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

Also admitted in Massachusetts

February 20, 2014

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

Re: **Notice of Exempt Modification – Antenna Swap**
10 Bona Street, Milford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 113-foot level of the existing 133-foot tower at 10 Bona Street in Milford, Connecticut (the "Property"). The tower is owned by Crown Castle . The Council approved Cellco's use of the existing tower in 2002. Cellco now intends to replace six (6) of its existing antennas with three (3) model BXA-171063-8BF, 1900 MHz antennas and three (3) model SWCP 2x5514, 700 MHz antennas. Cellco also intends to install three (3) model BXA-171063-8BF, 2100 MHz antennas, for a total of fifteen (15) antennas, all at the same 113-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 installed inside the monopole. Included in Attachment 1 are specifications for Cellco's 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 Milford's Mayor, Benjamin G. Blake. A copy of this letter is also being sent to 10 Bona Street LLC, 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 replaced antennas and RRHs will be located on Cellco's existing antenna platform at the 113-foot level on the 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 cumulative 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 Report included in Attachment 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:
Benjamin G. Blake, Mayor
10 Bona Street LLC
Sandy M. Carter

ATTACHMENT 1

BXA-171063-8BF-EDIN-X

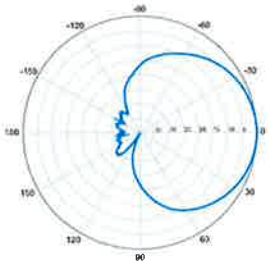
Replace "X" with desired electrical downtilt

X-Pol | FET Panel | 63° | 17.4 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	7°	7°	7°
Gain	14.5 dBd / 16.6 dBi	14.9 dBd / 17.0 dBi	15.3 dBd / 17.4 dBi
Electrical downtilt (X)	0, 2, 4, 6, 8		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	< -25 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1225 x 154 x 105 mm		48.2 x 6.1 x 4.1 in
Depth with t-brackets	133 mm		5.2 in
Weight without mounting brackets	4.2 kg		9.2 lbs
Survival wind speed	296 km/hr		184 mph
Wind area	Front: 0.19 m² Side: 0.14 m²		Front: 2.0 ft² Side: 1.5 ft²
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N		Front: 63 lbf Side: 50 lbf

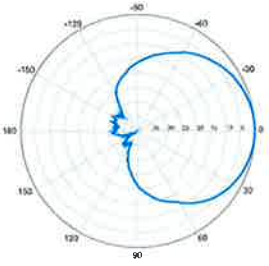
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-8BF-EDIN-X-FP		

BXA-171063-8BF-EDIN-X



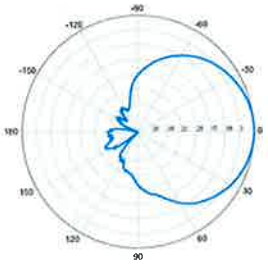
Horizontal | 1710-1880 MHz

BXA-171063-8BF-EDIN-X



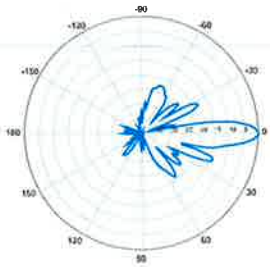
Horizontal | 1850-1990 MHz

BXA-171063-8BF-EDIN-X



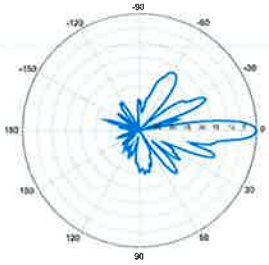
Horizontal | 1920-2170 MHz

BXA-171063-8BF-EDIN-0



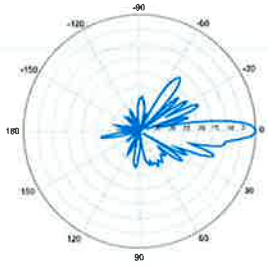
0° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-0

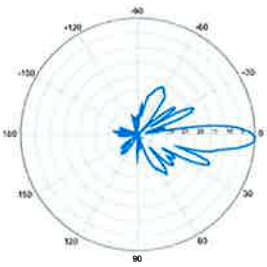


0° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-X

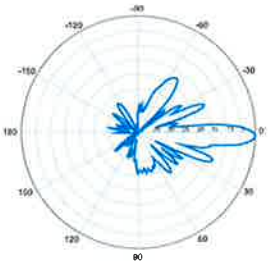
X-Pol | FET Panel | 63° | 17.4 dBi

BXA-171063-8BF-EDIN-2



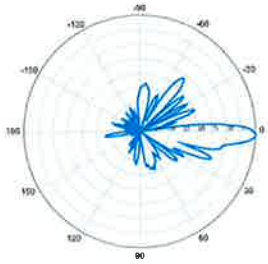
2° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-2



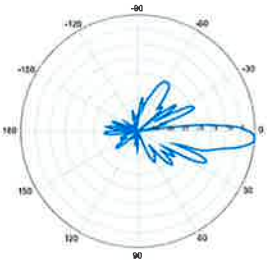
2° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-2



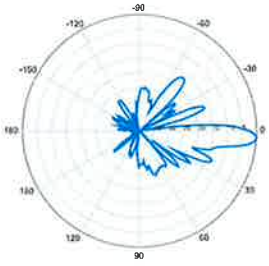
2° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-4



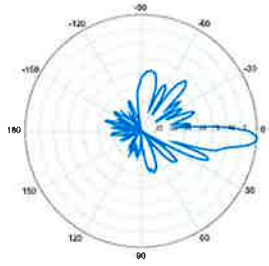
4° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-4



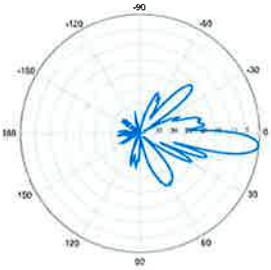
4° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-4



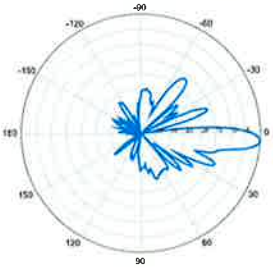
4° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-6



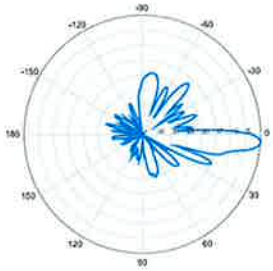
6° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-6



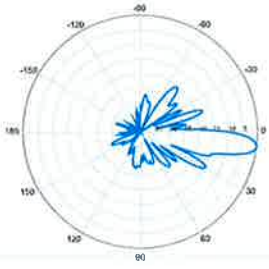
6° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-6



