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

Internet: ct.gov/csc

Daniel F. Caruso
Chairman

March 16, 2010

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597

RE: **EM-VER-052-100201** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 130 Birdseye Road, Farmington, 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.

The proposed modifications are to be implemented as specified here and in your notice dated February 1, 2010, including the placement of all necessary equipment and shelters within the tower compound. 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. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/MP/laf

c: The Honorable Mike Clark, Chairman Town Council, Town of Farmington
Kathleen Eagen (via e-mail service), Town Manager, Town of Farmington
Jeffrey Ollendorf (via e-mail service), Town Planner, Town of Farmington
Crown Castle USA, Inc.

G:\EM\BAM-VERIZON\FARMINGTON\dc030410BirdseyeRd.DOC

ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

EM-VER-052-100201

February 1, 2010

Via Hand Delivery

S. Derek Phelps
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Antenna Swap**
130 Birdseye Road, Farmington, Connecticut

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains wireless telecommunications antennas at the 109-foot level on the existing 140-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco's use of the existing tower in 2005 through EM-VER-052-050912. Cellco now intends to modify its installation by replacing six (6) of its PCS antennas with three (3) model BXA-185060/8CF-2 PCS antennas; two (2) BXA-70063-6CF_2 LTE (700 MHz) antennas; and one (1) BXA-70063/6CF_4 LTE (700 MHz) antenna, all at the same 109-foot level on the tower. Attached behind Tab 1 are the specifications for the proposed replacement antennas.

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 Kathleen A. Eagen, Town Manager for the Town of Farmington. A copy of this letter is also being sent to Cell Tower Lease Acquisition LLC, 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 any increase in the overall height of the existing tower. Cellco's antennas will be located at the same 109-foot level on the existing 140-foot tower.

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

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The operation of the replacement antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for Cellco's modified facility is included behind Tab 2.

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed antennas modification. (See Tab 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:
Kathleen A. Eagen, Farmington Town Manager
Cell Tower Lease Acquisition LLC
Sandy M. Carter

Slant +/- 45° Dual Polarized, Panel 60° / 18.5 dBi

BXA-185060/8CF __ 2°

When ordering replace "__" with connector type.

Mechanical specifications

Length	1238 mm	48.8 in
Width	154 mm	6.1 in
Depth	80 mm	3.2 in
Depth with t-bracket	108 mm	4.3 in
4) Weight	4.5 kg	10.0 lbs
Wind Area		
Fore/Aft	0.19 m^2	2.1 ft^2
Side	0.10 m^2	1.1 ft^2
Rated Wind Velocity (Safety factor 2.0)	>322 km/hr	>200 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	288 N	65 lbs
Side	170 N	38 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome.

Mounting and Downtilting

Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in).

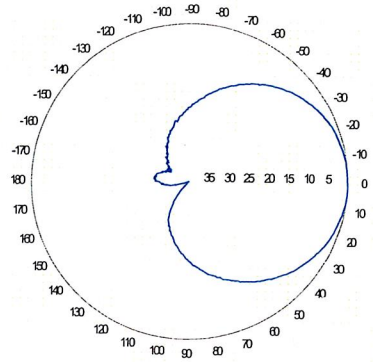
Mounting bracket kit #26799997
Downtilt bracket kit #26799999

The downtilt bracket kit includes the mounting bracket kit.

Electrical specifications

	Frequency Range	1850-1990 MHz
	Impedance	50Ω
3)	Connector(s)	NE or E-DIN 2 ports / center
1)	VSWR	≤ 1.4:1
	Polarization	Slant ± 45°
1)	Isolation Between Ports	< -30 dB
1)	Gain	18.5 dBi
2)	Power Rating	250 W
1)	Half Power Angle	
	H-Plane	60°
	E-Plane	7°
1)	Electrical Downtilt	2°
1)	Null Fill	5%
	Lightning Protection	Direct Ground

Radiation pattern1)



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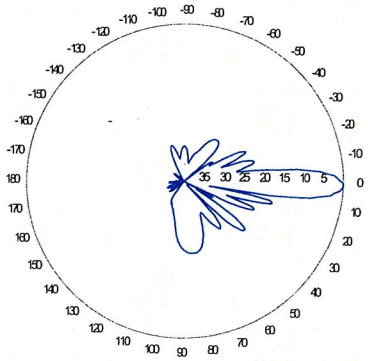
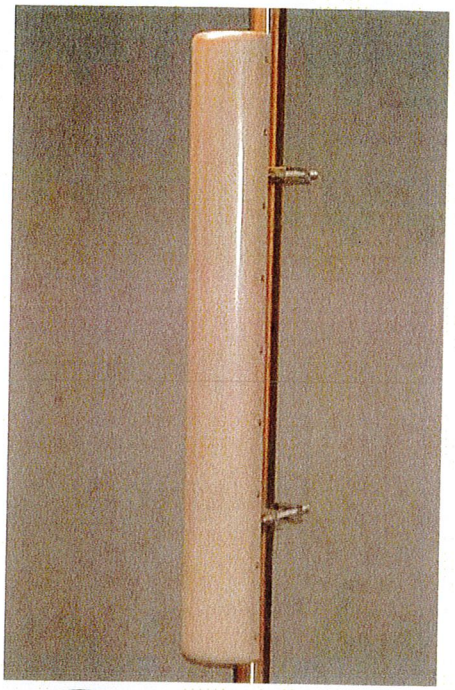


Vertical

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back ratio.



Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:

- Watercut brass feedline assembly for consistent performance.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

This Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.

Antenna available with center-fed connectors only.

Patented Dipole Design: U.S. Patent No. 6,597,324 B2

1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
4) The antenna weight listed above does not include the bracket weight.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

CF Denotes a Center-Fed Connector.

1850-1990 MHz

Amphenol Antel, Inc. 1300 Capital Drive Rockford, Illinois 61109 USA Tel. (815) 399-0001
Toll-Free (888) 417-9562 Fax. (815) 399-0156 antel@antelinc.com www.antelinc.com

Amphenol Antel, Inc. The Antenna Technology Company

Revision Date: 7/11/07

Slant ±45° Dual Polarized FET Panel 63° / 14.5 dBd
696-900 MHz

Mechanical specifications

Length	1804	mm	71.0	in
Width	285	mm	11.2	in
Depth	114	mm	4.5	in
Depth with z-bracket	154	mm	6.1	in
Weight [4]	7.9	kg	17.0	lbs
Wind Area Fore/Aft	0.51	m^2	5.5	ft^2
Wind Area Side	0.21	m^2	2.2	ft^2
Max Wind Survivability	>201	km/hr	>125	mph
Wind Load @ 100 mph (161 km/hr)				
Fore/Aft	753	N	169	lbf
Side	351	N	79	lbf

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiber-glass radome.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter Ø50-160 mm; Ø2.0-6.3 in

Mounting Bracket Kit	36210002
Downtilt Bracket Kit	36114003

Electrical specifications

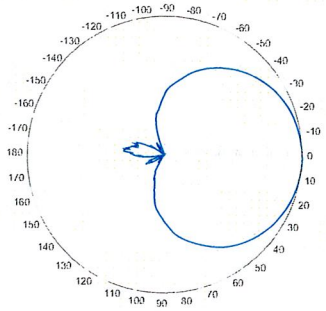
Frequency Range	696-900 MHz
Impedance	50Ω
Connector [3]	NE or E-DIN Female 2 ports / Center
VSWR [1]	≤ 1.35:1
Polarization	Slant ±45°
Isolation Between Ports [1]	< -25 dB
Gain [1]	14.5 dBd 16.5 dBi
Power Rating [2]	500 W
Half Power Angle [1]	
Horizontal Beamwidth	63°
Vertical Beamwidth	11°
Electrical downtilt [5]	2°
Null fill [1]	5%
Lightning protection	Direct ground

Patented Dipole Design: U.S. Patent No. 6,608,600 B2

1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
4) Antenna weight does not include brackets.
5) Add'l downtilts may be available. Check website for details.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Radiation-pattern
750 MHz



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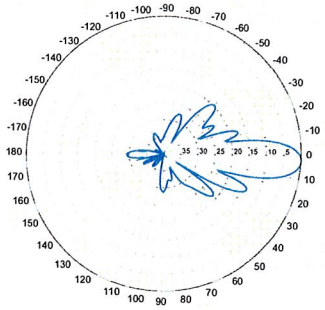
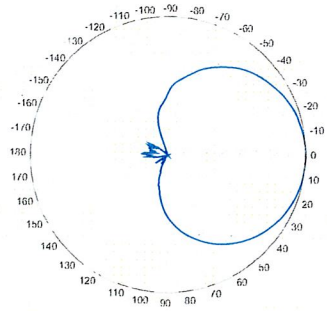
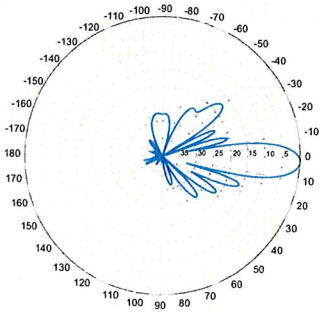


Vertical

850 MHz



Horizontal

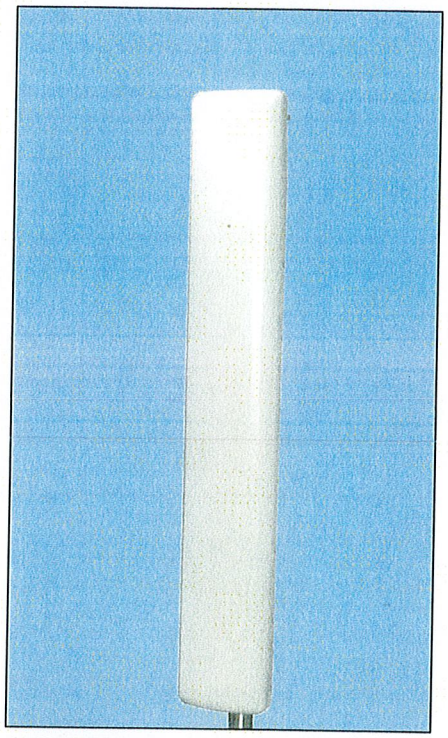


Vertical

696-900 MHz

BXA-70063/6CF __ 2°

When ordering replace "__" with connector type.



Featuring our Exclusive 3T Technology™ Antenna Design:

- Watercut brass feedline assembly for consistent performance.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

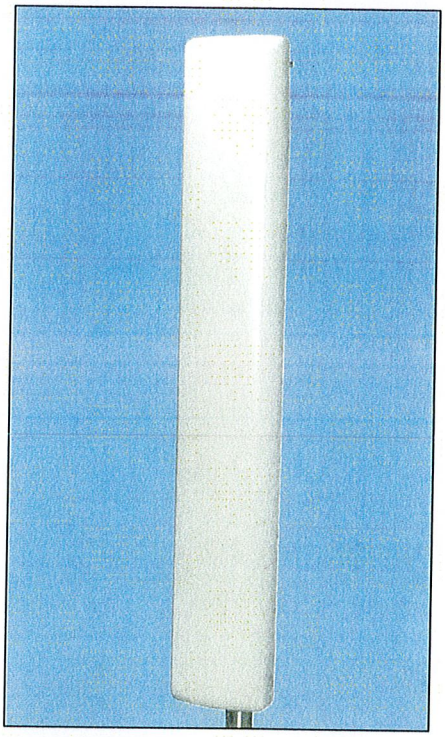
Warranty:
This antenna is under a five-year limited warranty for repair or replacement.

Revision Date: 04/07/09

815.399.0001 • antel@antelinc.com • www.antelinc.com

Slant ±45° Dual Polarized, Panel 63° / 14.5 dBd
696-900 MHz

BXA-70063/6CF __ 4°
When ordering replace "__" with connector type.



Mechanical specifications

Length	1804	mm	71.0	in
Width	285	mm	11.2	in
Depth	114	mm	4.5	in
Depth with z-bracket	154	mm	6.1	in
Weight [4]	7.9	kg	17.0	lbs
Wind Area Fore/Aft	0.51	m^2	5.5	ft^2
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Max Wind Survivability	>201	km/hr	>125	mph
Wind Load @ 100 mph (161 km/hr)				
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Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiber-glass radome.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter Ø50-160 mm; Ø2.0-6.3 in

Mounting Bracket Kit	36210003
Downtilt Bracket Kit	36210004

Electrical specifications

Frequency Range	696-900 MHz
Impedance	50Ω
Connector [3]	NE or E-DIN Female 2 ports / Center
VSWR [1]	≤ 1.35:1
Polarization	Slant ±45°
Isolation Between Ports [1]	< -25 dB
Gain [1]	14.5 dBd 16.5 dBi
Power Rating [2]	500 W
Half Power Angle [1]	
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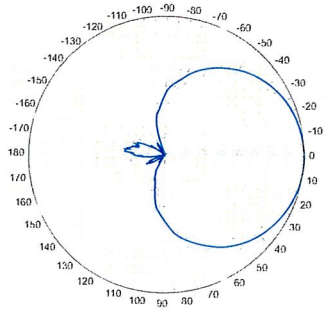
Null fill [1]	5%
Lightning protection	Direct ground

Patented Dipole Design: U.S. Patent No. 6,608,600 B2

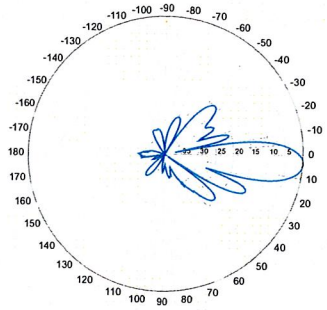
1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
4) Antenna weight does not include brackets.
5) Add'l downtilts may be available. Check website for details.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Radiation-pattern[1]
750 MHz

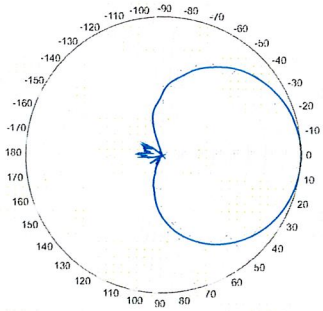


Horizontal

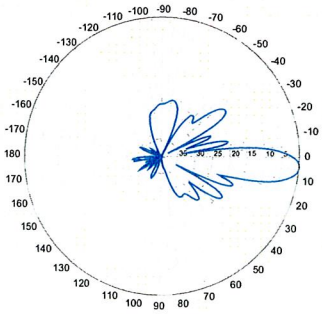


Vertical

850 MHz



Horizontal



Vertical

696-900 MHz

Featuring our Exclusive 3T Technology™ Antenna Design:

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- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

Warranty:
This antenna is under a five-year limited warranty for repair or replacement.

Revision Date: 04/09/09

Site Name: New Britain 5 (Farmington) Tower Height: Verizon @ 109'	General	Power	Density					
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*Nextel	9	100	120	0.0225	851	0.5673	3.96%	
*Sprint	11	122	140	0.0246	1957.5	1.0000	2.46%	
*Pocket	3	631	90	0.0840	2130	1.0000	8.40%	
*T-Mobile GSM	8	198	100	0.0570	1945	1.0000	5.70%	
*T-Mobile UMTS	2	791	100	0.0569	2100	1.0000	5.69%	
*Cingular GSM	2	646	131	0.0271	1900	1.0000	2.71%	
*Cingular UMTS	1	500	131	0.0105	880	0.5867	1.79%	
Verizon	**3**	**428**	**109**	**0.0389**	**1970**	**1.0000**	**3.89%**	
Verizon	**9**	**306**	**109**	**0.0833**	**869**	**0.5793**	**14.39%**	
Verizon	**1**	**881**	**109**	**0.0267**	**757**	**0.4973**	**5.36%**	
* Source: Siting Council								54.3%

Date: **January 8, 2010**

Ms. Molly Carder
Crown Castle USA Inc.
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6596

B&T Engineering, Inc.
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
ctuttle@btengineering.com

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	117998
	Carrier Site Name:	New Britain 5
Crown Castle Designation:	**Crown Castle BU Number:**	876335
	Crown Castle Site Name:	East Farmington
	Crown Castle JDE Job Number:	128990
	Crown Castle Work Order Number:	311301
Engineering Firm Designation:	**B&T Engineering, Inc. Project Number:**	77969
Site Data:	**3 A Birdseye Road, Farmington, CT, Hartford County** **Latitude *41° 42' 56.58"*, Longitude *-72° 48' 39.08"*** **140 Foot - Monopole**	

Dear Ms. Carder,

B&T 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 357514, in accordance with application 92862, revision 3.

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:

LC1: 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 International Building Code with 2005 Connecticut Supplement based upon a wind speed of 80 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 *B&T Engineering, Inc.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle USA Inc. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Sachin S. Chougule
Project Engineer

Chad E. Tuttle, P.E.
President

STATE OF CONNECTICUT ★ CHAD TUTTLE No. 23924 LICENSED PROFESSIONAL ENGINEER ★ 1/8/10

RISA Tower Report - version 5.3.1.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 140 ft Monopole tower designed by Summit Manufacturing in November of 1997. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. The tower has been reinforced as specified by B&T Engineering in 2008 and those reinforcements are incorporated in this analysis.

