Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

December 2, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
35 Old Route 44, Eastford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the top of the existing 190-foot guyed-lattice tower at 35 Old Route 44 in Eastford, Connecticut (the "Property"). The tower is owned by Cordless Data Transfer ("CDT"). The Council approved Cellco's use of this tower in 2000. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with three (3) model LNX-8513DS-VTM, 850 MHz antennas; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas; and three (3) model HBXX-6517DS-VTM, 2100 MHz antennas, all at the same 190-foot level on the tower. Cellco also intends to install three (3) new remote radio heads ("RRHs"), one (1) each behind its 2100 MHz antennas and one (1) HYBRIFLEX™ 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 Arthur Brodeur, First Selectman for the Town of Eastford. A copy of this letter is also being sent to Priscilla Armita, the owner of the Property and CDT, 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).

1. The proposed modifications will not result in an increase in the height of the existing tower. The replacement antennas and RRHs will be located at the same 190-foot level on the tower.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table 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 superstructure and substructure can support Cellco's proposed modifications. (*See* Structural Analysis 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:
Arthur Brodeur, Eastford First Selectman
Priscilla Armita
CDT
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

LNX-8513DS-VTM

Andrew® Teletilt® Antenna, 698–896 MHz, 85° horizontal beamwidth, RET compatible

POWERED BY ANDREW.

Electrical Specifications

Frequency Band, MHz	698–806	806–896
Gain, dBi	14.6	15.3
Beamwidth, Horizontal, degrees	85	85
Beamwidth, Vertical, degrees	12.2	11.0
Beam Tilt, degrees	0–10	0–10
USLS, typical, dB	17	17
Front-to-Back Ratio at 180°, dB	25	26
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°

Mechanical Specifications

Color | Radome Material	Light gray | Fiberglass, UV resistant
Connector Interface | Location | Quantity	7-16 DIN Female | Bottom | 2
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph
Antenna Dimensions, L x W x D	1847.0 mm x 301.0 mm x 181.0 mm | 72.7 in x 11.9 in x 7.1 in
Net Weight	17.8 kg | 39.2 lb
Model with factory installed AISG 2.0 RET	LNX-8513DS-A1M

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

HBXX-6517DS-VTM

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

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

Electrical Specifications

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

Electrical Specifications, BASTA*

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

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

General Specifications

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

Product Specifications

HBXX-6517DS-VTM

Performance Note	Outdoor usage

Mechanical Specifications

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

Dimensions

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

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	HBXX-6517DS-A2M
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	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

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

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

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.

[illegible]

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.

[illegible]

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.

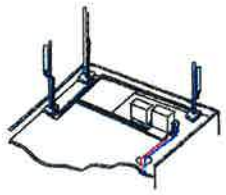
[illegible]

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.

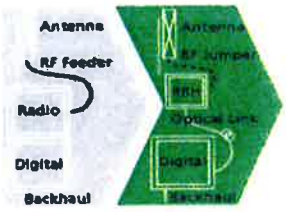
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

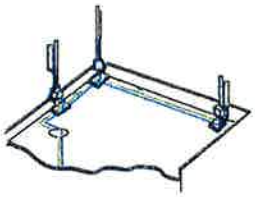
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

- 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
- 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.

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)

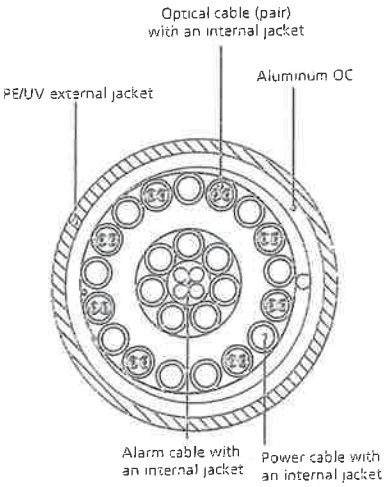


Figure 2: Construction Detail

- This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Eastford								
Tower Height: 190Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Sprint CDMA/LTE	2	557	165.5	0.0146	1900	1.0000	1.46%	
*AT&T UMTS	2	578	150	0.0185	880	0.5867	3.15%	
*AT&T UMTS	2	855	150	0.0273	1900	1.0000	2.73%	
*AT&T GSM	4	513	150	0.0328	1900	1.0000	3.28%	
*AT&T GSM	1	289	150	0.0046	880	0.5867	0.79%	
*AT&T LTE	1	1771	150	0.0283	734	0.4893	5.78%	
Verizon PCS	**11**	**408**	**190**	**0.0447**	**1970**	**1.0000**	**4.47%**	
Verizon Cellular	**9**	**257**	**190**	**0.0230**	**869**	**0.5793**	**3.98%**	
Verizon AWS	**1**	**2595**	**190**	**0.0258**	**2145**	**1.0000**	**2.58%**	
Verizon 700	**1**	**803**	**190**	**0.0080**	**746**	**0.4973**	**1.61%**	
								29.83%
* Source: Siting Council								

ATTACHMENT 3

FRED A. NUDD CORPORATION

1743 ROUTE 104, BOX 577
ONTARIO, NY 14519
(315) 524-2531 FAX (315) 524-4249

www.nuddtowers.com

Mark LeGault
Cordless Data Transfer, Inc.
600 Old Hartford Road
Colchester, CT 06415
May 26, 2015

Nudd Job Number: 115-35075

Site Location: 35 Old Route 44, Eastford, CT 06242, Windham County

Subject: Structural Analysis of an existing 190 ft Guyed Tower

Fred A. Nudd Corporation has completed a structural analysis of an existing 190 ft guyed tower. The tower was originally designed by Fred A. Nudd Corporation in March of 1998. The tower analysis was completed considering TIA-222-F design standards, which is the enforced design standard of the 2003 International Building Code and 2005 State Building Code of Connecticut with 2009 Amendments. Additional standards used in this analysis include AISC Allowable Stress Design Manual, 9th Edition, and ACI318-05, Building Code Requirements for Structural Concrete and Commentary. Tower and foundation dimensions have been taken from drawings by Fred A. Nudd, project number 98-5874, dated March 1998. The tower was later extended and re-guyed by Fred A. Nudd Corporation, drawing number 00-5874A-1, dated July 31, 2000. Geotechnical information was taken from a subsurface exploration report by Tower Engineering Professionals, Inc., project number 090004.14, dated September 22, 2009. Design criteria per each analysis are noted on the following page. The tower is assumed to be in good, undamaged and equivalent as new condition and has been maintained / inspected per criteria by TIA-222.

The purpose of this analysis is to determine the structure's ability to support new Verizon equipment installed at a rad center of 190 ft above ground level (AGL). The new equipment to be installed, which includes antennas, diplexers, and associated hardware are listed on the following page in the appurtenance loading table.

Results of the analysis indicate the tower will be able to the support the design loads noted in the appurtenance loading table on the following page. Specific section design loads, capacities and stress ratios are provided on the following pages. Maximum member usage was found to be 99.7%.

The tower base foundation and anchors were analyzed considering onsite soil information from the aforementioned geotechnical report. Based on this analysis, the foundation and anchors will be able support the proposed appurtenance loading, in addition to the existing wireless equipment and tower superstructure. Specific design loads, capacities and stress ratios are provided on the following pages.

In conclusion, the tower superstructure and substructure can support the listed existing and proposed appurtenance loading.

We trust this report satisfies your needs. Please contact us with any questions or concerns regarding this report.

Best Regards,

STATE OF CONNECTICUT
DAVID
No. 22092
LICENSED
PROFESSIONAL ENGINEER
5-9-15

Fred. A. Nudd Corporation

Code Design Criteria

TIA-222-F
Windspeed = 85 mph, fastest mile
Exposure = C
Radial Ice = 0.5 inch
Ice Windspeed = 74 mph, 3-second gust

Appurtenance Loading – Existing and To Remain on Tower

Height (ft)	Carrier	Antenna	Mount	Coax (in)
180	--	--	Sector Frame	--
165.5	Sprint	(1) RFS APXV9ERR18-C-A20 (2) RFS APXVSPP18-C-A20 (3) Alcatel Lucent 4x40W RRH, 1900 MHz (3) Alcatel Lucent 2x50W RRH, 800 MHz	(3) 12 ft Boom / Frame	(3) 1-1/4 Hybriflex
150	AT&T	(6) Powerwave P90-14-XLH-RR (3) KMW AM-X-CD-17-65-00T-RET (6) Ericsson RRUS-11 (6) Powerwave TT08-DB111-001 (1) Raycap DC6-48-60-18-8F	Sector Frame	(12) 1-5/8 (2) 19.7 mm DC (1) 10 mm Fiber

- *Note elevation is measured from grade to center of antenna*
- *Note any coax not to be removed during the installation of the new wireless equipment is to remain installed in its original location and orientation.*

Appurtenance Loading – Final Configuration for Verizon

Height (ft)	Carrier	Appurtenance	Mount	Coax (in)
190	Verizon	(3) Antel BXA-70063-6CF (6) Andrew HBXX-6517DS-A2M (3) Andrew LNX-8513DS-A1M (3) Alcatel Lucent RH2x60AWS (1) Junction Box	Sector Frame	(12) 1-5/8 (1) 5/8 Fiber

- *Height measurement taken as distance from top of base foundation to center of appurtenance.*
- *Final configuration should be (4) 1-5/8" stacked on top of (8) 1-5/8 in coax. The 1-5/8 in fiber may be installed in any location alongside the existing coax.*

Maximum Member Usage Results

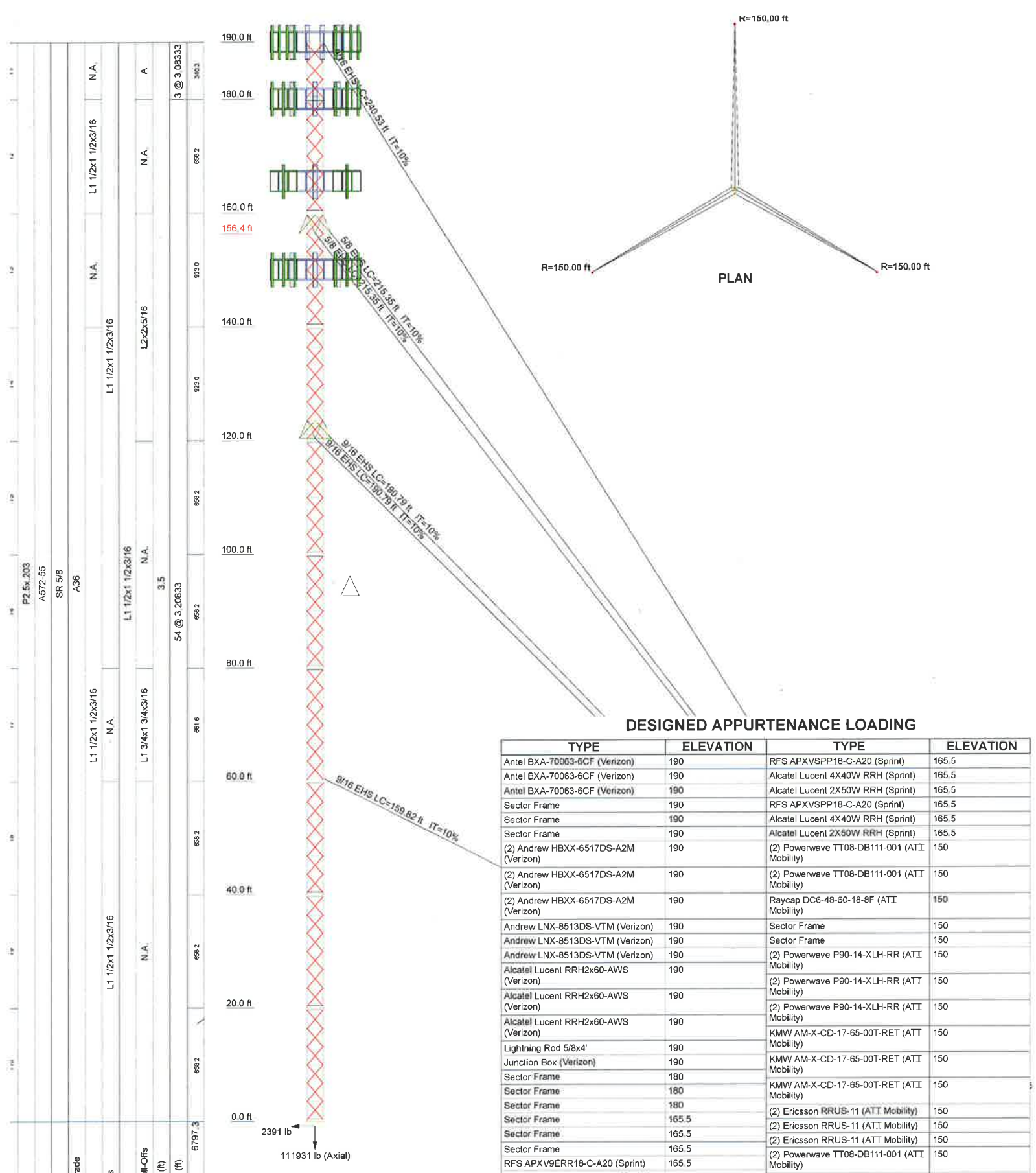
Member	Usage (%)
Leg	99.7
Diagonal	82.0
Horizontal	61.0
Guy Wires	75.1
Bolts	49.7
Anchor Rod	72.0

- *Usage above 100% indicates the applied design load exceeds the member strength capacity and requires strengthening.*

Maximum Member Usage Results

Member	Capacity (kips)	Analysis (kips)	Usage (%)
Base Axial	121.0	114.0	94.0
Anchor Uplift	64.9	43.9	68.0
Anchor Shear	54.3	50.6	93.0

- *Usage above 100% indicates the applied design load exceeds the member strength capacity and requires strengthening.*



PLAN

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Antel BXA-70063-6CF (Verizon)	190	RFS APXVSPP18-C-A20 (Sprint)	165.5
Antel BXA-70063-6CF (Verizon)	190	Alcatel Lucent 4X40W RRH (Sprint)	165.5
Antel BXA-70063-6CF (Verizon)	190	Alcatel Lucent 2X50W RRH (Sprint)	165.5
Sector Frame	190	RFS APXVSPP18-C-A20 (Sprint)	165.5
Sector Frame	190	Alcatel Lucent 4X40W RRH (Sprint)	165.5
Sector Frame	190	Alcatel Lucent 2X50W RRH (Sprint)	165.5
(2) Andrew HBXX-6517DS-A2M (Verizon)	190	(2) Powerwave TT08-DB111-001 (ATT Mobility)	150
(2) Andrew HBXX-6517DS-A2M (Verizon)	190	(2) Powerwave TT08-DB111-001 (ATT Mobility)	150
(2) Andrew HBXX-6517DS-A2M (Verizon)	190	Raycap DC6-48-60-18-8F (ATT Mobility)	150
Andrew LNX-8513DS-VTM (Verizon)	190	Sector Frame	150
Andrew LNX-8513DS-VTM (Verizon)	190	Sector Frame	150
Andrew LNX-8513DS-VTM (Verizon)	190	(2) Powerwave P90-14-XLH-RR (ATT Mobility)	150
Alcatel Lucent RRH2x60-AWS (Verizon)	190	(2) Powerwave P90-14-XLH-RR (ATT Mobility)	150
Alcatel Lucent RRH2x60-AWS (Verizon)	190	(2) Powerwave P90-14-XLH-RR (ATT Mobility)	150
Alcatel Lucent RRH2x60-AWS (Verizon)	190	KMW AM-X-CD-17-65-00T-RET (ATT Mobility)	150
Lightning Rod 5/8x4'	190	KMW AM-X-CD-17-65-00T-RET (ATT Mobility)	150
Junction Box (Verizon)	190	KMW AM-X-CD-17-65-00T-RET (ATT Mobility)	150
Sector Frame	180	(2) Ericsson RRUS-11 (ATT Mobility)	150
Sector Frame	180	(2) Ericsson RRUS-11 (ATT Mobility)	150
Sector Frame	180	(2) Ericsson RRUS-11 (ATT Mobility)	150
Sector Frame	165.5	(2) Powerwave TT08-DB111-001 (ATT Mobility)	150
Sector Frame	165.5	Sector Frame	150
Sector Frame	165.5		
RFS APXV9ERR18-C-A20 (Sprint)	165.5		
Alcatel Lucent 4X40W RRH (Sprint)	165.5		
Alcatel Lucent 2X50W RRH (Sprint)	165.5		

SYMBOL LIST

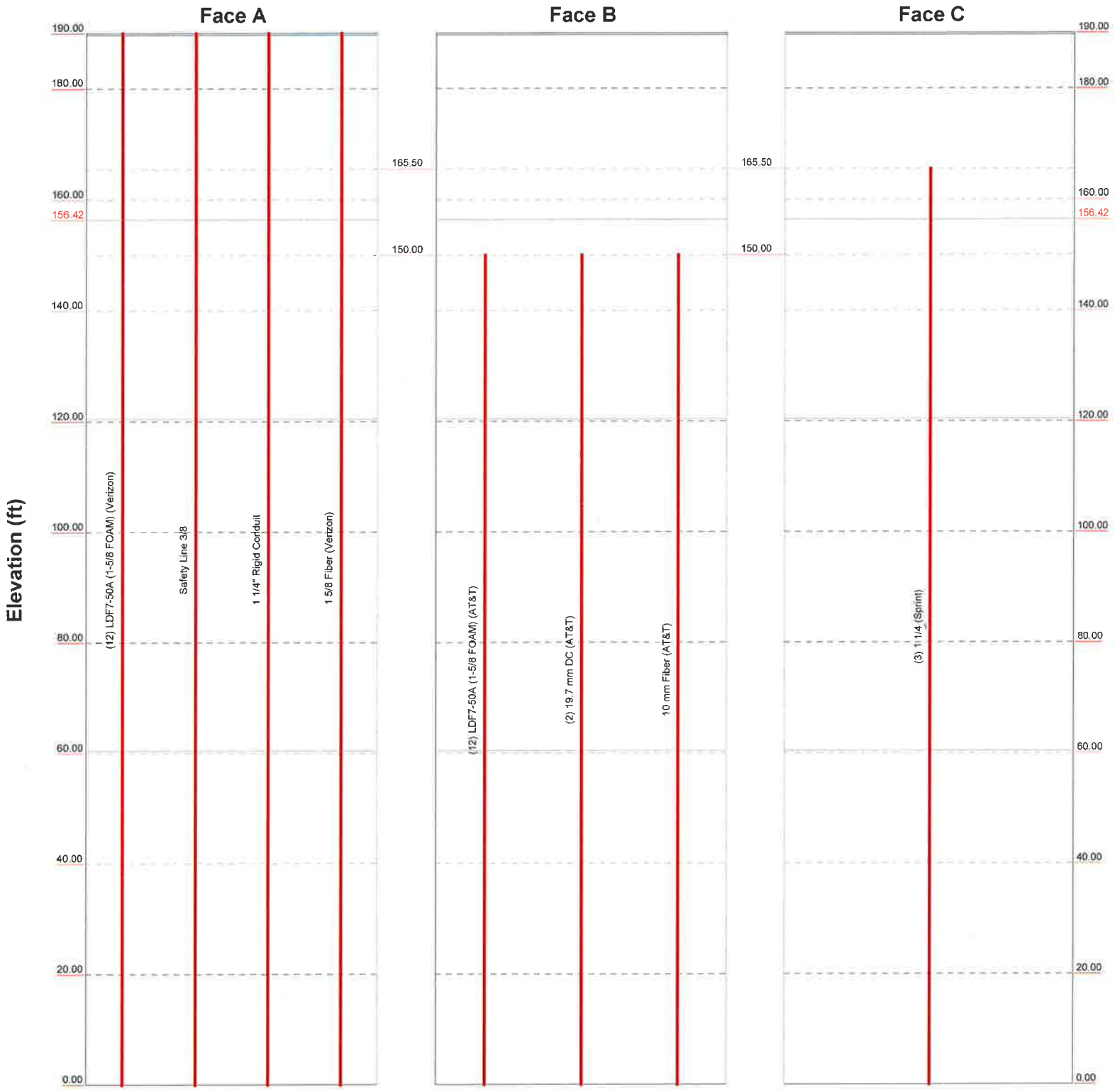
MARK	SIZE	MARK	SIZE

Job: 115-35075			
Project: Eastford, CT			
Client: CDT	Drawn by: FAN	App'd:	
Code: TIA/EIA-222-F	Date: 05/26/15	Scale: N	
Path:		Dwg No.	

