

# 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](mailto:siting.council@ct.gov)

Internet: [ct.gov/csc](http://ct.gov/csc)

Daniel F. Caruso

Chairman

August 9, 2010

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

RE: **EM-VER-077-100302** - Celco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 266 Center Street, Manchester, Connecticut. Modification.

Dear Attorney Baldwin:

In addition to the Connecticut Siting Council (Council) acknowledgement dated April 12, 2010 (filing dated March 2, 2010), 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 July 22, 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 Louis A. Spadaccini, Mayor, Town of Manchester  
Scott A. Shanley, General Manager, Town of Manchester  
James Davis, Zoning Enforcement Officer, Town of Manchester  
Crown Castle USA, Inc.



CONNECTICUT SITING COUNCIL

Affirmative Action / Equal Opportunity Employer

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ORIGINAL

July 22, 2010  
**RECEIVED**  
JUL 23 2010  
CONNECTICUT  
SITING COUNCIL

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

Re: **Cellco Partnership d/b/a Verizon Wireless  
EM-VER-077-100302 – Center Street, Manchester, Connecticut**

Dear Mr. Perrone:

On April 12, 2010, the Siting Council acknowledged receipt of Cellco's notice of intent to modify the above-referenced telecommunications facility. This modification involved the addition of three (3) LTE antennas to the existing facility, for a total of fifteen (15) antennas and six (6) additional coax cables to be installed inside the monopole.

Cellco recently learned that three (3) of the six (6) additional cables will not fit inside the tower. The remaining three (3) cables will need to be attached to the outside the monopole structure. Attached is a Structural Opinion Letter confirming that the tower and foundation can support the antenna modifications authorized in EM-VER-077-100302 and the installation of three (3) coax cables on the outside of the tower.

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



Law Offices

BOSTON

PROVIDENCE

HARTFORD

NEW LONDON

STAMFORD

WHITE PLAINS

NEW YORK CITY

ALBANY

SARASOTA

www.rc.com

10525233-v1

Date: July 19, 2010

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



GPD Associates  
520 South Main St. Suite 2531  
Akron, OH 44311  
(614) 859-1618  
[londecker@gpdgroup.com](mailto:londecker@gpdgroup.com)

**Subject: Structural Opinion Letter: 115 Foot – Valmont Monopole Tower**

**Carrier Designation:**

**Verizon Wireless Co-Locate**  
Carrier Site Number: CT-HFD0214  
Carrier Site Name: Manchester

**Crown Castle Designation:**

Crown Castle BU Number: 806372  
Crown Castle Site Name: HRT 093 943228  
Crown Castle JDE Job Number: 137151  
Crown Castle WO Number: 347106

**GPD Associate Designation**

GPD Associates Project Number: 2010183.95

**Site Data:**

Center and Pine St., Manchester, CT 06040, Hartford County  
Latitude 41° 46' 19", Longitude -72° 31' 48.8"

Dear Ms. Molly Carder,

GPD Associates is pleased to submit this "Structural Opinion Letter" for the structural integrity of the aforementioned tower. This evaluation has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 380281. The purpose of the opinion letter is to determine the suitability of the tower with the proposed, existing, and reserved loading as specified in Tables 1 & 2 on the next page. This opinion is consistent with the guidelines as stated in the TIA/EIA-222-F standard based upon a wind speed of 80 mph fastest mile.

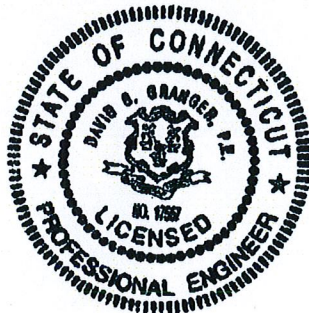
This opinion letter assumes the tower has been well maintained and in good condition with no structural defects. This is not a condition assessment of the structure. It is only a review based on the results of a previous structural analysis performed by GPD Associates (Job #: 2010182.54, dated June 11, 2010), which gave a tower rating/capacity of 56.8% and an adequate foundations rating based on a wind speed of 80 mph fastest mile. This letter is not based on a computer structural analysis.

Based upon a comparison of the current loads, proposed loads, and the results from the previous analysis using the current code prescribed fastest mile wind speed of 80 mph, it is our opinion that the design for the tower structure and foundations should be sufficient for the proposed loading.

We at the GPD Associates appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

David B. Granger, P.E.  
Connecticut #: 17557



**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
115	116	2	Antel	BXA-70063/6CFx4	6	1-5/8	1
		1	Antel	BXA-70063/6CFx6			

Notes:

- 1) Three of the proposed coax shall be external to the monopole.

**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	
115	116	6	Antel	BSA-185090/16CF	12	1-5/8		
		6	Decibel	DB844G65ZAXY				
	115	1		Platform Mount [LP 713-1]				
105	108	2	Dragonwave	A-ANT-18G-2-C	3	1/2 1/4 5/8 5/16	1	
		1	Motorola	TIMING 2000				
	105	105	3					Side Arm Mount [SO 701-1]
			2	Dragonwave				Horizon Compact TMA
			3	Argus Technologies				LLPX310R
			3	Samsung				WIMAX DAP HEAD BSTN
99	99	1		Platform Mount [LP 601-1]				

Notes:

- 1) Reserved equipment.



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April 12, 2010

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

RE: **EM-VER-077-100302**- Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 266 Center Street, Manchester, Connecticut.

Dear Attorney Baldwin:

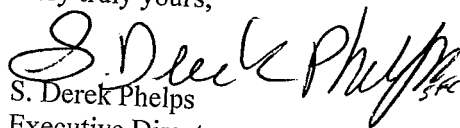
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here and in your notice dated March 2, 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

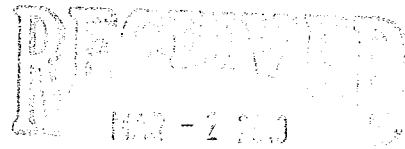
c: The Honorable Louis A. Spadaccini, Mayor, Town of Manchester  
Scott A. Shanley, General Manager, Town of Manchester  
James Davis, Zoning Enforcement Officer, Town of Manchester  
Crown Castle USA, Inc.

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Direct (860) 275-8345

March 2, 2010

*Via Hand Delivery*

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



CONNECTICUT  
SITING COUNCIL

Re: **Notice of Exempt Modification**  
**266 Center Street, Manchester, Connecticut**

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains wireless telecommunications antennas at the top of the existing 115-foot monopole tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco’s use of this facility in Docket No 129. Cellco now intends to modify its installation by adding three (3) BXA-70063/6CF LTE antennas, for a total of fifteen (15) antennas at the same level on the tower. Attached behind Tab 1 are the specifications for the proposed LTE 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 Louis A. Spadaccini, Mayor for the Town of Manchester. A copy of this letter is also being sent to Mark S. Stephens, the owner of the property on which the tower is located.

The planned modifications to the facility falls 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 height of the existing structure. Cellco’s new LTE antennas will be located adjacent to its existing antennas at the top of the 115-foot tower.

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



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# ROBINSON & COLE LLP

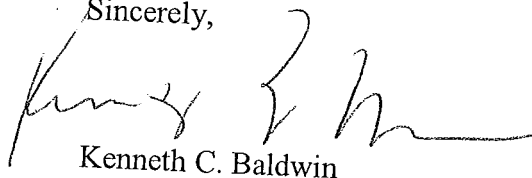
S. Derek Phelps  
March 2, 2010  
Page 2

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.
4. The installation of three (3) LTE 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 the modified facility is included behind Tab 2.

Also attached is a Structural Analysis Report confirming that the tower and foundation can support the proposed modifications. (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:

Louis A. Spadaccini, Manchester Mayor  
Mark S. Stephens  
Sandy M. Carter



### 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 <sup>4)</sup>	7.9 kg	17.0 lbs
Wind Area Fore/Aft	0.51 m <sup>2</sup>	5.5 ft <sup>2</sup>
Wind Area Side	0.21 m <sup>2</sup>	2.2 ft <sup>2</sup>
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 fiberglass radome.