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 80 mph with no ice, 69.3 mph with 0.5 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
108	109	3	Antel	BXA-185060/8CFx2	--	--	--
		2	Antel	BXA-70063/6CFx2			
		1	Antel	BXA-70063/6CFx4			

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
139	139	6	--	MLA Antenna (6'x1'x6" Panel)	6	1 5/8	3
		1	--	LP Platform			
		6	Decibel	DB980H90A-M w/ Mount Pipe	6	1 5/8	1
128	130	1	--	(3) T-Arms	9	7/8	1
		3	Powerwave	7770.00 w/ Mount Pipe			
		6	Powerwave	LGP21401			
120	120	1	--	LP Platform	12	7/8	1
		12	Swedcom	ALP 9212-N w/ Mount Pipe			
108	109	**6**	**Antel**	**LPA-185063/8CF**	**--**	**--**	**4**
		6	Antel	LPD-6513 w/ Mount Pipe	12	1 5/8	1
	108	--	--	--	2 1	1/2 5/16	5
		1	--	LP Platform	--	--	1
98	99	3	--	Pipe Mount	6	1 5/8	2
		3	Andrew	ONEBASE TWIN DUAL DUPLEX TMA			
		3	RFS/Celwave	APX16DWV-16DWV-S-E-ACU			
90	90	3	--	Pipe Mount	6	1 5/8	1
		3	RFS/Celwave	APXV18-206517S-C			
70	72	2	Lucent	KS24019-L112A	2	5/16	1
	70	2	--	Side Arm			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
49	51	1	Lucent	KS24019-L112A	1	1/2	1
	49	1	--	Side Arm			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) MLA Equipment not considered in this analysis.
4) **Equipment to be Removed**
5) Abandoned Feedlines used in this analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)

Information Not Available

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Locate Revision #3	92862	Crown OTG
Tower Manufacturing Drawing	Summit Manufacturing, Dtd 11/03/1997	1615361	Crown OTG
Foundation Drawing	Summit Manufacturing, Job No.2933	1440555	Crown OTG
Geotech Report	Dr. Clarence Welti Geotechnical Engineering, Dtd.06/19/06	1850446	Crown OTG
Tower Modification Drawing	B&T Engineering, Dtd.12/09/08	N/A	Crown OTG
Antenna Configuration	Crown CAD Package	Date: 12/30/09	Crown OTG

3.1) Analysis Method

RISATower (version 5.3.1.0), 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. This structural analysis **does not** include a grouted base plate.
2. Tower and structures were built in accordance with the manufacturer's specifications.
3. The tower and structures have been maintained in accordance with manufacturer's specifications.
4. The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
5. When applicable, transmission cables are considered to be structural components for calculating wind loads, as allowed by TIA/EIA-222-F.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and B&T Engineering, Inc. should be allowed to review any new information to determine its effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary) – LC1

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	140 - 91.75	Pole	TP25.89x16x0.25	1	-9.450	964.748	84.5	Pass
L2	91.75 - 69	Pole	TP30.056x24.724x0.313	2	-13.776	1555.944	95.1	Pass
L3	69 - 46.5	Pole	TP34.67x30.056x0.419	3	-17.475	2337.629	80.6	Pass
L4	46.5 - 0	Pole	TP43.58x32.909x0.455	4	-30.669	3281.806	87.8	Pass
							Summary	
						Pole (L2)	95.1	Pass
						RATING =	**95.1**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity – LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	Base	99.1	Pass
1,2	Base Plate	Base	95.7	Pass
1	Base Foundation	Base	90.6	Pass

Structure Rating (max from all components) =	99.1%

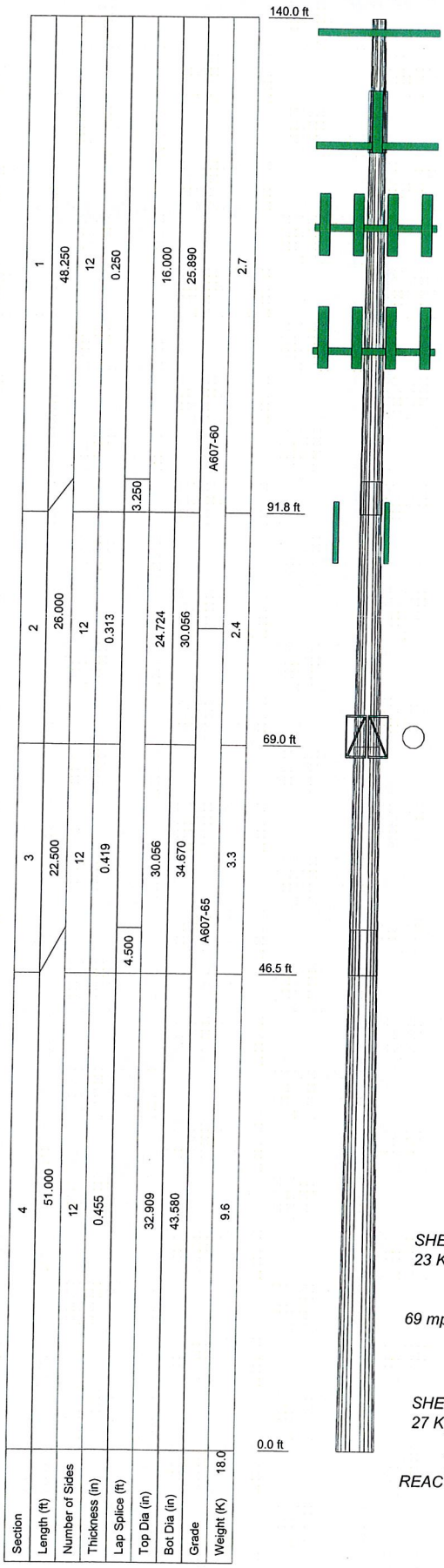
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Capacities up to 105% are considered acceptable based on analysis methods used.
3) The percent capacities shown above (excluding foundations) include the 1/3 increase in allowable stresses as allowed by TIA/EIA-222-F.

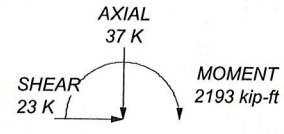
4.1) Recommendations

N/A

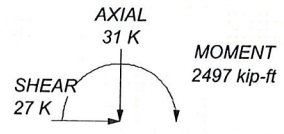
APPENDIX A

RISA TOWER OUTPUT





TORQUE 1 kip-ft
69 mph WIND - 0.500 in ICE



TORQUE 1 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) DB980H90A-M w/Mount Pipe (E)	139	BXA-70063/6CFx2 w/Mount Pipe (P)	109
(2) DB980H90A-M w/Mount Pipe (E)	139	BXA-70063/6CFx2 w/Mount Pipe (P)	109
(2) DB980H90A-M w/Mount Pipe (E)	139	BXA-70063/6CFx4 w/Mount Pipe (P)	109
Platform Mount [LP 401-1] (E)	139	Platform Mount [LP 304-1] (E)	108
6' x 2" Mount Pipe (MLA)	139	APX16DWV-16DWV-S-E-ACU (R)	99
6' x 2" Mount Pipe (MLA)	139	APX16DWV-16DWV-S-E-ACU (R)	99
6' x 2" Mount Pipe (MLA)	139	APX16DWV-16DWV-S-E-ACU (R)	99
7770.00 w/Mount Pipe (E)	130	ONEBASE TWIN DUAL DUPLEX TMA (R)	99
7770.00 w/Mount Pipe (E)	130	ONEBASE TWIN DUAL DUPLEX TMA (R)	99
7770.00 w/Mount Pipe (E)	130	ONEBASE TWIN DUAL DUPLEX TMA (R)	99
(2) LGP21401 (E)	130	Pipe Mount [PM 502-3] (R)	98
(2) LGP21401 (E)	130	APXV18-206517S-C w/ Mount Pipe (E)	90
(2) LGP21401 (E)	130	APXV18-206517S-C w/ Mount Pipe (E)	90
(2) 6' x 2" Mount Pipe (E)	130	APXV18-206517S-C w/ Mount Pipe (E)	90
(2) 6' x 2" Mount Pipe (E)	130	KS24019-L112A (E)	72
(2) 6' x 2" Mount Pipe (E)	130	KS24019-L112A (E)	72
T-Arm Mount [TA 602-3] (E)	128	Side Arm Mount [SO 201-1] (E)	70
(4) ALP 9212-N w/Mount Pipe (E)	120	Side Arm Mount [SO 201-1] (E)	70
(4) ALP 9212-N w/Mount Pipe (E)	120	KS24019-L112A (E)	51
(4) ALP 9212-N w/Mount Pipe (E)	120	Side Arm Mount [SO 701-1] (E)	49
Platform Mount [LP 401-1] (E)	120		
(2) LPD-6513 w/Mount Pipe (E)	109		
(2) LPD-6513 w/Mount Pipe (E)	109		
(2) LPD-6513 w/Mount Pipe (E)	109		
BXA-185060/8CFx2 w/Mount Pipe (P)	109		
BXA-185060/8CFx2 w/Mount Pipe (P)	109		
BXA-185060/8CFx2 w/Mount Pipe (P)	109		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	A607-65	65 ksi	80 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 95.1%

B & T Engineering
1717 South Boulder
Tulsa, OK 74159
Phone: 918-587-4630
FAX: 918-295-0265

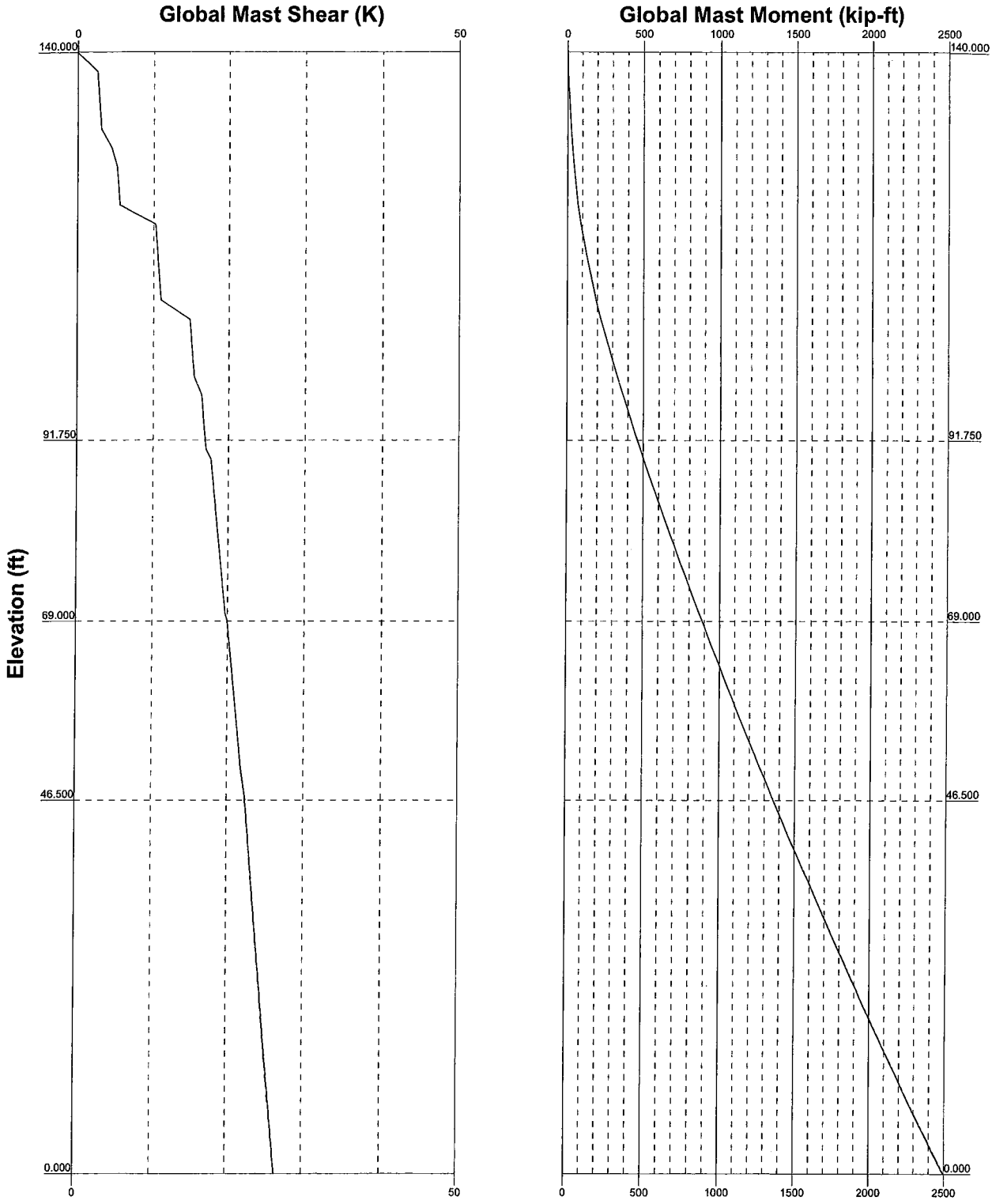
Job:	77969 - East Farmington, CT (BU# 876335)		
Project:	140' Summit Monopole / App ID: 92862; Rev: 3		
Client: Crown Castle USA, Inc.	Drawn by: Terry Carter	App'd:	
Code: TIA/EIA-222-F	Date: 01/08/10	Scale: NTS	
Path: S:\B&T Engineering\Projects\Crown Castle\77969_876335_East Farmington\Engineering\RISA\77969_Rev6_EastFarmington.CCM		Dwg No. E-1	

TIA/EIA-222-F - 80 mph/69 mph 0.500 in Ice

Vx ---------- Vz

Maximum Values

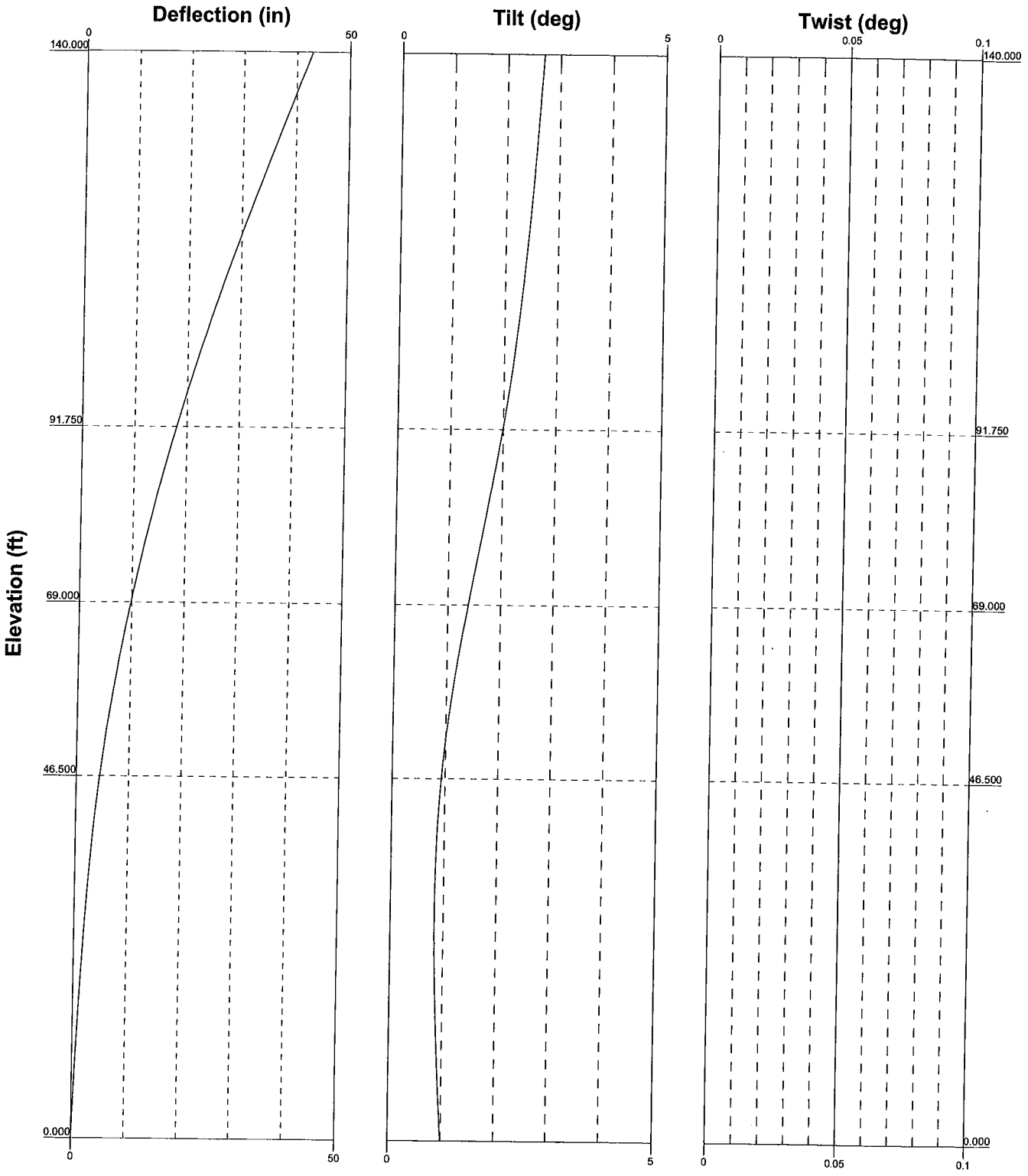
Mx ---------- Mz



B & T Engineering 1717 South Boulder Tulsa, OK 74159 Phone: 918-587-4630 FAX: 918-295-0265	Job: 77969 - East Farmington, CT (BU# 876335)		
	Project: 140' Summit Monopole / App ID: 92862; Rev: 3		
	Client: Crown Castle USA, Inc.	Drawn by: Terry Carter	App'd:
	Code: TIA/EIA-222-F	Date: 01/08/10	Scale: NTS
	Path:		Dwg No. E-4

TIA/EIA-222-F - Service - 50 mph

Maximum Values

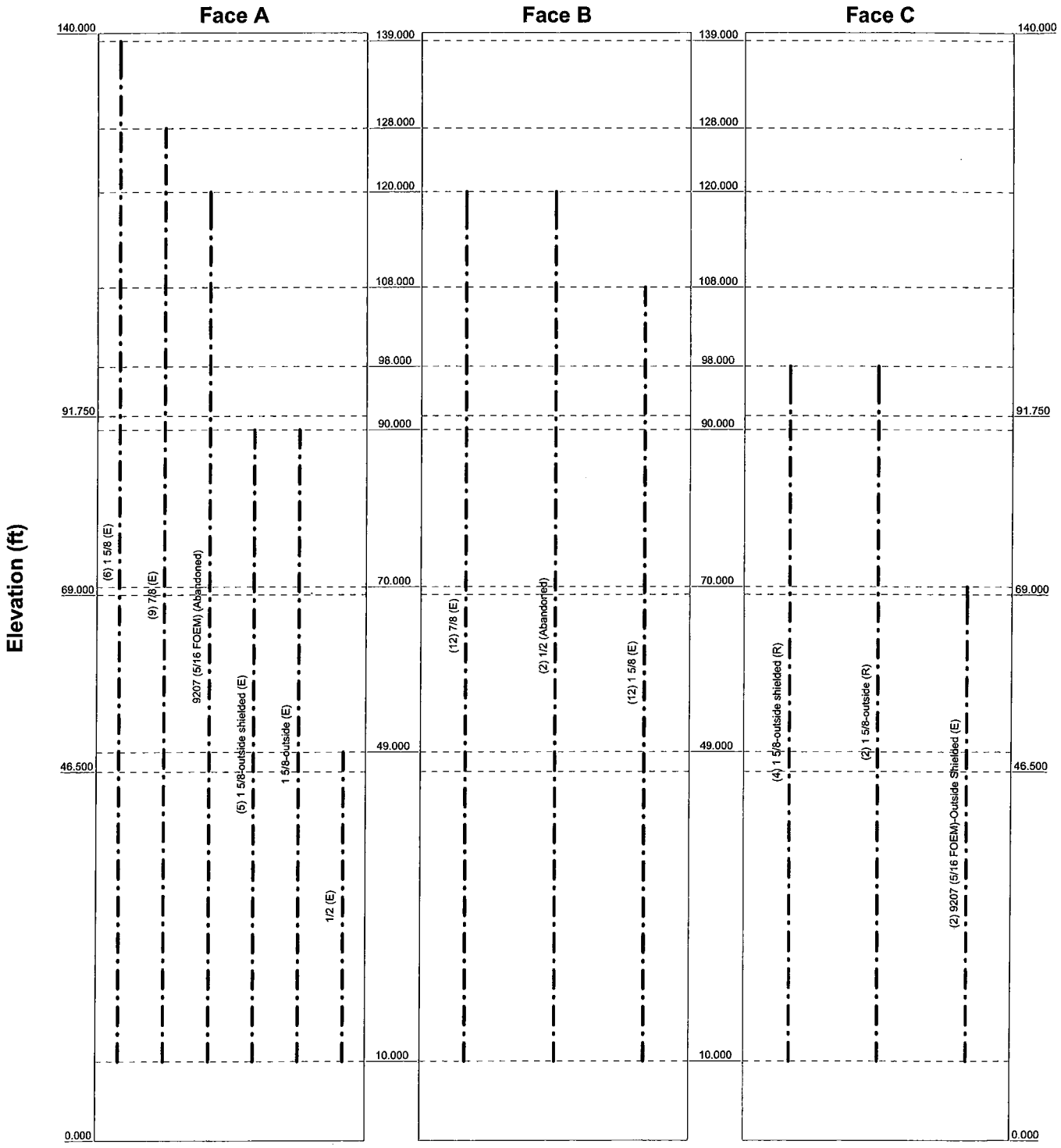


B & T Engineering
1717 South Boulder
Tulsa, OK 74159
Phone: 918-587-4630
FAX: 918-295-0265