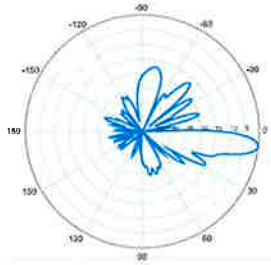
6° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-8



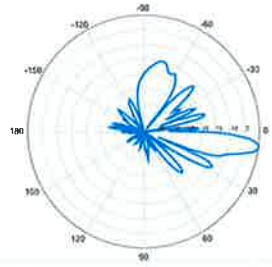
8° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-8



8° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-8



8° | Vertical | 1920-2170 MHz

Swedcom

SWCP 2x5514

698 - 896 MHz Dual (2x) CP log-periodic antenna

Features

- Transmit Diversity Gain
- Can be configured to combine space & polarization diversity
- Outstanding performance over the entire band (698 - 896 MHz)
- Excellent Axial Ratio
- Optimized for 4G & 3G systems
- Low intermodulation
- Improved Side-to-side rejection
- Fading reduction
- Excellent isolation between ports

Electrical specifications

Frequency range:	**698-896 MHz**	
Impedance:	**50 ohm**	
Connector type:	**7/16 Din**	
Return loss:	**18 dB**	
Polarization:	**Circular**	
Gain ea. port [Circular]:	**2x14 dBdC**	
Gain ea. port [Linear]:	**2x11 dBdL**	
Axial Ratio:	**2 dB**	
Isolation between ports (TX band):	**30 dB**	
Front-to-back ratio:	**30 dB**	
Intermodulation (2x20W):	**IM3**	**150 dB**
	IM5	**160 dB**
	IM7/9	**170 dB**
Power rating:	**2x 500 W**	
H-plane (-3 dB point):	**2x 55°**	
V-plane (-3 dB point):	**2x 16°**	
Lightning protection:	**DC grounded**	

Mechanical specifications

Overall height:	**51.9 in**	**[1318 mm]**
Width:	**13.9 in**	**[353 mm]**
Depth:	**11.3 in**	**[287 mm]**
Weight (excluding brackets):	**20 lbs**	**[9 Kg]**
Wind load measured up to:	**150 mph**	**[240 Km/h]**
Wind area (front of antenna):	**5.01 sq. ft.**	**[0.46 sq.m]**
Lateral thrust at 113 mph/ 180 Km/h (worst case):	**256 lbs**	**[1138 N]**

Materials

Radiating Elements:	**Aluminum**
Transformer (Power distribution)	**Ceramic PCB**
Chassis:	**Aluminum**
Radome:	**Grey Fiberglass/PVC**
Mounting bolts:	**Stainless steel**

The SWCP 2x5514 is made in the U.S.A.

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

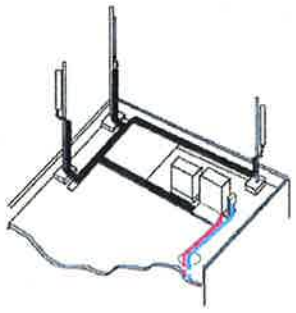
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation 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

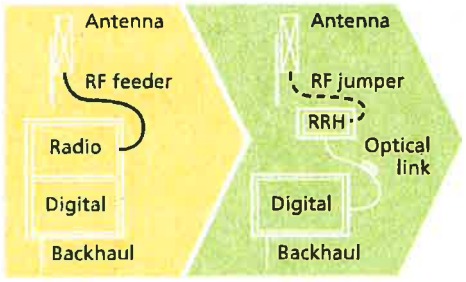
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

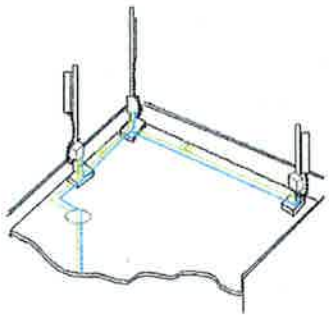
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility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

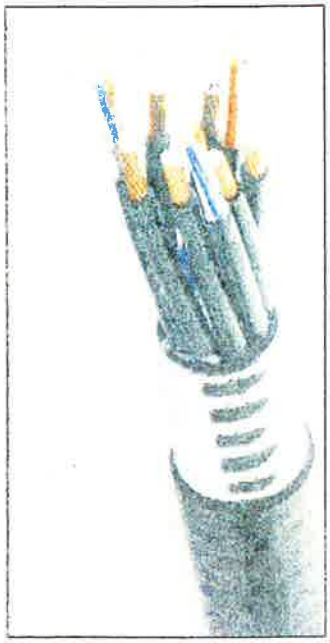


Figure 1: HYBRIFLEX Series

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)

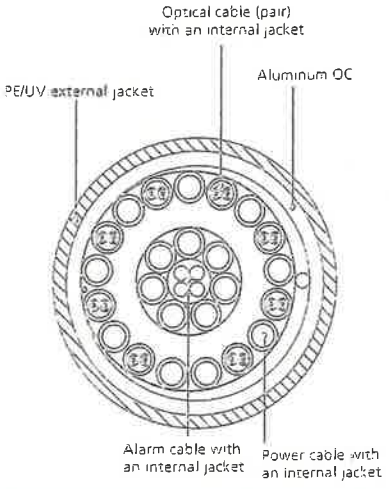


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Milford 3								
Tower Height: Verizon @ 130ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	1	500	136	0.0097	1900	1.0000	0.97%	
*AT&T UMTS	1	500	136	0.0097	880	0.5867	1.66%	
*AT&T GSM	6	427	136	0.0498	1900	1.0000	4.98%	
*AT&T GSM	9	296	136	0.0518	880	0.5867	8.83%	
*AT&T LTE	1	500	136	0.0097	740	0.4933	1.97%	
Verizon PCS	**7**	**346**	**113**	**0.0682**	**1970**	**1.0000**	**6.82%**	
Verizon Cellular	**9**	**220**	**113**	**0.0558**	**869**	**0.5793**	**9.62%**	
Verizon AWS	**1**	**1265**	**113**	**0.0356**	**2145**	**1.0000**	**3.56%**	
Verizon 700	**1**	**791**	**113**	**0.0223**	**698**	**0.4653**	**4.79%**	
								43.20%
* Source: Siting Council								

ATTACHMENT 3

Date: **August 29, 2013**

Veronica Harris
Crown Castle
1200 McArthur Blvd
Mahwah, NJ 07430

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Milford-3, CT
Crown Castle Designation:	**Crown Castle BU Number:**	873633
	Crown Castle Site Name:	Milford
	Crown Castle JDE Job Number:	242217
	Crown Castle Work Order Number:	644983
	Crown Castle Application Number:	195293 Rev. 1
Engineering Firm Designation:	**Crown Castle Project Number:**	644983
Site Data:	**10 Bona Street, MILFORD, New Haven County, CT** **Latitude *41° 13' 12.27"*, Longitude *-73° 4' 38.56"*** **133 Foot - Monopole Tower**	

Dear Veronica Harris,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 644983, in accordance with application 195293, revision 1.

