ROBINSON & COLE LLP

KENNETH C. BALDWIN

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

ORIGINAL

September 26, 2008

Michael Perrone
Siting Analyst
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Cellco Partnership d/b/a Verizon Wireless**
Exempt Modification Approval

Dear Mr. Perrone:

Enclosed you will find a structural opinion letter confirming that the Verizon Wireless antenna installation was completed in accordance with the requirements of the Structural Analysis submitted as a part of the referenced exempt modification filings. The attached report relates specifically to the following Siting Council filing.

1. EM-VER-010-080118
Bethlehem NE – 310 Watertown Road, Bethlehem, CT

If you have any questions regarding any of these materials, please do not hesitate to contact me or Rachel Mayo.

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Sandy M. Carter
Brian Ragozzine
Mark Gauger

September 18, 2008

Mr. Mark Luther
SBA Network Services
723 Highland Ave.
Clarks Green, PA 18411
(570) 558-3450

Subject: **Structural Opinion Letter**
Verizon Wireless Change-Out
SBA Site Name: Morris, CT
SBA Site Number: CT-01501-S
195' Nudd MJ-180 Monopole Tower
Vertical Structures Job Number: 2008-007-027

Dear Mr. Luther,

Vertical Structures is pleased to provide you with this structural opinion letter for the 195' tall monopole tower at the Morris site in Connecticut. The purpose of this letter is to determine the suitability of the tower upon replacing six (6) existing Antel LPA-185080/12CF panel antennas mounted on an existing platform at 175' with six (6) proposed Antel LPA-80080/6CF panel antennas for Verizon Wireless when combined with the existing and reserved equipment in Table 1.

Table 1 – Proposed and Existing Loads

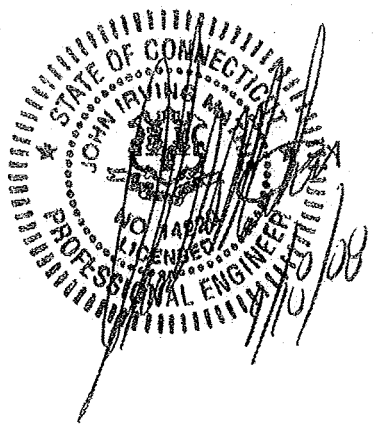
Mount Elevation	Carrier Name	Status	Antennas	Mounts	Feedlines
195'	Sprint	Existing	(6) Decibel DB980H90E-M Panels	14' L.P. Platform	(6) 1 5/8" Coax
185'	Nextel	Existing	(12) Decibel DB844H80 Panels	12' L.P. Platform	(12) 1 5/8" Coax
175'	Verizon Wireless	Existing	(6) Antel LPA-185080/12CF Panels	14' L.P. Platform	(12) 1 5/8" Coax
		Remove	**(6) Antel LPA-185080/12CF Panels**		
		Proposed	**(6) Antel LPA-80080/6CF Panels**		
165'	Cingular	Existing	(12) Powerwave Technologies 7770.00 Panels	14' L.P. Platform	(24) 1 5/8" Coax
		Existing	(24) Powerwave Technologies LGP 2140X TMAs		
155'	T-Mobile	Existing	(3) RFS APXV18-209014-C Panels	14' L.P. Platform	(6) 1 5/8" Coax
			(6) Remec S20057A1 TMAs		

Based on a comparison of the loads in Table 1 to the loads considered in our January 8, 2008 structural analysis as well as taking into account that six (6) empty pipe mounts at the 195' level have been removed, we have determined that the tower superstructure and foundation are sufficient for the proposed Verizon Wireless change-out. All existing feedlines are assumed to be routed up the interior of the pole.

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

Respectfully Submitted,

Daryn Ward
Project Engineer



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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

Daniel F. Caruso
Chairman

February 22, 2008

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597

RE: **EM-VER-010-080118** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify existing telecommunications facility located at 310 Watertown Road, Bethlehem, Connecticut.

Dear Attorney Baldwin:

At a public meeting held on February 14, 2008, the Connecticut Siting Council (Council) acknowledged your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies, with the condition that the modifications specified on page 5 of the structural analysis report dated January 8, 2008 and sealed by John Irving Mathis, P.E. are implemented prior to the antenna swap and a signed letter from a Professional Engineer is submitted to the Council to certify that the modifications have been properly completed.

The proposed modifications are to be implemented as specified here and in your notice dated January 18, 2008, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

Daniel F. Caruso
Chairman

DFC/MP/cm

c: The Honorable Jeffrey Hamel, First Selectman, Town of Bethlehem
Jeffrey Hamel, Planning and Zoning Chairman, Town of Bethlehem
SBA

G:\EM\BAM-VERIZON\Bethlehem\dc021408.DOC

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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

Daniel F. Caruso
Chairman

January 22, 2008

The Honorable Jeffrey Hamel
First Selectman
Town of Bethlehem
P. O. Box 160
Bethlehem, CT 06751-0160

RE: **EM-VER-010-080118** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 310 Watertown Road, Bethlehem, Connecticut.

