ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
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August 2, 2012

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

Re: **EM-VER-003-120217 – 174 Ashford Center Road, Ashford, Connecticut**
EM-VER-133-120229 – Baltic-Hanover Road, Sprague, Connecticut
EM-VER-023-1111114A – 14 Canton Springs Road, Canton, Connecticut
EM-VER-023-1111114B – 650 Albany Turnpike, Canton, Connecticut
EM-VER-060-120301 – 370 Rockland Road, Guilford, Connecticut
EM-VER-091-120123 – 18 Titicus Mountain Road, New Fairfield, Connecticut
EM-VER-092-120112 – 20 Antolini Road, New Hartford, Connecticut

Completion of Construction Activity

Dear Ms. Roberts:

The purpose of this letter is to notify the Siting Council that construction activity associated with the above-referenced Cellco Partnership d/b/a Verizon Wireless telecommunications facilities has been completed.

If you have any questions or need any additional information regarding this facility please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Copy to:
Sandy M. Carter

11801779-v1

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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

March 6, 2012

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

RE: **EM-VER-003-120217** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 174 Ashford Center Road, Ashford, Connecticut.

Dear Attorney Baldwin:

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

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

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated February 16, 2012. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

Very truly yours,

Linda Roberts

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Ralph H. Fletcher, First Selectman, Town of Ashford
Richard Dziadus, Zoning Enforcement Officer, Town of Ashford

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

February 21, 2012

The Honorable Ralph H. Fletcher
First Selectman
Town of Ashford
Knowlton Memorial Town Hall
5 Town Hall Road
Ashford, CT 06278

RE: **EM-VER-003-120217** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 174 Ashford Center Road, Ashford, Connecticut.

Dear First Selectman Fletcher:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by March 6, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

LRoberts

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Richard Dziadus, Zoning Enforcement Officer, Town of Ashford

ROBINSON & COLE **EM-VER-003-120217**

KENNETH C. BALDWIN

280 Trumbull Street
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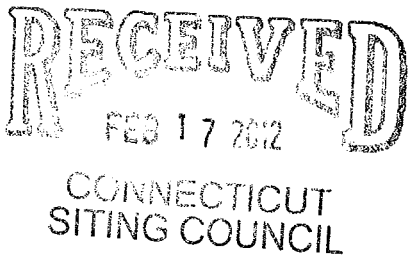
February 16, 2012



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

Re: **Notice of Exempt Modification – Antenna Swap**
174 Ashford Center Road, Ashford, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the top level on the existing 120-foot tower at the above-referenced address. The tower is owned by Cellco. The Council approved Cellco's use of the tower in 2007 (Docket No. 341). Cellco now intends to modify its installation by replacing six (6) of its existing antennas with three (3) model BXA-171085-12CF PCS antennas and three (3) model BXA-70063-6CF LTE antennas, all at the same level on the tower. Cellco also intends to install three (3) additional coax cables inside the existing monopole tower. Attached behind Tab 1 are the specifications for the 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 Ralph A. Fletcher, First Selectman of the Town of Ashford. A copy of this letter is also being sent to P&G Realty 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 an increase in the overall height of the existing tower. Cellco's replacement antennas will be located at the top of the existing 120-foot tower.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site 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 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 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:
Ralph A. Fletcher, Ashford First Selectman
P&G Realty LLC
Sandy M. Carter

BXA-171085-12CF-EDIN-X

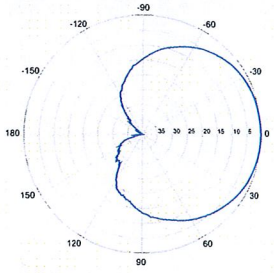
Replace 'X' with desired electrical downtilt.

X-Pol | FET Panel | 85° | 18.0 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	88°	85°	80°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	15.1 dBd / 17.2 dBi	15.5 dBd / 17.6 dBi	15.9 dBd / 18.0 dBi
Electrical downtilt (X)	0, 2, 4		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Center (Back)		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1840 x 154 x 105 mm		72.4 x 6.1 x 4.1 in
Depth with z-brackets	133 mm		5.2 in
Weight without mounting brackets	6.8 kg		15 lbs
Survival wind speed	> 201 km/hr		> 125 mph
Wind area	Front: 0.28 m² Side: 0.19 m²		Front: 3.1 ft² Side: 2.1 ft²
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N		Front: 103 lbf Side: 68 lbf

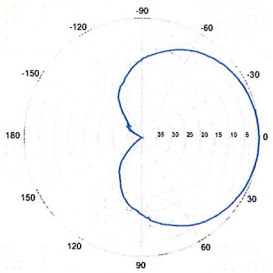
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171085-12CF-EDIN-X-FP		

BXA-171085-12CF-EDIN-X



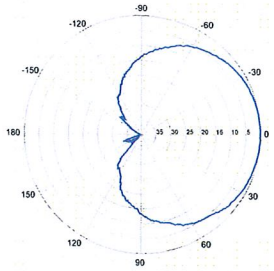
Horizontal | 1710-1880 MHz

BXA-171085-12CF-EDIN-X



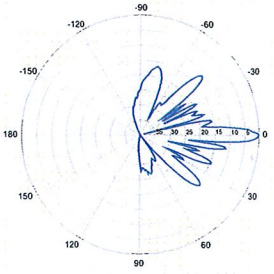
Horizontal | 1850-1990 MHz

BXA-171085-12CF-EDIN-X



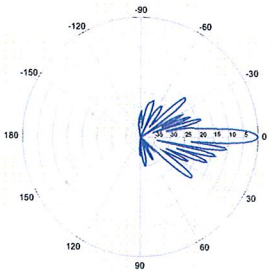
Horizontal | 1920-2170 MHz

BXA-171085-12CF-EDIN-0



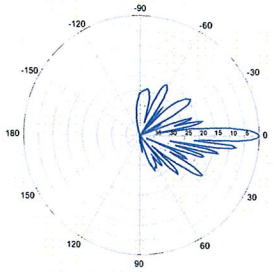
0° | Vertical | 1710-1880 MHz

BXA-171085-12CF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171085-12CF-EDIN-0



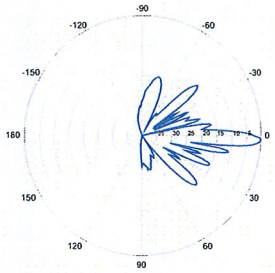
0° | Vertical | 1920-2170 MHz

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

BXA-171085-12CF-EDIN-X

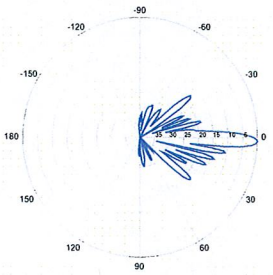
X-Pol | FET Panel | 85° | 18.0 dBi

BXA-171085-12CF-EDIN-2



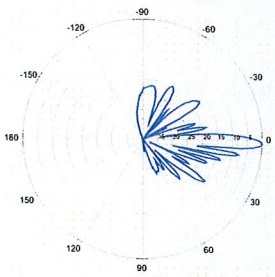
2° | Vertical | 1710-1880 MHz

BXA-171085-12CF-EDIN-2



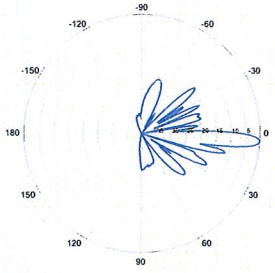
2° | Vertical | 1850-1990 MHz

BXA-171085-12CF-EDIN-2



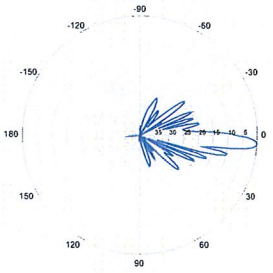
2° | Vertical | 1920-2170 MHz

BXA-171085-12CF-EDIN-4



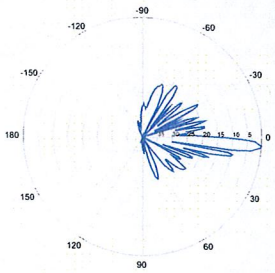
4° | Vertical | 1710-1880 MHz

BXA-171085-12CF-EDIN-4



4° | Vertical | 1850-1990 MHz

BXA-171085-12CF-EDIN-4



4° | Vertical | 1920-2170 MHz

Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

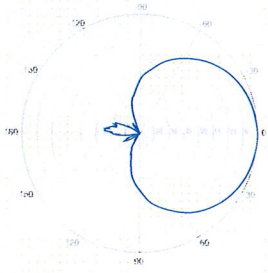
Replace "X" with desired electrical downtilt.

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

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

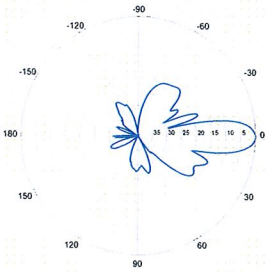
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



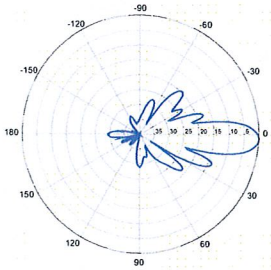
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

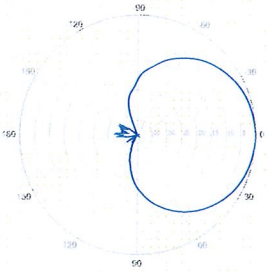


0° | Vertical | 750 MHz

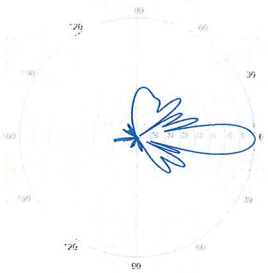
BXA-70063-6CF-EDIN-2



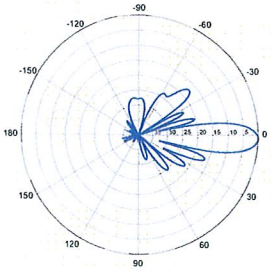
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz

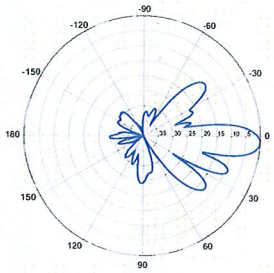


2° | Vertical | 850 MHz

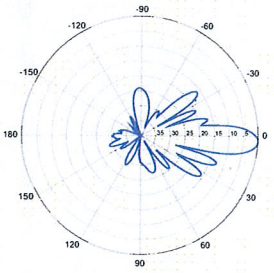
BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3

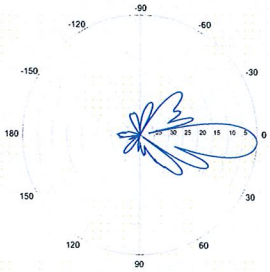


3° | Vertical | 750 MHz

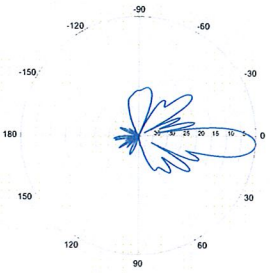


3° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-4

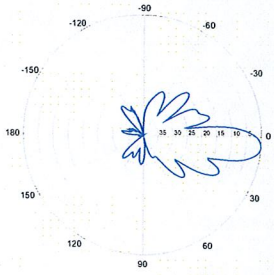


4° | Vertical | 750 MHz

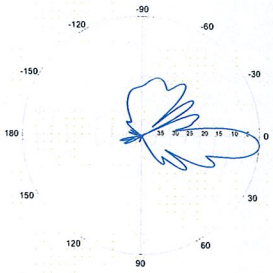


4° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-5

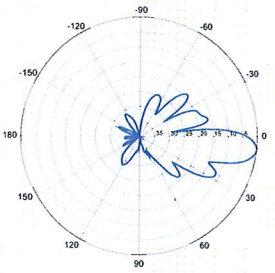


5° | Vertical | 750 MHz

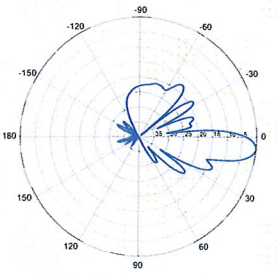


5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6

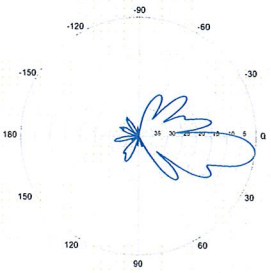


6° | Vertical | 750 MHz

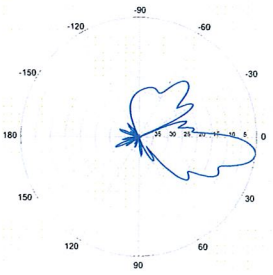


6° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-8

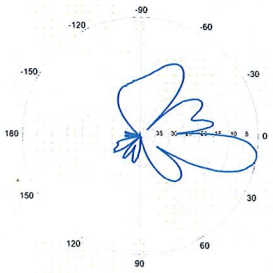


8° | Vertical | 750 MHz

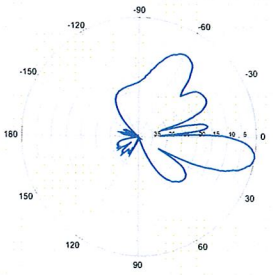


8° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-10



10° | Vertical | 750 MHz



10° | Vertical | 850 MHz

	General	Power	Density					
Site Name: Ashford N								
Tower Height: Verizon @ 120ft								
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*Town of Ashford	1	100	120	0.0025	45.4	0.2000	1.25%	
*Town of Ashford	1	300	120	0.0075	460	0.3067	2.44%	
Verizon PCS	**11**	**264**	**120**	**0.0725**	**1970**	**1.0000**	**7.25%**	
Verizon Cellular	**9**	**266**	**120**	**0.0598**	**869**	**0.5793**	**10.32%**	
Verizon AWS	**1**	**670**	**120**	**0.0167**	**2145**	**1.0000**	**1.67%**	
Verizon 700	**1**	**867**	**120**	**0.0216**	**698**	**0.4653**	**4.65%**	
								27.59%
* Source: Siting Council								

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

120-ft Existing EEI Monopole

Proposed Verizon Wireless
Antenna Upgrade

Verizon Site Ref: Ashford North

174 Ashford Center Road
Ashford, CT

Centek Project No. 11001.CO67

Date: January 17, 2012

Prepared for:

Verizon Wireless
99 East River Road, 9th Floor
East Hartford, CT 06108

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

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Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by Verizon Wireless on the existing monopole (tower) located in Ashford, CT.