Phone:
FAX:

0' - 190'

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



Phone: FAX:	Job: 115-35075			
	Project: Eastford, CT			
	Client: CDT	Drawn by: FAN	App'd:	
	Code: TIA/EIA-222-F	Date: 05/26/15	Scale: N	
	Path:		Dwg No.	

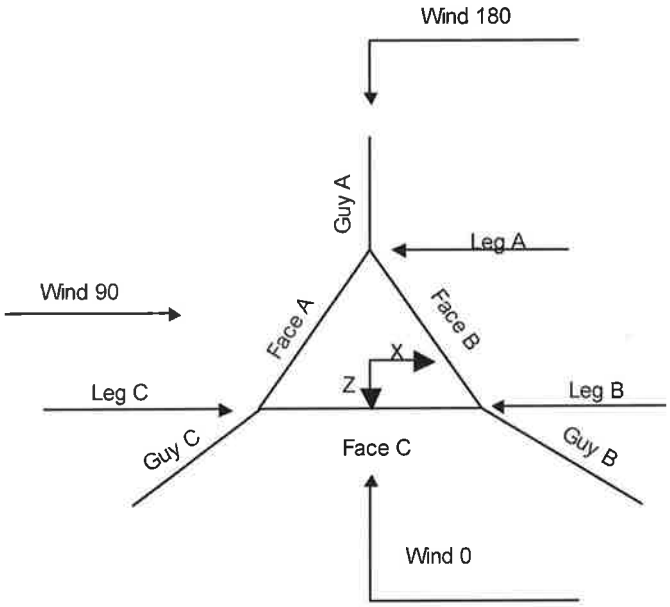
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 190.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 3.50 ft at the top and 3.50 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

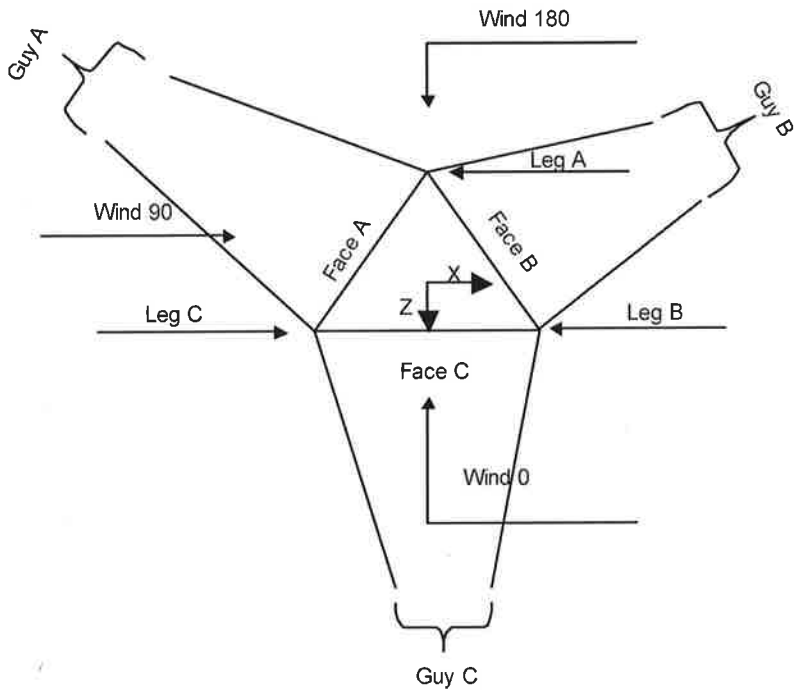
Tower is located in New London County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Weld together tower sections have flange connections..
Tension only take-up is 0.0313 in.
Pressures are calculated at each section.
Safety factor used in guy design is 2.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline 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		



Corner & Starmount Guyed Tower



Face Guyed

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	190.00-180.00			3.50	1	10.00
T2	180.00-160.00			3.50	1	20.00
T3	160.00-140.00			3.50	1	20.00
T4	140.00-120.00			3.50	1	20.00
T5	120.00-100.00			3.50	1	20.00
T6	100.00-80.00			3.50	1	20.00
T7	80.00-60.00			3.50	1	20.00
T8	60.00-40.00			3.50	1	20.00
T9	40.00-20.00			3.50	1	20.00
T10	20.00-0.00			3.50	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	190.00-180.00	3.08	TX Brace	No	Yes	4.5000	4.5000
T2	180.00-160.00	3.21	TX Brace	No	Yes	4.5000	4.5000
T3	160.00-140.00	3.21	TX Brace	No	Yes	4.5000	4.5000
T4	140.00-120.00	3.21	TX Brace	No	Yes	4.5000	4.5000
T5	120.00-100.00	3.21	TX Brace	No	Yes	4.5000	4.5000
T6	100.00-80.00	3.21	TX Brace	No	Yes	4.5000	4.5000
T7	80.00-60.00	3.21	TX Brace	No	Yes	4.5000	4.5000
T8	60.00-40.00	3.21	TX Brace	No	Yes	4.5000	4.5000
T9	40.00-20.00	3.21	TX Brace	No	Yes	4.5000	4.5000
T10	20.00-0.00	3.21	TX Brace	No	Yes	4.5000	4.5000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 190.00-180.00	Pipe	P2.5x.203	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)
T2 180.00-160.00	Pipe	P2.5x.203	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)
T3 160.00-140.00	Pipe	P2.5x.203	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)
T4 140.00-120.00	Pipe	P2.5x.203	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)
T5 120.00-100.00	Pipe	P2.5x.203	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)
T6 100.00-80.00	Pipe	P2.5x.203	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)
T7 80.00-60.00	Pipe	P2.5x.203	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)
T8 60.00-40.00	Pipe	P2.5x.203	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)
T9 40.00-20.00	Pipe	P2.5x.203	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)
T10 20.00-0.00	Pipe	P2.5x.203	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 190.00-180.00	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T2 180.00-160.00	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T3 160.00-140.00	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T4 140.00-120.00	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T5 120.00-100.00	Equal Angle	L1 1/2x1 1/2x3/16	A36	Equal Angle	L1 1/2x1 1/2x3/16	A36

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T6 100.00-80.00	Equal Angle	L1 1/2x1 1/2x3/16	(36 ksi) A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	(36 ksi) A36 (36 ksi)
T7 80.00-60.00	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T8 60.00-40.00	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T9 40.00-20.00	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T10 20.00-0.00	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 190.00-180.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T2 180.00-160.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T3 160.00-140.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T4 140.00-120.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T5 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T6 100.00-80.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T7 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T8 60.00-40.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T9 40.00-20.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T10 20.00-0.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

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
T1 190.00-180.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3	0.00	0.0000	A36	1	1	1	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft²	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
160.00-140.00			(36 ksi)					
T4	0.00	0.0000	A36	1	1	1	36.0000	36.0000
140.00-120.00			(36 ksi)					
T5	0.00	0.0000	A36	1	1	1	36.0000	36.0000
120.00-100.00			(36 ksi)					
T6	0.00	0.0000	A36	1	1	1	36.0000	36.0000
100.00-80.00			(36 ksi)					
T7 80.00-60.00	0.00	0.0000	A36	1	1	1	36.0000	36.0000
			(36 ksi)					
T8 60.00-40.00	0.00	0.0000	A36	1	1	1	36.0000	36.0000
			(36 ksi)					
T9 40.00-20.00	0.00	0.0000	A36	1	1	1	36.0000	36.0000
			(36 ksi)					
T10 20.00-0.00	0.00	0.0000	A36	1	1	1	36.0000	36.0000
			(36 ksi)					

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	No	No	1	1	1	1	0.65	0.65	1	1
190.00-180.00				1	1	1	0.65	0.65	1	1
T2	No	No	1	1	1	1	0.65	0.65	1	1
180.00-160.00				1	1	1	0.65	0.65	1	1
T3	No	No	1	1	1	1	0.65	0.65	1	1
160.00-140.00				1	1	1	0.65	0.65	1	1
T4	No	No	1	1	1	1	0.65	0.65	1	1
140.00-120.00				1	1	1	0.65	0.65	1	1
T5	No	No	1	1	1	1	0.65	0.65	1	1
120.00-100.00				1	1	1	0.65	0.65	1	1
T6	No	No	1	1	1	1	0.65	0.65	1	1
100.00-80.00				1	1	1	0.65	0.65	1	1
T7	No	No	1	1	1	1	0.65	0.65	1	1
80.00-60.00				1	1	1	0.65	0.65	1	1
T8	No	No	1	1	1	1	0.65	0.65	1	1
60.00-40.00				1	1	1	0.65	0.65	1	1
T9	No	No	1	1	1	1	0.65	0.65	1	1
40.00-20.00				1	1	1	0.65	0.65	1	1
T10	No	No	1	1	1	1	0.65	0.65	1	1
20.00-0.00				1	1	1	0.65	0.65	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 190.00-180.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T2 180.00-160.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T3 160.00-140.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T4 140.00-120.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T5 120.00-100.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T6 100.00-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T7 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T8 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T9 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T10 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 190.00-180.00	Flange	0.7500 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 180.00-160.00	Flange	0.7500 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 160.00-140.00	Flange	0.7500 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 140.00-120.00	Flange	0.7500 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 120.00-100.00	Flange	0.7500 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 100.00-80.00	Flange	0.7500 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 80.00-60.00	Flange	0.7500 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 60.00-40.00	Flange	0.7500 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 40.00-20.00	Flange	0.7500 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 20.00-0.00	Flange	0.7500 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension lb	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
156.417	EHS	A	5/8	4240.00	10%	21000	0.813	215.17	150.00	0.0000	0.00	100%
		B	5/8	4240.00	10%	21000	0.813	215.17	150.00	0.0000	0.00	100%
		C	5/8	4240.00	10%	21000	0.813	215.17	150.00	0.0000	0.00	100%
120.375	EHS	A	9/16	3500.00	10%	21000	0.671	190.63	150.00	0.0000	0.00	100%
		B	9/16	3500.00	10%	21000	0.671	190.63	150.00	0.0000	0.00	100%
		C	9/16	3500.00	10%	21000	0.671	190.63	150.00	0.0000	0.00	100%
60.375	EHS	A	9/16	3500.00	10%	21000	0.671	159.69	150.00	0.0000	0.00	100%
		B	9/16	3500.00	10%	21000	0.671	159.69	150.00	0.0000	0.00	100%
		C	9/16	3500.00	10%	21000	0.671	159.69	150.00	0.0000	0.00	100%
189.625	EHS	A	9/16	3500.00	10%	21000	0.671	240.33	150.00	0.0000	0.00	100%
		B	9/16	3500.00	10%	21000	0.671	240.33	150.00	0.0000	0.00	100%
		C	9/16	3500.00	10%	21000	0.671	240.33	150.00	0.0000	0.00	100%

Guy Data(cont'd)

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
156.417	Torque Arm	7.00	30.0000	Dog Ear	A36 (36 ksi)	Single Angle	L3x3x1/4
120.375	Torque Arm	7.00	30.0000	Dog Ear	A36 (36 ksi)	Single Angle	L3x3x1/4
60.375	Corner						
189.625	Corner						

Guy Data (cont'd)

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
156.42	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Equal Angle	L2x2x5/16
120.38	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Equal Angle	L2x2x5/16
60.38	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Equal Angle	L1 3/4x1 3/4x3/16
189.63	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Equal Angle	L1 3/4x1 3/4x3/16

Guy Data (cont'd)

Guy Elevation ft	Cable Weight A lb	Cable Weight B lb	Cable Weight C lb	Cable Weight D lb	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft

Guy Elevation ft	Cable Weight A lb	Cable Weight B lb	Cable Weight C lb	Cable Weight D lb	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
156.417	174.93	174.93	174.93		4.38 3.6 sec/pulse	4.38 3.6 sec/pulse	4.38 3.6 sec/pulse	
120.375	127.91	127.91	127.91		3.45 3.2 sec/pulse	3.45 3.2 sec/pulse	3.45 3.2 sec/pulse	
60.375	107.15	107.15	107.15		2.43 2.7 sec/pulse	2.43 2.7 sec/pulse	2.43 2.7 sec/pulse	
189.625	161.26	161.26	161.26		5.44 4.0 sec/pulse	5.44 4.0 sec/pulse	5.44 4.0 sec/pulse	

Guy Data (cont'd)

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
156.417	No	No	1	1	1	1	1	1
120.375	No	No	1	1	1	1	1	1
60.375	No	No			1	1	1	1
189.625	No	No			1	1	1	1

Guy Data (cont'd)

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
156.417	0.7500 A325N	2	0.0000	0.75	0.7500 A325N	2	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
120.375	0.7500 A325N	2	0.0000	0.75	0.7500 A325N	2	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
60.375	0.6250 A325N	0	0.0000	0.75	0.0000 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
189.625	0.6250 A325N	0	0.0000	0.75	0.0000 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
156.417	A	78.21	24	18	0.5000
	B	78.21	24	18	0.5000
	C	78.21	24	18	0.5000
120.375	A	60.19	22	16	0.5000
	B	60.19	22	16	0.5000
	C	60.19	22	16	0.5000
60.375	A	30.19	18	14	0.5000
	B	30.19	18	14	0.5000

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
	C	30.19	18	14	0.5000
189.625	A	94.81	25	19	0.5000
	B	94.81	25	19	0.5000
	C	94.81	25	19	0.5000

Guy-Mast Forces (Excluding Wind) - No Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom lb	F_x lb	F_y lb	F_z lb	M_x lb-ft	M_y lb-ft	M_z lb-ft
156.417	A	46.5797	4367.06 4240.00	-69.93	3213.15	-2956.68	-6492.90	10489.68	-11246.04
	A	46.5797	4367.06 4240.00	69.93	3213.15	-2956.68	-6492.90	-10489.68	11246.04
	B	46.5797	4367.06 4240.00	2595.52	3213.15	1417.78	12985.81	10489.68	0.00
	B	46.5797	4367.06 4240.00	2525.59	3213.15	1538.90	-6492.90	-10489.68	-11246.04
	C	46.5797	4367.06 4240.00	-2525.59	3213.15	1538.90	-6492.90	10489.68	11246.04
	C	46.5797	4367.06 4240.00	-2595.52	3213.15	1417.78	12985.81	-10489.68	0.00
			Sum:	0.00	19278.93	0.00	-0.00	0.00	0.00
120.375	A	39.1191	3580.70 3500.00	-64.94	2297.61	-2745.58	-4642.84	9740.74	-8041.64
	A	39.1191	3580.70 3500.00	64.94	2297.61	-2745.58	-4642.84	-9740.74	8041.64
	B	39.1191	3580.70 3500.00	2410.21	2297.61	1316.55	9285.68	9740.74	0.00
	B	39.1191	3580.70 3500.00	2345.27	2297.61	1429.03	-4642.84	-9740.74	-8041.64
	C	39.1191	3580.70 3500.00	-2345.27	2297.61	1429.03	-4642.84	9740.74	8041.64
	C	39.1191	3580.70 3500.00	-2410.21	2297.61	1316.55	9285.68	-9740.74	0.00
			Sum:	0.00	13785.67	0.00	-0.00	0.00	0.00
60.375	A	22.1953	3540.48 3500.00	0.00	1383.35	-3259.04	-2795.37	0.00	0.00
	B	22.1953	3540.48 3500.00	2822.41	1383.35	1629.52	1397.68	0.00	-2420.86
	C	22.1953	3540.48 3500.00	-2822.41	1383.35	1629.52	1397.68	-0.00	2420.86
			Sum:	0.00	4150.04	0.00	0.00	0.00	0.00
189.625	A	52.0323	3627.13 3500.00	0.00	2889.89	-2191.94	-5839.67	0.00	0.00
	B	52.0323	3627.13 3500.00	1898.28	2889.89	1095.97	2919.83	0.00	-5057.30
	C	52.0323	3627.13 3500.00	-1898.28	2889.89	1095.97	2919.83	-0.00	5057.30
			Sum:	0.00	8669.66	-0.00	0.00	0.00	0.00

Guy-Mast Forces (Excluding Wind) - Ice

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top / Bottom	F_x	F_y	F_z	M_x	M_y	M_z
ft		°	lb	lb	lb	lb	lb-ft	lb-ft	lb-ft
156.417	A	46.5797	6148.96 / 5914.51	-98.00	4542.18	-4143.51	-9178.51	14700.32	-15897.64
	A	46.5797	6148.96 / 5914.51	98.00	4542.18	-4143.51	-9178.51	-14700.32	15897.64
	B	46.5797	6148.96 / 5914.51	3637.39	4542.18	1986.88	18357.02	14700.32	0.00
	B	46.5797	6148.96 / 5914.51	3539.38	4542.18	2156.63	-9178.51	-14700.32	-15897.64
	C	46.5797	6148.96 / 5914.51	-3539.38	4542.18	2156.63	-9178.51	14700.32	15897.64
	C	46.5797	6148.96 / 5914.51	-3637.39	4542.18	1986.88	18357.02	-14700.32	0.00
			Sum:	0.00	27253.10	0.00	-0.00	0.00	0.00
120.375	A	39.1191	5072.76 / 4914.01	-91.58	3276.08	-3871.93	-6620.07	13736.80	-11466.29
	A	39.1191	5072.76 / 4914.01	91.58	3276.08	-3871.93	-6620.07	-13736.80	11466.29
	B	39.1191	5072.76 / 4914.01	3398.98	3276.08	1856.65	13240.14	13736.80	0.00
	B	39.1191	5072.76 / 4914.01	3307.40	3276.08	2015.27	-6620.07	-13736.80	-11466.29
	C	39.1191	5072.76 / 4914.01	-3307.40	3276.08	2015.27	-6620.07	13736.80	11466.29
	C	39.1191	5072.76 / 4914.01	-3398.98	3276.08	1856.65	13240.14	-13736.80	0.00
			Sum:	0.00	19656.50	0.00	-0.00	0.00	0.00
60.375	A	22.1953	5015.17 / 4935.55	0.00	1984.79	-4605.71	-4010.72	0.00	0.00
	B	22.1953	5015.17 / 4935.55	3988.66	1984.79	2302.85	2005.36	0.00	-3473.38
	C	22.1953	5015.17 / 4935.55	-3988.66	1984.79	2302.85	2005.36	-0.00	3473.38
			Sum:	0.00	5954.37	0.00	0.00	0.00	0.00
189.625	A	52.0323	5142.99 / 4892.91	0.00	4114.31	-3085.91	-8313.89	0.00	0.00
	B	52.0323	5142.99 / 4892.91	2672.48	4114.31	1542.95	4156.95	0.00	-7200.04
	C	52.0323	5142.99 / 4892.91	-2672.48	4114.31	1542.95	4156.95	-0.00	7200.04
			Sum:	0.00	12342.93	-0.00	0.00	0.00	0.00

Guy-Mast Forces (Excluding Wind) - Service

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top / Bottom	F_x	F_y	F_z	M_x	M_y	M_z
ft		°	lb	lb	lb	lb	lb-ft	lb-ft	lb-ft
156.417	A	46.5797	4367.06 / 4240.00	-69.93	3213.15	-2956.68	-6492.90	10489.68	-11246.04
	A	46.5797	4367.06	69.93	3213.15	-2956.68	-6492.90	-10489.68	11246.04

