

June 3, 2015

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

Re: **Notice of Exempt Modification – Facility Modification  
280 Ross Road, Killingly, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the 100-foot level on an existing 119-foot monopole tower at 280 Ross Road in Killingly, Connecticut (the “Property”). The tower is owned by Crown Castle. Cellco’s use of the tower was approved by the Council in 2009. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with three (3) model BXA-70080-6CF, 850 MHz antennas; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas; and three (3) model HBXX-6517DS-VTM, 2100 MHz antennas, all at the same 100-foot level on the tower. Cellco also intends to add six (6) remote radio heads (“RRHs”), one (1) each behind its 1900 MHz and 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable inside the monopole tower shaft. 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 Sean Hendricks, Town Manager for the Town of Killingly. A copy of this letter is also being sent to Snake Meadow Club Inc., the owner of the Property.

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

13851632-v1

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1. The proposed modifications will not result in an increase in the height of the existing tower. The replacement antennas and RRHs will be installed on Cellco's existing antenna platform at the 100-foot level on the tower.
2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table with Cellco's modified facility is included in Attachment 2.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support Cellco's proposed modifications. (*See Structural Analysis Report included in Attachment 3*).

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

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Sean Hendricks, Killingly Town Manager  
Snake Meadow Club Inc.  
Tim Parks

# **ATTACHMENT 1**

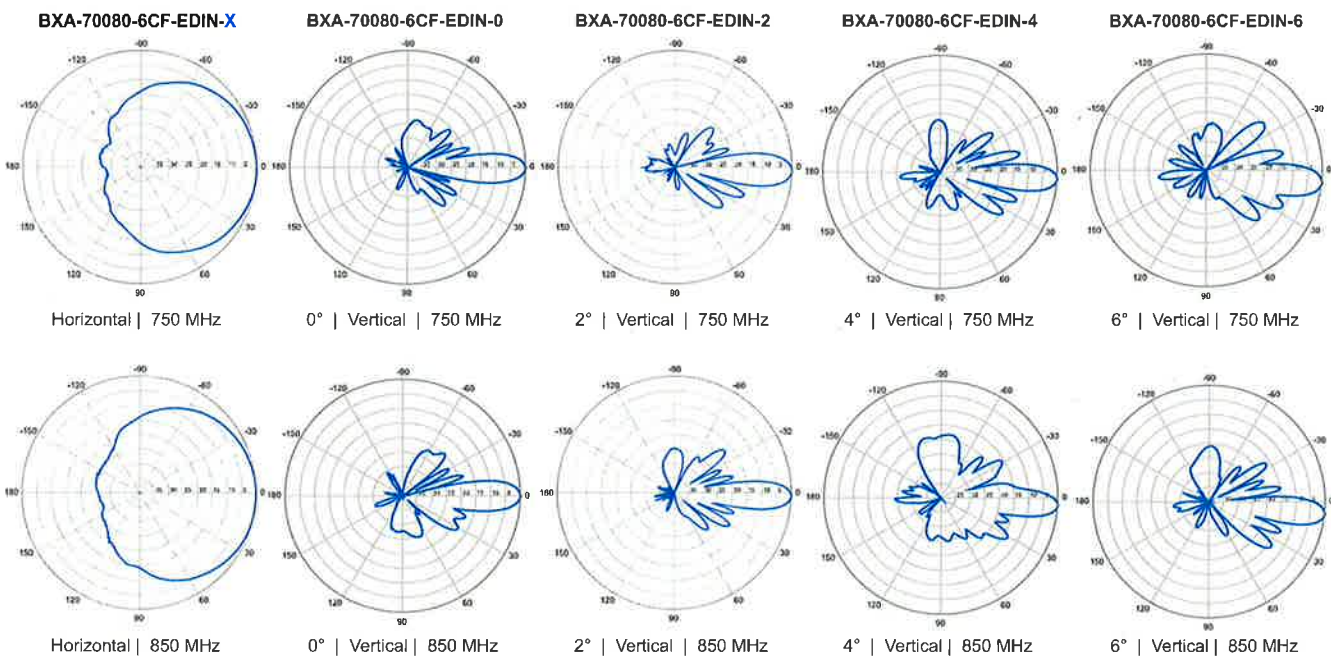
## BXA-70080-6CF-EDIN-X

X-Pol | FET Panel | 80° | 13.5 dBd

Replace "X" with desired electrical downtilt.

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

Electrical Characteristics	696-900 MHz		
Frequency bands	696-806 MHz	806-900 MHz	
Polarization	±45°		
Horizontal beamwidth	82°	80°	
Vertical beamwidth	12°	10°	
Gain	13.0 dBd (15.1 dBi)	13.5 dBd (15.6 dBi)	
Electrical downtilt (X)	0, 2, 4, 6, 8, 10		
Impedance	50Ω		
VSWR	≤1.35:1		
Upper sidelobe suppression (0°)	-18.3 dB	-18.6 dB	
Front-to-back ratio (+/-30°)	-26.9 dB	-25.6 dB	
Null fill	5% (-26.02 dB)		
Isolation between ports	< -25 dB		
Input power with EDIN connectors	500 W		
Input power with NE connectors	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1804 x 204 x 151 mm	71.0 x 8.0 x 5.9 in	
Depth with z-brackets	191 mm	7.5 in	
Weight without mounting brackets	8.2 kg	18 lbs	
Survival wind speed	> 201 km/hr	> 125 mph	
Wind area	Front: 0.37 m <sup>2</sup> Side: 0.27 m <sup>2</sup>	Front: 3.9 ft <sup>2</sup> Side: 2.9 ft <sup>2</sup>	
Wind load @ 161 km/hr (100 mph)	Front: 531 N Side: 475 N	Front: 119 lbf Side: 104 lbf	
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70080-6CF-EDIN-X-FP		

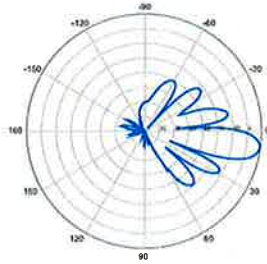


Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product.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

### BXA-70080-6CF-EDIN-X

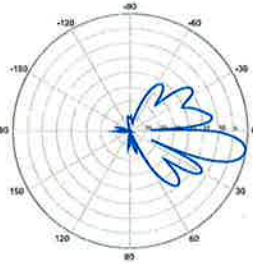
X-Pol | FET Panel | 80° | 13.5 dBd

BXA-70080-6CF-EDIN-8

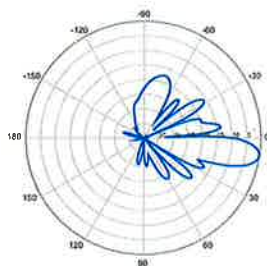


8° | Vertical | 750 MHz

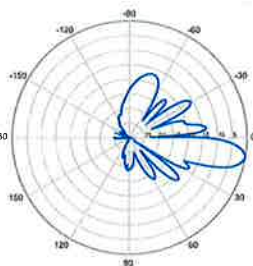
BXA-70080-6CF-EDIN-10



10° | Vertical | 750 MHz



8° | Vertical | 850 MHz



10° | 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.



## HBXX-6517DS-VTM

**Andrew® Quad Port Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible**

- Superior azimuth tracking and pattern symmetry with excellent passive intermodulation suppression

### Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain, dBi	19.0	19.1	19.2
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	18	18
Front-to-Back Ratio at 180°, dB	30	30	30
CPR at Boresight, dB	21	22	21
CPR at Sector, dB	10	11	9
Isolation, dB	30	30	30
VSWR   Return Loss, dB	1.4   15.6	1.4   15.6	1.4   15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm

### Electrical Specifications, BASTA\*

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
	0 °   18.4	0 °   18.4	0 °   18.7
Gain by Beam Tilt, average, dBi	3 °   18.7	3 °   18.7	3 °   18.9
	6 °   18.4	6 °   18.5	6 °   18.6
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9

\* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper [Time to Raise the Bar on BSAs](#).