Dear Mr. Hamel:

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

The Council will consider this item at the next meeting scheduled for February 14, 2008, at 1:30 p.m. in Hearing Room One, Ten Franklin Square, New Britain, Connecticut.

If you have any questions or comments regarding this proposal, please call me or inform the Council by February 13, 2008.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/jb

Enclosure: Notice of Intent

c: Jeffrey Hamel, Planning and Zoning Chairman, Town of Bethlehem

ROBINSON & COLE LLP

KENNETH C. BALDWIN

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

EM-VER-010-080118

January 18, 2008

Via Hand Delivery ORIGINAL

RECEIVED
JAN 18 2008
CONNECTICUT
SITING COUNCIL

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

Re: **Notice of Exempt Modification – Antenna Swap**
310 Watertown Road, Bethlehem, Connecticut

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains a wireless telecommunications facility at the above referenced location. The Council approved Cellco's use of this facility on March 22, 2006. Cellco intends to modify its installation by replacing six (6) LPA-185080/12CF antennas with six (6) LPA-80080/6CF antennas at the same 175-foot level on the tower. Attached behind Tab 1 are the specifications for the existing and proposed replacement antennas.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Jeffrey Hamel, First Selectman of the Town of Bethlehem. Pursuant to a Council directive, a copy of this letter is also being sent to Gary and Amy Swingle, the owners of the property on which the facility 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 any increase in the overall height of the existing structures. Cellco's replacement antennas will be located at the same height and location as the existing antennas.

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

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

4. The operation of the replacement antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for the facility is included behind Tab 2.

Also attached is a Detailed Structural Analysis confirming that the tower, with structural modifications, can support the proposed modifications. (See Tab 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Jeffrey Hamel, Bethlehem First Selectman
Gary and Amy Swingle
Sandy M. Carter

Vertically Polarized, Log Periodic 80° / 17.5 dBi

LPA-185080/12CF ___

When ordering replace "___" with connector type.

Mechanical specifications

Length	1806 mm	71.1 in
Width	104 mm	4.1 in
Depth	150 mm	5.9 in
Depth with t-bracket	178 mm	7.0 in
[4] Weight	4.8 kg	10.5 lbs
Wind Area		
Fore/Aft	0.19 m^2	2.0 ft^2
Side	0.27 m^2	2.9 ft^2
Rated Wind Velocity (Safety factor 2.0)	>270 km/hr	>168 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	325 N	73.1 lbs
Side	440 N	98.9 lbs

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

Mounting and Downtilting

Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in).

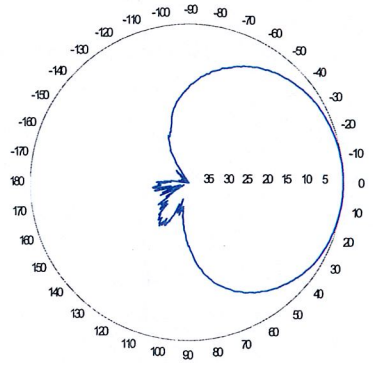
Mounting bracket kit #26799997
Downtilt bracket kit #26799999

The downtil bracket kit includes the mounting bracket kit.

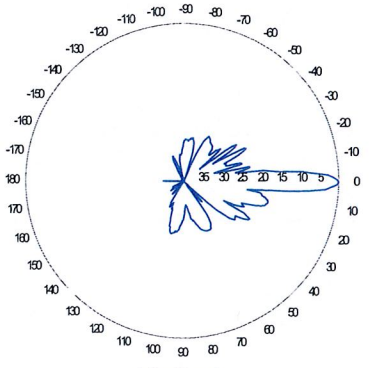
Electrical specifications

	Frequency Range	1850-1990 MHz
	Impedance	50Ω
[3]	Connector(s)	NE or E-DIN 1 port / center
[1]	VSWR	≤ 1.4:1
	Polarization	Vertical
[1]	Gain	17.5 dBi
[2]	Power Rating	250 W
[1]	Half Power Angle	
	H-Plane	80°
	E-Plane	5°
[1]	Electrical Downtilt	0°
[1]	Null Fill	10%
	Lightning Protection	Direct Ground

Radiation pattern[1]



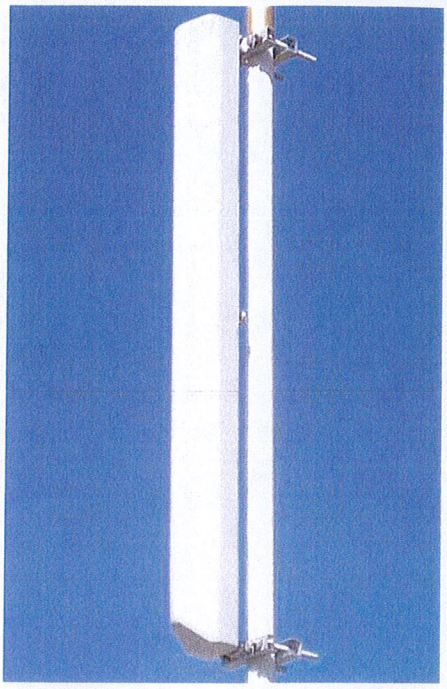
Horizontal



Vertical

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back ratio.



Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

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

Antenna available with center-fed connector only.

1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
4) The antenna weight listed above does not include the bracket weight.

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

CF Denotes a Center-Fed Connector.

1850-1990 MHz

Amphenol Antel, Inc. 1300 Capital Drive Rockford, Illinois 61109 USA Tel. (815) 399-0001
Toll-Free (888) 417-9562 Fax. (815) 399-0156 antel@antelinc.com www.antelinc.com

Amphenol Antel, Inc. The Antenna Technology Company

Revision Date: 7/12/07

Vertically Polarized, Log Periodic 80° / 14 dBd

LPA-80080/6CF ___

When ordering replace "___" with connector type.

Mechanical specifications

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

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

Mounting and Downtilting

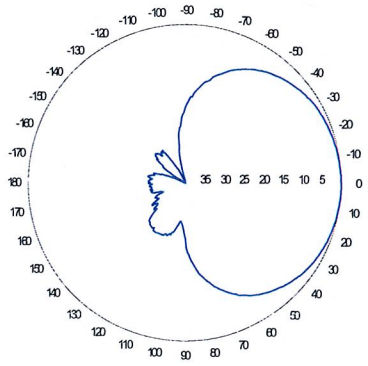
Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in). If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in)

Mounting Bracket & Downtilt Bracket Kit #21699999

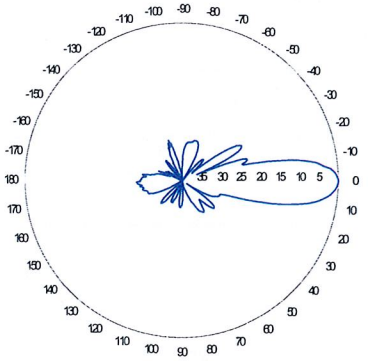
Electrical specifications

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

Radiation pattern[1]



Horizontal

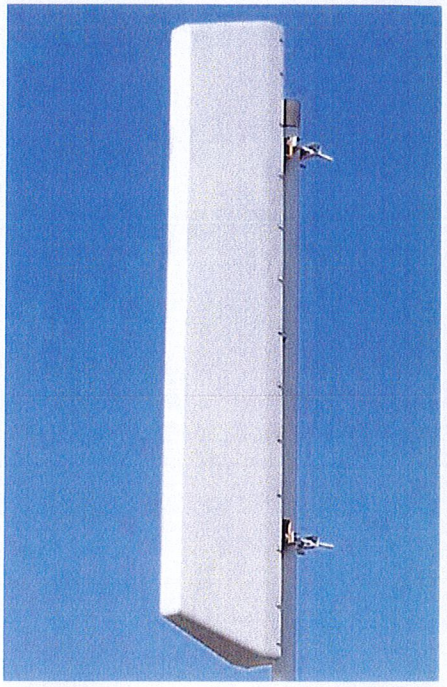


Vertical

Featuring upper side lobe suppression.

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back ratio.



Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

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

Antenna available with center-fed connector only.

1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
4) The antenna weight listed above does not include the bracket weight.

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

CF Denotes a Center-Fed Connector.

806-960 MHz

Amphenol Antel, Inc. 1300 Capital Drive Rockford, Illinois 61109 USA Tel. (815) 399-0001
Toll-Free (888) 417-9562 Fax. (815) 399-0156 antel@antelinc.com www.antelinc.com

Revision Date: 7/5/07

			General	Power	Density		
Site Name: Bethlehem NE							
Tower Height: Verizon @ 175Ft.							
		ERP					
Carrier	**channels**	**watt/ch**	**distance (feet)**	**S (mW/cm^2)**	**f (MHz)**	**Smax**	**Percent MPE**
*Nextel	9	100	185	0.0095	851	0.5673	1.67%
*Sprint	11	111	195	0.0115	1962.5	1.0000	1.15%
*Cingular	6	296	165	0.0235	880	0.5867	4.00%
*Cingular	3	427	165	0.0169	1930	1.0000	1.69%
Verizon	**9**	**485**	**175**	**0.05128**	**1970**	**1.0000**	**5.13**
Verizon	**9**	**200**	**175**	**0.02115**	**875**	**0.5830**	**3.63**
*Source: Siting Council Records						**Total %MPE**	8.84

VERTICAL STRUCTURES, INC.

January 8, 2008

Mr. Mark Luther
SBA Network Services
723 Highland Ave.
Clarks Green, PA 18411
(570) 558-3450

Subject:

Structural Analysis Report
Verizon Wireless Change-Out
SBA Site Name: Morris, CT
SBA Site Number: CT-01501-S
195' Nudd MJ-180 Monopole Tower
Vertical Structures Job Number: 2008-007-002

Dear Mr. Luther,

Vertical Structures is pleased to provide you with the results of the structural analysis performed on the 195' tall monopole tower at the Morris site in Connecticut. The purpose of the analysis was to determine the suitability of the tower upon replacing six (6) existing Antel LPA-185080/12CF panel antennas mounted on an existing platform at 175' with six (6) proposed Antel LPA-80080/6CF panel antennas for Verizon Wireless when combined with the existing and reserved equipment on the structure. This analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon an 80 MPH basic "fastest mile" wind speed, equivalent to a 100 MPH basic "3-second gust" wind speed per IBC Table 1609.3.1.

