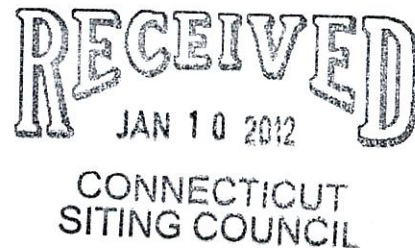


280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

January 6, 2012

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



Re: **Notice of Exempt Modification – Coax Cable Modifications
650 Albany Turnpike, Canton, Connecticut**

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains wireless telecommunications antennas at the top of the existing 120-foot tower at the above-referenced address. The tower is owned by Cellco. The Council approved Cellco's use of the existing tower in 2002 (Docket No. 204) and recently acknowledged Cellco's intent to replace its existing antennas and install six (6) additional coax cables inside the monopole (EM-VER-111114B). Due to space limitations inside the monopole, however, Cellco will need to modify this facility further and attach the six (6) additional coax cables to the outside of the monopole.

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 Richard Barlow, First Selectman of the Town of Canton. A copy of this letter is also being sent to Andrew C. Chellman, the owner of the property on which the tower is located.

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

1. The proposed modifications will not result in an increase in the overall height of the existing tower.



Law Offices

BOSTON

PROVIDENCE

HARTFORD

NEW LONDON

STAMFORD

WHITE PLAINS

NEW YORK CITY

ALBANY

SARASOTA

www.rc.com

11467423-v1

ROBINSON & COLE_{LLP}

Linda Roberts
January 6, 2012
Page 2

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

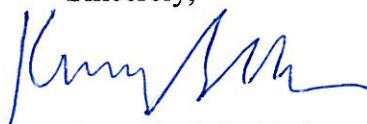
3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The relocation of six (6) coax cables to the outside of the tower will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard.

Attached is an updated Structural Analysis Report confirming that the tower and foundation can support the above-described coax cable modifications.

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:

Richard Barlow, Canton First Selectman
Andrew C. Chellman
Sandy M. Carter



Structural Analysis Report

120-ft Existing EEI Monopole

*Proposed Verizon Wireless
Antenna Upgrade*

Verizon Site Ref: Collinsville

*650 Albany Turnpike
Canton, CT*

Centek Project No. 11074.CO24

~~Date: September 29, 2011~~

Rev 1: December 7, 2011



Prepared for:

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

Table of Contents

SECTION 1 - REPORT

- INTRODUCTION.
- ANTENNA AND APPURTENANCE SUMMARY.
- PRIMARY ASSUMPTIONS USED IN THE ANALYSIS.
- ANALYSIS.
- TOWER LOADING.
- TOWER CAPACITY.
- FOUNDATION AND ANCHORS.
- CONCLUSION.

SECTION 2 – CONDITIONS & SOFTWARE

- STANDARD ENGINEERING CONDITIONS.
- GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM.

SECTION 3 – CALCULATIONS

- RISATower INPUT/OUTPUT SUMMARY.
- RISATower DETAILED OUTPUT.
- ANCHOR BOLT AND BASE PLATE ANALYSIS.
- SPREAD FOOTING W/ PIER ANALYSIS.

SECTION 4 – REFERENCE MATERIAL

- VERIZON RF DATA SHEET.
- ANTENNA CUT SHEETS.
- TOWER INVENTORY MAPPING REPORT PREPARED BY JWB TOWER SERVICES, LLC DATED SEPTEMBER 11, 2011.

Introduction

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

The host tower is a 120-ft tall, three-section, eighteen sided, tapered monopole extendable to 150-ft, originally designed and manufactured by EEI job no; 11936-E01, dated September 11, 2003. The tower geometry, structure member sizes and foundation system information were obtained from a previous structural report prepared by Centek Engineering dated January 9, 2009. Antenna and appurtenance information were obtained from the tower mapping and inventory report prepared by JWB Tower Services, LLC (JWB) dated September 11, 2011 and a Verizon RF data sheet.

The tower is made up of three (3) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 26.90-in at the top and 49.00-in at the base.

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

Antenna and Appurtenance Summary

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

- AT&T (Existing):
Antennas: Six (6) Powerwave P65-15-XLH-RR panel antennas and six (6) TT19-08BP111-001 TMA's mounted on a 12-ft 6-in low profile platform with a RAD center elevation of 110-ft above exiting grade.
Coax Cables: Twelve (12) 1-5/8" $\varnothing$ coax cables running on the inside of the existing monopole.
- T-MOBILE (Existing):
Antennas: Three (3) RFS APX16DWV-16DWVS panel antennas, three (3) RFS ATM1900D-1CWA TMA's and three (3) RFS ATMAP1412D-1A20 TMA's mounted to three (3) T-Arms with a RAD center elevation of 100-ft above exiting grade.
Coax Cables: Twelve (12) 1-5/8" $\varnothing$ coax cables running on the inside of the existing monopole.
- METROPCS (Existing):
Antennas: Three (3) RFS APXV18-206517S flush mounted with a RAD center elevation of 91-ft above exiting grade.
Coax Cables: Six (6) 1-5/8" $\varnothing$ coax cables running on the inside of the existing monopole.

- **VERIZON (Existing to Remain):**
Antennas: Six (6) Antel LPA-80080/6CF panel antennas mounted to one (1) low profile platform with a RAD center elevation of 120-ft above exiting grade.
Coax Cables: Twelve (12) 1-5/8" Ø coax cables running on the inside of the existing monopole.
- **VERIZON (Existing to Remove):**
Antennas: Six (6) Andrew DB950F85E-M panel antennas mounted to one (1) low profile platform with a RAD center elevation of 120-ft above exiting grade.
- **VERIZON (Proposed):**
Antennas: Three (3) Antel BXA-70063-6CF and three (3) Antel BXA-171085-12BF panel antennas mounted to one (1) low profile platform with a RAD center elevation of 120-ft above exiting grade.
Coax Cables: Six (6) 1-5/8" Ø coax cables banded to the exterior 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 80 mph basic wind speed (fastest mile) with no ice and 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

Tower Loading

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

Basic Wind Speed:	Hartford; v = 80 mph (fastest mile)	[Section 16 of TIA/EIA-222-F-96]
	Canton; 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 wind speed controls.	
Load Cases:	<u>Load Case 1</u> ; 80 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation. This load case typically controls the design of monopole towers.	[Section 2.3.16 of TIA/EIA-222-F-96]
	<u>Load Case 2</u> ; 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. This load case typically controls the design of lattice towers.	[Section 2.3.16 of TIA/EIA-222-F-96]
	<u>Load Case 3</u> ; Seismic – not checked	[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type

Tower Capacity

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

- Calculated stresses were found to be within allowable limits. In Load Case 1, per RISATower "Section Capacity Table", this tower was found to be at **39.1%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L3)	0.00'-46.16'	39.1%	PASS

Foundation and Anchors

The existing foundation consists of a 7-ft Ø x 5-ft long reinforced concrete pier on a 24.0-ft square x 3-ft thick reinforce concrete pad. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned structural analysis report prepared by Centek. Engineering The base of the tower is connected to the foundation by means of (18) 2.25"Ø, 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	16 kips
	Compression	30 kips
	Moment	1337 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS) ⁽¹⁾	Proposed Loading (FS) ⁽¹⁾	Result
Reinforced Concrete Pad and Pier	OTM ⁽²⁾	2.0	5.97	PASS

Note 1: FS denotes Factor of Safety.

Note 2: OTM denotes Overturning Moment

- 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	32.4%	PASS
Base Plate	Bending	43.6%	PASS

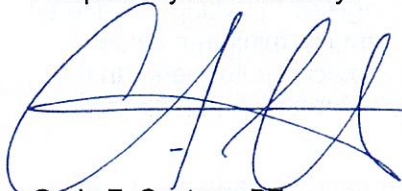
Conclusion

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

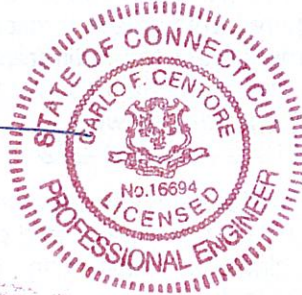
The analysis is based, in part, on the information provided to this office by Verizon Wireless. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

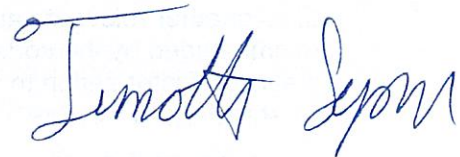
Respectfully Submitted by:



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

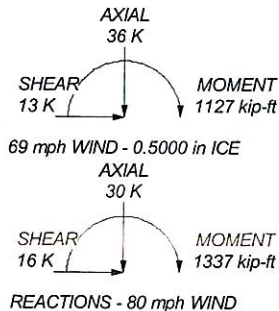
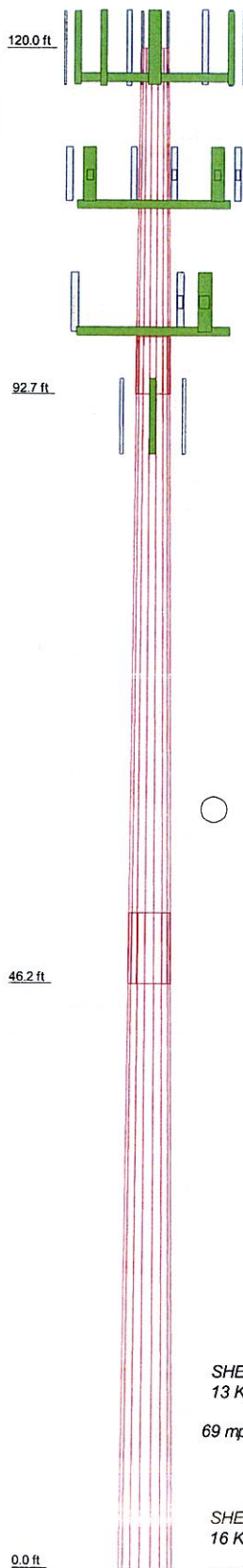
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

RISATower Features:

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

Section	1	2	3	
Length (ft)	27.29	51.13	51.83	
Number of Sides	18	18	18	
Thickness (in)	0.2500	0.3750	0.4375	
Socket Length (ft)	4.58	5.67		
Top Dia (in)	26.9000	30.8688	38.9487	
Bot Dia (in)	32.2700	40.8000	49.0000	
Grade		A572-65		
Weight (K)	2.2	7.3	10.7	20.2



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
LPA-80080-6CF (Verizon - Existing)	120	Andrew 12'-6" Low Profile Platform (ATI - Existing)	108
BXA-171085-12BF (Verizon - Proposed)	120	APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	100
BXA-70063/6CF (Verizon - Proposed)	120	APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	100
LPA-80080-6CF (Verizon - Existing)	120	APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	100
LPA-80080-6CF (Verizon - Existing)	120	APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	100
BXA-171085-12BF (Verizon - Proposed)	120	ATM1900D-1CWA (T-Mobile - Existing)	100
BXA-70063/6CF (Verizon - Proposed)	120	ATM1900D-1CWA (T-Mobile - Existing)	100
LPA-80080-6CF (Verizon - Existing)	120	ATM1900D-1CWA (T-Mobile - Existing)	100
BXA-171085-12BF (Verizon - Proposed)	120	ATMAP1412D-1A20 (T-Mobile - Existing)	100
BXA-70063/6CF (Verizon - Proposed)	120	ATMAP1412D-1A20 (T-Mobile - Existing)	100
LPA-80080-6CF (Verizon - Existing)	120	ATMAP1412D-1A20 (T-Mobile - Existing)	100
EEI 14-ft Low Profile Platform (Verizon - Existing)	118	Valmont T-Arm (3) (T-Mobile - Existing)	98
(2) P65-15-XLH-RR (ATI - Existing)	110	Uni-Tri Bracket (MetroPCS - Existing)	91
(2) P65-15-XLH-RR (ATI - Existing)	110	APXV18-206517S (MetroPCS - Existing)	91
(2) P65-15-XLH-RR (ATI - Existing)	110	APXV18-206517S (MetroPCS - Existing)	91
(2) TT19-08BP111-001 TMA (ATI - Existing)	110	APXV18-206517S (MetroPCS - Existing)	91
(2) TT19-08BP111-001 TMA (ATI - Existing)	110	APXV18-206517S (MetroPCS - Existing)	91
(2) TT19-08BP111-001 TMA (ATI - Existing)	110		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 39.1%

Centek Engineering Inc.

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

Job: 11074.CO24 - Collinsville

Project: 120' EEI Monopole - 650 Albany Turnpike - Canton, CT

Client: Verizon Wireless Drawn by: T.J.L. App'd:

Code: TIA/EIA-222-F Date: 12/07/11 Scale: NTS

Path: Dwg No. E-1

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	1 of 26
	Project	120' EEL Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Basic wind speed of 80 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

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

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

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

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	Use Azimuth Dish Coefficients	Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	120.00-92.71	27.29	4.58	18	26.9000	32.2700	0.2500	1.0000	A572-65 (65 ksi)
L2	92.71-46.16	51.13	5.67	18	30.8688	40.8000	0.3750	1.5000	A572-65 (65 ksi)
L3	46.16-0.00	51.83		18	38.9487	49.0000	0.4375	1.7500	A572-65 (65 ksi)

Tapered Pole Properties

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	2 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	27.3150	21.1468	1897.4748	9.4608	13.6652	138.8545	3797.4464	10.5754	4.2944	17.178
	32.7678	25.4079	3291.1552	11.3671	16.3932	200.7639	6586.6410	12.7063	5.2395	20.958
L2	32.2483	36.2952	4263.9191	10.8253	15.6813	271.9105	8533.4488	18.1511	4.7729	12.728
	41.4294	48.1159	9934.0359	14.3509	20.7264	479.2938	19881.1433	24.0625	6.5208	17.389
L3	40.6661	53.4776	10020.3566	13.6715	19.7859	506.4384	20053.8983	26.7439	6.0850	13.909
	49.7559	67.4351	20092.1096	17.2397	24.8920	807.1714	40210.6569	33.7240	7.8540	17.952

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 120.00-92.71				1	1	1		
L2 92.71-46.16				1	1	1		
L3 46.16-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
1 5/8 (Verizon - Existing)	C	No	Inside Pole	120.00 - 3.00	12	No Ice	0.00	1.04
1 5/8 (AT&T - Existing)	C	No	Inside Pole	110.00 - 3.00	12	1/2" Ice	0.00	1.04
1 5/8 (T-Mobile - Existing)	C	No	Inside Pole	100.00 - 3.00	12	No Ice	0.00	1.04
1 5/8 (MetroPCS - Existing)	C	No	Inside Pole	90.00 - 3.00	6	1/2" Ice	0.00	1.04
1 5/8 (Verizon - Proposed)	C	No	CaAa (Out Of Face)	120.00 - 3.00	1	No Ice	0.20	1.04
1 5/8 (Verizon - Proposed)	C	No	CaAa (Out Of Face)	120.00 - 3.00	5	1/2" Ice	0.30	2.55
						No Ice	0.00	1.04
						1/2" Ice	0.00	2.55

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	120.00-92.71	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.403	0.82
L2	92.71-46.16	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	9.217	2.31
L3	46.16-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	8.546	2.15

Feed Line/Linear Appurtenances Section Areas - With Ice

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page 3 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date 17:09:38 12/07/11
	Client	Verizon Wireless	Designed by TJL

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	120.00-92.71	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.132	1.06
L2	92.71-46.16	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	13.872	2.73
L3	46.16-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	12.862	2.55

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
EEI 14-ft Low Profile Platform	C	None		0.0000	118.00	No Ice 1/2" Ice	16.50 20.00	1.55 1.80
(Verizon - Existing)								
LPA-80080-6CF	A	From Face	3.50	0.0000	120.00	No Ice	4.33	0.02
(Verizon - Existing)			-6.00			1/2" Ice	4.76	0.07
			0.00					
BXA-171085-12BF	A	From Face	3.50	0.0000	120.00	No Ice	4.73	0.02
(Verizon - Proposed)			4.00			1/2" Ice	5.18	0.04
			0.00					
BXA-70063/6CF	A	From Face	3.50	0.0000	120.00	No Ice	7.73	0.02
(Verizon - Proposed)			0.00			1/2" Ice	8.27	0.06
			0.00					
LPA-80080-6CF	A	From Face	3.50	0.0000	120.00	No Ice	4.33	0.02
(Verizon - Existing)			6.00			1/2" Ice	4.76	0.07
			0.00					
LPA-80080-6CF	B	From Face	3.50	0.0000	120.00	No Ice	4.33	0.02
(Verizon - Existing)			-6.00			1/2" Ice	4.76	0.07
			0.00					
BXA-171085-12BF	B	From Face	3.50	0.0000	120.00	No Ice	4.73	0.02
(Verizon - Proposed)			4.00			1/2" Ice	5.18	0.04
			0.00					
BXA-70063/6CF	B	From Face	3.50	0.0000	120.00	No Ice	7.73	0.02
(Verizon - Proposed)			0.00			1/2" Ice	8.27	0.06
			0.00					
LPA-80080-6CF	B	From Face	3.50	0.0000	120.00	No Ice	4.33	0.02
(Verizon - Existing)			6.00			1/2" Ice	4.76	0.07
			0.00					
LPA-80080-6CF	C	From Face	3.50	0.0000	120.00	No Ice	4.33	0.02
(Verizon - Existing)			-6.00			1/2" Ice	4.76	0.07
			0.00					
BXA-171085-12BF	C	From Face	3.50	0.0000	120.00	No Ice	4.73	0.02
(Verizon - Proposed)			4.00			1/2" Ice	5.18	0.04
			0.00					
BXA-70063/6CF	C	From Face	3.50	0.0000	120.00	No Ice	7.73	0.02
(Verizon - Proposed)			0.00			1/2" Ice	8.27	0.06
			0.00					
LPA-80080-6CF	C	From Face	3.50	0.0000	120.00	No Ice	4.33	0.02
(Verizon - Existing)			6.00			1/2" Ice	4.76	0.07

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	4 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
Andrew 12'-6" Low Profile Platform	C	None	0.00	0.0000	108.00	No Ice	14.45	14.45	1.30
(AT&T - Existing)						1/2" Ice	19.00	19.00	1.69
(2) P65-15-XLH-RR	A	From Face	3.50	0.0000	110.00	No Ice	5.95	3.08	0.04
(AT&T - Existing)			0.00			1/2" Ice	6.36	3.41	0.08
(2) P65-15-XLH-RR	B	From Face	3.50	0.0000	110.00	No Ice	5.95	3.08	0.04
(AT&T - Existing)			0.00			1/2" Ice	6.36	3.41	0.08
(2) P65-15-XLH-RR	C	From Face	3.50	0.0000	110.00	No Ice	5.95	3.08	0.04
(AT&T - Existing)			0.00			1/2" Ice	6.36	3.41	0.08
(2) TT19-08BP111-001 TMA	A	From Face	3.50	0.0000	110.00	No Ice	0.64	0.52	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.76	0.62	0.02
(2) TT19-08BP111-001 TMA	B	From Face	3.50	0.0000	110.00	No Ice	0.64	0.52	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.76	0.62	0.02
(2) TT19-08BP111-001 TMA	C	From Face	3.50	0.0000	110.00	No Ice	0.64	0.52	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.76	0.62	0.02
Valmont T-Arm (3)	C	None		0.0000	98.00	No Ice	21.00	21.00	1.01
(T-Mobile - Existing)						1/2" Ice	29.00	29.00	1.24
APX16DWV-16DWVS-E-A	A	From Face	3.50	0.0000	100.00	No Ice	7.07	2.15	0.04
20			-4.00			1/2" Ice	7.52	2.49	0.07
(T-Mobile - Existing)			0.00						
APX16DWV-16DWVS-E-A	B	From Face	3.50	0.0000	100.00	No Ice	7.07	2.15	0.04
20			-4.00			1/2" Ice	7.52	2.49	0.07
(T-Mobile - Existing)			0.00						
APX16DWV-16DWVS-E-A	C	From Face	3.50	0.0000	100.00	No Ice	7.07	2.15	0.04
20			-4.00			1/2" Ice	7.52	2.49	0.07
(T-Mobile - Existing)			0.00						
ATM1900D-1CWA	A	From Face	3.50	0.0000	100.00	No Ice	0.85	0.27	0.01
(T-Mobile - Existing)			-4.00			1/2" Ice	0.98	0.36	0.01
			0.00						
ATM1900D-1CWA	B	From Face	3.50	0.0000	100.00	No Ice	0.85	0.27	0.01
(T-Mobile - Existing)			-4.00			1/2" Ice	0.98	0.36	0.01
			0.00						
ATM1900D-1CWA	C	From Face	3.50	0.0000	100.00	No Ice	0.85	0.27	0.01
(T-Mobile - Existing)			-4.00			1/2" Ice	0.98	0.36	0.01
			0.00						
ATMAP1412D-1A20	A	From Face	3.50	0.0000	100.00	No Ice	1.17	0.47	0.01
(T-Mobile - Existing)			-4.00			1/2" Ice	1.31	0.57	0.02
			0.00						
ATMAP1412D-1A20	B	From Face	3.50	0.0000	100.00	No Ice	1.17	0.47	0.01
(T-Mobile - Existing)			-4.00			1/2" Ice	1.31	0.57	0.02
			0.00						
ATMAP1412D-1A20	C	From Face	3.50	0.0000	100.00	No Ice	1.17	0.47	0.01
(T-Mobile - Existing)			-4.00			1/2" Ice	1.31	0.57	0.02
			0.00						
Uni-Tri Bracket	C	None		0.0000	91.00	No Ice	1.75	1.75	0.29
(MetroPCS - Existing)						1/2" Ice	1.94	1.94	0.31
APXV18-206517S	A	From Face	1.50	0.0000	91.00	No Ice	5.17	3.04	0.03
(MetroPCS - Existing)			0.00			1/2" Ice	5.62	3.47	0.05
			0.00						
APXV18-206517S	B	From Face	1.50	0.0000	91.00	No Ice	5.17	3.04	0.03