Job: 77969 - East Farmington, CT (BU# 876335)			
Project: 140' Summit Monopole / App ID: 92862; Rev: 3			
Client: Crown Castle USA, Inc.	Drawn by: Terry Carter	App'd:	
Code: TIA/EIA-222-F	Date: 01/08/10	Scale: NTS	
Path:		Dwg No. E-5	

Feedline Distribution Chart
0' - 140'

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



B & T Engineering 1717 South Boulder Tulsa, OK 74159 Phone: 918-587-4630 FAX: 918-295-0265	Job: *77969 - East Farmington, CT (BU# 876335)*		
	Project: *140' Summit Monopole / App ID: 92862; Rev: 3*		
	Client: Crown Castle USA, Inc.	Drawn by: Terry Carter	App'd:
	Code: TIA/EIA-222-F	Date: 01/08/10	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 Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 0.500 in.
Ice density of 56.000 pcf.
A wind speed of 69 mph is used in combination with ice.
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 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	140.000-91.750	48.250	3.250	12	16.000	25.890	0.250	1.000	A607-60 (60 ksi)
L2	91.750-69.000	26.000	0.000	12	24.724	30.056	0.313	1.250	A607-65 (65 ksi)
L3	69.000-46.500	22.500	4.500	12	30.056	34.670	0.419	1.676	A607-65 (65 ksi)
L4	46.500-0.000	51.000		12	32.909	43.580	0.455	1.818	A607-65 (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	16.564	12.679	401.443	5.638	8.288	48.437	813.432	6.240	3.618	14.472
	26.803	20.640	1731.952	9.179	13.411	129.144	3509.405	10.158	6.269	25.074
L2	26.286	24.564	1868.385	8.739	12.807	145.888	3785.855	12.090	5.788	18.523
	31.116	29.929	3379.621	10.648	15.569	217.074	6848.029	14.730	7.218	23.096
L3	31.116	39.986	4482.895	10.610	15.569	287.937	9083.561	19.680	6.932	16.544
	35.893	46.211	6919.514	12.262	17.959	385.294	14020.812	22.744	8.169	19.496
L4	35.045	47.507	6387.046	11.619	17.047	374.673	12941.887	23.382	7.601	16.721
	45.117	63.127	14985.480	15.439	22.574	663.825	30364.646	31.069	10.461	23.012

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 140.000-91.750				1	1	1		
L2 91.750-69.000				1	1	1		
L3 69.000-46.500				1	1	1		
L4 46.500-0.000				1	1	1		

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
1 5/8	A	No	Inside Pole	139.000 - 10.000	6	No Ice	0.000	0.001
(E)						1/2" Ice	0.000	0.001
**								
7/8	A	No	Inside Pole	128.000 - 10.000	9	No Ice	0.000	0.001
(E)						1/2" Ice	0.000	0.001
**								
7/8	B	No	Inside Pole	120.000 - 10.000	12	No Ice	0.000	0.001
(E)						1/2" Ice	0.000	0.001
1/2	B	No	Inside Pole	120.000 - 10.000	2	No Ice	0.000	0.000
(Abandoned)						1/2" Ice	0.000	0.000
9207 (5/16 FOEM)	A	No	Inside Pole	120.000 - 10.000	1	No Ice	0.000	0.001
(Abandoned)						1/2" Ice	0.000	0.001
**								
1 5/8	B	No	Inside Pole	108.000 - 10.000	12	No Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
(E) **						1/2" Ice	0.000	0.001
1 5/8-outside shielded (R)	C	No	Inside Pole	98.000 - 10.000	4	No Ice 1/2" Ice	0.000 0.000	0.001 0.001
1 5/8-outside (R) **	C	No	CaAa (Out Of Face)	98.000 - 10.000	2	No Ice 1/2" Ice	0.198 0.298	0.001 0.003
1 5/8-outside shielded (E)	A	No	Inside Pole	90.000 - 10.000	5	No Ice 1/2" Ice	0.000 0.000	0.001 0.001
1 5/8-outside (E) **	A	No	CaAa (Out Of Face)	90.000 - 10.000	1	No Ice 1/2" Ice	0.198 0.298	0.001 0.003
9207 (5/16 FOEM)-Outside Shielded (E) **	C	No	Inside Pole	70.000 - 10.000	2	No Ice 1/2" Ice	0.000 0.000	0.001 0.001
1/2 (E) **	A	No	Inside Pole	49.000 - 10.000	1	No Ice 1/2" Ice	0.000 0.000	0.000 0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	140.000-91.750	A	0.000	0.000	0.000	0.000	0.499
		B	0.000	0.000	0.000	0.000	0.400
		C	0.000	0.000	0.000	2.475	0.039
L2	91.750-69.000	A	0.000	0.000	0.000	4.158	0.406
		B	0.000	0.000	0.000	0.000	0.443
		C	0.000	0.000	0.000	9.009	0.144
L3	69.000-46.500	A	0.000	0.000	0.000	4.455	0.413
		B	0.000	0.000	0.000	0.000	0.438
		C	0.000	0.000	0.000	8.910	0.185
L4	46.500-0.000	A	0.000	0.000	0.000	7.227	0.679
		B	0.000	0.000	0.000	0.000	0.710
		C	0.000	0.000	0.000	14.454	0.301

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	140.000-91.750	A	0.500	0.000	0.000	0.000	0.000	0.499
		B		0.000	0.000	0.000	0.000	0.400
		C		0.000	0.000	0.000	3.725	0.058
L2	91.750-69.000	A	0.500	0.000	0.000	0.000	6.258	0.438
		B		0.000	0.000	0.000	0.000	0.443
		C		0.000	0.000	0.000	13.559	0.213
L3	69.000-46.500	A	0.500	0.000	0.000	0.000	6.705	0.447
		B		0.000	0.000	0.000	0.000	0.438
		C		0.000	0.000	0.000	13.410	0.253
L4	46.500-0.000	A	0.500	0.000	0.000	0.000	10.877	0.734
		B		0.000	0.000	0.000	0.000	0.710
		C		0.000	0.000	0.000	21.754	0.411

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	140.000-91.750	-0.078	0.045	-0.111	0.064
L2	91.750-69.000	-0.411	0.017	-0.548	0.022
L3	69.000-46.500	-0.422	0.000	-0.568	0.000
L4	46.500-0.000	-0.343	0.000	-0.476	0.000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
**										
(2) DB980H90A-M w/Mount Pipe	C	From Face	0.000	0.000	0.000	139.000	No Ice	4.274	3.857	0.034
(E)			0.000				1/2" Ice	4.861	4.946	0.070
(2) DB980H90A-M w/Mount Pipe	B	From Face	0.000	0.000	0.000	139.000	No Ice	4.274	3.857	0.034
(E)			0.000				1/2" Ice	4.861	4.946	0.070
(2) DB980H90A-M w/Mount Pipe	A	From Face	0.000	0.000	0.000	139.000	No Ice	4.274	3.857	0.034
(E)			0.000				1/2" Ice	4.861	4.946	0.070
Platform Mount [LP 401-1]	C	None			0.000	139.000	No Ice	24.330	24.330	1.645
(E)							1/2" Ice	30.220	30.220	2.030
6' x 2" Mount Pipe	C	From Face	0.000	0.000	0.000	139.000	No Ice	1.425	1.425	0.022
(MLA)			0.000				1/2" Ice	1.925	1.925	0.033
6' x 2" Mount Pipe	B	From Face	0.000	0.000	0.000	139.000	No Ice	1.425	1.425	0.022
(MLA)			0.000				1/2" Ice	1.925	1.925	0.033
6' x 2" Mount Pipe	A	From Face	0.000	0.000	0.000	139.000	No Ice	1.425	1.425	0.022
(MLA)			0.000				1/2" Ice	1.925	1.925	0.033
**										
7770.00 w/Mount Pipe	C	From Face	0.000	0.000	0.000	130.000	No Ice	6.218	4.353	0.057
(E)			0.000				1/2" Ice	6.769	5.198	0.103
7770.00 w/Mount Pipe	B	From Face	0.000	0.000	0.000	130.000	No Ice	6.218	4.353	0.057
(E)			0.000				1/2" Ice	6.769	5.198	0.103
7770.00 w/Mount Pipe	A	From Face	0.000	0.000	0.000	130.000	No Ice	6.218	4.353	0.057
(E)			0.000				1/2" Ice	6.769	5.198	0.103
(2) LGP21401	C	From Face	0.000	0.000	0.000	130.000	No Ice	1.288	0.233	0.014
(E)			0.000				1/2" Ice	1.445	0.313	0.021
(2) LGP21401	B	From Face	0.000	0.000	0.000	130.000	No Ice	1.288	0.233	0.014
(E)			0.000				1/2" Ice	1.445	0.313	0.021

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000						
(2) LGP21401	A	From Face	0.000	0.000	130.000	No Ice	1.288	0.233	0.014
(E)			0.000			1/2" Ice	1.445	0.313	0.021
			0.000						
T-Arm Mount [TA 602-3]	C	None		0.000	128.000	No Ice	11.590	11.590	0.774
(E)						1/2" Ice	15.440	15.440	0.990
(2) 6' x 2" Mount Pipe	C	From Face	0.000	0.000	130.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000						
(2) 6' x 2" Mount Pipe	B	From Face	0.000	0.000	130.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000						
(2) 6' x 2" Mount Pipe	A	From Face	0.000	0.000	130.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000						
**									
(4) ALP 9212-N w/Mount Pipe	C	From Face	0.000	0.000	120.000	No Ice	6.417	7.446	0.043
			0.000			1/2" Ice	7.110	8.590	0.104
(E)			0.000						
(4) ALP 9212-N w/Mount Pipe	B	From Face	0.000	0.000	120.000	No Ice	6.417	7.446	0.043
			0.000			1/2" Ice	7.110	8.590	0.104
(E)			0.000						
(4) ALP 9212-N w/Mount Pipe	A	From Face	0.000	0.000	120.000	No Ice	6.417	7.446	0.043
			0.000			1/2" Ice	7.110	8.590	0.104
(E)			0.000						
Platform Mount [LP 401-1]	C	None		0.000	120.000	No Ice	24.330	24.330	1.645
(E)						1/2" Ice	30.220	30.220	2.030
**									
(2) LPD-6513 w/Mount Pipe	C	From Face	0.000	0.000	109.000	No Ice	7.144	6.811	0.054
(E)			0.000			1/2" Ice	7.863	7.922	0.092
			0.000						
(2) LPD-6513 w/Mount Pipe	B	From Face	0.000	0.000	109.000	No Ice	7.144	6.811	0.054
(E)			0.000			1/2" Ice	7.863	7.922	0.092
			0.000						
(2) LPD-6513 w/Mount Pipe	A	From Face	0.000	0.000	109.000	No Ice	7.144	6.811	0.054
(E)			0.000			1/2" Ice	7.863	7.922	0.092
			0.000						
BXA-185060/8CFx2 w/Mount Pipe	C	From Face	0.000	0.000	109.000	No Ice	3.486	3.295	0.032
			0.000			1/2" Ice	3.960	4.103	0.063
(P)			0.000						
BXA-185060/8CFx2 w/Mount Pipe	B	From Face	0.000	0.000	109.000	No Ice	3.486	3.295	0.032
			0.000			1/2" Ice	3.960	4.103	0.063
(P)			0.000						
BXA-185060/8CFx2 w/Mount Pipe	A	From Face	0.000	0.000	109.000	No Ice	3.486	3.295	0.032
			0.000			1/2" Ice	3.960	4.103	0.063
(P)			0.000						
BXA-70063/6CFx2 w/Mount Pipe	C	From Face	0.000	0.000	109.000	No Ice	7.751	5.180	0.039
			0.000			1/2" Ice	8.295	6.114	0.093
(P)			0.000						
BXA-70063/6CFx2 w/Mount Pipe	B	From Face	0.000	0.000	109.000	No Ice	7.751	5.180	0.039
			0.000			1/2" Ice	8.295	6.114	0.093
(P)			0.000						
BXA-70063/6CFx4 w/Mount Pipe	A	From Face	0.000	0.000	109.000	No Ice	7.751	5.180	0.039
			0.000			1/2" Ice	8.295	6.114	0.093
(P)			0.000						
Platform Mount [LP 304-1]	C	None		0.000	108.000	No Ice	17.460	17.460	1.349
(E)						1/2" Ice	22.440	22.440	1.625

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
**									
APX16DWV-16DWV-S-E-A	C	From Leg	0.000	0.000	99.000	No Ice	6.699	2.003	0.040
CU			0.000			1/2" Ice	7.131	2.326	0.071
(R)			0.000						
APX16DWV-16DWV-S-E-A	B	From Leg	0.000	0.000	99.000	No Ice	6.699	2.003	0.040
CU			0.000			1/2" Ice	7.131	2.326	0.071
(R)			0.000						
APX16DWV-16DWV-S-E-A	A	From Leg	0.000	0.000	99.000	No Ice	6.699	2.003	0.040
CU			0.000			1/2" Ice	7.131	2.326	0.071
(R)			0.000						
ONEBASE TWIN DUAL	C	From Leg	0.000	0.000	99.000	No Ice	0.674	0.306	0.011
DUPLEX TMA			0.000			1/2" Ice	0.786	0.392	0.016
(R)			0.000						
ONEBASE TWIN DUAL	B	From Leg	0.000	0.000	99.000	No Ice	0.674	0.306	0.011
DUPLEX TMA			0.000			1/2" Ice	0.786	0.392	0.016
(R)			0.000						
ONEBASE TWIN DUAL	A	From Leg	0.000	0.000	99.000	No Ice	0.674	0.306	0.011
DUPLEX TMA			0.000			1/2" Ice	0.786	0.392	0.016
(R)			0.000						
Pipe Mount [PM 502-3]	C	From Leg	0.000	0.000	98.000	No Ice	6.430	6.430	0.301
(R)			0.000			1/2" Ice	10.250	10.250	0.330
			0.000						
**									
APXV18-206517S-C w/	C	From Leg	0.000	0.000	90.000	No Ice	5.167	4.463	0.048
Mount Pipe			0.000			1/2" Ice	5.618	5.394	0.088
(E)			0.000						
APXV18-206517S-C w/	B	From Leg	0.000	0.000	90.000	No Ice	5.167	4.463	0.048
Mount Pipe			0.000			1/2" Ice	5.618	5.394	0.088
(E)			0.000						
APXV18-206517S-C w/	A	From Leg	0.000	0.000	90.000	No Ice	5.167	4.463	0.048
Mount Pipe			0.000			1/2" Ice	5.618	5.394	0.088
(E)			0.000						
**									
KS24019-L112A	C	From Leg	0.000	0.000	72.000	No Ice	0.100	0.100	0.005
(E)			0.000			1/2" Ice	0.180	0.180	0.006
			0.000						
KS24019-L112A	B	From Leg	0.000	0.000	72.000	No Ice	0.100	0.100	0.005
(E)			0.000			1/2" Ice	0.180	0.180	0.006
			0.000						
Side Arm Mount [SO 201-1]	C	From Leg	0.000	0.000	70.000	No Ice	2.960	2.110	0.096
(E)			0.000			1/2" Ice	4.100	2.930	0.117
			0.000						
Side Arm Mount [SO 201-1]	B	From Leg	0.000	0.000	70.000	No Ice	2.960	2.110	0.096
(E)			0.000			1/2" Ice	4.100	2.930	0.117
			0.000						
**									
KS24019-L112A	A	From Leg	0.000	0.000	51.000	No Ice	0.100	0.100	0.005
(E)			0.000			1/2" Ice	0.180	0.180	0.006
			0.000						
Side Arm Mount [SO 701-1]	A	From Leg	0.000	0.000	49.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000						
**									

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
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
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
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	140 - 91.75	Pole	Max Tension	11	0.000	-0.000	0.000
			Max. Compression	14	-14.677	0.320	-0.185
			Max. Mx	11	-9.450	408.774	-0.160
			Max. My	8	-9.451	0.280	-408.666
			Max. Vy	11	-16.623	408.774	-0.160
			Max. Vx	8	16.624	0.280	-408.666
			Max. Torque	26			0.319
L2	91.75 - 69	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-19.438	0.438	-0.344

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	11	-13.776	885.582	-0.291
			Max. My	8	-13.779	0.340	-885.535
			Max. Vy	11	-19.978	885.582	-0.291
			Max. Vx	8	19.949	0.340	-885.535
			Max. Torque	20			-0.452
L3	69 - 46.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-23.315	0.545	-0.344
			Max. Mx	11	-17.475	1261.431	-0.295
			Max. My	8	-17.477	0.389	-1260.825
			Max. Vy	11	-21.820	1261.431	-0.295
			Max. Vx	8	21.790	0.389	-1260.825
			Max. Torque	20			-0.518
L4	46.5 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-37.021	0.825	-0.222
			Max. Mx	11	-30.669	2496.782	-0.202
			Max. My	8	-30.669	0.507	-2493.269
			Max. Vy	11	-26.533	2496.782	-0.202
			Max. Vx	8	26.480	0.507	-2493.269
			Max. Torque	20			-0.631

