ROBINSON & COLE LLP

EM-VER-062-130703

KENNETH C. BALDWIN

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Also admitted in Massachusetts

July 2, 2013

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification**
150 Willow Street, Hamden, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 147-foot level on the existing 157-foot tower at the above-referenced address. The tower is owned by Sprint. The Council approved Cellco's shared use of this tower in 2008. Cellco now intends to replace three (3) of its existing antennas with two (2) model BXA-70063-6CF LTE antennas and one (1) model BXA-70080-6CF LTE antenna, at the same 147-foot level. Attached behind Tab 1 are the specifications for the 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 Scott D. Jackson, Mayor for the Town of Hamden. A copy of this letter is also being sent to Hamden Fish & Game Protective Association, the owner of the property on which the tower is located.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas will be located at the 147-foot level on the 157-foot tower.

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

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative General Power Density table for Cellco's modified facility is included behind Tab 2.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation can support Cellco's proposed modifications. (*See* Tower Analysis Report attached behind 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:
Scott D. Jackson, Hamden Mayor
Hamden Fish & Game Protective Association
Sandy M. Carter

Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

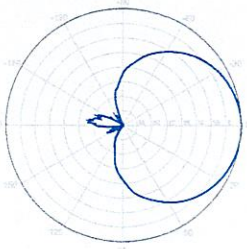
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-18.3 dB	-18.2 dB
Front-to-back ratio (+/-30°)	-33.4 dB	-36.3 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1804 x 285 x 132 mm	71.0 x 11.2 x 5.2 in
Depth with z-brackets	172 mm	6.8 in
Weight without mounting brackets	7.9 kg	17 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.51 m^2 Side: 0.24 m^2	Front: 5.5 ft^2 Side: 2.6 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf

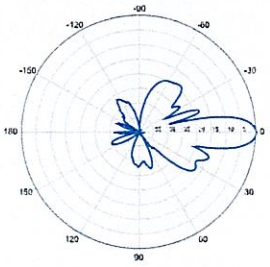
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0



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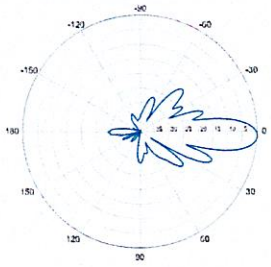
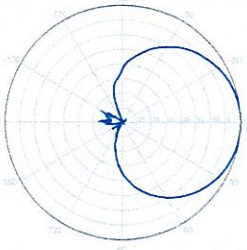
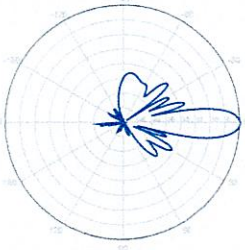


2° | Vertical | 750 MHz



Horizontal | 850 MHz



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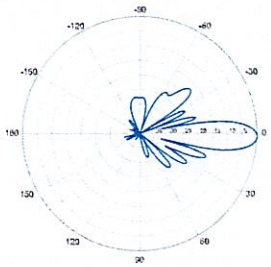
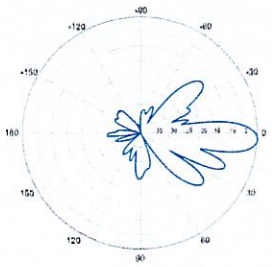


2° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



3° | Vertical | 750 MHz

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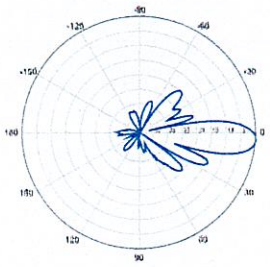
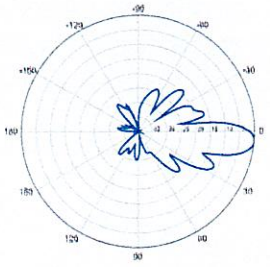
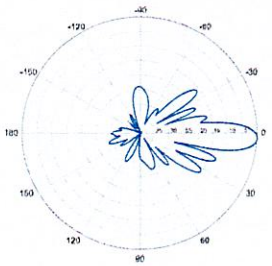


4° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-5



5° | Vertical | 750 MHz



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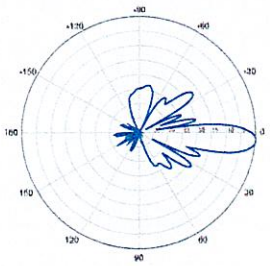

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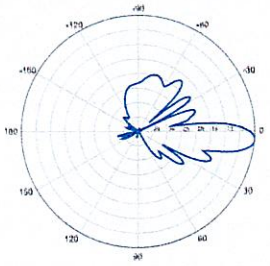