### Mounting & Downtilting

Mounting hardware attaches to pipe diameter  $\varnothing 50$ -160 mm;  $\varnothing 2.0$ -6.3 in

Mounting Bracket Kit	36210003
Downtilt Bracket Kit	36210004

### Electrical specifications

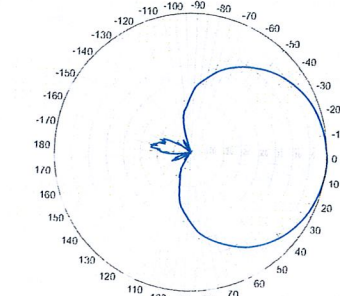
Frequency Range	696-900 MHz
Impedance	50 $\Omega$
Connector <sup>3)</sup>	NE or E-DIN Female 2 ports / Center
VSWR <sup>1)</sup>	$\leq 1.35:1$
Polarization	Slant $\pm 45^\circ$
Isolation Between Ports <sup>1)</sup>	< -25 dB
Gain <sup>1)</sup>	14.5 dBd 16.5 dBi
Power Rating <sup>2)</sup>	500 W
Half Power Angle <sup>1)</sup>	
Horizontal Beamwidth	63 $^\circ$
Vertical Beamwidth	11 $^\circ$
Electrical downtilt <sup>5)</sup>	4 $^\circ$
Null fill <sup>1)</sup>	5%
Lightning protection	Direct ground

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

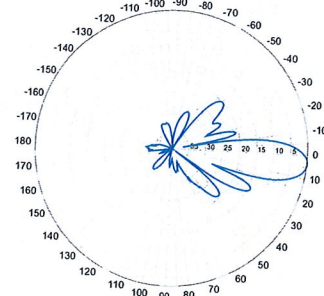
- 1) Typical values.
- 2) Power rating limited by connector only.
- 3) NE indicates an elongated N connector.  
E-DIN indicates an elongated DIN connector.
- 4) Antenna weight does not include brackets.
- 5) Add'l downtilts may be available. Check website for details.

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

Radiation-pattern<sup>1)</sup>  
750 MHz

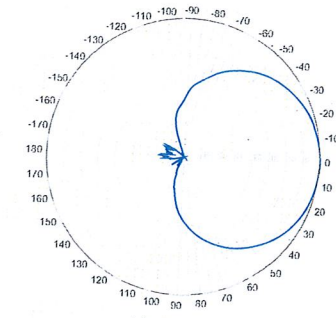


Horizontal

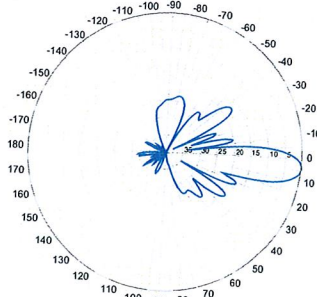


Vertical

850 MHz



Horizontal

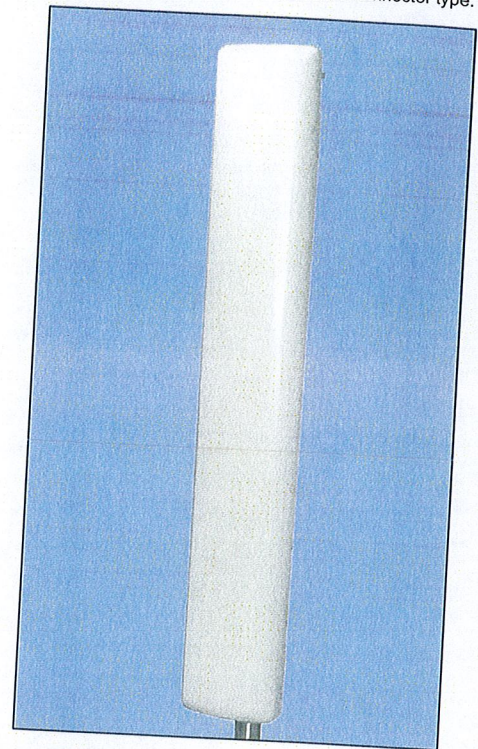


Vertical

696-900 MHz

BXA-70063/6CF \_\_\_ 4 $^\circ$

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 bandwidth 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



		General			Power	Density			
Site Name: Manchester									
Tower Height: Verizon @ 116Ft.									
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total	
*XM Sat Radio	2	3141	125	0.1446	2337.49	1.0000	14.46%		
Verizon	3	548	116	0.0439	1970	1.0000	4.39%		
Verizon	9	319	116	0.0767	869	0.5793	13.24%		
Verizon	1	832	116	0.0222	757	0.4973	4.47%		
								36.56%	
* Source: Siting Council									

Date: January 12, 2010

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



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520 S. Main St. Suite 2531  
Akron, OH 44311  
(614) 859-1618  
[londecker@gpdgroup.com](mailto:londecker@gpdgroup.com)

**Subject:** Structural Analysis Report

**Carrier Designation:** Verizon Wireless Co-Locate  
Carrier Site Number: 2010441916  
Carrier Site Name: Manchester

**Crown Castle Designation:** Crown Castle BU Number: 806372  
Crown Castle Site Name: HRT 093 943228  
Crown Castle JDE Job Number: 129136  
Crown Castle Work Order Number: 312272

**Engineering Firm Designation:** GPD Associates Project Number: 2010175.29

**Site Data:** Center and Pine St., CT 06040, Hartford County  
Latitude 41° 46' 19", Longitude -72° 31' 48.8"  
115 Foot – Valmont Monopole Tower

Dear Molly Carder,

GPD Associates 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 358227, in accordance with application 93117, revision 1.

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

LC1: Existing + Reserved + Proposed Equipment

**Sufficient Capacity**

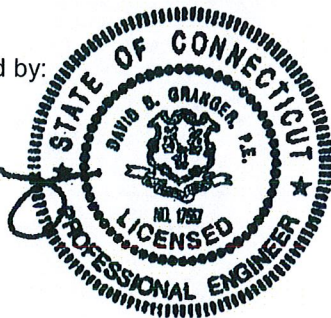
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard based upon a wind speed of 80 mph fastest mile.

We at GPD Associates 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:

David B. Granger P.E.  
Connecticut #: 17557



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## 1) INTRODUCTION

The existing 115' monopole has 12 sides and is evenly tapered from 43.85" (flat-flat) at the base to 21.91" (flat-flat) at 115'. It has three major sections connected with two slip joints. The structure is galvanized and has no tower lighting.

The tower was originally designed by Valmont in May of 1990 for a wind speed of 90 mph with 1/2" radial ice per EIA-222-D.

## 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
115	116	3	Antel	BXA-70063/6CFx4	6	1-5/8	1

Notes:

- 1) See Appendix B for proposed coax layout.

**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
	116	6	Antel	BSA-185090/16CF			
115		6	Decibel	DB844G65ZAXY	12	1-5/8	
	115	1		12' Platform Mount [LP 713-1]			
99	99	1		12' Platform Mount [LP 601-1]			

**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)
112	112	4		PD10017		
		1		Platform Mount		
99	99	12		PD1132		
		1		Platform Mount		

### 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
Manufacturer's Drawings	Valmont Order #: 10665-90, dated 05/01/90	Doc ID#: 262172	Crown DMZ
Geotechnical Report	Testwell Craig Laboratories of CT, dated 4/12/90	Doc ID#: 262174	Crown DMZ
Previous Structural Analysis	H.E. Bergeron Engineers, Project #: 2000-084, dated 6/5/00	Doc ID#: 821523	Crown DMZ

#### 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) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
- 5) Mount sizes, weights, and manufacturers are best estimates based on site photos provided and are determined without the benefit of a site visit by GPD.