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

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

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

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

Structural analysis prepared by: Manoj Pai M. / Tyler Stevens, EIT

Respectfully submitted by:

Jamal A. Huwel, P.E.
Manager Engineering

tnxTower Report - version 6.1.3.1

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA
Table 1 - Proposed Antenna and Cable Information
Table 2 - Existing and Reserved Antenna and Cable Information
Table 3 - Design Antenna and Cable Information

3) ANALYSIS PROCEDURE
Table 4 - Documents Provided
3.1) Analysis Method
3.2) Assumptions

4) ANALYSIS RESULTS
Table 5 - Section Capacity (Summary)
Table 6 – Tower Components vs. Capacity
4.1) Recommendations

5) APPENDIX A
tnxTower Output

6) APPENDIX B
Base Level Drawing

7) APPENDIX C
Additional Calculations

1) INTRODUCTION

This tower is a 133 ft Monopole tower designed by SUMMIT in December of 2001. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 38 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
115.0	115.0	1	rfs celwave	TMA-DB-T1-6Z-8AB-0Z	-	-	-
		1	tower mounts	Collar Mount [SO 102-1]			
113.0	113.0	3	alcatel lucent	9442 RRH2X40-AWS	1	1-5/8	-
		3	amphenol	BXA-171063-8BF-EDIN-4 w/ Mount Pipe			
		3	antel	BXA-171063-8BF-2 w/ Mount Pipe			
		3	swedcom	SWCP 2x5514 w/ Mount Pipe			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
133.0	136.0	6	ericsson	RRUS-11	12 2 1	1-5/8 7/8 1/4	1
		3	kmw communications	AM-X-CD-14-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		12	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
	133.0	1	tower mounts	Platform Mount [LP 712-1]			
113.0	113.0	6	antel	LPA-185080/8CFx2 w/ Mount Pipe	-	-	2
		6	antel	LPA-80090/4CF w/ Mount Pipe	12	1-5/8	1
		1	tower mounts	Platform Mount [LP 303-1]			

Notes:
1) Existing Equipment
2) Equipment to be Removed; not included in this analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
133	133	12	dapa	DB896H panel	-	-
123	123	12	dapa	48000 PCS panel	-	-
113	113	12	dapa	48000 PCS panel	-	-
103	103	12	dapa	48000 PCS panel	-	-
93	93	12	dapa	48000 PCS panel	-	-
83	83	12	dapa	48000 PCS panel	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Criscuolo Shepard Associates, PC.	1340372	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit	1340388	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit	1339622	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.3.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	133 - 86.5	Pole	TP33.116x24x0.25	1	-7.800	1321.408	42.5	Pass
L2	86.5 - 39.75	Pole	TP41.78x31.783x0.281	2	-14.808	1878.117	63.9	Pass
L3	39.75 - 0	Pole	TP49.01x40.188x0.375	3	-25.262	3009.407	58.8	Pass
							Summary	
						Pole (L2)	63.9	Pass
						Rating =	63.9	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	44.0	Pass
1	Base Plate	0	51.6	Pass
1,2	Base Foundation (Drilled Pier)	0	41.7	Pass
1,2	Base Foundation Soil Interaction (Pad & Pier)	0	43.4	Pass

Structure Rating (max from all components) =	63.9%

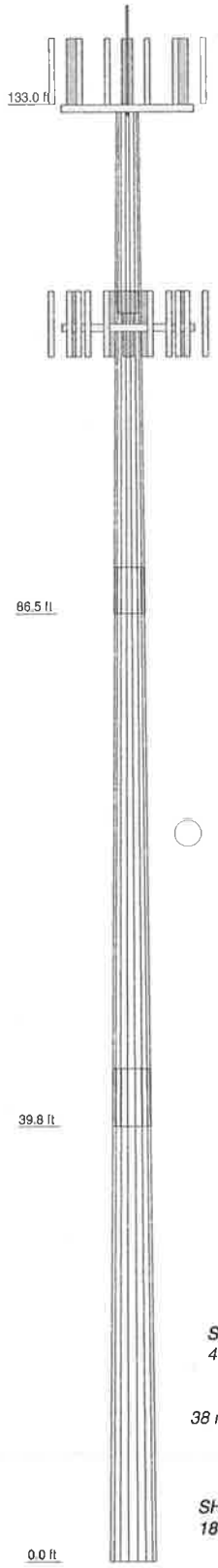
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) It is unknown whether the drilled pier or pier and pad design was installed. Both designs were analyzed and determined to be sufficient.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT



Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	46'6"	18	0.250	4'3"	24.000	33.116		3.6
2	51'	18	0.281	5'3"	31.783	41.760	A607-65	5.7
3	45'	18	0.375		40.188	49.010		8.1
								17.3

DESIGNED APPURTENANCE LOADING

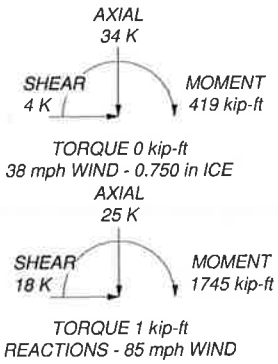
TYPE	ELEVATION	TYPE	ELEVATION
8'x2" Mount Pipe	133	(2) LPA-80090/4CF w/ Mount Pipe	113
(2) 7770.00 w/ Mount Pipe	133	(2) LPA-80090/4CF w/ Mount Pipe	113
(2) 7770.00 w/ Mount Pipe	133	(2) LPA-80090/4CF w/ Mount Pipe	113
(2) 7770.00 w/ Mount Pipe	133	SWCP 2x5514 w/ Mount Pipe	113
AM-X-CD-14-65-00T-RET w/ Mount Pipe	133	SWCP 2x5514 w/ Mount Pipe	113
		SWCP 2x5514 w/ Mount Pipe	113
AM-X-CD-14-65-00T-RET w/ Mount Pipe	133	BXA-171063-8BF-2 w/ Mount Pipe	113
		BXA-171063-8BF-2 w/ Mount Pipe	113
AM-X-CD-14-65-00T-RET w/ Mount Pipe	133	BXA-171063-8BF-2 w/ Mount Pipe	113
(4) LGP21401	133	BXA-171063-8BF-EDIN-4 w/ Mount Pipe	113
(4) LGP21401	133		
(4) LGP21401	133	BXA-171063-8BF-EDIN-4 w/ Mount Pipe	113
(2) RRUS-11	133	BXA-171063-8BF-EDIN-4 w/ Mount Pipe	113
(2) RRUS-11	133		
(2) RRUS-11	133	9442 RRH2X40-AWS	113
DC6-48-60-18-8F	133	9442 RRH2X40-AWS	113
Platform Mount [LP 712-1]	133	9442 RRH2X40-AWS	113
TMA-DB-T1-6Z-8AB-0Z	115	Platform Mount [LP 303-1]	113
Collar Mount [SO 102-1]	115		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 63.9%



