

December 23, 2015

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

Re: **Notice of Exempt Modification – Facility Modification
203 Davis Road, Chaplin, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the 155-foot level of the existing 175-foot tower at 203 Davis Road in Chaplin, Connecticut (the “Property”). The tower is owned by SBA Communications Corporation (“SBA”). The Council approved Cellco’s use of the tower in 2007. Cellco now intends to modify its facility by replacing six (6) of its existing antennas with three (3) model SBNHH-1D65B, 700 MHz antennas and three (3) model SBNHH-1D65B, 1900/2100 MHz antennas, all at the same level on the tower. Cellco also intends to install nine (9) remote radio heads (“RRHs”) and two (2) HYBRIFLEX™ fiber optic antenna cables. Included in Attachment 1 are specifications for Cellco’s replacement antennas, RRHs and HYBRIFLEX™ cables.

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 Matthew Cunningham, First Selectman of the Town of Chaplin. A copy of this letter is also being sent to Truman Pearl, the owner of the Property and SBA, the tower owner.

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

Melanie A. Bachman
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Page 2

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be located at the 155-foot level on the 175-foot tower.
2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and/or local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for Cellco's modified facility is included behind 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:

Matthew Cunningham, First Selectman
Truman Pearl
SBA
Tim Parks

ATTACHMENT 1



SBNH-1D65B

Andrew® Dualband Antenna, 698–896 MHz and 1710–2360 MHz, 65° horizontal beamwidth, internal RET.

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

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1710–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.8	14.6	17.8	18.1	18.5	18.5
Beamwidth, Horizontal, degrees	68	66	70	65	62	59
Beamwidth, Vertical, degrees	12.1	11.0	5.7	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS (First Lobe), dB	17	16	15	14	16	15
Front-to-Back Ratio at 180°, dB	29	32	31	28	30	31
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	1710–1880	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	14.5	14.1	17.5	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.9	±0.4	±0.3	±0.5	±0.4
	0° 14.6	0° 14.3	0° 17.5	0° 17.8	0° 18.0	0° 18.0
Gain by Beam Tilt, average, dBi	7° 14.6	7° 14.3	3° 17.5	3° 18.0	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	±1.7	±3.3	±2.3	±4.9	±4.5	±4.4
Beamwidth, Vertical Tolerance, degrees	±0.8	±0.7	±0.3	±0.2	±0.3	±0.1
USLS, beampeak to 20° above beampeak, dB	17	16	15	14	15	14
Front-to-Back Total Power at 180° ± 30°, dB	25	25	28	25	25	26
CPR at Boresight, dB	21	22	19	20	19	23
CPR at Sector, dB	13	11	16	13	13	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
Band	Multiband
Brand	DualPol® Teletilt®
Operating Frequency Band	1710 – 2360 MHz 698 – 896 MHz
Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
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SBNH-1D65B



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	4
Wind Loading, maximum	618.0 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241 km/h 150 mph

Dimensions

Depth	181.0 mm 7.1 in
Length	1848.0 mm 72.8 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®

Packed Dimensions

Depth	299.0 mm 11.8 in
Length	1970.0 mm 77.6 in
Width	409.0 mm 16.1 in
Shipping Weight	31.0 kg 68.3 lb

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

BSAMNT-1 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one

Product Specifications

COMMSCOPE®

SBNH-1D65B

POWERED BY



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.

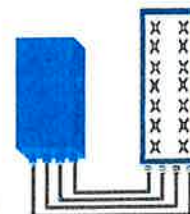
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

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.)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield)
Volume in L	38 (with solar shield)
Weight in kg (lb) (w/o mounting HW)	26 (57.2) (with solar shield)
DC voltage range	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption
DC power consumption	550W typical @100% RF load (in 2Tx or 4TX mode)
Environmental conditions	-40°C (-40°F) / +55°C (+131°F) IP65
Wind load (@150km/h or 93mph)	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

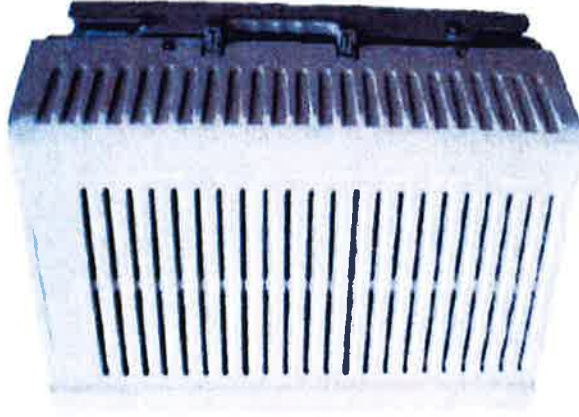
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PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

RRH2x60	
RF Output Power	2x60W
Instantaneous Bandwidth	20MHz
Transmitter	2 TX
Receiver	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)



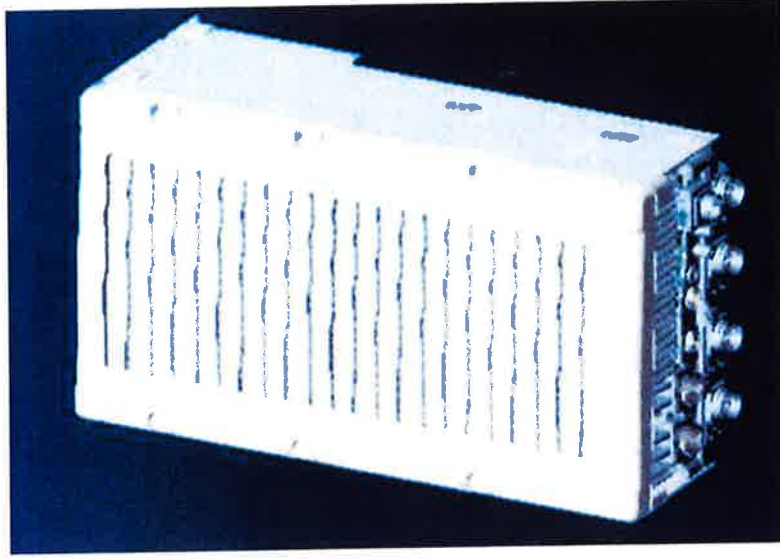
** Not a Verizon Wireless deployed product

ALCATEL-LUCENT – CONFIDENTIAL – SOLELY FOR AUTHORIZED PERSONS HAVING A NEED TO KNOW – PROPRIETARY – USE PURSUANT TO COMPANY INSTRUCTION

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**

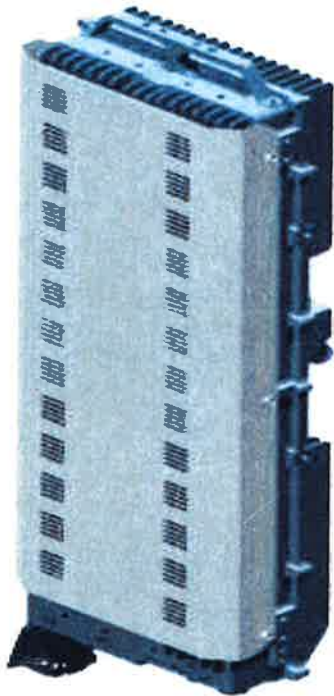


** - Includes solar shield but not mounting brackets (8 lbs.)



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.

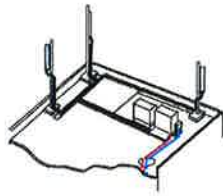
EASY INSTALLATION

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.

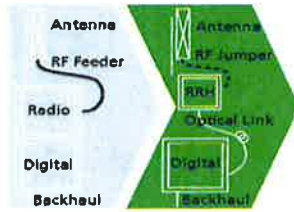
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

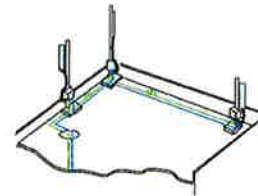
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



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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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 ² (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)		(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

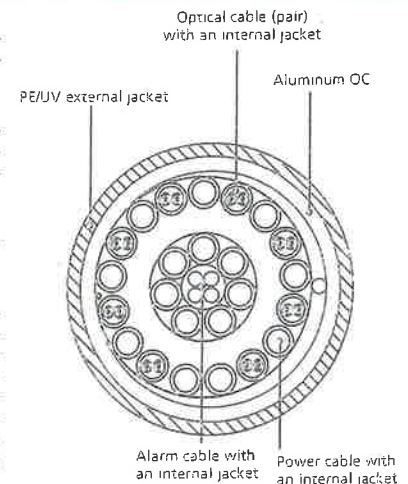


Figure 2: Construction Detail

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

ATTACHMENT 2

		General		Power	Density				
Site Name: Mansfield NE (Chaplin) Tower Height: 212Ft									
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total	
*Sprint/Nextel	no RF information available		173						
*Sprint CDMA/LTE	2	769	162.5	0.0226	1900	1.0000	0.23%		
Verizon	11	399	155	0.0657	1970	1.0000	6.57%		
Verizon	7	408	155	0.0427	869	0.5793	7.38%		
Verizon	1	2302	155	0.0345	2145	1.0000	3.45%		
Verizon	1	822	155	0.0123	698	0.4653	2.64%		
								20.26%	
* Source: Siting Council									

ATTACHMENT 3



Tower Engineering Solutions

Phone (972) 483-0607, Fax (972) 975-9615
8445 Freeport Parkway, Suite 375, Irving, Texas 75063

Structural Analysis Report

Existing 175 ft. Nudd Corporation Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT03113-S

Customer Site Name: North Chaplin

Carrier Name: Verizon

Carrier Site Number: N/A

Carrier Site Name: Mansfield NE

Site Location: 203 Davis Road

Chaplin, Connecticut

Windham County

Latitude: 41.793486

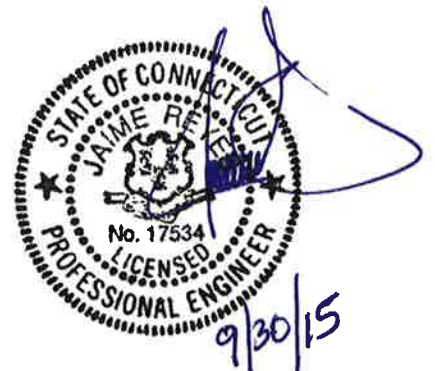
Longitude: -72.160178

Analysis Result:

Max Structural Usage: 83.3% [Pass]

Max Foundation Usage: 39% [Pass]

Report Prepared By : Stacey Hesselbein



Introduction

The purpose of this report is to summarize the analysis results on the 175 ft. Nudd Corporation Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Tower Drawings prepared by Fred A. Nudd Corporation Project # 7678; 10125-056 Dated 07/2000
Foundation Drawing	Foundation Drawings prepared by Fred A. Nudd Corporation Project # 7678; 10125-056 Dated 07/2000
Geotechnical Report	Geotechnical Report prepared by FDH, Project # 1206274EG1 Dated 08/20/2012
Modification Drawings	N/A

Analysis Criteria

The rigorous analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-F. In accordance with this standard, the structure was analyzed using **TESPoles**, a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Basic Wind Speed Used in the Analysis:	85.0 mph (fastest mile)
Basic Wind Speed with Ice:	74 mph (fastest mile) with 1/2" radial ice concurrent
Operational Wind Speed:	50 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-F / 2005 Connecticut State Building Code/ IBC 2003
Exposure Category:	C
Crest Height:	0 ft.

