ROBINSON & COLE LLP

EM-VER-058-070801

EY LEE MIRANDA

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Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
jmiranda@rc.com
Direct (860) 275-8227

August 1, 2007

Via Hand Delivery

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

Re: **Notice of Exempt Modification**
1439 Voluntown Road
Griswold, Connecticut

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") intends to install antennas on an existing 180-foot self-supporting monopole tower owned by Crown Castle International at 1439 Voluntown Road in Griswold, Connecticut. 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 Griswold First Selectwoman, Anne P. Hatfield. Pursuant to Council directive, a copy of this letter is also being sent to Robert E. & Mildred Rose, the property owners of the land on which the tower is located.

The facility consists of a 180-foot self-supporting monopole tower capable of supporting multiple carriers within a fenced compound at 1439 Voluntown Road in Griswold. The tower is currently shared by Sprint Nextel Corporation with antennas at the 177-foot level and AT&T with antennas at the 167-foot level on the tower. Cellco intends to install twelve (12) panel-type antennas (six cellular and six PCS) at the 157-foot level on the tower and place a 12' x 30' equipment shelter on the ground at the base of the tower within the existing fenced compound. Attached behind Tab 1 are Project Plans for the proposed Cellco installation.

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

1. The proposed modification will not increase the overall height of the existing tower. Cellco's antennas will be mounted with their centerline at the 157-foot level on the 180-foot tower.

2. The proposed installation of a 12' x 30' equipment shelter will not require an extension of the fenced compound or lease area.

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

4. The operation of the antennas will not increase radio frequency ("RF") power density levels at the facility to a level at or above the Federal Communications Commission ("FCC") adopted safety standard. The cumulative worst-case RF power density calculations for the existing antennas and Cellco antennas would be 15.44% of the FCC standard. A copy of the cumulative power density calculations table is attached behind Tab 2.

Also attached, behind Tab 3, is a Structural Analysis confirming that the tower can support the existing and proposed antennas and associated equipment.

For the foregoing reasons, Cellco respectfully submits that the proposed antenna installation at the facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Joey Lee Miranda

Attachments
Copy to:
Anne R. Hatfield, Griswold First Selectwoman
Robert E. & Mildred Rose
Sandy M. Carter

Cellco Partnership

d.b.a. verizon wireless

WIRELESS COMMUNICATIONS FACILITY

GRISWOLD EAST
1439 VOLUNTOWN ROAD
GRISWOLD, CT 06351

PROJECT SUMMARY

SITE NAME:	GRISWOLD EAST
SITE ADDRESS:	1439 VOLUNTOWN ROAD GRISWOLD, CT 06351
SITE LOCATION:	LATITUDE 41°-34'-35" LONGITUDE 71°-53'-18" COORDINATES BASED ON CSC WEB LOG LAST UPDATED 07/03/07
SITE OWNER:	CROWN CASTLE INTERNATIONAL
APPLICANT:	CELLCO PARTNERSHIP d.b.a. VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
CONTACT PERSON:	SANDY CARTER CELLCO PARTNERSHIP (860) 803-8219

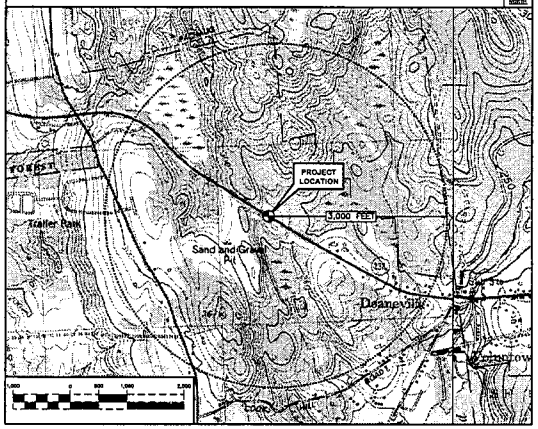
SITE DIRECTIONS

FROM: 99 EAST RIVER DRIVE, EAST HARTFORD, CONNECTICUT **TO:** 1439 VOLUNTOWN ROAD, GRISWOLD, CONNECTICUT

1. START OUT GOING EAST ON E RIVER DR.	<0.1 MI.
2. MERGE ONTO I-84 E / US-6 E VIA THE RAMP ON THE LEFT TOWARD BOSTON.	0.2 MI.
3. MERGE ONTO CT-2 E VIA EXIT 55 TOWARD NORWICH / NEW LONDON.	36.5 MI.
4. TAKE EXIT #28N/PROVIDENCE ONTO I-395 N.	8.2 MI.
5. TAKE EXIT #85/PRESTON CITY/PACHAUG.	0.6 MI.
6. BEAR RIGHT ONTO VOLUNTOWN RD (CT-138).	4.6 MI.
7. ARRIVE AT 1439 VOLUNTOWN RD, GRISWOLD.	

