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Also admitted in Massachusetts

March 17, 2014

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

Re: **Notice of Exempt Modification – Facility Modification**
2619 Day Hill Road, Bloomfield, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains fifteen (15) wireless telecommunications antennas at the top of the existing 110-foot tower at 2619 Day Hill Road in Bloomfield, Connecticut (the "Property"). The tower is owned by Florida Tower Partners ("FTP"). The Council approved Cellco's use of the tower in 2011 (Docket No. 416). Cellco now intends to modify its facility by replacing six (6) of its existing antennas with three (3) model HBX-6517DS-VTM, 1900 MHz antennas and three (3) model HBX-6517DS-VTM, 2100 MHz antennas, at the same 110-foot level on the tower. Cellco also intends to install three (3) remote radio heads ("RRHs") behind its 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable inside the monopole. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

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 Philip K. Schenk, Jr., Town Manager for the Town of Bloomfield. A copy of this letter is also being sent to River Bend Associates, Inc., the owner of the Property.

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. The replacement antennas and RRHs will be located at the 110-foot level on the 110-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) safety standard. A worst-case RF emissions calculation for Cellco's modified facility is included in Attachment 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* Structural Analysis included in Attachment 3). Please note that the Structural Analysis contemplates Cellco installing a total of eighteen (18) antennas on this tower. This coincides with Cellco's current lease with FTP which allows for future growth at this location. Cellco will, however, continue to maintain only fifteen (15) antennas at this site, including three (3) BXA-70063/6CF, 700 MHz antennas; six (6) LPA-80063/6CF, 850 MHz antennas; three (3) HBX6517DS, 1900 MHz antennas; and three (3) HBX6517DS, 2100 MHz antennas.

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:
Philip K. Schenk, Jr., Bloomfield Town Manager
River Bend Associates, Inc.
Sandy M. Carter

ATTACHMENT 1

Product Specifications

COMMSCOPE®

HBX-6517DS-VTM

Andrew® Teletilt® Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

POWERED BY ANDREW.

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain, dBi	19.0	19.1	19.2
Beamwidth, Horizontal, degrees	65	65	65
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beam Tilt, degrees	0–6	0–6	0–6
USLS, typical, dB	18	18	18
Front-to-Back Ratio at 180°, dB	30	30	30
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°

Mechanical Specifications

Color | Radome Material	Light gray | PVC, UV resistant
Connector Interface | Location | Quantity	7-16 DIN Female | Bottom | 2
Wind Loading, maximum	393.2 N @ 150 km/h 88.4 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph
Antenna Dimensions, L x W x D	1902.0 mm x 166.0 mm x 83.0 mm | 74.9 in x 6.5 in x 3.3 in
Net Weight	6.2 kg | 13.7 lb
Model with factory installed AISG 2.0 RET	HBX-6517DS-A1M

Alcatel-Lucent RRH2x40-AWS

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-AWS is a high-power, small form-factor Remote Radio Head (RRH) operating in the AWS frequency band (1700/2100MHz - 3GPP Band 4). The Alcatel-Lucent RRH2x40-AWS is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.

A distributed eNodeB expands deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information. The Alcatel-Lucent RRH2x40-AWS has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to four-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 20 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-AWS is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-AWS is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-AWS is compact and weighs less than 20 kg (44 lb), eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day — a fraction of the time required for a traditional BTS.

Excellent RF performance

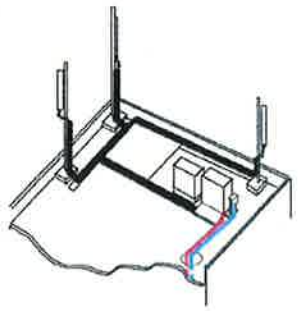
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced.
The Alcatel-Lucent RRH2x40-AWS provides more RF power while at the same time consuming less electricity.

