EM-CING-058-121108

HPC Wireless Services
46 Mill Plain Rd.
Floor 2
Danbury, CT, 06811
P.: 203.797.1112

November 6, 2012

VIA OVERNIGHT COURIER

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051
Attn: Ms. Linda Roberts, Executive Director

Re: New Cingular Wireless PCS, LLC – Exempt Modification
1439 Voluntown Road, Griswold

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of New Cingular Wireless PCS, LLC ("AT&T"). AT&T is making modifications to certain existing sites in its Connecticut system in order to implement LTE technology. Please accept this letter and attachments as notification, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies ("R.S.C.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the First Selectman of the Town of Griswold.

AT&T plans to modify the existing wireless communications facility owned by Crown Castle and located at 1439 Voluntown Road, Griswold (coordinates 41°-34-35" N, 71°-53'-16" W). Attached are a compound plan and elevation depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration. Also included is a power density report reflecting the modification to AT&T's operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. AT&T will relocate three (3) GSM/UMTS antennas, add three (3) LTE panel antennas to new mounts attached to the platform, and place one (1) Surge Arrestor on a new mount behind the LTE antennas, all at a center line height of approximately 167'. Six (6) RRHS (remote radio units) will be mounted to new mounting pipes at a centerline

height of approximately 165'. AT&T will also place DC power and fiber runs from the equipment to the antennas along the existing coaxial cable run. These changes will not extend the height of the approximately 179.5' structure.

2. AT&T will remove one (1) cabinet and install two (2) stacked cabinets on the existing concrete pad, and place a DC Plant on a proposed concrete pad extension of 3' X 0" X 6'-0" (18 square feet). AT&T will also mount a new GPS antenna to the existing Ice Bridge, and a Surge Suppressor on the existing Ice Bridge Post. These changes will be within the existing compound and will have no effect on the site boundaries.

3. The proposed changes will not increase the noise level at the existing facility by six (6) decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by C Squared Systems, LLC, AT&T's operations at the site will result in a power density of approximately 1.21%; the combined site operations will result in a total power density of approximately 12.50%.

Please do not hesitate to contact me by phone at (203) 610-1071 or by e-mail at mjhowlett@optonline.net, with questions concerning this matter. Thank you for your consideration.

Respectfully yours,

Melanie J. Howlett

Attachments

cc: Honorable Phillip E, Anthony, First Selectman, Town of Griswold
Robert E. and Milfred Rose (underlying property owners)

C Squared Systems, LLC
65 Dartmouth Drive, Unit A3
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions

at&t

CT5717

(Griswold - Voluntown Rd)

1439 Voluntown Road, Griswold, CT 06351

October 15, 2012

Table of Contents

List of Tables

List of Figures

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the monopole tower located on 1439 Voluntown Road in Griswold, CT. The coordinates of the tower are 41° 34' 34.55" N, 71° 53' 15.22" W.

AT&T is proposing the following modifications:

1) Install three multi-band (700/850/1900/2100 MHz) antennas for their LTE network (one per sector).

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{1.6^2 \times EIRP}{4\pi \times R^2} \right) \text{x Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.

4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical patterns of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	%MPE
AT&T UMTS	*167*	*880*	*1*	*500*	*0.0064*	*0.5867*	*1.10%*
AT&T GSM	*167*	*1900*	*2*	*427*	*0.0110*	*1.0000*	*1.10%*
AT&T GSM	*167*	*880*	*4*	*296*	*0.0153*	*0.5867*	*2.60%*
Sprint	177	1962.5	11	250	0.0316	1.0000	3.16%
Verizon PCS	157	1900	3	400	0.0175	1.0000	1.75%
Verizon cellular	157	880	9	285	0.0374	0.5867	6.38%
AT&T UMTS	169	880	2	565	0.0014	0.5867	0.24%
AT&T UMTS	169	1900	2	875	0.0022	1.0000	0.22%
AT&T LTE	167	734	1	1615	0.0021	0.4893	0.43%
AT&T GSM	169	880	1	283	0.0004	0.5867	0.06%
AT&T GSM	169	1900	4	525	0.0026	1.0000	0.26%
						Total	**12.50%**

Table 1: Carrier Information[1] [2] [3]

[1] The existing CSC filing for AT&T should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for carriers other than AT&T was taken directly from the CSC database dated 7/26/2012. Please note that %MPE values listed are rounded to two decimal points. The total %MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

[2] In the case where antenna models are not uniform across all 3 sectors for the same frequency band, the antenna model with the highest gain was used for the calculations to present a worse-case scenario.

[3] Antenna height listed for AT&T is in reference to the Vertical Structures, Inc. Structural Analysis dated August 22, 2012.

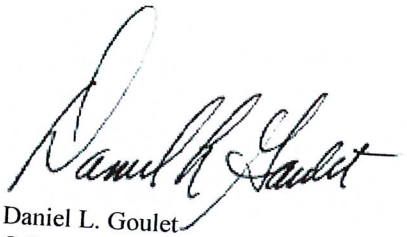
5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **12.50% of the FCC limit**.

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



Daniel L. Goulet
C Squared Systems, LLC

October 15, 2012
Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure[4]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Popula. n/Uncontrolled Exposure[5]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