### General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® quad
Band	Single band
Brand	DualPol®   Teletilt®
Operating Frequency Band	1710 – 2180 MHz

HBXX-6517DS-VTM

POWERED BY



Performance Note

Outdoor usage

## Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Low loss circuit board
Radome Material	PVC, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h   149.8 mph

## Dimensions

Depth	166.0 mm   6.5 in
Length	1903.0 mm   74.9 in
Width	305.0 mm   12.0 in
Net Weight	19.5 kg   43.0 lb

## Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator HBXX-6517DS-A2M

RET System Teletilt®

## Regulatory Compliance/Certifications

### Agency

RoHS 2011/65/EU  
China RoHS SJ/T 11364-2006  
ISO 9001:2008

### Classification

Compliant by Exemption  
Above Maximum Concentration Value (MCV)  
Designed, manufactured and/or distributed under this quality management system



## Included Products

600899A-2 — Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

### \* Footnotes

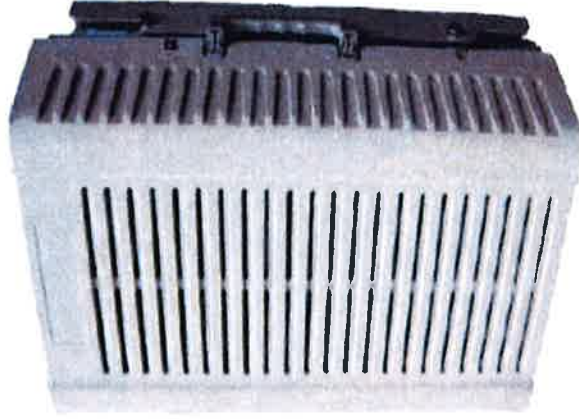
Performance Note Severe environmental conditions may degrade optimum performance



# PCS RF MODULES

## RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3



	<b>RRH2x60</b>
RF Output Power	2x60W
Instantaneous Bandwidth	20MHz
Transmitter	2 TX
Receiver	1900 HW version 1900A HW version
Features	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3 AISG 2.0 for RET/TMA Internal Smart Bias-T
Power	-48VDC
CPRI Ports	2 CPRI Rate 3 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (top mounted)

\*\* Not a Verizon Wireless deployed product

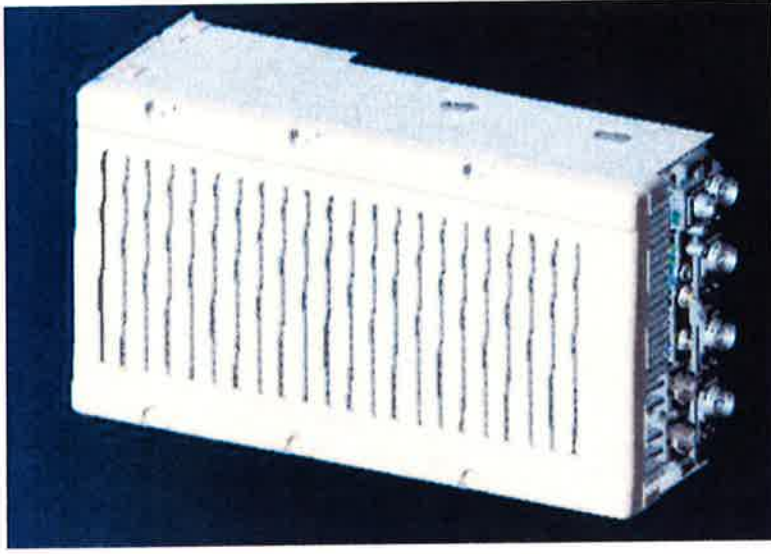


# NEW PCS RF MODULES FOR VZW

## RRH2X60 - HW CHARACTERISTICS

LR14.3

RRH2X60	
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (downward facing)
Dimensions	22"(h) x 12"(w) x 9.4" (d)**
Weight	55lb**



\*\* - Includes solar shield but not mounting brackets (8 lbs.)

# ALCATEL-LUCENT WIRELESS PRODUCT DATASHEET RRH2X60-AWS FOR BAND 4 APPLICATIONS

The Alcatel-Lucent RRH2x60-AWS is a high power, small form factor Remote Radio Head operating in the AWS frequency band (3GPP Band 4) for LTE technology. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.



A distributed Node B expands the 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 a Node B to be installed separately, within the same site or several kilometers apart.

The Alcatel-Lucent RRH2x60-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.

#### SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-AWS integrates all the latest technologies. This allows to offer best-in-class characteristics.

It delivers an outstanding 120 watts of total RF power thanks to its two transmit RF paths of 60 W each.

It is ideally suited to support multiple-input multiple-output (MIMO) 2x2 operation.

It includes four RF receivers to natively support 4-way uplink reception diversity. This improves the radio uplink coverage and this can be used to extend the cell radius commensurate with 2x2MIMO 2x60 W for the downlink.

It supports multiple discontinuous LTE carriers within an instantaneous bandwidth of 45 MHz corresponding to the entire AWS B4 spectrum.

The latest generation power amplifiers (PA) used in this product achieve high efficiency (>40%), resulting in improved power consumption figures.

#### OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-AWS is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

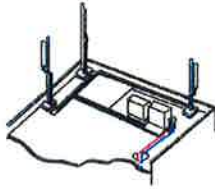
#### EASY INSTALLATION

The RRH2x60-AWS includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

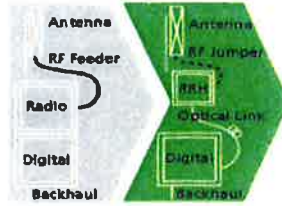
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-AWS is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

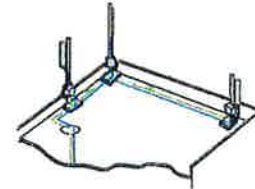
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

## FEATURES

- RRH2x60-AWS integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- RRH2x60-AWS is optimized for LTE operation
- RRH2x60-AWS is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

## BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and

silent solutions, with minimum impact on the neighborhood, which ease the deployment

- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

## TECHNICAL SPECIFICATIONS

Specifications listed are hardware capabilities. Some capabilities depend on support in a specific software release or future release.

### Dimensions and weights

- HxWxD : 510x285x186mm (27 l with solar shield)
- Weight : 20 kg (44 lbs)

### Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption (ETSI average traffic load reference) : 250W @2x60W

### RF Characteristics

- Frequency band: 1710-1755, UL / 2110-2155 MHz, DL (3GPP band 4)
- Output power: 2x60W at antenna connectors
- Technology supported: LTE
- Instantaneous bandwidth: 45 MHz
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -105 dBm for LTE

### Connectivity

- Two CPRI optical ports for daisy chaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 500m using MM fiber, up to 20km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

### Environmental specifications

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions : ETS 300 019-1-4 class 4.1E
- Ingress Protection : IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

### Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B, CE Mark – European Directive : 2002/95/EC (ROHS); 2002/96/EC (WEEE); 1999/5/EC (R&TTE)
- Health : EN 50385

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.....Alcatel-Lucent

**AT THE SPEED OF IDEAS™**







**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.

**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



Figure 1: HYBRIFLEX Series

**Technical Specifications**

Outer Conductor Armor	Corrugated Aluminum	(mm (in))	46.5 (1.83)
Jacket	Polyethylene, PE	(mm (in))	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		(kg/m (lb/ft))	1.9 (1.30)
Minimum Bending Radius, Single Bending		(mm (in))	200 (8)
Minimum Bending Radius, Repeated Bending		(mm (in))	500 (20)
Recommended/Maximum Clamp Spacing		(m (ft))	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		(Ω/km (Ω/1000ft))	068 (0.205)
DC-Resistance Power Cable, 8.4mm <sup>2</sup> (8AWG)		(Ω/km (Ω/1000ft))	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		(μm)	50/125
Primary Coating (Acrylate)		(μm)	245
Buffer Diameter, Nominal		(μm)	900
Secondary Protection, Jacket, Nominal		(mm (in))	2.0 (0.08)
Minimum Bending Radius		(mm (in))	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL34-V0, UL1666 RoHS Compliant
Size (Power)		(mm (AWG))	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		(mm (AWG))	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		(mm (in))	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		(°C (°F))	-40 to +65 (-40 to 149)
Operation Temperature		(°C (°F))	-40 to +65 (-40 to 149)

\* This data is provisional and subject to change

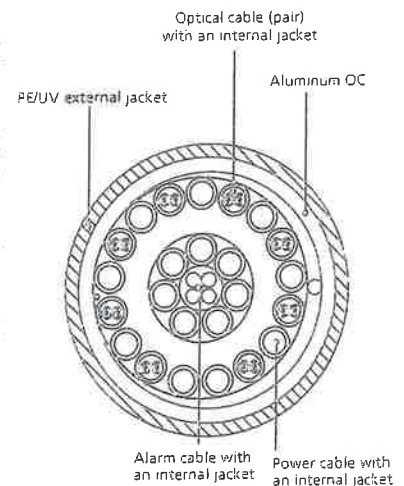


Figure 2: Construction Detail

All information contained in the present datasheet is subject to confirmation at time of ordering.

