ROBINSON & COLE LLP

KENNETH C. BALDWIN

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

Also admitted in Massachusetts

October 24, 2012

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

Re: **EM-VER-158-111214 – Bayberry Lane, Westport, Connecticut**
EM-VER-033-120620 – 201 Main Street, Cromwell, Connecticut
EM-VER-155-120615 – 570 New Park Avenue, West Hartford, Connecticut
EM-VER-151-120802 – 940 Meriden Road, Waterbury, Connecticut
EM-VER-110-120806 – 335 Washington Street, Plainville, Connecticut
EM-VER-011-120525 – 811 Blue Hills Avenue, Bloomfield, Connecticut
EM-VER-017-120904 – 1191 Terryville Avenue, Bristol, Connecticut
EM-VER-155-120829 – 3114 Albany Avenue, West 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 facility modifications 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

June 12, 2012

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

RE: **EM-VER-011-120525-** Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 811 Blue Hills Avenue, Bloomfield, 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 May 25, 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/jb

c: The Honorable Sydney Schulman, Mayor, Town of Bloomfield
Louie Chapman, Jr., Town Manager, Town of Bloomfield
Thomas B. Hooper, Director of Planning, Town of Bloomfield

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

May 29, 2012

The Honorable Sydney Schulman
Mayor
Town of Bloomfield
Town Hall
800 Bloomfield Avenue
P. O. Box 337
Bloomfield, CT 06002-0337

RE: **EM-VER-011-120525**- Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 811 Blue Hills Avenue, Bloomfield, Connecticut.

Dear Mayor Schulman:

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 June 12, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Louie Chapman, Jr., Town Manager, Town of Bloomfield
Thomas B. Hooper, Director of Planning, Town of Bloomfield

CSC
CONNECTICUT SITING COUNCIL

EM-VER-011-120525

ROBINSON & COLE LLP

KENNETH C. BALDWIN

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

May 24, 2012 ORIGINAL

RECEIVED
MAY 25 2012
CONNECTICUT
SITING COUNCIL

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

Re: **Notice of Exempt Modification – Antenna Swap**
811 Blue Hills Avenue, Bloomfield, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 107-foot level on an existing 110-foot tower at the above-referenced address. The tower is owned by Cellco and was approved by the Council in 2007 (Docket No. 336). Cellco now intends to replace six (6) of its existing antennas with three (3) model BXA-171063-12BF PCS antennas; and three (3) model BXA-70063-6CF LTE antennas, all at the 107-foot level. Cellco also intends to install six (6) additional coax cables inside the monopole tower. Attached behind Tab 1 are the specifications for Cellco's 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 Louis Chapman, Jr., Town Manager for the Town of Bloomfield. A copy of this letter is also being sent to Samo 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 height of the existing tower. Cellco's replacement antennas will be located at the 107-foot level on the existing 110-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) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for Cellco's modified facility is included behind Tab 2.

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed 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:
Louie Chapman, Jr., Bloomfield Town Manager
Samo Realty LLC
Sandy M. Carter

BXA-171063-12BF-EDIN-X-FP

X-Pol | FET Panel for Concealment | 63° | 19.5 dBi

Replace "X" with desired electrical downtilt.

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

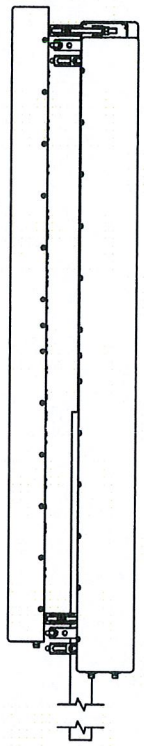
Description	
Antennas for Concealment	The BXA-171063-12BF-EDIN-X-FP is a standard BXA-171063-12BF-EDIN-X modified for mounting within a concealment cannister such as a flag pole (FP). A typical array would consists of three (3) BXA-171063-12BF-EDIN-X-FP. If three antennas are installed, they must be staggered. See **Requirements** section below.

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	Slant ±45°	Slant ±45°	Slant ±45°
Horizontal beamwidth	65°	63°	61°
Vertical beamwidth	6°	5°	4°
Gain	19.5 dBi	19.5 dBi	19.0 dBi
Electrical downtilt (X)	0, 2, 4		
Impedance	50Ω		
VSWR	≤1.5:1		
Null fill	5% (-26.02 dB)		
Isolation between ports	< -25 dB		
Input power	250 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN or NE / Female / Bottom		

Mechanical Characteristics		
Dimensions Length x Width x Depth	1829 x 154 x 105 mm	72.0 x 6.1 x 4.1 in
Overall length of 3 antennas staggered	1944 mm	76.5 in
Weight of single antenna	5.9 kg	13 lbs

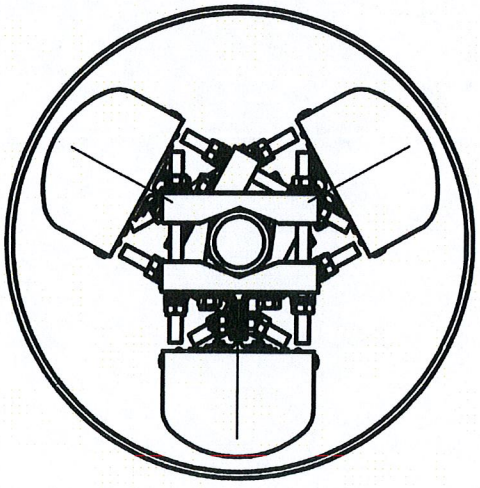
Requirements for 3-Antenna Arrays	
Staggering of Antennas	Antennas must be staggered creating an overall length of 1944 mm or 76.5 in.

Mounting	Outside Diameter of Mounting Pipe	Inside Diameter of Concealment Radome
Mounting Pipe / Concealment Radome	63.5 mm 2.500 in	457.20 mm 18.000 in
	88.9 mm 3.500 in	485.26 mm 19.105 in
	101.6 mm 4.000 in	485.26 mm 19.105 in
Mounting Kit	Mounting kit included in price of antenna Fits mounting pipe 50.00-102.00 mm or 2.0-4.0 in	



Typical 3-antenna array

View from top of 3-antenna array

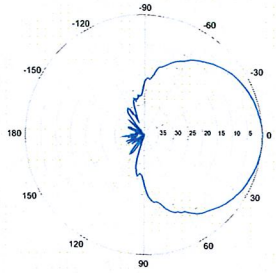


Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product.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

BXA-171063-12BF-EDIN-X-FP

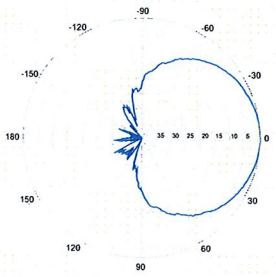
X-Pol | FET Panel for Concealment | 63° | 19.5 dBi

BXA-171063-12BF-EDIN-X-FP



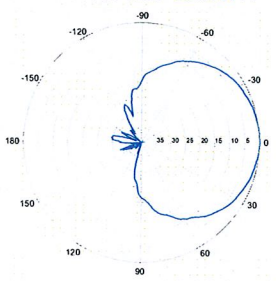
Horizontal | 1710-1880 MHz

BXA-171063-12BF-EDIN-X-FP

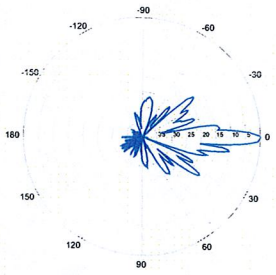


Horizontal | 1850-1990 MHz

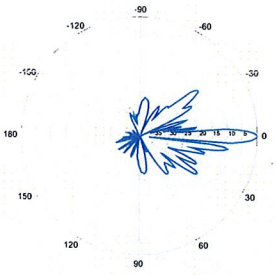
BXA-171063-12BF-EDIN-X-FP



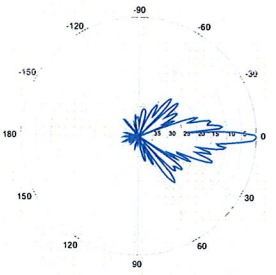
Horizontal | 1920-2170 MHz



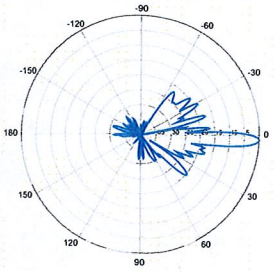
0° | Vertical | 1710-1880 MHz



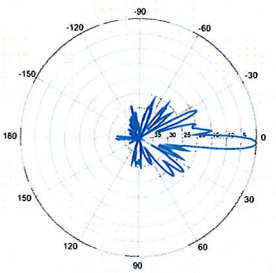
0° | Vertical | 1850-1990 MHz



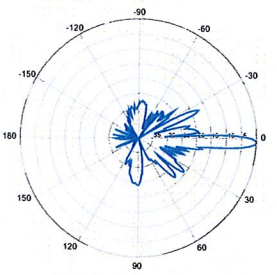
0° | Vertical | 1920-2170 MHz



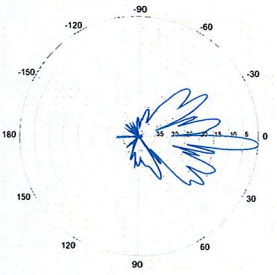
2° | Vertical | 1710-1880 MHz



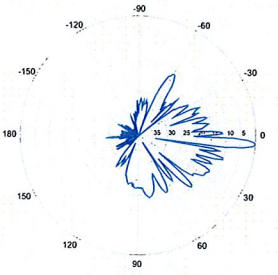
2° | Vertical | 1850-1990 MHz



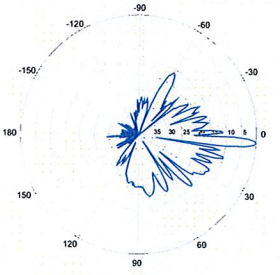
2° | Vertical | 1920-2170 MHz



4° | Vertical | 1710-1880 MHz



4° | Vertical | 1850-1990 MHz



4° | Vertical | 1920-2170 MHz

Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

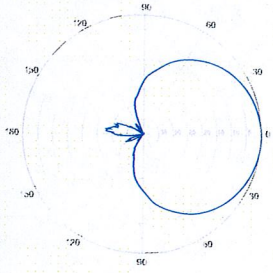
Replace "X" with desired electrical downtilt.

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

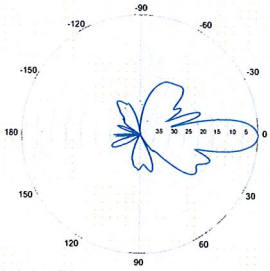
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



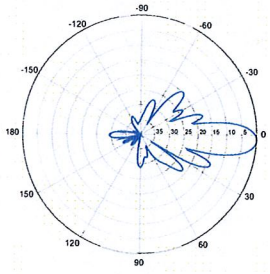
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

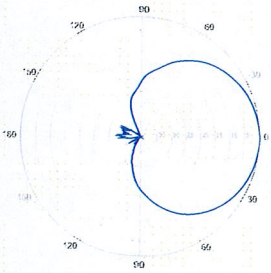


0° | Vertical | 750 MHz

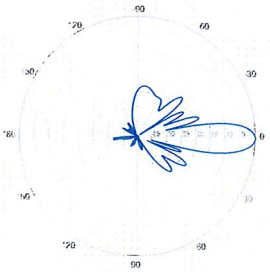
BXA-70063-6CF-EDIN-2



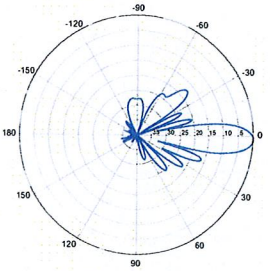
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz

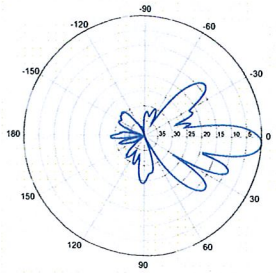


2° | Vertical | 850 MHz

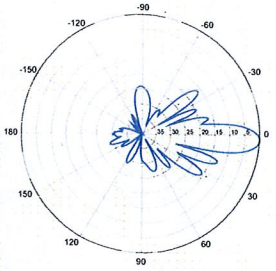
BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3