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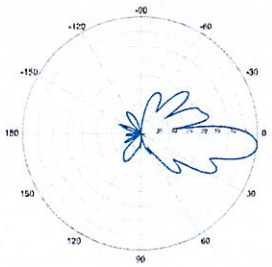
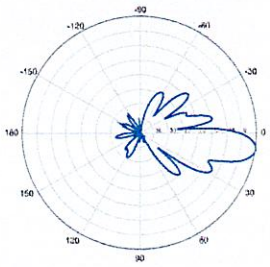


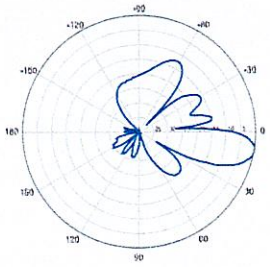
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

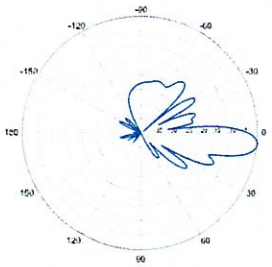


8° | Vertical | 750 MHz

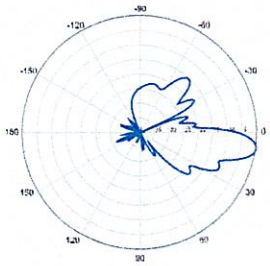
BXA-70063-6CF-EDIN-10



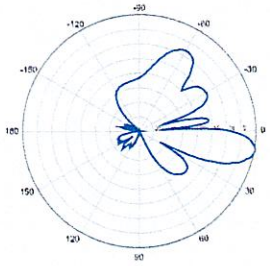
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

Amphenol ANTENNA SOLUTIONS

BXA-70080-6CF-EDIN-X

X-Pol | FET Panel | 80° | 13.5 dBd

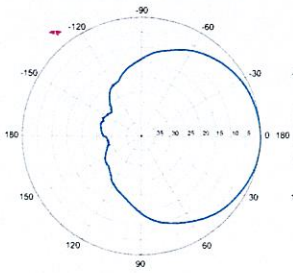
Replace "X" with desired electrical downtilt

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

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	82°	80°
Vertical beamwidth	12°	10°
Gain	13.0 dBd (15.1 dBi)	13.5 dBd (15.6 dBi)
Electrical downtilt (X)	0, 2, 4, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-18.3 dB	-18.6 dB
Front-to-back ratio (+/-30°)	-26.9 dB	-25.6 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -30 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1804 x 204 x 151 mm	71.0 x 8.0 x 5.9 in
Depth with z-brackets	191 mm	7.5 in
Weight without mounting brackets	8.2 kg	18 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.37 m^2 Side: 0.27 m^2	Front: 3.9 ft^2 Side: 2.9 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 531 N Side: 475 N	Front: 119 lbf Side: 104 lbf

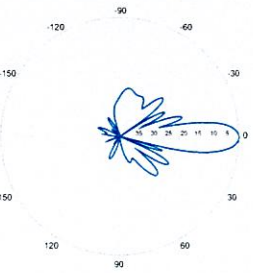
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70080-6CF-EDIN-X-FP		

BXA-70080-6CF-EDIN-X



Horizontal | 750 MHz

BXA-70080-6CF-EDIN-0



0° | Vertical | 750 MHz

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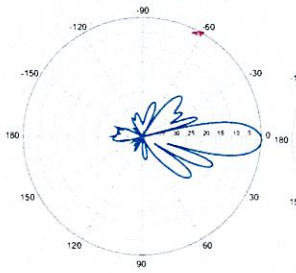
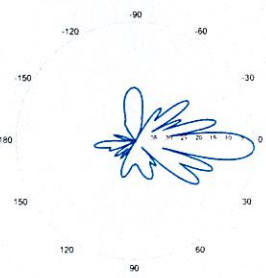
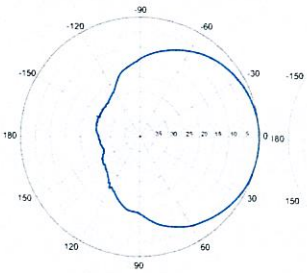