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	5 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
(MetroPCS - Existing)			0.00			1/2" Ice 5.62	3.47	0.05
APXV18-206517S	C	From Face	0.00	0.0000	91.00	No Ice 5.17	3.04	0.03
(MetroPCS - Existing)			0.00			1/2" Ice 5.62	3.47	0.05
			0.00					

Tower Pressures - No Ice

$$G_H = 1.690$$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e ft	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 120.00-92.71	105.94	1.396	23	67.281	A	0.000	67.281	67.281	100.00	0.000	0.000
					B	0.000	67.281		100.00	0.000	0.000
					C	0.000	67.281		100.00	0.000	5.403
L2 92.71-46.16	69.03	1.235	20	140.733	A	0.000	140.733	140.733	100.00	0.000	0.000
					B	0.000	140.733		100.00	0.000	0.000
					C	0.000	140.733		100.00	0.000	9.217
L3 46.16-0.00	22.38	1	16	171.269	A	0.000	171.269	171.269	100.00	0.000	0.000
					B	0.000	171.269		100.00	0.000	0.000
					C	0.000	171.269		100.00	0.000	8.546

Tower Pressure - With Ice

$$G_H = 1.690$$

Section Elevation ft	z ft	K _Z	q _z psf	t _z in	A _G ft ²	F a c e ft	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 120.00-92.71	105.94	1.396	17	0.5000	69.555	A	0.000	69.555	69.555	100.00	0.000	0.000
						B	0.000	69.555		100.00	0.000	0.000
						C	0.000	69.555		100.00	0.000	8.132
L2 92.71-46.16	69.03	1.235	15	0.5000	144.612	A	0.000	144.612	144.612	100.00	0.000	0.000
						B	0.000	144.612		100.00	0.000	0.000
						C	0.000	144.612		100.00	0.000	13.872
L3 46.16-0.00	22.38	1	12	0.5000	175.116	A	0.000	175.116	175.116	100.00	0.000	0.000
						B	0.000	175.116		100.00	0.000	0.000
						C	0.000	175.116		100.00	0.000	12.862

Tower Pressure - Service

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	6 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

$$G_H = 1.690$$

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
L1 120.00-92.71	105.94	1.396	9	67.281	A	0.000	67.281	67.281	100.00	0.000	0.000
					B	0.000	67.281		100.00	0.000	0.000
					C	0.000	67.281		100.00	0.000	5.403
L2 92.71-46.16	69.03	1.235	8	140.733	A	0.000	140.733	140.733	100.00	0.000	0.000
					B	0.000	140.733		100.00	0.000	0.000
					C	0.000	140.733		100.00	0.000	9.217
L3 46.16-0.00	22.38	1	6	171.269	A	0.000	171.269	171.269	100.00	0.000	0.000
					B	0.000	171.269		100.00	0.000	0.000
					C	0.000	171.269		100.00	0.000	8.546

Tower Forces - No Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1 120.00-92.71	0.82	2.16	A	1	0.65	1	1	1	67.281	1.90	69.57	C
			B	1	0.65	1	1	1	67.281			
			C	1	0.65	1	1	1	67.281			
L2 92.71-46.16	2.31	7.34	A	1	0.65	1	1	1	140.733	3.42	73.57	C
			B	1	0.65	1	1	1	140.733			
			C	1	0.65	1	1	1	140.733			
L3 46.16-0.00	2.15	10.66	A	1	0.65	1	1	1	171.269	3.34	72.32	C
			B	1	0.65	1	1	1	171.269			
			C	1	0.65	1	1	1	171.269			
Sum Weight:	5.28	20.17						OTM	512.23 kip-ft	8.66		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1 120.00-92.71	0.82	2.16	A	1	0.65	1	1	1	67.281	1.90	69.57	C
			B	1	0.65	1	1	1	67.281			
			C	1	0.65	1	1	1	67.281			
L2 92.71-46.16	2.31	7.34	A	1	0.65	1	1	1	140.733	3.42	73.57	C
			B	1	0.65	1	1	1	140.733			
			C	1	0.65	1	1	1	140.733			
L3 46.16-0.00	2.15	10.66	A	1	0.65	1	1	1	171.269	3.34	72.32	C
			B	1	0.65	1	1	1	171.269			
			C	1	0.65	1	1	1	171.269			
Sum Weight:	5.28	20.17						OTM	512.23 kip-ft	8.66		

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page 7 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date 17:09:38 12/07/11
	Client	Verizon Wireless	Designed by TJL

Tower Forces - No Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1 120.00-92.71	0.82	2.16	A	1	0.65	1	1	1	67.281	1.90	69.57	C
			B	1	0.65	1	1	1	67.281			
			C	1	0.65	1	1	1	67.281			
L2 92.71-46.16	2.31	7.34	A	1	0.65	1	1	1	140.733	3.42	73.57	C
			B	1	0.65	1	1	1	140.733			
			C	1	0.65	1	1	1	140.733			
L3 46.16-0.00	2.15	10.66	A	1	0.65	1	1	1	171.269	3.34	72.32	C
			B	1	0.65	1	1	1	171.269			
			C	1	0.65	1	1	1	171.269			
Sum Weight:	5.28	20.17						OTM	512.23 kip-ft	8.66		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1 120.00-92.71	0.82	2.16	A	1	0.65	1	1	1	67.281	1.90	69.57	C
			B	1	0.65	1	1	1	67.281			
			C	1	0.65	1	1	1	67.281			
L2 92.71-46.16	2.31	7.34	A	1	0.65	1	1	1	140.733	3.42	73.57	C
			B	1	0.65	1	1	1	140.733			
			C	1	0.65	1	1	1	140.733			
L3 46.16-0.00	2.15	10.66	A	1	0.65	1	1	1	171.269	3.34	72.32	C
			B	1	0.65	1	1	1	171.269			
			C	1	0.65	1	1	1	171.269			
Sum Weight:	5.28	20.17						OTM	512.23 kip-ft	8.66		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1 120.00-92.71	1.06	2.67	A	1	0.65	1	1	1	69.555	1.55	56.65	C
			B	1	0.65	1	1	1	69.555			
			C	1	0.65	1	1	1	69.555			
L2 92.71-46.16	2.73	8.40	A	1	0.65	1	1	1	144.612	2.75	59.11	C
			B	1	0.65	1	1	1	144.612			
			C	1	0.65	1	1	1	144.612			
L3 46.16-0.00	2.55	11.95	A	1	0.65	1	1	1	175.116	2.65	57.32	C
			B	1	0.65	1	1	1	175.116			
			C	1	0.65	1	1	1	175.116			
Sum Weight:	6.34	23.01						OTM	412.91 kip-ft	6.94		

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	8 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

Tower Forces - With Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1	1.06	2.67	A	1	0.65	1	1	1	69.555	1.55	56.65	C
120.00-92.71			B	1	0.65	1	1	1	69.555			
			C	1	0.65	1	1	1	69.555			
L2	2.73	8.40	A	1	0.65	1	1	1	144.612	2.75	59.11	C
92.71-46.16			B	1	0.65	1	1	1	144.612			
			C	1	0.65	1	1	1	144.612			
L3 46.16-0.00	2.55	11.95	A	1	0.65	1	1	1	175.116	2.65	57.32	C
			B	1	0.65	1	1	1	175.116			
			C	1	0.65	1	1	1	175.116			
Sum Weight:	6.34	23.01						OTM	412.91 kip-ft	6.94		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1	1.06	2.67	A	1	0.65	1	1	1	69.555	1.55	56.65	C
120.00-92.71			B	1	0.65	1	1	1	69.555			
			C	1	0.65	1	1	1	69.555			
L2	2.73	8.40	A	1	0.65	1	1	1	144.612	2.75	59.11	C
92.71-46.16			B	1	0.65	1	1	1	144.612			
			C	1	0.65	1	1	1	144.612			
L3 46.16-0.00	2.55	11.95	A	1	0.65	1	1	1	175.116	2.65	57.32	C
			B	1	0.65	1	1	1	175.116			
			C	1	0.65	1	1	1	175.116			
Sum Weight:	6.34	23.01						OTM	412.91 kip-ft	6.94		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1	1.06	2.67	A	1	0.65	1	1	1	69.555	1.55	56.65	C
120.00-92.71			B	1	0.65	1	1	1	69.555			
			C	1	0.65	1	1	1	69.555			
L2	2.73	8.40	A	1	0.65	1	1	1	144.612	2.75	59.11	C
92.71-46.16			B	1	0.65	1	1	1	144.612			
			C	1	0.65	1	1	1	144.612			
L3 46.16-0.00	2.55	11.95	A	1	0.65	1	1	1	175.116	2.65	57.32	C
			B	1	0.65	1	1	1	175.116			
			C	1	0.65	1	1	1	175.116			
Sum Weight:	6.34	23.01						OTM	412.91	6.94		

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	9 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
									kip-ft			

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1 120.00-92.71	0.82	2.16	A	1	0.65	1	1	1	67.281	0.74	27.18	C
			B	1	0.65	1	1	1	67.281			
			C	1	0.65	1	1	1	67.281			
L2 92.71-46.16	2.31	7.34	A	1	0.65	1	1	1	140.733	1.34	28.74	C
			B	1	0.65	1	1	1	140.733			
			C	1	0.65	1	1	1	140.733			
L3 46.16-0.00	2.15	10.66	A	1	0.65	1	1	1	171.269	1.30	28.25	C
			B	1	0.65	1	1	1	171.269			
			C	1	0.65	1	1	1	171.269			
Sum Weight:	5.28	20.17						OTM	200.09 kip-ft	3.38		

Tower Forces - Service - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1 120.00-92.71	0.82	2.16	A	1	0.65	1	1	1	67.281	0.74	27.18	C
			B	1	0.65	1	1	1	67.281			
			C	1	0.65	1	1	1	67.281			
L2 92.71-46.16	2.31	7.34	A	1	0.65	1	1	1	140.733	1.34	28.74	C
			B	1	0.65	1	1	1	140.733			
			C	1	0.65	1	1	1	140.733			
L3 46.16-0.00	2.15	10.66	A	1	0.65	1	1	1	171.269	1.30	28.25	C
			B	1	0.65	1	1	1	171.269			
			C	1	0.65	1	1	1	171.269			
Sum Weight:	5.28	20.17						OTM	200.09 kip-ft	3.38		

Tower Forces - Service - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1 120.00-92.71	0.82	2.16	A	1	0.65	1	1	1	67.281	0.74	27.18	C
			B	1	0.65	1	1	1	67.281			
			C	1	0.65	1	1	1	67.281			

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	10 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L2	2.31	7.34	A	1	0.65	1	1	1	140.733	1.34	28.74	C
92.71-46.16			B	1	0.65	1	1	1	140.733			
			C	1	0.65	1	1	1	140.733			
L3 46.16-0.00	2.15	10.66	A	1	0.65	1	1	1	171.269	1.30	28.25	C
			B	1	0.65	1	1	1	171.269			
			C	1	0.65	1	1	1	171.269			
Sum Weight:	5.28	20.17						OTM	200.09 kip-ft	3.38		

Tower Forces - Service - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1	0.82	2.16	A	1	0.65	1	1	1	67.281	0.74	27.18	C
120.00-92.71			B	1	0.65	1	1	1	67.281			
			C	1	0.65	1	1	1	67.281			
L2	2.31	7.34	A	1	0.65	1	1	1	140.733	1.34	28.74	C
92.71-46.16			B	1	0.65	1	1	1	140.733			
			C	1	0.65	1	1	1	140.733			
L3 46.16-0.00	2.15	10.66	A	1	0.65	1	1	1	171.269	1.30	28.25	C
			B	1	0.65	1	1	1	171.269			
			C	1	0.65	1	1	1	171.269			
Sum Weight:	5.28	20.17						OTM	200.09 kip-ft	3.38		

Force Totals

Load Case	Vertical Forces	Sum of Forces X	Sum of Forces Z	Sum of Overturning Moments, M _x	Sum of Overturning Moments, M _z	Sum of Torques
	K	K	K	kip-ft	kip-ft	kip-ft
Leg Weight	20.17					
Bracing Weight	0.00					
Total Member Self-Weight	20.17			0.00	0.00	
Total Weight	30.46			0.00	0.00	
Wind 0 deg - No Ice		0.00	-15.90	-1314.16	0.00	0.00
Wind 30 deg - No Ice		7.95	-13.77	-1138.09	-657.08	0.00
Wind 45 deg - No Ice		11.24	-11.24	-929.25	-929.25	0.00
Wind 60 deg - No Ice		13.77	-7.95	-657.08	-1138.09	0.00
Wind 90 deg - No Ice		15.90	0.00	0.00	-1314.16	0.00
Wind 120 deg - No Ice		13.77	7.95	657.08	-1138.09	0.00
Wind 135 deg - No Ice		11.24	11.24	929.25	-929.25	0.00
Wind 150 deg - No Ice		7.95	13.77	1138.09	-657.08	0.00
Wind 180 deg - No Ice		0.00	15.90	1314.16	0.00	0.00
Wind 210 deg - No Ice		-7.95	13.77	1138.09	657.08	0.00
Wind 225 deg - No Ice		-11.24	11.24	929.25	929.25	0.00
Wind 240 deg - No Ice		-13.77	7.95	657.08	1138.09	0.00
Wind 270 deg - No Ice		-15.90	0.00	0.00	1314.16	0.00
Wind 300 deg - No Ice		-13.77	-7.95	-657.08	1138.09	0.00

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	11 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

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 315 deg - No Ice		-11.24	-11.24	-929.25	929.25	0.00
Wind 330 deg - No Ice		-7.95	-13.77	-1138.09	657.08	0.00
Member Ice	2.85					
Total Weight Ice	36.18			0.00	0.00	
Wind 0 deg - Ice		0.00	-13.19	-1102.39	0.00	0.00
Wind 30 deg - Ice		6.59	-11.42	-954.70	-551.19	0.00
Wind 45 deg - Ice		9.32	-9.32	-779.51	-779.51	0.00
Wind 60 deg - Ice		11.42	-6.59	-551.19	-954.70	0.00
Wind 90 deg - Ice		13.19	0.00	0.00	-1102.39	0.00
Wind 120 deg - Ice		11.42	6.59	551.19	-954.70	0.00
Wind 135 deg - Ice		9.32	9.32	779.51	-779.51	0.00
Wind 150 deg - Ice		6.59	11.42	954.70	-551.19	0.00
Wind 180 deg - Ice		0.00	13.19	1102.39	0.00	0.00
Wind 210 deg - Ice		-6.59	11.42	954.70	551.19	0.00
Wind 225 deg - Ice		-9.32	9.32	779.51	779.51	0.00
Wind 240 deg - Ice		-11.42	6.59	551.19	954.70	0.00
Wind 270 deg - Ice		-13.19	0.00	0.00	1102.39	0.00
Wind 300 deg - Ice		-11.42	-6.59	-551.19	954.70	0.00
Wind 315 deg - Ice		-9.32	-9.32	-779.51	779.51	0.00
Wind 330 deg - Ice		-6.59	-11.42	-954.70	551.19	0.00
Total Weight	30.46			0.00	0.00	
Wind 0 deg - Service		0.00	-6.21	-513.34	0.00	0.00
Wind 30 deg - Service		3.10	-5.38	-444.57	-256.67	0.00
Wind 45 deg - Service		4.39	-4.39	-362.99	-362.99	0.00
Wind 60 deg - Service		5.38	-3.10	-256.67	-444.57	0.00
Wind 90 deg - Service		6.21	0.00	0.00	-513.34	0.00
Wind 120 deg - Service		5.38	3.10	256.67	-444.57	0.00
Wind 135 deg - Service		4.39	4.39	362.99	-362.99	0.00
Wind 150 deg - Service		3.10	5.38	444.57	-256.67	0.00
Wind 180 deg - Service		0.00	6.21	513.34	0.00	0.00
Wind 210 deg - Service		-3.10	5.38	444.57	256.67	0.00
Wind 225 deg - Service		-4.39	4.39	362.99	362.99	0.00
Wind 240 deg - Service		-5.38	3.10	256.67	444.57	0.00
Wind 270 deg - Service		-6.21	0.00	0.00	513.34	0.00
Wind 300 deg - Service		-5.38	-3.10	-256.67	444.57	0.00
Wind 315 deg - Service		-4.39	-4.39	-362.99	362.99	0.00
Wind 330 deg - Service		-3.10	-5.38	-444.57	256.67	0.00

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page 12 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date 17:09:38 12/07/11
	Client	Verizon Wireless	Designed by TJL

Comb. No.	Description
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	120 - 92.71	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-9.43	0.00	0.00
			Max. Mx	6	-6.86	-120.93	0.00
			Max. My	10	-6.86	0.00	-120.93
			Max. Vy	6	8.46	-120.93	0.00
			Max. Vx	10	8.46	0.00	-120.93
			Max. Torque	3			-0.00
			Max Tension	1	0.00	0.00	0.00
L2	92.71 - 46.16	Pole	Max. Compression	18	-20.29	0.00	0.00
			Max. Mx	6	-16.25	-603.76	0.00
			Max. My	10	-16.25	0.00	-603.76
			Max. Vy	6	12.39	-603.76	0.00
			Max. Vx	10	12.39	0.00	-603.76
			Max. Torque	15			-0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-36.18	0.00	0.00
L3	46.16 - 0	Pole	Max. Mx	6	-30.45	-1337.42	0.00

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	13 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	10	-30.45	0.00	-1337.42
			Max. Vy	6	15.91	-1337.42	0.00
			Max. Vx	2	-15.91	0.00	1337.42
			Max. Torque	15			-0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	23	36.18	-13.19	0.00
	Max. H _x	14	30.46	15.90	0.00
	Max. H _z	2	30.46	0.00	15.90
	Max. M _x	2	1337.42	0.00	15.90
	Max. M _z	6	1337.42	-15.90	0.00
	Max. Torsion	5	0.00	-13.77	7.95
	Min. Vert	1	30.46	0.00	0.00
	Min. H _x	6	30.46	-15.90	0.00
	Min. H _z	10	30.46	0.00	-15.90
	Min. M _x	10	-1337.42	0.00	-15.90
	Min. M _z	14	-1337.42	15.90	0.00
	Min. Torsion	15	-0.00	13.77	7.95