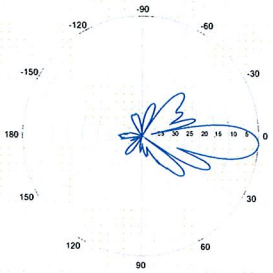


3° | Vertical | 750 MHz

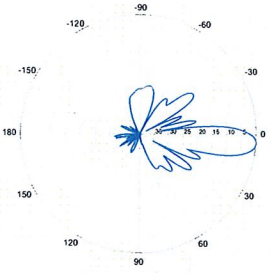


3° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-4

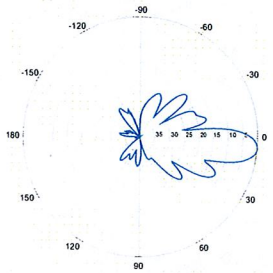


4° | Vertical | 750 MHz

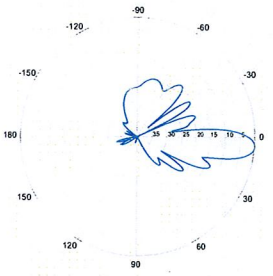


4° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-5

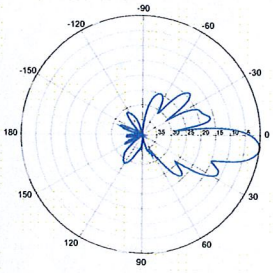


5° | Vertical | 750 MHz

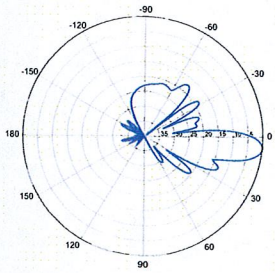


5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6

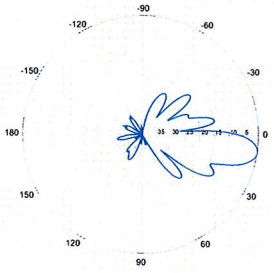


6° | Vertical | 750 MHz

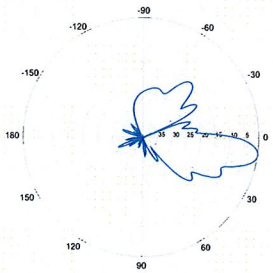


6° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-8

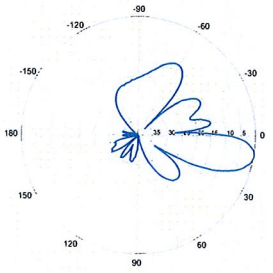


8° | Vertical | 750 MHz

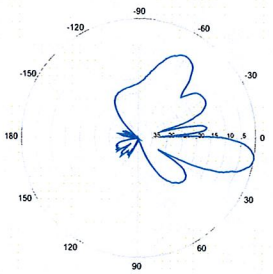


8° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-10



10° | Vertical | 750 MHz



10° | Vertical | 850 MHz

	General	Power	Density					
Site Name: Bloomfield Blue Hills								
Tower Height: Verizon @ 107Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Clearwire	2	153	95	0.0122	2496	1.0000	1.22%	
*Clearwire	1	211	95	0.0084	11 GHz	1.0000	0.84%	
Verizon PCS	**11**	**264**	**107**	**0.0912**	**1970**	**1.0000**	**9.12%**	
Verizon Cellular	**9**	**266**	**107**	**0.0752**	**869**	**0.5793**	**12.98%**	
Verizon AWS	**1**	**675**	**107**	**0.0212**	**2145**	**1.0000**	**2.12%**	
Verizon 700	**1**	**867**	**107**	**0.0272**	**698**	**0.4653**	**5.85%**	
								32.13%
* Source: Siting Council								

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

110-ft Existing EEI Monopole

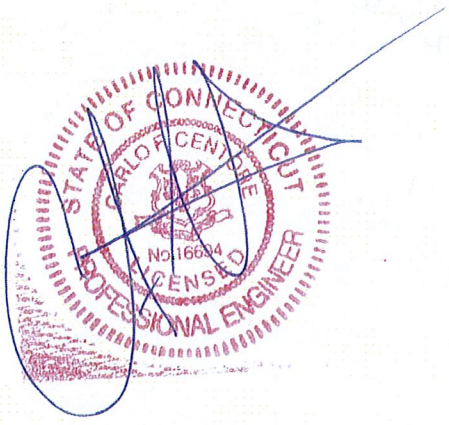
Proposed Verizon Wireless
Antenna Upgrade

Verizon Site Ref: Bloomfield Blue Hills

811 Blue Hills Ave
Bloomfield, CT

CENTEK Project No. 12001.C049

Date: May 16, 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

Table of Contents

Introduction

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

The host tower is a 110-ft tall extendable to 118-ft, three-section, eighteen sided, tapered monopole, originally designed and manufactured by Engineered Endeavors Incorporated; project no. 15165 dated December 5, 2007. The tower geometry, structure member sizes and foundation system information were obtained from the original manufacturers design documents.

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 17.00-in at the top and 51.00-in at the base.

Antenna and appurtenance information were obtained from visual verification from grade conducted by Centek personnel on May 9, 2012 and a Verizon RF data sheet.

Verizon proposes the removal of six (6) panel antennas and the installation of six (6) panel antennas mounted to the existing three (3) T-Arms. 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 tower was designed to support several communication antennas. The existing, proposed and future loads considered in this analysis consist of the following:

- VERIZON (Existing to Remain):
  Antennas: Six (6) Antel LPA-80063/6CF panel antennas mounted on a three (3) T-Arms with a RAD center elevation of 107-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- **VERIZON (Existing to Remove):**
  Antennas: Six (6) Antel LPA-185063/12CF panel antennas mounted on a three (3) T-Arms with a RAD center elevation of 107-ft above grade level.
- **VERIZON (Proposed):**
  Antennas: Three (3) Antel BXA-70063-6CF and three (3) Antel BXA-171063-12BF panel antennas mounted on a three (3) T-Arms with a RAD center elevation of 107-ft above grade level.
  Coax Cables: Six (6) 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 the controlling basic wind speed (fastest mile) with no ice and a 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).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC[1] and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation oF the tower analysis.

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 on the tower structure and its components.

Basic Wind Speed:	Hartford; v = 80 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Bloomfield; v = 95 mph (3 second gust) equivalent to v = 77.5 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA/EIA-222-F wind speed controls.	
Load Cases:	Load Case 1; 80 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 69 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 69 mph wind speed velocity represents 75% of the wind pressure generated by the 80 mph wind speed.	*[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*

[1] The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

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 **31.4%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L1)	73.96'-110.00'	31.4%	**PASS**

Foundation and Anchors

The existing foundation consists of a 7.0-ft ∅ x 27.0-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. 15165 dated December 5, 2007. The base of the tower is connected to the foundation by means of (16) 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	10 kips
	Compression	15 kips
	Moment	761 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	20.6%	**PASS**
	Lateral Deflection	0.48 in (1)	

Note 1: Lateral deflection typically limited to 1.0 in. 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	20.3%	**PASS**
Base Plate	Bending	17.2%	**PASS**

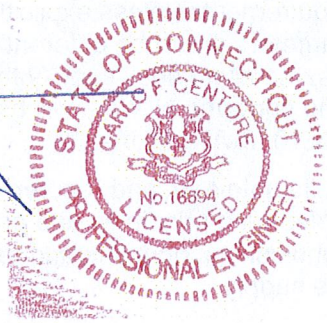
Conclusion

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

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 provide 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

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.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM~LPILE Plus

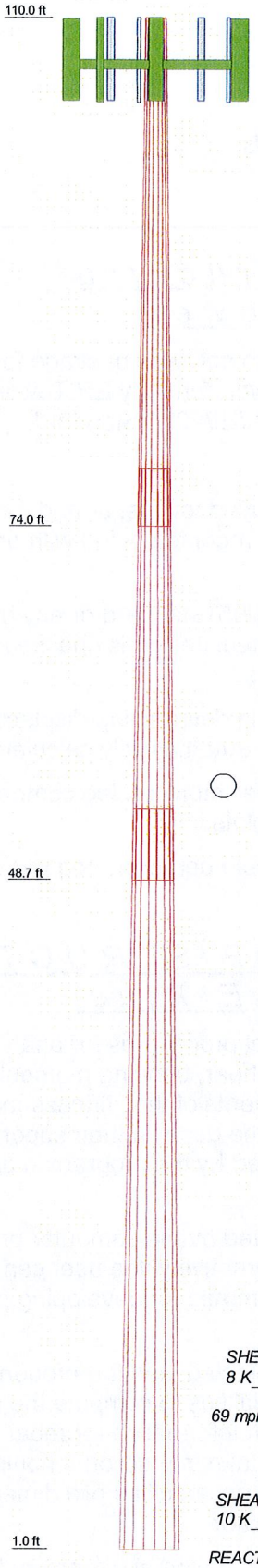
LPILE Plus is a special purpose program based on rational procedures for analyzing a pile under lateral loading. The program computes deflection, shear, bending moment, and soil response with respect to depth in nonlinear soils. Components of the stiffness matrix at the pile head may be computed internally by the program to help the users in their super-structure analysis. Several pile lengths may be automatically checked by the program in order to help the user produce a design with an optimum pile penetration.

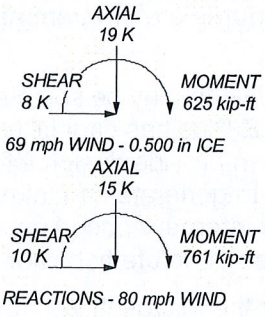
Soil behavior is modeled with p-y curves internally generated by the computer program following published recommendations for various types of soils; alternatively, the user can manually introduce other p-y curves. Special procedures are programmed for developing p-y curves for layered soils and for rocks.

Several types of pile-head boundary conditions may be selected, and the properties of the pile can also vary as a function of depth. LPILE Plus has capabilities to compute the ultimate-moment capacity of a pile's section and can provide design information for rebar arrangement. The user may optionally ask the program to generate and take into account nonlinear values of flexural stiffness (EI) which are generated internally based on specified pile dimensions, material properties, and cracked/uncracked concrete behavior.

A single, user-friendly interface written for the Microsoft Windows© environment is provided for the preparation of input, analytical run, and for the graphical observation of data contained in the output file. The program has been written in 32-bit programming codes for compatibility with the latest versions of the Microsoft Windows operating system. The program produces plain-text input and output files that may be observed and/or edited for their inclusion in project reports.

Section	1	2	3
Length (ft)	36.040	29.330	52.796
Number of Sides	18	18	18
Thickness (in)	0.188	0.313	0.313
Socket Length (ft)	4.083	5.083	
Top Dia (in)	17.000	26.964	34.074
Bot Dia (in)	28.660	36.320	51.000
Grade		A572-65	
Weight (K)	1.7	3.1	7.5





69 mph WIND - 0.500 in ICE

REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
LPA-80063/6CF (Verizon - Existing)	107	LPA-80063/6CF (Verizon - Existing)	107
BXA-70063/6CF (Verizon - Proposed)	107	LPA-80063/6CF (Verizon - Existing)	107
BXA-171063-12BF (Verizon - Proposed)	107	BXA-70063/6CF (Verizon - Proposed)	107
LPA-80063/6CF (Verizon - Existing)	107	BXA-171063-12BF (Verizon - Proposed)	107
LPA-80063/6CF (Verizon - Existing)	107	LPA-80063/6CF (Verizon - Existing)	107
BXA-70063/6CF (Verizon - Proposed)	107	Valmont T-Arm (3) (Verizon)	107
BXA-171063-12BF (Verizon - Proposed)	107		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 60 mph wind.
5. Weld together tower sections have flange connections.
6. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.
9. TOWER RATING: 31.4%

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

Job: **12001.CO49 - Bloomfield Blue Hills**			
Project: **110 EEI Monopole - 811 Blue Hills Ave Bloomfield, CT**			
Client: Verizon Wireless	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 05/15/12	Scale: NTS	
Path: J:\Jobs\12200100.WI\CO49 - Bloomfield Blue Hills\Calcs\ERI110' EEI Monopole.eri		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:

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 0.500 in.
Ice density of 56 pcf.
A wind speed of 69 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 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	110.000-73.960	36.040	4.083	18	17.000	28.660	0.188	0.750	A572-65 (65 ksi)
L2	73.960-48.713	29.330	5.083	18	26.964	36.320	0.313	1.250	A572-65 (65 ksi)
L3	48.713-1.000	52.796		18	34.074	51.000	0.313	1.250	A572-65

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 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	17.262	10.006	357.308	5.968	8.636	41.374	715.086	5.004	2.662	14.197
	29.102	16.945	1735.491	10.108	14.559	119.202	3473.266	8.474	4.714	25.142
L2	28.703	26.435	2372.252	9.461	13.698	173.186	4747.625	13.220	4.196	13.426
	36.880	35.715	5850.235	12.783	18.451	317.076	11708.168	17.861	5.842	18.695
L3	36.254	33.487	4822.177	11.985	17.309	278.588	9650.700	16.747	5.447	17.43
	51.787	50.276	16319.130	17.994	25.908	629.888	32659.734	25.143	8.426	26.963

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 110.000-73.960				1	1	1		
L2 73.960-48.713				1	1	1		
L3 48.713-1.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
1 5/8 (Verizon - Existing)	C	No	Inside Pole	107.000 - 4.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
1 5/8 (Verizon - Proposed)	C	No	Inside Pole	107.000 - 4.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	110.000-73.960	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	0.619
L2	73.960-48.713	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	0.473
L3	48.713-1.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	0.000	0.837

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	110.000-73.960	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	0.619
L2	73.960-48.713	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	0.473
L3	48.713-1.000	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	0.837

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
LPA-80063/6CF (Verizon - Existing)	A	From Face	3.000 -6.000 0.000	0.000	107.000	No Ice 1/2" Ice	10.308 10.868	9.005 9.554	0.027 0.101
BXA-70063/6CF (Verizon - Proposed)	A	From Face	3.000 0.000 0.000	0.000	107.000	No Ice 1/2" Ice	7.731 8.268	4.158 4.595	0.017 0.059
BXA-171063-12BF (Verizon - Proposed)	A	From Face	3.000 4.000 0.000	0.000	107.000	No Ice 1/2" Ice	4.734 5.180	3.572 4.007	0.015 0.042
LPA-80063/6CF (Verizon - Existing)	A	From Face	3.000 6.000 0.000	0.000	107.000	No Ice 1/2" Ice	10.308 10.868	9.005 9.554	0.027 0.101
LPA-80063/6CF (Verizon - Existing)	B	From Face	3.000 -6.000 0.000	0.000	107.000	No Ice 1/2" Ice	10.308 10.868	9.005 9.554	0.027 0.101
BXA-70063/6CF (Verizon - Proposed)	B	From Face	3.000 0.000 0.000	0.000	107.000	No Ice 1/2" Ice	7.731 8.268	4.158 4.595	0.017 0.059
BXA-171063-12BF (Verizon - Proposed)	B	From Face	3.000 4.000 0.000	0.000	107.000	No Ice 1/2" Ice	4.734 5.180	3.572 4.007	0.015 0.042
LPA-80063/6CF (Verizon - Existing)	B	From Face	3.000 6.000 0.000	0.000	107.000	No Ice 1/2" Ice	10.308 10.868	9.005 9.554	0.027 0.101
LPA-80063/6CF (Verizon - Existing)	C	From Face	3.000 -6.000 0.000	0.000	107.000	No Ice 1/2" Ice	10.308 10.868	9.005 9.554	0.027 0.101
BXA-70063/6CF	C	From Face	3.000	0.000	107.000	No Ice	7.731	4.158	0.017