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

### 4) ANALYSIS RESULTS

**Table 5 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P <sub>allow</sub> (K)	% Capacity	Pass / Fail	
L1	115 - 72.3333	Pole	TP30.45x21.91x0.219	1	-5.80	237.02	45.6	Pass	
L2	72.3333 - 29.3333	Pole	TP38.61x29.0779x0.313	2	-11.60	691.95	50.2	Pass	
L3	29.3333 - 0	Pole	TP43.85x36.8508x0.375	3	-18.68	1314.68	51.7	Pass	
							Summary		
							Pole (L3)	51.7	Pass
							Rating =	51.7	Pass

**Table 6 - Tower Component Stresses vs. Capacity - LC1**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods		47.1%	Pass
1	Base Plate		30.2%	Pass
2	Base Foundation		51.3%	Pass
<b>Structure Rating (max from all components) =</b>				<b>51.7%</b>

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Foundation capacity determined by comparing analysis reactions to original design reactions.

**4.1) Recommendations**

The design of the tower and its foundation is sufficient for the proposed loading and does not require modification.

## 5) DISCLAIMER OF WARRANTIES

GPD ASSOCIATES has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD ASSOCIATES in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. All tower components have been assumed to only resist dead loads when no other loads are applied. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

GPD ASSOCIATES does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD ASSOCIATES provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the feasibility of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD ASSOCIATES, but are beyond the scope of this report.

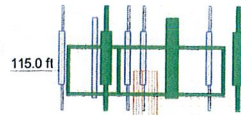
Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

GPD ASSOCIATES makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD ASSOCIATES will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD ASSOCIATES pursuant to this report will be limited to the total fee received for preparation of this report.

**APPENDIX A**  
**RISA TOWER OUTPUT**



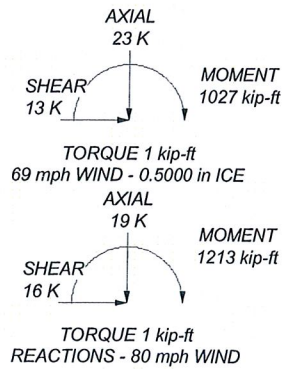
Section	1	2	3	
Length (ft)	42.67	47.67	35.00	
Number of Sides	12	12	12	
Thickness (in)	0.2185	0.3125	0.3750	
Lap Splice (ft)			5.67	
Top Dia (in)	21.9100	29.0789	36.8519	
Bot Dia (in)	30.4500	38.6100	43.8500	
Grade		A572-65		
Weight (K)	2.7	5.5	5.7	13.9



72.3 ft

29.3 ft

0.0 ft



### DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Platform Mount [LP 713-1]	115	BXA-70063/6CFx4 w/ Mount Pipe	115
(2) DB844G65ZAXY w/Mount Pipe	115	(2) DB844G65ZAXY w/Mount Pipe	115
(2) BSA-185090/16CF w/Mount Pipe	115	(2) BSA-185090/16CF w/Mount Pipe	115
BXA-70063/6CFx4 w/ Mount Pipe	115	BXA-70063/6CFx4 w/ Mount Pipe	115
(2) DB844G65ZAXY w/Mount Pipe	115	Platform Mount [LP 601-1]	99
(2) BSA-185090/16CF w/Mount Pipe	115		

### MATERIAL STRENGTH

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

### TOWER DESIGN NOTES

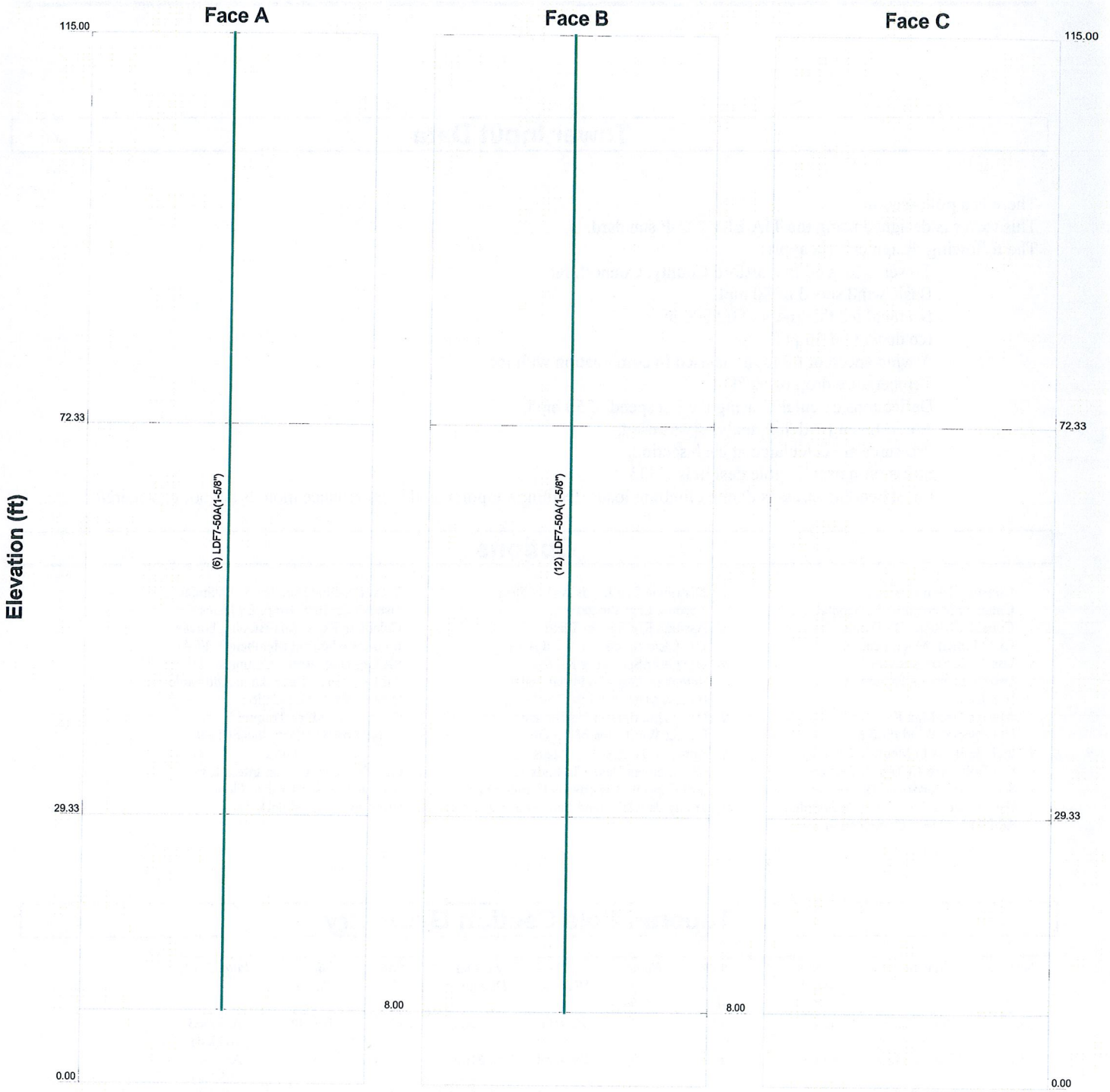
1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 51.7%

 <b>GPD GROUP</b> Consulting Engineers	<b>GPD Associates</b> 520 S. Main St. Suite 2531 Akron, OH 44311 Phone: (614) 859-1618 FAX: (330) 572-2101	Job: <b>HRT 093 943228</b> Project: <b>2010175.29</b> Client: <b>Crown Castle USA</b>	Drawn by: <b>londecker</b> Date: <b>01/12/10</b> Path: <b>N:\2010\2010175\29\IRISA\060372.eri</b>	
		App'd: _____ Scale: <b>NTS</b> Dwg No. <b>E-1</b>		

# Feedline Distribution Chart

## 0' - 115'

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



 <b>GPD GROUP</b> Consulting Engineers	<b>GPD Associates</b>	<b>Job: HRT 093 943228</b>		
	520 S. Main St. Suite 2531		<b>Project: 2010175.29</b>	
	Akron, OH 44311		Client: Crown Castle USA	Drawn by: londecker
	Phone: (614) 859-1618		Code: TIA/EIA-222-F	Date: 01/12/10
FAX: (330) 572-2101		Path: N:\2010\2010175\29\RISA\806372.eri	App'd: _____	
			Scale: NTS	
			Dwg No. E-7	

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	Client	Crown Castle USA	Designed by	londecker

## 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 0.5000 in.

Ice density of 56 pcf.