Features

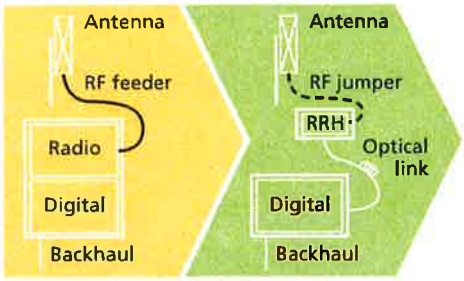
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

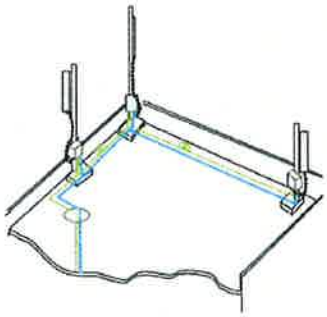
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 620 mm (24.4 in.)
- Width: 270 mm (10.63 in.)
- Depth: 170m (6.7 in.)
- Weight (without mounting kit): less than 20 kg (44 lb)

Power

- Power supply: -48VDC

Operating environment

- Outdoor temperature range:
  - ¬ With solar load: -40°C to +50°C (-40°F to +122°F)
  - ¬ Without solar load: -40°C to +55°C (-40°F to +131°F)
- Passive convection cooling (no fans)
- Enclosure protection
  - ¬ IP65 (International Protection rating)

RF characteristics

- Frequency band: 1700/2100 MHz (AWS); 3GPP Band 4
- Bandwidth: up to 20 MHz
- RF output power at antenna port: 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way with optional Rx Diversity module
- Noise figure: below 2.0 dB typical
- Antenna Line Device features
  - ¬ TMA and Remote electrical tilt (RET) support via AISG v2.0

Optical characteristics

Type/number of fibers

- Single-mode variant
  - ¬ One Single Mode Single Fiber per RRH2x, carrying UL and DL using CWDM
  - ¬ Single mode dual fiber (SM/DF)
- Multi-mode variant
  - ¬ Two Multi-mode fibers per RRH2x: one carrying UL, the other carrying DL

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Digital Ports and Alarms

- Two optical ports to support daisy-chaining
- Six external alarms

Alcatel·Lucent

Product Data Sheet **HB158-1-08U8-S8J18**

HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber

Product Description

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX® accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

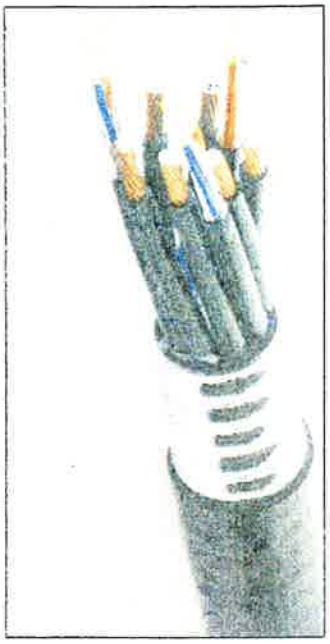


Figure 1: HYBRIFLEX Series

Features/Benefits

- Aluminum corrugated armor with outstanding bending characteristics – minimizes installation time and enables mechanical protection and shielding
- Same accessories as 1 5/8" coaxial cable
- Outer conductor grounding – Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design – Decreases tower loading
- Robust cabling – Eliminates need for expensive cable trays and ducts
- Installation of tight bundled fiber optic cable pairs directly to the RRH – Reduces CAPEX and wind load by eliminating need for interconnection
- Optical fiber and power cables housed in single corrugated cable – Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Outdoor polyethylene jacket – Ensures long-lasting cable protection