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
(Verizon - Proposed)			0.000 0.000			1/2" Ice	8.268	4.595	0.059
BXA-171063-12BF	C	From Face	3.000	0.000	107.000	No Ice	4.734	3.572	0.015
(Verizon - Proposed)			4.000 0.000			1/2" Ice	5.180	4.007	0.042
LPA-80063/6CF	C	From Face	3.000	0.000	107.000	No Ice	10.308	9.005	0.027
(Verizon - Existing)			6.000 0.000			1/2" Ice	10.868	9.554	0.101
Valmont T-Arm (3)	C	None		0.000	107.000	No Ice	21.000	21.000	1.008
(Verizon)						1/2" Ice	29.000	29.000	1.236

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	90.694	1.335	0.022	68.566	A	0.000	68.566	68.566	100.00	0.000	0.000
110.000-73.960					B	0.000	68.566		100.00	0.000	0.000
					C	0.000	68.566		100.00	0.000	0.000
L2	60.812	1.191	0.020	67.942	A	0.000	67.942	67.942	100.00	0.000	0.000
73.960-48.713					B	0.000	67.942		100.00	0.000	0.000
					C	0.000	67.942		100.00	0.000	0.000
L3	23.619	1	0.017	172.370	A	0.000	172.370	172.370	100.00	0.000	0.000
48.713-1.000					B	0.000	172.370		100.00	0.000	0.000
					C	0.000	172.370		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	90.694	1.335	0.016	0.500	71.569	A	0.000	71.569	71.569	100.00	0.000	0.000
110.000-73.960						B	0.000	71.569		100.00	0.000	0.000
						C	0.000	71.569		100.00	0.000	0.000
L2	60.812	1.191	0.015	0.500	70.046	A	0.000	70.046	70.046	100.00	0.000	0.000
73.960-48.713						B	0.000	70.046		100.00	0.000	0.000
						C	0.000	70.046		100.00	0.000	0.000
L3 48.713-1.000	23.619	1	0.012	0.500	176.346	A	0.000	176.346	176.346	100.00	0.000	0.000
						B	0.000	176.346		100.00	0.000	0.000
						C	0.000	176.346		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 老□ŷ	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	90.694	1.335	0.012	68.566	A	0.000	68.566	68.566	100.00	0.000	0.000
110.000-73.96					B	0.000	68.566		100.00	0.000	0.000
0					C	0.000	68.566		100.00	0.000	0.000
L2	60.812	1.191	0.011	67.942	A	0.000	67.942	67.942	100.00	0.000	0.000
73.960-48.713					B	0.000	67.942		100.00	0.000	0.000
					C	0.000	67.942		100.00	0.000	0.000
L3	23.619	1	0.009	172.370	A	0.000	172.370	172.370	100.00	0.000	0.000
48.713-1.000					B	0.000	172.370		100.00	0.000	0.000
					C	0.000	172.370		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	0.619	1.653	A	1	0.65	1	1	1	68.566	1.644	0.046	C
110.000-73.96			B	1	0.65	1	1	1	68.566			
0			C	1	0.65	1	1	1	68.566			
L2	0.473	3.101	A	1	0.65	1	1	1	67.942	1.456	0.058	C
73.960-48.713			B	1	0.65	1	1	1	67.942			
			C	1	0.65	1	1	1	67.942			
L3	0.837	7.524	A	1	0.65	1	1	1	172.370	3.142	0.066	C
48.713-1.000			B	1	0.65	1	1	1	172.370			
			C	1	0.65	1	1	1	172.370			
Sum Weight:	1.928	12.278						OTM	305.670 kip-ft	6.243		

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	0.619	1.653	A	1	0.65	1	1	1	68.566	1.644	0.046	C
110.000-73.96			B	1	0.65	1	1	1	68.566			
0			C	1	0.65	1	1	1	68.566			
L2	0.473	3.101	A	1	0.65	1	1	1	67.942	1.456	0.058	C
73.960-48.713			B	1	0.65	1	1	1	67.942			
			C	1	0.65	1	1	1	67.942			
L3	0.837	7.524	A	1	0.65	1	1	1	172.370	3.142	0.066	C
48.713-1.000			B	1	0.65	1	1	1	172.370			
			C	1	0.65	1	1	1	172.370			
Sum Weight:	1.928	12.278						OTM	305.670 kip-ft	6.243		

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	0.619	1.653	A	1	0.65	1	1	1	68.566	1.644	0.046	C
110.000-73.96			B	1	0.65	1	1	1	68.566			
0			C	1	0.65	1	1	1	68.566			
L2	0.473	3.101	A	1	0.65	1	1	1	67.942	1.456	0.058	C
73.960-48.713			B	1	0.65	1	1	1	67.942			
			C	1	0.65	1	1	1	67.942			
L3	0.837	7.524	A	1	0.65	1	1	1	172.370	3.142	0.066	C
48.713-1.000			B	1	0.65	1	1	1	172.370			
			C	1	0.65	1	1	1	172.370			
Sum Weight:	1.928	12.278						OTM	305.670 kip-ft	6.243		

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	0.619	1.653	A	1	0.65	1	1	1	68.566	1.644	0.046	C
110.000-73.96			B	1	0.65	1	1	1	68.566			
0			C	1	0.65	1	1	1	68.566			
L2	0.473	3.101	A	1	0.65	1	1	1	67.942	1.456	0.058	C
73.960-48.713			B	1	0.65	1	1	1	67.942			
			C	1	0.65	1	1	1	67.942			
L3	0.837	7.524	A	1	0.65	1	1	1	172.370	3.142	0.066	C
48.713-1.000			B	1	0.65	1	1	1	172.370			
			C	1	0.65	1	1	1	172.370			
Sum Weight:	1.928	12.278						OTM	305.670 kip-ft	6.243		

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	0.619	2.171	A	1	0.65	1	1	1	71.569	1.287	0.036	C
110.000-73.96			B	1	0.65	1	1	1	71.569			
0			C	1	0.65	1	1	1	71.569			
L2	0.473	3.612	A	1	0.65	1	1	1	70.046	1.126	0.045	C
73.960-48.713			B	1	0.65	1	1	1	70.046			
			C	1	0.65	1	1	1	70.046			
L3	0.837	8.815	A	1	0.65	1	1	1	176.346	2.411	0.051	C
48.713-1.000			B	1	0.65	1	1	1	176.346			
			C	1	0.65	1	1	1	176.346			

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
Sum Weight:	1.928	14.599						OTM	237.350 kip-ft	4.824		

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	0.619	2.171	A	1	0.65	1	1	1	71.569	1.287	0.036	C
110.000-73.96			B	1	0.65	1	1	1	71.569			
0			C	1	0.65	1	1	1	71.569			
L2	0.473	3.612	A	1	0.65	1	1	1	70.046	1.126	0.045	C
73.960-48.713			B	1	0.65	1	1	1	70.046			
			C	1	0.65	1	1	1	70.046			
L3	0.837	8.815	A	1	0.65	1	1	1	176.346	2.411	0.051	C
48.713-1.000			B	1	0.65	1	1	1	176.346			
			C	1	0.65	1	1	1	176.346			
Sum Weight:	1.928	14.599						OTM	237.350 kip-ft	4.824		

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	0.619	2.171	A	1	0.65	1	1	1	71.569	1.287	0.036	C
110.000-73.96			B	1	0.65	1	1	1	71.569			
0			C	1	0.65	1	1	1	71.569			
L2	0.473	3.612	A	1	0.65	1	1	1	70.046	1.126	0.045	C
73.960-48.713			B	1	0.65	1	1	1	70.046			
			C	1	0.65	1	1	1	70.046			
L3	0.837	8.815	A	1	0.65	1	1	1	176.346	2.411	0.051	C
48.713-1.000			B	1	0.65	1	1	1	176.346			
			C	1	0.65	1	1	1	176.346			
Sum Weight:	1.928	14.599						OTM	237.350 kip-ft	4.824		

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	0.619	2.171	A	1	0.65	1	1	1	71.569	1.287	0.036	C
110.000-73.96			B	1	0.65	1	1	1	71.569			

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
0			C	1	0.65	1	1	1	71.569			
L2	0.473	3.612	A	1	0.65	1	1	1	70.046	1.126	0.045	C
73.960-48.713			B	1	0.65	1	1	1	70.046			
			C	1	0.65	1	1	1	70.046			
L3	0.837	8.815	A	1	0.65	1	1	1	176.346	2.411	0.051	C
48.713-1.000			B	1	0.65	1	1	1	176.346			
			C	1	0.65	1	1	1	176.346			
Sum Weight:	1.928	14.599						OTM	237.350 kip-ft	4.824		

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	0.619	1.653	A	1	0.65	1	1	1	68.566	0.925	0.026	C
110.000-73.96			B	1	0.65	1	1	1	68.566			
0			C	1	0.65	1	1	1	68.566			
L2	0.473	3.101	A	1	0.65	1	1	1	67.942	0.819	0.032	C
73.960-48.713			B	1	0.65	1	1	1	67.942			
			C	1	0.65	1	1	1	67.942			
L3	0.837	7.524	A	1	0.65	1	1	1	172.370	1.768	0.037	C
48.713-1.000			B	1	0.65	1	1	1	172.370			
			C	1	0.65	1	1	1	172.370			
Sum Weight:	1.928	12.278						OTM	171.940 kip-ft	3.512		

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	0.619	1.653	A	1	0.65	1	1	1	68.566	0.925	0.026	C
110.000-73.96			B	1	0.65	1	1	1	68.566			
0			C	1	0.65	1	1	1	68.566			
L2	0.473	3.101	A	1	0.65	1	1	1	67.942	0.819	0.032	C
73.960-48.713			B	1	0.65	1	1	1	67.942			
			C	1	0.65	1	1	1	67.942			
L3	0.837	7.524	A	1	0.65	1	1	1	172.370	1.768	0.037	C
48.713-1.000			B	1	0.65	1	1	1	172.370			
			C	1	0.65	1	1	1	172.370			
Sum Weight:	1.928	12.278						OTM	171.940 kip-ft	3.512		

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	0.619	1.653	A	1	0.65	1	1	1	68.566	0.925	0.026	C
110.000-73.96			B	1	0.65	1	1	1	68.566			
0			C	1	0.65	1	1	1	68.566			
L2	0.473	3.101	A	1	0.65	1	1	1	67.942	0.819	0.032	C
73.960-48.713			B	1	0.65	1	1	1	67.942			
			C	1	0.65	1	1	1	67.942			
L3	0.837	7.524	A	1	0.65	1	1	1	172.370	1.768	0.037	C
48.713-1.000			B	1	0.65	1	1	1	172.370			
			C	1	0.65	1	1	1	172.370			
Sum Weight:	1.928	12.278						OTM	171.940 kip-ft	3.512		

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 ft²	F K	w klf	Ctrl. Face
L1	0.619	1.653	A	1	0.65	1	1	1	68.566	0.925	0.026	C
110.000-73.96			B	1	0.65	1	1	1	68.566			
0			C	1	0.65	1	1	1	68.566			
L2	0.473	3.101	A	1	0.65	1	1	1	67.942	0.819	0.032	C
73.960-48.713			B	1	0.65	1	1	1	67.942			
			C	1	0.65	1	1	1	67.942			
L3	0.837	7.524	A	1	0.65	1	1	1	172.370	1.768	0.037	C
48.713-1.000			B	1	0.65	1	1	1	172.370			
			C	1	0.65	1	1	1	172.370			
Sum Weight:	1.928	12.278						OTM	171.940 kip-ft	3.512		