CROWN CASTLE
We Are Solutions
Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX: (724) 416-2254

Job: BU# 873633			
Project:			
Client: Crown Castle	Drawn by: Manoj Pai M		App'd:
Code: TIA/EIA-222-F	Date: 08/29/13		Scale: NTS
Path: C:\Documents and Settings\user\Desktop\73731_873633_MRpt_ManojTrs_00129130829_873633.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:

3) Tower is located in New Haven County, Connecticut.
4) Basic wind speed of 85 mph.
5) Nominal ice thickness of 0.750 in.
6) Ice thickness is considered to increase with height.
7) Ice density of 56.000 pcf.
8) A wind speed of 38 mph is used in combination with ice.
9) Temperature drop of 50.000 °F.
10) Deflections calculated using a wind speed of 50 mph.
11) A non-linear (P-delta) analysis was used.
12) Pressures are calculated at each section.
13) Stress ratio used in pole design is 1.333.
14) Local bending stresses due to climbing loads, feed line 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	Use TIA-222-G Tension Splice Capacity Exemption	

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	133'-86'6"	46'6"	4'3"	18	24.000	33.116	0.250	1.000	A607-65 (65 ksi)
L2	86'6"-39'9"	51'	5'3"	18	31.783	41.780	0.281	1.125	A607-65 (65 ksi)
L3	39'9"-0'	45'		18	40.188	49.010	0.375	1.500	A607-65 (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	24.370	18.846	1342.998	8.431	12.192	110.154	2687.762	9.425	3.784	15.136
	33.627	26.079	3558.975	11.667	16.823	211.555	7122.633	13.042	5.388	21.554

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
L2	33.119	28.121	3525.603	11.183	16.146	218.362	7055.845	14.063	5.099	18.129
	42.425	37.045	8060.128	14.732	21.224	379.761	16130.862	18.526	6.858	24.385
L3	41.853	47.388	9489.924	14.134	20.416	464.835	18992.335	23.698	6.413	17.102
	49.766	57.888	17299.056	17.265	24.897	694.823	34620.874	28.949	7.966	21.242

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 133'-86'6"				1	1	1		
L2 86'6"-39'9"				1	1	1		
L3 39'9"-0'				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
///										

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 klf
LCF158-50A(1-5/8")	A	No	Inside Pole	133' - 0'	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
6-8AWG 3 PAIR(7/8")	A	No	Inside Pole	133' - 0'	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
A-DQZNB2Yn1750 N(1/4")	A	No	Inside Pole	133' - 0'	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
3" Conduit	A	No	Inside Pole	133' - 0'	1	No Ice	0.000	0.003
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.003
						2" Ice	0.000	0.003
						4" Ice	0.000	0.003
///								
561(1-5/8")	C	No	Inside Pole	113' - 0'	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	113' - 0'	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
///								

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 K
L1	133'-86'6"	A	0.000	0.000	0.000	0.000	0.641
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.464
L2	86'6"-39'9"	A	0.000	0.000	0.000	0.000	0.644
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.818
L3	39'9"-0'	A	0.000	0.000	0.000	0.000	0.548
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.696

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 K
L1	133'-86'6"	A	0.865	0.000	0.000	0.000	0.000	0.641
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.464
L2	86'6"-39'9"	A	0.810	0.000	0.000	0.000	0.000	0.644
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.818
L3	39'9"-0'	A	0.750	0.000	0.000	0.000	0.000	0.548
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.696

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	133'-86'6"	0.000	0.000	0.000	0.000
L2	86'6"-39'9"	0.000	0.000	0.000	0.000
L3	39'9"-0'	0.000	0.000	0.000	0.000

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 K
8'x2" Mount Pipe	A	From Leg	0.000 0' 4'	0.000	133'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.900 2.728 3.401 4.396 6.498	1.900 2.728 3.401 4.396 6.498	0.030 0.044 0.064 0.120 0.301
/// (2) 7770.00 w/ Mount Pipe	A	From Leg	4.000 0' 3'	0.000	133'	No Ice 1/2" Ice 1" Ice 2" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665

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 K
						4" Ice			
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.000 0' 3'	0.000	133'	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000 0' 3'	0.000	133'	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
AM-X-CD-14-65-00T-RET w/ Mount Pipe	A	From Leg	4.000 0' 3'	0.000	133'	No Ice	5.744	4.015	0.035
						1/2" Ice	6.198	4.633	0.080
						1" Ice	6.661	5.276	0.131
						2" Ice	7.618	6.678	0.254
						4" Ice	9.668	9.744	0.610
AM-X-CD-14-65-00T-RET w/ Mount Pipe	B	From Leg	4.000 0' 3'	0.000	133'	No Ice	5.744	4.015	0.035
						1/2" Ice	6.198	4.633	0.080
						1" Ice	6.661	5.276	0.131
						2" Ice	7.618	6.678	0.254
						4" Ice	9.668	9.744	0.610
AM-X-CD-14-65-00T-RET w/ Mount Pipe	C	From Leg	4.000 0' 3'	0.000	133'	No Ice	5.744	4.015	0.035
						1/2" Ice	6.198	4.633	0.080
						1" Ice	6.661	5.276	0.131
						2" Ice	7.618	6.678	0.254
						4" Ice	9.668	9.744	0.610
(4) LGP21401	A	From Leg	4.000 0' 3'	0.000	133'	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(4) LGP21401	B	From Leg	4.000 0' 3'	0.000	133'	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(4) LGP21401	C	From Leg	4.000 0' 3'	0.000	133'	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(2) RRUS-11	A	From Leg	4.000 0' 3'	0.000	133'	No Ice	3.249	1.373	0.048
						1/2" Ice	3.491	1.551	0.068
						1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
(2) RRUS-11	B	From Leg	4.000 0' 3'	0.000	133'	No Ice	3.249	1.373	0.048
						1/2" Ice	3.491	1.551	0.068
						1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
(2) RRUS-11	C	From Leg	4.000 0' 3'	0.000	133'	No Ice	3.249	1.373	0.048
						1/2" Ice	3.491	1.551	0.068
						1" Ice	3.741	1.738	0.092
						1" Ice	4.268	2.138	0.150