The host tower is a 120-ft extendable to 140-ft tall, three-section, eighteen sided, tapered monopole, originally designed and manufactured by Engineered Endeavors Incorporated (EEI job no; 15269), dated March 28, 2008. The tower geometry, structure member sizes and foundation system information were obtained from the aforementioned EEI design documents. Antenna and appurtenance information were obtained from visual verification from grade conducted by Centek personnel on December 5, 2011 and a Verizon RF data sheet.

The tower is made up of three (3) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 25.46-in at the top and 62.0-in at the base.

Verizon proposes the removal of six (6) panel antennas and the installation of six (6) panel antennas mounted to the existing low profile platform. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- VERIZON (EXISTING TO REMAIN):
  Antennas: Six (6) Antel LPA-80080/6CF panel antennas mounted on a 14-ft low profile platform with a RAD center elevation of 120-ft above existing grade.
  Coax Cables: Fifteen (15) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- **VERIZON (EXISTING TO REMOVE):**
  Antennas: Six (6) Antel LPA-185080-12CF panel antennas mounted on a 14-ft low profile platform with a RAD center elevation of 120-ft above existing grade.
- **VERIZON (PROPOSED):**
  Antennas: Three (3) Antel BXA-70063-6CF and three (3) Antel BXA-171085-12CF panel antennas mounted on a 14-ft low profile platform with a RAD center elevation of 120-ft above existing grade.
  Coax Cables: Three (3) 1-5/8" ∅ coax cables running on the inside of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All existing coax cables to be installed as indicated in this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled RISATower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for 85 mph basic wind speed (fastest mile) with no ice and 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice tower structure and its components.

Basic Wind Speed:	Windham; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Ashford; v = 100 mph (3 second gust) equivalent to v = 80 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA/EIA wind speed controls.	
Load Cases:	Load Case 1; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation. This load case typically controls the design of monopole towers.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 74 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 74 mph wind speed velocity represents 75% of the wind pressure generated by the 85 mph wind speed. This load case typically controls the design of lattice towers.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software RISATower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

- Calculated stresses were found to be within allowable limits. In Load Case 1, per RISATower "Section Capacity Table", this tower was found to be at **17.3%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L3)	1.00'-46.71'	17.3%	**PASS**

Foundation and Anchors

The existing foundation consists of a 8.5-ft ∅ x 30.0-ft long reinforced concrete caisson. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned EEI design report; project no. 15269 dated March 28, 2008. The base of the tower is connected to the foundation by means of (32) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 7-ft into the concrete foundation structure.

Review of the foundation and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	14 kips
	Compression	33 kips
	Moment	1066 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	14.0%	**PASS**
	Lateral Deflection	0.17 in (1)	

Note 1: Lateral deflection typically limited to 1.0" for monopole tower structures.

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Compression	12.3%	**PASS**
Base Plate	Bending	10.1%	**PASS**

Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by Verizon Wireless. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer

STATE OF CONNECTICUT
CARLO F. CENTORE
No. 16694
LICENSED
PROFESSIONAL ENGINEER

Prepared by:

Timothy J. Lynn, EIT
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

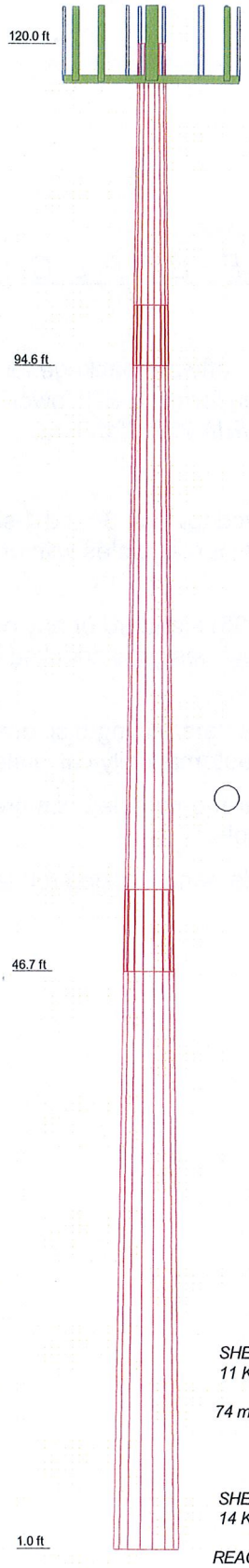
RISATower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, RISATower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

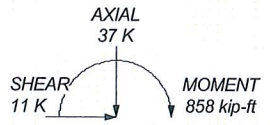
RISATower Features:

- RISATower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- RISATower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

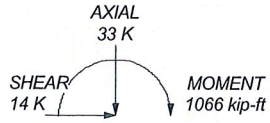
Section	1	2	3
Length (ft)	25.370	52.670	52.290
Number of Sides	18	18	18
Thickness (in)	0.313	0.500	0.500
Socket Length (ft)	4.750	6.580	
Top Dia (in)	25.460	31.492	45.261
Bot Dia (in)	33.650	48.370	62.000
Grade	A572-65		
Weight (K)	2.5	11.2	15.0

28.7





74 mph WIND - 0.500 in ICE



REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
LPA-80080-6CF (Verizon - Existing)	120	LPA-80080-6CF (Verizon - Existing)	120
BXA-171085-12CF (Verizon - Proposed)	120	LPA-80080-6CF (Verizon - Existing)	120
BXA-70063/6CF (Verizon - Proposed)	120	BXA-171085-12CF (Verizon - Proposed)	120
LPA-80080-6CF (Verizon - Existing)	120	BXA-70063/6CF (Verizon - Proposed)	120
LPA-80080-6CF (Verizon - Existing)	120	LPA-80080-6CF (Verizon - Existing)	120
BXA-171085-12CF (Verizon - Proposed)	120	EEI Low Profile Platform (Verizon - Existing)	117.5
BXA-70063/6CF (Verizon - Proposed)	120		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. Weld together tower sections have flange connections.
5. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
6. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
7. Welds are fabricated with ER-70S-6 electrodes.
8. TOWER RATING: 17.3%

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: ***11001.CO67 - Ashford North***		
Project: ***120-ft EEI Monopole - 174 Ashford Center Rd., Ashford, CT***		
Client: Verizon Wireless	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 01/17/12	Scale: NTS
Path: J:\Jobs\1100100.WI\CO67 - Ashford North\Calcs\ERI Files\120' EEI Monopole_Ashford_CT.er		Dwg No. E-1

Tower Input Data

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

Basic wind speed of 85 mph.
Nominal ice thickness of 0.500 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
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	120.000-94.630	25.370	4.750	18	25.460	33.650	0.313	1.250	A572-65 (65 ksi)
L2	94.630-46.710	52.670	6.580	18	31.492	48.370	0.500	2.000	A572-65 (65 ksi)
L3	46.710-1.000	52.290		18	45.261	62.000	0.500	2.000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia.	Area	I	r	C	I/C	J	It/Q	w	w/t
	in	in^2	in^4	in	in	in^3	in^4	in^2	in	
L1	25.853	24.943	1992.869	8.927	12.934	154.084	3988.361	12.474	3.931	12.579
	34.169	33.067	4642.944	11.835	17.094	271.609	9291.998	16.536	5.372	17.192
L2	33.523	49.184	5968.238	11.002	15.998	373.068	11944.329	24.597	4.663	9.325
	49.116	75.970	21994.022	16.994	24.572	895.086	44016.985	37.992	7.633	15.266
L3	48.098	71.036	17981.478	15.890	22.993	782.048	35986.617	35.525	7.086	14.172
	62.956	97.600	46637.979	21.833	31.496	1480.759	93337.326	48.810	10.032	20.064

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
L1 120.000-94.630				1	1	1		
L2 94.630-46.710				1	1	1		
L3 46.710-1.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number		C_AA_A	Weight
				ft			ft^2/ft	klf
1 5/8 (Verizon - Existing)	C	No	Inside Pole	120.000 - 4.000	15	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
1 5/8 (Verizon - Proposed)	C	No	Inside Pole	120.000 - 4.000	3	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation	Face	A_R	A_F	C_AA_A In Face	C_AA_A Out Face	Weight
	ft		ft^2	ft^2	ft^2	ft^2	K
L1	120.000-94.630	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.475
L2	94.630-46.710	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.897
L3	46.710-1.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.800

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	120.000-94.630	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.475
L2	94.630-46.710	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.897
L3	46.710-1.000	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.800

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
EEI Low Profile Platform	C	None		0.000	117.500	No Ice	22.500	22.500	1.500
(Verizon - Existing)						1/2" Ice	28.200	28.200	2.250
LPA-80080-6CF	A	From Face	3.500	0.000	120.000	No Ice	4.326	9.088	0.021
(Verizon - Existing)			6.000			1/2" Ice	4.764	9.637	0.069
			0.000						
BXA-171085-12CF	A	From Face	3.500	0.000	120.000	No Ice	4.791	3.618	0.015
(Verizon - Proposed)			4.000			1/2" Ice	5.242	4.058	0.042
			0.000						
BXA-70063/6CF	A	From Face	3.500	0.000	120.000	No Ice	7.731	4.158	0.017
(Verizon - Proposed)			0.000			1/2" Ice	8.268	4.595	0.059
			0.000						
LPA-80080-6CF	A	From Face	3.500	0.000	120.000	No Ice	4.326	9.088	0.021
(Verizon - Existing)			-6.000			1/2" Ice	4.764	9.637	0.069
			0.000						
LPA-80080-6CF	B	From Face	3.500	0.000	120.000	No Ice	4.326	9.088	0.021
(Verizon - Existing)			6.000			1/2" Ice	4.764	9.637	0.069
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(Verizon - Proposed)			0.000			1/2" Ice	8.268	4.595	0.059
			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
LPA-80080-6CF	C	From Face	3.500	0.000	120.000	No Ice	4.326	9.088	0.021
(Verizon - Existing)			-6.000			1/2" Ice	4.764	9.637	0.069
			0.000						