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	12.278					
Bracing Weight	0.000					
Total Member Self-Weight	12.278			0.000	0.000	
Total Weight	15.472			0.000	0.000	
Wind 0 deg - No Ice		0.000	-10.476	-754.334	0.000	0.000
Wind 30 deg - No Ice		5.238	-9.072	-653.272	-377.167	0.000
Wind 45 deg - No Ice		7.407	-7.407	-533.395	-533.395	0.000
Wind 60 deg - No Ice		9.072	-5.238	-377.167	-653.272	0.000
Wind 90 deg - No Ice		10.476	0.000	0.000	-754.334	0.000
Wind 120 deg - No Ice		9.072	5.238	377.167	-653.272	0.000
Wind 135 deg - No Ice		7.407	7.407	533.395	-533.395	0.000
Wind 150 deg - No Ice		5.238	9.072	653.272	-377.167	0.000
Wind 180 deg - No Ice		0.000	10.476	754.334	0.000	0.000
Wind 210 deg - No Ice		-5.238	9.072	653.272	377.167	0.000
Wind 225 deg - No Ice		-7.407	7.407	533.395	533.395	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 240 deg - No Ice		-9.072	5.238	377.167	653.272	0.000
Wind 270 deg - No Ice		-10.476	0.000	0.000	754.334	0.000
Wind 300 deg - No Ice		-9.072	-5.238	-377.167	653.272	0.000
Wind 315 deg - No Ice		-7.407	-7.407	-533.395	533.395	0.000
Wind 330 deg - No Ice		-5.238	-9.072	-653.272	377.167	0.000
Member Ice	2.321					
Total Weight Ice	18.674			0.000	0.000	
Wind 0 deg - Ice		0.000	-8.409	-617.316	0.000	0.000
Wind 30 deg - Ice		4.205	-7.282	-534.612	-308.658	0.000
Wind 45 deg - Ice		5.946	-5.946	-436.509	-436.509	0.000
Wind 60 deg - Ice		7.282	-4.205	-308.658	-534.612	0.000
Wind 90 deg - Ice		8.409	0.000	0.000	-617.316	0.000
Wind 120 deg - Ice		7.282	4.205	308.658	-534.612	0.000
Wind 135 deg - Ice		5.946	5.946	436.509	-436.509	0.000
Wind 150 deg - Ice		4.205	7.282	534.612	-308.658	0.000
Wind 180 deg - Ice		0.000	8.409	617.316	0.000	0.000
Wind 210 deg - Ice		-4.205	7.282	534.612	308.658	0.000
Wind 225 deg - Ice		-5.946	5.946	436.509	436.509	0.000
Wind 240 deg - Ice		-7.282	4.205	308.658	534.612	0.000
Wind 270 deg - Ice		-8.409	0.000	0.000	617.316	0.000
Wind 300 deg - Ice		-7.282	-4.205	-308.658	534.612	0.000
Wind 315 deg - Ice		-5.946	-5.946	-436.509	436.509	0.000
Wind 330 deg - Ice		-4.205	-7.282	-534.612	308.658	0.000
Total Weight	15.472			0.000	0.000	
Wind 0 deg - Service		0.000	-5.893	-424.313	0.000	0.000
Wind 30 deg - Service		2.946	-5.103	-367.466	-212.156	0.000
Wind 45 deg - Service		4.167	-4.167	-300.034	-300.034	0.000
Wind 60 deg - Service		5.103	-2.946	-212.156	-367.466	0.000
Wind 90 deg - Service		5.893	0.000	0.000	-424.313	0.000
Wind 120 deg - Service		5.103	2.946	212.156	-367.466	0.000
Wind 135 deg - Service		4.167	4.167	300.034	-300.034	0.000
Wind 150 deg - Service		2.946	5.103	367.466	-212.156	0.000
Wind 180 deg - Service		0.000	5.893	424.313	0.000	0.000
Wind 210 deg - Service		-2.946	5.103	367.466	212.156	0.000
Wind 225 deg - Service		-4.167	4.167	300.034	300.034	0.000
Wind 240 deg - Service		-5.103	2.946	212.156	367.466	0.000
Wind 270 deg - Service		-5.893	0.000	0.000	424.313	0.000
Wind 300 deg - Service		-5.103	-2.946	-212.156	367.466	0.000
Wind 315 deg - Service		-4.167	-4.167	-300.034	300.034	0.000
Wind 330 deg - Service		-2.946	-5.103	-367.466	212.156	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

Comb. No.	Description
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
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	110 - 73.96	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	18	-4.565	0.000	0.000
			Max. Mx	6	-3.119	-145.476	0.000
			Max. My	10	-3.119	0.000	-145.476
			Max. Vy	6	5.721	-145.476	0.000
			Max. Vx	10	5.721	0.000	-145.476
			Max. Torque	15			-0.000
L2	73.96 - 48.713	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	18	-8.210	0.000	0.000
			Max. Mx	6	-6.316	-300.503	0.000
			Max. My	10	-6.316	0.000	-300.503
			Max. Vy	6	7.097	-300.503	0.000
			Max. Vx	10	7.097	0.000	-300.503
			Max. Torque	13			0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L3	48.713 - 1	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	18	-18.674	0.000	0.000
			Max. Mx	6	-15.469	-761.271	0.000
			Max. My	2	-15.469	0.000	761.271
			Max. Vy	6	10.480	-761.271	0.000
			Max. Vx	10	10.480	0.000	-761.271
			Max. Torque	13			0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	19	18.674	0.000	8.409
	Max. H_x	14	15.472	10.476	0.000
	Max. H_z	2	15.472	0.000	10.476
	Max. M_x	2	761.271	0.000	10.476
	Max. M_z	6	761.271	-10.476	0.000
	Max. Torsion	13	0.000	9.072	-5.238
	Min. Vert	1	15.472	0.000	0.000
	Min. H_x	6	15.472	-10.476	0.000
	Min. H_z	10	15.472	0.000	-10.476
	Min. M_x	10	-761.271	0.000	-10.476
	Min. M_z	14	-761.271	10.476	0.000
	Min. Torsion	15	-0.000	9.072	5.238

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	15.472	0.000	0.000	0.000	0.000	0.000
Dead+Wind 0 deg - No Ice	15.472	0.000	-10.476	-761.271	0.000	0.000
Dead+Wind 30 deg - No Ice	15.472	5.238	-9.072	-659.280	-380.636	0.000
Dead+Wind 45 deg - No Ice	15.472	7.407	-7.407	-538.300	-538.300	0.000
Dead+Wind 60 deg - No Ice	15.472	9.072	-5.238	-380.636	-659.280	-0.000
Dead+Wind 90 deg - No Ice	15.472	10.476	0.000	0.000	-761.271	0.000
Dead+Wind 120 deg - No Ice	15.472	9.072	5.238	380.636	-659.280	0.000
Dead+Wind 135 deg - No Ice	15.472	7.407	7.407	538.300	-538.300	0.000
Dead+Wind 150 deg - No Ice	15.472	5.238	9.072	659.280	-380.636	-0.000
Dead+Wind 180 deg - No Ice	15.472	0.000	10.476	761.271	0.000	0.000
Dead+Wind 210 deg - No Ice	15.472	-5.238	9.072	659.280	380.636	0.000
Dead+Wind 225 deg - No Ice	15.472	-7.407	7.407	538.300	538.300	0.000
Dead+Wind 240 deg - No Ice	15.472	-9.072	5.238	380.636	659.280	-0.000
Dead+Wind 270 deg - No Ice	15.472	-10.476	0.000	0.000	761.271	0.000
Dead+Wind 300 deg - No Ice	15.472	-9.072	-5.238	-380.636	659.280	0.000
Dead+Wind 315 deg - No Ice	15.472	-7.407	-7.407	-538.300	538.300	0.000
Dead+Wind 330 deg - No Ice	15.472	-5.238	-9.072	-659.280	380.636	-0.000
Dead+Ice+Temp	18.674	0.000	0.000	0.000	0.000	0.000
Dead+Wind 0 deg+Ice+Temp	18.674	0.000	-8.409	-624.956	0.000	0.000
Dead+Wind 30 deg+Ice+Temp	18.674	4.205	-7.282	-541.228	-312.478	0.000
Dead+Wind 45 deg+Ice+Temp	18.674	5.946	-5.946	-441.911	-441.911	0.000
Dead+Wind 60 deg+Ice+Temp	18.674	7.282	-4.205	-312.478	-541.228	-0.000

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 90 deg+Ice+Temp	18.674	8.409	0.000	0.000	-624.956	0.000
Dead+Wind 120 deg+Ice+Temp	18.674	7.282	4.205	312.478	-541.228	0.000
Dead+Wind 135 deg+Ice+Temp	18.674	5.946	5.946	441.911	-441.911	0.000
Dead+Wind 150 deg+Ice+Temp	18.674	4.205	7.282	541.228	-312.478	-0.000
Dead+Wind 180 deg+Ice+Temp	18.674	0.000	8.409	624.956	0.000	0.000
Dead+Wind 210 deg+Ice+Temp	18.674	-4.205	7.282	541.228	312.478	0.000
Dead+Wind 225 deg+Ice+Temp	18.674	-5.946	5.946	441.911	441.911	0.000
Dead+Wind 240 deg+Ice+Temp	18.674	-7.282	4.205	312.478	541.228	-0.000
Dead+Wind 270 deg+Ice+Temp	18.674	-8.409	0.000	0.000	624.956	0.000
Dead+Wind 300 deg+Ice+Temp	18.674	-7.282	-4.205	-312.478	541.228	0.000
Dead+Wind 315 deg+Ice+Temp	18.674	-5.946	-5.946	-441.911	441.911	0.000
Dead+Wind 330 deg+Ice+Temp	18.674	-4.205	-7.282	-541.228	312.478	-0.000
Dead+Wind 0 deg - Service	15.472	0.000	-5.893	-428.248	0.000	0.000
Dead+Wind 30 deg - Service	15.472	2.946	-5.103	-370.874	-214.124	0.000
Dead+Wind 45 deg - Service	15.472	4.167	-4.167	-302.817	-302.817	0.000
Dead+Wind 60 deg - Service	15.472	5.103	-2.946	-214.124	-370.874	-0.000
Dead+Wind 90 deg - Service	15.472	5.893	0.000	0.000	-428.248	0.000
Dead+Wind 120 deg - Service	15.472	5.103	2.946	214.124	-370.874	0.000
Dead+Wind 135 deg - Service	15.472	4.167	4.167	302.817	-302.817	0.000
Dead+Wind 150 deg - Service	15.472	2.946	5.103	370.874	-214.124	-0.000
Dead+Wind 180 deg - Service	15.472	0.000	5.893	428.248	0.000	0.000
Dead+Wind 210 deg - Service	15.472	-2.946	5.103	370.874	214.124	0.000
Dead+Wind 225 deg - Service	15.472	-4.167	4.167	302.817	302.817	0.000
Dead+Wind 240 deg - Service	15.472	-5.103	2.946	214.124	370.874	-0.000
Dead+Wind 270 deg - Service	15.472	-5.893	0.000	0.000	428.248	0.000
Dead+Wind 300 deg - Service	15.472	-5.103	-2.946	-214.124	370.874	0.000
Dead+Wind 315 deg - Service	15.472	-4.167	-4.167	-302.817	302.817	0.000
Dead+Wind 330 deg - Service	15.472	-2.946	-5.103	-370.874	214.124	-0.000

Solution Summary

Load Comb.	Sum of Applied Forces PX	PY	PZ	Sum of Reactions PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-15.472	0.000	0.000	15.472	0.000	0.000%
2	0.000	-15.472	-10.476	0.000	15.472	10.476	0.000%
3	5.238	-15.472	-9.072	-5.238	15.472	9.072	0.000%
4	7.407	-15.472	-7.407	-7.407	15.472	7.407	0.000%
5	9.072	-15.472	-5.238	-9.072	15.472	5.238	0.000%
6	10.476	-15.472	0.000	-10.476	15.472	0.000	0.000%
7	9.072	-15.472	5.238	-9.072	15.472	-5.238	0.000%
8	7.407	-15.472	7.407	-7.407	15.472	-7.407	0.000%
9	5.238	-15.472	9.072	-5.238	15.472	-9.072	0.000%
10	0.000	-15.472	10.476	0.000	15.472	-10.476	0.000%
11	-5.238	-15.472	9.072	5.238	15.472	-9.072	0.000%
12	-7.407	-15.472	7.407	7.407	15.472	-7.407	0.000%
13	-9.072	-15.472	5.238	9.072	15.472	-5.238	0.000%
14	-10.476	-15.472	0.000	10.476	15.472	0.000	0.000%
15	-9.072	-15.472	-5.238	9.072	15.472	5.238	0.000%
16	-7.407	-15.472	-7.407	7.407	15.472	7.407	0.000%
17	-5.238	-15.472	-9.072	5.238	15.472	9.072	0.000%
18	0.000	-18.674	0.000	0.000	18.674	0.000	0.000%
19	0.000	-18.674	-8.409	0.000	18.674	8.409	0.000%
20	4.205	-18.674	-7.282	-4.205	18.674	7.282	0.000%
21	5.946	-18.674	-5.946	-5.946	18.674	5.946	0.000%
22	7.282	-18.674	-4.205	-7.282	18.674	4.205	0.000%
23	8.409	-18.674	0.000	-8.409	18.674	0.000	0.000%
24	7.282	-18.674	4.205	-7.282	18.674	-4.205	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
25	5.946	-18.674	5.946	-5.946	18.674	-5.946	0.000%
26	4.205	-18.674	7.282	-4.205	18.674	-7.282	0.000%
27	0.000	-18.674	8.409	0.000	18.674	-8.409	0.000%
28	-4.205	-18.674	7.282	4.205	18.674	-7.282	0.000%
29	-5.946	-18.674	5.946	5.946	18.674	-5.946	0.000%
30	-7.282	-18.674	4.205	7.282	18.674	-4.205	0.000%
31	-8.409	-18.674	0.000	8.409	18.674	0.000	0.000%
32	-7.282	-18.674	-4.205	7.282	18.674	4.205	0.000%
33	-5.946	-18.674	-5.946	5.946	18.674	5.946	0.000%
34	-4.205	-18.674	-7.282	4.205	18.674	7.282	0.000%
35	0.000	-15.472	-5.893	0.000	15.472	5.893	0.000%
36	2.946	-15.472	-5.103	-2.946	15.472	5.103	0.000%
37	4.167	-15.472	-4.167	-4.167	15.472	4.167	0.000%
38	5.103	-15.472	-2.946	-5.103	15.472	2.946	0.000%
39	5.893	-15.472	0.000	-5.893	15.472	0.000	0.000%
40	5.103	-15.472	2.946	-5.103	15.472	-2.946	0.000%
41	4.167	-15.472	4.167	-4.167	15.472	-4.167	0.000%
42	2.946	-15.472	5.103	-2.946	15.472	-5.103	0.000%
43	0.000	-15.472	5.893	0.000	15.472	-5.893	0.000%
44	-2.946	-15.472	5.103	2.946	15.472	-5.103	0.000%
45	-4.167	-15.472	4.167	4.167	15.472	-4.167	0.000%
46	-5.103	-15.472	2.946	5.103	15.472	-2.946	0.000%
47	-5.893	-15.472	0.000	5.893	15.472	0.000	0.000%
48	-5.103	-15.472	-2.946	5.103	15.472	2.946	0.000%
49	-4.167	-15.472	-4.167	4.167	15.472	4.167	0.000%
50	-2.946	-15.472	-5.103	2.946	15.472	5.103	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	0.00010512
4	Yes	4	0.00000001	0.00012076
5	Yes	4	0.00000001	0.00010512
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00010512
8	Yes	4	0.00000001	0.00012076
9	Yes	4	0.00000001	0.00010512
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00010512
12	Yes	4	0.00000001	0.00012076
13	Yes	4	0.00000001	0.00010512
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00010512
16	Yes	4	0.00000001	0.00012076
17	Yes	4	0.00000001	0.00010512
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00039373
20	Yes	4	0.00000001	0.00047710
21	Yes	4	0.00000001	0.00050175
22	Yes	4	0.00000001	0.00047710
23	Yes	4	0.00000001	0.00039373
24	Yes	4	0.00000001	0.00047710
25	Yes	4	0.00000001	0.00050175