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft.)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	173.0	12	Decibel - DB844H90E-XY - Panel	(1)Low Profile Platform	(12) 1 1/4"	Nextel
2	165.0	12	Decibel - DB980H90 - Panel	(1)Low Profile Platform	(12) 1 5/8"	Sprint
3	155.0	1	Antel - BXA-171085-12BF - Panel	(1)Pirod Low Profile Platform	(12) 1 5/8"	Verizon
4		2	Antel - BXA-171063-12BF-EDIN-X - Panel			
5		3	Antel - BXA-70063-6CF-2 - Panel			
7		2	Antel - LPA-80080-6CF-EDIN - Panel			
8		4	Antel - LPA-80063/6CF - Panel			
12		6	RFS - FD9R6004/2C-3L - Diplexer			

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft.)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
6	155.0	6	Commscope - SBNHH-1D65B - Panel	(1)Pirod Low Profile Platform	(6) 1 5/8" (2) 1 5/8" Hybrid	Verizon
7		2	Antel - LPA-80080-6CF-EDIN - Panel			
8		4	Antel - LPA-80063/6CF - Panel			
9		3	Alcatel - RRH2X60-AWS - RRH			
10		3	Alcatel - RRH2X60-PCS - RRH			
11		3	Alcatel - RRH2X60-700 - RRH			
12		6	RFS - FD9R6004/2C-3L - Diplexer			
13		1	RFS - DB-T1-6Z-8AB-OZ - Distribution Box			

All transmission lines are considered running inside of the pole shafts.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	62.4%	47.8%	83.3%
Pass/Fail	Pass	Pass	Pass

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Original Design Reactions	5680.0	43.6	N/A
Analysis Reactions	3527.1	29.2	47.1
% of Design Reactions	62.1%	66.9%	N/A

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

Operational Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA 222-F for the installed antennas. Maximum twist/sway at the elevation of the proposed equipment is 1.3575 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the ANSI/TIA/EIA 222-F Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC**. Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.
2. The analysis is based on the presumption that the tower members and components along with any existing reinforcement items have been correctly and properly designed, manufactured, installed and maintained.
3. All the existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion.
4. An initial tension of 10% of the break strength on all the existing guy wires was assumed in all the structural analyses of guyed towers unless different values were provided by the client. **TES** cannot take responsibility for the deviations in the analysis results because of differences in the initial tension forces of the existing guy wires.
5. Secondary component or connection secondary components, welds and bolts are assumed to be able to carry their intended original design loads. **TES** cannot take responsibility for verification of the adequacy on the connections, bolts and welds present in the structure.
6. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed or/and ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.
7. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.
8. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.
9. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Usage Diagram - Max Stress 62.4% at 48.0ft

Structure: CT03113-S-SBA
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69

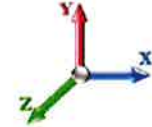
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Dead Load Factor: 1.00
Wind Load Factor: 1.00

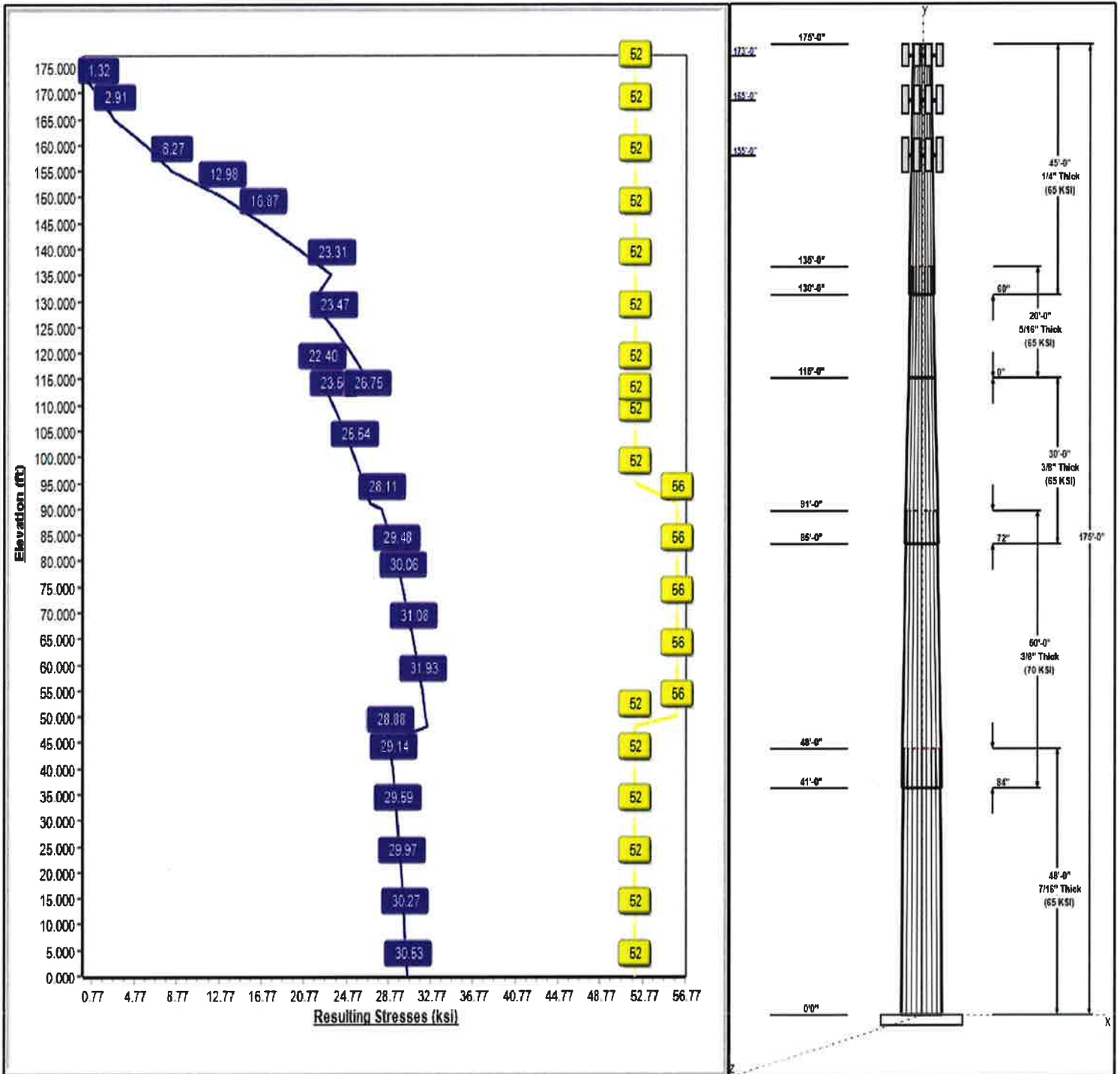
Load Case : 85 mph Wind with 0 in Ice



Iterations: 23

- 52 Allowable Stress
- 32 Resulting Stress

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Structure: CT03113-S-SBA

Type: Tapered
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.24286

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Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	48.00	52.84	64.50	0.438		0.24286	65
2	50.00	43.15	55.29	0.375	Slip	0.24286	70
3	30.00	38.07	45.36	0.375	Slip	0.24286	65
4	20.00	33.21	38.07	0.313	Butt	0.24286	65
5	45.00	24.00	34.93	0.250	Slip	0.24286	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
175.00	175.00	1	6' Lightning rod	Verizon
173.00	173.00	12	DB844H90E-XY	Nextel
173.00	173.00	1	Low Profile Platform-flat	Nextel
165.00	165.00	12	DB980H90A-KL	Sprint
165.00	165.00	1	Low Profile Platform-flat	Sprint
155.00	155.00	1	13 ft Low Profile Platform	Verizon
155.00	155.00	1	DB-T1-6Z-8AB-0Z	Verizon
155.00	155.00	6	FD9R6004/2C-3L (3.1 lbs)	Verizon
155.00	155.00	4	LPA-80063/6CF	Verizon
155.00	155.00	2	LPA-80080-6CF-EDIN-2	Verizon
155.00	155.00	3	RRH2X60-700	Verizon
155.00	155.00	3	RRH2X60-AWS	Verizon
155.00	155.00	3	RRH2X60-PCS	Verizon
155.00	155.00	6	SBNHH-1D65B	Verizon

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	173.00	Inside	1 1/4" Coax	Nextel
0.00	165.00	Inside	1 5/8" Coax	Sprint
0.00	155.00	Inside	1 5/8" Coax	Verizon
0.00	155.00	Inside	1 5/8" Hybrid	Verizon

Anchor Bolts

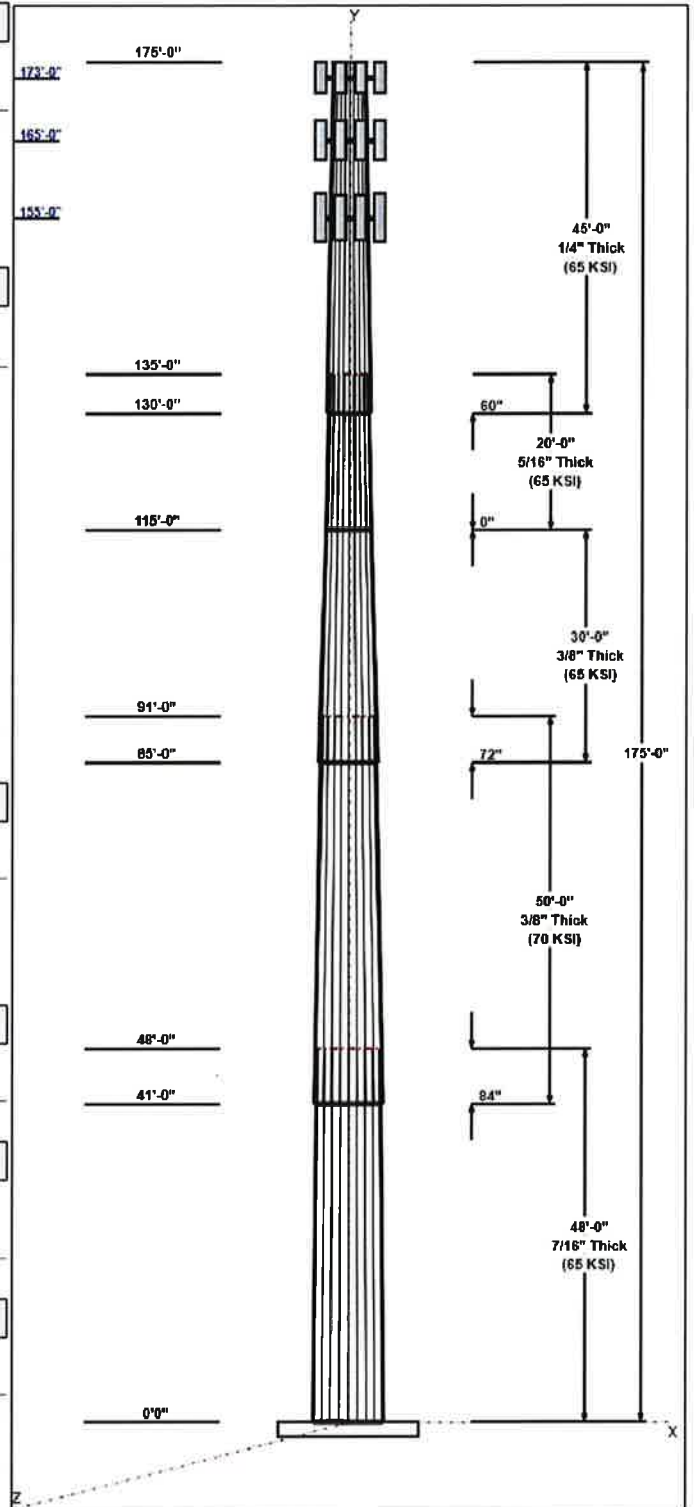
Qty	Specifications	Grade (ksi)	Arrangement
29	2.00" A687	105.0	Radial

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
1.5000	64.5	50.0	Polygon

Reactions

Load Case	Moment	Shear	Axial
85 mph Wind with 0" Ice	3527.1	29.2	41.1
73.61 mph Wind with 0.5" Ice	2880.1	23.3	47.1
50 mph Wind with 0" Ice	1221.2	10.1	41.1

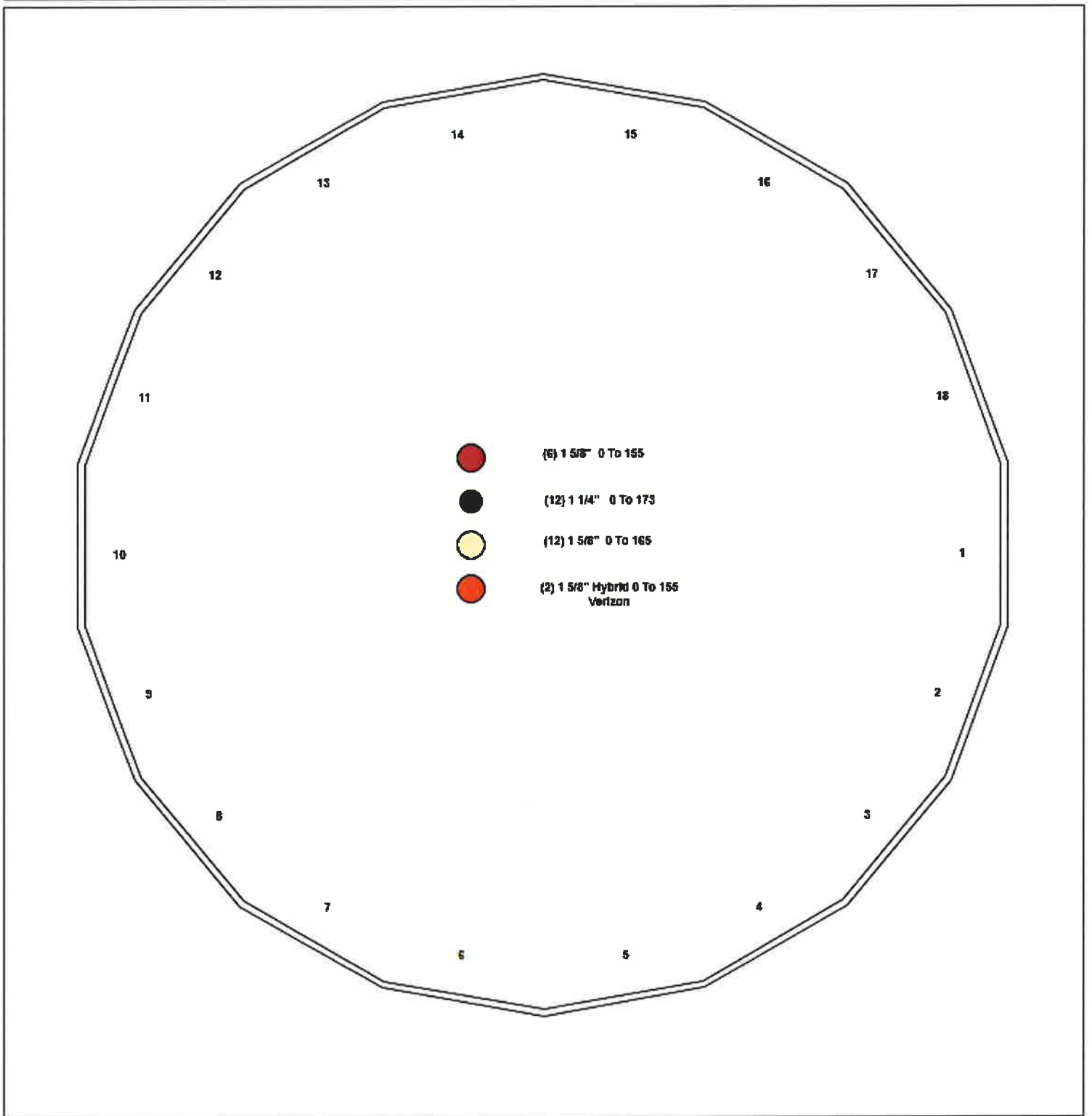


Structure: CT03113-S-SBA - Coax Line Placement

Type: Monopole
Site Name: North Chaplin
Height: 175.00 (ft)

