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

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**
Grassy Hill Road, Orange, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 118-foot level of the existing 140-foot tower off Grassy Hill Road in Orange, Connecticut (the "Property"). The tower is owned by Crown Castle. The Council approved Cellco's shared use of this tower in 2004. Cellco now intends to modify its facility by replacing six (6) of its existing antennas with three (3) model BXA-70063-6CF, 850 MHz antennas and three (3) model BXA-171063-8BF, 2100 MHz antennas, at the same 118-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 attached to the outside of the monopole tower. 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 James Zeoli, First Selectman for the Town of Orange. The Town of Orange is 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 118-foot level on the 140-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 cumulative 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, with certain modifications, 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:
James Zeoli, Orange First Selectman
Sandy M. Carter

ATTACHMENT 1

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

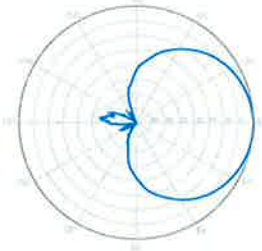
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-18.3 dB	-18.2 dB
Front-to-back ratio (+/-30°)	-33.4 dB	-36.3 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
IM3 (2x20W carriers)	< -153 dBc	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1804 x 285 x 132 mm	71.0 x 11.2 x 5.2 in
Depth with z-brackets	172 mm	6.8 in
Weight without mounting brackets	7.9 kg	17 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.51 m^2 Side: 0.24 m^2	Front: 5.5 ft^2 Side: 2.6 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf

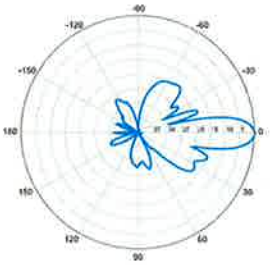
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



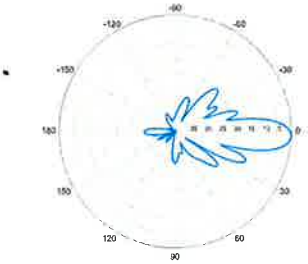
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

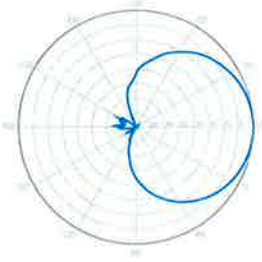


0° | Vertical | 750 MHz

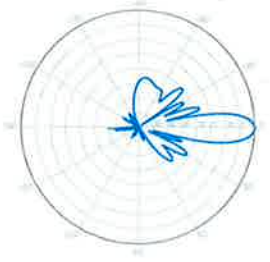
BXA-70063-6CF-EDIN-2



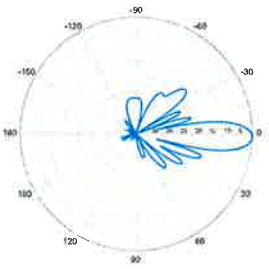
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



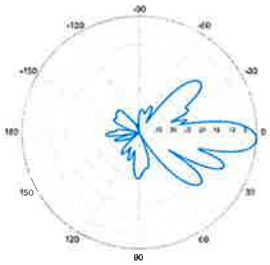
2° | Vertical | 850 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

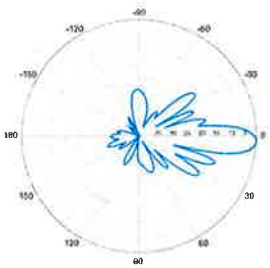
BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3

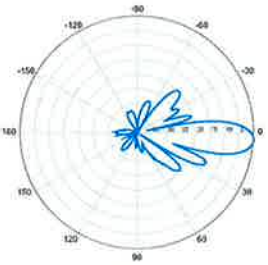


3° | Vertical | 750 MHz

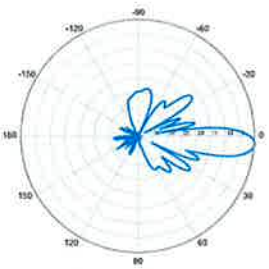


3° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-4

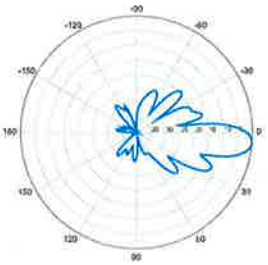


4° | Vertical | 750 MHz

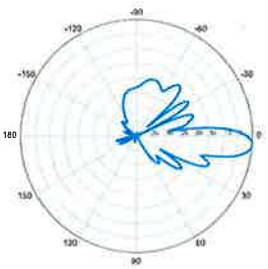


4° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-5

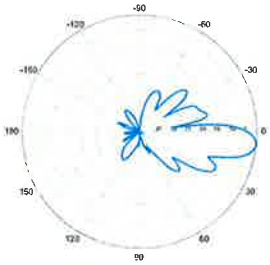


5° | Vertical | 750 MHz

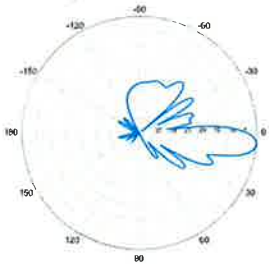


5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6

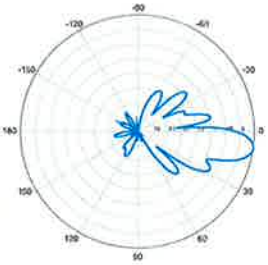


6° | Vertical | 750 MHz

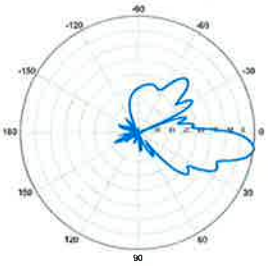


6° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-8

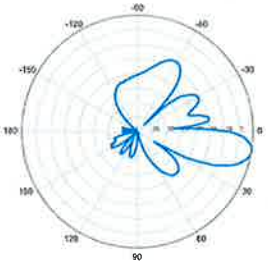


8° | Vertical | 750 MHz

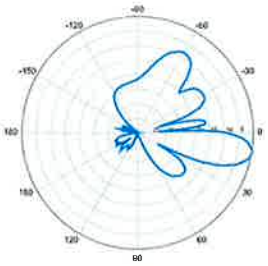


8° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-10



10° | Vertical | 750 MHz



10° | Vertical | 850 MHz

BXA-171063-8BF-EDIN-X

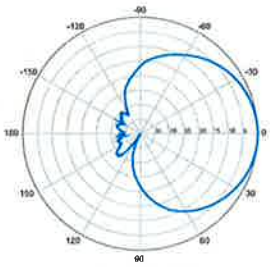
Replace "X" with desired electrical downtilt

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	

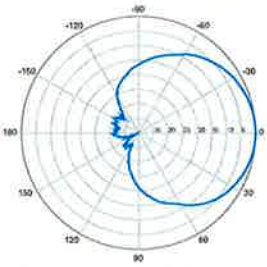
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-8BF-EDIN-X-FP		

BXA-171063-8BF-EDIN-X



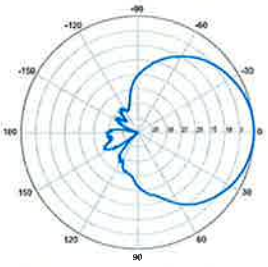
Horizontal | 1710-1880 MHz

BXA-171063-8BF-EDIN-X



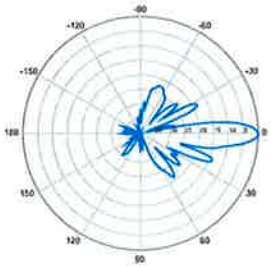
Horizontal | 1850-1990 MHz

BXA-171063-8BF-EDIN-X



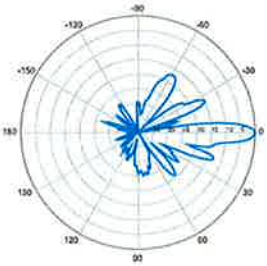
Horizontal | 1920-2170 MHz

BXA-171063-8BF-EDIN-0



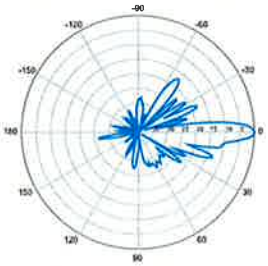
0° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-0



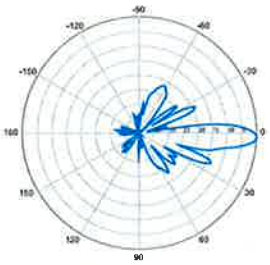
0° | Vertical | 1920-2170 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

BXA-171063-8BF-EDIN-X

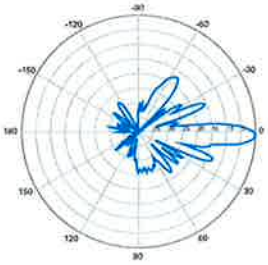
X-Pol | FET Panel | 63° | 17.4 dBi

BXA-171063-8BF-EDIN-2



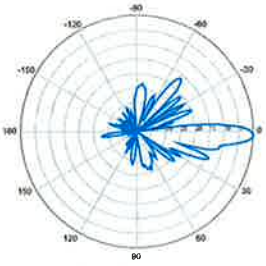
2° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-2



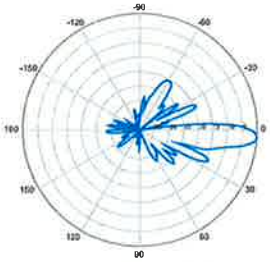
2° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-2



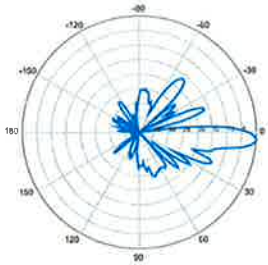
2° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-4



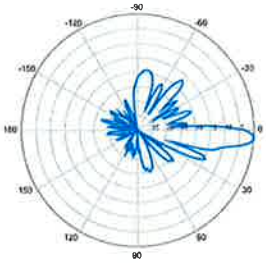
4° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-4



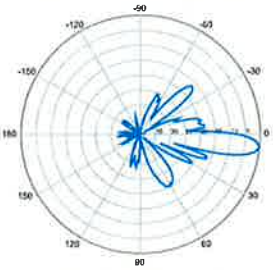
4° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-4



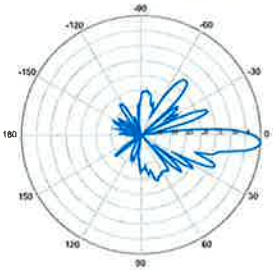
4° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-6



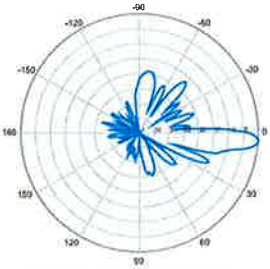
6° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-6



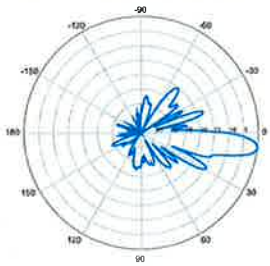
6° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-6



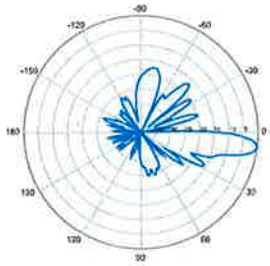
6° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-8



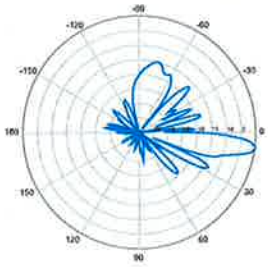
8° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-8



8° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-8

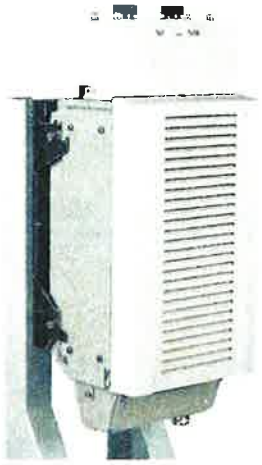


8° | Vertical | 1920-2170 MHz

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

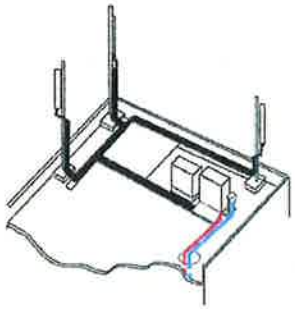
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation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

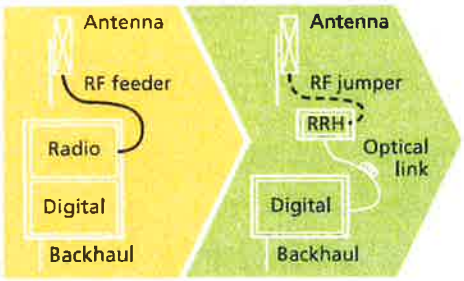
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