A wind speed of 69 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

## Options

- |  |  |   |
|--|--|---|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>√ Include Bolts In Member Capacity</li> <li>√ Leg Bolts Are At Top Of Section</li> <li>√ Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>Add IBC .6D+W Combination</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>√ Use Clear Spans For KL/r</li> <li>√ Retension Guys To Initial Tension</li> <li>Bypass Mast Stability Checks</li> <li>√ Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>√ Autocalc Torque Arm Areas</li> <li>SR Members Have Cut Ends</li> <li>Sort Capacity Reports By Component</li> <li>√ Triangulate Diamond Inner Bracing</li> </ul> | <ul style="list-style-type: none"> <li>Treat Feedline Bundles As Cylinder</li> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>√ Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>√ All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>Consider Feedline Torque</li> <li>Include Angle Block Shear Check</li> <li style="padding-left: 40px;">Poles</li> <li>√ Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> </ul> |
|--|--|---|

## Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	115.00-72.33	42.67	4.67	12	21.9100	30.4500	0.2185	0.8740	A572-65 (65 ksi)
L2	72.33-29.33	47.67	5.67	12	29.0789	38.6100	0.3125	1.2500	A572-65 (65 ksi)
L3	29.33-0.00	35.00		12	36.8519	43.8500	0.3750	1.5000	A572-65 (65 ksi)

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	<b>Project</b> 2010175.29	<b>Date</b> 07:35:12 01/12/10
	<b>Client</b> Crown Castle USA	<b>Designed by</b> londecker

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/O in <sup>2</sup>	w in	w/t
L1	22.6829	15.2615	916.5624	7.7656	11.3494	80.7588	1857.2038	7.5112	5.2863	24.194
	31.5242	21.2700	2481.2604	10.8229	15.7731	157.3096	5027.7064	10.4684	7.5750	34.668
L2	31.0708	28.9462	3057.3828	10.2984	15.0629	202.9746	6195.0865	14.2464	6.9557	22.258
	39.9720	38.5369	7214.4482	13.7105	20.0000	360.7228	14618.4279	18.9667	9.5100	30.432
L3	39.3249	44.0459	7480.4536	13.0587	19.0893	391.8663	15157.4269	21.6780	8.8713	23.657
	45.3969	52.4961	12664.6112	15.5641	22.7143	557.5611	25661.9358	25.8370	10.7468	28.658

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft <sup>2</sup>	in					in	in
L1 115.00-72.33				1	1	1		
L2 72.33-29.33				1	1	1		
L3 29.33-0.00				1	1	1		

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow. Shield	Component Type	Placement	Total Number	C <sub>A</sub> A <sub>A</sub>	Weight
				ft		ft <sup>2</sup> /ft	plf
LDF7-50A(1-5/8")	A	No	Inside Pole	115.00 - 8.00	6	No Ice 1/2" Ice	0.82 0.82
LDF7-50A(1-5/8")	B	No	Inside Pole	115.00 - 8.00	12	No Ice 1/2" Ice	0.82 0.82

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation	Face	A <sub>R</sub>	A <sub>F</sub>	C <sub>A</sub> A <sub>A</sub> In Face	C <sub>A</sub> A <sub>A</sub> Out Face	Weight
	ft		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	K
L1	115.00-72.33	A	0.000	0.000	0.000	0.000	0.21
		B	0.000	0.000	0.000	0.000	0.42
		C	0.000	0.000	0.000	0.000	0.00
L2	72.33-29.33	A	0.000	0.000	0.000	0.000	0.21
		B	0.000	0.000	0.000	0.000	0.42
		C	0.000	0.000	0.000	0.000	0.00
L3	29.33-0.00	A	0.000	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.21
		C	0.000	0.000	0.000	0.000	0.00

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation	Face or Leg	Ice Thickness	A <sub>R</sub>	A <sub>F</sub>	C <sub>A</sub> A <sub>A</sub> In Face	C <sub>A</sub> A <sub>A</sub> Out Face	Weight
	ft		in	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	K
L1	115.00-72.33	A	0.500	0.000	0.000	0.000	0.000	0.21

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	Client	Crown Castle USA	Designed by	londecker

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L2	72.33-29.33	B	0.500	0.000	0.000	0.000	0.000	0.42
		C		0.000	0.000	0.000	0.000	0.00
		A		0.000	0.000	0.000	0.000	0.21
L3	29.33-0.00	B	0.500	0.000	0.000	0.000	0.000	0.42
		C		0.000	0.000	0.000	0.000	0.00
		A		0.000	0.000	0.000	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.21
		C		0.000	0.000	0.000	0.000	0.00

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K
Platform Mount [LP 713-1]	C	None		0.0000	115.00	No Ice 31.27 1/2" Ice 39.68	31.27 39.68	1.51 1.93
(2) DB844G65ZAXY w/ Mount Pipe	A	From Centroid-Fa	3.86 -1.04 1.00	-15.0000	115.00	No Ice 5.38 1/2" Ice 6.07	5.40 6.49	0.04 0.09
(2) BSA-185090/16CF w/ Mount Pipe	A	From Centroid-Fa	3.86 -1.04 1.00	-15.0000	115.00	No Ice 5.08 1/2" Ice 5.66	4.53 6.25	0.04 0.08
BXA-70063/6CFx4 w/ Mount Pipe	A	From Centroid-Fa	3.86 -1.04 1.00	-15.0000	115.00	No Ice 8.00 1/2" Ice 8.65	5.42 6.59	0.04 0.10
(2) DB844G65ZAXY w/ Mount Pipe	B	From Centroid-Fa	3.63 -1.69 1.00	-25.0000	115.00	No Ice 5.38 1/2" Ice 6.07	5.40 6.49	0.04 0.09
(2) BSA-185090/16CF w/ Mount Pipe	B	From Centroid-Fa	3.63 -1.69 1.00	-25.0000	115.00	No Ice 5.08 1/2" Ice 5.66	4.53 6.25	0.04 0.08
BXA-70063/6CFx4 w/ Mount Pipe	B	From Centroid-Fa	3.63 -1.69 1.00	-25.0000	115.00	No Ice 8.00 1/2" Ice 8.65	5.42 6.59	0.04 0.10
(2) DB844G65ZAXY w/ Mount Pipe	C	From Centroid-Fa	3.46 -2.00 1.00	-30.0000	115.00	No Ice 5.38 1/2" Ice 6.07	5.40 6.49	0.04 0.09
(2) BSA-185090/16CF w/ Mount Pipe	C	From Centroid-Fa	3.46 -2.00 1.00	-30.0000	115.00	No Ice 5.08 1/2" Ice 5.66	4.53 6.25	0.04 0.08
BXA-70063/6CFx4 w/ Mount Pipe	C	From Centroid-Fa	3.46 -2.00 1.00	-30.0000	115.00	No Ice 8.00 1/2" Ice 8.65	5.42 6.59	0.04 0.10
Platform Mount [LP 601-1]	C	None		0.0000	99.00	No Ice 28.47 1/2" Ice 33.59	28.47 33.59	1.12 1.51