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	106.729	1.398	0.026	62.484	A	0.000	62.484	62.484	100.00	0.000	0.000
120.000-94.63					B	0.000	62.484		100.00	0.000	0.000
0					C	0.000	62.484		100.00	0.000	0.000
L2	69.746	1.238	0.023	162.496	A	0.000	162.496	162.496	100.00	0.000	0.000
94.630-46.710					B	0.000	162.496		100.00	0.000	0.000
					C	0.000	162.496		100.00	0.000	0.000
L3	22.932	1	0.019	208.300	A	0.000	208.300	208.300	100.00	0.000	0.000
46.710-1.000					B	0.000	208.300		100.00	0.000	0.000
					C	0.000	208.300		100.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	106.729	1.398	0.019	0.500	64.598	A	0.000	64.598	64.598	100.00	0.000	0.000
120.000-94.630						B	0.000	64.598		100.00	0.000	0.000
						C	0.000	64.598		100.00	0.000	0.000
L2	69.746	1.238	0.017	0.500	166.490	A	0.000	166.490	166.490	100.00	0.000	0.000
94.630-46.710						B	0.000	166.490		100.00	0.000	0.000
						C	0.000	166.490		100.00	0.000	0.000
L3 46.710-1.000	22.932	1	0.014	0.500	212.109	A	0.000	212.109	212.109	100.00	0.000	0.000
						B	0.000	212.109		100.00	0.000	0.000
						C	0.000	212.109		100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	106.729	1.398	0.009	62.484	A	0.000	62.484	62.484	100.00	0.000	0.000
120.000-94.63					B	0.000	62.484		100.00	0.000	0.000
0					C	0.000	62.484		100.00	0.000	0.000
L2	69.746	1.238	0.008	162.496	A	0.000	162.496	162.496	100.00	0.000	0.000
94.630-46.710					B	0.000	162.496		100.00	0.000	0.000
					C	0.000	162.496		100.00	0.000	0.000
L3	22.932	1	0.006	208.300	A	0.000	208.300	208.300	100.00	0.000	0.000
46.710-1.000					B	0.000	208.300		100.00	0.000	0.000
					C	0.000	208.300		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.475	2.504	A	1	0.65	1	1	1	62.484	1.775	0.070	C
120.000-94.63			B	1	0.65	1	1	1	62.484			
0			C	1	0.65	1	1	1	62.484			
L2	0.897	11.215	A	1	0.65	1	1	1	162.496	4.067	0.085	C
94.630-46.710			B	1	0.65	1	1	1	162.496			
			C	1	0.65	1	1	1	162.496			
L3	0.800	15.003	A	1	0.65	1	1	1	208.300	4.266	0.093	C
46.710-1.000			B	1	0.65	1	1	1	208.300			
			C	1	0.65	1	1	1	208.300			
Sum Weight:	2.172	28.722						OTM	560.832 kip-ft	10.108		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.475	2.504	A	1	0.65	1	1	1	62.484	1.775	0.070	C
120.000-94.63			B	1	0.65	1	1	1	62.484			
0			C	1	0.65	1	1	1	62.484			
L2	0.897	11.215	A	1	0.65	1	1	1	162.496	4.067	0.085	C
94.630-46.710			B	1	0.65	1	1	1	162.496			
			C	1	0.65	1	1	1	162.496			
L3	0.800	15.003	A	1	0.65	1	1	1	208.300	4.266	0.093	C
46.710-1.000			B	1	0.65	1	1	1	208.300			
			C	1	0.65	1	1	1	208.300			
Sum Weight:	2.172	28.722						OTM	560.832 kip-ft	10.108		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.475	2.504	A	1	0.65	1	1	1	62.484	1.775	0.070	C
120.000-94.63			B	1	0.65	1	1	1	62.484			
0			C	1	0.65	1	1	1	62.484			
L2	0.897	11.215	A	1	0.65	1	1	1	162.496	4.067	0.085	C
94.630-46.710			B	1	0.65	1	1	1	162.496			
			C	1	0.65	1	1	1	162.496			
L3	0.800	15.003	A	1	0.65	1	1	1	208.300	4.266	0.093	C
46.710-1.000			B	1	0.65	1	1	1	208.300			
			C	1	0.65	1	1	1	208.300			
Sum Weight:	2.172	28.722						OTM	560.832 kip-ft	10.108		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.475	2.504	A	1	0.65	1	1	1	62.484	1.775	0.070	C
120.000-94.63			B	1	0.65	1	1	1	62.484			
0			C	1	0.65	1	1	1	62.484			
L2	0.897	11.215	A	1	0.65	1	1	1	162.496	4.067	0.085	C
94.630-46.710			B	1	0.65	1	1	1	162.496			
			C	1	0.65	1	1	1	162.496			
L3	0.800	15.003	A	1	0.65	1	1	1	208.300	4.266	0.093	C
46.710-1.000			B	1	0.65	1	1	1	208.300			
			C	1	0.65	1	1	1	208.300			
Sum Weight:	2.172	28.722						OTM	560.832 kip-ft	10.108		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.475	2.975	A	1	0.65	1	1	1	64.598	1.377	0.054	C
120.000-94.63			B	1	0.65	1	1	1	64.598			
0			C	1	0.65	1	1	1	64.598			
L2	0.897	12.434	A	1	0.65	1	1	1	166.490	3.125	0.065	C
94.630-46.710			B	1	0.65	1	1	1	166.490			
			C	1	0.65	1	1	1	166.490			
L3	0.800	16.560	A	1	0.65	1	1	1	212.109	3.258	0.071	C
46.710-1.000			B	1	0.65	1	1	1	212.109			
			C	1	0.65	1	1	1	212.109			
Sum Weight:	2.172	31.968						OTM	431.824 kip-ft	7.759		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.475	2.975	A	1	0.65	1	1	1	64.598	1.377	0.054	C
120.000-94.63			B	1	0.65	1	1	1	64.598			
0			C	1	0.65	1	1	1	64.598			
L2	0.897	12.434	A	1	0.65	1	1	1	166.490	3.125	0.065	C
94.630-46.710			B	1	0.65	1	1	1	166.490			
			C	1	0.65	1	1	1	166.490			
L3	0.800	16.560	A	1	0.65	1	1	1	212.109	3.258	0.071	C
46.710-1.000			B	1	0.65	1	1	1	212.109			
			C	1	0.65	1	1	1	212.109			
Sum Weight:	2.172	31.968						OTM	431.824 kip-ft	7.759		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.475	2.975	A	1	0.65	1	1	1	64.598	1.377	0.054	C
120.000-94.63			B	1	0.65	1	1	1	64.598			
0			C	1	0.65	1	1	1	64.598			
L2	0.897	12.434	A	1	0.65	1	1	1	166.490	3.125	0.065	C
94.630-46.710			B	1	0.65	1	1	1	166.490			
			C	1	0.65	1	1	1	166.490			
L3	0.800	16.560	A	1	0.65	1	1	1	212.109	3.258	0.071	C
46.710-1.000			B	1	0.65	1	1	1	212.109			
			C	1	0.65	1	1	1	212.109			
Sum Weight:	2.172	31.968						OTM	431.824 kip-ft	7.759		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.475	2.975	A	1	0.65	1	1	1	64.598	1.377	0.054	C
120.000-94.63			B	1	0.65	1	1	1	64.598			
0			C	1	0.65	1	1	1	64.598			
L2	0.897	12.434	A	1	0.65	1	1	1	166.490	3.125	0.065	C
94.630-46.710			B	1	0.65	1	1	1	166.490			
			C	1	0.65	1	1	1	166.490			
L3	0.800	16.560	A	1	0.65	1	1	1	212.109	3.258	0.071	C
46.710-1.000			B	1	0.65	1	1	1	212.109			
			C	1	0.65	1	1	1	212.109			
Sum Weight:	2.172	31.968						OTM	431.824 kip-ft	7.759		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.475	2.504	A	1	0.65	1	1	1	62.484	0.614	0.024	C
120.000-94.63			B	1	0.65	1	1	1	62.484			
0			C	1	0.65	1	1	1	62.484			
L2	0.897	11.215	A	1	0.65	1	1	1	162.496	1.407	0.029	C
94.630-46.710			B	1	0.65	1	1	1	162.496			
			C	1	0.65	1	1	1	162.496			
L3	0.800	15.003	A	1	0.65	1	1	1	208.300	1.476	0.032	C
46.710-1.000			B	1	0.65	1	1	1	208.300			
			C	1	0.65	1	1	1	208.300			
Sum Weight:	2.172	28.722						OTM	194.060 kip-ft	3.498		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.475	2.504	A	1	0.65	1	1	1	62.484	0.614	0.024	C
120.000-94.63			B	1	0.65	1	1	1	62.484			
0			C	1	0.65	1	1	1	62.484			
L2	0.897	11.215	A	1	0.65	1	1	1	162.496	1.407	0.029	C
94.630-46.710			B	1	0.65	1	1	1	162.496			
			C	1	0.65	1	1	1	162.496			
L3	0.800	15.003	A	1	0.65	1	1	1	208.300	1.476	0.032	C
46.710-1.000			B	1	0.65	1	1	1	208.300			
			C	1	0.65	1	1	1	208.300			
Sum Weight:	2.172	28.722						OTM	194.060 kip-ft	3.498		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.475	2.504	A	1	0.65	1	1	1	62.484	0.614	0.024	C
120.000-94.63			B	1	0.65	1	1	1	62.484			
0			C	1	0.65	1	1	1	62.484			
L2	0.897	11.215	A	1	0.65	1	1	1	162.496	1.407	0.029	C
94.630-46.710			B	1	0.65	1	1	1	162.496			
			C	1	0.65	1	1	1	162.496			
L3	0.800	15.003	A	1	0.65	1	1	1	208.300	1.476	0.032	C
46.710-1.000			B	1	0.65	1	1	1	208.300			
			C	1	0.65	1	1	1	208.300			
Sum Weight:	2.172	28.722						OTM	194.060	3.498		

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
									kip-ft			

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.475	2.504	A	1	0.65	1	1	1	62.484	0.614	0.024	C
120.000-94.63			B	1	0.65	1	1	1	62.484			
0			C	1	0.65	1	1	1	62.484			
L2	0.897	11.215	A	1	0.65	1	1	1	162.496	1.407	0.029	C
94.630-46.710			B	1	0.65	1	1	1	162.496			
			C	1	0.65	1	1	1	162.496			
L3	0.800	15.003	A	1	0.65	1	1	1	208.300	1.476	0.032	C
46.710-1.000			B	1	0.65	1	1	1	208.300			
			C	1	0.65	1	1	1	208.300			
Sum Weight:	2.172	28.722						OTM	194.060 kip-ft	3.498		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	28.722					
Bracing Weight	0.000					
Total Member Self-Weight	28.722			0.000	0.000	
Total Weight	32.616			0.000	0.000	
Wind 0 deg - No Ice		0.000	-14.314	-1058.859	0.000	0.000
Wind 30 deg - No Ice		7.157	-12.396	-916.999	-529.429	0.000
Wind 45 deg - No Ice		10.122	-10.122	-748.726	-748.726	0.000
Wind 60 deg - No Ice		12.396	-7.157	-529.429	-916.999	0.000
Wind 90 deg - No Ice		14.314	0.000	0.000	-1058.859	0.000
Wind 120 deg - No Ice		12.396	7.157	529.429	-916.999	0.000
Wind 135 deg - No Ice		10.122	10.122	748.726	-748.726	0.000
Wind 150 deg - No Ice		7.157	12.396	916.999	-529.429	0.000
Wind 180 deg - No Ice		0.000	14.314	1058.859	0.000	0.000
Wind 210 deg - No Ice		-7.157	12.396	916.999	529.429	0.000
Wind 225 deg - No Ice		-10.122	10.122	748.726	748.726	0.000
Wind 240 deg - No Ice		-12.396	7.157	529.429	916.999	0.000
Wind 270 deg - No Ice		-14.314	0.000	0.000	1058.859	0.000
Wind 300 deg - No Ice		-12.396	-7.157	-529.429	916.999	0.000
Wind 315 deg - No Ice		-10.122	-10.122	-748.726	748.726	0.000
Wind 330 deg - No Ice		-7.157	-12.396	-916.999	529.429	0.000
Member Ice	3.246					
Total Weight Ice	37.111			0.000	0.000	
Wind 0 deg - Ice		0.000	-11.301	-850.948	0.000	0.000
Wind 30 deg - Ice		5.651	-9.787	-736.942	-425.474	0.000
Wind 45 deg - Ice		7.991	-7.991	-601.711	-601.711	0.000

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 60 deg - Ice		9.787	-5.651	-425.474	-736.942	0.000
Wind 90 deg - Ice		11.301	0.000	0.000	-850.948	0.000
Wind 120 deg - Ice		9.787	5.651	425.474	-736.942	0.000
Wind 135 deg - Ice		7.991	7.991	601.711	-601.711	0.000
Wind 150 deg - Ice		5.651	9.787	736.942	-425.474	0.000
Wind 180 deg - Ice		0.000	11.301	850.948	0.000	0.000
Wind 210 deg - Ice		-5.651	9.787	736.942	425.474	0.000
Wind 225 deg - Ice		-7.991	7.991	601.711	601.711	0.000
Wind 240 deg - Ice		-9.787	5.651	425.474	736.942	0.000
Wind 270 deg - Ice		-11.301	0.000	0.000	850.948	0.000
Wind 300 deg - Ice		-9.787	-5.651	-425.474	736.942	0.000
Wind 315 deg - Ice		-7.991	-7.991	-601.711	601.711	0.000
Wind 330 deg - Ice		-5.651	-9.787	-736.942	425.474	0.000
Total Weight	32.616			0.000	0.000	
Wind 0 deg - Service		0.000	-4.953	-366.387	0.000	0.000
Wind 30 deg - Service		2.477	-4.289	-317.301	-183.194	0.000
Wind 45 deg - Service		3.502	-3.502	-259.075	-259.075	0.000
Wind 60 deg - Service		4.289	-2.477	-183.194	-317.301	0.000
Wind 90 deg - Service		4.953	0.000	0.000	-366.387	0.000
Wind 120 deg - Service		4.289	2.477	183.194	-317.301	0.000
Wind 135 deg - Service		3.502	3.502	259.075	-259.075	0.000
Wind 150 deg - Service		2.477	4.289	317.301	-183.194	0.000
Wind 180 deg - Service		0.000	4.953	366.387	0.000	0.000
Wind 210 deg - Service		-2.477	4.289	317.301	183.194	0.000
Wind 225 deg - Service		-3.502	3.502	259.075	259.075	0.000
Wind 240 deg - Service		-4.289	2.477	183.194	317.301	0.000
Wind 270 deg - Service		-4.953	0.000	0.000	366.387	0.000
Wind 300 deg - Service		-4.289	-2.477	-183.194	317.301	0.000
Wind 315 deg - Service		-3.502	-3.502	-259.075	259.075	0.000
Wind 330 deg - Service		-2.477	-4.289	-317.301	183.194	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 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp

Comb. No.	Description
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	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	120 - 94.63	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	18	-5.712	0.000	0.000
			Max. Mx	6	-4.030	-98.762	0.000
			Max. My	2	-4.030	0.000	98.762
			Max. Vy	6	5.655	-98.762	0.000
			Max. Vx	2	-5.655	0.000	98.762
L2	94.63 - 46.71	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	18	-17.770	0.000	0.000
			Max. Mx	6	-14.970	-445.974	0.000
			Max. My	2	-14.970	0.000	445.974
			Max. Vy	6	9.524	-445.974	0.000
			Max. Vx	2	-9.524	0.000	445.974
L3	46.71 - 1	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	18	-37.111	0.000	0.000
			Max. Mx	6	-32.614	-1066.342	0.000
			Max. My	2	-32.614	0.000	1066.342
			Max. Vy	6	14.319	-1066.342	0.000
			Max. Vx	2	-14.319	0.000	1066.342
			Max. Torque	7			-0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	23	37.111	-11.301	0.000
	Max. H_x	14	32.616	14.314	0.000
	Max. H_z	2	32.616	0.000	14.314
	Max. M_x	2	1066.342	0.000	14.314
	Max. M_z	6	1066.342	-14.314	0.000
	Max. Torsion	5	0.000	-12.396	7.157
	Min. Vert	39	32.616	-4.953	0.000
	Min. H_x	6	32.616	-14.314	0.000
	Min. H_z	10	32.616	0.000	-14.314
	Min. M_x	10	-1066.342	0.000	-14.314
	Min. M_z	14	-1066.342	14.314	0.000
	Min. Torsion	7	-0.000	-12.396	-7.157