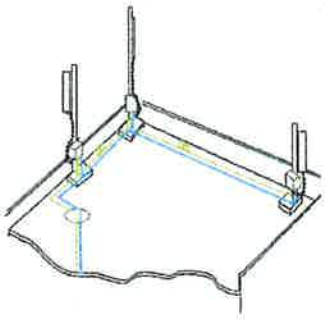
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility 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
Mechanical Properties			
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)
Electrical Properties			
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)
Fiber Optic Properties			
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
DC Power Cable Properties			
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
Temperature			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

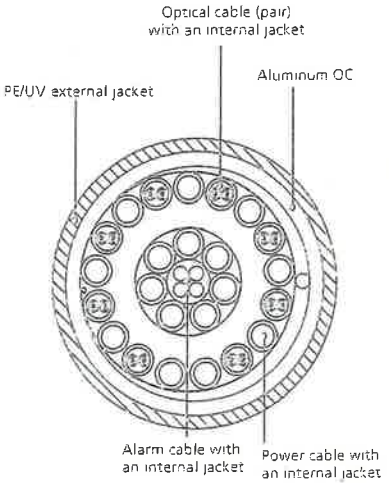


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Orange 3								
Tower Height: 140Ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Sprint CDMA/LTE	2	778	130	0.0331	1962.5	1.0000	3.31%	
*Sprint CDMA/LTE	1	438	130	0.0093	850	0.5667	1.64%	
*Pocket (now MetroPCS)	3	631	100	0.0681	2130	1.0000	6.81%	
*Sprint WiMAX	3	562	130	0.0359	2657	1.0000	3.59%	
*Clearwire	2	153	128	0.0067	2496	1.0000	0.67%	
*Clearwire	1	211	128	0.0046	11 GHz	1.0000	0.46%	
*AT&T UMTS	1	500	140	0.0092	1900	1.0000	0.92%	
*AT&T UMTS	1	500	140	0.0092	880	0.5867	1.56%	
*AT&T GSM	6	427	140	0.0470	1900	1.0000	4.70%	
*AT&T GSM	6	296	140	0.0326	880	0.5867	5.55%	
*AT&T LTE	1	500	140	0.0092	740	0.4933	1.86%	
*T-Mobile LTE	2	12.0815	109	0.0007	2100	1.0000	0.07%	
*T-Mobile GSM/UMTS	4	12.0815	109	0.0015	1950	1.0000	0.15%	
Verizon	**7**	**394**	**118**	**0.0712**	**1970**	**1.0000**	**7.12%**	
Verizon	**9**	**251**	**118**	**0.0583**	**869**	**0.5793**	**10.07%**	
Verizon	**1**	**1265**	**118**	**0.0327**	**2145**	**1.0000**	**3.27%**	
Verizon	**1**	**785**	**118**	**0.0203**	**698**	**0.4653**	**4.36%**	
								56.11%
* Source: Siting Council								

ATTACHMENT 3

October 24, 2013

Mr. Jason Rouse
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6605

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
ctuttle@btgrp.com

Subject:	**Structural Modification Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	orange 3
Crown Castle Designation:	**Crown Castle BU Number:**	881541
	Crown Castle Site Name:	Rogers Property
	Crown Castle JDE Job Number:	241277
	Crown Castle Work Order Number:	661413
	Crown Castle Application Number:	195656 Rev. 6
Engineering Firm Designation:	**B+T Group Project Number:**	88674.001.01
Site Data:	**Grassy Hill Road, Orange, CT, New Haven County** **Latitude *41° 17' 7.75"*, Longitude *-73° 2' 33.27"*** **139.5 Foot - Monopole**	

Dear Mr. Rouse,

B+T Group is pleased to submit this **"Structural Modification 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 586671, in accordance with application 195656, revision 6.

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:

LC4.7: TSA specified load case with proposed modifications **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved 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 modifications and 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 *B+T Group* 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.

Respectfully submitted by:
B+T Engineering, Inc.

Santhosha Shanbhogue
Project Engineer

Chad E. Tuttle, P.E.
President

tnxTower Report - version 6.1.3.1

TABLE OF CONTENTS

1) INTRODUCTION

This is a 139.5 ft. monopole designed by Engineered Endeavors, Inc. in February of 2004. The monopole was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this monopole 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, 37.6 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
120.0	120.0	1	RFS Celwave	DB-T1-6Z-8AB-0Z	--	--	--
		1	--	Side Arm Mount [SO 102-1]			
118.0	118.0	3	Alcatel Lucent	RRH2X40-AWS	1	1 5/8	--
		3	Antel	BXA-171063-8BF-EDIN-0			
		3	Antel	BXA-70063-6CF-EDIN-0			

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
136.0	140.0	3	Ericsson	RRUS-11	1 2 6	5/8 3/8 1 5/8	1
		3	Kathrein	800 10121			
		6	Powerwave Technologies	LGP21401			
		3	Powerwave Technologies	P65-16-XLH-RR			
		1	Raycap	DC6-48-60-18-8F			
	136.0	1	--	T-Arm Mount [TA 702-3]			
130.0	134.0	1	Andrew	VHLP2-11	3 3	1/2 5/16	1
	132.0	1	Dragonwave	A-ANT-23G-2-C			
		3	Argus Technologies	LLPX310R			
		3	Samsung	FDD_R6_RRH			
	130.0	3	Alcatel Lucent	800 EXTERNAL NOTCH FILTER	3	1 1/4	2
		9	RFS Celwave	ACU-A20-N			
		3	RFS Celwave	APXVSPP18-C-A20			
		6	CSS	CSS-XS4-65-R	6	1 1/4	1
		1	--	T-Arm Mount [TA 602-3]			
128.0	128.0	3	Alcatel Lucent	1900MHz RRH (65MHz)	--	--	2
		3	Alcatel Lucent	800MHZ RRH			
		1	--	Side Arm Mount [SO 102-3]			
124	124	--	--	--	6	1 5/8	4

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
118.0	118.0	**3**	**Powerwave**	**P65.16.XL.2**	--	--	**3**
		6	Decibel	DB846F65ZAXY	12	1 5/8	1
		6	RFS Celwave	FD9R6004/2C-3L			
		3	Rymsa Wireless	MG D3-800Tx			
		1	--	T-Arm Mount [TA 602-3]			
108.0	109.0	3	EMS Wireless	RR90-17-02DP	12	1 5/8	1
		6	Ericsson	KRY 112 71			
		3	RFS Celwave	APXV18-206516S-C-A20			
		3	RFS Celwave	ATMAA1412D-1A20			
	108.0	1	--	T-Arm Mount [TA 602-3]			
100.0	100.0	3	RFS Celwave	APXV18-206517-C	6	1 5/8	1
		3	--	Flush Mount			
75.0	77.0	1	Lucent	KS24019-L112A	1	1/2	1
	75.0	1	--	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) **Equipment To Be Removed**
4) Abandoned Feed lines Considered 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)
140	140	12	Dapa	48000	--	--
		1	Generic	Low Profile Platform		
130	130	12	Dapa	48000	--	--
		1	Generic	Low Profile Platform		
120	120	12	Dapa	48000	--	--
		1	Generic	Low Profile Platform		
110	110	12	Dapa	48000	--	--
		1	Generic	Low Profile Platform		
100	100	12	Dapa	48000	--	--
		1	Generic	Low Profile Platform		
75	75	1	Generic	GPS	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Locate Revision # 6	195656	CCI Sites
Tower Manufacturer Drawing	EEI, Job No. 12364	2207700	CCI Sites
Foundation Drawing	EEI, Project No. 12364	2208511	CCI Sites
Geotechnical Report	Clarence Welti Assoc., Inc. Project No:F300001972.21/F07	2245154	CCI Sites
Antenna Configuration	Previous SA by Vertical Structures Project No:2013-004-053	3985656	CCI Sites

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.
5) Mount areas and weights are assumed based on photographs provided.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary) - LC4.7

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	139.5 - 93.04	Pole	TP26.99x15.5x0.25	1	-8.162	1063.078	91.5	Pass
L2	93.04 - 46.38	Pole	TP37.91x25.521x0.375	2	-17.435	2242.999	90.4	Pass
L3	46.38 - 0	Pole	TP48.5x35.874x0.375	3	-26.539	2719.293	97.2	Pass
							Summary	
						Pole (L3)	97.2	Pass
						RATING =	**97.2**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity - LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	75.2	Pass
1	Base Plate	Base	72.6	Pass
1	Base Foundation	Base	79.2	Pass

Structure Rating (max from all components) =	**97.2%**

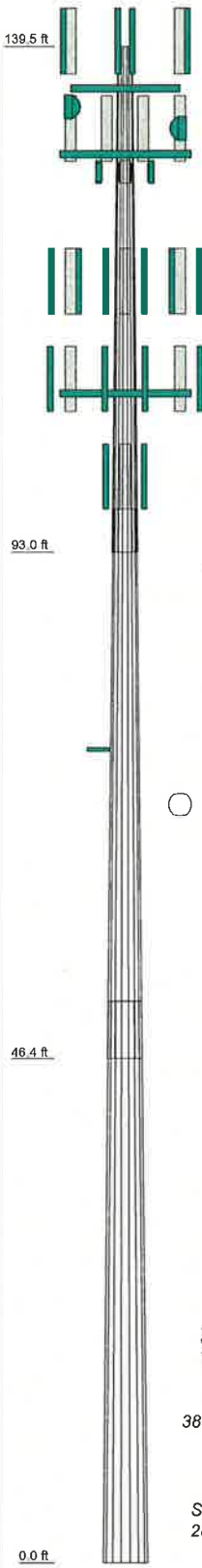
Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.

4.1) Recommendations

1) All modifications proposed in this report shall be installed in accordance with the attached drawings (Appendix D) for the determined available structural capacity to be effective.

APPENDIX A

tnxTOWER OUTPUT



Section	1	2	3
Length (ft)	46.460	50.580	51.630
Number of Sides	18	18	18
Thickness (in)	0.250	0.375	0.375
Socket Length (ft)	3.920	5.250	
Top Dia (in)	15.500	25.521	35.874
Bot Dia (in)	26.990	37.910	48.500
Grade	A572-65		
Weight (K)	2.6	6.4	8.7

AXIAL 46 K
SHEAR 7 K
TORQUE 1 kip-ft
38 mph WIND - 0.750 i
AXIAL 31 K
SHEAR 28 K
TORQUE 2 kip-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
RRUS-11 (E)	136	1900MHz RRH (65MHz) (R)	128
RRUS-11 (E)	136	Side Arm Mount [SO 102-1] (P)	120
RRUS-11 (E)	136	DB-T1-6Z-8AB-0Z (P)	120
800 10121 w/ Mount Pipe (E)	136	5' x 2" Pipe Mount (For Antenna)	120
800 10121 w/ Mount Pipe (E)	136	(2) FD9R6004/2C-3L (E)	118
800 10121 w/ Mount Pipe (E)	136	(2) DB846F65ZAXY w/ Mount Pipe (E)	118
(2) LGP21401 (E)	136	(2) DB846F65ZAXY w/ Mount Pipe (E)	118
(2) LGP21401 (E)	136	(2) DB846F65ZAXY w/ Mount Pipe (E)	118
(2) LGP21401 (E)	136	MG D3-800Tx w/ Mount Pipe (E)	118
P65-16-XLH-RR w/ Mount Pipe (E)	136	MG D3-800Tx w/ Mount Pipe (E)	118
P65-16-XLH-RR w/ Mount Pipe (E)	136	MG D3-800Tx w/ Mount Pipe (E)	118
P65-16-XLH-RR w/ Mount Pipe (E)	136	RRH2X40-AWS (P)	118
DC6-48-60-18-8F (E)	136	RRH2X40-AWS (P)	118
T-Arm Mount [TA 702-3] (E)	136	RRH2X40-AWS (P)	118
LLPX310R w/Mount Pipe (E)	130	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (P)	118
LLPX310R w/Mount Pipe (E)	130	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (P)	118
LLPX310R w/Mount Pipe (E)	130	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (P)	118
FDD_R6_RRH (E)	130	BXA-171063-8BF-EDIN-0 w/ Mount Pipe (P)	118
FDD_R6_RRH (E)	130	BXA-171063-8BF-EDIN-0 w/ Mount Pipe (P)	118
FDD_R6_RRH (E)	130	BXA-171063-8BF-EDIN-0 w/ Mount Pipe (P)	118
800 EXTERNAL NOTCH FILTER (R)	130	T-Arm Mount [TA 602-3] (E)	118
800 EXTERNAL NOTCH FILTER (R)	130	(2) FD9R6004/2C-3L (E)	118
800 EXTERNAL NOTCH FILTER (R)	130	(2) FD9R6004/2C-3L (E)	118
(3) ACU-A20-N (R)	130	RR90-17-02DP w/ Mount Pipe (E)	108
(3) ACU-A20-N (R)	130	(2) KRY 112 71 (E)	108
(3) ACU-A20-N (R)	130	(2) KRY 112 71 (E)	108
APXVSPP18-C-A20 w/ Mount Pipe (R)	130	(2) KRY 112 71 (E)	108
APXVSPP18-C-A20 w/ Mount Pipe (R)	130	APXV18-206516S-C-A20 w/ Mount Pipe (E)	108
APXVSPP18-C-A20 w/ Mount Pipe (R)	130	APXV18-206516S-C-A20 w/ Mount Pipe (E)	108
(2) CSS-XS4-65-R w/ Mount Pipe (E)	130	APXV18-206516S-C-A20 w/ Mount Pipe (E)	108
(2) CSS-XS4-65-R w/ Mount Pipe (E)	130	ATMAA1412D-1A20 (E)	108
(2) CSS-XS4-65-R w/ Mount Pipe (E)	130	ATMAA1412D-1A20 (E)	108
6' x 3" Mount Pipe (E-For Dish)	130	ATMAA1412D-1A20 (E)	108
6' x 3" Mount Pipe (E-For Dish)	130	(2) 6' x 2" Mount Pipe (E)	108
T-Arm Mount [TA 602-3] (E)	130	(2) 6' x 2" Mount Pipe (E)	108
A-ANT-23G-2-C (E)	130	(2) 6' x 2" Mount Pipe (E)	108
VHLP2-11 (E)	130	T-Arm Mount [TA 602-3] (E)	108
1900MHz RRH (65MHz) (R)	128	RR90-17-02DP w/ Mount Pipe (E)	108
800MHZ RRH (R)	128	RR90-17-02DP w/ Mount Pipe (E)	108
800MHZ RRH (R)	128	APXV18-206517-C w/ Mount Pipe (E)	100
800MHZ RRH (R)	128	APXV18-206517-C w/ Mount Pipe (E)	100
Side Arm Mount [SO 102-3] (R)	128	APXV18-206517-C w/ Mount Pipe (E)	100
(2) 5' x 2" Pipe Mount (R-For TME)	128	Side Arm Mount [SO 701-1] (E)	75
(2) 5' x 2" Pipe Mount (R-For TME)	128	KS24019-L112A (E)	75
(2) 5' x 2" Pipe Mount (R-For TME)	128	6' x 2" Mount Pipe (E)	75
1900MHz RRH (65MHz) (R)	128		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for 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: 97.2%