### Tower Pressures - No Ice

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$$G_H = 1.690$$

Section Elevation	z	K <sub>Z</sub>	q <sub>z</sub>	A <sub>G</sub>	F a c e	A <sub>F</sub>	A <sub>R</sub>	A <sub>leg</sub>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face	C <sub>A</sub> A <sub>A</sub> Out Face
ft	ft		psf	ft <sup>2</sup>	e	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>
L1 115.00-72.33	92.85	1.344	22	93.085	A	0.000	93.085	93.085	100.00	0.000	0.000
					B	0.000	93.085		100.00	0.000	0.000
					C	0.000	93.085		100.00	0.000	0.000
L2 72.33-29.33	50.60	1.13	18	122.948	A	0.000	122.948	122.948	100.00	0.000	0.000
					B	0.000	122.948		100.00	0.000	0.000
					C	0.000	122.948		100.00	0.000	0.000
L3 29.33-0.00	14.32	1	16	100.020	A	0.000	100.020	100.020	100.00	0.000	0.000
					B	0.000	100.020		100.00	0.000	0.000
					C	0.000	100.020		100.00	0.000	0.000

### Tower Pressure - With Ice

$$G_H = 1.690$$

Section Elevation	z	K <sub>Z</sub>	q <sub>z</sub>	t <sub>z</sub>	A <sub>G</sub>	F a c e	A <sub>F</sub>	A <sub>R</sub>	A <sub>leg</sub>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face	C <sub>A</sub> A <sub>A</sub> Out Face
ft	ft		psf	in	ft <sup>2</sup>	e	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>
L1 115.00-72.33	92.85	1.344	16	0.5000	96.640	A	0.000	96.640	96.640	100.00	0.000	0.000
						B	0.000	96.640		100.00	0.000	0.000
						C	0.000	96.640		100.00	0.000	0.000
L2 72.33-29.33	50.60	1.13	14	0.5000	126.531	A	0.000	126.531	126.531	100.00	0.000	0.000
						B	0.000	126.531		100.00	0.000	0.000
						C	0.000	126.531		100.00	0.000	0.000
L3 29.33-0.00	14.32	1	12	0.5000	102.465	A	0.000	102.465	102.465	100.00	0.000	0.000
						B	0.000	102.465		100.00	0.000	0.000
						C	0.000	102.465		100.00	0.000	0.000

### Tower Pressure - Service

$$G_H = 1.690$$

Section Elevation	z	K <sub>Z</sub>	q <sub>z</sub>	A <sub>G</sub>	F a c e	A <sub>F</sub>	A <sub>R</sub>	A <sub>leg</sub>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face	C <sub>A</sub> A <sub>A</sub> Out Face
ft	ft		psf	ft <sup>2</sup>	e	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>
L1 115.00-72.33	92.85	1.344	9	93.085	A	0.000	93.085	93.085	100.00	0.000	0.000
					B	0.000	93.085		100.00	0.000	0.000
					C	0.000	93.085		100.00	0.000	0.000
L2 72.33-29.33	50.60	1.13	7	122.948	A	0.000	122.948	122.948	100.00	0.000	0.000
					B	0.000	122.948		100.00	0.000	0.000
					C	0.000	122.948		100.00	0.000	0.000
L3 29.33-0.00	14.32	1	6	100.020	A	0.000	100.020	100.020	100.00	0.000	0.000
					B	0.000	100.020		100.00	0.000	0.000
					C	0.000	100.020		100.00	0.000	0.000

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**Tower Forces - No Ice - Wind Normal To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 115.00-72.33	0.63	2.65	A	1	1.03	1	1	1	93.085	3.56	83.42	C
			B	1	1.03	1	1	1	93.085			
			C	1	1.03	1	1	1	93.085			
L2 72.33-29.33	0.63	5.47	A	1	1.03	1	1	1	122.948	3.93	91.36	C
			B	1	1.03	1	1	1	122.948			
			C	1	1.03	1	1	1	122.948			
L3 29.33-0.00	0.31	5.75	A	1	1.03	1	1	1	100.020	2.85	97.25	C
			B	1	1.03	1	1	1	100.020			
			C	1	1.03	1	1	1	100.020			
Sum Weight:	1.58	13.87						OTM	570.07 kip-ft	10.34		

**Tower Forces - No Ice - Wind 60 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 115.00-72.33	0.63	2.65	A	1	1.03	1	1	1	93.085	3.56	83.42	C
			B	1	1.03	1	1	1	93.085			
			C	1	1.03	1	1	1	93.085			
L2 72.33-29.33	0.63	5.47	A	1	1.03	1	1	1	122.948	3.93	91.36	C
			B	1	1.03	1	1	1	122.948			
			C	1	1.03	1	1	1	122.948			
L3 29.33-0.00	0.31	5.75	A	1	1.03	1	1	1	100.020	2.85	97.25	C
			B	1	1.03	1	1	1	100.020			
			C	1	1.03	1	1	1	100.020			
Sum Weight:	1.58	13.87						OTM	570.07 kip-ft	10.34		

**Tower Forces - No Ice - Wind 90 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 115.00-72.33	0.63	2.65	A	1	1.03	1	1	1	93.085	3.56	83.42	C
			B	1	1.03	1	1	1	93.085			
			C	1	1.03	1	1	1	93.085			
L2 72.33-29.33	0.63	5.47	A	1	1.03	1	1	1	122.948	3.93	91.36	C
			B	1	1.03	1	1	1	122.948			
			C	1	1.03	1	1	1	122.948			
L3 29.33-0.00	0.31	5.75	A	1	1.03	1	1	1	100.020	2.85	97.25	C
			B	1	1.03	1	1	1	100.020			
			C	1	1.03	1	1	1	100.020			
Sum Weight:	1.58	13.87						OTM	570.07 kip-ft	10.34		

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**Tower Forces - With Ice - Wind Normal To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 115.00-72.33	0.63	3.36	A	1	1.03	1	1	1	96.640	2.77	64.95	C
			B	1	1.03	1	1	96.640				
			C	1	1.03	1	1	96.640				
L2 72.33-29.33	0.63	6.41	A	1	1.03	1	1	1	126.531	3.03	70.52	C
			B	1	1.03	1	1	1	126.531			
			C	1	1.03	1	1	1	126.531			
L3 29.33-0.00	0.31	6.51	A	1	1.03	1	1	1	102.465	2.19	74.72	C
			B	1	1.03	1	1	1	102.465			
			C	1	1.03	1	1	1	102.465			
Sum Weight:	1.58	16.28						OTM	442.11 kip-ft	8.00		

**Tower Forces - With Ice - Wind 60 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 115.00-72.33	0.63	3.36	A	1	1.03	1	1	1	96.640	2.77	64.95	C
			B	1	1.03	1	1	1	96.640			
			C	1	1.03	1	1	1	96.640			
L2 72.33-29.33	0.63	6.41	A	1	1.03	1	1	1	126.531	3.03	70.52	C
			B	1	1.03	1	1	1	126.531			
			C	1	1.03	1	1	1	126.531			
L3 29.33-0.00	0.31	6.51	A	1	1.03	1	1	1	102.465	2.19	74.72	C
			B	1	1.03	1	1	1	102.465			
			C	1	1.03	1	1	1	102.465			
Sum Weight:	1.58	16.28						OTM	442.11 kip-ft	8.00		

**Tower Forces - With Ice - Wind 90 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 115.00-72.33	0.63	3.36	A	1	1.03	1	1	1	96.640	2.77	64.95	C
			B	1	1.03	1	1	1	96.640			
			C	1	1.03	1	1	1	96.640			
L2 72.33-29.33	0.63	6.41	A	1	1.03	1	1	1	126.531	3.03	70.52	C
			B	1	1.03	1	1	1	126.531			
			C	1	1.03	1	1	1	126.531			
L3 29.33-0.00	0.31	6.51	A	1	1.03	1	1	1	102.465	2.19	74.72	C
			B	1	1.03	1	1	1	102.465			
			C	1	1.03	1	1	1	102.465			
Sum Weight:	1.58	16.28						OTM	442.11	8.00		



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Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
									kip-ft			