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	32.616	0.000	0.000	0.000	0.000	0.000
Dead+Wind 0 deg - No Ice	32.616	0.000	-14.314	-1066.342	0.000	0.000
Dead+Wind 30 deg - No Ice	32.616	7.157	-12.396	-923.480	-533.171	0.000
Dead+Wind 45 deg - No Ice	32.616	10.122	-10.122	-754.018	-754.018	0.000
Dead+Wind 60 deg - No Ice	32.616	12.396	-7.157	-533.171	-923.480	-0.000
Dead+Wind 90 deg - No Ice	32.616	14.314	0.000	0.000	-1066.342	0.000
Dead+Wind 120 deg - No Ice	32.616	12.396	7.157	533.171	-923.480	0.000
Dead+Wind 135 deg - No Ice	32.616	10.122	10.122	754.018	-754.018	0.000
Dead+Wind 150 deg - No Ice	32.616	7.157	12.396	923.480	-533.171	-0.000
Dead+Wind 180 deg - No Ice	32.616	0.000	14.314	1066.342	0.000	0.000
Dead+Wind 210 deg - No Ice	32.616	-7.157	12.396	923.480	533.171	0.000
Dead+Wind 225 deg - No Ice	32.616	-10.122	10.122	754.018	754.018	0.000
Dead+Wind 240 deg - No Ice	32.616	-12.396	7.157	533.171	923.480	-0.000
Dead+Wind 270 deg - No Ice	32.616	-14.314	0.000	0.000	1066.342	0.000
Dead+Wind 300 deg - No Ice	32.616	-12.396	-7.157	-533.171	923.480	0.000
Dead+Wind 315 deg - No Ice	32.616	-10.122	-10.122	-754.018	754.018	0.000
Dead+Wind 330 deg - No Ice	32.616	-7.157	-12.396	-923.480	533.171	-0.000
Dead+Ice+Temp	37.111	0.000	0.000	0.000	0.000	0.000
Dead+Wind 0 deg+Ice+Temp	37.111	0.000	-11.301	-858.367	0.000	0.000
Dead+Wind 30 deg+Ice+Temp	37.111	5.651	-9.787	-743.368	-429.183	0.000
Dead+Wind 45 deg+Ice+Temp	37.111	7.991	-7.991	-606.957	-606.957	0.000
Dead+Wind 60 deg+Ice+Temp	37.111	9.787	-5.651	-429.183	-743.368	0.000
Dead+Wind 90 deg+Ice+Temp	37.111	11.301	0.000	0.000	-858.367	0.000
Dead+Wind 120 deg+Ice+Temp	37.111	9.787	5.651	429.183	-743.368	0.000
Dead+Wind 135 deg+Ice+Temp	37.111	7.991	7.991	606.957	-606.957	0.000
Dead+Wind 150 deg+Ice+Temp	37.111	5.651	9.787	743.368	-429.183	0.000
Dead+Wind 180 deg+Ice+Temp	37.111	0.000	11.301	858.367	0.000	0.000
Dead+Wind 210 deg+Ice+Temp	37.111	-5.651	9.787	743.368	429.183	0.000
Dead+Wind 225 deg+Ice+Temp	37.111	-7.991	7.991	606.957	606.957	0.000
Dead+Wind 240 deg+Ice+Temp	37.111	-9.787	5.651	429.183	743.368	0.000
Dead+Wind 270 deg+Ice+Temp	37.111	-11.301	0.000	0.000	858.367	0.000
Dead+Wind 300 deg+Ice+Temp	37.111	-9.787	-5.651	-429.183	743.368	0.000
Dead+Wind 315 deg+Ice+Temp	37.111	-7.991	-7.991	-606.957	606.957	0.000
Dead+Wind 330 deg+Ice+Temp	37.111	-5.651	-9.787	-743.368	429.183	0.000
Dead+Wind 0 deg - Service	32.616	0.000	-4.953	-368.980	0.000	0.000
Dead+Wind 30 deg - Service	32.616	2.477	-4.289	-319.546	-184.490	0.000

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+Wind 45 deg - Service	32.616	3.502	-3.502	-260.908	-260.908	0.000
Dead+Wind 60 deg - Service	32.616	4.289	-2.477	-184.490	-319.546	0.000
Dead+Wind 90 deg - Service	32.616	4.953	0.000	0.000	-368.980	0.000
Dead+Wind 120 deg - Service	32.616	4.289	2.477	184.490	-319.546	0.000
Dead+Wind 135 deg - Service	32.616	3.502	3.502	260.908	-260.908	0.000
Dead+Wind 150 deg - Service	32.616	2.477	4.289	319.546	-184.490	0.000
Dead+Wind 180 deg - Service	32.616	0.000	4.953	368.980	0.000	0.000
Dead+Wind 210 deg - Service	32.616	-2.477	4.289	319.546	184.490	0.000
Dead+Wind 225 deg - Service	32.616	-3.502	3.502	260.908	260.908	0.000
Dead+Wind 240 deg - Service	32.616	-4.289	2.477	184.490	319.546	0.000
Dead+Wind 270 deg - Service	32.616	-4.953	0.000	0.000	368.980	0.000
Dead+Wind 300 deg - Service	32.616	-4.289	-2.477	-184.490	319.546	0.000
Dead+Wind 315 deg - Service	32.616	-3.502	-3.502	-260.908	260.908	0.000
Dead+Wind 330 deg - Service	32.616	-2.477	-4.289	-319.546	184.490	0.000

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	-32.616	0.000	0.000	32.616	0.000	0.000%
2	0.000	-32.616	-14.314	0.000	32.616	14.314	0.000%
3	7.157	-32.616	-12.396	-7.157	32.616	12.396	0.000%
4	10.122	-32.616	-10.122	-10.122	32.616	10.122	0.000%
5	12.396	-32.616	-7.157	-12.396	32.616	7.157	0.000%
6	14.314	-32.616	0.000	-14.314	32.616	0.000	0.000%
7	12.396	-32.616	7.157	-12.396	32.616	-7.157	0.000%
8	10.122	-32.616	10.122	-10.122	32.616	-10.122	0.000%
9	7.157	-32.616	12.396	-7.157	32.616	-12.396	0.000%
10	0.000	-32.616	14.314	0.000	32.616	-14.314	0.000%
11	-7.157	-32.616	12.396	7.157	32.616	-12.396	0.000%
12	-10.122	-32.616	10.122	10.122	32.616	-10.122	0.000%
13	-12.396	-32.616	7.157	12.396	32.616	-7.157	0.000%
14	-14.314	-32.616	0.000	14.314	32.616	0.000	0.000%
15	-12.396	-32.616	-7.157	12.396	32.616	7.157	0.000%
16	-10.122	-32.616	-10.122	10.122	32.616	10.122	0.000%
17	-7.157	-32.616	-12.396	7.157	32.616	12.396	0.000%
18	0.000	-37.111	0.000	0.000	37.111	0.000	0.000%
19	0.000	-37.111	-11.301	0.000	37.111	11.301	0.000%
20	5.651	-37.111	-9.787	-5.651	37.111	9.787	0.000%
21	7.991	-37.111	-7.991	-7.991	37.111	7.991	0.000%
22	9.787	-37.111	-5.651	-9.787	37.111	5.651	0.000%
23	11.301	-37.111	0.000	-11.301	37.111	0.000	0.000%
24	9.787	-37.111	5.651	-9.787	37.111	-5.651	0.000%
25	7.991	-37.111	7.991	-7.991	37.111	-7.991	0.000%
26	5.651	-37.111	9.787	-5.651	37.111	-9.787	0.000%
27	0.000	-37.111	11.301	0.000	37.111	-11.301	0.000%
28	-5.651	-37.111	9.787	5.651	37.111	-9.787	0.000%
29	-7.991	-37.111	7.991	7.991	37.111	-7.991	0.000%
30	-9.787	-37.111	5.651	9.787	37.111	-5.651	0.000%
31	-11.301	-37.111	0.000	11.301	37.111	0.000	0.000%
32	-9.787	-37.111	-5.651	9.787	37.111	5.651	0.000%
33	-7.991	-37.111	-7.991	7.991	37.111	7.991	0.000%
34	-5.651	-37.111	-9.787	5.651	37.111	9.787	0.000%
35	0.000	-32.616	-4.953	0.000	32.616	4.953	0.000%
36	2.477	-32.616	-4.289	-2.477	32.616	4.289	0.000%
37	3.502	-32.616	-3.502	-3.502	32.616	3.502	0.000%
38	4.289	-32.616	-2.477	-4.289	32.616	2.477	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
39	4.953	-32.616	0.000	-4.953	32.616	0.000	0.000%
40	4.289	-32.616	2.477	-4.289	32.616	-2.477	0.000%
41	3.502	-32.616	3.502	-3.502	32.616	-3.502	0.000%
42	2.477	-32.616	4.289	-2.477	32.616	-4.289	0.000%
43	0.000	-32.616	4.953	0.000	32.616	-4.953	0.000%
44	-2.477	-32.616	4.289	2.477	32.616	-4.289	0.000%
45	-3.502	-32.616	3.502	3.502	32.616	-3.502	0.000%
46	-4.289	-32.616	2.477	4.289	32.616	-2.477	0.000%
47	-4.953	-32.616	0.000	4.953	32.616	0.000	0.000%
48	-4.289	-32.616	-2.477	4.289	32.616	2.477	0.000%
49	-3.502	-32.616	-3.502	3.502	32.616	3.502	0.000%
50	-2.477	-32.616	-4.289	2.477	32.616	4.289	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	0.00000001
3	Yes	4	0.00000001	0.00000934
4	Yes	4	0.00000001	0.00001075
5	Yes	4	0.00000001	0.00000934
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000934
8	Yes	4	0.00000001	0.00001075
9	Yes	4	0.00000001	0.00000934
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000934
12	Yes	4	0.00000001	0.00001075
13	Yes	4	0.00000001	0.00000934
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000934
16	Yes	4	0.00000001	0.00001075
17	Yes	4	0.00000001	0.00000934
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00007267
20	Yes	4	0.00000001	0.00007794
21	Yes	4	0.00000001	0.00007962
22	Yes	4	0.00000001	0.00007794
23	Yes	4	0.00000001	0.00007267
24	Yes	4	0.00000001	0.00007794
25	Yes	4	0.00000001	0.00007962
26	Yes	4	0.00000001	0.00007794
27	Yes	4	0.00000001	0.00007267
28	Yes	4	0.00000001	0.00007794
29	Yes	4	0.00000001	0.00007962
30	Yes	4	0.00000001	0.00007794
31	Yes	4	0.00000001	0.00007267
32	Yes	4	0.00000001	0.00007794
33	Yes	4	0.00000001	0.00007962
34	Yes	4	0.00000001	0.00007794
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001

40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 94.63	3.248	35	0.238	0.000
L2	99.38 - 46.71	2.265	35	0.209	0.000
L3	53.29 - 1	0.662	35	0.115	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.000	LPA-80080-6CF	35	3.248	0.238	0.000	130645
117.500	EEI Low Profile Platform	35	3.126	0.235	0.000	130645

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 94.63	9.386	6	0.688	0.000
L2	99.38 - 46.71	6.545	6	0.604	0.000
L3	53.29 - 1	1.914	6	0.333	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.000	LPA-80080-6CF	6	9.386	0.688	0.000	45220
117.500	EEI Low Profile Platform	6	9.032	0.678	0.000	45220

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	120 - 94.63 (1)	TP33.65x25.46x0.313	25.370	0.000	0.0	39.000	31.546	-4.030	1230.280	0.003
L2	94.63 - 46.71 (2)	TP48.37x31.492x0.5	52.670	0.000	0.0	39.000	72.623	-14.970	2832.310	0.005
L3	46.71 - 1 (3)	TP62x45.261x0.5	52.290	0.000	0.0	39.000	97.601	-32.614	3806.420	0.009

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	120 - 94.63 (1)	TP33.65x25.46x0.313	98.762	4.796	39.000	0.123	0.000	0.000	39.000	0.000
L2	94.63 - 46.71 (2)	TP48.37x31.492x0.5	445.974	6.546	39.000	0.168	0.000	0.000	39.000	0.000
L3	46.71 - 1 (3)	TP62x45.261x0.5	1066.342	8.642	39.000	0.222	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	120 - 94.63 (1)	TP33.65x25.46x0.313	5.655	0.179	26.000	0.014	0.000	0.000	26.000	0.000
L2	94.63 - 46.71 (2)	TP48.37x31.492x0.5	9.524	0.131	26.000	0.010	0.000	0.000	26.000	0.000
L3	46.71 - 1 (3)	TP62x45.261x0.5	14.319	0.147	26.000	0.011	0.000	0.000	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	120 - 94.63 (1)	0.003	0.123	0.000	0.014	0.000	0.126 ✔	1.333	H1-3+VT ✔
L2	94.63 - 46.71 (2)	0.005	0.168	0.000	0.010	0.000	0.173 ✔	1.333	H1-3+VT ✔
L3	46.71 - 1 (3)	0.009	0.222	0.000	0.011	0.000	0.230 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	120 - 94.63	Pole	TP33.65x25.46x0.313	1	-4.030	1639.963	9.5	Pass
L2	94.63 - 46.71	Pole	TP48.37x31.492x0.5	2	-14.970	3775.469	13.0	Pass
L3	46.71 - 1	Pole	TP62x45.261x0.5	3	-32.614	5073.958	17.3	Pass
							Summary	
						Pole (L3)	17.3	Pass
						RATING =	**17.3**	**Pass**

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Subject:		Anchor Bolt and Baseplate Analysis
Location:		120-ft EEI Monopole Ashford, CT
Rev. 0: 1/17/12		Prepared by: T.J.L. Checked by: C.F.C. Job No. 11001.CO67

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 1066·ft·kips	(Input From RisaTower)
Shear Force =	Shear := 14·kips	(Input From RisaTower)
Axial Force =	Axial := 33·kips	(Input From RisaTower)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts =	N := 32	(User Input)
Diameter of Bolt Circle =	D_{bc} := 70.0·in	(User Input)
Bolt "Column" Distance =	l := 3.0·in	(User Input)
Bolt Ultimate Strenght =	F_u := 100·ksi	(User Input)
Bolt Yeild Strenght =	F_y := 75·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 2.25·in	(User Input)
Threads per Inch =	n := 4.5	(User Input)

Base Plate Data:

Use ASTM A572 GR 50

Plate Yield Strength =	Fy_{bp} := 50·ksi	(User Input)
Base Plate Thickness =	t_{bp} := 3.25·in	(User Input)
Base Plate Diameter =	D_{bp} := 76.0·in	(User Input)
Outer Pole Diameter =	D_{pole} := 62.0·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 35 \cdot in$

Distance to Bolts = $i := 1 .. N$

$d_i := \left| \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N} \right) \right.$
$\left. d \leftarrow R_{bc} \cdot \sin(\theta) \right.$

$d_1 = 6.83 \cdot in$
$d_2 = 13.39 \cdot in$
$d_3 = 19.44 \cdot in$
$d_4 = 24.75 \cdot in$
$d_5 = 29.10 \cdot in$
$d_6 = 32.34 \cdot in$
$d_7 = 34.33 \cdot in$
$d_8 = 35.00 \cdot in$
$d_9 = 34.33 \cdot in$
$d_{10} = 32.34 \cdot in$
$d_{11} = 29.10 \cdot in$
etc.

