STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

September 24, 2013

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103

RE: **EM-VER-033-130905** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 201 Main Street, Cromwell, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated September 4, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/CDM/jb

c: The Honorable Mertie Terry, First Selectman, Town of Cromwell
Frederic Curtin, Zoning Enforcement Officer, Town of Cromwell
Crown Castle

ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
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Also admitted in Massachusetts

September 4, 2013

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

Re: **Notice of Exempt Modification – Antenna Swap**
201 Main Street, Cromwell, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 105-foot level of the existing 125-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco's shared use of this tower in 2001. Cellco now intends to replace one (1) of its antennas with one (1) model BXA-70063-6CF LTE antenna at the same level on the tower. Included in Attachment 1 are specifications for the replacement antenna.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that 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 Mertie Terry, First Selectman for the Town of Cromwell. A copy of this letter is also being sent to S&S Partners, Inc., the owner of the property on which the tower is located.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antenna will be located at the 105-foot level on the 125-foot tower.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. Far Field Approximation tables for the RF emissions at each of Cellco's operating frequencies at the modified facility are included in Attachment 2. These tables indicate that Cellco's modified facility will operate well within the FCC standards.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation can support Cellco's proposed modifications. (*See* Structural Analysis Report included in Attachment 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Mertie Terry, Cromwell First Selectman
S&S Partners, Inc.
Sandy M. Carter

ATTACHMENT 1

Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

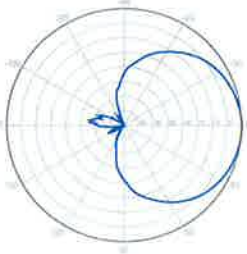
Replace "X" with desired electrical downtilt.

Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-18.3 dB	-18.2 dB
Front-to-back ratio (+/-30°)	-33.4 dB	-36.3 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1804 x 285 x 132 mm	71.0 x 11.2 x 5.2 in
Depth with z-brackets	172 mm	6.8 in
Weight without mounting brackets	7.9 kg	17 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.51 m² Side: 0.24 m²	Front: 5.5 ft² Side: 2.6 ft²
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf

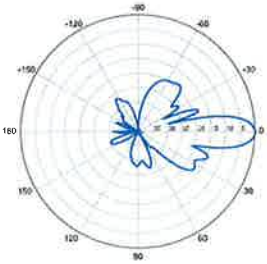
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



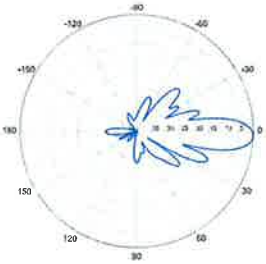
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

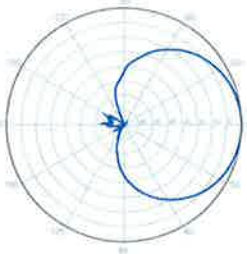


0° | Vertical | 750 MHz

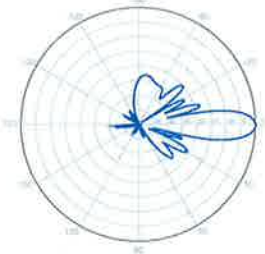
BXA-70063-6CF-EDIN-2



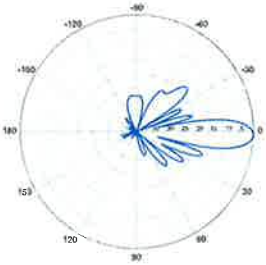
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



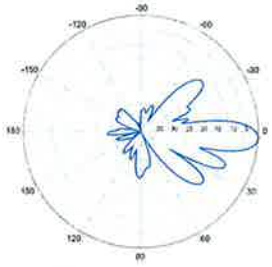
2° | Vertical | 850 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

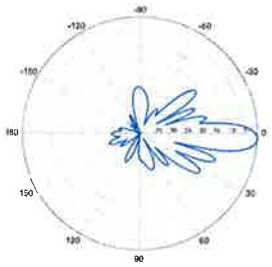
BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3

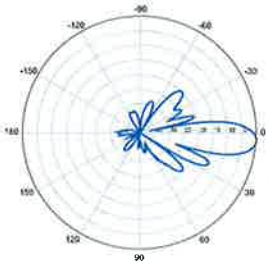


3° | Vertical | 750 MHz

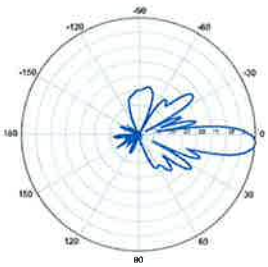


3° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-4

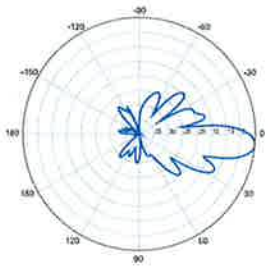


4° | Vertical | 750 MHz

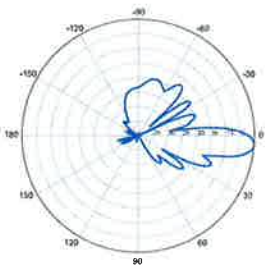


4° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-5

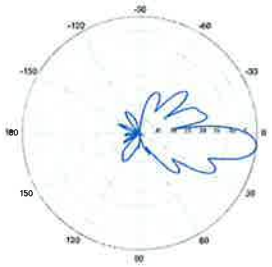


5° | Vertical | 750 MHz

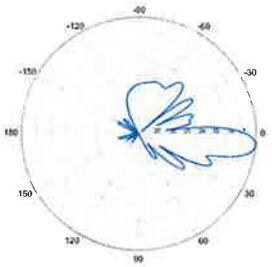


5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6

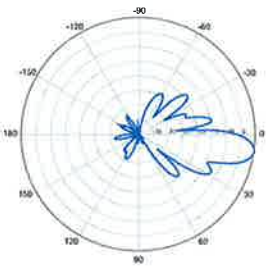


6° | Vertical | 750 MHz

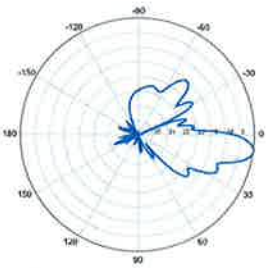


6° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-8

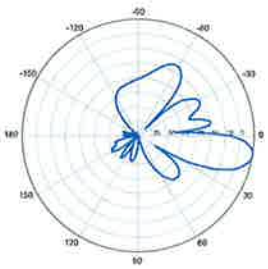


8° | Vertical | 750 MHz

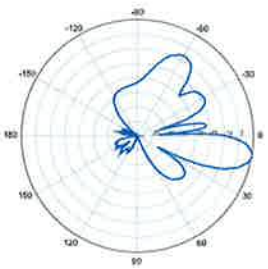


8° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-10



10° | Vertical | 750 MHz



10° | Vertical | 850 MHz

ATTACHMENT 2

Far Field Approximation
with downtilt variation

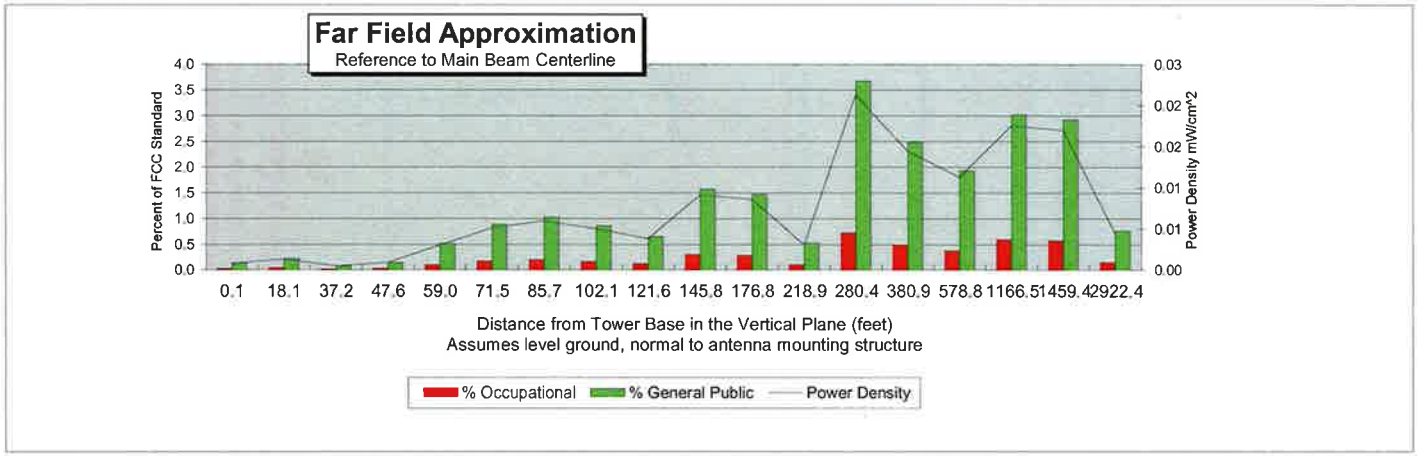
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	CROMWELL SE, CT
Site #:	2-0612
Date:	09/03/13
Name:	Mark Brauer
File Name:	Cromwell SE, CT - FF Power

Operating Freq. (MHz)	**869.0**
Antenna Height (ft):	**105.0**
Antenna Gain (dBi):	**16.7**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**3712.0**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	102.0	103.6	108.6	112.6	117.8	124.6	133.2	144.3	158.8	177.9	204.1	241.5	298.4	394.3	587.7	1170.9	1463.0	2924.2
Distance from Antenna Structure Base in Horizontal plane	0.1	18.1	37.2	47.6	59.0	71.5	85.7	102.1	121.6	145.8	176.8	218.9	280.4	380.9	578.8	1166.5	1459.4	2922.4
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.02	0.01	0.01	0.02	0.02	0.00
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1	0.3	0.3	0.1	0.7	0.5	0.4	0.6	0.6	0.2
Percent of General Population Standard	0.1	0.2	0.1	0.2	0.5	0.9	1.0	0.9	0.7	1.6	1.5	0.5	3.7	2.5	1.9	3.0	2.9	0.8

Antenna Type DB846F65ZAXY
Max% 3.68%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pc
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

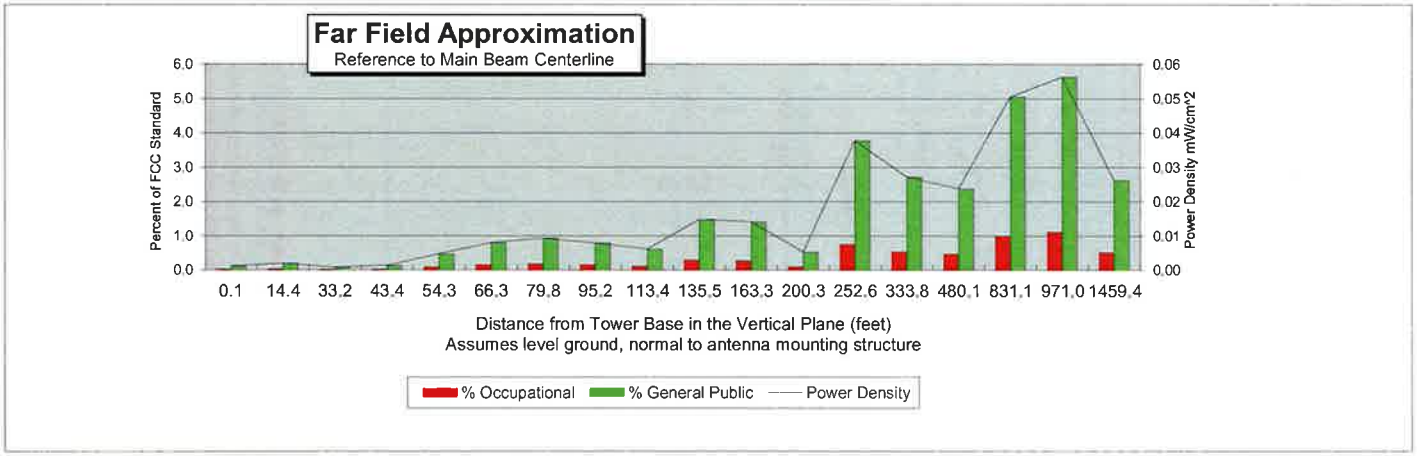
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	CROMWELL SE, CT
Site #:	2-0612
Date:	09/03/13
Name:	Mark Brauer
File Name:	Cromwell SE, CT - FF Power

Operating Freq. (MHz)	**1970.0**
Antenna Height (ft):	**105.0**
Antenna Gain (dBi):	**17.1**
Antenna Size (in.):	**48.0**
Downtilt (degrees):	**2.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**4994.0**



