Robinson+Cole

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Also admitted in Massachusetts

August 13, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
258 Ridge Road, Madison, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 130-foot level of the existing 150-foot tower at 258 Ridge Road in Madison, Connecticut (the "Property"). The tower is owned by Crown Castle. The Council approved Cellco's use of this tower in 2009. On March 10, 2014, the Council acknowledged Cellco's request to modify its existing facility (EM-VER-076-140220). That work contemplated in EM-VER-076-140220 was, however, never completed. Cellco now intends to replace six (6) of its existing antennas with three (3) model SBNHH-1D65B, 700 MHz antennas; three (3) model SBNHH-1D65B, 1900 MHz antennas; and add three (3) model SBNHH-1D65B, 2100 MHz antennas, for a total of fifteen (15) antennas, all at the same level on the tower. Cellco also intends to replace three (3) existing remote radio heads ("RRHs") and install six (6) additional RRHs and install one (1) HYBRIFLEX™ fiber optic antenna cable. 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 Fillmore McPherson, First Selectman of the Town of Madison. The Town of Madison is the owner of the Property. A copy of this letter is also being sent to Crown Castle, the owner of the tower.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRH's will be located on its existing platform at the 130-foot level.

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 worst-case General Power Density table for Cellco's modified facility is included in Attachment 2.

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

6. The tower and its foundation can support Cellco's proposed modifications. (*See* Structural Analysis Report included in Attachment 3).

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Fillmore McPherson, Madison First Selectman
Crown Castle
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

SBNHH-1D65B

Andrew® Tri-band Antenna, 698–896 and 2x 1695–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.

- Interleaved dipole technology providing for attractive, low wind load mechanical package

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS, dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
CPR at Boresight, dB	20	23	20	20	17	21
CPR at Sector, dB	14	10	12	10	9	1
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain by all Beam Tilts, average, dBi	14.5	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.6	0 ° | 14.5	0 ° | 17.4	0 ° | 17.8	0 ° | 18.1	0 ° | 18.2
	7 ° | 14.6	7 ° | 14.4	3 ° | 17.5	3 ° | 17.9	3 ° | 18.3	3 ° | 18.4
	14 ° | 14.2	14 ° | 13.6	7 ° | 17.4	7 ° | 17.9	7 ° | 18.2	7 ° | 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	4

* 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® multiband with internal RET
Band	Multiband
Brand	DualPol® | Teletilt®
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Performance Note	Outdoor usage

Product Specifications

SBNHH-1D65B

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h | 150.0 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

BSAMNT-1 — Wide Profile Antenna 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

ALCATEL-LUCENT B13 RRH4X30-4R

Alcatel-Lucent B13 Remote Radio Head 4x30-4R is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

Supporting 2Tx/4Tx MIMO and 4-way Rx diversity, Alcatel-Lucent B13 RRH4x30-4R allows operators to have a compact radio solution to deploy LTE in the 700U band (700 MHz, 3GPP band 13), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B13 RRH4x30-4R product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity and up to 10MHz instantaneous bandwidth.

The Alcatel-Lucent B13 RRH4x30-4R is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

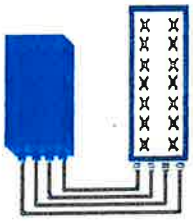
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 700 MHz band (700U, 3GPP band 13)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- 10MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in 700U band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through MIMO4
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



4x30W with 4T4R
or
2x60W with 2T4R

Can be switched between modes via SW w/o site visit

Alcatel·Lucent

TECHNICAL SPECIFICATIONS

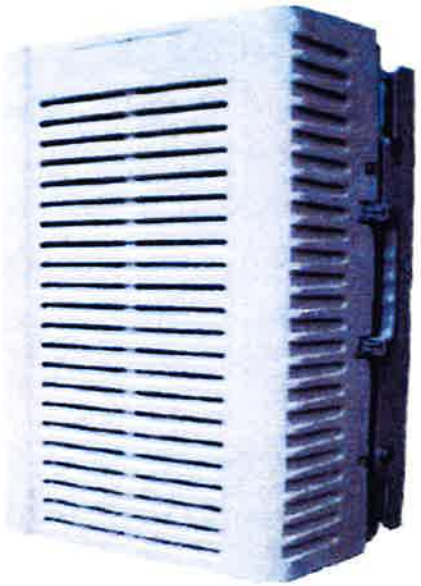
Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz
Instantaneous bandwidth - #carriers	10MHz – 1 LTE carrier (In 10MHz occupied bandwidth)
LTE carrier bandwidth	10 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure – RX Diversity scheme	2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity
Sizes (HxWxD) in mm (in.) Volume in L Weight in kg (lb) (w/o mounting HW)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield) 38 (with solar shield) 26 (57.2) (with solar shield)
DC voltage range DC power consumption	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 550W typical @100% RF load (in 2Tx or 4TX mode)
Environmental conditions Wind load (@150km/h or 93mph)	-40°C (-40°F) /+55°C (+131°F) IP65 Frontal:<200N / Lateral :<150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate7, 9.8 Gbps) SFP single mode dual fiber
AISG interfaces	1 AISG2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) – 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

	RRH2x60
RF Output Power	2x60W
Instantaneous Bandwidth	20MHz
Transmitter	2 TX
Receiver 1900 HW version 1900A HW version	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3
Features	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)



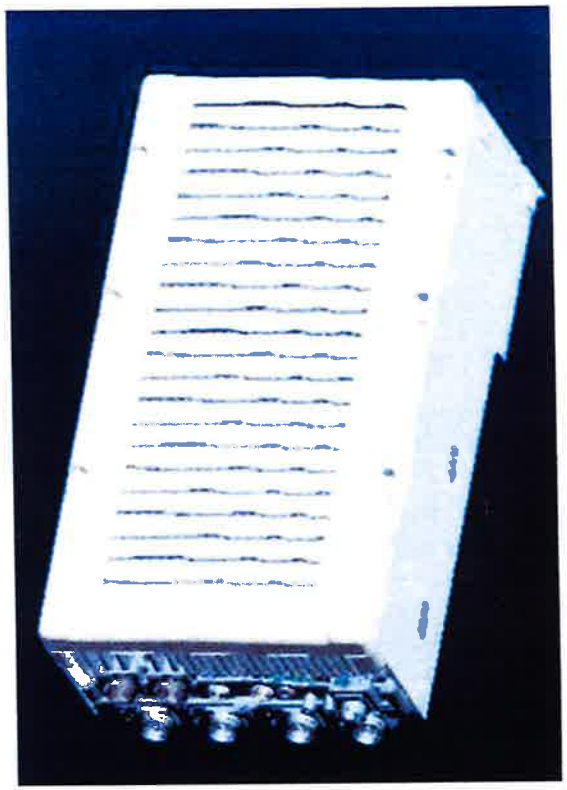
** Not a Verizon Wireless deployed product

Alcatel·Lucent

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.)

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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.

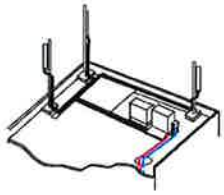
EASY INSTALLATION

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.

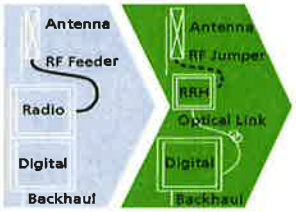
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

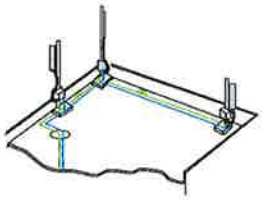
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



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 daisychaining 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

Alcatel·Lucent

AT THE SPEED OF IDEAS™

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 CELLFLEX² accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