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 K
						2" Ice 4" Ice	5.426	3.042	0.310
DC6-48-60-18-8F	A	From Leg	4.000 0' 3'	0.000	133'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.266 1.456 1.658 2.093 3.098	1.266 1.456 1.658 2.093 3.098	0.020 0.035 0.053 0.095 0.215
Platform Mount [LP 712-1]	C	None		0.000	133'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.530 29.940 35.350 46.170 67.810	24.530 29.940 35.350 46.170 67.810	1.335 1.646 1.956 2.577 3.820
*/// TMA-DB-T1-6Z-8AB-0Z	A	From Leg	2.000 0' 0'	0.000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	0.044 0.080 0.120 0.213 0.455
Collar Mount [SO 102-1]	A	From Leg	1.000 0' 0'	0.000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.500 1.740 1.980 2.460 3.420	1.500 1.740 1.980 2.460 3.420	0.025 0.035 0.045 0.065 0.105
*/// (2) LPA-80090/4CF w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.856 3.220 3.592 4.450 6.318	5.484 6.153 6.841 8.270 11.398	0.029 0.069 0.114 0.224 0.552
(2) LPA-80090/4CF w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.856 3.220 3.592 4.450 6.318	5.484 6.153 6.841 8.270 11.398	0.029 0.069 0.114 0.224 0.552
(2) LPA-80090/4CF w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.856 3.220 3.592 4.450 6.318	5.484 6.153 6.841 8.270 11.398	0.029 0.069 0.114 0.224 0.552
SWCP 2x5514 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.251 7.751 8.252 9.286 11.480	6.966 7.746 8.499 10.058 13.400	0.039 0.104 0.174 0.339 0.791
SWCP 2x5514 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.251 7.751 8.252 9.286 11.480	6.966 7.746 8.499 10.058 13.400	0.039 0.104 0.174 0.339 0.791
SWCP 2x5514 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.251 7.751 8.252 9.286 11.480	6.966 7.746 8.499 10.058 13.400	0.039 0.104 0.174 0.339 0.791
BXA-171063-8BF-2 w/	A	From Leg	4.000	0.000	113'	No Ice	3.179	3.353	0.029

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 K
Mount Pipe			0' 0'			1/2" Ice 1" Ice 2" Ice 4" Ice	3.555 3.964 4.853 6.767	3.971 4.595 5.893 8.885	0.061 0.099 0.193 0.488
BXA-171063-8BF-2 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
BXA-171063-8BF-2 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
BXA-171063-8BF-EDIN-4 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
BXA-171063-8BF-EDIN-4 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
BXA-171063-8BF-EDIN-4 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
9442 RRH2X40-AWS	A	From Leg	4.000 0' 0'	0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.515 2.746 2.986 3.491 4.606	1.589 1.795 2.010 2.465 3.479	0.044 0.061 0.082 0.132 0.275
9442 RRH2X40-AWS	B	From Leg	4.000 0' 0'	0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.515 2.746 2.986 3.491 4.606	1.589 1.795 2.010 2.465 3.479	0.044 0.061 0.082 0.132 0.275
9442 RRH2X40-AWS	C	From Leg	4.000 0' 0'	0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.515 2.746 2.986 3.491 4.606	1.589 1.795 2.010 2.465 3.479	0.044 0.061 0.082 0.132 0.275
Platform Mount [LP 303-1]	C	None		0.000	113'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.660 18.870 23.080 31.500 48.340	14.660 18.870 23.080 31.500 48.340	1.250 1.481 1.713 2.175 3.101
///									

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 K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	133 - 86.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-13.240	0.000	0.739
			Max. Mx	5	-7.814	-360.332	0.309
			Max. My	2	-7.800	0.000	364.308
			Max. Vy	5	11.769	-360.332	0.309
			Max. Vx	2	-11.919	0.000	364.308
			Max. Torque	5			0.869
L2	86.5 - 39.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-21.886	0.000	0.739
			Max. Mx	5	-14.815	-976.540	0.331
			Max. My	2	-14.808	0.000	987.379
			Max. Vy	5	15.134	-976.540	0.331
			Max. Vx	2	-15.284	0.000	987.379
			Max. Torque	5			0.868
L3	39.75 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-34.117	0.000	0.739
			Max. Mx	5	-25.262	-1727.924	0.334
			Max. My	2	-25.262	0.000	1745.426
			Max. Vy	5	18.258	-1727.924	0.334

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-18.404	0.000	1745.426
			Max. Torque	5			0.867

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	34.117	0.000	4.216
	Max. H_x	11	25.272	18.245	0.000
	Max. H_z	2	25.272	0.000	18.391
	Max. M_x	2	1745.426	0.000	18.391
	Max. M_z	5	1727.924	-18.245	0.000
	Max. Torsion	5	0.867	-18.245	0.000
	Min. Vert	1	25.272	0.000	0.000
	Min. H_x	5	25.272	-18.245	0.000
	Min. H_z	8	25.272	0.000	-18.391
	Min. M_x	8	-1744.754	0.000	-18.391
	Min. M_z	11	-1727.924	18.245	0.000
	Min. Torsion	11	-0.867	18.245	0.000