# **ATTACHMENT 2**

		General		Power		Density							
<b>Site Name:</b> Danielson S (Killingly)													
<b>Tower Height:</b> 100Ft.													
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total					
*AT&T UMTS	2	565	121	0.0278	880	0.5867	4.73%						
*AT&T UMTS	2	875	121	0.0430	1900	1.0000	4.30%						
*AT&T GSM	1	283	121	0.0070	880	0.5867	1.18%						
*AT&T GSM	4	525	121	0.0516	1900	1.0000	5.16%						
*AT&T LTE	1	1771	121	0.0435	734	0.4893	8.89%						
*MetroPCS	3	443.61	90	0.0591	2140	1.0000	5.91%						
*T-Mobile	8	193	110	0.0459	1935	1.0000	4.59%						
<b>Verizon PCS</b>	<b>11</b>	<b>459</b>	<b>100</b>	<b>0.1815</b>	<b>1970</b>	<b>1.0000</b>	<b>18.15%</b>						
<b>Verizon Cellular</b>	<b>9</b>	<b>416</b>	<b>100</b>	<b>0.1346</b>	<b>869</b>	<b>0.5793</b>	<b>23.24%</b>						
<b>Verizon AWS</b>	<b>1</b>	<b>1750</b>	<b>100</b>	<b>0.0629</b>	<b>2145</b>	<b>1.0000</b>	<b>6.29%</b>						
<b>Verizon 700</b>	<b>1</b>	<b>1050</b>	<b>100</b>	<b>0.0378</b>	<b>746</b>	<b>0.4973</b>	<b>7.59%</b>						
								<b>90.03%</b>					
* Source: Siting Council													



# **ATTACHMENT 3**



GPD Engineering and Architecture  
Professional Corporation

Date: **April 22, 2015**

Mitzi Parker  
Crown Castle  
3530 Toringdon Way Suite 300  
Charlotte, NC 28277  
(704) 405-6613

520 South Main Street, Suite 2531  
Akron, OH 44311  
(614) 859-1607  
dpalkovic@gpdgroup.com

**Subject:** **Structural Analysis Report**

**Carrier Designation:** **Verizon Wireless Co-Locate**  
**Carrier Site Number:** 171758  
**Carrier Site Name:** Danielson South CT

**Crown Castle Designation:** **Crown Castle BU Number:** 857013  
**Crown Castle Site Name:** KILLINGLY ROSS ROAD  
**Crown Castle JDE Job Number:** 270506  
**Crown Castle Work Order Number:** 1045452  
**Crown Castle Application Number:** 227136 Rev. 7

**Engineering Firm Designation:** **GPD Group Project Number:** 2015777.857013.02

**Site Data:** **280 Ross Road, Killingly, Windham County, CT 06239**  
**Latitude 41° 46' 17.59", Longitude -71° 51' 20.39"**  
**119 Foot - Monopole Tower**

Dear Mitzi Parker,

GPD is pleased to submit this **“Structural Analysis Report”** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural ‘Statement of Work’ and the terms of Crown Castle Purchase Order Number 777988, in accordance with application 227136, revision 7.

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

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

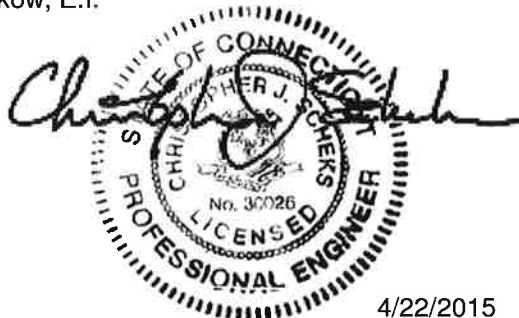
The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 CT State Building Code based upon a wind speed of 85 mph fastest mile.

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

Structural analysis prepared by: Benjamin Darkow, E.I.

Respectfully submitted by:

Christopher J. Scheks, P.E.  
Connecticut #: 0030026



4/22/2015

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## 1) INTRODUCTION

This tower is a 119 ft Monopole tower which was mapped by GPD in January of 2009. The original tower design code, wind speed and loading are unknown.

The existing monopole tower has three major sections connected by slip joints. It has 18 sides and is evenly tapered from 50.4674" (flat-flat) at the base to 18.9450" (flat-flat) at the top. The structure is galvanized and has no tower lighting.

## 2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 40 mph with 0.75 inch ice thickness (in accordance with ASCE 7-05 ice conditions) 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
100.0	100.0	3	Alcatel Lucent	RRH2X60-AWS	1	1-5/8	1
		3	Alcatel Lucent	RRH2X60-1900A-4R			
		3	Antel	BXA-70080-6CF-EDIN-X			
		3	Antel	BXA-70063-6CF-EDIN-0			
		6	Commscope	HBXX-6517DS-A2M			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			

Notes:

- 1) See Appendix B for the proposed coax layout

**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
119.0	121.0	6	Andrew	E15S08P77	12	1-5/8	
		6	Ericsson	RBS 6601			
		3	KMW Communications	AM-X-CD-17-65-00T-RET			
		6	Nextnet Wireless	BTS-2500			
		6	Powerwave	7770.00			
		6	Powerwave	LGP21401			
		1	Raycap	DC6-48-60-18-8F			
	119.0	1		Platform Mount [LP 715-1]			
107.0	109.0	6	Allgon	LGP 13903	18	1-5/8	
		9	EMS Wireless	RR90-17-00DP			
	107.0	1		Platform Mount [LP 304-1]			
100.0	100.0	6	Antel	BXA-185085/12CF	18	1-5/8	1
		3	Antel	BXA-70063-6CF-EDIN-0			
		3	Antel	LPA-80080/6CF			
		1		Platform Mount [LP 303-1]			

Notes:

- 1) Existing equipment to be removed; not considered in this analysis

### 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Remarks	Reference	Source
GEOTECHNICAL REPORTS	WEI Project No. 2009-872, dated 8/7/2009	4908007	CCISITES
TOWER FOUNDATION DRAWINGS	WEI Project No. 2009-872, dated 8/7/2009	4908012	CCISITES
TOWER MAPPING REPORT	GPD, dated 1/19/2009	4908008	CCISITES

#### 3.1) Analysis Method

tnxTower (version 6.1.4.1), 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) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

### 4) ANALYSIS RESULTS

**Table 4 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
L1	119 - 84.33	Pole	TP28.7844x18.945x0.5	1	-11125.50	1722995.74	35.8	Pass
L2	84.33 - 45.5	Pole	TP38.8044x26.6492x0.625	2	-21594.90	2916203.98	45.3	Pass
L3	45.5 - 0	Pole	TP50.4674x36.1354x0.6875	3	-34489.30	3928804.06	46.0	Pass
							Summary	
						Pole (L3)	46.0	Pass
						Rating =	46.0	Pass

**Table 5 - Tower Component Stresses vs. Capacity – LC5**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	50.8	Pass
1	Base Plate	0	77.2	Pass
1	Base Foundation	0	39.6	Pass
1	Base Foundation Soil Interaction	0	30.6	Pass

<b>Structure Rating (max from all components) =</b>	<b>77.2%</b>
---	--------------

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

**4.1) Recommendations**

The existing tower and its foundation are sufficient for the proposed loading and do not require modifications.



## 5) DISCLAIMER OF WARRANTIES

GPD has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

This analysis is limited to the designated maximum wind and seismic conditions per the governing tower standards and code. Wind forces resulting in tower vibrations near the structure's resonant frequencies were not considered in this analysis and are outside the scope of this analysis. Lateral loading from any dynamic response was not evaluated under a time-domain based fatigue analysis.

GPD does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the capability of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the code specified amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD, but are beyond the scope of this report.