26	Yes	4	0.00000001	0.00047710
27	Yes	4	0.00000001	0.00039373
28	Yes	4	0.00000001	0.00047710
29	Yes	4	0.00000001	0.00050175
30	Yes	4	0.00000001	0.00047710
31	Yes	4	0.00000001	0.00039373
32	Yes	4	0.00000001	0.00047710
33	Yes	4	0.00000001	0.00050175
34	Yes	4	0.00000001	0.00047710
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00002513
37	Yes	4	0.00000001	0.00002893
38	Yes	4	0.00000001	0.00002513
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00002513
41	Yes	4	0.00000001	0.00002893
42	Yes	4	0.00000001	0.00002513
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00002513
45	Yes	4	0.00000001	0.00002893
46	Yes	4	0.00000001	0.00002513
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00002513
49	Yes	4	0.00000001	0.00002893
50	Yes	4	0.00000001	0.00002513

Maximum Tower Deflections - Service Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	110 - 73.96	10.933	39	0.977	0.000
L2	78.043 - 48.713	5.176	39	0.653	0.000
L3	53.796 - 1	2.393	39	0.432	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
107.000	LPA-80063/6CF	39	10.345	0.946	0.000	25500

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	110 - 73.96	19.432	2	1.737	0.000
L2	78.043 - 48.713	9.200	2	1.161	0.000
L3	53.796 - 1	4.253	2	0.767	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
107.000	LPA-80063/6CF	2	18.387	1.682	0.000	14363

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	110 - 73.96 (1)	TP28.66x17x0.188	36.040	0.000	0.0	39.000	16.159	-3.119	630.184	0.005
L2	73.96 - 48.713 (2)	TP36.32x26.964x0.313	29.330	0.000	0.0	39.000	34.107	-6.316	1330.160	0.005
L3	48.713 - 1 (3)	TP51x34.074x0.313	52.796	0.000	0.0	37.642	50.276	-15.469	1892.490	0.008

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	110 - 73.96 (1)	TP28.66x17x0.188	145.476	16.110	39.000	0.413	0.000	0.000	39.000	0.000
L2	73.96 - 48.713 (2)	TP36.32x26.964x0.313	300.503	12.476	39.000	0.320	0.000	0.000	39.000	0.000
L3	48.713 - 1 (3)	TP51x34.074x0.313	761.272	14.503	37.642	0.385	0.000	0.000	37.642	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	110 - 73.96 (1)	TP28.66x17x0.188	5.721	0.354	26.000	0.027	0.000	0.000	26.000	0.000
L2	73.96 - 48.713 (2)	TP36.32x26.964x0.313	7.097	0.208	26.000	0.016	0.000	0.000	26.000	0.000
L3	48.713 - 1 (3)	TP51x34.074x0.313	10.480	0.208	26.000	0.016	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	110 - 73.96 (1)	0.005	0.413	0.000	0.027	0.000	0.418 ✓	1.333	H1-3+VT ✓
L2	73.96 - 48.713 (2)	0.005	0.320	0.000	0.016	0.000	0.325 ✓	1.333	H1-3+VT ✓
L3	48.713 - 1 (3)	0.008	0.385	0.000	0.016	0.000	0.394 ✓	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	110 - 73.96	Pole	TP28.66x17x0.188	1	-3.119	840.035	31.4	Pass
L2	73.96 - 48.713	Pole	TP36.32x26.964x0.313	2	-6.316	1773.103	24.4	Pass
L3	48.713 - 1	Pole	TP51x34.074x0.313	3	-15.469	2522.689	29.5	Pass
						Summary		
						Pole (L1)	31.4	Pass
						RATING =	**31.4**	**Pass**

CENTEK engineering
Centered on Solutions
63-2 North Branford Road
Branford, CT 06405
www.centekeng.com
P: (203) 488-0580
F: (203) 488-8587

Subject:	Anchor Bolt and Baseplate Analysis	
Location:	110-ft EEI Monopole Bloomfield, CT	
Rev. 0: 5/15/12	Prepared by: T.J.L. Checked by: C.F.C. Job No. 12001.CO49	

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 761·ft·kips	(Input From RisaTower)
Shear Force =	Shear := 10·kips	(Input From RisaTower)
Axial Force =	Axial := 15·kips	(Input From RisaTower)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts =	N := 16	(User Input)
Diameter of Bolt Circle =	D_{bc} := 59.00·in	(User Input)
Bolt "Column" Distance =	l := 3.0·in	(User Input)
Bolt Ultimate Strength =	F_u := 100·ksi	(User Input)
Bolt Yield Strength =	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 50

Plate Yield Strength =	Fy_{bp} := 50·ksi	(User Input)
Base Plate Thickness =	t_{bp} := 2.5·in	(User Input)
Base Plate Diameter =	D_{bp} := 65.00·in	(User Input)
Outer Pole Diameter =	D_{pole} := 51.00·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =:

$$R_{bc} := \frac{D_{bc}}{2} = 29.5 \cdot in$$

Distance to Bolts =

$i := 1 .. N$

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

$d_1 = 11.29 \cdot in$ $d_7 = 11.29 \cdot in$

$d_2 = 20.86 \cdot in$ $d_8 = 0.00 \cdot in$

$d_3 = 27.25 \cdot in$ $d_9 = -11.29 \cdot in$

$d_4 = 29.50 \cdot in$ $d_{10} = -20.86 \cdot in$

$d_5 = 27.25 \cdot in$ $d_{11} = -27.25 \cdot in$

$d_6 = 20.86 \cdot in$ etc.

Critical Distances For Bending in Plate:

Outer Pole Radius =

$$R_{pole} := \frac{D_{pole}}{2} = 25.5 \cdot in$$

Moment Arms of Bolts about Neutral Axis =

$$MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$$

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_3 = 1.75 \cdot in$ $MA_9 = 0.00 \cdot in$

$MA_4 = 4.00 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 1.75 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 0.00 \cdot in$ etc

Effective Width of Baseplate for Bending =

$$B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 32.2 \cdot in$$

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 6.962 \times 10^3 \cdot in^2$

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 = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 37.8 \cdot kips$

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 = $\frac{T_{Max}}{T_{ALL.Net}} \cdot 100 = 19$ 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 = $M_x := \left(\frac{Shear}{N}\right) \cdot l = 0.156 \cdot ft \cdot kips$

Maximum Bending Stress = $f_{bx} := \frac{M_x}{S_x} = 2.3 \cdot ksi$

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.

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

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

Check Anchor Bolt Compression/Combined Stress:

Maximum Compressive Force =

$$C_{Max} := OM \cdot \frac{R_{bc}}{I_p} + \frac{Axial}{N} = 39.6 \cdot kips$$

Maximum Compressive Stress =

$$f_a := \frac{C_{Max}}{A_n} = 12.2 \cdot ksi$$

$$K := 0.65$$

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

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

Allowable Compressive Stress =

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

(1.333 increase allowed per TIA/EIA)

Combined Stress % of Capacity =

$$\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}}\right) \cdot 100 = 20.3$$

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

$C_1 = 15.7 \cdot kips$ $C_7 = 15.7 \cdot kips$

$C_2 = 28.3 \cdot kips$ $C_8 = 0.9 \cdot kips$

$C_3 = 36.7 \cdot kips$ $C_9 = -13.9 \cdot kips$

$C_4 = 39.6 \cdot kips$ $C_{10} = -26.4 \cdot kips$

$C_5 = 36.7 \cdot kips$ $C_{11} = -34.8 \cdot kips$

$C_6 = 28.3 \cdot kips$ etc.

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 8.6 \cdot ksi$

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

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} \cdot 100 = 17.2$

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

Condition3 = "Ok"

CENTEK engineering
Centered on Solutions
63-2 North Branford Road
Branford, CT 06405
www.centekeng.com
P: (203) 488-0580
F: (203) 488-8587

Subject:	CAISSON FOUNDATION
Location:	110-ft EEI Monopole Bloomfield, CT
Rev. 0: 5/15/12	Prepared by: TJL Checked by: C.F.C. Job No. 12001.CO49

Caisson Foundation:

Input Data:

Shear Force =	$S := 10k$	*USER INPUT-FROM RISATower*
Overturning Moment =	$M := 761ft \cdot k$	*USER INPUT-FROM RISATower*
Applied Axial Load =	$A1 := 15k$	*USER INPUT-FROM RISATower*
Bending Moment =	$Mu := 838ft \cdot k$	*USER INPUT–FROM LPILE*
Moment Capacity =	$Mn := 5318ft \cdot k$	*USER INPUT–FROM LPILE*
Foundation Diameter =	$d := 7.0ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 27.0ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 1.0ft$	*USER INPUT*
Number of Rebar =	$n := 36$	*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 =

$$LD := L_c - L_{pag} = 26ft$$ (TIA/EIA-222-F 7.2.5)

Depth Required =

$$LD1 := 2.0ft + \left(\frac{S \cdot ft^2}{3k \cdot d}\right) + 2ft \cdot .5\left(\frac{M \cdot ft}{3 \cdot k \cdot d} + \frac{S \cdot ft}{2k} + \frac{S^2 ft^3}{18k^2 d^2}\right)^{.5} = 15.34ft$$

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

DepthCheck = "OK"

Check Moment Capacity:

Factor of Safety =

$$FS := \frac{Mn}{Mu} = 6.3$$

Factor of Safety Required =

$$FS_{reqd} := 1.3$$

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

FOSCheck = "OK"

Check Axial Capacity:

Concrete Weight =

$$A2 := .150\frac{k}{ft^3} \cdot LD \cdot \pi \frac{d^2}{4} = 150.1 \cdot kips$$

Total Axial Load =

$$AT := A1 + A2 = 165.1 \cdot kips$$

Area of Concrete =

$$Ag := \pi \cdot \frac{d^2}{4} = 38.48ft^2$$

Axial Capacity =

$$Po := n \cdot Ar \cdot fy + (Ag - n \cdot Ar) \cdot 0.85 \cdot f'c = 20451.7 \cdot kips$$

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

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\1200100.WI\C049 - Bloomfield Blue Hills\Calcs\LPile\
Name of input data file: Bloomfield Blue Hills Caisson Analysis.lpd
Name of output file: Bloomfield Blue Hills Caisson Analysis.lpo
Name of plot output file: Bloomfield Blue Hills Caisson Analysis.lpp
Name of runtime file: Bloomfield Blue Hills Caisson Analysis.lpr

Time and Date of Analysis

Date: May 15, 2012 Time: 18:20:06

Problem Title

12001.C049 - Bloomfield Blue Hills

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:
- User-specified 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 = 324.00 in

Depth of ground surface below top of pile = 12.00 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	84.00000000	2443920.	5541.8000	3000000.
2	324.0000	84.00000000	2443920.	5541.8000	3000000.

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 modelled using user-specified p-y curves
Distance from top of pile to top of layer = 12.000 in
Distance from top of pile to bottom of layer = 60.000 in

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 60.000 in
Distance from top of pile to bottom of layer = 228.000 in
p-y subgrade modulus k for top of soil layer = 35.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 35.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 228.000 in
Distance from top of pile to bottom of layer = 336.000 in
p-y subgrade modulus k for top of soil layer = 100.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 100.000 lbs/in**3

(Depth of lowest layer extends 12.00 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	12.00	.00000
2	60.00	.00000
3	60.00	.07200
4	228.00	.07200
5	228.00	.03800
6	336.00	.03800

**** WARNING - POSSIBLE INPUT DATA ERROR ****

Values entered for effective unit weights of soil were outside the limits of 0.011574 pci (20 pcf) or 0.0810019 pci (140 pcf) This data may be erroneous. Please check your data.

Shear Strength of Soils

Shear strength parameters with depth defined using 4 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	60.000	.00000	32.00	------	------
2	228.000	.00000	32.00	------	------
3	228.000	.00000	32.00	------	------
4	336.000	.00000	32.00	------	------

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.

User-specified p-y Curves

User-specified p-y curves defined using 2 curves.