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top / Bottom lb	F_x lb	F_y lb	F_z lb	M_x lb-ft	M_y lb-ft	M_z lb-ft
			4240.00						
	B	46.5797	4367.06	2595.52	3213.15	1417.78	12985.81	10489.68	0.00
			4240.00						
	B	46.5797	4367.06	2525.59	3213.15	1538.90	-6492.90	-10489.68	-11246.04
			4240.00						
	C	46.5797	4367.06	-2525.59	3213.15	1538.90	-6492.90	10489.68	11246.04
			4240.00						
	C	46.5797	4367.06	-2595.52	3213.15	1417.78	12985.81	-10489.68	0.00
			4240.00						
			Sum:	0.00	19278.93	0.00	-0.00	0.00	0.00
120.375	A	39.1191	3580.70	-64.94	2297.61	-2745.58	-4642.84	9740.74	-8041.64
			3500.00						
	A	39.1191	3580.70	64.94	2297.61	-2745.58	-4642.84	-9740.74	8041.64
			3500.00						
	B	39.1191	3580.70	2410.21	2297.61	1316.55	9285.68	9740.74	0.00
			3500.00						
	B	39.1191	3580.70	2345.27	2297.61	1429.03	-4642.84	-9740.74	-8041.64
			3500.00						
	C	39.1191	3580.70	-2345.27	2297.61	1429.03	-4642.84	9740.74	8041.64
			3500.00						
	C	39.1191	3580.70	-2410.21	2297.61	1316.55	9285.68	-9740.74	0.00
			3500.00						
			Sum:	0.00	13785.67	0.00	-0.00	0.00	0.00
60.375	A	22.1953	3540.48	0.00	1383.35	-3259.04	-2795.37	0.00	0.00
			3500.00						
	B	22.1953	3540.48	2822.41	1383.35	1629.52	1397.68	0.00	-2420.86
			3500.00						
	C	22.1953	3540.48	-2822.41	1383.35	1629.52	1397.68	-0.00	2420.86
			3500.00						
			Sum:	0.00	4150.04	0.00	0.00	0.00	0.00
189.625	A	52.0323	3627.13	0.00	2889.89	-2191.94	-5839.67	0.00	0.00
			3500.00						
	B	52.0323	3627.13	1898.28	2889.89	1095.97	2919.83	0.00	-5057.30
			3500.00						
	C	52.0323	3627.13	-1898.28	2889.89	1095.97	2919.83	-0.00	5057.30
			3500.00						
			Sum:	0.00	8669.66	-0.00	0.00	0.00	0.00

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF7-50A (1-5/8 FOAM) (Verizon)	A	Yes	Ar (CfAe)	190.00 - 0.00	1.5000	-0.15	12	8	1.0000	1.9800		0.82
1 1/4 (Sprint)	C	Yes	Ar (CfAe)	165.50 - 0.00	1.5000	0	3	3	1.0000	1.5500		0.66
LDF7-50A (1-5/8 FOAM) (AT&T)	B	Yes	Ar (CfAe)	150.00 - 0.00	1.5000	0.25	12	6	1.0000	1.9800		0.82
Safety Line 3/8	A	Yes	Ar (CfAe)	190.00 - 0.00	0.0000	0.1	1	1	0.3750	0.3750		0.22
1 1/4" Rigid	A	Yes	Ar (CfAe)	190.00 - 0.00	0.0000	0.4	1	1	1.2500	1.2500		0.70

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Conduit 19.7 mm DC (AT&T)	B	Yes	Ar (CfAe)	150.00 - 0.00	0.0000	0.25	2	2	0.8800	0.8800		0.40
10 mm Fiber (AT&T)	B	Yes	Ar (CfAe)	150.00 - 0.00	0.0000	0.25	1	1	0.4000 0.8800	0.8800		0.20
1 5/8 Fiber (Verizon)	A	Yes	Ar (CfAe)	190.00 - 0.00	1.5000	-0.15	1	1	1.0000	1.9800		0.82

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 lb
T1	190.00-180.00	A	16.204	0.000	0.000	0.000	115.80
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	32.408	0.000	0.000	0.000	231.60
		B	0.000	0.000	0.000	0.000	0.00
		C	2.131	0.000	0.000	0.000	10.89
T3	160.00-140.00	A	32.408	0.000	0.000	0.000	231.60
		B	12.100	0.000	0.000	0.000	108.40
		C	7.750	0.000	0.000	0.000	39.60
T4	140.00-120.00	A	32.408	0.000	0.000	0.000	231.60
		B	24.200	0.000	0.000	0.000	216.80
		C	7.750	0.000	0.000	0.000	39.60
T5	120.00-100.00	A	32.408	0.000	0.000	0.000	231.60
		B	24.200	0.000	0.000	0.000	216.80
		C	7.750	0.000	0.000	0.000	39.60
T6	100.00-80.00	A	32.408	0.000	0.000	0.000	231.60
		B	24.200	0.000	0.000	0.000	216.80
		C	7.750	0.000	0.000	0.000	39.60
T7	80.00-60.00	A	32.408	0.000	0.000	0.000	231.60
		B	24.200	0.000	0.000	0.000	216.80
		C	7.750	0.000	0.000	0.000	39.60
T8	60.00-40.00	A	32.408	0.000	0.000	0.000	231.60
		B	24.200	0.000	0.000	0.000	216.80
		C	7.750	0.000	0.000	0.000	39.60
T9	40.00-20.00	A	32.408	0.000	0.000	0.000	231.60
		B	24.200	0.000	0.000	0.000	216.80
		C	7.750	0.000	0.000	0.000	39.60
T10	20.00-0.00	A	32.408	0.000	0.000	0.000	231.60
		B	24.200	0.000	0.000	0.000	216.80
		C	7.750	0.000	0.000	0.000	39.60

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 lb
T1	190.00-180.00	A	0.500	7.988	17.383	0.000	0.000	368.12
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	0.500	15.975	34.767	0.000	0.000	736.25
		B		0.000	0.000	0.000	0.000	0.00

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 lb
		C		1.169	2.337	0.000	0.000	37.52
T3	160.00-140.00	A	0.500	15.975	34.767	0.000	0.000	736.25
		B		5.617	13.883	0.000	0.000	391.67
		C		4.250	8.500	0.000	0.000	136.44
T4	140.00-120.00	A	0.500	15.975	34.767	0.000	0.000	736.25
		B		11.233	27.767	0.000	0.000	783.34
		C		4.250	8.500	0.000	0.000	136.44
T5	120.00-100.00	A	0.500	15.975	34.767	0.000	0.000	736.25
		B		11.233	27.767	0.000	0.000	783.34
		C		4.250	8.500	0.000	0.000	136.44
T6	100.00-80.00	A	0.500	15.975	34.767	0.000	0.000	736.25
		B		11.233	27.767	0.000	0.000	783.34
		C		4.250	8.500	0.000	0.000	136.44
T7	80.00-60.00	A	0.500	15.975	34.767	0.000	0.000	736.25
		B		11.233	27.767	0.000	0.000	783.34
		C		4.250	8.500	0.000	0.000	136.44
T8	60.00-40.00	A	0.500	15.975	34.767	0.000	0.000	736.25
		B		11.233	27.767	0.000	0.000	783.34
		C		4.250	8.500	0.000	0.000	136.44
T9	40.00-20.00	A	0.500	15.975	34.767	0.000	0.000	736.25
		B		11.233	27.767	0.000	0.000	783.34
		C		4.250	8.500	0.000	0.000	136.44
T10	20.00-0.00	A	0.500	15.975	34.767	0.000	0.000	736.25
		B		11.233	27.767	0.000	0.000	783.34
		C		4.250	8.500	0.000	0.000	136.44

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	190.00-180.00	A	0.675	3.593	0.844	1.321
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	180.00-160.00	A	1.374	7.073	1.418	2.220
		B	0.000	0.000	0.000	0.000
		C	0.090	0.489	0.093	0.153
T3	160.00-140.00	A	1.374	7.073	1.485	2.326
		B	0.513	2.718	0.555	0.894
		C	0.329	1.777	0.355	0.584
T4	140.00-120.00	A	1.374	7.073	1.485	2.326
		B	1.026	5.436	1.109	1.787
		C	0.329	1.777	0.355	0.584
T5	120.00-100.00	A	1.374	7.073	1.418	2.220
		B	1.026	5.436	1.059	1.706
		C	0.329	1.777	0.339	0.558
T6	100.00-80.00	A	1.374	7.073	1.418	2.220
		B	1.026	5.436	1.059	1.706
		C	0.329	1.777	0.339	0.558
T7	80.00-60.00	A	1.374	7.073	1.452	2.273
		B	1.026	5.436	1.084	1.747
		C	0.329	1.777	0.347	0.571
T8	60.00-40.00	A	1.374	7.073	1.418	2.220
		B	1.026	5.436	1.059	1.706
		C	0.329	1.777	0.339	0.558
T9	40.00-20.00	A	1.374	7.073	1.418	2.220
		B	1.026	5.436	1.059	1.706

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
		C	0.329	1.777	0.339	0.558
T10	20.00-0.00	A	1.374	7.073	1.418	2.220
		B	1.026	5.436	1.059	1.706
		C	0.329	1.777	0.339	0.558

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	190.00-180.00	-6.0970	-1.4741	-4.6780	-1.3530
T2	180.00-160.00	-6.0916	-1.1093	-4.6954	-1.1515
T3	160.00-140.00	-2.8119	0.0363	-2.3564	-0.3947
T4	140.00-120.00	-0.5513	0.1761	-0.7285	-0.2530
T5	120.00-100.00	-0.5540	0.1769	-0.7303	-0.2530
T6	100.00-80.00	-0.5540	0.1769	-0.7303	-0.2530
T7	80.00-60.00	-0.5526	0.1765	-0.7294	-0.2530
T8	60.00-40.00	-0.5540	0.1769	-0.7303	-0.2530
T9	40.00-20.00	-0.5540	0.1769	-0.7303	-0.2530
T10	20.00-0.00	-0.5540	0.1769	-0.7303	-0.2530

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft / ft / ft	°	ft		ft^2	ft^2	lb
Antel BXA-70063-6CF (Verizon)	A	From Leg	3.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	7.57 8.02	2.21 2.70	17.00 57.60
Antel BXA-70063-6CF (Verizon)	B	From Leg	3.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	7.57 8.02	2.21 2.70	17.00 57.60
Antel BXA-70063-6CF (Verizon)	C	From Leg	3.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	7.57 8.02	2.21 2.70	17.00 57.60
Sector Frame	A	From Leg	0.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	13.60 18.40	13.60 18.40	465.00 600.00
Sector Frame	B	From Leg	0.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	13.60 18.40	13.60 18.40	465.00 600.00
Sector Frame	C	From Leg	0.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	13.60 18.40	13.60 18.40	465.00 600.00
(2) Andrew HBXX-6517DS-A2M (Verizon)	A	From Leg	3.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	8.53 9.00	5.24 5.74	43.00 93.50
(2) Andrew	B	From Leg	3.00	0.0000	190.00	No Ice	8.53	5.24	43.00

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 lb
HBXX-6517DS-A2M			0.00			1/2" Ice	9.00	5.74	93.50
(Verizon)			0.00						
(2) Andrew	C	From Leg	3.00	0.0000	190.00	No Ice	8.53	5.24	43.00
HBXX-6517DS-A2M			0.00			1/2" Ice	9.00	5.74	93.50
(Verizon)			0.00						
Andrew LNX-8513DS-VTM	A	From Leg	3.00	0.0000	190.00	No Ice	6.04	5.46	26.50
(Verizon)			0.00			1/2" Ice	6.50	5.93	67.70
			0.00						
Andrew LNX-8513DS-VTM	B	From Leg	3.00	0.0000	190.00	No Ice	6.04	5.46	26.50
(Verizon)			0.00			1/2" Ice	6.50	5.93	67.70
			0.00						
Andrew LNX-8513DS-VTM	C	From Leg	3.00	0.0000	190.00	No Ice	6.04	5.46	26.50
(Verizon)			0.00			1/2" Ice	6.50	5.93	67.70
			0.00						
Alcatel Lucent	A	From Leg	3.00	0.0000	190.00	No Ice	1.88	1.24	44.00
RRH2x60-AWS			0.00			1/2" Ice	2.03	1.37	60.00
(Verizon)			0.00						
Alcatel Lucent	B	From Leg	3.00	0.0000	190.00	No Ice	1.88	1.24	44.00
RRH2x60-AWS			0.00			1/2" Ice	2.03	1.37	60.00
(Verizon)			0.00						
Alcatel Lucent	C	From Leg	3.00	0.0000	190.00	No Ice	1.88	1.24	44.00
RRH2x60-AWS			0.00			1/2" Ice	2.03	1.37	60.00
(Verizon)			0.00						
Lightning Rod 5/8x4'	C	None		0.0000	190.00	No Ice	0.25	0.25	31.00
						1/2" Ice	0.66	0.66	33.82
Sector Frame	A	From Leg	0.00	0.0000	180.00	No Ice	13.60	13.60	465.00
			0.00			1/2" Ice	18.40	18.40	600.00
			0.00						
Sector Frame	B	From Leg	0.00	0.0000	180.00	No Ice	13.60	13.60	465.00
			0.00			1/2" Ice	18.40	18.40	600.00
			0.00						
Sector Frame	C	From Leg	0.00	0.0000	180.00	No Ice	13.60	13.60	465.00
			0.00			1/2" Ice	18.40	18.40	600.00
			0.00						
Sector Frame	A	From Leg	0.00	0.0000	150.00	No Ice	13.60	13.60	465.00
			0.00			1/2" Ice	18.40	18.40	600.00
			0.00						
Sector Frame	B	From Leg	0.00	0.0000	150.00	No Ice	13.60	13.60	465.00
			0.00			1/2" Ice	18.40	18.40	600.00
			0.00						
Sector Frame	C	From Leg	0.00	0.0000	150.00	No Ice	13.60	13.60	465.00
			0.00			1/2" Ice	18.40	18.40	600.00
			0.00						
(2) Powerwave	A	From Leg	3.00	0.0000	150.00	No Ice	5.56	2.05	41.00
P90-14-XLH-RR			0.00			1/2" Ice	5.89	2.38	76.10
(AT&T Mobility)			0.00						
(2) Powerwave	B	From Leg	3.00	0.0000	150.00	No Ice	5.56	2.05	41.00
P90-14-XLH-RR			0.00			1/2" Ice	5.89	2.38	76.10
(AT&T Mobility)			0.00						
(2) Powerwave	C	From Leg	3.00	0.0000	150.00	No Ice	5.56	2.05	41.00
P90-14-XLH-RR			0.00			1/2" Ice	5.89	2.38	76.10
(AT&T Mobility)			0.00						
KMW	A	From Leg	3.00	0.0000	150.00	No Ice	11.31	6.80	59.50
AM-X-CD-17-65-00T-RET			0.00			1/2" Ice	11.93	7.48	120.90
(AT&T Mobility)			0.00						
KMW	B	From Leg	3.00	0.0000	150.00	No Ice	11.31	6.80	59.50
AM-X-CD-17-65-00T-RET			0.00			1/2" Ice	11.93	7.48	120.90

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 lb
(AT&T Mobility)			0.00						
KMW	C	From Leg	3.00	0.0000	150.00	No Ice	11.31	6.80	59.50
AM-X-CD-17-65-00T-RET			0.00			1/2" Ice	11.93	7.48	120.90
(AT&T Mobility)			0.00						
(2) Ericsson RRUS-11	A	From Leg	3.00	0.0000	150.00	No Ice	2.94	1.25	50.00
(AT&T Mobility)			0.00			1/2" Ice	3.12	1.37	69.30
			0.00						
(2) Ericsson RRUS-11	B	From Leg	3.00	0.0000	150.00	No Ice	2.94	1.25	50.00
(AT&T Mobility)			0.00			1/2" Ice	3.12	1.37	69.30
			0.00						
(2) Ericsson RRUS-11	C	From Leg	3.00	0.0000	150.00	No Ice	2.94	1.25	50.00
(AT&T Mobility)			0.00			1/2" Ice	3.12	1.37	69.30
			0.00						
(2) Powerwave	A	From Leg	3.00	0.0000	150.00	No Ice	0.92	0.75	22.00
TT08-DB111-001			0.00			1/2" Ice	1.03	0.85	29.60
(AT&T Mobility)			0.00						
(2) Powerwave	B	From Leg	3.00	0.0000	150.00	No Ice	0.92	0.75	22.00
TT08-DB111-001			0.00			1/2" Ice	1.03	0.85	29.60
(AT&T Mobility)			0.00						
(2) Powerwave	C	From Leg	3.00	0.0000	150.00	No Ice	0.92	0.75	22.00
TT08-DB111-001			0.00			1/2" Ice	1.03	0.85	29.60
(AT&T Mobility)			0.00						
Raycap DC6-48-60-18-8F	A	From Leg	3.00	0.0000	150.00	No Ice	2.57	2.57	31.80
(AT&T Mobility)			0.00			1/2" Ice	2.74	2.74	54.40
			0.00						
Sector Frame	A	From Leg	0.00	0.0000	165.50	No Ice	13.60	7.00	465.00
			0.00			1/2" Ice	18.40	9.00	600.00
			0.00						
Sector Frame	B	From Leg	0.00	0.0000	165.50	No Ice	13.60	7.00	465.00
			0.00			1/2" Ice	18.40	9.00	600.00
			0.00						
Sector Frame	C	From Leg	0.00	0.0000	165.50	No Ice	13.60	7.00	465.00
			0.00			1/2" Ice	18.40	9.00	600.00
			0.00						
RFS APXV9ERR18-C-A20	A	From Leg	3.00	0.0000	165.50	No Ice	8.02	3.35	62.00
(Sprint)			0.00			1/2" Ice	8.48	3.81	114.00
			0.00						
Alcatel Lucent 4X40W RRH	A	From Leg	3.00	0.0000	165.50	No Ice	1.20	2.24	60.00
(Sprint)			0.00			1/2" Ice	2.50	2.42	83.10
			0.00						
Alcatel Lucent 2X50W RRH	A	From Leg	3.00	0.0000	165.50	No Ice	1.10	1.36	60.00
(Sprint)			0.00			1/2" Ice	2.22	1.50	78.30
			0.00						
RFS APXVSPP18-C-A20	B	From Leg	3.00	0.0000	165.50	No Ice	8.02	3.35	62.00
(Sprint)			0.00			1/2" Ice	8.48	3.81	114.00
			0.00						
Alcatel Lucent 4X40W RRH	B	From Leg	3.00	0.0000	165.50	No Ice	1.20	2.24	60.00
(Sprint)			0.00			1/2" Ice	2.50	2.42	83.10
			0.00						
Alcatel Lucent 2X50W RRH	B	From Leg	3.00	0.0000	165.50	No Ice	1.10	1.36	60.00
(Sprint)			0.00			1/2" Ice	2.22	1.50	78.30
			0.00						
RFS APXVSPP18-C-A20	C	From Leg	3.00	0.0000	165.50	No Ice	8.02	3.35	62.00
(Sprint)			0.00			1/2" Ice	8.48	3.81	114.00
			0.00						
Alcatel Lucent 4X40W RRH	C	From Leg	3.00	0.0000	165.50	No Ice	1.20	2.24	60.00
(Sprint)			0.00			1/2" Ice	2.50	2.42	83.10

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 lb
			0.00						
Alcatel Lucent 2X50W RRH (Sprint)	C	From Leg	3.00 0.00 0.00	0.0000	165.50	No Ice 1/2" Ice	1.10 2.22	1.36 1.50	60.00 78.30
Junction Box (Verizon)	C	From Leg	3.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	1.88 2.03	1.24 1.37	44.00 60.00