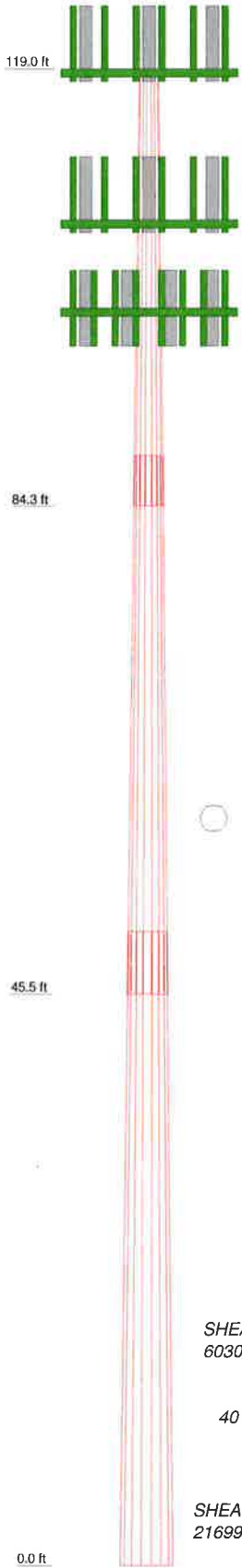
Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal. Legs carry axial loads and derive their strength from shorter unbraced lengths by the presence of redundant members and their connection to the diagonals with bolts or welds. If the bolts or welds are removed without providing any substitute to the frame, the leg is subjected to a higher unbraced length that immediately reduces its load carrying capacity. If a diagonal is also removed in addition to the connection, the unbraced length of the leg is greatly increased, jeopardizing its load carrying capacity. Failure of one leg can result in a tower collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the tower.

GPD makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD pursuant to this report will be limited to the total fee received for preparation of this report.

**APPENDIX A**  
**TNXTOWER OUTPUT**

Section	1	2	3
Length (ft)	34.67	42.83	50.50
Number of Sides	18	18	18
Thickness (in)	0.5000	0.6250	0.6875
Socket Length (ft)	4.00	5.00	
Top Dia (in)	18.9450	26.6492	36.1354
Bot Dia (in)	28.7644	38.8044	50.4674
Grade	A572-50	A572-50	A572-50
Weight (lb)	4374.5	9281.1	15979.3
			29634.9



**DESIGNED APPURTENANCE LOADING**

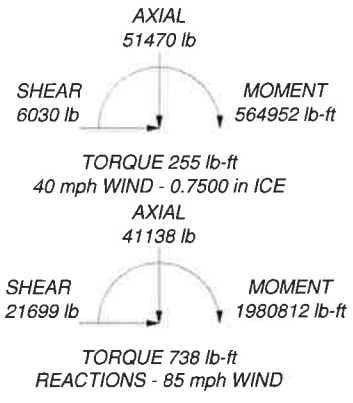
TYPE	ELEVATION	TYPE	ELEVATION
(2) 7770.00 w/ Mount Pipe	119	(2) LGP 13903	107
(2) 7770.00 w/ Mount Pipe	119	(2) LGP 13903	107
(2) 7770.00 w/ Mount Pipe	119	(2) LGP 13903	107
AM-X-CD-17-65-00T-RET w/ Mount Pipe	119	Platform Mount [LP 304-1]	107
AM-X-CD-17-65-00T-RET w/ Mount Pipe	119	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	100
AM-X-CD-17-65-00T-RET w/ Mount Pipe	119	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	100
(3) LGP21401	119	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	100
(3) LGP21401	119	BXA-70080-6CF-EDIN-X w/ Mount Pipe	100
(3) E15S08P77	119	BXA-70080-6CF-EDIN-X w/ Mount Pipe	100
(3) E15S08P77	119	BXA-70080-6CF-EDIN-X w/ Mount Pipe	100
(2) RBS 6601	119	BXA-70080-6CF-EDIN-X w/ Mount Pipe	100
(2) RBS 6601	119	BXA-70080-6CF-EDIN-X w/ Mount Pipe	100
(2) RBS 6601	119	BXA-70080-6CF-EDIN-X w/ Mount Pipe	100
(3) BTS-2500	119	(2) HBXX-6517DS-A2M w/ Mount Pipe	100
(3) BTS-2500	119	(2) HBXX-6517DS-A2M w/ Mount Pipe	100
(3) BTS-2500	119	(2) HBXX-6517DS-A2M w/ Mount Pipe	100
DC6-48-60-18-8F Surge Suppression Unit	119	RRH2X60-1900A-4R	100
Pipe Mount 8"x2.375"	119	RRH2X60-1900A-4R	100
Pipe Mount 8"x2.375"	119	RRH2X60-1900A-4R	100
Pipe Mount 8"x2.375"	119	RRH2X60-AWS	100
Platform Mount [LP 715-1]	119	RRH2X60-AWS	100
(3) RR90-17-00DP w/ Mount Pipe	107	RRH2X60-AWS	100
(3) RR90-17-00DP w/ Mount Pipe	107	DB-T1-6Z-8AB-0Z	100
(3) RR90-17-00DP w/ Mount Pipe	107	Platform Mount [LP 303-1]	100


**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

**TOWER DESIGN NOTES**

1. Tower is located in Windham 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 40 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: 46%