2° | Vertical | 750 MHz

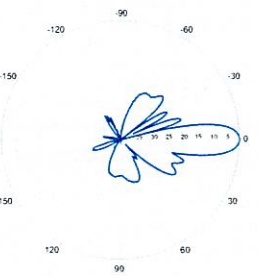
BXA-70080-6CF-EDIN-4



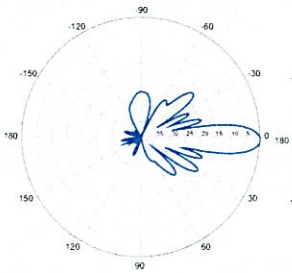
4° | Vertical | 750 MHz



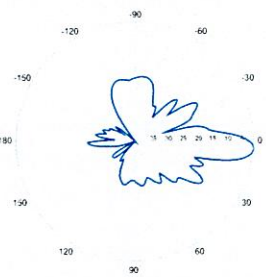
Horizontal | 850 MHz



0° | Vertical | 850 MHz



2° | Vertical | 850 MHz

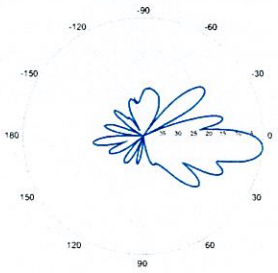


4° | Vertical | 850 MHz

BXA-70080-6CF-EDIN-X

X-Pol | FET Panel | 80° | 13.5 dBd

BXA-70080-6CF-EDIN-6



6° | Vertical | 750 MHz

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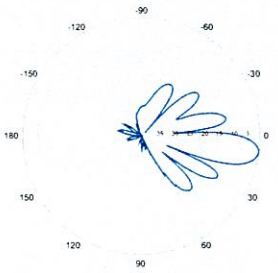

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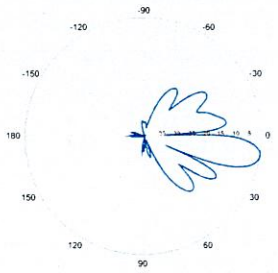
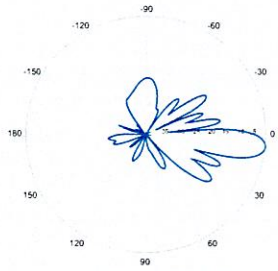


10° | Vertical | 750 MHz



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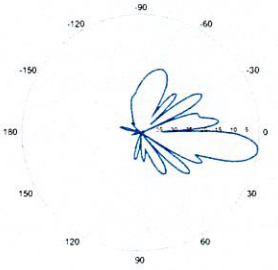
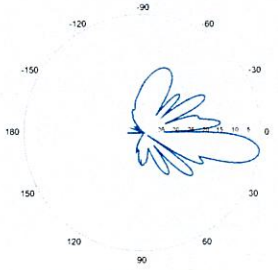


8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

Site Name: Hamden N 2 Tower Height: Verizon @ 147ft	General	Power	Density					
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*Sprint CDMA/LTE	2	778	157.5	0.0226	1900	1.0000	2.26%	
*Sprint CDMA/LTE	1	438	157.5	0.0063	850	0.5667	1.12%	
*Pocket (now MetroPCS)	3	631	137	0.0363	2130	1.0000	3.63%	
Verizon PCS	**7**	**244**	**147**	**0.0284**	**1970**	**1.0000**	**2.84%**	
Verizon Cellular	**9**	**310**	**147**	**0.0464**	**869**	**0.5793**	**8.01%**	
Verizon AWS	**2**	**1750**	**147**	**0.0582**	**2145**	**1.0000**	**5.82%**	
Verizon 700	**1**	**805**	**147**	**0.0134**	**698**	**0.4653**	**2.88%**	
								26.56%
* Source: Siting Council								

INFINIGY Design. Build. Deliver.

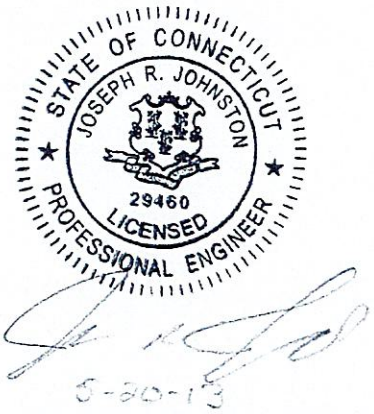
New York Office
11 Herbert Drive
Latham, NY 12110
Phone: (518) 690-0790
Fax: (518) 690-0793
www.infinigy.com

Tower Analysis Report

May 20, 2013

Site Name	Hamden Fish & Game Club
Infinigy Job Number	286-064
Client	Verizon
Site Location	150 Willow Street, Hamden, CT 06518 New Haven County 41° 26' 57.81" N NAD83 72° 54' 16.46" W NAD83
Structure Type	157' EEI Monopole
Structural Usage Ratio	**42%**
Overall Result	**Pass**

Upon reviewing the results of this analysis, it is our opinion that the structure meets the specified TIA code requirements. The tower and foundations are therefore deemed adequate to support the existing and proposed loading as listed in this report.



Joseph R. Johnston, P.E.
Department Manager - Structural

Table of Contents

Introduction

Infinigy Engineering has been requested to perform a structural analysis on the existing 157' EEI Monopole. All supporting documents have been obtained from Pyramid Network Services and are assumed to be accurate and applicable to this site. The tower was analyzed using tnxTower version 6.0 tower analysis software.