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	37.021	0.000	0.000
	Max. H_x	11	30.696	26.502	-0.000
	Max. H_z	2	30.696	0.000	26.448
	Max. M_x	2	2492.866	0.000	26.448
	Max. M_z	5	2495.767	-26.502	-0.000
	Max. Torsion	26	0.631	11.346	19.602
	Min. Vert	11	30.696	26.502	-0.000
	Min. H_x	5	30.696	-26.502	-0.000
	Min. H_z	8	30.696	0.000	-26.448
	Min. M_x	8	-2493.269	0.000	-26.448
	Min. M_z	11	-2496.782	26.502	-0.000
	Min. Torsion	20	-0.631	-11.346	-19.602

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	30.696	0.000	0.000	0.189	0.484	0.000
Dead+Wind 0 deg - No Ice	30.696	-0.000	-26.448	-2492.866	0.507	-0.538
Dead+Wind 30 deg - No Ice	30.696	13.252	-22.905	-2158.905	-1247.735	-0.389
Dead+Wind 60 deg - No Ice	30.696	22.953	-13.224	-1246.358	-2161.508	-0.135
Dead+Wind 90 deg - No Ice	30.696	26.502	0.000	0.202	-2495.767	0.155
Dead+Wind 120 deg - No Ice	30.696	22.953	13.224	1246.761	-2161.508	0.404
Dead+Wind 150 deg - No Ice	30.696	13.252	22.905	2159.308	-1247.735	0.544
Dead+Wind 180 deg - No Ice	30.696	-0.000	26.448	2493.269	0.507	0.538
Dead+Wind 210 deg - No Ice	30.696	-13.252	22.905	2159.308	1248.749	0.388
Dead+Wind 240 deg - No Ice	30.696	-22.953	13.224	1246.761	2162.523	0.135

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 270 deg - No Ice	30.696	-26.502	0.000	0.202	2496.782	-0.155
Dead+Wind 300 deg - No Ice	30.696	-22.953	-13.224	-1246.358	2162.523	-0.403
Dead+Wind 330 deg - No Ice	30.696	-13.252	-22.905	-2158.905	1248.749	-0.544
Dead+Ice	37.021	0.000	0.000	0.222	0.825	0.000
Dead+Wind 0 deg+Ice	37.021	-0.000	-22.634	-2187.930	0.873	-0.623
Dead+Wind 30 deg+Ice	37.021	11.346	-19.602	-1894.844	-1095.045	-0.449
Dead+Wind 60 deg+Ice	37.021	19.652	-11.317	-1093.885	-1897.310	-0.154
Dead+Wind 90 deg+Ice	37.021	22.692	0.000	0.243	-2190.872	0.182
Dead+Wind 120 deg+Ice	37.021	19.652	11.317	1094.371	-1897.311	0.469
Dead+Wind 150 deg+Ice	37.021	11.346	19.602	1895.331	-1095.046	0.631
Dead+Wind 180 deg+Ice	37.021	-0.000	22.634	2188.418	0.873	0.623
Dead+Wind 210 deg+Ice	37.021	-11.346	19.602	1895.333	1096.792	0.449
Dead+Wind 240 deg+Ice	37.021	-19.652	11.317	1094.372	1899.059	0.154
Dead+Wind 270 deg+Ice	37.021	-22.692	0.000	0.243	2192.621	-0.182
Dead+Wind 300 deg+Ice	37.021	-19.652	-11.317	-1093.886	1899.058	-0.469
Dead+Wind 330 deg+Ice	37.021	-11.346	-19.602	-1894.846	1096.791	-0.631
Dead+Wind 0 deg - Service	30.696	0.000	-10.331	-975.190	0.511	-0.212
Dead+Wind 30 deg - Service	30.696	5.176	-8.947	-844.583	-487.883	-0.153
Dead+Wind 60 deg - Service	30.696	8.966	-5.166	-487.534	-845.412	-0.053
Dead+Wind 90 deg - Service	30.696	10.352	-0.000	0.204	-976.196	0.061
Dead+Wind 120 deg - Service	30.696	8.966	5.166	487.941	-845.412	0.159
Dead+Wind 150 deg - Service	30.696	5.176	8.947	844.990	-487.883	0.214
Dead+Wind 180 deg - Service	30.696	0.000	10.331	975.598	0.511	0.212
Dead+Wind 210 deg - Service	30.696	-5.176	8.947	844.990	488.906	0.153
Dead+Wind 240 deg - Service	30.696	-8.966	5.166	487.941	846.436	0.053
Dead+Wind 270 deg - Service	30.696	-10.352	-0.000	0.204	977.219	-0.061
Dead+Wind 300 deg - Service	30.696	-8.966	-5.166	-487.534	846.436	-0.159
Dead+Wind 330 deg - Service	30.696	-5.176	-8.947	-844.583	488.906	-0.214

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-30.696	0.000	0.000	30.696	0.000	0.000%
2	0.000	-30.696	-26.449	0.000	30.696	26.448	0.001%
3	13.252	-30.696	-22.905	-13.252	30.696	22.905	0.000%
4	22.953	-30.696	-13.224	-22.953	30.696	13.224	0.000%
5	26.503	-30.696	0.000	-26.502	30.696	-0.000	0.004%
6	22.953	-30.696	13.224	-22.953	30.696	-13.224	0.000%
7	13.252	-30.696	22.905	-13.252	30.696	-22.905	0.000%
8	0.000	-30.696	26.449	0.000	30.696	-26.448	0.001%
9	-13.252	-30.696	22.905	13.252	30.696	-22.905	0.000%
10	-22.953	-30.696	13.224	22.953	30.696	-13.224	0.000%
11	-26.503	-30.696	0.000	26.502	30.696	-0.000	0.004%
12	-22.953	-30.696	-13.224	22.953	30.696	13.224	0.000%
13	-13.252	-30.696	-22.905	13.252	30.696	22.905	0.000%
14	0.000	-37.021	0.000	0.000	37.021	0.000	0.000%
15	0.000	-37.021	-22.634	0.000	37.021	22.634	0.002%
16	11.346	-37.021	-19.602	-11.346	37.021	19.602	0.000%
17	19.652	-37.021	-11.317	-19.652	37.021	11.317	0.000%
18	22.693	-37.021	0.000	-22.692	37.021	-0.000	0.002%
19	19.652	-37.021	11.317	-19.652	37.021	-11.317	0.000%
20	11.346	-37.021	19.602	-11.346	37.021	-19.602	0.000%
21	0.000	-37.021	22.634	0.000	37.021	-22.634	0.002%
22	-11.346	-37.021	19.602	11.346	37.021	-19.602	0.000%
23	-19.652	-37.021	11.317	19.652	37.021	-11.317	0.000%
24	-22.693	-37.021	0.000	22.692	37.021	-0.000	0.002%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
25	-19.652	-37.021	-11.317	19.652	37.021	11.317	0.000%
26	-11.346	-37.021	-19.602	11.346	37.021	19.602	0.000%
27	0.000	-30.696	-10.332	-0.000	30.696	10.331	0.002%
28	5.176	-30.696	-8.947	-5.176	30.696	8.947	0.000%
29	8.966	-30.696	-5.166	-8.966	30.696	5.166	0.000%
30	10.353	-30.696	0.000	-10.352	30.696	0.000	0.002%
31	8.966	-30.696	5.166	-8.966	30.696	-5.166	0.000%
32	5.176	-30.696	8.947	-5.176	30.696	-8.947	0.000%
33	0.000	-30.696	10.332	-0.000	30.696	-10.331	0.002%
34	-5.176	-30.696	8.947	5.176	30.696	-8.947	0.000%
35	-8.966	-30.696	5.166	8.966	30.696	-5.166	0.000%
36	-10.353	-30.696	0.000	10.352	30.696	0.000	0.002%
37	-8.966	-30.696	-5.166	8.966	30.696	5.166	0.000%
38	-5.176	-30.696	-8.947	5.176	30.696	8.947	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	7	0.00000001	0.00005854
3	Yes	10	0.00000001	0.00007809
4	Yes	10	0.00000001	0.00007848
5	Yes	6	0.00006137	0.00013030
6	Yes	10	0.00000001	0.00007895
7	Yes	10	0.00000001	0.00007789
8	Yes	7	0.00000001	0.00005856
9	Yes	10	0.00000001	0.00007893
10	Yes	10	0.00000001	0.00007848
11	Yes	6	0.00006136	0.00013037
12	Yes	10	0.00000001	0.00007802
13	Yes	10	0.00000001	0.00007913
14	Yes	4	0.00000001	0.00000001
15	Yes	7	0.00002994	0.00008721
16	Yes	10	0.00000001	0.00009448
17	Yes	10	0.00000001	0.00009519
18	Yes	7	0.00002994	0.00005020
19	Yes	10	0.00000001	0.00009601
20	Yes	10	0.00000001	0.00009415
21	Yes	7	0.00002994	0.00008725
22	Yes	10	0.00000001	0.00009599
23	Yes	10	0.00000001	0.00009523
24	Yes	7	0.00002993	0.00005024
25	Yes	10	0.00000001	0.00009442
26	Yes	10	0.00000001	0.00009634
27	Yes	6	0.00006743	0.00006963
28	Yes	8	0.00000001	0.00009406
29	Yes	8	0.00000001	0.00009525
30	Yes	6	0.00006742	0.00005891
31	Yes	8	0.00000001	0.00009666
32	Yes	8	0.00000001	0.00009356
33	Yes	6	0.00006743	0.00006969
34	Yes	8	0.00000001	0.00009659
35	Yes	8	0.00000001	0.00009536
36	Yes	6	0.00006742	0.00005901
37	Yes	8	0.00000001	0.00009401
38	Yes	8	0.00000001	0.00009713

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 91.75	42.897	36	2.686	0.001
L2	95 - 69	19.419	36	2.069	0.001
L3	69 - 46.5	9.860	36	1.390	0.001
L4	51 - 0	5.372	36	0.991	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
139.000	(2) DB980H90A-M w/Mount Pipe	36	42.334	2.677	0.001	19559
130.000	7770.00 w/Mount Pipe	36	37.285	2.590	0.001	9779
128.000	T-Arm Mount [TA 602-3]	36	36.173	2.569	0.001	8149
120.000	(4) ALP 9212-N w/Mount Pipe	36	31.796	2.480	0.001	4888
109.000	(2) LPD-6513 w/Mount Pipe	36	26.047	2.330	0.001	3153
108.000	Platform Mount [LP 304-1]	36	25.545	2.315	0.001	3054
99.000	APX16DWV-16DWV-S-E-ACU	36	21.217	2.153	0.001	2383
98.000	Pipe Mount [PM 502-3]	36	20.760	2.133	0.001	2329
90.000	APXV18-206517S-C w/ Mount Pipe	36	17.295	1.951	0.001	2189
72.000	KS24019-L112A	36	10.777	1.470	0.001	2256
70.000	Side Arm Mount [SO 201-1]	36	10.160	1.416	0.001	2260
51.000	KS24019-L112A	36	5.372	0.991	0.000	2197
49.000	Side Arm Mount [SO 701-1]	36	4.983	0.961	0.000	2253

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 91.75	109.299	11	6.848	0.003
L2	95 - 69	49.539	11	5.277	0.003
L3	69 - 46.5	25.170	11	3.547	0.002
L4	51 - 0	13.719	11	2.530	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
139.000	(2) DB980H90A-M w/Mount Pipe	11	107.866	6.824	0.003	7855
130.000	7770.00 w/Mount Pipe	11	95.018	6.606	0.003	3926
128.000	T-Arm Mount [TA 602-3]	11	92.189	6.555	0.003	3271
120.000	(4) ALP 9212-N w/Mount Pipe	11	81.049	6.331	0.003	1960

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
109.000	(2) LPD-6513 w/Mount Pipe	11	66.416	5.949	0.003	1262
108.000	Platform Mount [LP 304-1]	11	65.137	5.909	0.003	1222
99.000	APX16DWV-16DWV-S-E-ACU	11	54.118	5.495	0.003	952
98.000	Pipe Mount [PM 502-3]	11	52.953	5.442	0.003	930
90.000	APXV18-206517S-C w/ Mount Pipe	11	44.127	4.972	0.003	871
72.000	KS24019-L112A	11	27.510	3.746	0.002	892
70.000	Side Arm Mount [SO 201-1]	11	25.936	3.613	0.002	893
51.000	KS24019-L112A	11	13.719	2.530	0.001	863
49.000	Side Arm Mount [SO 701-1]	11	12.726	2.437	0.001	885

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	140 - 91.75 (1)	TP25.89x16x0.25	48.250	0.000	0.0	36.0000	20.104	-9.450	723.742	0.013
L2	91.75 - 69 (2)	TP30.056x24.724x0.313	26.000	0.000	0.0	39.0000	29.929	-13.776	1167.250	0.012
L3	69 - 46.5 (3)	TP34.67x30.056x0.419	22.500	0.000	0.0	39.0000	44.966	-17.475	1753.660	0.010
L4	46.5 - 0 (4)	TP43.58x32.909x0.455	51.000	0.000	0.0	39.0000	63.127	-30.669	2461.970	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	140 - 91.75 (1)	TP25.89x16x0.25	408.849	40.0541	36.0000	1.113	0.000	0.0000	36.0000	0.000
L2	91.75 - 69 (2)	TP30.056x24.724x0.313	885.742	48.9646	39.0000	1.255	0.000	0.0000	39.0000	0.000
L3	69 - 46.5 (3)	TP34.67x30.056x0.419	1261.483	41.5088	39.0000	1.064	0.000	0.0000	39.0000	0.000
L4	46.5 - 0 (4)	TP43.58x32.909x0.455	2496.783	45.1345	39.0000	1.157	0.000	0.0000	39.0000	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	140 - 91.75 (1)	TP25.89x16x0.25	16.625	0.8269	24.0000	0.070	0.000	0.0000	24.0000	0.000
L2	91.75 - 69 (2)	TP30.056x24.724x0.313	19.972	0.6673	26.0000	0.052	0.045	0.0012	26.0000	0.000
L3	69 - 46.5 (3)	TP34.67x30.056x0.419	21.813	0.4851	26.0000	0.038	0.013	0.0002	26.0000	0.000
L4	46.5 - 0 (4)	TP43.58x32.909x0.455	26.533	0.4203	26.0000	0.033	0.155	0.0013	26.0000	0.000

Pole Interaction Design Data

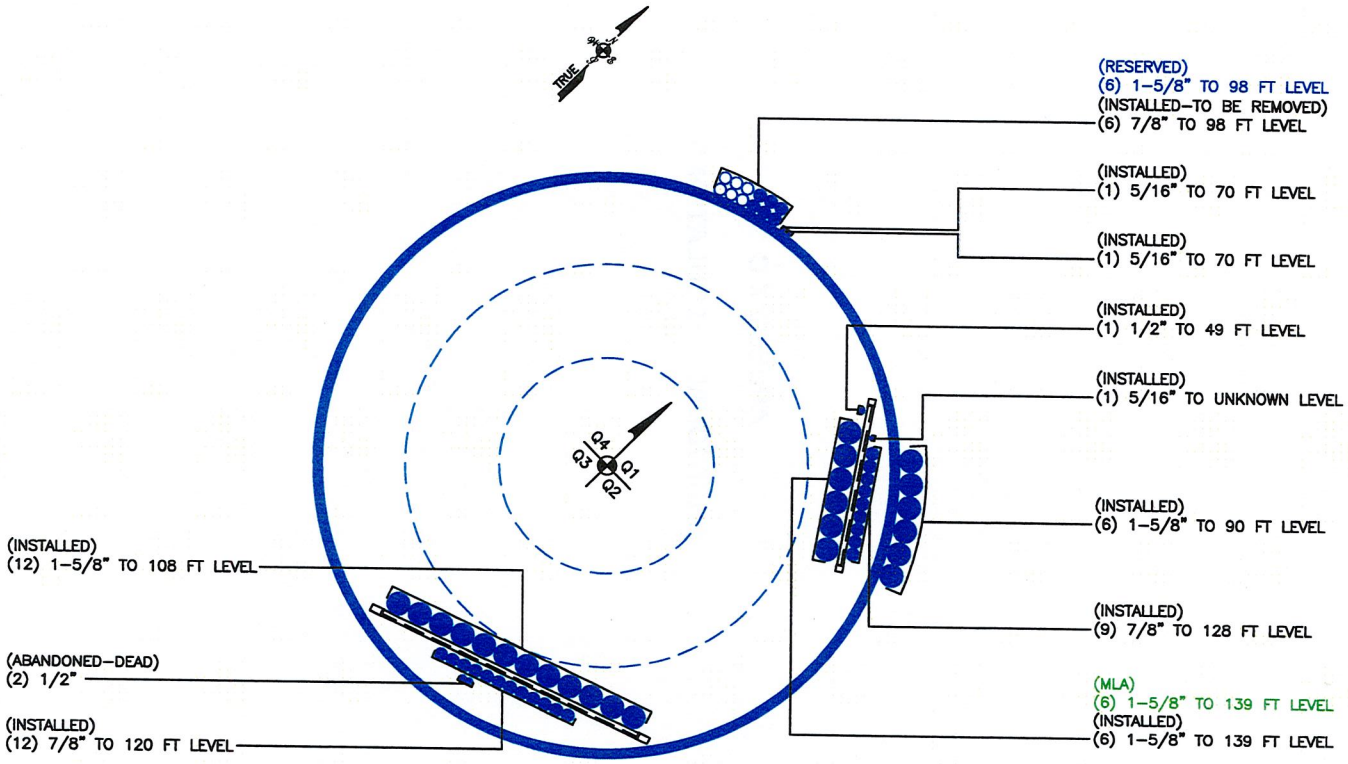
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	140 - 91.75 (1)	0.013	1.113	0.000	0.070	0.000	1.127 ✓	1.333	H1-3+VT ✓
L2	91.75 - 69 (2)	0.012	1.255	0.000	0.052	0.000	1.268 ✓	1.333	H1-3+VT ✓
L3	69 - 46.5 (3)	0.010	1.064	0.000	0.038	0.000	1.075 ✓	1.333	H1-3+VT ✓
L4	46.5 - 0 (4)	0.012	1.157	0.000	0.033	0.000	1.170 ✓	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	140 - 91.75	Pole	TP25.89x16x0.25	1	-9.450	964.748	84.5	Pass
L2	91.75 - 69	Pole	TP30.056x24.724x0.313	2	-13.776	1555.944	95.1	Pass
L3	69 - 46.5	Pole	TP34.67x30.056x0.419	3	-17.475	2337.629	80.6	Pass
L4	46.5 - 0	Pole	TP43.58x32.909x0.455	4	-30.669	3281.806	87.8	Pass
							Summary	
						Pole (L2)	95.1	Pass
						RATING =	**95.1**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876335 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Square, Unstiffened Base Plate, Any Rod Material - Rev. F