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 31 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$
$MA_2 = 0.00 \cdot in$
$MA_3 = 0.00 \cdot in$
$MA_4 = 0.00 \cdot in$
$MA_5 = 0.00 \cdot in$
$MA_6 = 1.34 \cdot in$
$MA_7 = 3.33 \cdot in$
$MA_8 = 4.00 \cdot in$
$MA_9 = 3.33 \cdot in$
$MA_{10} = 1.34 \cdot in$
$MA_{11} = 0.00 \cdot in$
etc

Effective Width of Baseplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 35.2 \cdot in$

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 1.96 \times 10^4 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.826 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 21.8 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u\right) = 174.9 \cdot kips$ (1.333 increase allowed per TIA/EIA)

$T_{ALL.Net} := 1.333 \cdot \left(0.60 \cdot A_n \cdot F_y\right) = 194.812 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} = 11.2 \cdot \%$ Bolts are "upset bolts". Use net area per AISC

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Check Anchor Bolt Bending Stress:

Maximum Bending Moment = $M_x := \left(\frac{Shear}{N}\right) \cdot l = 0.109 \cdot ft \cdot kips$

Maximum Bending Stress = $f_{bx} := \frac{M_x}{S_x} = 1.6 \cdot ksi$

Allowable Bending Stress = $F_{bx} := 1.333 \cdot 0.6 \cdot F_y = 60 \cdot ksi$ (1.333 increase allowed per TIA/EIA)

Check Combined Stress Requirement:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required.

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n = 0 \cdot in \\ 0 & \text{otherwise} \end{cases}$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n = 0 \cdot ksi \\ 0 & \text{otherwise} \end{cases}$$

Check Anchor Bolt Compression/Combined Stress:

Maximum Compressive Force =

$$C_{Max} := OM \cdot \frac{R_{bc}}{I_p} + \frac{Axial}{N} = 23.9 \cdot kips$$

Maximum Compressive Stress =

$$f_a := \frac{C_{Max}}{A_n} = 7.4 \cdot ksi$$

$$K := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} = 87.364$$

$$F_a := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^2}\right] \cdot F_y}{\dfrac{5}{3} + \dfrac{3 \cdot \left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^3}} & \text{if } \dfrac{K \cdot l}{r} \le C_c = 45 \cdot ksi \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \dfrac{K \cdot l}{r} > C_c \end{cases}$$

Allowable Compressive Stress =

$$F_a := 1.333 \cdot F_a = 60 \cdot ksi$$

(1.333 increase allowed per TIA/EIA)

Combined Stress % of Capacity =

$$\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}}\right) = 12.3 \cdot \%$$

Condition 2 =

$$Condition2 := if\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \le 1.00, "OK", "Overstressed"\right)$$

Condition2 = "OK"

Base Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 5.5 \cdot kips$ $C_7 = 23.4 \cdot kips$

$C_2 = 9.8 \cdot kips$ $C_8 = 23.9 \cdot kips$

$C_3 = 13.7 \cdot kips$ $C_9 = 23.4 \cdot kips$

$C_4 = 17.2 \cdot kips$ $C_{10} = 22.1 \cdot kips$

$C_5 = 20.0 \cdot kips$ $C_{11} = 20.0 \cdot kips$

$C_6 = 22.1 \cdot kips$ etc.

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 5 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 49.9 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 10.1 \cdot \%$

Condition3 = $Condition3 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

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Subject:	CAISSON FOUNDATION
Location:	120-ft EEI Monopole Ashford, CT
Rev. 0: 1/17/12	Prepared by: T.J.L. Checked by: C.F.C. Job No. 11001.CO67

Caisson Foundation:

Input Data:

Shear Force =	$S := 14k$	*USER INPUT-FROM RISATower*
Overturning Moment =	$M := 1066ft \cdot k$	*USER INPUT-FROM RISATower*
Applied Axial Load =	$A1 := 33k$	*USER INPUT-FROM RISATower*
Bending Moment =	$Mu := 1156ft \cdot k$	*USER INPUT–FROM LPILE*
Moment Capacity =	$Mn := 10730ft \cdot k$	*USER INPUT–FROM LPILE*
Foundation Diameter =	$d := 8.5ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 30.0ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 3.0ft$	*USER INPUT*
Number of Rebar =	$n := 60$	*USER INPUT*
Area of Rebar =	$Ar := 0.79in^2$	*USER INPUT*
Rebar Yield Strength =	$fy := 60ksi$	*USER INPUT*
Concrete Comp Strength =	$f'c := 4ksi$	*USER INPUT*

Check Foundation Depth:

Depth of Caisson Below Ground Level = $LD := L_c - L_{pag} = 27\,ft$ (TIA/EIA-222-F 7.2.5)

Depth Required = $LD1 := 2.0ft + \left(\frac{S \cdot ft^2}{3k \cdot d}\right) + 2ft \cdot .5\left(\frac{M \cdot ft}{3 \cdot k \cdot d} + \frac{S \cdot ft}{2k} + \frac{S^2 ft^3}{18k^2 d^2}\right)^{.5} = 16.54\,ft$

$DepthCheck := if(LD1 \le LD, "OK", "NO GOOD")$

$DepthCheck = "OK"$

Check Moment Capacity:

Factor of Safety = $FS := \frac{Mn}{Mu} = 9.3$

Factor of Safety Required = $FS_{reqd} := 1.3$

$FOSCheck := if(FS \ge FS_{reqd}, "OK", "NO GOOD")$

$FOSCheck = "OK"$

Check Axial Capacity:

Concrete Weight = $A2 := .150\frac{k}{ft^3} \cdot LD \cdot \pi \frac{d^2}{4} = 229.8 \cdot kips$

Total Axial Load = $AT := A1 + A2 = 262.8 \cdot kips$

Area of Concrete = $Ag := \pi \cdot \frac{d^2}{4} = 56.75ft^2$

Axial Capacity = $Po := n \cdot Ar \cdot fy + (Ag - n \cdot Ar) \cdot 0.85 \cdot f'c = 30465.2 \cdot kips$

$AxialCheck := if(AT \le Po, "OK", "NO GOOD")$

$AxialCheck = "OK"$

LPILE Plus for Windows, Version 5.0 (5.0.39)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This program is licensed to:

TJL
Centek Engineering Inc

Path to file locations: J:\Jobs\1100100.WI\C067 - Ashford North\Calcs\MathCad\Foundation\
Name of input data file: Ashford North Caisson Analysis.lpd
Name of output file: Ashford North Caisson Analysis.lpo
Name of plot output file: Ashford North Caisson Analysis.lpp
Name of runtime file: Ashford North Caisson Analysis.lpr

Time and Date of Analysis

Date: January 17, 2012 Time: 9:39:59

Problem Title

Verizon Wireless - Ashford North

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 8

Pile Structural Properties and Geometry

Pile Length = 360.00 in

Depth of ground surface below top of pile = 36.00 in

Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in

1	0.0000	102.00000	5313376.	8171.3000	3605000.
2	360.0000	102.00000	5313376.	8171.3000	3605000.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of moment of inertia and modulus of are not used for any computations other than total stress due to combined axial loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 3 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 36.000 in
Distance from top of pile to bottom of layer = 108.000 in
p-y subgrade modulus k for top of soil layer = 60.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 60.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 108.000 in
Distance from top of pile to bottom of layer = 180.000 in
p-y subgrade modulus k for top of soil layer = 90.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 90.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 180.000 in
Distance from top of pile to bottom of layer = 360.000 in
p-y subgrade modulus k for top of soil layer = 120.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 120.000 lbs/in**3

(Depth of lowest layer extends .00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 6 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	36.00	.06700
2	108.00	.06700
3	108.00	.07200
4	180.00	.07200
5	180.00	.03600
6	360.00	.03600

Shear Strength of Soils

Shear strength parameters with depth defined using 6 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	36.000	.00000	30.00	------	------
2	108.000	.00000	30.00	------	------
3	108.000	.00000	39.00	------	------
4	180.000	.00000	39.00	------	------
5	180.000	.00000	39.00	------	------
6	360.000	.00000	39.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 14000.000 lbs
Bending moment at pile head = 12792000.000 in-lbs
Axial load at pile head = 33000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 102.0000 in

Material Properties:

Compressive Strength of Concrete	=	4.000 kip/in**2
Yield Stress of Reinforcement	=	60. kip/in**2
Modulus of Elasticity of Reinforcement	=	29000. kip/in**2
Number of Reinforcing Bars	=	60
Area of Single Bar	=	.79000 in**2
Number of Rows of Reinforcing Bars	=	31
Area of Steel	=	47.400 in**2
Area of Shaft	=	8171.282 in**2
Percentage of Steel Reinforcement	=	.580 percent
Cover Thickness (edge to bar center)	=	4.000 in

Unfactored Axial Squash Load Capacity = 30465.20 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	.790	47.000
2	1.580	46.743
3	1.580	45.973
4	1.580	44.700
5	1.580	42.937
6	1.580	40.703
7	1.580	38.024
8	1.580	34.928
9	1.580	31.449
10	1.580	27.626
11	1.580	23.500
12	1.580	19.117
13	1.580	14.524
14	1.580	9.772
15	1.580	4.913
16	1.580	0.000
17	1.580	-4.913
18	1.580	-9.772
19	1.580	-14.524
20	1.580	-19.117
21	1.580	-23.500
22	1.580	-27.626
23	1.580	-31.449
24	1.580	-34.928
25	1.580	-38.024
26	1.580	-40.703
27	1.580	-42.937
28	1.580	-44.700
29	1.580	-45.973
30	1.580	-46.743
31	.790	-47.000