[4] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

[5] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

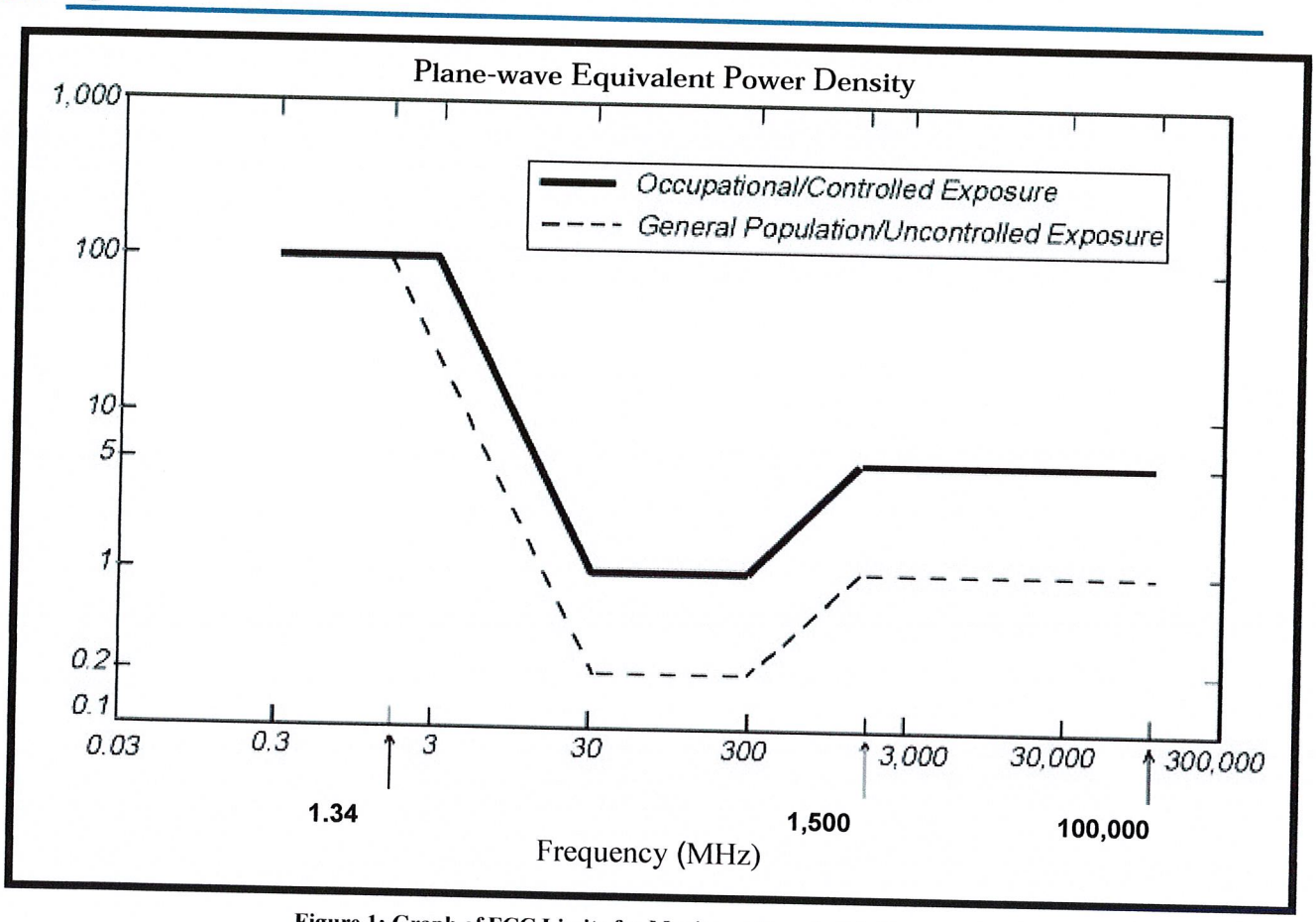
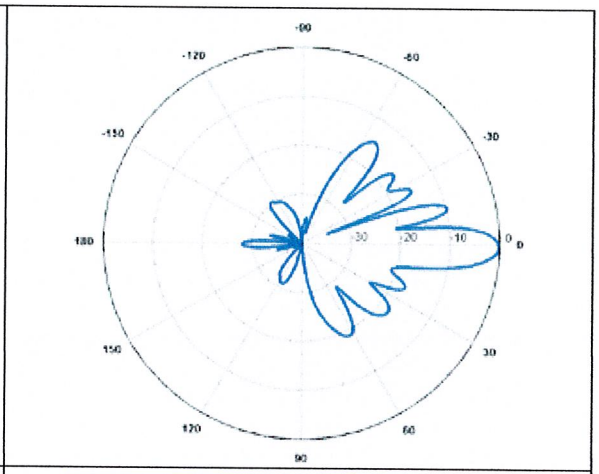


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: AT&T Antenna Data Sheets and Electrical Patterns

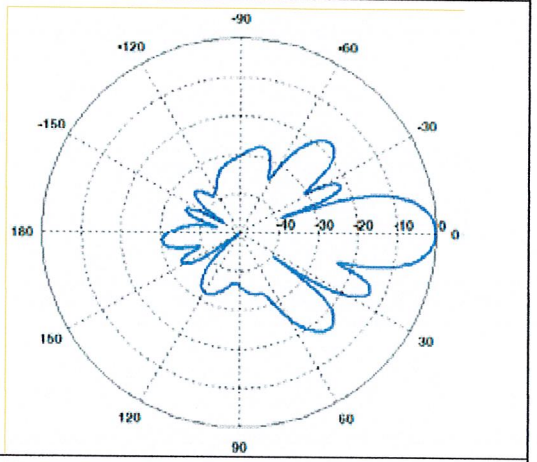
700 MHz

Manufacturer:	Powerwave
Model #:	P65-17-XLH-RR
Frequency Band:	698-806 MHz
Gain:	14.3 dBd
Vertical Beamwidth:	8.4°
Horizontal Beamwidth:	70°
Polarization:	Dual Linear ± 45°
Size L x W x D:	96.0" x 12.0" x 6.0"



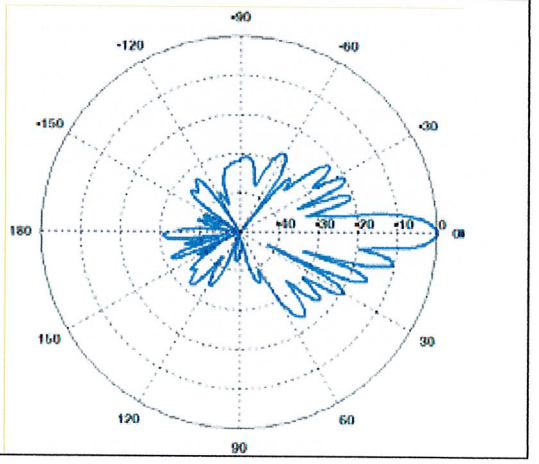
850 MHz

Manufacturer:	Powerwave
Model #:	7770.00
Frequency Band:	824-896 MHz
Gain:	11.5 dBd
Vertical Beamwidth:	15°
Horizontal Beamwidth:	82°
Polarization:	Dual Linear ± 45°
Size L x W x D:	55" x 11.0" x 5.0"



1900 MHz

Manufacturer:	Powerwave
Model #:	7770.00
Frequency Band:	1850-1990 MHz
Gain:	13.4 dBd
Vertical Beamwidth:	7°
Horizontal Beamwidth:	86°
Polarization:	± 45°
Size L x W x D:	55" x 11.0" x 5.0"



Date: **August 22, 2012**

Eva Morales
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Charlotte, NC 28277
(704) 405-6612

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
(859) 624-8360
amathis@verticalstructures.com

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT5717
	Carrier Site Name:	Griswold-Voluntown Road
Crown Castle Designation:	**Crown Castle BU Number:**	876367
	Crown Castle Site Name:	Wappingers Falls/Bob's Antiq
	Crown Castle JDE Job Number:	199572
	Crown Castle Work Order Number:	520714
	Crown Castle Application Number:	158131 Rev. 1
Engineering Firm Designation:	**Vertical Structures, Inc. Project Number:**	2012-004-063
Site Data:	**1439 Voluntown Road, Griswold, CT, New London County** **Latitude *41° 34' 33.99"*, Longitude *-71° 53' 16.96"*** **179.5 Foot - Monopole Tower**	

Dear Eva Morales,

Vertical Structures, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 482408.