Calc Angle	90.0	82.0	72.0	67.0	62.0	57.0	52.0	47.0	42.0	37.0	32.0	27.0	22.0	17.0	12.0	7.0	6.0	4.0	
Solve for r, dx to antenna	102.0	103.0	107.3	110.8	115.6	121.7	129.5	139.5	152.5	169.6	192.6	224.8	272.4	349.0	490.8	837.4	976.3	1463.0	
Distance from Antenna Structure Base in Horizontal plane	0.1	14.4	33.2	43.4	54.3	66.3	79.8	95.2	113.4	135.5	163.3	200.3	252.6	333.8	480.1	831.1	971.0	1459.4	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.03	0.02	0.05	0.06	0.03	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1	0.3	0.3	0.1	0.8	0.5	0.5	1.0	1.1	0.5	
Percent of General Population Standard	0.1	0.2	0.1	0.1	0.5	0.8	0.9	0.8	0.6	1.5	1.4	0.5	3.8	2.7	2.4	5.1	5.6	2.6	

Antenna Type BXA-171063-8CF_2
Max% 5.63%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 P
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

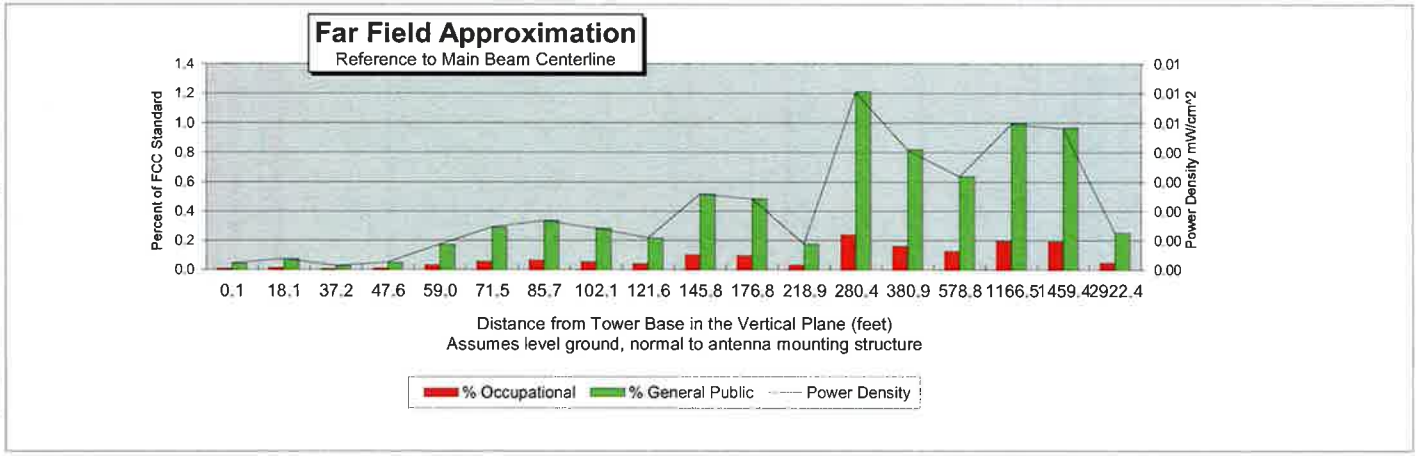
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	CROMWELL SE, CT
Site #:	2-0612
Date:	09/03/13
Name:	Mark Brauer
File Name:	Cromwell SE, CT - FF Power

Operating Freq. (MHz)	**746.0**
Antenna Height (ft):	**105.0**
Antenna Gain (dBi):	**16.7**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**1050.0**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	102.0	103.6	108.6	112.6	117.8	124.6	133.2	144.3	158.8	177.9	204.1	241.5	298.4	394.3	587.7	1170.9	1463.0	2924.2	
Distance from Antenna Structure Base in Horizontal plane	0.1	18.1	37.2	47.6	59.0	71.5	85.7	102.1	121.6	145.8	176.8	218.9	280.4	380.9	578.8	1166.5	1459.4	2922.4	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.2	0.2	0.1	0.2	0.2	0.1	
Percent of General Population Standard	0.0	0.1	0.0	0.0	0.2	0.3	0.3	0.3	0.2	0.5	0.5	0.2	1.2	0.8	0.6	1.0	1.0	0.3	

Antenna Type BXA-70063-6CF
Max% 1.21%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pc
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

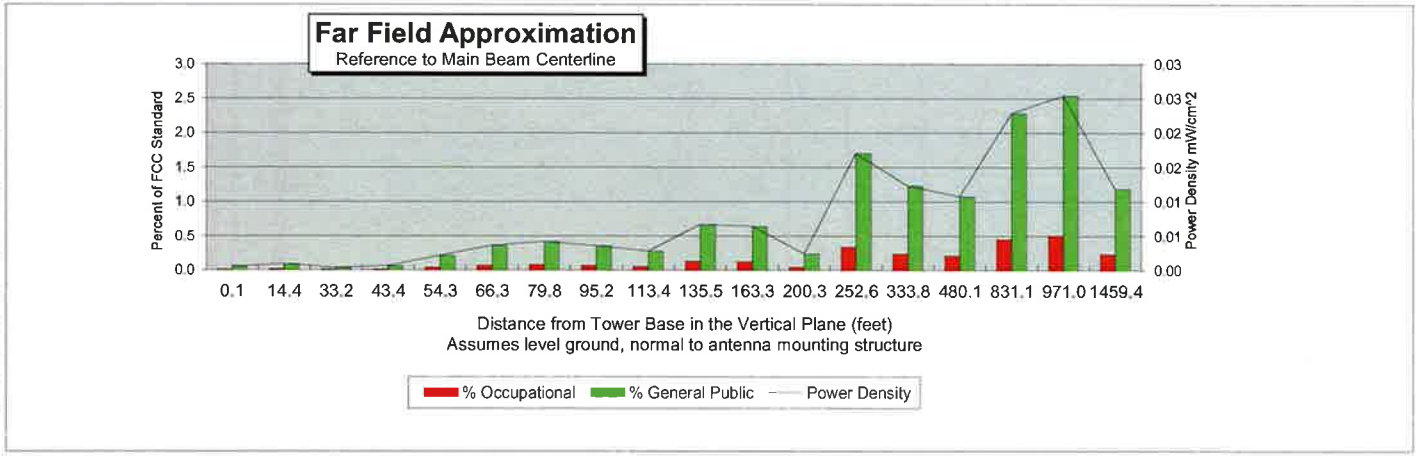
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	CROMWELL SE, CT
Site #:	2-0612
Date:	09/03/13
Name:	Mark Brauer
File Name:	Cromwell SE, CT - FF Power

Operating Freq. (MHz)	**2110.0**
Antenna Height (ft):	**105.0**
Antenna Gain (dBi):	**18.2**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**2.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**1750.0**



Calc Angle	90.0	82.0	72.0	67.0	62.0	57.0	52.0	47.0	42.0	37.0	32.0	27.0	22.0	17.0	12.0	7.0	6.0	4.0	
Solve for r, dx to antenna	102.0	103.0	107.3	110.8	115.6	121.7	129.5	139.5	152.5	169.6	192.6	224.8	272.4	349.0	490.8	837.4	976.3	1463.0	
Distance from Antenna Structure Base in Horizontal plane	0.1	14.4	33.2	43.4	54.3	66.3	79.8	95.2	113.4	135.5	163.3	200.3	252.6	333.8	480.1	831.1	971.0	1459.4	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.02	0.01	0.01	0.02	0.03	0.01	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.3	0.2	0.2	0.5	0.5	0.2	
Percent of General Population Standard	0.1	0.1	0.0	0.1	0.2	0.4	0.4	0.4	0.3	0.7	0.6	0.2	1.7	1.2	1.1	2.3	2.5	1.2	

Antenna Type BXA-171063-12CF_2
Max% 2.54%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pc
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

ATTACHMENT 3

July 23, 2013

John Bell
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6619

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	119617
	Carrier Site Name:	Cromwell SE CT
Crown Castle Designation:	**Crown Castle BU Number:**	876364
	Crown Castle Site Name:	CROMWELL / FIRST LINE EMERGENC
	Crown Castle JDE Job Number:	236042
	Crown Castle Work Order Number:	617641
	Crown Castle Application Number:	188495 Rev. 1
Engineering Firm Designation:	**B+T Group Project Number:**	84470.007.01
Site Data:	**201 Main St., CROMWELL, Middlesex County, CT** **Latitude *41° 35' 0.11"*, Longitude *-72° 38' 59.14"*** **125 Foot - Monopole Tower**	

Dear John Bell,

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 552069, in accordance with application 188495, 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:

LC4.7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2003 IBC; 2003 IRC (State Building Code, 2005 CT supplement) based upon a wind speed of 85 mph fastest mile.

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

We at *B+T Group* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:
B+T Engineering, Inc.

STATE OF CONNECTICUT ★ CHAD TUTTLE ★ No. 23924 LICENSED PROFESSIONAL ENGINEER 7/23/13

Jennifer Barnat
Project Engineer

Chad E. Tuttle, P.E.
President

tnxTower Report - version 6.0.4.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 125 ft. Monopole tower designed by Engineered Endeavors, Inc. in February of 2002. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/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 0.75 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
105.0	105.0	1	Antel	BXA-70063-6CF-EDIN-0	--	--	--

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
125.0	129.0	3	Argus	LLPX310R-V1	3	1/4	1
		3	Samsung	WIMAX DAP HEAD	3	5/16	
	127.0	6	Decibel	DB980H90A-M	2 6	1/2 1 5/8	
		3	RFS Celwave	APXVSPP18-C-A20	3	1 1/4	2
	125.0	1	Tower Mounts	Platform Mount [LP 712-1]	--	--	1
124.0	124.0	1	Andrew	VHLP2-11			
		1	Andrew	VHLP2-18			
123.0	123.0	3	Alcatel Lucent	800MHZ 2X50W RRH W/FILTER	--	--	2
		3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz			
		1	Tower Mounts	Side Arm Mount [SO 102-3]			
115.0	117.0	6	Communication Components Inc.	DTMABP7819VG12A	12 2 1	1 1/4 3/4 3/8	1
		3	Ericsson	RRUS-11			
		9	KMW Communications	AM-X-CD-16-65-00T-RET			
		1	Raycap	DC6-48-60-18-8F			
	115.0	1	Tower Mounts	Sector Mount [SM 308-3]			
105.0	105.0	**1**	**Swedcom**	**SLCP 2x6014**	**--**	**--**	**3**
		6	Andrew	DB846F65ZAXY	12	1 5/8	1
		3	Antel	BXA-171063-8BF-EDIN-2			
		2	Antel	BXA-70063-6CF-EDIN-0			
		6	RFS Celwave	FD9R6004/2C-3L			
		1	Tower Mounts	Platform Mount [LP 712-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
95.0	95.0	12	Decibel	DB844H65E-XY	12	1 5/8	1
		1	Tower Mounts	Platform Mount [LP 303-1]			
85.0	85.0	3	Kathrein	742 213	6	1 5/8	1
		1	Tower Mounts	Pipe Mount [PM 601-3]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) **Equipment To Be Removed**

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)
125	125	1	--	L.P.Platform	--	--
		6	Decibel	DB980H65		
		3	Decibel	DB980H90		
115	115	1	--	T-Arm	--	--
		6	Allgon	7250		
105	105	1		L.P.Platform	--	--
		12	Decibel	DB844		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Location Revision#1	188495	CCI Sites
Tower Manufacturer Drawings	EEI Job No.10554	2068958	CCI Sites
Tower Modification Drawings	Semaan Engineering Solutions	2055765	CCI Sites
Post-Modification Inspection	VSI Job No. 2008-004-036	2182292	CCI Sites
Tower Modification Drawing	B+T Group, Project N0:84890.001	Date:7/11/2012	CCI Sites
Tower Modification Drawing	B+T Group, Project N0:84470.006.01	3669962	CCI Sites
Foundation Drawings	EEI Project No.6464	1613909	CCI Sites
Base Plate Details	Crown Project # 320820	2608627	CCI Sites
Geotechnical Reports	Dr. Clarence Welti, P.E.	1532312	CCI Sites
Antenna Configuration	Crown CAD Package	Date:06/04/2013	CCI Sites

3.1) Analysis Method

TnxTower (version 6.0.4.0), 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.
5) 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)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	125 - 94	Pole	TP25.164x18.5x0.188	1	-7.717	772.739	97.0	Pass
L2	94 - 85.04	Pole	TP27.09x25.164x0.439	2	-8.576	1445.985	63.9	Pass
L3	85.04 - 78.5833	Pole	TP28.078x25.873x0.485	3	-11.183	1712.198	75.5	Pass
L4	78.5833 - 73	Pole	TP29.264x28.078x0.609	4	-12.488	2235.441	66.2	Pass
L5	73 - 60.5	Pole	TP31.921x29.264x0.367	5	-14.892	1908.243	97.5	Pass
L6	60.5 - 40.457	Pole	TP36.18x31.921x0.436	6	-18.240	2492.137	90.9	Pass
L7	40.457 - 30.5	Pole	TP37.787x34.6x0.485	7	-22.823	2983.507	89.1	Pass
L8	30.5 - 0	Pole	TP44.25x37.787x0.456	8	-30.903	3297.309	99.1	Pass
							Summary	
						Pole (L8)	99.1	Pass
						Rating =	99.1	Pass

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

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	92.8	Pass
1	Base Plate	Base	91.3	Pass
1	Base Foundation	Base	90.0	Pass