Assumptions: Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48.
Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)

Site Data

BU#: *876335*
Site Name: *East Farmington, CT*
App #: *92862; Rev: 3*

Reactions		
Moment:	2497	ft-kips
Axial:	31	kips
Shear:	27	kips

Connection Type:	*Butt*

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Grade(Fy):	75	ksi
Bolt Circle:	51	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	49.5	in
Thick:	3	in
Grade:	50	ksi
B effective	26.42	in

Pole Data		
Diam:	43.58	in
Thick:	0.375	in
Grade:	65	ksi

Stress Increase Factor		
ASIF:	1.333	

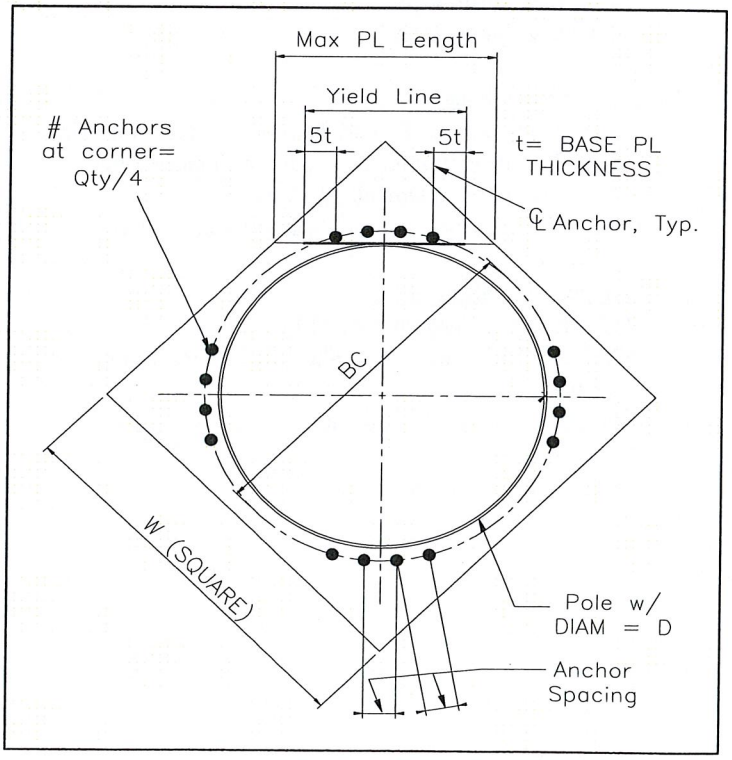
Anchor Rod Results

Maximum Rod Tension:	193.3 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	99.1% **Pass**

Base Plate Results

Base Plate Stress:	47.8 ksi
Allowable Plate Stress:	50.0 ksi
Base Plate Stress Ratio:	95.7% **Pass**

PL Ref. Data
Yield Line (in):
26.42
Max PL Length:
26.42



Slab Size

Program: Pad and Pedestal Date: 1/8/2010
File Name: 77969
Location: East Farmington, CT (BU 876335)

INPUT **Bold Values Only are Input**

20.00	**Length, L (ft.)**	**Conc. Unit Weight**	**0.088** kcf
20.00	**Width, B (ft.)**	**Soil Unit Weight**	**0.11** kcf
4.00	**Thickness, T (ft)**		
0.50	**Height of Pier Above Grade, (ft.)**	**** See Design Notes Below**	
9.00	**Depth to Base, D (ft.)**		
1.00	**Round Pedestal =0, Else Square Pedestal**		
8.00	**Pedestal Diameter or Width, (ft.)**		
30.00	**Phi Angle, (deg.)**	0.5236 Phi in Radians	
0.00	**Cohesion, c (ksf)**		
3000	**Conc. f'c, (psi)**		
1.30	**USD Load Factor**		
12.00	**Net Allow Bearing Stress, include Code Increase when approp., (ksf)**		
1.50	**Allow O.T. Factor of Safety**		

2497	**Tower O.T. Moment, (ft.-kips)**	O.T. Moment @ fdn Base:	2753.50 ft.-kips
31	**Leg Download, kips**		
0	**Leg Uplift, kips**		
27	**Leg Shear, kips**		

Check of Punching Shear

43.50	d, top of conc. To middle of bottom rebar mat, (in.)
558.00	Bo, The circumference at d/2 from face of pier, (in.)
40.3	Factored Leg Download, (kips)
4520.3	Phi*Vn, Conc. 2-way Shear Resistance, (kips)

Check of One Way Shear Shear

457.8	Factored Shear at Face of Pier
972.1	Phi*Vn, Conc. 1-way Shear Resistance, (kips)

Mat Thickness is acceptable

72.30 Concrete Volume (c.y.)

Slab Size

Program: Pad and Pedestal
File Name: 77969
Location: East Farmington, CT (BU 876335)

Check Net Vert. Soil Pressure Eccentricity = 7.10 > 3.33 ft. (L/6)

Vert. Loads in kips

31.00	Tower	RESULTANT IS OUTSIDE MIDDLE THIRD OF THE PAD
184.80	Soil	L-PRIME= 8.69
171.78	Conc	
387.58	Sum of the Verticals, (kips)	

0.00	Net q-min. (ksf)			
3.47	Net q-max, (ksf))	Status:	OK	**28.9%**
1.66	O.T. Factor of Safety	Status:	OK	**90.6%**
3.56	q-Bottom Design, (ksf)	The Net q-max minus the opposing effect of conc DW		
0.90	q-TopDesign, (ksf)	Deadweight TO BE USED FOR CONCRETE SLAB DESIGN of top mat reinforcing steel		

Conservatively assume maximum moment at the pier centerline with maximum mat edge distance

Pier Design, Max Moment =	31746	in.-kips
Pad Bottom Design, Moment Arm:	6.00	ft.
Pad Bottom Design, Max Moment:	3844	in.-kips
Pad Top Design, Moment Arm:	6.00	ft.
Pad Top Design, Max Moment:	974	in.-kips

Use the above moments in the Pier, Pad Bottom & Top design sheets
in this Workbook to determine reinforcing steel requirements.

Design Notes:
1. **Assumed water table at 5' below grade per the original foundation design.**
2. **Analysis considers a soil weight of 110 pcf (above the water table).**
3. **Analysis considers bouyant weight for concrete.**

ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

ORIGINAL

August 30, 2010

Michael Perrone
Siting Analyst
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **EM-VER-052-100201 – Cellco Partnership d/b/a Verizon Wireless**
130 Birdseye Road, Farmington, Connecticut

Dear Mr. Perrone:

On March 16, 2010, the Siting Council acknowledged receipt of Cellco's notice of intent to modify the above-referenced telecommunications facility. This modification involved the replacement of six (6) existing PCS antennas with three (3) newer model PCS antennas, and three (3) LTE antennas.

In addition to these antenna modifications, Cellco now intends to install six (6) antenna cable diplexers on its antenna mounting platform. Attached to this letter is a Structural Analysis Report verifying that the tower can support the previously approved antenna modifications and the installation of the diplexers.

If you have any questions regarding any of these materials, please do not hesitate to contact me or Rachel Mayo.

Sincerely,

Kenneth C. Baldwin

Attachment
Copy to:
Sandy M. Carter
Brian Ragozzine
Mark Gauger

Date: **August 27, 2010**

Mr. JD Williams
Crown Castle USA Inc.
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6521

B&T Engineering, Inc.
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
ctuttle@btengineering.com

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	117998
	Carrier Site Name:	New Britain 5
Crown Castle Designation:	**Crown Castle BU Number:**	876335
	Crown Castle Site Name:	East Farmington
	Crown Castle JDE Job Number:	138611
	Crown Castle Work Order Number:	352682
Engineering Firm Designation:	**B&T Engineering, Inc. Project Number:**	77969
Site Data:	**3 A Birdseye Road, Farmington, CT, Hartford County**	
	Latitude *41° 42' 56.58"*, Longitude *-72° 48' 39.08"*	
	140 Foot - Monopole	

Dear Mr. Williams,

B&T 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 384934, in accordance with application 104235, revision 3.

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:

LC1: 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 80 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 *B&T Engineering, Inc.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle USA Inc. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Terry Carter
Project Engineer

Chad E. Tuttle, P.E.
President

RISA Tower Report - version 5.3.1.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 140 ft Monopole tower designed by Summit Manufacturing in November of 1997. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. The tower has been reinforced as specified by B&T Engineering in 2008 and those reinforcements are incorporated in this analysis.

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 80 mph with no ice, 69.3 mph with 0.5 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
108	109	3	Antel	BXA-185060/8CFx2	--	--	--
		2	Antel	BXA-70063/6CFx2			
		1	Antel	BXA-70063/6CFx4			
		6	RFS/Cellwave	FD9R6004/2C-3L			

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
139	139	6	--	MLA Antenna (6'x1'x6" Panel)	6	1 5/8	3
		1	--	LP Platform	6	1 5/8	1
		6	Decibel	DB980H90A-M w/ Mount Pipe			
128	130	1	--	(3) T-Arms	9	7/8	1
		3	Powerwave	7770.00 w/ Mount Pipe			
		6	Powerwave	LGP21401			
120	120	1	--	LP Platform	12	7/8	1
		12	Swedcom	ALP 9212-N w/ Mount Pipe			
108	109	6	Antel	LPD-6513 w/ Mount Pipe	12	1 5/8	1
		6	Antel	LPA-185063/8CF	--	--	4
	108	--	--	--	2 1	1/2 5/16	5
		1	--	LP Platform	--	--	1
100	100	3	--	Pipe Mount	6	1 5/8	1
		6	Andrew	ONEBASE TWIN DUAL DUPLEX TMA			6
		3	RFS/Celwave	APX16DWV-16DWV-S-E-ACU			
		3	RFS/Celwave	APX16DWV-16DWV-S-E-ACU			1
		3	Ericsson	KRY 112 89/5			
		3		KRY 112 144/1			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
90	90	3	--	Pipe Mount	6	7/8	1
		3	Kathrein	742 213			
70	72	2	Lucent	KS24019-L112A	2	5/16	1
	70	2	--	Side Arm			
49	51	1	Lucent	KS24019-L112A	1	1/2	1
	49	1	--	Side Arm			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) MLA Equipment not considered in this analysis.
4) Equipment to be Removed
5) Abandoned Feedlines used in this analysis
6) Not installed equipment.

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)
Information Not Available						

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Locate Revision #3	92862	Crown OTG
Tower Manufacturing Drawing	Summit Manufacturing, Dtd 11/03/1997	1615361	Crown OTG
Foundation Drawing	Summit Manufacturing, Job No.2933	1440555	Crown OTG
Geotech Report	Dr. Clarence Welti Geotechnical Engineering, Dtd.06/19/06	1850446	Crown OTG
Tower Modification Drawing	B&T Engineering, Dtd.12/09/08	N/A	Crown OTG
Antenna Configuration	Crown CAD Package	Date: 8/16/10	Crown OTG

3.1) Analysis Method

RISATower (version 5.4.2.0), 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. This structural analysis **does not** include a grouted base plate.
2. Tower and structures were built in accordance with the manufacturer's specifications.
3. The tower and structures have been maintained in accordance with manufacturer's specifications.
4. The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
5. When applicable, transmission cables are considered to be structural components for calculating wind loads, as allowed by TIA/EIA-222-F.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and B&T Engineering, Inc. should be allowed to review any new information to determine its effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary) – LC1

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	140 - 91.75	Pole	TP25.89x16x0.25	1	-9.410	964.748	85.0	Pass
L2	91.75 - 69	Pole	TP30.056x24.724x0.313	2	-13.729	1555.944	95.5	Pass
L3	69 - 46.5	Pole	TP34.67x30.056x0.419	3	-17.430	2337.629	80.9	Pass
L4	46.5 - 0	Pole	TP43.58x32.909x0.455	4	-30.629	3281.806	88.0	Pass
							Summary	
							Pole (L2) 95.5	Pass
							RATING = **95.5**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity – LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	99.4	Pass
1	Base Plate	Base	95.9	Pass
1	Base Foundation	Base	90.8	Pass

Structure Rating (max from all components) =	**99.4%**

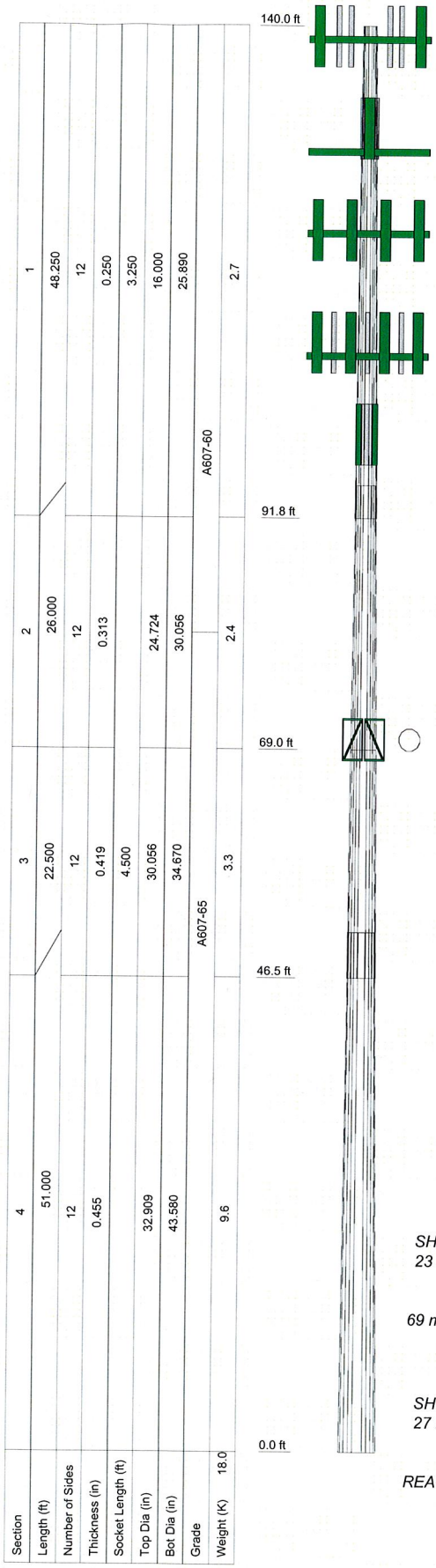
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Capacities up to 105% are considered acceptable based on analysis methods used.
3) The percent capacities shown above (excluding foundations) include the 1/3 increase in allowable stresses as allowed by TIA/EIA-222-F.

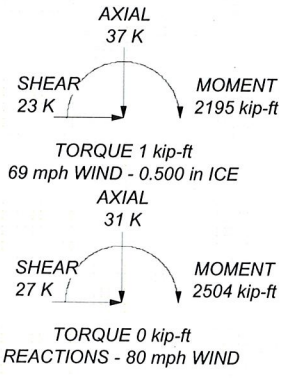
4.1) Recommendations

N/A

APPENDIX A

RISA TOWER OUTPUT





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) DB980H90A-M w/Mount Pipe (E)	139	BXA-185060/8CFx2 w/Mount Pipe (P)	109
(2) DB980H90A-M w/Mount Pipe (E)	139	BXA-70063/6CFx2 w/Mount Pipe (P)	109
(2) DB980H90A-M w/Mount Pipe (E)	139	BXA-70063/6CFx2 w/Mount Pipe (P)	109
Platform Mount [LP 401-1] (E)	139	BXA-70063/6CFx4 w/Mount Pipe (P)	109
6' x 2" Mount Pipe (E)	139		
6' x 2" Mount Pipe (E)	139	(2) FD9R6004/2C-3L (P)	109
6' x 2" Mount Pipe (E)	139	(2) FD9R6004/2C-3L (P)	109
7770.00 w/Mount Pipe (E)	130	(2) FD9R6004/2C-3L (P)	109
7770.00 w/Mount Pipe (E)	130	Platform Mount [LP 304-1] (E)	108
7770.00 w/Mount Pipe (E)	130	APX16DWV-16DWV-S-E-A20 (E)	100
(2) LGP21401 (E)	130	APX16DWV-16DWV-S-E-A20 (E)	100
(2) LGP21401 (E)	130	APX16DWV-16DWV-S-E-A20 (E)	100
(2) LGP21401 (E)	130	KRY 112 89/5 TMA (E)	100
(2) 6' x 2" Mount Pipe (E)	130	KRY 112 89/5 TMA (E)	100
(2) 6' x 2" Mount Pipe (E)	130	KRY 112 89/5 TMA (E)	100
(2) 6' x 2" Mount Pipe (E)	130	KRY 112 144/1 (E)	100
T-Arm Mount [TA 602-3] (E)	128	KRY 112 144/1 (E)	100
(4) ALP 9212-N w/Mount Pipe (E)	120	KRY 112 144/1 (E)	100
(4) ALP 9212-N w/Mount Pipe (E)	120	Pipe Mount [PM 601-3] (E)	100
(4) ALP 9212-N w/Mount Pipe (E)	120	742 213 w/ Mount Pipe (E)	90
Platform Mount [LP 401-1] (E)	120	742 213 w/ Mount Pipe (E)	90
(2) LPD-6513 w/Mount Pipe (E)	109	742 213 w/ Mount Pipe (E)	90
(2) LPD-6513 w/Mount Pipe (E)	109	KS24019-L112A (E)	72
(2) LPD-6513 w/Mount Pipe (E)	109	KS24019-L112A (E)	72
BXA-185060/8CFx2 w/Mount Pipe (P)	109	Side Arm Mount [SO 201-1] (E)	70
		Side Arm Mount [SO 201-1] (E)	70
BXA-185060/8CFx2 w/Mount Pipe (P)	109	KS24019-L112A (E)	51
		Side Arm Mount [SO 701-1] (E)	49

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	A607-65	65 ksi	80 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 95.5%

B & T Engineering
1717 South Boulder
Tulsa, OK 74159
Phone: 918-587-4630
FAX: 918-295-0265