Based on our analysis we have determined the tower superstructure is insufficient for the proposed loading. However, the foundation is adequate.

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

Respectfully submitted,

Andy Cronin
Project Engineer

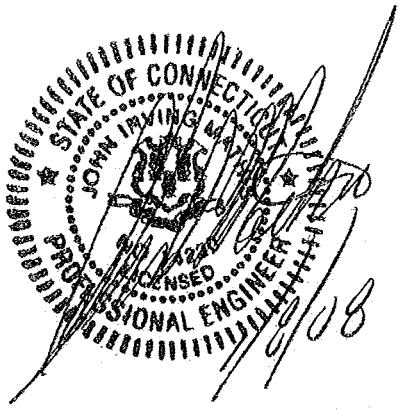


TABLE OF CONTENTS

INTRODUCTION

The subject tower is located in Morris, Connecticut. The 195' Nudd MJ-180 monopole tower was designed and manufactured by Fred A. Nudd Corporation in 2000. The existing structure consists of four (4) 18-sided tapered polygonal tubes joined via slip joint connections and one (1) pipe section joined via a bolted flange connection. The tower is founded on a 4' diameter by 12'-6" deep drilled pier embedded 8' into rock. The tower was reworked in 2002 to accommodate additional loading.

ANALYSIS CRITERIA

The Morris 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 Table 1. Applied forces in this study were derived from an 80 MPH basic "fastest mile" wind speed with no ice and a reduced 69 MPH basic "fastest mile" wind speed with a 1/2" of radial ice accumulation. The tower was originally designed for an 80 MPH basic "fastest mile" wind speed with no ice and a reduced 69 MPH basic "fastest mile" wind speed with a 1/2" of radial ice accumulation. The original design loads are listed in Table 2. All cables are assumed to be routed up the interior of the pole unless otherwise noted.

Table 1 – Proposed and Existing Loads

Mount Elevation	Carrier Name	Status	Antennas	Mounts	Feedlines
195'	Sprint	Existing	(6) Decibel DB980H90E-M Panels	14' L.P. Platform	(6) 1 5/8" Coax
185'	Nextel	Existing	(12) Decibel DB844H80 Panels	12' L.P. Platform	(12) 1 5/8" Coax
175'	**Verizon Wireless**	Existing	(6) Antel LPA-185080/12CF Panels	14' L.P. Platform	(12) 1 5/8" Coax
		Remove	**(6) Antel LPA-185080/12CF Panels**		
		Proposed	**(6) Antel LPA-80080/6CF Panels**		
165'	Cingular	Existing	(12) Powerwave Technologies 7770.00 Panels	14' L.P. Platform	(24) 1 5/8" Coax
		Existing	(24) Powerwave Technologies LGP 2140X TMAs		
155'	T-Mobile	Existing	(3) RFS APXV18-209014-C Panels	14' L.P. Platform	(6) 1 5/8" Coax
			(6) Remec S20057A1 TMAs		

Table 2 – Original Design Loads

Mount Elevation	Carrier Name	Status	Antennas	Mounts	Feedlines
195'	Co-Lo	Design	(12) Decibel DB896 Panels	14' L.P. Platform	(12) 1 5/8" Coax
185'	Co-Lo	Design	(12) Decibel DB896 Panels	14' L.P. Platform	(12) 1 5/8" Coax
175'	Co-Lo	Design	(12) Decibel DB896 Panels	14' L.P. Platform	(12) 1 5/8" Coax
165'	Co-Lo	Design	(12) Decibel DB896 Panels	14' L.P. Platform	(12) 1 5/8" Coax
155'	Co-Lo	Design	(12) Decibel DB896 Panels	14' L.P. Platform	(12) 1 5/8" Coax

ANALYSIS PROCEDURE

Table 3 – Resources Utilized

Resource	Remarks
Proposed Loads	SBA E-mail Dated " December 13, 2007"
Existing Loads	Vertical Structures Job No. 2006-007-033
Tower Drawings	Nudd Drawing No. DD-7627-1
Foundation Drawings	Nudd Drawing No. DD-7627-1
Geotechnical Report	Jaworski Geotech Project No. 99290G
Rework Drawings	o2wireless Solutions Job No. 2230-043

Analysis Methods

RISA Tower (Version 5.0), a commercially available software program, 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.

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 Table 1 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.

ANALYSIS RESULTS

The Morris tower superstructure is found to be insufficient for the intended loading at the wind and ice conditions considered. Calculated foundation reactions are within the original design limits. Table 4 summarizes the condition of the tower. Capacities up to 105% are considered acceptable based on the analysis procedures used.