Supporting Documentation

Tower Drawings	EEI Drawing #GS56844, dated July 17, 2007
Foundation Drawing	EEI Drawing #14977D-16.0, dated July 17, 2007

Analysis Code Requirements

Wind Speed	105 mph (3-Second Gust) – North of Route 15
Wind Speed w/ ice	50 mph (3-Second Gust) w/ 3/4" ice
TIA Revision	ANSI/TIA-222-G
Adopted IBC	2003 IBC
Jurisdictional Code	2005 Connecticut Supplement & 2009 Connecticut Amendments
Structure Class	2
Exposure Category	B
Topographic Category	1
Calculated Crest Height	0 ft

Conclusion

Upon reviewing the results of this analysis, it is our opinion that the structure meets the specified TIA code requirements. The tower and foundations are therefore deemed adequate to support the existing and proposed loading as listed in this report.

If you have any questions, require additional information, or actual conditions differ from those as detailed in this report please contact me via the information below:

Joseph R. Johnston, P.E.
Department Manager - Structural
Infinigy Engineering, PLLC
11 Herbert Drive | Latham | NY | 12110
M: [518] 669-4428
jjohnston@infinigy.com | www.infinigy.com

Existing and Reserved Loading

Mount Height (ft)	Qty.	Appurtenance	Mount Type	Coax& Lines	Carrier
157.0	3	RFS APXVSPP18-C-A20	Platform w/ Handrails	(3) 1 5/8" (3) 1 1/4" Fiber	Sprint Nextel
	3	Decibel DB848H90E-M			
	6	ALU 1900 MHz RRH			
	3	ALU 800 MHz RRH w/ Notch Filters			
147.0	6	Antel LPA 80080/4CF	Low Profile Platform	(12) 1 5/8"	Verizon
	6	RFS FD9R6004/2C-3L			
	3	Rymsa MGD3-800TO			
137.0	3	Kathrein 742 213	Pipe	(6) 1 5/8"	Metro PCS

Proposed Loading

Mount Height (ft)	Qty.	Appurtenance	Mount Type	Coax& Lines	Carrier
147.0	2	Antel BXA-70063/6CF	Low Profile Platform	--	Verizon
	1	Antel BXA-70080/6CF			

Structure Usages

Pole (L1)	42.0	Pass
Base Plate	24.7	Pass
RATING =	**42.0**	**Pass**

Foundation Reactions

Reaction Data	Design Reactions	Analysis Reactions	Result
Overturning Moment (kip-ft)	7151.4	2464.8	34%
Base Compression (kip)	68.8	48.2	72%
Base Shear (kip)	61.4	23.9	39%

Tower base reactions are acceptable when compared to the original design reactions.

Deflection, Twist, and Sway

Antenna Elevation (ft)	Deflection (in)	Twist (°)	Sway (°)
147.0	7.1	0.02	0.57

*Per ANSI/TIA-222-G Section 2.8.2 maximum serviceability structural deflection limit is 3% of structure height.
*Per ANSI/TIA-222-G Section 2.8.2 maximum serviceability structural twist and sway limit is 4 degrees.
*Per ANSI/TIA-222-G Section 2.8.3 deflection, Twist, and sway values were calculated using a basic 3-second gust wind speed of 60 mph.
*It is the responsibility of the client to ensure their proposed and/or existing equipment will meet ANSI/TIA-222-G Annex D or other appropriate microwave signal degradation limits based on the provided values above.

Assumptions and Limitations

All engineering services are completed assuming all information provided to Infinigy Engineering is current and correct. If actual conditions differ from those described in this report we should be notified immediately to complete a revised evaluation.

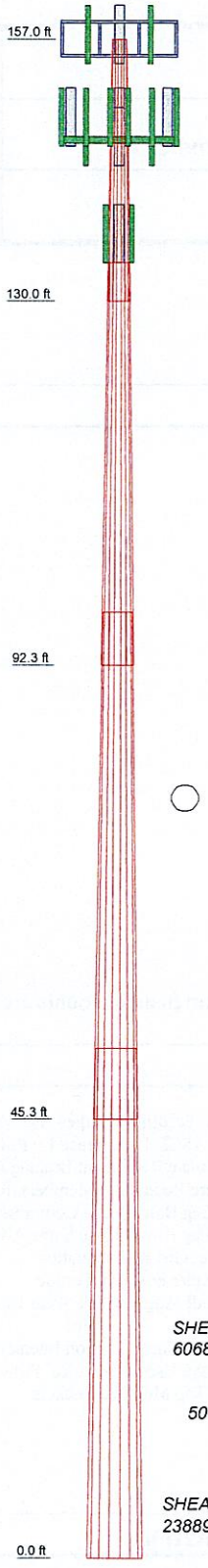
It is the responsibility of the client to ensure that the information provided to Infinigy Engineering is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the original design drawings and specifications that have been supplied.

All calculations are completed in accordance with generally accepted engineering principles and practices. Infinigy Engineering is not responsible the conclusions, opinions, and recommendations made by others based on the information we supply.

This report is an evaluation of the tower structure only and does not reflect adequacy of any existing antenna mounts, mount connections, or coax mounting attachments. These elements are assumed to be adequate for the purposes of this analysis and are assumed to have been installed per their manufacturer requirements.