User-specified curve number 1 at depth = 12.000in

Point No.	y in	p, lbs/in
1	.0000	.000
2	.0000	.000

User-specified curve number 2 at depth = 60.000in

Point No.	y in	p, lbs/in
1	.0000	.000
2	.0000	.000

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 = 10000.000 lbs
Bending moment at pile head = 9132000.000 in-lbs
Axial load at pile head = 15000.000 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 = 84.0000 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 = 36
Area of Single Bar = .79000 in**2
Number of Rows of Reinforcing Bars = 19
Area of Steel = 28.440 in**2
Area of Shaft = 5541.769 in**2
Percentage of Steel Reinforcement = .513 percent
Cover Thickness (edge to bar center) = 4.000 in

Unfactored Axial Squash Load Capacity = 20451.72 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	.790	38.000
2	1.580	37.423
3	1.580	35.708
4	1.580	32.909

5	1.580	29.110
6	1.580	24.426
7	1.580	19.000
8	1.580	12.997
9	1.580	6.599
10	1.580	0.000
11	1.580	-6.599
12	1.580	-12.997
13	1.580	-19.000
14	1.580	-24.426
15	1.580	-29.110
16	1.580	-32.909
17	1.580	-35.708
18	1.580	-37.423
19	.790	-38.000

Axial Thrust Force = 15000.00 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
5914922.	9.463876E+12	6.250000E-07	.00002708	43.32026929	96.18105878	712.67988
11776521.	9.421216E+12	.00000125	.00005342	42.73428458	188.39374	1404.11782
17584962.	9.378646E+12	.00000188	.00007976	42.53880948	279.30030	2095.54777
23340247.	9.336099E+12	.00000250	.00010610	42.44095927	368.90078	2786.96955
29042374.	9.293560E+12	.00000313	.00013244	42.38215703	457.19520	3478.38298
29042374.	7.744633E+12	.00000375	.00006936	18.49685651	238.37029	6688.46685
29042374.	6.638257E+12	.00000438	.00008033	18.36130768	275.18935	7820.40909
29042374.	5.808475E+12	.00000500	.00009131	18.26180023	311.83009	8952.03897
29042374.	5.163089E+12	.00000563	.00010237	18.19999892	348.55694	10081.12518
29042374.	4.646780E+12	.00000625	.00011368	18.18908662	385.88866	11203.22805
29042374.	4.224345E+12	.00000688	.00012470	18.13828272	422.01086	12333.67988
29042374.	3.872317E+12	.00000750	.00013573	18.09756249	457.95631	13463.78016
29042374.	3.574446E+12	.00000813	.00014677	18.06460530	493.72444	14593.52738
29042374.	3.319129E+12	.00000875	.00015783	18.03775889	529.31482	15722.91868
29042374.	3.097853E+12	.00000938	.00016890	18.01580912	564.72694	16851.95190
29042374.	2.904237E+12	.00001000	.00017998	17.99784476	599.96026	17980.62502
29042374.	2.733400E+12	.00001063	.00019107	17.98316735	635.01419	19108.93656
29042374.	2.581544E+12	.00001125	.00020218	17.97124118	669.88838	20236.88257
29042374.	2.445674E+12	.00001188	.00021329	17.96163064	704.58201	21364.46345
29042374.	2.323390E+12	.00001250	.00022443	17.95400280	739.09488	22491.67399
29042374.	2.212752E+12	.00001313	.00023557	17.94807225	773.42609	23618.51500
29042374.	2.112173E+12	.00001375	.00024672	17.94362122	807.57545	24744.98104
29042374.	2.020339E+12	.00001438	.00025789	17.94045693	841.54216	25871.07202
29042374.	1.936158E+12	.00001500	.00026908	17.93842417	875.32567	26996.78549
29042374.	1.858712E+12	.00001563	.00028027	17.93739527	908.92557	28122.11777
29042374.	1.787223E+12	.00001625	.00029148	17.93725759	942.34118	29247.06736
29042374.	1.721030E+12	.00001688	.00030270	17.93791848	975.57200	30371.63114
29042374.	1.659564E+12	.00001750	.00031394	17.93929535	1008.61737	31495.80761
29042374.	1.602338E+12	.00001813	.00032519	17.94132060	1041.47679	32619.59336
29042374.	1.548927E+12	.00001875	.00033645	17.94393414	1074.14968	33742.98581
29042374.	1.498961E+12	.00001938	.00034772	17.94708091	1106.63530	34865.98391
29042374.	1.452119E+12	.00002000	.00035901	17.95071584	1138.93306	35988.58481
29042374.	1.408115E+12	.00002063	.00037032	17.95480388	1171.04268	37110.78293
29042374.	1.366700E+12	.00002125	.00038164	17.95930248	1202.96312	38232.57984
29372020.	1.342721E+12	.00002188	.00039297	17.96418411	1234.69397	39353.97071
30188005.	1.341689E+12	.00002250	.00040431	17.96942121	1266.23465	40474.95266
31003263.	1.340682E+12	.00002313	.00041567	17.97498876	1297.58448	41595.52316
31817791.	1.339696E+12	.00002375	.00042705	17.98086423	1328.74283	42715.67976
32631584.	1.338732E+12	.00002438	.00043843	17.98702759	1359.70902	43835.41988
34256952.	1.336857E+12	.00002563	.00046125	18.00015038	1421.06244	46073.63825
35879339.	1.335045E+12	.00002688	.00048413	18.01423699	1481.63962	48310.15405
37498707.	1.333287E+12	.00002813	.00050707	18.02918476	1541.43499	50544.94618
39115030.	1.331576E+12	.00002938	.00053007	18.04491609	1600.44340	52777.98710
40728265.	1.329903E+12	.00003063	.00055313	18.06135839	1658.65892	55009.25608
42338384.	1.328263E+12	.00003188	.00057625	18.07845908	1716.07617	57238.72438
43945347.	1.326652E+12	.00003313	.00059944	18.09616810	1772.68914	59466.36852
45353515.	1.319375E+12	.00003438	.00062170	18.08577400	1826.05420	60000.00000
46465245.	1.304288E+12	.00003563	.00064250	18.03517789	1874.98019	60000.00000
47436595.	1.286416E+12	.00003688	.00066261	17.96899563	1921.45253	60000.00000
48288446.	1.266582E+12	.00003813	.00068210	17.89118260	1965.76801	60000.00000
49062001.	1.246019E+12	.00003938	.00070118	17.80772442	2008.43968	60000.00000
49729656.	1.224115E+12	.00004063	.00071967	17.71499616	2049.12574	60000.00000
50395979.	1.203486E+12	.00004188	.00073820	17.62854141	2089.27789	60000.00000
50966381.	1.181829E+12	.00004313	.00075613	17.53354758	2127.52449	60000.00000
51473470.	1.159966E+12	.00004438	.00077370	17.43540198	2164.37767	60000.00000
51979469.	1.139276E+12	.00004563	.00079128	17.34321696	2200.74674	60000.00000
52484367.	1.119666E+12	.00004688	.00080890	17.25651938	2236.62947	60000.00000
52899377.	1.099208E+12	.00004813	.00082589	17.16134530	2270.65831	60000.00000
53272554.	1.078938E+12	.00004938	.00084260	17.06539267	2303.61140	60000.00000
53644817.	1.059651E+12	.00005063	.00085934	16.97463709	2336.12380	60000.00000
54016152.	1.041275E+12	.00005188	.00087610	16.88870305	2368.19340	60000.00000
54386583.	1.023747E+12	.00005313	.00089289	16.80726010	2399.81907	60000.00000
55060805.	1.012613E+12	.00005438	.00091350	16.80000025	2438.37425	60000.00000
55060805.	9.898572E+11	.00005563	.00092961	16.71205348	2467.60949	60000.00000
55303834.	9.723751E+11	.00005688	.00094503	16.61590058	2495.10578	60000.00000

55562702.	9.559175E+11	.00005813	.00096047	16.52423126	2522.22792	60000.00000
55820887.	9.401413E+11	.00005938	.00097593	16.43676513	2548.97449	60000.00000
56078363.	9.250039E+11	.00006063	.00099142	16.35323936	2575.34344	60000.00000
56335154.	9.104671E+11	.00006188	.00100692	16.27342361	2601.33399	60000.00000
56591236.	8.964948E+11	.00006313	.00102244	16.19709510	2626.94409	60000.00000
56809514.	8.824779E+11	.00006438	.00103756	16.11744457	2651.44650	60000.00000
56986601.	8.683673E+11	.00006563	.00105223	16.03402144	2674.80426	60000.00000
57163096.	8.547753E+11	.00006688	.00106692	15.95398289	2697.82120	60000.00000
57339032.	8.416739E+11	.00006813	.00108163	15.87715119	2720.49683	60000.00000
57514376.	8.290361E+11	.00006938	.00109636	15.80334860	2742.82916	60000.00000
57689135.	8.168373E+11	.00007063	.00111110	15.73241740	2764.81710	60000.00000
57863310.	8.050547E+11	.00007188	.00112587	15.66420990	2786.45940	60000.00000
58036888.	7.936668E+11	.00007313	.00114065	15.59858590	2807.75450	60000.00000
58209872.	7.826537E+11	.00007438	.00115545	15.53541774	2828.70120	60000.00000
58554067.	7.616789E+11	.00007688	.00118510	15.41597825	2869.54429	60000.00000
58893785.	7.419689E+11	.00007938	.00122171	15.39156264	2918.42535	60000.00000
59112700.	7.219872E+11	.00008188	.00124857	15.24974281	2952.18863	60000.00000
59329873.	7.031689E+11	.00008438	.00127550	15.11707288	2984.80490	60000.00000
59545295.	6.854135E+11	.00008688	.00130250	14.99277180	3016.26586	60000.00000
59758959.	6.686317E+11	.00008938	.00132956	14.87614614	3046.56306	60000.00000
59970852.	6.527440E+11	.00009188	.00135668	14.76657754	3075.68781	60000.00000
60180930.	6.376787E+11	.00009438	.00138387	14.66350776	3103.63073	60000.00000
60389192.	6.233723E+11	.00009688	.00141112	14.56644362	3130.38308	60000.00000
60583208.	6.096423E+11	.00009938	.00143818	14.47223586	3155.67386	60000.00000
60716372.	5.959889E+11	.00010188	.00146401	14.37069064	3178.58995	60000.00000
60848016.	5.829750E+11	.00010438	.00148991	14.27458531	3200.43072	60000.00000
60978119.	5.705555E+11	.00010688	.00151587	14.18354183	3221.18804	60000.00000
61106660.	5.586895E+11	.00010938	.00154188	14.09721726	3240.85372	60000.00000
61233633.	5.473397E+11	.00011188	.00156796	14.01530117	3259.41962	60000.00000
61762700.	5.400018E+11	.00011438	.00160125	14.00000042	3281.77398	60000.00000
61762700.	5.284509E+11	.00011688	.00163412	13.98175317	3301.93411	60000.00000
61762700.	5.173839E+11	.00011938	.00165899	13.89733618	3315.69763	60000.00000
61783840.	5.069443E+11	.00012188	.00168393	13.81687957	3328.45289	60000.00000
61894365.	4.976431E+11	.00012438	.00170893	13.74014801	3340.19190	60000.00000
62003468.	4.886973E+11	.00012688	.00173399	13.66692621	3350.90665	60000.00000
62111151.	4.800862E+11	.00012938	.00175911	13.59701890	3360.58917	60000.00000
62217384.	4.717906E+11	.00013188	.00178430	13.53024083	3369.23107	60000.00000
62305189.	4.636665E+11	.00013438	.00180892	13.46175295	3376.63513	60000.00000
62366019.	4.556421E+11	.00013688	.00183265	13.38924962	3382.79172	60000.00000
62425641.	4.478970E+11	.00013938	.00185644	13.31974787	3388.02072	60000.00000
62484058.	4.404163E+11	.00014188	.00188028	13.25309497	3392.31511	60000.00000
62541235.	4.331860E+11	.00014438	.00190418	13.18914324	3395.66758	60000.00000
62597186.	4.261936E+11	.00014688	.00192814	13.12776250	3398.07090	60000.00000
62651883.	4.194268E+11	.00014938	.00195216	13.06882507	3399.51759	60000.00000
62705297.	4.128744E+11	.00015188	.00197623	13.01221329	3399.98730	60000.00000
62752656.	4.064949E+11	.00015438	.00200036	12.95781952	3394.07289	60000.00000
62799592.	4.003161E+11	.00015688	.00202456	12.90554363	3388.14256	60000.00000
62846067.	3.943283E+11	.00015938	.00204881	12.85528547	3382.19632	60000.00000
62892106.	3.885227E+11	.00016188	.00207313	12.80695993	3381.83393	60000.00000
62937695.	3.828909E+11	.00016438	.00209750	12.76048189	3386.56268	60000.00000
62982801.	3.774250E+11	.00016688	.00212194	12.71576875	3390.59176	60000.00000
63027445.	3.721178E+11	.00016938	.00214645	12.67275041	3393.91443	60000.00000
63071636.	3.669622E+11	.00017188	.00217101	12.63135928	3396.52368	60000.00000
63071636.	3.617011E+11	.00017438	.00219712	12.59999925	3398.52625	60000.00000
63071636.	3.516189E+11	.00017938	.00226012	12.59999925	3396.41491	60000.00000
63282556.	3.432274E+11	.00018438	.00232312	12.59999925	3382.54280	60000.00000
63419052.	3.348861E+11	.00018938	.00237289	12.53013700	3375.17241	60000.00000
63491292.	3.266433E+11	.00019438	.00242083	12.45441681	3383.72906	60000.00000
63532460.	3.186581E+11	.00019938	.00246652	12.37126404	3390.04886	60000.00000
63560845.	3.110011E+11	.00020438	.00251140	12.28821892	3394.70723	60000.00000
63588575.	3.037066E+11	.00020938	.00255646	12.20994526	3397.92237	60000.00000
63615634.	2.967493E+11	.00021438	.00260168	12.13612515	3399.66731	60000.00000
63641335.	2.901030E+11	.00021938	.00264721	12.06706899	3397.48150	60000.00000
63665275.	2.837450E+11	.00022438	.00269313	12.00281185	3389.97269	60000.00000
63688897.	2.776628E+11	.00022938	.00273915	11.94180661	3382.43657	60000.00000
63712207.	2.718388E+11	.00023438	.00278528	11.88385302	3374.87266	60000.00000
63735194.	2.662567E+11	.00023938	.00283151	11.82876581	3367.28058	60000.00000
63757862.	2.609017E+11	.00024438	.00287785	11.77637726	3365.09701	60000.00000
63780172.	2.557601E+11	.00024938	.00292430	11.72652715	3372.71636	60000.00000
63802153.	2.508193E+11	.00025438	.00297087	11.67907780	3379.43037	60000.00000
63823775.	2.460676E+11	.00025938	.00301754	11.63389403	3385.22484	60000.00000
63845056.	2.414943E+11	.00026438	.00306433	11.59085816	3390.08568	60000.00000
63865952.	2.370894E+11	.00026938	.00311124	11.54985255	3393.99790	60000.00000
63886498.	2.328437E+11	.00027438	.00315827	11.51077956	3396.94665	60000.00000
63904085.	2.287395E+11	.00027938	.00320597	11.47552425	3398.95191	60000.00000
63920147.	2.247741E+11	.00028438	.00325406	11.44283491	3399.91689	60000.00000
63934709.	2.209407E+11	.00028938	.00330254	11.41266900	3396.10675	60000.00000
63948415.	2.172345E+11	.00029438	.00335128	11.38439065	3389.70209	60000.00000
63961935.	2.136516E+11	.00029938	.00340009	11.35729140	3383.27888	60000.00000
63975285.	2.101857E+11	.00030438	.00344897	11.33131868	3376.83666	60000.00000
63985002.	2.068202E+11	.00030938	.00349877	11.30914861	3370.15223	60000.00000
63990907.	2.035496E+11	.00031438	.00354953	11.29073614	3363.21424	60000.00000
63996556.	2.003806E+11	.00031938	.00360038	11.27321237	3356.24990	60000.00000
64001946.	1.973085E+11	.00032438	.00365134	11.25654227	3349.25870	60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 63815.64903 in-kip