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

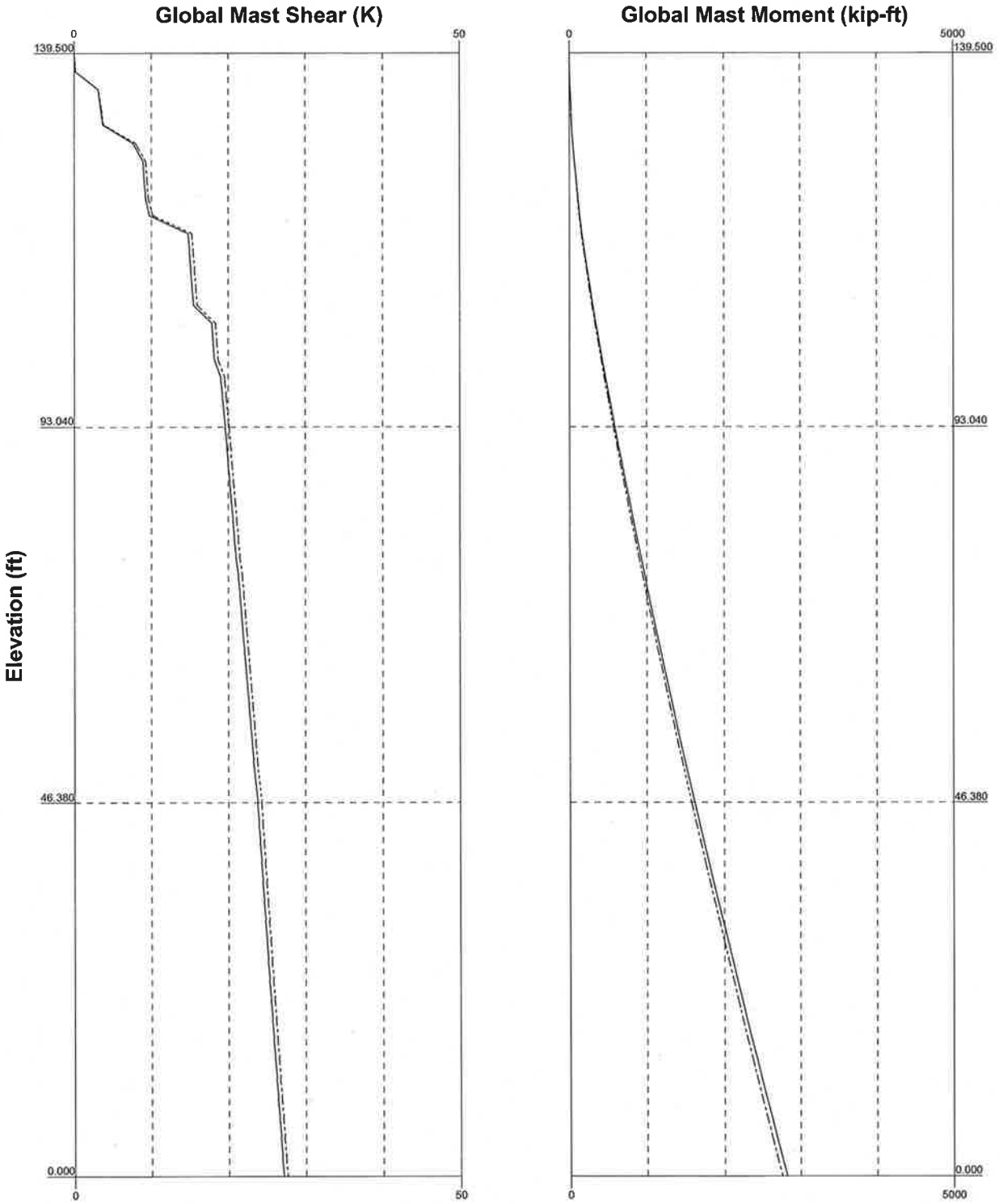
Job: 88674.001.01 - Rogers Property, CT (BU# 88154			
Project:			
Client: Crown Castle	Drawn by: HKarande	App'd:	
Code: TIA/EIA-222-F	Date: 10/21/13	Scale: NTS	
Path:		Dwg No. E-1	

TIA/EIA-222-F - 85 mph/38 mph 0.750 in Ice

Vx ---------- Vz

Maximum Values

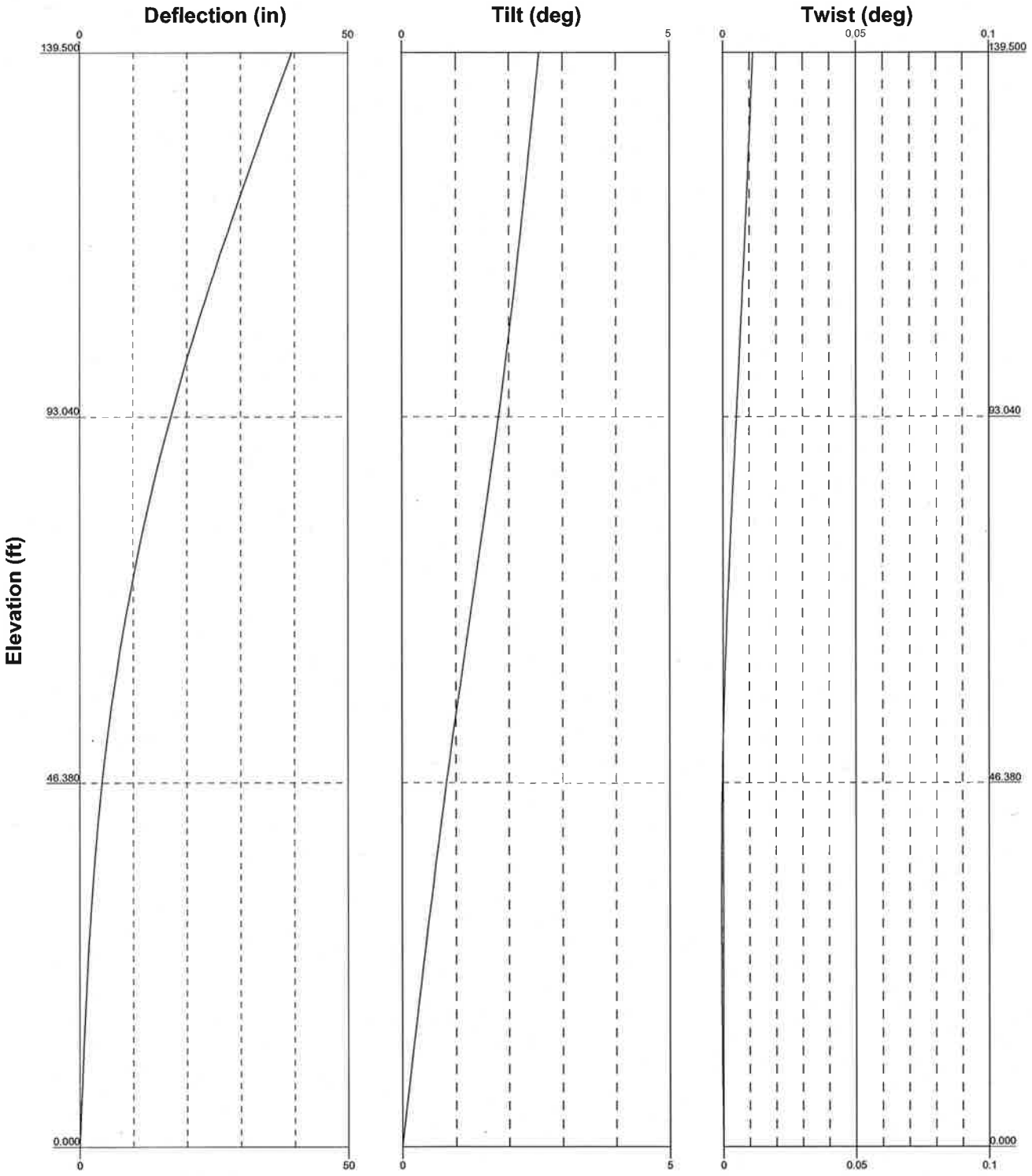
Mx ---------- Mz



B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 88674.001.01 - Rogers Property, CT (BU# 88154			
Project:			
Client: Crown Castle	Drawn by: HKarande	App'd:	
Code: TIA/EIA-222-F	Date: 10/21/13	Scale: NTS	
Path:		Dwg No. E-4	

TIA/EIA-222-F - Service - 50 mph **Maximum Values**



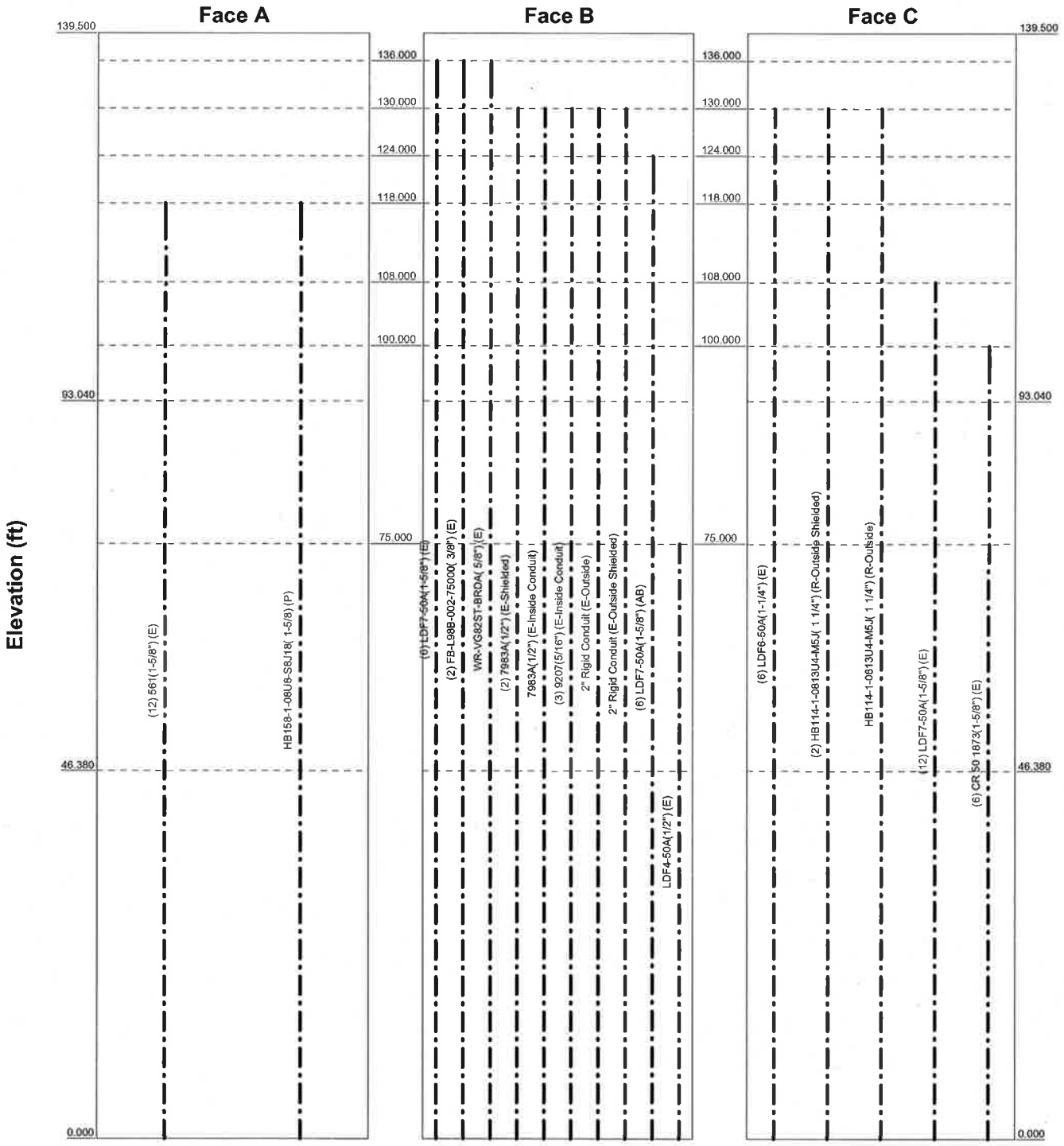
B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 88674.001.01 - Rogers Property, CT (BU# 88154			
Project:			
Client: Crown Castle	Drawn by: HKarande	App'd:	
Code: TIA/EIA-222-F	Date: 10/21/13	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart

0' - 139'6"

Round — Flat — App In Face — App Out Face — Truss Leg



B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 88674.001.01 - Rogers Property, CT (BU# 88154			
Project:			
Client: Crown Castle	Drawn by: HKarande	App'd:	
Code: TIA/EIA-222-F	Date: 10/21/13	Scale: NTS	
Path:		Dwg No. E-7	

Tower Input Data

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

Tower is located in New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line 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	139.500-93.040	46.460	3.920	18	15.500	26.990	0.250	1.000	A572-65 (65 ksi)
L2	93.040-46.380	50.580	5.250	18	25.521	37.910	0.375	1.500	A572-65 (65 ksi)
L3	46.380-0.000	51.630		18	35.874	48.500	0.375	1.500	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	15.739	12.101	355.544	5.414	7.874	45.154	711.557	6.052	2.288	9.152
	27.406	21.218	1916.764	9.493	13.711	139.798	3836.050	10.611	4.310	17.241
L2	26.889	29.929	2390.886	8.927	12.964	184.419	4784.918	14.968	3.832	10.218
	38.495	44.676	7952.156	13.325	19.258	412.921	15914.776	22.342	6.012	16.032
L3	37.731	42.253	6727.054	12.602	18.224	369.131	13462.960	21.130	5.654	15.077
	49.248	57.281	16760.535	17.084	24.638	680.272	33543.123	28.646	7.876	21.003

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 139.500-93.040				1	1	1		
L2 93.040-46.380				1	1	1		

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
L3 46.380-0.000				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
LDF7-50A(1-5/8") (E)	B	No	Inside Pole	136.000 - 0.000	6	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
FB-L98B-002-75000(3/8") (E)	B	No	Inside Pole	136.000 - 0.000	2	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
WR-VG82ST-BRDA(5/8") (E)	B	No	Inside Pole	136.000 - 0.000	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
////								
7983A(1/2") (E-Shielded)	B	No	CaAa (Out Of Face)	130.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
7983A(1/2") (E-Inside Conduit)	B	No	CaAa (Out Of Face)	130.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
9207(5/16") (E-Inside Conduit)	B	No	CaAa (Out Of Face)	130.000 - 0.000	3	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
2" Rigid Conduit (E-Outside)	B	No	CaAa (Out Of Face)	130.000 - 0.000	1	No Ice	0.200	0.003
						1/2" Ice	0.300	0.004
						1" Ice	0.400	0.006
						2" Ice	0.600	0.013
						4" Ice	1.000	0.032
2" Rigid Conduit (E-Outside Shielded)	B	No	CaAa (Out Of Face)	130.000 - 0.000	1	No Ice	0.000	0.003
						1/2" Ice	0.000	0.004

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						1" Ice	0.000	0.006
						2" Ice	0.000	0.013
						4" Ice	0.000	0.032
LDF6-50A(1-1/4") (E)	C	No	Inside Pole	130.000 - 0.000	6	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
HB114-1-0813U4-M5J(1 1/4") (R-Outside Shielded)	C	No	CaAa (Out Of Face)	130.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.028
HB114-1-0813U4-M5J(1 1/4") (R-Outside)	C	No	CaAa (Out Of Face)	130.000 - 0.000	1	No Ice	0.154	0.001
						1/2" Ice	0.254	0.002
						1" Ice	0.354	0.004
						2" Ice	0.554	0.010
						4" Ice	0.954	0.028
////								
LDF7-50A(1-5/8") (AB)	B	No	Inside Pole	124.000 - 0.000	6	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
////								
561(1-5/8") (E)	A	No	Inside Pole	118.000 - 0.000	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) (P)	A	No	CaAa (Out Of Face)	118.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.003
						1" Ice	0.398	0.005
						2" Ice	0.598	0.011
						4" Ice	0.998	0.031
////								
LDF7-50A(1-5/8") (E)	C	No	Inside Pole	108.000 - 0.000	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
////								
CR 50 1873(1-5/8") (E)	C	No	Inside Pole	100.000 - 0.000	6	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
////								
LDF4-50A(1/2") (E)	B	No	Inside Pole	75.000 - 0.000	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
////								

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	139.500-93.040	A	0.000	0.000	0.000	4.942	0.437
		B	0.000	0.000	0.000	7.392	0.665
		C	0.000	0.000	0.000	5.692	0.461
L2	93.040-46.380	A	0.000	0.000	0.000	9.239	0.817
		B	0.000	0.000	0.000	9.332	0.840
		C	0.000	0.000	0.000	7.186	1.044
L3	46.380-0.000	A	0.000	0.000	0.000	9.183	0.812
		B	0.000	0.000	0.000	9.276	0.838
		C	0.000	0.000	0.000	7.143	1.038

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	139.500-93.040	A	0.871	0.000	0.000	0.000	9.289	0.514
		B		0.000	0.000	0.000	13.829	1.221
		C		0.000	0.000	0.000	12.128	0.752
L2	93.040-46.380	A	0.819	0.000	0.000	0.000	17.365	0.961
		B		0.000	0.000	0.000	17.458	1.542
		C		0.000	0.000	0.000	15.312	1.411
L3	46.380-0.000	A	0.750	0.000	0.000	0.000	16.783	0.945
		B		0.000	0.000	0.000	16.875	1.481
		C		0.000	0.000	0.000	14.742	1.376

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	139.500-93.040	0.041	0.036	0.033	0.069
L2	93.040-46.380	0.050	-0.026	0.041	-0.022
L3	46.380-0.000	0.052	-0.027	0.045	-0.024

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
RRUS-11	A	From Leg	3.000	0.000	136.000	No Ice	3.249	1.373	0.048
(E)			0.000			1/2" Ice	3.491	1.551	0.068
			4.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
RRUS-11	B	From Leg	3.000	0.000	136.000	No Ice	3.249	1.373	0.048

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
(E)			0.000			1/2" Ice	3.491	1.551	0.068
			4.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
RRUS-11	C	From Leg	3.000	0.000	136.000	No Ice	3.249	1.373	0.048
(E)			0.000			1/2" Ice	3.491	1.551	0.068
			4.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
800 10121 w/ Mount Pipe	A	From Leg	3.000	0.000	136.000	No Ice	5.685	4.600	0.066
(E)			0.000			1/2" Ice	6.182	5.351	0.114
			4.000			1" Ice	6.676	6.046	0.168
						2" Ice	7.695	7.526	0.298
						4" Ice	9.858	10.832	0.675
800 10121 w/ Mount Pipe	B	From Leg	3.000	0.000	136.000	No Ice	5.685	4.600	0.066
(E)			0.000			1/2" Ice	6.182	5.351	0.114
			4.000			1" Ice	6.676	6.046	0.168
						2" Ice	7.695	7.526	0.298
						4" Ice	9.858	10.832	0.675
800 10121 w/ Mount Pipe	C	From Leg	3.000	0.000	136.000	No Ice	5.685	4.600	0.066
(E)			0.000			1/2" Ice	6.182	5.351	0.114
			4.000			1" Ice	6.676	6.046	0.168
						2" Ice	7.695	7.526	0.298
						4" Ice	9.858	10.832	0.675
(2) LGP21401	A	From Leg	3.000	0.000	136.000	No Ice	1.288	0.233	0.014
(E)			0.000			1/2" Ice	1.445	0.313	0.021
			4.000			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) LGP21401	B	From Leg	3.000	0.000	136.000	No Ice	1.288	0.233	0.014
(E)			0.000			1/2" Ice	1.445	0.313	0.021
			4.000			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) LGP21401	C	From Leg	3.000	0.000	136.000	No Ice	1.288	0.233	0.014
(E)			0.000			1/2" Ice	1.445	0.313	0.021
			4.000			1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
P65-16-XLH-RR w/ Mount Pipe	A	From Leg	3.000	0.000	136.000	No Ice	8.637	6.362	0.079
			0.000			1/2" Ice	9.290	7.538	0.144
(E)			4.000			1" Ice	9.910	8.427	0.218
						2" Ice	11.176	10.239	0.393
						4" Ice	13.829	14.099	0.886
P65-16-XLH-RR w/ Mount Pipe	B	From Leg	3.000	0.000	136.000	No Ice	8.637	6.362	0.079
			0.000			1/2" Ice	9.290	7.538	0.144
(E)			4.000			1" Ice	9.910	8.427	0.218
						2" Ice	11.176	10.239	0.393
						4" Ice	13.829	14.099	0.886
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	3.000	0.000	136.000	No Ice	8.637	6.362	0.079
			0.000			1/2" Ice	9.290	7.538	0.144
(E)			4.000			1" Ice	9.910	8.427	0.218
						2" Ice	11.176	10.239	0.393
						4" Ice	13.829	14.099	0.886
DC6-48-60-18-8F	C	From Leg	3.000	0.000	136.000	No Ice	2.567	2.567	0.019
(E)			0.000			1/2" Ice	2.798	2.798	0.041
			4.000			1" Ice	3.038	3.038	0.067

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
						2" Ice	3.543	3.543	0.129
						4" Ice	4.658	4.658	0.299
T-Arm Mount [TA 702-3] (E)	C	None		0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.640 6.550 7.460 9.280 12.920	5.640 6.550 7.460 9.280 12.920	0.339 0.429 0.519 0.699 1.059
////									
LLPX310R w/Mount Pipe (E)	A	From Leg	4.000 0.000 2.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.429 5.990 6.506 7.574 9.862	3.382 4.151 4.796 6.194 9.254	0.051 0.092 0.140 0.255 0.597
LLPX310R w/Mount Pipe (E)	A	From Leg	4.000 0.000 2.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.429 5.990 6.506 7.574 9.862	3.382 4.151 4.796 6.194 9.254	0.051 0.092 0.140 0.255 0.597
LLPX310R w/Mount Pipe (E)	A	From Leg	4.000 0.000 2.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.429 5.990 6.506 7.574 9.862	3.382 4.151 4.796 6.194 9.254	0.051 0.092 0.140 0.255 0.597
FDD_R6_RRH (E)	A	From Leg	4.000 0.000 2.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.789 1.971 2.163 2.571 3.491	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.200
FDD_R6_RRH (E)	B	From Leg	4.000 0.000 2.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.789 1.971 2.163 2.571 3.491	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.200
FDD_R6_RRH (E)	C	From Leg	4.000 0.000 2.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.789 1.971 2.163 2.571 3.491	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.200
800 EXTERNAL NOTCH FILTER (R)	A	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.770 0.890 1.018 1.301 1.970	0.375 0.465 0.563 0.787 1.337	0.011 0.017 0.024 0.045 0.114
800 EXTERNAL NOTCH FILTER (R)	B	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.770 0.890 1.018 1.301 1.970	0.375 0.465 0.563 0.787 1.337	0.011 0.017 0.024 0.045 0.114
800 EXTERNAL NOTCH FILTER (R)	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.770 0.890 1.018 1.301 1.970	0.375 0.465 0.563 0.787 1.337	0.011 0.017 0.024 0.045 0.114
(3) ACU-A20-N (R)	A	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.078 0.121 0.173 0.302	0.136 0.189 0.251 0.400	0.001 0.002 0.004 0.012