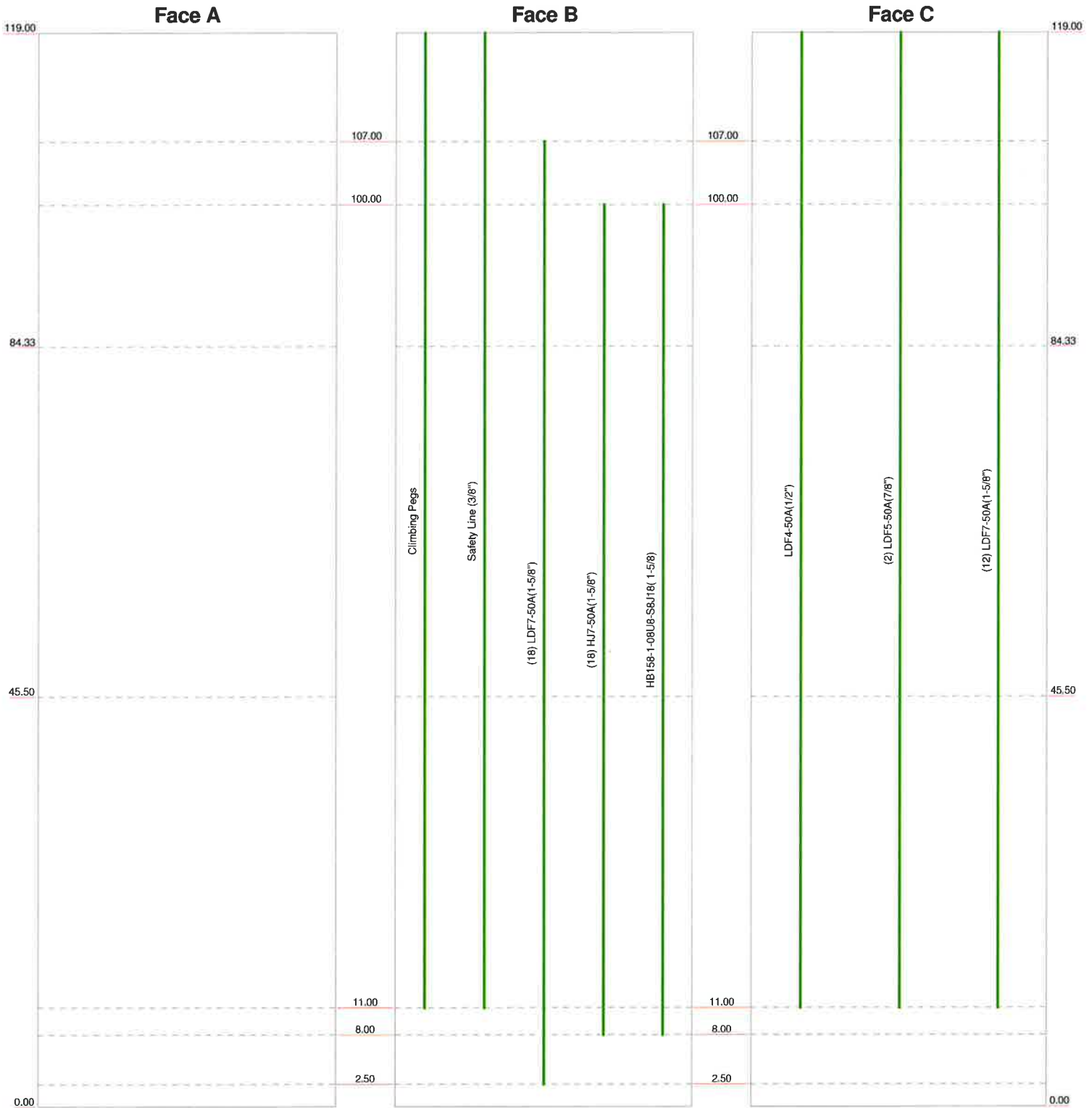



 <p><b>GPD</b> 520 South Main Street, Suite 2531 Akron, OH 44311 Phone: (330) 572-2148 FAX: (330) 572-2101</p>	<p><b>Job:</b> BU #: 857013, KILLINGLY ROSS ROAD</p>
	<p><b>Project:</b> 2015777.857013.02</p>
	<p><b>Client:</b> Crown Castle USA, Inc. <b>Drawn by:</b> B Darkow <b>App'd:</b></p>
	<p><b>Code:</b> TIA/EIA-222-F <b>Date:</b> 04/22/15 <b>Scale:</b> N</p>
<p><b>Path:</b> \\AKRN05.gpdco.com\TELECOM\Crown\857013\02\TNX\857013.dwg</p>	

# 0' - 119'

Round Flat App In Face App Out Face Truss Leg

Elevation (ft)



 <p>GPD</p>	<b>GPD</b>		<b>Job: BU #: 857013, KILLINGLY ROSS ROAD</b>		
	520 South Main Street, Suite 2531		Project: 2015777.857013.02		
	Akron, OH 44311		Client: Crown Castle USA, Inc.	Drawn by: B Darkow	App'd:
	Phone: (330) 572-2148		Code: TIA/EIA-222-F	Date: 04/22/15	Scale: N
	FAX: (330) 572-2101		Path: \\AKR05.gpdco.com\TELECOM\Crown\857013\02\TX\857013.dwg		

## Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

- 1) Tower is located in Windham County, Connecticut.
- 2) Basic wind speed of 85 mph.
- 3) Nominal ice thickness of 0.7500 in.
- 4) Ice thickness is considered to increase with height.
- 5) Ice density of 56 pcf.
- 6) A wind speed of 40 mph is used in combination with ice.
- 7) Temperature drop of 50 °F.
- 8) Deflections calculated using a wind speed of 50 mph.
- 9) A non-linear (P-delta) analysis was used.
- 10) Pressures are calculated at each section.
- 11) Stress ratio used in pole design is 1.333.
- 12) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys ✓ Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area ✓ Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Use TIA-222-G Tension Splice Capacity Exemption	Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feedline Torque Include Angle Block Shear Check <div style="text-align: center; background-color: #e0e0e0; padding: 2px;"><b>Poles</b></div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
--	--	---

## 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	119.00-84.33	34.67	4.00	18	18.9450	28.7844	0.5000	2.0000	A572-50 (50 ksi)
L2	84.33-45.50	42.83	5.00	18	26.6492	38.8044	0.6250	2.5000	A572-50 (50 ksi)
L3	45.50-0.00	50.50		18	36.1354	50.4674	0.6875	2.7500	A572-50 (50 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	19.2373	29.2722	1258.2020	6.5480	9.6241	130.7350	2518.0595	14.6389	2.4543	4.909
	29.2285	44.8874	4536.8615	10.0410	14.6225	310.2663	9079.6927	22.4479	4.1861	8.372
L2	28.2130	51.6255	4417.2956	9.2386	13.5378	326.2936	8840.4036	25.8177	3.5903	5.744
	39.4030	75.7384	13948.0194	13.5537	19.7126	707.5670	27914.3920	37.8764	5.7296	9.167
L3	38.1338	77.3518	12279.7414	12.5840	18.3568	668.9481	24575.6407	38.6832	5.1498	7.491
	51.2459	108.6260	34007.8519	17.6719	25.6374	1326.4917	68060.4522	54.3233	7.6723	11.16

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft <sup>2</sup>	in					in	in
L1 119.00-84.33				1	1	1		
L2 84.33-45.50				1	1	1		
L3 45.50-0.00				1	1	1		

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C <sub>A</sub> A <sub>A</sub>	Weight
				ft		ft <sup>2</sup> /ft	plf
Climbing Pegs	B	No	CaAa (Out Of Face)	119.00 - 11.00	1	No Ice	0.01
						1/2" Ice	0.12
						1" Ice	0.22
						2" Ice	0.41
						4" Ice	0.82
Safety Line (3/8")	B	No	CaAa (Out Of Face)	119.00 - 11.00	1	No Ice	0.04
						1/2" Ice	0.14
						1" Ice	0.24
						2" Ice	0.44
						4" Ice	0.84
LDF4-50A(1/2")	C	No	Inside Pole	119.00 - 11.00	1	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
						2" Ice	0.00
						4" Ice	0.00
LDF5-50A(7/8")	C	No	Inside Pole	119.00 - 11.00	2	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
						2" Ice	0.00
						4" Ice	0.00
LDF7-50A(1-5/8")	C	No	Inside Pole	119.00 - 11.00	12	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
						2" Ice	0.00
						4" Ice	0.00
LDF7-50A(1-5/8")	B	No	Inside Pole	107.00 - 2.50	18	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
						2" Ice	0.00
						4" Ice	0.00
HJ7-50A(1-5/8")	B	No	Inside Pole	100.00 - 8.00	18	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
						2" Ice	0.00
						4" Ice	0.00
HB158-1-08U8-S8J18(1-5/8)	B	No	Inside Pole	100.00 - 8.00	1	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
						2" Ice	0.00
						4" Ice	0.00



Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
					4" Ice	0.00	1.30

### Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight lb
L1	119.00-84.33	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	1.820	666.70
		C	0.000	0.000	0.000	0.000	369.24
L2	84.33-45.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	2.039	1371.09
		C	0.000	0.000	0.000	0.000	413.54
L3	45.50-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	1.811	1403.71
		C	0.000	0.000	0.000	0.000	367.43

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight lb
L1	119.00-84.33	A	0.857	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	13.711	736.95
		C		0.000	0.000	0.000	0.000	369.24
L2	84.33-45.50	A	0.812	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	15.356	1449.77
		C		0.000	0.000	0.000	0.000	413.54
L3	45.50-0.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	13.023	1468.85
		C		0.000	0.000	0.000	0.000	367.43

### Feed Line Center of Pressure

Section	Elevation ft	CP <sub>X</sub> in	CP <sub>Z</sub> in	CP <sub>X</sub> Ice in	CP <sub>Z</sub> Ice in
L1	119.00-84.33	0.0664	0.0384	0.4043	0.2334
L2	84.33-45.50	0.0669	0.0386	0.4302	0.2484
L3	45.50-0.00	0.0493	0.0285	0.3216	0.1857