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	25.272	0.000	0.000	-0.322	0.000	0.000
Dead+Wind 0 deg - No Ice	25.272	0.000	-18.391	-1745.426	0.000	0.000
Dead+Wind 30 deg - No Ice	25.272	9.122	-15.927	-1511.633	-863.956	-0.430
Dead+Wind 60 deg - No Ice	25.272	15.800	-9.195	-872.888	-1496.424	-0.747
Dead+Wind 90 deg - No Ice	25.272	18.245	-0.000	-0.334	-1727.924	-0.867
Dead+Wind 120 deg - No Ice	25.272	15.800	9.195	872.219	-1496.422	-0.754
Dead+Wind 150 deg - No Ice	25.272	9.122	15.927	1510.963	-863.954	-0.436
Dead+Wind 180 deg - No Ice	25.272	0.000	18.391	1744.754	0.000	0.000
Dead+Wind 210 deg - No Ice	25.272	-9.122	15.927	1510.963	863.954	0.436
Dead+Wind 240 deg - No Ice	25.272	-15.800	9.195	872.219	1496.422	0.754
Dead+Wind 270 deg - No Ice	25.272	-18.245	-0.000	-0.334	1727.924	0.867
Dead+Wind 300 deg - No Ice	25.272	-15.800	-9.195	-872.888	1496.424	0.747
Dead+Wind 330 deg - No Ice	25.272	-9.122	-15.927	-1511.633	863.956	0.430
Dead+Ice+Temp	34.117	0.000	0.000	-0.739	0.000	0.000
Dead+Wind 0 deg+Ice+Temp	34.117	0.000	-4.216	-419.339	0.000	0.000
Dead+Wind 30 deg+Ice+Temp	34.117	2.093	-3.652	-363.265	-207.447	-0.113
Dead+Wind 60 deg+Ice+Temp	34.117	3.625	-2.108	-210.066	-359.309	-0.196
Dead+Wind 90 deg+Ice+Temp	34.117	4.186	-0.000	-0.793	-414.895	-0.227
Dead+Wind 120 deg+Ice+Temp	34.117	3.625	2.108	208.480	-359.309	-0.197
Dead+Wind 150 deg+Ice+Temp	34.117	2.093	3.652	361.679	-207.447	-0.114
Dead+Wind 180 deg+Ice+Temp	34.117	0.000	4.216	417.753	0.000	0.000
Dead+Wind 210 deg+Ice+Temp	34.117	-2.093	3.652	361.679	207.447	0.114
Dead+Wind 240 deg+Ice+Temp	34.117	-3.625	2.108	208.480	359.309	0.197
Dead+Wind 270 deg+Ice+Temp	34.117	-4.186	-0.000	-0.793	414.895	0.227
Dead+Wind 300	34.117	-3.625	-2.108	-210.066	359.309	0.196

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
deg+Ice+Temp						
Dead+Wind 330 deg+Ice+Temp	34.117	-2.093	-3.652	-363.265	207.447	0.113
Dead+Wind 0 deg - Service	25.272	0.000	-6.364	-604.493	0.000	0.000
Dead+Wind 30 deg - Service	25.272	3.157	-5.511	-523.552	-299.103	-0.150
Dead+Wind 60 deg - Service	25.272	5.467	-3.182	-302.415	-518.062	-0.260
Dead+Wind 90 deg - Service	25.272	6.313	0.000	-0.337	-598.207	-0.301
Dead+Wind 120 deg - Service	25.272	5.467	3.182	301.742	-518.062	-0.261
Dead+Wind 150 deg - Service	25.272	3.157	5.511	522.878	-299.103	-0.151
Dead+Wind 180 deg - Service	25.272	0.000	6.364	603.820	0.000	0.000
Dead+Wind 210 deg - Service	25.272	-3.157	5.511	522.878	299.103	0.151
Dead+Wind 240 deg - Service	25.272	-5.467	3.182	301.742	518.062	0.261
Dead+Wind 270 deg - Service	25.272	-6.313	0.000	-0.337	598.207	0.301
Dead+Wind 300 deg - Service	25.272	-5.467	-3.182	-302.415	518.062	0.260
Dead+Wind 330 deg - Service	25.272	-3.157	-5.511	-523.552	299.103	0.150

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-25.272	0.000	0.000	25.272	0.000	0.000%
2	0.000	-25.272	-18.391	0.000	25.272	18.391	0.000%
3	9.122	-25.272	-15.927	-9.122	25.272	15.927	0.000%
4	15.800	-25.272	-9.195	-15.800	25.272	9.195	0.000%
5	18.245	-25.272	0.000	-18.245	25.272	0.000	0.000%
6	15.800	-25.272	9.195	-15.800	25.272	-9.195	0.000%
7	9.122	-25.272	15.927	-9.122	25.272	-15.927	0.000%
8	0.000	-25.272	18.391	0.000	25.272	-18.391	0.000%
9	-9.122	-25.272	15.927	9.122	25.272	-15.927	0.000%
10	-15.800	-25.272	9.195	15.800	25.272	-9.195	0.000%
11	-18.245	-25.272	0.000	18.245	25.272	0.000	0.000%
12	-15.800	-25.272	-9.195	15.800	25.272	9.195	0.000%
13	-9.122	-25.272	-15.927	9.122	25.272	15.927	0.000%
14	0.000	-34.117	0.000	0.000	34.117	0.000	0.000%
15	0.000	-34.117	-4.216	0.000	34.117	4.216	0.000%
16	2.093	-34.117	-3.652	-2.093	34.117	3.652	0.000%
17	3.625	-34.117	-2.108	-3.625	34.117	2.108	0.000%
18	4.186	-34.117	0.000	-4.186	34.117	0.000	0.000%
19	3.625	-34.117	2.108	-3.625	34.117	-2.108	0.000%
20	2.093	-34.117	3.652	-2.093	34.117	-3.652	0.000%
21	0.000	-34.117	4.216	0.000	34.117	-4.216	0.000%
22	-2.093	-34.117	3.652	2.093	34.117	-3.652	0.000%
23	-3.625	-34.117	2.108	3.625	34.117	-2.108	0.000%
24	-4.186	-34.117	0.000	4.186	34.117	0.000	0.000%
25	-3.625	-34.117	-2.108	3.625	34.117	2.108	0.000%
26	-2.093	-34.117	-3.652	2.093	34.117	3.652	0.000%
27	0.000	-25.272	-6.364	0.000	25.272	6.364	0.000%
28	3.157	-25.272	-5.511	-3.157	25.272	5.511	0.000%
29	5.467	-25.272	-3.182	-5.467	25.272	3.182	0.000%
30	6.313	-25.272	0.000	-6.313	25.272	0.000	0.000%
31	5.467	-25.272	3.182	-5.467	25.272	-3.182	0.000%
32	3.157	-25.272	5.511	-3.157	25.272	-5.511	0.000%
33	0.000	-25.272	6.364	0.000	25.272	-6.364	0.000%
34	-3.157	-25.272	5.511	3.157	25.272	-5.511	0.000%
35	-5.467	-25.272	3.182	5.467	25.272	-3.182	0.000%
36	-6.313	-25.272	0.000	6.313	25.272	0.000	0.000%
37	-5.467	-25.272	-3.182	5.467	25.272	3.182	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
38	-3.157	-25.272	-5.511	3.157	25.272	5.511	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00002519
3	Yes	5	0.00000001	0.00006189
4	Yes	5	0.00000001	0.00006541
5	Yes	4	0.00000001	0.00017662
6	Yes	5	0.00000001	0.00006082
7	Yes	5	0.00000001	0.00006445
8	Yes	4	0.00000001	0.00002517
9	Yes	5	0.00000001	0.00006445
10	Yes	5	0.00000001	0.00006082
11	Yes	4	0.00000001	0.00017662
12	Yes	5	0.00000001	0.00006541
13	Yes	5	0.00000001	0.00006189
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00056374
16	Yes	4	0.00000001	0.00062139
17	Yes	4	0.00000001	0.00062145
18	Yes	4	0.00000001	0.00055727
19	Yes	4	0.00000001	0.00061451
20	Yes	4	0.00000001	0.00061848
21	Yes	4	0.00000001	0.00055926
22	Yes	4	0.00000001	0.00061848
23	Yes	4	0.00000001	0.00061451
24	Yes	4	0.00000001	0.00055727
25	Yes	4	0.00000001	0.00062145
26	Yes	4	0.00000001	0.00062139
27	Yes	4	0.00000001	0.00001087
28	Yes	4	0.00000001	0.00013430
29	Yes	4	0.00000001	0.00015352
30	Yes	4	0.00000001	0.00003091
31	Yes	4	0.00000001	0.00012943
32	Yes	4	0.00000001	0.00014757
33	Yes	4	0.00000001	0.00001084
34	Yes	4	0.00000001	0.00014757
35	Yes	4	0.00000001	0.00012943
36	Yes	4	0.00000001	0.00003091
37	Yes	4	0.00000001	0.00015352
38	Yes	4	0.00000001	0.00013430