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

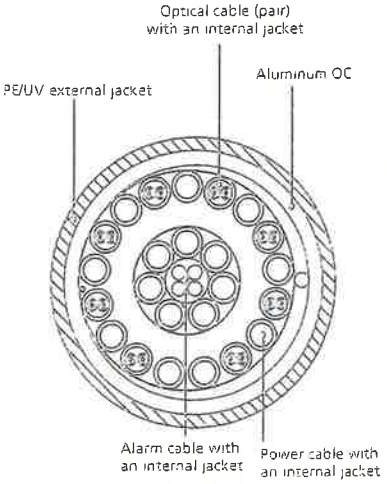


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

Site Name: North Bloomfield, CT
Cumulative Power Density

Operator	Operating Frequency	Number of Trans.	ERP Per Trans.	Total ERP	Distance to Target	Calculated Power Density	Maximum Permissable Exposure*	Fraction of MPE
	(MHz)		(watts)	(watts)	(feet)	(mW/cm^2)	(mW/cm^2)	(%)
VZW PCS	1970	11	459	5052.574	110	0.1502	1.0	15.02%
VZW Cellular	869	9	416	3739.663	110	0.1111	0.579333333	19.19%
VZW AWS	2145	1	1750	1750	110	0.0520	1.0	5.20%
VZW 700	746	1	1050	1050	110	0.0312	0.497333333	6.27%

Total Percentage of Maximum Permissible Exposure 45.68%

*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Part 1 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1-1992

MHz = Megahertz
mW/cm^2 = milliwatts per square centimeter
ERP = Effective Radiated Power

Absolute worst case maximum values used.

ATTACHMENT 3

Structural Analysis
110-ft Monopole

Prepared For:
Florida Tower Partners, LLC
1001 3rd Ave. West, Suite 420
Bradenton, FL 34205

MFP Project #40914-029

Site Location:
CT1021 North Bloomfield
Hartford Co., Connecticut
Lat/Long: 41°52'35.4", -72°44'30.6"

Analysis Type:
ANSI/TIA-222-G

February 27, 2014

Michael F. Plahovinsak, P.E.
18301 State Route 161 W, Plain City, OH 43064
614-398-6250 - mike@mfpeng.com

Project Summary:

I have completed a structural analysis of the existing monopole for the following new configuration:

- 110' – Verizon:
  - (3) Antel BXA-70063/6CF + (6) LPA-80063/6CF + (3) LPA-171063/12CF
  - (6) Andrew HBX-6517DS Panel
  - (3) ALU 2x40 RRH & (1) RFS DB-T1-6Z-8AB-OZ Box w/ (24) 1 5/8" Cable
  - 14' T-Arm Mounts

The pole has been analyzed in accordance with the requirements of the International Building Code per IBC section 3108.4, and the recommendations of the Telecommunications Industry Association *"Structural Standard for Steel Antenna Supporting Structures"* **ANSI/TIA-222-G.**

This analysis may be considered a "Rigorous Structural Analysis" as defined in ANSI/TIA-222-G 15.5.2.

As indicated in the conclusions of this analysis, I have determined that the existing pole and foundation have *sufficient capacity* to support the existing, reserved and proposed antenna loads as detailed herein. Based on the results of my analysis, structural modifications are not required at this time.

Source of Data:

Resource	Source	Job Number	Date
Pole and Foundation Drawings	Sabre Industries	67167	09/19/12
Geotechnical Report	Design Earth Tech	2011-20	01/28/12

Analysis Criteria:

2006-2012 International Building Code section 3108
Structural Standards for Steel Antenna Supporting Structures **ANSI/TIA-222-G 2**

- Basic Wind Speed 95 mph (3-Sec Gust)
- Wind Speed with 1" Ice 50 mph (3-Sec Gust)
- Operational Wind Speed 60 mph (3-Sec Gust)

Structure Class	Exposure Category	Topographic Category
II (I = 1.0)	C	I

Appurtenance Listing:

Status	Elev.	Antenna / Mounting	Coax	Owner
Proposed	110'	(3) BXA-70063/6CF + (6) LPA-80063/6CF + (3) LPA-171063/12CF (6) HBX-6517DS Panel + (3) 2x40 RRH + (1) Suppressor 12' Low Profile Platform	(24) 1 5/8"	Verizon

All antenna lines assumed internally mounted, not exposed to the wind.