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	30.46	0.00	0.00	0.00	0.00	0.00
Dead+Wind 0 deg - No Ice	30.46	0.00	-15.90	-1337.42	0.00	0.00
Dead+Wind 30 deg - No Ice	30.46	7.95	-13.77	-1158.24	-668.71	0.00
Dead+Wind 45 deg - No Ice	30.46	11.24	-11.24	-945.70	-945.70	0.00
Dead+Wind 60 deg - No Ice	30.46	13.77	-7.95	-668.71	-1158.24	-0.00
Dead+Wind 90 deg - No Ice	30.46	15.90	0.00	0.00	-1337.42	0.00
Dead+Wind 120 deg - No Ice	30.46	13.77	7.95	668.71	-1158.24	0.00
Dead+Wind 135 deg - No Ice	30.46	11.24	11.24	945.70	-945.70	0.00
Dead+Wind 150 deg - No Ice	30.46	7.95	13.77	1158.24	-668.71	-0.00
Dead+Wind 180 deg - No Ice	30.46	0.00	15.90	1337.42	0.00	0.00
Dead+Wind 210 deg - No Ice	30.46	-7.95	13.77	1158.24	668.71	0.00
Dead+Wind 225 deg - No Ice	30.46	-11.24	11.24	945.70	945.70	0.00
Dead+Wind 240 deg - No Ice	30.46	-13.77	7.95	668.71	1158.24	-0.00
Dead+Wind 270 deg - No Ice	30.46	-15.90	0.00	0.00	1337.42	0.00
Dead+Wind 300 deg - No Ice	30.46	-13.77	-7.95	-668.71	1158.24	0.00
Dead+Wind 315 deg - No Ice	30.46	-11.24	-11.24	-945.70	945.70	0.00
Dead+Wind 330 deg - No Ice	30.46	-7.95	-13.77	-1158.24	668.71	-0.00
Dead+Ice+Temp	36.18	0.00	0.00	0.00	0.00	0.00
Dead+Wind 0 deg+Ice+Temp	36.18	0.00	-13.19	-1127.12	0.00	0.00
Dead+Wind 30 deg+Ice+Temp	36.18	6.59	-11.42	-976.12	-563.56	0.00
Dead+Wind 45 deg+Ice+Temp	36.18	9.32	-9.32	-797.00	-797.00	0.00
Dead+Wind 60 deg+Ice+Temp	36.18	11.42	-6.59	-563.56	-976.12	-0.00
Dead+Wind 90 deg+Ice+Temp	36.18	13.19	0.00	0.00	-1127.12	0.00
Dead+Wind 120 deg+Ice+Temp	36.18	11.42	6.59	563.56	-976.12	0.00
Dead+Wind 135 deg+Ice+Temp	36.18	9.32	9.32	797.00	-797.00	0.00

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	14 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

Load Combination	Vertical K	Shear _x K	Shear _y K	Overturning Moment, M _x kip-ft	Overturning Moment, M _y kip-ft	Torque kip-ft
Dead+Wind 150 deg+Ice+Temp	36.18	6.59	11.42	976.12	-563.56	-0.00
Dead+Wind 180 deg+Ice+Temp	36.18	0.00	13.19	1127.12	0.00	0.00
Dead+Wind 210 deg+Ice+Temp	36.18	-6.59	11.42	976.12	563.56	0.00
Dead+Wind 225 deg+Ice+Temp	36.18	-9.32	9.32	797.00	797.00	0.00
Dead+Wind 240 deg+Ice+Temp	36.18	-11.42	6.59	563.56	976.12	-0.00
Dead+Wind 270 deg+Ice+Temp	36.18	-13.19	0.00	0.00	1127.12	0.00
Dead+Wind 300 deg+Ice+Temp	36.18	-11.42	-6.59	-563.56	976.12	0.00
Dead+Wind 315 deg+Ice+Temp	36.18	-9.32	-9.32	-797.00	797.00	0.00
Dead+Wind 330 deg+Ice+Temp	36.18	-6.59	-11.42	-976.12	563.56	-0.00
Dead+Wind 0 deg - Service	30.46	0.00	-6.21	-522.50	0.00	0.00
Dead+Wind 30 deg - Service	30.46	3.10	-5.38	-452.50	-261.25	0.00
Dead+Wind 45 deg - Service	30.46	4.39	-4.39	-369.46	-369.46	0.00
Dead+Wind 60 deg - Service	30.46	5.38	-3.10	-261.25	-452.50	-0.00
Dead+Wind 90 deg - Service	30.46	6.21	0.00	0.00	-522.50	0.00
Dead+Wind 120 deg - Service	30.46	5.38	3.10	261.25	-452.50	0.00
Dead+Wind 135 deg - Service	30.46	4.39	4.39	369.46	-369.46	0.00
Dead+Wind 150 deg - Service	30.46	3.10	5.38	452.50	-261.25	-0.00
Dead+Wind 180 deg - Service	30.46	0.00	6.21	522.50	0.00	0.00
Dead+Wind 210 deg - Service	30.46	-3.10	5.38	452.50	261.25	0.00
Dead+Wind 225 deg - Service	30.46	-4.39	4.39	369.46	369.46	0.00
Dead+Wind 240 deg - Service	30.46	-5.38	3.10	261.25	452.50	-0.00
Dead+Wind 270 deg - Service	30.46	-6.21	0.00	0.00	522.50	0.00
Dead+Wind 300 deg - Service	30.46	-5.38	-3.10	-261.25	452.50	0.00
Dead+Wind 315 deg - Service	30.46	-4.39	-4.39	-369.46	369.46	0.00
Dead+Wind 330 deg - Service	30.46	-3.10	-5.38	-452.50	261.25	-0.00

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-30.46	0.00	0.00	30.46	0.00	0.000%
2	0.00	-30.46	-15.90	0.00	30.46	15.90	0.000%
3	7.95	-30.46	-13.77	-7.95	30.46	13.77	0.000%
4	11.24	-30.46	-11.24	-11.24	30.46	11.24	0.000%
5	13.77	-30.46	-7.95	-13.77	30.46	7.95	0.000%
6	15.90	-30.46	0.00	-15.90	30.46	0.00	0.000%
7	13.77	-30.46	7.95	-13.77	30.46	-7.95	0.000%
8	11.24	-30.46	11.24	-11.24	30.46	-11.24	0.000%
9	7.95	-30.46	13.77	-7.95	30.46	-13.77	0.000%
10	0.00	-30.46	15.90	0.00	30.46	-15.90	0.000%
11	-7.95	-30.46	13.77	7.95	30.46	-13.77	0.000%
12	-11.24	-30.46	11.24	11.24	30.46	-11.24	0.000%
13	-13.77	-30.46	7.95	13.77	30.46	-7.95	0.000%
14	-15.90	-30.46	0.00	15.90	30.46	0.00	0.000%
15	-13.77	-30.46	-7.95	13.77	30.46	7.95	0.000%
16	-11.24	-30.46	-11.24	11.24	30.46	11.24	0.000%
17	-7.95	-30.46	-13.77	7.95	30.46	13.77	0.000%
18	0.00	-36.18	0.00	0.00	36.18	0.00	0.000%
19	0.00	-36.18	-13.19	0.00	36.18	13.19	0.000%
20	6.59	-36.18	-11.42	-6.59	36.18	11.42	0.000%
21	9.32	-36.18	-9.32	-9.32	36.18	9.32	0.000%
22	11.42	-36.18	-6.59	-11.42	36.18	6.59	0.000%
23	13.19	-36.18	0.00	-13.19	36.18	0.00	0.000%
24	11.42	-36.18	6.59	-11.42	36.18	-6.59	0.000%
25	9.32	-36.18	9.32	-9.32	36.18	-9.32	0.000%
26	6.59	-36.18	11.42	-6.59	36.18	-11.42	0.000%
27	0.00	-36.18	13.19	0.00	36.18	-13.19	0.000%

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	15 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
28	-6.59	-36.18	11.42	6.59	36.18	-11.42	0.000%
29	-9.32	-36.18	9.32	9.32	36.18	-9.32	0.000%
30	-11.42	-36.18	6.59	11.42	36.18	-6.59	0.000%
31	-13.19	-36.18	0.00	13.19	36.18	0.00	0.000%
32	-11.42	-36.18	-6.59	11.42	36.18	6.59	0.000%
33	-9.32	-36.18	-9.32	9.32	36.18	9.32	0.000%
34	-6.59	-36.18	-11.42	6.59	36.18	11.42	0.000%
35	0.00	-30.46	-6.21	0.00	30.46	6.21	0.000%
36	3.10	-30.46	-5.38	-3.10	30.46	5.38	0.000%
37	4.39	-30.46	-4.39	-4.39	30.46	4.39	0.000%
38	5.38	-30.46	-3.10	-5.38	30.46	3.10	0.000%
39	6.21	-30.46	0.00	-6.21	30.46	0.00	0.000%
40	5.38	-30.46	3.10	-5.38	30.46	-3.10	0.000%
41	4.39	-30.46	4.39	-4.39	30.46	-4.39	0.000%
42	3.10	-30.46	5.38	-3.10	30.46	-5.38	0.000%
43	0.00	-30.46	6.21	0.00	30.46	-6.21	0.000%
44	-3.10	-30.46	5.38	3.10	30.46	-5.38	0.000%
45	-4.39	-30.46	4.39	4.39	30.46	-4.39	0.000%
46	-5.38	-30.46	3.10	5.38	30.46	-3.10	0.000%
47	-6.21	-30.46	0.00	6.21	30.46	0.00	0.000%
48	-5.38	-30.46	-3.10	5.38	30.46	3.10	0.000%
49	-4.39	-30.46	-4.39	4.39	30.46	4.39	0.000%
50	-3.10	-30.46	-5.38	3.10	30.46	5.38	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	0.00001091
3	Yes	4	0.00000001	0.00056701
4	Yes	4	0.00000001	0.00065119
5	Yes	4	0.00000001	0.00056701
6	Yes	4	0.00000001	0.00001091
7	Yes	4	0.00000001	0.00056701
8	Yes	4	0.00000001	0.00065119
9	Yes	4	0.00000001	0.00056701
10	Yes	4	0.00000001	0.00001091
11	Yes	4	0.00000001	0.00056701
12	Yes	4	0.00000001	0.00065119
13	Yes	4	0.00000001	0.00056701
14	Yes	4	0.00000001	0.00001091
15	Yes	4	0.00000001	0.00056701
16	Yes	4	0.00000001	0.00065119
17	Yes	4	0.00000001	0.00056701
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00073950
20	Yes	5	0.00000001	0.00003102
21	Yes	5	0.00000001	0.00003393
22	Yes	5	0.00000001	0.00003102
23	Yes	4	0.00000001	0.00073950
24	Yes	5	0.00000001	0.00003102
25	Yes	5	0.00000001	0.00003393
26	Yes	5	0.00000001	0.00003102
27	Yes	4	0.00000001	0.00073950
28	Yes	5	0.00000001	0.00003102

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
	11074.CO24 - Collinsville	16 of 26
	Project 120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date 17:09:38 12/07/11
	Client Verizon Wireless	Designed by TJL

29	Yes	5	0.00000001	0.00003393
30	Yes	5	0.00000001	0.00003102
31	Yes	4	0.00000001	0.00073950
32	Yes	5	0.00000001	0.00003102
33	Yes	5	0.00000001	0.00003393
34	Yes	5	0.00000001	0.00003102
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00004391
37	Yes	4	0.00000001	0.00005058
38	Yes	4	0.00000001	0.00004391
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00004391
41	Yes	4	0.00000001	0.00005058
42	Yes	4	0.00000001	0.00004391
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00004391
45	Yes	4	0.00000001	0.00005058
46	Yes	4	0.00000001	0.00004391
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00004391
49	Yes	4	0.00000001	0.00005058
50	Yes	4	0.00000001	0.00004391

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 92.71	9.852	39	0.6562	0.0000
L2	97.29 - 46.16	6.806	39	0.6076	0.0000
L3	51.83 - 0	2.047	39	0.3550	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.00	LPA-80080-6CF	39	9.852	0.6562	0.0000	80455
118.00	EEI 14-ft Low Profile Platform	39	9.579	0.6530	0.0000	80455
110.00	(2) P65-15-XLH-RR	39	8.490	0.6393	0.0000	40227
108.00	Andrew 12'-6" Low Profile Platform	39	8.220	0.6353	0.0000	33523
100.00	APX16DWV-16DWVS-E-A20	39	7.158	0.6159	0.0000	20124
98.00	Valmont T-Arm (3)	39	6.898	0.6098	0.0000	18344
91.00	Uni-Tri Bracket	39	6.009	0.5842	0.0000	14287

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 92.71	25.214	6	1.6795	0.0000

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
	11074.CO24 - Collinsville	17 of 26
	Project 120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date 17:09:38 12/07/11
	Client Verizon Wireless	Designed by TJL

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L2	97.29 - 46.16	17.419	6	1.5550	0.0000
L3	51.83 - 0	5.239	6	0.9087	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.00	LPA-80080-6CF	6	25.214	1.6795	0.0000	31487
118.00	EEI 14-ft Low Profile Platform	6	24.514	1.6713	0.0000	31487
110.00	(2) P65-15-XLH-RR	6	21.729	1.6362	0.0000	15743
108.00	Andrew 12'-6" Low Profile Platform	6	21.039	1.6261	0.0000	13119
100.00	APX16DWV-16DWVS-E-A20	6	18.320	1.5763	0.0000	7875
98.00	Valmont T-Arm (3)	6	17.654	1.5608	0.0000	7178
91.00	Uni-Tri Bracket	6	15.380	1.4952	0.0000	5589

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 P P _a
L1	120 - 118.805	TP32.27x26.9x0.25	27.29	0.00	0.0	39.000	21.3334	-0.28	832.00	0.000
	118.805 - 117.609					39.000	21.5200	-1.93	839.28	0.002
	117.609 - 116.414					39.000	21.7067	-2.05	846.56	0.002
	116.414 - 115.219					39.000	21.8933	-2.17	853.84	0.003
	115.219 - 114.024					39.000	22.0799	-2.29	861.12	0.003
	114.024 - 112.828					39.000	22.2666	-2.42	868.40	0.003
	112.828 - 111.633					39.000	22.4532	-2.54	875.67	0.003
	111.633 - 110.438					39.000	22.6398	-2.67	882.95	0.003
	110.438 - 109.243					39.000	22.8264	-3.12	890.23	0.004
	109.243 - 108.047					39.000	23.0131	-3.25	897.51	0.004
	108.047 - 106.852					39.000	23.1997	-4.66	904.79	0.005
	106.852 - 105.657					39.000	23.3863	-4.79	912.07	0.005
	105.657 - 104.462					39.000	23.5730	-4.92	919.35	0.005
	104.462 - 103.266					39.000	23.7596	-5.05	926.62	0.005

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	18 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

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 P P _a
L2	103.266 -	TP40.8x30.8688x0.375	51.13	0.00	0.0	39.000	23.9462	-5.18	933.90	0.006
	102.071									
	102.071 -					39.000	24.1329	-5.31	941.18	0.006
	100.876									
	100.876 -					39.000	24.3195	-5.60	948.46	0.006
	99.6805									
	99.6805 -					39.000	24.5061	-5.74	955.74	0.006
	98.4853									
	98.4853 - 97.29					39.000	24.6927	-6.86	963.02	0.007
	97.29 - 92.71					39.000	25.4079	-3.26	990.91	0.003
	97.29 - 92.71					39.000	37.3540	-4.70	1456.81	0.003
	92.71 - 90.4389					39.000	37.8791	-8.72	1477.29	0.006
	90.4389 -					39.000	38.4042	-9.13	1497.76	0.006
	88.1678									
	88.1678 -					39.000	38.9292	-9.54	1518.24	0.006
	85.8967									
	85.8967 -					39.000	39.4543	-9.96	1538.72	0.006
	83.6256									
	83.6256 -					39.000	39.9793	-10.38	1559.19	0.007
	81.3544									
	81.3544 -					39.000	40.5044	-10.80	1579.67	0.007
	79.0833									
	79.0833 -					39.000	41.0294	-11.23	1600.15	0.007
	76.8122									
	76.8122 -					39.000	41.5545	-11.66	1620.62	0.007
	74.5411									
	74.5411 - 72.27					39.000	42.0795	-12.10	1641.10	0.007
	72.27 - 69.9989					39.000	42.6046	-12.55	1661.58	0.008
	69.9989 -					39.000	43.1296	-12.99	1682.06	0.008
	67.7278									
	67.7278 -					39.000	43.6547	-13.45	1702.53	0.008
	65.4567									
	65.4567 -					39.000	44.1797	-13.90	1723.01	0.008
	63.1856									
	63.1856 -					39.000	44.7048	-14.36	1743.49	0.008
	60.9144									
	60.9144 -					39.000	45.2299	-14.83	1763.96	0.008
	58.6433									
	58.6433 -					39.000	45.7549	-15.30	1784.44	0.009
	56.3722									
	56.3722 -					39.000	46.2800	-15.77	1804.92	0.009
	54.1011									
	54.1011 - 51.83					39.000	46.8050	-16.25	1825.40	0.009
	51.83 - 46.16					39.000	48.1159	-8.70	1876.52	0.005
L3	51.83 - 46.16	TP49x38.9487x0.4375	51.83	0.00	0.0	39.000	55.0045	-9.79	2145.18	0.005
	46.16 - 43.7305					39.000	55.6587	-19.07	2170.69	0.009
	43.7305 -					39.000	56.3130	-19.66	2196.21	0.009
	41.3011									
	41.3011 -					39.000	56.9672	-20.25	2221.72	0.009
	38.8716									
	38.8716 -					39.000	57.6215	-20.84	2247.24	0.009
	36.4421									
	36.4421 -					39.000	58.2757	-21.44	2272.75	0.009
	34.0126									
	34.0126 -					39.000	58.9300	-22.05	2298.27	0.010
	31.5832									
	31.5832 -					39.000	59.5842	-22.66	2323.78	0.010
	29.1537									
	29.1537 -					39.000	60.2384	-23.28	2349.30	0.010
	26.7242									

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
	11074.CO24 - Collinsville	20 of 26
	Project 120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date 17:09:38 12/07/11
	Client Verizon Wireless	Designed by TJL

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 $\frac{f_{by}}{F_{by}}$
L2	102.071 - 100.876	TP40.8x30.8688x0.375	94.04	6.233	39.000	0.160	0.00	0.000	39.000	0.000
	100.876 - 99.6805		102.30	6.677	39.000	0.171	0.00	0.000	39.000	0.000
	99.6805 - 98.4853		111.27	7.151	39.000	0.183	0.00	0.000	39.000	0.000
	98.4853 - 97.29		120.93	7.655	39.000	0.196	0.00	0.000	39.000	0.000
	97.29 - 92.71		66.63	3.983	39.000	0.102	0.00	0.000	39.000	0.000
	92.71 - 90.4389		93.89	3.911	39.000	0.100	0.00	0.000	39.000	0.000
	90.4389 - 88.1678		181.05	7.332	39.000	0.188	0.00	0.000	39.000	0.000
	88.1678 - 85.8967		202.87	7.992	39.000	0.205	0.00	0.000	39.000	0.000
	85.8967 - 83.6256		225.07	8.627	39.000	0.221	0.00	0.000	39.000	0.000
	83.6256 - 81.3544		247.65	9.240	39.000	0.237	0.00	0.000	39.000	0.000
	81.3544 - 79.0833		270.60	9.832	39.000	0.252	0.00	0.000	39.000	0.000
	79.0833 - 76.8122		293.94	10.403	39.000	0.267	0.00	0.000	39.000	0.000
	76.8122 - 74.5411		317.66	10.955	39.000	0.281	0.00	0.000	39.000	0.000
	74.5411 - 72.27		341.76	11.489	39.000	0.295	0.00	0.000	39.000	0.000
	72.27 - 69.9989		366.23	12.005	39.000	0.308	0.00	0.000	39.000	0.000
	69.9989 - 67.7278		391.10	12.504	39.000	0.321	0.00	0.000	39.000	0.000
	67.7278 - 65.4567		416.34	12.987	39.000	0.333	0.00	0.000	39.000	0.000
	65.4567 - 63.1856		441.96	13.455	39.000	0.345	0.00	0.000	39.000	0.000
	63.1856 - 60.9144		467.97	13.909	39.000	0.357	0.00	0.000	39.000	0.000
	60.9144 - 58.6433		494.36	14.348	39.000	0.368	0.00	0.000	39.000	0.000
	58.6433 - 56.3722		521.14	14.775	39.000	0.379	0.00	0.000	39.000	0.000
	56.3722 - 54.1011		548.30	15.188	39.000	0.389	0.00	0.000	39.000	0.000
	54.1011 - 51.83		575.84	15.589	39.000	0.400	0.00	0.000	39.000	0.000
	51.83 - 46.16		603.76	15.979	39.000	0.410	0.00	0.000	39.000	0.000
L3	46.16 - 43.7305	TP49x38.9487x0.4375	322.16	8.066	39.000	0.207	0.00	0.000	39.000	0.000
	43.7305 - 41.3011		353.10	7.906	39.000	0.203	0.00	0.000	39.000	0.000
	41.3011 - 38.8716		706.62	15.450	39.000	0.396	0.00	0.000	39.000	0.000
	38.8716 - 36.4421		738.37	15.769	39.000	0.404	0.00	0.000	39.000	0.000
	36.4421 - 34.0126		770.50	16.078	39.000	0.412	0.00	0.000	39.000	0.000
	34.0126 - 31.5832		803.01	16.376	39.000	0.420	0.00	0.000	39.000	0.000
			835.90	16.664	39.000	0.427	0.00	0.000	39.000	0.000
			869.17	16.943	39.000	0.434	0.00	0.000	39.000	0.000