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Shaft Properties

Structure: CT03113-S-SBA
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

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Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	48.000	0.4375	65		0.00	13,207
2	18	50.000	0.3750	70	Slip	84.00	9,891
3	18	30.000	0.3750	65	Slip	72.00	5,023
4	18	20.000	0.3125	65	Flange	0.00	2,385
5	18	45.000	0.2500	65	Slip	60.00	3,550
Total Shaft Weight:							34,056

Bottom

Top

Sec. No.	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Taper
1	64.50	0.00	88.96	46124.76	24.58	147.4	52.84	48.00	72.77	25249.3	19.88	120.7	0.242857
2	55.29	41.00	65.36	24906.71	24.58	147.4	43.15	91.00	50.91	11769.1	18.87	115.0	0.242857
3	45.36	85.00	53.54	13686.62	19.91	120.9	38.07	115.0	44.87	8055.20	16.49	101.5	0.242857
4	38.07	115.0	37.45	6746.11	20.07	121.8	33.21	135.0	32.63	4463.27	17.33	106.2	0.242857
5	34.93	130.0	27.52	4180.88	23.22	139.7	24.00	175.0	18.84	1343.00	15.51	96	0.242857

Loading Summary

Structure: CT03113-S-SBA
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/30/2015

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Discrete Appurtenances

No.	Elev (ft)	Description	Qty	No Ice			Ice			Hor. Ecc. (ft)	Vert Ecc (ft)
				Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor		
1	175.0	6' Lightning rod	1	6.50	0.38	0.00	11.80	0.980	0.00	0.00	
2	173.0	DB844H90E-XY	12	14.00	3.06	1.00	0.00	3.340	1.00	0.00	
3	173.0	Low Profile Platform-flat	1	1200.00	25.00	1.00	1500.00	31.00	1.00	0.00	
4	165.0	DB980H90A-KL	12	8.50	3.80	0.79	0.00	4.080	0.80	0.00	
5	165.0	Low Profile Platform-flat	1	1200.00	25.00	1.00	1500.00	31.00	1.00	0.00	
6	155.0	13 ft Low Profile Platform	1	1300.00	15.70	1.00	1765.00	20.10	1.00	0.00	
7	155.0	DB-T1-6Z-8AB-0Z	1	44.00	5.60	1.00	51.10	5.870	1.00	0.00	
8	155.0	FD9R6004/2C-3L (3.1 lbs)	6	3.10	0.37	0.62	5.40	0.440	0.65	0.00	
9	155.0	LPA-80063/6CF	4	27.00	10.34	0.94	0.00	10.82	0.94	0.00	
10	155.0	LPA-80080-6CF-EDIN-2	2	21.00	4.32	1.00	69.30	4.640	1.00	0.00	
11	155.0	RRH2X60-700	3	60.00	3.96	0.73	80.10	4.230	0.74	0.00	
12	155.0	RRH2X60-AWS	3	60.00	3.96	0.73	80.10	4.230	0.74	0.00	
13	155.0	RRH2X60-PCS	3	55.00	2.57	0.89	80.10	2.760	0.90	0.00	
14	155.0	SBNHH-1D65B	6	50.71	8.33	0.82	87.00	8.800	0.82	0.00	
Totals:			56	5,018.36			6,241.80				

Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	No Ice		Ice		Exposed
			Weight (lb/ft)	CaAa (sf/ft)	Weight (lb/ft)	CaAa (sf/ft)	
0.00	173.0	(12) 1 1/4" Coax	7.92	0.00	0.00	0.00	Inside
0.00	165.0	(12) 1 5/8" Coax	1.04	0.00	0.00	0.00	Inside
0.00	155.0	(6) 1 5/8" Coax	1.04	0.00	0.00	0.00	Inside
0.00	155.0	(2) 1 5/8" Hybrid	2.20	0.00	0.00	0.00	Inside
Totals:			2,043.96		0.00		

Shaft Section Properties

Structure: CT03113-S-SBA
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

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Increment Length: 5 (ft)

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in ²)	Ix (in ⁴)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)
0.00		0.4375	64.500	88.956	46124.8	24.59	147.43	65	52	0.0
5.00		0.4375	63.286	87.269	43551.3	24.10	144.65	65	52	1499.1
10.00		0.4375	62.071	85.583	41075.4	23.61	141.88	65	52	1470.4
15.00		0.4375	60.857	83.897	38695.2	23.12	139.10	65	52	1441.8
20.00		0.4375	59.643	82.211	36408.7	22.63	136.33	65	52	1413.1
25.00		0.4375	58.429	80.525	34214.2	22.14	133.55	65	52	1384.4
30.00		0.4375	57.214	78.839	32109.6	21.65	130.78	65	52	1355.7
35.00		0.4375	56.000	77.153	30093.2	21.16	128.00	65	52	1327.0
40.00		0.4375	54.786	75.467	28163.0	20.67	125.22	65	52	1298.3
41.00	Bot - Section 2	0.4375	54.543	75.129	27787.1	20.57	124.67	65	52	256.2
45.00		0.4375	53.571	73.780	26317.1	20.18	122.45	65	52	1895.2
48.00	Top - Section 1	0.3750	53.593	63.340	22664.6	23.79	142.91	70	52	1399.0
50.00		0.3750	53.107	62.762	22049.7	23.56	141.62	70	56	429.1
55.00		0.3750	51.893	61.317	20561.2	22.99	138.38	70	56	1055.5
60.00		0.3750	50.679	59.872	19141.3	22.42	135.14	70	56	1030.9
65.00		0.3750	49.464	58.426	17788.4	21.85	131.90	70	56	1006.4
70.00		0.3750	48.250	56.981	16500.7	21.28	128.67	70	56	981.8
75.00		0.3750	47.036	55.536	15276.7	20.71	125.43	70	56	957.2
80.00		0.3750	45.821	54.091	14114.8	20.13	122.19	70	56	932.6
85.00	Bot - Section 3	0.3750	44.607	52.645	13013.4	19.56	118.95	70	56	908.0
90.00		0.3750	43.393	51.200	11970.8	18.99	115.71	70	56	1782.0
91.00	Top - Section 2	0.3750	43.900	51.804	12399.2	19.23	117.07	65	56	350.5
95.00		0.3750	42.929	50.648	11587.3	18.77	114.48	65	52	697.2
100.00		0.3750	41.714	49.202	10623.4	18.20	111.24	65	52	849.4
105.00		0.3750	40.500	47.757	9714.5	17.63	108.00	65	52	824.8
110.00		0.3750	39.286	46.312	8859.0	17.06	104.76	65	52	800.2
115.00	Top - Section 3	0.0000	0.000	0.000	0.0	NAN	NAN	0	0	775.6
115.00	Bot - Section 4	0.3750	38.071	44.867	8055.2	16.49	101.52	65	52	
120.00		0.3125	36.857	36.246	6116.0	19.39	117.94	65	52	626.9
125.00		0.3125	35.643	35.042	5526.4	18.70	114.06	65	52	606.4
130.00	Bot - Section 5	0.3125	34.429	33.838	4975.9	18.02	110.17	65	52	586.0
135.00	Top - Section 4	0.2500	33.714	26.553	3756.9	22.37	134.86	65	52	1025.4
140.00		0.2500	32.500	25.589	3362.6	21.51	130.00	65	52	443.6
145.00		0.2500	31.286	24.626	2996.9	20.66	125.14	65	52	427.2
150.00		0.2500	30.071	23.662	2658.7	19.80	120.29	65	52	410.8
155.00		0.2500	28.857	22.699	2347.0	18.94	115.43	65	52	394.4
160.00		0.2500	27.643	21.735	2060.6	18.09	110.57	65	52	378.0
165.00		0.2500	26.429	20.772	1798.5	17.23	105.71	65	52	361.6
170.00		0.2500	25.214	19.808	1559.7	16.37	100.86	65	52	345.2
173.00		0.2500	24.486	19.230	1427.1	15.86	97.94	65	52	199.3
175.00		0.2500	24.000	18.845	1343.0	15.52	96.00	65	52	129.6

34056.0

Wind Loading - Shaft

Structure: CT03113-S-SBA
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

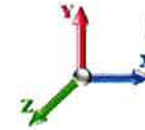
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Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 23