Structure Rating (max from all components) =	99.1%

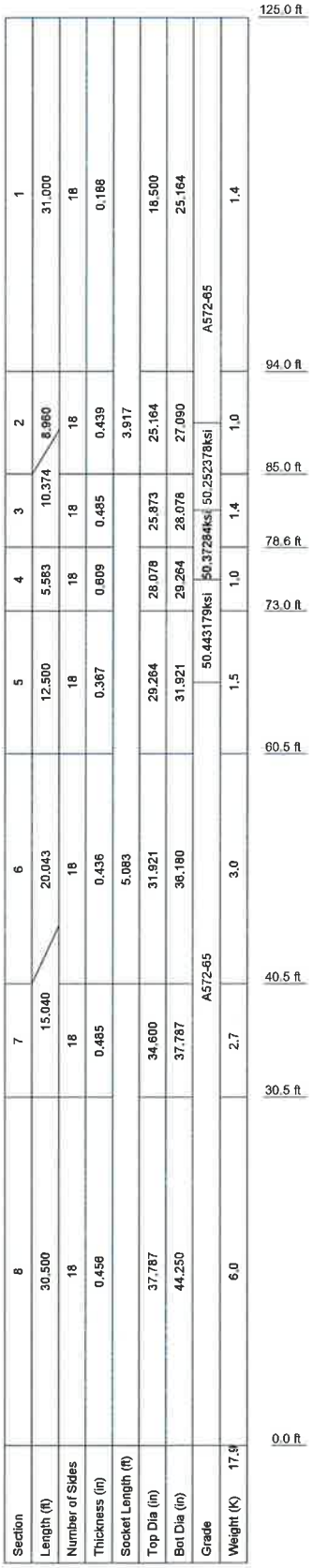
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

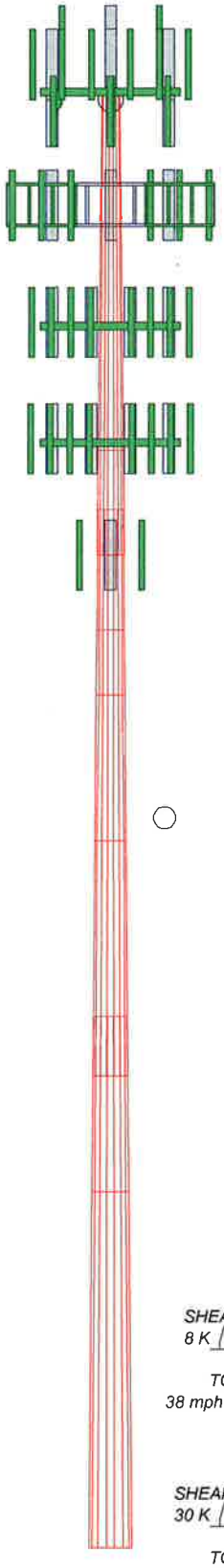
The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time. For the determined structural capacity to be effective the modifications proposed in document 3373019 (B+T mod drawings, Dated 07/11/2013) shall be installed prior to any loading changes.

APPENDIX A

TNXTOWER OUTPUT



Section	8	7	6	5	4	3	2	1
Length (ft)	30.500	15.040	20.043	12.500	5.583	10.374	8.960	31.000
Number of Sides	18	18	18	18	18	18	18	18
Thickness (in)	0.456	0.485	0.436	0.367	0.609	0.485	0.439	0.188
Socket Length (ft)			5.083				3.917	
Top Dia (in)	37.787	34.600	31.921	29.264	28.078	25.873	25.164	18.500
Bot Dia (in)	44.250	37.787	38.180	31.921	29.264	28.078	27.090	25.164
Grade	A572-65				50.443179ksi	50.37284ksi	50.252378ksi	A572-65
Weight (K)	17.9	6.0	2.7	3.0	1.5	1.0	1.4	1.0



DESIGNED APPURTENANCE LOADING

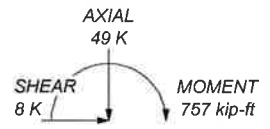
TYPE	ELEVATION	TYPE	ELEVATION
LLPX310R-V1 w/ Mount Pipe (E)	125	(2) DTMABP7819VG12A (E)	115
LLPX310R-V1 w/ Mount Pipe (E)	125	(2) DTMABP7819VG12A (E)	115
LLPX310R-V1 w/ Mount Pipe (E)	125	(2) DTMABP7819VG12A (E)	115
WIMAX DAP HEAD (E)	125	DC6-48-60-18-8F (E)	115
WIMAX DAP HEAD (E)	125	Sector Mount [SM 308-3] (E)	115
WIMAX DAP HEAD (E)	125	(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	115
6' x 2" Mount Pipe (E)	125		
6' x 2" Mount Pipe (E)	125	(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	115
6' x 2" Mount Pipe (E)	125		
(2) DB980H90A-M w/ Mount Pipe (E-I)	125	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	105
(2) DB980H90A-M w/ Mount Pipe (E-I)	125	(2) DB846F65ZAXY w/ Mount Pipe (E)	105
(2) DB980H90A-M w/ Mount Pipe (E-I)	125	(2) DB846F65ZAXY w/ Mount Pipe (E)	105
APXVSPP18-C-A20 w/ Mount Pipe (R)	125	(2) DB846F65ZAXY w/ Mount Pipe (E)	105
APXVSPP18-C-A20 w/ Mount Pipe (R)	125	BXA-171063-8BF-EDIN-2 w/ Mount Pipe (E)	105
APXVSPP18-C-A20 w/ Mount Pipe (R)	125	BXA-171063-8BF-EDIN-2 w/ Mount Pipe (E)	105
Platform Mount [LP 712-1] (E)	125	BXA-171063-8BF-EDIN-2 w/ Mount Pipe (E)	105
VHLP2-11 (E)	124	(2) FD9R6004/2C-3L (E)	105
VHLP2-18 (E)	124	(2) FD9R6004/2C-3L (E)	105
800MHZ 2X50W RRH W/FILTER w / Mount Pipe (R)	123	(2) FD9R6004/2C-3L (E)	105
PCS 1900MHz 4x45W-65MHz w / Mount Pipe (R)	123	Platform Mount [LP 712-1] (E)	105
PCS 1900MHz 4x45W-65MHz w / Mount Pipe (R)	123	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (P)	105
PCS 1900MHz 4x45W-65MHz w / Mount Pipe (R)	123	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	105
Side Arm Mount [SO 102-3] (R)	123	(4) DB844H65E-XY w/ Mount Pipe (E)	95
800MHZ 2X50W RRH W/FILTER w / Mount Pipe (R)	123	Platform Mount [LP 303-1] (E)	95
800MHZ 2X50W RRH W/FILTER w / Mount Pipe (R)	123	(4) DB844H65E-XY w/ Mount Pipe (E)	95
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	115	(4) DB844H65E-XY w/ Mount Pipe (E)	95
RRUS-11 (E)	115	742 213 (E)	85
RRUS-11 (E)	115	Pipe Mount [PM 601-3] (E)	85
RRUS-11 (E)	115	742 213 (E)	85
		742 213 (E)	85

MATERIAL STRENGTH

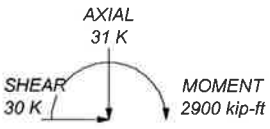
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	50.37284ksi	50 ksi	65 ksi
50.252378ksi	50 ksi	65 ksi	50.443179ksi	50 ksi	65 ksi

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99.1%



TORQUE 1 kip-ft
38 mph WIND - 0.750 in ICE



TORQUE 2 kip-ft
REACTIONS - 85 mph WIND

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

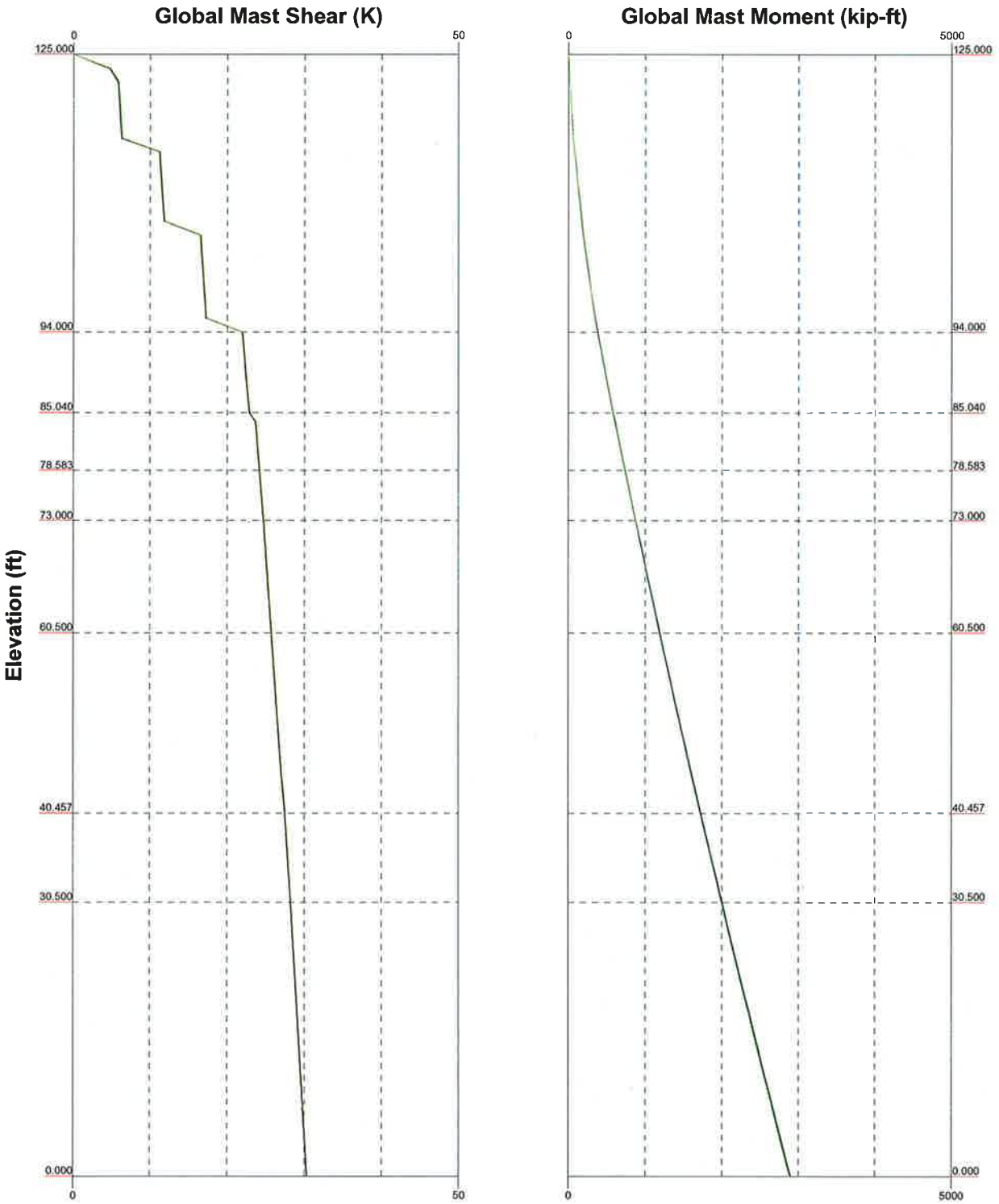
Job: 84470.007.01 - Cromwell, CT (BU# 876364			
Project:			
Client: Crown Castle	Drawn by: JBarnat	App'd:	
Code: TIA/EIA-222-F	Date: 07/22/13	Scale: NTS	
Path:		Dwg No. E-1	