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight lb	
(2) 7770.00 w/ Mount Pipe	A	From Centroid-Leg	4.00	0.0000	119.00	No Ice	6.22	4.35	56.90
			0.00			1/2"	6.77	5.20	105.42
			2.00			Ice	7.30	5.92	160.42
						1" Ice	8.38	7.41	293.10
						2" Ice	10.69	10.76	679.83
(2) 7770.00 w/ Mount Pipe	B	From Centroid-Leg	4.00	0.0000	119.00	No Ice	6.22	4.35	56.90
			0.00			1/2"	6.77	5.20	105.42
			2.00			Ice	7.30	5.92	160.42
						4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight lb	
(2) 7770.00 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	8.38	7.41	293.10
						2" Ice	10.69	10.76	679.83
						4" Ice			
						No Ice	6.22	4.35	56.90
						1/2" Ice	6.77	5.20	105.42
						Ice	7.30	5.92	160.42
AM-X-CD-17-65-00T-RET w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	8.38	7.41	293.10
						2" Ice	10.69	10.76	679.83
						4" Ice			
						No Ice	11.31	8.70	88.70
						1/2" Ice	11.93	10.11	171.19
						Ice	12.55	11.38	263.33
AM-X-CD-17-65-00T-RET w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	13.88	13.58	480.57
						2" Ice	16.88	18.18	1084.29
						4" Ice			
						No Ice	11.31	8.70	88.70
						1/2" Ice	11.93	10.11	171.19
						Ice	12.55	11.38	263.33
AM-X-CD-17-65-00T-RET w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	13.88	13.58	480.57
						2" Ice	16.88	18.18	1084.29
						4" Ice			
						No Ice	11.31	8.70	88.70
						1/2" Ice	11.93	10.11	171.19
						Ice	12.55	11.38	263.33
(3) LGP21401	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	1.97	0.87	54.89
						2" Ice	2.79	1.52	135.29
						4" Ice			
						No Ice	1.29	0.36	14.10
						1/2" Ice	1.45	0.48	21.26
						Ice	1.61	0.60	30.32
(3) LGP21401	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	1.97	0.87	54.89
						2" Ice	2.79	1.52	135.29
						4" Ice			
						No Ice	1.29	0.36	14.10
						1/2" Ice	1.45	0.48	21.26
						Ice	1.61	0.60	30.32
(3) E15S08P77	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	0.99	0.58	32.97
						2" Ice	1.59	1.07	89.00
						4" Ice			
						No Ice	0.54	0.24	8.15
						1/2" Ice	0.64	0.31	12.11
						Ice	0.75	0.39	17.44
(3) E15S08P77	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	0.99	0.58	32.97
						2" Ice	1.59	1.07	89.00
						4" Ice			
						No Ice	0.54	0.24	8.15
						1/2" Ice	0.64	0.31	12.11
						Ice	0.75	0.39	17.44
(2) RBS 6601	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	1.19	0.91	89.38
						2" Ice	1.97	1.55	206.33
						4" Ice			
						No Ice	0.55	0.40	22.00
						1/2" Ice	0.70	0.52	34.88
						Ice	0.86	0.64	50.27
(2) RBS 6601	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	1.19	0.91	89.38
						2" Ice	1.97	1.55	206.33
						4" Ice			
						No Ice	0.55	0.40	22.00
						1/2" Ice	0.70	0.52	34.88
						Ice	0.86	0.64	50.27
(2) RBS 6601	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	No Ice	0.55	0.40	22.00
						1/2" Ice	0.70	0.52	34.88
						Ice	0.86	0.64	50.27

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight lb
(3) BTS-2500	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	1.19	89.38
						2" Ice	1.97	206.33
						4" Ice		
						No Ice	2.12	35.00
						1/2" Ice	2.32	48.31
						Ice	2.53	64.14
(3) BTS-2500	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	2.98	104.09
						2" Ice	3.98	222.64
						4" Ice		
						No Ice	2.12	35.00
						1/2" Ice	2.32	48.31
						Ice	2.53	64.14
DC6-48-60-18-8F Surge Suppression Unit	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	2.33	105.34
						2" Ice	3.38	239.02
						4" Ice		
						No Ice	1.47	18.90
						1/2" Ice	1.67	36.62
						Ice	1.88	56.82
Pipe Mount 8'x2.375"	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	4.40	123.36
						2" Ice	6.50	304.85
						4" Ice		
						No Ice	1.90	33.70
						1/2" Ice	2.73	48.04
						Ice	3.40	67.66
Pipe Mount 8'x2.375"	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	4.40	123.36
						2" Ice	6.50	304.85
						4" Ice		
						No Ice	1.90	33.70
						1/2" Ice	2.73	48.04
						Ice	3.40	67.66
Pipe Mount 8'x2.375"	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	1" Ice	4.40	123.36
						2" Ice	6.50	304.85
						4" Ice		
						No Ice	1.90	33.70
						1/2" Ice	2.73	48.04
						Ice	3.40	67.66
Platform Mount [LP 715-1]	B	None		0.0000	119.00	1" Ice	83.25	3967.00
						2" Ice	122.29	6159.00
						4" Ice		
						No Ice	44.21	1775.00
						1/2" Ice	53.97	2323.00
						Ice	63.73	2871.00
(3) RR90-17-00DP w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	107.00	1" Ice	6.76	229.08
						2" Ice	9.00	568.89
						4" Ice		
						No Ice	4.67	35.40
						1/2" Ice	5.20	73.70
						Ice	5.71	118.21
(3) RR90-17-00DP w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	107.00	1" Ice	6.76	229.08
						2" Ice	9.00	568.89
						4" Ice		
						No Ice	4.67	35.40
						1/2" Ice	5.20	73.70
						Ice	5.71	118.21
(3) RR90-17-00DP w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	107.00	1" Ice	6.76	229.08
						2" Ice	9.00	568.89
						4" Ice		
						No Ice	4.67	35.40
						1/2" Ice	5.20	73.70
						Ice	5.71	118.21
(2) LGP 13903	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	107.00	No Ice	0.59	10.40
						1/2" Ice	0.69	14.63
						Ice	0.81	20.27

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight lb	
						1" Ice	1.06	0.67	36.60
						2" Ice	1.68	1.19	94.85
						4" Ice			
(2) LGP 13903	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	107.00	No Ice	0.59	0.28	10.40
						1/2" Ice	0.69	0.36	14.63
						1" Ice	0.81	0.46	20.27
						2" Ice	1.06	0.67	36.60
						4" Ice	1.68	1.19	94.85
(2) LGP 13903	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	107.00	No Ice	0.59	0.28	10.40
						1/2" Ice	0.69	0.36	14.63
						1" Ice	0.81	0.46	20.27
						2" Ice	1.06	0.67	36.60
						4" Ice	1.68	1.19	94.85
Platform Mount [LP 304-1]	B	None		0.0000	107.00	No Ice	17.46	17.46	1349.00
						1/2" Ice	22.44	22.44	1624.58
						1" Ice	27.42	27.42	1900.16
						2" Ice	37.38	37.38	2451.32
						4" Ice	57.30	57.30	3553.64
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	7.75	5.58	38.90
						1/2" Ice	8.29	6.52	97.27
						1" Ice	8.85	7.33	163.19
						2" Ice	9.97	9.01	320.89
						4" Ice	12.34	12.57	770.42
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	7.75	5.58	38.90
						1/2" Ice	8.29	6.52	97.27
						1" Ice	8.85	7.33	163.19
						2" Ice	9.97	9.01	320.89
						4" Ice	12.34	12.57	770.42
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	7.75	5.58	38.90
						1/2" Ice	8.29	6.52	97.27
						1" Ice	8.85	7.33	163.19
						2" Ice	9.97	9.01	320.89
						4" Ice	12.34	12.57	770.42
BXA-70080-6CF-EDIN-X w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	5.79	5.99	39.90
						1/2" Ice	6.25	6.93	92.08
						1" Ice	6.71	7.74	151.64
						2" Ice	7.68	9.43	296.15
						4" Ice	9.96	13.04	717.35
BXA-70080-6CF-EDIN-X w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	5.79	5.99	39.90
						1/2" Ice	6.25	6.93	92.08
						1" Ice	6.71	7.74	151.64
						2" Ice	7.68	9.43	296.15
						4" Ice	9.96	13.04	717.35
BXA-70080-6CF-EDIN-X w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	5.79	5.99	39.90
						1/2" Ice	6.25	6.93	92.08
						1" Ice	6.71	7.74	151.64
						2" Ice	7.68	9.43	296.15
						4" Ice	9.96	13.04	717.35
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	8.98	6.96	67.23
						1/2" Ice	9.65	8.18	136.85
						1" Ice	10.29	9.14	214.64
						2" Ice	11.59	11.02	398.47
						4" Ice	14.32	15.03	913.98
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	8.98	6.96	67.23
						1/2" Ice	9.65	8.18	136.85
						1" Ice	10.29	9.14	214.64