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

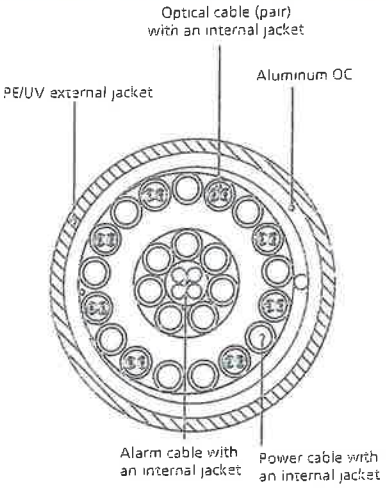


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Madison 3								
Tower Height: 150ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
T-Mobile LTE	2	24	150	0.0008	2100	1.0000	0.08%	
T-Mobile GSM/UMTS	2	12	150	0.0004	1950	1.0000	0.04%	
T-Mobile UMTS	2	12	150	0.0004	2100	1.0000	0.04%	
AT&T UMTS	2	565	140	0.0207	880	0.5867	3.53%	
AT&T UMTS	2	875	140	0.0321	1900	1.0000	3.21%	
AT&T GSM	1	283	140	0.0052	880	0.5867	0.88%	
AT&T GSM	4	525	140	0.0385	1900	1.0000	3.85%	
AT&T LTE	1	1313	140	0.0241	734	0.4893	4.92%	
Verizon	**7**	**401**	**130**	**0.0597**	**1970**	**1.0000**	**5.97%**	
Verizon	**9**	**397**	**130**	**0.0760**	**869**	**0.5793**	**13.12%**	
Verizon	**1**	**2306**	**130**	**0.0491**	**2145**	**1.0000**	**4.91%**	
Verizon	**1**	**1050**	**130**	**0.0223**	**698**	**0.4973**	**4.49%**	
								45.05%
* Source: Siting Council								

ATTACHMENT 3

Date: **July 29, 2015**

Sean Dempsey
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

JACOBS
Jacobs Engineering Group. Inc.
5449 Bells Ferry Road
Acworth, GA 30102
770-701-2500

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
Crown Castle Designation:	**Crown Castle BU Number:**	5800059
	Crown Castle Site Name:	Ridge Road, Madison
	Crown Castle JDE Job Number:	341453
	Crown Castle Work Order Number:	1096162
	Crown Castle Application Number:	304568 Rev. 0
Engineering Firm Designation:	**Jacobs Engineering Group Project Number:**	1096162
Site Data:	**258 Ridge Road, MADISON, New Haven County, CT** **Latitude *41° 18' 33.3"*, Longitude *-72° 36' 51.57"*** **150 Foot - Monopole Tower**	

Dear Sean Dempsey,

Jacobs Engineering Group 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 811090, in accordance with application 304568, revision 0.

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:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II 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 *Jacobs Engineering 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:

Di Wang, E.I.T.
Structural Engineer

Reviewed By:

Matthew E. Watkins, PE, LEED[AP]
Project Engineer
7/29/15

tnxTower Report - version 6.1.4.1

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1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by Valmont/DaVinci in October of 2008. The tower was originally designed for a wind speed of 115 mph per TIA-222-G.

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, 37.6 mph with 1.25 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
130.0	132.0	3	alcatel lucent	RRH2X60-AWS	1	1-5/8	-
	130.0	3	alcatel lucent	RRH2X60-PCS			
		3	alcatel lucent	RRH2x60-700			
		9	commscope	SBNHH-1D65B w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

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
148.0	159.0	1	dbspectra	DS4C06F36D-N	13 2	1-5/8 7/8	1
	150.0	3	ericsson	ERICSSON AIR 21 B2P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
	148.0	1	tower mounts	Platform Mount [LP 303-1]			
141.0	141.0	3	ericsson	TME-RRUS-11	-	-	1
		1	tower mounts	Side Arm Mount [SO 102-3]			
140.0	141.0	3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe	12 2 1	1-5/8 5/8 3/8	1
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		6	powerwave technologies	LGP21903			
		1	raycap	DC6-48-60-18-8F			
	140.0	1	tower mounts	Platform Mount [LP 304-1]			
132.0	132.0	3	alcatel lucent	RRH2X40-AWS	-	-	2
		1	tower mounts	Side Arm Mount [SO 102-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
130.0	130.0	3	antel	BXA-185063/8CF w/ Mount Pipe	-	-	3
		3	antel	BXA-70063/6CF w/ Mount Pipe			
		6	decibel	DB846F65ZAXY w/ Mount Pipe	18	1-5/8	1
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 304-1]			
124.0	124.0	1	radiowaves	HP2-4.7NS	2 1	11/32 7/8	1
		1	kathrein	800 10251 w/ Mount Pipe			
		1	tower mounts	Side Arm Mount [SO 701-1]			
113.0	113.0	3	kathrein	800 10252 w/ Mount Pipe	3	7/8	1
		1	tower mounts	T-Arm Mount [TA 702-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment; To be removed; Considered in this analysis
3) Equipment To Be Removed; Not 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)
150	150	12	allgon	7273	-	-
		2	decibel	DB616		
		6	generic	TMA		
140	140	12	antel	RWA-80017	-	-
		6	generic	TMA		
130	130	12	allgon	7273	-	-
		6	generic	TMA		
120	120	12	allgon	7273	-	-
		6	generic	TMA		
80	80	1	generic	4-FT STD. MICROWAVE	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	ANS Consultants, Inc.	2354009	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Valmont	2354010	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont	2354011	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) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	150 - 110	Pole	TP39.633x28.4x0.25	1	-11.08	1556.78	34.4	Pass
L2	110 - 94.25	Pole	TP43.556x37.659x0.281	2	-14.28	1936.62	45.5	Pass
L3	94.25 - 46.25	Pole	TP56.472x41.449x0.375	3	-26.00	3345.18	52.2	Pass
L4	46.25 - 0	Pole	TP68.71x53.686x0.438	4	-45.37	4844.04	53.4	Pass
							Summary	
						Pole (L4)	53.4	Pass
						Rating =	53.4	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	47.2	Pass
1	Base Plate	0	42.6	Pass
1	Base Foundation Structural	0	61.4	Pass
1	Base Foundation Soil Interaction	0	31.1	Pass

Structure Rating (max from all components) =	61.4%

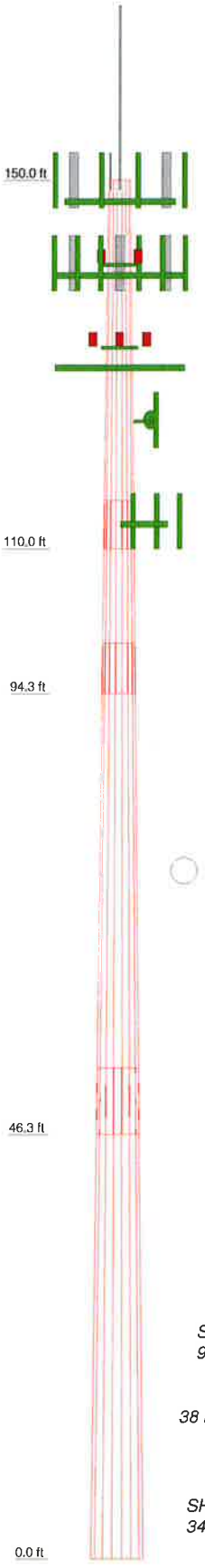
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT



Section	1	2	3	4
Length (ft)	40.000	21.000	53.500	53.500
Number of Sides	18	18	18	18
Thickness (in)	0.250	0.281	0.375	0.438
Socket Length (ft)	5.250	5.500	7.250	
Top Dia (in)	28.400	37.659	41.449	53.686
Bot Dia (in)	39.633	43.556	56.472	68.710
Grade	A572-65			
Weight (K)	3.6	2.6	10.5	15.4