TIA/EIA-222-F - 85 mph/38 mph 0.750 in Ice

Vx Vz

Maximum Values

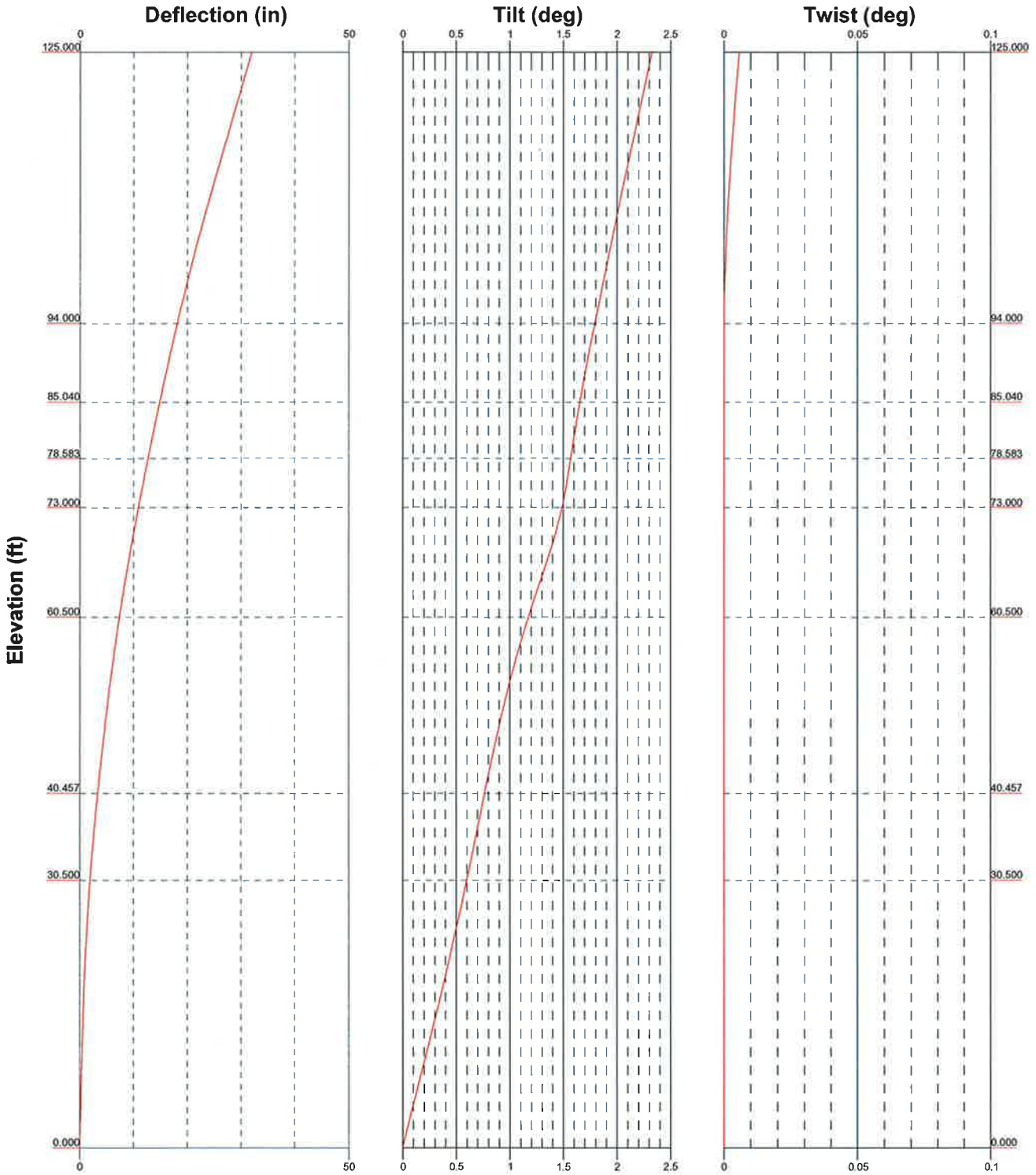
Mx Mz



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

Job: 84470.007.01 - Cromwell, CT (BU# 876364			
Project:			
Client: Crown Castle	Drawn by: JBarnat	App'd:	
Code: TIA/EIA-222-F	Date: 07/22/13	Scale: NTS	
Path:		Dwg No. E-4	

TIA/EIA-222-F - Service - 50 mph **Maximum Values**



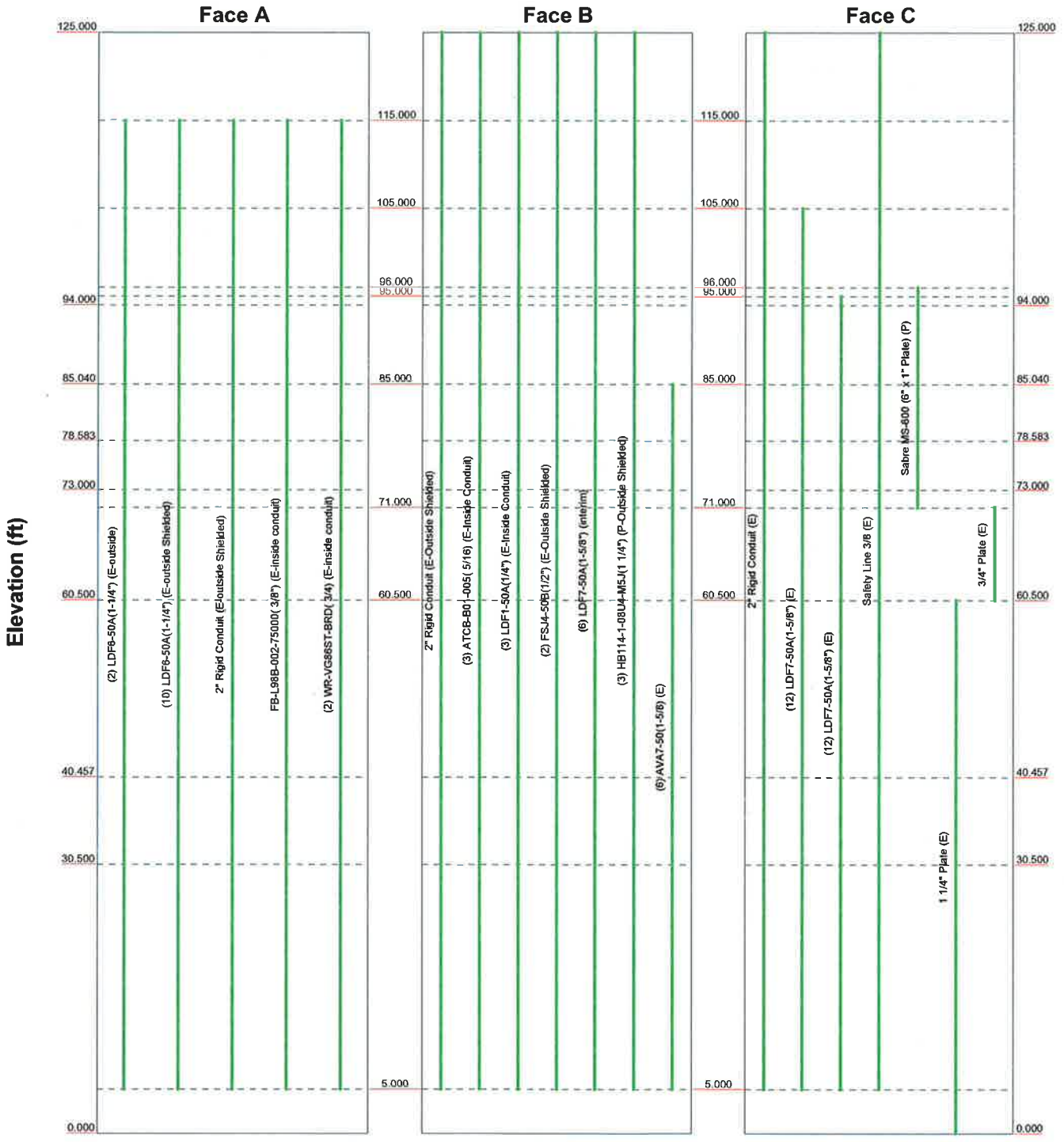
B+T GRP

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

Job: *84470.007.01 - Cromwell, CT (BU# 876364*			
Project:			
Client: Crown Castle	Drawn by: JBarnat	App'd:	
Code: TIA/EIA-222-F	Date: 07/22/13	Scale: NTS	
Path:		Dwg No. E-5	

Feedline Distribution Chart
0' - 125'

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



B+T GRP

B+T Group
1717 South Boulder Ave, Suite 300
Tulsa, OK - 74119
Phone: (918) 587-4630
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Job:	***84470.007.01 - Cromwell, CT (BU# 876364***		
Project:			
Client: Crown Castle		Drawn by: JBarnat	App'd:
Code: TIA/EIA-222-F		Date: 07/22/13	Scale: NTS
Path:			Dwg No. E-7

Tower Input Data

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

Tower is located in Middlesex County, Connecticut.
Basic wind speed of 85 mph.
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 38 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 50 mph.
TOWER RATING: 99.1%.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline 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		Poles
	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				

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	125.000-94.000	31.000	0.000	18	18.500	25.164	0.188	0.750	A572-65 (65 ksi)
L2	94.000-85.040	8.960	3.917	18	25.164	27.090	0.439	1.757	50.252378ksi (50 ksi)
L3	85.040-78.583	10.374	0.000	18	25.873	28.078	0.485	1.941	50.37284ksi (50 ksi)
L4	78.583-73.000	5.583	0.000	18	28.078	29.264	0.609	2.437	50.443179ksi (50 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
L5	73.000-60.500	12.500	0.000	18	29.264	31.921	0.367	1.466	A572-65 (65 ksi)
L6	60.500-40.457	20.043	5.083	18	31.921	36.180	0.436	1.743	A572-65 (65 ksi)
L7	40.457-30.500	15.040	0.000	18	34.600	37.787	0.485	1.939	A572-65 (65 ksi)
L8	30.500-0.000	30.500		18	37.787	44.250	0.456	1.825	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	18.785	10.898	461.730	6.501	9.398	49.131	924.069	5.450	2.926	15.605
	25.552	14.864	1171.483	8.867	12.783	91.642	2344.507	7.433	4.099	21.861
L2	25.552	34.466	2661.891	8.777	12.783	208.232	5327.284	17.236	3.656	8.324
	27.508	37.151	3333.705	9.461	13.762	242.245	6671.796	18.579	3.995	9.096
L3	27.117	39.103	3184.168	9.013	13.143	242.262	6372.526	19.555	3.700	7.624
	28.511	42.499	4087.788	9.795	14.263	286.593	8180.956	21.253	4.088	8.423
L4	28.511	53.115	5063.098	9.751	14.263	354.971	10132.858	26.562	3.869	6.351
	29.716	55.409	5747.975	10.172	14.866	386.648	11503.512	27.710	4.078	6.694
L5	29.716	33.616	3546.548	10.259	14.866	238.565	7097.762	16.811	4.505	12.293
	32.413	36.706	4617.275	11.202	16.216	284.742	9240.626	18.357	4.973	13.569
L6	32.413	43.541	5453.050	11.177	16.216	336.283	10913.275	21.775	4.851	11.134
	36.738	49.432	7979.124	12.689	18.379	434.133	15968.747	24.720	5.601	12.855
L7	36.227	52.486	7717.450	12.111	17.577	439.073	15445.054	26.248	5.236	10.803
	38.370	57.389	10088.726	13.242	19.196	525.572	20190.728	28.700	5.797	11.96
L8	38.370	54.065	9518.850	13.252	19.196	495.884	19050.225	27.038	5.847	12.815
	44.933	63.426	15368.309	15.547	22.479	683.674	30756.839	31.719	6.985	15.308

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
L1 125.000-94.000				1	1	1		
L2 94.000-85.040				1	1	0.93228		
L3 85.040-78.583				1	1	0.943859		
L4 78.583-73.000				1	1	0.93408		
L5 73.000-60.500				1	1	0.976519		
L6 60.500-40.457				1	1	0.959022		
L7 40.457-30.500				1	1	0.966927		
L8 30.500-0.000				1	1	0.9761		

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" Rigid Conduit (E)	C	No	CaAa (Out Of Face)	125.000 - 5.000	1	No Ice	0.200	0.003
						1/2" Ice	0.300	0.004
						1" Ice	0.400	0.006
						2" Ice	0.600	0.013
						4" Ice	1.000	0.032
2" Rigid Conduit (E-Outside Shielded)	B	No	CaAa (Out Of Face)	125.000 - 5.000	1	No Ice	0.000	0.003
						1/2" Ice	0.000	0.004
						1" Ice	0.000	0.006
						2" Ice	0.000	0.013
						4" Ice	0.000	0.032
ATCB-B01-005(5/16) (E-Inside Conduit)	B	No	CaAa (Out Of Face)	125.000 - 5.000	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
LDF1-50A(1/4") (E-Inside Conduit)	B	No	CaAa (Out Of Face)	125.000 - 5.000	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
FSJ4-50B(1/2") (E-Outside Shielded)	B	No	CaAa (Out Of Face)	125.000 - 5.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
//**								
LDF7-50A(1-5/8") (interim)	B	No	Inside Pole	125.000 - 5.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
HB114-1-08U4-M5J(1 1/4") (P-Outside Shielded)	B	No	CaAa (Out Of Face)	125.000 - 5.000	3	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
/								
LDF6-50A(1-1/4") (E-outside)	A	No	CaAa (Out Of Face)	115.000 - 5.000	2	No Ice	0.155	0.001
						1/2" Ice	0.255	0.002
						1" Ice	0.355	0.004
						2" Ice	0.555	0.009
						4" Ice	0.955	0.028
LDF6-50A(1-1/4") (E-outside Shielded)	A	No	CaAa (Out Of Face)	115.000 - 5.000	10	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.009
						4" Ice	0.000	0.028
2" Rigid Conduit	A	No	CaAa (Out Of	115.000 - 5.000	1	No Ice	0.000	0.003