Section	1	2	3	4
Length (ft)	27.00	41.75	52.42	52.66
Number of Sides	18	18	18	18
Thickness (in)	0.1875	0.3750	0.4375	0.4375
Socket Length (ft)	4.00	5.50	7.33	
Top Dia (in)	18.5000	25.7235	36.8396	50.7416
Bot Dia (in)	27.4200	39.3900	54.0200	68.0000
Grade			A572-65	
Weight (lb)	1245.1	5441.8	11144.4	14665.2

32496.4



ALL REACTIONS ARE FACTORED

AXIAL 69853 lb

SHEAR 6068 lb — *MOMENT 624929 lb-ft*

TORQUE 3130 lb-ft
50 mph WIND - 0.7500 in ICE

AXIAL 48217 lb

SHEAR 23889 lb — *MOMENT 2464776 lb-ft*

TORQUE 13254 lb-ft
REACTIONS - 105 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSPP18-C-A20 (Sprint Nextel)	157	(2) LPA-80080/4CF (Verizon)	147
APXVSPP18-C-A20 (Sprint Nextel)	157	(2) LPA-80080/4CF (Verizon)	147
APXVSPP18-C-A20 (Sprint Nextel)	157	(2) LPA-80080/4CF (Verizon)	147
(2) 1900 MHz RRH (Sprint Nextel)	157	(2) FD9R6004/2C-3L (Verizon)	147
(2) 1900 MHz RRH (Sprint Nextel)	157	(2) FD9R6004/2C-3L (Verizon)	147
(2) 1900 MHz RRH (Sprint Nextel)	157	(2) FD9R6004/2C-3L (Verizon)	147
800 MHz w/ Notch Filter (Sprint Nextel)	157	BXA-70063/6CF (Verizon)	147
		BXA-70063/6CF (Verizon)	147
800 MHz w/ Notch Filter (Sprint Nextel)	157	BXA-70080/6CF (Verizon)	147
		MGD3-800T0 (Verizon)	147
800 MHz w/ Notch Filter (Sprint Nextel)	157	MGD3-800T0 (Verizon)	147
		MGD3-800T0 (Verizon)	147
DB848H90E-M (Sprint Nextel)	157	Round Low Profile Platform (Verizon)	147
DB848H90E-M (Sprint Nextel)	157	742 213 (Metro PCS)	137
DB848H90E-M (Sprint Nextel)	157	742 213 (Metro PCS)	137
Platform w/ Handrails (Sprint Nextel)	157	742 213 (Metro PCS)	137

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 42%

Infinigy Engineering PLLC
2255 Sewell Mill Road, Suite 130
Marietta, GA 30062
Phone: (678) 444-4463
FAX: (678) 444-4472

Job: **286-064**		
Project: ***CT54XC773 - Hamden Fish & Game Club***		
Client: Verizon	Drawn by: JJohnston	App'd:
Code: TIA-222-G	Date: 05/20/13	Scale: NTS
Path:		Dwg No. E-1

tnxTower	Job	Page
	286-064	1 of 9
Infinigy Engineering PLLC 2255 Sewell Mill Road, Suite 130 Marietta, GA 30062 Phone: (678) 444-4463 FAX: (678) 444-4472	**Project** CT54XC773 - Hamden Fish & Game Club	**Date** 09:48:06 05/20/13
	Client Verizon	**Designed by** JJohnston

Tower Input Data

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

Tower is located in New Haven County, Connecticut.
Basic wind speed of 105 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
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	157.00-130.00	27.00	4.00	18	18.5000	27.4200	0.1875	0.7500	A572-65 (65 ksi)
L2	130.00-92.25	41.75	5.50	18	25.7235	39.3900	0.3750	1.5000	A572-65 (65 ksi)
L3	92.25-45.33	52.42	7.33	18	36.8396	54.0200	0.4375	1.7500	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
L4	45.33-0.00	52.66		18	50.7416	68.0000	0.4375	1.7500	(65 ksi) 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	18.7854	10.8982	461.7305	6.5009	9.3980	49.1307	924.0685	5.4501	2.9260	15.605
	27.8430	16.2067	1518.4769	9.6675	13.9294	109.0127	3038.9518	8.1049	4.4959	23.978
L2	27.4499	30.1711	2449.2517	8.9987	13.0675	187.4301	4901.7261	15.0884	3.8673	10.313
	39.9977	46.4376	8930.3910	13.8503	20.0101	446.2937	17872.5328	23.2232	6.2726	16.727
L3	39.2383	50.5489	8462.5771	12.9228	18.7145	452.1929	16936.2895	25.2793	5.7138	13.06
	54.8533	74.4060	26989.2830	19.0218	27.4422	983.4970	54014.0793	37.2101	8.7375	19.971
L4	53.9646	69.8536	22332.3190	17.8580	25.7768	866.3743	44694.0235	34.9334	8.1605	18.653
	69.0490	93.8190	54105.2694	23.9847	34.5440	1566.2711	108281.731 9	46.9184	11.1980	25.595