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

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 Connecticut State Building Code based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Vertical Structures, Inc.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Andrew Mathis
Project Engineer

tnxTower Report - version 6.0.4.0

8/22/12

Date: **August 22, 2012**

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Respectfully submitted by:

Andrew Mathis
Project Engineer

tnxTower Report - version 6.0.4.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 179.5 ft Monopole tower designed by EEI in 2000. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. The tower was designed with the option to be extended up 10' to 190'.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice and 50 mph under service loads. Also, per Crown Castle's direction and in accordance with ASCE-7-05 we have considered a fastest mile wind speed of 38 mph with an escalating 0.75 inch ice thickness.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
167.0	167.0	1	andrew	SBNH-1D6565C w/ Mount Pipe	3	3/8	
		1	kmw communications	AM-X-CD-14-65-00T-RET w/ Mount Pipe			
		1	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
165.0	165.0	1		Side Arm Mount [SO 102-3]			
		6	ericsson	RRUS-11 BTS			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
177.0	180.0	6	decibel	DB980H90E-M w/ Mount Pipe	6	1 5/8	1
	177.0	1	eei	10'-8" Low-Profile Platform			
167.0	169.0	6	powerwave technologies	7770.00 w/ mount pipe	12	1 1/4	1
		6	powerwave technologies	LGP 17201 TMA			
		6	powerwave technologies	LGP 21901 Diplexer			
	167.0	1		Platform Mount [LP 303-1]			
155.0	157.0	3	antel	BXA-171063-8BF-EDIN-2 w/ Mount Pipe			2
		3	antel	BXA-70063-6CF-EDIN-2 w/ Mount Pipe			
		2	antel	LPA-80063/4CF w/ Mount Pipe			
		4	antel	LPA-80080/4CF w/ Mount Pipe			1
		6	celwave	FD9R6004/2C-3L Diplexer			2
	155.0	1		Platform Mount [LP 303-1]	12	1 5/8	1
60.0	60.0	1		GPS	1	1/2	1
		1		Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
187.5	187.5	12	decibel	DB980H90-EM		
		1	eei	L.P. Platform		
177.5	177.5	12	decibel	DB980H90-EM		
		1	eei	L.P. Platform		
167.5	167.5	12	decibel	DB980H90-EM		
		1	eei	L.P. Platform		
157.5	157.5	12	decibel	DB980H90-EM		
		1	eei	L.P. Platform		
147.5	147.5	12	decibel	DB980H90-EM		
		1	eei	L.P. Platform		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	AT&T Mobility Co-Locate Revision #1	158131	CCIsites
Tower Drawings	EEI Drawing No. GS51862	1999079	CCIsites
Foundation Drawing	EEI Project No. 6024	1613910	CCIsites
Geotechnical Report	Criscuolo Shepard Associates Project No. 99089-1	1613525	CCIsites

3.1) Analysis Method

tnxTower (version 6.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. Crown Castle's CCIplate 1.5 analysis tool was used to evaluate the anchor bolts, base plate, and any splice flanges.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
L1	179.5 - 129.76	Pole	TP31.8522x19.59x0.3125	1	-9631.45	1569354.16	49.9	Pass
L2	129.76 - 84.6094	Pole	TP42.2609x30.1223x0.375	2	-17644.70	2504267.01	61.9	Pass
L3	84.6094 - 40.737	Pole	TP52.2288x40.0964x0.4375	3	-29117.70	3614869.24	60.1	Pass
L4	40.737 - 0	Pole	TP61.25x49.6365x0.5	4	-46463.10	5012079.79	56.0	Pass
							Summary	
						Pole (L2)	61.9	Pass
						Rating =	61.9	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	59.4	Pass
1	Base Plate	0	61.2	Pass
1	Base Foundation Soil Interaction	0	56.8	Pass

Structure Rating (max from all components) =	61.9%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity.

4.1) Recommendations

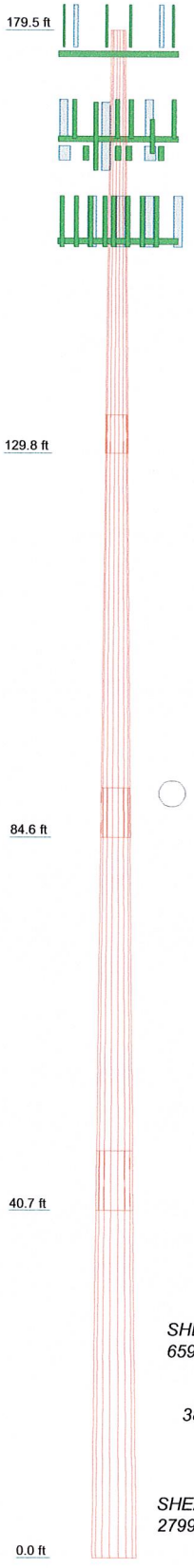
N/A

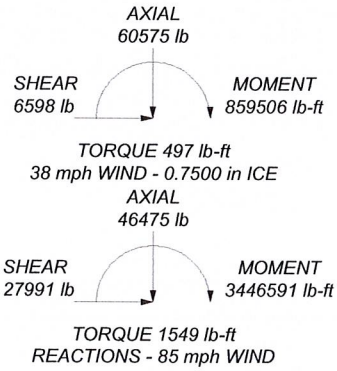
APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4
Length (ft)	49.74	49.63	49.66	47.77
Number of Sides	18	18	18	18
Thickness (in)	0.3125	0.3750	0.4375	0.5000
Socket Length (ft)	4.48	5.78	7.03	
Top Dia (in)	19.5900	30.1223	40.0964	49.6365
Bot Dia (in)	31.8522	42.2609	52.2288	61.2500
Grade	A572-65			
Weight (lb)	4265.6	7199.9	10728.7	14172.4

Total Weight (lb): 36366.6





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
EEI 10'-8" Low-Profile Platform (TIA-G)	177	DC6-48-60-18-8F (ATT Mobility)	167
EEI Monopole Platform Ladder (VSI)	177	Side Arm Mount [SO 102-3] (ATT Mobility)	165
(2) DB980H90E-M w/ Mount Pipe	177	(2) RRUS-11 BTS w/ 4' Mount Pipe (ATT Mobility)	165
(2) DB980H90E-M w/ Mount Pipe	177	(2) RRUS-11 BTS w/ 4' Mount Pipe (ATT Mobility)	165
(2) DB980H90E-M w/ Mount Pipe	177	(2) RRUS-11 BTS w/ 4' Mount Pipe (ATT Mobility)	165
(2) 7'x2" Antenna Mount Pipe	177	Platform Mount [LP 303-1]	155
(2) 7'x2" Antenna Mount Pipe	177	(2) LPA-80080/4CF w/ Mount Pipe (VSI)	155
(2) 7'x2" Antenna Mount Pipe	177	(2) LPA-80080/4CF w/ Mount Pipe (VSI)	155
Platform Mount [LP 303-1] (ATT Mobility)	167	BXA-70063-6CF-EDIN-2 w/ Mount Pipe	155
(2) 7770.00 w/ mount pipe (ATT Mobility)	167	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	155
(2) 7770.00 w/ mount pipe (ATT Mobility)	167	BXA-70063-6CF-EDIN-2 w/ Mount Pipe	155
(2) 7770.00 w/ mount pipe (ATT Mobility)	167	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	155
SBNH-1D6565C w/ Mount Pipe (ATT Mobility)	167	BXA-70063-6CF-EDIN-2 w/ Mount Pipe	155
AM-X-CD-14-65-00T-RET w/ Mount Pipe (ATT Mobility)	167	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	155
P65-17-XLH-RR w/ Mount Pipe (ATT Mobility)	167	(2) LPA-80063/4CF w/ Mount Pipe (VSI)	155
(2) LGP 17201 TMA (VSI) (ATT Mobility)	167	(2) FD9R6004/2C-3L Diplexer	155
(2) LGP 17201 TMA (VSI) (ATT Mobility)	167	(2) FD9R6004/2C-3L Diplexer	155
(2) LGP 17201 TMA (VSI) (ATT Mobility)	167	(2) FD9R6004/2C-3L Diplexer	155
(2) LGP 21901 Diplexer (VSI) (ATT Mobility)	167	Side Arm Mount [SO 701-1]	60
(2) LGP 21901 Diplexer (VSI) (ATT Mobility)	167	Generic GPS (VSI)	60
(2) LGP 21901 Diplexer (VSI) (ATT Mobility)	167		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 61.9%

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
Phone: (859) 624-8360
FAX: (859) 624-8369

Job:	***Wappingers Falls/Bob's Antiq, CT BU#87636***		
Project:	***Vertical Structures Job No. 2012-004-063***		
Client: Crown Castle	Drawn by: Andrew Mathis	App'd:	
Code: TIA/EIA-222-F	Date: 08/22/12	Scale: NTS	
Path: \\Nas1\amathis\Current Jobs\2012-004-063-Wappingers Falls, CT\tnx\876357.eri		Dwg No. E-1	

Tower Input Data

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

Tower is located in New London County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 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	179.50-129.76	49.74	4.48	18	19.5900	31.8522	0.3125	1.2500	A572-65 (65 ksi)
L2	129.76-84.61	49.63	5.78	18	30.1223	42.2609	0.3750	1.5000	A572-65 (65 ksi)
L3	84.61-40.74	49.66	7.03	18	40.0964	52.2288	0.4375	1.7500	A572-65 (65 ksi)
L4	40.74-0.00	47.77		18	49.6365	61.2500	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	19.8922	19.1209	897.7316	6.8435	9.9517	90.2087	1796.6445	9.5623	2.8978	9.273
	32.3436	31.2834	3931.5796	11.1966	16.1809	242.9763	7868.3324	15.6447	5.0560	16.179
L2	31.7000	35.4067	3958.3946	10.5603	15.3021	258.6825	7921.9978	17.7067	4.6415	12.377
	42.9128	49.8547	11050.4304	14.8695	21.4685	514.7268	22115.4013	24.9321	6.7779	18.074
L3	42.1499	55.0713	10943.1659	14.0789	20.3689	537.2475	21900.7312	27.5409	6.2870	14.37
	53.0345	71.9187	24372.0953	18.3859	26.5322	918.5845	48776.2599	35.9662	8.4223	19.251
L4	52.1375	77.9796	23786.3084	17.4435	25.2153	943.3268	47603.9155	38.9972	7.8560	15.712
	62.1949	96.4103	44952.4352	21.5663	31.1150	1444.7191	89964.0200	48.2143	9.9000	19.8

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 179.50-129.76				1	1	1		
L2 129.76-84.61				1	1	1		
L3 84.61-40.74				1	1	1		
L4 40.74-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	179.50 - 5.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF6-50A (1-1/4 FOAM) (AT&T Mobility)	C	No	Inside Pole	169.00 - 5.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
FB-L98B-002-75000 (3/8") (AT&T Mobility)	C	No	Inside Pole	167.00 - 5.00	1	No Ice	0.00	0.10
						1/2" Ice	0.00	0.10
						1" Ice	0.00	0.10
						2" Ice	0.00	0.10
						4" Ice	0.00	0.10
WR-VG122ST-BRDA (Power Cable) (AT&T Mobility)	C	No	Inside Pole	167.00 - 5.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
FLC 158-50J (1-5/8 FOAM)	C	No	Inside Pole	157.00 - 5.00	12	No Ice	0.00	0.92
						1/2" Ice	0.00	0.92
						1" Ice	0.00	0.92
						2" Ice	0.00	0.92
						4" Ice	0.00	0.92
LDF4-50A (1/2 FOAM)	C	No	CaAa (Out Of	60.00 - 5.00	1	No Ice	0.06	0.15

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
			Face)			1/2" Ice	0.16	0.84
						1" Ice	0.26	2.14
						2" Ice	0.46	6.58
						4" Ice	0.86	22.78

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	179.50-129.76	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	0.000	871.12
L2	129.76-84.61	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	0.000	1096.27
L3	84.61-40.74	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	1.214	1068.11
L4	40.74-0.00	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	2.251	873.05

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	179.50-129.76	A	0.902	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	0.000	871.12
L2	129.76-84.61	A	0.863	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	0.000	1096.27
L3	84.61-40.74	A	0.810	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	4.539	1099.61
L4	40.74-0.00	A	0.750	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	8.038	926.51

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	179.50-129.76	0.0000	0.0000	0.0000	0.0000
L2	129.76-84.61	0.0000	0.0000	0.0000	0.0000
L3	84.61-40.74	-0.0380	0.0219	-0.1345	0.0777
L4	40.74-0.00	-0.0702	0.0405	-0.2368	0.1367

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
EEI 10'-8" Low-Profile Platform (TIA-G)	C	None		0.0000	177.00	No Ice	18.62	18.62	1500.00
						1/2" Ice	23.10	23.10	2250.00
						1" Ice	27.58	27.58	3000.00
						2" Ice	36.54	36.54	4500.00
						4" Ice	54.46	54.46	7500.00
EEI Monopole Platform Ladder (VSI)	C	From Centroid-Face	4.00 0.00 -3.00	0.0000	177.00	No Ice	5.00	5.50	60.00
						1/2" Ice	8.00	9.00	90.00
						1" Ice	11.00	12.50	120.00
						2" Ice	17.00	19.50	180.00
						4" Ice	29.00	33.50	300.00
(2) DB980H90E-M w/ Mount Pipe	A	From Centroid-Leg	4.50 0.00 3.00	0.0000	177.00	No Ice	4.04	3.62	30.40
						1/2" Ice	4.50	4.48	63.98
						1" Ice	4.95	5.22	107.35
						2" Ice	5.87	6.74	215.66
						4" Ice	8.05	10.00	549.35
(2) DB980H90E-M w/ Mount Pipe	B	From Centroid-Leg	4.50 0.00 3.00	0.0000	177.00	No Ice	4.04	3.62	30.40
						1/2" Ice	4.50	4.48	63.98
						1" Ice	4.95	5.22	107.35
						2" Ice	5.87	6.74	215.66
						4" Ice	8.05	10.00	549.35
(2) DB980H90E-M w/ Mount Pipe	C	From Centroid-Leg	4.50 0.00 3.00	0.0000	177.00	No Ice	4.04	3.62	30.40
						1/2" Ice	4.50	4.48	63.98
						1" Ice	4.95	5.22	107.35
						2" Ice	5.87	6.74	215.66
						4" Ice	8.05	10.00	549.35
(2) 7'x2" Antenna Mount Pipe	A	From Centroid-Leg	4.50 0.00 2.00	0.0000	177.00	No Ice	1.66	1.66	26.00
						1/2" Ice	2.39	2.39	38.58
						1" Ice	2.83	2.83	55.84
						2" Ice	3.71	3.71	104.97
						4" Ice	5.58	5.58	266.00
(2) 7'x2" Antenna Mount Pipe	B	From Centroid-Leg	4.50 0.00 2.00	0.0000	177.00	No Ice	1.66	1.66	26.00
						1/2" Ice	2.39	2.39	38.58
						1" Ice	2.83	2.83	55.84
						2" Ice	3.71	3.71	104.97
						4" Ice	5.58	5.58	266.00
(2) 7'x2" Antenna Mount Pipe	C	From Centroid-Leg	4.50 0.00 2.00	0.0000	177.00	No Ice	1.66	1.66	26.00
						1/2" Ice	2.39	2.39	38.58
						1" Ice	2.83	2.83	55.84
						2" Ice	3.71	3.71	104.97
						4" Ice	5.58	5.58	266.00
**									
Platform Mount [LP 303-1] (AT&T Mobility)	A	None		0.0000	167.00	No Ice	14.66	14.66	1250.00
						1/2" Ice	18.87	18.87	1481.33
						1" Ice	23.08	23.08	1712.66
						2" Ice	31.50	31.50	2175.32
						4" Ice	48.34	48.34	3100.64
(2) 7770.00 w/ mount pipe (AT&T Mobility)	A	From Centroid-Leg	3.80 -1.40 2.00	-75.0000	167.00	No Ice	6.22	4.35	56.90
						1/2" Ice	6.77	5.20	102.99
						1" Ice	7.30	5.92	159.01
						2" Ice	8.38	7.41	293.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						4" Ice	10.69	10.76	679.74
(2) 7770.00 w/ mount pipe (AT&T Mobility)	B	From Centroid-Leg	3.80 -1.40 2.00	-65.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.22 6.77 7.30 8.38 10.69	4.35 5.20 5.92 7.41 10.76	56.90 102.99 159.01 293.01 679.74
(2) 7770.00 w/ mount pipe (AT&T Mobility)	C	From Centroid-Leg	3.80 -1.40 2.00	-65.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.22 6.77 7.30 8.38 10.69	4.35 5.20 5.92 7.41 10.76	56.90 102.99 159.01 293.01 679.74
SBNH-1D6565C w/ Mount Pipe (AT&T Mobility)	A	From Centroid-Leg	3.80 -1.40 0.00	-75.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.45 12.06 12.69 14.03 17.05	9.60 11.02 12.29 14.51 19.14	95.30 179.04 277.12 505.58 1129.48
AM-X-CD-14-65-00T-RET w/ Mount Pipe (AT&T Mobility)	B	From Centroid-Leg	3.80 -1.40 0.00	-65.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.74 6.20 6.66 7.62 9.67	4.02 4.63 5.28 6.68 9.74	34.75 77.95 129.96 254.09 610.07
P65-17-XLH-RR w/ Mount Pipe (AT&T Mobility)	C	From Centroid-Leg	3.80 -1.40 0.00	-65.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.47 12.08 12.71 14.07 17.08	8.70 10.11 11.38 13.58 18.18	88.20 168.13 262.32 482.70 1089.38
(2) LGP 17201 TMA (VSI) (AT&T Mobility)	A	From Centroid-Leg	3.80 -1.40 2.00	-75.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.95 2.13 2.33 2.75 3.69	0.50 0.62 0.75 1.03 1.69	31.00 41.95 55.17 89.19 193.00
(2) LGP 17201 TMA (VSI) (AT&T Mobility)	B	From Centroid-Leg	3.80 -1.40 2.00	-65.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.95 2.13 2.33 2.75 3.69	0.50 0.62 0.75 1.03 1.69	31.00 41.95 55.17 89.19 193.00
(2) LGP 17201 TMA (VSI) (AT&T Mobility)	C	From Centroid-Leg	3.80 -1.40 2.00	-65.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.95 2.13 2.33 2.75 3.69	0.50 0.62 0.75 1.03 1.69	31.00 41.95 55.17 89.19 193.00
(2) LGP 21901 Diplexer (VSI) (AT&T Mobility)	A	From Centroid-Leg	3.80 -1.40 2.00	-75.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.27 0.34 0.43 0.62 1.10	0.18 0.25 0.32 0.49 0.94	5.50 7.92 11.41 22.43 66.02
(2) LGP 21901 Diplexer (VSI) (AT&T Mobility)	B	From Centroid-Leg	3.80 -1.40 2.00	-65.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.27 0.34 0.43 0.62 1.10	0.18 0.25 0.32 0.49 0.94	5.50 7.92 11.41 22.43 66.02
(2) LGP 21901 Diplexer (VSI) (AT&T Mobility)	C	From Centroid-Leg	3.80 -1.40 2.00	-65.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.27 0.34 0.43 0.62 1.10	0.18 0.25 0.32 0.49 0.94	5.50 7.92 11.41 22.43 66.02
DC6-48-60-18-8F	C	From	3.80	-65.0000	167.00	No Ice	2.57	4.32	18.90

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(AT&T Mobility)		Centroid-Leg	-1.40 0.00			1/2" Ice	2.80	4.60	50.21
						1" Ice	3.04	4.88	85.17
						2" Ice	3.54	5.49	166.87
						4" Ice	4.66	6.80	382.77
Side Arm Mount [SO 102-3] (AT&T Mobility)	C	None		0.0000	165.00	No Ice	3.00	3.00	81.00
						1/2" Ice	3.48	3.48	111.00
						1" Ice	3.96	3.96	141.00
						2" Ice	4.92	4.92	201.00
						4" Ice	6.84	6.84	321.00
(2) RRUS-11 BTS w/ 4' Mount Pipe (AT&T Mobility)	A	From Centroid-Leg	2.15 -1.25 0.00	-75.0000	165.00	No Ice	3.76	2.24	62.22
						1/2" Ice	4.15	2.66	92.07
						1" Ice	4.55	3.10	128.53
						2" Ice	5.39	4.04	216.47
						4" Ice	7.33	6.27	476.19
(2) RRUS-11 BTS w/ 4' Mount Pipe (AT&T Mobility)	B	From Centroid-Leg	2.15 -1.25 0.00	-65.0000	165.00	No Ice	3.76	2.24	62.22
						1/2" Ice	4.15	2.66	92.07
						1" Ice	4.55	3.10	128.53
						2" Ice	5.39	4.04	216.47
						4" Ice	7.33	6.27	476.19
(2) RRUS-11 BTS w/ 4' Mount Pipe (AT&T Mobility)	C	From Centroid-Leg	2.15 -1.25 0.00	-65.0000	165.00	No Ice	3.76	2.24	62.22
						1/2" Ice	4.15	2.66	92.07
						1" Ice	4.55	3.10	128.53
						2" Ice	5.39	4.04	216.47
						4" Ice	7.33	6.27	476.19
**									
Platform Mount [LP 303-1]	C	None		0.0000	155.00	No Ice	14.66	14.66	1250.00
						1/2" Ice	18.87	18.87	1481.33
						1" Ice	23.08	23.08	1712.66
						2" Ice	31.50	31.50	2175.32
						4" Ice	48.34	48.34	3100.64
(2) LPA-80080/4CF w/ Mount Pipe (VSI)	A	From Centroid-Leg	3.46 2.00 2.00	30.0000	155.00	No Ice	3.11	7.48	33.90
						1/2" Ice	3.58	8.38	80.49
						1" Ice	4.02	9.15	136.66
						2" Ice	5.01	10.75	269.99
						4" Ice	7.15	14.17	651.41
(2) LPA-80080/4CF w/ Mount Pipe (VSI)	B	From Centroid-Leg	3.46 2.00 2.00	30.0000	155.00	No Ice	3.11	7.48	33.90
						1/2" Ice	3.58	8.38	80.49
						1" Ice	4.02	9.15	136.66
						2" Ice	5.01	10.75	269.99
						4" Ice	7.15	14.17	651.41
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	A	From Centroid-Leg	3.46 2.00 2.00	30.0000	155.00	No Ice	8.23	6.00	46.20
						1/2" Ice	8.98	7.27	106.29
						1" Ice	9.70	8.38	178.90
						2" Ice	11.08	10.29	350.95
						4" Ice	13.96	14.30	840.18
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	A	From Centroid-Leg	3.46 2.00 2.00	30.0000	155.00	No Ice	3.41	3.58	32.40
						1/2" Ice	3.88	4.38	64.64
						1" Ice	4.35	5.06	106.00
						2" Ice	5.36	6.47	208.30
						4" Ice	7.52	9.64	522.07
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	B	From Centroid-Leg	3.46 2.00 2.00	30.0000	155.00	No Ice	8.23	6.00	46.20
						1/2" Ice	8.98	7.27	106.29
						1" Ice	9.70	8.38	178.90
						2" Ice	11.08	10.29	350.95
						4" Ice	13.96	14.30	840.18
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	B	From Centroid-	3.46 2.00	30.0000	155.00	No Ice	3.41	3.58	32.40
						1/2" Ice	3.88	4.38	64.64

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
		Leg	2.00			1" Ice	4.35	5.06	106.00
						2" Ice	5.36	6.47	208.30
						4" Ice	7.52	9.64	522.07
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	C	From Centroid-Leg	3.46 2.00 2.00	30.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.23 8.98 9.70 11.08 13.96	6.00 7.27 8.38 10.29 14.30	46.20 106.29 178.90 350.95 840.18
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	C	From Centroid-Leg	3.46 2.00 2.00	30.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.41 3.88 4.35 5.36 7.52	3.58 4.38 5.06 6.47 9.64	32.40 64.64 106.00 208.30 522.07
(2) LPA-80063/4CF w/ Mount Pipe (VSI)	C	From Centroid-Leg	3.46 2.00 2.00	30.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.02 7.43 7.86 8.73 10.57	6.95 7.59 8.25 9.63 12.73	34.60 96.28 166.65 328.63 761.32
(2) FD9R6004/2C-3L Diplexer	A	From Centroid-Leg	3.46 2.00 2.00	30.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
(2) FD9R6004/2C-3L Diplexer	B	From Centroid-Leg	3.46 2.00 2.00	30.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
(2) FD9R6004/2C-3L Diplexer	C	From Centroid-Leg	3.46 2.00 2.00	30.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
**									
Side Arm Mount [SO 701-1]	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	65.00 79.00 93.00 121.00 177.00
Generic GPS (VSI)	A	From Centroid-Leg	5.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.40 1.70 1.90 2.20 2.50	1.40 1.70 1.90 2.20 2.50	25.00 30.00 35.00 40.00 45.00