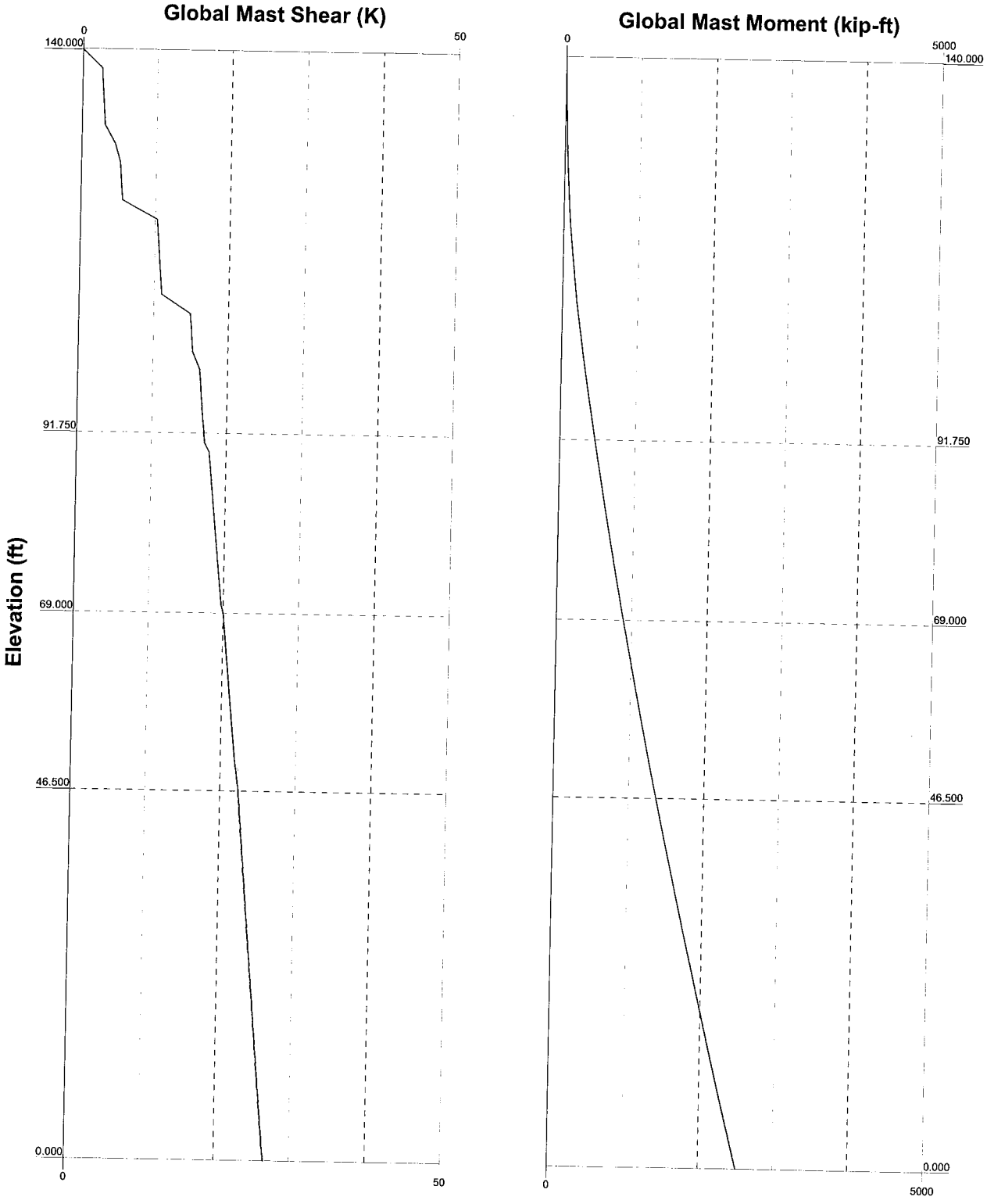
Job: 77969 - East Farmington, CT (BU# 876335)		
Project: 140' Summit Monopole / App ID: 104235; Rev: 3		
Client: Crown Castle USA, Inc.	Drawn by: Terry Carter	App'd:
Code: TIA/EIA-222-F	Date: 08/27/10	Scale: NTS
Path: S:\B&T Engineering\Projects\Crown Castle\77969_876335_East Farmington\Engineering\RISA\77969_002_East Farmington.eri		Dwg No. E-1

TIA/EIA-222-F - 80 mph/69 mph 0.500 in Ice

Vx ---------- Vz

Maximum Values

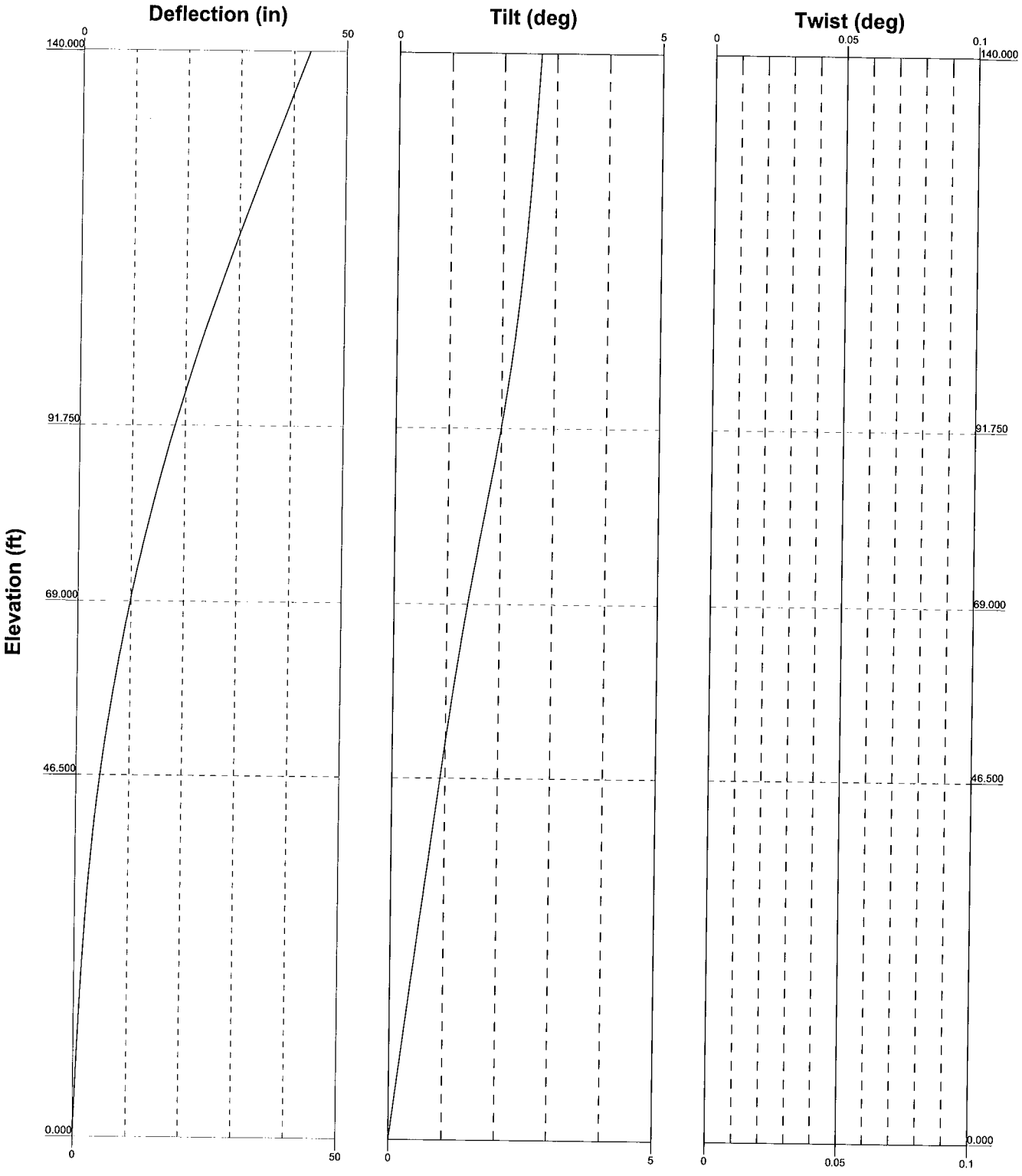
Mx ---------- Mz



B & T Engineering
1717 South Boulder
Tulsa, OK 74159
Phone: 918-587-4630
FAX: 918-295-0265

Job: 77969 - East Farmington, CT (BU# 876335)			
Project: 140' Summit Monopole / App ID: 104235; Rev: 3			
Client: Crown Castle USA, Inc.	Drawn by: Terry Carter	App'd:	
Code: TIA/EIA-222-F	Date: 08/27/10	Scale: NTS	
Path: S:\B&T Engineering\Projects\Crown Castle\77969 876335 East Farmington, Engineering\RISA\77969_002_East Farmington, E.e		Dwg No. E-4	

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



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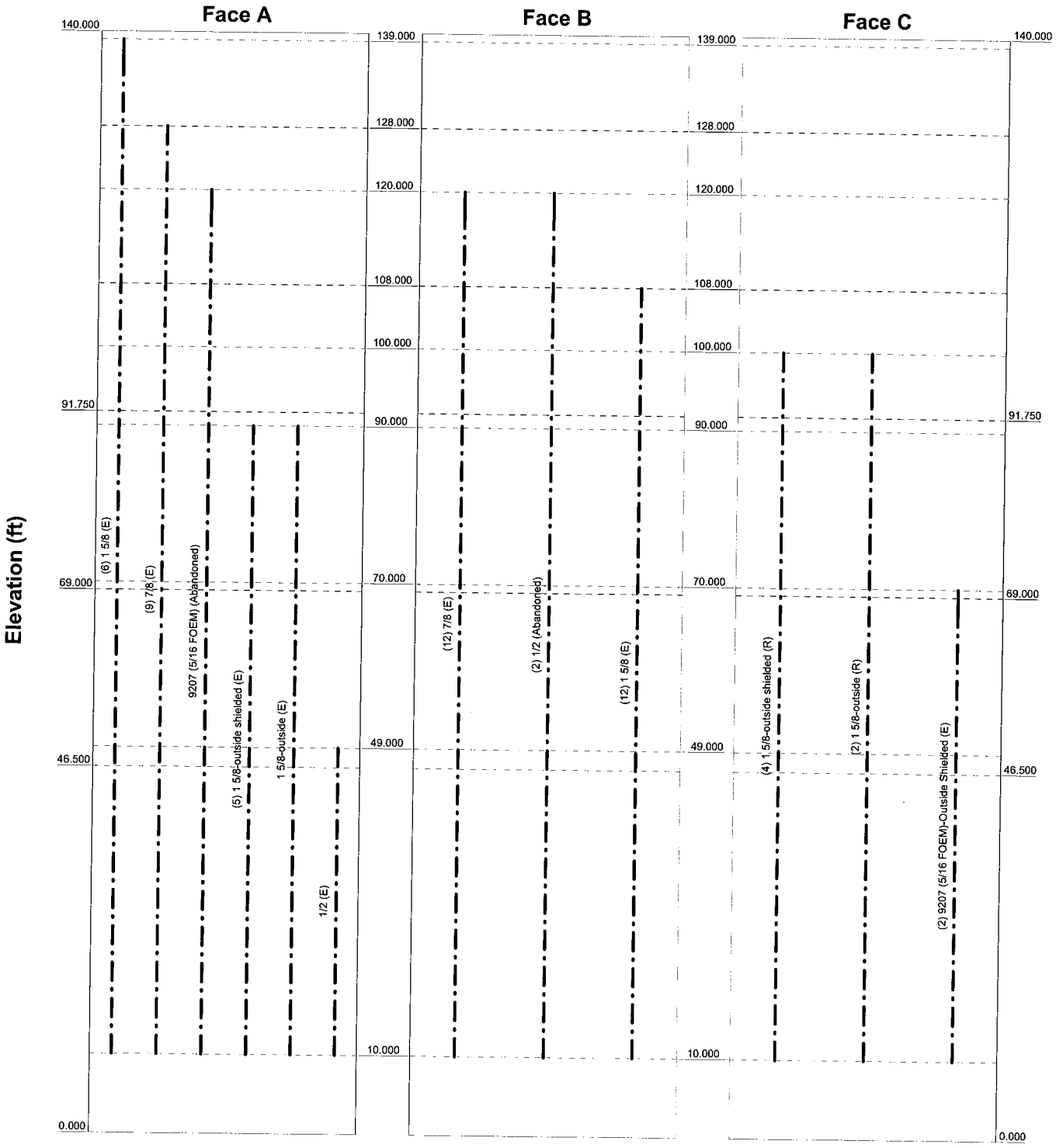
Job:	***77969 - East Farmington, CT (BU# 876335)***		
Project:	***140' Summit Monopole / App ID: 104235; Rev: 3***		
Client:	Crown Castle USA, Inc.	Drawn by: Terry Carter	App'd:
Code:	TIA/EIA-222-F	Date: 08/27/10	Scale: NTS
Path:			Dwg No. E-5

Feedline Distribution Chart
0' - 140'

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



B & T Engineering 1717 South Boulder Tulsa, OK 74159 Phone: 918-587-4630 FAX: 918-295-0265	Job: 77969 - East Farmington, CT (BU# 876335)	
	Project: 140' Summit Monopole / App ID: 104235; Rev: 3	
	Client: Crown Castle USA, Inc.	Drawn by: Terry Carter / App'd:
	Code: TIA/EIA-222-F	Date: 08/27/10 / 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 Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 0.500 in.
Ice density of 56.000 pcf.
A wind speed of 69 mph is used in combination with ice.
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 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	140.000-91.750	48.250	3.250	12	16.000	25.890	0.250	1.000	A607-60 (60 ksi)
L2	91.750-69.000	26.000	0.000	12	24.724	30.056	0.313	1.250	A607-65 (65 ksi)
L3	69.000-46.500	22.500	4.500	12	30.056	34.670	0.419	1.676	A607-65 (65 ksi)
L4	46.500-0.000	51.000		12	32.909	43.580	0.455	1.818	A607-65 (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	16.564	12.679	401.443	5.638	8.288	48.437	813.432	6.240	3.618	14.472
	26.803	20.640	1731.952	9.179	13.411	129.144	3509.405	10.158	6.269	25.074
L2	26.286	24.564	1868.385	8.739	12.807	145.888	3785.855	12.090	5.788	18.523
	31.116	29.929	3379.621	10.648	15.569	217.074	6848.029	14.730	7.218	23.096
L3	31.116	39.986	4482.895	10.610	15.569	287.937	9083.561	19.680	6.932	16.544
	35.893	46.211	6919.514	12.262	17.959	385.294	14020.812	22.744	8.169	19.496
L4	35.045	47.507	6387.046	11.619	17.047	374.673	12941.887	23.382	7.601	16.721
	45.117	63.127	14985.480	15.439	22.574	663.825	30364.646	31.069	10.461	23.012

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 140.000-91.750				1	1	1		
L2 91.750-69.000				1	1	1		
L3 69.000-46.500				1	1	1		
L4 46.500-0.000				1	1	1		

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
1 5/8 (E) **	A	No	Inside Pole	139.000 - 10.000	6	No Ice 1/2" Ice	0.000 0.000	0.001 0.001
7/8 (E) **	A	No	Inside Pole	128.000 - 10.000	9	No Ice 1/2" Ice	0.000 0.000	0.001 0.001
7/8 (E)	B	No	Inside Pole	120.000 - 10.000	12	No Ice 1/2" Ice	0.000 0.000	0.001 0.001
1/2 (Abandoned)	B	No	Inside Pole	120.000 - 10.000	2	No Ice 1/2" Ice	0.000 0.000	0.000 0.000
9207 (5/16 FOEM) (Abandoned) **	A	No	Inside Pole	120.000 - 10.000	1	No Ice 1/2" Ice	0.000 0.000	0.001 0.001
1 5/8	B	No	Inside Pole	108.000 - 10.000	12	No Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
(E) **						1/2" Ice	0.000	0.001
1 5/8-outside shielded (R)	C	No	Inside Pole	100.000 - 10.000	4	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
1 5/8-outside (R) **	C	No	CaAa (Out Of Face)	100.000 - 10.000	2	No Ice	0.198	0.001
						1/2" Ice	0.298	0.003
1 5/8-outside shielded (E)	A	No	Inside Pole	90.000 - 10.000	5	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
1 5/8-outside (E) **	A	No	CaAa (Out Of Face)	90.000 - 10.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.003
9207 (5/16 FOEM)-Outside Shielded (E) **	C	No	Inside Pole	70.000 - 10.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
1/2 (E) **	A	No	Inside Pole	49.000 - 10.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	140.000-91.750	A	0.000	0.000	0.000	0.000	0.499
		B	0.000	0.000	0.000	0.000	0.400
		C	0.000	0.000	0.000	3.267	0.051
L2	91.750-69.000	A	0.000	0.000	0.000	4.158	0.406
		B	0.000	0.000	0.000	0.000	0.443
		C	0.000	0.000	0.000	9.009	0.144
L3	69.000-46.500	A	0.000	0.000	0.000	4.455	0.413
		B	0.000	0.000	0.000	0.000	0.438
		C	0.000	0.000	0.000	8.910	0.185
L4	46.500-0.000	A	0.000	0.000	0.000	7.227	0.679
		B	0.000	0.000	0.000	0.000	0.710
		C	0.000	0.000	0.000	14.454	0.301

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	140.000-91.750	A	0.500	0.000	0.000	0.000	0.000	0.499
		B		0.000	0.000	0.000	0.000	0.400
		C		0.000	0.000	0.000	4.917	0.076
L2	91.750-69.000	A	0.500	0.000	0.000	0.000	6.258	0.438
		B		0.000	0.000	0.000	0.000	0.443
		C		0.000	0.000	0.000	13.559	0.213
L3	69.000-46.500	A	0.500	0.000	0.000	0.000	6.705	0.447
		B		0.000	0.000	0.000	0.000	0.438
		C		0.000	0.000	0.000	13.410	0.253
L4	46.500-0.000	A	0.500	0.000	0.000	0.000	10.877	0.734
		B		0.000	0.000	0.000	0.000	0.710
		C		0.000	0.000	0.000	21.754	0.411

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	140.000-91.750	-0.101	0.058	-0.143	0.083
L2	91.750-69.000	-0.411	0.017	-0.548	0.022
L3	69.000-46.500	-0.422	0.000	-0.568	0.000
L4	46.500-0.000	-0.343	0.000	-0.476	0.000