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 157.00-130.00				1	1	1		
L2 130.00-92.25				1	1	1		
L3 92.25-45.33				1	1	1		
L4 45.33-0.00				1	1	1		

Monopole Base Plate Data

Base Plate Data	
Base plate is square	
Base plate is grouted	
Anchor bolt grade	A615-75
Anchor bolt size	2.2500 in
Number of bolts	36
Embedment length	79.2000 in
f'_c	3 ksi
Grout space	6.0000 in
Base plate grade	A572-60
Base plate thickness	3.0000 in
Bolt circle diameter	76.0000 in
Outer diameter	82.0000 in
Inner diameter	58.0000 in
Base plate type	Plain Plate

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
1 5/8 (Sprint Nextel)	C	No	Inside Pole	157.00 - 5.00	3	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
1 1/4" Hybriflex Cable (Sprint Nextel)	C	No	Inside Pole	157.00 - 5.00	1	No Ice	0.00	1.00
						1/2" Ice	0.00	1.00
						1" Ice	0.00	1.00
***								
1 5/8 (Verizon)	C	No	Inside Pole	147.00 - 5.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
***								
1 5/8 (Metro PCS)	C	No	Inside Pole	137.00 - 5.00	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04

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	157.00-130.00	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	367.08
L2	130.00-92.25	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	862.21
L3	92.25-45.33	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	1071.65
L4	45.33-0.00	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	921.14

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	157.00-130.00	A	1.736	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	367.08
L2	130.00-92.25	A	1.692	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	862.21
L3	92.25-45.33	A	1.613	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	1071.65
L4	45.33-0.00	A	1.440	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	921.14

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	157.00-130.00	0.0000	0.0000	0.0000	0.0000
L2	130.00-92.25	0.0000	0.0000	0.0000	0.0000
L3	92.25-45.33	0.0000	0.0000	0.0000	0.0000
L4	45.33-0.00	0.0000	0.0000	0.0000	0.0000

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

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
APXVSPP18-C-A20	A	From Leg	3.00		0.0000	157.00	No Ice	8.26	5.28	57.00
(Sprint Nextel)			0.00				1/2" Ice	8.81	5.74	106.52
			0.50				1" Ice	9.36	6.20	162.12
APXVSPP18-C-A20	B	From Leg	3.00		0.0000	157.00	No Ice	8.26	5.28	57.00
(Sprint Nextel)			0.00				1/2" Ice	8.81	5.74	106.52
			0.50				1" Ice	9.36	6.20	162.12
APXVSPP18-C-A20	C	From Leg	3.00		0.0000	157.00	No Ice	8.26	5.28	57.00
(Sprint Nextel)			0.00				1/2" Ice	8.81	5.74	106.52
			0.50				1" Ice	9.36	6.20	162.12
(2) 1900 MHz RRH	A	From Leg	3.00		0.0000	157.00	No Ice	2.73	1.45	44.09
(Sprint Nextel)			0.00				1/2" Ice	2.96	1.64	62.32
			0.50				1" Ice	3.20	1.84	83.43
(2) 1900 MHz RRH	B	From Leg	3.00		0.0000	157.00	No Ice	2.73	1.45	44.09
(Sprint Nextel)			0.00				1/2" Ice	2.96	1.64	62.32
			0.50				1" Ice	3.20	1.84	83.43
(2) 1900 MHz RRH	C	From Leg	3.00		0.0000	157.00	No Ice	2.73	1.45	44.09
(Sprint Nextel)			0.00				1/2" Ice	2.96	1.64	62.32
			0.50				1" Ice	3.20	1.84	83.43
800 MHz w/ Notch Filter	A	From Leg	3.00		0.0000	157.00	No Ice	2.49	2.91	61.80
(Sprint Nextel)			0.00				1/2" Ice	2.71	3.14	87.79
			0.50				1" Ice	2.93	3.38	117.08
800 MHz w/ Notch Filter	B	From Leg	3.00		0.0000	157.00	No Ice	2.49	2.91	61.80
(Sprint Nextel)			0.00				1/2" Ice	2.71	3.14	87.79
			0.50				1" Ice	2.93	3.38	117.08
800 MHz w/ Notch Filter	C	From Leg	3.00		0.0000	157.00	No Ice	2.49	2.91	61.80
(Sprint Nextel)			0.00				1/2" Ice	2.71	3.14	87.79
			0.50				1" Ice	2.93	3.38	117.08
DB848H90E-M	A	From Leg	3.00		0.0000	157.00	No Ice	7.19	8.36	28.00
(Sprint Nextel)			0.00				1/2" Ice	7.78	8.95	78.41
			0.50				1" Ice	8.37	9.55	136.18
DB848H90E-M	B	From Leg	3.00		0.0000	157.00	No Ice	7.19	8.36	28.00
(Sprint Nextel)			0.00				1/2" Ice	7.78	8.95	78.41