Designed by
TJL

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 $\frac{f_{by}}{F_{by}}$
	31.5832 - 29.1537		902.83	17.212	39.000	0.441	0.00	0.000	39.000	0.000
	29.1537 - 26.7242		936.88	17.474	39.000	0.448	0.00	0.000	39.000	0.000
	26.7242 - 24.2947		971.31	17.727	39.000	0.455	0.00	0.000	39.000	0.000
	24.2947 - 21.8653		1006.13	17.972	39.000	0.461	0.00	0.000	39.000	0.000
	21.8653 - 19.4358		1041.36	18.210	39.000	0.467	0.00	0.000	39.000	0.000
	19.4358 - 17.0063		1076.97	18.441	39.000	0.473	0.00	0.000	39.000	0.000
	17.0063 - 14.5768		1112.97	18.665	39.000	0.479	0.00	0.000	39.000	0.000
	14.5768 - 12.1474		1149.38	18.883	39.000	0.484	0.00	0.000	39.000	0.000
	12.1474 - 9.7179		1186.18	19.094	39.000	0.490	0.00	0.000	39.000	0.000
	9.7179 - 7.28842		1223.39	19.300	39.000	0.495	0.00	0.000	39.000	0.000
	7.28842 - 4.85895		1261.00	19.500	39.000	0.500	0.00	0.000	39.000	0.000
	4.85895 - 2.42947		1299.01	19.694	39.000	0.505	0.00	0.000	39.000	0.000
	2.42947 - 0		1337.43	19.883	39.000	0.510	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation <i>ft</i>	Size	Actual <i>V</i> <i>K</i>	Actual <i>f_c</i> <i>ksi</i>	Allow. <i>F_v</i> <i>ksi</i>	Ratio $\frac{f_c}{F_v}$	Actual <i>T</i> <i>kip-ft</i>	Actual <i>f_{vt}</i> <i>ksi</i>	Allow. <i>F_{vt}</i> <i>ksi</i>	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	120 - 118.805	TP32.27x26.9x0.25	2.91	0.136	26.000	0.010	0.00	0.000	26.000	0.000
	118.805 - 117.609		3.69	0.172	26.000	0.013	0.00	0.000	26.000	0.000
	117.609 - 116.414		3.77	0.174	26.000	0.013	0.00	0.000	26.000	0.000
	116.414 - 115.219		3.86	0.176	26.000	0.014	0.00	0.000	26.000	0.000
	115.219 - 114.024		3.94	0.178	26.000	0.014	0.00	0.000	26.000	0.000
	114.024 - 112.828		4.02	0.181	26.000	0.014	0.00	0.000	26.000	0.000
	112.828 - 111.633		4.10	0.183	26.000	0.014	0.00	0.000	26.000	0.000
	111.633 - 110.438		4.19	0.185	26.000	0.014	0.00	0.000	26.000	0.000
	110.438 - 109.243		5.48	0.240	26.000	0.018	0.00	0.000	26.000	0.000
	109.243 - 108.047		5.56	0.242	26.000	0.019	0.00	0.000	26.000	0.000
	108.047 - 106.852		6.25	0.269	26.000	0.021	0.00	0.000	26.000	0.000
	106.852 - 105.657		6.33	0.271	26.000	0.021	0.00	0.000	26.000	0.000
	105.657 - 104.462		6.42	0.272	26.000	0.021	0.00	0.000	26.000	0.000

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page 22 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date 17:09:38 12/07/11
	Client	Verizon Wireless	Designed by TJL

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 $\frac{f_{vt}}{F_{vt}}$
	104.462 - 103.266		6.51	0.274	26.000	0.021	0.00	0.000	26.000	0.000
	103.266 - 102.071		6.59	0.275	26.000	0.021	0.00	0.000	26.000	0.000
	102.071 - 100.876		6.68	0.277	26.000	0.021	0.00	0.000	26.000	0.000
	100.876 - 99.6805		7.46	0.307	26.000	0.024	0.00	0.000	26.000	0.000
	99.6805 - 98.4853		7.55	0.308	26.000	0.024	0.00	0.000	26.000	0.000
	98.4853 - 97.29		8.46	0.343	26.000	0.026	0.00	0.000	26.000	0.000
L2	97.29 - 92.71	TP40.8x30.8688x0.375	3.76	0.148	26.000	0.011	0.00	0.000	26.000	0.000
	92.71 - 90.4389		5.07	0.136	26.000	0.010	0.00	0.000	26.000	0.000
	90.4389 - 88.1678		9.53	0.251	26.000	0.019	0.00	0.000	26.000	0.000
	88.1678 - 85.8967		9.69	0.252	26.000	0.019	0.00	0.000	26.000	0.000
	85.8967 - 83.6256		9.86	0.253	26.000	0.019	0.00	0.000	26.000	0.000
	83.6256 - 81.3544		10.03	0.254	26.000	0.020	0.00	0.000	26.000	0.000
	81.3544 - 79.0833		10.19	0.255	26.000	0.020	0.00	0.000	26.000	0.000
	79.0833 - 76.8122		10.36	0.256	26.000	0.020	0.00	0.000	26.000	0.000
	76.8122 - 74.5411		10.53	0.257	26.000	0.020	0.00	0.000	26.000	0.000
	74.5411 - 72.27		10.70	0.257	26.000	0.020	0.00	0.000	26.000	0.000
	72.27 - 69.9989		10.87	0.258	26.000	0.020	0.00	0.000	26.000	0.000
	69.9989 - 67.7278		11.03	0.259	26.000	0.020	0.00	0.000	26.000	0.000
	67.7278 - 65.4567		11.20	0.260	26.000	0.020	0.00	0.000	26.000	0.000
	65.4567 - 63.1856		11.37	0.261	26.000	0.020	0.00	0.000	26.000	0.000
	63.1856 - 60.9144		11.54	0.261	26.000	0.020	0.00	0.000	26.000	0.000
	60.9144 - 58.6433		11.71	0.262	26.000	0.020	0.00	0.000	26.000	0.000
	58.6433 - 56.3722		11.88	0.263	26.000	0.020	0.00	0.000	26.000	0.000
	56.3722 - 54.1011		12.05	0.263	26.000	0.020	0.00	0.000	26.000	0.000
	54.1011 - 51.83		12.22	0.264	26.000	0.020	0.00	0.000	26.000	0.000
	51.83 - 46.16		12.39	0.265	26.000	0.020	0.00	0.000	26.000	0.000
L3	46.16 - 43.7305	TP49x38.9487x0.4375	6.24	0.130	26.000	0.010	0.00	0.000	26.000	0.000
	43.7305 - 41.3011		6.60	0.120	26.000	0.009	0.00	0.000	26.000	0.000
	41.3011 - 38.8716		13.00	0.234	26.000	0.018	0.00	0.000	26.000	0.000
	38.8716 - 36.4421		13.15	0.234	26.000	0.018	0.00	0.000	26.000	0.000
			13.31	0.234	26.000	0.018	0.00	0.000	26.000	0.000
			13.47	0.234	26.000	0.018	0.00	0.000	26.000	0.000

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	23 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

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 $\frac{f_{vt}}{F_{vt}}$
	36.4421 - 34.0126		13.62	0.234	26.000	0.018	0.00	0.000	26.000	0.000
	34.0126 - 31.5832		13.78	0.234	26.000	0.018	0.00	0.000	26.000	0.000
	31.5832 - 29.1537		13.94	0.234	26.000	0.018	0.00	0.000	26.000	0.000
	29.1537 - 26.7242		14.10	0.234	26.000	0.018	0.00	0.000	26.000	0.000
	26.7242 - 24.2947		14.26	0.234	26.000	0.018	0.00	0.000	26.000	0.000
	24.2947 - 21.8653		14.43	0.234	26.000	0.018	0.00	0.000	26.000	0.000
	21.8653 - 19.4358		14.59	0.235	26.000	0.018	0.00	0.000	26.000	0.000
	19.4358 - 17.0063		14.75	0.235	26.000	0.018	0.00	0.000	26.000	0.000
	17.0063 - 14.5768		14.91	0.235	26.000	0.018	0.00	0.000	26.000	0.000
	14.5768 - 12.1474		15.08	0.235	26.000	0.018	0.00	0.000	26.000	0.000
	12.1474 - 9.7179		15.24	0.235	26.000	0.018	0.00	0.000	26.000	0.000
	9.7179 - 7.28842		15.41	0.235	26.000	0.018	0.00	0.000	26.000	0.000
	7.28842 - 4.85895		15.57	0.236	26.000	0.018	0.00	0.000	26.000	0.000
	4.85895 - 2.42947		15.74	0.236	26.000	0.018	0.00	0.000	26.000	0.000
	2.42947 - 0		15.91	0.236	26.000	0.018	0.00	0.000	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P P_a	Ratio f_{bx} F_{bx}	Ratio f_{by} F_{by}	Ratio f_v F_v	Ratio f_{vt} F_{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	120 - 118.805	0.000	0.007	0.000	0.010	0.000	0.008	1.333	H1-3+VT ✓
	118.805 - 117.609	0.002	0.015	0.000	0.013	0.000	0.018	1.333	H1-3+VT ✓
	117.609 - 116.414	0.002	0.025	0.000	0.013	0.000	0.027	1.333	H1-3+VT ✓
	116.414 - 115.219	0.003	0.034	0.000	0.014	0.000	0.036	1.333	H1-3+VT ✓
	115.219 - 114.024	0.003	0.042	0.000	0.014	0.000	0.045	1.333	H1-3+VT ✓
	114.024 - 112.828	0.003	0.051	0.000	0.014	0.000	0.054	1.333	H1-3+VT ✓
	112.828 - 111.633	0.003	0.060	0.000	0.014	0.000	0.063	1.333	H1-3+VT ✓
	111.633 - 110.438	0.003	0.069	0.000	0.014	0.000	0.072	1.333	H1-3+VT ✓
	110.438 -	0.004	0.079	0.000	0.018	0.000	0.082	1.333	H1-3+VT ✓

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	24 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

Section No.	Elevation ft	Ratio P P_a	Ratio f_{bx} F_{bx}	Ratio f_{by} F_{by}	Ratio f_v F_v	Ratio f_{vt} F_{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	109.243						✓		
	109.243 - 108.047	0.004	0.090	0.000	0.019	0.000	0.094	1.333	H1-3+VT ✓
	108.047 - 106.852	0.005	0.102	0.000	0.021	0.000	0.107	1.333	H1-3+VT ✓
	106.852 - 105.657	0.005	0.114	0.000	0.021	0.000	0.119	1.333	H1-3+VT ✓
	105.657 - 104.462	0.005	0.126	0.000	0.021	0.000	0.131	1.333	H1-3+VT ✓
	104.462 - 103.266	0.005	0.137	0.000	0.021	0.000	0.143	1.333	H1-3+VT ✓
	103.266 - 102.071	0.006	0.149	0.000	0.021	0.000	0.154	1.333	H1-3+VT ✓
	102.071 - 100.876	0.006	0.160	0.000	0.021	0.000	0.166	1.333	H1-3+VT ✓
	100.876 - 99.6805	0.006	0.171	0.000	0.024	0.000	0.177	1.333	H1-3+VT ✓
	99.6805 - 98.4853	0.006	0.183	0.000	0.024	0.000	0.190	1.333	H1-3+VT ✓
	98.4853 - 97.29	0.007	0.196	0.000	0.026	0.000	0.204	1.333	H1-3+VT ✓
	97.29 - 92.71	0.003	0.102	0.000	0.011	0.000	0.105	1.333	H1-3+VT ✓
L2	97.29 - 92.71	0.003	0.100	0.000	0.010	0.000	0.104	1.333	H1-3+VT ✓
	92.71 - 90.4389	0.006	0.188	0.000	0.019	0.000	0.194	1.333	H1-3+VT ✓
	90.4389 - 88.1678	0.006	0.205	0.000	0.019	0.000	0.211	1.333	H1-3+VT ✓
	88.1678 - 85.8967	0.006	0.221	0.000	0.019	0.000	0.228	1.333	H1-3+VT ✓
	85.8967 - 83.6256	0.006	0.237	0.000	0.020	0.000	0.243	1.333	H1-3+VT ✓
	83.6256 - 81.3544	0.007	0.252	0.000	0.020	0.000	0.259	1.333	H1-3+VT ✓
	81.3544 - 79.0833	0.007	0.267	0.000	0.020	0.000	0.274	1.333	H1-3+VT ✓
	79.0833 - 76.8122	0.007	0.281	0.000	0.020	0.000	0.288	1.333	H1-3+VT ✓
	76.8122 - 74.5411	0.007	0.295	0.000	0.020	0.000	0.302	1.333	H1-3+VT ✓
	74.5411 - 72.27	0.007	0.308	0.000	0.020	0.000	0.315	1.333	H1-3+VT ✓
	72.27 - 69.9989	0.008	0.321	0.000	0.020	0.000	0.328	1.333	H1-3+VT ✓
	69.9989 - 67.7278	0.008	0.333	0.000	0.020	0.000	0.341	1.333	H1-3+VT ✓
	67.7278 - 65.4567	0.008	0.345	0.000	0.020	0.000	0.353	1.333	H1-3+VT ✓
	65.4567 - 63.1856	0.008	0.357	0.000	0.020	0.000	0.365	1.333	H1-3+VT ✓
	63.1856 - 60.9144	0.008	0.368	0.000	0.020	0.000	0.376	1.333	H1-3+VT ✓

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	25 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

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
L3	60.9144 - 58.6433	0.008	0.379	0.000	0.020	0.000	0.387	1.333	H1-3+VT ✓
	58.6433 - 56.3722	0.009	0.389	0.000	0.020	0.000	0.398	1.333	H1-3+VT ✓
	56.3722 - 54.1011	0.009	0.400	0.000	0.020	0.000	0.409	1.333	H1-3+VT ✓
	54.1011 - 51.83	0.009	0.410	0.000	0.020	0.000	0.419	1.333	H1-3+VT ✓
	51.83 - 46.16	0.005	0.207	0.000	0.010	0.000	0.211	1.333	H1-3+VT ✓
	51.83 - 46.16	0.005	0.203	0.000	0.009	0.000	0.207	1.333	H1-3+VT ✓
	46.16 - 43.7305	0.009	0.396	0.000	0.018	0.000	0.405	1.333	H1-3+VT ✓
	43.7305 - 41.3011	0.009	0.404	0.000	0.018	0.000	0.413	1.333	H1-3+VT ✓
	41.3011 - 38.8716	0.009	0.412	0.000	0.018	0.000	0.421	1.333	H1-3+VT ✓
	38.8716 - 36.4421	0.009	0.420	0.000	0.018	0.000	0.429	1.333	H1-3+VT ✓
	36.4421 - 34.0126	0.009	0.427	0.000	0.018	0.000	0.437	1.333	H1-3+VT ✓
	34.0126 - 31.5832	0.010	0.434	0.000	0.018	0.000	0.444	1.333	H1-3+VT ✓
	31.5832 - 29.1537	0.010	0.441	0.000	0.018	0.000	0.451	1.333	H1-3+VT ✓
	29.1537 - 26.7242	0.010	0.448	0.000	0.018	0.000	0.458	1.333	H1-3+VT ✓
	26.7242 - 24.2947	0.010	0.455	0.000	0.018	0.000	0.465	1.333	H1-3+VT ✓
	24.2947 - 21.8653	0.010	0.461	0.000	0.018	0.000	0.471	1.333	H1-3+VT ✓
	21.8653 - 19.4358	0.010	0.467	0.000	0.018	0.000	0.477	1.333	H1-3+VT ✓
	19.4358 - 17.0063	0.011	0.473	0.000	0.018	0.000	0.483	1.333	H1-3+VT ✓
	17.0063 - 14.5768	0.011	0.479	0.000	0.018	0.000	0.489	1.333	H1-3+VT ✓
	14.5768 - 12.1474	0.011	0.484	0.000	0.018	0.000	0.495	1.333	H1-3+VT ✓
	12.1474 - 9.7179	0.011	0.490	0.000	0.018	0.000	0.501	1.333	H1-3+VT ✓
	9.7179 - 7.28842	0.011	0.495	0.000	0.018	0.000	0.506	1.333	H1-3+VT ✓
	7.28842 - 4.85895	0.011	0.500	0.000	0.018	0.000	0.511	1.333	H1-3+VT ✓
	4.85895 - 2.42947	0.011	0.505	0.000	0.018	0.000	0.516	1.333	H1-3+VT ✓
	2.42947 - 0	0.012	0.510	0.000	0.018	0.000	0.521	1.333	H1-3+VT ✓

<i>RISATower</i> Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11074.CO24 - Collinsville	Page	26 of 26
	Project	120' EEI Monopole - 650 Albany Turnpike - Canton, CT	Date	17:09:38 12/07/11
	Client	Verizon Wireless	Designed by	TJL

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
L1	120 - 92.71	Pole	TP32.27x26.9x0.25	1	-6.86	1283.70	15.3	Pass
L2	92.71 - 46.16	Pole	TP40.8x30.8688x0.375	2	-16.25	2433.26	31.4	Pass
L3	46.16 - 0	Pole	TP49x38.9487x0.4375	3	-30.45	3505.75	39.1	Pass
							Summary	
							Pole (L3)	39.1 Pass
							RATING =	39.1 Pass

Program Version 5.4.1.8 - 4/8/2010 File:J:\Jobs\1107400.WI\CO24 - Verizon Collinsville - Canton, CT\Rev (1)\Calcs\ERI Files\120' EEI Monopole_Extendable_to_150_Canton_CT.eri

Anchor Bolt and Base Plate Analysis:**Input Data:**Tower Reactions:

Overturning Moment =	OM := 1337-ft-kips	(Input From RisaTower)
Shear Force =	Shear := 16-kips	(Input From RisaTower)
Axial Force =	Axial := 30-kips	(Input From RisaTower)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts =	N := 18	(User Input)
Diameter of Bolt Circle =	D _{bc} := 58.0-in	(User Input)
Bolt "Column" Distance =	l := 3.0-in	(User Input)
Bolt Ultimate Strenght =	F _u := 100-ksi	(User Input)
Bolt Yield Strenght =	F _y := 75-ksi	(User Input)
Bolt Modulus =	E := 29000-ksi	(User Input)
Diameter of Anchor Bolts =	D := 2.25-in	(User Input)
Threads per Inch =	n := 4.5	(User Input)

Base Plate Data:

Use ASTM A572 Grade 60

Plate Yield Strength =	F _{ybp} := 60-ksi	(User Input)
Base Plate Thickness =	t _{bp} := 2.0-in	(User Input)
Base Plate Diameter =	D _{bp} := 64.0-in	(User Input)
Outer Pole Diameter =	D _{pole} := 49.0-in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =:

$$R_{bc} := \frac{D_{bc}}{2} = 29\text{-in}$$

Distance to Bolts =

$$i := 1..N$$

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

$$d_1 = 9.92\text{-in} \quad d_9 = 0.00\text{-in}$$

$$d_2 = 18.64\text{-in} \quad d_{10} = -9.92\text{-in}$$

$$d_3 = 25.11\text{-in} \quad d_{11} = -18.64\text{-in}$$

$$d_4 = 28.56\text{-in} \quad d_{12} = -25.11\text{-in}$$

$$d_5 = 28.56\text{-in} \quad d_{13} = -28.56\text{-in}$$

$$d_6 = 25.11\text{-in} \quad d_{14} = -28.56\text{-in}$$

$$d_7 = 18.64\text{-in} \quad d_{15} = -25.11\text{-in}$$

$$d_8 = 9.92\text{-in} \quad d_{16} = -18.64\text{-in}$$

Critical Distances For Bending in Plate:

Outer Pole Radius =

$$R_{pole} := \frac{D_{pole}}{2} = 24.5\text{-in}$$

Moment Arms of Bolts about Neutral Axis =

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

$$MA_1 = 0.00\text{-in} \quad MA_9 = 0.00\text{-in}$$

$$MA_2 = 0.00\text{-in} \quad MA_{10} = 0.00\text{-in}$$

$$MA_3 = 0.61\text{-in} \quad MA_{11} = 0.00\text{-in}$$

$$MA_4 = 4.06\text{-in} \quad MA_{12} = 0.00\text{-in}$$

$$MA_5 = 4.06\text{-in} \quad MA_{13} = 0.00\text{-in}$$

$$MA_6 = 0.61\text{-in} \quad MA_{14} = 0.00\text{-in}$$

$$MA_7 = 0.00\text{-in} \quad MA_{15} = 0.00\text{-in}$$

$$MA_8 = 0.00\text{-in} \quad MA_{16} = 0.00\text{-in}$$

Effective Width of Baseplate for Bending =

$$B_{eff} := 0.8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 32.9\text{-in}$$

Anchor Bolt Analysis:Calculated Anchor Bolt Properties:

Polar Moment of Inertia =

$$I_p := \sum_i (d_i)^2 = 7.569 \times 10^3 \cdot \text{in}^2$$

Gross Area of Bolt =

$$A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot \text{in}^2$$

Net Area of Bolt =

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

Net Diameter =

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

Radius of Gyration of Bolt =

$$r := \frac{D_n}{4} = 0.508 \cdot \text{in}$$

Section Modulus of Bolt =

$$S_x := \frac{\pi \cdot D_n^3}{32} = 0.826 \cdot \text{in}^3$$

Check Anchor Bolt Tension Force:

Maximum Tensile Force =

$$T_{\text{Max}} := \text{OM} \cdot \frac{R_{bc}}{I_p} - \frac{\text{Axial}}{N} = 59.8 \cdot \text{kips}$$

Allowable Tensile Force =

$$T_{\text{ALL.Gross}} := 1.333 \cdot (0.33 \cdot A_g \cdot F_u) = 174.9 \cdot \text{kips} \quad (1.333 \text{ increase allowed per TIA/EIA})$$

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

Bolt Tension % of Capacity =

$$\frac{T_{\text{Max}}}{T_{\text{ALL.Net}}} = 30.7\% \quad \text{Bolts are "upset bolts". Use net area per AISC}$$

Condition1 =

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

Condition1 = "OK"

Check Anchor Bolt Bending Stress:

Maximum Bending Moment =

$$M_x := \left(\frac{\text{Shear}}{N} \right) \cdot l = 0.222 \cdot \text{ft} \cdot \text{kips}$$

Maximum Bending Stress =

$$f_{bx} := \frac{M_x}{S_x} = 3.2 \cdot \text{ksi}$$

Allowable Bending Stress =

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

Check Combined Stress Requirement:

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

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

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

Check Anchor Bolt Compression/Combined Stress:

Maximum Compressive Force =

$$C_{Max} := OM \cdot \frac{R_{bc}}{l_p} + \frac{Axial}{N} = 63.1 \cdot \text{kips}$$

Maximum Compressive Stress =

$$f_a := \frac{C_{Max}}{A_n} = 19.4 \cdot \text{ksi}$$

$$K := 0.65$$

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

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

Allowable Compressive Stress =

$$F_a := 1.333 \cdot F_a = 60 \cdot \text{ksi} \quad (1.333 \text{ increase allowed per TIA/EIA})$$

Combined Stress % of Capacity =

$$\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \right) = 32.4 \cdot \%$$

Condition 2 =

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

Condition2 = "OK"

Base Plate Analysis:

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

$C_1 = 22.7 \text{ kips}$

$C_9 = 1.7 \text{ kips}$

$C_2 = 41.2 \text{ kips}$

$C_{10} = -19.4 \text{ kips}$

$C_3 = 54.9 \text{ kips}$

$C_{11} = -37.8 \text{ kips}$

$C_4 = 62.2 \text{ kips}$

$C_{12} = -51.6 \text{ kips}$

$C_5 = 62.2 \text{ kips}$

$C_{13} = -58.9 \text{ kips}$

$C_6 = 54.9 \text{ kips}$

$C_{14} = -58.9 \text{ kips}$

$C_7 = 41.2 \text{ kips}$

$C_{15} = -51.6 \text{ kips}$

$C_8 = 22.7 \text{ kips}$

$C_{16} = -37.8 \text{ kips}$

Maximum Bending Stress in Plate =
$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{(B_{eff} t_{bp})^2} = 26.1 \text{ ksi}$$

Allowable Bending Stress in Plate =
$$F_{bp} := 1.33 \cdot 0.75 \cdot F_y = 59.9 \text{ ksi}$$

Plate Bending Stress % of Capacity =
$$\frac{f_{bp}}{F_{bp}} = 43.6\%$$

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

Condition3 = "Ok"

Standard Monopole Foundation:**Input Data:**Tower Data

Overturning Moment = OM := 1337-ft-kips (User Input from RISATower)
 Shear Force = Shear := 16-kip (User Input from RISATower)
 Axial Force = Axial := 30-kip (User Input from RISATower)
 Tower Height = H_t := 120-ft (User Input)

Footing Data:

Overall Depth of Footing = D_f := 8.0 ft (User Input)
 Length of Pier = L_p := 5.0 ft (User Input)
 Extension of Pier Above Grade = L_{pag} := 1.0 ft (User Input)
 Diameter of Pier = d_p := 7.0 ft (User Input)
 Thickness of Footing = T_f := 3.0 ft (User Input)
 Width of Footing = W_f := 24.0 ft (User Input)

Anchor Bolt Data:

Length of Anchor Bolts = L_{st} := 96-in (User Input)
 Projection of Anchor Bolts Above Pier = A_{BP} := 12.0-in (User Input)
 Anchor Bolt Diameter = d_{anchor} := 2.25-in (User Input)
 Base Plate Bolt Circle = MP := 58.0-in (User Input)

Material Properties:

Concrete Compressive Strength = f_c := 4000-psi (User Input)
 Steel Reinforcement Yield Strength = f_y := 60000-psi (User Input)
 Anchor Bolt Yield Strength = f_{ya} := 75000-psi (User Input)
 Internal Friction Angle of Soil = Φ_s := 33-deg (User Input)
 Allowable Soil Bearing Capacity = q_s := 5000-psf (User Input)
 Unit Weight of Soil = γ_{soil} := 125-pcf (User Input)
 Unit Weight of Concrete = γ_{conc} := 150-pcf (User Input)
 Foundation Bouyancy = Bouyancy := 0 (User Input) (Yes=1 / No=0)
 Depth to Neglect = n := 1-ft (User Input)
 Cohesion of Clay Type Soil = c := 0-ksf (User Input) (Use 0 for Sandy Soil)
 Seismic Zone Factor = Z := 2 (User Input) (UBC-1997 Fig 23-2)
 Coefficient of Friction Between Concrete = μ := 0.45 (User Input)

Pier Reinforcement:

Bar Size =	$BS_{\text{pier}} := 9$	(User Input)	
Bar Diameter =	$d_{\text{bpier}} := 1.128\text{-in}$	(User Input)	
Number of Bars =	$NB_{\text{pier}} := 30$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{\text{pier}} := 3\text{-in}$	(User Input)	
Reinforcement Location Factor =	$\alpha_{\text{pier}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{\text{pier}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{\text{pier}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{\text{pier}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{\text{Tie}} := 0.5\text{-in}$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{\text{top}} := 9$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{\text{btop}} := 1.128\text{-in}$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{\text{top}} := 20$	(User Input)	(Top of Pad)
Bar Size =	$BS_{\text{bot}} := 9$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{\text{bbot}} := 1.128\text{-in}$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{\text{bot}} := 36$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{\text{pad}} := 3.0\text{-in}$	(User Input)	
Reinforcement Location Factor =	$\alpha_{\text{pad}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{\text{pad}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{\text{pad}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{\text{pad}} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area =	$A_{\text{bpier}} := \frac{\pi \cdot d_{\text{bpier}}^2}{4} = 0.999\text{-in}^2$	
Pad Top Reinforcement Bar Area =	$A_{\text{btop}} := \frac{\pi \cdot d_{\text{btop}}^2}{4} = 0.999\text{-in}^2$	
Pad Bottom Reinforcement Bar Area =	$A_{\text{bbot}} := \frac{\pi \cdot d_{\text{bbot}}^2}{4} = 0.999\text{-in}^2$	
Coefficient of Lateral Soil Pressure =	$K_p := \frac{1 + \sin(\phi_s)}{1 - \sin(\phi_s)} = 3.392$	
Load Factor =	$LF := \begin{cases} 1.333 & \text{if } H_t \leq 700\text{-ft} \\ 1.7 & \text{if } H_t \geq 1200\text{-ft} \\ 1.333 + \left(\frac{H_t - 700\text{ft}}{1200\text{ft} - 700\text{ft}} \right) \cdot 0.4 & \text{otherwise} \end{cases}$	= 1.333

Stability of Footing:

Adjusted Concrete Unit Weight =

$$\gamma_c := \text{if}(\text{Bouyancy} = 1, \gamma_{\text{conc}} - 62.4 \text{ pcf}, \gamma_{\text{conc}}) = 150 \text{ pcf}$$

Adjusted Soil Unit Weight =

$$\gamma_s := \text{if}(\text{Bouyancy} = 1, \gamma_{\text{soil}} - 62.4 \text{ pcf}, \gamma_{\text{soil}}) = 125 \text{ pcf}$$

Passive Pressure =

$$P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0.424 \text{ ksf}$$

$$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 2.12 \text{ ksf}$$

$$P_{top} := \text{if}(n < (D_f - T_f), P_{pt}, P_{pn}) = 2.12 \text{ ksf}$$

$$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 3.392 \text{ ksf}$$

$$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 2.756 \text{ ksf}$$

$$T_p := \text{if}(n < (D_f - T_f), T_f, (D_f - n)) = 3$$

$$A_p := W_f \cdot T_p = 72$$

Ultimate Shear =

$$S_u := P_{ave} \cdot A_p = 198.439 \text{ kip}$$

Weight of Concrete Pad =

$$WT_c := \left[(W_f^2 \cdot T_f) + \frac{d_p^2 \cdot \pi}{4} L_p \right] \cdot \gamma_c = 288.063 \text{ kip}$$

Weight of Soil Above Footing =

$$WT_{s1} := \left[\left(W_f^2 - \frac{d_p^2 \cdot \pi}{4} \right) \cdot (L_p - L_{pag} - n) \right] \cdot \gamma_s = 201.57 \text{ kip}$$

Weight of Soil Wedge at Back Face =

$$WT_{s2} := \left(\frac{D_f^2 \cdot \tan(\Phi_s)}{2} \cdot W_f \right) \cdot \gamma_s = 62.343 \text{ kip}$$

Weight of Soil Wedge at back face Corners =

$$WT_{s3} := 2 \cdot \left[(D_f)^3 \cdot \frac{\tan(\Phi_s)}{3} \right] \cdot \gamma_s = 27.708 \text{ kips}$$

Total Weight =

$$WT_{tot} := WT_c + WT_{s1} + \text{Axial} = 519.632 \text{ kip}$$

Resisting Moment =

$$M_r := (WT_{tot}) \cdot \frac{W_f}{2} + S_u \cdot \frac{T_f}{3} + \left[(WT_{s2} + WT_{s3}) \cdot \left(W_f + \frac{D_f \tan(\Phi_s)}{3} \right) \right] = 8751 \text{ kip-ft}$$

Overturning Moment =

$$M_{ot} := OM + \text{Shear} \cdot (L_p + T_f) = 1465 \text{ kip-ft}$$

Factor of Safety Actual =

$$FS := \frac{M_r}{M_{ot}} = 5.97$$

Factor of Safety Required =

$$FS_{req} := 2$$

$$\text{OverTurning_Moment_Check} := \text{if}(FS \geq FS_{req}, \text{"Okay"}, \text{"No Good"})$$

$$\text{OverTurning_Moment_Check} = \text{"Okay"}$$

Shear Capacity in Pier:

Shear Resistance of Pier =

$$S_p := \frac{\mu \cdot W_{T_{tot}}}{F_{S_{req}}} = 116.917 \cdot \text{kips}$$

$$\text{Shear_Check} := \text{if}(S_p > \text{Shear}, \text{"Okay"}, \text{"No Good"})$$

$$\text{Shear_Check} = \text{"Okay"}$$

Bearing Pressure Caused by Footing:

Area of the Mat =

$$A_{mat} := W_f^2 = 576$$

Section Modulus of Mat =

$$S := \frac{W_f^3}{6} = 2304 \cdot \text{ft}^3$$

Maximum Pressure in Mat =

$$P_{max} := \frac{W_{T_{tot}}}{A_{mat}} + \frac{M_{ot}}{S} = 1.538 \cdot \text{ksf}$$

$$\text{Max_Pressure_Check} := \text{if}(P_{max} < q_s, \text{"Okay"}, \text{"No Good"})$$

$$\text{Max_Pressure_Check} = \text{"Okay"}$$

Minimum Pressure in Mat =

$$P_{min} := \frac{W_{T_{tot}}}{A_{mat}} - \frac{M_{ot}}{S} = 0.266 \cdot \text{ksf}$$

$$\text{Min_Pressure_Check} := \text{if}((P_{min} \geq 0) \cdot (P_{min} < q_s), \text{"Okay"}, \text{"No Good"})$$

$$\text{Min_Pressure_Check} = \text{"Okay"}$$

Distance to Resultant of Pressure Distribution =

$$X_p := \frac{\frac{P_{max}}{P_{max} - P_{min}} \cdot \frac{1}{3}}{\frac{W_f}{W_f}} = 9.675$$

Distance to Kern =

$$X_k := \frac{W_f}{6} = 4$$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity =

$$e := \frac{M_{ot}}{W_{T_{tot}}} = 2.819$$

Adjusted Soil Pressure =

$$P_a := \frac{2 \cdot W_{T_{tot}}}{3 \cdot W_f \left(\frac{W_f}{2} - e \right)} = 1.572 \cdot \text{ksf}$$

$$q_{adj} := \text{if}(P_{min} < 0, P_a, P_{max}) = 1.538 \cdot \text{ksf}$$

$$\text{Pressure_Check} := \text{if}(q_{adj} < q_s, \text{"Okay"}, \text{"No Good"})$$

$$\text{Pressure_Check} = \text{"Okay"}$$

Concrete Bearing Capacity:

Strength Reduction Factor =

$$\Phi_c := 0.65 \quad (\text{ACI-2008 9.3.2.2})$$

Bearing Strength Between Pier and Pad =

$$P_b := \Phi_c \cdot 0.85 \cdot f_c \cdot \frac{\pi \cdot d_p^2}{4} = 1.225 \times 10^4 \text{ kips} \quad (\text{ACI-2008 10.14})$$

$$\text{Bearing_Check} := \text{if}(P_b > \text{LF} \cdot \text{Axial}, \text{"Okay"}, \text{"No Good"})$$

$$\text{Bearing_Check} = \text{"Okay"}$$

Shear Strength of Concrete:

Beam Shear:

(Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$$\Phi_c := 0.85 \quad (\text{ACI 9.3.2.5})$$

$$d := T_f - \text{Cvr}_{\text{pad}} - d_{\text{bbot}} = 31.872 \text{ in}$$

$$d_1 := \frac{W_f}{2} - \frac{d_p}{2}$$

$$d_2 := d_1 - d$$

$$L := \left(\frac{W_f}{2} - e \right) \cdot 3$$

$$\text{Slope} := \text{if} \left(L > W_f, \frac{P_{\text{max}} - P_{\text{min}}}{W_f}, \frac{q_{\text{adj}}}{L} \right)$$

$$V_{\text{req}} := \text{LF} \cdot \left[(q_{\text{adj}} - \text{Slope} \cdot d_1) + \left(\frac{\text{Slope} \cdot d_1}{2} \right) \right] \cdot W_f \cdot d_1$$

$$V_{\text{Avail}} := \Phi_c \cdot 2 \cdot \sqrt{f_c \cdot \text{psi}} \cdot W_f \cdot d \quad (\text{ACI-2008 11.2.1.1})$$

$$\text{Beam_Shear_Check} := \text{if}(V_{\text{req}} < V_{\text{Avail}}, \text{"Okay"}, \text{"No Good"})$$

$$\text{Beam_Shear_Check} = \text{"Okay"}$$

Punching Shear:

(Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.11.1.2)

Critical Perimeter of Punching Shear =

$$b_o := (d_p + d) \cdot \pi = 30.3$$

Area Included Inside Perimeter =

$$A_{bo} := \frac{\pi \cdot (d_p + d)^2}{4} = 73.2$$

Area Outside of Perimeter =

$$A_{\text{out}} := A_{\text{mat}} - A_{bo} = 502.8$$

Guess Value =

$$v_u := 1 \text{ ksf}$$

(From "Foundation Analysis and design", By Joseph Bowles, Eq. 8-9)

Given

$$d^2 + d_p \cdot d = \frac{W_{T_{tot}}}{\pi \cdot v_u}$$

$$v_u := \text{Find}(v_u) = 6.4 \cdot \text{ksf}$$

$$V_u := v_u \cdot d \cdot W_f = 411.1 \cdot \text{kips}$$

Required Shear Strength =

$$V_{req} := L F \cdot V_u = 548 \cdot \text{kips}$$

Available Shear Strength =

$$V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c} \cdot \text{psi} \cdot b_o \cdot d = 2494.9 \cdot \text{kip} \quad (\text{ACI-2008 11.11.2.1})$$

$$\text{Punching_Shear_Check} := \text{if}(V_{req} < V_{Avail}, \text{"Okay"}, \text{"No Good"})$$

$$\text{Punching_Shear_Check} = \text{"Okay"}$$

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor =

$$\phi_m := .90$$

(ACI-2008 9.3.2.1)

$$q_b := q_{adj} - d_1 \cdot \text{Slope} = 1.088 \cdot \text{ksf}$$

Maximum Bending at Face of Pier =

$$M_n := \frac{1}{L F \cdot \phi_m} \cdot \left[(q_{adj} - q_b) \cdot \frac{d_1^2}{3} + q_b \cdot \frac{d_1^2}{2} \right] \cdot W_f = 1003 \cdot \text{kip} \cdot \text{ft}$$

$$\beta := \begin{cases} 0.85 & \text{if } 2500 \cdot \text{psi} \leq f_c \leq 4000 \cdot \text{psi} \\ 0.65 & \text{if } f_c > 8000 \cdot \text{psi} \end{cases} = 0.85$$

$$\left[\left[0.85 - \left(\frac{\left(\frac{f_c}{\text{psi}} - 4000 \right)}{1000} \right) \right] \cdot 0.5 \right] \quad \text{otherwise} \quad (\text{ACI-2008 10.2.7.3})$$

$$R_u := \frac{M_n}{\phi_m \cdot W_f \cdot d^2} = 6.6 \cdot \text{ksf}$$

$$\rho := \frac{0.85 \cdot f_c}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot R_u}{0.85 \cdot f_c}} \right) = 0.0008$$

$$\rho_{min} := 1.333 \cdot \rho = 0.00102$$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000 \text{ psi} \\ .0020 & \text{otherwise} \end{cases} \quad (\text{ACI -2008 7.12.2.1})$$

Check Bottom Bars:

$$A_s := \max(\rho, \rho_{min}, \rho_{sh}) \cdot W_f d = 16.5 \text{ in}^2$$

$$A_{s_{prov}} := A_{bbot} \cdot NB_{bot} = 36 \text{ in}^2$$

$$Pad_Reinforcement_Bot := \text{if}(A_{s_{prov}} > A_s, \text{"Okay"}, \text{"No Good"})$$

$$Pad_Reinforcement_Bot = \text{"Okay"}$$

Check top Bars:

$$A_s := \rho_{sh} (W_f d) = 16.5 \text{ in}^2$$

$$A_{s_{prov}} := A_{btop} \cdot NB_{top} = 20 \text{ in}^2$$

$$Pad_Reinforcement_Top := \text{if}(A_{s_{prov}} > A_s, \text{"Okay"}, \text{"No Good"})$$

$$Pad_Reinforcement_Top = \text{"Okay"}$$

Development Length Pad Reinforcement:

Bar Spacing =

$$B_{sPad} := \frac{W_f - 2 \cdot C_{vr_{pad}} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1} = 6.9 \text{ in}$$

Spacing or Cover Dimension =

$$c := \text{if} \left(C_{vr_{pad}} < \frac{B_{sPad}}{2}, C_{vr_{pad}}, \frac{B_{sPad}}{2} \right) = 3 \text{ in}$$

Transverse Reinforcement Index =

$$k_{tr} := 0 \quad (\text{ACI-2008 12.2.3})$$

$$L_{dbt} := \frac{3 \cdot f_y \cdot \alpha_{pad} \cdot \beta_{pad} \cdot \gamma_{pad} \cdot \lambda_{pad}}{40 \cdot \sqrt{f_c \cdot \text{psi}} \cdot \frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot} = 30.2 \text{ in}$$

Minimum Development Length =

$$L_{dbmin} := 12 \text{ in} \quad (\text{ACI-2008 12.2.1})$$

$$L_{dbtCheck} := \text{if}(L_{dbt} \geq L_{dbmin}, \text{"Use L.dbt"}, \text{"Use L.dbmin"})$$

Available Length in Pad =

$$L_{Pad} := \frac{W_f}{2} - \frac{d_p}{2} - C_{vr_{pad}} = 99 \text{ in}$$

$$L_{pad_Check} := \text{if}(L_{Pad} > L_{dbt}, \text{"Okay"}, \text{"No Good"})$$

$$L_{pad_Check} = \text{"Okay"}$$

Steel Reinforcement in Pier:

Area of Pier =

$$A_p := \frac{\pi \cdot d_p^2}{4} = 5541.77 \cdot \text{in}^2$$

$$A_{smin} := 0.01 \cdot 0.05 \cdot A_p = 2.77 \cdot \text{in}^2 \quad (\text{ACI-2008 10.8.4 \& 10.9.1})$$

$$A_{sprov} := N_{B_{pier}} \cdot A_{B_{pier}} = 29.98 \cdot \text{in}^2$$

$$\text{Steel_Area_Check} := \text{if}(A_{sprov} > A_{smin}, \text{"Okay"}, \text{"No Good"})$$

$$\text{Steel_Area_Check} = \text{"Okay"}$$

Bar Spacing In Pier =

$$B_{sPier} := \frac{d_p \cdot \pi}{N_{B_{pier}}} - d_{B_{pier}} = 7.668 \cdot \text{in}$$

Diameter of Reinforcement Cage =

$$\text{Diam}_{cage} := d_p - 2 \cdot C_{v_{pier}} = 78 \cdot \text{in}$$

Maximum Moment in Pier =

$$M_p := \left[OM + \text{Shear} \cdot \left(L_p + \frac{A_{BP}}{2} \right) \right] \cdot LF = 22794.3 \cdot \text{in-kips}$$

Pier Check evaluated from outside program and results are listed below;

$$(D \ N \ n \ P_u \ M_{xu}) := \left(d_p \cdot 12 \ N_{B_{pier}} \ B_{s_{pier}} \ \frac{\text{Axial} \cdot 1.333}{\text{kips}} \ \frac{M_p}{\text{in-kips}} \right)$$

$$(D \ N \ n \ P_u \ M_{xu}) = (84 \ 30 \ 9 \ 39.99 \ 2.279 \times 10^4)$$

$$(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) := (0 \ 0 \ 0 \ 0)$$

$$(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) := \phi P'_n (D, N, n, P_u, M_{xu})^T$$

$$(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) = (104.892 \ 5.979 \times 10^4 \ -60 \ 5.413 \times 10^{-3})$$

$$\text{Axial_Load_Check} := \text{if}(\phi P_n \geq P_u, \text{"Okay"}, \text{"No Good"})$$

$$\text{Axial_Load_Check} = \text{"Okay"}$$

$$\text{Bending_Check} := \text{if}(\phi M_{xn} \geq M_{xu}, \text{"Okay"}, \text{"No Good"})$$

$$\text{Bending_Check} = \text{"Okay"}$$

Development Length Pier Reinforcement:
Available Length in Foundation:

$$L_{\text{pier}} := L_p - C_{\text{vr}}_{\text{pier}} = 57 \cdot \text{in}$$

$$L_{\text{pad}} := T_f - C_{\text{vr}}_{\text{pad}} = 33 \cdot \text{in}$$

Tension:

(ACI-2008 12.2.3)

Spacing or Cover Dimension =

$$c := \text{if} \left(C_{\text{vr}}_{\text{pier}} < \frac{B_{\text{sPier}}}{2}, C_{\text{vr}}_{\text{pier}}, \frac{B_{\text{sPier}}}{2} \right) = 3 \cdot \text{in}$$

Transverse Reinforcement =

$$k_{\text{tr}} := 0 \quad (\text{ACI-2008 12.2.3})$$

$$L_{\text{dbt}} := \frac{3 \cdot f_y \cdot \alpha_{\text{pier}} \cdot \beta_{\text{pier}} \cdot \gamma_{\text{pier}} \cdot \lambda_{\text{pier}}}{40 \cdot \sqrt{f_c \cdot \text{psi}} \cdot \left(\frac{c + k_{\text{tr}}}{d_{\text{bpier}}} \right)} \cdot d_{\text{bpier}} = 30.18 \cdot \text{in}$$

Minimum Development Length =

 Pier reinforcement bars are standard 90 degree hooks
 and therefore development in the pad is computed
 as follows:

$$L_{\text{dh}} := \frac{1200 \cdot d_{\text{bpier}}}{\sqrt{\frac{f_c}{\text{psi}}}} \cdot .7 = 14.982 \cdot \text{in} \quad (\text{ACI 12.2.1})$$

$$L_{\text{db}} := \max(L_{\text{dbt}}, L_{\text{dbmin}})$$

$$L_{\text{tension_Check}} := \text{if}(L_{\text{pier}} + L_{\text{pad}} > L_{\text{dbt}}, \text{"Okay"}, \text{"No Good"})$$

$$L_{\text{tension_Check}} = \text{"Okay"}$$

Compression:

(ACI-2008 12.3.2)

$$L_{\text{dbc1}} := \frac{.02 \cdot d_{\text{bpier}} \cdot f_y}{\sqrt{f_c \cdot \text{psi}}} = 21.402 \cdot \text{in}$$

$$L_{\text{dbmin}} := 0.003 \cdot \frac{\text{in}^2}{\text{lb}} \cdot (d_{\text{bpier}} \cdot f_y) = 20.304 \cdot \text{in}$$

$$L_{\text{dbc}} := \text{if}(L_{\text{dbc1}} \geq L_{\text{dbmin}}, L_{\text{dbc1}}, L_{\text{dbmin}}) = 21.402 \cdot \text{in}$$

$$L_{\text{compression_Check}} := \text{if}(L_{\text{pier}} + L_{\text{pad}} > L_{\text{dbc}}, \text{"Okay"}, \text{"No Good"})$$

$$L_{\text{compression_Check}} = \text{"Okay"}$$

Tie Size and Spacing in Column:

Minimum Tie Size =

$$Tie_{min} := \text{if}(BS_{pier} \leq 10, 3, 4) = 3$$

Used #4 Ties

Seismic Factor =

$$z := \text{if}(Z \leq 2, 1, 0.5) = 1 \quad (\text{ACI-2008 21.10.5})$$

$$s_{lim1} := 16 \cdot d_{bpier} \cdot z = 18.048 \cdot \text{in}$$

$$s_{lim2} := 48 \cdot d_{Tie} \cdot z = 24 \cdot \text{in}$$

$$s_{lim3} := D_r \cdot z = 96 \cdot \text{in}$$

$$s_{lim4} := 18 \cdot \text{in}$$

Maximum Spacing =

$$s_{tie} := \min \begin{pmatrix} s_{lim1} \\ s_{lim2} \\ s_{lim3} \\ s_{lim4} \end{pmatrix} = 18 \cdot \text{in}$$

Number of Ties Required =

$$n_{tie} := \frac{L_{pier} - 3 \cdot \text{in}}{s_{tie}} + 1 = 4$$

Check Anchor Steel Embedment:

Depth Available =

$$D_{ab} := L_{st} - A_{BP} = 7 \cdot \text{ft}$$

Length of Anchor Bolt =

$$L_{anchor} := \frac{(0.11 \cdot f_{ya}) \cdot \text{in}}{\sqrt{f_c \cdot \text{psi}}} = 10.87 \cdot \text{ft}$$

$$\text{Depth_Check} := \text{if}(D_{ab} \geq L_{anchor}, \text{"Okay"}, \text{"No Good"})$$

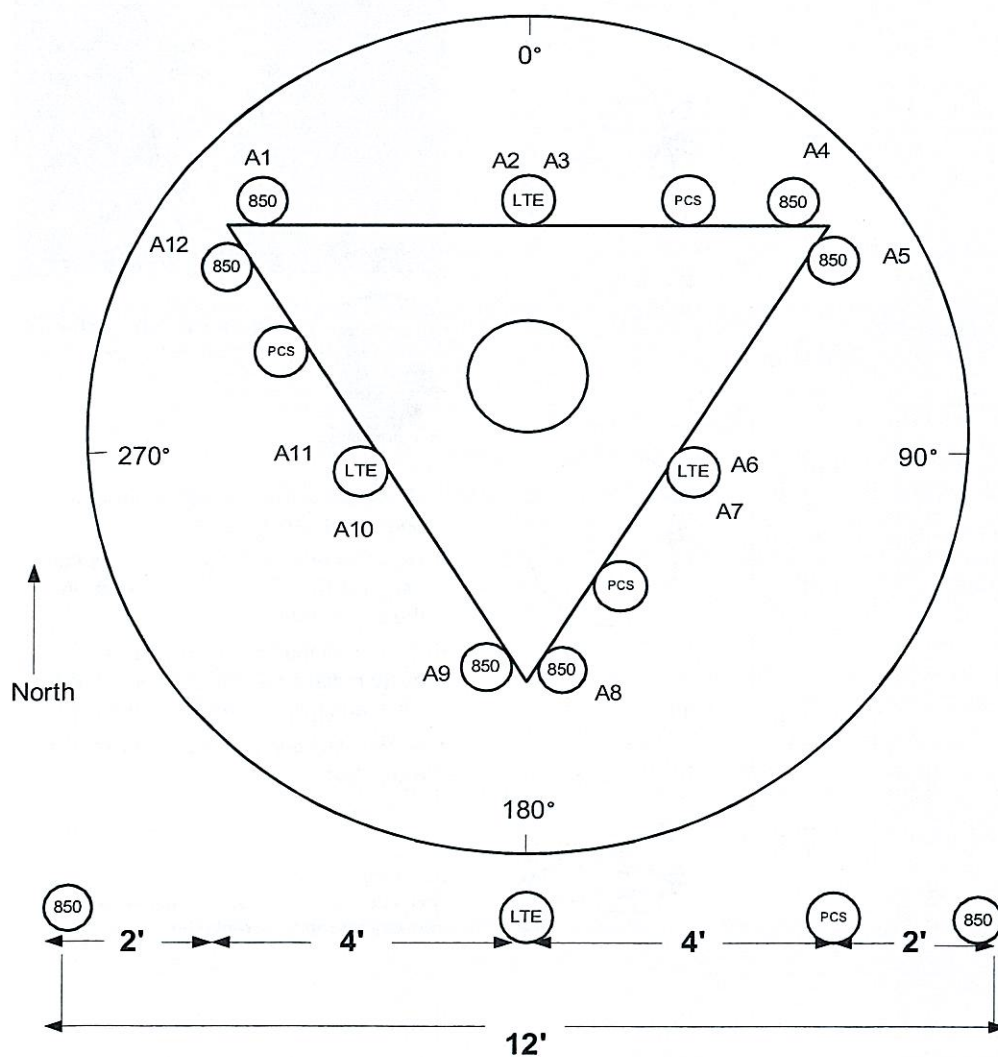
Depth_Check = "No Good"

Note: Anchor plate is provided

SITE NAME		COLLINSVILLE CT		ECP - CELL #		2		486		
LATITUDE		41-51-02.03 N		LONGITUDE		72-56-55.41 W				
Additional Comments: LTE antenna add keeping with 12 antennas and adding 6 additional main lines				SAVE BUTTON						
				STRUCTURE TYPE						
700 Mhz - LTE ANTENNA ADD		ALPHA		BETA		GAMMA				
EQUIPMENT TYPE		eNodeB		eNodeB		eNodeB				
ANTENNA TYPE		BXA-70063-6CF_2		BXA-70063-6CF_2		BXA-70063-6CF_2				
QTY OF ANTENNAS PER FACE		1		1		1				
ORIENTATION (DEG)		30		140		270				
DOWN TILT (MECH/DEG)		0		4		0				
RAD CTR (FT AGL)		120		120		120				
TMA - QTY / MODEL										
DIPLEXER - QTY / MODEL										
850 Cellular - Current Config		ALPHA		BETA		GAMMA				
EQUIPMENT TYPE		#N/A		#N/A		#N/A				
ANTENNA TYPE		LPA-80080/6CF		LPA-80080/6CF		LPA-80080/6CF				
QTY OF ANTENNAS PER FACE		2		2		2				
ORIENTATION (DEG)		30		150		270				
DOWN TILT (MECH/DEG)		0		4		0				
RAD CTR (FT AGL)		120		120		120				
TMA - QTY / MODEL										
DIPLEXER - QTY / MODEL										
850 Cellular - Future Config		ALPHA		BETA		GAMMA				
EQUIPMENT TYPE		#N/A		#N/A		#N/A				
ANTENNA TYPE		LPA-80080/6CF		LPA-80080/6CF		LPA-80080/6CF				
QTY OF ANTENNAS PER FACE		2		2		2				
ORIENTATION (DEG)		30		140		270				
DOWN TILT (MECH/DEG)		0		4		0				
RAD CTR (FT AGL)		120		120		120				
TMA - QTY / MODEL										
DIPLEXER - QTY / MODEL										
DIPLEX WITH LTE CABLE										
1900 PCS - Current Config		ALPHA		BETA		GAMMA				
EQUIPMENT TYPE		#N/A		#N/A		#N/A				
ANTENNA TYPE		DB950F85E-M_0		DB950F85E-M_0		DB950F85E-M_0				
QTY OF ANTENNAS PER FACE		2		2		2				
ORIENTATION (DEG)		30		150		270				
DOWN TILT (MECH/DEG)		0		0		0				
RAD CTR (FT AGL)		120		120		120				
TMA - QTY / MODEL										
DIPLEXER - QTY / MODEL										
1900 PCS - Future Config		ALPHA		BETA		GAMMA				
EQUIPMENT TYPE		#N/A		#N/A		#N/A				
ANTENNA TYPE		BXA-171085-12BF_2		BXA-171085-12BF_2		BXA-171085-12BF_2				
QTY OF ANTENNAS PER FACE		1		1		1				
ORIENTATION (DEG)		30		140		270				
DOWN TILT (MECH/DEG)		0		0		0				
RAD CTR (FT AGL)		120		120		120				
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		
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				9/1/2011		

Site Configuration



Slant $\pm 45^\circ$ Dual Polarized FET Panel 63° / 14.5 dBd 696-900 MHz

Mechanical specifications

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

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

Mounting & Downtilting

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

Mounting Bracket Kit	36210002
Downtilt Bracket Kit	36114003

Electrical specifications

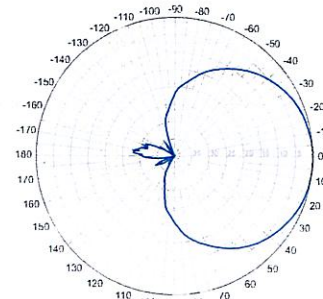
Frequency Range	696-900 MHz
Impedance	50 Ω
Connector ³⁾	NE or E-DIN Female 2 ports / Center
VSWR ¹⁾	$\leq 1.4:1$
Polarization	Slant $\pm 45^\circ$
Isolation Between Ports ¹⁾	< -25 dB
Gain ¹⁾	14.5 dBd
Power Rating ²⁾	500 W
Half Power Angle ¹⁾	
Horizontal Beamwidth	63°
Vertical Beamwidth	11°
Electrical downtilt ⁵⁾	0°
Null fill ¹⁾	5%
Lightning protection	Direct ground

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

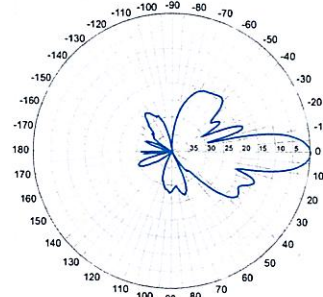
- 1) Typical values.
- 2) Power rating limited by connector only.
- 3) NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.
- 4) Antenna weight does not include brackets.
- 5) Add'l downtilts may be available. Check website for details.

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

Radiation-pattern¹⁾
750 MHz

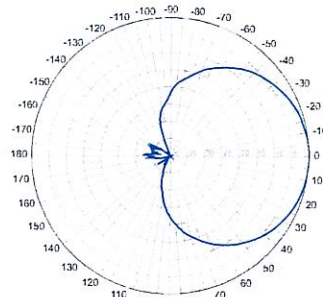


Horizontal

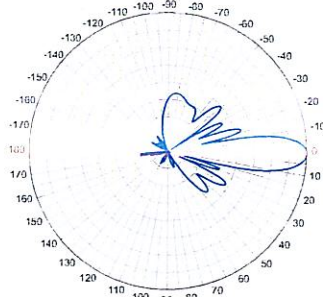


Vertical

850 MHz



Horizontal

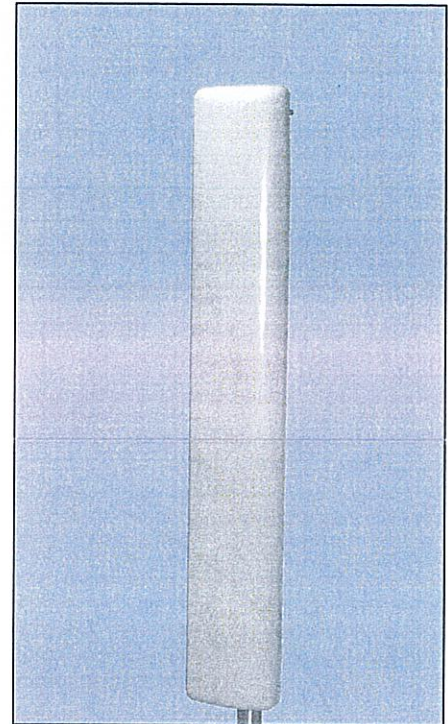


Vertical

696-900 MHz

BXA-70063/6CF

When ordering replace " " with connector type.



Featuring our Exclusive
3T Technology™
Antenna Design:

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

Warranty:

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

Revision Date: 08/07/08

BXA-171085-12BF-EDIN-X

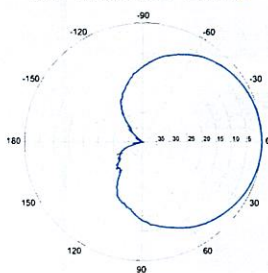
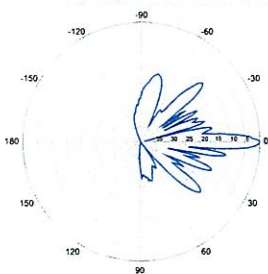
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 85° | 18.0 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	88°	85°	80°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	15.1 dBd / 17.2 dBi	15.5 dBd / 17.6 dBi	15.9 dBd / 18.0 dBi
Electrical downtilt (X)	0, 2, 4		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / 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 m ² Side: 0.19 m ²	Front: 3.1 ft ² Side: 2.1 ft ²	
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N	Front: 103 lbf Side: 68 lbf	
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171085-12BF-EDIN-X-FP		

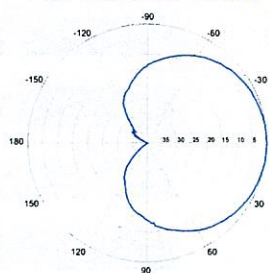
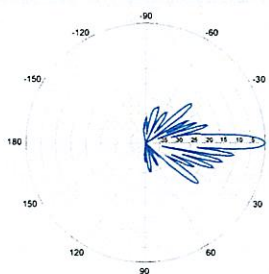


BXA-171085-12BF-EDIN-X

Horizontal | 1710-1880 MHz
BXA-171085-12BF-EDIN-0

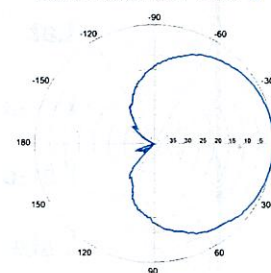
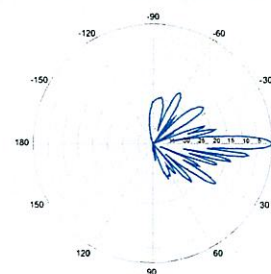
0° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-X

Horizontal | 1850-1990 MHz
BXA-171085-12BF-EDIN-0

0° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-X

Horizontal | 1920-2170 MHz
BXA-171085-12BF-EDIN-0

0° | Vertical | 1920-2170 MHz

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



JWB Tower Services, LLC
148 Governor Street
New Britain, CT 06053
(800) 819-3084
(860) 256-8175 fax

Monopole Inventory General Information

Site Name:	Collinsville	
Site Number:		
FCC Number:		
Manufacturer ID #	EI	
Street Address:	650 Albany Turnpike	
City/State/Zip Code:	Canton, CT	
County:		
Lat:	N/S	41° 51' 02"
Long:	E/W	72° 56' 55"
Performed By:	JWB	
Date:	9/11/2011	