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight lb	
						1" Ice	11.59	11.02	398.47
						2" Ice	14.32	15.03	913.98
						4" Ice			
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	8.98	6.96	67.23
						1/2" Ice	9.65	8.18	136.85
						Ice	10.29	9.14	214.64
						1" Ice	11.59	11.02	398.47
						2" Ice	14.32	15.03	913.98
						4" Ice			
RRH2X60-1900A-4R	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	2.18	1.48	46.00
						1/2" Ice	2.39	1.66	62.25
						Ice	2.60	1.85	81.21
						1" Ice	3.06	2.26	128.05
						2" Ice	4.08	3.19	262.80
						4" Ice			
RRH2X60-1900A-4R	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	2.18	1.48	46.00
						1/2" Ice	2.39	1.66	62.25
						Ice	2.60	1.85	81.21
						1" Ice	3.06	2.26	128.05
						2" Ice	4.08	3.19	262.80
						4" Ice			
RRH2X60-1900A-4R	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	2.18	1.48	46.00
						1/2" Ice	2.39	1.66	62.25
						Ice	2.60	1.85	81.21
						1" Ice	3.06	2.26	128.05
						2" Ice	4.08	3.19	262.80
						4" Ice			
RRH2X60-AWS	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	2.19	1.43	44.00
						1/2" Ice	2.40	1.61	60.01
						Ice	2.61	1.80	78.72
						1" Ice	3.07	2.21	125.00
						2" Ice	4.09	3.13	258.50
						4" Ice			
RRH2X60-AWS	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	2.19	1.43	44.00
						1/2" Ice	2.40	1.61	60.01
						Ice	2.61	1.80	78.72
						1" Ice	3.07	2.21	125.00
						2" Ice	4.09	3.13	258.50
						4" Ice			
RRH2X60-AWS	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	2.19	1.43	44.00
						1/2" Ice	2.40	1.61	60.01
						Ice	2.61	1.80	78.72
						1" Ice	3.07	2.21	125.00
						2" Ice	4.09	3.13	258.50
						4" Ice			
DB-T1-6Z-8AB-0Z	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	100.00	No Ice	5.60	2.33	44.00
						1/2" Ice	5.92	2.56	80.13
						Ice	6.24	2.79	120.22
						1" Ice	6.91	3.28	213.04
						2" Ice	8.37	4.37	454.67
						4" Ice			
Platform Mount [LP 303-1]	B	None		0.0000	100.00	No Ice	14.66	14.66	1250.00
						1/2" Ice	18.87	18.87	1481.33
						Ice	23.08	23.08	1712.66
						1" Ice	31.50	31.50	2175.32
						2" Ice	48.34	48.34	3100.64
						4" Ice			

### 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	119 - 84.33	9.947	31	0.7592	0.0016
L2	88.33 - 45.5	5.433	31	0.6085	0.0006
L3	50.5 - 0	1.698	31	0.3211	0.0002

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
119.00	(2) 7770.00 w/ Mount Pipe	31	9.947	0.7592	0.0016	45866
107.00	(3) RR90-17-00DP w/ Mount Pipe	31	8.097	0.7074	0.0012	19111
100.00	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	31	7.054	0.6741	0.0010	12070

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	119 - 84.33	28.707	6	2.1903	0.0047
L2	88.33 - 45.5	15.685	6	1.7566	0.0019
L3	50.5 - 0	4.902	6	0.9272	0.0006

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
119.00	(2) 7770.00 w/ Mount Pipe	6	28.707	2.1903	0.0047	15960
107.00	(3) RR90-17-00DP w/ Mount Pipe	6	23.372	2.0413	0.0034	6650
100.00	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	6	20.363	1.9454	0.0028	4199

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
L1	119 - 84.33 (1)	TP28.7844x18.945x0.5	34.67	0.00	0.0	30.000	43.0858	-11125.50	1292570.0	0.009
L2	84.33 - 45.5 (2)	TP38.8044x26.6492x0.625	42.83	0.00	0.0	30.000	72.9235	-21594.90	2187700.0	0.010
L3	45.5 - 0 (3)	TP50.4674x36.1354x0.687 5	50.50	0.00	0.0	30.000	98.2447	-34489.30	2947340.0	0.012

### Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M <sub>x</sub> lb-ft	Actual f <sub>bx</sub> ksi	Allow. F <sub>bx</sub> ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M <sub>y</sub> lb-ft	Actual f <sub>by</sub> ksi	Allow. F <sub>by</sub> ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	119 - 84.33 (1)	TP28.7844x18.945x0.5	334439	14.049	30.000	0.468	0.00	0.000	30.000	0.000
L2	84.33 - 45.5 (2)	TP38.8044x26.6492x0.625 5	974016	17.830	30.000	0.594	0.00	0.000	30.000	0.000
L3	45.5 - 0 (3)	TP50.4674x36.1354x0.687 75	162732	18.023	30.000	0.601	0.00	0.000	30.000	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V lb	Actual $f_v$ ksi	Allow. $F_v$ ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual $f_{vt}$ ksi	Allow. $F_{vt}$ ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	119 - 84.33 (1)	TP28.7844x18.945x0.5	15613. 60	0.362	20.000	0.036	518.76	0.011	20.000	0.001
L2	84.33 - 45.5 (2)	TP38.8044x26.6492x0.62 5	18220. 40	0.250	20.000	0.025	518.46	0.005	20.000	0.000
L3	45.5 - 0 (3)	TP50.4674x36.1354x0.68 75	20668. 80	0.210	20.000	0.021	518.32	0.003	20.000	0.000

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio P $\frac{P_a}{P_a}$	Ratio $f_{bx}$ $\frac{F_{bx}}{F_{bx}}$	Ratio $f_{by}$ $\frac{F_{by}}{F_{by}}$	Ratio $f_v$ $\frac{F_v}{F_v}$	Ratio $f_{vt}$ $\frac{F_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	119 - 84.33 (1)	0.009	0.468	0.000	0.036	0.001	0.477	1.333	H1-3+VT ✓
L2	84.33 - 45.5 (2)	0.010	0.594	0.000	0.025	0.000	0.604	1.333	H1-3+VT ✓
L3	45.5 - 0 (3)	0.012	0.601	0.000	0.021	0.000	0.613	1.333	H1-3+VT ✓

### Section Capacity Table

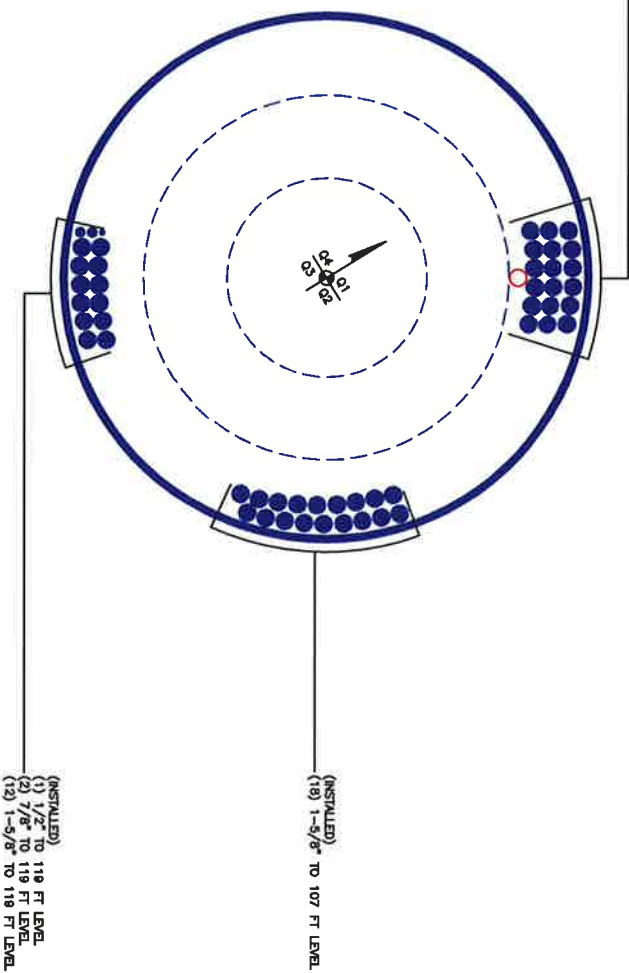
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF* $P_{allow}$ lb	% Capacity	Pass Fail	
L1	119 - 84.33	Pole	TP28.7844x18.945x0.5	1	-11125.50	1722995.7 4	35.8	Pass	
L2	84.33 - 45.5	Pole	TP38.8044x26.6492x0.625	2	-21594.90	2916203.9 8	45.3	Pass	
L3	45.5 - 0	Pole	TP50.4674x36.1354x0.6875	3	-34489.30	3928804.0 6	46.0	Pass	
							Summary	ELC: Load Case 5	
							Pole (L3) Rating =	46.0 46.0	Pass Pass