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
			0.50			1" Ice	8.37	9.55	136.18
DB848H90E-M	C	From Leg	3.00	0.0000	157.00	No Ice	7.19	8.36	28.00
(Sprint Nextel)			0.00			1/2" Ice	7.78	8.95	78.41
			0.50			1" Ice	8.37	9.55	136.18
Platform w/ Handrails	A	From Leg	3.00	0.0000	157.00	No Ice	42.40	42.40	2000.00
(Sprint Nextel)			0.00			1/2" Ice	48.40	48.40	2450.00
			0.00			1" Ice	54.40	54.40	2900.00
***									
(2) LPA-80080/4CF	A	From Leg	3.00	0.0000	147.00	No Ice	2.62	6.06	12.00
(Verizon)			0.00			1/2" Ice	2.92	6.45	45.12
			2.00			1" Ice	3.23	6.86	82.72
(2) LPA-80080/4CF	B	From Leg	3.00	0.0000	147.00	No Ice	2.62	6.06	12.00
(Verizon)			0.00			1/2" Ice	2.92	6.45	45.12
			2.00			1" Ice	3.23	6.86	82.72
(2) LPA-80080/4CF	C	From Leg	3.00	0.0000	147.00	No Ice	2.62	6.06	12.00
(Verizon)			0.00			1/2" Ice	2.92	6.45	45.12
			2.00			1" Ice	3.23	6.86	82.72
(2) FD9R6004/2C-3L	A	From Leg	3.00	0.0000	147.00	No Ice	0.37	0.08	2.60
(Verizon)			0.00			1/2" Ice	0.45	0.14	4.90
			0.00			1" Ice	0.54	0.20	8.29
(2) FD9R6004/2C-3L	B	From Leg	3.00	0.0000	147.00	No Ice	0.37	0.08	2.60
(Verizon)			0.00			1/2" Ice	0.45	0.14	4.90
			0.00			1" Ice	0.54	0.20	8.29
(2) FD9R6004/2C-3L	C	From Leg	3.00	0.0000	147.00	No Ice	0.37	0.08	2.60
(Verizon)			0.00			1/2" Ice	0.45	0.14	4.90
			0.00			1" Ice	0.54	0.20	8.29
BXA-70063/6CF	A	From Leg	3.00	0.0000	147.00	No Ice	7.73	4.04	14.90
(Verizon)			0.00			1/2" Ice	8.27	4.48	56.85
			0.00			1" Ice	8.81	4.92	104.64
BXA-70063/6CF	B	From Leg	3.00	0.0000	147.00	No Ice	7.73	4.04	14.90
(Verizon)			0.00			1/2" Ice	8.27	4.48	56.85
			0.00			1" Ice	8.81	4.92	104.64
BXA-70080/6CF	C	From Leg	3.00	0.0000	147.00	No Ice	7.73	4.04	14.90
(Verizon)			0.00			1/2" Ice	8.27	4.48	56.85
			0.00			1" Ice	8.81	4.92	104.64
MGD3-800T0	A	From Leg	3.00	0.0000	147.00	No Ice	3.45	2.22	19.80
(Verizon)			0.00			1/2" Ice	3.80	2.55	39.87
			2.00			1" Ice	4.16	2.89	64.29
MGD3-800T0	B	From Leg	3.00	0.0000	147.00	No Ice	3.45	2.22	19.80
(Verizon)			0.00			1/2" Ice	3.80	2.55	39.87
			2.00			1" Ice	4.16	2.89	64.29
MGD3-800T0	C	From Leg	3.00	0.0000	147.00	No Ice	3.45	2.22	19.80
(Verizon)			0.00			1/2" Ice	3.80	2.55	39.87
			2.00			1" Ice	4.16	2.89	64.29
Round Low Profile Platform	A	From Leg	3.00	0.0000	147.00	No Ice	21.70	21.70	1500.00
(Verizon)			0.00			1/2" Ice	27.20	27.20	1700.00
			0.00			1" Ice	32.70	32.70	1900.00
***									
742 213	A	From Leg	0.50	0.0000	137.00	No Ice	5.14	2.87	22.00
(Metro PCS)			0.00			1/2" Ice	5.61	3.48	47.15
			0.00			1" Ice	6.09	3.95	78.02
742 213	B	From Leg	0.50	0.0000	137.00	No Ice	5.14	2.87	22.00
(Metro PCS)			0.00			1/2" Ice	5.61	3.48	47.15
			0.00			1" Ice	6.09	3.95	78.02
742 213	C	From Leg	0.50	0.0000	137.00	No Ice	5.14	2.87	22.00
(Metro PCS)			0.00			1/2" Ice	5.61	3.48	47.15
			0.00			1" Ice	6.09	3.95	78.02