Tower Pressures - No Ice

$G_H = 1.117$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1 190.00-180.00	185.00	1.636	30	37.396	A	0.854	21.679	4.792	21.27	0.000	0.000
					B	1.698	6.150		61.06	0.000	0.000
					C	1.698	6.150		61.06	0.000	0.000
T2 180.00-160.00	170.00	1.597	30	74.792	A	1.435	43.382	9.583	21.38	0.000	0.000
					B	2.853	12.348		63.05	0.000	0.000
					C	2.760	14.389		55.89	0.000	0.000
T3 160.00-140.00	150.00	1.541	29	74.792	A	1.503	43.382	9.583	21.35	0.000	0.000
					B	2.434	23.935		36.34	0.000	0.000
					C	2.634	19.769		42.78	0.000	0.000
T4 140.00-120.00	130.00	1.48	27	74.792	A	1.503	43.382	9.583	21.35	0.000	0.000
					B	1.880	35.522		25.62	0.000	0.000
					C	2.634	19.769		42.78	0.000	0.000
T5 120.00-100.00	110.00	1.411	26	74.792	A	1.435	43.382	9.583	21.38	0.000	0.000
					B	1.794	35.522		25.68	0.000	0.000
					C	2.514	19.769		43.01	0.000	0.000
T6 100.00-80.00	90.00	1.332	25	74.792	A	1.435	43.382	9.583	21.38	0.000	0.000
					B	1.794	35.522		25.68	0.000	0.000
					C	2.514	19.769		43.01	0.000	0.000
T7 80.00-60.00	70.00	1.24	23	74.792	A	1.469	43.382	9.583	21.37	0.000	0.000
					B	1.837	35.522		25.65	0.000	0.000
					C	2.574	19.769		42.89	0.000	0.000
T8 60.00-40.00	50.00	1.126	21	74.792	A	1.435	43.382	9.583	21.38	0.000	0.000
					B	1.794	35.522		25.68	0.000	0.000
					C	2.514	19.769		43.01	0.000	0.000
T9 40.00-20.00	30.00	1	18	74.792	A	1.435	43.382	9.583	21.38	0.000	0.000
					B	1.794	35.522		25.68	0.000	0.000
					C	2.514	19.769		43.01	0.000	0.000
T10 20.00-0.00	10.00	1	18	74.792	A	1.435	43.382	9.583	21.38	0.000	0.000
					B	1.794	35.522		25.68	0.000	0.000
					C	2.514	19.769		43.01	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.117$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 190.00-180.00	185.00	1.636	23	0.5000	38.229	A	17.760	15.470	6.458	19.44	0.000	0.000
						B	1.698	11.076		50.56	0.000	0.000
						C	1.698	11.076		50.56	0.000	0.000
T2 180.00-160.00	170.00	1.597	22	0.5000	76.458	A	35.400	30.908	12.917	19.48	0.000	0.000
						B	2.853	22.006		51.96	0.000	0.000
						C	5.037	22.686		46.59	0.000	0.000
T3 160.00-140.00	150.00	1.541	21	0.5000	76.458	A	35.430	30.908	12.917	19.47	0.000	0.000
						B	15.978	24.905		31.59	0.000	0.000
						C	10.904	24.479		36.51	0.000	0.000
T4 140.00-120.00	130.00	1.48	21	0.5000	76.458	A	35.430	30.908	12.917	19.47	0.000	0.000
						B	28.968	27.803		22.75	0.000	0.000
						C	10.904	24.479		36.51	0.000	0.000
T5 120.00-100.00	110.00	1.411	20	0.5000	76.458	A	35.400	30.908	12.917	19.48	0.000	0.000
						B	28.913	27.803		22.77	0.000	0.000
						C	10.795	24.479		36.62	0.000	0.000
T6 100.00-80.00	90.00	1.332	18	0.5000	76.458	A	35.400	30.908	12.917	19.48	0.000	0.000
						B	28.913	27.803		22.77	0.000	0.000
						C	10.795	24.479		36.62	0.000	0.000
T7 80.00-60.00	70.00	1.24	17	0.5000	76.458	A	35.415	30.908	12.917	19.48	0.000	0.000
						B	28.941	27.803		22.76	0.000	0.000
						C	10.850	24.479		36.56	0.000	0.000
T8 60.00-40.00	50.00	1.126	16	0.5000	76.458	A	35.400	30.908	12.917	19.48	0.000	0.000
						B	28.913	27.803		22.77	0.000	0.000
						C	10.795	24.479		36.62	0.000	0.000
T9 40.00-20.00	30.00	1	14	0.5000	76.458	A	35.400	30.908	12.917	19.48	0.000	0.000
						B	28.913	27.803		22.77	0.000	0.000
						C	10.795	24.479		36.62	0.000	0.000
T10 20.00-0.00	10.00	1	14	0.5000	76.458	A	35.400	30.908	12.917	19.48	0.000	0.000
						B	28.913	27.803		22.77	0.000	0.000
						C	10.795	24.479		36.62	0.000	0.000

Tower Pressure - Service

$G_H = 1.117$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 190.00-180.00	185.00	1.636	10	37.396	A	0.854	21.679	4.792	21.27	0.000	0.000
					B	1.698	6.150		61.06	0.000	0.000
					C	1.698	6.150		61.06	0.000	0.000
T2 180.00-160.00	170.00	1.597	10	74.792	A	1.435	43.382	9.583	21.38	0.000	0.000
					B	2.853	12.348		63.05	0.000	0.000
					C	2.760	14.389		55.89	0.000	0.000
T3 160.00-140.00	150.00	1.541	10	74.792	A	1.503	43.382	9.583	21.35	0.000	0.000
					B	2.434	23.935		36.34	0.000	0.000
					C	2.634	19.769		42.78	0.000	0.000
T4 140.00-120.00	130.00	1.48	9	74.792	A	1.503	43.382	9.583	21.35	0.000	0.000
					B	1.880	35.522		25.62	0.000	0.000
					C	2.634	19.769		42.78	0.000	0.000
T5	110.00	1.411	9	74.792	A	1.435	43.382	9.583	21.38	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
120.00-100.00					B	1.794	35.522		25.68	0.000	0.000
					C	2.514	19.769		43.01	0.000	0.000
T6	90.00	1.332	9	74.792	A	1.435	43.382	9.583	21.38	0.000	0.000
100.00-80.00					B	1.794	35.522		25.68	0.000	0.000
					C	2.514	19.769		43.01	0.000	0.000
T7 80.00-60.00	70.00	1.24	8	74.792	A	1.469	43.382	9.583	21.37	0.000	0.000
					B	1.837	35.522		25.65	0.000	0.000
					C	2.574	19.769		42.89	0.000	0.000
T8 60.00-40.00	50.00	1.126	7	74.792	A	1.435	43.382	9.583	21.38	0.000	0.000
					B	1.794	35.522		25.68	0.000	0.000
					C	2.514	19.769		43.01	0.000	0.000
T9 40.00-20.00	30.00	1	6	74.792	A	1.435	43.382	9.583	21.38	0.000	0.000
					B	1.794	35.522		25.68	0.000	0.000
					C	2.514	19.769		43.01	0.000	0.000
T10 20.00-0.00	10.00	1	6	74.792	A	1.435	43.382	9.583	21.38	0.000	0.000
					B	1.794	35.522		25.68	0.000	0.000
					C	2.514	19.769		43.01	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	115.80	340.32	A	0.603	1.802	0.755	1	1	17.225	1049.92	104.99	A
190.00-180.00			B	0.21	2.563	0.592	1	1	5.341			
			C	0.21	2.563	0.592	1	1	5.341			
T2	242.49	658.24	A	0.599	1.804	0.753	1	1	34.107	2031.59	101.58	A
180.00-160.00			B	0.203	2.585	0.591	1	1	10.151			
			C	0.229	2.501	0.597	1	1	11.347			
T3	379.60	680.49	A	0.6	1.804	0.754	1	1	34.200	1964.92	98.25	A
160.00-140.00		TA 242.49	B	0.353	2.166	0.633	1	1	17.594			
			C	0.3	2.297	0.616	1	1	14.807			
T4	488.00	680.49	A	0.6	1.804	0.754	1	1	34.200	1886.21	94.31	A
140.00-120.00		TA 242.49	B	0.5	1.9	0.698	1	1	26.657			
			C	0.3	2.297	0.616	1	1	14.807			
T5	488.00	658.24	A	0.599	1.804	0.753	1	1	34.107	1793.99	89.70	A
120.00-100.00			B	0.499	1.901	0.697	1	1	26.551			
			C	0.298	2.302	0.615	1	1	14.677			
T6	488.00	658.24	A	0.599	1.804	0.753	1	1	34.107	1694.03	84.70	A
100.00-80.00			B	0.499	1.901	0.697	1	1	26.551			
			C	0.298	2.302	0.615	1	1	14.677			
T7	488.00	661.59	A	0.6	1.804	0.753	1	1	34.154	1578.54	78.93	A
80.00-60.00			B	0.5	1.901	0.697	1	1	26.604			
			C	0.299	2.299	0.616	1	1	14.742			
T8	488.00	658.24	A	0.599	1.804	0.753	1	1	34.107	1432.14	71.61	A
60.00-40.00			B	0.499	1.901	0.697	1	1	26.551			
			C	0.298	2.302	0.615	1	1	14.677			
T9	488.00	658.24	A	0.599	1.804	0.753	1	1	34.107	1271.82	63.59	A
40.00-20.00			B	0.499	1.901	0.697	1	1	26.551			
			C	0.298	2.302	0.615	1	1	14.677			
T10	488.00	658.24	A	0.599	1.804	0.753	1	1	34.107	1271.82	63.59	A
20.00-0.00			B	0.499	1.901	0.697	1	1	26.551			
			C	0.298	2.302	0.615	1	1	14.677			
Sum Weight:	4153.89	6797.35								15974.97		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	115.80	340.32	A	0.603	1.802	0.755	0.8	1	17.054	1039.51	103.95	A
190.00-180.00			B	0.21	2.563	0.592	0.8	1	5.002			
			C	0.21	2.563	0.592	0.8	1	5.002			
T2	242.49	658.24	A	0.599	1.804	0.753	0.8	1	33.820	2014.49	100.72	A
180.00-160.00			B	0.203	2.585	0.591	0.8	1	9.581			
			C	0.229	2.501	0.597	0.8	1	10.795			
T3	379.60	680.49	A	0.6	1.804	0.754	0.8	1	33.899	1947.65	97.38	A
160.00-140.00		TA 242.49	B	0.353	2.166	0.633	0.8	1	17.107			
			C	0.3	2.297	0.616	0.8	1	14.280			
T4	488.00	680.49	A	0.6	1.804	0.754	0.8	1	33.899	1869.62	93.48	A
140.00-120.00		TA 242.49	B	0.5	1.9	0.698	0.8	1	26.281			
			C	0.3	2.297	0.616	0.8	1	14.280			
T5	488.00	658.24	A	0.599	1.804	0.753	0.8	1	33.820	1778.89	88.94	A
120.00-100.00			B	0.499	1.901	0.697	0.8	1	26.192			
			C	0.298	2.302	0.615	0.8	1	14.174			
T6	488.00	658.24	A	0.599	1.804	0.753	0.8	1	33.820	1679.77	83.99	A
100.00-80.00			B	0.499	1.901	0.697	0.8	1	26.192			
			C	0.298	2.302	0.615	0.8	1	14.174			
T7	488.00	661.59	A	0.6	1.804	0.753	0.8	1	33.860	1564.96	78.25	A
80.00-60.00			B	0.5	1.901	0.697	0.8	1	26.237			
			C	0.299	2.299	0.616	0.8	1	14.227			
T8	488.00	658.24	A	0.599	1.804	0.753	0.8	1	33.820	1420.09	71.00	A
60.00-40.00			B	0.499	1.901	0.697	0.8	1	26.192			
			C	0.298	2.302	0.615	0.8	1	14.174			
T9	488.00	658.24	A	0.599	1.804	0.753	0.8	1	33.820	1261.12	63.06	A
40.00-20.00			B	0.499	1.901	0.697	0.8	1	26.192			
			C	0.298	2.302	0.615	0.8	1	14.174			
T10	488.00	658.24	A	0.599	1.804	0.753	0.8	1	33.820	1261.12	63.06	A
20.00-0.00			B	0.499	1.901	0.697	0.8	1	26.192			
			C	0.298	2.302	0.615	0.8	1	14.174			
Sum Weight:	4153.89	6797.35								15837.22		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	115.80	340.32	A	0.603	1.802	0.755	0.85	1	17.097	1042.11	104.21	A
190.00-180.00			B	0.21	2.563	0.592	0.85	1	5.087			
			C	0.21	2.563	0.592	0.85	1	5.087			
T2	242.49	658.24	A	0.599	1.804	0.753	0.85	1	33.892	2018.77	100.94	A
180.00-160.00			B	0.203	2.585	0.591	0.85	1	9.723			
			C	0.229	2.501	0.597	0.85	1	10.933			
T3	379.60	680.49	A	0.6	1.804	0.754	0.85	1	33.974	1951.97	97.60	A
160.00-140.00		TA 242.49	B	0.353	2.166	0.633	0.85	1	17.229			
			C	0.3	2.297	0.616	0.85	1	14.411			
T4	488.00	680.49	A	0.6	1.804	0.754	0.85	1	33.974	1873.77	93.69	A
140.00-120.00		TA 242.49	B	0.5	1.9	0.698	0.85	1	26.375			
			C	0.3	2.297	0.616	0.85	1	14.411			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T5	488.00	658.24	A	0.599	1.804	0.753	0.85	1	33.892	1782.67	89.13	A
120.00-100.00			B	0.499	1.901	0.697	0.85	1	26.282			
			C	0.298	2.302	0.615	0.85	1	14.300			
T6	488.00	658.24	A	0.599	1.804	0.753	0.85	1	33.892	1683.33	84.17	A
100.00-80.00			B	0.499	1.901	0.697	0.85	1	26.282			
			C	0.298	2.302	0.615	0.85	1	14.300			
T7	488.00	661.59	A	0.6	1.804	0.753	0.85	1	33.933	1568.36	78.42	A
80.00-60.00			B	0.5	1.901	0.697	0.85	1	26.329			
			C	0.299	2.299	0.616	0.85	1	14.356			
T8	488.00	658.24	A	0.599	1.804	0.753	0.85	1	33.892	1423.10	71.15	A
60.00-40.00			B	0.499	1.901	0.697	0.85	1	26.282			
			C	0.298	2.302	0.615	0.85	1	14.300			
T9	488.00	658.24	A	0.599	1.804	0.753	0.85	1	33.892	1263.79	63.19	A
40.00-20.00			B	0.499	1.901	0.697	0.85	1	26.282			
			C	0.298	2.302	0.615	0.85	1	14.300			
T10	488.00	658.24	A	0.599	1.804	0.753	0.85	1	33.892	1263.79	63.19	A
20.00-0.00			B	0.499	1.901	0.697	0.85	1	26.282			
			C	0.298	2.302	0.615	0.85	1	14.300			
Sum Weight:	4153.89	6797.35								15871.66		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	368.12	526.95	A	0.869	1.884	0.955	1	1	32.539	1554.44	155.44	A
190.00-180.00			B	0.334	2.209	0.627	1	1	8.642			
			C	0.334	2.209	0.627	1	1	8.642			
T2	773.77	1013.22	A	0.867	1.881	0.954	1	1	64.873	3021.20	151.06	A
180.00-160.00			B	0.325	2.231	0.624	1	1	16.583			
			C	0.363	2.143	0.637	1	1	19.489			
T3	1264.36	1039.55	A	0.868	1.882	0.954	1	1	64.914	2917.64	145.88	A
160.00-140.00		TA 376.86	B	0.535	1.859	0.716	1	1	33.805			
			C	0.463	1.953	0.679	1	1	27.531			
T4	1656.03	1039.55	A	0.868	1.882	0.954	1	1	64.914	2800.76	140.04	A
140.00-120.00		TA 376.86	B	0.743	1.785	0.851	1	1	52.633			
			C	0.463	1.953	0.679	1	1	27.531			
T5	1656.03	1013.22	A	0.867	1.881	0.954	1	1	64.873	2667.86	133.39	A
120.00-100.00			B	0.742	1.784	0.851	1	1	52.564			
			C	0.461	1.955	0.679	1	1	27.405			
T6	1656.03	1013.22	A	0.867	1.881	0.954	1	1	64.873	2519.20	125.96	A
100.00-80.00			B	0.742	1.784	0.851	1	1	52.564			
			C	0.461	1.955	0.679	1	1	27.405			
T7	1656.03	1018.61	A	0.867	1.881	0.954	1	1	64.893	2345.69	117.28	A
80.00-60.00			B	0.742	1.785	0.851	1	1	52.598			
			C	0.462	1.954	0.679	1	1	27.468			
T8	1656.03	1013.22	A	0.867	1.881	0.954	1	1	64.873	2129.75	106.49	A
60.00-40.00			B	0.742	1.784	0.851	1	1	52.564			
			C	0.461	1.955	0.679	1	1	27.405			
T9	1656.03	1013.22	A	0.867	1.881	0.954	1	1	64.873	1891.34	94.57	A
40.00-20.00			B	0.742	1.784	0.851	1	1	52.564			
			C	0.461	1.955	0.679	1	1	27.405			
T10	1656.03	1013.22	A	0.867	1.881	0.954	1	1	64.873	1891.34	94.57	A
20.00-0.00			B	0.742	1.784	0.851	1	1	52.564			
			C	0.461	1.955	0.679	1	1	27.405			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
Sum Weight:	13998.45	10457.71								23739.23		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	368.12	526.95	A	0.869	1.884	0.955	0.8	1	28.987	1384.76	138.48	A
190.00-180.00			B	0.334	2.209	0.627	0.8	1	8.302			
			C	0.334	2.209	0.627	0.8	1	8.302			
T2	773.77	1013.22	A	0.867	1.881	0.954	0.8	1	57.793	2691.48	134.57	A
180.00-160.00			B	0.325	2.231	0.624	0.8	1	16.012			
			C	0.363	2.143	0.637	0.8	1	18.482			
T3	1264.36	1039.55	A	0.868	1.882	0.954	0.8	1	57.828	2599.15	129.96	A
160.00-140.00		TA 376.86	B	0.535	1.859	0.716	0.8	1	30.610			
			C	0.463	1.953	0.679	0.8	1	25.350			
T4	1656.03	1039.55	A	0.868	1.882	0.954	0.8	1	57.828	2495.03	124.75	A
140.00-120.00		TA 376.86	B	0.743	1.785	0.851	0.8	1	46.840			
			C	0.463	1.953	0.679	0.8	1	25.350			
T5	1656.03	1013.22	A	0.867	1.881	0.954	0.8	1	57.793	2376.70	118.84	A
120.00-100.00			B	0.742	1.784	0.851	0.8	1	46.781			
			C	0.461	1.955	0.679	0.8	1	25.246			
T6	1656.03	1013.22	A	0.867	1.881	0.954	0.8	1	57.793	2244.27	112.21	A
100.00-80.00			B	0.742	1.784	0.851	0.8	1	46.781			
			C	0.461	1.955	0.679	0.8	1	25.246			
T7	1656.03	1018.61	A	0.867	1.881	0.954	0.8	1	57.810	2089.66	104.48	A
80.00-60.00			B	0.742	1.785	0.851	0.8	1	46.810			
			C	0.462	1.954	0.679	0.8	1	25.298			
T8	1656.03	1013.22	A	0.867	1.881	0.954	0.8	1	57.793	1897.32	94.87	A
60.00-40.00			B	0.742	1.784	0.851	0.8	1	46.781			
			C	0.461	1.955	0.679	0.8	1	25.246			
T9	1656.03	1013.22	A	0.867	1.881	0.954	0.8	1	57.793	1684.93	84.25	A
40.00-20.00			B	0.742	1.784	0.851	0.8	1	46.781			
			C	0.461	1.955	0.679	0.8	1	25.246			
T10	1656.03	1013.22	A	0.867	1.881	0.954	0.8	1	57.793	1684.93	84.25	A
20.00-0.00			B	0.742	1.784	0.851	0.8	1	46.781			
			C	0.461	1.955	0.679	0.8	1	25.246			
Sum Weight:	13998.45	10457.71								21148.23		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	368.12	526.95	A	0.869	1.884	0.955	0.85	1	29.875	1427.18	142.72	A
190.00-180.00			B	0.334	2.209	0.627	0.85	1	8.387			
			C	0.334	2.209	0.627	0.85	1	8.387			
T2	773.77	1013.22	A	0.867	1.881	0.954	0.85	1	59.563	2773.91	138.70	A
180.00-160.00			B	0.325	2.231	0.624	0.85	1	16.155			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
			C	0.363	2.143	0.637	0.85	1	18.733			
T3	1264.36	1039.55	A	0.868	1.882	0.954	0.85	1	59.599	2678.77	133.94	A
160.00-140.00		TA 376.86	B	0.535	1.859	0.716	0.85	1	31.409			
			C	0.463	1.953	0.679	0.85	1	25.895			
T4	1656.03	1039.55	A	0.868	1.882	0.954	0.85	1	59.599	2571.46	128.57	A
140.00-120.00		TA 376.86	B	0.743	1.785	0.851	0.85	1	48.288			
			C	0.463	1.953	0.679	0.85	1	25.895			
T5	1656.03	1013.22	A	0.867	1.881	0.954	0.85	1	59.563	2449.49	122.47	A
120.00-100.00			B	0.742	1.784	0.851	0.85	1	48.227			
			C	0.461	1.955	0.679	0.85	1	25.786			
T6	1656.03	1013.22	A	0.867	1.881	0.954	0.85	1	59.563	2313.00	115.65	A
100.00-80.00			B	0.742	1.784	0.851	0.85	1	48.227			
			C	0.461	1.955	0.679	0.85	1	25.786			
T7	1656.03	1018.61	A	0.867	1.881	0.954	0.85	1	59.581	2153.67	107.68	A
80.00-60.00			B	0.742	1.785	0.851	0.85	1	48.257			
			C	0.462	1.954	0.679	0.85	1	25.840			
T8	1656.03	1013.22	A	0.867	1.881	0.954	0.85	1	59.563	1955.43	97.77	A
60.00-40.00			B	0.742	1.784	0.851	0.85	1	48.227			
			C	0.461	1.955	0.679	0.85	1	25.786			
T9	1656.03	1013.22	A	0.867	1.881	0.954	0.85	1	59.563	1736.53	86.83	A
40.00-20.00			B	0.742	1.784	0.851	0.85	1	48.227			
			C	0.461	1.955	0.679	0.85	1	25.786			
T10	1656.03	1013.22	A	0.867	1.881	0.954	0.85	1	59.563	1736.53	86.83	A
20.00-0.00			B	0.742	1.784	0.851	0.85	1	48.227			
			C	0.461	1.955	0.679	0.85	1	25.786			
Sum Weight:	13998.45	10457.71								21795.98		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	115.80	340.32	A	0.603	1.802	0.755	1	1	17.225	363.29	36.33	A
190.00-180.00			B	0.21	2.563	0.592	1	1	5.341			
			C	0.21	2.563	0.592	1	1	5.341			
T2	242.49	658.24	A	0.599	1.804	0.753	1	1	34.107	702.97	35.15	A
180.00-160.00			B	0.203	2.585	0.591	1	1	10.151			
			C	0.229	2.501	0.597	1	1	11.347			
T3	379.60	680.49	A	0.6	1.804	0.754	1	1	34.200	679.90	34.00	A
160.00-140.00		TA 242.49	B	0.353	2.166	0.633	1	1	17.594			
			C	0.3	2.297	0.616	1	1	14.807			
T4	488.00	680.49	A	0.6	1.804	0.754	1	1	34.200	652.67	32.63	A
140.00-120.00		TA 242.49	B	0.5	1.9	0.698	1	1	26.657			
			C	0.3	2.297	0.616	1	1	14.807			
T5	488.00	658.24	A	0.599	1.804	0.753	1	1	34.107	620.76	31.04	A
120.00-100.00			B	0.499	1.901	0.697	1	1	26.551			
			C	0.298	2.302	0.615	1	1	14.677			
T6	488.00	658.24	A	0.599	1.804	0.753	1	1	34.107	586.17	29.31	A
100.00-80.00			B	0.499	1.901	0.697	1	1	26.551			
			C	0.298	2.302	0.615	1	1	14.677			
T7	488.00	661.59	A	0.6	1.804	0.753	1	1	34.154	546.21	27.31	A
80.00-60.00			B	0.5	1.901	0.697	1	1	26.604			
			C	0.299	2.299	0.616	1	1	14.742			
T8	488.00	658.24	A	0.599	1.804	0.753	1	1	34.107	495.55	24.78	A
60.00-40.00			B	0.499	1.901	0.697	1	1	26.551			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
			C	0.298	2.302	0.615	1	1	14.677			
T9	488.00	658.24	A	0.599	1.804	0.753	1	1	34.107	440.08	22.00	A
40.00-20.00			B	0.499	1.901	0.697	1	1	26.551			
			C	0.298	2.302	0.615	1	1	14.677			
T10	488.00	658.24	A	0.599	1.804	0.753	1	1	34.107	440.08	22.00	A
20.00-0.00			B	0.499	1.901	0.697	1	1	26.551			
			C	0.298	2.302	0.615	1	1	14.677			
Sum Weight:	4153.89	6797.35								5527.67		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	115.80	340.32	A	0.603	1.802	0.755	0.8	1	17.054	359.69	35.97	A
190.00-180.00			B	0.21	2.563	0.592	0.8	1	5.002			
			C	0.21	2.563	0.592	0.8	1	5.002			
T2	242.49	658.24	A	0.599	1.804	0.753	0.8	1	33.820	697.06	34.85	A
180.00-160.00			B	0.203	2.585	0.591	0.8	1	9.581			
			C	0.229	2.501	0.597	0.8	1	10.795			
T3	379.60	680.49	A	0.6	1.804	0.754	0.8	1	33.899	673.93	33.70	A
160.00-140.00		TA 242.49	B	0.353	2.166	0.633	0.8	1	17.107			
			C	0.3	2.297	0.616	0.8	1	14.280			
T4	488.00	680.49	A	0.6	1.804	0.754	0.8	1	33.899	646.93	32.35	A
140.00-120.00		TA 242.49	B	0.5	1.9	0.698	0.8	1	26.281			
			C	0.3	2.297	0.616	0.8	1	14.280			
T5	488.00	658.24	A	0.599	1.804	0.753	0.8	1	33.820	615.53	30.78	A
120.00-100.00			B	0.499	1.901	0.697	0.8	1	26.192			
			C	0.298	2.302	0.615	0.8	1	14.174			
T6	488.00	658.24	A	0.599	1.804	0.753	0.8	1	33.820	581.24	29.06	A
100.00-80.00			B	0.499	1.901	0.697	0.8	1	26.192			
			C	0.298	2.302	0.615	0.8	1	14.174			
T7	488.00	661.59	A	0.6	1.804	0.753	0.8	1	33.860	541.51	27.08	A
80.00-60.00			B	0.5	1.901	0.697	0.8	1	26.237			
			C	0.299	2.299	0.616	0.8	1	14.227			
T8	488.00	658.24	A	0.599	1.804	0.753	0.8	1	33.820	491.38	24.57	A
60.00-40.00			B	0.499	1.901	0.697	0.8	1	26.192			
			C	0.298	2.302	0.615	0.8	1	14.174			
T9	488.00	658.24	A	0.599	1.804	0.753	0.8	1	33.820	436.37	21.82	A
40.00-20.00			B	0.499	1.901	0.697	0.8	1	26.192			
			C	0.298	2.302	0.615	0.8	1	14.174			
T10	488.00	658.24	A	0.599	1.804	0.753	0.8	1	33.820	436.37	21.82	A
20.00-0.00			B	0.499	1.901	0.697	0.8	1	26.192			
			C	0.298	2.302	0.615	0.8	1	14.174			
Sum Weight:	4153.89	6797.35								5480.01		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	115.80	340.32	A	0.603	1.802	0.755	0.85	1	17.097	360.59	36.06	A
190.00-180.00			B	0.21	2.563	0.592	0.85	1	5.087			
			C	0.21	2.563	0.592	0.85	1	5.087			
T2	242.49	658.24	A	0.599	1.804	0.753	0.85	1	33.892	698.54	34.93	A
180.00-160.00			B	0.203	2.585	0.591	0.85	1	9.723			
			C	0.229	2.501	0.597	0.85	1	10.933			
T3	379.60	680.49	A	0.6	1.804	0.754	0.85	1	33.974	675.42	33.77	A
160.00-140.00		TA 242.49	B	0.353	2.166	0.633	0.85	1	17.229			
			C	0.3	2.297	0.616	0.85	1	14.411			
T4	488.00	680.49	A	0.6	1.804	0.754	0.85	1	33.974	648.36	32.42	A
140.00-120.00		TA 242.49	B	0.5	1.9	0.698	0.85	1	26.375			
			C	0.3	2.297	0.616	0.85	1	14.411			
T5	488.00	658.24	A	0.599	1.804	0.753	0.85	1	33.892	616.84	30.84	A
120.00-100.00			B	0.499	1.901	0.697	0.85	1	26.282			
			C	0.298	2.302	0.615	0.85	1	14.300			
T6	488.00	658.24	A	0.599	1.804	0.753	0.85	1	33.892	582.47	29.12	A
100.00-80.00			B	0.499	1.901	0.697	0.85	1	26.282			
			C	0.298	2.302	0.615	0.85	1	14.300			
T7	488.00	661.59	A	0.6	1.804	0.753	0.85	1	33.933	542.68	27.13	A
80.00-60.00			B	0.5	1.901	0.697	0.85	1	26.329			
			C	0.299	2.299	0.616	0.85	1	14.356			
T8	488.00	658.24	A	0.599	1.804	0.753	0.85	1	33.892	492.42	24.62	A
60.00-40.00			B	0.499	1.901	0.697	0.85	1	26.282			
			C	0.298	2.302	0.615	0.85	1	14.300			
T9	488.00	658.24	A	0.599	1.804	0.753	0.85	1	33.892	437.30	21.86	A
40.00-20.00			B	0.499	1.901	0.697	0.85	1	26.282			
			C	0.298	2.302	0.615	0.85	1	14.300			
T10	488.00	658.24	A	0.599	1.804	0.753	0.85	1	33.892	437.30	21.86	A
20.00-0.00			B	0.499	1.901	0.697	0.85	1	26.282			
			C	0.298	2.302	0.615	0.85	1	14.300			
Sum Weight:	4153.89	6797.35								5491.92		