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
						4" Ice	0.665	0.802	0.045
(3) ACU-A20-N (R)	B	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.078 0.121 0.173 0.302 0.665	0.136 0.189 0.251 0.400 0.802	0.001 0.002 0.004 0.012 0.045
(3) ACU-A20-N (R)	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.078 0.121 0.173 0.302 0.665	0.136 0.189 0.251 0.400 0.802	0.001 0.002 0.004 0.012 0.045
APXVSPP18-C-A20 w/ Mount Pipe (R)	A	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
APXVSPP18-C-A20 w/ Mount Pipe (R)	B	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
APXVSPP18-C-A20 w/ Mount Pipe (R)	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
(2) CSS-XS4-65-R w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.376 3.785 4.214 5.106 7.023	3.315 3.923 4.542 5.830 8.811	0.055 0.088 0.127 0.223 0.520
(2) CSS-XS4-65-R w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.376 3.785 4.214 5.106 7.023	3.315 3.923 4.542 5.830 8.811	0.055 0.088 0.127 0.223 0.520
(2) CSS-XS4-65-R w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.376 3.785 4.214 5.106 7.023	3.315 3.923 4.542 5.830 8.811	0.055 0.088 0.127 0.223 0.520
6' x 3" Mount Pipe (E-For Dish)	B	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.767 2.129 2.501 3.272 4.926	1.767 2.129 2.501 3.272 4.926	0.030 0.044 0.061 0.109 0.260
6' x 3" Mount Pipe (E-For Dish)	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.767 2.129 2.501 3.272 4.926	1.767 2.129 2.501 3.272 4.926	0.030 0.044 0.061 0.109 0.260
T-Arm Mount [TA 602-3] (E)	C	None		0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.500 16.710 19.920 26.340 39.180	13.500 16.710 19.920 26.340 39.180	0.600 0.750 0.900 1.200 1.800

////

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
1900MHz RRH (65MHz) (R)	A	From Leg	2.000 0.000 0.000	0.000	128.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.698 2.936 3.183 3.703 4.846	2.771 3.011 3.260 3.784 4.935	0.060 0.084 0.111 0.176 0.354
1900MHz RRH (65MHz) (R)	B	From Leg	2.000 0.000 0.000	0.000	128.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.698 2.936 3.183 3.703 4.846	2.771 3.011 3.260 3.784 4.935	0.060 0.084 0.111 0.176 0.354
1900MHz RRH (65MHz) (R)	C	From Leg	2.000 0.000 0.000	0.000	128.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.698 2.936 3.183 3.703 4.846	2.771 3.011 3.260 3.784 4.935	0.060 0.084 0.111 0.176 0.354
800MHZ RRH (R)	A	From Leg	2.000 0.000 0.000	0.000	128.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.490 2.706 2.931 3.407 4.462	2.068 2.271 2.481 2.928 3.927	0.053 0.074 0.098 0.157 0.318
800MHZ RRH (R)	B	From Leg	2.000 0.000 0.000	0.000	128.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.490 2.706 2.931 3.407 4.462	2.068 2.271 2.481 2.928 3.927	0.053 0.074 0.098 0.157 0.318
800MHZ RRH (R)	C	From Leg	2.000 0.000 0.000	0.000	128.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.490 2.706 2.931 3.407 4.462	2.068 2.271 2.481 2.928 3.927	0.053 0.074 0.098 0.157 0.318
Side Arm Mount [SO 102-3] (R)	C	None		0.000	128.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.000 3.480 3.960 4.920 6.840	3.000 3.480 3.960 4.920 6.840	0.081 0.111 0.141 0.201 0.321
(2) 5' x 2" Pipe Mount (R-For TME)	A	From Leg	2.000 0.000 0.000	0.000	128.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.000 1.393 1.703 2.351 3.778	1.000 1.393 1.703 2.351 3.778	0.029 0.037 0.048 0.082 0.196
(2) 5' x 2" Pipe Mount (R-For TME)	B	From Leg	2.000 0.000 0.000	0.000	128.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.000 1.393 1.703 2.351 3.778	1.000 1.393 1.703 2.351 3.778	0.029 0.037 0.048 0.082 0.196
(2) 5' x 2" Pipe Mount (R-For TME)	C	From Leg	2.000 0.000 0.000	0.000	128.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.000 1.393 1.703 2.351 3.778	1.000 1.393 1.703 2.351 3.778	0.029 0.037 0.048 0.082 0.196
//// DB-T1-6Z-8AB-0Z (P)	A	From Leg	3.500 0.000 0.000	0.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.025 7.962 8.790 10.211 13.239	4.233 5.286 6.192 7.680 10.871	0.073 0.130 0.194 0.342 0.765
5' x 2" Pipe Mount	A	From Leg	2.000	0.000	120.000	No Ice	1.000	1.000	0.029

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
(For Antenna)			0.000			1/2" Ice	1.393	1.393	0.037
			0.000			1" Ice	1.703	1.703	0.048
						2" Ice	2.351	2.351	0.082
						4" Ice	3.778	3.778	0.196
Side Arm Mount [SO 102-1]	A	From Leg	1.000	0.000	120.000	No Ice	1.500	1.500	0.025
(P)			0.000			1/2" Ice	1.740	1.750	0.035
			0.000			1" Ice	1.980	2.000	0.045
						2" Ice	2.460	2.500	0.065
						4" Ice	3.420	3.500	0.105
////									
(2) FD9R6004/2C-3L	A	From Leg	4.000	0.000	118.000	No Ice	0.367	0.085	0.003
(E)			0.000			1/2" Ice	0.451	0.136	0.005
			0.000			1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L	B	From Leg	4.000	0.000	118.000	No Ice	0.367	0.085	0.003
(E)			0.000			1/2" Ice	0.451	0.136	0.005
			0.000			1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L	C	From Leg	4.000	0.000	118.000	No Ice	0.367	0.085	0.003
(E)			0.000			1/2" Ice	0.451	0.136	0.005
			0.000			1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) DB846F65ZAXY w/	A	From Leg	4.000	0.000	118.000	No Ice	7.271	7.821	0.047
Mount Pipe			0.000			1/2" Ice	7.877	9.010	0.114
(E)			0.000			1" Ice	8.484	9.912	0.189
						2" Ice	9.724	11.812	0.367
						4" Ice	12.325	15.978	0.867
(2) DB846F65ZAXY w/	B	From Leg	4.000	0.000	118.000	No Ice	7.271	7.821	0.047
Mount Pipe			0.000			1/2" Ice	7.877	9.010	0.114
(E)			0.000			1" Ice	8.484	9.912	0.189
						2" Ice	9.724	11.812	0.367
						4" Ice	12.325	15.978	0.867
(2) DB846F65ZAXY w/	C	From Leg	4.000	0.000	118.000	No Ice	7.271	7.821	0.047
Mount Pipe			0.000			1/2" Ice	7.877	9.010	0.114
(E)			0.000			1" Ice	8.484	9.912	0.189
						2" Ice	9.724	11.812	0.367
						4" Ice	12.325	15.978	0.867
MG D3-800Tx w/ Mount	A	From Leg	4.000	0.000	118.000	No Ice	3.570	3.418	0.035
Pipe			0.000			1/2" Ice	3.979	4.119	0.068
(E)			0.000			1" Ice	4.387	4.784	0.108
						2" Ice	5.325	6.164	0.208
						4" Ice	7.341	9.175	0.517
MG D3-800Tx w/ Mount	B	From Leg	4.000	0.000	118.000	No Ice	3.570	3.418	0.035
Pipe			0.000			1/2" Ice	3.979	4.119	0.068
(E)			0.000			1" Ice	4.387	4.784	0.108
						2" Ice	5.325	6.164	0.208
						4" Ice	7.341	9.175	0.517
MG D3-800Tx w/ Mount	C	From Leg	4.000	0.000	118.000	No Ice	3.570	3.418	0.035
Pipe			0.000			1/2" Ice	3.979	4.119	0.068
(E)			0.000			1" Ice	4.387	4.784	0.108
						2" Ice	5.325	6.164	0.208
						4" Ice	7.341	9.175	0.517
RRH2X40-AWS	A	From Leg	4.000	0.000	118.000	No Ice	2.522	1.589	0.044
(P)			0.000			1/2" Ice	2.753	1.795	0.061

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
			0.000			1" Ice	2.993	2.010	0.082
						2" Ice	3.499	2.465	0.132
						4" Ice	4.615	3.479	0.275
RRH2X40-AWS	B	From Leg	4.000	0.000	118.000	No Ice	2.522	1.589	0.044
(P)			0.000			1/2" Ice	2.753	1.795	0.061
			0.000			1" Ice	2.993	2.010	0.082
						2" Ice	3.499	2.465	0.132
						4" Ice	4.615	3.479	0.275
RRH2X40-AWS	C	From Leg	4.000	0.000	118.000	No Ice	2.522	1.589	0.044
(P)			0.000			1/2" Ice	2.753	1.795	0.061
			0.000			1" Ice	2.993	2.010	0.082
						2" Ice	3.499	2.465	0.132
						4" Ice	4.615	3.479	0.275
BXA-70063-6CF-EDIN-0 w/	A	From Leg	4.000	0.000	118.000	No Ice	7.969	5.801	0.042
Mount Pipe			0.000			1/2" Ice	8.609	6.953	0.103
(P)			0.000			1" Ice	9.216	7.819	0.171
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.804
BXA-70063-6CF-EDIN-0 w/	B	From Leg	4.000	0.000	118.000	No Ice	7.969	5.801	0.042
Mount Pipe			0.000			1/2" Ice	8.609	6.953	0.103
(P)			0.000			1" Ice	9.216	7.819	0.171
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.804
BXA-70063-6CF-EDIN-0 w/	C	From Leg	4.000	0.000	118.000	No Ice	7.969	5.801	0.042
Mount Pipe			0.000			1/2" Ice	8.609	6.953	0.103
(P)			0.000			1" Ice	9.216	7.819	0.171
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.804
BXA-171063-8BF-EDIN-0	A	From Leg	4.000	0.000	118.000	No Ice	3.179	3.353	0.029
w/ Mount Pipe			0.000			1/2" Ice	3.555	3.971	0.061
(P)			0.000			1" Ice	3.964	4.595	0.099
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.488
BXA-171063-8BF-EDIN-0	B	From Leg	4.000	0.000	118.000	No Ice	3.179	3.353	0.029
w/ Mount Pipe			0.000			1/2" Ice	3.555	3.971	0.061
(P)			0.000			1" Ice	3.964	4.595	0.099
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.488
BXA-171063-8BF-EDIN-0	C	From Leg	4.000	0.000	118.000	No Ice	3.179	3.353	0.029
w/ Mount Pipe			0.000			1/2" Ice	3.555	3.971	0.061
(P)			0.000			1" Ice	3.964	4.595	0.099
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.488
T-Arm Mount [TA 602-3]	C	None		0.000	118.000	No Ice	11.590	11.590	0.774
(E)						1/2" Ice	15.440	15.440	0.990
						1" Ice	19.290	19.290	1.206
						2" Ice	26.990	26.990	1.639
						4" Ice	42.390	42.390	2.503
////									
RR90-17-02DP w/ Mount	A	From Leg	4.000	0.000	108.000	No Ice	4.593	3.319	0.034
Pipe			0.000			1/2" Ice	5.088	4.089	0.072
(E)			1.000			1" Ice	5.578	4.784	0.115
						2" Ice	6.588	6.225	0.224
						4" Ice	8.731	9.308	0.557
RR90-17-02DP w/ Mount	B	From Leg	4.000	0.000	108.000	No Ice	4.593	3.319	0.034
Pipe			0.000			1/2" Ice	5.088	4.089	0.072
(E)			1.000			1" Ice	5.578	4.784	0.115