VICINITY MAP

SCALE: 1" = 1000'



SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	A
C-1	COMPOUND PLAN AND ELEVATION	A

GENERAL NOTES

1. PROPOSED ANTENNA LOCATIONS AND HEIGHTS PROVIDED BY VERIZON WIRELESS.

PROJECT SCOPE

1. THE PROPOSED SCOPE OF WORK GENERALLY INCLUDES THE INSTALLATION OF A 12'x30' PREFABRICATED WIRELESS EQUIPMENT SHELTER ON A CONCRETE FOUNDATION WITHIN THE EXISTING WIRELESS COMMUNICATIONS COMPOUND.
2. TWELVE (12) PANEL ANTENNAS ARE PROPOSED TO BE INSTALLED ON THE EXISTING 180 FT TALL MONOPOLE TOWER AT A RAD CENTER ELEVATION OF 157 FT±.
3. ELECTRIC AND TELCO UTILITIES SHALL BE ROUTED UNDERGROUND TO THE VERIZON EQUIPMENT SHELTER FROM AN EXISTING UTILITY BACKBOARD LOCATED ADJACENT TO THE FENCED COMPOUND.

REVISIONS		
A	07/30/07	CSC - REVIEW

Cellco Partnership
d.b.a. verizon wireless

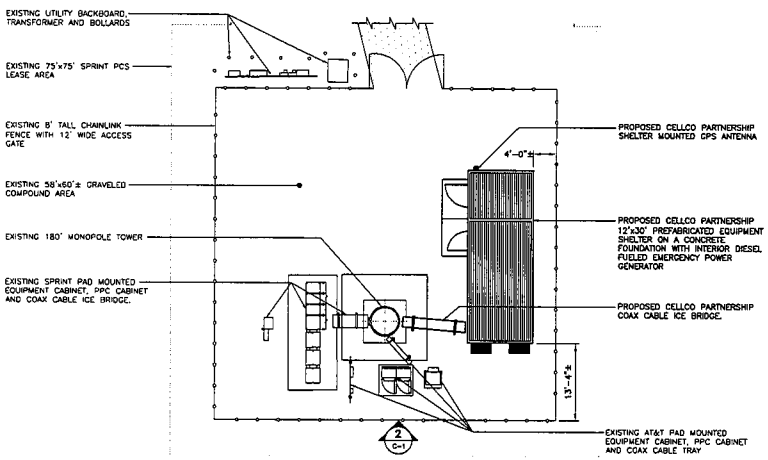
Natcomm, LLC - Engineering Consultants
NATCOMM
Natcomm, LLC.
53-2 North Branford Road
Branford, Connecticut 06405
Tel. (203) 488-0580
Fax (203) 488-8587
Consulting Engineers - Project Management
Civil - Structural - Mechanical - Electrical

GRISWOLD EAST
1439 VOLUNTOWN ROAD
GRISWOLD, CT 06351

PROJECT NO:	07058
DRAWN BY:	DEB
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	07/27/07

TITLE SHEET

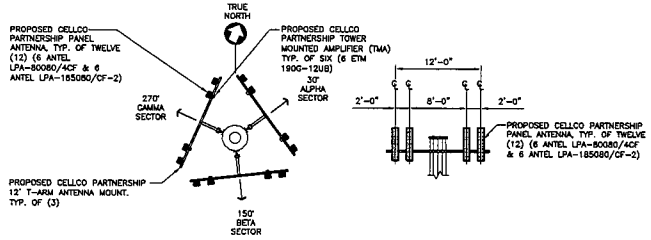
T-1
DWG. 1 OF 2



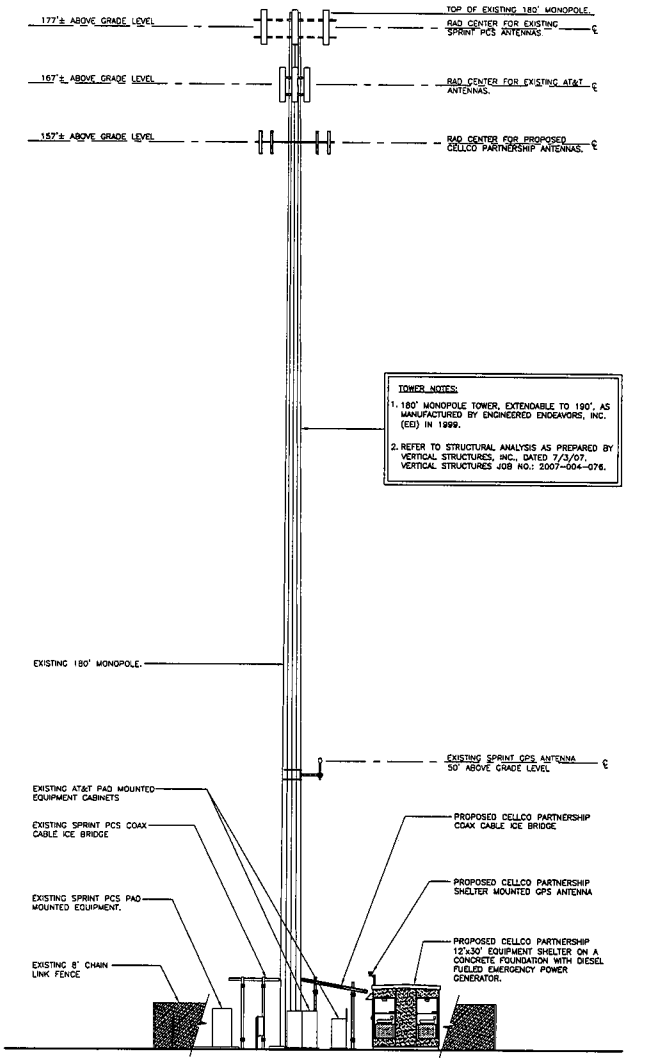
1 / C-1 **COMPOUND PLAN**
SCALE: 1" = 10'- 0"

TRUE NORTH

GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.