Foundation Analysis:

The existing monopole foundation design was analyzed in conjunction with site specific geotechnical report. The existing foundation has sufficient capacity to support the pole with the proposed antenna configuration.

Conclusion:

I have completed a structural analysis of the existing monopole and foundation in accordance with the project specifics outlined above. My analysis indicates that the existing monopole and foundation is stressed to a maximum of 64.2% of its usable capacity when considering the existing plus proposed loading. Please refer to the attached calculations for an itemized listing of all member stress ratios. The existing pole is safe and adequate to support the proposed loads, and no structural reinforcing is required to support the above loading.

If you have any questions about the contents of this structural report or require any additional information, please feel free to contact my office.

Sincerely,

Michael F. Plahovinsak, P.E.

mike@mfpeng.com - 614.398-6250

Standard Conditions for Providing Structural Consulting Services on Existing Structures

1. The following standard conditions are a general overview of key issues regarding the work product supplied.

2. If the existing conditions are not as represented in this structural report or attached sketches, I should be contacted to evaluate the significance of the deviation and revise the structural assessment accordingly.

3. The structural analysis has been performed assuming that the structure is in "like new" condition. No allowance was made for excessive corrosion, damaged or missing structural members, loose bolts, etc. If there are any known deficiencies in the structure that potentially compromise structural integrity, I should be made aware of the deficiencies. If I am aware of a deficiency that exists in a structure at the time of my analysis, a general explanation of the structural concern due to the deficiency will be included in the structural report, but the deficiency will not be reflected in capacity calculations.

4. The structural analysis provided is an assessment of the primary load carrying capacity of the structure. I provide a limited scope of service in that I have not verified the capacity of every weld, plate, connection detail, etc. In most cases, structural fabrication details are unknown at the time of my analysis, and the detailed field measurement of this information is beyond the scope of my services. In instances where I have not performed connection capacity calculations, it is assumed that existing manufactured connections develop the full capacity of the primary members being connected.

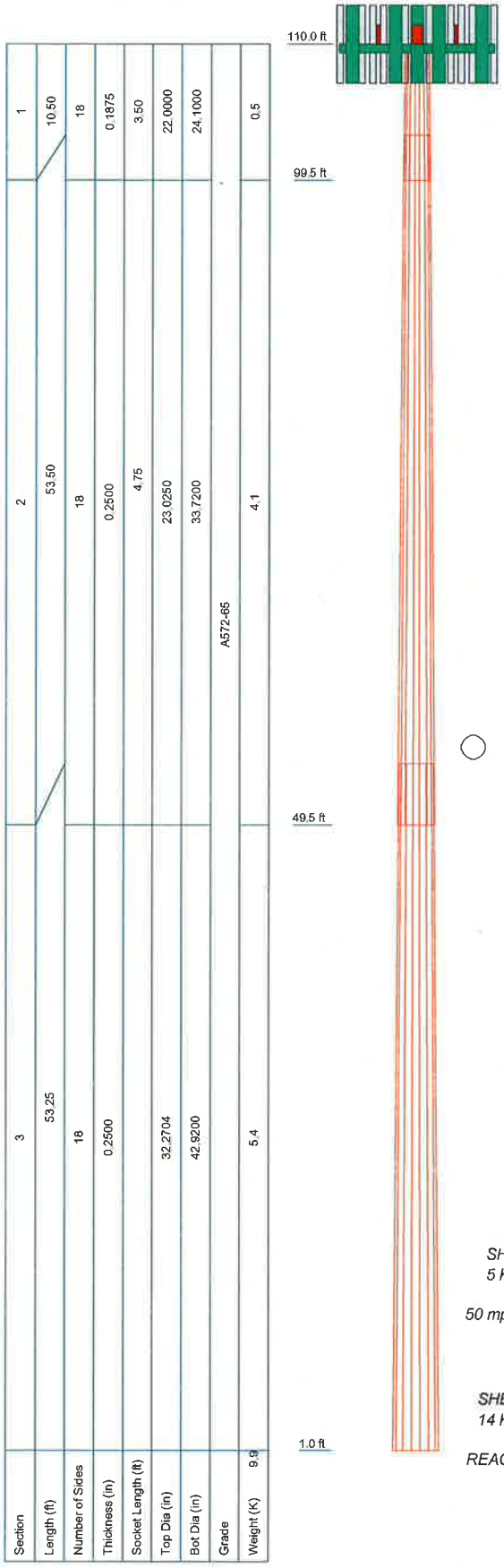
5. The structural integrity of the existing foundation system can only be verified if exact foundation sizes and soils conditions are known. I will not accept any responsibility for the adequacy of the existing foundations unless this site-specific data is supplied.