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 = 10000.000 lbs
Specified moment at pile head = 9132000.000 in-lbs
Specified axial load at pile head = 15000.000 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	.478145	9.13E+06	10000.	-.001966	159.645	9.43E+12	0.000	0.000
25.920	.427527	9.39E+06	10000.	-.001940	164.112	9.43E+12	0.000	0.000
51.840	.377578	9.65E+06	10000.	-.001914	168.580	9.43E+12	0.000	0.000
77.760	.328317	9.91E+06	9133.838	-.001887	172.981	9.43E+12	-135.502	1337.208
103.680	.279761	1.01E+07	1205.810	-.001860	175.588	9.43E+12	-427.698	4953.312
129.600	.231920	9.93E+06	-11841.	-.001832	173.368	9.43E+12	-564.957	7892.640
155.520	.184784	9.43E+06	-27346.	-.001805	164.705	9.43E+12	-617.771	10832.
181.440	.138318	8.51E+06	-43146.	-.001781	148.987	9.44E+12	-587.907	13771.
207.360	.092455	7.21E+06	-57116.	-.001759	126.557	9.45E+12	-476.847	16711.
233.280	.047103	5.58E+06	-69642.	-.001741	98.604	9.46E+12	-763.787	52537.
259.200	.002145	3.59E+06	-80546.	-.001729	64.447	9.46E+12	-40.332	60936.
285.120	-.042559	1.59E+06	-69751.	-.001722	30.040	9.46E+12	910.733	69334.
311.040	-.087146	2.13E+05	-31340.	-.001719	6.365	9.46E+12	2090.746	77732.

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 = .47814483 in
Computed slope at pile head = -.00196552
Maximum bending moment = 10061479. lbs-in
Maximum shear force = -80546.29996 lbs
Depth of maximum bending moment = 106.92000 in
Depth of maximum shear force = 259.20000 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= 10000.	M= 9.13E+06	15000.0000	.4781448	1.0061E+07	-80546.3000

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

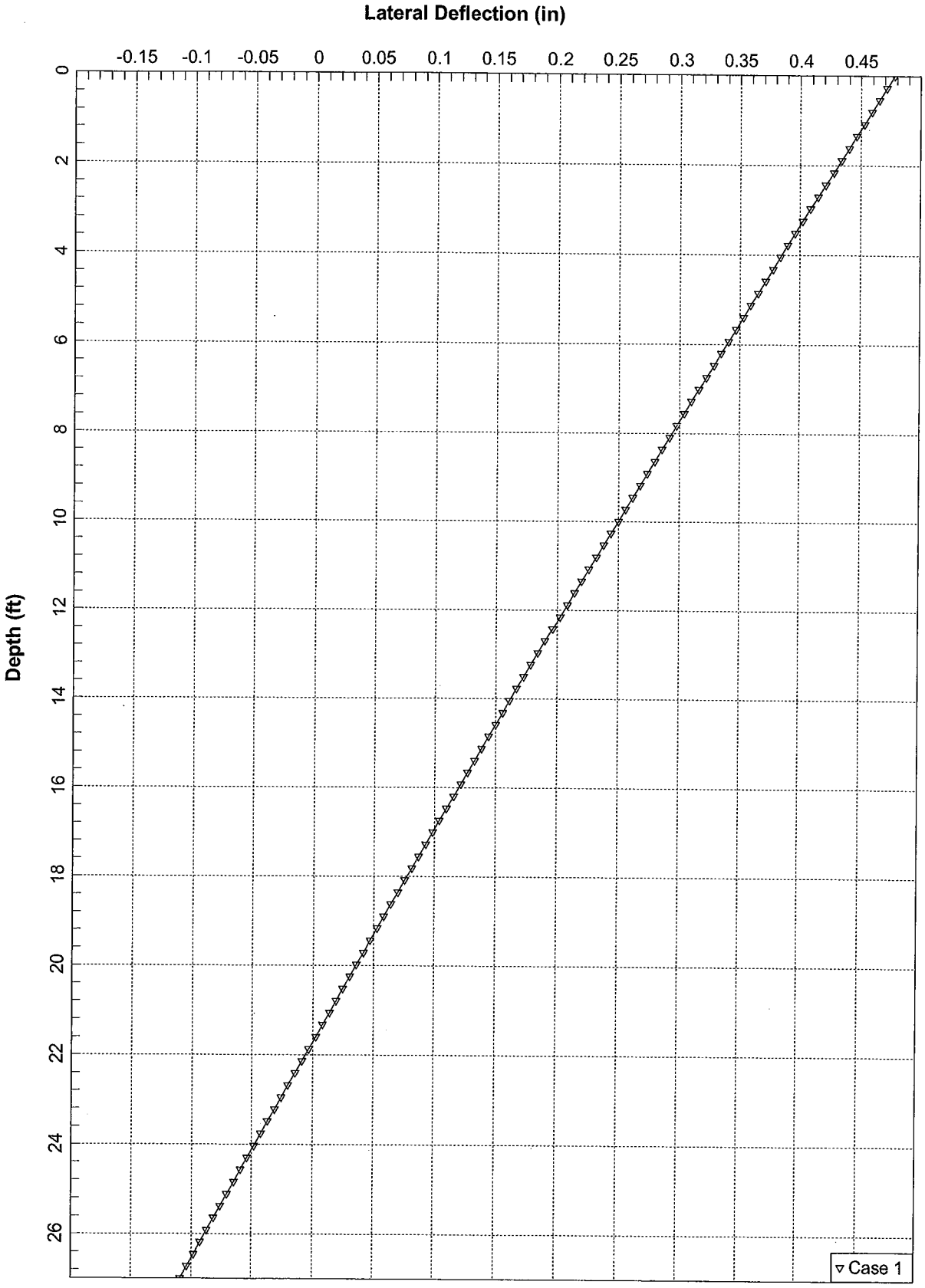
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
.00095303	1000.00001	237811.27903	1049280.	2.495307E+08
.00286892	3010.29996	715883.27227	1049280.	2.495307E+08

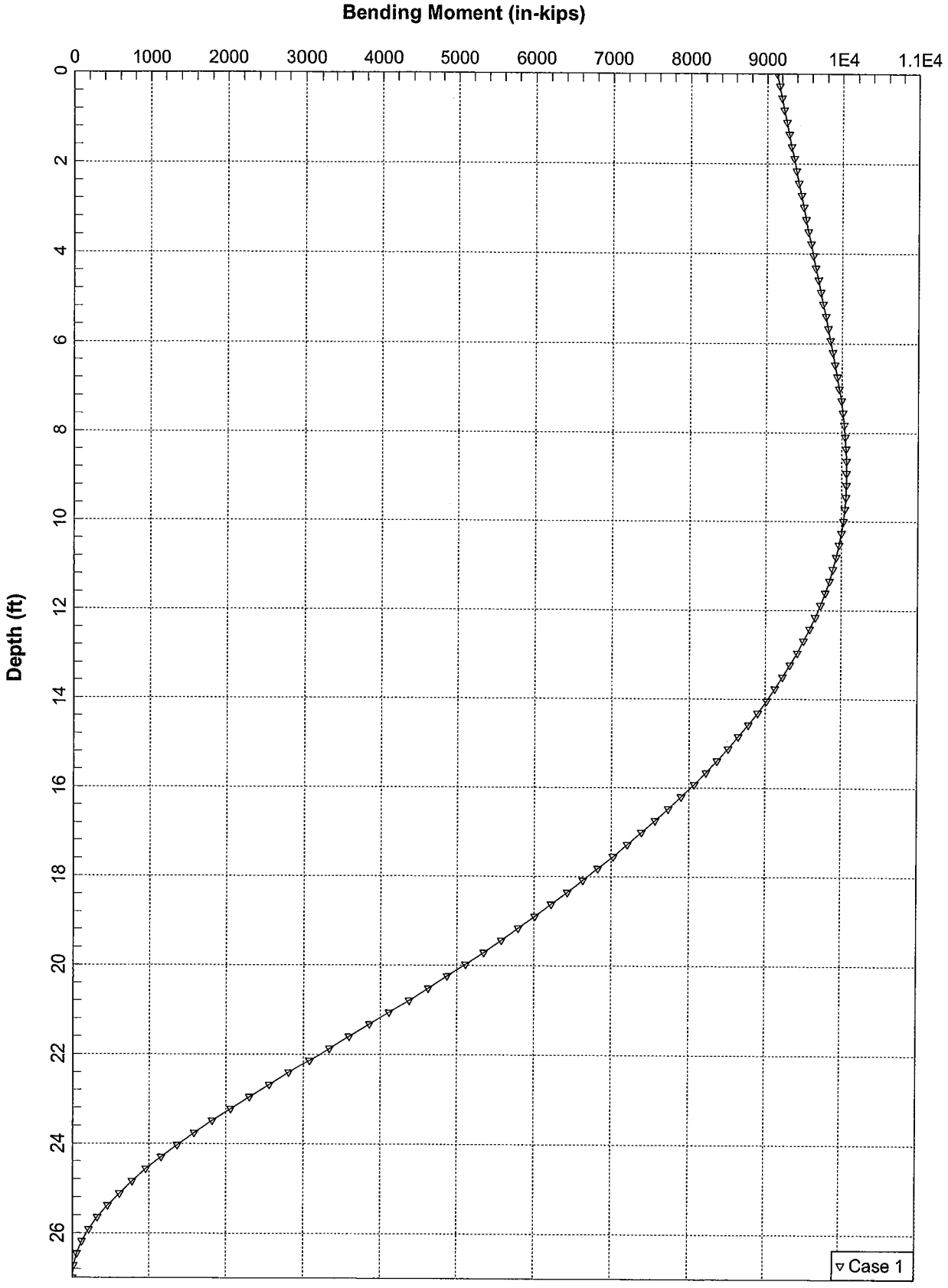
.00454713	4771.21255	1134648.	1049280.	2.495307E+08
.00573784	6020.59991	1431767.	1049280.	2.495307E+08
.00666142	6989.70004	1662229.	1049280.	2.495307E+08
.00741605	7781.51250	1850531.	1049280.	2.495307E+08
.00805407	8450.98040	2009738.	1049280.	2.495307E+08
.00860676	9030.89987	2147650.	1049280.	2.495307E+08
.00909426	9542.42509	2269296.	1049280.	2.495307E+08
.00953034	10000.00000	2378113.	1049280.	2.495307E+08