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	18.496	31.26	456.88	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	18.496	31.26	448.27	0.650	0.000	5.00	26.622	17.30	540.9	0.0	1499.1
10.00		0.00	1.00	18.496	31.26	439.67	0.650	0.000	5.00	26.116	16.98	530.6	0.0	1470.4
15.00		0.00	1.00	18.496	31.26	431.07	0.650	0.000	5.00	25.610	16.65	520.3	0.0	1441.8
20.00		0.00	1.00	18.496	31.26	422.47	0.650	0.000	5.00	25.104	16.32	510.1	0.0	1413.1
25.00		0.00	1.00	18.496	31.26	413.87	0.650	0.000	5.00	24.598	15.99	499.8	0.0	1384.4
30.00		0.00	1.00	18.496	31.26	405.27	0.650	0.000	5.00	24.092	15.66	489.5	0.0	1355.7
35.00		0.00	1.02	18.810	31.79	400.02	0.650	0.000	5.00	23.586	15.33	487.3	0.0	1327.0
40.00		0.00	1.06	19.541	33.02	398.88	0.650	0.000	5.00	23.080	15.00	495.4	0.0	1298.3
41.00	Bot - Section 2	0.00	1.06	19.679	33.26	398.51	0.650	0.000	1.00	4.555	2.96	98.5	0.0	256.2
45.00		0.00	1.09	20.210	34.15	396.66	0.650	0.000	4.00	18.269	11.87	405.6	0.0	1895.2
48.00	Top - Section 1	0.00	1.11	20.586	34.79	394.89	0.650	0.000	3.00	13.489	8.77	305.0	0.0	1399.0
50.00		0.00	1.13	20.827	35.20	399.18	0.650	0.000	2.00	8.892	5.78	203.4	0.0	429.1
55.00		0.00	1.16	21.402	36.17	395.40	0.650	0.000	5.00	21.875	14.22	514.3	0.0	1055.5
60.00		0.00	1.19	21.941	37.08	390.98	0.650	0.000	5.00	21.369	13.89	515.0	0.0	1030.9
65.00		0.00	1.21	22.449	37.94	386.00	0.650	0.000	5.00	20.863	13.56	514.5	0.0	1006.4
70.00		0.00	1.24	22.929	38.75	380.53	0.650	0.000	5.00	20.357	13.23	512.7	0.0	981.8
75.00		0.00	1.26	23.386	39.52	374.63	0.650	0.000	5.00	19.851	12.90	510.0	0.0	957.2
80.00		0.00	1.29	23.821	40.26	368.34	0.650	0.000	5.00	19.345	12.57	506.2	0.0	932.6
85.00	Bot - Section 3	0.00	1.31	24.237	40.96	361.70	0.650	0.000	5.00	18.839	12.25	501.6	0.0	908.0
90.00		0.00	1.33	24.636	41.63	354.73	0.650	0.000	5.00	18.646	12.12	504.6	0.0	1782.0
91.00	Top - Section 2	0.00	1.34	24.714	41.77	353.31	0.650	0.000	1.00	3.668	2.38	99.6	0.0	350.5
95.00		0.00	1.35	25.020	42.28	353.66	0.650	0.000	4.00	14.471	9.41	397.7	0.0	697.2
100.00		0.00	1.37	25.389	42.91	346.18	0.650	0.000	5.00	17.634	11.46	491.8	0.0	849.4
105.00		0.00	1.39	25.745	43.51	338.46	0.650	0.000	5.00	17.128	11.13	484.4	0.0	824.8
110.00		0.00	1.41	26.090	44.09	330.50	0.650	0.000	5.00	16.622	10.80	476.4	0.0	800.2
115.00	Top - Section 3	0.00	1.43	26.423	44.66	322.32	0.650	0.000	5.00	16.116	10.48	467.8	0.0	775.6
120.00		0.00	1.45	26.747	45.20	313.95	0.650	0.000	5.00	15.610	10.15	458.6	0.0	626.9
125.00		0.00	1.46	27.060	45.73	305.38	0.650	0.000	5.00	15.104	9.82	449.0	0.0	606.4
130.00	Bot - Section 5	0.00	1.48	27.365	46.25	296.63	0.650	0.000	5.00	14.598	9.49	438.8	0.0	586.0
135.00	Top - Section 4	0.00	1.50	27.662	46.75	287.72	0.650	0.000	5.00	14.301	9.30	434.5	0.0	1025.4
140.00		0.00	1.51	27.951	47.24	283.00	0.650	0.000	5.00	13.795	8.97	423.6	0.0	443.6
145.00		0.00	1.53	28.233	47.71	273.79	0.650	0.000	5.00	13.289	8.64	412.1	0.0	427.2
150.00		0.00	1.54	28.507	48.18	264.44	0.650	0.000	5.00	12.783	8.31	400.3	0.0	410.8
155.00	Appurtenance(s)	0.00	1.56	28.776	48.63	254.96	0.650	0.000	5.00	12.277	7.98	388.1	0.0	394.4
160.00		0.00	1.57	29.038	49.07	245.34	0.650	0.000	5.00	11.771	7.65	375.5	0.0	378.0
165.00	Appurtenance(s)	0.00	1.58	29.294	49.51	235.59	0.650	0.000	5.00	11.265	7.32	362.5	0.0	361.6
170.00		0.00	1.60	29.545	49.93	225.73	0.650	0.000	5.00	10.759	6.99	349.2	0.0	345.2
173.00	Appurtenance(s)	0.00	1.61	29.693	50.18	219.76	0.650	0.000	3.00	6.213	4.04	202.6	0.0	199.3
175.00	Appurtenance(s)	0.00	1.61	29.791	50.35	215.75	0.650	0.000	2.00	4.040	2.63	132.2	0.0	129.6
Totals:									175.00			16,410.2		34,056.0

Discrete Appurtenance Forces

Structure: CT03113-S-SB
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

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Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 23

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	175.00	6' Lightning rod	1	29.791	50.347	0.00	0.38	6.50	0.000	0.000	19.13	0.00	0.00
2	173.00	Low Profile Platform-flat	1	29.693	50.182	1.00	25.00	1200.00	0.000	0.000	1254.54	0.00	0.00
3	173.00	DB844H90E-XY	12	29.693	50.182	1.00	36.72	168.00	0.000	0.000	1842.67	0.00	0.00
4	165.00	Low Profile Platform-flat	1	29.294	49.507	1.00	25.00	1200.00	0.000	0.000	1237.69	0.00	0.00
5	165.00	DB980H90A-KL	12	29.294	49.507	0.79	36.02	102.00	0.000	0.000	1783.46	0.00	0.00
6	155.00	SBNHH-1D65B	6	28.776	48.631	0.82	40.98	304.26	0.000	0.000	1993.07	0.00	0.00
7	155.00	13 ft Low Profile Platform	1	28.776	48.631	1.00	15.70	1300.00	0.000	0.000	763.50	0.00	0.00
8	155.00	RRH2X60-AWS	3	28.776	48.631	0.73	8.67	180.00	0.000	0.000	421.75	0.00	0.00
9	155.00	RRH2X60-PCS	3	28.776	48.631	0.89	6.86	165.00	0.000	0.000	333.70	0.00	0.00
10	155.00	RRH2X60-700	3	28.776	48.631	0.73	8.67	180.00	0.000	0.000	421.75	0.00	0.00
11	155.00	LPA-80080-6CF-EDIN-2	2	28.776	48.631	1.00	8.64	42.00	0.000	0.000	420.17	0.00	0.00
12	155.00	LPA-80063/6CF	4	28.776	48.631	0.94	38.88	108.00	0.000	0.000	1890.69	0.00	0.00
13	155.00	FD9R6004/2C-3L (3.1 lbs)	6	28.776	48.631	0.62	1.38	18.60	0.000	0.000	66.94	0.00	0.00
14	155.00	DB-T1-6Z-8AB-0Z	1	28.776	48.631	1.00	5.60	44.00	0.000	0.000	272.33	0.00	0.00
Totals:								5,018.36			12,721.38		

Total Applied Force Summary

Structure: CT03113-S-SB
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

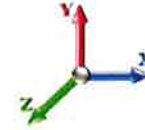
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Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 23

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		540.90	1560.14	0.00	0.00
10.00		530.62	1531.45	0.00	0.00
15.00		520.34	1502.76	0.00	0.00
20.00		510.06	1474.07	0.00	0.00
25.00		499.78	1445.39	0.00	0.00
30.00		489.50	1416.70	0.00	0.00
35.00		487.35	1388.01	0.00	0.00
40.00		495.44	1359.32	0.00	0.00
41.00		98.48	268.42	0.00	0.00
45.00		405.58	1944.02	0.00	0.00
48.00		305.04	1435.64	0.00	0.00
50.00		203.43	453.50	0.00	0.00
55.00		514.29	1116.53	0.00	0.00
60.00		515.04	1091.94	0.00	0.00
65.00		514.48	1067.36	0.00	0.00
70.00		512.75	1042.77	0.00	0.00
75.00		509.96	1018.18	0.00	0.00
80.00		506.21	993.59	0.00	0.00
85.00		501.58	969.00	0.00	0.00
90.00		504.61	1843.00	0.00	0.00
91.00		99.59	362.70	0.00	0.00
95.00		397.73	746.04	0.00	0.00
100.00		491.81	910.42	0.00	0.00
105.00		484.40	885.83	0.00	0.00
110.00		476.38	861.24	0.00	0.00
115.00		467.79	836.65	0.00	0.00
120.00		458.64	687.94	0.00	0.00
125.00		448.98	667.45	0.00	0.00
130.00		438.83	646.96	0.00	0.00
135.00		434.55	1086.43	0.00	0.00
140.00		423.55	504.57	0.00	0.00
145.00		412.13	488.18	0.00	0.00
150.00		400.30	471.79	0.00	0.00
155.00	(29) appurtenances	6971.97	2797.25	0.00	0.00
160.00		375.47	422.80	0.00	0.00
165.00	(13) appurtenances	3383.64	1708.41	0.00	0.00
170.00		349.19	384.82	0.00	0.00
173.00	(13) appurtenances	3299.85	1591.02	0.00	0.00
175.00	(1) appurtenances	151.36	136.06	0.00	0.00
	Totals:	29,131.63	41,118.32	0.00	0.00

Resulting Forces and Deflections

Structure: CT03113-S-SB
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

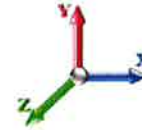
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/30/2015
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Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 23

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-29.170	-41.090	0.000	0.000	0.000	-3527.1	0.000	0.000	0.000	0.000	0.000
5.00	-28.702	-39.477	0.000	0.000	0.000	-3381.2	-0.058	0.000	0.058	-0.107	0.000
10.00	-28.239	-37.894	0.000	0.000	0.000	-3237.7	-0.227	0.000	0.227	-0.215	0.000
15.00	-27.782	-36.340	0.000	0.000	0.000	-3096.5	-0.511	0.000	0.511	-0.324	0.000
20.00	-27.330	-34.816	0.000	0.000	0.000	-2957.6	-0.911	0.000	0.911	-0.436	0.000
25.00	-26.884	-33.321	0.000	0.000	0.000	-2821.0	-1.428	0.000	1.428	-0.548	0.000
30.00	-26.444	-31.857	0.000	0.000	0.000	-2686.6	-2.064	0.000	2.064	-0.663	0.000
35.00	-26.001	-30.422	0.000	0.000	0.000	-2554.4	-2.821	0.000	2.821	-0.779	0.000
40.00	-25.522	-29.039	0.000	0.000	0.000	-2424.4	-3.701	0.000	3.701	-0.897	0.000
41.00	-25.449	-28.745	0.000	0.000	0.000	-2398.8	-3.891	0.000	3.891	-0.921	0.000
45.00	-25.050	-26.771	0.000	0.000	0.000	-2297.0	-4.705	0.000	4.705	-1.017	0.000
48.00	-24.746	-25.315	0.000	0.000	0.000	-2221.9	-5.368	0.000	5.368	-1.091	0.000
50.00	-24.574	-24.825	0.000	0.000	0.000	-2172.4	-5.836	0.000	5.836	-1.140	0.000
55.00	-24.093	-23.662	0.000	0.000	0.000	-2049.5	-7.103	0.000	7.103	-1.276	0.000
60.00	-23.607	-22.526	0.000	0.000	0.000	-1929.1	-8.514	0.000	8.514	-1.414	0.000
65.00	-23.117	-21.416	0.000	0.000	0.000	-1811.0	-10.069	0.000	10.069	-1.553	0.000
70.00	-22.625	-20.333	0.000	0.000	0.000	-1695.4	-11.771	0.000	11.771	-1.693	0.000
75.00	-22.132	-19.276	0.000	0.000	0.000	-1582.3	-13.620	0.000	13.620	-1.834	0.000
80.00	-21.639	-18.246	0.000	0.000	0.000	-1471.7	-15.618	0.000	15.618	-1.977	0.000
85.00	-21.146	-17.243	0.000	0.000	0.000	-1363.5	-17.765	0.000	17.765	-2.119	0.000
90.00	-20.594	-15.390	0.000	0.000	0.000	-1257.7	-20.061	0.000	20.061	-2.263	0.000
91.00	-20.499	-15.005	0.000	0.000	0.000	-1237.1	-20.538	0.000	20.538	-2.292	0.000
95.00	-20.103	-14.232	0.000	0.000	0.000	-1155.1	-22.508	0.000	22.508	-2.408	0.000
100.00	-19.603	-13.297	0.000	0.000	0.000	-1054.6	-25.103	0.000	25.103	-2.544	0.000
105.00	-19.108	-12.390	0.000	0.000	0.000	-956.66	-27.839	0.000	27.839	-2.678	0.000
110.00	-18.618	-11.510	0.000	0.000	0.000	-861.12	-30.715	0.000	30.715	-2.811	0.000
115.00	-18.132	-10.657	0.000	0.000	0.000	-768.03	-33.730	0.000	33.730	-2.942	0.000
120.00	-17.662	-9.951	0.000	0.000	0.000	-677.37	-36.879	0.000	36.879	-3.070	0.000
125.00	-17.201	-9.266	0.000	0.000	0.000	-589.06	-40.173	0.000	40.173	-3.217	0.000
130.00	-16.746	-8.606	0.000	0.000	0.000	-503.06	-43.618	0.000	43.618	-3.358	0.000
135.00	-16.264	-7.511	0.000	0.000	0.000	-419.33	-47.205	0.000	47.205	-3.490	0.000
140.00	-15.825	-6.999	0.000	0.000	0.000	-338.01	-50.924	0.000	50.924	-3.610	0.000
145.00	-15.396	-6.508	0.000	0.000	0.000	-258.88	-54.774	0.000	54.774	-3.736	0.000
150.00	-14.975	-6.040	0.000	0.000	0.000	-181.91	-58.744	0.000	58.744	-3.841	0.000
155.00	-7.834	-3.713	0.000	0.000	0.000	-107.03	-62.810	0.000	62.810	-3.918	0.000
160.00	-7.432	-3.311	0.000	0.000	0.000	-67.868	-66.941	0.000	66.941	-3.971	0.000
165.00	-3.939	-1.841	0.000	0.000	0.000	-30.707	-71.118	0.000	71.118	-4.005	0.000
170.00	-3.564	-1.481	0.000	0.000	0.000	-11.012	-75.320	0.000	75.320	-4.022	0.000
173.00	-0.160	-0.125	0.000	0.000	0.000	-0.321	-77.847	0.000	77.847	-4.025	0.000
175.00	-0.151	0.000	0.000	0.000	0.000	0.000	0.000	0.000	79.531	-4.025	0.000