6. Miscellaneous items such as antenna mounts, coax supports, etc. have not been designed, detailed, or specified as part of my work. It is assumed that material of adequate size and strength will be purchased from a reputable component manufacturer. The attached report and sketches are schematic in nature and should not be used to fabricate or purchase hardware and accessories to be attached to the structure. I recommend field measurement of the structure before fabricating or purchasing new hardware and accessories. I am not responsible for proper fit and clearance of hardware and accessory items in the field.

7. The structural analysis has been performed considering minimum code requirements or recommendations. If alternate wind, ice, or deflection criteria are to be considered, then I shall be made aware of the alternate criteria.

Michael F. Plahovinsak, P.E. - 2014

mike@mfpeng.com



Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	10.50	18	0.1875	3.50	22.0000	24.1000		0.5
2	53.50	18	0.2500	4.75	23.0250	33.7200		4.1
3	53.25	18	0.2500		32.2704	42.9200		5.4
							A572-65	9.9

ALL REACTIONS ARE FACTORED

AXIAL 34 K

SHEAR 5 K *MOMENT 394 kip-ft*

50 mph WIND - 1.0000 in ICE

AXIAL 17 K

SHEAR 14 K *MOMENT 1152 kip-ft*

REACTIONS - 95 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Antel BXA-70063/6CF w/ mount pipe (Verizon)	110	(2) Andrew HBX-6517DS-VTM w/ mount pipe (Verizon)	110
(2) Antel LPA-80063/6CF w/ mount pipe (Verizon)	110	Lucent 2x40 RRH (Verizon)	110
Antel LPA-171063/12CF w/ mount pipe (Verizon)	110	Antel BXA-70063/6CF w/ mount pipe (Verizon)	110
(2) Andrew HBX-6517DS-VTM w/ mount pipe (Verizon)	110	(2) Antel LPA-80063/6CF w/ mount pipe (Verizon)	110
Lucent 2x40 RRH (Verizon)	110	Antel LPA-171063/12CF w/ mount pipe (Verizon)	110
Antel BXA-70063/6CF w/ mount pipe (Verizon)	110	(2) Andrew HBX-6517DS-VTM w/ mount pipe (Verizon)	110
(2) Antel LPA-80063/6CF w/ mount pipe (Verizon)	110	Lucent 2x40 RRH (Verizon)	110
Antel LPA-171063/12CF w/ mount pipe (Verizon)	110	RFS DB-T1-6Z-8AB-0Z Box (Verizon)	110
		14' T-Arm Mounts (Verizon)	110

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 95 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 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: 64.2%

Michael F. Plahovinsak, P.E.
18301 State Route 161 W
Plain City, OH 43064
Phone: 614-398-6250
FAX: mike@mfpeng.com

Job:	***110-ft Monopole - MFP #40914-029***
Project:	***CT1021 North Bloomfield***
Client: Florida Tower Partners	Drawn by: Mike / App'd:
Code: TIA-222-G	Date: 02/27/14 / Scale: NTS
Path: J:\Projects\409-Misc\40914-029\40914-029.eri	Dwg No. E-1

tnxTower	Job: 110-ft Monopole - MFP #40914-029	Page: 1 of 5
Michael F. Plahovinsak, P.E. 18301 State Route 161 W Plain City, OH 43064 Phone: 614-398-6250 FAX: mike@mfpeng.com	Project: CT1021 North Bloomfield	Date: 08:49:29 02/27/14
	Client: Florida Tower Partners	Designed by: Mike

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 95 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 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.