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
(E-outside Shielded)			Face)			1/2" Ice	0.000	0.004
						1" Ice	0.000	0.006
						2" Ice	0.000	0.013
						4" Ice	0.000	0.032
FB-L98B-002-75000(3/8")	A	No	CaAa (Out Of Face)	115.000 - 5.000	1	No Ice	0.000	0.000
(E-inside conduit)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
WR-VG86ST-BRD(3/4)	A	No	CaAa (Out Of Face)	115.000 - 5.000	2	No Ice	0.000	0.001
(E-inside conduit)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.003
						2" Ice	0.000	0.007
						4" Ice	0.000	0.024
/								
LDF7-50A(1-5/8")	C	No	Inside Pole	105.000 - 5.000	12	No Ice	0.000	0.001
(E)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
/								
LDF7-50A(1-5/8")	C	No	Inside Pole	95.000 - 5.000	12	No Ice	0.000	0.001
(E)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
/								
AVA7-50(1-5/8)	B	No	Inside Pole	85.000 - 5.000	6	No Ice	0.000	0.001
(E)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
/								
Safety Line 3/8	C	No	CaAa (Out Of Face)	125.000 - 5.000	1	No Ice	0.037	0.000
(E)						1/2" Ice	0.137	0.001
						1" Ice	0.238	0.001
						2" Ice	0.437	0.002
						4" Ice	0.838	0.004
/								
Sabre MS-600 (6" x 1" Plate)	C	No	CaAa (Out Of Face)	96.000 - 71.000	1	No Ice	0.167	0.000
(P)						1/2" Ice	0.250	0.000
						1" Ice	0.333	0.000
						2" Ice	0.500	0.000
						4" Ice	0.833	0.000
/								
1 1/4" Plate	C	No	CaAa (Out Of Face)	60.500 - 0.000	1	No Ice	0.208	0.000
(E)						1/2" Ice	0.292	0.000
						1" Ice	0.375	0.000
						2" Ice	0.542	0.000
						4" Ice	0.875	0.000
3/4" Plate	C	No	CaAa (Out Of Face)	71.000 - 60.500	1	No Ice	0.125	0.000
(E)						1/2" Ice	0.208	0.000
						1" Ice	0.292	0.000
						2" Ice	0.458	0.000
						4" Ice	0.792	0.000
**								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	125.000-94.000	A	0.000	0.000	0.000	6.510	0.251
		B	0.000	0.000	0.000	0.000	0.361
		C	0.000	0.000	0.000	7.696	0.212
L2	94.000-85.040	A	0.000	0.000	0.000	2.778	0.107
		B	0.000	0.000	0.000	0.000	0.104
		C	0.000	0.000	0.000	3.621	0.203
L3	85.040-78.583	A	0.000	0.000	0.000	2.002	0.077
		B	0.000	0.000	0.000	0.000	0.102
		C	0.000	0.000	0.000	2.610	0.147
L4	78.583-73.000	A	0.000	0.000	0.000	1.731	0.067
		B	0.000	0.000	0.000	0.000	0.088
		C	0.000	0.000	0.000	2.257	0.127
L5	73.000-60.500	A	0.000	0.000	0.000	3.875	0.149
		B	0.000	0.000	0.000	0.000	0.198
		C	0.000	0.000	0.000	4.615	0.284
L6	60.500-40.457	A	0.000	0.000	0.000	6.213	0.240
		B	0.000	0.000	0.000	0.000	0.318
		C	0.000	0.000	0.000	8.936	0.455
L7	40.457-30.500	A	0.000	0.000	0.000	3.087	0.119
		B	0.000	0.000	0.000	0.000	0.158
		C	0.000	0.000	0.000	4.439	0.226
L8	30.500-0.000	A	0.000	0.000	0.000	7.905	0.305
		B	0.000	0.000	0.000	0.000	0.404
		C	0.000	0.000	0.000	12.410	0.579

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	125.000-94.000	A	0.866	0.000	0.000	0.000	13.780	1.079
		B		0.000	0.000	0.000	0.000	0.798
		C		0.000	0.000	0.000	18.717	0.336
L2	94.000-85.040	A	0.845	0.000	0.000	0.000	5.807	0.450
		B		0.000	0.000	0.000	0.000	0.226
		C		0.000	0.000	0.000	7.913	0.238
L3	85.040-78.583	A	0.836	0.000	0.000	0.000	4.185	0.324
		B		0.000	0.000	0.000	0.000	0.190
		C		0.000	0.000	0.000	5.703	0.172
L4	78.583-73.000	A	0.829	0.000	0.000	0.000	3.582	0.275
		B		0.000	0.000	0.000	0.000	0.162
		C		0.000	0.000	0.000	4.878	0.148
L5	73.000-60.500	A	0.816	0.000	0.000	0.000	7.955	0.607
		B		0.000	0.000	0.000	0.000	0.360
		C		0.000	0.000	0.000	10.395	0.331
L6	60.500-40.457	A	0.789	0.000	0.000	0.000	12.538	0.943
		B		0.000	0.000	0.000	0.000	0.565
		C		0.000	0.000	0.000	17.895	0.527
L7	40.457-30.500	A	0.756	0.000	0.000	0.000	6.229	0.468
		B		0.000	0.000	0.000	0.000	0.281
		C		0.000	0.000	0.000	8.890	0.262
L8	30.500-0.000	A	0.750	0.000	0.000	0.000	15.555	1.143
		B		0.000	0.000	0.000	0.000	0.697
		C		0.000	0.000	0.000	23.873	0.665

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	125.000-94.000	-0.259	-0.114	-0.476	-0.148
L2	94.000-85.040	-0.395	-0.122	-0.649	-0.175
L3	85.040-78.583	-0.400	-0.123	-0.662	-0.179
L4	78.583-73.000	-0.404	-0.125	-0.671	-0.181
L5	73.000-60.500	-0.378	-0.149	-0.663	-0.203
L6	60.500-40.457	-0.457	-0.103	-0.733	-0.170
L7	40.457-30.500	-0.464	-0.105	-0.754	-0.175
L8	30.500-0.000	-0.440	-0.067	-0.713	-0.122

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
LLPX310R-V1 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 4.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.065 5.480 5.905 6.788 8.704	2.983 3.526 4.086 5.313 8.131	0.045 0.081 0.125 0.232 0.544
LLPX310R-V1 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 4.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.065 5.480 5.905 6.788 8.704	2.983 3.526 4.086 5.313 8.131	0.045 0.081 0.125 0.232 0.544
LLPX310R-V1 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 4.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.065 5.480 5.905 6.788 8.704	2.983 3.526 4.086 5.313 8.131	0.045 0.081 0.125 0.232 0.544
WIMAX DAP HEAD (E)	A	From Leg	4.000 0.000 4.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.201
WIMAX DAP HEAD (E)	B	From Leg	4.000 0.000 4.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.201
WIMAX DAP HEAD (E)	C	From Leg	4.000 0.000 4.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.201
6' x 2" Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090

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
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	125.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	125.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
//**									
(2) DB980H90A-M w/ Mount Pipe	A	From Leg	4.000	0.000	125.000	No Ice	4.036	3.619	0.030
(E-I)			0.000			1/2" Ice	4.499	4.481	0.064
			2.000			1" Ice	4.947	5.219	0.107
						2" Ice	5.870	6.744	0.216
						4" Ice	8.046	9.995	0.549
(2) DB980H90A-M w/ Mount Pipe	B	From Leg	4.000	0.000	125.000	No Ice	4.036	3.619	0.030
(E-I)			0.000			1/2" Ice	4.499	4.481	0.064
			2.000			1" Ice	4.947	5.219	0.107
						2" Ice	5.870	6.744	0.216
						4" Ice	8.046	9.995	0.549
(2) DB980H90A-M w/ Mount Pipe	C	From Leg	4.000	0.000	125.000	No Ice	4.036	3.619	0.030
(E-I)			0.000			1/2" Ice	4.499	4.481	0.064
			2.000			1" Ice	4.947	5.219	0.107
						2" Ice	5.870	6.744	0.216
						4" Ice	8.046	9.995	0.549
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000	0.000	125.000	No Ice	8.498	6.946	0.083
(R)			0.000			1/2" Ice	9.149	8.127	0.148
			2.000			1" Ice	9.767	9.021	0.225
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000	0.000	125.000	No Ice	8.498	6.946	0.083
(R)			0.000			1/2" Ice	9.149	8.127	0.148
			2.000			1" Ice	9.767	9.021	0.225
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000	0.000	125.000	No Ice	8.498	6.946	0.083
(R)			0.000			1/2" Ice	9.149	8.127	0.148
			2.000			1" Ice	9.767	9.021	0.225
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
Platform Mount [LP 712-1]	C	None		0.000	125.000	No Ice	24.530	24.530	1.335
(E)						1/2" Ice	29.940	29.940	1.646
						1" Ice	35.350	35.350	1.956
						2" Ice	46.170	46.170	2.577
						4" Ice	67.810	67.810	3.820
/									
800MHZ 2X50W RRH W/FILTER w / Mount Pipe	A	From Leg	2.000	0.000	123.000	No Ice	2.586	2.731	0.073
(R)			0.000			1/2" Ice	2.861	3.102	0.101
			0.000			1" Ice	3.149	3.490	0.135
						2" Ice	3.780	4.371	0.216
						4" Ice	5.207	6.396	0.453
800MHZ 2X50W RRH W/FILTER w / Mount Pipe	B	From Leg	2.000	0.000	123.000	No Ice	2.586	2.731	0.073
(R)			0.000			1/2" Ice	2.861	3.102	0.101
			0.000			1" Ice	3.149	3.490	0.135
						2" Ice	3.780	4.371	0.216

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
						4" Ice	5.207	6.396	0.453
800MHZ 2X50W RRH W/FILTER w / Mount Pipe (R)	C	From Leg	2.000 0.000 0.000	0.000	123.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.586 2.861 3.149 3.780 5.207	2.731 3.102 3.490 4.371 6.396	0.073 0.101 0.135 0.216 0.453
PCS 1900MHz 4x45W-65MHz w / Mount Pipe (R)	A	From Leg	2.000 0.000 0.000	0.000	123.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.905 3.206 3.519 4.187 5.703	3.218 3.647 4.094 5.064 7.343	0.071 0.101 0.138 0.225 0.480
PCS 1900MHz 4x45W-65MHz w / Mount Pipe (R)	B	From Leg	2.000 0.000 0.000	0.000	123.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.905 3.206 3.519 4.187 5.703	3.218 3.647 4.094 5.064 7.343	0.071 0.101 0.138 0.225 0.480
PCS 1900MHz 4x45W-65MHz w / Mount Pipe (R)	C	From Leg	2.000 0.000 0.000	0.000	123.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.905 3.206 3.519 4.187 5.703	3.218 3.647 4.094 5.064 7.343	0.071 0.101 0.138 0.225 0.480
Side Arm Mount [SO 102-3) (R)	C	None		0.000	123.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.000 3.480 3.960 4.920 6.840	3.000 3.480 3.960 4.920 6.840	0.081 0.111 0.141 0.201 0.321
/									
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	A	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.074 0.136 0.210 0.385 0.874
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	B	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.074 0.136 0.210 0.385 0.874
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	C	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.074 0.136 0.210 0.385 0.874
RRUS-11 (E)	A	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
RRUS-11 (E)	B	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
RRUS-11 (E)	C	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310

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
(2) DTMABP7819VG12A	A	From Leg	4.000	0.000	115.000	No Ice	1.139	0.391	0.019
(E)			0.000			1/2" Ice	1.284	0.488	0.026
			2.000			1" Ice	1.437	0.595	0.036
						2" Ice	1.769	0.833	0.060
						4" Ice	2.538	1.414	0.140
(2) DTMABP7819VG12A	B	From Leg	4.000	0.000	115.000	No Ice	1.139	0.391	0.019
(E)			0.000			1/2" Ice	1.284	0.488	0.026
			2.000			1" Ice	1.437	0.595	0.036
						2" Ice	1.769	0.833	0.060
						4" Ice	2.538	1.414	0.140
(2) DTMABP7819VG12A	C	From Leg	4.000	0.000	115.000	No Ice	1.139	0.391	0.019
(E)			0.000			1/2" Ice	1.284	0.488	0.026
			2.000			1" Ice	1.437	0.595	0.036
						2" Ice	1.769	0.833	0.060
						4" Ice	2.538	1.414	0.140
DC6-48-60-18-8F	A	From Leg	4.000	0.000	115.000	No Ice	2.567	4.317	0.019
(E)			0.000			1/2" Ice	2.798	4.596	0.050
			2.000			1" Ice	3.038	4.885	0.085
						2" Ice	3.543	5.488	0.167
						4" Ice	4.658	6.797	0.383
Sector Mount [SM 308-3]	C	None		0.000	115.000	No Ice	22.340	22.340	0.381
(E)						1/2" Ice	31.700	31.700	0.832
						1" Ice	41.060	41.060	1.284
						2" Ice	59.780	59.780	2.187
						4" Ice	97.220	97.220	3.992
/									
BXA-70063-6CF-EDIN-0 w/	C	From Leg	4.000	0.000	105.000	No Ice	7.969	5.801	0.042
Mount Pipe			0.000			1/2" Ice	8.609	6.953	0.100
(P)			0.000			1" Ice	9.216	7.819	0.170
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.803
BXA-70063-6CF-EDIN-0 w/	B	From Leg	4.000	0.000	105.000	No Ice	7.969	5.801	0.042
Mount Pipe			0.000			1/2" Ice	8.609	6.953	0.100
(E)			0.000			1" Ice	9.216	7.819	0.170
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.803
BXA-70063-6CF-EDIN-0 w/	A	From Leg	4.000	0.000	105.000	No Ice	7.969	5.801	0.042
Mount Pipe			0.000			1/2" Ice	8.609	6.953	0.100
(E)			0.000			1" Ice	9.216	7.819	0.170
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.803
(2) DB846F65ZAXY w/	A	From Leg	4.000	0.000	105.000	No Ice	7.271	7.821	0.047
Mount Pipe			0.000			1/2" Ice	7.877	9.010	0.111
(E)			0.000			1" Ice	8.484	9.912	0.188
						2" Ice	9.724	11.812	0.367
						4" Ice	12.325	15.978	0.867
(2) DB846F65ZAXY w/	B	From Leg	4.000	0.000	105.000	No Ice	7.271	7.821	0.047
Mount Pipe			0.000			1/2" Ice	7.877	9.010	0.111
(E)			0.000			1" Ice	8.484	9.912	0.188
						2" Ice	9.724	11.812	0.367
						4" Ice	12.325	15.978	0.867
(2) DB846F65ZAXY w/	C	From Leg	4.000	0.000	105.000	No Ice	7.271	7.821	0.047
Mount Pipe			0.000			1/2" Ice	7.877	9.010	0.111
(E)			0.000			1" Ice	8.484	9.912	0.188
						2" Ice	9.724	11.812	0.367
						4" Ice	12.325	15.978	0.867
BXA-171063-8BF-EDIN-2	A	From Leg	4.000	0.000	105.000	No Ice	3.179	3.353	0.029