Total Weight: 32.1

AXIAL 78 K
SHEAR 9 K
MOMENT 1015 kip-ft
TORQUE 1 kip-ft
38 mph WIND - 1.250 in ICE
AXIAL 45 K
SHEAR 34 K
MOMENT 3571 kip-ft
TORQUE 3 kip-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 5/8" x 2'	150	(2) LGP21903	140
ERICSSON AIR 21 B2P w/ Mount Pipe	148	DC6-48-60-18-8F	140
ERICSSON AIR 21 B2P w/ Mount Pipe	148	Platform Mount [LP 304-1]	140
ERICSSON AIR 21 B2P w/ Mount Pipe	148	RRH2X40-AWS	132
ERICSSON AIR 21 B4P w/ Mount Pipe	148	RRH2X40-AWS	132
ERICSSON AIR 21 B4P w/ Mount Pipe	148	RRH2X40-AWS	132
ERICSSON AIR 21 B4P w/ Mount Pipe	148	5' x 2" Pipe Mount	132
KRY 112 144/1	148	5' x 2" Pipe Mount	132
KRY 112 144/1	148	5' x 2" Pipe Mount	132
KRY 112 144/1	148	Side Arm Mount [SO 102-3]	132
DS4C06F36D-N	148	(3) SBNHH-1D65B w/ Mount Pipe	130
Platform Mount [LP 303-1]	148	(3) SBNHH-1D65B w/ Mount Pipe	130
TME-RRUS-11	141	(3) SBNHH-1D65B w/ Mount Pipe	130
TME-RRUS-11	141	RRH2x60-700	130
TME-RRUS-11	141	RRH2x60-700	130
6' x 3" Horizontal Mount Pipe	141	RRH2x60-700	130
6' x 3" Horizontal Mount Pipe	141	RRH2X60-AWS	130
6' x 3" Horizontal Mount Pipe	141	RRH2X60-AWS	130
6' x 2" Mount Pipe	141	RRH2X60-AWS	130
Side Arm Mount [SO 102-3]	141	RRH2X60-PCS	130
(2) 7770.00 w/ Mount Pipe	140	RRH2X60-PCS	130
(2) 7770.00 w/ Mount Pipe	140	RRH2X60-PCS	130
(2) 7770.00 w/ Mount Pipe	140	DB-T1-6Z-8AB-0Z	130
AM-X-CD-16-65-00T-RET w/ Mount Pipe	140	(2) DB846F65ZAXY w/ Mount Pipe	130
AM-X-CD-16-65-00T-RET w/ Mount Pipe	140	(2) DB846F65ZAXY w/ Mount Pipe	130
AM-X-CD-16-65-00T-RET w/ Mount Pipe	140	(2) DB846F65ZAXY w/ Mount Pipe	130
(2) LGP21401	140	DB-T1-6Z-8AB-0Z	130
(2) LGP21401	140	Platform Mount [LP 304-1]	130
(2) LGP21401	140	800 10251 w/ Mount Pipe	124
(2) LGP21903	140	5' x 2" Pipe Mount	124
(2) LGP21903	140	Side Arm Mount [SO 701-1]	124
		HP2-4.7NS	124
		T-Arm Mount [TA 702-1]	113
		(3) 800 10252 w/ Mount Pipe	113

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 1.25 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 53.4%

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Acworth, GA 30102
Phone: 770-701-2500
FAX: 770-701-2501

Job: Ridge Road, Madison			
Project: BU#5800059 WO#1096162			
Client: Crown Castle	Drawn by: Di Wang	App'd:	
Code: TIA/EIA-222-F	Date: 07/29/15	Scale: N	
Path:		Dwg No.	

Tower Input Data

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

4) Tower is located in New Haven County, Connecticut.
5) Basic wind speed of 85 mph.
6) Nominal ice thickness of 1.250 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56.000 pcf.
9) A wind speed of 38 mph is used in combination with ice.
10) Temperature drop of 50.000 °F.
11) Deflections calculated using a wind speed of 50 mph.
12) A non-linear (P-delta) analysis was used.
13) Pressures are calculated at each section.
14) Stress ratio used in pole design is 1.333.
15) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	150.000-110.000	40.000	5.250	18	28.400	39.633	0.250	1.000	A572-65 (65 ksi)
L2	110.000-94.250	21.000	5.500	18	37.659	43.556	0.281	1.125	A572-65 (65 ksi)
L3	94.250-46.250	53.500	7.250	18	41.449	56.472	0.375	1.500	A572-65 (65 ksi)
L4	46.250-0.000	53.500		18	53.686	68.710	0.438	1.750	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

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	28.838	22.337	2236.246	9.993	14.427	155.002	4475.435	11.171	4.558	18.234
	40.244	31.250	6123.656	13.981	20.134	304.152	12255.369	15.628	6.535	26.142
L2	39.737	33.366	5889.316	13.269	19.131	307.848	11786.380	16.686	6.133	21.806
	44.228	38.631	9139.882	15.363	22.126	413.075	18291.791	19.319	7.171	25.496
L3	43.657	48.888	10420.184	14.581	21.056	494.878	20854.080	24.449	6.635	17.693
	57.343	66.769	26545.722	19.914	28.688	925.332	53126.374	33.391	9.279	24.744
L4	56.582	73.942	26487.969	18.903	27.273	971.231	53010.792	36.978	8.679	19.837
	69.770	94.805	55829.000	24.237	34.905	1599.470	111731.461	47.411	11.323	25.881

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 150.000-110.000				1	1	1		
L2 110.000-94.250				1	1	1		
L3 94.250-46.250				1	1	1		
L4 46.250-0.000				1	1	1		

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
**								
LDF5-50A(7/8")	A	No	Inside Pole	148.000 - 6.000	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
LCF158-50A(1-5/8")	A	No	Inside Pole	148.000 - 6.000	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
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	A	No	CaAa (Out Of Face)	148.000 - 6.000	1	No Ice	0.163	0.001
						1/2" Ice	0.263	0.002
						1" Ice	0.362	0.004
						2" Ice	0.562	0.010
						4" Ice	0.962	0.029
**								
AVA7-50(1-5/8)	C	No	Inside Pole	140.000 - 2.000	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
LDF4-75A(5/8")	C	No	Inside Pole	140.000 - 2.000	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
FB-L98B-002-75000(3/8")	C	No	Inside Pole	140.000 - 2.000	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
2" Rigid Conduit	C	No	Inside Pole	140.000 - 2.000	1	No Ice	0.000	0.003
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.003
						2" Ice	0.000	0.003
						4" Ice	0.000	0.003

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
**								
AVA7-50(1-5/8)	B	No	Inside Pole	130.000 - 6.000	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
AVA7-50(1-5/8)	B	No	CaAa (Out Of Face)	130.000 - 6.000	1	No Ice	0.201	0.001
						1/2" Ice	0.301	0.002
						1" Ice	0.401	0.004
						2" Ice	0.601	0.010
						4" Ice	1.001	0.030
AVA7-50(1-5/8)	B	No	CaAa (Out Of Face)	130.000 - 6.000	5	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	0.030
HB158-1-08U8-S8J18(1-5/8)	B	No	CaAa (Out Of Face)	130.000 - 6.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.005
						2" Ice	0.000	0.011
						4" Ice	0.000	0.031
**								
LDF5-50A(7/8")	C	No	Inside Pole	124.000 - 2.000	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
7921A(11/32")	C	No	Inside Pole	124.000 - 2.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
**								
LDF5-50A(7/8")	C	No	Inside Pole	113.000 - 2.000	3	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
**								
Safety Line 3/8	C	No	CaAa (Out Of Face)	150.000 - 2.000	1	No Ice	0.037	0.000
						1/2" Ice	0.137	0.001
						1" Ice	0.238	0.001
						2" Ice	0.437	0.002
						4" Ice	0.838	0.004

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	150.000-110.000	A	0.000	0.000	0.000	6.175	0.43
		B	0.000	0.000	0.000	4.020	0.28
		C	0.000	0.000	0.000	1.500	0.38
L2	110.000-94.250	A	0.000	0.000	0.000	2.559	0.18
		B	0.000	0.000	0.000	3.166	0.22
		C	0.000	0.000	0.000	0.591	0.22
L3	94.250-46.250	A	0.000	0.000	0.000	7.800	0.54
		B	0.000	0.000	0.000	9.648	0.67
		C	0.000	0.000	0.000	1.800	0.68
L4	46.250-0.000	A	0.000	0.000	0.000	6.541	0.46
		B	0.000	0.000	0.000	8.090	0.56
		C	0.000	0.000	0.000	1.659	0.62

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	150.000-110.000	A	1.472	0.000	0.000	0.000	17.365	0.65
		B		0.000	0.000	0.000	9.909	1.20
		C		0.000	0.000	0.000	13.279	0.44
L2	110.000-94.250	A	1.431	0.000	0.000	0.000	7.197	0.27
		B		0.000	0.000	0.000	7.804	0.94
		C		0.000	0.000	0.000	5.228	0.25
L3	94.250-46.250	A	1.367	0.000	0.000	0.000	21.540	0.81
		B		0.000	0.000	0.000	23.388	2.79
		C		0.000	0.000	0.000	15.540	0.75
L4	46.250-0.000	A	1.250	0.000	0.000	0.000	17.549	0.67
		B		0.000	0.000	0.000	19.098	2.23
		C		0.000	0.000	0.000	13.762	0.69

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	150.000-110.000	0.084	-0.112	-0.057	-0.143
L2	110.000-94.250	0.190	-0.058	0.147	-0.045
L3	94.250-46.250	0.194	-0.059	0.156	-0.048
L4	46.250-0.000	0.166	-0.050	0.115	-0.027