3 / C-1 **ANTENNA MOUNTING CONFIGURATION**
NOT TO SCALE



2 / C-1 **COMPOUND AND TOWER ELEVATION**
SCALE: 1" = 10'- 0"

GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.

REVISIONS		
A	07/30/07	CSC - REVIEW

Cellco Partnership
d.b.a. verizon wireless

Natcomm, LLC.
63-2 North Branford Road
Branford, Connecticut 06405
Tel (203) 488-0580
Fax (203) 488-8587
Consulting Engineers, Project Management
Civil · Structural · Mechanical · Electrical

NOT FOR CONSTRUCTION

GRISWOLD EAST

1439 VOLUNTOWN ROAD
GRISWOLD, CT 06351

PROJECT NO:	07058
DRAWN BY:	DEB
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	07/27/07

COMPOUND PLAN AND ELEVATION

C-1
DWG. 2 OF 2

			General	Power	Density		
Site Name: Griswold E							
Tower Height: Verizon @ 157 Ft.							
		ERP					
Carrier	**channels**	**watt/ch**	**distance (feet)**	**S (mW/cm^2)**	**f (MHz)**	**Smax**	**Percent MPE**
AT&T*	12	250	167	0.0387	1945	1	3.87
Sprint*	12	250	177	0.0344	1962.5	1.0000	3.44
Verizon PCS	**3**	**400**	**157**	**0.01750**	**1900**	**1.0000**	**1.75**
Verizon	**9**	**285**	**157**	**0.03740**	**880**	**0.5867**	**6.38**
*Source: Siting Council Records						**Total %MPE**	**15.44**

July 3, 2007

Paul Brown
Crown Castle International
9105 Monroe Road, Suite 150
Charlotte, NC 28270
(704) 321-5369

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

Subject: **Structural Analysis Report**

Carrier Designation	**Verizon Wireless Co-Locate** **Carrier Site Number: 2006203902** **Carrier Site Name: Griswold E CT**
Crown Castle Designation	**Crown Castle BU Number: 876367** **Crown Castle Site Name: Wappingers Falls/Bob's Antiq** **Crown Castle JDE Job Number: 89939**
Engineering Firm Designation	**Vertical Structures Project Number: 2007-004-076**
Site Data	**1439 Voluntown Road, Griswold, CT, New London County** **Latitude 41°-34'-33.99", Longitude -71°-53'-16.96"** **180' EEI Monopole Tower**

Dear Mr. Brown,

Vertical Structures is pleased to submit this structural analysis report to determine the structural integrity of the aforementioned 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 244133, and Application Number 46544, Revision 0. The purpose of the analysis is to determine the suitability of the tower for the following load case:

Load Case 1 (LC1): Proposed Equipment (Table 1) + Existing/Reserved Equipment (Table 2)

Based on our analysis we have determined the tower superstructure and foundation are sufficient for LC1. This analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a 90 MPH basic "fastest mile" wind speed, equivalent to a 110 MPH basic "3-second gust" wind speed per IBC Table 1609.3.1.

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

Respectfully submitted,

Kyle Meehan
Project Engineer

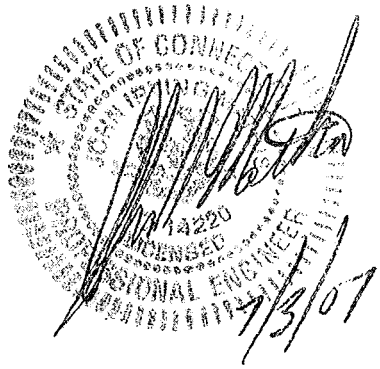


TABLE OF CONTENTS

1.) INTRODUCTION

The 180' tall monopole tower was designed and manufactured by EEI for Sprint PCS in 1999, with the option to be extended 10' to 190'. The existing structure consists of four (4) 18-sided polygonal tubes joined via slip joint connections and is founded on a 27' square by 6' thick mat bearing 6'-6" below grade.

2.) ANALYSIS CRITERIA

The Wappingers Falls/Bob's Antiq monopole tower was analyzed in accordance with the current EIA-222-F publication, "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures." The proposed, existing and reserved antennas, cables and mounts considered in this analysis are listed in Tables 1 and 2. Applied forces in this study were derived from a 90 MPH basic "fastest mile" wind speed with no ice and a reduced 78 MPH basic "fastest mile" wind speed with a 1/2" of radial ice accumulation. The tower was originally designed for a 90 MPH basic "fastest mile" wind speed with no ice and a reduced 78 MPH basic "fastest mile" wind speed with a 1/2" of radial ice accumulation. The original design loads are listed in Table 3. All cables are assumed to be routed in accordance with the drawing in Appendix B.