Axial Thrust Force = 33000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
12986110.	2.077778E+13	6.250000E-07	.00003305	52.88694075	117.24550	886.07580
25833538.	2.066683E+13	.00000125	.00006507	52.05274567	228.77263	1741.91203
38539617.	2.055446E+13	.00000188	.00009705	51.76263276	338.29443	2597.09316
51105361.	2.044214E+13	.00000250	.00012904	51.61742279	445.89032	3452.26315
51105361.	1.635372E+13	.00000313	.00007436	23.79577777	255.76590	6724.75764
51105361.	1.362810E+13	.00000375	.00008819	23.51668122	302.08705	8100.06092
51105361.	1.168123E+13	.00000438	.00010203	23.32138386	348.12562	9474.84942
51105361.	1.022107E+13	.00000500	.00011589	23.17848417	393.88063	10849.11980
51105361.	9.085398E+12	.00000563	.00012977	23.07053956	439.35113	12222.86823
51105361.	8.176858E+12	.00000625	.00014367	22.98708388	484.53615	13596.09105
51105361.	7.433507E+12	.00000688	.00015758	22.92145380	529.43463	14968.78515
51105361.	6.814048E+12	.00000750	.00017152	22.86921421	574.04567	16340.94591
51105361.	6.289891E+12	.00000813	.00018547	22.82728878	618.36821	17712.57008
51105361.	5.840613E+12	.00000875	.00019944	22.79348275	662.40124	19083.65375
51105361.	5.451239E+12	.00000938	.00021343	22.76618806	706.14378	20454.19262
51105361.	5.110536E+12	.00001000	.00022744	22.74419788	749.59479	21824.18262
51105361.	4.809916E+12	.00001063	.00024147	22.72658810	792.75321	23193.62004
51105361.	4.542699E+12	.00001125	.00025552	22.71263829	835.61786	24562.50176
51105361.	4.303609E+12	.00001188	.00026958	22.70178607	878.18782	25930.82242
51105361.	4.088429E+12	.00001250	.00028367	22.69357851	920.46202	27298.57779
51105361.	3.893742E+12	.00001313	.00029778	22.68764779	962.43931	28665.76406
51105361.	3.716754E+12	.00001375	.00031190	22.68369600	1004.11867	30032.37622
51105361.	3.555156E+12	.00001438	.00032605	22.68147084	1045.49878	31398.41184
51105361.	3.407024E+12	.00001500	.00034021	22.68077168	1086.57875	32763.86432
51711492.	3.309535E+12	.00001563	.00035440	22.68142220	1127.35729	34128.73056
53713451.	3.305443E+12	.00001625	.00036860	22.68327650	1167.83326	35493.00595
55713228.	3.301525E+12	.00001688	.00038283	22.68620995	1208.00549	36856.68601
57710818.	3.297761E+12	.00001750	.00039708	22.69011918	1247.87295	38219.76452
59706201.	3.294135E+12	.00001813	.00041135	22.69490996	1287.43434	39582.23795
61699363.	3.290633E+12	.00001875	.00042563	22.70050326	1326.68847	40944.10135
63690289.	3.287241E+12	.00001938	.00043994	22.70682916	1365.63408	42305.35037
65678963.	3.283948E+12	.00002000	.00045428	22.71382686	1404.26989	43665.98042
67665383.	3.280746E+12	.00002063	.00046863	22.72144774	1442.59490	45025.98407
69649518.	3.277624E+12	.00002125	.00048300	22.72964010	1480.60756	46385.35929
71631370.	3.274577E+12	.00002188	.00049740	22.73836747	1518.30685	47744.09814
73610912.	3.271596E+12	.00002250	.00051182	22.74759033	1555.69132	49102.19731
75588126.	3.268676E+12	.00002313	.00052626	22.75727525	1592.75958	50459.65228
77563013.	3.265811E+12	.00002375	.00054073	22.76739791	1629.51058	51816.45469
79535540.	3.262996E+12	.00002438	.00055521	22.77792791	1665.94272	53172.60221
83473480.	3.257502E+12	.00002563	.00058425	22.80012783	1737.84543	55882.90500
87401832.	3.252161E+12	.00002688	.00061339	22.82372001	1808.45688	58590.51322
91055312.	3.237522E+12	.00002813	.00064195	22.82506058	1876.15601	60000.00000
93829398.	3.194192E+12	.00002938	.00066840	22.75394663	1937.31957	60000.00000
96145297.	3.139438E+12	.00003063	.00069370	22.65157405	1994.57771	60000.00000
98149889.	3.079212E+12	.00003188	.00071822	22.53227261	2048.86950	60000.00000
99923950.	3.016572E+12	.00003313	.00074212	22.40370271	2100.73155	60000.00000
1.015438E+08	2.954000E+12	.00003438	.00076563	22.27285901	2150.69798	60000.00000
1.029242E+08	2.889100E+12	.00003563	.00078844	22.13155523	2198.17224	60000.00000
1.043120E+08	2.828799E+12	.00003688	.00081437	22.08464751	2251.34736	60000.00000
1.054601E+08	2.766165E+12	.00003813	.00083603	21.92862180	2294.46714	60000.00000
1.065870E+08	2.706971E+12	.00003938	.00085765	21.78168216	2336.69633	60000.00000
1.075377E+08	2.647082E+12	.00004063	.00087861	21.62738612	2376.77456	60000.00000
1.084857E+08	2.590702E+12	.00004188	.00089961	21.48320058	2416.15651	60000.00000
1.093454E+08	2.535545E+12	.00004313	.00092026	21.33943453	2454.10905	60000.00000
1.101215E+08	2.481611E+12	.00004438	.00094059	21.19643757	2490.70345	60000.00000
1.108952E+08	2.430579E+12	.00004563	.00096096	21.06203726	2526.63994	60000.00000
1.116176E+08	2.381175E+12	.00004688	.00098111	20.93044880	2561.48319	60000.00000
1.122444E+08	2.332351E+12	.00004813	.00100085	20.79686925	2594.86560	60000.00000
1.128690E+08	2.285954E+12	.00004938	.00102062	20.67070994	2627.62616	60000.00000
1.134914E+08	2.241806E+12	.00005063	.00104042	20.55142978	2659.76205	60000.00000
1.140624E+08	2.198793E+12	.00005188	.00105998	20.43332300	2690.82100	60000.00000
1.152138E+08	2.168730E+12	.00005313	.00108375	20.40000030	2728.03610	60000.00000
1.152138E+08	2.118874E+12	.00005438	.00110349	20.29400119	2757.88706	60000.00000
1.156361E+08	2.078851E+12	.00005563	.00112204	20.17157176	2785.23813	60000.00000
1.161157E+08	2.041595E+12	.00005688	.00114063	20.05504873	2812.03909	60000.00000
1.165516E+08	2.005189E+12	.00005813	.00115895	19.93897864	2837.85098	60000.00000
1.169286E+08	1.969323E+12	.00005938	.00117690	19.82150719	2862.54378	60000.00000
1.173040E+08	1.934911E+12	.00006063	.00119488	19.70933720	2886.72119	60000.00000
1.176779E+08	1.901865E+12	.00006188	.00121288	19.60214952	2910.38063	60000.00000
1.180501E+08	1.870101E+12	.00006313	.00123092	19.49964926	2933.51947	60000.00000
1.184208E+08	1.839547E+12	.00006438	.00124898	19.40156588	2956.13513	60000.00000
1.187711E+08	1.809846E+12	.00006563	.00126691	19.30534288	2978.03115	60000.00000
1.190600E+08	1.780336E+12	.00006688	.00128439	19.20585814	2998.80056	60000.00000
1.193473E+08	1.751888E+12	.00006813	.00130190	19.11041334	3019.07812	60000.00000
1.196333E+08	1.724444E+12	.00006938	.00131943	19.01878962	3038.86125	60000.00000
1.199178E+08	1.697951E+12	.00007063	.00133699	18.93078938	3058.14783	60000.00000
1.202008E+08	1.672359E+12	.00007188	.00135457	18.84622112	3076.93509	60000.00000
1.204824E+08	1.647623E+12	.00007313	.00137218	18.76491460	3095.22090	60000.00000
1.204824E+08	1.619931E+12	.00007438	.00139081	18.69999889	3114.04635	60000.00000
1.213786E+08	1.578909E+12	.00007688	.00143361	18.64854053	3155.32948	60000.00000

1.217810E+08	1.534249E+12	.00007938	.00146618	18.47150955	3184.12830	60000.00000
1.221788E+08	1.492260E+12	.00008188	.00149884	18.30647072	3211.20737	60000.00000
1.225720E+08	1.452705E+12	.00008438	.00153161	18.15237227	3236.55042	60000.00000
1.229604E+08	1.415371E+12	.00008688	.00156447	18.00828096	3260.14067	60000.00000
1.233197E+08	1.379801E+12	.00008938	.00159711	17.86974648	3281.74163	60000.00000
1.236060E+08	1.345371E+12	.00009188	.00162893	17.72986534	3301.02580	60000.00000
1.238880E+08	1.312721E+12	.00009438	.00166085	17.59839544	3318.64781	60000.00000
1.241657E+08	1.281710E+12	.00009688	.00169286	17.47469231	3334.59157	60000.00000
1.244390E+08	1.252216E+12	.00009938	.00172497	17.35818449	3348.84116	60000.00000
1.247078E+08	1.224126E+12	.00010188	.00175718	17.24835518	3361.38021	60000.00000
1.249722E+08	1.197338E+12	.00010438	.00178948	17.14473322	3372.19184	60000.00000
1.252236E+08	1.171683E+12	.00010688	.00182175	17.04559198	3381.22139	60000.00000
1.260039E+08	1.152036E+12	.00010938	.00185938	17.00000051	3389.59081	60000.00000
1.272175E+08	1.137140E+12	.00011188	.00190188	17.00000051	3396.12983	60000.00000
1.272175E+08	1.112284E+12	.00011438	.00193194	16.89129594	3398.79896	60000.00000
1.272175E+08	1.088492E+12	.00011688	.00196179	16.78536978	3399.94652	60000.00000
1.272175E+08	1.065696E+12	.00011938	.00199173	16.68465999	3394.61149	60000.00000
1.272175E+08	1.043836E+12	.00012188	.00202177	16.58885953	3387.23655	60000.00000
1.272175E+08	1.022854E+12	.00012438	.00205190	16.49767658	3382.24445	60000.00000
1.272175E+08	1.002700E+12	.00012688	.00208213	16.41085580	3387.95993	60000.00000
1.272175E+08	9.833237E+11	.00012938	.00211245	16.32815400	3392.58557	60000.00000
1.272175E+08	9.646825E+11	.00013188	.00214288	16.24934927	3396.10776	60000.00000
1.272175E+08	9.467349E+11	.00013438	.00217238	16.16654715	3398.43291	60000.00000
1.272175E+08	9.294429E+11	.00013688	.00220179	16.08616474	3399.71555	60000.00000
1.272175E+08	9.127713E+11	.00013938	.00223135	16.00967637	3398.39531	60000.00000
1.272880E+08	8.971842E+11	.00014188	.00226111	15.93735865	3392.21519	60000.00000
1.273724E+08	8.822332E+11	.00014438	.00229094	15.86801693	3386.01708	60000.00000
1.274561E+08	8.677861E+11	.00014688	.00232085	15.80150226	3379.80086	60000.00000
1.275391E+08	8.538179E+11	.00014938	.00235082	15.73768392	3376.96923	60000.00000
1.276213E+08	8.403047E+11	.00015188	.00238086	15.67642817	3382.41394	60000.00000
1.277028E+08	8.272244E+11	.00015438	.00241097	15.61761948	3387.14147	60000.00000
1.277835E+08	8.145559E+11	.00015688	.00244115	15.56114236	3391.14374	60000.00000
1.278634E+08	8.022802E+11	.00015938	.00247141	15.50689647	3394.41278	60000.00000
1.279426E+08	7.903790E+11	.00016188	.00250174	15.45478454	3396.94031	60000.00000
1.280210E+08	7.788348E+11	.00016438	.00253215	15.40470931	3398.71780	60000.00000
1.280986E+08	7.676319E+11	.00016688	.00256263	15.35659173	3399.73676	60000.00000
1.281748E+08	7.567515E+11	.00016938	.00259323	15.31055948	3399.07177	60000.00000
1.281748E+08	7.457443E+11	.00017188	.00262969	15.29999909	3392.24502	60000.00000
1.281748E+08	7.350526E+11	.00017438	.00266794	15.29999909	3384.94565	60000.00000
1.281748E+08	7.145633E+11	.00017938	.00274444	15.29999909	3370.34690	60000.00000
1.285851E+08	6.974106E+11	.00018438	.00281068	15.24434271	3376.26707	60000.00000
1.286514E+08	6.793476E+11	.00018938	.00286774	15.14317694	3383.84034	60000.00000
1.287065E+08	6.621558E+11	.00019438	.00292615	15.05413708	3390.22677	60000.00000
1.287577E+08	6.458065E+11	.00019938	.00298508	14.97218308	3395.08831	60000.00000
1.288076E+08	6.302511E+11	.00020438	.00304424	14.89534208	3398.31205	60000.00000
1.288561E+08	6.154323E+11	.00020938	.00310362	14.82327667	3399.85945	60000.00000
1.288950E+08	6.012594E+11	.00021438	.00316435	14.76083842	3394.99173	60000.00000
1.289250E+08	5.876923E+11	.00021938	.00322631	14.70680836	3386.48314	60000.00000
1.289543E+08	5.747268E+11	.00022438	.00328841	14.65587893	3377.93350	60000.00000
1.289829E+08	5.623234E+11	.00022938	.00335068	14.60786471	3369.34173	60000.00000
1.290108E+08	5.504460E+11	.00023438	.00341311	14.56259546	3360.70685	60000.00000
1.290126E+08	5.389562E+11	.00023938	.00347321	14.50947431	3352.68821	60000.00000
1.290126E+08	5.279289E+11	.00024438	.00353325	14.45832601	3358.70058	60000.00000
1.290126E+08	5.173439E+11	.00024938	.00359344	14.40978286	3367.02474	60000.00000
1.290126E+08	5.071750E+11	.00025438	.00365377	14.36370805	3374.45796	60000.00000
1.290126E+08	4.973981E+11	.00025938	.00371484	14.32226899	3381.14452	60000.00000
1.290126E+08	4.879910E+11	.00026438	.00377704	14.28669378	3387.07422	60000.00000
1.290126E+08	4.789332E+11	.00026938	.00383944	14.25314310	3391.92141	60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 128770.26357 in-kip

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Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 14000.000 lbs
Specified moment at pile head = 12792000.000 in-lbs
Specified axial load at pile head = 33000.000 lbs

Non-zero moment for this load case indicates the pile-head may rotate under
the applied pile-head loading, but is not a free-head (zero moment)condition.

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Flx. Rig. EI lbs-in**2	Soil Res. p lbs/in	Es*h F/L
0.000	.172727	1.28E+07	14000.	-.000737	126.821	2.08E+13	0.000	0.000
28.800	.151762	1.32E+07	14000.	-.000719	130.698	2.08E+13	0.000	0.000
57.600	.131323	1.36E+07	12093.	-.000700	134.444	2.08E+13	-170.195	4665.600
86.400	.111427	1.38E+07	4630.312	-.000681	136.876	2.08E+13	-336.956	10886.
115.200	.092083	1.38E+07	-7766.828	-.000662	136.624	2.08E+13	-567.212	22175.
144.000	.073289	1.33E+07	-25392.	-.000643	132.098	2.08E+13	-641.410	31506.
172.800	.055026	1.23E+07	-43828.	-.000625	122.524	2.08E+13	-624.204	40838.

201.600	.037254	1.08E+07	-64404.	-.000609	107.592	2.08E+13	-673.030	65037.
230.400	.019911	8.68E+06	-80531.	-.000596	87.398	2.08E+13	-428.524	77479.
259.200	.002914	6.23E+06	-88011.	-.000585	63.864	2.08E+13	-72.774	89920.
288.000	-.013835	3.73E+06	-83655.	-.000578	39.824	2.08E+13	393.393	1.02E+05
316.800	-.030434	1.56E+06	-64278.	-.000575	18.987	2.08E+13	970.549	1.15E+05
345.600	-.046969	1.99E+05	-26664.	-.000574	5.951	2.08E+13	1660.146	1.27E+05

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection	=	.17272671 in
Computed slope at pile head	=	-.00073691
Maximum bending moment	=	13869547. lbs-in
Maximum shear force	=	-88178.90705 lbs
Depth of maximum bending moment	=	100.80000 in
Depth of maximum shear force	=	262.80000 in
Number of iterations	=	5
Number of zero deflection points	=	1

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacment in
Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-head Slope, radians
Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 14000.	M= 1.28E+07	33000.0000	.1727267	1.3870E+07	-88178.9070

Computed Pile-head Stiffness Matrix Members K22, K23, K32, K33 for Superstructure