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	133 - 86.5	19.050	27	1.224	0.003
L2	90.75 - 39.75	9.037	27	0.966	0.001
L3	45 - 0	2.135	27	0.434	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
133'	8'x2" Mount Pipe	27	19.050	1.224	0.003	46311
115'	TMA-DB-T1-6Z-8AB-0Z	27	14.557	1.137	0.002	12864
113'	(2) LPA-80090/4CF w/ Mount Pipe	27	14.071	1.126	0.002	11577

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	133 - 86.5	54.944	2	3.530	0.008
L2	90.75 - 39.75	26.077	2	2.788	0.004
L3	45 - 0	6.163	2	1.254	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
133'	8'x2" Mount Pipe	2	54.944	3.530	0.008	16180
115'	TMA-DB-T1-6Z-8AB-0Z	2	41.992	3.280	0.006	4493
113'	(2) LPA-80090/4CF w/ Mount Pipe	2	40.591	3.248	0.006	4043

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 K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	133 - 86.5 (1)	TP33.116x24x0.25	46'6"	0'	0.0	39.000	25.418	-7.800	991.304	0.008
L2	86.5 - 39.75 (2)	TP41.78x31.783x0.281	51'	0'	0.0	39.000	36.127	-14.808	1408.940	0.011
L3	39.75 - 0 (3)	TP49.01x40.188x0.375	45'	0'	0.0	39.000	57.888	-25.262	2257.620	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	133 - 86.5 (1)	TP33.116x24x0.25	364.308	21.758	39.000	0.558	0.000	0.000	39.000	0.000
L2	86.5 - 39.75 (2)	TP41.78x31.783x0.281	987.383	32.813	39.000	0.841	0.000	0.000	39.000	0.000
L3	39.75 - 0 (3)	TP49.01x40.188x0.375	1745.425	30.145	39.000	0.773	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	133 - 86.5 (1)	TP33.116x24x0.25	11.919	0.469	26.000	0.036	0.000	0.000	26.000	0.000
L2	86.5 - 39.75 (2)	TP41.78x31.783x0.281	15.284	0.423	26.000	0.033	0.000	0.000	26.000	0.000
L3	39.75 - 0 (3)	TP49.01x40.188x0.375	18.404	0.318	26.000	0.024	0.000	0.000	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	133 - 86.5 (1)	0.008	0.558	0.000	0.036	0.000	0.566 ✓	1.333	H1-3+VT ✓
L2	86.5 - 39.75 (2)	⇉	0.841	0.000	0.033	0.000	0.852 ✓	1.333	H1-3+VT ✓
L3	39.75 - 0 (3)	0.011	0.773	0.000	0.024	0.000	0.784 ✓	1.333	H1-3+VT ✓

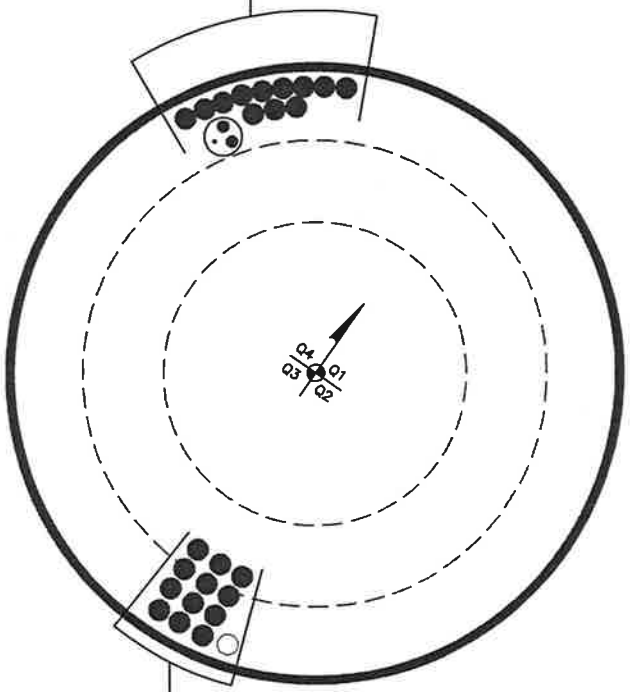
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	133 - 86.5	Pole	TP33.116x24x0.25	1	-7.800	1321.408	42.5	Pass
L2	86.5 - 39.75	Pole	TP41.78x31.783x0.281	2	-14.808	1878.117	63.9	Pass
L3	39.75 - 0	Pole	TP49.01x40.188x0.375	3	-25.262	3009.407	58.8	Pass
							Summary	
						Pole (L2)	63.9	Pass
						RATING =	**63.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

(INSTALLED)
(1) 1/4" TO 133 FT LEVEL-BUNDLED IN 3" CONDUIT
(2) 7/8" TO 133 FT LEVEL-BUNDLED IN 3" CONDUIT
(INSTALLED)
(12) 1-5/8" TO 133 FT LEVEL



(PROPOSED)
(1) 1-5/8" TO 113 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 113 FT LEVEL

BUSINESS UNIT: 873633 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *873633*
Site Name: *Milford*
App #: *195293; Rev: 1*