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	157 - 130	8.396	39	0.6510	0.0319
L2	134 - 92.25	5.645	39	0.4666	0.0108
L3	97.75 - 45.33	2.773	39	0.2884	0.0038
L4	52.663 - 0	0.765	39	0.1357	0.0012

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.00	APXVSPP18-C-A20	39	8.396	0.6510	0.0319	29941
147.00	(2) LPA-80080/4CF	39	7.142	0.5661	0.0215	14971
137.00	742 213	39	5.969	0.4878	0.0128	7513

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	157 - 130	42.753	2	3.0014	0.1747
L2	134 - 92.25	29.493	2	2.3605	0.0590
L3	97.75 - 45.33	14.690	2	1.5126	0.0210
L4	52.663 - 0	4.083	2	0.7227	0.0067

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.00	APXVSPP18-C-A20	2	42.753	3.0014	0.1747	7481
147.00	(2) LPA-80080/4CF	2	36.758	2.7171	0.1179	3740
137.00	742 213	2	31.084	2.4407	0.0702	1875

Base Plate Design Data

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual Allowable Ratio Bolt Tension lb	Actual Allowable Ratio Bolt Compression lb	Actual Allowable Ratio Plate Stress ksi	Actual Allowable Ratio Stiffener Stress ksi	Controlling Condition	Ratio

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual Allowable Ratio Bolt Tension lb	Actual Allowable Ratio Bolt Compression lb	Actual Allowable Ratio Plate Stress ksi	Actual Allowable Ratio Stiffener Stress ksi	Controlling Condition	Ratio
3.0000	36	2.2500	41950.50 223654.40 0.19	44580.88 371266.30 0.12	13.356 54.000 0.25		Plate	0.25 ✓

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
L1	157 - 130 (1)	TP27.42x18.5x0.1875	27.00	157.00	204.8	15.4203	-6533.75	105463.00	0.062
L2	130 - 92.25 (2)	TP39.39x25.7235x0.375	41.75	157.00	142.6	44.2947	-13324.00	624910.00	0.021
L3	92.25 - 45.33 (3)	TP54.02x36.8396x0.4375	52.42	157.00	103.7	71.0686	-26900.10	1896280.00	0.014
L4	45.33 - 0 (4)	TP68x50.7416x0.4375	52.66	157.00	78.6	93.8190	-48210.90	3877420.00	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	157 - 130 (1)	TP27.42x18.5x0.1875	197660.83	552396.67	0.358	0.00	552396.67	0.000
L2	130 - 92.25 (2)	TP39.39x25.7235x0.375	634018.33	2512833.33	0.252	0.00	2512833.33	0.000
L3	92.25 - 45.33 (3)	TP54.02x36.8396x0.4375	1353858.33	5317391.67	0.255	0.00	5317391.67	0.000
L4	45.33 - 0 (4)	TP68x50.7416x0.4375	2464775.00	8375166.67	0.294	0.00	8375166.67	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	157 - 130 (1)	TP27.42x18.5x0.1875	10524.70	518055.00	0.020	0.00	1106141.67	0.000
L2	130 - 92.25 (2)	TP39.39x25.7235x0.375	13667.70	1645440.00	0.008	0.00	5031808.33	0.000
L3	92.25 - 45.33 (3)	TP54.02x36.8396x0.4375	18329.50	2528020.00	0.007	0.00	10647833.33	0.000
L4	45.33 - 0 (4)	TP68x50.7416x0.4375	23901.10	3010010.00	0.008	0.00	16770833.33	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	157 - 130 (1)	0.062	0.358	0.000	0.020	0.000	0.420 ✔	1.000	4.8.2 ✔
L2	130 - 92.25 (2)	0.021	0.252	0.000	0.008	0.000	0.274 ✔	1.000	4.8.2 ✔
L3	92.25 - 45.33 (3)	0.014	0.255	0.000	0.007	0.000	0.269 ✔	1.000	4.8.2 ✔
L4	45.33 - 0 (4)	0.012	0.294	0.000	0.008	0.000	0.307 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	157 - 130	Pole	TP27.42x18.5x0.1875	1	-6533.75	105463.00	42.0	Pass
L2	130 - 92.25	Pole	TP39.39x25.7235x0.375	2	-13324.00	624910.00	27.4	Pass
L3	92.25 - 45.33	Pole	TP54.02x36.8396x0.4375	3	-26900.10	1896280.00	26.9	Pass
L4	45.33 - 0	Pole	TP68x50.7416x0.4375	4	-48210.90	3877420.00	30.7	Pass
							Summary	
						Pole (L1)	42.0	Pass
						Base Plate	24.7	Pass
						RATING =	**42.0**	**Pass**

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