**Tower Forces - Service - Wind Normal To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 115.00-72.33	0.63	2.65	A	1	1.03	1	1	1	93.085	1.39	32.58	C
			B	1	1.03	1	1	1	93.085			
			C	1	1.03	1	1	1	93.085			
L2 72.33-29.33	0.63	5.47	A	1	1.03	1	1	1	122.948	1.53	35.69	C
			B	1	1.03	1	1	1	122.948			
			C	1	1.03	1	1	1	122.948			
L3 29.33-0.00	0.31	5.75	A	1	1.03	1	1	1	100.020	1.11	37.99	C
			B	1	1.03	1	1	1	100.020			
			C	1	1.03	1	1	1	100.020			
Sum Weight:	1.58	13.87						OTM	222.68 kip-ft	4.04		

**Tower Forces - Service - Wind 60 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 115.00-72.33	0.63	2.65	A	1	1.03	1	1	1	93.085	1.39	32.58	C
			B	1	1.03	1	1	1	93.085			
			C	1	1.03	1	1	1	93.085			
L2 72.33-29.33	0.63	5.47	A	1	1.03	1	1	1	122.948	1.53	35.69	C
			B	1	1.03	1	1	1	122.948			
			C	1	1.03	1	1	1	122.948			
L3 29.33-0.00	0.31	5.75	A	1	1.03	1	1	1	100.020	1.11	37.99	C
			B	1	1.03	1	1	1	100.020			
			C	1	1.03	1	1	1	100.020			
Sum Weight:	1.58	13.87						OTM	222.68 kip-ft	4.04		

**Tower Forces - Service - Wind 90 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 115.00-72.33	0.63	2.65	A	1	1.03	1	1	1	93.085	1.39	32.58	C
			B	1	1.03	1	1	1	93.085			
			C	1	1.03	1	1	1	93.085			

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Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L2 72.33-29.33	0.63	5.47	A	1	1.03	1	1	1	122.948	1.53	35.69	C
			B	1	1.03	1	1	1	122.948			
			C	1	1.03	1	1	1	122.948			
L3 29.33-0.00	0.31	5.75	A	1	1.03	1	1	1	100.020	1.11	37.99	C
			B	1	1.03	1	1	1	100.020			
			C	1	1.03	1	1	1	100.020			
Sum Weight:	1.58	13.87						OTM	222.68	4.04		
									kip-ft			

**Discrete Appurtenance Pressures - No Ice**      $G_H = 1.690$

Description	Aiming Azimuth °	Weight K	Offset <sub>x</sub> ft	Offset <sub>z</sub> ft	z ft	K <sub>z</sub>	q <sub>z</sub> psf	C <sub>AAC</sub> Front ft <sup>2</sup>	C <sub>AAC</sub> Side ft <sup>2</sup>
Platform Mount [LP 713-1]	0.0000	1.51	0.00	0.00	115.00	1.429	23	31.27	31.27
DB844G65ZAXY w/Mount Pipe	285.0000	0.08	-3.86	-1.03	116.00	1.432	23	10.76	10.79
BSA-185090/16CF w/Mount Pipe	285.0000	0.08	-3.86	-1.03	116.00	1.432	23	10.17	9.05
BXA-70063/6CFx4 w/Mount Pipe	285.0000	0.04	-3.86	-1.03	116.00	1.432	23	8.00	5.42
DB844G65ZAXY w/Mount Pipe	35.0000	0.08	2.30	-3.28	116.00	1.432	23	10.76	10.79
BSA-185090/16CF w/Mount Pipe	35.0000	0.08	2.30	-3.28	116.00	1.432	23	10.17	9.05
BXA-70063/6CFx4 w/Mount Pipe	35.0000	0.04	2.30	-3.28	116.00	1.432	23	8.00	5.42
DB844G65ZAXY w/Mount Pipe	150.0000	0.08	2.00	3.46	116.00	1.432	23	10.76	10.79
BSA-185090/16CF w/Mount Pipe	150.0000	0.08	2.00	3.46	116.00	1.432	23	10.17	9.05
BXA-70063/6CFx4 w/Mount Pipe	150.0000	0.04	2.00	3.46	116.00	1.432	23	8.00	5.42
Platform Mount [LP 601-1]	0.0000	1.12	0.00	0.00	99.00	1.369	22	28.47	28.47
Sum Weight:		3.23							

**Discrete Appurtenance Pressures - With Ice**      $G_H = 1.690$

Description	Aiming Azimuth °	Weight K	Offset <sub>x</sub> ft	Offset <sub>z</sub> ft	z ft	K <sub>z</sub>	q <sub>z</sub> psf	C <sub>AAC</sub> Front ft <sup>2</sup>	C <sub>AAC</sub> Side ft <sup>2</sup>	t <sub>z</sub> in
Platform Mount [LP 713-1]	0.0000	1.93	0.00	0.00	115.00	1.429	18	39.68	39.68	0.5000
DB844G65ZAXY w/Mount Pipe	285.0000	0.18	-3.86	-1.03	116.00	1.432	18	12.14	12.98	0.5000
BSA-185090/16CF w/Mount Pipe	285.0000	0.16	-3.86	-1.03	116.00	1.432	18	11.32	12.51	0.5000
BXA-70063/6CFx4 w/Mount Pipe	285.0000	0.10	-3.86	-1.03	116.00	1.432	18	8.65	6.59	0.5000
DB844G65ZAXY	35.0000	0.18	2.30	-3.28	116.00	1.432	18	12.14	12.98	0.5000

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Description	Aiming Azimuth °	Weight K	Offset <sub>x</sub> ft	Offset <sub>y</sub> ft	z ft	K <sub>z</sub>	q <sub>z</sub> psf	C <sub>A</sub> C <sub>C</sub> Front ft <sup>2</sup>	C <sub>A</sub> C <sub>C</sub> Side ft <sup>2</sup>	t <sub>z</sub> in
w/Mount Pipe BSA-185090/16CF	35.0000	0.16	2.30	-3.28	116.00	1.432	18	11.32	12.51	0.5000
w/Mount Pipe BXA-70063/6CFx4 w/ Mount Pipe	35.0000	0.10	2.30	-3.28	116.00	1.432	18	8.65	6.59	0.5000
DB844G65ZAXY w/Mount Pipe	150.0000	0.18	2.00	3.46	116.00	1.432	18	12.14	12.98	0.5000
BSA-185090/16CF w/Mount Pipe	150.0000	0.16	2.00	3.46	116.00	1.432	18	11.32	12.51	0.5000
BXA-70063/6CFx4 w/ Mount Pipe	150.0000	0.10	2.00	3.46	116.00	1.432	18	8.65	6.59	0.5000
Platform Mount [LP 601-1]	0.0000	1.51	0.00	0.00	99.00	1.369	17	33.59	33.59	0.5000
Sum Weight:		4.76								

**Discrete Appurtenance Pressures - Service**       $G_H = 1.690$

Description	Aiming Azimuth °	Weight K	Offset <sub>x</sub> ft	Offset <sub>y</sub> ft	z ft	K <sub>z</sub>	q <sub>z</sub> psf	C <sub>A</sub> C <sub>C</sub> Front ft <sup>2</sup>	C <sub>A</sub> C <sub>C</sub> Side ft <sup>2</sup>
Platform Mount [LP 713-1]	0.0000	1.51	0.00	0.00	115.00	1.429	9	31.27	31.27
DB844G65ZAXY w/Mount Pipe	285.0000	0.08	-3.86	-1.03	116.00	1.432	9	10.76	10.79
BSA-185090/16CF w/Mount Pipe	285.0000	0.08	-3.86	-1.03	116.00	1.432	9	10.17	9.05
BXA-70063/6CFx4 w/ Mount Pipe	285.0000	0.04	-3.86	-1.03	116.00	1.432	9	8.00	5.42
DB844G65ZAXY w/Mount Pipe	35.0000	0.08	2.30	-3.28	116.00	1.432	9	10.76	10.79
BSA-185090/16CF w/Mount Pipe	35.0000	0.08	2.30	-3.28	116.00	1.432	9	10.17	9.05
BXA-70063/6CFx4 w/ Mount Pipe	35.0000	0.04	2.30	-3.28	116.00	1.432	9	8.00	5.42
DB844G65ZAXY w/Mount Pipe	150.0000	0.08	2.00	3.46	116.00	1.432	9	10.76	10.79
BSA-185090/16CF w/Mount Pipe	150.0000	0.08	2.00	3.46	116.00	1.432	9	10.17	9.05
BXA-70063/6CFx4 w/ Mount Pipe	150.0000	0.04	2.00	3.46	116.00	1.432	9	8.00	5.42
Platform Mount [LP 601-1]	0.0000	1.12	0.00	0.00	99.00	1.369	9	28.47	28.47
Sum Weight:		3.23							