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	60	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	58	in
Thick:	3.25	in
Grade:	55	ksi
Clip Distance:	16	in

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

Pole Data		
Diam:	49.01	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions

TIA Revision:	F	
Unfactored Moment, M:	1745	ft-kips
Unfactored Axial, P:	25	kips
Unfactored Shear, V:	18	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	85.7 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	44.0%

Base Plate Results Flexural Check

Base Plate Stress:	28.4 ksi
Allowable PL Bending Stress:	55.0 ksi
Base Plate Stress Ratio:	51.6%

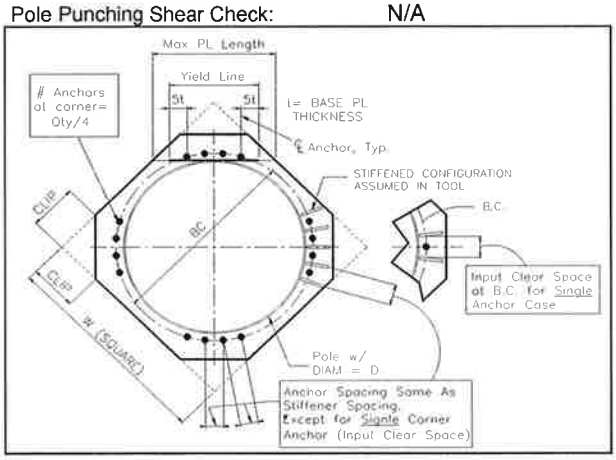
PL Ref. Data
Yield Line (in): 33.01
Max PL Length: 33.01

N/A - Unstiffened
Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

Monopole Pier and Pad Foundation

BU # : 873633
Site Name: Milford
App. Number: 195293; Rev: 1

TIA-222 Revision: F

Design Reactions		
Shear, **S**:	18	kips
Moment, **M**:	1745	ft-kips
Tower Height, **H**:	133	ft
Tower Weight, **Wt**:	25	kips
Base Diameter, **BD**:	4.08	ft

Foundation Dimensions		
Depth, **D**:	7	ft
Pad Width, **W**:	23.5	ft
Neglected Depth, **N**:	3.33	ft
Thickness, **T**:	3.00	ft
Pier Diameter, **Pd**:	7.00	ft
Ext. Above Grade, **E**:	0.50	ft
BP Dist. Above Pier:	3	in.
Clear Cover, **Cc**:	3.0	in

Soil Properties		
Soil Unit Weight, **γ**:	0.120	kcf
Ult. Bearing Capacity, Bc:	10.0	ksf
Angle of Friction, **Φ**:	30	deg
Cohesion, **Co**:	0.000	ksf
Passive Pressure, **Pp**:	0.000	ksf
Base Friction, **μ**:	0.30	

Material Properties		
Rebar Yield Strength, **Fy**:	60000	psi
Concrete Strength, **F'c**:	3000	psi
Concrete Unit Weight, **δc**:	0.150	kcf
Seismic Zone, **z**:	1	

Rebar Properties		
Pier Rebar Size, **Sp**:	11	
Pier Rebar Quanity, **mp**:	32	18
Pad Rebar Size, **Spad**:	11	
Pad Rebar Quanity, **mpad**:	24	6
Pier Tie Size, **St**:	4	4
Tie Quanity, **mt**:	12	5

Design Checks	Capacity/ Availability	Demand/ Limits	Check
Req'd Pier Diam.(ft)	7	5.5841	**OK**
Overturning (ft-kips)	4022.37	1745.00	**43.4%**
Shear Capacity (kips)	90.24	18.00	**19.9%**
Bearing (ksf)	7.50	2.00	**26.7%**
Pad Shear - 1-way (kips)	748.23	297.69	**39.8%**
Pad Shear - 2-way (kips)	1938.78	88.78	**4.6%**
Pad Moment Capacity (k-ft)	5177.90	739.21	**14.3%**
Pier Moment Capacity (k-ft)	5864.37	1826.00	**31.1%**

CCI Foundation Tool Suite - Monopole Pier - Beta Release

CCI Foundation Tool Suite - v1.0 Date: 8/29/2013

BU:	873633
Site Name:	Milford
App Number:	195293; Rev: 1
Work Order:	644983

Monopole Drilled Pier

Input

Criteria

TIA Revision:	F
ACI 318 Revision:	2002
Seismic Category:	B

Forces

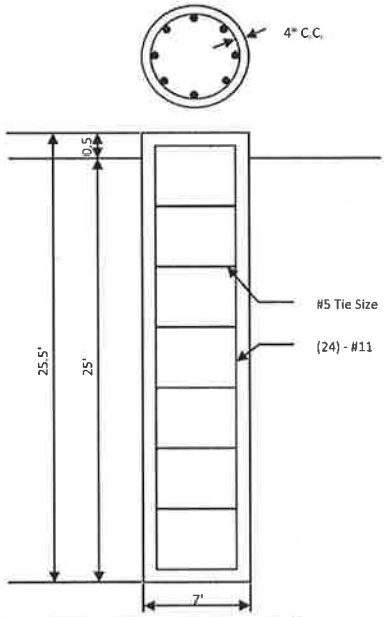
Compression	25 kips
Shear	18 kips
Moment	1745 k-ft
Swelling Force	0 kips

Foundation Dimensions

Pier Diameter:	7 ft
Ext. above grade:	0.5 ft
Depth below grade:	25 ft

Material Properties

Number of Rebar:	24
Rebar Size:	11
Tie Size	5
Rebar tensile strength:	60 ksi
Concrete Strength:	3000 psi
Ultimate Concrete Strain	0.003 in/in
Clear Cover to Ties:	4 in



Soil Profile: Profile per Criscuolo Geotech

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	3.5	0	3.5	120	0	0	0	0	0	
2	21.5	3.5	25	120		30			10	

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	5.96 ft
Max Moment, Mu:	1851.44 k-ft
Soil Safety Factor:	5.20
Safety Factor Req'd:	2
RATING:	38.50%

Soil Axial Capacity

Skin Friction (k):	163.38 kips
End Bearing (k):	192.42 kips
Comp. Capacity (k), ϕCn:	355.80 kips
Comp. (k), Cu:	25.00 kips
RATING:	7.03%

Concrete/Steel Check

Mu (from soil analysis)	2406.87 k-ft
ϕMn	5766.89 k-ft
RATING:	41.74%

rho provided	0.68
rho required	0.33 OK
Rebar Spacing	8.19
Spacing required	22.56 OK
Dev. Length required	18.71
Dev. Length provided	61.78 OK

Overall Foundation Rating: 41.7%