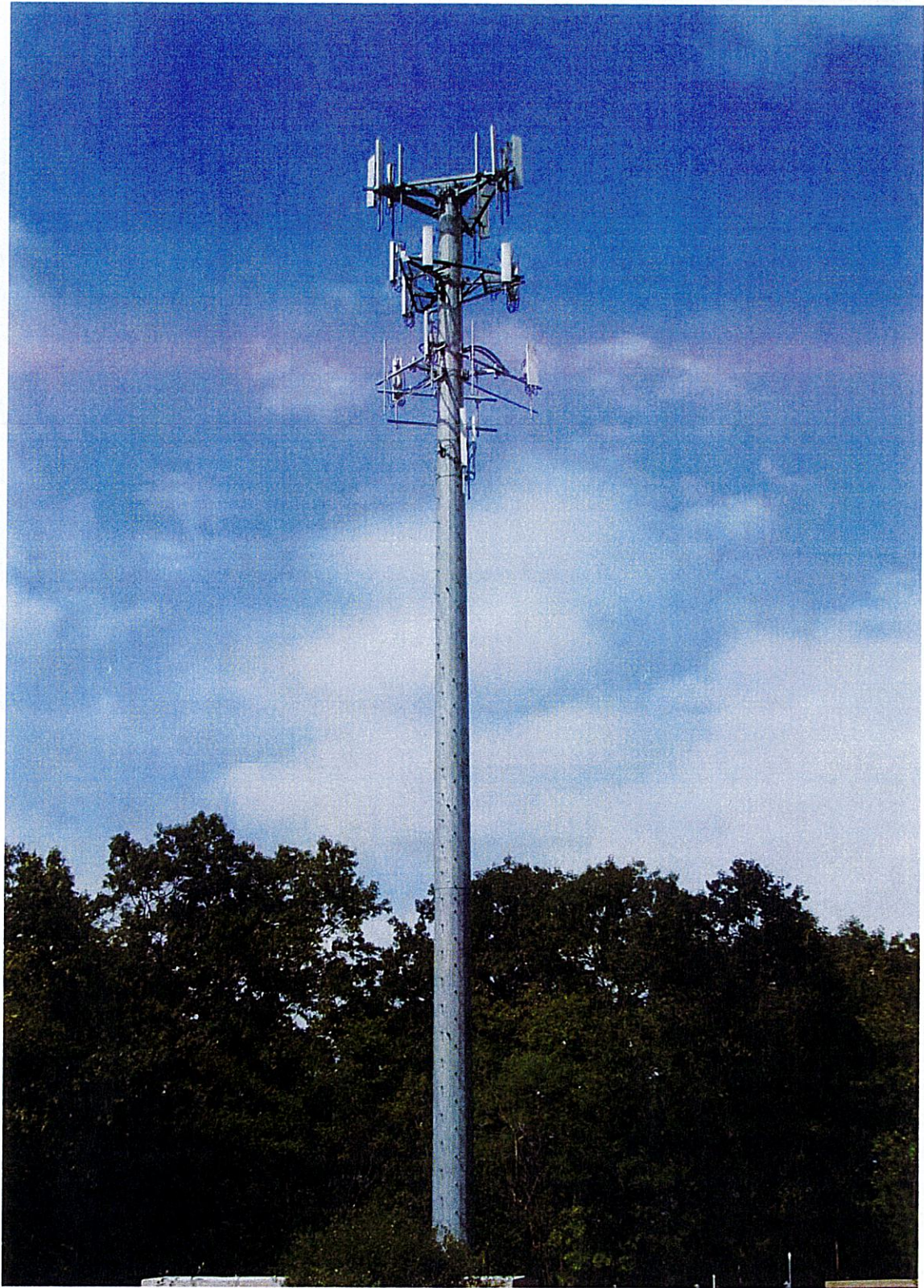
Antenna Information:

CARRIER		Verizon		PIC #		3	
MOUNT							
Type:	Lo-pro Plat	Manf.:	EEI				
Elev. C/L:	118'	Bottom:	Top:	Leg:			
Face Width:	14'	Height:	4"	Projection:	N/A	Azimuth/s:	
ANTENNA 1 - Outer							
Type:	Panel	Manf.:	Antel/Amphenol	Model:	LPA-80080/6CF		
Elev. C/L:	120'	Bottom:	Top:	Leg:			
Quantity:	6	Dim: (HxWxD)					
ANTENNA 2 - Inner							
Type:	Panel	Manf.:	Andrew/Decibel	Model:	DB950F85E-M		
Elev. C/L:	120'	Bottom:	Top:	Leg:			
Quantity:	6	Dim: (HxWxD)					
TMA'S							
Quantity:	N/A	Manf.:	Model:				
COAX							
Quantity:	12	Size:	1 5/8"	Jumper:	1/2"	Color:	N/A

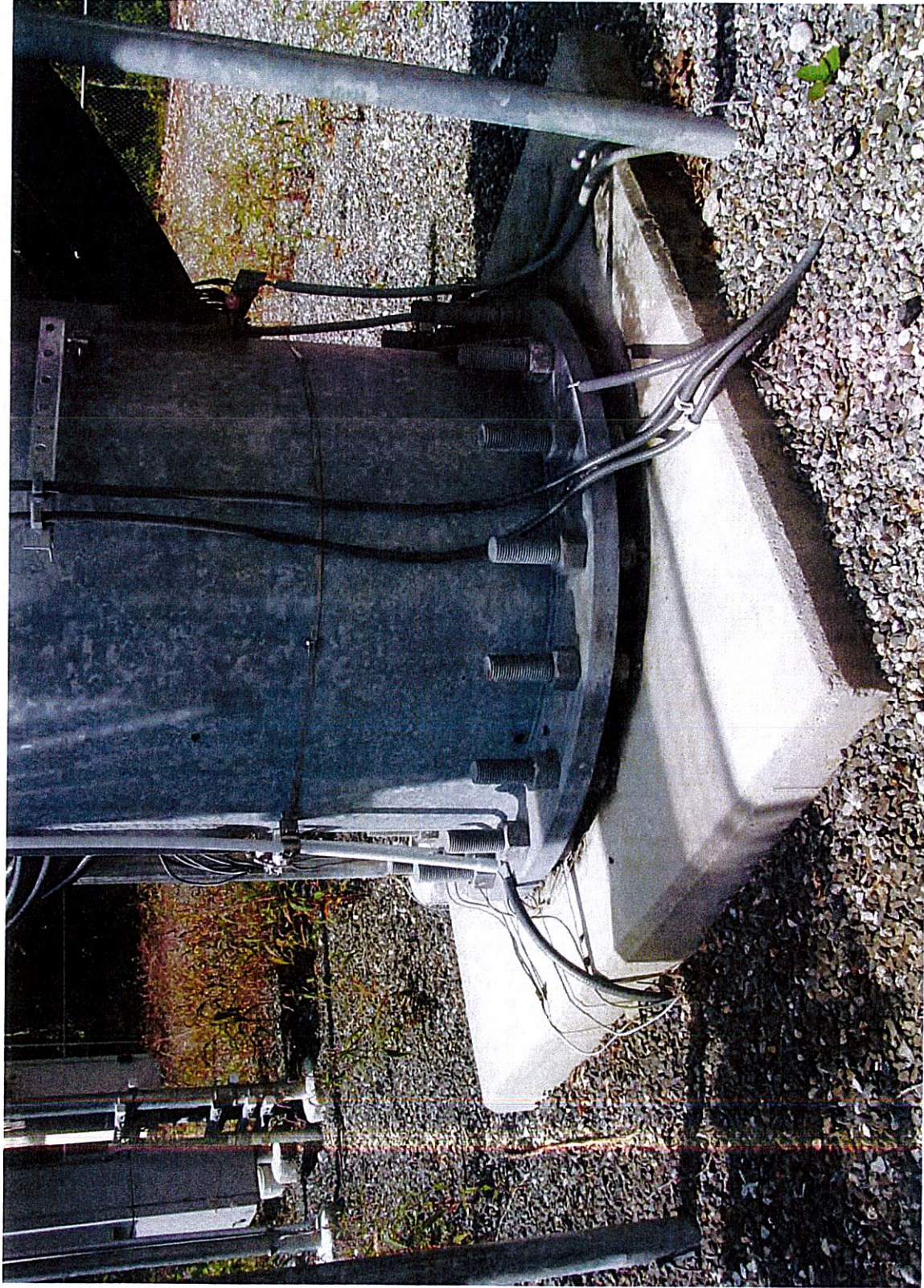
CARRIER		AT&T		PIC #		4	
MOUNT							
Type:	Lo-pro Plat	Manf.:	Valmont / SitePro				
Elev. C/L:	108'	Bottom:	Top:	Leg:			
Face Width:	12'-6"	Height:	4"	Projection:	N/A	Azimuth/s:	
ANTENNA							
Type:	Panel	Manf.:	Powerwave	Model:	P65-15-XLH-RR H		
Elev. C/L:	110'	Bottom:	Top:	Leg:			
Quantity:	6	Dim: (HxWxD)					
TMA'S							
Quantity:	6	Manf.:	Powerwave	Model:	TT19-08BP111-001		
COAX							
Quantity:	12	Size:	1 5/8"	Jumper:	1/2"	Color:	N/A

CARRIER		T-Mobile		PIC #		5	
MOUNT							
Type:	<u>T-Arm</u>	Manf.:	<u>Valmont / SitePro</u>				
Elev. C/L:	<u>98'</u>	Bottom:	<u>Top:</u>	<u>Leg:</u>			
Face Width:	<u>12'</u>	Height:	<u>4"</u>	Projection:	<u>N/A</u>	<u>Azimuth/s:</u>	
ANTENNA							
Type:	<u>Panel</u>	Manf.:	<u>RFS</u>	Model:	<u>APX16DWV-16DWVS</u>		
Elev. C/L:	<u>100'</u>	Bottom:	<u>Top:</u>	<u>Leg:</u>			
Quantity:	<u>3</u>	Dim: (HxWxD)	<u>Azimuth/s:</u>				
TMA'S							
Quantity:	<u>3</u>	Manf.:	<u>RFS</u>	Model:	<u>ATM1900D-1CWA</u>		
TMA'S							
Quantity:	<u>3</u>	Manf.:	<u>RFS</u>	Model:	<u>ATMAP1412D-1A20</u>		
COAX							
Quantity:	<u>12</u>	Size:	<u>1 5/8"</u>	Jumper:	<u>1/2"</u>	Color:	<u>N/A</u>

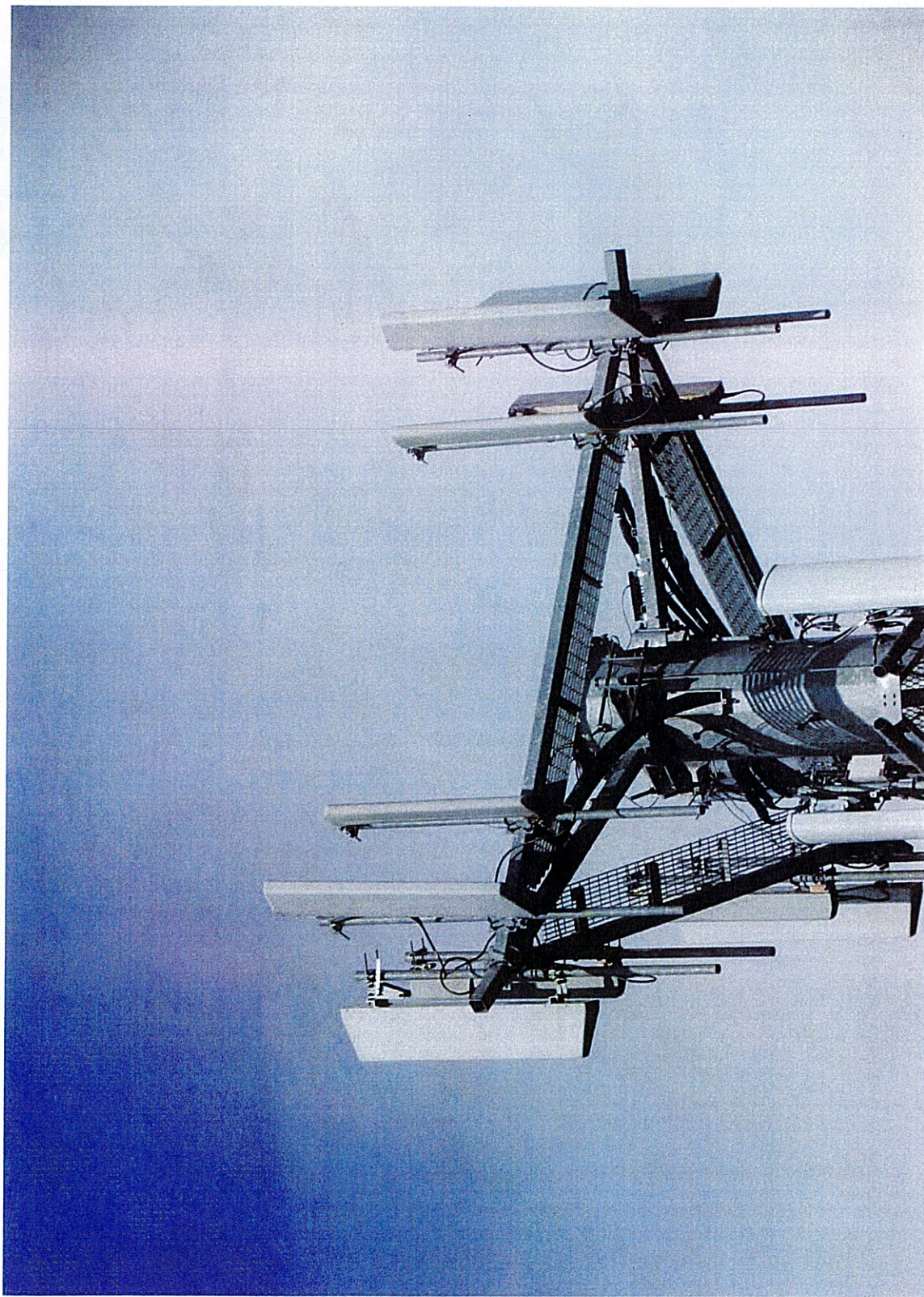
CARRIER		MetroPCS		PIC #		6	
MOUNT							
Type:	<u>Flush</u>	Manf.:	<u>Unknown/Chain Mount</u>				
Elev. C/L:	<u>91'</u>	Bottom:	<u>Top:</u>	<u>Leg:</u>			
Face Width:	<u>2.5"</u>	Height:	<u>N/A</u>	Projection:	<u>N/A</u>	<u>Azimuth/s:</u>	
ANTENNA							
Type:	<u>Panel</u>	Manf.:	<u>RFS</u>	Model:	<u>APXV18-206517S</u>		
Elev. C/L:	<u>91'</u>	Bottom:	<u>Top:</u>	<u>Leg:</u>			
Quantity:	<u>3</u>	Dim: (HxWxD)	<u>Azimuth/s:</u>				
COAX							
Quantity:	<u>6</u>	Size:	<u>1 5/8"</u>	Jumper:	<u>1/2"</u>	Color:	<u>N/A</u>



1.0 Elevation



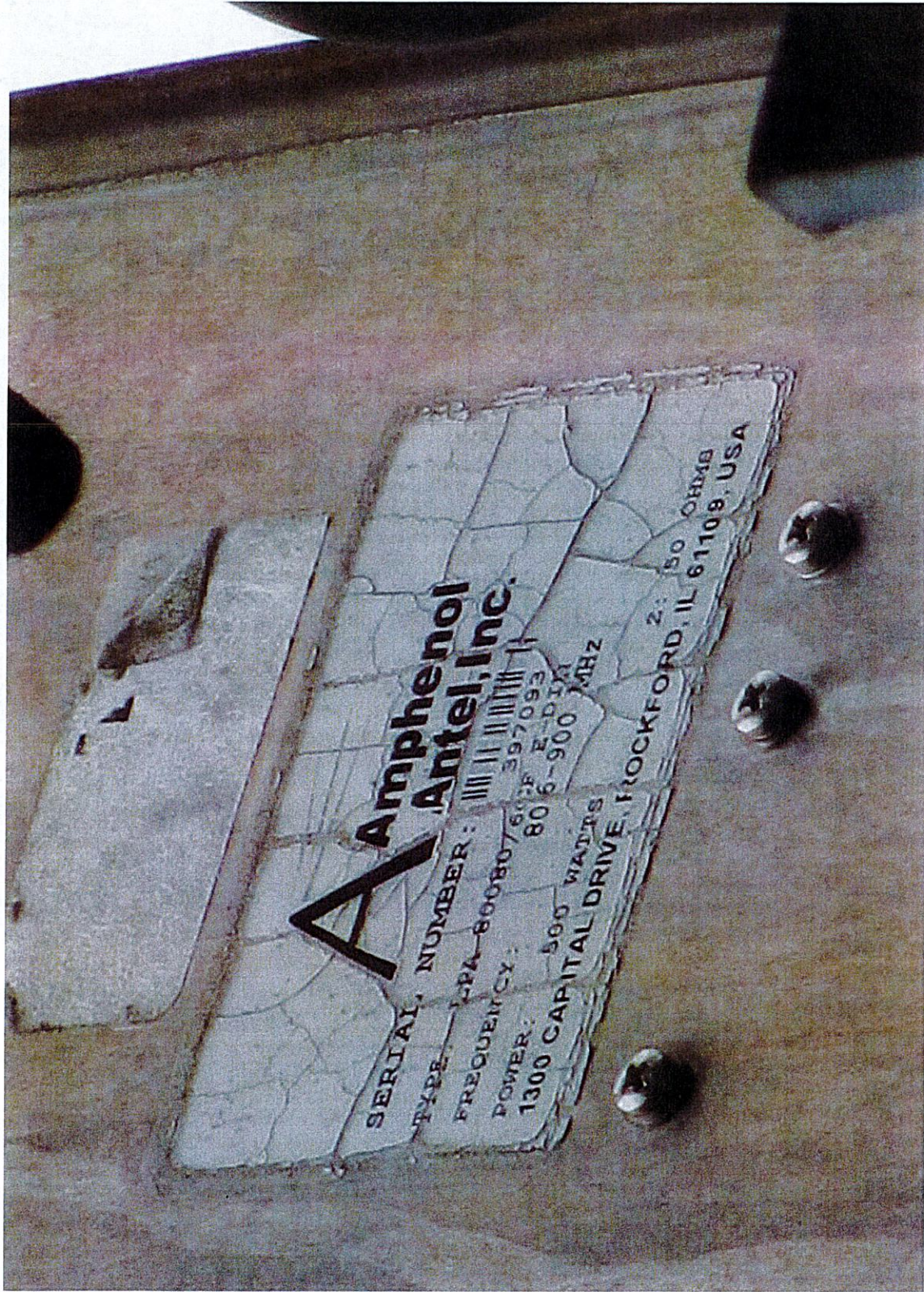
2.0 Base

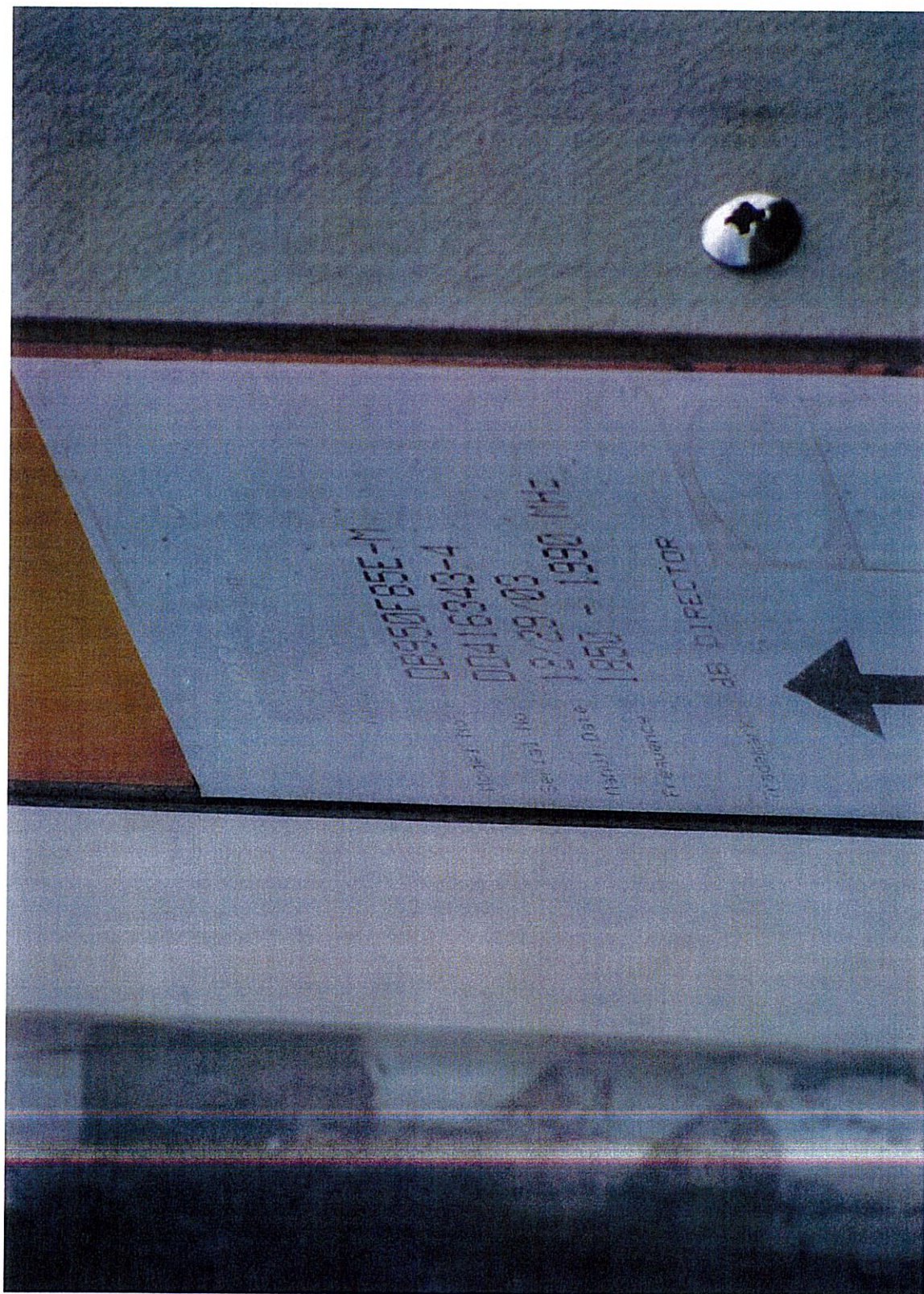


3.1 Verizon

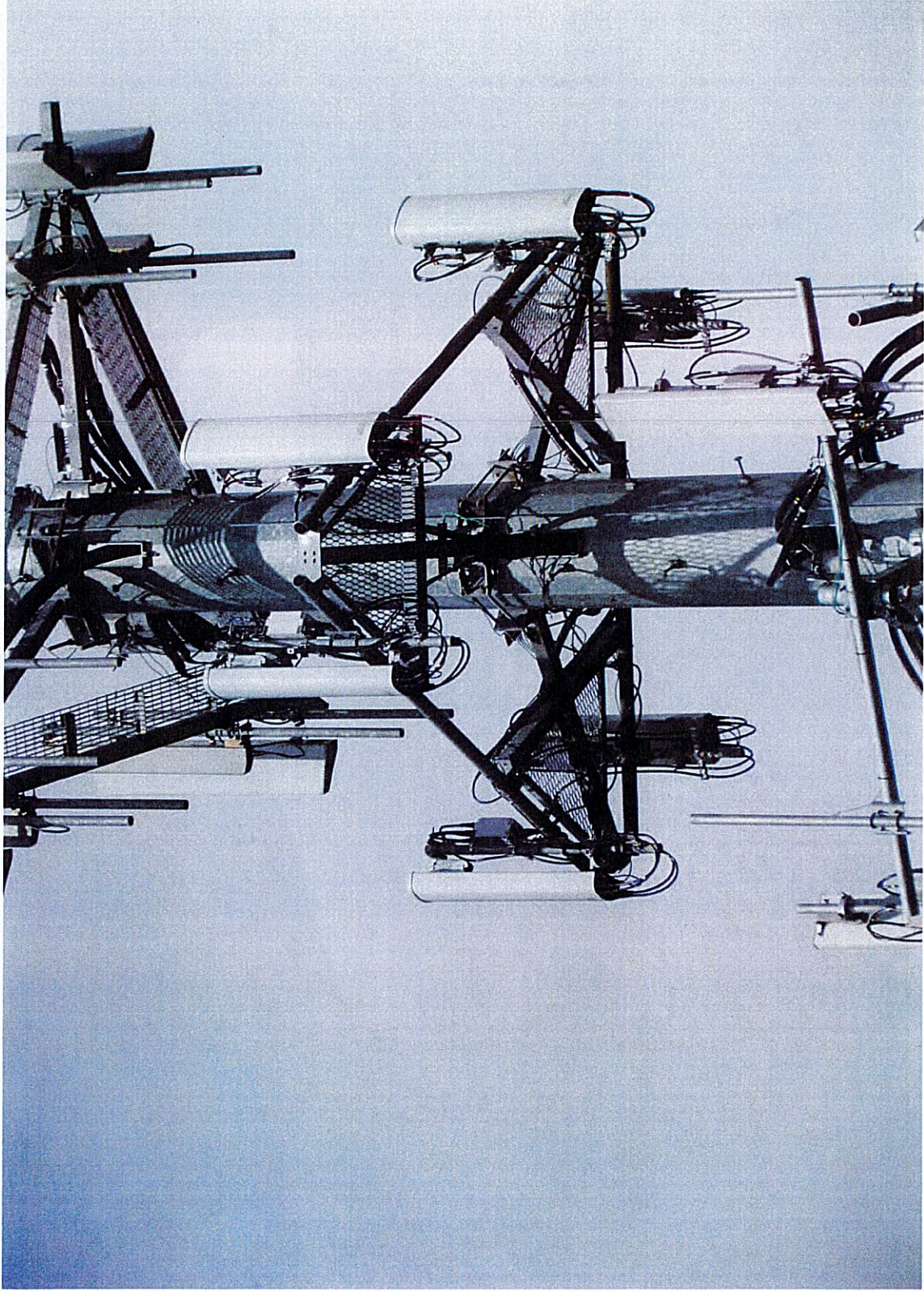


3.2 Verizon





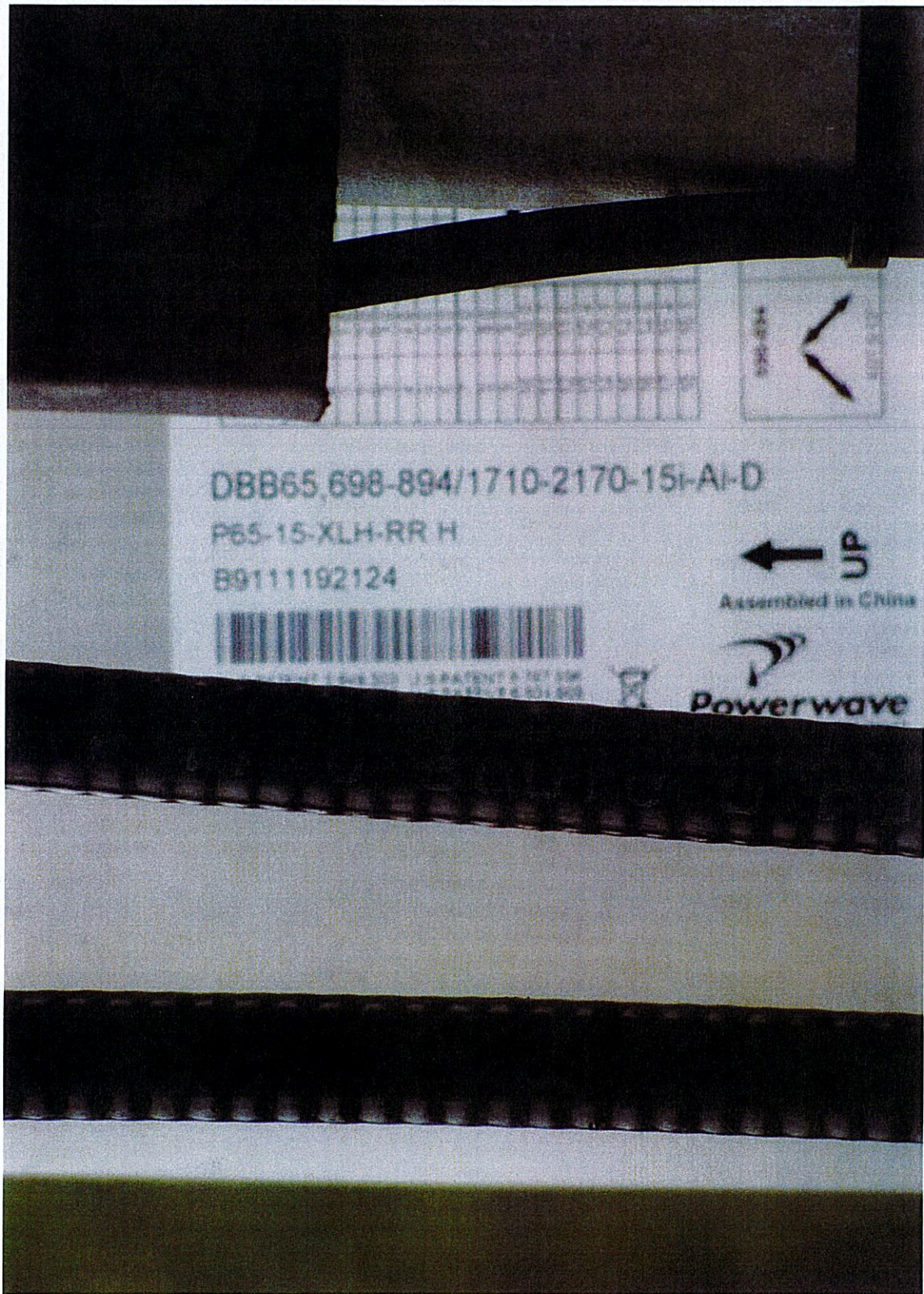
3.4 Verizon



4.1 ATT



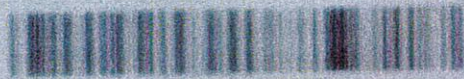
4.2 ATT



DBB65,698-894/1710-2170-15-AI-D

P65-15-XLH-RR H

B9111192124



U.S. PATENT & TRADEMARK OFFICE
U.S. PATENT NO. 6,811,192

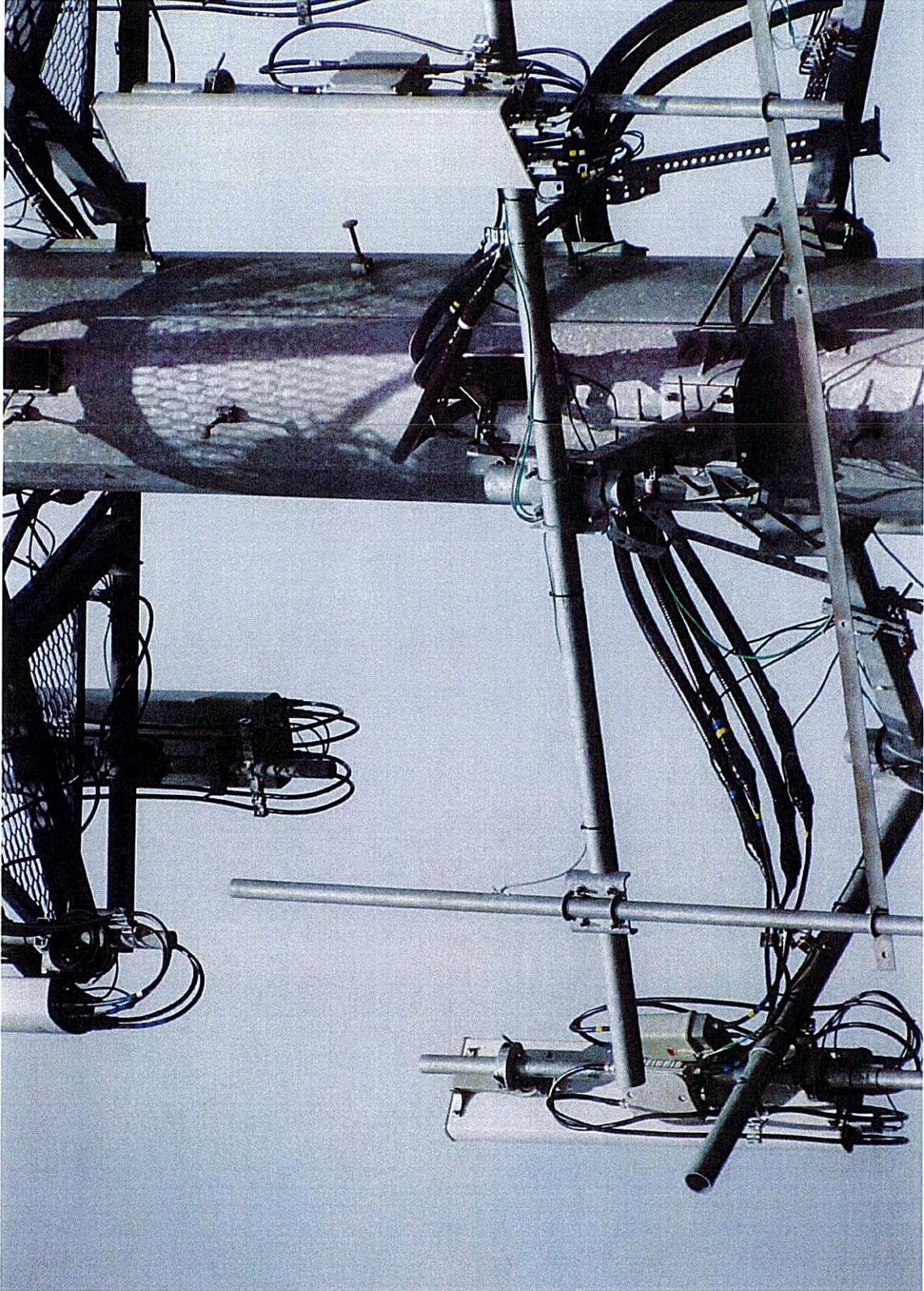
← P
Assembled in China


Powerwave

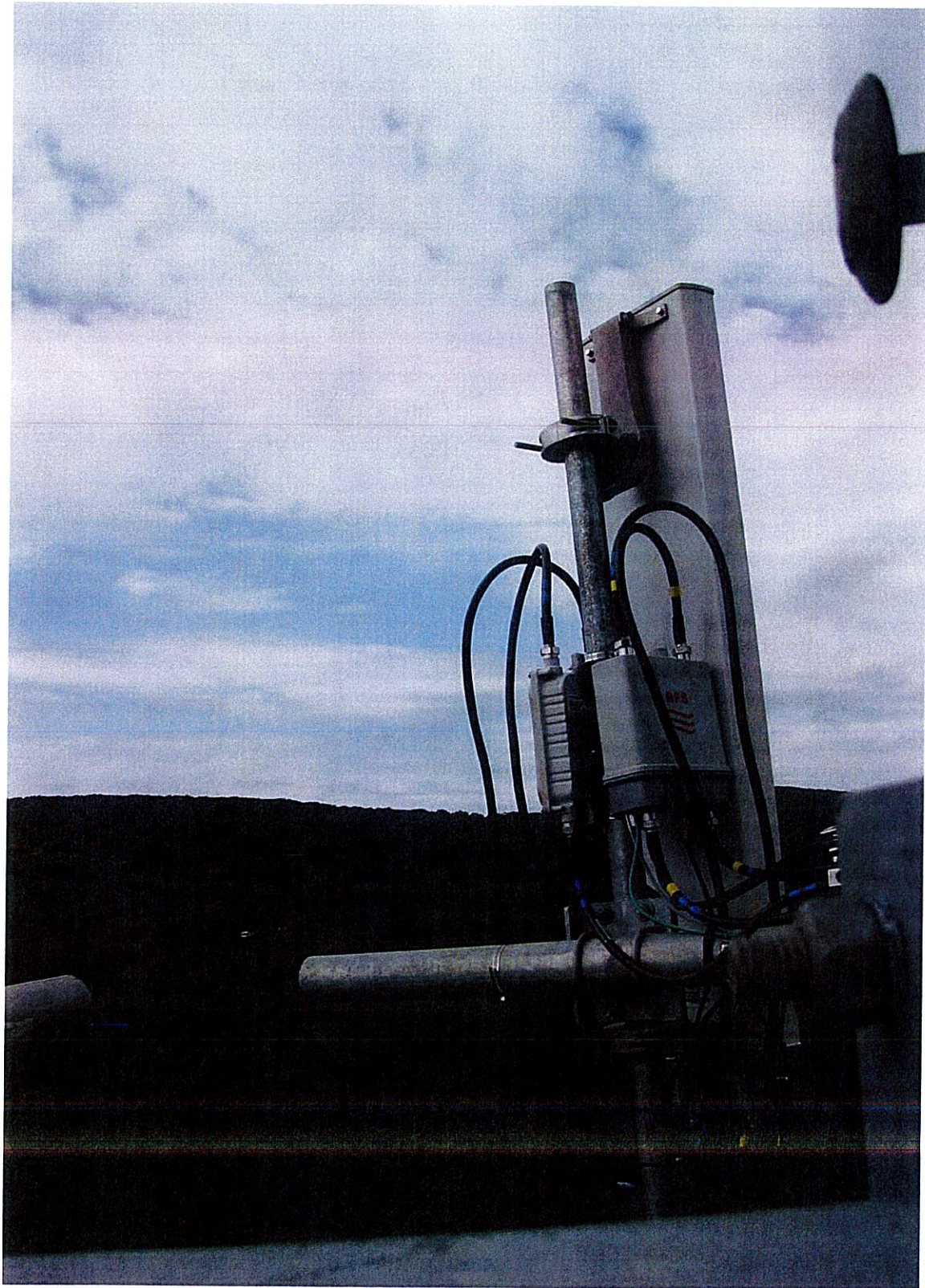
4.3 ATT



4.4 ATT



5.1 T-Mobile



5.2 T-Mobile

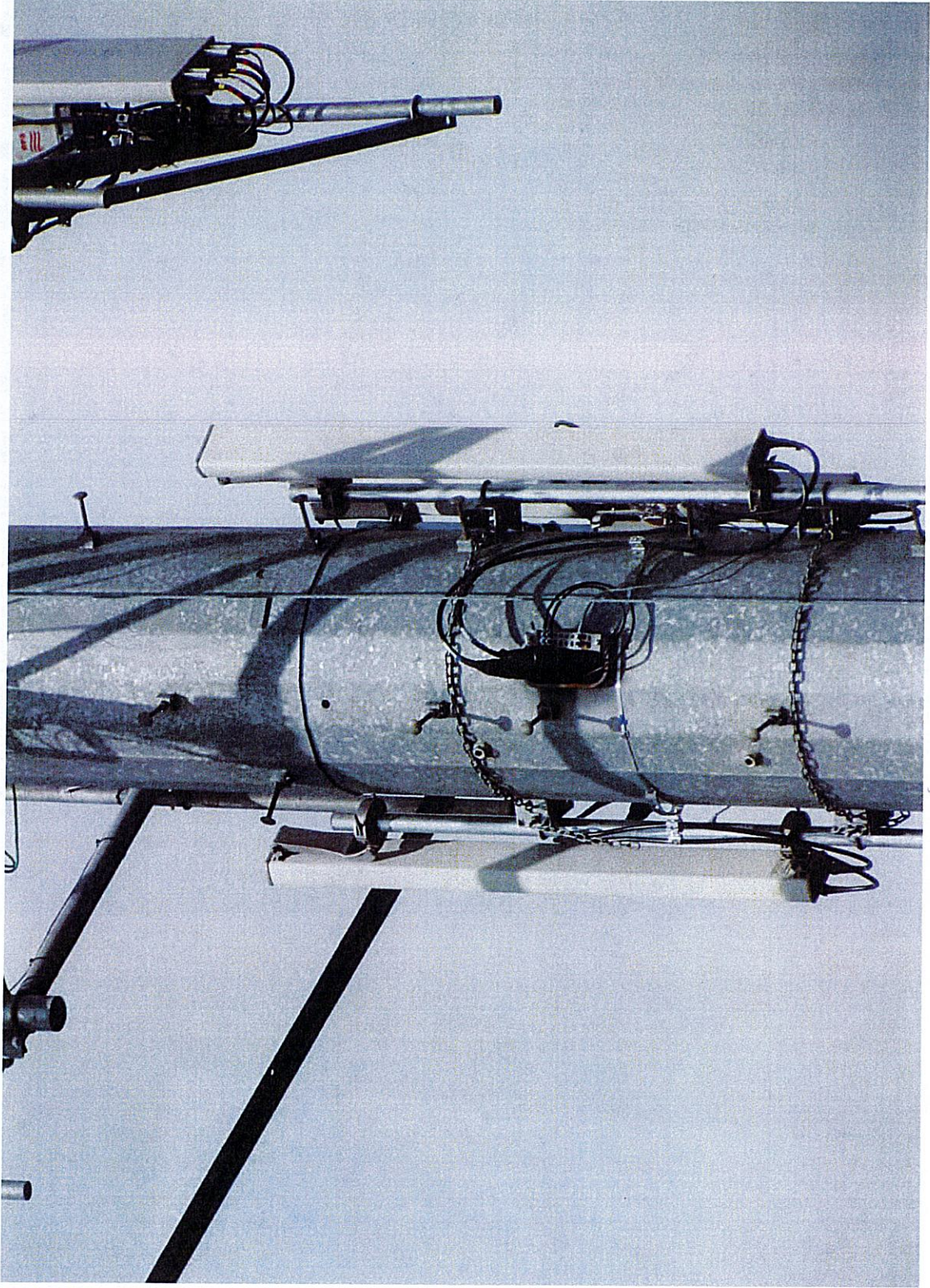
1710-2200/1710-2200MHz



*1071216817-92



5.4 T-Mobile



6.1 MetroPCS