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 lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L1	179.5 - 129.76 (1)	TP31.8522x19.59x0.3125	49.74	0.00	0.0	39.000	30.1875	-9631.45	1177310.00	0.008
L2	129.76 - 84.6094 (2)	TP42.2609x30.1223x0.375	49.63	0.00	0.0	39.000	48.1710	-17644.70	1878670.00	0.009
L3	84.6094 - 40.737 (3)	TP52.2288x40.0964x0.4375	49.66	0.00	0.0	39.000	69.5340	-29117.70	2711830.00	0.011
L4	40.737 - 0 (4)	TP61.25x49.6365x0.5	47.77	0.00	0.0	39.000	96.4102	-46463.10	3760000.00	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	179.5 - 129.76 (1)	TP31.8522x19.59x0.3125	483237.50	-25.639	39.000	0.657	0.00	0.000	39.000	0.000
L2	129.76 - 84.6094 (2)	TP42.2609x30.1223x0.375	1272583.33	-31.788	39.000	0.815	0.00	0.000	39.000	0.000
L3	84.6094 - 40.737 (3)	TP52.2288x40.0964x0.4375	2206375.00	-30.843	39.000	0.791	0.00	0.000	39.000	0.000
L4	40.737 - 0 (4)	TP61.25x49.6365x0.5	3446591.67	-28.628	39.000	0.734	0.00	0.000	39.000	0.000

Pole Interaction Design Data

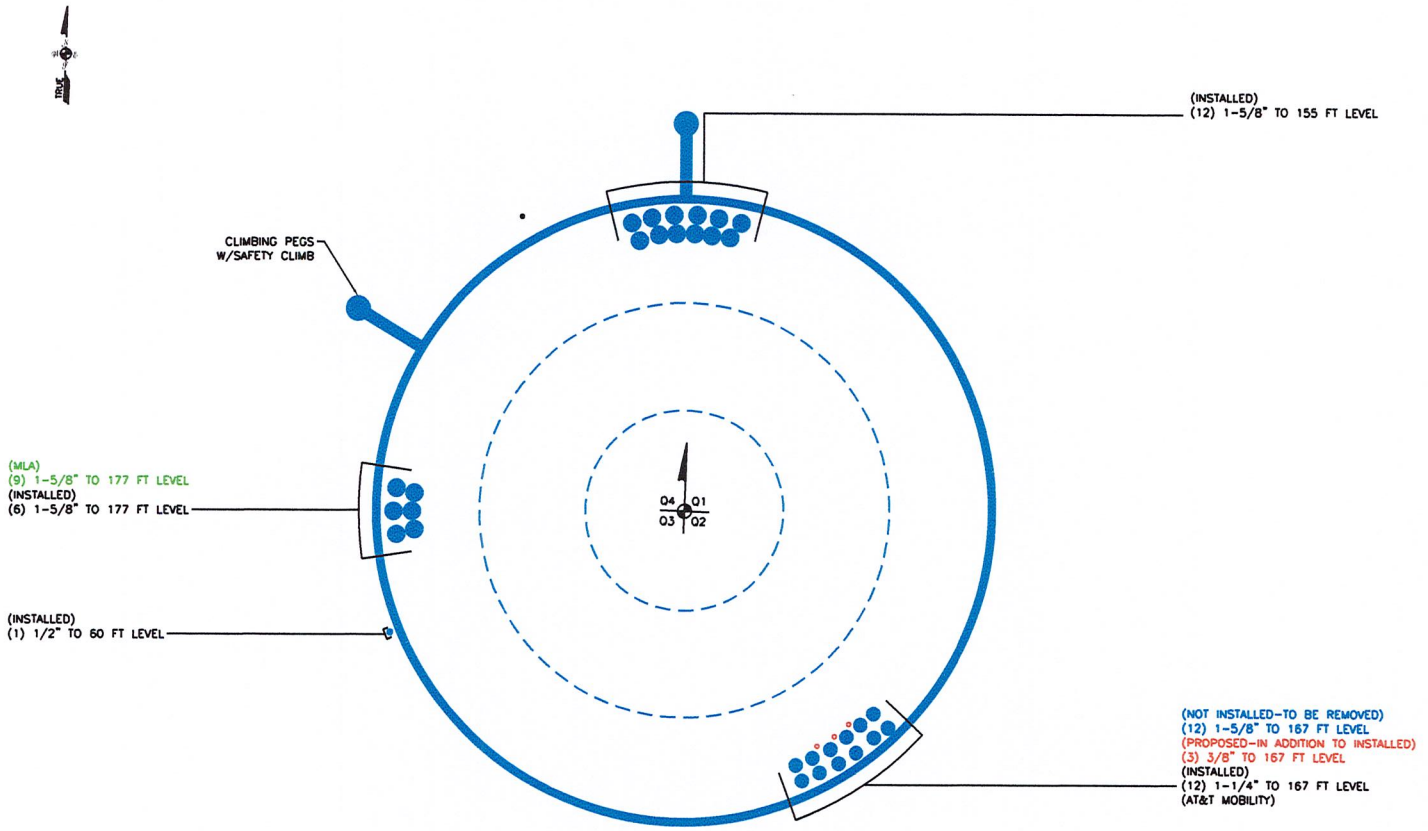
Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	179.5 - 129.76 (1)	TP31.8522x19.59x0.3125	0.008	0.657	0.000	0.666 ✔	1.333	H1-3 ✔
L2	129.76 - 84.6094 (2)	TP42.2609x30.1223x0.375	0.009	0.815	0.000	0.824 ✔	1.333	H1-3 ✔
L3	84.6094 - 40.737 (3)	TP52.2288x40.0964x0.4375	0.011	0.791	0.000	0.802 ✔	1.333	H1-3 ✔
L4	40.737 - 0 (4)	TP61.25x49.6365x0.5	0.012	0.734	0.000	0.746 ✔	1.333	H1-3 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	179.5 - 129.76	Pole	TP31.8522x19.59x0.3125	1	-9631.45	1569354.16	49.9	Pass
L2	129.76 - 84.6094	Pole	TP42.2609x30.1223x0.375	2	-17644.70	2504267.01	61.9	Pass
L3	84.6094 - 40.737	Pole	TP52.2288x40.0964x0.4375	3	-29117.70	3614869.24	60.1	Pass
L4	40.737 - 0	Pole	TP61.25x49.6365x0.5	4	-46463.10	5012079.79	56.0	Pass
							Summary	
						Pole (L2)	61.9	Pass
						RATING =	**61.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876367 TOWER ID: C_BASELEVEL

CROWN REGION ADDRESS

USA

07/08/07	NEW BUILD PER WORK ORDER # 151931	ESG
22/10/08	AS-BUILT INFORMATION ADDED PER WORK ORDER # 239162 APPLICATION ADDED PER WORK ORDER # 239162	BA
11/11/08		AEF
25/06/09	AS-BUILT INFORMATION ADDED PER WORK ORDER # 271252 APPLICATION ADDED PER WORK ORDER # 271252	CJP
07/07/09	AS-BUILT INFORMATION ADDED PER WORK ORDER # 281921 APPLICATION ADDED PER WORK ORDER # 281921	TC
28/10/11	AS-BUILT INFORMATION ADDED PER WORK ORDER # 441182 APPLICATION ADDED PER WORK ORDER # 441182	KMH
15/06/12	AS-BUILT INFORMATION ADDED PER WORK ORDER # 520713 APPLICATION ADDED PER WORK ORDER # 520713	LAN

DRAWN BY: ESG
CHECKED BY: SL
DRAWING DATE: 07/08/07

SITE NUMBER:
SITE NAME:

SITE NAME

WAPPINGERS FALLS / BOB'S ANTI

BUSINESS UNIT NUMBER

876367

SITE ADDRESS

1439 VOLUNTOWN RD
GRISWOLD, CT 06384
NEW LONDON COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING

SCALE: 1" = 1'-0" | 1

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *876367*
Site Name: *Wappingers Falls/Bob's Antiq, CT*
App #: *158131, Rev. 1*

Pole Manufacturer:	*Other*

Reactions		
Moment:	3446.591	ft-kips
Axial:	46.475	kips
Shear:	27.991	kips

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

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	70	in

Anchor Rod Results

Maximum Rod Tension:	115.8 Kips	Non-Rigid
Allowable Tension:	195.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	59.4% **Pass**	Fty*ASIF

Plate Data		
Diam:	76	in
Thick:	2.25	in
Grade:	65	ksi
Single-Rod B-eff:	9.72	in

Base Plate Results

	Flexural Check	Non-Rigid
Base Plate Stress:	39.8 ksi	Service ASD
Allowable Plate Stress:	65.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	61.2% **Pass**	Y.L. Length: 33.89

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

Stiffener Results

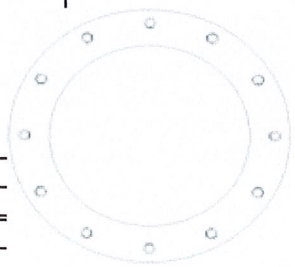
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check:	n/a

Pole Data		
Diam:	61.25	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

BU#: *876367*
Site Name: *Wappingers Falls/Bob's Antiq, CT*
App #: *158131, Rev. 1*

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Pad & Pier Data		
Base PL Dist. Above Pier:	0	in
Pier Dist. Above Grade:	12	in
Pad Bearing Depth, D:	6.5	ft
Pad Thickness, T:	6	ft
Pad Width=Length, L:	27	ft
Pier Cross Section Shape:	Square	<--Pull Down
Enter Pier Side Width:	7.5	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	56.25	ft^2
Pier Height:	1.50	ft
Soil (above pad) Height:	0.50	ft

Soil Parameters		
Unit Weight, γ:	100.0	pcf
Ultimate Bearing Capacity, qn:	16.00	ksf
Strength Reduct. factor, ϕ:	0.75	
Angle of Friction, Φ:	0.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: ϕ*qn:	12.00	ksf
Passive Pres. Coeff., Kp	1.00	

Forces/Moments due to Wind and Lateral Soil		
Minimum of (φ*Ultimate Pad Passive Force, Vu):	37.8	kips
Pad Force Location Above D:	2.14	ft
ϕ(Passive Pressure Moment):	80.97	ft-kips
Factored O.T. M(WL), "1.6W":	4936.3	ft-kips
Factored OT (MW-Msoil), M1	4855.33	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	0.00	ft
Sum of Soil Wedges Wt:	0.00	kips
Soil Wedges ecc, K1:	0.00	ft
Ftg+Soil above Pad wt:	702.4	kips
Unfactored (Total ftg-soil Wt):	702.39	kips
1.2D. **No Soil Wedges.**	898.64	kips
0.9D. **With Soil Wedges**	673.98	kips

Resistance due to Cohesion (Vertical)		
ϕ*(1/2*Cu)(Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	46.475	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	27.991	kips
Unfactored WL Moment, M:	3446.591	ft-kips

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	55.77	kips
0.90	0.9D+1.6W, Pu:	41.8275	kips
1.35	Vu:	37.78785	kips
	Mu:	4652.898	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(**No Soil Wedges**) [Reaction+Conc+Soil]	898.64	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	4855.33	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 =	5.40	ft
Orthogonal qu=	2.22	ksf
qu/ϕ*qn Ratio=	**18.50%**	**Pass**

Diagonal Direction:

ecc2 = (0.707M1)/P1 =	3.82	ft
Diagonal qu=	2.40	ksf
qu/ϕ*qn Ratio=	**19.98%**	**Pass**

Run <-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(**w/ Soil Wedges**) [Reaction+Conc+Soil]	673.98	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	4855.33	ft-kips

Orthogonal ecc3 = M2/P2 =	7.20	ft
Ortho Non Bearing Length,NBL=	14.41	ft
Orthogonal qu=	1.98	ksf
Diagonal qu=	2.38	ksf

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating			
Actual M:	3446.59		
M Orthogonal:	6070.60	**56.78%**	**Pass**
M Diagonal:	6070.60	**56.78%**	**Pass**