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	110.00-99.50	10.50	3.50	18	22.0000	24.1000	0.1875	0.7500	A572-65 (65 ksi)
L2	99.50-49.50	53.50	4.75	18	23.0250	33.7200	0.2500	1.0000	A572-65 (65 ksi)
L3	49.50-1.00	53.25		18	32.2704	42.9200	0.2500	1.0000	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	22.3394	12.9812	780.3007	7.7434	11.1760	69.8193	1561.6281	6.4918	3.5420	18.891
	24.4718	14.2309	1028.0650	8.4889	12.2428	83.9730	2057.4828	7.1168	3.9116	20.862
L2	24.0907	18.0720	1184.2940	8.0851	11.6967	101.2503	2370.1464	9.0377	3.6124	14.45
	34.2402	26.5584	3758.8199	11.8819	17.1298	219.4321	7522.5858	13.2817	5.4947	21.979
L3	33.7329	25.4082	3291.2921	11.3673	16.3934	200.7695	6586.9150	12.7065	5.2396	20.958
	43.5821	33.8586	7788.4728	15.1479	21.8034	357.2143	15587.1940	16.9325	7.1139	28.456

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" (Verizon)	C	No	Inside Pole	110.00 - 1.00	24	No Ice	0.00	0.92
						1/2" Ice	0.00	0.92
						1" Ice	0.00	0.92

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Antel BXA-70063/6CF w/ mount pipe (Verizon)	A	From Face	3.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	7.75 8.29 8.85	5.18 6.11 6.92	0.04 0.09 0.16
(2) Antel LPA-80063/6CF w/ mount pipe (Verizon)	A	From Face	3.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	10.36 10.93 11.51	10.45 11.50 12.43	0.05 0.14 0.24
Antel LPA-171063/12CF w/ mount pipe (Verizon)	A	From Face	3.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	6.26 6.82 7.35	7.73 8.92 9.84	0.03 0.09 0.16
(2) Andrew HBX-6517DS-VTM w/ mount pipe (Verizon)	A	From Face	3.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	5.24 5.71 6.18	4.73 5.68 6.50	0.04 0.08 0.13
Lucent 2x40 RRH (Verizon)	A	From Face	2.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	1.20 1.35 1.51	2.25 2.45 2.66	0.01 0.03 0.05
Antel BXA-70063/6CF w/ mount pipe (Verizon)	B	From Face	3.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	7.75 8.29 8.85	5.18 6.11 6.92	0.04 0.09 0.16
(2) Antel LPA-80063/6CF w/ mount pipe (Verizon)	B	From Face	3.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	10.36 10.93 11.51	10.45 11.50 12.43	0.05 0.14 0.24
Antel LPA-171063/12CF w/ mount pipe (Verizon)	B	From Face	3.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	6.26 6.82 7.35	7.73 8.92 9.84	0.03 0.09 0.16
(2) Andrew HBX-6517DS-VTM w/ mount pipe (Verizon)	B	From Face	3.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	5.24 5.71 6.18	4.73 5.68 6.50	0.04 0.08 0.13
Lucent 2x40 RRH (Verizon)	B	From Face	2.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	1.20 1.35 1.51	2.25 2.45 2.66	0.01 0.03 0.05
Antel BXA-70063/6CF w/ mount pipe (Verizon)	C	From Face	3.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	7.75 8.29 8.85	5.18 6.11 6.92	0.04 0.09 0.16
(2) Antel LPA-80063/6CF w/ mount pipe (Verizon)	C	From Face	3.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	10.36 10.93 11.51	10.45 11.50 12.43	0.05 0.14 0.24
Antel LPA-171063/12CF w/ mount pipe (Verizon)	C	From Face	3.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	6.26 6.82 7.35	7.73 8.92 9.84	0.03 0.09 0.16
(2) Andrew HBX-6517DS-VTM w/ mount pipe (Verizon)	C	From Face	3.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	5.24 5.71 6.18	4.73 5.68 6.50	0.04 0.08 0.13
Lucent 2x40 RRH (Verizon)	C	From Face	2.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	1.20 1.35 1.51	2.25 2.45 2.66	0.01 0.03 0.05
RFS DB-T1-6Z-8AB-OZ Box (Verizon)	C	None		0.0000	110.00	No Ice 1/2" Ice 1" Ice	5.60 5.92 6.24	2.33 2.56 2.79	0.04 0.08 0.12
14' T-Arm Mounts (Verizon)	C	None		0.0000	110.00	No Ice 1/2" Ice 1" Ice	14.00 16.00 18.00	14.00 16.00 18.00	1.20 1.35 0.50