Table 4 – Tower Component Capacities

Section Number	Elevation	Percent Capacity Used		
		Pole	Flange Plate	Splice Bolts
1	195' – 180'	23.3	106.0	61.2
2	180' – 130'	87.0	-	-
3	130' – 85'	93.7	-	-
4	85' – 81'	98.6	-	-
5	81' – 41'	87.4	-	-
6	41' – 0'	96.0	-	-
Anchor Bolts – Tension		91.9		
Base Plate and Gussets		107.0		
Foundation – Moment		95.6		

Required Modifications

Modifications (A) and (B) are required to remedy the deficiencies identified in this analysis. Alternatively, if the six (6) empty pipe mounts at the 195' level are removed the overstresses will be eliminated and modifications (A) and (B) will no longer be required. If requested, Vertical Structures will supply the construction drawings and material necessary to make the required modifications.

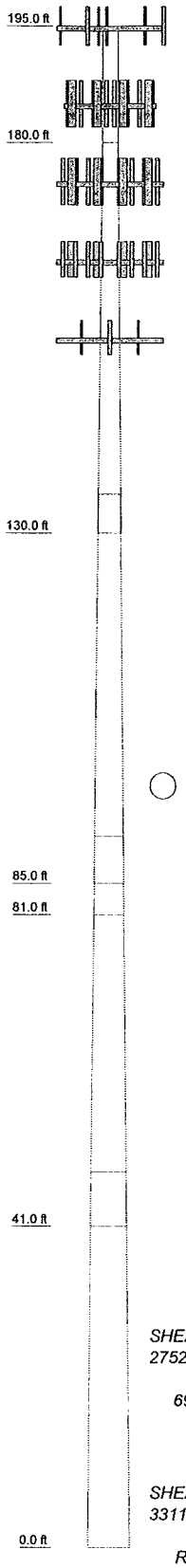
(A) Reinforce the flange connection at 180'.

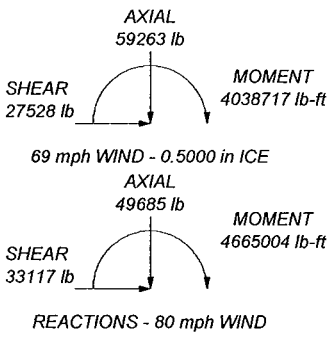
(B) Reinforce the base plate gusset welds.

APPENDIX A

Section	1	2	3	4	5	6
Length (ft)	15.00	50.00	50.00	10.00	40.00	48.00
Number of Sides	1	18	18	18	18	18
Thickness (in)	0.2810	0.2500	0.3125	0.3125	0.3750	0.3750
Lap Splice (ft)		5.00		6.00		7.00
Top Dia (in)	24.0000	24.0000	34.2500	44.1361	46.5250	53.1427
Bot Dia (in)	24.0000	35.9444	46.1944	45.5250	55.4556	64.5000
Grade	A36		A572-65			
Weight (lb)	1068.2	4012.7	6735.0	1519.4	8200.0	11362.4

Total Weight: 32897.7





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Nudd 14' Low Profile Platform (VSI)	195	(2) LPA-185080/12CF w/ mount pipe (Verizon Wireless)	175
(2) DB980H90E-M w/Mount Pipe	195	(2) LPA-80080/6CF w/Mount Pipe (Verizon Wireless)	175
(2) DB980H90E-M w/Mount Pipe	195	14' Low-Profile Platform	165
(2) DB980H90E-M w/Mount Pipe	195	(4) 7770.00 w/ mount pipe	165
(2) 5'x2" Antenna Mount Pipe	195	(4) 7770.00 w/ mount pipe	165
(2) 5'x2" Antenna Mount Pipe	195	(4) 7770.00 w/ mount pipe	165
(2) 5'x2" Antenna Mount Pipe	195	(8) LGP2140X	165
12' L.P. Platform	185	(8) LGP2140X	165
(4) DB844H80 w/Mount Pipe	185	(8) LGP2140X	165
(4) DB844H80 w/Mount Pipe	185	14' Low-Profile Platform	155
(4) DB844H80 w/Mount Pipe	185	APXV18-209014-C w/ Mount Pipe	155
14' Low-Profile Platform (Verizon Wireless)	175	(2) S20057A1	155
(2) LPA-185080/12CF w/ mount pipe (Verizon Wireless)	175	APXV18-209014-C w/ Mount Pipe	155
(2) LPA-80080/6CF w/Mount Pipe (Verizon Wireless)	175	(2) S20057A1	155
(2) LPA-185080/12CF w/ mount pipe (Verizon Wireless)	175	APXV18-209014-C w/ Mount Pipe	155
(2) LPA-80080/6CF w/Mount Pipe (Verizon Wireless)	175	(2) S20057A1	155