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
						2" Ice	6.588	6.225	0.224
						4" Ice	8.731	9.308	0.557
RR90-17-02DP w/ Mount Pipe (E)	C	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice	4.593	3.319	0.034
						1/2" Ice	5.088	4.089	0.072
						1" Ice	5.578	4.784	0.115
						2" Ice	6.588	6.225	0.224
						4" Ice	8.731	9.308	0.557
(2) KRY 112 71 (E)	A	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice	0.681	0.450	0.013
						1/2" Ice	0.802	0.559	0.018
						1" Ice	0.932	0.677	0.025
						2" Ice	1.219	0.939	0.044
						4" Ice	1.896	1.566	0.111
(2) KRY 112 71 (E)	B	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice	0.681	0.450	0.013
						1/2" Ice	0.802	0.559	0.018
						1" Ice	0.932	0.677	0.025
						2" Ice	1.219	0.939	0.044
						4" Ice	1.896	1.566	0.111
(2) KRY 112 71 (E)	C	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice	0.681	0.450	0.013
						1/2" Ice	0.802	0.559	0.018
						1" Ice	0.932	0.677	0.025
						2" Ice	1.219	0.939	0.044
						4" Ice	1.896	1.566	0.111
APXV18-206516S-C-A20 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice	3.859	3.296	0.039
						1/2" Ice	4.274	4.004	0.073
						1" Ice	4.727	4.672	0.113
						2" Ice	5.686	6.056	0.215
						4" Ice	7.727	9.038	0.528
APXV18-206516S-C-A20 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice	3.859	3.296	0.039
						1/2" Ice	4.274	4.004	0.073
						1" Ice	4.727	4.672	0.113
						2" Ice	5.686	6.056	0.215
						4" Ice	7.727	9.038	0.528
APXV18-206516S-C-A20 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice	3.859	3.296	0.039
						1/2" Ice	4.274	4.004	0.073
						1" Ice	4.727	4.672	0.113
						2" Ice	5.686	6.056	0.215
						4" Ice	7.727	9.038	0.528
ATMAA1412D-1A20 (E)	A	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice	1.167	0.467	0.013
						1/2" Ice	1.314	0.575	0.021
						1" Ice	1.469	0.691	0.030
						2" Ice	1.806	0.951	0.056
						4" Ice	2.584	1.573	0.137
ATMAA1412D-1A20 (E)	B	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice	1.167	0.467	0.013
						1/2" Ice	1.314	0.575	0.021
						1" Ice	1.469	0.691	0.030
						2" Ice	1.806	0.951	0.056
						4" Ice	2.584	1.573	0.137
ATMAA1412D-1A20 (E)	C	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice	1.167	0.467	0.013
						1/2" Ice	1.314	0.575	0.021
						1" Ice	1.469	0.691	0.030
						2" Ice	1.806	0.951	0.056
						4" Ice	2.584	1.573	0.137
(2) 6' x 2" Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	108.000	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231

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
(2) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	108.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
(2) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	108.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
T-Arm Mount [TA 602-3]	C	None		0.000	108.000	No Ice	11.590	11.590	0.774
(E)						1/2" Ice	15.440	15.440	0.990
						1" Ice	19.290	19.290	1.206
						2" Ice	26.990	26.990	1.639
						4" Ice	42.390	42.390	2.503
////									
APXV18-206517-C w/	A	From Leg	1.000	0.000	100.000	No Ice	5.404	4.700	0.052
Mount Pipe			0.000			1/2" Ice	5.960	5.860	0.097
(E)			0.000			1" Ice	6.481	6.734	0.150
						2" Ice	7.547	8.515	0.280
						4" Ice	9.919	12.277	0.679
APXV18-206517-C w/	B	From Leg	1.000	0.000	100.000	No Ice	5.404	4.700	0.052
Mount Pipe			0.000			1/2" Ice	5.960	5.860	0.097
(E)			0.000			1" Ice	6.481	6.734	0.150
						2" Ice	7.547	8.515	0.280
						4" Ice	9.919	12.277	0.679
APXV18-206517-C w/	C	From Leg	1.000	0.000	100.000	No Ice	5.404	4.700	0.052
Mount Pipe			0.000			1/2" Ice	5.960	5.860	0.097
(E)			0.000			1" Ice	6.481	6.734	0.150
						2" Ice	7.547	8.515	0.280
						4" Ice	9.919	12.277	0.679
////									
KS24019-L112A	C	From Leg	3.000	0.000	75.000	No Ice	0.156	0.156	0.005
(E)			0.000			1/2" Ice	0.225	0.225	0.007
			2.000			1" Ice	0.302	0.302	0.009
						2" Ice	0.484	0.484	0.018
						4" Ice	0.951	0.951	0.056
6' x 2" Mount Pipe	C	From Leg	3.000	0.000	75.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Side Arm Mount [SO 701-1]	C	From Leg	1.500	0.000	75.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
						4" Ice	3.170	7.030	0.177
////									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
A-ANT-23G-2-C (E)	B	Paraboloid w/Shroud (HP)	From Leg	4.000 0.000 2.000	10.000		130.000	2.175	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.720 4.010 4.300 4.880 6.040	0.012 0.030 0.050 0.090 0.180
VHLP2-11 (E)	C	Paraboloid w/Shroud (HP)	From Leg	4.000 0.000 4.000	-30.000		130.000	2.175	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.720 4.010 4.300 4.880 6.040	0.027 0.050 0.070 0.110 0.190

////

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 Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	139.5 - 93.04	39.461	27	2.568	0.014
L2	96.96 - 46.38	18.584	27	1.888	0.005
L3	51.63 - 0	5.080	27	0.933	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
136.000	RRUS-11	27	37.612	2.517	0.014	19276
134.000	VHLP2-11	27	36.558	2.488	0.013	17524
132.000	A-ANT-23G-2-C	27	35.506	2.459	0.013	12851
130.000	LLPX310R w/Mount Pipe	27	34.459	2.430	0.012	10145
128.000	1900MHz RRH (65MHz)	27	33.416	2.400	0.012	8380
120.000	DB-T1-6Z-8AB-0Z	27	29.311	2.279	0.010	4942
118.000	(2) FD9R6004/2C-3L	27	28.307	2.248	0.009	4482
108.000	RR90-17-02DP w/ Mount Pipe	27	23.466	2.086	0.007	3058
100.000	APXV18-206517-C w/ Mount Pipe	27	19.871	1.945	0.005	2441
75.000	KS24019-L112A	27	10.727	1.434	0.003	2342

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	139.5 - 93.04	113.354	2	7.374	0.040
L2	96.96 - 46.38	53.493	2	5.432	0.013
L3	51.63 - 0	14.640	2	2.688	0.004

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
136.000	RRUS-11	2	108.057	7.230	0.039	6916
134.000	VHLP2-11	2	105.035	7.147	0.037	6287
132.000	A-ANT-23G-2-C	2	102.022	7.064	0.036	4610
130.000	LLPX310R w/Mount Pipe	2	99.019	6.980	0.034	3639
128.000	1900MHz RRH (65MHz)	2	96.030	6.896	0.033	3005
120.000	DB-T1-6Z-8AB-0Z	2	84.264	6.551	0.027	1770
118.000	(2) FD9R6004/2C-3L	2	81.385	6.462	0.026	1605
108.000	RR90-17-02DP w/ Mount Pipe	2	67.504	5.998	0.020	1092
100.000	APXV18-206517-C w/ Mount Pipe	2	57.188	5.595	0.015	870
75.000	KS24019-L112A	2	30.907	4.131	0.007	824

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	139.5 - 93.04 (1)	TP26.99x15.5x0.25	46.460	0.000	0.0	39.000	20.449	-8.162	797.508	0.010
L2	93.04 - 46.38 (2)	TP37.91x25.521x0.375	50.580	0.000	0.0	39.000	43.145	-17.435	1682.670	0.010
L3	46.38 - 0 (3)	TP48.5x35.874x0.375	51.630	0.000	0.0	39.000	52.307	-26.539	2039.980	0.013

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	139.5 - 93.04 (1)	TP26.99x15.5x0.25	509.322	47.087	39.000	1.207	0.000	0.000	39.000	0.000
L2	93.04 - 46.38 (2)	TP37.91x25.521x0.375	1494.442	46.583	39.000	1.194	0.000	0.000	39.000	0.000
L3	46.38 - 0 (3)	TP48.5x35.874x0.375	2361.158	49.985	39.000	1.282	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	139.5 - 93.04 (1)	TP26.99x15.5x0.25	19.725	0.965	26.000	0.074	0.614	0.028	26.000	0.001
L2	93.04 - 46.38 (2)	TP37.91x25.521x0.375	23.764	0.551	26.000	0.042	0.988	0.015	26.000	0.001
L3	46.38 - 0 (3)	TP48.5x35.874x0.375	26.537	0.507	26.000	0.038	0.971	0.010	26.000	0.000

Pole Interaction Design Data

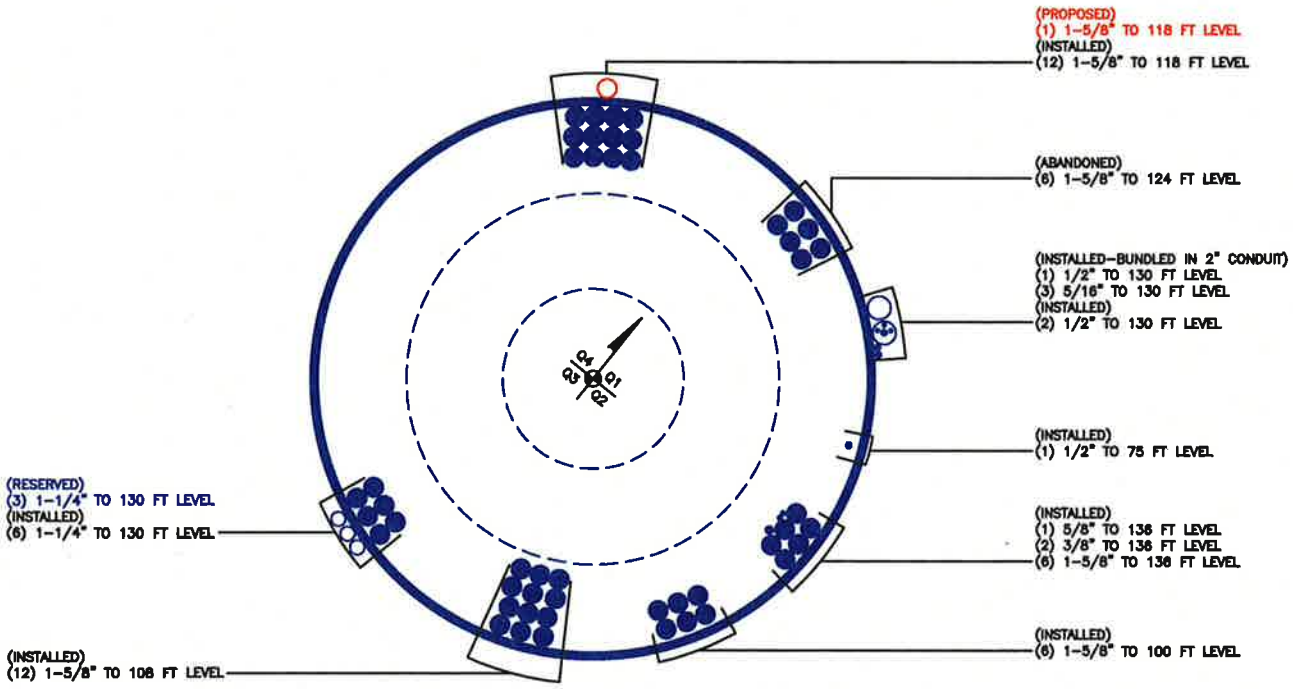
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	139.5 - 93.04 (1)	0.010	1.207	0.000	0.074	0.001	1.219 ✔	1.333	H1-3+VT ✔
L2	93.04 - 46.38 (2)	0.010	1.194	0.000	0.042	0.001	1.205 ✔	1.333	H1-3+VT ✔
L3	46.38 - 0 (3)	0.013	1.282	0.000	0.038	0.000	1.295 ✔	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	139.5 - 93.04	Pole	TP26.99x15.5x0.25	1	-8.162	1063.078	91.5	Pass
L2	93.04 - 46.38	Pole	TP37.91x25.521x0.375	2	-17.435	2242.999	90.4	Pass
L3	46.38 - 0	Pole	TP48.5x35.874x0.375	3	-26.539	2719.293	97.2	Pass
							Summary	
						Pole (L3)	97.2	Pass
						RATING =	**97.2**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 881541 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *881541*
Site Name: *ROGERS PROPERTY,CT*
App #: *195656 Rev: 6*

Pole Manufacturer:	*Other*

Reactions		
Moment:	2822	ft-kips
Axial:	31	kips
Shear:	28	kips

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	57	in

Plate Data		
Diam:	63	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	9.62	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Both	
Groove Depth:	0.375	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	6	in
Height:	15	in
Thick:	0.75	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	48.5	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	146.6 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	75.2% **Pass**	

Base Plate Results

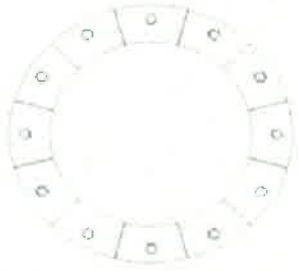
	Flexural Check	Stiffened
Base Plate Stress:	38.9 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	64.9% **Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	65.6% **Pass**
Vertical Weld:	61.4% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	23.9% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	66.4% **Pass**
Plate Comp. (AISC Bracket):	72.6% **Pass**

Pole Results

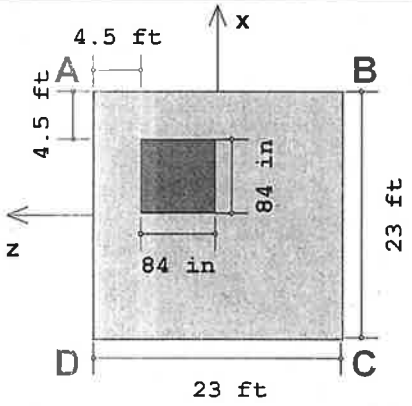
Pole Punching Shear Check:	15.8% **Pass**