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
**									
(2) DB980H90A-M w/Mount Pipe	C	From Face	0.000 0.000 0.000	0.000	139.000	No Ice 1/2" Ice	4.274 4.861	3.857 4.946	0.034 0.070
(E)									
(2) DB980H90A-M w/Mount Pipe	B	From Face	0.000 0.000 0.000	0.000	139.000	No Ice 1/2" Ice	4.274 4.861	3.857 4.946	0.034 0.070
(E)									
(2) DB980H90A-M w/Mount Pipe	A	From Face	0.000 0.000 0.000	0.000	139.000	No Ice 1/2" Ice	4.274 4.861	3.857 4.946	0.034 0.070
(E)									
Platform Mount [LP 401-1]	C	None		0.000	139.000	No Ice 1/2" Ice	24.330 30.220	24.330 30.220	1.645 2.030
(E)									
6' x 2" Mount Pipe	C	From Face	0.000 0.000 0.000	0.000	139.000	No Ice 1/2" Ice	1.425 1.925	1.425 1.925	0.022 0.033
(E)									
6' x 2" Mount Pipe	B	From Face	0.000 0.000 0.000	0.000	139.000	No Ice 1/2" Ice	1.425 1.925	1.425 1.925	0.022 0.033
(E)									
6' x 2" Mount Pipe	A	From Face	0.000 0.000 0.000	0.000	139.000	No Ice 1/2" Ice	1.425 1.925	1.425 1.925	0.022 0.033
(E)									
**									
7770.00 w/Mount Pipe	C	From Face	0.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice	6.218 6.769	4.353 5.198	0.057 0.103
(E)									
7770.00 w/Mount Pipe	B	From Face	0.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice	6.218 6.769	4.353 5.198	0.057 0.103
(E)									
7770.00 w/Mount Pipe	A	From Face	0.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice	6.218 6.769	4.353 5.198	0.057 0.103
(E)									
(2) LGP21401	C	From Face	0.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice	1.288 1.445	0.233 0.313	0.014 0.021
(E)									
(2) LGP21401	B	From Face	0.000 0.000	0.000	130.000	No Ice 1/2" Ice	1.288 1.445	0.233 0.313	0.014 0.021
(E)									

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000						
(2) LGP21401	A	From Face	0.000	0.000	130.000	No Ice	1.288	0.233	0.014
(E)			0.000			1/2" Ice	1.445	0.313	0.021
			0.000						
T-Arm Mount [TA 602-3]	C	None		0.000	128.000	No Ice	11.590	11.590	0.774
(E)						1/2" Ice	15.440	15.440	0.990
(2) 6' x 2" Mount Pipe	C	From Face	0.000	0.000	130.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000						
(2) 6' x 2" Mount Pipe	B	From Face	0.000	0.000	130.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000						
(2) 6' x 2" Mount Pipe	A	From Face	0.000	0.000	130.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000						
**									
(4) ALP 9212-N w/Mount Pipe	C	From Face	0.000	0.000	120.000	No Ice	6.417	7.446	0.043
			0.000			1/2" Ice	7.110	8.590	0.104
(E)			0.000						
(4) ALP 9212-N w/Mount Pipe	B	From Face	0.000	0.000	120.000	No Ice	6.417	7.446	0.043
			0.000			1/2" Ice	7.110	8.590	0.104
(E)			0.000						
(4) ALP 9212-N w/Mount Pipe	A	From Face	0.000	0.000	120.000	No Ice	6.417	7.446	0.043
			0.000			1/2" Ice	7.110	8.590	0.104
(E)			0.000						
Platform Mount [LP 401-1]	C	None		0.000	120.000	No Ice	24.330	24.330	1.645
(E)						1/2" Ice	30.220	30.220	2.030
**									
(2) LPD-6513 w/Mount Pipe	C	From Face	0.000	0.000	109.000	No Ice	7.144	6.811	0.054
(E)			0.000			1/2" Ice	7.863	7.922	0.092
			0.000						
(2) LPD-6513 w/Mount Pipe	A	From Face	0.000	0.000	109.000	No Ice	7.144	6.811	0.054
(E)			0.000			1/2" Ice	7.863	7.922	0.092
			0.000						
(2) LPD-6513 w/Mount Pipe	B	From Face	0.000	0.000	109.000	No Ice	7.144	6.811	0.054
(E)			0.000			1/2" Ice	7.863	7.922	0.092
			0.000						
BXA-185060/8CFx2 w/Mount Pipe	C	From Face	0.000	0.000	109.000	No Ice	3.486	3.295	0.032
			0.000			1/2" Ice	3.960	4.103	0.063
(P)			0.000						
BXA-185060/8CFx2 w/Mount Pipe	B	From Face	0.000	0.000	109.000	No Ice	3.486	3.295	0.032
			0.000			1/2" Ice	3.960	4.103	0.063
(P)			0.000						
BXA-185060/8CFx2 w/Mount Pipe	A	From Face	0.000	0.000	109.000	No Ice	3.486	3.295	0.032
			0.000			1/2" Ice	3.960	4.103	0.063
(P)			0.000						
BXA-70063/6CFx2 w/Mount Pipe	C	From Face	0.000	0.000	109.000	No Ice	7.751	5.180	0.039
			0.000			1/2" Ice	8.295	6.114	0.093
(P)			0.000						
BXA-70063/6CFx2 w/Mount Pipe	B	From Face	0.000	0.000	109.000	No Ice	7.751	5.180	0.039
			0.000			1/2" Ice	8.295	6.114	0.093
(P)			0.000						
BXA-70063/6CFx4 w/Mount Pipe	A	From Face	0.000	0.000	109.000	No Ice	7.751	5.180	0.039
			0.000			1/2" Ice	8.295	6.114	0.093
(P)			0.000						
(2) FD9R6004/2C-3L	B	From Face	0.000	0.000	109.000	No Ice	0.367	0.085	0.003
(P)			0.000			1/2" Ice	0.451	0.136	0.005

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000						
(2) FD9R6004/2C-3L	C	From Face	0.000	0.000	109.000	No Ice	0.367	0.085	0.003
(P)			0.000			1/2" Ice	0.451	0.136	0.005
			0.000						
(2) FD9R6004/2C-3L	A	From Face	0.000	0.000	109.000	No Ice	0.367	0.085	0.003
(P)			0.000			1/2" Ice	0.451	0.136	0.005
			0.000						
Platform Mount [LP 304-1]	C	None		0.000	108.000	No Ice	17.460	17.460	1.349
(E)						1/2" Ice	22.440	22.440	1.625
**									
APX16DWV-16DWV-S-E-A	C	From Leg	0.000	0.000	100.000	No Ice	6.699	2.003	0.040
20			0.000			1/2" Ice	7.131	2.326	0.071
(E)			0.000						
APX16DWV-16DWV-S-E-A	B	From Leg	0.000	0.000	100.000	No Ice	6.699	2.003	0.040
20			0.000			1/2" Ice	7.131	2.326	0.071
(E)			0.000						
APX16DWV-16DWV-S-E-A	A	From Leg	0.000	0.000	100.000	No Ice	6.699	2.003	0.040
20			0.000			1/2" Ice	7.131	2.326	0.071
(E)			0.000						
KRY 112 89/5 TMA	A	From Leg	0.000	0.000	100.000	No Ice	0.700	0.653	0.016
(E)			0.000			1/2" Ice	0.821	0.772	0.022
			0.000						
KRY 112 89/5 TMA	B	From Leg	0.000	0.000	100.000	No Ice	0.700	0.653	0.016
(E)			0.000			1/2" Ice	0.821	0.772	0.022
			0.000						
KRY 112 89/5 TMA	C	From Leg	0.000	0.000	100.000	No Ice	0.700	0.653	0.016
(E)			0.000			1/2" Ice	0.821	0.772	0.022
			0.000						
KRY 112 144/1	A	From Leg	0.000	0.000	100.000	No Ice	0.411	0.189	0.011
(E)			0.000			1/2" Ice	0.500	0.256	0.014
			0.000						
KRY 112 144/1	B	From Leg	0.000	0.000	100.000	No Ice	0.411	0.189	0.011
(E)			0.000			1/2" Ice	0.500	0.256	0.014
			0.000						
KRY 112 144/1	C	From Leg	0.000	0.000	100.000	No Ice	0.411	0.189	0.011
(E)			0.000			1/2" Ice	0.500	0.256	0.014
			0.000						
Pipe Mount [PM 601-3]	C	From Leg	0.000	0.000	100.000	No Ice	4.390	4.390	0.195
(E)			0.000			1/2" Ice	5.480	5.480	0.237
			0.000						
**									
742 213 w/ Mount Pipe	C	From Leg	0.000	0.000	90.000	No Ice	5.135	4.294	0.044
(E)			0.000			1/2" Ice	5.609	5.408	0.083
			0.000						
742 213 w/ Mount Pipe	B	From Leg	0.000	0.000	90.000	No Ice	5.135	4.294	0.044
(E)			0.000			1/2" Ice	5.609	5.408	0.083
			0.000						
742 213 w/ Mount Pipe	A	From Leg	0.000	0.000	90.000	No Ice	5.135	4.294	0.044
(E)			0.000			1/2" Ice	5.609	5.408	0.083
			0.000						
**									
KS24019-L112A	C	From Leg	0.000	0.000	72.000	No Ice	0.100	0.100	0.005
(E)			0.000			1/2" Ice	0.180	0.180	0.006
			0.000						
KS24019-L112A	B	From Leg	0.000	0.000	72.000	No Ice	0.100	0.100	0.005
(E)			0.000			1/2" Ice	0.180	0.180	0.006
			0.000						

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
Side Arm Mount [SO 201-1]	C	From Leg	0.000 0.000 0.000	0.000	70.000	No Ice 1/2" Ice	2.960 4.100	2.110 2.930	0.096 0.117
Side Arm Mount [SO 201-1] (E)	B	From Leg	0.000 0.000 0.000	0.000	70.000	No Ice 1/2" Ice	2.960 4.100	2.110 2.930	0.096 0.117
**									
KS24019-L112A (E)	A	From Leg	0.000 0.000 0.000	0.000	51.000	No Ice 1/2" Ice	0.100 0.180	0.100 0.180	0.005 0.006
Side Arm Mount [SO 701-1] (E)	A	From Leg	0.000 0.000 0.000	0.000	49.000	No Ice 1/2" Ice	0.850 1.140	1.670 2.340	0.065 0.079
**									

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
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
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
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

Comb. No.	Description
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	140 - 91.75	Pole	Max Tension	11	0.000	-0.000	0.000
			Max. Compression	14	-14.696	0.243	-0.140
			Max. Mx	11	-9.410	411.154	-0.107
			Max. My	8	-9.411	0.187	-411.087
			Max. Vy	11	-16.686	411.154	-0.107
			Max. Vx	8	16.687	0.187	-411.087
			Max. Torque	13			0.206
L2	91.75 - 69	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-19.441	0.361	-0.300
			Max. Mx	11	-13.729	889.421	-0.236
			Max. My	8	-13.731	0.244	-889.415
			Max. Vy	11	-20.033	889.421	-0.236
			Max. Vx	8	20.003	0.244	-889.415
			Max. Torque	20			-0.335
L3	69 - 46.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-23.318	0.469	-0.300
			Max. Mx	11	-17.430	1266.251	-0.239
			Max. My	8	-17.432	0.291	-1265.686
			Max. Vy	11	-21.874	1266.251	-0.239
			Max. Vx	8	21.844	0.291	-1265.686
			Max. Torque	20			-0.401
L4	46.5 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-37.024	0.748	-0.178
			Max. Mx	11	-30.629	2504.380	-0.145
			Max. My	8	-30.629	0.408	-2500.909
			Max. Vy	11	-26.587	2504.380	-0.145
			Max. Vx	8	26.533	0.408	-2500.909
			Max. Torque	15			0.522

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	37.024	0.000	0.000
	Max. H_x	11	30.656	26.555	-0.000
	Max. H_z	2	30.657	0.000	26.502
	Max. M_x	2	2500.620	0.000	26.502
	Max. M_z	5	2503.562	-26.555	-0.000
	Max. Torsion	15	0.522	0.000	22.638
	Min. Vert	11	30.656	26.555	-0.000
	Min. H_x	5	30.656	-26.555	-0.000
	Min. H_z	8	30.657	0.000	-26.502

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. M_x	8	-2500.909	0.000	-26.502
	Min. M_z	11	-2504.380	26.555	-0.000
	Min. Torsion	21	-0.522	0.000	-22.638

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	30.657	0.000	0.000	0.135	0.391	0.000
Dead+Wind 0 deg - No Ice	30.657	-0.000	-26.502	-2500.620	0.408	-0.487
Dead+Wind 30 deg - No Ice	30.657	13.279	-22.952	-2165.628	-1251.682	-0.359
Dead+Wind 60 deg - No Ice	30.657	22.999	-13.251	-1250.263	-2168.273	-0.135
Dead+Wind 90 deg - No Ice	30.656	26.555	0.000	0.145	-2503.562	0.126
Dead+Wind 120 deg - No Ice	30.657	22.999	13.251	1250.552	-2168.273	0.353
Dead+Wind 150 deg - No Ice	30.657	13.279	22.952	2165.917	-1251.682	0.485
Dead+Wind 180 deg - No Ice	30.657	-0.000	26.502	2500.909	0.408	0.487
Dead+Wind 210 deg - No Ice	30.657	-13.279	22.952	2165.918	1252.499	0.359
Dead+Wind 240 deg - No Ice	30.657	-22.999	13.251	1250.553	2169.091	0.135
Dead+Wind 270 deg - No Ice	30.656	-26.555	0.000	0.145	2504.380	-0.126
Dead+Wind 300 deg - No Ice	30.657	-22.999	-13.251	-1250.264	2169.090	-0.352
Dead+Wind 330 deg - No Ice	30.657	-13.279	-22.952	-2165.629	1252.499	-0.485
Dead+Ice	37.024	0.000	0.000	0.178	0.748	0.000
Dead+Wind 0 deg+Ice	37.024	-0.000	-22.638	-2190.755	0.791	-0.522
Dead+Wind 30 deg+Ice	37.024	11.348	-19.605	-1897.297	-1096.516	-0.391
Dead+Wind 60 deg+Ice	37.024	19.656	-11.319	-1095.321	-1899.798	-0.154
Dead+Wind 90 deg+Ice	37.024	22.696	0.000	0.196	-2193.732	0.124
Dead+Wind 120 deg+Ice	37.024	19.656	11.319	1095.713	-1899.798	0.369
Dead+Wind 150 deg+Ice	37.024	11.348	19.605	1897.690	-1096.516	0.515
Dead+Wind 180 deg+Ice	37.024	-0.000	22.638	2191.148	0.791	0.522
Dead+Wind 210 deg+Ice	37.024	-11.348	19.605	1897.691	1098.099	0.390
Dead+Wind 240 deg+Ice	37.024	-19.656	11.319	1095.714	1901.383	0.154
Dead+Wind 270 deg+Ice	37.024	-22.696	0.000	0.196	2195.316	-0.124
Dead+Wind 300 deg+Ice	37.024	-19.656	-11.319	-1095.322	1901.382	-0.368
Dead+Wind 330 deg+Ice	37.024	-11.348	-19.605	-1897.298	1098.099	-0.514
Dead+Wind 0 deg - Service	30.657	0.000	-10.352	-978.273	0.412	-0.192
Dead+Wind 30 deg - Service	30.657	5.187	-8.966	-847.260	-489.496	-0.141
Dead+Wind 60 deg - Service	30.657	8.984	-5.176	-489.104	-848.132	-0.053
Dead+Wind 90 deg - Service	30.657	10.373	-0.000	0.146	-979.321	0.050
Dead+Wind 120 deg - Service	30.657	8.984	5.176	489.397	-848.133	0.139
Dead+Wind 150 deg - Service	30.657	5.187	8.966	847.553	-489.496	0.191
Dead+Wind 180 deg - Service	30.657	0.000	10.352	978.566	0.412	0.192
Dead+Wind 210 deg - Service	30.657	-5.187	8.966	847.553	490.319	0.141
Dead+Wind 240 deg - Service	30.657	-8.984	5.176	489.397	848.956	0.053
Dead+Wind 270 deg - Service	30.657	-10.373	-0.000	0.146	980.145	-0.050
Dead+Wind 300 deg - Service	30.657	-8.984	-5.176	-489.104	848.956	-0.139
Dead+Wind 330 deg - Service	30.657	-5.187	-8.966	-847.261	490.319	-0.191

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	-30.657	0.000	0.000	30.657	0.000	0.000%
2	0.000	-30.657	-26.503	0.000	30.657	26.502	0.001%
3	13.279	-30.657	-22.952	-13.279	30.657	22.952	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
4	22.999	-30.657	-13.251	-22.999	30.657	13.251	0.000%
5	26.557	-30.657	0.000	-26.555	30.656	-0.000	0.004%
6	22.999	-30.657	13.251	-22.999	30.657	-13.251	0.000%
7	13.279	-30.657	22.952	-13.279	30.657	-22.952	0.000%
8	0.000	-30.657	26.503	0.000	30.657	-26.502	0.001%
9	-13.279	-30.657	22.952	13.279	30.657	-22.952	0.000%
10	-22.999	-30.657	13.251	22.999	30.657	-13.251	0.000%
11	-26.557	-30.657	0.000	26.555	30.656	-0.000	0.004%
12	-22.999	-30.657	-13.251	22.999	30.657	13.251	0.000%
13	-13.279	-30.657	-22.952	13.279	30.657	22.952	0.000%
14	0.000	-37.024	0.000	0.000	37.024	0.000	0.000%
15	0.000	-37.024	-22.638	0.000	37.024	22.638	0.002%
16	11.348	-37.024	-19.605	-11.348	37.024	19.605	0.000%
17	19.656	-37.024	-11.319	-19.656	37.024	11.319	0.000%
18	22.696	-37.024	0.000	-22.696	37.024	-0.000	0.002%
19	19.656	-37.024	11.319	-19.656	37.024	-11.319	0.000%
20	11.348	-37.024	19.605	-11.348	37.024	-19.605	0.000%
21	0.000	-37.024	22.638	0.000	37.024	-22.638	0.002%
22	-11.348	-37.024	19.605	11.348	37.024	-19.605	0.000%
23	-19.656	-37.024	11.319	19.656	37.024	-11.319	0.000%
24	-22.696	-37.024	0.000	22.696	37.024	-0.000	0.002%
25	-19.656	-37.024	-11.319	19.656	37.024	11.319	0.000%
26	-11.348	-37.024	-19.605	11.348	37.024	19.605	0.000%
27	0.000	-30.657	-10.353	-0.000	30.657	10.352	0.002%
28	5.187	-30.657	-8.966	-5.187	30.657	8.966	0.000%
29	8.984	-30.657	-5.176	-8.984	30.657	5.176	0.000%
30	10.374	-30.657	0.000	-10.373	30.657	0.000	0.002%
31	8.984	-30.657	5.176	-8.984	30.657	-5.176	0.000%
32	5.187	-30.657	8.966	-5.187	30.657	-8.966	0.000%
33	0.000	-30.657	10.353	-0.000	30.657	-10.352	0.002%
34	-5.187	-30.657	8.966	5.187	30.657	-8.966	0.000%
35	-8.984	-30.657	5.176	8.984	30.657	-5.176	0.000%
36	-10.374	-30.657	0.000	10.373	30.657	0.000	0.002%
37	-8.984	-30.657	-5.176	8.984	30.657	5.176	0.000%
38	-5.187	-30.657	-8.966	5.187	30.657	8.966	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	7	0.00000001	0.00005284
3	Yes	10	0.00000001	0.00007885
4	Yes	10	0.00000001	0.00007920
5	Yes	6	0.00006133	0.00012228
6	Yes	10	0.00000001	0.00007959
7	Yes	10	0.00000001	0.00007869
8	Yes	7	0.00000001	0.00005286
9	Yes	10	0.00000001	0.00007958
10	Yes	10	0.00000001	0.00007918
11	Yes	6	0.00006133	0.00012233
12	Yes	10	0.00000001	0.00007879
13	Yes	10	0.00000001	0.00007975
14	Yes	4	0.00000001	0.00000001
15	Yes	7	0.00003006	0.00007276
16	Yes	10	0.00000001	0.00009552