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi	A572-65	65 ksi	80 ksi

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 98.6%

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

Job: *Morris, CT (CT-01501-S)*			
Project: *Vertical Structures Job No. 2008-007-002*			
Client: SBA	Drawn by: Andy Cronin	App'd:	
Code: TIA/EIA-222-F	Date: 01/08/08	Scale: NTS	
Path: \\Nas1\acronin\2008-007-002-Morris CT\RISA\Morris CT.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 Litchfield County, Connecticut.
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	195.00-180.00	15.00	0.00	Round	24.0000	24.0000	0.2810		A36 (36 ksi)
L2	180.00-130.00	50.00	5.00	18	24.0000	35.9444	0.2500	1.0000	A572-65 (65 ksi)
L3	130.00-85.00	50.00	6.00	18	34.2500	46.1944	0.3125	1.2500	A572-65 (65 ksi)
L4	85.00-81.00	10.00	0.00	18	44.1361	46.5250	0.3125	1.2500	A572-65 (65 ksi)
L5	81.00-41.00	40.00	7.00	18	46.5250	55.4556	0.3750	1.5000	A572-65 (65 ksi)
L6	41.00-0.00	48.00		18	53.1427	64.5000	0.3750	1.5000	A572-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
									(65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.0000	20.9282	1473.6284	8.3965	12.0000	122.8024	2943.2423	10.4632	0.0000	0
	24.0000	20.9282	1473.6284	8.3965	12.0000	122.8024	2943.2423	10.4632	0.0000	0
L2	24.3702	18.8456	1342.9976	8.4313	12.1920	110.1540	2687.7623	9.4246	3.7840	15.136
	36.4989	28.3235	4559.1580	12.6715	18.2598	249.6834	9124.3150	14.1644	5.8862	23.545
L3	35.9912	33.6617	4898.1536	12.0478	17.3990	281.5196	9802.7523	16.8341	5.4780	17.53
	46.9070	45.5091	12103.7119	16.2881	23.4668	515.7812	24223.3501	22.7589	7.5802	24.257
L4	46.2724	43.4675	10546.7236	15.5574	22.4211	470.3923	21107.3249	21.7379	7.2179	23.097
	47.2427	45.8370	12367.2399	16.4054	23.6347	523.2662	24750.7529	22.9229	7.6384	24.443
L5	47.2427	54.9300	14780.5555	16.3833	23.6347	625.3752	29580.5596	27.4702	7.5284	20.076
	56.3111	65.5597	25128.7929	19.5536	28.1714	891.9952	50290.6510	32.7861	9.1002	24.267
L6	55.6444	62.8068	22094.3508	18.7325	26.9965	818.4149	44217.7740	31.4094	8.6931	23.182
	65.4950	76.3248	39651.3314	22.7644	32.7660	1210.1365	79354.8371	38.1696	10.6920	28.512

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 195.00-180.00				1	1	1		
L2 180.00-130.00				1	1	1		
L3 130.00-85.00				1	1	1		
L4 85.00-81.00				1	1	1		
L5 81.00-41.00				1	1	1		
L6 41.00-0.00				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	195.00 - 5.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	185.00 - 5.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM) (Verizon Wireless)	C	No	Inside Pole	175.00 - 5.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	165.00 - 5.00	24	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	155.00 - 5.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82

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	195.00-180.00	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	0.000	123.00
L2	180.00-130.00	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	0.000	1992.60
L3	130.00-85.00	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	0.000	2214.00
L4	85.00-81.00	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	0.000	196.80
L5	81.00-41.00	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	0.000	1968.00
L6	41.00-0.00	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	0.000	1771.20

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	195.00-180.00	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	0.000	123.00
L2	180.00-130.00	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	0.000	1992.60
L3	130.00-85.00	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	0.000	2214.00
L4	85.00-81.00	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	0.000	196.80
L5	81.00-41.00	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	0.000	1968.00
L6	41.00-0.00	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	0.000	1771.20

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	195.00-180.00	0.0000	0.0000	0.0000	0.0000

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L2	180.00-130.00	0.0000	0.0000	0.0000	0.0000
L3	130.00-85.00	0.0000	0.0000	0.0000	0.0000
L4	85.00-81.00	0.0000	0.0000	0.0000	0.0000
L5	81.00-41.00	0.0000	0.0000	0.0000	0.0000
L6	41.00-0.00	0.0000	0.0000	0.0000	0.0000