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 90 deg - No Ice
5	0.9 Dead+1.6 Wind 90 deg - No Ice
6	1.2 Dead+1.6 Wind 180 deg - No Ice
7	0.9 Dead+1.6 Wind 180 deg - No Ice
8	1.2 Dead+1.0 Ice+1.0 Temp
9	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
10	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
11	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
12	Dead+Wind 0 deg - Service
13	Dead+Wind 90 deg - Service
14	Dead+Wind 180 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	110 - 99.5	Pole	Max Tension	8	0.00	0.00	0.00
			Max. Compression	8	-10.00	0.00	0.00
			Max. Mx	4	-2.55	-47.97	0.00
			Max. My	2	-2.55	0.00	47.97
			Max. Vy	4	7.09	-47.97	0.00
			Max. Vx	2	-7.09	0.00	47.97
L2	99.5 - 49.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-20.13	0.00	0.00
			Max. Mx	4	-8.44	-479.71	0.00
			Max. My	2	-8.44	0.00	479.71
			Max. Vy	4	10.70	-479.71	0.00
			Max. Vx	2	-10.70	0.00	479.71
L3	49.5 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-34.01	0.00	0.00
			Max. Mx	4	-17.20	-1152.29	0.00
			Max. My	2	-17.20	0.00	1152.29
			Max. Vy	4	14.42	-1152.29	0.00
			Max. Vx	2	-14.42	0.00	1152.29

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 99.5	10.841	13	0.8175	0.0000
L2	103 - 49.5	9.648	13	0.8056	0.0000
L3	54.25 - 1	2.809	13	0.4824	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
110.00	Antel BXA-70063/6CF w/ mount pipe	13	10.841	0.8175	0.0000	31142

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 99.5	48.778	4	3.6792	0.0000
L2	103 - 49.5	43.414	4	3.6258	0.0000
L3	54.25 - 1	12.643	4	2.1716	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
110.00	Antel BXA-70063/6CF w/ mount pipe	4	48.778	3.6792	0.0000	6998

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	110 - 99.5 (1)	TP24.1x22x0.1875	10.50	0.00	0.0	13.8143	-2.55	965.24	0.003
L2	99.5 - 49.5 (2)	TP33.72x23.025x0.25	53.50	0.00	0.0	25.8050	-8.44	1772.86	0.005
L3	49.5 - 1 (3)	TP42.92x32.2704x0.25	53.25	0.00	0.0	33.8586	-17.20	2070.07	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	110 - 99.5 (1)	TP24.1x22x0.1875	47.97	460.63	0.104	0.00	460.63	0.000
L2	99.5 - 49.5 (2)	TP33.72x23.025x0.25	479.71	1185.76	0.405	0.00	1185.76	0.000
L3	49.5 - 1 (3)	TP42.92x32.2704x0.25	1152.29	1819.97	0.633	0.00	1819.97	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	110 - 99.5 (1)	TP24.1x22x0.1875	7.09	479.82	0.015	0.00	922.40	0.000
L2	99.5 - 49.5 (2)	TP33.72x23.025x0.25	10.70	877.49	0.012	0.00	2374.43	0.000
L3	49.5 - 1 (3)	TP42.92x32.2704x0.25	14.42	1029.02	0.014	0.00	3644.39	0.000