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
**									
Lighting Rod 5/8" x 2'	C	From Leg	0.000 0.000 1.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.125 0.278 0.410 0.719 1.533	0.125 0.278 0.410 0.719 1.533	0.01 0.01 0.01 0.03 0.07
148									
ERICSSON AIR 21 B2P w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.175	5.642 6.480 7.257 8.864 12.293	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2P w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.175	5.642 6.480 7.257 8.864 12.293	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2P w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.175	5.642 6.480 7.257 8.864 12.293	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4P w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	148.000	No Ice 1/2"	6.825 7.347	5.642 6.480	0.11 0.17

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2.000			Ice	7.863	7.257	0.23
						1" Ice	8.926	8.864	0.38
						2" Ice	11.175	12.293	0.81
						4" Ice			
ERICSSON AIR 21 B4P w/ Mount Pipe	B	From Leg	4.000	0.000	148.000	No Ice	6.825	5.642	0.11
			0.000			1/2"	7.347	6.480	0.17
			2.000			Ice	7.863	7.257	0.23
						1" Ice	8.926	8.864	0.38
						2" Ice	11.175	12.293	0.81
						4" Ice			
ERICSSON AIR 21 B4P w/ Mount Pipe	C	From Leg	4.000	0.000	148.000	No Ice	6.825	5.642	0.11
			0.000			1/2"	7.347	6.480	0.17
			2.000			Ice	7.863	7.257	0.23
						1" Ice	8.926	8.864	0.38
						2" Ice	11.175	12.293	0.81
						4" Ice			
KRY 112 144/1	A	From Leg	4.000	0.000	148.000	No Ice	0.411	0.189	0.01
			0.000			1/2"	0.500	0.256	0.01
			2.000			Ice	0.597	0.332	0.02
						1" Ice	0.818	0.510	0.03
						2" Ice	1.363	0.970	0.08
						4" Ice			
KRY 112 144/1	B	From Leg	4.000	0.000	148.000	No Ice	0.411	0.189	0.01
			0.000			1/2"	0.500	0.256	0.01
			2.000			Ice	0.597	0.332	0.02
						1" Ice	0.818	0.510	0.03
						2" Ice	1.363	0.970	0.08
						4" Ice			
KRY 112 144/1	C	From Leg	4.000	0.000	148.000	No Ice	0.411	0.189	0.01
			0.000			1/2"	0.500	0.256	0.01
			2.000			Ice	0.597	0.332	0.02
						1" Ice	0.818	0.510	0.03
						2" Ice	1.363	0.970	0.08
						4" Ice			
DS4C06F36D-N	A	From Leg	4.000	0.000	148.000	No Ice	5.500	5.500	0.07
			0.000			1/2"	7.367	7.367	0.11
			11.000			Ice	9.250	9.250	0.16
						1" Ice	13.067	13.067	0.30
						2" Ice	19.246	19.246	0.72
						4" Ice			
Platform Mount [LP 303-1]	C	None		0.000	148.000	No Ice	14.660	14.660	1.25
						1/2"	18.870	18.870	1.48
						Ice	23.080	23.080	1.71
						1" Ice	31.500	31.500	2.18
						2" Ice	48.340	48.340	3.10
						4" Ice			
141									
TME-RRUS-11	A	From Leg	1.000	0.000	141.000	No Ice	3.310	1.717	0.05
			0.000			1/2"	3.576	2.025	0.08
			0.000			Ice	3.855	2.370	0.11
						1" Ice	4.446	3.130	0.19
						2" Ice	5.757	4.886	0.40
						4" Ice			
TME-RRUS-11	B	From Leg	1.000	0.000	141.000	No Ice	3.310	1.717	0.05
			0.000			1/2"	3.576	2.025	0.08
			0.000			Ice	3.855	2.370	0.11
						1" Ice	4.446	3.130	0.19
						2" Ice	5.757	4.886	0.40
						4" Ice			
TME-RRUS-11	C	From Leg	1.000	0.000	141.000	No Ice	3.310	1.717	0.05
			0.000			1/2"	3.576	2.025	0.08
			0.000			Ice	3.855	2.370	0.11
						1" Ice	4.446	3.130	0.19
						2" Ice	5.757	4.886	0.40
						4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
6' x 3" Horizontal Mount Pipe	A	From Leg	0.500 0.000 0.000	0.000	141.000	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	0.03 0.04 0.06 0.11 0.26
6' x 3" Horizontal Mount Pipe	B	From Leg	0.500 0.000 0.000	0.000	141.000	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	0.03 0.04 0.06 0.11 0.26
6' x 3" Horizontal Mount Pipe	C	From Leg	0.500 0.000 0.000	0.000	141.000	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	0.03 0.04 0.06 0.11 0.26
6' x 2" Mount Pipe	B	From Leg	0.500 0.000 0.000	0.000	141.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.02 0.03 0.05 0.09 0.23
Side Arm Mount [SO 102-3]	C	None		0.000	141.000	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	0.08 0.11 0.14 0.20 0.32
140 (2) 7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.06 0.10 0.16 0.29 0.66
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.06 0.10 0.16 0.29 0.66
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.06 0.10 0.16 0.29 0.66
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.07 0.14 0.21 0.38 0.87
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.07 0.14 0.21 0.38 0.87
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	8.498 9.149 9.767 11.031	6.304 7.479 8.368 10.179	0.07 0.14 0.21 0.38

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	13.679	14.024	0.87
						4" Ice			
(2) LGP21401	A	From Leg	4.000	0.000	140.000	No Ice	1.288	0.233	0.01
			0.000			1/2" Ice	1.445	0.313	0.02
			1.000			1" Ice	1.611	0.403	0.03
						2" Ice	1.969	0.608	0.05
						4" Ice	2.788	1.121	0.14
(2) LGP21401	B	From Leg	4.000	0.000	140.000	No Ice	1.288	0.233	0.01
			0.000			1/2" Ice	1.445	0.313	0.02
			1.000			1" Ice	1.611	0.403	0.03
						2" Ice	1.969	0.608	0.05
						4" Ice	2.788	1.121	0.14
(2) LGP21401	C	From Leg	4.000	0.000	140.000	No Ice	1.288	0.233	0.01
			0.000			1/2" Ice	1.445	0.313	0.02
			1.000			1" Ice	1.611	0.403	0.03
						2" Ice	1.969	0.608	0.05
						4" Ice	2.788	1.121	0.14
(2) LGP21903	A	From Leg	4.000	0.000	140.000	No Ice	0.270	0.184	0.01
			0.000			1/2" Ice	0.343	0.248	0.01
			1.000			1" Ice	0.425	0.322	0.02
						2" Ice	0.616	0.494	0.03
						4" Ice	1.101	0.943	0.07
(2) LGP21903	B	From Leg	4.000	0.000	140.000	No Ice	0.270	0.184	0.01
			0.000			1/2" Ice	0.343	0.248	0.01
			1.000			1" Ice	0.425	0.322	0.02
						2" Ice	0.616	0.494	0.03
						4" Ice	1.101	0.943	0.07
(2) LGP21903	C	From Leg	4.000	0.000	140.000	No Ice	0.270	0.184	0.01
			0.000			1/2" Ice	0.343	0.248	0.01
			1.000			1" Ice	0.425	0.322	0.02
						2" Ice	0.616	0.494	0.03
						4" Ice	1.101	0.943	0.07
DC6-48-60-18-8F	B	From Leg	4.000	0.000	140.000	No Ice	1.467	1.467	0.03
			0.000			1/2" Ice	1.667	1.667	0.05
			1.000			1" Ice	1.878	1.878	0.07
						2" Ice	2.333	2.333	0.12
						4" Ice	3.378	3.378	0.25
Platform Mount [LP 304-1]	C	None		0.000	140.000	No Ice	17.460	17.460	1.35
						1/2" Ice	22.440	22.440	1.62
						1" Ice	27.420	27.420	1.90
						2" Ice	37.380	37.380	2.45
						4" Ice	57.300	57.300	3.55
132 RRH2X40-AWS	A	From Leg	2.000	0.000	132.000	No Ice	2.522	1.589	0.04
			0.000			1/2" Ice	2.753	1.795	0.06
			0.000			1" Ice	2.993	2.010	0.08
						2" Ice	3.499	2.465	0.13
						4" Ice	4.615	3.479	0.28
RRH2X40-AWS	B	From Leg	2.000	0.000	132.000	No Ice	2.522	1.589	0.04
			0.000			1/2" Ice	2.753	1.795	0.06
			0.000			1" Ice	2.993	2.010	0.08
						2" Ice	3.499	2.465	0.13
						4" Ice	4.615	3.479	0.28
RRH2X40-AWS	C	From Leg	2.000	0.000	132.000	No Ice	2.522	1.589	0.04
			0.000			1/2" Ice	2.753	1.795	0.06