Table 1 – Proposed Antenna and Cable Information

Mount Center Line Elevation (feet)	Number Of Antenna	Antenna Manufacturer	Antenna Model	Mount Manufacturer	Mount Model	Number Of Feed Lines	Feed Line Size (inches)
157	6	Antel	LPA-80080/4CF		(3) 12' T-Arms	12	1 5/8
	6	Antel	LPA-185080/8CFx2				
	6	Andrew	ETM190G-12UB TMA				

Table 2 – Existing and Reserved Antenna and Cable Information

Mount Center Line Elevation (feet)	Number Of Antenna	Antenna Manufacturer	Antenna Model	Mount Manufacturer	Mount Model	Number Of Feed Lines	Feed Line Size (inches)
177	9*	EMS Wireless	FV65-14-00NA2	EEI	10'-8" L.P. Platform	9*	1 5/8
167	3 + 3**	Allgon	7250.03		(3**) 12' T-Arms	6 + 6**	1 5/8
60	1		GPS		(1) 2' Sidearm	1	1/2

*Indicates MLA loading.
**Indicates reserved loading.

Table 3 – Design Antenna and Cable Information

Mount Center Line Elevation (feet)	Number Of Antenna	Antenna Manufacturer	Antenna Model	Mount Manufacturer	Mount Model	Number Of Feed Lines	Feed Line Size (inches)
187.5	12	Decibel	DB980H90-EM	EEI	L.P. Platform		
177.5	12	Decibel	DB980H90-EM	EEI	L.P. Platform		
167.5	12	Decibel	DB980H90-EM	EEI	L.P. Platform		
157.5	12	Decibel	DB980H90-EM	EEI	L.P. Platform		
147.5	12	Decibel	DB980H90-EM	EEI	L.P. Platform		

3.) ANALYSIS PROCEDURE

Table 4 – Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Locate Revision #0	46544	CCI iSite
Tower Drawings	EEI Drawing No. GS51862	N/A	On File
Foundation Drawing	EEI Project No. 6024	N/A	On File
Geotechnical Report	Criscuolo Shepard Associates Project No. 99089-1	1613525	CCI iSite

3.1) Analysis Methods

RISA Tower (Version 5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various dead, live, wind, and ice load cases. All loads were computed in accordance with the ANSI/EIA/TIA-222-F or the local building code requirements. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

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

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and Vertical Structures should be allowed to review any new information to determine its effect on the structural integrity of the tower.

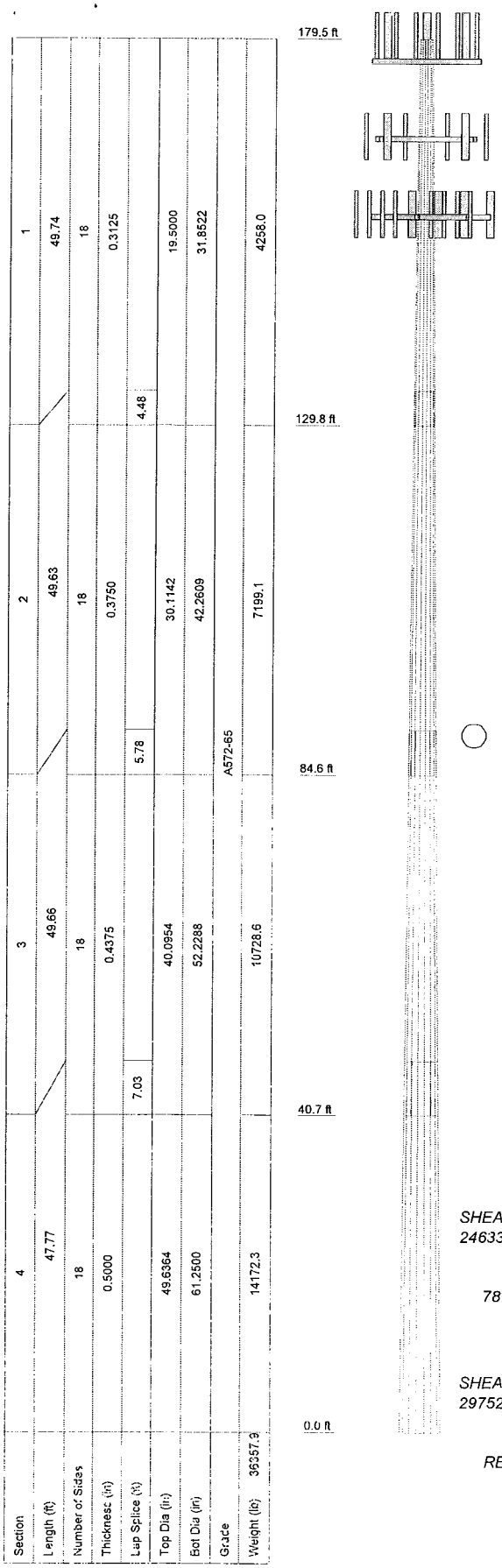
4.) ANALYSIS RESULTS

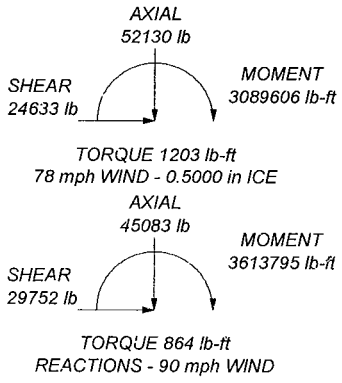
Table 5 – Tower Component Stresses vs. Capacity (LC1)

Notes	Component	Elevation (feet)	% Capacity	Pass/Fail
RISA Tower Analysis Summary:				
	Pole (L1)	179.5 – 129.8	53.8	Pass
	Pole (L2)	129.8 – 84.6	64.5	Pass
	Pole (L3)	84.6 – 40.7	62.7	Pass
	Pole (L4)	40.7 – 0	58.6	Pass
Additional Component Analysis Summary:				
1	Anchor Bolts (Tension)		69.5	Pass
1	Base Plate (Bending)		71.2	Pass
	Foundation (Compared to Design Loads)		78.0	Pass
		Structure Rating =	**78.0**	**Pass**

1) Indicates calculations supporting % capacity are included in Appendix C.