**APPENDIX B**  
**BASE LEVEL DRAWING**



(PROPOSED) TO 100 FT LEVEL  
 (1) 1/2" TO 119 FT LEVEL  
 (2) 7/8" TO 119 FT LEVEL  
 (18) 1-5/8" TO 100 FT LEVEL



BUSINESS UNIT: 857013 TOWER ID: C\_BASSELBER

CROWN REGION ADDRESS  
 USA

1 of 1

NEW BUILD PER WORK ORDER #149987  
 11/17/14  
 UPDATED PER WORK ORDER # 79714  
 03/05/15  
 102/8/8  
 1/30/15

DRAWN BY: VIL  
 CHECKED BY: AMT  
 DRAWING DATE: 210414

SITE NUMBER:  
 SITE NAME:  
 KILLINGLY ROSS ROAD  
 BUSINESS UNIT NUMBER  
 857013  
 SITE ADDRESS  
 200 ROSS ROAD  
 WINDHAM, VT 05086  
 WINDHAM COUNTY  
 USA  
 SHEET TITLE  
 BASE LEVEL  
 SHEET NUMBER  
 1

A1-0

**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

## Stiffened or Unstiffened, UngROUTed, Circular Base Plate - Any Rod Material

### TIA Rev F

#### Site Data

BU#: 857013	
Site Name: KILLINGLY ROSS ROAD	
App #: 227136 Rev. 7	
Pole Manufacturer:	Other

#### Reactions

Moment:	1981	ft-kips
Axial:	41	kips
Shear:	22	kips

#### Anchor Rod Data

Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	58.4674	in

If No stiffeners, Criteria:

AISC ASD

<-Only Applicable to Unstiffened Cases

#### Anchor Rod Results

Maximum Rod Tension: 99.1 Kips  
 Allowable Tension: 195.0 Kips  
 Anchor Rod Stress Ratio: 50.8% Pass

Rigid
Service ASD
Fty*ASIF

#### Plate Data

Diam:	64.4674	in
Thick:	2	in
Grade:	50	ksi
Single-Rod B-eff:	10.01	in

#### Base Plate Results

Base Plate Stress: 38.6 ksi  
 Allowable Plate Stress: 50.0 ksi  
 Base Plate Stress Ratio: 77.2% Pass

Flexural Check

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length:
29.52

#### Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:		
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

#### Stiffener Results

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

#### Pole Results

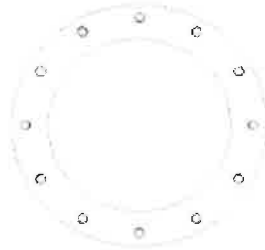
Pole Punching Shear Check: n/a

#### Pole Data

Diam:	50.4674	in
Thick:	0.6875	in
Grade:	50	ksi
# of Sides:	18	"0" IF Round
Fu	65	ksi
Reinf. Fillet Weld	0	"0" if None

#### Stress Increase Factor

ASIF:	1.333	
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\* 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



**Mat Foundation Analysis**  
**BU #: 857013, KILLINGLY ROSS ROAD**  
**2015777.857013.02**

General Info	
Code	TIA/EIA-222-F (LRFD)
Bearing On	Soil
Foundation Type	Mono Pad
Pier Type	Square
Reinforcing Known	No
Max Capacity	1.1

Tower Reactions	
Moment, M	1981 k-ft
Axial, P	41 k
Shear, V	22 k

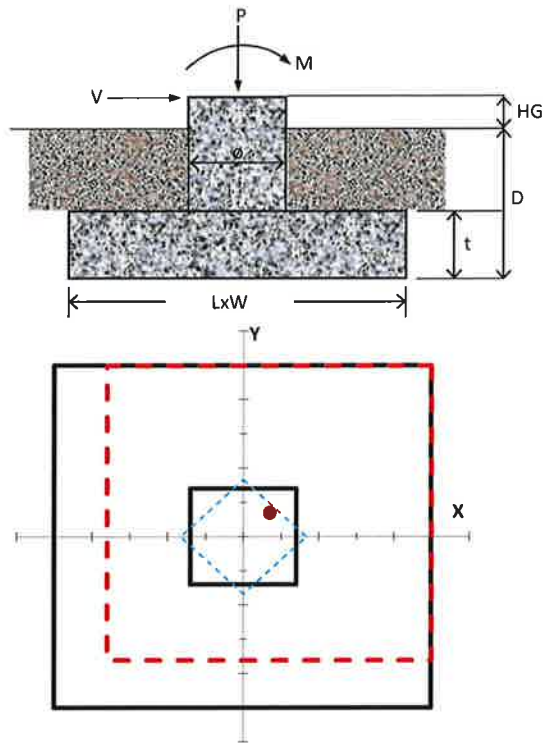
Pad & Pier Geometry	
Pier Width, $\phi$	7 ft
Pad Length, L	25 ft
Pad Width, W	25 ft
Pad Thickness, t	3 ft
Depth, D	7 ft
Height Above Grade, HG	0.5 ft

Pad & Pier Reinforcing	
Rebar $F_y$	60 ksi
Concrete $F_c'$	3 ksi
Clear Cover	3 in
Reinforced Top & Bottom?	Yes
Pad Reinforcing Size	# 9
Pad Quantity Per Layer	10
Pier Rebar Size	# 10
Pier Quantity of Rebar	39

Soil Properties	
Soil Type	Granular
Soil Unit Weight	125 pcf
Angle of Friction, $\phi$	32 °
Bearing Type	Net
Ultimate Bearing	15 ksf
Water Table Depth	99 ft
Frost Depth	3.33 ft

Bearing Summary			Load Case
$Q_{xmax}$	1.61	ksf	1.2D+1.6W
$Q_{ymax}$	1.61	ksf	1.2D+1.6W
$Q_{max @ 45^\circ}$	1.67	ksf	1.2D+1.6W
$Q_{(all) Gross}$	11.91	ksf	
<b>Controlling Capacity</b>	<b>14.0%</b>	<b>Pass</b>	

Overturning Summary (Required FS=1.0)			Load Case
FS(ot)x	3.26	$\geq 1.0$	0.9D+1.6W
FS(ot)y	3.26	$\geq 1.0$	0.9D+1.6W
<b>Controlling Capacity</b>	<b>30.6%</b>	<b>Pass</b>	





**Base Foundation Reinforcement Check**  
**BU #: 857013, KILLINGLY ROSS ROAD**  
**2015777.857013.02**

Code  
**TIA/EIA-222-F**

Tower Reactions	
Moment	1980.812 k-ft
Axial	41.138 k
Shear	21.699 k

Pad & Pier Geometry	
Height	7 ft
Height above Grade	0.5 ft
Pad Length, L	25 ft
Pad Width, W	25 ft
Pad Thickness	3 ft
Pier Shape	Square
Square Pier Width	7 ft

Pad & Pier Reinforcing	
Reinforcing Known	No
$f'_c$	3 ksi
Clear Cover	3 in
Rebar $F_y$	60 ksi
Reinforced Top & Bottom?	Yes
Pad Rebar Size	# 9
Pad Rebar Quantity	10
Pier Rebar Size	# 10
Pier Rebar Quantity	39

Unit Weights	
Concrete Unit Weight	150 pcf
Soil Unit Weight	125 pcf

Orthogonal Bearing	
$Q_{max}$	2.01 ksf
$Q_{min}$	0.09 ksf

Pad Moment Capacity	
$M_u =$	22.06 k-ft
$\phi M_n =$	55.65 k-ft
Moment Capacity	39.6% <b>OK</b>
<i>One-Way (Wide-Beam) Shear</i>	
$V_u =$	84.61 kips
$\phi V_n =$	771.66 kips
Shear Capacity	11.0% <b>OK</b>
<i>Two-Way (Punching) Shear</i>	
$V_u =$	376.91 kips
$\phi V_n =$	2372.78 kips
Shear Capacity	15.9% <b>OK</b>
<i>Pier Compression</i>	
$P_u =$	53.48 kips
$\phi P_n =$	10835.92 kips
Compression Capacity	0.5% <b>OK</b>

Overall Capacities		
Reinforcement Capacity	39.6%	<b>OK</b>
As Min Met?	Yes	
Controlling Capacity	39.6%	<b>OK</b>

← Reinforcement unknown; minimums assumed