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
w/ Mount Pipe			0.000			1/2" Ice	3.555	3.971	0.059
(E)			0.000			1" Ice	3.964	4.595	0.098
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.487
BXA-171063-8BF-EDIN-2	B	From Leg	4.000	0.000	105.000	No Ice	3.179	3.353	0.029
w/ Mount Pipe			0.000			1/2" Ice	3.555	3.971	0.059
(E)			0.000			1" Ice	3.964	4.595	0.098
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.487
BXA-171063-8BF-EDIN-2	C	From Leg	4.000	0.000	105.000	No Ice	3.179	3.353	0.029
w/ Mount Pipe			0.000			1/2" Ice	3.555	3.971	0.059
(E)			0.000			1" Ice	3.964	4.595	0.098
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.487
(2) FD9R6004/2C-3L	A	From Leg	4.000	0.000	105.000	No Ice	0.367	0.085	0.003
(E)			0.000			1/2" Ice	0.451	0.136	0.005
			0.000			1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L	B	From Leg	4.000	0.000	105.000	No Ice	0.367	0.085	0.003
(E)			0.000			1/2" Ice	0.451	0.136	0.005
			0.000			1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L	C	From Leg	4.000	0.000	105.000	No Ice	0.367	0.085	0.003
(E)			0.000			1/2" Ice	0.451	0.136	0.005
			0.000			1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
Platform Mount [LP 712-1]	C	None		0.000	105.000	No Ice	24.530	24.530	1.335
(E)						1/2" Ice	29.940	29.940	1.646
						1" Ice	35.350	35.350	1.956
						2" Ice	46.170	46.170	2.577
						4" Ice	67.810	67.810	3.820
/									
(4) DB844H65E-XY w/	A	From Leg	4.000	0.000	95.000	No Ice	10.038	5.154	0.038
Mount Pipe			0.000			1/2" Ice	10.551	5.833	0.104
(E)			0.000			1" Ice	11.073	6.523	0.179
						2" Ice	12.150	7.959	0.351
						4" Ice	14.438	11.092	0.813
(4) DB844H65E-XY w/	B	From Leg	4.000	0.000	95.000	No Ice	10.038	5.154	0.038
Mount Pipe			0.000			1/2" Ice	10.551	5.833	0.104
(E)			0.000			1" Ice	11.073	6.523	0.179
						2" Ice	12.150	7.959	0.351
						4" Ice	14.438	11.092	0.813
(4) DB844H65E-XY w/	C	From Leg	4.000	0.000	95.000	No Ice	10.038	5.154	0.038
Mount Pipe			0.000			1/2" Ice	10.551	5.833	0.104
(E)			0.000			1" Ice	11.073	6.523	0.179
						2" Ice	12.150	7.959	0.351
						4" Ice	14.438	11.092	0.813
Platform Mount [LP 303-1]	C	None		0.000	95.000	No Ice	14.660	14.660	1.250
(E)						1/2" Ice	18.870	18.870	1.481
						1" Ice	23.080	23.080	1.713
						2" Ice	31.500	31.500	2.175
						4" Ice	48.340	48.340	3.101
/									
742 213	A	From Leg	2.000	0.000	85.000	No Ice	5.135	2.869	0.022

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 0.000			1/2" Ice	5.609	3.483	0.047
						1" Ice	6.090	3.946	0.078
						2" Ice	7.074	4.893	0.158
						4" Ice	9.130	6.876	0.394
742 213	B	From Leg	2.000	0.000	85.000	No Ice	5.135	2.869	0.022
(E)			0.000			1/2" Ice	5.609	3.483	0.047
			0.000			1" Ice	6.090	3.946	0.078
						2" Ice	7.074	4.893	0.158
						4" Ice	9.130	6.876	0.394
742 213	C	From Leg	2.000	0.000	85.000	No Ice	5.135	2.869	0.022
(E)			0.000			1/2" Ice	5.609	3.483	0.047
			0.000			1" Ice	6.090	3.946	0.078
						2" Ice	7.074	4.893	0.158
						4" Ice	9.130	6.876	0.394
Pipe Mount [PM 601-3]	C	None		0.000	85.000	No Ice	4.390	4.390	0.195
(E)						1/2" Ice	5.480	5.480	0.237
						1" Ice	6.570	6.570	0.280
						2" Ice	8.750	8.750	0.365
						4" Ice	13.110	13.110	0.534
/									

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
VHLP2-11	A	Paraboloid w/o Radome	From Leg	4.000 0.000 0.000	-29.000		124.000	2.175	No Ice	3.715	0.027
(E)									1/2" Ice	4.006	0.048
									1" Ice	4.296	0.068
									2" Ice	4.876	0.109
									4" Ice	6.037	0.191
VHLP2-18	C	Paraboloid w/o Radome	From Leg	4.000 0.000 0.000	-58.000		124.000	2.175	No Ice	3.715	0.031
(E)									1/2" Ice	4.006	0.052
									1" Ice	4.296	0.072
									2" Ice	4.876	0.113
									4" Ice	6.037	0.195
/											

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

Comb. No.	Description
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
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 Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	125 - 94	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-19.652	-0.071	1.238
			Max. Mx	5	-7.740	-377.395	-5.900
			Max. My	2	-7.719	-0.112	381.259
			Max. Vy	5	21.941	-377.395	-5.900
			Max. Vx	2	-22.043	-0.112	381.259
			Max. Torque	4			2.180
L2	94 - 85.04	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-20.872	-0.139	1.459
			Max. Mx	5	-8.598	-489.207	-6.878
			Max. My	2	-8.578	-0.137	493.609
			Max. Vy	5	22.411	-489.207	-6.878
			Max. Vx	2	-22.513	-0.137	493.609
			Max. Torque	4			2.190
L3	85.04 - 78.5833	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-24.655	-0.284	1.930
			Max. Mx	5	-11.203	-731.738	-8.901
			Max. My	2	-11.184	-0.191	737.255

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	5	24.149	-731.738	-8.901
			Max. Vx	2	-24.252	-0.191	737.255
			Max. Torque	4			2.212
L4	78.5833 - 73	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-26.373	-0.366	2.194
			Max. Mx	5	-12.507	-868.080	-9.991
			Max. My	2	-12.489	-0.222	874.200
			Max. Vy	5	24.695	-868.080	-9.991
			Max. Vx	2	-24.799	-0.222	874.200
			Max. Torque	4			2.223
L5	73 - 60.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-29.526	-0.556	2.808
			Max. Mx	5	-14.907	-1183.217	-12.431
			Max. My	2	-14.893	-0.301	1190.692
			Max. Vy	5	25.739	-1183.217	-12.431
			Max. Vx	2	-25.841	-0.301	1190.692
			Max. Torque	4			2.249
L6	60.5 - 40.457	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-33.786	-0.795	3.575
			Max. Mx	5	-18.251	-1577.343	-15.325
			Max. My	2	-18.241	-0.408	1586.440
			Max. Vy	5	26.970	-1577.343	-15.325
			Max. Vx	2	-27.073	-0.408	1586.440
			Max. Torque	4			2.281
L7	40.457 - 30.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-39.538	-1.037	4.343
			Max. Mx	5	-22.831	-1993.026	-18.217
			Max. My	2	-22.823	-0.522	2003.751
			Max. Vy	5	28.229	-1993.026	-18.217
			Max. Vx	2	-28.331	-0.522	2003.751
			Max. Torque	4			2.315
L8	30.5 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-49.173	-1.476	5.742
			Max. Mx	5	-30.903	-2884.875	-24.006
			Max. My	2	-30.903	-0.756	2898.830
			Max. Vy	5	30.291	-2884.875	-24.006
			Max. Vx	2	-30.390	-0.756	2898.830
			Max. Torque	4			2.376

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	49.173	-0.001	7.647
	Max. H_x	11	30.925	30.201	0.017
	Max. H_z	2	30.925	-0.003	30.367
	Max. M_x	2	2898.830	-0.003	30.367
	Max. M_z	5	2884.875	-30.269	-0.196
	Max. Torsion	4	2.376	-26.105	15.294
	Min. Vert	1	30.925	0.000	0.000
	Min. H_x	5	30.925	-30.269	-0.196
	Min. H_z	8	30.925	-0.131	-30.361
	Min. M_x	8	-2895.601	-0.131	-30.361
	Min. M_z	11	-2875.487	30.201	0.017
	Min. Torsion	11	-1.420	30.201	0.017

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	30.925	0.000	0.000	-1.145	-0.368	0.000
Dead+Wind 0 deg - No Ice	30.925	0.003	-30.367	-2898.830	-0.756	-1.384
Dead+Wind 30 deg - No Ice	30.925	15.052	-26.313	-2512.456	-1432.018	-2.078
Dead+Wind 60 deg - No Ice	30.925	26.105	-15.294	-1464.103	-2484.552	-2.376
Dead+Wind 90 deg - No Ice	30.925	30.269	0.196	24.007	-2884.875	-1.697
Dead+Wind 120 deg - No Ice	30.925	26.210	15.292	1461.595	-2497.865	-0.719
Dead+Wind 150 deg - No Ice	30.925	15.209	26.301	2508.519	-1452.088	-0.093
Dead+Wind 180 deg - No Ice	30.925	0.131	30.361	2895.601	-17.221	0.419
Dead+Wind 210 deg - No Ice	30.925	-14.984	26.340	2513.496	1422.551	0.631
Dead+Wind 240 deg - No Ice	30.925	-26.139	15.092	1435.991	2488.137	1.371
Dead+Wind 270 deg - No Ice	30.925	-30.201	-0.017	-3.410	2875.487	1.420
Dead+Wind 300 deg - No Ice	30.925	-26.172	-15.329	-1468.703	2492.281	0.144
Dead+Wind 330 deg - No Ice	30.925	-15.093	-26.362	-2518.740	1436.511	-0.402
Dead+Ice+Temp	49.173	0.000	-0.000	-5.742	-1.476	0.000
Dead+Wind 0 deg+Ice+Temp	49.173	0.001	-7.647	-756.801	-1.586	-0.385
Dead+Wind 30 deg+Ice+Temp	49.173	3.793	-6.625	-656.608	-372.934	-0.535
Dead+Wind 60 deg+Ice+Temp	49.173	6.578	-3.848	-384.558	-645.873	-0.578
Dead+Wind 90 deg+Ice+Temp	49.173	7.623	0.044	-0.040	-749.249	-0.390
Dead+Wind 120 deg+Ice+Temp	49.173	6.601	3.848	372.855	-648.949	-0.133
Dead+Wind 150 deg+Ice+Temp	49.173	3.828	6.623	644.580	-377.561	0.037
Dead+Wind 180 deg+Ice+Temp	49.173	0.029	7.645	744.929	-5.377	0.167
Dead+Wind 210 deg+Ice+Temp	49.173	-3.778	6.631	645.717	367.930	0.209
Dead+Wind 240 deg+Ice+Temp	49.173	-6.585	3.803	366.950	643.867	0.352
Dead+Wind 270 deg+Ice+Temp	49.173	-7.608	-0.004	-6.351	744.253	0.327
Dead+Wind 300 deg+Ice+Temp	49.173	-6.593	-3.856	-385.621	644.836	0.002
Dead+Wind 330 deg+Ice+Temp	49.173	-3.802	-6.636	-658.061	371.148	-0.151
Dead+Wind 0 deg - Service	30.925	0.001	-10.508	-1005.516	-0.506	-0.485
Dead+Wind 30 deg - Service	30.925	5.208	-9.105	-871.593	-496.575	-0.728
Dead+Wind 60 deg - Service	30.925	9.033	-5.292	-508.233	-861.372	-0.833
Dead+Wind 90 deg - Service	30.925	10.474	0.068	7.547	-1000.127	-0.595
Dead+Wind 120 deg - Service	30.925	9.069	5.291	505.815	-866.005	-0.253
Dead+Wind 150 deg - Service	30.925	5.262	9.101	868.684	-503.544	-0.034
Dead+Wind 180 deg - Service	30.925	0.045	10.505	1002.844	-6.217	0.146
Dead+Wind 210 deg - Service	30.925	-5.185	9.114	870.397	492.803	0.221
Dead+Wind 240 deg - Service	30.925	-9.045	5.222	496.921	862.115	0.481
Dead+Wind 270 deg - Service	30.925	-10.450	-0.006	-1.960	996.367	0.498
Dead+Wind 300 deg - Service	30.925	-9.056	-5.304	-509.831	863.574	0.050
Dead+Wind 330 deg - Service	30.925	-5.222	-9.122	-873.780	497.651	-0.141