APPENDIX A





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
EEI 10'-8" Low-Profile Platform	177	(2) LPA-80080/4CF w/ Mount Pipe (VSI) (Verizon Wireless)	157
EEI Monopole Platform Ladder (VSI)	177	(2) LPA-80080/4CF w/ Mount Pipe (VSI) (Verizon Wireless)	157
(3) FV65-14-00NA2 w/Mount Pipe	177	(2) LPA-185080/8CFx2 w/Mount Pipe (Verizon Wireless)	157
(3) FV65-14-00NA2 w/Mount Pipe	177	(2) LPA-185080/8CFx2 w/Mount Pipe (Verizon Wireless)	157
(3) FV65-14-00NA2 w/Mount Pipe	177	(2) LPA-185080/8CFx2 w/Mount Pipe (Verizon Wireless)	157
7'x2" Antenna Mount Pipe	177	(2) ETM190G-12UB TMA (VSI) (Verizon Wireless)	157
7'x2" Antenna Mount Pipe	177	(2) ETM190G-12UB TMA (VSI) (Verizon Wireless)	157
7'x2" Antenna Mount Pipe	177	(2) ETM190G-12UB TMA (VSI) (Verizon Wireless)	157
12' T-Arm Mount	167	2' Sidearm (4" Tube) (VSI)	60
12' T-Arm Mount	167	Generic GPS (VSI)	60
12' T-Arm Mount	167		
(2) 7250.03 w/Mount Pipe	167		
(2) 7250.03 w/Mount Pipe	167		
(2) 7250.03 w/Mount Pipe	167		
12' T-Arm Mount (Verizon Wireless)	157		
12' T-Arm Mount (Verizon Wireless)	157		
12' T-Arm Mount (Verizon Wireless)	157		
(2) LPA-80080/4CF w/ Mount Pipe (VSI) (Verizon Wireless)	157		

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 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 78 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 64.5%

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 #2007-004-076***		
Client: Crown Castle	Drawn by: Kyle Meehan	App'd:	
Code: TIA/EIA-222-F	Date: 07/03/07	Scale: NTS	
Path: \\Nas1\kmeehan\2007-004-076\RISA\876367.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 90 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 78 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	19.5000	31.8522	0.3125	1.2500	A572-65 (65 ksi)
L2	129.76-84.61	49.63	5.78	18	30.1142	42.2609	0.3750	1.5000	A572-65 (65 ksi)
L3	84.61-40.74	49.66	7.03	18	40.0954	52.2288	0.4375	1.7500	A572-65 (65 ksi)
L4	40.74-0.00	47.77		18	49.6364	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	19.8008	19.0316	885.2166	6.8116	9.9060	89.3617	1771.5981	9.5176	2.8820	9.222
	32.3436	31.2834	3931.5796	11.1966	16.1809	242.9763	7868.3324	15.6447	5.0560	16.179
L2	31.6925	35.3971	3955.1584	10.5574	15.2980	258.5406	7915.5211	17.7019	4.6401	12.374
	42.9128	49.8547	11050.4304	14.8695	21.4685	514.7268	22115.4013	24.9321	6.7779	18.074
L3	42.1490	55.0700	10942.3835	14.0786	20.3685	537.2217	21899.1653	27.5402	6.2868	14.37
	53.0345	71.9187	24372.0953	18.3859	26.5322	918.5845	48776.2599	35.9662	8.4223	19.251
L4	52.1374	77.9794	23786.1145	17.4434	25.2153	943.3217	47603.5274	38.9971	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	9	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	167.00 - 5.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
FLC 158-50J (1-5/8 FOAM) (Verizon Wireless)	C	No	Inside Pole	157.00 - 5.00	12	No Ice	0.00	0.92
						1/2" Ice	0.00	0.92
LDF4-50A (1/2 FOAM)	C	No	CaAa (Out Of Face)	60.00 - 5.00	1	No Ice	0.06	0.15
						1/2" Ice	0.16	0.84

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	1034.24
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	1275.97
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	1242.72

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
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	1015.29

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
L1	179.50-129.76	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	0.000	1034.24
L2	129.76-84.61	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	0.000	1275.97
L3	84.61-40.74	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	3.140	1256.02
L4	40.74-0.00	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	5.825	1039.96

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	-0.0952	0.0549
L4	40.74-0.00	-0.0702	0.0405	-0.1753	0.1012

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight lb
EEI 10'-8" Low-Profile Platform	C	None		0.0000	177.00	No Ice	22.50	22.50	1500.00
						1/2" Ice	28.10	28.10	2250.00
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
(3) FV65-14-00NA2 w/Mount Pipe	A	From Centroid-Leg	4.50 0.00 3.00	0.0000	177.00	No Ice	8.64	6.95	55.55
						1/2" Ice	9.29	8.13	121.25

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
(3) FV65-14-00NA2 w/Mount Pipe	B	From Centroid-Leg	4.50 0.00 3.00	0.0000	177.00	No Ice 1/2" Ice	8.64 9.29	6.95 8.13	55.55 121.25
(3) FV65-14-00NA2 w/Mount Pipe	C	From Centroid-Leg	4.50 0.00 3.00	0.0000	177.00	No Ice 1/2" Ice	8.64 9.29	6.95 8.13	55.55 121.25
7'x2" Antenna Mount Pipe	A	From Centroid-Leg	4.50 0.00 2.00	0.0000	177.00	No Ice 1/2" Ice	1.66 2.39	1.66 2.39	26.00 38.58
7'x2" Antenna Mount Pipe	B	From Centroid-Leg	4.50 0.00 2.00	0.0000	177.00	No Ice 1/2" Ice	1.66 2.39	1.66 2.39	26.00 38.58
7'x2" Antenna Mount Pipe	C	From Centroid-Leg	4.50 0.00 2.00	0.0000	177.00	No Ice 1/2" Ice	1.66 2.39	1.66 2.39	26.00 38.58
**									
12' T-Arm Mount	A	From Centroid-Face	4.00 0.00 0.00	0.0000	167.00	No Ice 1/2" Ice	8.00 9.90	4.00 4.95	200.00 250.00
12' T-Arm Mount	B	From Centroid-Face	4.00 0.00 0.00	0.0000	167.00	No Ice 1/2" Ice	8.00 9.90	4.00 4.95	200.00 250.00
12' T-Arm Mount	C	From Centroid-Face	4.00 0.00 0.00	0.0000	167.00	No Ice 1/2" Ice	8.00 9.90	4.00 4.95	200.00 250.00
(2) 7250.03 w/Mount Pipe	A	From Centroid-Face	6.00 0.00 0.00	0.0000	167.00	No Ice 1/2" Ice	4.45 5.03	3.54 4.72	40.95 76.25
(2) 7250.03 w/Mount Pipe	B	From Centroid-Face	6.00 0.00 0.00	0.0000	167.00	No Ice 1/2" Ice	4.45 5.03	3.54 4.72	40.95 76.25
(2) 7250.03 w/Mount Pipe	C	From Centroid-Face	6.00 0.00 0.00	0.0000	167.00	No Ice 1/2" Ice	4.45 5.03	3.54 4.72	40.95 76.25
**									
12' T-Arm Mount (Verizon Wireless)	A	From Centroid-Leg	3.83 2.25 0.00	30.0000	157.00	No Ice 1/2" Ice	8.00 9.90	4.00 4.95	200.00 250.00
12' T-Arm Mount (Verizon Wireless)	B	From Centroid-Leg	3.83 2.25 0.00	30.0000	157.00	No Ice 1/2" Ice	8.00 9.90	4.00 4.95	200.00 250.00
12' T-Arm Mount (Verizon Wireless)	C	From Centroid-Leg	3.83 2.25 0.00	30.0000	157.00	No Ice 1/2" Ice	8.00 9.90	4.00 4.95	200.00 250.00
(2) LPA-80080/4CF w/ Mount Pipe (VSI) (Verizon Wireless)	A	From Centroid-Leg	5.53 3.25 0.00	30.0000	157.00	No Ice 1/2" Ice	3.11 3.58	7.48 8.38	33.90 80.49
(2) LPA-80080/4CF w/ Mount Pipe (VSI) (Verizon Wireless)	B	From Centroid-Leg	5.53 3.25 0.00	30.0000	157.00	No Ice 1/2" Ice	3.11 3.58	7.48 8.38	33.90 80.49
(2) LPA-80080/4CF w/ Mount Pipe (VSI) (Verizon Wireless)	C	From Centroid-Leg	5.53 3.25 0.00	30.0000	157.00	No Ice 1/2" Ice	3.11 3.58	7.48 8.38	33.90 80.49
(2) LPA-185080/8CFx2 w/Mount Pipe (Verizon Wireless)	A	From Centroid-Leg	5.53 3.25 0.00	30.0000	157.00	No Ice 1/2" Ice	2.82 3.43	4.45 5.48	32.55 66.25
(2) LPA-185080/8CFx2	B	From	5.53	30.0000	157.00	No Ice	2.82	4.45	32.55

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
w/Mount Pipe		Centroid-	3.25			1/2" Ice	3.43	5.48	66.25
(Verizon Wireless)		Leg	0.00						
(2) LPA-185080/8CFx2	C	From	5.53	30.0000	157.00	No Ice	2.82	4.45	32.55
w/Mount Pipe		Centroid-	3.25			1/2" Ice	3.43	5.48	66.25
(Verizon Wireless)		Leg	0.00						
(2) ETM190G-12UB TMA	A	From	5.53	30.0000	157.00	No Ice	1.06	0.45	20.00
(VSI)		Centroid-	3.25			1/2" Ice	1.21	0.57	26.53
(Verizon Wireless)		Leg	0.00						
(2) ETM190G-12UB TMA	B	From	5.53	30.0000	157.00	No Ice	1.06	0.45	20.00
(VSI)		Centroid-	3.25			1/2" Ice	1.21	0.57	26.53
(Verizon Wireless)		Leg	0.00						
(2) ETM190G-12UB TMA	C	From	5.53	30.0000	157.00	No Ice	1.06	0.45	20.00
(VSI)		Centroid-	3.25			1/2" Ice	1.21	0.57	26.53
(Verizon Wireless)		Leg	0.00						
**									
2' Sidearm (4" Tube) (VSI)	A	From	3.00	0.0000	60.00	No Ice	0.30	1.33	30.00
		Centroid-	0.00			1/2" Ice	0.50	1.67	40.00
		Leg	0.00						
Generic GPS (VSI)	A	From	4.00	0.0000	60.00	No Ice	1.40	1.40	25.00
		Centroid-	0.00			1/2" Ice	1.70	1.70	30.00
		Leg	0.00						