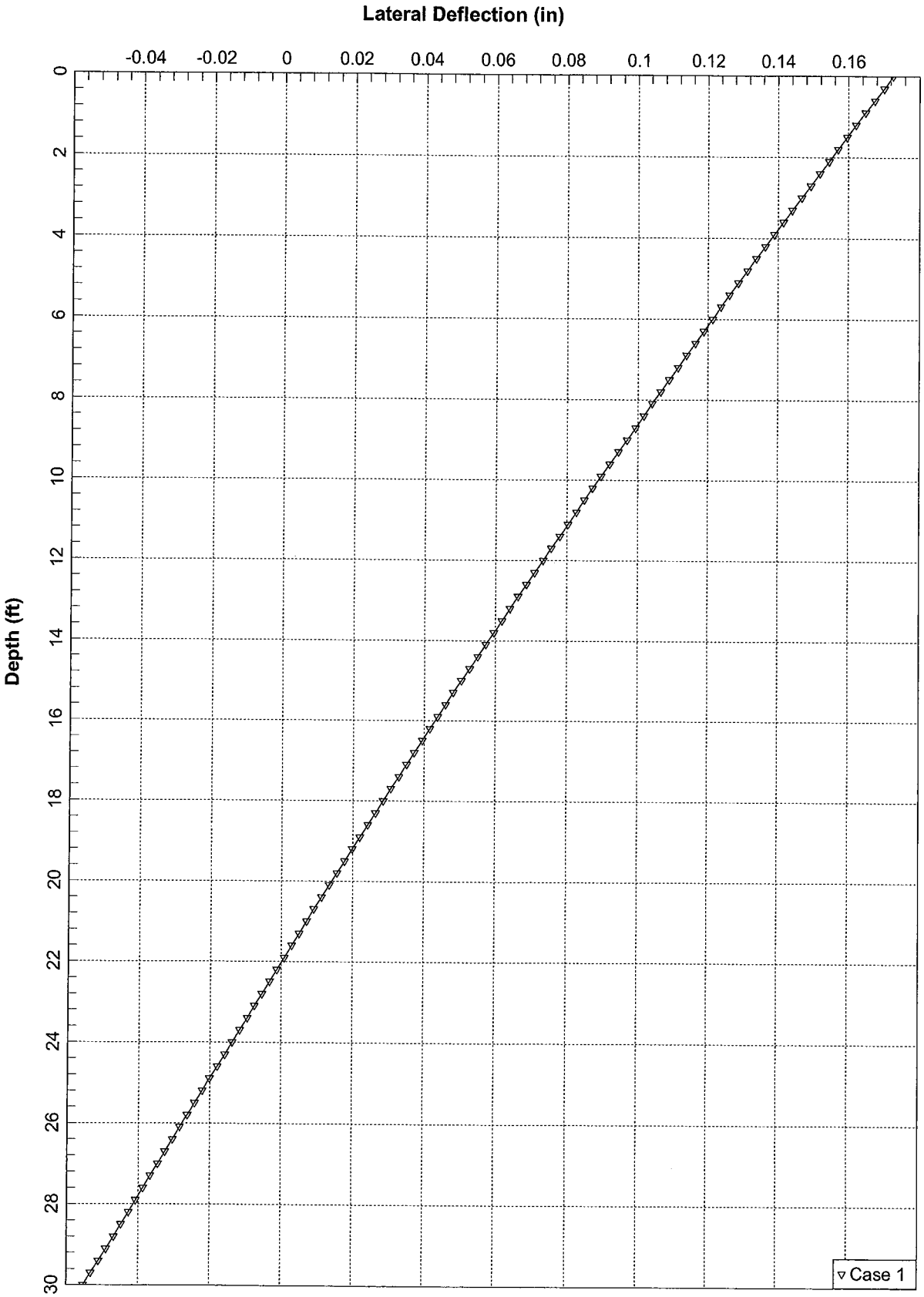
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
.00058650	1400.00002	317017.46725	2387026.	5.405207E+08
.00176555	4214.41994	954317.65369	2387026.	5.405207E+08
.00279833	6679.69757	1512558.	2387026.	5.405207E+08
.00353111	8428.83988	1908635.	2387026.	5.405207E+08
.00409949	9785.58006	2215857.	2387026.	5.405207E+08
.00456389	10894.11751	2466875.	2387026.	5.405207E+08
.00495653	11831.37256	2679108.	2387026.	5.405207E+08
.00529666	12643.25982	2862953.	2387026.	5.405207E+08
.00559667	13359.39513	3025115.	2387026.	5.405207E+08
.00586504	14000.00000	3170175.	2387026.	5.405207E+08

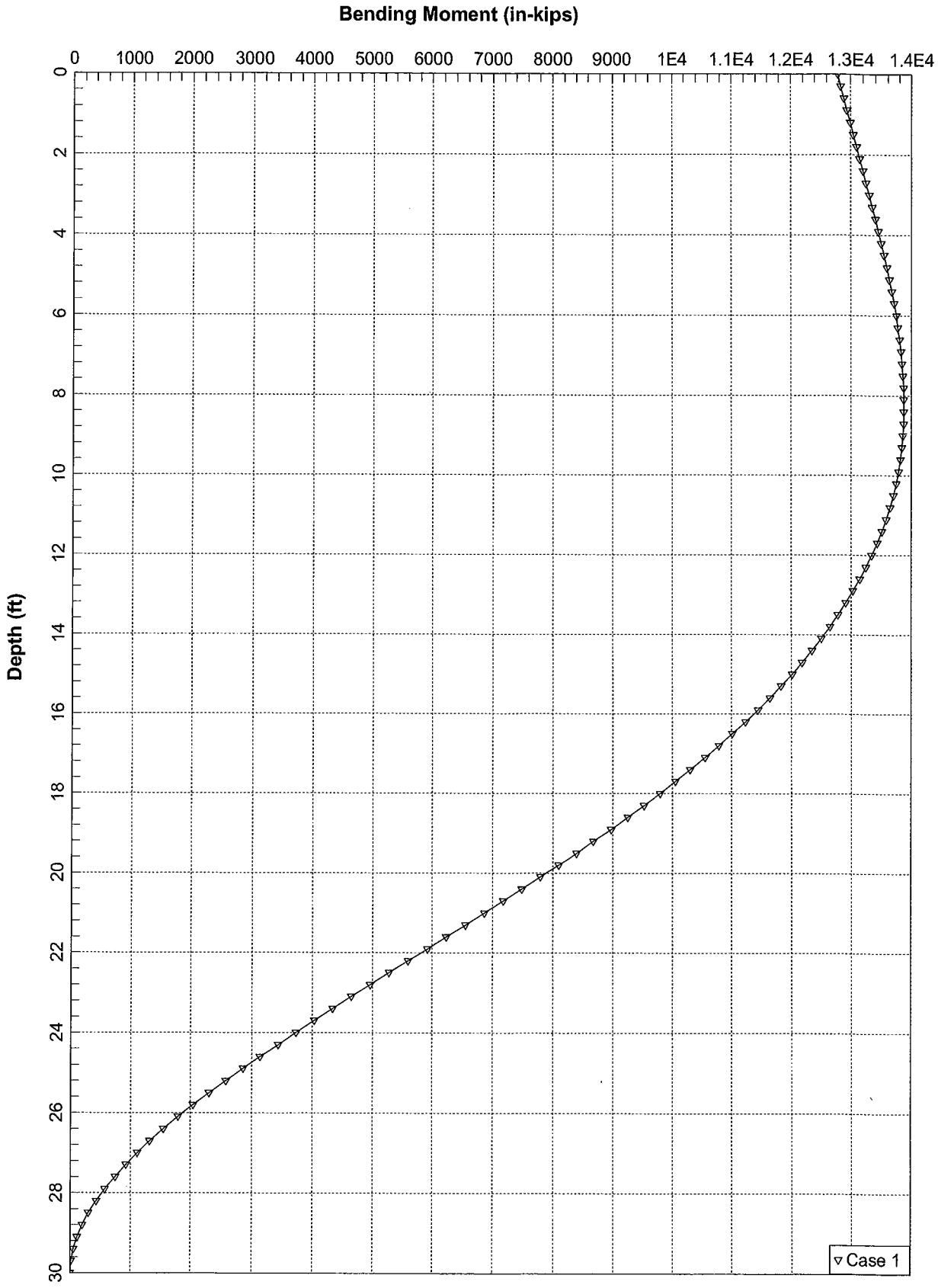
Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
.00000888	4799.68788	1279200.	5.405207E+08	1.440581E+11
.00002673	14448.50000	3850776.	5.405207E+08	1.440581E+11
.00004237	22900.33069	6103335.	5.405207E+08	1.440581E+11
.00005346	28897.00000	7701551.	5.405207E+08	1.440581E+11
.00006207	33548.37808	8941224.	5.405207E+08	1.440581E+11
.00006910	37348.83070	9954111.	5.405207E+08	1.440581E+11
.00007504	40562.06760	10810494.	5.405207E+08	1.440581E+11
.00008019	43345.50001	11552327.	5.405207E+08	1.440581E+11
.00008473	45800.66139	12206670.	5.405207E+08	1.440581E+11
.00008880	47996.87809	12792000.	5.405207E+08	1.440581E+11

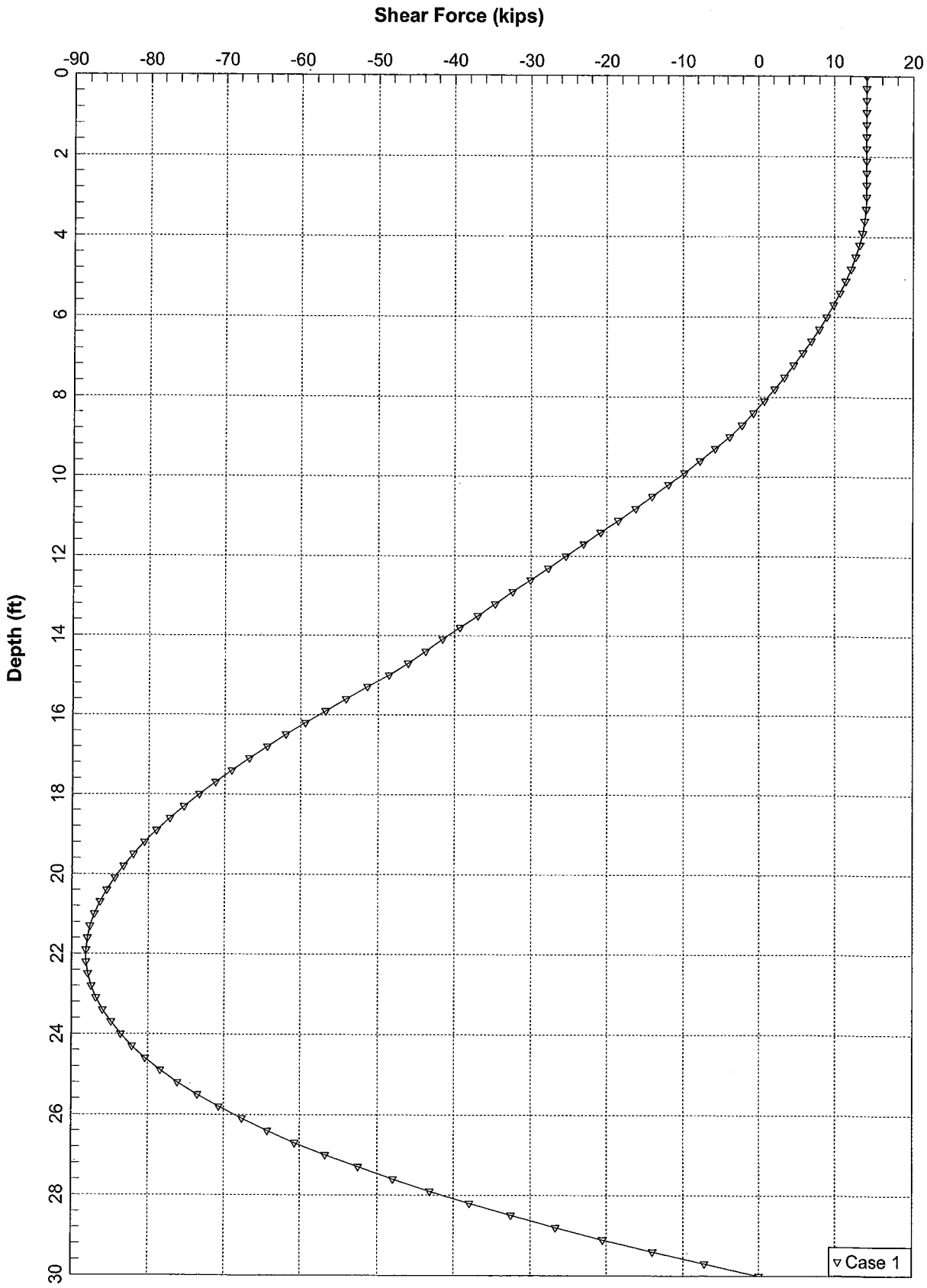
K22 = abs(Shear Reaction/Top y)
K23 = abs(Shear Reaction/Top Rotation)
K32 = abs(Moment Reaction/Top y)

K33 = abs(Moment Reaction/Top Rotation)

The analysis ended normally.