Resulting Stresses

Structure: CT03113-S-SBA
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/30/2015

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Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 23

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvT Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.46	0.66	0.00	0.00	0.00	30.05	30.53	52.0	0.587
5.00	0.45	0.66	0.00	0.00	0.00	29.94	30.41	52.0	0.585
10.00	0.44	0.67	0.00	0.00	0.00	29.81	30.27	52.0	0.582
15.00	0.43	0.67	0.00	0.00	0.00	29.67	30.13	52.0	0.580
20.00	0.42	0.67	0.00	0.00	0.00	29.52	29.97	52.0	0.576
25.00	0.41	0.67	0.00	0.00	0.00	29.35	29.79	52.0	0.573
30.00	0.40	0.68	0.00	0.00	0.00	29.17	29.59	52.0	0.569
35.00	0.39	0.68	0.00	0.00	0.00	28.96	29.38	52.0	0.565
40.00	0.38	0.68	0.00	0.00	0.00	28.73	29.14	52.0	0.561
41.00	0.38	0.68	0.00	0.00	0.00	28.69	29.09	52.0	0.560
45.00	0.36	0.68	0.00	0.00	0.00	28.49	28.88	52.0	0.556
48.00	0.40	0.79	0.00	0.00	0.00	32.01	32.44	52.0	0.624
50.00	0.40	0.79	0.00	0.00	0.00	31.88	32.30	56.0	0.577
55.00	0.39	0.79	0.00	0.00	0.00	31.52	31.93	56.0	0.570
60.00	0.38	0.79	0.00	0.00	0.00	31.12	31.52	56.0	0.563
65.00	0.37	0.80	0.00	0.00	0.00	30.68	31.08	56.0	0.555
70.00	0.36	0.80	0.00	0.00	0.00	30.21	30.59	56.0	0.547
75.00	0.35	0.80	0.00	0.00	0.00	29.68	30.06	56.0	0.537
80.00	0.34	0.81	0.00	0.00	0.00	29.11	29.48	56.0	0.527
85.00	0.33	0.81	0.00	0.00	0.00	28.48	28.84	56.0	0.515
90.00	0.30	0.81	0.00	0.00	0.00	27.78	28.11	56.0	0.502
91.00	0.29	0.80	0.00	0.00	0.00	26.69	27.01	56.0	0.483
95.00	0.28	0.80	0.00	0.00	0.00	26.07	26.39	52.0	0.508
100.00	0.27	0.80	0.00	0.00	0.00	25.23	25.54	52.0	0.491
105.00	0.26	0.81	0.00	0.00	0.00	24.30	24.60	52.0	0.473
110.00	0.25	0.81	0.00	0.00	0.00	23.27	23.56	52.0	0.453
115.00	0.24	0.81	0.00	0.00	0.00	22.12	22.40	52.0	0.431
115.00	0.24	0.81	0.00	0.00	0.00	22.12	22.40	52.0	0.515
120.00	0.27	0.98	0.00	0.00	0.00	24.87	25.20	52.0	0.485
125.00	0.26	0.99	0.00	0.00	0.00	23.15	23.47	52.0	0.452
130.00	0.25	1.00	0.00	0.00	0.00	21.21	21.53	52.0	0.414
135.00	0.28	1.23	0.00	0.00	0.00	22.93	23.31	52.0	0.448
140.00	0.27	1.25	0.00	0.00	0.00	19.90	20.29	52.0	0.390
145.00	0.26	1.26	0.00	0.00	0.00	16.47	16.87	52.0	0.325
150.00	0.26	1.28	0.00	0.00	0.00	12.54	12.98	52.0	0.250
155.00	0.16	0.70	0.00	0.00	0.00	8.02	8.27	52.0	0.159
160.00	0.15	0.69	0.00	0.00	0.00	5.55	5.82	52.0	0.112
165.00	0.09	0.38	0.00	0.00	0.00	2.75	2.91	52.0	0.056
170.00	0.07	0.36	0.00	0.00	0.00	1.08	1.32	52.0	0.025
173.00	0.01	0.02	0.00	0.00	0.00	0.03	0.05	52.0	0.001
175.00	0.00	0.02	0.00	0.00	0.00	0.00	0.03	52.0	0.001

Wind Loading - Shaft

Structure: CT03113-S-SBA
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

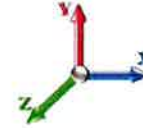
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Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 23

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	13.871	23.44	395.65	0.650	0.500	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	13.871	23.44	388.21	0.650	0.500	5.00	27.039	17.58	412.0	196.8	1696.0
10.00		0.00	1.00	13.871	23.44	380.76	0.650	0.500	5.00	26.533	17.25	404.3	193.1	1663.5
15.00		0.00	1.00	13.871	23.44	373.31	0.650	0.500	5.00	26.027	16.92	396.6	189.3	1631.1
20.00		0.00	1.00	13.871	23.44	365.86	0.650	0.500	5.00	25.521	16.59	388.9	185.6	1598.7
25.00		0.00	1.00	13.871	23.44	358.41	0.650	0.500	5.00	25.015	16.26	381.2	181.8	1566.2
30.00		0.00	1.00	13.871	23.44	350.96	0.650	0.500	5.00	24.509	15.93	373.5	178.1	1533.8
35.00		0.00	1.02	14.106	23.84	346.41	0.650	0.500	5.00	24.003	15.60	371.9	174.3	1501.4
40.00		0.00	1.06	14.655	24.77	345.43	0.650	0.500	5.00	23.497	15.27	378.3	170.6	1468.9
41.00	Bot - Section 2	0.00	1.06	14.759	24.94	345.11	0.650	0.500	1.00	4.639	3.02	75.2	34.0	290.2
45.00		0.00	1.09	15.156	25.61	343.50	0.650	0.500	4.00	18.602	12.09	309.7	135.3	2030.5
48.00	Top - Section 1	0.00	1.11	15.439	26.09	341.97	0.650	0.500	3.00	13.739	8.93	233.0	100.1	1499.2
50.00		0.00	1.13	15.620	26.40	345.69	0.650	0.500	2.00	9.058	5.89	155.4	66.2	495.3
55.00		0.00	1.16	16.051	27.13	342.42	0.650	0.500	5.00	22.292	14.49	393.0	161.7	1217.2
60.00		0.00	1.19	16.455	27.81	338.59	0.650	0.500	5.00	21.786	14.16	393.8	157.9	1188.9
65.00		0.00	1.21	16.836	28.45	334.28	0.650	0.500	5.00	21.280	13.83	393.5	154.2	1160.5
70.00		0.00	1.24	17.196	29.06	329.54	0.650	0.500	5.00	20.774	13.50	392.4	150.4	1132.2
75.00		0.00	1.26	17.538	29.64	324.43	0.650	0.500	5.00	20.268	13.17	390.5	146.7	1103.9
80.00		0.00	1.29	17.865	30.19	318.98	0.650	0.500	5.00	19.762	12.85	387.8	142.9	1075.5
85.00	Bot - Section 3	0.00	1.31	18.177	30.72	313.23	0.650	0.500	5.00	19.256	12.52	384.5	139.2	1047.2
90.00		0.00	1.33	18.476	31.22	307.20	0.650	0.500	5.00	19.063	12.39	386.9	137.8	1919.8
91.00	Top - Section 2	0.00	1.34	18.534	31.32	305.96	0.650	0.500	1.00	3.752	2.44	76.4	27.4	377.9
95.00		0.00	1.35	18.764	31.71	306.27	0.650	0.500	4.00	14.805	9.62	305.2	107.2	804.4
100.00		0.00	1.37	19.041	32.18	299.79	0.650	0.500	5.00	18.051	11.73	377.5	130.3	979.7
105.00		0.00	1.39	19.308	32.63	293.10	0.650	0.500	5.00	17.545	11.40	372.1	126.5	951.3
110.00		0.00	1.41	19.566	33.07	286.21	0.650	0.500	5.00	17.039	11.08	366.2	122.8	923.0
115.00	Top - Section 3	0.00	1.43	19.816	33.49	279.13	0.650	0.500	5.00	16.533	10.75	359.9	119.0	894.7
120.00		0.00	1.45	20.059	33.90	271.88	0.650	0.500	5.00	16.027	10.42	353.1	115.3	742.2
125.00		0.00	1.46	20.294	34.30	264.46	0.650	0.500	5.00	15.521	10.09	346.0	111.5	718.0
130.00	Bot - Section 5	0.00	1.48	20.523	34.68	256.88	0.650	0.500	5.00	15.015	9.76	338.5	107.8	693.7
135.00	Top - Section 4	0.00	1.50	20.745	35.06	249.16	0.650	0.500	5.00	14.717	9.57	335.4	105.6	1131.0
140.00		0.00	1.51	20.962	35.43	245.07	0.650	0.500	5.00	14.211	9.24	327.2	101.8	545.4
145.00		0.00	1.53	21.173	35.78	237.10	0.650	0.500	5.00	13.705	8.91	318.8	98.1	525.3
150.00		0.00	1.54	21.379	36.13	229.01	0.650	0.500	5.00	13.199	8.58	310.0	94.3	505.1
155.00	Appurtenance(s)	0.00	1.56	21.581	36.47	220.79	0.650	0.500	5.00	12.693	8.25	300.9	90.6	485.0
160.00		0.00	1.57	21.777	36.80	212.46	0.650	0.500	5.00	12.188	7.92	291.6	86.8	464.8
165.00	Appurtenance(s)	0.00	1.58	21.969	37.13	204.02	0.650	0.500	5.00	11.682	7.59	281.9	83.1	444.7
170.00		0.00	1.60	22.158	37.45	195.48	0.650	0.500	5.00	11.176	7.26	272.0	79.3	424.6
173.00	Appurtenance(s)	0.00	1.61	22.269	37.63	190.31	0.650	0.500	3.00	6.463	4.20	158.1	46.3	245.5
175.00	Appurtenance(s)	0.00	1.61	22.342	37.76	186.84	0.650	0.500	2.00	4.207	2.73	103.3	30.2	159.8
Totals:									175.00			12,596.5		38,836.0

Discrete Appurtenance Forces

Structure: CT03113-S-SB
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/30/2015
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Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 23

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	175.00	6' Lightning rod	1	22.342	37.758	0.00	0.98	11.80	0.000	0.000	37.00	0.00	0.00
2	173.00	Low Profile Platform-flat	1	22.269	37.634	1.00	31.00	1500.00	0.000	0.000	1166.66	0.00	0.00
3	173.00	DB844H90E-XY	12	22.269	37.634	1.00	40.08	0.00	0.000	0.000	1508.37	0.00	0.00
4	165.00	Low Profile Platform-flat	1	21.969	37.128	1.00	31.00	1500.00	0.000	0.000	1150.98	0.00	0.00
5	165.00	DB980H90A-KL	12	21.969	37.128	0.80	39.17	0.00	0.000	0.000	1454.24	0.00	0.00
6	155.00	SBNHH-1D65B	6	21.581	36.471	0.82	43.30	522.00	0.000	0.000	1579.05	0.00	0.00
7	155.00	13 ft Low Profile Platform	1	21.581	36.471	1.00	20.10	1765.00	0.000	0.000	733.07	0.00	0.00
8	155.00	RRH2X60-AWS	3	21.581	36.471	0.74	9.39	240.30	0.000	0.000	342.49	0.00	0.00
9	155.00	RRH2X60-PCS	3	21.581	36.471	0.90	7.45	240.30	0.000	0.000	271.78	0.00	0.00
10	155.00	RRH2X60-700	3	21.581	36.471	0.74	9.39	240.30	0.000	0.000	342.49	0.00	0.00
11	155.00	LPA-80080-6CF-EDIN-2	2	21.581	36.471	1.00	9.28	138.60	0.000	0.000	338.45	0.00	0.00
12	155.00	LPA-80063/6CF	4	21.581	36.471	0.94	40.68	0.00	0.000	0.000	1483.76	0.00	0.00
13	155.00	FD9R6004/2C-3L (3.1 lbs)	6	21.581	36.471	0.65	1.72	32.40	0.000	0.000	62.58	0.00	0.00
14	155.00	DB-T1-6Z-8AB-0Z	1	21.581	36.471	1.00	5.87	51.10	0.000	0.000	214.09	0.00	0.00
Totals:								6,241.80			10,685.01		

Total Applied Force Summary

Structure: CT03113-S-SB
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

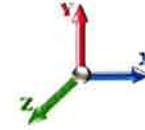
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Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 23

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		412.00	1756.96	0.00	0.00
10.00		404.29	1724.53	0.00	0.00
15.00		396.58	1692.09	0.00	0.00
20.00		388.87	1659.66	0.00	0.00
25.00		381.16	1627.22	0.00	0.00
30.00		373.45	1594.79	0.00	0.00
35.00		371.95	1562.35	0.00	0.00
40.00		378.27	1529.92	0.00	0.00
41.00		75.20	302.39	0.00	0.00
45.00		309.72	2079.35	0.00	0.00
48.00		233.01	1535.79	0.00	0.00
50.00		155.42	519.67	0.00	0.00
55.00		393.04	1278.20	0.00	0.00
60.00		393.79	1249.87	0.00	0.00
65.00		393.55	1221.53	0.00	0.00
70.00		392.41	1193.19	0.00	0.00
75.00		390.47	1164.86	0.00	0.00
80.00		387.81	1136.52	0.00	0.00
85.00		384.49	1108.19	0.00	0.00
90.00		386.89	1980.76	0.00	0.00
91.00		76.39	390.10	0.00	0.00
95.00		305.15	853.25	0.00	0.00
100.00		377.55	1040.68	0.00	0.00
105.00		372.12	1012.34	0.00	0.00
110.00		366.22	984.01	0.00	0.00
115.00		359.89	955.67	0.00	0.00
120.00		353.14	803.21	0.00	0.00
125.00		346.01	778.97	0.00	0.00
130.00		338.50	754.74	0.00	0.00
135.00		335.39	1192.01	0.00	0.00
140.00		327.24	606.40	0.00	0.00
145.00		318.77	586.26	0.00	0.00
150.00		309.99	566.12	0.00	0.00
155.00	(29) appurtenances	5668.66	3775.98	0.00	0.00
160.00		291.55	509.64	0.00	0.00
165.00	(13) appurtenances	2887.14	1989.50	0.00	0.00
170.00		272.02	464.16	0.00	0.00
173.00	(13) appurtenances	2833.11	1769.28	0.00	0.00
175.00	(1) appurtenances	140.26	171.60	0.00	0.00
	Totals:	23,281.49	47,121.77	0.00	0.00

Resulting Forces and Deflections

Structure: CT03113-S-SB
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/30/2015
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Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 23

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-23.318	-47.103	0.000	0.000	0.000	-2880.1	0.000	0.000	0.000	0.000	0.000
5.00	-22.974	-45.312	0.000	0.000	0.000	-2763.5	-0.047	0.000	0.047	-0.087	0.000
10.00	-22.633	-43.553	0.000	0.000	0.000	-2648.6	-0.186	0.000	0.186	-0.175	0.000
15.00	-22.296	-41.827	0.000	0.000	0.000	-2535.5	-0.418	0.000	0.418	-0.265	0.000
20.00	-21.963	-40.135	0.000	0.000	0.000	-2424.0	-0.745	0.000	0.745	-0.356	0.000
25.00	-21.633	-38.475	0.000	0.000	0.000	-2314.2	-1.168	0.000	1.168	-0.449	0.000
30.00	-21.307	-36.848	0.000	0.000	0.000	-2206.0	-1.689	0.000	1.689	-0.543	0.000
35.00	-20.978	-35.255	0.000	0.000	0.000	-2099.5	-2.309	0.000	2.309	-0.638	0.000
40.00	-20.615	-33.709	0.000	0.000	0.000	-1994.6	-3.029	0.000	3.029	-0.735	0.000
41.00	-20.565	-33.389	0.000	0.000	0.000	-1974.0	-3.186	0.000	3.186	-0.755	0.000
45.00	-20.265	-31.290	0.000	0.000	0.000	-1891.7	-3.852	0.000	3.852	-0.834	0.000
48.00	-20.035	-29.740	0.000	0.000	0.000	-1830.9	-4.396	0.000	4.396	-0.895	0.000
50.00	-19.910	-29.196	0.000	0.000	0.000	-1790.9	-4.780	0.000	4.780	-0.935	0.000
55.00	-19.550	-27.887	0.000	0.000	0.000	-1691.3	-5.820	0.000	5.820	-1.048	0.000
60.00	-19.185	-26.606	0.000	0.000	0.000	-1593.6	-6.979	0.000	6.979	-1.161	0.000
65.00	-18.817	-25.356	0.000	0.000	0.000	-1497.6	-8.257	0.000	8.257	-1.276	0.000
70.00	-18.446	-24.134	0.000	0.000	0.000	-1403.6	-9.656	0.000	9.656	-1.392	0.000
75.00	-18.073	-22.943	0.000	0.000	0.000	-1311.3	-11.177	0.000	11.177	-1.509	0.000
80.00	-17.700	-21.781	0.000	0.000	0.000	-1221.0	-12.821	0.000	12.821	-1.627	0.000
85.00	-17.325	-20.649	0.000	0.000	0.000	-1132.5	-14.589	0.000	14.589	-1.746	0.000
90.00	-16.899	-18.660	0.000	0.000	0.000	-1045.8	-16.481	0.000	16.481	-1.865	0.000
91.00	-16.830	-18.255	0.000	0.000	0.000	-1028.9	-16.875	0.000	16.875	-1.890	0.000
95.00	-16.528	-17.382	0.000	0.000	0.000	-961.67	-18.499	0.000	18.499	-1.986	0.000
100.00	-16.145	-16.324	0.000	0.000	0.000	-879.04	-20.640	0.000	20.640	-2.099	0.000
105.00	-15.765	-15.295	0.000	0.000	0.000	-798.31	-22.898	0.000	22.898	-2.211	0.000
110.00	-15.388	-14.297	0.000	0.000	0.000	-719.48	-25.273	0.000	25.273	-2.322	0.000
115.00	-15.014	-13.329	0.000	0.000	0.000	-642.54	-27.764	0.000	27.764	-2.432	0.000
120.00	-14.652	-12.512	0.000	0.000	0.000	-567.47	-30.368	0.000	30.368	-2.538	0.000
125.00	-14.295	-11.720	0.000	0.000	0.000	-494.22	-33.093	0.000	33.093	-2.662	0.000
130.00	-13.943	-10.954	0.000	0.000	0.000	-422.74	-35.944	0.000	35.944	-2.780	0.000
135.00	-13.568	-9.755	0.000	0.000	0.000	-353.02	-38.916	0.000	38.916	-2.891	0.000
140.00	-13.226	-9.142	0.000	0.000	0.000	-285.19	-41.998	0.000	41.998	-2.992	0.000
145.00	-12.892	-8.551	0.000	0.000	0.000	-219.06	-45.191	0.000	45.191	-3.099	0.000
150.00	-12.562	-7.986	0.000	0.000	0.000	-154.60	-48.486	0.000	48.486	-3.188	0.000
155.00	-6.694	-4.529	0.000	0.000	0.000	-91.794	-51.862	0.000	51.862	-3.254	0.000
160.00	-6.376	-4.032	0.000	0.000	0.000	-58.325	-55.294	0.000	55.294	-3.299	0.000
165.00	-3.380	-2.212	0.000	0.000	0.000	-26.443	-58.765	0.000	58.765	-3.328	0.000
170.00	-3.081	-1.764	0.000	0.000	0.000	-9.544	-62.258	0.000	62.258	-3.343	0.000
173.00	-0.150	-0.163	0.000	0.000	0.000	-0.300	-64.359	0.000	64.359	-3.345	0.000
175.00	-0.140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	65.759	-3.345	0.000

Resulting Stresses

Structure: CT03113-S-SBA
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/30/2015

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Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 23

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvT Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.53	0.53	0.00	0.00	0.00	24.54	25.08	52.0	0.483
5.00	0.52	0.53	0.00	0.00	0.00	24.47	25.00	52.0	0.481
10.00	0.51	0.53	0.00	0.00	0.00	24.39	24.91	52.0	0.479
15.00	0.50	0.54	0.00	0.00	0.00	24.30	24.81	52.0	0.477
20.00	0.49	0.54	0.00	0.00	0.00	24.19	24.70	52.0	0.475
25.00	0.48	0.54	0.00	0.00	0.00	24.08	24.57	52.0	0.473
30.00	0.47	0.54	0.00	0.00	0.00	23.95	24.43	52.0	0.470
35.00	0.46	0.55	0.00	0.00	0.00	23.80	24.28	52.0	0.467
40.00	0.45	0.55	0.00	0.00	0.00	23.64	24.11	52.0	0.464
41.00	0.44	0.55	0.00	0.00	0.00	23.61	24.07	52.0	0.463
45.00	0.42	0.55	0.00	0.00	0.00	23.46	23.91	52.0	0.460
48.00	0.47	0.64	0.00	0.00	0.00	26.38	26.87	52.0	0.517
50.00	0.47	0.64	0.00	0.00	0.00	26.28	26.77	56.0	0.478
55.00	0.45	0.64	0.00	0.00	0.00	26.01	26.49	56.0	0.473
60.00	0.44	0.65	0.00	0.00	0.00	25.71	26.17	56.0	0.468
65.00	0.43	0.65	0.00	0.00	0.00	25.37	25.83	56.0	0.461
70.00	0.42	0.65	0.00	0.00	0.00	25.01	25.45	56.0	0.455
75.00	0.41	0.66	0.00	0.00	0.00	24.60	25.04	56.0	0.447
80.00	0.40	0.66	0.00	0.00	0.00	24.15	24.58	56.0	0.439
85.00	0.39	0.66	0.00	0.00	0.00	23.65	24.07	56.0	0.430
90.00	0.36	0.67	0.00	0.00	0.00	23.10	23.49	56.0	0.420
91.00	0.35	0.65	0.00	0.00	0.00	22.20	22.58	56.0	0.403
95.00	0.34	0.66	0.00	0.00	0.00	21.71	22.08	52.0	0.425
100.00	0.33	0.66	0.00	0.00	0.00	21.03	21.39	52.0	0.412
105.00	0.32	0.67	0.00	0.00	0.00	20.28	20.63	52.0	0.397
110.00	0.31	0.67	0.00	0.00	0.00	19.44	19.78	52.0	0.381
115.00	0.30	0.67	0.00	0.00	0.00	18.50	18.84	52.0	0.362
115.00	0.30	0.67	0.00	0.00	0.00	18.50	18.84	52.0	0.433
120.00	0.35	0.81	0.00	0.00	0.00	20.84	21.23	52.0	0.408
125.00	0.33	0.82	0.00	0.00	0.00	19.42	19.81	52.0	0.381
130.00	0.32	0.83	0.00	0.00	0.00	17.82	18.20	52.0	0.350
135.00	0.37	1.03	0.00	0.00	0.00	19.30	19.75	52.0	0.380
140.00	0.36	1.04	0.00	0.00	0.00	16.79	17.25	52.0	0.332
145.00	0.35	1.06	0.00	0.00	0.00	13.93	14.40	52.0	0.277
150.00	0.34	1.07	0.00	0.00	0.00	10.65	11.15	52.0	0.214
155.00	0.20	0.59	0.00	0.00	0.00	6.88	7.15	52.0	0.138
160.00	0.19	0.59	0.00	0.00	0.00	4.77	5.06	52.0	0.097
165.00	0.11	0.33	0.00	0.00	0.00	2.37	2.54	52.0	0.049
170.00	0.09	0.31	0.00	0.00	0.00	0.94	1.16	52.0	0.022
173.00	0.01	0.02	0.00	0.00	0.00	0.03	0.05	52.0	0.001
175.00	0.00	0.01	0.00	0.00	0.00	0.00	0.03	52.0	0.000

Wind Loading - Shaft

Structure: CT03113-S-SBA
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

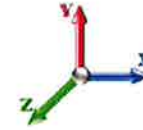
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Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	6.400	10.82	268.75	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	6.400	10.82	263.69	0.650	0.000	5.00	26.622	17.30	187.2	0.0	1499.1
10.00		0.00	1.00	6.400	10.82	258.63	0.650	0.000	5.00	26.116	16.98	183.6	0.0	1470.4
15.00		0.00	1.00	6.400	10.82	253.57	0.650	0.000	5.00	25.610	16.65	180.0	0.0	1441.8
20.00		0.00	1.00	6.400	10.82	248.51	0.650	0.000	5.00	25.104	16.32	176.5	0.0	1413.1
25.00		0.00	1.00	6.400	10.82	243.45	0.650	0.000	5.00	24.598	15.99	172.9	0.0	1384.4
30.00		0.00	1.00	6.400	10.82	238.39	0.650	0.000	5.00	24.092	15.66	169.4	0.0	1355.7
35.00		0.00	1.02	6.509	11.00	235.30	0.650	0.000	5.00	23.586	15.33	168.6	0.0	1327.0
40.00		0.00	1.06	6.762	11.43	234.63	0.650	0.000	5.00	23.080	15.00	171.4	0.0	1298.3
41.00	Bot - Section 2	0.00	1.06	6.809	11.51	234.42	0.650	0.000	1.00	4.555	2.96	34.1	0.0	256.2
45.00		0.00	1.09	6.993	11.82	233.33	0.650	0.000	4.00	18.269	11.87	140.3	0.0	1895.2
48.00	Top - Section 1	0.00	1.11	7.123	12.04	232.29	0.650	0.000	3.00	13.489	8.77	105.6	0.0	1399.0
50.00		0.00	1.13	7.207	12.18	234.81	0.650	0.000	2.00	8.892	5.78	70.4	0.0	429.1
55.00		0.00	1.16	7.406	12.52	232.59	0.650	0.000	5.00	21.875	14.22	178.0	0.0	1055.5
60.00		0.00	1.19	7.592	12.83	229.99	0.650	0.000	5.00	21.369	13.89	178.2	0.0	1030.9
65.00		0.00	1.21	7.768	13.13	227.06	0.650	0.000	5.00	20.863	13.56	178.0	0.0	1006.4
70.00		0.00	1.24	7.934	13.41	223.84	0.650	0.000	5.00	20.357	13.23	177.4	0.0	981.8
75.00		0.00	1.26	8.092	13.68	220.37	0.650	0.000	5.00	19.851	12.90	176.5	0.0	957.2
80.00		0.00	1.29	8.242	13.93	216.67	0.650	0.000	5.00	19.345	12.57	175.2	0.0	932.6
85.00	Bot - Section 3	0.00	1.31	8.387	14.17	212.76	0.650	0.000	5.00	18.839	12.25	173.6	0.0	908.0
90.00		0.00	1.33	8.525	14.41	208.67	0.650	0.000	5.00	18.646	12.12	174.6	0.0	1782.0
91.00	Top - Section 2	0.00	1.34	8.552	14.45	207.83	0.650	0.000	1.00	3.668	2.38	34.5	0.0	350.5
95.00		0.00	1.35	8.657	14.63	208.04	0.650	0.000	4.00	14.471	9.41	137.6	0.0	697.2
100.00		0.00	1.37	8.785	14.85	203.64	0.650	0.000	5.00	17.634	11.46	170.2	0.0	849.4
105.00		0.00	1.39	8.908	15.06	199.09	0.650	0.000	5.00	17.128	11.13	167.6	0.0	824.8
110.00		0.00	1.41	9.028	15.26	194.41	0.650	0.000	5.00	16.622	10.80	164.8	0.0	800.2
115.00	Top - Section 3	0.00	1.43	9.143	15.45	189.60	0.650	0.000	5.00	16.116	10.48	161.9	0.0	775.6
120.00		0.00	1.45	9.255	15.64	184.67	0.650	0.000	5.00	15.610	10.15	158.7	0.0	626.9
125.00		0.00	1.46	9.363	15.82	179.63	0.650	0.000	5.00	15.104	9.82	155.4	0.0	606.4
130.00	Bot - Section 5	0.00	1.48	9.469	16.00	174.49	0.650	0.000	5.00	14.598	9.49	151.8	0.0	586.0
135.00	Top - Section 4	0.00	1.50	9.572	16.18	169.25	0.650	0.000	5.00	14.301	9.30	150.4	0.0	1025.4
140.00		0.00	1.51	9.672	16.35	166.47	0.650	0.000	5.00	13.795	8.97	146.6	0.0	443.6
145.00		0.00	1.53	9.769	16.51	161.05	0.650	0.000	5.00	13.289	8.64	142.6	0.0	427.2
150.00		0.00	1.54	9.864	16.67	155.55	0.650	0.000	5.00	12.783	8.31	138.5	0.0	410.8
155.00	Appurtenance(s)	0.00	1.56	9.957	16.83	149.97	0.650	0.000	5.00	12.277	7.98	134.3	0.0	394.4
160.00		0.00	1.57	10.048	16.98	144.32	0.650	0.000	5.00	11.771	7.65	129.9	0.0	378.0
165.00	Appurtenance(s)	0.00	1.58	10.136	17.13	138.58	0.650	0.000	5.00	11.265	7.32	125.4	0.0	361.6
170.00		0.00	1.60	10.223	17.28	132.78	0.650	0.000	5.00	10.759	6.99	120.8	0.0	345.2
173.00	Appurtenance(s)	0.00	1.61	10.274	17.36	129.27	0.650	0.000	3.00	6.213	4.04	70.1	0.0	199.3
175.00	Appurtenance(s)	0.00	1.61	10.308	17.42	126.91	0.650	0.000	2.00	4.040	2.63	45.8	0.0	129.6
Totals:									175.00			5,678.3		34,056.0

Discrete Appurtenance Forces

Structure: CT03113-S-SB
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/30/2015
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Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	175.00	6' Lightning rod	1	10.308	17.421	0.00	0.38	6.50	0.000	0.000	6.62	0.00	0.00
2	173.00	Low Profile Platform-flat	1	10.274	17.364	1.00	25.00	1200.00	0.000	0.000	434.10	0.00	0.00
3	173.00	DB844H90E-XY	12	10.274	17.364	1.00	36.72	168.00	0.000	0.000	637.60	0.00	0.00
4	165.00	Low Profile Platform-flat	1	10.136	17.131	1.00	25.00	1200.00	0.000	0.000	428.26	0.00	0.00
5	165.00	DB980H90A-KL	12	10.136	17.131	0.79	36.02	102.00	0.000	0.000	617.11	0.00	0.00
6	155.00	SBNHH-1D65B	6	9.957	16.827	0.82	40.98	304.26	0.000	0.000	689.64	0.00	0.00
7	155.00	13 ft Low Profile Platform	1	9.957	16.827	1.00	15.70	1300.00	0.000	0.000	264.19	0.00	0.00
8	155.00	RRH2X60-AWS	3	9.957	16.827	0.73	8.67	180.00	0.000	0.000	145.93	0.00	0.00
9	155.00	RRH2X60-PCS	3	9.957	16.827	0.89	6.86	165.00	0.000	0.000	115.47	0.00	0.00
10	155.00	RRH2X60-700	3	9.957	16.827	0.73	8.67	180.00	0.000	0.000	145.93	0.00	0.00
11	155.00	LPA-80080-6CF-EDIN-2	2	9.957	16.827	1.00	8.64	42.00	0.000	0.000	145.39	0.00	0.00
12	155.00	LPA-80063/6CF	4	9.957	16.827	0.94	38.88	108.00	0.000	0.000	654.22	0.00	0.00
13	155.00	FD9R6004/2C-3L (3.1 lbs)	6	9.957	16.827	0.62	1.38	18.60	0.000	0.000	23.16	0.00	0.00
14	155.00	DB-T1-6Z-8AB-0Z	1	9.957	16.827	1.00	5.60	44.00	0.000	0.000	94.23	0.00	0.00
Totals:								5,018.36			4,401.86		

Total Applied Force Summary

Structure: CT03113-S-SB
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

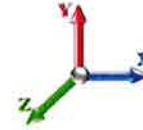
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

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Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 22

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		187.16	1560.14	0.00	0.00
10.00		183.61	1531.45	0.00	0.00
15.00		180.05	1502.76	0.00	0.00
20.00		176.49	1474.07	0.00	0.00
25.00		172.94	1445.39	0.00	0.00
30.00		169.38	1416.70	0.00	0.00
35.00		168.63	1388.01	0.00	0.00
40.00		171.43	1359.32	0.00	0.00
41.00		34.08	268.42	0.00	0.00
45.00		140.34	1944.02	0.00	0.00
48.00		105.55	1435.64	0.00	0.00
50.00		70.39	453.50	0.00	0.00
55.00		177.96	1116.53	0.00	0.00
60.00		178.22	1091.94	0.00	0.00
65.00		178.02	1067.36	0.00	0.00
70.00		177.42	1042.77	0.00	0.00
75.00		176.46	1018.18	0.00	0.00
80.00		175.16	993.59	0.00	0.00
85.00		173.56	969.00	0.00	0.00
90.00		174.60	1843.00	0.00	0.00
91.00		34.46	362.70	0.00	0.00
95.00		137.62	746.04	0.00	0.00
100.00		170.18	910.42	0.00	0.00
105.00		167.61	885.83	0.00	0.00
110.00		164.84	861.24	0.00	0.00
115.00		161.86	836.65	0.00	0.00
120.00		158.70	687.94	0.00	0.00
125.00		155.36	667.45	0.00	0.00
130.00		151.85	646.96	0.00	0.00
135.00		150.36	1086.43	0.00	0.00
140.00		146.56	504.57	0.00	0.00
145.00		142.61	488.18	0.00	0.00
150.00		138.51	471.79	0.00	0.00
155.00	(29) appurtenances	2412.45	2797.25	0.00	0.00
160.00		129.92	422.80	0.00	0.00
165.00	(13) appurtenances	1170.81	1708.41	0.00	0.00
170.00		120.83	384.82	0.00	0.00
173.00	(13) appurtenances	1141.82	1591.02	0.00	0.00
175.00	(1) appurtenances	52.37	136.06	0.00	0.00
	Totals:	10,080.15	41,118.32	0.00	0.00

Resulting Forces and Deflections

Structure: CT03113-S-SB
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/30/2015
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Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 22

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-10.093	-41.115	0.000	0.000	0.000	-1221.1	0.000	0.000	0.000	0.000	0.000
5.00	-9.931	-39.548	0.000	0.000	0.000	-1170.6	-0.020	0.000	0.020	-0.037	0.000
10.00	-9.771	-38.011	0.000	0.000	0.000	-1121.0	-0.079	0.000	0.079	-0.074	0.000
15.00	-9.613	-36.502	0.000	0.000	0.000	-1072.1	-0.177	0.000	0.177	-0.112	0.000
20.00	-9.457	-35.022	0.000	0.000	0.000	-1024.1	-0.315	0.000	0.315	-0.151	0.000
25.00	-9.302	-33.571	0.000	0.000	0.000	-976.83	-0.495	0.000	0.495	-0.190	0.000
30.00	-9.150	-32.148	0.000	0.000	0.000	-930.32	-0.715	0.000	0.715	-0.230	0.000
35.00	-8.997	-30.755	0.000	0.000	0.000	-884.57	-0.977	0.000	0.977	-0.270	0.000
40.00	-8.832	-29.392	0.000	0.000	0.000	-839.58	-1.281	0.000	1.281	-0.311	0.000
41.00	-8.807	-29.121	0.000	0.000	0.000	-830.75	-1.347	0.000	1.347	-0.319	0.000
45.00	-8.669	-27.173	0.000	0.000	0.000	-795.53	-1.629	0.000	1.629	-0.352	0.000
48.00	-8.564	-25.735	0.000	0.000	0.000	-769.52	-1.859	0.000	1.859	-0.378	0.000
50.00	-8.505	-25.277	0.000	0.000	0.000	-752.39	-2.021	0.000	2.021	-0.395	0.000
55.00	-8.338	-24.155	0.000	0.000	0.000	-709.87	-2.460	0.000	2.460	-0.442	0.000
60.00	-8.171	-23.058	0.000	0.000	0.000	-668.18	-2.948	0.000	2.948	-0.490	0.000
65.00	-8.002	-21.986	0.000	0.000	0.000	-627.33	-3.487	0.000	3.487	-0.538	0.000
70.00	-7.832	-20.938	0.000	0.000	0.000	-587.32	-4.076	0.000	4.076	-0.586	0.000
75.00	-7.662	-19.915	0.000	0.000	0.000	-548.16	-4.717	0.000	4.717	-0.635	0.000
80.00	-7.491	-18.917	0.000	0.000	0.000	-509.86	-5.409	0.000	5.409	-0.685	0.000
85.00	-7.321	-17.944	0.000	0.000	0.000	-472.40	-6.152	0.000	6.152	-0.734	0.000
90.00	-7.131	-16.100	0.000	0.000	0.000	-435.79	-6.948	0.000	6.948	-0.784	0.000
91.00	-7.098	-15.735	0.000	0.000	0.000	-428.66	-7.113	0.000	7.113	-0.794	0.000
95.00	-6.961	-14.985	0.000	0.000	0.000	-400.27	-7.796	0.000	7.796	-0.834	0.000
100.00	-6.789	-14.072	0.000	0.000	0.000	-365.47	-8.694	0.000	8.694	-0.881	0.000
105.00	-6.618	-13.183	0.000	0.000	0.000	-331.52	-9.642	0.000	9.642	-0.928	0.000
110.00	-6.449	-12.320	0.000	0.000	0.000	-298.43	-10.639	0.000	10.639	-0.974	0.000
115.00	-6.282	-11.481	0.000	0.000	0.000	-266.19	-11.683	0.000	11.683	-1.019	0.000
120.00	-6.119	-10.791	0.000	0.000	0.000	-234.78	-12.775	0.000	12.775	-1.063	0.000
125.00	-5.960	-10.122	0.000	0.000	0.000	-204.18	-13.916	0.000	13.916	-1.114	0.000
130.00	-5.803	-9.473	0.000	0.000	0.000	-174.38	-15.110	0.000	15.110	-1.163	0.000
135.00	-5.637	-8.386	0.000	0.000	0.000	-145.37	-16.354	0.000	16.354	-1.209	0.000
140.00	-5.486	-7.880	0.000	0.000	0.000	-117.18	-17.643	0.000	17.643	-1.251	0.000
145.00	-5.337	-7.392	0.000	0.000	0.000	-89.758	-18.977	0.000	18.977	-1.294	0.000
150.00	-5.192	-6.920	0.000	0.000	0.000	-63.072	-20.354	0.000	20.354	-1.331	0.000
155.00	-2.716	-4.179	0.000	0.000	0.000	-37.113	-21.763	0.000	21.763	-1.358	0.000
160.00	-2.577	-3.759	0.000	0.000	0.000	-23.533	-23.195	0.000	23.195	-1.376	0.000
165.00	-1.366	-2.079	0.000	0.000	0.000	-10.647	-24.644	0.000	24.644	-1.388	0.000
170.00	-1.236	-1.698	0.000	0.000	0.000	-3.818	-26.100	0.000	26.100	-1.393	0.000
173.00	-0.056	-0.135	0.000	0.000	0.000	-0.111	-26.976	0.000	26.976	-1.395	0.000
175.00	-0.052	0.000	0.000	0.000	0.000	0.000	0.000	0.000	27.560	-1.395	0.000

Resulting Stresses

Structure: CT03113-S-SBA
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

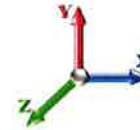
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

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Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 22

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvT Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.46	0.23	0.00	0.00	0.00	10.40	10.87	52.0	0.209
5.00	0.45	0.23	0.00	0.00	0.00	10.36	10.82	52.0	0.208
10.00	0.44	0.23	0.00	0.00	0.00	10.32	10.77	52.0	0.207
15.00	0.44	0.23	0.00	0.00	0.00	10.27	10.72	52.0	0.206
20.00	0.43	0.23	0.00	0.00	0.00	10.22	10.65	52.0	0.205
25.00	0.42	0.23	0.00	0.00	0.00	10.16	10.59	52.0	0.204
30.00	0.41	0.23	0.00	0.00	0.00	10.10	10.52	52.0	0.202
35.00	0.40	0.24	0.00	0.00	0.00	10.03	10.44	52.0	0.201
40.00	0.39	0.24	0.00	0.00	0.00	9.95	10.35	52.0	0.199
41.00	0.39	0.24	0.00	0.00	0.00	9.94	10.33	52.0	0.199
45.00	0.37	0.24	0.00	0.00	0.00	9.87	10.24	52.0	0.197
48.00	0.41	0.27	0.00	0.00	0.00	11.09	11.50	52.0	0.221
50.00	0.40	0.27	0.00	0.00	0.00	11.04	11.45	56.0	0.205
55.00	0.39	0.27	0.00	0.00	0.00	10.92	11.32	56.0	0.202
60.00	0.39	0.28	0.00	0.00	0.00	10.78	11.17	56.0	0.200
65.00	0.38	0.28	0.00	0.00	0.00	10.63	11.01	56.0	0.197
70.00	0.37	0.28	0.00	0.00	0.00	10.46	10.84	56.0	0.194
75.00	0.36	0.28	0.00	0.00	0.00	10.28	10.65	56.0	0.190
80.00	0.35	0.28	0.00	0.00	0.00	10.08	10.45	56.0	0.187
85.00	0.34	0.28	0.00	0.00	0.00	9.87	10.22	56.0	0.183
90.00	0.31	0.28	0.00	0.00	0.00	9.62	9.95	56.0	0.178
91.00	0.30	0.28	0.00	0.00	0.00	9.25	9.56	56.0	0.171
95.00	0.30	0.28	0.00	0.00	0.00	9.03	9.34	52.0	0.180
100.00	0.29	0.28	0.00	0.00	0.00	8.74	9.04	52.0	0.174
105.00	0.28	0.28	0.00	0.00	0.00	8.42	8.71	52.0	0.168
110.00	0.27	0.28	0.00	0.00	0.00	8.06	8.34	52.0	0.161
115.00	0.26	0.28	0.00	0.00	0.00	7.67	7.94	52.0	0.153
115.00	0.26	0.28	0.00	0.00	0.00	7.67	7.94	52.0	0.182
120.00	0.30	0.34	0.00	0.00	0.00	8.62	8.94	52.0	0.172
125.00	0.29	0.34	0.00	0.00	0.00	8.02	8.33	52.0	0.160
130.00	0.28	0.35	0.00	0.00	0.00	7.35	7.65	52.0	0.147
135.00	0.32	0.43	0.00	0.00	0.00	7.95	8.30	52.0	0.160
140.00	0.31	0.43	0.00	0.00	0.00	6.90	7.25	52.0	0.139
145.00	0.30	0.44	0.00	0.00	0.00	5.71	6.06	52.0	0.117
150.00	0.29	0.44	0.00	0.00	0.00	4.35	4.70	52.0	0.090
155.00	0.18	0.24	0.00	0.00	0.00	2.78	2.99	52.0	0.058
160.00	0.17	0.24	0.00	0.00	0.00	1.92	2.14	52.0	0.041
165.00	0.10	0.13	0.00	0.00	0.00	0.95	1.08	52.0	0.021
170.00	0.09	0.13	0.00	0.00	0.00	0.38	0.51	52.0	0.010
173.00	0.01	0.01	0.00	0.00	0.00	0.01	0.02	52.0	0.000
175.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	52.0	0.000

Final Analysis Summary

Structure: CT03113-S-SBA
Site Name: North Chaplin
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

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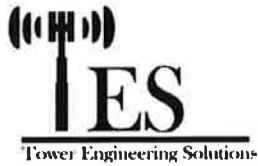


Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	t MZ (ft-kips)
85 mph Wind with 0" Ice	29.2	0.00	41.09	0.00	0.00	3527.15
73.61 mph Wind with 0.5" Ice	23.3	0.00	47.10	0.00	0.00	2880.15
50 mph Wind with 0" Ice	10.1	0.00	41.11	0.00	0.00	1221.16

Max Stresses

Load Case	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvT Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	Combined Stress (ksi)	Allowable Stress (ksi)	Elev (ft)	Stress Ratio
85 mph Wind with 0" Ice	0.40	0.79	0.00	0.00	0.00	32.01	32.44	52.0	48.00	0.624
73.61 mph Wind with 0.5" Ice	0.47	0.64	0.00	0.00	0.00	26.38	26.87	52.0	48.00	0.517
50 mph Wind with 0" Ice	0.41	0.27	0.00	0.00	0.00	11.09	11.50	52.0	48.00	0.221



Monopole Mat Foundation Design

Date

9/30/2015

Customer Name:	Verizon	EIA/TIA Standard:	EIA-222-F
Site Name:		Structure Height (Ft.):	175
Site Number:	CT03113-S-SBA	Engineer Name:	S. Hesselbein
Engr. Number:	17346	Engineer Login ID:	TES

Foundation Info Obtained from:

Drawings/Calculations

Structure Type:

Monopole

Analysis or Design?

Analysis

Base Reactions (Unfactored)

Axial Load (Kips):	41.1	Shear Force (Kips):	29.2
Uplift Force (Kips):	0.0	Moment (Kips-ft):	3527.1

Foundation Geometries:

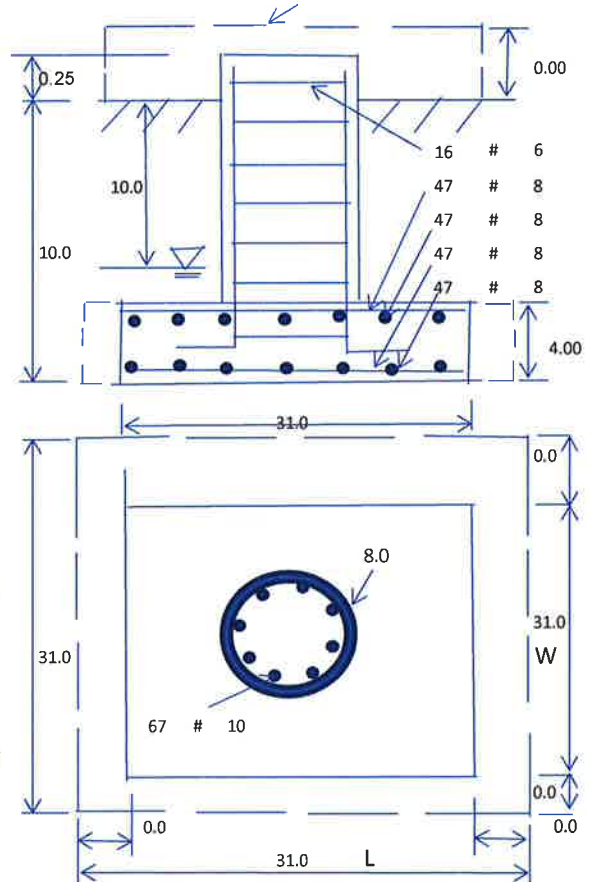
Diameter of Pier (ft.):	8.0	Depth of Base BG (ft.):	10.0
Pier Height A. G. (ft.):	0.25	Thickness of Pad (ft.):	4.00
Length of Pad (ft.):	31	Width of Pad (ft.):	31
Final Length of pad (ft)	31.0	Final width of pad (ft):	31.0
Control Value for Cell D18:	0	Control Value for Cell F18:	0

Mods required -Yes/No ?:

No

Material Properties and Rebar Info:

Concrete Strength (psi):	3500	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi):	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	10	Tie / Stirrup Size #:	6	
Qty. of Vertical Rebars:	67	Tie Spacing (in):	8.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	8	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	47	Qty. of Rebar in Pad (W):	47	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	47	Qty. of Rebar in Pad (W):	47	



Soil Design Parameters:

Soil Unit Weight (pcf):	135.0	Soil Buoyant Weight:	50.0	Pcf
Water Table B.G.S. (ft):	10.0	Unit Weight of Water:	62.4	pcf
Allowable Net Soil Bearing (psf):	15000	Allowable Skin Friction:	0	Psf
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No	
Consider soil hori. force for O.T.M.:	No	Reduction factor on the maximum soil bearing pressure:	1.00	
		Angle from Top of Pad:		30
		Angle from Bottm of Pad:		25
		Angle from Bottm of Pad:		25

Foundation Analysis and Design:

Total Dry Soil Volume (cu. Ft.):	5464.41	Total Dry Soil Weight (Kips):	737.69
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	737.69	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	4158.16	Total Dry Concrete Weight (Kips):	623.72
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	623.72	Total Vertical Load on Base (Kips):	1402.52

Check Soil Capacities:

Calculated Maxium Net Soil Pressure under the base (psf):	2010	<	Allowable Soil Bearing (psf):	15000	0.13	OK!
Allowable Foundation Overturning Resistance (SF=1.5, kips-ft.):	14492.7	>	Applied Momont (kips-ft):	3826	0.26	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	5.68					OK!

Check the capacities of Reinforcing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75		
Strength reduction factor (Axial compression):	0.65	Wind Load Factor on Concrete Design:	1.30		

(1) Concrete Pier:

				Load/ Capacity Ratio	
Vertical Steel Rebar Area (sq. in./each):	1.27	Tie / Stirrup Area (sq. in./each):	0.44		
Calculated Moment Capacity (Mn,Kips-Ft):	15354.1	> Design Factored Moment (Mu, Kips-Ft)	3709.6	0.24	OK!
Calculated Shear Capacity (Kips):	1149.2	> Design Factored Shear (Kips):	38.0	0.03	OK!
Calculated Tension Capacity (Tn, Kips):	4594.9	> Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	11065.9	> Design Factored Axial Load (Pu Kips):	53.4	0.00	OK!
Moment & Axial Strength Combination:	0.24	OK! Check Tie Spacing (Design/Required):		0.6667	OK!
Pier Reinforcement Ratio:	0.012	Reinforcement Ratio is satisfied per ACI			

(2).Concrete Pad:

One-Way Design Shear Capacity (L-Direction, Kips):	1469.0	> One-Way Factored Shear (L-D. Kips):	448.0	0.30	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	1469.0	> One-Way Factored Shear (W-D., Kips):	448.0	0.30	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	1698.4	> One-Way Factored Shear (C-C, Kips):	663.6	0.39	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0022	OK! Lower Steel Pad Reinf. Ratio (W-Direct	0.0022		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	7267.1	> Moment at Bottom (L-Direct. K-Ft):	1342.6	0.18	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	7267.1	> Moment at Bottom (W-Direct. K-Ft):	1342.6	0.18	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	10224.2	> Moment at Bottom (C-C Dir. K-Ft):	1898.8	0.19	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0022	OK! Upper Steel Reinf. Ratio (W-Direct.):	0.0022		
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	7267.1	> Moment at the top (L-Dir Kips-Ft):	503.6	0.07	OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	7267.1	> Moment at the top (W-Dir Kips-Ft):	503.6	0.07	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	10224.2	> Moment at the top (C-C Direc. K-Ft):	928.4	0.09	OK!