17	Yes	10	0.00000001	0.00009612
18	Yes	7	0.00003005	0.00004437
19	Yes	10	0.00000001	0.00009672
20	Yes	10	0.00000001	0.00009530
21	Yes	7	0.00003006	0.00007279
22	Yes	10	0.00000001	0.00009677
23	Yes	10	0.00000001	0.00009612
24	Yes	7	0.00003005	0.00004440
25	Yes	10	0.00000001	0.00009553
26	Yes	10	0.00000001	0.00009700
27	Yes	6	0.00006744	0.00006688
28	Yes	8	0.00000001	0.00009540
29	Yes	8	0.00000001	0.00009648
30	Yes	6	0.00006743	0.00005832
31	Yes	8	0.00000001	0.00009764
32	Yes	8	0.00000001	0.00009497
33	Yes	6	0.00006744	0.00006693
34	Yes	8	0.00000001	0.00009758
35	Yes	8	0.00000001	0.00009647
36	Yes	6	0.00006743	0.00005839
37	Yes	8	0.00000001	0.00009535
38	Yes	8	0.00000001	0.00009805

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 91.75	43.054	36	2.696	0.001
L2	95 - 69	19.487	36	2.077	0.001
L3	69 - 46.5	9.892	36	1.395	0.000
L4	51 - 0	5.390	36	0.994	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
139.000	(2) DB980H90A-M w/Mount Pipe	36	42.489	2.687	0.001	19483
130.000	7770.00 w/Mount Pipe	36	37.421	2.602	0.001	9741
128.000	T-Arm Mount [TA 602-3]	36	36.305	2.582	0.001	8117
120.000	(4) ALP 9212-N w/Mount Pipe	36	31.911	2.494	0.001	4869
109.000	(2) LPD-6513 w/Mount Pipe	36	26.140	2.344	0.001	3140
108.000	Platform Mount [LP 304-1]	36	25.636	2.328	0.001	3042
100.000	APX16DWV-16DWV-S-E-A20	36	21.756	2.184	0.001	2433
90.000	742 213 w/ Mount Pipe	36	17.355	1.956	0.001	2180
72.000	KS24019-L112A	36	10.813	1.472	0.000	2246
70.000	Side Arm Mount [SO 201-1]	36	10.194	1.420	0.000	2250
51.000	KS24019-L112A	36	5.390	0.994	0.000	2189
49.000	Side Arm Mount [SO 701-1]	36	4.999	0.953	0.000	2246

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 91.75	109.708	11	6.874	0.002
L2	95 - 69	49.716	11	5.298	0.002

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L3	69 - 46.5	25.254	11	3.560	0.001
L4	51 - 0	13.763	11	2.539	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
139.000	(2) DB980H90A-M w/Mount Pipe	11	108.269	6.851	0.003	7825
130.000	7770.00 w/Mount Pipe	11	95.372	6.634	0.003	3911
128.000	T-Arm Mount [TA 602-3]	11	92.532	6.583	0.003	3259
120.000	(4) ALP 9212-N w/Mount Pipe	11	81.348	6.360	0.002	1953
109.000	(2) LPD-6513 w/Mount Pipe	11	66.658	5.977	0.002	1257
108.000	Platform Mount [LP 304-1]	11	65.375	5.937	0.002	1217
100.000	APX16DWV-16DWV-S-E-A20	11	55.494	5.570	0.002	972
90.000	742 213 w/ Mount Pipe	11	44.283	4.989	0.002	868
72.000	KS24019-L112A	11	27.603	3.756	0.001	888
70.000	Side Arm Mount [SO 201-1]	11	26.024	3.624	0.001	889
51.000	KS24019-L112A	11	13.763	2.539	0.001	860
49.000	Side Arm Mount [SO 701-1]	11	12.767	2.434	0.001	882

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	140 - 91.75 (1)	TP25.89x16x0.25	48.250	0.000	0.0	36.0000	20.104	-9.410	723.742	0.013
L2	91.75 - 69 (2)	TP30.056x24.724x0.313	26.000	0.000	0.0	39.0000	29.929	-13.729	1167.250	0.012
L3	69 - 46.5 (3)	TP34.67x30.056x0.419	22.500	0.000	0.0	39.0000	44.966	-17.430	1753.660	0.010
L4	46.5 - 0 (4)	TP43.58x32.909x0.455	51.000	0.000	0.0	39.0000	63.127	-30.629	2461.970	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	140 - 91.75 (1)	TP25.89x16x0.25	411.215	40.2860	36.0000	1.119	0.000	0.0000	36.0000	0.000
L2	91.75 - 69 (2)	TP30.056x24.724x0.313	889.567	49.1760	39.0000	1.261	0.000	0.0000	39.0000	0.000
L3	69 - 46.5 (3)	TP34.67x30.056x0.419	1266.292	41.6669	39.0000	1.068	0.000	0.0000	39.0000	0.000
L4	46.5 - 0 (4)	TP43.58x32.909x0.455	2504.383	45.2718	39.0000	1.161	0.000	0.0000	39.0000	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	140 - 91.75 (1)	TP25.89x16x0.25	16.688	0.8301	24.0000	0.070	0.000	0.0000	24.0000	0.000
L2	91.75 - 69 (2)	TP30.056x24.724x0.313	20.026	0.6691	26.0000	0.052	0.045	0.0012	26.0000	0.000
L3	69 - 46.5 (3)	TP34.67x30.056x0.419	21.867	0.4863	26.0000	0.038	0.013	0.0002	26.0000	0.000
L4	46.5 - 0 (4)	TP43.58x32.909x0.455	26.587	0.4212	26.0000	0.033	0.126	0.0011	26.0000	0.000

Pole Interaction Design Data

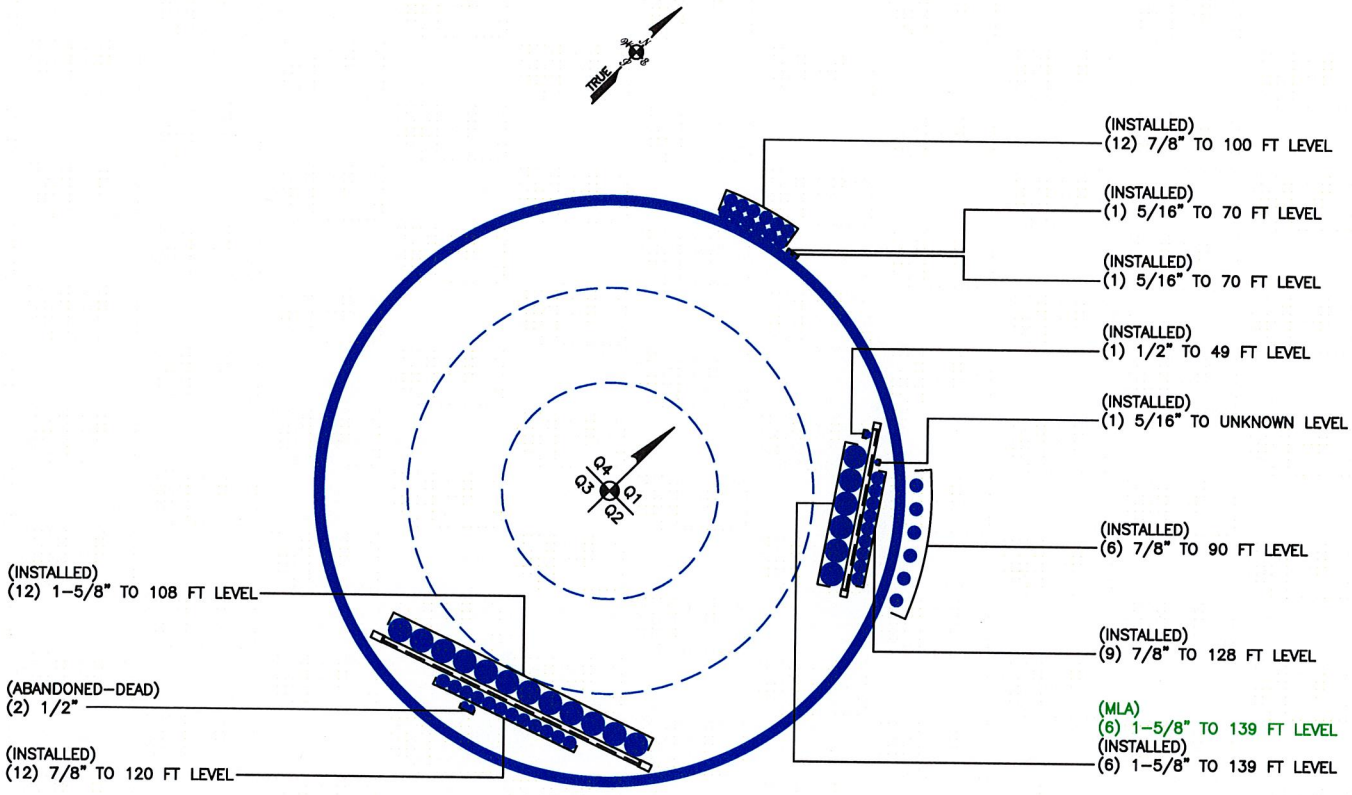
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	140 - 91.75 (1)	0.013	1.119	0.000	0.070	0.000	1.133 ✔	1.333	H1-3+VT ✔
L2	91.75 - 69 (2)	0.012	1.261	0.000	0.052	0.000	1.273 ✔	1.333	H1-3+VT ✔
L3	69 - 46.5 (3)	0.010	1.068	0.000	0.038	0.000	1.079 ✔	1.333	H1-3+VT ✔
L4	46.5 - 0 (4)	0.012	1.161	0.000	0.033	0.000	1.174 ✔	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	140 - 91.75	Pole	TP25.89x16x0.25	1	-9.410	964.748	85.0	Pass
L2	91.75 - 69	Pole	TP30.056x24.724x0.313	2	-13.729	1555.944	95.5	Pass
L3	69 - 46.5	Pole	TP34.67x30.056x0.419	3	-17.430	2337.629	80.9	Pass
L4	46.5 - 0	Pole	TP43.58x32.909x0.455	4	-30.629	3281.806	88.0	Pass
							Summary	
						Pole (L2)	95.5	Pass
						RATING =	**95.5**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876335 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Square, Unstiffened Base Plate, Any Rod Material - Rev. F

Assumptions: Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48.
Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)

Site Data

BU#: *876335*
Site Name: *East Farmington, CT*
App #: *92862; Rev: 3*

Reactions		
Moment:	2504	ft-kips
Axial:	31	kips
Shear:	27	kips

Connection Type:	*Butt*

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Grade(Fy):	75	ksi
Bolt Circle:	51	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	49.5	in
Thick:	3	in
Grade:	50	ksi
B effective	26.42	in

Pole Data		
Diam:	43.58	in
Thick:	0.375	in
Grade:	65	ksi

Stress Increase Factor		
ASIF:	1.333	

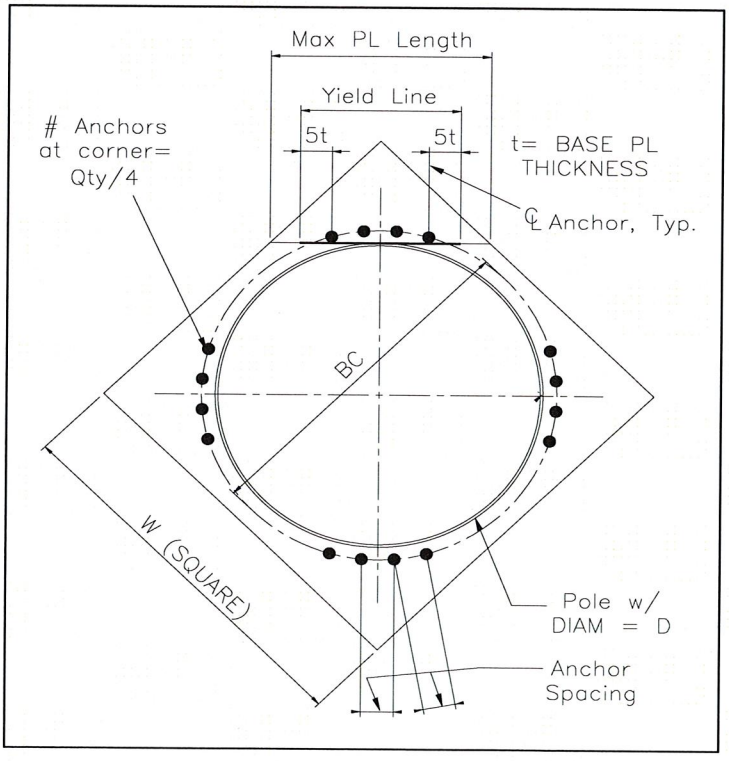
Anchor Rod Results

Maximum Rod Tension:	193.8 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	99.4% **Pass**

Base Plate Results

Base Plate Stress:	48.0 ksi
Allowable Plate Stress:	50.0 ksi
Base Plate Stress Ratio:	95.9% **Pass**

PL Ref. Data
Yield Line (in):
26.42
Max PL Length:
26.42



Slab Size

Program: Pad and Pedestal Date: 8/27/2010
File Name: 77969
Location: East Farmington, CT (BU 876335)

INPUT **Bold Values Only are Input**

20.00	**Length, L (ft.)**	**Conc. Unit Weight**	**0.088** kcf
20.00	**Width, B (ft.)**	**Soil Unit Weight**	**0.11** kcf
4.00	**Thickness, T (ft)**		
0.50	**Height of Pier Above Grade, (ft.)**	**** See Design Notes Below**	
9.00	**Depth to Base, D (ft.)**		
1.00	**Round Pedestal =0, Else Square Pedestal**		
8.00	**Pedestal Diameter or Width, (ft.)**		
30.00	**Phi Angle, (deg.)**	0.5236 Phi in Radians	
0.00	**Cohesion, c (ksf)**		
3000	**Conc. f'c, (psi)**		
1.30	**USD Load Factor**		
12.00	**Net Allow Bearing Stress, include Code Increase when approp., (ksf)**		
1.50	**Allow O.T. Factor of Safety**		
2504	**Tower O.T. Moment, (ft.-kips)**	O.T. Moment @ fdn Base:	2760.50 ft.-kips
31	**Leg Download, kips**		
0	**Leg Uplift, kips**		
27	**Leg Shear, kips**		

Check of Punching Shear

43.50	d, top of conc. To middle of bottom rebar mat, (in.)
558.00	Bo, The circumference at d/2 from face of pier, (in.)
40.3	Factored Leg Download, (kips)
4520.3	Phi*Vn, Conc. 2-way Shear Resistance, (kips)

Check of One Way Shear Shear

462.7	Factored Shear at Face of Pier
972.1	Phi*Vn, Conc. 1-way Shear Resistance, (kips)

Mat Thickness is acceptable

72.30 Concrete Volume (c.y.)

Slab Size

Program: Pad and Pedestal
File Name: 77969
Location: East Farmington, CT (BU 876335)

Check Net Vert. Soil Pressure Eccentricity = 7.12 > 3.33 ft. (L/6)

Vert. Loads in kips

31.00	Tower	RESULTANT IS OUTSIDE MIDDLE THIRD OF THE PAD
184.80	Soil	L-PRIME= 8.63
171.78	Conc	
387.58	Sum of the Verticals, (kips)	

0.00	Net q-min. (ksf)			
3.50	Net q-max, (ksf))	Status:	OK	**29.2%**
1.65	O.T. Factor of Safety	Status:	OK	**90.8%**
3.59	q-Bottom Design, (ksf)	The Net q-max minus the opposing effect of conc DW		
0.90	q-TopDesign, (ksf)	Deadweight TO BE USED FOR CONCRETE SLAB DESIGN of top mat reinforcing steel		

Conservatively assume maximum moment at the pier centerline with maximum mat edge distance

Pier Design, Max Moment =	31830	in.-kips
Pad Bottom Design, Moment Arm:	6.00	ft.
Pad Bottom Design, Max Moment:	3875	in.-kips
Pad Top Design, Moment Arm:	6.00	ft.
Pad Top Design, Max Moment:	974	in.-kips

Use the above moments in the Pier, Pad Bottom & Top design sheets in this Workbook to determine reinforcing steel requirements.

Design Notes:
1. **Assumed water table at 5' below grade per the original foundation design.**
2. **Analysis considers a soil weight of 110 pcf (above the water table).**
3. **Analysis considers bouyant weight for concrete.**

ROBINSON & COLE LLP

ORIGINAL

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

December 13, 2010

Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Completion of Construction Activity**
EM-VER-167-100111 – 1116 Johnson Road, Woodbridge, Connecticut
EM-VER-089-100224A – 167 Lester Street, New Britain, Connecticut
EM-VER-052-100201 – 130 Birdseye Road, Farmington, Connecticut
EM-VER-084-100111 – 528 Wheelers Farm Road, Milford, Connecticut
EM-VER-084-100115 – 18 Research Parkway, Milford, Connecticut
EM-VER-107-100107 – Grassy Hill Road, Orange, Connecticut

Dear Ms. Roberts:

The purpose of this letter is to notify you that construction activity associated with the above-referenced facility modifications has been completed.

If you have any questions or need any additional information regarding any of these facilities, please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

KCB/kmd
Copy to:
Sandy M. Carter