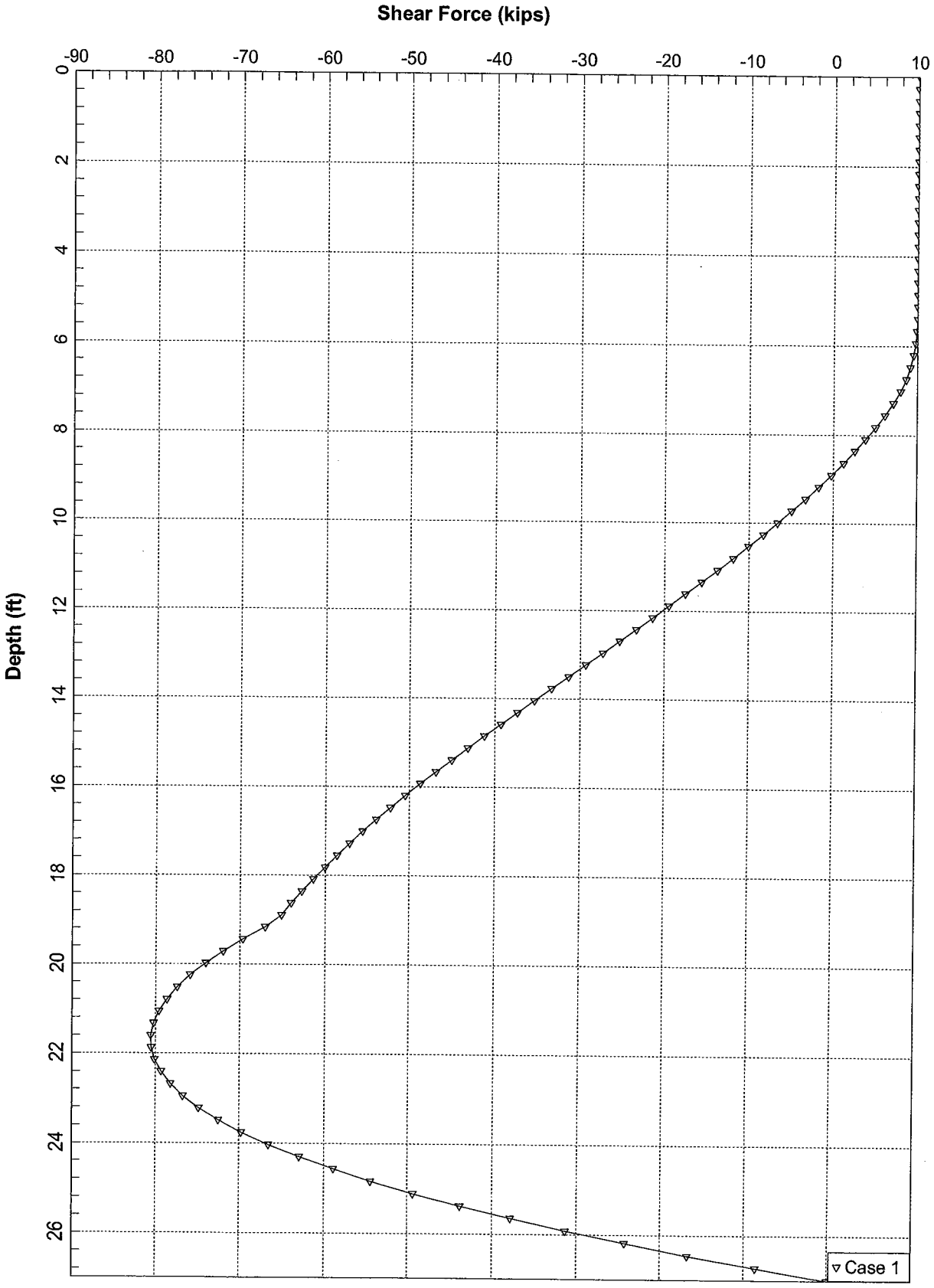
Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
.00001398	3488.25645	913200.01361	2.495307E+08	6.532531E+10
.00004208	10500.69807	2749006.	2.495307E+08	6.532531E+10
.00006670	16643.21267	4357071.	2.495307E+08	6.532531E+10
.00008416	21001.39614	5498012.	2.495307E+08	6.532531E+10
.00009772	24381.86861	6382994.	2.495196E+08	6.532241E+10
.00010880	27143.94619	7106077.	2.494763E+08	6.531098E+10
.00011819	29479.29021	7717435.	2.494281E+08	6.529823E+10
.00012632	31502.29107	8247018.	2.493835E+08	6.528637E+10
.00013350	33286.73011	8714143.	2.493439E+08	6.527580E+10
.00013992	34882.98545	9132000.	2.493089E+08	6.526647E+10

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)
-0.15
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
Case 1


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


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

SITE NAME	BLOOMFIELD BLUE HILLS CT		ECP - CELL #	8	280
LATITUDE	41-48-34.86 N		LONGITUDE	72-41-47.75 W	
Additional Comments: LTE antenna add, keeping with 12 antennas and adding 6 main lines			SAVE BUTTON		
			STRUCTURE TYPE	MONOPOLE	

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)	5	4	4
RAD CTR (FT AGL)	107	107	107
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

850 Celluar - Current Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	Cellular Modcell	Cellular Modcell	Cellular Modcell
ANTENNA TYPE	LPA-80063/6CF 5	LPA-80063/6CF 5	LPA-80063/6CF 5
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	30	150	270
DOWN TILT (MECH/DEG)	3	4	2
RAD CTR (FT AGL)	107	107	107
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

850 Celluar - Future Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	Cellular Modcell	Cellular Modcell	Cellular Modcell
ANTENNA TYPE	LPA-80063/6CF 5	LPA-80063/6CF 5	LPA-80063/6CF 5
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	30	150	270
DOWN TILT (MECH/DEG)	3	4	2
RAD CTR (FT AGL)	107	107	107
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-185063/12CF 2	LPA-185063/12CF 2	LPA-185063/12CF 2
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	30	150	270
DOWN TILT (MECH/DEG)	2	2	2
RAD CTR (FT AGL)	107	107	107
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

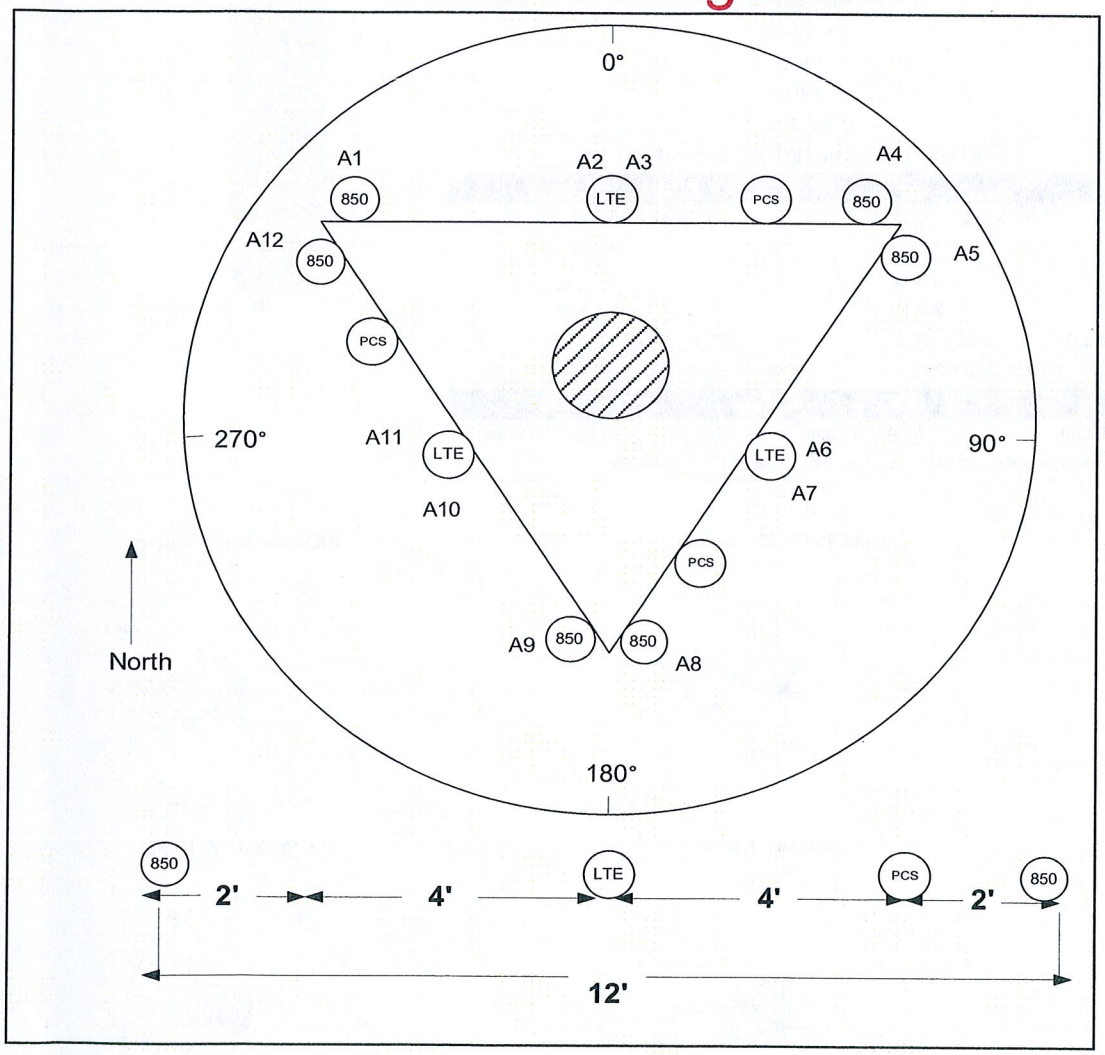
1900 PCS - Future Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B
ANTENNA TYPE	BXA-171063-12BF_2	BXA-171063-12BF_2	BXA-171063-12BF_2
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	30	150	270
DOWN TILT (MECH/DEG)	2	2	2
RAD CTR (FT AGL)	107	107	107
TMA - QTY / 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	12 +	6	TOP JUMPER #	12	+	6

TX / RX FREQUENCIES			TX POWER OUTPUT	
Cellular A-Band	PCS F / AWS-Band	700 Mhz C - E	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		4/25/2012	

Site Configuration



Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

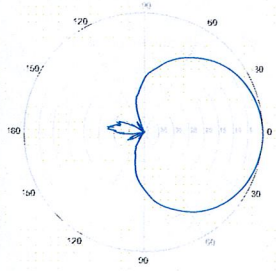
Replace 'X' with desired electrical downtilt.

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

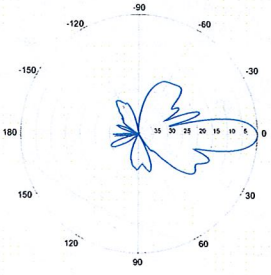
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



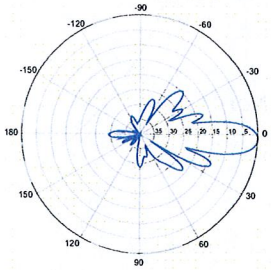
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

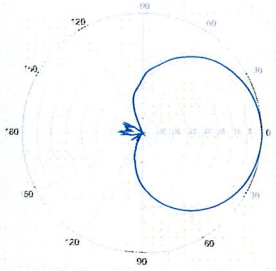


0° | Vertical | 750 MHz

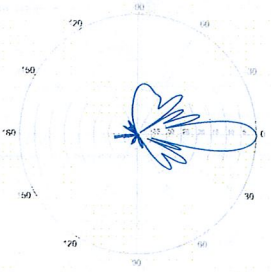
BXA-70063-6CF-EDIN-2



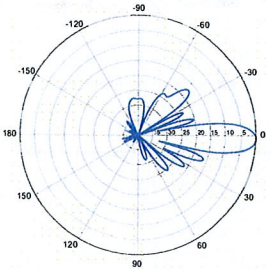
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



2° | Vertical | 850 MHz

Amphenol ANTENNA SOLUTIONS

BXA-171063-12BF-EDIN-X

Replace "X" with desired electrical downtilt.

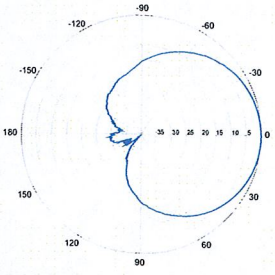
X-Pol | FET Panel | 63° | 19.0 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	16.1 dBd / 18.2 dBi	16.5 dBd / 18.6 dBi	16.9 dBd / 19.0 dBi
Electrical downtilt (X)	0, 2, 5		
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 / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		

Mechanical Characteristics		
Dimensions Length x Width x Depth	1820 x 154 x 105 mm	71.7 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

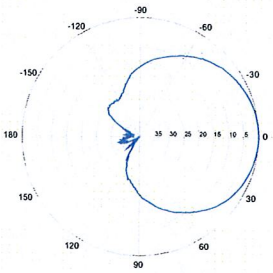
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-12BF-EDIN-X-FP		

BXA-171063-12BF-EDIN-X



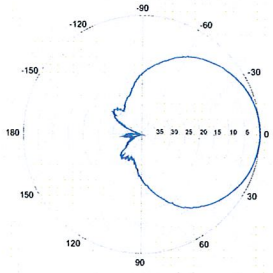
Horizontal | 1710-1880 MHz

BXA-171063-12BF-EDIN-X



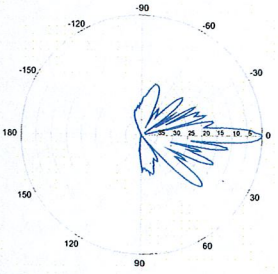
Horizontal | 1850-1990 MHz

BXA-171063-12BF-EDIN-X



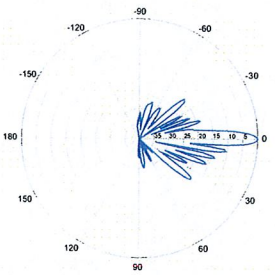
Horizontal | 1920-2170 MHz

BXA-171063-12BF-EDIN-0



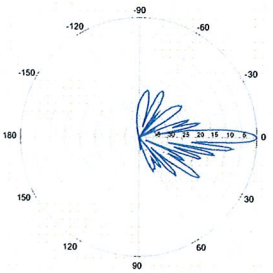
0° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-0



0° | Vertical | 1920-2170 MHz