Lateral Deflection (in)
-0.04
-0.02
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
Case 1


Bending Moment (in-kips)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
1E4
1.1E4
1.2E4
1.3E4
1.4E4
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
Case 1


Shear Force (kips)
-90
-80
-70
-60
-50
-40
-30
-20
-10
0
10
20
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
Case 1

SITE NAME	ASHFORD NORTH CT	ECP - CELL #	2	24
LATITUDE	41-52-05.78 N	LONGITUDE	72-08-45.04 W	
Additional Comments: LTE antenna add keeping with 12 antennas and adding 3 additional main lines		SAVE BUTTON		
		STRUCTURE TYPE		

700 Mhz - LTE ANTENNA ADD	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	eNodeB	eNodeB	eNodeB
ANTENNA TYPE	BXA-70063-6CF_2	BXA-70063-6CF_2	BXA-70063-6CF_2
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	30	150	270
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	117	117	117
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

850 Celluar - Current Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	Cellular Modcell 4.0B	Cellular Modcell 4.0B	Cellular Modcell 4.0B
ANTENNA TYPE	LPA-80080/6CF	LPA-80080/6CF	LPA-80080/6CF
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	30	150	270
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	117	117	117
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

850 Celluar - Future Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	Cellular Modcell 4.0B	Cellular Modcell 4.0B	Cellular Modcell 4.0B
ANTENNA TYPE	LPA-80080/6CF	LPA-80080/6CF	LPA-80080/6CF
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	30	150	270
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	117	117	117
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
DIPLEX WITH LTE CABLE			

1900 PCS - Current Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B
ANTENNA TYPE	LPA-185080-12CF 2	LPA-185080-12CF 2	LPA-185080-12CF 2
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	30	150	270
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	117	117	117
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

1900 PCS - Future Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B
ANTENNA TYPE	BXA-171085-12CF_2	BXA-171085-12CF_2	BXA-171085-12CF_2
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	30	150	270
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	117	117	117
TMA - QTY / MODEL			
DIPLEX WITH CELLULAR CABLE			

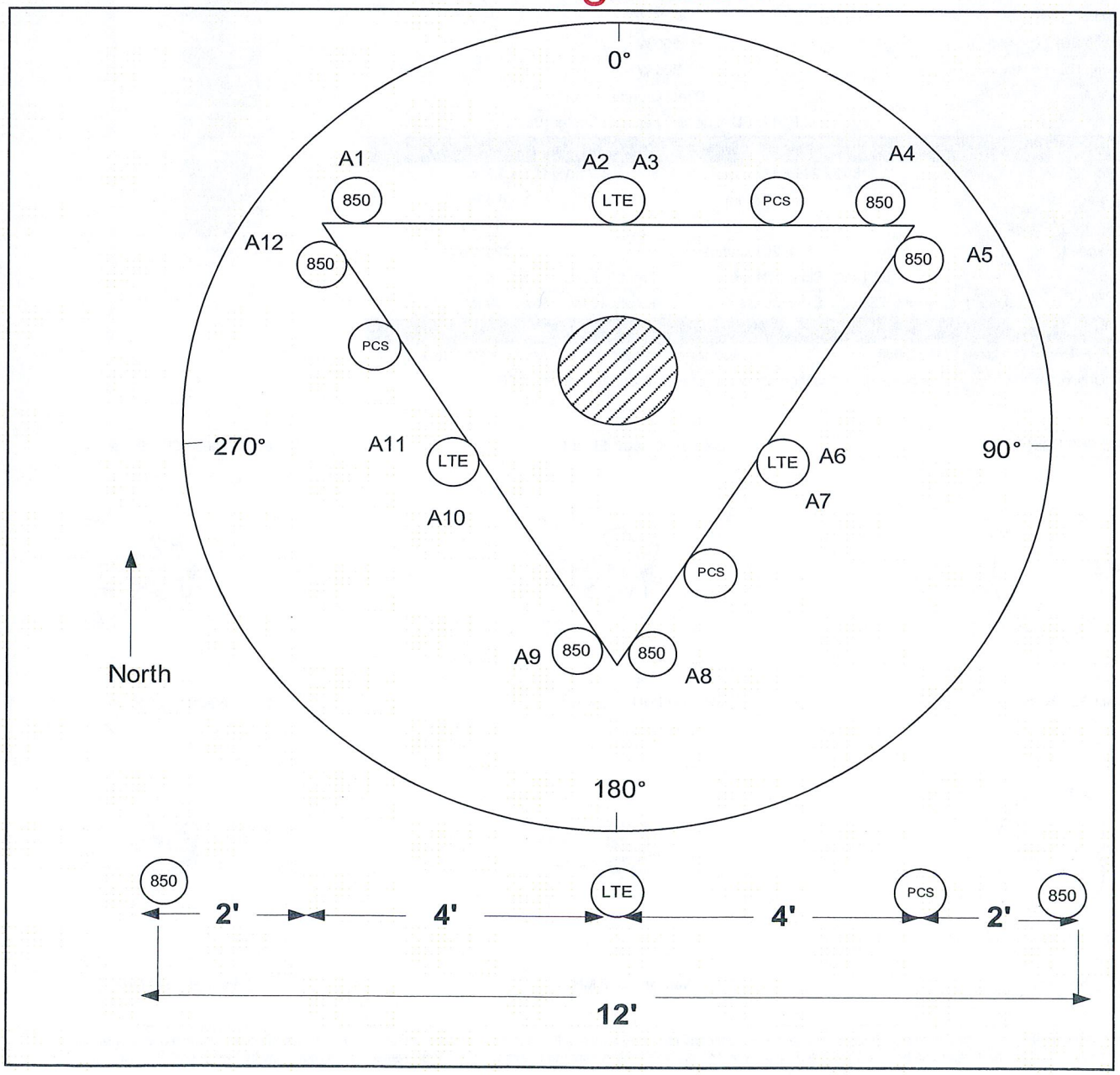
NUMBER OF CABLE'S NEEDED					ESTIMATED CABLE LENGTH			
MAINLINE SIZE	1 5/8"	TOTAL # OF MAINLINES		18	MAINLINE (FT)			
JUMPER SIZE	1/2 "	TOTAL # OF TOP JUMPERS		18	TOP JUMPER (FT)			12
Equipment Cable Ordering		MAIN CABLE	15 +	3	TOP JUMPER #	12	+	6

TX / RX FREQUENCIES			TX POWER OUTPUT	
Cellular A-Band	PCS F / AWS-Band	700 Mhz C - B	Cellular (Watts)	20
TX - 869-880,890-891.5 MHz	TX - 1970-1975 / 2145-21	TX - 746-757	PCS (Watts)	16
RX - 824-835,845-846.5 MHz	RX - 1890-1895 / 1745-17	RX - 776-787	LTE (Watts)	40

ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1	800	Tx1/Rx0	RED	A7	800	Tx2/Rx0	BLUE	A13	800	Tx3/Rx0	GREEN
A2	1900	Tx1/Rx0	RED/ WHITE	A8	1900	Tx2/Rx0	BLUE/ WHITE	A14	1900	Tx3/Rx0	GREEN/WHITE
A3	700	Tx1/Rx0	RED/ ORANGE	A9	700	Tx2/Rx0	BLUE/ ORANGE	A15	700	Tx3/Rx0	GREEN/ORANGE
A4	700	Tx4/Rx1	RED/RED/ ORANGE	A10	700	Tx5/Rx1	BLUE/BLUE/ ORANGE	A16	700	Tx6/Rx1	GREEN/GREEN/ ORANGE
A5	1900	Tx4/Rx1	RED/RED/ WHITE	A11	1900	Tx5/Rx1	BLUE/BLUE/ WHITE	A17	1900	Tx6/Rx1	GREEN/GREEN/ WHITE
A6	800	Tx4/Rx1	RED/RED	A12	800	Tx5/Rx1	BLUE/BLUE	A18	800	Tx6/Rx1	GREEN/GREEN

RF ENGINEER	RF MANAGER	INITIALS	DATE
Prepared By: Mark Brauer	Steve Weatherbee	MB	1/3/2012

Site Configuration



Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

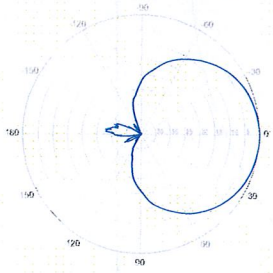
Replace 'X' with desired electrical downtilt.

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

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

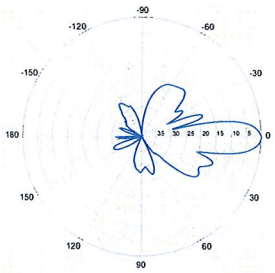
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



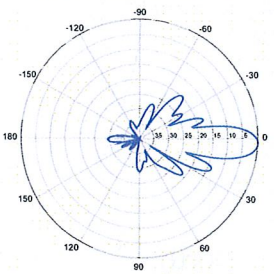
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

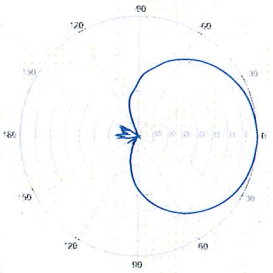


0° | Vertical | 750 MHz

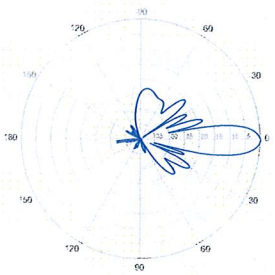
BXA-70063-6CF-EDIN-2



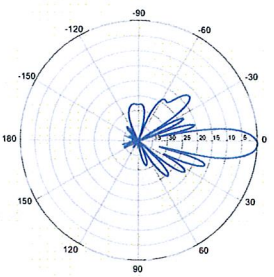
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



2° | Vertical | 850 MHz

BXA-171085-12CF-EDIN-X

Replace 'X' with desired electrical downtilt.

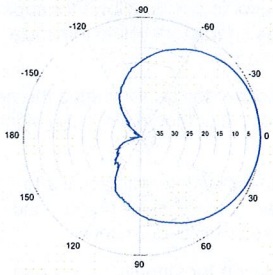
X-Pol | FET Panel | 85° | 18.0 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	88°	85°	80°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	15.1 dBd / 17.2 dBi	15.5 dBd / 17.6 dBi	15.9 dBd / 18.0 dBi
Electrical downtilt (X)	0, 2, 4		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Center (Back)		
Operating temperature	-40° to +60° C / -40° to +140° F		

Mechanical Characteristics		
Dimensions Length x Width x Depth	1840 x 154 x 105 mm	72.4 x 6.1 x 4.1 in
Depth with z-brackets	133 mm	5.2 in
Weight without mounting brackets	6.8 kg	15 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.28 m² Side: 0.19 m²	Front: 3.1 ft² Side: 2.1 ft²
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N	Front: 103 lbf Side: 68 lbf

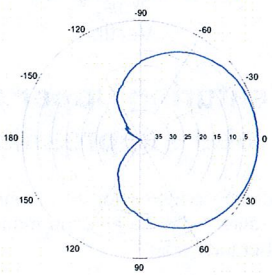
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171085-12CF-EDIN-X-FP		

BXA-171085-12CF-EDIN-X



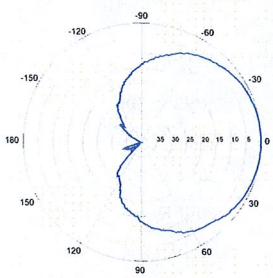
Horizontal | 1710-1880 MHz

BXA-171085-12CF-EDIN-X



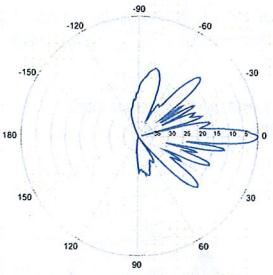
Horizontal | 1850-1990 MHz

BXA-171085-12CF-EDIN-X



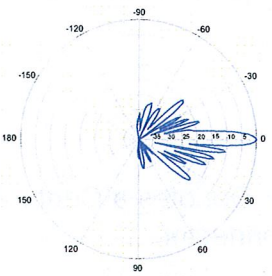
Horizontal | 1920-2170 MHz

BXA-171085-12CF-EDIN-0



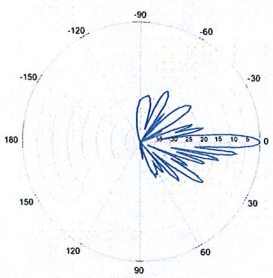
0° | Vertical | 1710-1880 MHz

BXA-171085-12CF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171085-12CF-EDIN-0



0° | Vertical | 1920-2170 MHz

Vertically Polarized, Log Periodic 80° / 14 dBd

LPA-80080/6CF ___

When ordering replace "___" with connector type.

Mechanical specifications

Length	1800	mm	70.9	in
Width	140	mm	5.5	in
Depth	335	mm	13.2	in
Depth with z-bracket	375	mm	14.8	in
[4] Weight	9.5	kg	21.0	lbs
Wind Area				
Fore/Aft	0.25	m^2	2.7	ft^2
Side	0.60	m^2	6.5	ft^2
Rated Wind Velocity (Safety factor 2.0)	>295	km/hr	>183	mph
Wind Load @ 100 mph (161 km/hr)				
Fore/Aft	415	N	93.3	lbs
Side	870	N	195.6	lbs

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

Mounting and Downtilting

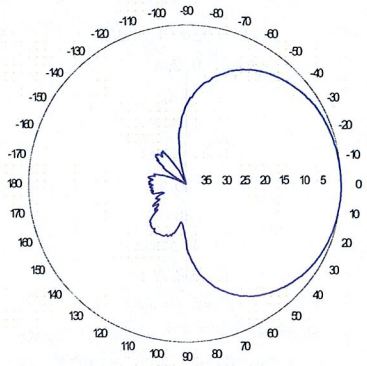
Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in). If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in)

Mounting Bracket & Downtilt Bracket Kit #21699999

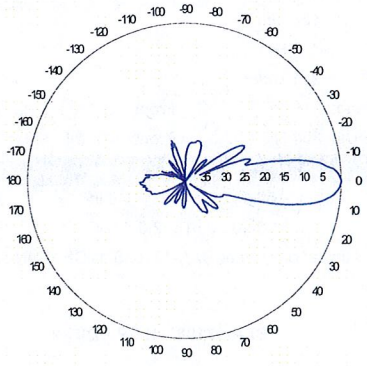
Electrical specifications

Frequency Range	806-960 MHz
Impedance	50Ω
[3] Connector(s)	NE or E-DIN 1 port / center
[1] VSWR	≤ 1.4:1
Polarization	Vertical
[1] Gain	14 dBd
[2] Power Rating	500 W
[1] Half Power Angle	
H-Plane	80°
E-Plane	10°
[1] Electrical Downtilt	0°
[1] Null Fill	10%
Lightning Protection	Direct Ground

Radiation pattern[1]



Horizontal

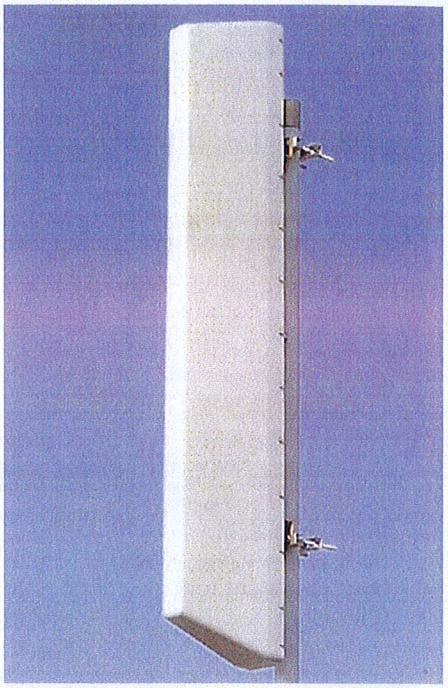


Vertical

Featuring upper side lobe suppression.

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:

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- 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 connector only.

CF Denotes a Center-Fed Connector.

806-960 MHz

[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.

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