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
Nudd 14' Low Profile Platform (VSI)	C	None		0.0000	195.00	No Ice	32.00	32.00	1350.00
						1/2" Ice	42.00	42.00	1750.00
(2) DB980H90E-M w/Mount Pipe	A	From Centroid-Face	3.50 -2.00 0.00	-30.0000	195.00	No Ice	4.27	3.86	34.05
						1/2" Ice	4.86	4.95	69.84
(2) DB980H90E-M w/Mount Pipe	B	From Centroid-Face	3.50 -2.00 0.00	-30.0000	195.00	No Ice	4.27	3.86	34.05
						1/2" Ice	4.86	4.95	69.84
(2) DB980H90E-M w/Mount Pipe	C	From Centroid-Face	3.50 -2.00 0.00	-30.0000	195.00	No Ice	4.27	3.86	34.05
						1/2" Ice	4.86	4.95	69.84
(2) 5'x2" Antenna Mount Pipe	A	From Centroid-Face	3.50 -2.00 0.00	-30.0000	195.00	No Ice	1.19	1.19	18.25
						1/2" Ice	1.50	1.50	27.32
(2) 5'x2" Antenna Mount Pipe	B	From Centroid-Face	3.50 -2.00 0.00	-30.0000	195.00	No Ice	1.19	1.19	18.25
						1/2" Ice	1.50	1.50	27.32
(2) 5'x2" Antenna Mount Pipe	C	From Centroid-Face	3.50 -2.00 0.00	-30.0000	195.00	No Ice	1.19	1.19	18.25
						1/2" Ice	1.50	1.50	27.32
***									
12' L.P. Platform	C	None		0.0000	185.00	No Ice	25.00	25.00	1700.00
						1/2" Ice	29.00	29.00	2530.00
(4) DB844H80 w/Mount Pipe	A	From Centroid-Face	3.50 0.00 0.00	0.0000	185.00	No Ice	3.58	5.63	35.55
						1/2" Ice	4.20	6.73	77.48
(4) DB844H80 w/Mount Pipe	B	From Centroid-Face	3.50 0.00 0.00	0.0000	185.00	No Ice	3.58	5.63	35.55
						1/2" Ice	4.20	6.73	77.48
(4) DB844H80 w/Mount Pipe	C	From Centroid-Face	3.50 0.00 0.00	0.0000	185.00	No Ice	3.58	5.63	35.55
						1/2" Ice	4.20	6.73	77.48
***									
14' Low-Profile Platform (Verizon Wireless)	C	None		0.0000	175.00	No Ice	25.00	25.00	1000.00
						1/2" Ice	31.00	31.00	1300.00
(2) LPA-185080/12CF w/ mount pipe (Verizon Wireless)	A	From Centroid-Face	4.25 0.00 0.00	0.0000	175.00	No Ice	3.55	5.99	32.40
						1/2" Ice	3.99	6.94	72.35
(2) LPA-80080/6CF w/Mount Pipe (Verizon Wireless)	A	From Centroid-Face	4.25 0.00 0.00	0.0000	175.00	No Ice	4.35	10.51	42.90
						1/2" Ice	4.79	11.56	104.60

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
(2) LPA-185080/12CF w/ mount pipe (Verizon Wireless)	B	From Centroid-Face	4.25 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice	3.55 3.99	5.99 6.94	32.40 72.35
(2) LPA-80080/6CF w/Mount Pipe (Verizon Wireless)	B	From Centroid-Face	4.25 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice	4.35 4.79	10.51 11.56	42.90 104.60
(2) LPA-185080/12CF w/ mount pipe (Verizon Wireless)	C	From Centroid-Face	4.25 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice	3.55 3.99	5.99 6.94	32.40 72.35
(2) LPA-80080/6CF w/Mount Pipe (Verizon Wireless)	C	From Centroid-Face	4.25 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice	4.35 4.79	10.51 11.56	42.90 104.60
***									
14' Low-Profile Platform	C	None		0.0000	165.00	No Ice 1/2" Ice	25.00 31.00	25.00 31.00	1000.00 1300.00
(4) 7770.00 w/ mount pipe	A	From Centroid-Leg	4.25 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice	6.22 6.77	4.35 5.20	56.90 102.99
(4) 7770.00 w/ mount pipe	B	From Centroid-Leg	4.25 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice	6.22 6.77	4.35 5.20	56.90 102.99
(4) 7770.00 w/ mount pipe	C	From Centroid-Leg	4.25 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice	6.22 6.77	4.35 5.20	56.90 102.99
(8) LGP2140X	A	From Centroid-Leg	4.25 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice	1.23 1.38	0.37 0.48	17.50 24.46
(8) LGP2140X	B	From Centroid-Leg	4.25 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice	1.23 1.38	0.37 0.48	17.50 24.46
(8) LGP2140X	C	From Centroid-Leg	4.25 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice	1.23 1.38	0.37 0.48	17.50 24.46
***									
14' Low-Profile Platform	C	None		0.0000	155.00	No Ice 1/2" Ice	25.00 31.00	25.00 31.00	1000.00 1300.00
APXV18-209014-C w/ Mount Pipe	A	From Centroid-Face	4.25 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice	3.62 4.00	3.21 3.84	36.95 67.79
(2) S20057A1	A	From Centroid-Face	4.25 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice	0.82 0.95	0.39 0.49	11.00 16.41
APXV18-209014-C w/ Mount Pipe	B	From Centroid-Face	4.25 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice	3.62 4.00	3.21 3.84	36.95 67.79
(2) S20057A1	B	From Centroid-Face	4.25 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice	0.82 0.95	0.39 0.49	11.00 16.41
APXV18-209014-C w/ Mount Pipe	C	From Centroid-Face	4.25 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice	3.62 4.00	3.21 3.84	36.95 67.79
(2) S20057A1	C	From Centroid-Face	4.25 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice	0.82 0.95	0.39 0.49	11.00 16.41