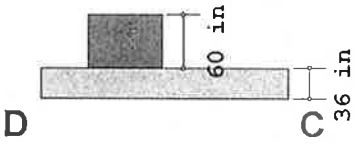


* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

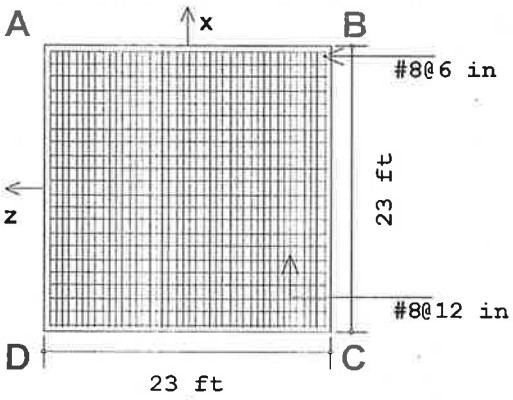
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Sketch

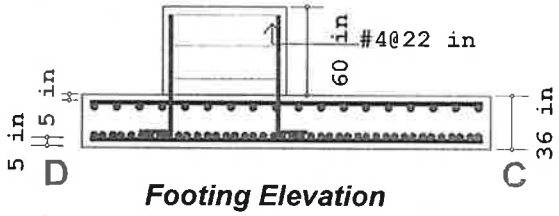




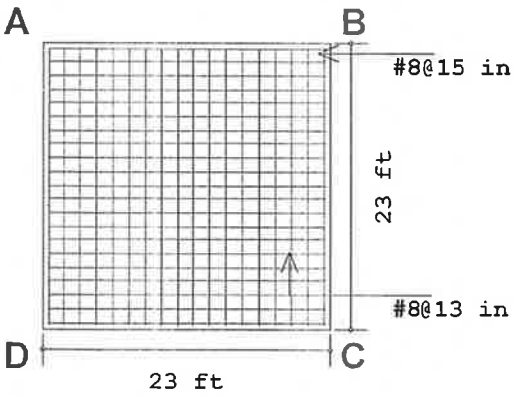
Details

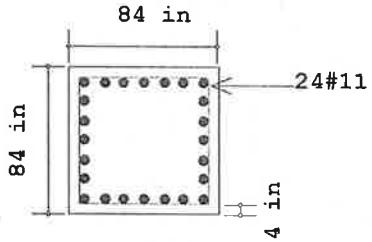


Bottom Rebar Plan



Footing Elevation





Pedestal Rebar Plan

x Dir. Steel: 14.14 in^2 (18 #8)

z Dir. Steel: 16.49 in^2 (min)(21 #8)

Top Rebar Plan

Geometry, Materials and Criteria

Length	:23 ft	eX	:42 in	Gross Allow. Bearing	:4000 psf (gross)	Steel fy	:60 ksi
Width	:23 ft	eZ	:42 in	Concrete Weight	:150 pcf	Minimum Steel	:.0033
Thickness	:36 in	pX	:84 in	Concrete f'c	:4 ksi	Maximum Steel	:.0075
Height	:60 in	pZ	:84 in	Design Code	:ACI 318-05		

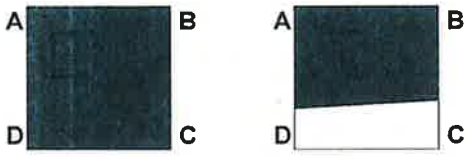
Footing Top Bar Cover	:5 in	Overturning / Sliding SF	:1.5	Phi for Flexure	:0.9
Footing Bottom Bar Cover	:5 in	Coefficient of Friction	:0.6	Phi for Shear	:0.75
Pedestal Longitudinal Bar Cover	:4 in	Passive Resistance of Soil	:0 k	Phi for Bearing	:0.65

Loads

	P (k)	Vx (k)	Vz (k)	Mx (k-ft)	Mz (k-ft)	Overburden (psf)
DL	31					437.5
WL		28			2822	

Soil Bearing

Description	Categories and Factors	Gross Allow.(psf)	Max Bearing (psf)	Max/Allowable Ratio
Service Load 1	1DL	4000	1134.92 (A)	.284
Service Load 2	1DL+1WL	4000	2949.16 (A)	.737



1DL
QA: 1134.92 psf
QB: 975.047 psf
QC: 815.178 psf
QD: 975.047 psf
NAZ: 1959.34 in
NAX: 1959.34 in

1DL+1WL
QA: 2949.16 psf
QB: 2716.78 psf
QC: 0 psf
QD: 0 psf
NAZ: 3502.78 in
NAX: 197.667 in

Footing Flexure Design (Bottom Bars)

As-min x-dir (Top Flexure): **27.6 in^2**
As-min z-dir (Top Flexure): **27.6 in^2**
As-min x-dir (Bot Flexure): **27.6 in^2**
As-min z-dir (Bot Flexure): **27.6 in^2**

As-min x-dir (T & S): **17.885 in^2**
As-min z-dir (T & S): **17.885 in^2**

Description	Categories and Factors	Mu-xx UC Max	Mu-xx (k-ft)	z-Dir As Required (in^2)	z-Dir As Provided (in^2)	Mu-zz UC Max	Mu-zz (k-ft)	x-Dir As Required (in^2)	x-Dir As Provided (in^2)
Factored Load	1 1.2DL	.02731	62.52	.463	17.279	.01455	62.52	.463	32.987
Factored Load	2 1.2DL+1.6WL	.02752	63.02	.467	17.279	.19164	823.43	6.14	32.987
Factored Load	3 .9DL+1.6WL	.02064	47.27	.35	17.279	.36864	1583.94	11.883	32.987

Steel Reqd → 11.883 in²
Steel Provided → $\frac{\pi}{4} \times (1)^2 \times 90 = 70.68 \text{ in}^2$
#8 (90) EW
16.8 % OK

Footing Flexure Design (Top Bars)

Description	Categories and Factors	Mu-xx (k-ft)	z Dir As (in^2)	Mu-zz (k-ft)	x Dir As (in^2)
SW+OB	1SW+1OB-(Factored Lo..,Factored Lo..	87.712	0	1349.78	10.107

Moment Capacity of Plain Concrete Section Along xx and zz= **770.721k-ft,770.721k-ft** Per Chapter 22 of ACI 318.

Footing Shear Check

Two Way (Punching) Vc: **3460.8 k** One Way (x Dir. Cut) Vc **1047.35 k** One Way (z Dir. Cut) Vc: **1047.35 k**

Description	Categories and Factors	Punching Vu(k)	Punching Vu/øVc	x Dir. Cut Vu(k)	x Dir. Cut Vu/øVc	z Dir. Cut Vu(k)	z Dir. Cut Vu/øVc
Factored Load 1	1.2DL	40.824	.016	9.661	.012	9.661	.012
Factored Load 2	1.2DL+1.6WL+	31.769	.012	9.697	.012	220.455	.281
Factored Load 3	.9DL+1.6WL	113.768	.044	7.272	.009	426.833	.543

Pedestal Design

Shear Check Results (Envelope):

	Vc	Vs	Vu	Vu/phi*Vn	phi
Shear Along x Direction:	837.217	84.389	44.8	.065	.75
Shear Along z Direction:	837.217	84.389	0	0	.75

Pedestal Ties : **#4 @ 22 in**

Bending Check Results (Envelope): PCA Load Contour Method (for biaxial)

Unity Check	: .73	Phi	: .9	Parme Beta	: .65
Pu	: 0 k	Mux	: 0 k-ft	Muz	: 4739.2 k-ft
Pn	: 0 k	Mnx	: NC	Mnz	: 7216.74 k-ft
Governing LC	: 4	Mnox	: NC	Mnoz	: NC
Pedestal Bars	: 24 #11	% Steel	: .5311		

Overturning Check (Service)

Description	Categories and Factors	Mo-xx (k-ft)	Ms-xx (k-ft)	Mo-zz (k-ft)	Ms-zz (k-ft)	OSF-xx	OSF-zz
Service Load 1	1DL	0	5769.61	0	5769.61	NA	NA
Service Load 2	1DL+1WL	0	5769.61	3046	5769.61	NA	1.894

Mo-xx: Governing Overturning Moment about AD or BC
Ms-xx: Governing Stablizing Moment about AD or BC
OSF-xx: Ratio of Ms-xx to Mo-xx

OTM SF = 1.894
UNITY = 1.5/1.894 = 79.2 %
OK

Sliding Check (Service)

Description	Categories and Factors	Va-xx (k)	Vr-xx (k)	Va-zz (k)	Vr-zz (k)	SR-xx	SR-zz
Service Load 1	1DL	0	309.48	0	309.48	NA	NA
Service Load 2	1DL+1WL	28	309.48	0	309.48	11.053	NA

Va-xx: Applied Lateral Force to Cause Sliding Along xx Axis
Vr-xx: Resisting Lateral Force Against Sliding Along xx Axis
SR-xx: Ratio of Vr-xx to Va-xx

APPENDIX D

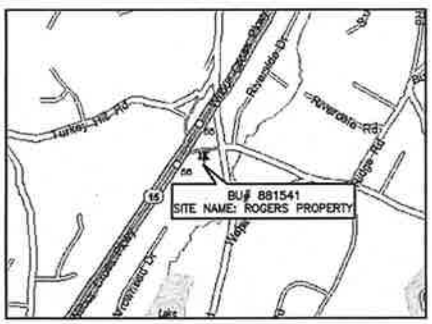
TOWER MODIFICATION DRAWINGS

CROWN CASTLE

TOWER MODIFICATION DRAWINGS

SITE NAME: ROGERS PROPERTY
BU NUMBER: 881541

SITE ADDRESS:
GRASSY HILL ROAD,
ORANGE, CT 06477
NEW HAVEN COUNTY, USA



MAP

DIRECTIONS

CT 15 TO EXIT 56 AND THEN RIGHT ON GRASSY HILL RD AND THE ACCESS ROAD ON RIGHT. TOWER BETWEEN CT 15, EXIT 56 AND GRASSY HILL RD.

PROJECT CONTACTS:

1. CROWN TOWER STRUCTURAL ANALYST
   JASON ROUSE
   (704) 405-6605
   JASON.ROUSE@CROWNCASTLE.COM
   3530 TORINGDON WAY, SUITE 300
   CHARLOTTE, NC 28277

2. B+T GROUP PROJECT ENGINEER
   SANTHOSHA SHANBHOGUE
   (918) 587-4630
   SSHANBHOGUE@BTGRP.COM
   1717 S BOULDER AVENUE, SUITE 300
   TULSA, OKLA. 74119

3. B+T GROUP ENGINEER (EOR)
   CHAD E TUTTLE, P.E.
   (918) 587-4630
   CTUTTLE@BTGRP.COM
   1717 S BOULDER AVENUE, SUITE 300
   TULSA, OKLA. 74119

TOWER INFORMATION

TOWER MANUFACTURER / DWG #:	EEI / GS55077
TOWER HEIGHT / TYPE:	139.5' MONOPOLE
TOWER LOCATION: DATUM: (NAD 1983)	LAT. 41° 17' 7.75" LONG. -73° 2' 33.27" ELEV. 100 FT AMSL
STRUCTURAL DESIGN DRAWING REPORT:	B+T GROUP / WO. # 661413
STRUCTURAL ANALYSIS REPORT:	VERTICAL STRUCTURES, INC. / WO. 641199
STRUCTURAL ANALYSIS DATE:	09/12/13
APPLICATION ID / REVISION #:	195656 / 6
CCISITES DOCUMENT ID:	3985656

CODE COMPLIANCE

THIS REINFORCEMENT DESIGN IS BASED ON THE REQUIREMENTS OF TIA/EIA-222-F STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES USING A 3-SECOND GUST WIND SPEED OF 85 MPH WITH NO ICE, 37.6 MPH WITH 0.75 INCH ICE THICKNESS AND 50 MPH UNDER SERVICE LOADS.

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S1	TITLE SHEET
S2	MODIFICATION INSPECTION NOTES AND CHECKLIST
S3	TOWER ELEV., SCHEDULE, TX LINE DIST. DIAG. AND GENERAL NOTES
S4	TOWER SECTION AT BASE AND BASE PLATE STIFFENER DETAIL

B+T GRP
1717 S. BOULDER AVE. SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/24/13	ISSUED FOR CONSTRUCTION

PROJECT NO:	88874.001.01
PROJECT ENG:	S. SHANBHOGUE
DRAWN BY:	VAT / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.