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)	TP31.8522x19.5x0.3125	49.74	0.00	0.0	39.000	30.1795	-7697.81	1177000.00	0.007
L2	129.76 - 84.6094 (2)	TP42.2609x30.1142x0.375	49.63	0.00	0.0	39.000	48.1699	-15884.40	1878630.00	0.008
L3	84.6094 - 40.737 (3)	TP52.2288x40.0954x0.4375	49.66	0.00	0.0	39.000	69.5338	-27512.00	2711820.00	0.010
L4	40.737 - 0 (4)	TP61.25x49.6364x0.5	47.77	0.00	0.0	39.000	96.4102	-45070.70	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)	TP31.8522x19.5x0.3125	522390.00	-27.732	39.000	0.711	0.00	0.000	39.000	0.000

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 $\frac{f_{by}}{F_{by}}$
L2	129.76 - 84.6094 (2)	TP42.2609x30.1142x0.375	1329591.67	-33.214	39.000	0.852	0.00	0.000	39.000	0.000
L3	84.6094 - 40.737 (3)	TP52.2288x40.0954x0.4375	2303091.67	-32.195	39.000	0.826	0.00	0.000	39.000	0.000
L4	40.737 - 0 (4)	TP61.25x49.6364x0.5	3613791.67	-30.017	39.000	0.770	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)	TP31.8522x19.5x0.3125	0.007	0.711	0.000	0.718 ✔	1.333	H1-3 ✔
L2	129.76 - 84.6094 (2)	TP42.2609x30.1142x0.375	0.008	0.852	0.000	0.860 ✔	1.333	H1-3 ✔
L3	84.6094 - 40.737 (3)	TP52.2288x40.0954x0.4375	0.010	0.826	0.000	0.836 ✔	1.333	H1-3 ✔
L4	40.737 - 0 (4)	TP61.25x49.6364x0.5	0.012	0.770	0.000	0.782 ✔	1.333	H1-3 ✔

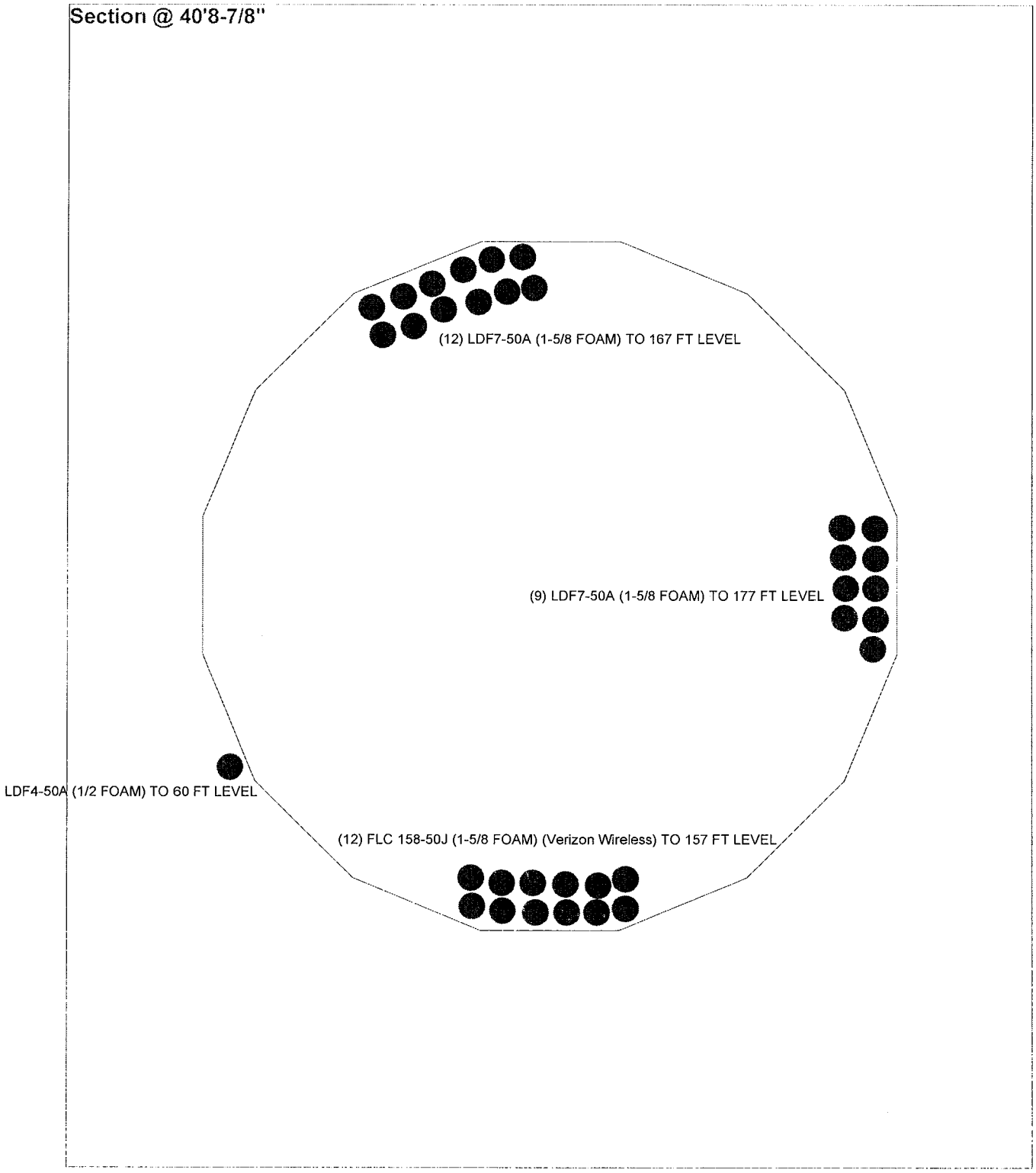
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	179.5 - 129.76	Pole	TP31.8522x19.5x0.3125	1	-7697.81	1568940.93	53.8	Pass
L2	129.76 - 84.6094	Pole	TP42.2609x30.1142x0.375	2	-15884.40	2504213.69	64.5	Pass
L3	84.6094 - 40.737	Pole	TP52.2288x40.0954x0.4375	3	-27512.00	3614855.91	62.7	Pass
L4	40.737 - 0	Pole	TP61.25x49.6364x0.5	4	-45070.70	5012079.79	58.6	Pass
						Summary		
						Pole (L2)	64.5	Pass
						RATING =	**64.5**	**Pass**