Discrete Appurtenance Pressures - No Ice $G_H = 1.117$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft²	C_AA_C Side ft²
Torque Arm Face C	180.0000	0.00	0.00	2.53	157.41	1.563	29	4.25	6.25
Torque Arm Face B	60.0000	0.00	2.19	-1.26	157.41	1.563	29	4.25	6.25
Torque Arm Face A	300.0000	0.00	-2.19	-1.26	157.41	1.563	29	4.25	6.25
Torque Arm Face C	180.0000	0.00	0.00	2.53	121.37	1.451	27	4.25	6.25
Torque Arm Face B	60.0000	0.00	2.19	-1.26	121.37	1.451	27	4.25	6.25
Torque Arm Face A	300.0000	0.00	-2.19	-1.26	121.37	1.451	27	4.25	6.25
Antel BXA-70063-6CF	0.0000	17.00	0.00	-5.02	190.00	1.649	30	7.57	2.21
Antel BXA-70063-6CF	120.0000	17.00	4.35	2.51	190.00	1.649	30	7.57	2.21
Antel BXA-70063-6CF	240.0000	17.00	-4.35	2.51	190.00	1.649	30	7.57	2.21
Sector Frame	0.0000	465.00	0.00	-2.02	190.00	1.649	30	13.60	13.60
Sector Frame	120.0000	465.00	1.75	1.01	190.00	1.649	30	13.60	13.60
Sector Frame	240.0000	465.00	-1.75	1.01	190.00	1.649	30	13.60	13.60
Andrew HBXX-6517DS-A2M	0.0000	86.00	0.00	-5.02	190.00	1.649	30	17.06	10.48
Andrew HBXX-6517DS-A2M	120.0000	86.00	4.35	2.51	190.00	1.649	30	17.06	10.48
Andrew HBXX-6517DS-A2M	240.0000	86.00	-4.35	2.51	190.00	1.649	30	17.06	10.48
Andrew	0.0000	26.50	0.00	-5.02	190.00	1.649	30	6.04	5.46

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
LNX-8513DS-VTM Andrew	120.0000	26.50	4.35	2.51	190.00	1.649	30	6.04	5.46
LNX-8513DS-VTM Andrew	240.0000	26.50	-4.35	2.51	190.00	1.649	30	6.04	5.46
LNX-8513DS-VTM Alcatel Lucent	0.0000	44.00	0.00	-5.02	190.00	1.649	30	1.88	1.24
RRH2x60-AWS Alcatel Lucent	120.0000	44.00	4.35	2.51	190.00	1.649	30	1.88	1.24
RRH2x60-AWS Alcatel Lucent	240.0000	44.00	-4.35	2.51	190.00	1.649	30	1.88	1.24
RRH2x60-AWS Lightning Rod 5/8x4'	0.0000	31.00	0.00	0.00	190.00	1.649	30	0.25	0.25
Sector Frame	0.0000	465.00	0.00	-2.02	180.00	1.624	30	13.60	13.60
Sector Frame	120.0000	465.00	1.75	1.01	180.00	1.624	30	13.60	13.60
Sector Frame	240.0000	465.00	-1.75	1.01	180.00	1.624	30	13.60	13.60
Sector Frame	0.0000	465.00	0.00	-2.02	150.00	1.541	29	13.60	13.60
Sector Frame	120.0000	465.00	1.75	1.01	150.00	1.541	29	13.60	13.60
Sector Frame	240.0000	465.00	-1.75	1.01	150.00	1.541	29	13.60	13.60
Powerwave P90-14-XLH-RR	0.0000	82.00	0.00	-5.02	150.00	1.541	29	11.12	4.10
Powerwave P90-14-XLH-RR	120.0000	82.00	4.35	2.51	150.00	1.541	29	11.12	4.10
Powerwave P90-14-XLH-RR	240.0000	82.00	-4.35	2.51	150.00	1.541	29	11.12	4.10
KMW AM-X-CD-17-65-00T-RET	0.0000	59.50	0.00	-5.02	150.00	1.541	29	11.31	6.80
KMW AM-X-CD-17-65-00T-RET	120.0000	59.50	4.35	2.51	150.00	1.541	29	11.31	6.80
KMW AM-X-CD-17-65-00T-RET	240.0000	59.50	-4.35	2.51	150.00	1.541	29	11.31	6.80
Ericsson RRUS-11	0.0000	100.00	0.00	-5.02	150.00	1.541	29	5.88	2.50
Ericsson RRUS-11	120.0000	100.00	4.35	2.51	150.00	1.541	29	5.88	2.50
Ericsson RRUS-11	240.0000	100.00	-4.35	2.51	150.00	1.541	29	5.88	2.50
Powerwave TT08-DB111-001	0.0000	44.00	0.00	-5.02	150.00	1.541	29	1.84	1.50
Powerwave TT08-DB111-001	120.0000	44.00	4.35	2.51	150.00	1.541	29	1.84	1.50
Powerwave TT08-DB111-001	240.0000	44.00	-4.35	2.51	150.00	1.541	29	1.84	1.50
Raycap DC6-48-60-18-8F	0.0000	31.80	0.00	-5.02	150.00	1.541	29	2.57	2.57
Sector Frame	0.0000	465.00	0.00	-2.02	165.50	1.585	29	13.60	7.00
Sector Frame	120.0000	465.00	1.75	1.01	165.50	1.585	29	13.60	7.00
Sector Frame	240.0000	465.00	-1.75	1.01	165.50	1.585	29	13.60	7.00
RFS APXV9ERR18-C-A20	0.0000	62.00	0.00	-5.02	165.50	1.585	29	8.02	3.35
Alcatel Lucent 4X40W RRH	0.0000	60.00	0.00	-5.02	165.50	1.585	29	1.20	2.24
Alcatel Lucent 2X50W RRH	0.0000	60.00	0.00	-5.02	165.50	1.585	29	1.10	1.36
RFS APXVSPP18-C-A20	120.0000	62.00	4.35	2.51	165.50	1.585	29	8.02	3.35
Alcatel Lucent 4X40W RRH	120.0000	60.00	4.35	2.51	165.50	1.585	29	1.20	2.24
Alcatel Lucent 2X50W RRH	120.0000	60.00	4.35	2.51	165.50	1.585	29	1.10	1.36
RFS APXVSPP18-C-A20	240.0000	62.00	-4.35	2.51	165.50	1.585	29	8.02	3.35

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
Alcatel Lucent 4X40W RRH	240.0000	60.00	-4.35	2.51	165.50	1.585	29	1.20	2.24
Alcatel Lucent 2X50W RRH	240.0000	60.00	-4.35	2.51	165.50	1.585	29	1.10	1.36
Junction Box	240.0000	44.00	-4.35	2.51	190.00	1.649	30	1.88	1.24
	Sum Weight:	7609.80							

Discrete Appurtenance Pressures - With Ice $G_H = 1.117$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
Torque Arm Face C	180.0000	0.00	0.00	2.53	157.41	1.563	22	4.99	7.22	0.5000
Torque Arm Face B	60.0000	0.00	2.19	-1.26	157.41	1.563	22	4.99	7.22	0.5000
Torque Arm Face A	300.0000	0.00	-2.19	-1.26	157.41	1.563	22	4.99	7.22	0.5000
Torque Arm Face C	180.0000	0.00	0.00	2.53	121.37	1.451	20	4.99	7.22	0.5000
Torque Arm Face B	60.0000	0.00	2.19	-1.26	121.37	1.451	20	4.99	7.22	0.5000
Torque Arm Face A	300.0000	0.00	-2.19	-1.26	121.37	1.451	20	4.99	7.22	0.5000
Antel BXA-70063-6CF	0.0000	57.60	0.00	-5.02	190.00	1.649	23	8.02	2.70	0.5000
Antel BXA-70063-6CF	120.0000	57.60	4.35	2.51	190.00	1.649	23	8.02	2.70	0.5000
Antel BXA-70063-6CF	240.0000	57.60	-4.35	2.51	190.00	1.649	23	8.02	2.70	0.5000
Sector Frame	0.0000	600.00	0.00	-2.02	190.00	1.649	23	18.40	18.40	0.5000
Sector Frame	120.0000	600.00	1.75	1.01	190.00	1.649	23	18.40	18.40	0.5000
Sector Frame	240.0000	600.00	-1.75	1.01	190.00	1.649	23	18.40	18.40	0.5000
Andrew HBXX-6517DS-A2M	0.0000	187.00	0.00	-5.02	190.00	1.649	23	18.00	11.48	0.5000
Andrew HBXX-6517DS-A2M	120.0000	187.00	4.35	2.51	190.00	1.649	23	18.00	11.48	0.5000
Andrew HBXX-6517DS-A2M	240.0000	187.00	-4.35	2.51	190.00	1.649	23	18.00	11.48	0.5000
Andrew LNX-8513DS-VTM	0.0000	67.70	0.00	-5.02	190.00	1.649	23	6.50	5.93	0.5000
Andrew LNX-8513DS-VTM	120.0000	67.70	4.35	2.51	190.00	1.649	23	6.50	5.93	0.5000
Andrew LNX-8513DS-VTM	240.0000	67.70	-4.35	2.51	190.00	1.649	23	6.50	5.93	0.5000
Alcatel Lucent RRH2x60-AWS	0.0000	60.00	0.00	-5.02	190.00	1.649	23	2.03	1.37	0.5000
Alcatel Lucent RRH2x60-AWS	120.0000	60.00	4.35	2.51	190.00	1.649	23	2.03	1.37	0.5000
Alcatel Lucent RRH2x60-AWS	240.0000	60.00	-4.35	2.51	190.00	1.649	23	2.03	1.37	0.5000
Lightning Rod 5/8x4'	0.0000	33.82	0.00	0.00	190.00	1.649	23	0.66	0.66	0.5000
Sector Frame	0.0000	600.00	0.00	-2.02	180.00	1.624	23	18.40	18.40	0.5000
Sector Frame	120.0000	600.00	1.75	1.01	180.00	1.624	23	18.40	18.40	0.5000
Sector Frame	240.0000	600.00	-1.75	1.01	180.00	1.624	23	18.40	18.40	0.5000
Sector Frame	0.0000	600.00	0.00	-2.02	150.00	1.541	21	18.40	18.40	0.5000
Sector Frame	120.0000	600.00	1.75	1.01	150.00	1.541	21	18.40	18.40	0.5000
Sector Frame	240.0000	600.00	-1.75	1.01	150.00	1.541	21	18.40	18.40	0.5000
Powerwave P90-14-XLH-RR	0.0000	152.20	0.00	-5.02	150.00	1.541	21	11.78	4.76	0.5000
Powerwave P90-14-XLH-RR	120.0000	152.20	4.35	2.51	150.00	1.541	21	11.78	4.76	0.5000
Powerwave P90-14-XLH-RR	240.0000	152.20	-4.35	2.51	150.00	1.541	21	11.78	4.76	0.5000
KMW AM-X-CD-17-65-00T-R	0.0000	120.90	0.00	-5.02	150.00	1.541	21	11.93	7.48	0.5000