**Force Totals**

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M <sub>x</sub> kip-ft	Sum of Overturning Moments, M <sub>z</sub> kip-ft	Sum of Torques kip-ft
Leg Weight	13.87					
Bracing Weight	0.00					
Total Member Self-Weight	13.87			-0.17	-0.09	

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Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M <sub>x</sub> kip-ft	Sum of Overturning Moments, M <sub>z</sub> kip-ft	Sum of Torques kip-ft
Total Weight	18.69			-0.17	-0.09	
Wind 0 deg - No Ice		-0.03	-15.88	-1192.99	3.50	0.44
Wind 90 deg - No Ice		15.88	0.03	3.41	-1193.32	-0.85
Wind 180 deg - No Ice		0.03	15.88	1192.66	-3.67	-0.44
Member Ice	2.41					
Total Weight Ice	22.63			-0.37	-0.19	
Wind 0 deg - Ice		-0.00	-12.99	-1004.54	-0.17	0.42
Wind 90 deg - Ice		12.99	0.00	-0.35	-1004.36	-0.81
Wind 180 deg - Ice		0.00	12.99	1003.79	-0.22	-0.42
Total Weight	18.69			-0.17	-0.09	
Wind 0 deg - Service		-0.01	-6.20	-466.12	1.31	0.17
Wind 90 deg - Service		6.20	0.01	1.23	-466.19	-0.33
Wind 180 deg - Service		0.01	6.20	465.78	-1.49	-0.17

### Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 90 deg - No Ice
4	Dead+Wind 180 deg - No Ice
5	Dead+Ice+Temp
6	Dead+Wind 0 deg+Ice+Temp
7	Dead+Wind 90 deg+Ice+Temp
8	Dead+Wind 180 deg+Ice+Temp
9	Dead+Wind 0 deg - Service
10	Dead+Wind 90 deg - Service
11	Dead+Wind 180 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	115 - 72.3333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-8.27	-0.19	0.37
			Max. Mx	3	-5.80	-260.48	-1.07
			Max. My	2	-5.80	1.15	260.42
			Max. Vy	3	8.89	-260.48	-1.07
			Max. Vx	2	-8.88	1.15	260.42
			Max. Torque	3			0.86
L2	72.3333 - 29.3333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-14.85	-0.19	0.37
			Max. Mx	3	-11.60	-713.81	-2.39
			Max. My	2	-11.60	2.47	713.61
			Max. Vy	3	12.68	-713.81	-2.39
			Max. Vx	2	-12.68	2.47	713.61
			Max. Torque	3			0.85
L3	29.3333 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-22.63	-0.19	0.37
			Max. Mx	3	-18.68	-1213.28	-3.48

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-18.68	3.57	1212.96
			Max. Vy	3	15.89	-1213.28	-3.48
			Max. Vx	2	-15.88	3.57	1212.96
			Max. Torque	3			0.85

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	6	22.63	0.00	12.99
	Max. H <sub>x</sub>	2	18.69	0.03	15.88
	Max. H <sub>z</sub>	2	18.69	0.03	15.88
	Max. M <sub>x</sub>	2	1212.96	0.03	15.88
	Max. M <sub>z</sub>	3	1213.28	-15.88	-0.03
	Max. Torsion	3	0.85	-15.88	-0.03
	Min. Vert	1	18.69	0.00	0.00
	Min. H <sub>x</sub>	3	18.69	-15.88	-0.03
	Min. H <sub>z</sub>	4	18.69	-0.03	-15.88
	Min. M <sub>x</sub>	4	-1212.61	-0.03	-15.88
	Min. M <sub>z</sub>	2	-3.57	0.03	15.88
	Min. Torsion	2	-0.44	0.03	15.88

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overtuning Moment, M <sub>x</sub> kip-ft	Overtuning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	18.69	0.00	0.00	-0.17	-0.09	0.00
Dead+Wind 0 deg - No Ice	18.69	-0.03	-15.88	-1212.96	3.57	0.44
Dead+Wind 90 deg - No Ice	18.69	15.88	0.03	3.48	-1213.28	-0.85
Dead+Wind 180 deg - No Ice	18.69	0.03	15.88	1212.61	-3.74	-0.44
Dead+Ice+Temp	22.63	0.00	0.00	-0.37	-0.19	0.00
Dead+Wind 0 deg+Ice+Temp	22.63	-0.00	-12.99	-1027.37	-0.17	0.42
Dead+Wind 90 deg+Ice+Temp	22.63	12.99	0.00	-0.36	-1027.18	-0.82
Dead+Wind 180 deg+Ice+Temp	22.63	0.00	12.99	1026.58	-0.23	-0.42
Dead+Wind 0 deg - Service	18.69	-0.01	-6.20	-474.06	1.34	0.17
Dead+Wind 90 deg - Service	18.69	6.20	0.01	1.25	-474.13	-0.33
Dead+Wind 180 deg - Service	18.69	0.01	6.20	473.71	-1.52	-0.17

### Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-18.69	0.00	0.00	18.69	0.00	0.000%
2	-0.03	-18.69	-15.88	0.03	18.69	15.88	0.000%
3	15.88	-18.69	0.03	-15.88	18.69	-0.03	0.000%
4	0.03	-18.69	15.88	-0.03	18.69	-15.88	0.000%
5	0.00	-22.63	0.00	0.00	22.63	0.00	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
6	-0.00	-22.63	-12.99	0.00	22.63	12.99	0.000%
7	12.99	-22.63	0.00	-12.99	22.63	-0.00	0.000%
8	0.00	-22.63	12.99	-0.00	22.63	-12.99	0.000%
9	-0.01	-18.69	-6.20	0.01	18.69	6.20	0.000%
10	6.20	-18.69	0.01	-6.20	18.69	-0.01	0.000%
11	0.01	-18.69	6.20	-0.01	18.69	-6.20	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	4	0.00000001	0.00004391
3	Yes	4	0.00000001	0.00008785
4	Yes	4	0.00000001	0.00005393
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00077471
7	Yes	4	0.00000001	0.00078278
8	Yes	4	0.00000001	0.00077340
9	Yes	4	0.00000001	0.00001152
10	Yes	4	0.00000001	0.00002020
11	Yes	4	0.00000001	0.00001223

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	115 - 72.3333	14.304	9	1.0845	0.0024
L2	77 - 29.3333	6.521	10	0.7938	0.0008
L3	35 - 0	1.356	10	0.3460	0.0002

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
115.00	Platform Mount [LP 713-1]	9	14.304	1.0845	0.0047	38359
99.00	Platform Mount [LP 601-1]	10	10.829	0.9820	0.0032	11987

### Maximum Tower Deflections - Design Wind

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	115 - 72.3333	36.581	3	2.7722	0.0062
L2	77 - 29.3333	16.682	3	2.0306	0.0019
L3	35 - 0	3.470	3	0.8853	0.0005

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
115.00	Platform Mount [LP 713-1]	3	36.581	2.7722	0.0121	15070
99.00	Platform Mount [LP 601-1]	3	27.697	2.4969	0.0081	4708

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P K	Allow. P <sub>a</sub> K	Ratio $\frac{P}{P_a}$
L1	115 - 72.3333 (1)	TP30.45x21.91x0.2185	42.67	115.00	131.6	8.626	20.6128	-5.80	177.81	0.033
L2	72.3333 - 29.3333 (2)	TP38.61x29.0789x0.3125	47.67	115.00	103.7	13.881	37.3967	-11.60	519.10	0.022
L3	29.3333 - 0 (3)	TP43.85x36.8519x0.375	35.00	115.00	88.7	18.787	52.4961	-18.68	986.25	0.019

### Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M <sub>x</sub> kip-ft	Actual f <sub>bx</sub> ksi	Allow. F <sub>bx</sub> ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M <sub>y</sub> kip-ft	Actual f <sub>by</sub> ksi	Allow. F <sub>by</sub> ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	115 - 72.3333 (1)	TP30.45x21.91x0.2185	260.48	21.162	36.834	0.575	0.00	0.000	36.834	0.000
L2	72.3333 - 29.3333 (2)	TP38.61x29.0789x0.3125	713.82	25.223	39.000	0.647	0.00	0.000	39.000	0.000
L3	29.3333 - 0 (3)	TP43.85x36.8519x0.375	1213.29	26.113	39.000	0.670	0.00	0.000	39.000	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f <sub>v</sub> ksi	Allow. F <sub>v</sub> ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f <sub>vt</sub> ksi	Allow. F <sub>vt</sub> ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	115 - 72.3333	TP30.45x21.91x0.2185	8.89	0.431	26.000	0.034	0.85	0.033	26.000	0.001

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Section No.	Elevation ft	Size	Actual V K	Actual f <sub>v</sub> ksi	Allow. F <sub>v</sub> ksi	Ratio f <sub>v</sub> F <sub>v</sub>	Actual T kip-ft	Actual f <sub>vt</sub> ksi	Allow. F <sub>vt</sub> ksi	Ratio f <sub>vt</sub> F <sub>vt</sub>
L2	72.3333 - 29.3333 (2)	TP38.61x29.0789x0.3125	12.68	0.339	26.000	0.027	0.85	0.014	26.000	0.001
L3	29.3333 - 0 (3)	TP43.85x36.8519x0.375	15.89	0.303	26.000	0.024	0.85	0.009	26.000	0.000

### Pole Interaction Design Data

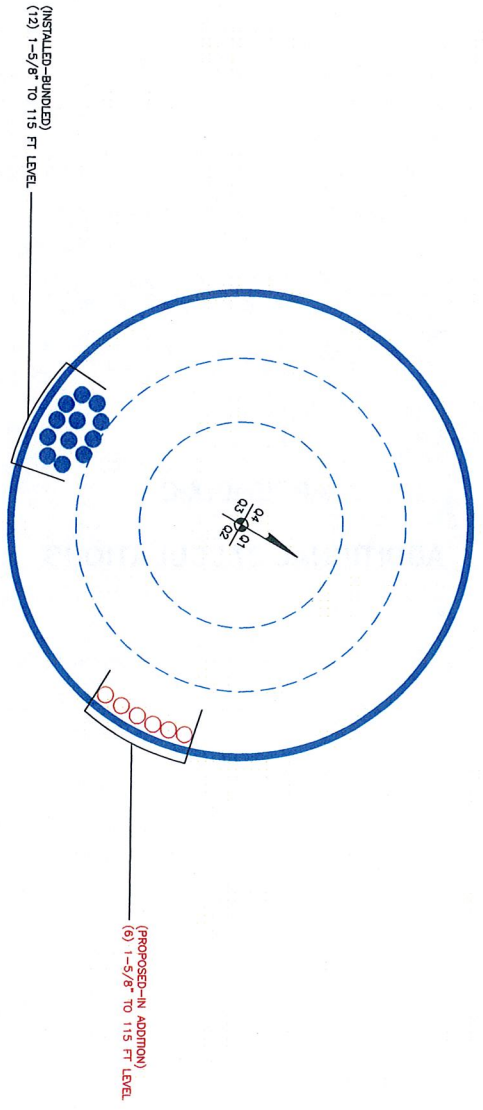
Section No.	Elevation ft	Ratio P	Ratio f <sub>bx</sub> F <sub>bx</sub>	Ratio f <sub>by</sub> F <sub>by</sub>	Ratio f <sub>v</sub> F <sub>v</sub>	Ratio f <sub>vt</sub> F <sub>vt</sub>	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	115 - 72.3333 (1)	0.033	0.575	0.000	0.034	0.001	0.607	1.333	H1-3+VT ✓
L2	72.3333 - 29.3333 (2)	0.022	0.647	0.000	0.027	0.001	0.669	1.333	H1-3+VT ✓
L3	29.3333 - 0 (3)	0.019	0.670	0.000	0.024	0.000	0.689	1.333	H1-3+VT ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P <sub>allow</sub> K	% Capacity	Pass Fail
L1	115 - 72.3333	Pole	TP30.45x21.91x0.2185	1	-5.80	237.02	45.6	Pass
L2	72.3333 - 29.3333	Pole	TP38.61x29.0789x0.3125	2	-11.60	691.95	50.2	Pass
L3	29.3333 - 0	Pole	TP43.85x36.8519x0.375	3	-18.68	1314.68	51.7	Pass
<b>Summary</b>								
Pole (L3)							51.7	Pass
<b>RATING =</b>							<b>51.7</b>	<b>Pass</b>



**APPENDIX B**  
**BASE LEVEL DRAWING**



SCALE :

BUSINESS UNIT: 609372 TOWER BY C. BASSELER

LEGEND: FEEDLINES	
●	SOLID BLUE CIRCLE DENOTES EXISTING FEEDLINE
○	OPEN RED CIRCLE DENOTES PROPOSED FEEDLINE
○	OPEN BLUE CIRCLE DENOTES RESERVED FEEDLINE
X	BLUE "X" DENOTES LOCATION NOT GIVEN

NOTE: ASSUME FEEDLINE ATTACHMENT HEIGHT TO TOWER STEEL AT 8'-FEET ABOVE FINISHED GRADE UNLESS OTHERWISE SPECIFIED

BASE LEVEL DRAWING

**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

# Stiffened or Unstiffened, UngROUTED, Circular Base Plate - Any Rod Material

## TIA Rev F

### Site Data

BU#: 806372

Site Name: HRT 093 943228

App #: 93117

Pole Manufacturer: *Other*

Reactions		
Moment:	1213	ft-kips
Axial:	19	kips
Shear:	16	kips

### Anchor Rod Data

Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	51.9	in

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

### Anchor Rod Results

Maximum Rod Tension: 91.9 Kips  
 Allowable Tension: 195.0 Kips  
 Anchor Rod Stress Ratio: 47.1% **Pass**

Rigid
Service ASD
Fty*ASIF

### Plate Data

Diam:	57.9	in
Thick:	2.625	in
Grade:	60	ksi
Single-Rod B-eff:	11.75	in

### Base Plate Results

Base Plate Stress: 18.1 ksi  
 Allowable Plate Stress: 60.0 ksi  
 Base Plate Stress Ratio: 30.2% **Pass**

### Flexural Check

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length:
27.76

### Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:	Both	
Groove Depth:	0.25	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	5	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	50	ksi
Weld str.:	70	ksi

n/a

### Stiffener Results

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

### Pole Results

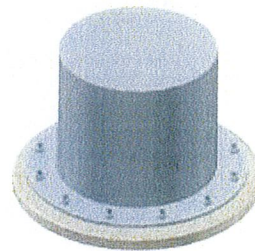
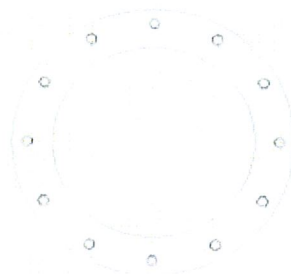
Pole Punching Shear Check: n/a

### Pole Data

Diam:	43.85	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

### Stress Increase Factor

ASIF:	1.333
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\* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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