tnxTower	Job	Page
	110-ft Monopole - MFP #40914-029	5 of 5
Michael F. Plahovinsak, P.E. 18301 State Route 161 W Plain City, OH 43064 Phone: 614-398-6250 FAX: mike@mfpeng.com	**Project** CT1021 North Bloomfield	**Date** 08:49:29 02/27/14
	Client Florida Tower Partners	**Designed by** Mike

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$

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	110 - 99.5 (1)	0.003	0.104	0.000	0.015	0.000	0.107 ✔	1.000	4.8.2 ✔
L2	99.5 - 49.5 (2)	0.005	0.405	0.000	0.012	0.000	0.409 ✔	1.000	4.8.2 ✔
L3	49.5 - 1 (3)	0.008	0.633	0.000	0.014	0.000	0.642 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	110 - 99.5	Pole	TP24.1x22x0.1875	1	-2.55	965.24	10.7	Pass
L2	99.5 - 49.5	Pole	TP33.72x23.025x0.25	2	-8.44	1772.86	40.9	Pass
L3	49.5 - 1	Pole	TP42.92x32.2704x0.25	3	-17.20	2070.07	64.2	Pass
							Summary	
						Pole (L3)	64.2	Pass
						RATING =	**64.2**	**Pass**

Michael F. Plahovinsak, P.E.
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Plain City, OH 43064
Phone: 614-398-6250
email: mike@mfpeng.com

Job	Page
110-ft monopole - MFP #40914-029	BP-G
Project	**Date**
CT1021 North Bloomfield	02/27/2014
Client	**Designed by**
FLORIDA TOWER PARTNERS	Mike

Anchor Rod and Base Plate Calculation

ANSI/TIA-222-G-2

Factored Base Reactions:		*Pole Shape:*	*Anchor Rods:*	*Base Plate:*
Moment:	1152 ft-kips	18-Sided	(8) 2.25 in. A615 GR. 75	2 in. x 46.75 in. Square
Shear:	14 kips	***Pole Dia. (D_f):***	Anchor Rods in Quadrants	fy = 50 ksi
Axial:	17 kips	42.92 in	On a 48.75 in Bolt Circle	

Anchor Rod Calculation According to TIA-222-G section 4.9.9

ϕ = 0.80 TIA 4.9.9

I_{bolts} = 2376.56 in^2 Momet of Inertia

P_u = 142 kips Tension Force

V_u = 2 kips Shear Force

R_{nt} = 325.00 kips Nominal Tensile Strength

η = 0.50 for detail type (d)

The following Interation Equation Shall Be Satisfied:

$$\left(\frac{P_u + \frac{V_u}{\eta}}{\phi R_{nt}} \right) \leq 1.0$$

$$0.559 \leq 1$$

Base Plate Calculation According to TIA-222-G

ϕ = 0.90 TIA 4.7

M_{PL} = 515.2 in-kip Plate Moment

L = 23.2 in Section Length

Z = 23.2 Plastic Section Modulus

M_P = 1159.7 in-kip Plastic Moment

ϕM_n = 1043.8 in-kip Factored Resistance

Calculated Moment vs Factored Resistance

515.20 in-kip $\leq$ 1044 in-kip

Anchor Rods Are Adequate	**55.9%** ☑
Base Plate is Adequate	**49.4%** ☑