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 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	195 - 180	Pole	Max Tension	5	0.06	0.08	-0.00
			Max. Compression	14	-7208.37	0.00	0.00
			Max. Mx	5	-3994.52	-73225.46	0.00
			Max. My	2	-3994.52	0.00	73225.46
			Max. Vy	5	7942.32	-73225.46	0.00
			Max. Vx	2	-7942.32	0.00	73225.46
			Max. Torque	26			0.00
L2	180 - 130	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20456.73	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Mx	5	-12917.80	-870210.85	0.00
			Max. My	2	-12917.80	0.00	870210.85
			Max. Vy	5	22576.22	-870210.85	0.00
			Max. Vx	2	-22576.22	0.00	870210.85
			Max. Torque	16			-0.01
L3	130 - 85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-29956.91	0.00	0.00
			Max. Mx	5	-21944.49	- 1944823.10	0.00
			Max. My	2	-21944.49	0.00	1944823.10
			Max. Vy	5	26255.59	- 1944823.10	0.00
			Max. Vx	2	-26255.59	0.00	1944823.10
			Max. Torque	23			0.02
L4	85 - 81	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-33168.13	0.00	0.00
			Max. Mx	5	-24995.59	- 2212057.81	0.00
			Max. My	2	-24995.59	0.00	2212057.81
			Max. Vy	5	27172.87	- 2212057.81	0.00
			Max. Vx	2	-27172.87	0.00	2212057.81
			Max. Torque	23			0.02
L5	81 - 41	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42485.04	0.00	0.00
			Max. Mx	5	-33817.29	- 3152118.64	0.00
			Max. My	2	-33817.29	0.00	3152118.64
			Max. Vy	5	29800.84	- 3152118.64	0.00
			Max. Vx	2	-29800.84	0.00	3152118.64
			Max. Torque	23			0.03
L6	41 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-59262.87	0.00	0.00
			Max. Mx	5	-49664.13	- 4664976.38	0.00
			Max. My	2	-49664.13	0.00	4664976.38
			Max. Vy	5	33148.66	- 4664976.38	0.00
			Max. Vx	2	-33148.66	0.00	4664976.38
			Max. Torque	23			0.03

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	195 - 180 (1)	TP24x24x0.281	15.00	0.00	0.0	21.600	20.9282	-3994.48	452050.00	0.009
L2	180 - 130 (2)	TP35.9444x24x0.25	50.00	0.00	0.0	39.000	27.3757	-12917.50	1067650.00	0.012
L3	130 - 85 (3)	TP46.1944x34.25x0.3125	50.00	0.00	0.0	39.000	44.0874	-21944.30	1719410.00	0.013
L4	85 - 81 (4)	TP46.525x44.1361x0.3125	10.00	0.00	0.0	39.000	45.8370	-24995.40	1787640.00	0.014
L5	81 - 41 (5)	TP55.4556x46.525x0.375	40.00	0.00	0.0	39.000	63.6995	-33817.20	2484280.00	0.014

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 $\frac{P}{P_a}$
L6	41 - 0 (6)	TP64.5x53.1427x0.375	48.00	0.00	0.0	36.657	76.3248	-49664.10	2797840.00	0.018

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	195 - 180 (1)	TP24x24x0.281	73226.33	-7.156	23.760	0.301	0.00	0.000	23.760	0.000
L2	180 - 130 (2)	TP35.9444x24x0.25	870216.67	-44.780	39.000	1.148	0.00	0.000	39.000	0.000
L3	130 - 85 (3)	TP46.1944x34.25x0.3125	1944841.67	-48.224	39.000	1.237	0.00	0.000	39.000	0.000
L4	85 - 81 (4)	TP46.525x44.1361x0.3125	2212075.00	-50.729	39.000	1.301	0.00	0.000	39.000	0.000
L5	81 - 41 (5)	TP55.4556x46.525x0.375	3152141.67	-44.928	39.000	1.152	0.00	0.000	39.000	0.000
L6	41 - 0 (6)	TP64.5x53.1427x0.375	4665000.00	-46.259	36.657	1.262	0.00	0.000	36.657	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	195 - 180 (1)	TP24x24x0.281	0.009	0.301	0.000	0.310 ✔	1.333	H1-3 ✔
L2	180 - 130 (2)	TP35.9444x24x0.25	0.012	1.148	0.000	1.160 ✔	1.333	H1-3 ✔
L3	130 - 85 (3)	TP46.1944x34.25x0.3125	0.013	1.237	0.000	1.249 ✔	1.333	H1-3 ✔
L4	85 - 81 (4)	TP46.525x44.1361x0.3125	0.014	1.301	0.000	1.315 ✔	1.333	H1-3 ✔
L5	81 - 41 (5)	TP55.4556x46.525x0.375	0.014	1.152	0.000	1.166 ✔	1.333	H1-3 ✔
L6	41 - 0 (6)	TP64.5x53.1427x0.375	0.018	1.262	0.000	1.280 ✔	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	195 - 180	Pole	TP24x24x0.281	1	-3994.48	602582.62	23.3	Pass
L2	180 - 130	Pole	TP35.9444x24x0.25	2	-12917.50	1423177.39	87.0	Pass
L3	130 - 85	Pole	TP46.1944x34.25x0.3125	3	-21944.30	2291973.43	93.7	Pass
L4	85 - 81	Pole	TP46.525x44.1361x0.3125	4	-24995.40	2382924.02	98.6	Pass
L5	81 - 41	Pole	TP55.4556x46.525x0.375	5	-33817.20	3311545.10	87.4	Pass
L6	41 - 0	Pole	TP64.5x53.1427x0.375	6	-49664.10	3729520.57	96.0	Pass
						Summary		
						Pole (L4)	98.6	Pass
						RATING =	**98.6**	**Pass**

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