STATE OF CONNECTICUT · CHAD TUTTLE · No. 25824 · LICENSED · PROFESSIONAL ENGINEER
10/24/13

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

ROGERS PROPERTY
881541
GRASSY HILL ROAD, ORANGE, CT
EXISTING 139.5' MONOPOLE

SHEET TITLE: TITLE SHEET

SHEET NUMBER: S1 | REVISION: 0

S:\Projects\Crown Castle\88874_881541_Rogers Property\TOW MOD\88874.001.01_Rogers Property 881541 TOW MOD.dwg - Sheet:S1 - User: Livingston - October 24, 2013 - 4:09 PM

MI CHECKLIST		
REQUIRED	REPORT ITEM	BRIEF DESCRIPTION
PRE-CONSTRUCTION		
X	MI CHECKLIST DRAWING	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT.
X	EOR APPROVED SHOP DRAWINGS	FABRICATION DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW. THE CONTRACTOR SHALL PROVIDE APPROVED SHOP DRAWINGS TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATION INSPECTION	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR CERTIFIED WELD INSPECTION	A VISUAL OBSERVATION BY A CWI OF A PORTION OF WELDING ON THE PROPOSED STRUCTURAL MEMBERS IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORT (MTR)	MILL CERTIFICATION SHALL BE PROVIDED FOR ALL STEEL AS SPECIFIED IN THE MODIFICATION DRAWINGS AND THIS DOCUMENTATION SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR NDE INSPECTION	CRITICAL SHOP WELDS THAT REQUIRE TESTING (PER ENG-STD-10069) ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED WELD INSPECTOR SHALL PERFORM NON-DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	NDE REPORT OF MONOPOLE BASE PLATE	A NDE (PER ENG-SOW-10033) OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
CONSTRUCTION (PREFORMED BY CONTRACTOR)		
X	CONSTRUCTION INSPECTIONS	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FOUNDATION INSPECTIONS	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	CONCRETE COMP. STRENGTH AND SLUMP TESTS	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	POST INSTALLED ANCHOR ROD VERIFICATION	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROWN REQUIREMENTS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	BASE PLATE GROUT VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS INSTALLED IN ACCORDANCE WITH CROWN ENG-PRC-10012 FOR INCLUSION IN THE MI REPORT.
X	CONTRACTOR'S CERTIFIED WELD INSPECTION	A CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST AS NECESSARY ALL FIELD WELDS. CWI SHALL FOLLOW ALL THE PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS ENG-SOW-10066, ENG-STD-10069 AND SRV-STD-10159. A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT. FULL PENETRATION WELDS IN THE VICINITY OF BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.
N/A	EARTHWORK: LIFT AND DENSITY	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	ON SITE COLD GALVANIZING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED IN ACCORDANCE WITH ENG-BUL-10149.
N/A	GUY WIRE TENSION REPORT	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT TO THE MI INSPECTOR INDICATING THE TEMPERATURE AND TENSION IN EVERY GUY CABLE AS PART OF PLUMB AND TENSION PROCEDURE FOR INCLUSION IN THE MI REPORT.
X	GC AS-BUILT DOCUMENTS	THE GENERAL CONTRACTOR SHALL SUBMIT A COPY OF THE CONTRACT DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD DUE TO FIELD CONDITIONS.
POST-CONSTRUCTION		
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTORS REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
N/A	POST INSTALLED ANCHOR ROD PULL-OUT TESTING	POST-INSTALLED ANCHOR RODS SHALL BE TESTED IN ACCORDANCE WITH ENG-PRC-10119 AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PHOTOGRAPHS	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI WHICH DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
ADDITIONAL TESTING AND INSPECTIONS:		

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE MI REPORT
N/A DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT

MODIFICATION INSPECTION NOTES:

GENERAL

THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 LIST OF APPROVED MI VENDORS.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 : MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE MI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MI'S

IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

MI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

REQUIRED PHOTOS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/24/13	ISSUED FOR CONSTRUCTION

PROJECT NO:	88674.001.01
PROJECT ENG:	S. SHANBHOGUE
DRAWN BY:	VAT / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER

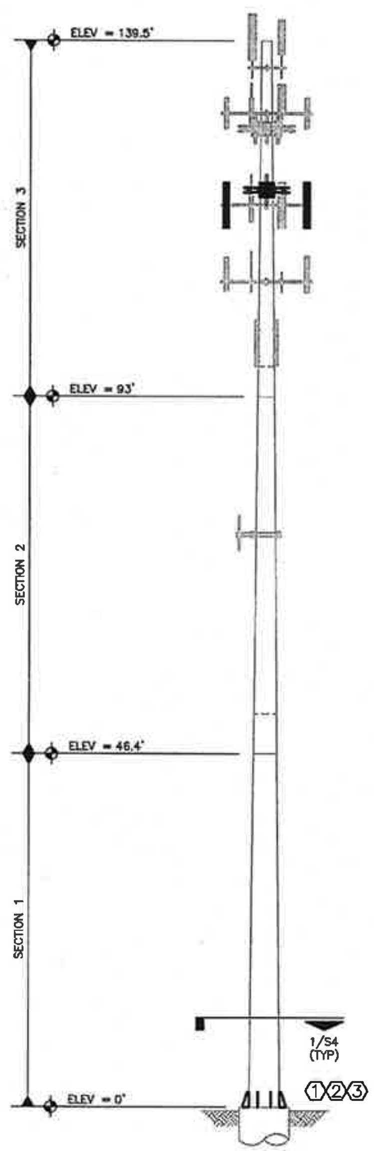
ROGERS PROPERTY
881541

GRASSY HILL ROAD,
ORANGE, CT

EXISTING 139.5' MONOPOLE

SHEET TITLE
MODIFICATION INSPECTION NOTES AND CHECKLIST

SHEET NUMBER:	REVISION:
S2	0



1 TOWER ELEVATION
SCALE: N.T.S.

EXISTING MEMBER SCHEDULE					
SECTION	NUMBER OF SIDES	THICKNESS	BOTTOM DIAMETER	TOP DIAMETER	LAP SPLICE
1	18	0.3750"	48.5000"	35.8740"	62.91"
2	18	0.3750"	37.9100"	25.5205"	46.47"
3	18	0.2500"	26.9900"	15.5000"	----

TOWER MODIFICATIONS:

1. CONTRACTOR SHALL BUDGET A SITE VISIT TO CHECK CRITICAL DIMENSIONS AND VERIFY UNKNOWN CONDITIONS PRIOR TO STEEL FABRICATION.
2. THE NEW AND EXISTING TRANSMISSION LINES MUST BE DISTRIBUTED AS SHOWN IN THE TX LINE DIST. DIAGRAM RE: DETAIL 2/S3.
3. INSTALL NEW BASE PLATE STIFFENERS RE: SHEET S4.

- * CONTRACTOR SHALL PROVIDE TEMPORARY BRACING FOR ALL REMOVE AND REPLACE PROCEDURES.
- ** MODIFICATIONS SHALL BE COMPLETED PRIOR TO ADDING THE PROPOSED APPURTENANCES.

GENERAL NOTES

1.1 ALL WORK SHALL COMPLY WITH THE TIA/EIA-222-F STANDARD AS WELL AS ANY OTHER GOVERNING BUILDING CODES.
1.2 FIELD WORK WILL BE DONE AROUND EXISTING COAXIAL CABLE AND EQUIPMENT. ALL WORK SHALL BE DONE IN A MANNER SUCH THAT NO DAMAGE OCCURS TO THE EXISTING EQUIPMENT OR THE STRUCTURE.
1.3 A MINIMUM OF TWO COATS OF ZINGA COLD GALVANIZING COMPOUND (OR APPROVED EQUIVALENT) SHALL BE APPLIED TO ANY FIELD CUTS OR FIELD DRILLED HOLES.
1.4 THE USE OF A GAS TORCH OR WELDER WILL NOT BE PERMITTED ON THE TOWER WITHOUT THE CONSENT OF THE OWNER.
1.5 IN LIEU OF TEMPORARY BRACING CONTRACTOR MAY HAVE A STABILITY ANALYSIS PERFORMED BY AN ENGINEER LICENSED IN THE STATE THE TOWER IS LOCATED. THE ANALYSIS SHALL USE A MINIMUM WIND SPEED OF 45 mph (3-SEC) PER TIA-1019.

FABRICATION

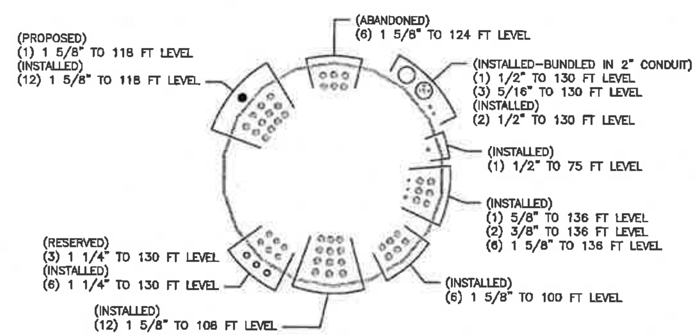
2.1 ALL WORK SHALL BE DONE IN ACCORDANCE WITH A.I.S.C. "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS.
2.2 STRUCTURAL STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS:

	YIELD	ASTM SPECS
A. STEEL SHAPES AND PLATES, U.N.O.	50ksi	A572

2.3 ALL NEW MATERIAL INCLUDING STRUCTURAL STEEL AND FASTENERS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 AND A153.
2.4 WELDING SHALL MEET ANSI/AWS D1.1 STRUCTURAL WELDING CODE (LATEST REVISION). ELECTRODES SHALL BE E80 SERIES.
2.5 CONTRACTOR SHALL PROVIDE SHOP FABRICATION DRAWINGS TO B+T GROUP 2 WEEKS PRIOR TO FABRICATION.

KEY NOTES

(#) TOWER MODIFICATION I.D.



2 TX LINE DISTRIBUTION DIAGRAM
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/24/13	ISSUED FOR CONSTRUCTION

PROJECT NO:	88674.001.01
PROJECT ENG:	S. SHANBHOGUE
DRAWN BY:	VAT / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.

STATE OF CONNECTICUT * CHAD TUTTLE * No. 23924 * LICENSED * PROFESSIONAL ENGINEER
10/24/13

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

ROGERS PROPERTY
881541

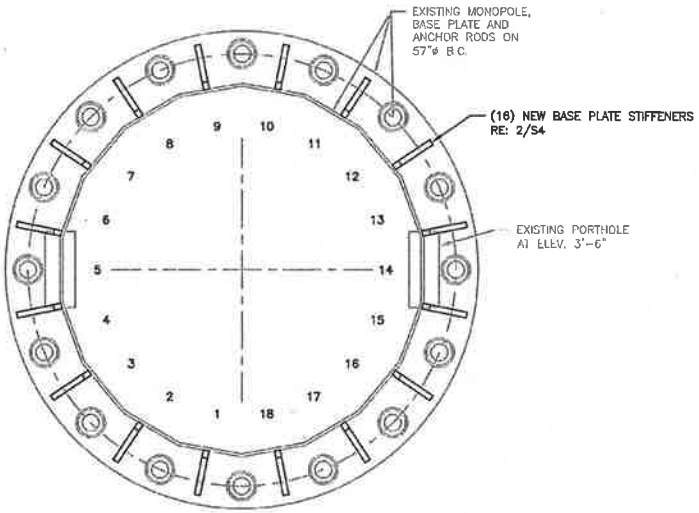
GRASSY HILL ROAD,
ORANGE, CT

EXISTING 139.5' MONOPOLE

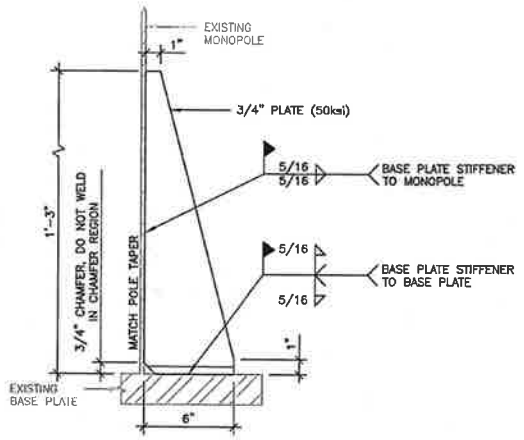
SHEET TITLE
TOWER ELEV., SCHEDULE, TX LINE DIST. DIAGRAM AND GENERAL NOTES

SHEET NUMBER: S3
REVISION: 0

S:\Projects\Crown Castle\88674_881541_Rogers Property\TOW MOD\88674.001.01_Rogers Property 881541 TOW MOD.dwg - SheetS3 - User: LAlmgreen - October 24, 2013 - 4:09 PM



1 TOWER SECTION AT BASE
SCALE: N.T.S.



2 BASE PLATE STIFFENER DETAIL
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/24/13	ISSUED FOR CONSTRUCTION

PROJECT NO:	88674.001.01
PROJECT ENG:	S. SHANBHOGUE
DRAWN BY:	VAT / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED PROFESSIONAL ENGINEER

ROGERS PROPERTY
881541

GRASSY HILL ROAD,
ORANGE, CT

EXISTING 139.5' MONOPOLE

SHEET TITLE
TOWER SECTION AT BASE AND BASE PLATE STIFFENER DETAIL

SHEET NUMBER: S4

REVISION: 0