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_c in
ET KMW AM-X-CD-17-65-00T-R	120.0000	120.90	4.35	2.51	150.00	1.541	21	11.93	7.48	0.5000
ET KMW AM-X-CD-17-65-00T-R	240.0000	120.90	-4.35	2.51	150.00	1.541	21	11.93	7.48	0.5000
ET Ericsson RRUS-11	0.0000	138.60	0.00	-5.02	150.00	1.541	21	6.24	2.74	0.5000
Ericsson RRUS-11	120.0000	138.60	4.35	2.51	150.00	1.541	21	6.24	2.74	0.5000
Ericsson RRUS-11	240.0000	138.60	-4.35	2.51	150.00	1.541	21	6.24	2.74	0.5000
Powerwave TT08-DB111-001	0.0000	59.20	0.00	-5.02	150.00	1.541	21	2.06	1.70	0.5000
Powerwave TT08-DB111-001	120.0000	59.20	4.35	2.51	150.00	1.541	21	2.06	1.70	0.5000
Powerwave TT08-DB111-001	240.0000	59.20	-4.35	2.51	150.00	1.541	21	2.06	1.70	0.5000
Raycap DC6-48-60-18-8F	0.0000	54.40	0.00	-5.02	150.00	1.541	21	2.74	2.74	0.5000
Sector Frame	0.0000	600.00	0.00	-2.02	165.50	1.585	22	18.40	9.00	0.5000
Sector Frame	120.0000	600.00	1.75	1.01	165.50	1.585	22	18.40	9.00	0.5000
Sector Frame	240.0000	600.00	-1.75	1.01	165.50	1.585	22	18.40	9.00	0.5000
RFS APXV9ERR18-C-A20	0.0000	114.00	0.00	-5.02	165.50	1.585	22	8.48	3.81	0.5000
Alcatel Lucent 4X40W RRH	0.0000	83.10	0.00	-5.02	165.50	1.585	22	2.50	2.42	0.5000
Alcatel Lucent 2X50W RRH	0.0000	78.30	0.00	-5.02	165.50	1.585	22	2.22	1.50	0.5000
RFS APXVSPP18-C-A20	120.0000	114.00	4.35	2.51	165.50	1.585	22	8.48	3.81	0.5000
Alcatel Lucent 4X40W RRH	120.0000	83.10	4.35	2.51	165.50	1.585	22	2.50	2.42	0.5000
Alcatel Lucent 2X50W RRH	120.0000	78.30	4.35	2.51	165.50	1.585	22	2.22	1.50	0.5000
RFS APXVSPP18-C-A20	240.0000	114.00	-4.35	2.51	165.50	1.585	22	8.48	3.81	0.5000
Alcatel Lucent 4X40W RRH	240.0000	83.10	-4.35	2.51	165.50	1.585	22	2.50	2.42	0.5000
Alcatel Lucent 2X50W RRH	240.0000	78.30	-4.35	2.51	165.50	1.585	22	2.22	1.50	0.5000
Junction Box	240.0000	60.00	-4.35	2.51	190.00	1.649	23	2.03	1.37	0.5000
	Sum Weight:	10704.02								

Discrete Appurtenance Pressures - Service $G_H = 1.117$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
Torque Arm Face C	180.0000	0.00	0.00	2.53	157.41	1.563	10	4.25	6.25
Torque Arm Face B	60.0000	0.00	2.19	-1.26	157.41	1.563	10	4.25	6.25
Torque Arm Face A	300.0000	0.00	-2.19	-1.26	157.41	1.563	10	4.25	6.25
Torque Arm Face C	180.0000	0.00	0.00	2.53	121.37	1.451	9	4.25	6.25
Torque Arm Face B	60.0000	0.00	2.19	-1.26	121.37	1.451	9	4.25	6.25
Torque Arm Face A	300.0000	0.00	-2.19	-1.26	121.37	1.451	9	4.25	6.25
Antel BXA-70063-6CF	0.0000	17.00	0.00	-5.02	190.00	1.649	11	7.57	2.21
Antel BXA-70063-6CF	120.0000	17.00	4.35	2.51	190.00	1.649	11	7.57	2.21
Antel BXA-70063-6CF	240.0000	17.00	-4.35	2.51	190.00	1.649	11	7.57	2.21
Sector Frame	0.0000	465.00	0.00	-2.02	190.00	1.649	11	13.60	13.60

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
Sector Frame	120.0000	465.00	1.75	1.01	190.00	1.649	11	13.60	13.60
Sector Frame	240.0000	465.00	-1.75	1.01	190.00	1.649	11	13.60	13.60
Andrew HBXX-6517DS-A2M	0.0000	86.00	0.00	-5.02	190.00	1.649	11	17.06	10.48
Andrew HBXX-6517DS-A2M	120.0000	86.00	4.35	2.51	190.00	1.649	11	17.06	10.48
Andrew HBXX-6517DS-A2M	240.0000	86.00	-4.35	2.51	190.00	1.649	11	17.06	10.48
Andrew LNX-8513DS-VTM	0.0000	26.50	0.00	-5.02	190.00	1.649	11	6.04	5.46
Andrew LNX-8513DS-VTM	120.0000	26.50	4.35	2.51	190.00	1.649	11	6.04	5.46
Andrew LNX-8513DS-VTM	240.0000	26.50	-4.35	2.51	190.00	1.649	11	6.04	5.46
Alcatel Lucent RRH2x60-AWS	0.0000	44.00	0.00	-5.02	190.00	1.649	11	1.88	1.24
Alcatel Lucent RRH2x60-AWS	120.0000	44.00	4.35	2.51	190.00	1.649	11	1.88	1.24
Alcatel Lucent RRH2x60-AWS	240.0000	44.00	-4.35	2.51	190.00	1.649	11	1.88	1.24
Lightning Rod 5/8x4'	0.0000	31.00	0.00	0.00	190.00	1.649	11	0.25	0.25
Sector Frame	0.0000	465.00	0.00	-2.02	180.00	1.624	10	13.60	13.60
Sector Frame	120.0000	465.00	1.75	1.01	180.00	1.624	10	13.60	13.60
Sector Frame	240.0000	465.00	-1.75	1.01	180.00	1.624	10	13.60	13.60
Sector Frame	0.0000	465.00	0.00	-2.02	150.00	1.541	10	13.60	13.60
Sector Frame	120.0000	465.00	1.75	1.01	150.00	1.541	10	13.60	13.60
Sector Frame	240.0000	465.00	-1.75	1.01	150.00	1.541	10	13.60	13.60
Powerwave P90-14-XLH-RR	0.0000	82.00	0.00	-5.02	150.00	1.541	10	11.12	4.10
Powerwave P90-14-XLH-RR	120.0000	82.00	4.35	2.51	150.00	1.541	10	11.12	4.10
Powerwave P90-14-XLH-RR	240.0000	82.00	-4.35	2.51	150.00	1.541	10	11.12	4.10
KMW AM-X-CD-17-65-00T-RET	0.0000	59.50	0.00	-5.02	150.00	1.541	10	11.31	6.80
KMW AM-X-CD-17-65-00T-RET	120.0000	59.50	4.35	2.51	150.00	1.541	10	11.31	6.80
KMW AM-X-CD-17-65-00T-RET	240.0000	59.50	-4.35	2.51	150.00	1.541	10	11.31	6.80
Ericsson RRUS-11	0.0000	100.00	0.00	-5.02	150.00	1.541	10	5.88	2.50
Ericsson RRUS-11	120.0000	100.00	4.35	2.51	150.00	1.541	10	5.88	2.50
Ericsson RRUS-11	240.0000	100.00	-4.35	2.51	150.00	1.541	10	5.88	2.50
Powerwave TT08-DB111-001	0.0000	44.00	0.00	-5.02	150.00	1.541	10	1.84	1.50
Powerwave TT08-DB111-001	120.0000	44.00	4.35	2.51	150.00	1.541	10	1.84	1.50
Powerwave TT08-DB111-001	240.0000	44.00	-4.35	2.51	150.00	1.541	10	1.84	1.50
Raycap DC6-48-60-18-8F	0.0000	31.80	0.00	-5.02	150.00	1.541	10	2.57	2.57
Sector Frame	0.0000	465.00	0.00	-2.02	165.50	1.585	10	13.60	7.00
Sector Frame	120.0000	465.00	1.75	1.01	165.50	1.585	10	13.60	7.00
Sector Frame	240.0000	465.00	-1.75	1.01	165.50	1.585	10	13.60	7.00
RFS APXV9ERR18-C-A20	0.0000	62.00	0.00	-5.02	165.50	1.585	10	8.02	3.35
Alcatel Lucent 4X40W RRH	0.0000	60.00	0.00	-5.02	165.50	1.585	10	1.20	2.24
Alcatel Lucent 2X50W	0.0000	60.00	0.00	-5.02	165.50	1.585	10	1.10	1.36

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
RRH RFS APXVSPP18-C-A20	120.0000	62.00	4.35	2.51	165.50	1.585	10	8.02	3.35
Alcatel Lucent 4X40W RRH	120.0000	60.00	4.35	2.51	165.50	1.585	10	1.20	2.24
Alcatel Lucent 2X50W RRH	120.0000	60.00	4.35	2.51	165.50	1.585	10	1.10	1.36
RFS APXVSPP18-C-A20	240.0000	62.00	-4.35	2.51	165.50	1.585	10	8.02	3.35
Alcatel Lucent 4X40W RRH	240.0000	60.00	-4.35	2.51	165.50	1.585	10	1.20	2.24
Alcatel Lucent 2X50W RRH	240.0000	60.00	-4.35	2.51	165.50	1.585	10	1.10	1.36
Junction Box	240.0000	44.00	-4.35	2.51	190.00	1.649	11	1.88	1.24
	Sum Weight:	7609.80							

Load Combinations

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

Comb. No.	Description
38	Dead+Wind 330 deg - Service+Guy

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Guy C @ 150 ft Elev 0 ft Azimuth 240 deg	Max. Vert	10	-1672.73	-1797.06	1036.53
	Max. H_x	10	-1672.73	-1797.06	1036.53
	Max. H_z	17	-43585.05	-43815.86	25307.77
	Min. Vert	17	-43585.05	-43815.86	25307.77
	Min. H_x	17	-43585.05	-43815.86	25307.77
	Min. H_z	10	-1672.73	-1797.06	1036.53
Guy B @ 150 ft Elev 0 ft Azimuth 120 deg	Max. Vert	6	-1668.72	1788.58	1033.25
	Max. H_x	25	-43576.84	43795.64	25282.46
	Max. H_z	25	-43576.84	43795.64	25282.46
	Min. Vert	25	-43576.84	43795.64	25282.46
	Min. H_x	6	-1668.72	1788.58	1033.25
	Min. H_z	6	-1668.72	1788.58	1033.25
Guy A @ 150 ft Elev 0 ft Azimuth 0 deg	Max. Vert	2	-1675.25	-1.41	-2075.10
	Max. H_x	24	-23903.95	1904.39	-27426.63
	Max. H_z	2	-1675.25	-1.41	-2075.10
	Min. Vert	21	-43572.97	11.81	-50582.33
	Min. H_x	18	-23877.42	-1904.42	-27414.35
	Min. H_z	21	-43572.97	11.81	-50582.33
Mast	Max. Vert	22	111930.62	1075.64	-1759.15
	Max. H_x	23	111093.51	2076.43	-1184.92
	Max. H_z	15	111066.27	18.67	2379.28
	Max. M_x	1	0.00	1.50	-0.23
	Max. M_z	1	0.00	1.50	-0.23
	Max. Torsion	1	0.00	1.50	-0.23
	Min. Vert	1	64367.75	1.50	-0.23
	Min. H_x	19	111047.59	-2042.26	-1186.69
	Min. H_z	21	111814.58	19.83	-1955.88
	Min. M_x	1	0.00	1.50	-0.23
	Min. M_z	1	0.00	1.50	-0.23
	Min. Torsion	1	0.00	1.50	-0.23

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	64367.75	-1.50	0.23	0.00	0.00	0.00
Dead+Wind 0 deg - No Ice+Guy	77781.50	-3.66	-1685.47	0.00	0.00	0.00
Dead+Wind 30 deg - No Ice+Guy	78034.71	785.77	-1383.05	0.00	0.00	0.00
Dead+Wind 60 deg - No	76031.71	1367.52	-792.51	0.00	0.00	0.00

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Ice+Guy						
Dead+Wind 90 deg - No Ice+Guy	78009.91	1589.28	7.08	0.00	0.00	0.00
Dead+Wind 120 deg - No Ice+Guy	77751.35	1457.18	843.16	0.00	0.00	0.00
Dead+Wind 150 deg - No Ice+Guy	77992.07	798.64	1375.08	0.00	0.00	0.00
Dead+Wind 180 deg - No Ice+Guy	76026.76	-4.87	1582.38	0.00	0.00	0.00
Dead+Wind 210 deg - No Ice+Guy	78058.72	-806.54	1374.01	0.00	0.00	0.00
Dead+Wind 240 deg - No Ice+Guy	77818.11	-1463.13	842.37	0.00	0.00	0.00
Dead+Wind 270 deg - No Ice+Guy	78049.94	-1594.39	7.76	0.00	0.00	0.00
Dead+Wind 300 deg - No Ice+Guy	76025.78	-1373.34	-790.25	0.00	0.00	0.00
Dead+Wind 330 deg - No Ice+Guy	78008.14	-792.63	-1381.50	0.00	0.00	0.00
Dead+Ice+Temp+Guy	90814.98	-11.75	-1.14	0.00	0.00	0.00
Dead+Wind 0 deg+Ice+Temp+Guy	111066.27	-18.67	-2379.28	0.00	0.00	0.00
Dead+Wind 30 deg+Ice+Temp+Guy	111911.15	980.26	-1800.12	0.00	0.00	0.00
Dead+Wind 60 deg+Ice+Temp+Guy	111818.26	1679.04	-983.75	0.00	0.00	0.00
Dead+Wind 90 deg+Ice+Temp+Guy	111875.03	2039.69	30.57	0.00	0.00	0.00
Dead+Wind 120 deg+Ice+Temp+Guy	111047.59	2042.26	1186.69	0.00	0.00	0.00
Dead+Wind 150 deg+Ice+Temp+Guy	111861.27	1039.34	1761.58	0.00	0.00	0.00
Dead+Wind 180 deg+Ice+Temp+Guy	111814.58	-19.83	1955.88	0.00	0.00	0.00
Dead+Wind 210 deg+Ice+Temp+Guy	111930.62	-1075.64	1759.15	0.00	0.00	0.00
Dead+Wind 240 deg+Ice+Temp+Guy	111093.51	-2076.43	1184.92	0.00	0.00	0.00
Dead+Wind 270 deg+Ice+Temp+Guy	111917.41	-2070.28	32.46	0.00	0.00	0.00
Dead+Wind 300 deg+Ice+Temp+Guy	111815.85	-1710.70	-979.10	0.00	0.00	0.00
Dead+Wind 330 deg+Ice+Temp+Guy	111884.28	-1014.21	-1797.30	0.00	0.00	0.00
Dead+Wind 0 deg - Service+Guy	64955.65	-2.30	-570.24	0.00	0.00	0.00
Dead+Wind 30 deg - Service+Guy	65072.54	277.90	-490.69	0.00	0.00	0.00
Dead+Wind 60 deg - Service+Guy	65195.91	483.83	-280.72	0.00	0.00	0.00
Dead+Wind 90 deg - Service+Guy	65072.32	562.77	2.66	0.00	0.00	0.00
Dead+Wind 120 deg - Service+Guy	64956.08	491.57	285.14	0.00	0.00	0.00
Dead+Wind 150 deg - Service+Guy	65072.44	282.43	487.97	0.00	0.00	0.00
Dead+Wind 180 deg - Service+Guy	65196.08	-2.48	561.33	0.00	0.00	0.00
Dead+Wind 210 deg - Service+Guy	65072.68	-287.27	488.02	0.00	0.00	0.00
Dead+Wind 240 deg -	64954.82	-496.26	285.19	0.00	0.00	0.00

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Service+Guy						
Dead+Wind 270 deg - Service+Guy	65073.05	-567.40	2.79	0.00	0.00	0.00
Dead+Wind 300 deg - Service+Guy	65196.71	-488.46	-280.53	0.00	0.00	0.00
Dead+Wind 330 deg - Service+Guy	65073.04	-282.49	-490.54	0.00	0.00	0.00

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-21182.83	0.00	-1.23	21104.26	-0.33	0.371%
2	9.44	-21395.75	-31330.66	-9.38	21394.54	31313.38	0.046%
3	15623.42	-21182.83	-27041.67	-15625.06	21181.76	27022.59	0.051%
4	27028.02	-20969.91	-15604.63	-26984.77	20968.55	15580.07	0.132%
5	31230.48	-21182.83	-9.44	-31214.85	21181.77	20.41	0.051%
6	27137.87	-21395.75	15657.15	-27122.72	21394.54	-15648.44	0.046%
7	15607.06	-21182.83	27032.22	-15589.81	21181.77	-27024.22	0.050%
8	-9.44	-20969.91	31192.91	9.49	20968.55	-31143.18	0.132%
9	-15623.42	-21182.83	27041.67	15606.04	21181.76	-27033.52	0.051%
10	-27147.31	-21395.75	15673.51	27132.32	21394.54	-15664.80	0.046%
11	-31230.48	-21182.83	9.44	31214.78	21181.76	1.55	0.051%
12	-27018.58	-20969.91	-15588.28	26975.41	20968.55	15563.71	0.132%
13	-15607.06	-21182.83	-27032.22	15608.75	21181.77	27013.26	0.051%
14	0.00	-40189.96	0.00	2.90	40116.59	0.18	0.183%
15	7.30	-40623.50	-41627.93	-7.26	40622.02	41594.80	0.057%
16	19844.87	-40189.96	-34357.72	-19849.16	40188.94	34333.30	0.044%
17	33817.93	-39756.43	-19524.79	-33767.17	39754.85	19496.76	0.104%
18	39677.10	-40189.96	-7.30	-39658.08	40188.95	23.38	0.044%
19	36054.50	-40623.50	20807.64	-36025.23	40622.01	-20790.75	0.058%
20	19832.22	-40189.96	34350.42	-19808.79	40188.96	-34342.01	0.044%
21	-7.30	-39756.43	39036.93	8.38	39754.85	-38978.93	0.104%
22	-19844.87	-40189.96	34357.72	19821.63	40188.93	-34349.22	0.044%
23	-36061.80	-40623.50	20820.29	36033.28	40622.02	-20803.79	0.057%
24	-39677.10	-40189.96	7.30	39658.16	40188.94	8.64	0.044%
25	-33810.63	-39756.43	-19512.14	33760.58	39754.85	19483.22	0.104%
26	-19832.22	-40189.96	-34350.42	19836.62	40188.95	34326.02	0.044%
27	3.27	-21256.50	-10841.06	-3.12	21256.46	10762.67	0.329%
28	5406.03	-21182.83	-9356.98	-5369.64	21182.65	9294.77	0.303%
29	9352.26	-21109.15	-5399.53	-9288.72	21108.84	5362.99	0.309%
30	10806.39	-21182.83	-3.27	-10734.18	21182.65	3.07	0.304%
31	9390.27	-21256.50	5417.70	-9322.18	21256.46	-5378.44	0.329%
32	5400.37	-21182.83	9353.71	-5364.39	21182.65	-9291.16	0.303%
33	-3.27	-21109.15	10793.40	3.43	21108.84	-10720.16	0.309%
34	-5406.03	-21182.83	9356.98	5370.36	21182.65	-9294.41	0.303%
35	-9393.53	-21256.50	5423.36	9325.77	21256.46	-5384.12	0.328%
36	-10806.39	-21182.83	3.27	10734.41	21182.65	-3.47	0.303%
37	-9348.99	-21109.15	-5393.87	9285.70	21108.84	5357.28	0.308%
38	-5400.37	-21182.83	-9353.71	5364.26	21182.65	9291.42	0.303%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	121	0.00000001	0.00000000
2	Yes	291	0.00014241	0.00015000
3	Yes	286	0.00000001	0.00015000
4	Yes	241	0.00000001	0.00005213
5	Yes	286	0.00000001	0.00015000
6	Yes	291	0.00014262	0.00015000
7	Yes	286	0.00000001	0.00015000
8	Yes	241	0.00000001	0.00005236
9	Yes	286	0.00014639	0.00015000
10	Yes	291	0.00014272	0.00015000
11	Yes	286	0.00000001	0.00015000
12	Yes	241	0.00000001	0.00005206
13	Yes	286	0.00000001	0.00015000
14	Yes	121	0.00000001	0.00000000
15	Yes	297	0.00014847	0.00015000
16	Yes	290	0.00014486	0.00015000
17	Yes	246	0.00014834	0.00005118
18	Yes	290	0.00014399	0.00015000
19	Yes	297	0.00014957	0.00015000
20	Yes	290	0.00014368	0.00015000
21	Yes	246	0.00014929	0.00005153
22	Yes	290	0.00014535	0.00015000
23	Yes	297	0.00014844	0.00015000
24	Yes	290	0.00014527	0.00015000
25	Yes	246	0.00014753	0.00005071
26	Yes	290	0.00014445	0.00015000
27	Yes	217	0.00000001	0.00007742
28	Yes	218	0.00000001	0.00006972
29	Yes	218	0.00000001	0.00006921
30	Yes	218	0.00000001	0.00006993
31	Yes	217	0.00000001	0.00007781
32	Yes	218	0.00000001	0.00006989
33	Yes	218	0.00000001	0.00006915
34	Yes	218	0.00000001	0.00006959
35	Yes	217	0.00000001	0.00007717
36	Yes	218	0.00000001	0.00006936
37	Yes	218	0.00000001	0.00006885
38	Yes	218	0.00000001	0.00006954

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	190 - 180	2.413	37	0.1309	0.0733
T2	180 - 160	2.127	37	0.1401	0.0684
T3	160 - 140	1.507	29	0.1289	0.0425
T4	140 - 120	1.062	29	0.0934	0.0335
T5	120 - 100	0.753	29	0.0425	0.0229
T6	100 - 80	0.684	29	0.0109	0.0318
T7	80 - 60	0.639	29	0.0161	0.0392
T8	60 - 40	0.557	29	0.0156	0.0448
T9	40 - 20	0.498	31	0.0275	0.0482
T10	20 - 0	0.316	35	0.0608	0.0501

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.00	Antel BXA-70063-6CF	37	2.413	0.1309	0.0733	47401
189.63	Guy	37	2.403	0.1313	0.0732	47401
180.00	Sector Frame	37	2.127	0.1401	0.0684	28881
165.50	Sector Frame	37	1.669	0.1352	0.0492	30447
156.42	Guy	29	1.414	0.1240	0.0396	19528
150.00	Sector Frame	29	1.265	0.1137	0.0367	28400
120.38	Guy	29	0.756	0.0434	0.0229	14458
60.38	Guy	29	0.558	0.0156	0.0447	66755

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	190 - 180	13.145	23	0.7920	0.3115
T2	180 - 160	11.447	23	0.8185	0.3000
T3	160 - 140	7.944	23	0.7459	0.2056
T4	140 - 120	5.272	19	0.5475	0.1795
T5	120 - 100	3.768	17	0.2769	0.1463
T6	100 - 80	3.428	17	0.0866	0.2107
T7	80 - 60	3.128	17	0.0957	0.2394
T8	60 - 40	2.819	19	0.0943	0.2592
T9	40 - 20	2.545	19	0.1428	0.2801
T10	20 - 0	1.607	19	0.3111	0.2914

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.00	Antel BXA-70063-6CF	23	13.145	0.7920	0.3115	14862
189.63	Guy	23	13.083	0.7934	0.3113	14862
180.00	Sector Frame	23	11.447	0.8185	0.3000	9173
165.50	Sector Frame	23	8.864	0.7805	0.2299	6732
156.42	Guy	23	7.390	0.7191	0.1960	4359
150.00	Sector Frame	19	6.487	0.6626	0.1879	5352
120.38	Guy	17	3.782	0.2819	0.1461	2579
60.38	Guy	19	2.822	0.0943	0.2588	15932

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	190	Leg	A325N	0.7500	4	0.13	19438.60	0.000	1.333	Bolt Tension
T2	180	Leg	A325N	0.7500	4	0.00	19434.30	0.000	1.333	Bolt Tension
T3	160	Leg	A325N	0.7500	4	2545.64	19407.00	0.131	1.333	Bolt Tension
		Top Guy Pull-Off@156.417	A325N	0.7500	2	2564.03	9277.52	0.276	1.333	Bolt Shear
		Torque Arm Top@156.417	A325N	0.7500	2	6140.41	9277.52	0.662	1.333	Bolt Shear
		Torque Arm Bottom@156.417	A325N	0.7500	2	4374.78	9277.52	0.472	1.333	Bolt Shear
T4	140	Leg	A325N	0.7500	4	0.00	19434.40	0.000	1.333	Bolt Tension
		Top Guy Pull-Off@120.375	A325N	0.7500	2	3044.92	9277.52	0.328	1.333	Bolt Shear
		Torque Arm Top@120.375	A325N	0.7500	2	3668.28	9277.52	0.395	1.333	Bolt Shear
		Torque Arm Bottom@120.375	A325N	0.7500	2	3338.18	9277.52	0.360	1.333	Bolt Shear
T5	120	Leg	A325N	0.7500	4	0.00	19411.60	0.000	1.333	Bolt Tension
T6	100	Leg	A325N	0.7500	4	0.00	19430.70	0.000	1.333	Bolt Tension
T7	80	Leg	A325N	0.7500	4	0.00	19438.30	0.000	1.333	Bolt Tension
T8	60	Leg	A325N	0.7500	4	0.00	19418.60	0.000	1.333	Bolt Tension
T9	40	Leg	A325N	0.7500	4	0.00	19437.10	0.000	1.333	Bolt Tension
T10	20	Leg	A325N	0.7500	4	0.00	19437.30	0.000	1.333	Bolt Tension

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T lb	Allowable T_a lb	Required S.F.	Actual S.F.
T1	189.63 (A) (615)	9/16 EHS	3500.00	35000.04	13103.50	17500.00	2.000	2.671
	189.63 (B) (614)	9/16 EHS	3500.00	35000.04	13143.30	17500.00	2.000	2.663
	189.63 (C) (613)	9/16 EHS	3500.00	35000.04	13089.90	17500.00	2.000	2.674
T3	156.42 (A) (586)	5/8 EHS	4240.00	42399.99	13271.70	21200.00	2.000	3.195
	156.42 (A) (587)	5/8 EHS	4240.00	42399.99	13585.10	21200.00	2.000	3.121
	156.42 (B) (580)	5/8 EHS	4240.00	42399.99	13462.20	21200.00	2.000	3.150
	156.42 (B) (581)	5/8 EHS	4240.00	42399.99	13396.00	21200.00	2.000	3.165
	156.42 (C) (574)	5/8 EHS	4240.00	42399.99	13559.60	21200.00	2.000	3.127
	156.42 (C)	5/8 EHS	4240.00	42399.99	13312.40	21200.00	2.000	3.185

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T lb	Allowable T_a lb	Required S.F.	Actual S.F.
	(575)							
T4	120.38 (A) (604)	9/16 EHS	3500.00	35000.04	9355.87	17500.00	2.000	3.741
	120.38 (A) (605)	9/16 EHS	3500.00	35000.04	9592.54	17500.00	2.000	3.649
	120.38 (B) (598)	9/16 EHS	3500.00	35000.04	9477.17	17500.00	2.000	3.693
	120.38 (B) (599)	9/16 EHS	3500.00	35000.04	9430.47	17500.00	2.000	3.711
	120.38 (C) (592)	9/16 EHS	3500.00	35000.04	9578.21	17500.00	2.000	3.654
	120.38 (C) (593)	9/16 EHS	3500.00	35000.04	9388.16	17500.00	2.000	3.728
T7	60.38 (A) (612)	9/16 EHS	3500.00	35000.04	9801.74	17500.00	2.000	3.571
	60.38 (B) (611)	9/16 EHS	3500.00	35000.04	9794.25	17500.00	2.000	3.574
	60.38 (C) (610)	9/16 EHS	3500.00	35000.04	9802.99	17500.00	2.000	3.570

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	Mast Stability Index	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	190 - 180	P2.5x.203	10.00	3.08	39.1 K=1.00	1.00	28.266	1.7040	-16433.10	48167.40	0.341
T2	180 - 160	P2.5x.203	20.00	3.21	40.6 K=1.00	1.00	28.005	1.7040	-32119.70	47721.80	0.673
T3	160 - 140	P2.5x.203	20.00	3.21	40.6 K=1.00	1.00	28.005	1.7040	-44133.50	47721.80	0.925
T4	140 - 120	P2.5x.203	20.00	3.21	40.6 K=1.00	1.00	28.005	1.7040	-63401.20	47721.80	1.329
T5	120 - 100	P2.5x.203	20.00	3.21	40.6 K=1.00	0.99	27.835	1.7040	-61628.40	47431.50	1.299
T6	100 - 80	P2.5x.203	20.00	3.21	40.6 K=1.00	0.99	27.717	1.7040	-37425.80	47231.00	0.792
T7	80 - 60	P2.5x.203	20.00	3.21	40.6 K=1.00	0.99	27.707	1.7040	-38767.90	47214.50	0.821
T8	60 - 40	P2.5x.203	20.00	3.21	40.6 K=1.00	0.99	27.708	1.7040	-46741.70	47215.90	0.990
T9	40 - 20	P2.5x.203	20.00	3.21	40.6 K=1.00	0.99	27.725	1.7040	-50163.10	47244.50	1.062
T10	20 - 0	P2.5x.203	20.00	3.21	40.6 K=1.00	0.99	27.713	1.7040	-49058.00	47224.50	1.039

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	190 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-4693.23	7695.87	0.610*
T2	180 - 160	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-4395.16	7695.87	0.571*
T3	160 - 140	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-5773.42	7695.87	0.750
T4	140 - 120	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-3712.14	7695.87	0.482*
T5	120 - 100	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-3303.25	7695.87	0.429*
T6	100 - 80	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-3277.61	7695.87	0.426*
T7	80 - 60	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-3339.67	7695.87	0.434*
T8	60 - 40	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-3135.55	7695.87	0.407*
T9	40 - 20	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-3076.21	7695.87	0.400*
T10	20 - 0	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-3139.33	7695.87	0.408*

* DL controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T2	180 - 160	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-2324.90	7695.87	0.302*
T4	140 - 120	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-1956.19	7695.87	0.254*
T5	120 - 100	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-3059.28	7695.87	0.398
T6	100 - 80	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-1727.15	7695.87	0.224*
T7	80 - 60	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-1711.50	7695.87	0.222*
T8	60 - 40	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-1504.10	7695.87	0.195*
T9	40 - 20	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-1621.21	7695.87	0.211*
T10	20 - 0	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-1605.15	7695.87	0.209*

* DL controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	190 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-2404.41	7695.87	0.312*
T2	180 - 160	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-3709.77	7695.87	0.482
T3	160 - 140	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-1957.25	7695.87	0.254*
T4	140 - 120	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-4076.02	7695.87	0.530
T5	120 - 100	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-1729.30	7695.87	0.225*
T6	100 - 80	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-1713.29	7695.87	0.223*
T8	60 - 40	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-1623.52	7695.87	0.211*
T9	40 - 20	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-1607.56	7695.87	0.209*
T10	20 - 0	L1 1/2x1 1/2x3/16	3.50	3.26	86.7 K=0.65	14.594	0.5273	-415.54	7695.87	0.054*

* DL controls

Top Guy Pull-Off Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	190 - 180	L1 3/4x1 3/4x3/16	3.50	3.26	113.9 K=1.00	11.138	0.6211	-2698.45	6917.59	0.390
T3	160 - 140	L2x2x5/16	3.50	3.26	100.3 K=1.00	12.937	1.1500	-5128.06	14877.70	0.345
T4	140 - 120	L2x2x5/16	3.50	3.26	100.3 K=1.00	12.937	1.1500	-6089.84	14877.70	0.409
T7	80 - 60	L1 3/4x1 3/4x3/16	3.50	3.26	113.9 K=1.00	11.138	0.6211	-788.79	6917.59	0.114

Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T3	160 - 140 (578)	L3x3x1/4	3.50	3.38	68.5	16.584	1.4400	-8737.95	23880.20	0.366

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
					K=1.00					
T3	160 - 140 (579)	L3x3x1/4	3.50	3.38	68.5	16.584	1.4400	-8726.40	23880.20	0.365
					K=1.00					
T3	160 - 140 (584)	L3x3x1/4	3.50	3.38	68.5	16.584	1.4400	-8718.97	23880.20	0.365
					K=1.00					
T3	160 - 140 (585)	L3x3x1/4	3.50	3.38	68.5	16.584	1.4400	-8687.61	23880.20	0.364
					K=1.00					
T3	160 - 140 (590)	L3x3x1/4	3.50	3.38	68.5	16.584	1.4400	-8749.55	23880.20	0.366
					K=1.00					
T3	160 - 140 (591)	L3x3x1/4	3.50	3.38	68.5	16.584	1.4400	-8708.51	23880.20	0.365
					K=1.00					
T4	140 - 120 (596)	L3x3x1/4	3.50	3.38	68.5	16.584	1.4400	-6676.37	23880.20	0.280
					K=1.00					
T4	140 - 120 (597)	L3x3x1/4	3.50	3.38	68.5	16.584	1.4400	-6671.88	23880.20	0.279
					K=1.00					
T4	140 - 120 (602)	L3x3x1/4	3.50	3.38	68.5	16.584	1.4400	-6561.62	23880.20	0.275
					K=1.00					
T4	140 - 120 (603)	L3x3x1/4	3.50	3.38	68.5	16.584	1.4400	-6550.73	23880.20	0.274
					K=1.00					
T4	140 - 120 (608)	L3x3x1/4	3.50	3.38	68.5	16.584	1.4400	-6521.23	23880.20	0.273
					K=1.00					
T4	140 - 120 (609)	L3x3x1/4	3.50	3.38	68.5	16.584	1.4400	-6527.64	23880.20	0.273
					K=1.00					

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	190 - 180	P2.5x.203	10.00	3.08	39.1	33.000	1.7040	0.52	56233.70	0.000*
T2	180 - 160	P2.5x.203	20.00	3.21	40.6	33.000	1.7040	10183.30	56233.70	0.181
T3	160 - 140	P2.5x.203	20.00	3.21	40.6	33.000	1.7040	10182.60	56233.70	0.181

* DL controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	190 - 180	5/8	4.66	4.35	333.7	21.600	0.3068	3392.93	6626.80	0.512*
T2	180 - 160	5/8	4.75	4.42	339.7	21.600	0.3068	7240.63	6626.80	1.093
T3	160 - 140	5/8	4.75	4.42	339.7	21.600	0.3068	3958.51	6626.80	0.597
T4	140 - 120	5/8	4.75	4.42	339.7	21.600	0.3068	3870.02	6626.80	0.584
T5	120 - 100	5/8	4.75	4.42	339.7	21.600	0.3068	4631.73	6626.80	0.699
T6	100 - 80	5/8	4.75	4.42	339.7	21.600	0.3068	2335.84	6626.80	0.352*
T7	80 - 60	5/8	4.75	4.42	339.7	21.600	0.3068	2507.56	6626.80	0.378*
T8	60 - 40	5/8	4.75	4.42	339.7	21.600	0.3068	3345.01	6626.80	0.505
T9	40 - 20	5/8	4.75	4.42	339.7	21.600	0.3068	2192.80	6626.80	0.331*
T10	20 - 0	5/8	4.75	4.42	339.7	21.600	0.3068	2303.97	6626.80	0.348*

* DL controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	190 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21.600	0.5273	284.63	11390.60	0.025
T2	180 - 160	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21.600	0.5273	556.33	11390.60	0.049
T3	160 - 140	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21.600	0.5273	764.41	11390.60	0.067
T4	140 - 120	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21.600	0.5273	1098.14	11390.60	0.096
T5	120 - 100	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21.600	0.5273	1067.44	11390.60	0.094
T6	100 - 80	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21.600	0.5273	648.23	11390.60	0.057
T7	80 - 60	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21.600	0.5273	671.48	11390.60	0.059
T8	60 - 40	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21.600	0.5273	809.59	11390.60	0.071
T9	40 - 20	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21.600	0.5273	868.85	11390.60	0.076
T10	20 - 0	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21.600	0.5273	849.71	11390.60	0.075

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T5	120 - 100	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21.600	0.5273	45.07	11390.60	0.004

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T4	140 - 120	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21.600	0.5273	696.96	11390.60	0.061
T10	20 - 0	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21.600	0.5273	246.24	11390.60	0.022

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	190 - 180	L1 3/4x1 3/4x3/16	3.50	3.26	72.9	21.600	0.6211	2226.52	13415.60	0.166
T3	160 - 140	L2x2x5/16	3.50	3.26	65.1	29.000	0.6574	1232.99	19065.20	0.065
T7	80 - 60	L1 3/4x1 3/4x3/16	3.50	3.26	72.9	21.600	0.6211	2889.51	13415.60	0.215

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T3	160 - 140 (576)	L3x3x1/4	4.75	4.59	59.2	29.000	0.9159	12049.10	26562.20	0.454
T3	160 - 140 (577)	L3x3x1/4	4.75	4.59	59.2	29.000	0.9159	11864.50	26562.20	0.447
T3	160 - 140 (582)	L3x3x1/4	4.75	4.59	59.2	29.000	0.9159	12280.80	26562.20	0.462
T3	160 - 140 (583)	L3x3x1/4	4.75	4.59	59.2	29.000	0.9159	11657.80	26562.20	0.439
T3	160 - 140 (588)	L3x3x1/4	4.75	4.59	59.2	29.000	0.9159	11761.00	26562.20	0.443

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T3	160 - 140 (589)	L3x3x1/4	4.75	4.59	59.2	29.000	0.9159	12199.90	26562.20	0.459
T4	140 - 120 (594)	L3x3x1/4	4.75	4.59	59.2	29.000	0.9159	7262.29	26562.20	0.273
T4	140 - 120 (595)	L3x3x1/4	4.75	4.59	59.2	29.000	0.9159	7216.73	26562.20	0.272
T4	140 - 120 (600)	L3x3x1/4	4.75	4.59	59.2	29.000	0.9159	7187.39	26562.20	0.271
T4	140 - 120 (601)	L3x3x1/4	4.75	4.59	59.2	29.000	0.9159	7336.56	26562.20	0.276
T4	140 - 120 (606)	L3x3x1/4	4.75	4.59	59.2	29.000	0.9159	7204.89	26562.20	0.271
T4	140 - 120 (607)	L3x3x1/4	4.75	4.59	59.2	29.000	0.9159	7305.55	26562.20	0.275

Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T3	160 - 140 (578)	L3x3x1/4	3.50	3.38	43.6	29.000	0.9159	2562.86	26562.20	0.096
T3	160 - 140 (579)	L3x3x1/4	3.50	3.38	43.6	29.000	0.9159	2509.15	26562.20	0.094
T3	160 - 140 (584)	L3x3x1/4	3.50	3.38	43.6	29.000	0.9159	2525.54	26562.20	0.095
T3	160 - 140 (585)	L3x3x1/4	3.50	3.38	43.6	29.000	0.9159	2634.68	26562.20	0.099
T3	160 - 140 (590)	L3x3x1/4	3.50	3.38	43.6	29.000	0.9159	2600.17	26562.20	0.098
T3	160 - 140 (591)	L3x3x1/4	3.50	3.38	43.6	29.000	0.9159	2654.83	26562.20	0.100
T4	140 - 120 (596)	L3x3x1/4	3.50	3.38	43.6	29.000	0.9159	4183.24	26562.20	0.157
T4	140 - 120 (597)	L3x3x1/4	3.50	3.38	43.6	29.000	0.9159	4190.48	26562.20	0.158
T4	140 - 120 (602)	L3x3x1/4	3.50	3.38	43.6	29.000	0.9159	4107.34	26562.20	0.155
T4	140 - 120 (603)	L3x3x1/4	3.50	3.38	43.6	29.000	0.9159	4151.48	26562.20	0.156
T4	140 - 120 (608)	L3x3x1/4	3.50	3.38	43.6	29.000	0.9159	4131.12	26562.20	0.156
T4	140 - 120 (609)	L3x3x1/4	3.50	3.38	43.6	29.000	0.9159	4093.63	26562.20	0.154

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P_{allow} lb	% Capacity	Pass Fail
T1	190 - 180	Leg	P2.5x.203	1	-16433.10	64207.14	25.6	Pass
		Diagonal	5/8	31	3392.93	6626.80	51.2	Pass
		Horizontal	L1 1/2x1 1/2x3/16	26	-4693.23	7695.87	61.0	Pass
		Bottom Girt	L1 1/2x1 1/2x3/16	8	-2404.41	7695.87	31.2	Pass
		Guy A@189.625	9/16	615	13103.50	17500.00	74.9	Pass
		Guy B@189.625	9/16	614	13143.30	17500.00	75.1	Pass
		Guy C@189.625	9/16	613	13089.90	17500.00	74.8	Pass
		Top Guy Pull-Off@189.625	L1 3/4x1 3/4x3/16	5	-2698.45	9221.15	29.3	Pass
T2	180 - 160	Leg	P2.5x.203	34	-32119.70	63613.16	50.5	Pass
		Diagonal	5/8	48	7240.63	8833.52	82.0	Pass
		Horizontal	L1 1/2x1 1/2x3/16	86	-4395.16	7695.87	57.1	Pass
		Top Girt	L1 1/2x1 1/2x3/16	38	-2324.90	7695.87	30.2	Pass
		Bottom Girt	L1 1/2x1 1/2x3/16	41	-3709.77	10258.59	36.2	Pass
T3	160 - 140	Leg	P2.5x.203	94	-44133.50	63613.16	69.4	Pass
		Diagonal	5/8	142	3958.51	8833.52	44.8	Pass
		Horizontal	L1 1/2x1 1/2x3/16	146	-5773.42	10258.59	56.3	Pass
		Bottom Girt	L1 1/2x1 1/2x3/16	100	-1957.25	7695.87	25.4	Pass
		Guy A@156.417	5/8	587	13585.10	21200.00	64.1	Pass
		Guy B@156.417	5/8	580	13462.20	21200.00	63.5	Pass
		Guy C@156.417	5/8	574	13559.60	21200.00	64.0	Pass
		Top Guy Pull-Off@156.417	L2x2x5/16	98	-5128.06	19831.97	25.9	Pass
		Torque Arm Top@156.417	L3x3x1/4	582	12280.80	35407.41	34.7 49.7 (b)	Pass
		Torque Arm Bottom@156.417	L3x3x1/4	590	-8749.55	31832.30	27.5 35.4 (b)	Pass
T4	140 - 120	Leg	P2.5x.203	154	-63401.20	63613.16	99.7	Pass
		Diagonal	5/8	176	3870.02	8833.52	43.8	Pass
		Horizontal	L1 1/2x1 1/2x3/16	206	-3712.14	7695.87	48.2	Pass
		Top Girt	L1 1/2x1 1/2x3/16	158	-1956.19	7695.87	25.4	Pass
		Bottom Girt	L1 1/2x1 1/2x3/16	161	-4076.02	10258.59	39.7	Pass
		Guy A@120.375	9/16	605	9592.54	17500.00	54.8	Pass
		Guy B@120.375	9/16	598	9477.17	17500.00	54.2	Pass
		Guy C@120.375	9/16	592	9578.21	17500.00	54.7	Pass
		Top Guy Pull-Off@120.375	L2x2x5/16	171	-6089.84	19831.97	30.7	Pass
		Torque Arm Top@120.375	L3x3x1/4	601	7336.56	35407.41	20.7 29.7 (b)	Pass
		Torque Arm Bottom@120.375	L3x3x1/4	596	-6676.37	31832.30	21.0 27.0 (b)	Pass
T5	120 - 100	Leg	P2.5x.203	214	-61628.40	63226.19	97.5	Pass
		Diagonal	5/8	272	4631.73	8833.52	52.4	Pass
		Horizontal	L1 1/2x1 1/2x3/16	267	-3303.25	7695.87	42.9	Pass
		Top Girt	L1 1/2x1 1/2x3/16	218	-3059.28	10258.59	29.8	Pass
		Bottom Girt	L1 1/2x1 1/2x3/16	222	-1729.30	7695.87	22.5	Pass
T6	100 - 80	Leg	P2.5x.203	274	-37425.80	62958.92	59.4	Pass
		Diagonal	5/8	332	2335.84	6626.80	35.2	Pass
		Horizontal	L1 1/2x1 1/2x3/16	327	-3277.61	7695.87	42.6	Pass
		Top Girt	L1 1/2x1 1/2x3/16	279	-1727.15	7695.87	22.4	Pass
		Bottom Girt	L1 1/2x1 1/2x3/16	281	-1713.29	7695.87	22.3	Pass
T7	80 - 60	Leg	P2.5x.203	335	-38767.90	62936.93	61.6	Pass
		Diagonal	5/8	344	2507.56	6626.80	37.8	Pass
		Horizontal	L1 1/2x1 1/2x3/16	351	-3339.67	7695.87	43.4	Pass
		Top Girt	L1 1/2x1 1/2x3/16	339	-1711.50	7695.87	22.2	Pass
		Guy A@60.375	9/16	612	9801.74	17500.00	56.0	Pass
		Guy B@60.375	9/16	611	9794.25	17500.00	56.0	Pass
		Guy C@60.375	9/16	610	9802.99	17500.00	56.0	Pass
		Top Guy Pull-Off@60.375	L1 3/4x1 3/4x3/16	342	2889.51	17882.99	16.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T8	60 - 40	Leg	P2.5x.203	395	-46741.70	62938.79	74.3	Pass
		Diagonal	5/8	452	3345.01	8833.52	37.9	Pass
		Horizontal	L1 1/2x1 1/2x3/16	447	-3135.55	7695.87	40.7	Pass
		Top Girt	L1 1/2x1 1/2x3/16	399	-1504.10	7695.87	19.5	Pass
		Bottom Girt	L1 1/2x1 1/2x3/16	401	-1623.52	7695.87	21.1	Pass
T9	40 - 20	Leg	P2.5x.203	455	-50163.10	62976.92	79.7	Pass
		Diagonal	5/8	509	2192.80	6626.80	33.1	Pass
		Horizontal	L1 1/2x1 1/2x3/16	506	-3076.21	7695.87	40.0	Pass
		Top Girt	L1 1/2x1 1/2x3/16	459	-1621.21	7695.87	21.1	Pass
		Bottom Girt	L1 1/2x1 1/2x3/16	461	-1607.56	7695.87	20.9	Pass
T10	20 - 0	Leg	P2.5x.203	515	-49058.00	62950.26	77.9	Pass
		Diagonal	5/8	524	2303.97	6626.80	34.8	Pass
		Horizontal	L1 1/2x1 1/2x3/16	530	-3139.33	7695.87	40.8	Pass
		Top Girt	L1 1/2x1 1/2x3/16	519	-1605.15	7695.87	20.9	Pass
		Bottom Girt	L1 1/2x1 1/2x3/16	521	-415.54	7695.87	5.4	Pass
							Summary	
							Leg (T4) 99.7	Pass
							Diagonal (T2) 82.0	Pass
							Horizontal (T1) 61.0	Pass
							Top Girt (T2) 30.2	Pass
							Bottom Girt (T4) 39.7	Pass
							Guy A (T1) 74.9	Pass
							Guy B (T1) 75.1	Pass
							Guy C (T1) 74.8	Pass
							Top Guy Pull-Off (T4) 30.7	Pass
							Torque Arm Top (T3) 49.7	Pass
							Torque Arm Bottom (T3) 35.4	Pass
							Bolt Checks 49.7	Pass
							RATING = 99.7	**Pass**

Site Name:	Eastford, CT
Job Number:	115-35075
Date:	05/26/15

Design Base Loads (Unfactored) per TIA-222-F

Foundation Mapped:	N		Concrete Compressive Strength (f'_c):	3000	psi
Moment (M):	0.0	k-ft	Vertical Steel Rebar Size #:	5	
Shear/Leg (V):	2.4	k	Vertical Steel Rebar Area:	0.31	in^2
Compression/Leg (P):	111.9	k	# of Vertical Steel Rebars:	8	
Uplift/Leg (U):	0.0	k	Vertical Steel Rebar Yield Strength (F_y):	60	ksi
Tower Type (GT / SST):	GT		Tie / Stirrup Size #:	4	
Diameter of Prismatic Portion of Pier (d):	2.0	ft	Tie / Stirrup Area:	0.20	in^2
Depth to Base of Foundation:	4.5	ft	Tie / Stirrup Spacing:	10.0	in
Pier Height Above Ground (h):	1.00	ft	Tie / Stirrup Steel Yield Strength (F_y):	40	ksi
Length / Width of Pad (w):	5.5	ft	Rebar Cage Diameter:	16.0	in
Thickness of Pad (t):	1.5	ft	Bending/Tension Reduction Factor (ϕ_B):	0.90	
Depth Below Ground Surface to Water Table (w):	20.0	ft	Shear Reduction Factor (ϕ_V):	0.75	
Unit Weight of Concrete:	150.0	pcf	Compression Reduction Factor (ϕ_V):	0.65	
Unit Weight of Water:	62.4	pcf	Wind Design Factor:	1.30	
Unit Weight of Soil Above Water Table:	120.0	pcf	Steel Elastic Modulus:	29000	ksi
Unit Weight of Soil Below Water Table:	65.0	pcf	Pad Steel Rebar Size #:	5	
Friction Angle of Uplift from Top of Pad:	33	Degrees	Pad Steel Rebar Area:	0.31	in^2
Friction Angle of Uplift from Base of Pad:	33	Degrees	Pad Steel Rebar Yield Strength (F_y):	60	ksi
Uplift Angle Started at Top or Base of Pad (T/B):	T		# of Rebar in Top of Pad:	0	
Allowable Skin Friction:	0	psf	# of Rebar in Base of Pad:	10	
Allowable Compressive Bearing Pressure:	4000	psf	Pad Clear Cover:	3	in
Capacity Increase (Due to Transient Loads):	1.00				

Axial Capacities and Design Moment

Weight of Concrete (Bouyancy Considered):	8.7	k
Weight of Soil (Bouyancy Considered):	19.3	k
Allowable Skin Friction Resistance:	0.0	k
Controlling Failure Mode (Top / Base):	Top	
Allowable Uplift Capacity per Leg:	16.6	k
Compressive Design Load:	114.0	k
Allowable Compression Capacity per Leg:	121.0	k
Uplift Design Load/Uplift Capacity:	0.00	Result: OK
Compression Design Load/Compression Capacity:	0.94	Result: OK

Depth (ft) Top	Depth (ft) Bottom	Ultimate Lateral Bearing Pressure (psf)	Increment (psf/ft)	γ_{soil} (pcf)	Cohesion (psf)	ϕ (degree)
0.0	0.5	0.0	115.0	115	0	0
0.5	3.0	179.6	359.3	115	0	31

Inflection Point (Below Ground Surface):	2.6	ft
Unfactored Design Moment At Inflection Point:	4.9	k-ft

Pad Strength Capacity

β:	0.85	ACI318-05 - 10.2.7.3
Lower Pad Flexural Reinforcement Ratio:	0.0033	OK - Minimum Reinforcement Ratio Met - ACI10.5.1
Upper Pad Flexural Reinforcement Ratio:	0.0000	OK - Minimum Reinforcement Ratio Met - ACI10.5.1
Lower Pad Flexural Reinforcement Spacing:	7	in - Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4
Upper Pad Flexural Reinforcement Spacing:	0	in - Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4
One Way Design Shear (V_u):	14.2	k
One Way Shear Capacity (ϕV_c):	81.2	k - ACI318-05 - 11.3.1.1
$V_u / \phi V_c$:	0.17	Result: OK
Punching Design Shear (V_u):	105.5	k
Nominal Punching Shear Capacity ($\phi_c V_n$):	293.3	k - ACI318-05 - 11.12.2.1
$V_u / \phi V_c$:	0.36	Result: OK
Flexural Loading Due to Soil Pressure (M_u):	41.3	k-ft
Lower Steel Pad Moment Capacity (ϕM_n):	197.2	k-ft - ACI318-05 - 10.3
$M_u / \phi M_n$:	0.21	Result: OK
Flexural Loading Due to Uplift (M_u):	0.0	k-ft
Upper Steel Pad Moment Capacity (ϕM_n):	0.0	k-ft - ACI318-05 - 10.3
$M_u / \phi M_n$:	0.00	Result: OK

Pier Strength Capacity

Design Moment (M_u):	6.4	k-ft
Nominal Moment Capacity ($\phi_B M_n$):	88.9	k-ft - ACI318-005 - 10.2
$M_u/\phi_B M_n$:	0.07	Result: OK
Design Shear (V_u):	3.1	k
Nominal Shear Capacity ($\phi_V V_n$):	67.9	k - ACI318-05 - 11.3.1.1 or 11.5.7.2
$V_u/\phi_V V_n$:	0.05	Result: OK
Design Tension (T_u):	0.0	k
Nominal Tension Capacity ($\phi_T T_n$):	133.9	k - ACI318-05 - 10.2
$T_u/\phi_T T_n$:	0.00	Result: OK
Design Compression (P_u):	145.5	k
Nominal Compression Capacity ($\phi_P P_n$):	596.6	k - ACI318-05 - 10.3.6.2
$P_u/\phi_P P_n$:	0.24	Result: OK
Pier Reinforcement Ratio:	0.005	Reinforcement Ratio is Satisfactory - ACI318-05 - 10.9.1 & 10.8.4
$M_u/\phi_B M_n + T_u/\phi_T T_n$:	0.07	Result: OK

Site Name:	Eastford, CT
Engineering Number:	115-35075
Date:	05/26/15

Design Standard per TIA-222-F

Anchor Radius:	150.0	ft
Uplift (Unfactored):	43.9	k
Shear (Unfactored):	50.6	k
Berm Present:	N	
Design Anchor Rod:	Y	
Mapped Foundation:	N	
Anchor Base Depth (d):	8.0	ft
Width of Anchor (W):	5.5	ft
Length of Anchor (L):	11.5	ft
Thickness of Anchor (t):	2.0	ft
Depth Below Ground Surface to Water Table (w):	20.0	ft
Soil Uplift at Base / Top of Anchor (B/T):	T	
Unit Weight of Concrete:	150.0	pcf
Unit Weight of Soil Above Water Table:	120.0	pcf
Unit Weight of Water:	62.4	pcf
Submerged Soil Unit Weight:	65.0	pcf
Internal Angle of Friction:	36	Degrees
Cohesion:	0	psf
Allowable Skin Friction of Pad Sides to Soil:	0	psf
Ultimate Coefficient of Shear Friction:	0.45	
Maximum Top Conical Failure Angle:	31	Degrees
Maximum Base Conical Failure Angle:	31	Degrees
Allowable Capacity Increase:	1.33	(Due to Transient Loads)

Uplift

Weight of Concrete (Buoyancy Effect Considered):	19.0	k
Weight of Soil (Buoyancy Effect Considered):	99.5	k
Uplift Resistance from Skin Friction:	0.0	k
Allowable Uplift Resistance (FS = 1.5 to 2):	64.9	k
Uplift Design Load/Allowable Uplift Resistance:	0.68	Result: OK

Shear

Ultimate Shear Friction Resistance Due to Normal Force - Uplift:	9.3	k
Passive Pressure:	3236	psf
Ultimate Passure Pressure Resistance:	99.2	k
Allowable Shear Resistance (FS = 1.5 to 2):	54.3	k
Shear Design Load/Allowable Shear Resistance:	0.93	Result: OK

Anchor Rod Capacity

# of Anchor Rods:	1	
Anchor Rod Gross Area:	2.41	in^2
Anchor Rod Net Area:	2.41	in^2
Anchor Rod Yield Strength:	48	ksi
Anchor Rod Ultimate Strength:	62	ksi
Allowable Stress Increase:	1.33	
Resultant Tensile Load:	67.0	k
Anchor Rod Tensile Resistance:	92.4	k
Resultant Tensile Load / Anchor Rod Tensile Resistance:	0.72	Result: OK

Strength Analysis of Reinforced Concrete

Concrete Compressive Srength (f'_c):	3000	psi
Longitudinal Rebar Yield Strength:	60000	psi
# Longitudinal Rebar (Top):	6	
# Longitudinal Rebar (1 Side):	5	
Rebar Size:	4	
Wind Load Factor:	1.3	
Strength Reduction Factor for Shear (ϕ_v):	0.75	
Strength Reduction Factor for Flexure (ϕ_b):	0.9	
Compression Zone Factor (β_1):	0.85	
Area of Single Rebar:	0.20	in^2
One Way Shear due to Shear Load (V_u):	18.1	k
Nominal One Way Shear Capacity for Shear Load ($\phi_c V_n$):	122.3	k
$V_u/\phi_v V_n$:	0.15	Result: OK
One Way Shear due to Uplift (V_u):	24.4	k
Nominal One Way Shear Capacity for Uplift ($\phi_c V_n$):	108.4	k
$V_u/\phi_v V_n$:	0.22	Result: OK
Pad Flexure due to Shear Load (M_u):	94.6	k-ft
Nominal Flexural Capacity for Shear Load ($\phi_b M_n$):	279.0	k-ft
Pad Flexure due to Uplift (M_u):	82.0	k-ft
Nominal Flexural Capacity for Uplift ($\phi_b M_n$):	107.9	k-ft
$M_u/\phi_b M_n$ (Max.):	0.76	Result: OK