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
			0.000				Ice	2.993	2.010	0.08
							1" Ice	3.499	2.465	0.13
							2" Ice	4.615	3.479	0.28
							4" Ice			
5' x 2" Pipe Mount	A	From Leg	2.000		0.000	132.000	No Ice	1.000	1.000	0.03
			0.000				1/2"	1.393	1.393	0.04
			0.000				Ice	1.703	1.703	0.05
							1" Ice	2.351	2.351	0.08
							2" Ice	3.778	3.778	0.20
							4" Ice			
5' x 2" Pipe Mount	B	From Leg	2.000		0.000	132.000	No Ice	1.000	1.000	0.03
			0.000				1/2"	1.393	1.393	0.04
			0.000				Ice	1.703	1.703	0.05
							1" Ice	2.351	2.351	0.08
							2" Ice	3.778	3.778	0.20
							4" Ice			
5' x 2" Pipe Mount	C	From Leg	2.000		0.000	132.000	No Ice	1.000	1.000	0.03
			0.000				1/2"	1.393	1.393	0.04
			0.000				Ice	1.703	1.703	0.05
							1" Ice	2.351	2.351	0.08
							2" Ice	3.778	3.778	0.20
							4" Ice			
Side Arm Mount [SO 102-3]	C	None			0.000	132.000	No Ice	3.000	3.000	0.08
							1/2"	3.480	3.480	0.11
							Ice	3.960	3.960	0.14
							1" Ice	4.920	4.920	0.20
							2" Ice	6.840	6.840	0.32
							4" Ice			
130										
(3) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.000		0.000	130.000	No Ice	8.533	7.004	0.08
			0.000				1/2"	9.184	8.185	0.14
			0.000				Ice	9.803	9.081	0.22
							1" Ice	11.067	10.905	0.40
							2" Ice	13.716	14.926	0.91
							4" Ice			
(3) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.000		0.000	130.000	No Ice	8.533	7.004	0.08
			0.000				1/2"	9.184	8.185	0.14
			0.000				Ice	9.803	9.081	0.22
							1" Ice	11.067	10.905	0.40
							2" Ice	13.716	14.926	0.91
							4" Ice			
(3) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.000		0.000	130.000	No Ice	8.533	7.004	0.08
			0.000				1/2"	9.184	8.185	0.14
			0.000				Ice	9.803	9.081	0.22
							1" Ice	11.067	10.905	0.40
							2" Ice	13.716	14.926	0.91
							4" Ice			
RRH2x60-700	A	From Leg	4.000		0.000	130.000	No Ice	3.957	1.816	0.06
			0.000				1/2"	4.272	2.075	0.08
			0.000				Ice	4.596	2.360	0.11
							1" Ice	5.271	2.957	0.17
							2" Ice	6.722	4.253	0.35
							4" Ice			
RRH2x60-700	B	From Leg	4.000		0.000	130.000	No Ice	3.957	1.816	0.06
			0.000				1/2"	4.272	2.075	0.08
			0.000				Ice	4.596	2.360	0.11
							1" Ice	5.271	2.957	0.17
							2" Ice	6.722	4.253	0.35
							4" Ice			
RRH2x60-700	C	From Leg	4.000		0.000	130.000	No Ice	3.957	1.816	0.06
			0.000				1/2"	4.272	2.075	0.08
			0.000				Ice	4.596	2.360	0.11
							1" Ice	5.271	2.957	0.17
							2" Ice	6.722	4.253	0.35
							4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRH2X60-AWS	A	From Leg	4.000 0.000 2.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.06 0.08 0.11 0.17 0.35
RRH2X60-AWS	B	From Leg	4.000 0.000 2.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.06 0.08 0.11 0.17 0.35
RRH2X60-AWS	C	From Leg	4.000 0.000 2.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.06 0.08 0.11 0.17 0.35
RRH2X60-PCS	A	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.06 0.08 0.10 0.16 0.31
RRH2X60-PCS	B	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.06 0.08 0.10 0.16 0.31
RRH2X60-PCS	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.06 0.08 0.10 0.16 0.31
DB-T1-6Z-8AB-0Z	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	0.04 0.08 0.12 0.21 0.45
(2) DB846F65ZAXY w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.152 7.702 8.277 9.455 11.923	7.702 8.775 9.641 11.483 15.535	0.04 0.11 0.18 0.36 0.85
(2) DB846F65ZAXY w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.152 7.702 8.277 9.455 11.923	7.702 8.775 9.641 11.483 15.535	0.04 0.11 0.18 0.36 0.85
(2) DB846F65ZAXY w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.152 7.702 8.277 9.455 11.923	7.702 8.775 9.641 11.483 15.535	0.04 0.11 0.18 0.36 0.85
DB-T1-6Z-8AB-0Z	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	0.04 0.08 0.12 0.21 0.45

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			
Platform Mount [LP 304-1]	C	None		0.000	130.000	No Ice	17.460	17.460	1.35
						1/2" Ice	22.440	22.440	1.62
						1" Ice	27.420	27.420	1.90
						2" Ice	37.380	37.380	2.45
						4" Ice	57.300	57.300	3.55
124									
800 10251 w/ Mount Pipe	B	From Leg	3.000	0.000	124.000	No Ice	4.883	2.256	0.04
			0.000			1/2" Ice	5.288	2.773	0.08
			0.000			1" Ice	5.703	3.306	0.11
						2" Ice	6.567	4.424	0.21
						4" Ice	8.448	7.080	0.50
5' x 2" Pipe Mount	B	From Leg	1.500	0.000	124.000	No Ice	1.000	1.000	0.03
			0.000			1/2" Ice	1.393	1.393	0.04
			0.000			1" Ice	1.703	1.703	0.05
						2" Ice	2.351	2.351	0.08
						4" Ice	3.778	3.778	0.20
Side Arm Mount [SO 701-1]	B	From Leg	1.500	0.000	124.000	No Ice	0.850	1.670	0.07
			0.000			1/2" Ice	1.140	2.340	0.08
			0.000			1" Ice	1.430	3.010	0.09
						2" Ice	2.010	4.350	0.12
						4" Ice	3.170	7.030	0.18
113									
(3) 800 10252 w/ Mount Pipe	B	From Leg	3.000	0.000	113.000	No Ice	7.578	3.787	0.04
			0.000			1/2" Ice	8.022	4.352	0.09
			0.000			1" Ice	8.476	4.935	0.15
						2" Ice	9.418	6.154	0.29
						4" Ice	11.461	8.932	0.66
T-Arm Mount [TA 702-1]	B	From Leg	1.500	0.000	113.000	No Ice	2.780	2.230	0.11
			0.000			1/2" Ice	3.390	2.430	0.14
			0.000			1" Ice	4.000	2.630	0.17
						2" Ice	5.220	3.030	0.23
						4" Ice	7.660	3.830	0.35
**									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
**											
HP2-4.7NS	B	Paraboloid w/Shroud (HP)	From Leg	1.500	-11.000		124.000	2.042	No Ice	3.274	0.03
				0.000					1/2" Ice	3.547	0.05
				0.000					1" Ice	3.819	0.06
									2" Ice	4.365	0.10
									4" Ice	5.456	0.17
**											

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 110	Pole	Max Tension	11	0.00	-0.00	-0.00
			Max. Compression	14	-26.38	-1.47	-1.22
			Max. Mx	5	-11.08	-408.24	1.06
			Max. My	8	-11.10	0.75	-405.00
			Max. Vy	11	-19.86	407.83	-1.54
			Max. Vx	8	19.58	0.75	-405.00
			Max. Torque	3			-2.01
L2	110 - 94.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.39	-5.59	-3.47
			Max. Mx	5	-14.28	-743.38	-1.40
			Max. My	8	-14.31	-2.40	-732.46
			Max. Vy	11	-22.63	741.82	0.17
			Max. Vx	8	22.08	-2.40	-732.46
			Max. Torque	3			-2.98
L3	94.25 - 46.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-50.62	-9.71	-5.37
			Max. Mx	5	-26.00	-1913.81	-9.17
			Max. My	8	-26.02	-11.40	-1879.06
			Max. Vy	11	-28.04	1913.24	8.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	8	27.49	-11.40	-1879.06
			Max. Torque	3			-3.04
L4	46.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-77.70	-14.36	-7.51
			Max. Mx	11	-45.37	3570.69	17.04
			Max. My	8	-45.37	-21.74	-3508.06
			Max. Vy	11	-33.92	3570.69	17.04
			Max. Vx	8	33.38	-21.74	-3508.06
			Max. Torque	3			-3.10

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	18	77.70	-9.11	-0.03
	Max. H_x	11	45.38	33.91	0.17
	Max. H_z	2	45.38	0.20	33.36
	Max. M_x	2	3505.52	0.20	33.36
	Max. M_z	5	3570.18	-33.87	-0.16
	Max. Torsion	9	3.07	16.82	-28.81
	Min. Vert	1	45.38	0.00	0.00
	Min. H_x	5	45.38	-33.87	-0.16
	Min. H_z	8	45.38	-0.18	-33.37
	Min. M_x	8	-3508.06	-0.18	-33.37
	Min. M_z	11	-3570.69	33.91	0.17
	Min. Torsion	3	-3.10	-16.82	28.81

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	45.38	0.00	0.00	1.13	-2.23	0.00
Dead+Wind 0 deg - No Ice	45.38	-0.20	-33.36	-3505.52	19.51	2.77
Dead+Wind 30 deg - No Ice	45.38	16.82	-28.81	-3026.45	-1775.53	3.10
Dead+Wind 60 deg - No Ice	45.38	29.27	-16.52	-1734.30	-3086.93	2.44
Dead+Wind 90 deg - No Ice	45.38	33.87	0.16	18.10	-3570.18	1.21
Dead+Wind 120 deg - No Ice	45.38	29.41	16.81	1767.83	-3100.20	-0.35
Dead+Wind 150 deg - No Ice	45.38	17.10	28.95	3043.84	-1803.85	-1.77
Dead+Wind 180 deg - No Ice	45.38	0.18	33.37	3508.06	-21.74	-2.82
Dead+Wind 210 deg - No Ice	45.38	-16.82	28.81	3028.66	1769.95	-3.07
Dead+Wind 240 deg - No Ice	45.38	-29.31	16.51	1735.18	3086.39	-2.43
Dead+Wind 270 deg - No Ice	45.38	-33.91	-0.17	-17.04	3570.69	-1.22
Dead+Wind 300 deg - No Ice	45.38	-29.44	-16.82	-1767.20	3100.38	0.32
Dead+Wind 330 deg - No Ice	45.38	-17.13	-28.97	-3043.69	1803.00	1.74
Dead+Ice+Temp	77.70	0.00	0.00	7.51	-14.36	0.00
Dead+Wind 0 deg+Ice+Temp	77.70	-0.03	-9.01	-979.63	-10.76	0.81
Dead+Wind 30 deg+Ice+Temp	77.70	4.54	-7.79	-845.89	-512.89	0.82
Dead+Wind 60 deg+Ice+Temp	77.70	7.88	-4.48	-483.01	-879.38	0.57
Dead+Wind 90 deg+Ice+Temp	77.70	9.11	0.03	10.15	-1013.73	0.19
Dead+Wind 120 deg+Ice+Temp	77.70	7.90	4.52	503.09	-881.02	-0.24
Dead+Wind 150 deg+Ice+Temp	77.70	4.58	7.81	863.17	-517.06	-0.60
Dead+Wind 180 deg+Ice+Temp	77.70	0.03	9.01	994.87	-17.69	-0.82

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 210 deg+Ice+Temp	77.70	-4.54	7.79	861.06	483.62	-0.81
Dead+Wind 240 deg+Ice+Temp	77.70	-7.89	4.47	497.85	851.36	-0.57
Dead+Wind 270 deg+Ice+Temp	77.70	-9.12	-0.03	4.73	985.97	-0.19
Dead+Wind 300 deg+Ice+Temp	77.70	-7.91	-4.53	-488.32	853.18	0.23
Dead+Wind 330 deg+Ice+Temp	77.70	-4.59	-7.81	-848.52	488.96	0.59
Dead+Wind 0 deg - Service	45.38	-0.07	-11.54	-1212.55	5.26	0.96
Dead+Wind 30 deg - Service	45.38	5.82	-9.97	-1046.73	-616.03	1.07
Dead+Wind 60 deg - Service	45.38	10.13	-5.72	-599.51	-1069.92	0.85
Dead+Wind 90 deg - Service	45.38	11.72	0.06	7.02	-1237.18	0.42
Dead+Wind 120 deg - Service	45.38	10.18	5.82	612.63	-1074.52	-0.12
Dead+Wind 150 deg - Service	45.38	5.92	10.02	1054.27	-625.83	-0.61
Dead+Wind 180 deg - Service	45.38	0.06	11.55	1214.94	-9.02	-0.98
Dead+Wind 210 deg - Service	45.38	-5.82	9.97	1049.01	611.11	-1.06
Dead+Wind 240 deg - Service	45.38	-10.14	5.71	601.33	1066.75	-0.84
Dead+Wind 270 deg - Service	45.38	-11.73	-0.06	-5.14	1234.38	-0.42
Dead+Wind 300 deg - Service	45.38	-10.19	-5.82	-610.90	1071.59	0.11
Dead+Wind 330 deg - Service	45.38	-5.93	-10.02	-1052.70	622.55	0.60

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-45.38	0.00	0.00	45.38	0.00	0.000%
2	-0.20	-45.38	-33.36	0.20	45.38	33.36	0.000%
3	16.82	-45.38	-28.81	-16.82	45.38	28.81	0.000%
4	29.27	-45.38	-16.52	-29.27	45.38	16.52	0.000%
5	33.87	-45.38	0.16	-33.87	45.38	-0.16	0.000%
6	29.41	-45.38	16.81	-29.41	45.38	-16.81	0.000%
7	17.10	-45.38	28.95	-17.10	45.38	-28.95	0.000%
8	0.18	-45.38	33.37	-0.18	45.38	-33.37	0.000%
9	-16.82	-45.38	28.81	16.82	45.38	-28.81	0.000%
10	-29.31	-45.38	16.51	29.31	45.38	-16.51	0.000%
11	-33.91	-45.38	-0.17	33.91	45.38	0.17	0.000%
12	-29.44	-45.38	-16.82	29.44	45.38	16.82	0.000%
13	-17.13	-45.38	-28.97	17.13	45.38	28.97	0.000%
14	0.00	-77.70	0.00	-0.00	77.70	-0.00	0.000%
15	-0.03	-77.70	-9.01	0.03	77.70	9.01	0.000%
16	4.54	-77.70	-7.79	-4.54	77.70	7.79	0.000%
17	7.88	-77.70	-4.48	-7.88	77.70	4.48	0.000%
18	9.11	-77.70	0.03	-9.11	77.70	-0.03	0.000%
19	7.90	-77.70	4.52	-7.90	77.70	-4.52	0.000%
20	4.58	-77.70	7.81	-4.58	77.70	-7.81	0.000%
21	0.03	-77.70	9.01	-0.03	77.70	-9.01	0.000%
22	-4.54	-77.70	7.79	4.54	77.70	-7.79	0.000%
23	-7.89	-77.70	4.47	7.89	77.70	-4.47	0.000%
24	-9.12	-77.70	-0.03	9.12	77.70	0.03	0.000%
25	-7.91	-77.70	-4.53	7.91	77.70	4.53	0.000%
26	-4.59	-77.70	-7.81	4.59	77.70	7.81	0.000%
27	-0.07	-45.38	-11.54	0.07	45.38	11.54	0.000%
28	5.82	-45.38	-9.97	-5.82	45.38	9.97	0.000%
29	10.13	-45.38	-5.72	-10.13	45.38	5.72	0.000%
30	11.72	-45.38	0.06	-11.72	45.38	-0.06	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
31	10.18	-45.38	5.82	-10.18	45.38	-5.82	0.000%
32	5.92	-45.38	10.02	-5.92	45.38	-10.02	0.000%
33	0.06	-45.38	11.55	-0.06	45.38	-11.55	0.000%
34	-5.82	-45.38	9.97	5.82	45.38	-9.97	0.000%
35	-10.14	-45.38	5.71	10.14	45.38	-5.71	0.000%
36	-11.73	-45.38	-0.06	11.73	45.38	0.06	0.000%
37	-10.19	-45.38	-5.82	10.19	45.38	5.82	0.000%
38	-5.93	-45.38	-10.02	5.93	45.38	10.02	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00023662
3	Yes	5	0.00000001	0.00003887
4	Yes	5	0.00000001	0.00003329
5	Yes	4	0.00000001	0.00014380
6	Yes	5	0.00000001	0.00003593
7	Yes	5	0.00000001	0.00003795
8	Yes	4	0.00000001	0.00028638
9	Yes	5	0.00000001	0.00003295
10	Yes	5	0.00000001	0.00003821
11	Yes	4	0.00000001	0.00010886
12	Yes	5	0.00000001	0.00003640
13	Yes	5	0.00000001	0.00003462
14	Yes	4	0.00000001	0.00001945
15	Yes	5	0.00000001	0.00004840
16	Yes	5	0.00000001	0.00005456
17	Yes	5	0.00000001	0.00005466
18	Yes	5	0.00000001	0.00005023
19	Yes	5	0.00000001	0.00005576
20	Yes	5	0.00000001	0.00005570
21	Yes	5	0.00000001	0.00004942
22	Yes	5	0.00000001	0.00005369
23	Yes	5	0.00000001	0.00005398
24	Yes	5	0.00000001	0.00004852
25	Yes	5	0.00000001	0.00005325
26	Yes	5	0.00000001	0.00005293
27	Yes	4	0.00000001	0.00004567
28	Yes	4	0.00000001	0.00014670
29	Yes	4	0.00000001	0.00010856
30	Yes	4	0.00000001	0.00002909
31	Yes	4	0.00000001	0.00012155
32	Yes	4	0.00000001	0.00013656
33	Yes	4	0.00000001	0.00004902
34	Yes	4	0.00000001	0.00010801
35	Yes	4	0.00000001	0.00014096
36	Yes	4	0.00000001	0.00002751
37	Yes	4	0.00000001	0.00012376
38	Yes	4	0.00000001	0.00011298

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 110	15.688	30	0.897	0.002
L2	115.25 - 94.25	9.400	30	0.786	0.002
L3	99.75 - 46.25	6.993	30	0.679	0.002

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L4	53.5 - 0	1.965	30	0.337	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.000	Lighting Rod 5/8" x 2'	30	15.688	0.897	0.002	63301
148.000	ERICSSON AIR 21 B2P w/ Mount Pipe	30	15.311	0.893	0.002	63301
141.000	TME-RRUS-11	30	13.996	0.879	0.002	35167
140.000	(2) 7770.00 w/ Mount Pipe	30	13.809	0.876	0.002	31651
132.000	RRH2X40-AWS	30	12.330	0.856	0.002	17583
130.000	(3) SBNHH-1D65B w/ Mount Pipe	30	11.967	0.849	0.002	15825
124.000	HP2-4.7NS	30	10.896	0.828	0.002	12173
113.000	(3) 800 10252 w/ Mount Pipe	30	9.030	0.772	0.002	9051

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 110	45.228	5	2.586	0.006
L2	115.25 - 94.25	27.106	5	2.264	0.006
L3	99.75 - 46.25	20.170	5	1.959	0.004
L4	53.5 - 0	5.670	11	0.973	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.000	Lighting Rod 5/8" x 2'	5	45.228	2.586	0.006	22046
148.000	ERICSSON AIR 21 B2P w/ Mount Pipe	5	44.141	2.574	0.006	22046
141.000	TME-RRUS-11	5	40.350	2.532	0.006	12248
140.000	(2) 7770.00 w/ Mount Pipe	5	39.811	2.526	0.006	11023
132.000	RRH2X40-AWS	5	35.552	2.466	0.006	6123
130.000	(3) SBNHH-1D65B w/ Mount Pipe	5	34.504	2.449	0.007	5510
124.000	HP2-4.7NS	5	31.418	2.386	0.007	4238
113.000	(3) 800 10252 w/ Mount Pipe	5	26.041	2.226	0.006	3151

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	150 - 110 (1)	TP39.633x28.4x0.25	40.000	0.000	0.0	38.825	30.080	-11.08	1167.88	0.009
L2	110 - 94.25 (2)	TP43.556x37.659x0.281	21.000	0.000	0.0	39.000	37.252	-14.28	1452.83	0.010
L3	94.25 - 46.25 (3)	TP56.472x41.449x0.375	53.500	0.000	0.0	39.000	64.346	-26.00	2509.51	0.010
L4	46.25 - 0 (4)	TP68.71x53.686x0.438	53.500	0.000	0.0	38.331	94.805	-45.37	3633.94	0.012

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	150 - 110 (1)	TP39.633x28.4x0.25	408.53	17.401	38.825	0.448	0.00	0.000	38.825	0.000
L2	110 - 94.25 (2)	TP43.556x37.659x0.281	743.38	23.229	39.000	0.596	0.00	0.000	39.000	0.000
L3	94.25 - 46.25 (3)	TP56.472x41.449x0.375	1913.83	26.730	39.000	0.685	0.00	0.000	39.000	0.000
L4	46.25 - 0 (4)	TP68.71x53.686x0.438	3570.73	26.789	38.331	0.699	0.00	0.000	38.331	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	150 - 110 (1)	TP39.633x28.4x0.25	19.83	0.659	26.000	0.051	0.13	0.003	26.000	0.000
L2	110 - 94.25 (2)	TP43.556x37.659x0.281	22.59	0.606	26.000	0.047	1.26	0.019	26.000	0.001
L3	94.25 - 46.25 (3)	TP56.472x41.449x0.375	28.00	0.435	26.000	0.033	1.24	0.008	26.000	0.000
L4	46.25 - 0 (4)	TP68.71x53.686x0.438	33.92	0.358	26.000	0.028	1.22	0.004	26.000	0.000

Pole Interaction Design Data

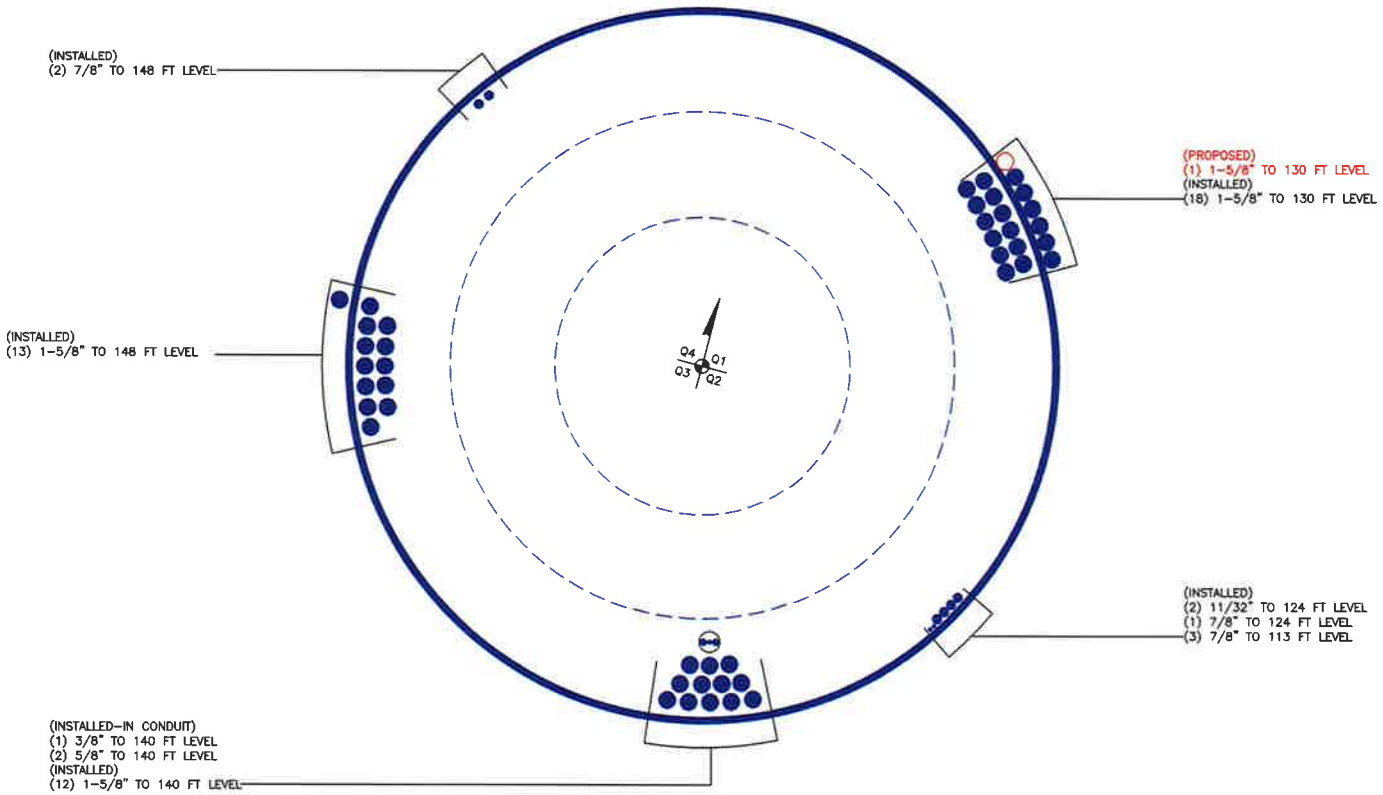
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 110 (1)	0.009	0.448	0.000	0.051	0.000	0.458 ✔	1.333	H1-3+VT ✔
L2	110 - 94.25 (2)	0.010	0.596	0.000	0.047	0.001	0.606 ✔	1.333	H1-3+VT ✔
L3	94.25 - 46.25 (3)	0.010	0.685	0.000	0.033	0.000	0.696 ✔	1.333	H1-3+VT ✔
L4	46.25 - 0 (4)	0.012	0.699	0.000	0.028	0.000	0.712 ✔	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	150 - 110	Pole	TP39.633x28.4x0.25	1	-11.08	1556.78	34.4	Pass
L2	110 - 94.25	Pole	TP43.556x37.659x0.281	2	-14.28	1936.62	45.5	Pass
L3	94.25 - 46.25	Pole	TP56.472x41.449x0.375	3	-26.00	3345.18	52.2	Pass
L4	46.25 - 0	Pole	TP68.71x53.686x0.438	4	-45.37	4844.04	53.4	Pass
							Summary	
						Pole (L4)	53.4	Pass
						RATING =	**53.4**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 5800059 TOWER ID: C_BASELEVEL

CROWN REGION ADDRESS

USA

10/08/12	APPLICATION ADDED PER WORK ORDER # 519316	AM
01/04/13	UPDATED PER WORK ORDER # 584194	MAJ
15/04/13	APPLICATION ADDED PER WORK ORDER # 5800059	JW
17/07/13	UPDATED PER WORK ORDER # 629122	ZMK
13/12/13	UPDATED PER WORK ORDER # 670157	TAS
14/01/14	UPDATED PER WORK ORDER # 700327	ADJ
21/03/14	UPDATED PER WORK ORDER # 731840	RES
16/12/14	UPDATED PER WORK ORDER # 961185	EAN
27/7/2015	UPDATED PER WORK ORDER 1066135	TS

DRAWN BY: MDB
CHECKED BY:
DRAWING DATE: 30/12/08

SITE NUMBER:
SITE NAME:

SITE NAME

SUMMER HILL ROAD

BUSINESS UNIT NUMBER

5800059

SITE ADDRESS

99 SUMMER HILL ROAD
MADISON, CT 06433
NEW HAVEN COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING

SCALE: 1" = 1'-0" | 1

PLOT DATE: 7/27/2015 - FILE NAME: 5800059_BASELEVEL.DWG

APPENDIX C

ADDITIONAL CALCULATIONS

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

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

Site Data

BU#: *5800059*
Site Name: *Ridge Road, Madison*
App #: *304568 Rev. 0*

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	76	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	77	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	12	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
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

Pole Data		
Diam:	68.71	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	3571	ft-kips
Unfactored Axial, P:	45	kips
Unfactored Shear, V:	34	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	92.1 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	47.2% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	21.3 ksi
Allowable PL Bending Stress:	50.0 ksi
Base Plate Stress Ratio:	42.6% **Pass**

PL Ref. Data
Yield Line (in): 40.18
Max PL Length: 40.18

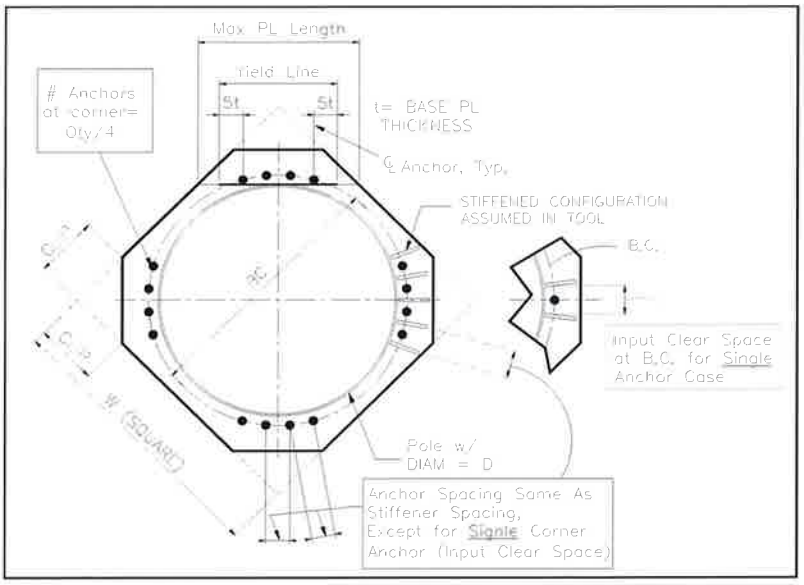
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check:	N/A



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

CCI Foundation Tool Suite - Monopole Pier

CCIFTS 1.2.108.14286 - Phase 1-2 Date: 7/29/2015

BU:	5800059
Site Name:	Ridge Road, Madison
App Number:	304568 Rev. 0
Work Order:	1096162

CROWN CASTLE

Monopole Drilled Pier

Input

Criteria

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

Forces

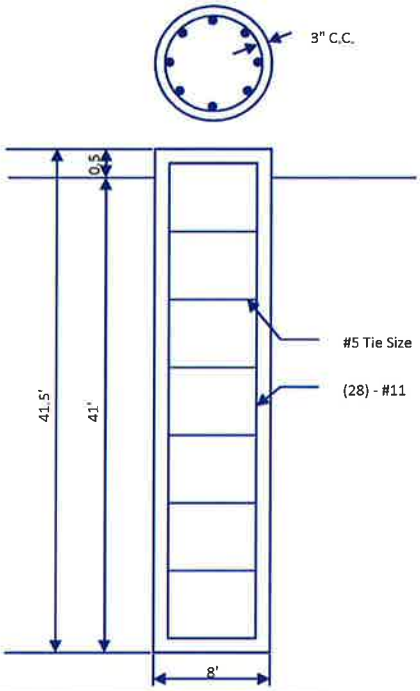
Compression	45 kips
Shear	34 kips
Moment	3571 k-ft
Swelling Force	0 kips

Foundation Dimensions

Pier Diameter:	8 ft
Ext. above grade:	0.5 ft
Depth below grade:	41 ft

Material Properties

Number of Rebar:	28
Rebar Size:	11
Tie Size	5
Rebar tensile strength:	60 ksi
Concrete Strength:	4000 psi
Ultimate Concrete Strain	0.003 in/in
Clear Cover to Ties:	3 in



Soil Profile: soil

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	4	0	4	100					0	
2	3	4	7	100		22			0	
3	5	7	12	37.6		22			0	
4	8	12	20	42.6		27			0	
5	21	20	41	62.6		31			6	

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	10.27 ft
Max Moment, Mu:	3864.47 k-ft
Soil Safety Factor:	6.42
Safety Factor Req'd:	2
RATING:	31.1%

Soil Axial Capacity

Skin Friction (k):	190.91 kips
End Bearing (k):	150.80 kips
Comp. Capacity (k), ϕCn:	341.70 kips
Comp. (k), Cu:	58.50 kips
RATING:	17.1%

Concrete/Steel Check

Mu (from soil analysis)	5023.81 k-ft
ϕMn	8182.37 k-ft
RATING:	61.4%

rho provided	0.60	
rho required	0.33	OK
Rebar Spacing	8.39	
Spacing required	22.56	OK
Dev. Length required	30.48	
Dev. Length provided	53.51	OK

Overall Foundation Rating: 61.4%