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-30.925	0.000	0.000	30.925	0.000	0.000%
2	0.003	-30.925	-30.367	-0.003	30.925	30.367	0.000%
3	15.052	-30.925	-26.313	-15.052	30.925	26.313	0.000%
4	26.105	-30.925	-15.294	-26.105	30.925	15.294	0.000%
5	30.269	-30.925	0.196	-30.269	30.925	-0.196	0.000%
6	26.210	-30.925	15.292	-26.210	30.925	-15.292	0.000%
7	15.209	-30.925	26.301	-15.209	30.925	-26.301	0.000%
8	0.131	-30.925	30.361	-0.131	30.925	-30.361	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
9	-14.984	-30.925	26.340	14.984	30.925	-26.340	0.000%
10	-26.139	-30.925	15.092	26.139	30.925	-15.092	0.000%
11	-30.201	-30.925	-0.017	30.201	30.925	0.017	0.000%
12	-26.172	-30.925	-15.329	26.172	30.925	15.329	0.000%
13	-15.093	-30.925	-26.362	15.093	30.925	26.362	0.000%
14	0.000	-49.173	0.000	-0.000	49.173	0.000	0.000%
15	0.001	-49.173	-7.647	-0.001	49.173	7.647	0.000%
16	3.793	-49.173	-6.625	-3.793	49.173	6.625	0.000%
17	6.578	-49.173	-3.848	-6.578	49.173	3.848	0.000%
18	7.623	-49.173	0.044	-7.623	49.173	-0.044	0.000%
19	6.601	-49.173	3.848	-6.601	49.173	-3.848	0.000%
20	3.828	-49.173	6.623	-3.828	49.173	-6.623	0.000%
21	0.029	-49.173	7.645	-0.029	49.173	-7.645	0.000%
22	-3.778	-49.173	6.631	3.778	49.173	-6.631	0.000%
23	-6.585	-49.173	3.803	6.585	49.173	-3.803	0.000%
24	-7.608	-49.173	-0.004	7.608	49.173	0.004	0.000%
25	-6.593	-49.173	-3.856	6.593	49.173	3.856	0.000%
26	-3.802	-49.173	-6.636	3.802	49.173	6.636	0.000%
27	0.001	-30.925	-10.508	-0.001	30.925	10.508	0.000%
28	5.208	-30.925	-9.105	-5.208	30.925	9.105	0.000%
29	9.033	-30.925	-5.292	-9.033	30.925	5.292	0.000%
30	10.474	-30.925	0.068	-10.474	30.925	-0.068	0.000%
31	9.069	-30.925	5.291	-9.069	30.925	-5.291	0.000%
32	5.262	-30.925	9.101	-5.262	30.925	-9.101	0.000%
33	0.045	-30.925	10.505	-0.045	30.925	-10.505	0.000%
34	-5.185	-30.925	9.114	5.185	30.925	-9.114	0.000%
35	-9.045	-30.925	5.222	9.045	30.925	-5.222	0.000%
36	-10.450	-30.925	-0.006	10.450	30.925	0.006	0.000%
37	-9.056	-30.925	-5.304	9.056	30.925	5.304	0.000%
38	-5.222	-30.925	-9.122	5.222	30.925	9.122	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00004029
3	Yes	6	0.00000001	0.00003163
4	Yes	6	0.00000001	0.00003470
5	Yes	4	0.00000001	0.00093165
6	Yes	6	0.00000001	0.00003260
7	Yes	6	0.00000001	0.00003324
8	Yes	4	0.00000001	0.00038152
9	Yes	6	0.00000001	0.00003317
10	Yes	6	0.00000001	0.00003196
11	Yes	5	0.00000001	0.00005008
12	Yes	6	0.00000001	0.00003328
13	Yes	6	0.00000001	0.00003320
14	Yes	4	0.00000001	0.00005868
15	Yes	5	0.00000001	0.00045187
16	Yes	5	0.00000001	0.00059871
17	Yes	5	0.00000001	0.00061210
18	Yes	5	0.00000001	0.00044671
19	Yes	5	0.00000001	0.00059417
20	Yes	5	0.00000001	0.00059676
21	Yes	5	0.00000001	0.00044341

22	Yes	5	0.00000001	0.00058947
23	Yes	5	0.00000001	0.00058213
24	Yes	5	0.00000001	0.00044385
25	Yes	5	0.00000001	0.00060649
26	Yes	5	0.00000001	0.00060439
27	Yes	4	0.00000001	0.00029434
28	Yes	5	0.00000001	0.00010119
29	Yes	5	0.00000001	0.00011912
30	Yes	4	0.00000001	0.00033480
31	Yes	5	0.00000001	0.00010660
32	Yes	5	0.00000001	0.00011039
33	Yes	4	0.00000001	0.00012812
34	Yes	5	0.00000001	0.00010891
35	Yes	5	0.00000001	0.00010149
36	Yes	4	0.00000001	0.00033905
37	Yes	5	0.00000001	0.00011090
38	Yes	5	0.00000001	0.00011023

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	125 - 94	32.026	38	2.324	0.008
L2	94 - 85.04	18.138	38	1.792	0.003
L3	88.957 - 78.5833	16.286	38	1.715	0.002
L4	78.5833 - 73	12.690	38	1.572	0.002
L5	73 - 60.5	10.900	38	1.490	0.002
L6	60.5 - 40.457	7.407	38	1.177	0.001
L7	45.54 - 30.5	4.228	38	0.853	0.001
L8	30.5 - 0	1.887	38	0.602	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.000	LLPX310R-V1 w/ Mount Pipe	38	32.026	2.324	0.013	11313
124.000	VHLP2-11	38	31.544	2.306	0.013	11313
123.000	800MHZ 2X50W RRH W/FILTER w / Mount Pipe	38	31.063	2.288	0.013	11313
115.000	(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	38	27.241	2.146	0.010	5656
105.000	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	38	22.669	1.972	0.006	2827
95.000	(4) DB844H65E-XY w/ Mount Pipe	38	18.521	1.808	0.004	2044
85.000	742 213	38	14.881	1.659	0.003	4903

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	125 - 94	92.108	2	6.686	0.022
L2	94 - 85.04	52.212	2	5.160	0.007
L3	88.957 - 78.5833	46.885	2	4.939	0.006
L4	78.5833 - 73	36.542	2	4.528	0.005
L5	73 - 60.5	31.391	2	4.291	0.005
L6	60.5 - 40.457	21.339	13	3.390	0.003
L7	45.54 - 30.5	12.185	13	2.458	0.002
L8	30.5 - 0	5.441	13	1.735	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.000	LLPX310R-V1 w/ Mount Pipe	2	92.108	6.686	0.037	4028
124.000	VHLP2-11	2	90.723	6.634	0.036	4028
123.000	800MHZ 2X50W RRH W/FILTER w / Mount Pipe	2	89.340	6.583	0.035	4028
115.000	(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	2	78.366	6.174	0.027	2013
105.000	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	2	65.233	5.676	0.018	1004
95.000	(4) DB844H65E-XY w/ Mount Pipe	2	53.314	5.205	0.012	723
85.000	742 213	2	42.846	4.777	0.009	1726

Compression Checks

Pole Design Data

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 $\frac{P}{P_a}$
L1	125 - 94 (1)	TP25.164x18.5x0.188	31.000	0.000	0.0	39.000	14.864	-7.717	579.699	0.013
L2	94 - 85.04 (2)	TP27.09x25.164x0.439	8.960	0.000	0.0	30.151	35.977	-8.576	1084.760	0.008
L3	85.04 - 78.5833 (3)	TP28.078x25.873x0.485	10.374	0.000	0.0	30.224	42.499	-11.183	1284.470	0.009
L4	78.5833 - 73 (4)	TP29.264x28.078x0.609	5.583	0.000	0.0	30.266	55.409	-12.488	1677.000	0.007
L5	73 - 60.5 (5)	TP31.921x29.264x0.367	12.500	0.000	0.0	39.000	36.706	-14.892	1431.540	0.010
L6	60.5 - 40.457 (6)	TP36.18x31.921x0.436	20.043	0.000	0.0	39.000	47.938	-18.240	1869.570	0.010
L7	40.457 - 30.5 (7)	TP37.787x34.6x0.485	15.040	0.000	0.0	39.000	57.389	-22.823	2238.190	0.010
L8	30.5 - 0 (8)	TP44.25x37.787x0.456	30.500	0.000	0.0	39.000	63.426	-30.903	2473.600	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	125 - 94 (1)	TP25.164x18.5x0.188	381.413	49.944	39.000	1.281	0.000	0.000	39.000	0.000
L2	94 - 85.04 (2)	TP27.09x25.164x0.439	493.798	26.097	30.151	0.866	0.000	0.000	30.151	0.000
L3	85.04 - 78.5833 (3)	TP28.078x25.873x0.485	737.517	30.881	30.224	1.022	0.000	0.000	30.224	0.000
L4	78.5833 - 73 (4)	TP29.264x28.078x0.609	874.500	27.141	30.266	0.897	0.000	0.000	30.266	0.000
L5	73 - 60.5 (5)	TP31.921x29.264x0.367	1191.075	50.196	39.000	1.287	0.000	0.000	39.000	0.000
L6	60.5 - 40.457 (6)	TP36.18x31.921x0.436	1586.917	46.658	39.000	1.196	0.000	0.000	39.000	0.000
L7	40.457 - 30.5 (7)	TP37.787x34.6x0.485	2004.325	45.763	39.000	1.173	0.000	0.000	39.000	0.000
L8	30.5 - 0 (8)	TP44.25x37.787x0.456	2899.592	50.894	39.000	1.305	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	125 - 94 (1)	TP25.164x18.5x0.188	22.053	1.484	26.000	0.114	0.180	0.011	26.000	0.000
L2	94 - 85.04 (2)	TP27.09x25.164x0.439	22.523	0.626	20.101	0.062	0.190	0.005	20.101	0.000
L3	85.04 - 78.5833 (3)	TP28.078x25.873x0.485	24.262	0.571	20.149	0.057	0.211	0.004	20.149	0.000
L4	78.5833 - 73 (4)	TP29.264x28.078x0.609	24.809	0.448	20.177	0.044	0.223	0.003	20.177	0.000
L5	73 - 60.5 (5)	TP31.921x29.264x0.367	25.851	0.704	26.000	0.054	0.246	0.005	26.000	0.000
L6	60.5 - 40.457 (6)	TP36.18x31.921x0.436	27.083	0.565	26.000	0.043	0.284	0.004	26.000	0.000
L7	40.457 - 30.5 (7)	TP37.787x34.6x0.485	28.341	0.494	26.000	0.038	0.323	0.004	26.000	0.000
L8	30.5 - 0 (8)	TP44.25x37.787x0.456	30.399	0.479	26.000	0.037	0.402	0.003	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	125 - 94 (1)	0.013	1.281	0.000	0.114	0.000	1.297 ✔	1.333	H1-3+VT ✔
L2	94 - 85.04 (2)	0.008	0.866	0.000	0.062	0.000	0.874 ✔	1.333	H1-3+VT ✔
L3	85.04 - 78.5833 (3)	0.009	1.022	0.000	0.057	0.000	1.031 ✔	1.333	H1-3+VT ✔
L4	78.5833 - 73 (4)	0.007	0.897	0.000	0.044	0.000	0.905 ✔	1.333	H1-3+VT ✔
L5	73 - 60.5 (5)	0.010	1.287	0.000	0.054	0.000	1.298 ✔	1.333	H1-3+VT ✔
L6	60.5 - 40.457	0.010	1.196	0.000	0.043	0.000	1.207	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	(6)						✔		
L7	40.457 - 30.5	0.010	1.173	0.000	0.038	0.000	1.184	1.333	H1-3+VT ✔
	(7)						✔		
L8	30.5 - 0 (8)	0.012	1.305	0.000	0.037	0.000	1.318	1.333	H1-3+VT ✔
							✔		