APPENDIX B

Feedline Plan
40'8-7/8"

Round _____ Flat _____ App In Face App Out Face



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#87536***		
Project: ***Vertical Structures Job #2007-004-076***		
Client: Crown Castle	Drawn by: Kyle Meehan	App'd:
Code: TIA/EIA-222-F	Date: 07/02/07	Scale: NTS
Path: \\Nas1\kmeehan\2007-004-076\RISA\876367.eri		Dwg No. E-7

APPENDIX C

ANCHOR BOLT CALCULATIONS

Customer:	Crown Castle
Site Name:	Wappingers Falls/Bob's Antiq, CT BU#876367
Job Number:	2007-004-076
Tower Model:	180' EEI Monopole Tower
Date:	7/3/2007

Input Information:	***Existing Bolts***	
# Bolts, **n**	20	
Bolt Diameter, **d**	2.25	in
Bolt Circle Diameter, **D**	70	in
Bolt Ultimate Tensile Stress, F_u	100	ksi
Applied Vertical Load **P**	45.08	kips
Applied Shear **S**	29.75	kips
Applied Moment **M**	43365.54	kip-in
Steel Grade	A615 Gr 75	

Bolt Cross-Sectional Area, **A**	3.976	in^2 (each)
Bolt Group Moment of Inertia, **I**	48706.95798	in^4
Maximum Tensile Stress (outer bolt), σ_v	30.59	ksi
Maximum Shear Stress(any bolt), τ_{xv}	0.374	ksi
Maximum Allowable Stress (per bolt), **Ft**	44.00	ksi
% Capacity	**69.5%**	

The Bolt Group is Adequate for Loading

Maximum Allowable Stress (per bolt), **Ft**

$$0.43F_u - 1.8f_v \leq 0.33F_u$$

This equation is for threaded parts, A449 bolts over 1 1/2" dia. (threads included in shear plane) Manual of Steel Construction ASD, 9th Edition, pg. 5-74, Table J3.3

VERTICAL STRUCTURES, INC.

BASE PLATE CALCULATIONS (BUTT WELDED)

Customer:	Crown Castle
Site Name:	Wappingers Falls/Bob's Antiq, CT BU#876367
Job Number:	2007-004-076
Tower Model:	180' EEI Monopole Tower
Date:	7/3/2007

FOR BUTT WELDED BASE PLATES WITH EQUALLY DISTRUBUTED ANCHOR BOLTS WITHOUT GUSSET PLATE STIFFENERS

Maximum Tensile Bolt Load	121.65	kip
Number of Sides of Pole	18	
Diameter of Pole at Base	61.25	in
Thickness of Pole at Base	0.5	in
Area of Pole at Base	96.41	in^2
Circumference of Pole at Base	194.40	in
Anchor Bolt Circle	70	in
Anchor Bolt Diameter	2.25	in
Base Plate Section Length	3.25	in
Anchor Bolt Quantity	20	
Base Plate Section Width	10.13	in
Moment on Base Plate Section	395.35	kip-in
Base Plate Thickness	2.25	in
Base Plate Bending Stress	46.25	ksi
Base Plate Yield Strength	65	ksi
Allowable Bending Stress (with 4/3 Increase)	**65**	ksi
% Capacity	**71.2%**	

Base Plate is Adequate for Loading