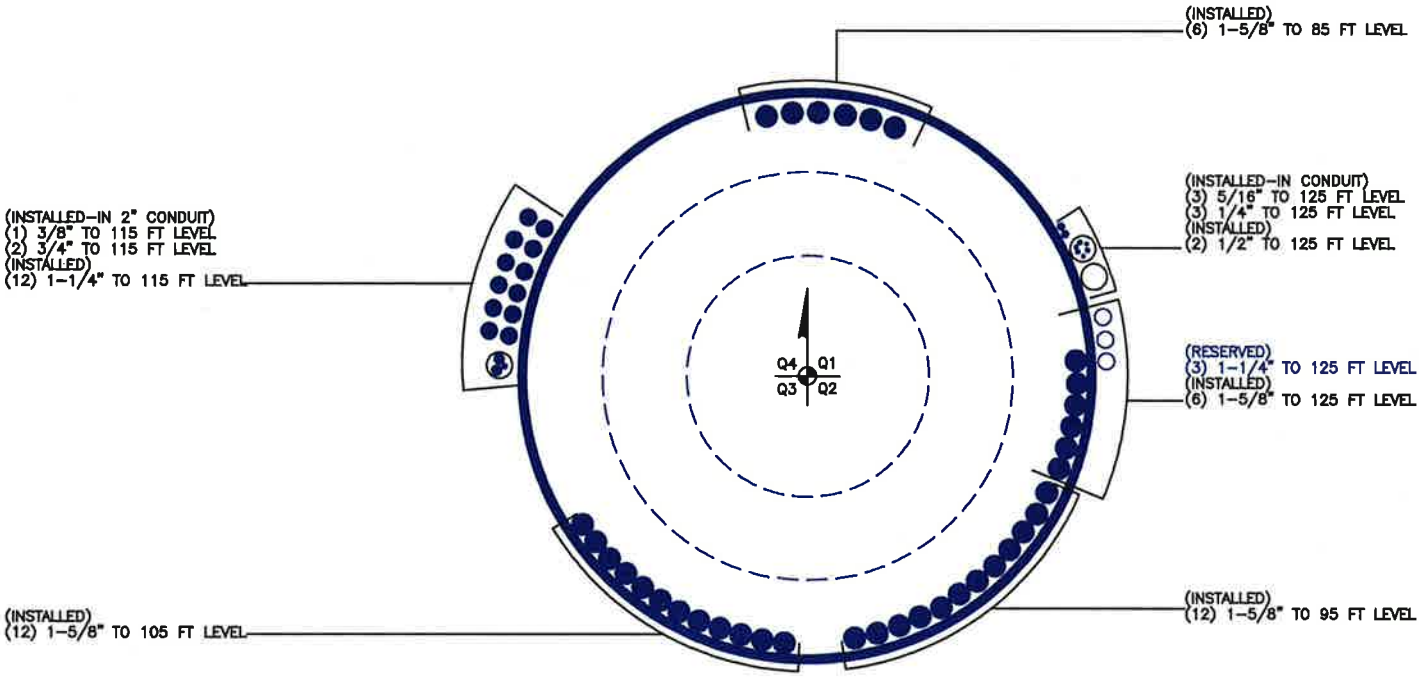
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	125 - 94	Pole	TP25.164x18.5x0.188	1	-7.717	772.739	**	**
L2	94 - 85.04	Pole	TP27.09x25.164x0.439	2	-8.576	1445.985	**	**
L3	85.04 - 78.5833	Pole	TP28.078x25.873x0.485	3	-11.183	1712.198	**	**
L4	78.5833 - 73	Pole	TP29.264x28.078x0.609	4	-12.488	2235.441	**	**
L5	73 - 60.5	Pole	TP31.921x29.264x0.367	5	-14.892	1908.243	**	**
L6	60.5 - 40.457	Pole	TP36.18x31.921x0.436	6	-18.240	2492.137	**	**
L7	40.457 - 30.5	Pole	TP37.787x34.6x0.485	7	-22.823	2983.507	**	**
L8	30.5 - 0	Pole	TP44.25x37.787x0.456	8	-30.903	3297.309	**	**
							Summary	
						Pole (L8)	99.1	Pass
						RATING =	**99.1**	**Pass**

** See additional calculations

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876364 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Reinforcement Capacity

AeroSolutions LLC
Optimizing Your Tower Infrastructure
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Dimensions and Properties														Compression				Axial				
																		ASD-9			LRFD	
Model	Weight (lb/ft)	Area (in^2)	Moment of Inertia (in^4)	Moment of Inertia (in^4)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Lerigth (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
MP203	10.2	3.00	0.14	4.00	0.375	0	0.75	4	0	0	1.21875	65	80	0.80	16	1.00	16	81.6	108.8	Rupture	122.5	Rupture
MP204	15.3	4.50	0.38	7.59	0.5	0	1	4.5	0	0	1.21875	65	80	0.80	20	1.00	20	128.8	171.7	Rupture	193.1	Rupture
MS-600	20.4	6.00	0.50	18.00	0.5	0	1	6	0	0	1.21875	65	80	0.80	16.375	1.00	16.375	187.8	250.4	Compress.	283.1	Rupture

Rein1

Bottom	Top	Qty	Model	Position	T or T&C
0	30.5	3	MP406	F	T&C
30.5	60.5	3	MP406	F	T&C
60.5	78.5833	3	MP404	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Flats (Used for relative orientation only. Actual flat numbers may vary.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		1						1						1			
			1						1						1		
		1						1						1			

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
73	94	3	MS-600	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1						1						1					

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
0				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Reinforcement 1						
Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
0	30.5	3	MP406	F	0	T&C
30.5	60.5	3	MP406	F	0	T&C
60.5	78.5833	3	MP404	F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Reinforcement 2						
Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
73	94	3	MS-600	F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Reinforcement 3						
Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
0				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Bottom Elevation	Top Elevation	Original Thickness	Original Yield Stress	Original Ultimate Stress	Reinforced Shaft Capacity	Reinf. 1 QTY	Reinf. 1 Type	Rein. 1 Capacity	Reinf. 2 QTY	Reinf. 2 Type	Rein. 2 Capacity	Reinf. 3 QTY	Reinf. 3 Type	Rein. 3 Capacity	Control Stress Ratio	Top Height	Section Length	Lap Splice	# of Sides	Top Diameter	Bottom Diameter	Equivalent Shaft Thickness	Equivalent Shaft Fy	Equivalent Weight Mult.	Top Elevation Failure	Bottom Elevation Failure	Section Failure %	
94.0000	125.0000	0.1875	65	80	97.0%										97.0%	125.0000	31.0000	0.0000	18	18.5000	25.1639	0.1875	65.0	1.00				1
85.0400	94.0000	0.1875	65	80	50.5%				3	MS-600	63.9%				63.9%	94.0000	8.9600	3.9170	18	25.1639	27.0900	0.4392	50.3	0.93				2
78.5833	88.9570	0.2500	65	80	59.4%				3	MS-600	75.5%				75.5%	88.9570	10.3737	0.0000	18	25.8730	28.0776	0.4853	50.4	0.94				3
73.0000	78.5833	0.2500	65	80	52.4%	3	MP404	48.2%	3	MS-600	66.2%				66.2%	78.5833	5.5833	0.0000	18	28.0776	29.2641	0.6092	50.4	0.93				4
60.5000	73.0000	0.2500	65	80	97.5%	3	MP404	93.0%							97.5%	73.0000	12.5000	0.0000	18	29.2641	31.9205	0.3665	65.0	0.98				5
40.4570	60.5000	0.2500	65	80	90.9%	3	MP406	86.7%							90.9%	60.5000	20.0430	5.0830	18	31.9205	36.1800	0.4357	65.0	0.96				6
30.5000	45.5400	0.3125	65	80	89.1%	3	MP406	84.8%							89.1%	45.5400	15.0400	0.0000	18	34.5998	37.7869	0.4847	65.0	0.97				7
0.0000	30.5000	0.3125	65	80	99.1%	3	MP406	93.9%							99.1%	30.5000	30.5000	0.0000	18	37.7869	44.2500	0.4563	65.0	0.98				8
																												9
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Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *876364*
Site Name: *CROMWELL - FIRST LINE*
App #: *188495 Revision # 1*
Pole Manufacturer: *Other*

Reactions		
Moment:	2432.1132	ft-kips
Axial:	30.9028	kips
Shear:	30.399286	kips

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

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	53	in

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	181.0 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	92.8% Pass	

Plate Data		
Diam:	59	in
Thick:	1.75	in
Grade:	60	ksi
Single-Rod B-eff:	11.70	in

Base Plate Results

	Flexural Check	Stiffened
Base Plate Stress:	54.8 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	91.3% Pass	Y.L. Length: N/A, Roark

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:	7	in
Height:	22	in
Thick:	0.75	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Stiffener Results

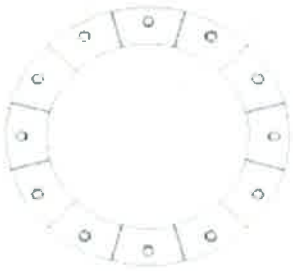
Horizontal Weld :	81.0% Pass
Vertical Weld:	43.1% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	17.8% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	71.1% Pass
Plate Comp. (AISC Bracket):	71.2% Pass

Pole Data		
Diam:	44.25	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Pole Results

Pole Punching Shear Check:	13.4% Pass

Stress Increase Factor		
ASIF:	1.333	



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

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

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

Site Information	
ID:	876364
Name:	CROMWELL - FIRST LINE EMERGENC
App. #:	188495 Revision # 1

AeroSolutions LLC
Optimizing Your Tower Infrastructure

Base Reactions		
Moment:	2900	ft-kip
Axial:	31	kip
Shear:	30	kip
Base Plate Type:	Circular	

Design Information	
TIA Code:	F
ASIF:	1.333
Failure:	100%
eta Factor:	0.50

Original Anchor Rod Data		
Quantity:	12	
Diameter:	2.25	in
Material:	#18J	
Bolt Circle:	53.0	in
Bolt Spacing:		in
Bolt Group Area:	47.71	in^2
Bolt Group MOIx:	16753	in^4

Reactions Seen by Original AR Group		
Moment:	2432.1	kip-ft
Axial:	30.9	kip
Shear:	30.4	kip

Original AR Capacity Check		
Tension Load:	181.0	kip
Allowable load:	194.8	kip
AR Capacity:	92.9%	Pass

First Added Anchor Rod Data		
Quantity:	3	
Diameter:	1.75	in
Material:	A193 B7	
Bolt Circle:	59.8	in
Bolt Group Area:	7.22	in^2
Bolt Group MOIx:	3220	in^4

Reactions Seen by First Added AR Group		
Moment:	467.5	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

First Added AR Capacity Check		
Tension Load:	125.2	kip
Allowable load:	132.3	kip
AR Capacity:	94.7%	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		
Tension 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		
Tension Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

PROJECT	**876364 - Cromwell, CT**				
SUBJECT	**188495 REV 1**				
DATE	**07/22/13**	PAGE	**1**	OF	**1**

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

B&T Proj. No.: 84470.007.01

Monopole Pad & Pier Foundation Analysis

Rev. Type: F

Design Loads:

Input unfactored loads

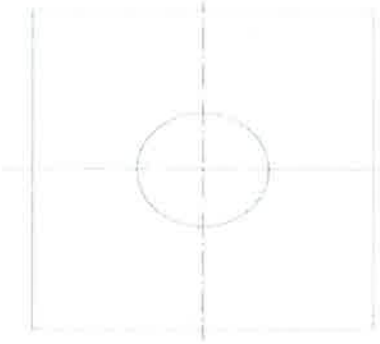
Shear:	30.0	kips
Moment:	2,900.0	ft-kips
Tower Height:	125.0	ft
Tower Weight:	31.0	kips

Pad & Pier Dimensions / Properties:

Pole Diameter at Base:	44.25	in
Bearing Depth:	5.0	ft
Pad Width:	24.0	ft
Neglected Depth:	3.5	ft
Thickness:	3.0	ft
Pier Diameter:	14.0	ft
Pier Height Above Grade:	1.0	ft
BP Dist. Above Pier:	0.0	in
Clear Cover:	3.0	in
Pier Rebar Size:	8	
Pier Rebar Quanity:	24	
Pad Rebar Size:	8	
Pad Rebar Quanity:	30	
Pier Tie Size:	4	
Tie Quanity:	4	
Rebar Yield Strength:	60000	psi
Concrete Strength:	3000	psi
Concrete Unit Weight:	0.15	kcf
Seismic Zone:	1	

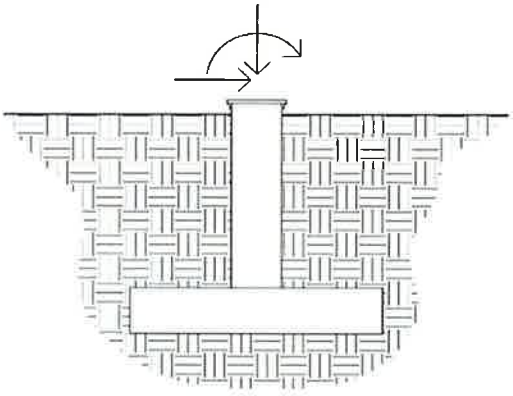
24.0 FT

Plan View



30.0 FT

Elevation Overview



Soil Data:

	Allowable Values	
Soil Unit Weight:	0.125	kcf
Ult. Bearing Capacity:	8.000	ksf
Angle of Friction:	30.000	deg
Cohesion:	0.000	ksf
Passive Pressure:	0.000	ksf
Base Friction:	0.600	

Summary of Results

Req'd Pier Diam.	OK
Overturning	90.0%
Shear Capacity	20.9%
Bearing	50.3%
Pad Shear - 1-way	20.7%
Pad Shear - 2-way	6.6%
Pad Moment Capacity	24.9%
Pier Moment Capacity	55.4%

** Notes: