

April 7, 2016

Via Hand Delivery

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

Re: **Notice of Exempt Modification – Facility Modification
528 Wheeler Farm Road, Milford, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains fifteen (15) wireless telecommunications antennas at the 114-foot level on the existing 120-foot tower at 528 Wheeler Farm Road in Milford, Connecticut (the “Property”). The tower is owned by Crown Castle (“Crown”). The Council approved Cellco’s use of this tower in 2004 (Petition No. 656). Cellco now intends to replace six (6) of its existing antennas with two (2) model SBNHH-1D45B, 700/2100 MHz antennas; one (1) model SBNHH-1D65B, 700/2100 MHz antenna; two (2) model SBNHH-1D45B, 1900 MHz antennas; and one (1) model SBNHH-1D65B, 1900 MHz antenna, all at the same level on the tower. Cellco also intends to replace three (3) remote radio heads (“RRHs”) and install six (6) new RRHs and one (1) HYBRIFLEX™ fiber optic antenna cable. Included in Attachment 1 are specifications for Cellco’s replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Benjamin G. Blake, Mayor for the City of Milford. A copy of this letter is also being sent to Global Signal Acquisitions II LLC, the owner of the Property and to Crown, 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).

14221282-v1

Robinson+Cole

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Page 2

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRH's will be located on its existing platform at the 114-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 worst-case General Power Density table for Cellco's modified facility is included in Attachment 2.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support Cellco's proposed modifications. (*See Structural Analysis Report included in Attachment 3*).

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

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Benjamin G. Blake, Milford Mayor
Global Signal Acquisitions II LLC
Crown Castle
Tim Parks

ATTACHMENT 1



SBNHH-1D45B

Andrew® Tri-band Antenna, 698–896 and 2x 1695–2360 MHz, 45° horizontal beamwidth, internal RETs.

- Interleaved dipole technology providing for attractive, low wind load mechanical package
- Three internal RETs for independent tilt on all three bands

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain, dBi	16.9	17.6	19.6	20.1	20.5	21.0
Beamwidth, Horizontal, degrees	47	43	45	42	42	39
Beamwidth, Vertical, degrees	12.4	11.4	5.8	5.3	5.1	4.5
Beam Tilt, degrees	0–14	0–14	0–8	0–8	0–8	0–8
USLS, dB	19	22	18	17	17	16
Front-to-Back Ratio at 180°, dB	30	31	31	33	33	35
CPR at Boresight, dB	27	27	21	23	16	17
CPR at 10 dB Horizontal Beamwidth, dB	11	14	10	11	11	13
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR Return Loss, dB	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain by all Beam Tilts, average, dBi	16.6	17.3	19.2	19.8	20.1	20.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.5	±0.4	±0.5	±0.4
	0° 16.6	0° 17.3	0° 19.3	0° 19.9	0° 20.1	0° 20.7
Gain by Beam Tilt, average, dBi	7° 16.7	7° 17.4	4° 19.3	4° 19.9	4° 20.2	4° 20.9
	14° 16.4	14° 17.1	8° 19.0	8° 19.6	8° 20.0	8° 20.4
Beamwidth, Horizontal Tolerance, degrees	±1.5	±2.8	±2.1	±1.7	±1	±1.7
Beamwidth, Vertical Tolerance, degrees	±0.8	±0.6	±0.3	±0.2	±0.4	±0.1
USLS, dB	19	23	16	15	16	16
Front-to-Back Total Power at 180° ± 30°, dB	24	24	28	30	31	30
CPR at Boresight, dB	28	29	23	24	20	19
CPR at 10 dB Horizontal Beamwidth, dB	13	17	13	13	13	13

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

General Specifications

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

SBNHH-1D45B

POWERED BY



Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	1038.0 N @ 150 km/h 233.4 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h 150.0 mph

Dimensions

Depth	178.0 mm 7.0 in
Length	1829.0 mm 72.0 in
Width	457.0 mm 18.0 in
Net Weight	29.2 kg 64.4 lb

Remote Electrical Tilt (RET) Information

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

Regulatory Compliance/Certifications

Agency

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

Classification

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



Included Products

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

* Footnotes

Performance Note Severe environmental conditions may degrade optimum performance

POWERED BY



SBNHH-1D65B

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

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

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS (First Lobe), dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
CPR at Boresight, dB	20	23	20	20	17	21
CPR at Sector, dB	14	10	12	10	9	1
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR Return Loss, dB	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	14.5	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
	0° 14.6	0° 14.5	0° 17.4	0° 17.8	0° 18.1	0° 18.2
Gain by Beam Tilt, average, dBi	7° 14.6	7° 14.4	3° 17.5	3° 17.9	3° 18.3	3° 18.4
	14° 14.2	14° 13.6	7° 17.4	7° 17.9	7° 18.2	7° 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	4

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

General Specifications

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

SBNHH-1D65B

POWERED BY



Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241 km/h 150 mph

Dimensions

Depth	180.0 mm 7.1 in
Length	1851.0 mm 72.9 in
Width	301.0 mm 11.9 in
Net Weight	18.4 kg 40.6 lb

Remote Electrical Tilt (RET) Information

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

Packed Dimensions

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

Regulatory Compliance/Certifications

Agency

RoHS 2011/65/EU

China RoHS SJ/T 11364-2006

ISO 9001:2008

Classification

Compliant by Exemption

Above Maximum Concentration Value (MCV)

Designed, manufactured and/or distributed under this quality management system



Included Products

Product Specifications

COMMSCOPE®

SBNHH-1D65B

POWERED BY



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

* Footnotes

Performance Note Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

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

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

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

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

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

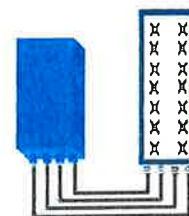


FEATURES

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

BENEFITS

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



4x30W with 4T4R
or
2x60W with 2T4R

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

TECHNICAL SPECIFICATIONS

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

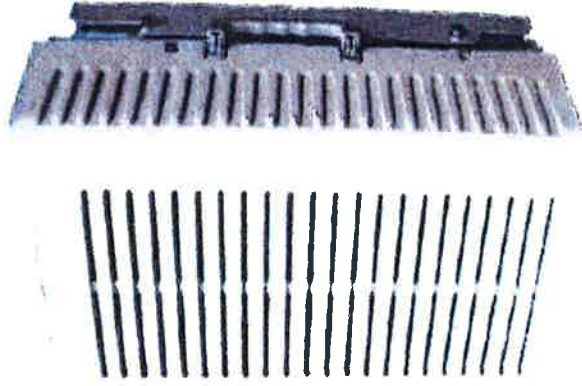
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PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

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



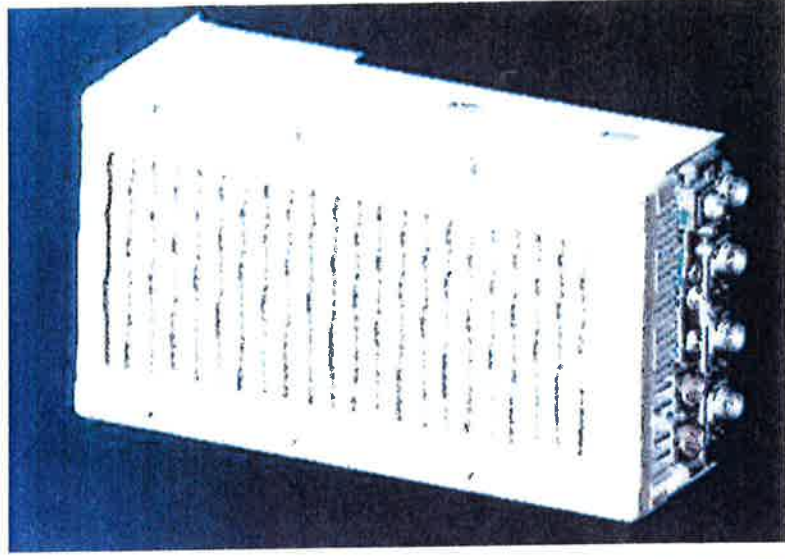
** Not a Verizon Wireless deployed product

NEW PCS RF MODULES FOR VZW

RRH2X60 - HW CHARACTERISTICS

LR14.3

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



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

B66A RRH 4X45 - PHYSICAL CHARACTERISTICS- TARGET 15.1



B4 RRH4x45-4R (AWS-Extension Band)	
Frequency Band	LR15.1 – B4 / LR16.1 B66 (AWS 1 and 3 only)
RF Output Power	2x90W/4x45W (SW configurable)
Operational range	2110-2180 MHz, DL/ 1710-1780 MHz UL
Instantaneous Bandwidth	70MHz
Configuration (HW readiness)	LTE: 2T2R, 2T4R, 4T4R
Carrier Bandwidths	5, 10, 15 and 20 MHz
Interfaces	2x CPRI Rate 7 Ports Antenna Connectors 4.3-10
AISG Support	AISG 2.0 for RET Internal Smart Bias T
Monitor Ports	NA (Spec An to replace ports)
Environmental	GR487 Compliance / GR3178 Compliance (with exceptions)
Mounting options	Pole/Wall
Connectors location	All bottom
External Alarms	4
Annual Return Rate (Target)	<2%
Operating Temperature	-40 C to +55 C (without solar load)

- Commercial Product Will include B66 support of AWS 1 and 3.
- Lower AWS 3 UL Not in 3GPP Band 66 Definition

Physical Dimensions – Not to Exceed		
	W/O Solar Shield	With Solar Shield
Dimensions HxWxD	H = 26in (H=660mm) W = 11.4in (W=290mm) D = 5.9in (D=150mm)	H = 26.6in (H=675mm) W = 12in (W=304mm) D = 6.8in (D=173mm)
Volume	29l	35.5l
Weight		64lbs / 29kg





HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber

Product Description

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX® accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

Features/Benefits

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



Figure 1: HYBRIFLEX Series

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Mass Properties			
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
Electrical Properties			
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	0.68 (0.205)
DC-Resistance Power Cable, 8.4mm ² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Optical Properties			
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[μm]	50/125
Primary Coating (Acrylate)		[μm]	245
Buffer Diameter, Nominal		[μm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
DC Power Cable Properties			
Size (Power)		[mm (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Environmental			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to 149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to 149)

* This data is provisional and subject to change

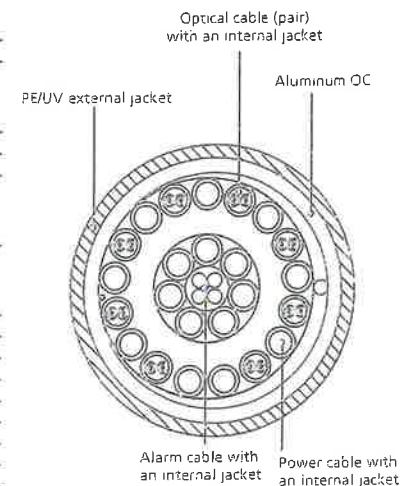


Figure 2: Construction Detail

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

ATTACHMENT 2

Site Name: Milford NE Tower Height: 120ft		General		Power		Density							
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total					
*AT&T LTE	1	500	97	0.0217	700	0.4667	0.47%						
*AT&T LTE	1	500	97	0.0217	1900	1.0000	0.22%						
*AT&T LTE	1	500	97	0.0217	2300	1.0000	0.22%						
*AT&T UMTS	2	500	97	0.0434	880	0.5867	0.74%						
*AT&T UMTS	2	500	97	0.0434	1900	1.0000	0.43%						
*AT&T GSM	1	296	97	0.0129	880	0.5867	0.22%						
*AT&T GSM	1	427	97	0.0185	1900	1.0000	0.19%						
*XM Radio	2	312	112	0.0200	2337	1.0000	0.20%						
*Pocket (now MetroPCS)	3	631	128	0.0457	2130	1.0000	0.46%						
*Clearwire	2	153	120	0.0085	2496	1.0000	0.08%						
*Clearwire	1	211	117	0.0062	11 GHz	1.0000	0.06%						
*Sprint CDMA/LTE	2	196	120	0.0108	2500	1.0000	0.11%						
*Sprint CDMA/LTE	4	348	120	0.0385	1900	1.0000	0.39%						
*Sprint CDMA/LTE	1	390	120	0.0108	850	0.5667	0.19%						
*T-Mobile GSM/UMTS	2	12	108	0.0008	1950	1.0000	0.01%						
*T-Mobile UMTS	2	12	107	0.0008	2100	1.0000	0.01%						
*T-Mobile LTE	2	24	108	0.0017	2100	1.0000	0.02%						
*Nextel	9	100	83	0.0546	851	0.5673	0.96%						
*Metricom	5	100	73	0.0401	902	0.6013	0.67%						
Verizon PCS	1	3288	114	0.0910	1970	1.0000	9.10%						
Verizon Cellular	9	409	114	0.1018	869	0.5793	17.58%						
Verizon AWS	1	3828	114	0.1059	2145	1.0000	10.59%						
Verizon 700	1	1665	114	0.0461	746	0.4973	9.26%						52.16%
* Source: Siting Council													

ATTACHMENT 3



Date: March 30, 2016

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6565

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
rkoors@pjfweb.com

Subject: Structural Analysis Report

Carrier Designation:	Verizon Wireless Co-Locate	
	Carrier Site Number:	N/A
	Carrier Site Name:	Milford NE
Crown Castle Designation:	Crown Castle BU Number:	876320
	Crown Castle Site Name:	528 Wheelers Farm Rd
	Crown Castle JDE Job Number:	356661
	Crown Castle Work Order Number:	1211014
	Crown Castle Application Number:	321006 Rev. 17

Engineering Firm Designation: Paul J Ford and Company Project Number: 37516-0701.002.7805

Site Data: 528 Wheelers Farm Road, MILFORD, New Haven County, CT
Latitude 41° 14' 54.35", Longitude -73° 4' 44.67"
120 Foot - Monopole Tower

Dear Sean Dempsey,

Paul J Ford and Company is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 886882, in accordance with application 321006, revision 17.

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

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 110 mph converted to a fastest mile wind speed of 90 mph with no ice, 37.6 mph with 1.25 inch ice thickness and 50 mph under service loads.

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

Structural analysis prepared by:

Respectfully submitted by:

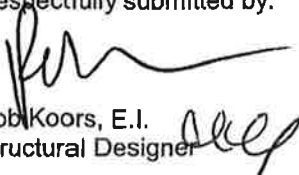

Bob Koors, E.I.
Structural Designer





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1) INTRODUCTION

This tower is a 120 ft Monopole tower designed by SUMMIT in February of 1997. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 110 mph converted to a fastest mile wind speed of 90 mph with no ice, 37.6 mph with 1.25 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
113.0	114.0	3	alcatel lucent	AWS-3 RRH4X45	1	1-5/8	-
		3	alcatel lucent	RRH2X60-1900			
		3	alcatel lucent	RRH2x60-700			
		4	commscope	SBNHH-1D45B w/ Mount Pipe			
		2	commscope	SBNHH-1D65B w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
122.0	125.0	2	andrew	VHLP2-11	6 3 3	5/16 1-1/4 1/2	1
	123.0	1	andrew	PX2F-52			
		1	mti wireless edge	MT-485025			
	122.0	3	argus technologies	LLPX310R w/ Mount Pipe			
		3	samsung telecommunications	FDD_R6_RRH			
		1	tower mounts	Platform Mount [LP 713-1]			
	121.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSP18-C-A20 w/ Mount Pipe			
		3	alcatel lucent	TD-RRH8x20-25			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
113.0	116.0	1	trimble	ACUTIME 2000	7	1-1/4	1
	114.0	2	andrew	DB846F65ZAXY w/ Mount Pipe			
		3	antel	BXA-171063-8BF-EDIN-0 w/ Mount Pipe			
		4	antel	LPA-80063/4CF w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		2	rfs celwave	FD9R6004/2C-3L			
	113.0	4	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 305-1]			
	114.0	3	alcatel lucent	RRH2x40-AWS	6	1-5/8	3
		1	antel	BXA-70040/6CFx2 w/ Mount Pipe			
		1	antel	BXA-70040/6CFx4 w/ Mount Pipe			
		1	antel	BXA-70063/6CF w/ Mount Pipe			
		3	rymsa wireless	MG D3-800Tx w/ Mount Pipe			
	105.0	107.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	7	1-5/8
3			ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
3			ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
3			ericsson	KRY 112 144/1			
3			ericsson	RRUS 11 B12			
105.0		1	tower mounts	Platform Mount [LP 712-1]			
97.0	97.0	6	ericsson	RRUS 11	2 4	3/8 5/8	1
		3	ericsson	TME-RRUS-32 B30			
		2	raycap	DC6-48-60-18-8F			
		1	tower mounts	Side Arm Mount [SO 102-3]			
96.0	97.0	3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe	12	1-1/4	1
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		12	powerwave technologies	LGP2140X			
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			
	96.0	1	tower mounts	Platform Mount [LP 601-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
82.0	82.0	-	-	-	12	7/8	1
75.0	75.0	-	-	-	1	1/2	1

Notes:

- 1) Existing Equipment
- 2) Reserved Equipment
- 3) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 08-10145E G1, 10/22/2008	1613534	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit, 2249, 02/27/1997	1614583	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit, 2249, 02/27/1997	1614557	CCISITES
4-POST-MODIFICATION INSPECTION	Semaan, CT03XC038, 05/17/2004	3350209	CCISITES
4-POST-MODIFICATION INSPECTION	B&T, 80214, 07/15/2009	2460628	CCISITES
4-POST-MODIFICATION INSPECTION	B&T, 80214.003, 04/04/2012	3349204	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 1210009, 04/01/2013	3753892	CCISITES
4-POST-MODIFICATION INSPECTION	SGS, 145190, 06/23/15	5760332	CCISITES
4-POST-MODIFICATION INSPECTION	FDH, 15CAZG1500, 02/23/2016	6112300	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) Monopole was reinforced in conformance with the referenced modification drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	120 - 96.75	Pole	TP26.6976x22x0.25	1	-8.85	1021.68	75.7	Pass
L2	96.75 - 91.58	Pole	TP27.7422x26.6976x0.3218	2	-11.49	1241.33	84.5	Pass
L3	91.58 - 90.0833	Pole	TP28.0446x27.7422x0.4817	3	-11.77	1638.43	69.4	Pass
L4	90.0833 - 78	Pole	TP30.486x28.0446x0.6179	4	-13.75	2197.17	70.9	Pass
L5	78 - 76.75	Pole	TP30.2385x28.4925x0.6778	5	-15.75	2442.76	75.0	Pass
L6	76.75 - 72	Pole	TP31.1982x30.2385x0.7684	6	-17.19	2511.59	82.1	Pass
L7	72 - 70.25	Pole	TP31.5518x31.1982x0.7862	7	-17.74	2809.52	76.3	Pass
L8	70.25 - 69.75	Pole	TP31.6528x31.5518x0.7066	8	-17.90	2427.78	88.8	Pass
L9	69.75 - 56	Pole	TP34.4308x31.6528x0.7047	9	-22.12	2924.60	93.7	Pass
L10	56 - 54	Pole	TP34.8349x34.4308x0.8307	10	-22.86	3499.04	81.2	Pass
L11	54 - 53.5	Pole	TP34.9359x34.8349x0.7439	11	-23.03	3415.23	83.4	Pass
L12	53.5 - 39.75	Pole	TP37.714x34.9359x0.621	12	-25.78	3199.04	99.4	Pass
L13	39.75 - 35	Pole	TP38.0487x35.5123x0.7536	13	-30.35	4011.97	90.2	Pass
L14	35 - 25	Pole	TP40.069x38.0487x0.7306	14	-34.11	4117.70	96.5	Pass
L15	25 - 14.5	Pole	TP42.1905x40.069x0.7714	15	-38.43	4590.76	94.6	Pass
L16	14.5 - 12.5	Pole	TP42.5945x42.1905x0.8155	16	-39.31	4901.57	90.2	Pass
L17	12.5 - 5.5	Pole	TP44.0088x42.5945x0.7987	17	-42.41	4977.25	93.4	Pass
L18	5.5 - 4.75	Pole	TP44.1603x44.0088x0.7413	18	-42.74	4752.05	98.0	Pass
L19	4.75 - 0	Pole	TP45.12x44.1603x0.7319	19	-44.76	4933.15	97.5	Pass
							Summary	
						Pole (L12)	99.4	Pass
						Rating =	99.4	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	92.4	Pass
1	Base Plate	0	54.2	Pass
1	Base Foundation Steel	0	75.1	Pass
1	Base Foundation Soil Interaction	0	90.9	Pass

Structure Rating (max from all components) =	99.4%
---	--------------

Notes:

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

APPENDIX A
TNXTOWER OUTPUT

Tower Input Data

There is a pole section.

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

The following design criteria apply:

- 4) Tower is located in New Haven County, Connecticut.
- 5) Basic wind speed of 90 mph.
- 6) Nominal ice thickness of 1.2500 in.
- 7) Ice thickness is considered to increase with height.
- 8) Ice density of 56.00 pcf.
- 9) A wind speed of 38 mph is used in combination with ice.
- 10) Temperature drop of 50 °F.
- 11) Deflections calculated using a wind speed of 50 mph.
- 12) A non-linear (P-delta) analysis was used.
- 13) Pressures are calculated at each section.
- 14) Stress ratio used in pole design is 1.333.
- 15) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	120.0000- 96.7500	23.2500	0.00	12	22.0000	26.6976	0.2500	1.0000	A607-60 (60 ksi)
L2	96.7500- 91.5800	5.1700	0.00	12	26.6976	27.7422	0.3218	1.2871	Reinf 54.63 ksi (55 ksi)
L3	91.5800- 90.0833	1.4967	0.00	12	27.7422	28.0446	0.4817	1.9267	Reinf 47.92 ksi (48 ksi)
L4	90.0833- 78.0000	12.0833	3.75	12	28.0446	30.4860	0.6179	2.4716	Reinf 47.43 ksi (47 ksi)
L5	78.0000- 76.7500	5.0000	0.00	12	28.4925	30.2385	0.6778	2.7112	Reinf 47.34 ksi (47 ksi)
L6	76.7500- 72.0000	4.7500	0.00	12	30.2385	31.1982	0.7684	3.0735	Reinf 41.71 ksi (42 ksi)
L7	72.0000- 70.2500	1.7500	0.00	12	31.1982	31.5518	0.7862	3.1450	Reinf 45.10 ksi (45 ksi)
L8	70.2500- 69.7500	0.5000	0.00	12	31.5518	31.6528	0.7066	2.8265	Reinf 43.11 ksi (43 ksi)
L9	69.7500- 56.0000	13.7500	0.00	12	31.6528	34.4308	0.7047	2.8189	Reinf 47.78 ksi (48 ksi)
L10	56.0000- 54.0000	2.0000	0.00	12	34.4308	34.8349	0.8307	3.3227	Reinf 48.10 ksi (48 ksi)
L11	54.0000- 53.5000	0.5000	0.00	12	34.8349	34.9359	0.7439	2.9754	Reinf 52.14 ksi (52 ksi)
L12	53.5000- 39.7500	13.7500	4.75	12	34.9359	37.7140	0.6210	2.4839	Reinf 55.36 ksi (55 ksi)
L13	39.7500- 35.0000	9.5000	0.00	12	35.5123	38.0487	0.7536	3.0143	Reinf 55.43 ksi (55 ksi)
L14	35.0000- 25.0000	10.0000	0.00	12	38.0487	40.0690	0.7306	2.9225	Reinf 55.63 ksi (56 ksi)
L15	25.0000- 14.5000	10.5000	0.00	12	40.0690	42.1904	0.7714	3.0857	Reinf 55.79 ksi (56 ksi)
L16	14.5000- 12.5000	2.0000	0.00	12	42.1904	42.5945	0.8155	3.2621	Reinf 55.86 ksi (56 ksi)
L17	12.5000- 5.5000	7.0000	0.00	12	42.5945	44.0088	0.7987	3.1948	Reinf 56.00 ksi (56 ksi)
L18	5.5000-4.7500	0.7500	0.00	12	44.0088	44.1603	0.7413	2.9651	Reinf 57.33 ksi (57 ksi)
L19	4.7500-0.0000	4.7500		12	44.1603	45.1200	0.7319	2.9277	Reinf 58.96 ksi (59 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	22.7761	17.5087	1057.2060	7.7865	11.3960	92.7699	2142.1860	8.6173	5.2260	20.904
	27.6394	21.2903	1900.8206	9.4682	13.8294	137.4482	3851.5778	10.4785	6.4850	25.94
L2	27.6394	27.3280	2426.6451	9.4426	13.8294	175.4705	4917.0409	13.4500	6.2926	19.556
	28.7208	28.4103	2726.5262	9.8165	14.3705	189.7314	5524.6813	13.9827	6.5726	20.426
L3	28.7208	42.2805	4010.4567	9.7593	14.3705	279.0765	8126.2725	20.8092	6.1440	12.756
	29.0339	42.7495	4145.4107	9.8675	14.5271	285.3570	8399.7260	21.0400	6.2251	12.924
L4	29.0339	54.5701	5239.4686	9.8188	14.5271	360.6685	10616.583	26.8577	5.8600	9.484
	31.5614	59.4276	6766.8944	10.6928	15.7917	428.5083	13711.562	29.2485	6.5142	10.542
							8			
							7			
L5	30.8533	60.7060	5994.6885	9.9577	14.7591	406.1685	12146.864	29.8777	5.8195	8.586
	31.3052	64.5167	7195.9399	10.5827	15.6635	459.4069	14580.925	31.7532	6.2874	9.276
							2			
L6	31.3052	72.9136	8082.7357	10.5503	15.6635	516.0222	16377.813	35.8858	6.0447	7.867
	32.2987	75.2880	8898.3682	10.8939	16.1607	550.6190	18030.506	37.0545	6.3019	8.202
							4			
L7	32.2987	76.9937	9089.2858	10.8875	16.1607	562.4328	18417.357	37.8940	6.2540	7.954
	32.6648	77.8889	9410.0116	11.0141	16.3438	575.7536	19067.234	38.3345	6.3488	8.075
							7			
L8	32.6648	70.1825	8522.9199	11.0426	16.3438	521.4767	17269.746	34.5417	6.5621	9.287
	32.7694	70.4123	8606.9339	11.0787	16.3961	524.9364	17439.981	34.6548	6.5892	9.325
							4			
							6			
L9	32.7694	70.2273	8585.3723	11.0794	16.3961	523.6214	17396.291	34.5637	6.5943	9.357
	35.6454	76.5313	11111.112	12.0740	17.8352	622.9887	22514.127	37.6664	7.3388	10.414
			9				2			
L10	35.6454	89.8734	12950.889	12.0289	17.8352	726.1431	26242.014	44.2329	7.0012	8.428
	36.0638	90.9542	13423.779	12.1735	18.0445	743.9268	27200.215	44.7649	7.1095	8.559
			9				2			
			0				7			
L11	36.0638	81.6548	12112.926	12.2046	18.0445	671.2812	24544.073	40.1880	7.3422	9.871
	36.1683	81.8968	12220.926	12.2408	18.0968	675.3081	24762.910	40.3071	7.3693	9.907
			5				4			
L12	36.1683	68.6147	10312.641	12.2848	18.0968	569.8594	20896.207	33.7701	7.6986	12.398
	39.0444	74.1696	13025.548	13.2793	19.5359	666.7510	26393.292	36.5040	8.4431	13.596
			4				4			
L13	38.0780	84.3420	13006.453	12.4436	18.3954	707.0494	26354.600	41.5106	7.4977	9.95
	39.3909	90.4964	16066.467	13.3516	19.7092	815.1758	32555.019	44.5396	8.1775	10.852
			5				1			
L14	39.3909	87.7943	15605.937	13.3599	19.7092	791.8095	31621.859	43.2097	8.2390	11.277
	41.4825	92.5474	18280.333	14.0832	20.7558	880.7353	37040.911	45.5490	8.7804	12.018
			6				9			
L15	41.4825	97.6142	19241.169	14.0685	20.7558	927.0278	38987.825	48.0427	8.6711	11.24
	43.6788	102.8837	22528.511	14.8280	21.8547	1030.8336	45648.871	50.6362	9.2396	11.977
			0				0			
L16	43.6788	108.6508	23740.686	14.8122	21.8547	1086.2989	48105.066	53.4746	9.1214	11.185
	44.0971	109.7119	24443.060	14.9569	22.0640	1107.8274	49528.266	53.9969	9.2297	11.317
			0				3			
L17	44.0971	107.4898	23967.290	14.9629	22.0640	1086.2641	48564.227	52.9032	9.2748	11.613
	45.5613	111.1269	26483.530	15.4692	22.7966	1161.7340	53662.813	54.6933	9.6539	12.087
			7				4			
L18	45.5613	103.2762	24677.991	15.4898	22.7966	1082.5317	50004.301	50.8294	9.8077	13.231
	45.7181	103.6378	24938.180	15.5440	22.8750	1090.1915	50531.513	51.0074	9.8483	13.286
			6				6			

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L19	45.7181	102.3513	24639.218	15.5474	22.8750	1077.1221	49925.736	50.3742	9.8734	13.49
			2				2			
	46.7117	104.6130	26309.010	15.8909	23.3722	1125.6559	53309.188	51.4874	10.1306	13.841
			6				3			

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
L1 120.0000-96.7500				1	1	1			
L2 96.7500-91.5800				1	1	1			
L3 91.5800-90.0833				1	1	1			
L4 90.0833-78.0000				1	1	1			
L5 78.0000-76.7500				1	1	1			
L6 76.7500-72.0000				1	1	1			
L7 72.0000-70.2500				1	1	1			
L8 70.2500-69.7500				1	1	1			
L9 69.7500-56.0000				1	1	1			
L10 56.0000-54.0000				1	1	1			
L11 54.0000-53.5000				1	1	1			
L12 53.5000-39.7500				1	1	1			
L13 39.7500-35.0000				1	1	1			
L14 35.0000-25.0000				1	1	1			
L15 25.0000-14.5000				1	1	1			
L16 14.5000-12.5000				1	1	1			
L17 12.5000-5.5000				1	1	1			
L18 5.5000-4.7500				1	1	1			
L19 4.7500-0.0000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	Number Per Row	Clear Spacing	Width or Diamete	Perimete	Weight
				ft			in	r	r	plf
								in	in	
**										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C _A A _A	Weight
				ft		ft ² /ft	plf

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A		Weight plf
							ft ² /ft	
9207(5/16")	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	6	No Ice	0.0000	0.60
						1/2" Ice	0.0000	1.11
						1" Ice	0.0000	2.22
						2" Ice	0.0000	6.29
						4" Ice	0.0000	21.76
7983A(1/2")	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	4	No Ice	0.0000	0.08
						1/2" Ice	0.0000	0.74
						1" Ice	0.0000	2.01
						2" Ice	0.0000	6.39
						4" Ice	0.0000	22.47
3" (Nominal) Conduit	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	1	No Ice	0.0000	1.49
						1/2" Ice	0.0000	3.93
						1" Ice	0.0000	6.99
						2" Ice	0.0000	14.93
						4" Ice	0.0000	38.14
3" (Nominal) Conduit	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	1	No Ice	0.3500	1.49
						1/2" Ice	0.4500	3.93
						1" Ice	0.5500	6.99
						2" Ice	0.7500	14.93
						4" Ice	1.1500	38.14
HB114-13U3M12-XXXF(1-1/4")	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	1	No Ice	0.0000	0.99
						1/2" Ice	0.0000	2.24
						1" Ice	0.0000	4.10
						2" Ice	0.0000	9.64
						4" Ice	0.0000	28.07
HB114-1-0813U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	2	No Ice	0.0000	1.20
						1/2" Ice	0.0000	2.45
						1" Ice	0.0000	4.30
						2" Ice	0.0000	9.85
						4" Ice	0.0000	28.27
HB114-1-0813U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	1	No Ice	0.1540	1.20
						1/2" Ice	0.2540	2.45
						1" Ice	0.3540	4.30
						2" Ice	0.5540	9.85
						4" Ice	0.9540	28.27
***	C	No	CaAa (Out Of Face)	113.0000 - 0.0000	1	No Ice	0.0000	0.82
LDF7-50A(1-5/8")						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
						2" Ice	0.0000	10.54
						4" Ice	0.0000	30.04
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	113.0000 - 0.0000	5	No Ice	0.0000	0.82
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
						2" Ice	0.0000	10.54
						4" Ice	0.0000	30.04
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	113.0000 - 0.0000	2	No Ice	0.1980	0.82
						1/2" Ice	0.2980	2.33
						1" Ice	0.3980	4.46
						2" Ice	0.5980	10.54
						4" Ice	0.9980	30.04
**	C	No	Inside Pole	105.0000 - 0.0000	1	No Ice	0.0000	0.82
LDF7-50A(1-5/8")						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	105.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
						2" Ice	0.0000	10.54
						4" Ice	0.0000	30.04
**	C	No	Inside Pole	97.0000 - 0.0000	1	No Ice	0.0000	0.06
FB-L98B-002-50000(3/8)						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
						2" Ice	0.0000	0.06
						4" Ice	0.0000	0.06
WR-VG82ST-BRDA(C	No	Inside Pole	97.0000 - 0.0000	2	No Ice	0.0000	0.31

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_{AA}	Weight
							ft^2/ft	plf
5/8")						1/2" Ice	0.0000	0.31
						1" Ice	0.0000	0.31
						2" Ice	0.0000	0.31
						4" Ice	0.0000	0.31
FB-L98B-002-50000(3/8)	C	No	Inside Pole	97.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
						2" Ice	0.0000	0.06
						4" Ice	0.0000	0.06
WR-VG82ST-BRDA(5/8")	C	No	Inside Pole	97.0000 - 0.0000	2	No Ice	0.0000	0.31
						1/2" Ice	0.0000	0.31
						1" Ice	0.0000	0.31
						2" Ice	0.0000	0.31
						4" Ice	0.0000	0.31
**								
LDF6-50A(1-1/4")	C	No	Inside Pole	96.0000 - 0.0000	12	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
						2" Ice	0.0000	0.66
						4" Ice	0.0000	0.66
**								
LDF5-50A(7/8")	C	No	Inside Pole	82.0000 - 0.0000	12	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
						2" Ice	0.0000	0.33
						4" Ice	0.0000	0.33

LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	75.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.84
						1" Ice	0.0000	2.14
						2" Ice	0.0000	6.58
						4" Ice	0.0000	22.78

C6 x 10.5	C	No	CaAa (Out Of Face)	56.0000 - 0.0000	2	No Ice	0.3390	0.00
						1/2" Ice	0.4223	0.00
						1" Ice	0.5057	0.00
						2" Ice	0.6723	0.00
						4" Ice	1.0057	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	92.0000 - 56.0000	2	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
						2" Ice	0.6111	0.00
						4" Ice	1.0556	0.00
**								

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_{AA} In Face ft^2	C_{AA} Out Face ft^2	Weight K
L1	120.0000-96.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	18.153	0.42
L2	96.7500-91.5800	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.793	0.17
L3	91.5800-90.0833	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.846	0.05
L4	90.0833-78.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	14.903	0.42
L5	78.0000-76.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.542	0.05
L6	76.7500-72.0000	A	0.000	0.000	0.000	0.000	0.00

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Tower Sectio n	Tower Elevation ft	Face	A_R	A_F	C_{AA}	C_{AA}	Weight K
			ft ²	ft ²	In Face ft ²	Out Face ft ²	
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.858	0.18
L7	72.0000-70.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.158	0.07
L8	70.2500-69.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.617	0.02
L9	69.7500-56.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	16.958	0.51
L10	56.0000-54.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.156	0.07
L11	54.0000-53.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.789	0.02
L12	53.5000-39.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	21.697	0.51
L13	39.7500-35.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.495	0.18
L14	35.0000-25.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	15.780	0.37
L15	25.0000-14.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	16.569	0.39
L16	14.5000-12.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.156	0.07
L17	12.5000-5.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.046	0.26
L18	5.5000-4.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.183	0.03
L19	4.7500-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.495	0.18

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Sectio n	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R	A_F	C_{AA}	C_{AA}	Weight K
				ft ²	ft ²	In Face ft ²	Out Face ft ²	
L1	120.0000- 96.7500	A	1.441	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	40.923	3.33
L2	96.7500-91.5800	A	1.418	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.921	1.00
L3	91.5800-90.0833	A	1.411	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.475	0.29
L4	90.0833-78.0000	A	1.398	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	35.928	2.32
L5	78.0000-76.7500	A	1.385	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.717	0.24
L6	76.7500-72.0000	A	1.378	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	14.004	0.92
L7	72.0000-70.2500	A	1.371	0.000	0.000	0.000	0.000	0.00

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Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.143	0.34
L8	70.2500-69.7500	A	1.368	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.468	0.10
L9	69.7500-56.0000	A	1.350	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	40.063	2.62
L10	56.0000-54.0000	A	1.329	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.168	0.37
L11	54.0000-53.5000	A	1.325	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.540	0.09
L12	53.5000-39.7500	A	1.303	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	41.997	2.51
L13	39.7500-35.0000	A	1.269	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	14.508	0.87
L14	35.0000-25.0000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	29.947	1.73
L15	25.0000-14.5000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	31.444	1.82
L16	14.5000-12.5000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.989	0.35
L17	12.5000-5.5000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	20.963	1.21
L18	5.5000-4.7500	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.246	0.13
L19	4.7500-0.0000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	14.225	0.82

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L1	120.0000-96.7500	-0.7400	0.4272	-1.1643	0.6722
L2	96.7500-91.5800	-0.8553	0.4938	-1.3490	0.7789
L3	91.5800-90.0833	-1.0468	0.6043	-1.6268	0.9392
L4	90.0833-78.0000	-1.0640	0.6143	-1.6686	0.9634
L5	78.0000-76.7500	-1.0731	0.6196	-1.6928	0.9773
L6	76.7500-72.0000	-1.0812	0.6242	-1.7087	0.9865
L7	72.0000-70.2500	-1.0886	0.6285	-1.7264	0.9967
L8	70.2500-69.7500	-1.0911	0.6300	-1.7324	1.0002
L9	69.7500-56.0000	-1.1065	0.6388	-1.7688	1.0212
L10	56.0000-54.0000	-1.3253	0.7651	-1.8675	1.0782
L11	54.0000-53.5000	-1.3287	0.7671	-1.8737	1.0818
L12	53.5000-39.7500	-1.3475	0.7780	-1.9069	1.1009
L13	39.7500-35.0000	-1.3610	0.7858	-1.9362	1.1178
L14	35.0000-25.0000	-1.3806	0.7971	-1.9607	1.1320
L15	25.0000-14.5000	-1.4036	0.8104	-2.0109	1.1610
L16	14.5000-12.5000	-1.4170	0.8181	-2.0403	1.1780
L17	12.5000-5.5000	-1.4262	0.8234	-2.0609	1.1899
L18	5.5000-4.7500	-1.4339	0.8279	-2.0782	1.1999
L19	4.7500-0.0000	-1.4393	0.8310	-2.0904	1.2069

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz Lateral	Vert						ft
							ft ²	ft ²	K	
APXVSP18-C-A20 w/ Mount Pipe	A	From Leg	4.0000	0.00	0.00	122.0000	No Ice	8.4975	6.9458	0.08
			0.00				1/2"	9.1490	8.1266	0.15
			-1.00				Ice	9.7672	9.0212	0.23
							1" Ice	11.0311	10.8440	0.41
							2" Ice	13.6786	14.8507	0.91
APXVSP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000	0.00	0.00	122.0000	No Ice	8.4975	6.9458	0.08
			0.00				1/2"	9.1490	8.1266	0.15
			-1.00				Ice	9.7672	9.0212	0.23
							1" Ice	11.0311	10.8440	0.41
							2" Ice	13.6786	14.8507	0.91
APXVSP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	122.0000	No Ice	8.4975	6.9458	0.08
			0.00				1/2"	9.1490	8.1266	0.15
			-1.00				Ice	9.7672	9.0212	0.23
							1" Ice	11.0311	10.8440	0.41
							2" Ice	13.6786	14.8507	0.91
LLPX310R w/ Mount Pipe	A	From Leg	4.0000	0.00	0.00	122.0000	No Ice	4.9623	2.8484	0.04
			0.00				1/2"	5.3512	3.3668	0.08
			0.00				Ice	5.7501	3.9019	0.12
							1" Ice	6.5777	5.0799	0.23
							2" Ice	8.3714	7.8368	0.53
LLPX310R w/ Mount Pipe	B	From Leg	4.0000	0.00	0.00	122.0000	No Ice	4.9623	2.8484	0.04
			0.00				1/2"	5.3512	3.3668	0.08
			0.00				Ice	5.7501	3.9019	0.12
							1" Ice	6.5777	5.0799	0.23
							2" Ice	8.3714	7.8368	0.53
LLPX310R w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	122.0000	No Ice	4.9623	2.8484	0.04
			0.00				1/2"	5.3512	3.3668	0.08
			0.00				Ice	5.7501	3.9019	0.12
							1" Ice	6.5777	5.0799	0.23
							2" Ice	8.3714	7.8368	0.53
MT-485025	C	From Leg	4.0000	0.00	0.00	122.0000	No Ice	2.0752	0.2358	0.01
			0.00				1/2"	2.2689	0.3329	0.01
			1.00				Ice	2.4713	0.4508	0.03
							1" Ice	2.9019	0.7125	0.06
							2" Ice	3.8669	1.3395	0.15
800 EXTERNAL NOTCH FILTER	A	From Leg	4.0000	0.00	0.00	122.0000	No Ice	0.7701	0.3747	0.01
			0.00				1/2"	0.8898	0.4647	0.02
			-1.00				Ice	1.0181	0.5634	0.02
							1" Ice	1.3007	0.7868	0.04
							2" Ice	1.9696	1.3372	0.11
800 EXTERNAL NOTCH FILTER	B	From Leg	4.0000	0.00	0.00	122.0000	No Ice	0.7701	0.3747	0.01
			0.00				1/2"	0.8898	0.4647	0.02
			-1.00				Ice	1.0181	0.5634	0.02
							1" Ice	1.3007	0.7868	0.04
							2" Ice	1.9696	1.3372	0.11
800 EXTERNAL NOTCH FILTER	C	From Leg	4.0000	0.00	0.00	122.0000	No Ice	0.7701	0.3747	0.01
			0.00				1/2"	0.8898	0.4647	0.02
			-1.00				Ice	1.0181	0.5634	0.02
							1" Ice	1.3007	0.7868	0.04
							2" Ice	1.9696	1.3372	0.11

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight	
			Horz	Lateral	Vert						ft
(3) ACU-A20-N	A	From Leg	4.0000	0.00	-1.00	0.00	122.0000	4" Ice			
								No Ice	0.0778	0.1361	0.00
								1/2"	0.1210	0.1890	0.00
								Ice	0.1728	0.2506	0.00
								1" Ice	0.3025	0.3997	0.01
								2" Ice	0.6654	0.8015	0.04
(3) ACU-A20-N	B	From Leg	4.0000	0.00	-1.00	0.00	122.0000	4" Ice			
								No Ice	0.0778	0.1361	0.00
								1/2"	0.1210	0.1890	0.00
								Ice	0.1728	0.2506	0.00
								1" Ice	0.3025	0.3997	0.01
								2" Ice	0.6654	0.8015	0.04
(3) ACU-A20-N	C	From Leg	4.0000	0.00	-1.00	0.00	122.0000	4" Ice			
								No Ice	0.0778	0.1361	0.00
								1/2"	0.1210	0.1890	0.00
								Ice	0.1728	0.2506	0.00
								1" Ice	0.3025	0.3997	0.01
								2" Ice	0.6654	0.8015	0.04
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.0000	0.00	-1.00	0.00	122.0000	4" Ice			
								No Ice	2.7087	2.6111	0.06
								1/2"	2.9477	2.8475	0.08
								Ice	3.1953	3.0925	0.11
								1" Ice	3.7164	3.6084	0.17
								2" Ice	4.8623	4.7439	0.35
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.0000	0.00	-1.00	0.00	122.0000	4" Ice			
								No Ice	2.7087	2.6111	0.06
								1/2"	2.9477	2.8475	0.08
								Ice	3.1953	3.0925	0.11
								1" Ice	3.7164	3.6084	0.17
								2" Ice	4.8623	4.7439	0.35
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.0000	0.00	-1.00	0.00	122.0000	4" Ice			
								No Ice	2.7087	2.6111	0.06
								1/2"	2.9477	2.8475	0.08
								Ice	3.1953	3.0925	0.11
								1" Ice	3.7164	3.6084	0.17
								2" Ice	4.8623	4.7439	0.35
800MHZ RRH	A	From Leg	4.0000	0.00	-1.00	0.00	122.0000	4" Ice			
								No Ice	2.4899	2.0685	0.05
								1/2"	2.7061	2.2705	0.07
								Ice	2.9310	2.4812	0.10
								1" Ice	3.4068	2.9284	0.16
								2" Ice	4.4620	3.9265	0.32
800MHZ RRH	B	From Leg	4.0000	0.00	-1.00	0.00	122.0000	4" Ice			
								No Ice	2.4899	2.0685	0.05
								1/2"	2.7061	2.2705	0.07
								Ice	2.9310	2.4812	0.10
								1" Ice	3.4068	2.9284	0.16
								2" Ice	4.4620	3.9265	0.32
800MHZ RRH	C	From Leg	4.0000	0.00	-1.00	0.00	122.0000	4" Ice			
								No Ice	2.4899	2.0685	0.05
								1/2"	2.7061	2.2705	0.07
								Ice	2.9310	2.4812	0.10
								1" Ice	3.4068	2.9284	0.16
								2" Ice	4.4620	3.9265	0.32
FDD_R6_RRH	A	From Leg	4.0000	0.00	0.00	0.00	122.0000	4" Ice			
								No Ice	1.7889	0.7778	0.03
								1/2"	1.9715	0.9182	0.04
								Ice	2.1627	1.0673	0.06
								1" Ice	2.5710	1.3914	0.09
								2" Ice	3.4914	2.1432	0.20
FDD_R6_RRH	B	From Leg	4.0000	0.00	0.00	0.00	122.0000	4" Ice			
								No Ice	1.7889	0.7778	0.03
								1/2"	1.9715	0.9182	0.04
								Ice	2.1627	1.0673	0.06
								1" Ice	2.5710	1.3914	0.09
								2" Ice	3.4914	2.1432	0.20

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
FDD_R6_RRH	C	From Leg	4.0000 0.00 0.00	0.00	122.0000	2" Ice	3.4914	2.1432	0.20
						4" Ice			
						No Ice	1.7889	0.7778	0.03
						1/2"	1.9715	0.9182	0.04
						Ice	2.1627	1.0673	0.06
						1" Ice	2.5710	1.3914	0.09
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000 0.00 -1.00	0.00	122.0000	2" Ice	3.4914	2.1432	0.20
						4" Ice			
						No Ice	7.1342	4.9591	0.08
						1/2"	7.6618	5.7544	0.13
						Ice	8.1830	6.4723	0.19
						1" Ice	9.2563	8.0099	0.34
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000 0.00 -1.00	0.00	122.0000	2" Ice	11.5262	11.4120	0.75
						4" Ice			
						No Ice	7.1342	4.9591	0.08
						1/2"	7.6618	5.7544	0.13
						Ice	8.1830	6.4723	0.19
						1" Ice	9.2563	8.0099	0.34
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.0000 0.00 -1.00	0.00	122.0000	2" Ice	11.5262	11.4120	0.75
						4" Ice			
						No Ice	7.1342	4.9591	0.08
						1/2"	7.6618	5.7544	0.13
						Ice	8.1830	6.4723	0.19
						1" Ice	9.2563	8.0099	0.34
TD-RRH8x20-25	A	From Leg	4.0000 0.00 -1.00	0.00	122.0000	2" Ice	7.3141	3.6805	0.40
						4" Ice			
						No Ice	4.7198	1.7027	0.07
						1/2"	5.0138	1.9196	0.10
						Ice	5.3165	2.1453	0.13
						1" Ice	5.9478	2.6224	0.20
TD-RRH8x20-25	B	From Leg	4.0000 0.00 -1.00	0.00	122.0000	2" Ice	7.3141	3.6805	0.40
						4" Ice			
						No Ice	4.7198	1.7027	0.07
						1/2"	5.0138	1.9196	0.10
						Ice	5.3165	2.1453	0.13
						1" Ice	5.9478	2.6224	0.20
TD-RRH8x20-25	C	From Leg	4.0000 0.00 -1.00	0.00	122.0000	2" Ice	7.3141	3.6805	0.40
						4" Ice			
						No Ice	4.7198	1.7027	0.07
						1/2"	5.0138	1.9196	0.10
						Ice	5.3165	2.1453	0.13
						1" Ice	5.9478	2.6224	0.20
Platform Mount [LP 713-1]	C	None		0.00	122.0000	2" Ice	98.5500	98.5500	4.86
						4" Ice			
						No Ice	31.2700	31.2700	1.51
						1/2"	39.6800	39.6800	1.93
						Ice	48.0900	48.0900	2.35
						1" Ice	64.9100	64.9100	3.19
2.375" OD x 5' Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	122.0000	2" Ice	3.9194	3.9194	0.20
						4" Ice			
						No Ice	1.1875	1.1875	0.02
						1/2"	1.4956	1.4956	0.03
						Ice	1.8071	1.8071	0.04
						1" Ice	2.4580	2.4580	0.08
2.375" OD x 5' Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	122.0000	2" Ice	3.9194	3.9194	0.20
						4" Ice			
						No Ice	1.1875	1.1875	0.02
						1/2"	1.4956	1.4956	0.03
						Ice	1.8071	1.8071	0.04
						1" Ice	2.4580	2.4580	0.08
2.375" OD x 5' Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	122.0000	2" Ice	3.9194	3.9194	0.20
						4" Ice			
						No Ice	1.1875	1.1875	0.02
						1/2"	1.4956	1.4956	0.03

120 Ft Monopole Tower Structural Analysis
 Project Number 37516-0701.002.7805, Application 321006, Revision 17

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz	Lateral Vert						
							ft ²	ft ²	K	
							1" Ice	2.4580	2.4580	0.08
							2" Ice	3.9194	3.9194	0.20
							4" Ice			
**										
(2) DB846F65ZAXY w/ Mount Pipe	A	From Face	4.0000	0.00	0.00	113.0000	No Ice	7.2708	7.8208	0.05
			0.00				1/2"	7.8773	9.0097	0.11
			1.00				Ice	8.4838	9.9124	0.19
							1" Ice	9.7244	11.8119	0.37
							2" Ice	12.3252	15.9785	0.87
							4" Ice			
(2) LPA-80063/4CF w/ Mount Pipe	B	From Face	4.0000	0.00	0.00	113.0000	No Ice	7.2481	7.2599	0.04
			0.00				1/2"	7.7190	7.9574	0.10
			1.00				Ice	8.2003	8.6723	0.18
							1" Ice	9.1945	10.1556	0.34
							2" Ice	11.3199	13.3910	0.80
							4" Ice			
(2) LPA-80063/4CF w/ Mount Pipe	C	From Face	4.0000	0.00	0.00	113.0000	No Ice	7.2481	7.2599	0.04
			0.00				1/2"	7.7190	7.9574	0.10
			1.00				Ice	8.2003	8.6723	0.18
							1" Ice	9.1945	10.1556	0.34
							2" Ice	11.3199	13.3910	0.80
							4" Ice			
ACUTIME 2000	A	From Face	4.0000	0.00	0.00	113.0000	No Ice	0.2975	0.2975	0.00
			0.00				1/2"	0.3739	0.3739	0.00
			3.00				Ice	0.4589	0.4589	0.01
							1" Ice	0.6549	0.6549	0.02
							2" Ice	1.1506	1.1506	0.08
							4" Ice			
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	A	From Face	4.0000	0.00	0.00	113.0000	No Ice	3.1789	3.3529	0.03
			0.00				1/2"	3.5550	3.9709	0.06
			1.00				Ice	3.9637	4.5950	0.10
							1" Ice	4.8533	5.8933	0.19
							2" Ice	6.7671	8.8855	0.49
							4" Ice			
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	B	From Face	4.0000	0.00	0.00	113.0000	No Ice	3.1789	3.3529	0.03
			0.00				1/2"	3.5550	3.9709	0.06
			1.00				Ice	3.9637	4.5950	0.10
							1" Ice	4.8533	5.8933	0.19
							2" Ice	6.7671	8.8855	0.49
							4" Ice			
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	C	From Face	4.0000	0.00	0.00	113.0000	No Ice	3.1789	3.3529	0.03
			0.00				1/2"	3.5550	3.9709	0.06
			1.00				Ice	3.9637	4.5950	0.10
							1" Ice	4.8533	5.8933	0.19
							2" Ice	6.7671	8.8855	0.49
							4" Ice			
(2) FD9R6004/2C-3L	A	From Face	4.0000	0.00	0.00	113.0000	No Ice	0.3665	0.0846	0.00
			0.00				1/2"	0.4506	0.1362	0.01
			1.00				Ice	0.5433	0.1965	0.01
							1" Ice	0.7546	0.3430	0.02
							2" Ice	1.2809	0.7396	0.06
							4" Ice			
(2) FD9R6004/2C-3L	B	From Face	4.0000	0.00	0.00	113.0000	No Ice	0.3665	0.0846	0.00
			0.00				1/2"	0.4506	0.1362	0.01
			0.00				Ice	0.5433	0.1965	0.01
							1" Ice	0.7546	0.3430	0.02
							2" Ice	1.2809	0.7396	0.06
							4" Ice			
(2) FD9R6004/2C-3L	C	From Face	4.0000	0.00	0.00	113.0000	No Ice	0.3665	0.0846	0.00
			0.00				1/2"	0.4506	0.1362	0.01
			0.00				Ice	0.5433	0.1965	0.01
							1" Ice	0.7546	0.3430	0.02
							2" Ice	1.2808	0.7396	0.06
							4" Ice			
DB-T1-6Z-8AB-0Z	A	From Face	4.0000	0.00	0.00	113.0000	No Ice	5.6000	2.3333	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
			0.00			1/2"	5.9154	2.5580	0.08
			1.00			Ice	6.2395	2.7914	0.12
						1" Ice	6.9136	3.2840	0.21
						2" Ice	8.3654	4.3728	0.45
						4" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.0000	0.00	113.0000	No Ice	8.6393	7.0730	0.07
			0.00			1/2"	9.2963	8.2637	0.14
			1.00			Ice	9.9210	9.1753	0.21
						1" Ice	11.1952	11.0130	0.39
						2" Ice	13.8631	15.0524	0.90
						4" Ice			
(2) SBNHH-1D45B w/ Mount Pipe	B	From Leg	4.0000	0.00	113.0000	No Ice	12.8375	6.9458	0.09
			0.00			1/2"	13.5292	8.1266	0.17
			1.00			Ice	14.1875	9.0212	0.26
						1" Ice	15.5319	10.8440	0.48
						2" Ice	18.3400	14.8507	1.05
						4" Ice			
(2) SBNHH-1D45B w/ Mount Pipe	C	From Leg	4.0000	0.00	113.0000	No Ice	12.8375	6.9458	0.09
			0.00			1/2"	13.5292	8.1266	0.17
			1.00			Ice	14.1875	9.0212	0.26
						1" Ice	15.5319	10.8440	0.48
						2" Ice	18.3400	14.8507	1.05
						4" Ice			
RRH2x60-700	A	From Leg	4.0000	0.00	113.0000	No Ice	3.9569	1.8157	0.06
			0.00			1/2"	4.2724	2.0751	0.08
			1.00			Ice	4.5964	2.3603	0.11
						1" Ice	5.2705	2.9566	0.17
						2" Ice	6.7224	4.2529	0.35
						4" Ice			
RRH2x60-700	B	From Leg	4.0000	0.00	113.0000	No Ice	3.9569	1.8157	0.06
			0.00			1/2"	4.2724	2.0751	0.08
			1.00			Ice	4.5964	2.3603	0.11
						1" Ice	5.2705	2.9566	0.17
						2" Ice	6.7224	4.2529	0.35
						4" Ice			
RRH2x60-700	C	From Leg	4.0000	0.00	113.0000	No Ice	3.9569	1.8157	0.06
			0.00			1/2"	4.2724	2.0751	0.08
			1.00			Ice	4.5964	2.3603	0.11
						1" Ice	5.2705	2.9566	0.17
						2" Ice	6.7224	4.2529	0.35
						4" Ice			
RRH2X60-1900	A	From Leg	4.0000	0.00	113.0000	No Ice	2.1865	1.4056	0.04
			0.00			1/2"	2.3935	1.5867	0.06
			1.00			Ice	2.6092	1.7765	0.08
						1" Ice	3.0666	2.1820	0.12
						2" Ice	4.0850	3.0967	0.26
						4" Ice			
RRH2X60-1900	B	From Leg	4.0000	0.00	113.0000	No Ice	2.1865	1.4056	0.04
			0.00			1/2"	2.3935	1.5867	0.06
			1.00			Ice	2.6092	1.7765	0.08
						1" Ice	3.0666	2.1820	0.12
						2" Ice	4.0850	3.0967	0.26
						4" Ice			
RRH2X60-1900	C	From Leg	4.0000	0.00	113.0000	No Ice	2.1865	1.4056	0.04
			0.00			1/2"	2.3935	1.5867	0.06
			1.00			Ice	2.6092	1.7765	0.08
						1" Ice	3.0666	2.1820	0.12
						2" Ice	4.0850	3.0967	0.26
						4" Ice			
AWS-3 RRH4X45	A	From Leg	4.0000	0.00	113.0000	No Ice	3.6190	4.2282	0.08
			0.00			1/2"	3.9021	4.5244	0.11
			1.00			Ice	4.1940	4.8293	0.15
						1" Ice	4.8035	5.4650	0.24
						2" Ice	6.1262	6.8402	0.47
						4" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A		Weight
			Horz	Lateral			Front	Side	
			ft	ft		ft	ft ²	ft ²	K
AWS-3 RRH4X45	B	From Leg	4.0000	0.00	113.0000	No Ice	3.6190	4.2282	0.08
			0.00			1/2"	3.9021	4.5244	0.11
			1.00			Ice	4.1940	4.8293	0.15
						1" Ice	4.8035	5.4650	0.24
						2" Ice	6.1262	6.8402	0.47
AWS-3 RRH4X45	C	From Leg	4.0000	0.00	113.0000	No Ice	3.6190	4.2282	0.08
			0.00			1/2"	3.9021	4.5244	0.11
			1.00			Ice	4.1940	4.8293	0.15
						1" Ice	4.8035	5.4650	0.24
						2" Ice	6.1262	6.8402	0.47
DB-T1-6Z-8AB-0Z	B	From Leg	4.0000	0.00	113.0000	No Ice	5.6000	2.3333	0.04
			0.00			1/2"	5.9154	2.5580	0.08
			1.00			Ice	6.2395	2.7914	0.12
						1" Ice	6.9136	3.2839	0.21
						2" Ice	8.3654	4.3728	0.45
Platform Mount [LP 305-1]	C	None		0.00	113.0000	No Ice	18.0100	18.0100	1.12
						1/2"	23.3300	23.3300	1.35
						Ice	28.6500	28.6500	1.58
						1" Ice	39.2900	39.2900	2.05
						2" Ice	60.5700	60.5700	2.97
** ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.0000	0.00	105.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2"	7.3471	6.4800	0.17
			2.00			Ice	7.8631	7.2567	0.23
						1" Ice	8.9261	8.8640	0.38
						2" Ice	11.1755	12.2932	0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.0000	0.00	105.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2"	7.3471	6.4800	0.17
			2.00			Ice	7.8631	7.2567	0.23
						1" Ice	8.9261	8.8640	0.38
						2" Ice	11.1755	12.2932	0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.0000	0.00	105.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2"	7.3471	6.4800	0.17
			2.00			Ice	7.8631	7.2567	0.23
						1" Ice	8.9261	8.8640	0.38
						2" Ice	11.1755	12.2932	0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.0000	0.00	105.0000	No Ice	6.8155	5.6334	0.11
			0.00			1/2"	7.3373	6.4717	0.17
			2.00			Ice	7.8532	7.2478	0.23
						1" Ice	8.9160	8.8537	0.38
						2" Ice	11.1650	12.2804	0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.0000	0.00	105.0000	No Ice	6.8155	5.6334	0.11
			0.00			1/2"	7.3373	6.4717	0.17
			2.00			Ice	7.8532	7.2478	0.23
						1" Ice	8.9160	8.8537	0.38
						2" Ice	11.1650	12.2804	0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.0000	0.00	105.0000	No Ice	6.8155	5.6334	0.11
			0.00			1/2"	7.3373	6.4717	0.17
			2.00			Ice	7.8532	7.2478	0.23
						1" Ice	8.9160	8.8537	0.38
						2" Ice	11.1650	12.2804	0.81
KRY 112 144/1	A	From Leg	4.0000	0.00	105.0000	No Ice	0.4083	0.2042	0.01
			0.00			1/2"	0.4969	0.2733	0.01
			2.00			Ice	0.5941	0.3511	0.02
						1" Ice	0.8145	0.5326	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
KRY 112 144/1	B	From Leg	4.0000 0.00 2.00	0.00	105.0000	2" Ice	1.3590	0.9992	0.08
						4" Ice			
						No Ice	0.4083	0.2042	0.01
						1/2"	0.4969	0.2733	0.01
						Ice	0.5941	0.3511	0.02
						1" Ice	0.8145	0.5326	0.03
KRY 112 144/1	C	From Leg	4.0000 0.00 2.00	0.00	105.0000	2" Ice	1.3590	0.9992	0.08
						4" Ice			
						No Ice	0.4083	0.2042	0.01
						1/2"	0.4969	0.2733	0.01
						Ice	0.5941	0.3511	0.02
						1" Ice	0.8145	0.5326	0.03
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.00	105.0000	4" Ice			
						No Ice	11.6828	9.8418	0.08
						1/2"	12.4043	11.3657	0.17
						Ice	13.1351	12.9138	0.27
						1" Ice	14.6007	15.2672	0.51
						2" Ice	17.8748	20.1392	1.15
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.00	105.0000	4" Ice			
						No Ice	11.6828	9.8418	0.08
						1/2"	12.4043	11.3657	0.17
						Ice	13.1351	12.9138	0.27
						1" Ice	14.6007	15.2672	0.51
						2" Ice	17.8748	20.1392	1.15
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.00	105.0000	4" Ice			
						No Ice	11.6828	9.8418	0.08
						1/2"	12.4043	11.3657	0.17
						Ice	13.1351	12.9138	0.27
						1" Ice	14.6007	15.2672	0.51
						2" Ice	17.8748	20.1392	1.15
RRUS 11 B12	A	From Leg	4.0000 0.00 2.00	0.00	105.0000	4" Ice			
						No Ice	3.3056	1.3611	0.05
						1/2"	3.5497	1.5404	0.07
						Ice	3.8025	1.7284	0.10
						1" Ice	4.3340	2.1302	0.15
						2" Ice	5.5006	3.0377	0.31
RRUS 11 B12	B	From Leg	4.0000 0.00 2.00	0.00	105.0000	4" Ice			
						No Ice	3.3056	1.3611	0.05
						1/2"	3.5497	1.5404	0.07
						Ice	3.8025	1.7284	0.10
						1" Ice	4.3340	2.1302	0.15
						2" Ice	5.5006	3.0377	0.31
RRUS 11 B12	C	From Leg	4.0000 0.00 2.00	0.00	105.0000	4" Ice			
						No Ice	3.3056	1.3611	0.05
						1/2"	3.5497	1.5404	0.07
						Ice	3.8025	1.7284	0.10
						1" Ice	4.3340	2.1302	0.15
						2" Ice	5.5006	3.0377	0.31
Platform Mount [LP 712-1]	C	None		0.00	105.0000	4" Ice			
						No Ice	24.5300	24.5300	1.34
						1/2"	29.9400	29.9400	1.65
						Ice	35.3500	35.3500	1.96
						1" Ice	46.1700	46.1700	2.58
						2" Ice	67.8100	67.8100	3.82
(2) RRUS 11	A	From Leg	2.0000 0.00 0.00	0.00	97.0000	4" Ice			
						No Ice	3.2560	1.3790	0.05
						1/2"	3.4982	1.5577	0.07
						Ice	3.7490	1.7450	0.10
						1" Ice	4.2766	2.1455	0.15
						2" Ice	5.4355	3.0504	0.31
(2) RRUS 11	B	From Leg	2.0000 0.00	0.00	97.0000	4" Ice			
						No Ice	3.2560	1.3790	0.05
						1/2"	3.4982	1.5577	0.07

120 Ft Monopole Tower Structural Analysis
 Project Number 37516-0701.002.7805, Application 321006, Revision 17

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
			0.00			Ice	3.7490	1.7450	0.10
						1" Ice	4.2766	2.1455	0.15
						2" Ice	5.4355	3.0504	0.31
						4" Ice			
(2) RRUS 11	C	From Leg	2.0000 0.00 0.00	0.00	97.0000	No Ice	3.2560	1.3790	0.05
						1/2"	3.4982	1.5577	0.07
						Ice	3.7490	1.7450	0.10
						1" Ice	4.2766	2.1455	0.15
						2" Ice	5.4355	3.0504	0.31
						4" Ice			
DC6-48-60-18-8F	A	From Leg	2.0000 0.00 0.00	0.00	97.0000	No Ice	1.4667	1.4667	0.02
						1/2"	1.6667	1.6667	0.04
						Ice	1.8778	1.8778	0.06
						1" Ice	2.3333	2.3333	0.11
						2" Ice	3.3778	3.3778	0.24
						4" Ice			
RRUS-32 B30	A	From Leg	2.0000 0.00 0.00	0.00	97.0000	No Ice	3.8662	2.7616	0.08
						1/2"	4.1506	3.0213	0.10
						Ice	4.4435	3.2896	0.14
						1" Ice	5.0554	3.8522	0.21
						2" Ice	6.3828	5.0811	0.41
						4" Ice			
RRUS-32 B30	B	From Leg	2.0000 0.00 0.00	0.00	97.0000	No Ice	3.8662	2.7616	0.08
						1/2"	4.1506	3.0213	0.10
						Ice	4.4435	3.2896	0.14
						1" Ice	5.0554	3.8522	0.21
						2" Ice	6.3828	5.0811	0.41
						4" Ice			
RRUS-32 B30	C	From Leg	2.0000 0.00 0.00	0.00	97.0000	No Ice	3.8662	2.7616	0.08
						1/2"	4.1506	3.0213	0.10
						Ice	4.4435	3.2896	0.14
						1" Ice	5.0554	3.8522	0.21
						2" Ice	6.3828	5.0811	0.41
						4" Ice			
DC6-48-60-18-8F	B	From Leg	2.0000 0.00 0.00	0.00	97.0000	No Ice	1.4667	1.4667	0.02
						1/2"	1.6667	1.6667	0.04
						Ice	1.8778	1.8778	0.06
						1" Ice	2.3333	2.3333	0.11
						2" Ice	3.3778	3.3778	0.24
						4" Ice			
Side Arm Mount [SO 102-3]	C	None		0.00	97.0000	No Ice	3.0000	3.0000	0.08
						1/2"	3.4800	3.4800	0.11
						Ice	3.9600	3.9600	0.14
						1" Ice	4.9200	4.9200	0.20
						2" Ice	6.8400	6.8400	0.32
						4" Ice			
(2) 2.375" OD x 3' Mount Pipe	A	From Leg	2.0000 0.00 0.00	0.00	97.0000	No Ice	0.5826	0.5826	0.03
						1/2"	0.7701	0.7701	0.03
						Ice	0.9669	0.9669	0.04
						1" Ice	1.4167	1.4167	0.06
						2" Ice	2.5361	2.5361	0.14
						4" Ice			
(2) 2.375" OD x 3' Mount Pipe	B	From Leg	2.0000 0.00 0.00	0.00	97.0000	No Ice	0.5826	0.5826	0.03
						1/2"	0.7701	0.7701	0.03
						Ice	0.9669	0.9669	0.04
						1" Ice	1.4167	1.4167	0.06
						2" Ice	2.5361	2.5361	0.14
						4" Ice			
(2) 2.375" OD x 3' Mount Pipe	C	From Leg	2.0000 0.00 0.00	0.00	97.0000	No Ice	0.5826	0.5826	0.03
						1/2"	0.7701	0.7701	0.03
						Ice	0.9669	0.9669	0.04
						1" Ice	1.4167	1.4167	0.06
						2" Ice	2.5361	2.5361	0.14
						4" Ice			

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120 Ft Monopole Tower Structural Analysis
 Project Number 37516-0701.002.7805, Application 321006, Revision 17

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement		C _{AA}	C _{AA}	Weight
			Horz	Lateral				Front	Side	
			ft	ft			ft ²	ft ²	K	
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.0000	0.00	96.0000	No Ice	6.2208	4.8204	0.09	
			0.00			1/2"	6.7144	5.5082	0.14	
			1.00			Ice	7.2182	6.2127	0.21	
						1" Ice	8.2568	7.6716	0.36	
						2" Ice	10.4762	11.0613	0.76	
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.0000	0.00	96.0000	No Ice	6.2208	4.8204	0.09	
			0.00			1/2"	6.7144	5.5082	0.14	
			1.00			Ice	7.2182	6.2127	0.21	
						1" Ice	8.2568	7.6716	0.36	
						2" Ice	10.4762	11.0613	0.76	
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.0000	0.00	96.0000	No Ice	6.2208	4.8204	0.09	
			0.00			1/2"	6.7144	5.5082	0.14	
			1.00			Ice	7.2182	6.2127	0.21	
						1" Ice	8.2568	7.6716	0.36	
						2" Ice	10.4762	11.0613	0.76	
P65-16-XLH-RR w/ Mount Pipe	A	From Leg	4.0000	0.00	96.0000	No Ice	8.6375	6.3625	0.08	
			0.00			1/2"	9.2903	7.5378	0.14	
			1.00			Ice	9.9098	8.4270	0.22	
						1" Ice	11.1763	10.2390	0.39	
						2" Ice	13.8289	14.0988	0.89	
P65-16-XLH-RR w/ Mount Pipe	B	From Leg	4.0000	0.00	96.0000	No Ice	8.6375	6.3625	0.08	
			0.00			1/2"	9.2903	7.5378	0.14	
			1.00			Ice	9.9098	8.4270	0.22	
						1" Ice	11.1763	10.2390	0.39	
						2" Ice	13.8289	14.0988	0.89	
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	4.0000	0.00	96.0000	No Ice	8.6375	6.3625	0.08	
			0.00			1/2"	9.2903	7.5378	0.14	
			1.00			Ice	9.9098	8.4270	0.22	
						1" Ice	11.1763	10.2390	0.39	
						2" Ice	13.8289	14.0988	0.89	
(4) LGP2140X	A	From Leg	4.0000	0.00	96.0000	No Ice	1.2600	0.3780	0.01	
			0.00			1/2"	1.4160	0.4932	0.02	
			1.00			Ice	1.5806	0.6170	0.03	
						1" Ice	1.9358	0.8905	0.05	
						2" Ice	2.7499	1.5412	0.13	
(4) LGP2140X	B	From Leg	4.0000	0.00	96.0000	No Ice	1.2600	0.3780	0.01	
			0.00			1/2"	1.4160	0.4932	0.02	
			1.00			Ice	1.5806	0.6170	0.03	
						1" Ice	1.9358	0.8905	0.05	
						2" Ice	2.7499	1.5412	0.13	
(4) LGP2140X	C	From Leg	4.0000	0.00	96.0000	No Ice	1.2600	0.3780	0.01	
			0.00			1/2"	1.4160	0.4932	0.02	
			1.00			Ice	1.5806	0.6170	0.03	
						1" Ice	1.9358	0.8905	0.05	
						2" Ice	2.7499	1.5412	0.13	
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.0000	0.00	96.0000	No Ice	10.5975	7.1792	0.10	
			0.00			1/2"	11.2684	8.3621	0.18	
			1.00			Ice	11.9061	9.2588	0.26	
						1" Ice	13.2089	11.0860	0.46	
						2" Ice	15.9341	15.1514	1.00	
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.0000	0.00	96.0000	No Ice	10.5975	7.1792	0.10	
			0.00			1/2"	11.2684	8.3621	0.18	
			1.00			Ice	11.9061	9.2588	0.26	
						1" Ice	13.2089	11.0860	0.46	
						2" Ice	15.9341	15.1514	1.00	

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Leg	4.0000	0.00	96.0000	4" Ice	10.5975	7.1792	0.10
			0.00			No Ice	11.2684	8.3621	0.18
			1.00			1/2" Ice	11.9061	9.2588	0.26
						1" Ice	13.2089	11.0860	0.46
						2" Ice	15.9341	15.1514	1.00
Platform Mount [LP 601-1]	C	None		0.00	96.0000	4" Ice	28.4700	28.4700	1.12
						No Ice	33.5900	33.5900	1.51
						1/2" Ice	38.7100	38.7100	1.91
						1" Ice	48.9500	48.9500	2.69
						2" Ice	69.4300	69.4300	4.26
					4" Ice				

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Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K	
PX2F-52	A	Paraboloid w/o Radome	From Leg	4.0000	25.00		122.0000	2.0917	No Ice	3.4400	0.02
				0.00					1/2" Ice	3.7200	0.04
				1.00					1" Ice	3.9900	0.06
									2" Ice	4.5500	0.09
									4" Ice	5.6700	0.17
VHLP2-11	A	Paraboloid w/o Radome	From Leg	4.0000	37.00		122.0000	2.1750	No Ice	3.7200	0.03
				0.00					1/2" Ice	4.0100	0.05
				3.00					1" Ice	4.3000	0.07
									2" Ice	4.8800	0.11
									4" Ice	6.0400	0.19
VHLP2-11	B	Paraboloid w/o Radome	From Leg	4.0000	10.00		122.0000	2.1750	No Ice	3.7200	0.03
				0.00					1/2" Ice	4.0100	0.05
				3.00					1" Ice	4.3000	0.07
									2" Ice	4.8800	0.11
									4" Ice	6.0400	0.19

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Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K _Z	q _Z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 120.0000-96.7500	108.0012	1.403	29.10	47.176	A	0.000	47.176	47.176	100.00	0.000	0.000
					B	0.000	47.176	100.00	0.000	0.000	
					C	0.000	47.176	100.00	0.000	18.153	
L2 96.7500-91.5800	94.1485	1.349	27.98	11.727	A	0.000	11.727	11.727	100.00	0.000	0.000
					B	0.000	11.727	100.00	0.000	0.000	
					C	0.000	11.727	100.00	0.000	4.793	
L3 91.5800-90.0833	90.8303	1.335	27.69	3.479	A	0.000	3.479	3.479	100.00	0.000	0.000
					B	0.000	3.479	100.00	0.000	0.000	
					C	0.000	3.479	100.00	0.000	1.846	

Section Elevation ft	z ft	K _Z	q _Z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L4 90.0833-78.0000	83.9576	1.306	27.08	29.468	A	0.000	29.468	29.468	100.00	0.000	0.000
					B	0.000	29.468	100.00	0.000	0.000	
					C	0.000	29.468	100.00	0.000	14.903	
L5 78.0000-76.7500	77.3735	1.276	26.45	3.127	A	0.000	3.127	3.127	100.00	0.000	0.000
					B	0.000	3.127	100.00	0.000	0.000	
					C	0.000	3.127	100.00	0.000	1.542	
L6 76.7500-72.0000	74.3626	1.261	26.15	12.159	A	0.000	12.159	12.159	100.00	0.000	0.000
					B	0.000	12.159	100.00	0.000	0.000	
					C	0.000	12.159	100.00	0.000	5.858	
L7 72.0000-70.2500	71.1234	1.245	25.82	4.576	A	0.000	4.576	4.576	100.00	0.000	0.000
					B	0.000	4.576	100.00	0.000	0.000	
					C	0.000	4.576	100.00	0.000	2.158	
L8 70.2500-69.7500	69.9999	1.24	25.71	1.317	A	0.000	1.317	1.317	100.00	0.000	0.000
					B	0.000	1.317	100.00	0.000	0.000	
					C	0.000	1.317	100.00	0.000	0.617	
L9 69.7500-56.0000	62.7787	1.202	24.92	37.860	A	0.000	37.860	37.860	100.00	0.000	0.000
					B	0.000	37.860	100.00	0.000	0.000	
					C	0.000	37.860	100.00	0.000	16.958	
L10 56.0000-54.0000	54.9981	1.157	23.99	5.772	A	0.000	5.772	5.772	100.00	0.000	0.000
					B	0.000	5.772	100.00	0.000	0.000	
					C	0.000	5.772	100.00	0.000	3.156	
L11 54.0000-53.5000	53.7499	1.15	23.84	1.454	A	0.000	1.454	1.454	100.00	0.000	0.000
					B	0.000	1.454	100.00	0.000	0.000	
					C	0.000	1.454	100.00	0.000	0.789	
L12 53.5000-39.7500	46.5374	1.103	22.88	41.622	A	0.000	41.622	41.622	100.00	0.000	0.000
					B	0.000	41.622	100.00	0.000	0.000	
					C	0.000	41.622	100.00	0.000	21.697	
L13 39.7500-35.0000	37.3616	1.036	21.48	14.810	A	0.000	14.810	14.810	100.00	0.000	0.000
					B	0.000	14.810	100.00	0.000	0.000	
					C	0.000	14.810	100.00	0.000	7.495	
L14 35.0000-25.0000	29.9569	1	20.74	32.549	A	0.000	32.549	32.549	100.00	0.000	0.000
					B	0.000	32.549	100.00	0.000	0.000	
					C	0.000	32.549	100.00	0.000	15.780	
L15 25.0000-14.5000	19.7049	1	20.74	35.989	A	0.000	35.989	35.989	100.00	0.000	0.000
					B	0.000	35.989	100.00	0.000	0.000	
					C	0.000	35.989	100.00	0.000	16.569	
L16 14.5000-12.5000	13.4984	1	20.74	7.065	A	0.000	7.065	7.065	100.00	0.000	0.000
					B	0.000	7.065	100.00	0.000	0.000	
					C	0.000	7.065	100.00	0.000	3.156	
L17 12.5000-5.5000	8.9809	1	20.74	25.259	A	0.000	25.259	25.259	100.00	0.000	0.000
					B	0.000	25.259	100.00	0.000	0.000	
					C	0.000	25.259	100.00	0.000	11.046	
L18 5.5000-4.7500	5.1248	1	20.74	2.755	A	0.000	2.755	2.755	100.00	0.000	0.000
					B	0.000	2.755	100.00	0.000	0.000	
					C	0.000	2.755	100.00	0.000	1.183	
L19 4.7500-0.0000	2.3665	1	20.74	17.670	A	0.000	17.670	17.670	100.00	0.000	0.000
					B	0.000	17.670	100.00	0.000	0.000	
					C	0.000	17.670	100.00	0.000	7.495	

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K _Z	q _Z psf	t _Z in	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 120.0000-96.7500	108.0012	1.403	5.08	1.4411	52.760	A	0.000	52.760	52.760	100.00	0.000	0.000
						B	0.000	52.760	100.00	0.000	0.000	
						C	0.000	52.760	100.00	0.000	40.923	
L2 96.7500-91.5800	94.1485	1.349	4.88	1.4176	12.949	A	0.000	12.949	12.949	100.00	0.000	0.000
						B	0.000	12.949	100.00	0.000	0.000	
						C	0.000	12.949	100.00	0.000	10.921	
L3 91.5800-90.0833	90.8303	1.335	4.83	1.4115	3.831	A	0.000	3.831	3.831	100.00	0.000	0.000
						B	0.000	3.831	100.00	0.000	0.000	

Section Elevation ft	z ft	K _Z	q _z psf	t _z in	A _G ft ²	F a c e ft ²	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L4 90.0833-78.0000	83.9576	1.306	4.73	1.3982	32.284	C 0.000	0.000	3.831	32.284	100.00	0.000	4.475
						A 0.000	0.000	32.284	32.284	100.00	0.000	0.000
						B 0.000	0.000	32.284	32.284	100.00	0.000	0.000
						C 0.000	0.000	32.284	32.284	100.00	0.000	35.928
L5 78.0000-76.7500	77.3735	1.276	4.62	1.3846	3.418	A 0.000	0.000	3.418	3.418	100.00	0.000	0.000
						B 0.000	0.000	3.418	3.418	100.00	0.000	0.000
						C 0.000	0.000	3.418	3.418	100.00	0.000	3.717
L6 76.7500-72.0000	74.3626	1.261	4.56	1.3780	13.250	A 0.000	0.000	13.250	13.250	100.00	0.000	0.000
						B 0.000	0.000	13.250	13.250	100.00	0.000	0.000
						C 0.000	0.000	13.250	13.250	100.00	0.000	14.004
L7 72.0000-70.2500	71.1234	1.245	4.51	1.3707	4.975	A 0.000	0.000	4.975	4.975	100.00	0.000	0.000
						B 0.000	0.000	4.975	4.975	100.00	0.000	0.000
						C 0.000	0.000	4.975	4.975	100.00	0.000	5.143
L8 70.2500-69.7500	69.9999	1.24	4.49	1.3680	1.431	A 0.000	0.000	1.431	1.431	100.00	0.000	0.000
						B 0.000	0.000	1.431	1.431	100.00	0.000	0.000
						C 0.000	0.000	1.431	1.431	100.00	0.000	1.468
L9 69.7500-56.0000	62.7787	1.202	4.35	1.3503	40.955	A 0.000	0.000	40.955	40.955	100.00	0.000	0.000
						B 0.000	0.000	40.955	40.955	100.00	0.000	0.000
						C 0.000	0.000	40.955	40.955	100.00	0.000	40.063
L10 56.0000-54.0000	54.9981	1.157	4.19	1.3290	6.215	A 0.000	0.000	6.215	6.215	100.00	0.000	0.000
						B 0.000	0.000	6.215	6.215	100.00	0.000	0.000
						C 0.000	0.000	6.215	6.215	100.00	0.000	6.168
L11 54.0000-53.5000	53.7499	1.15	4.16	1.3254	1.564	A 0.000	0.000	1.564	1.564	100.00	0.000	0.000
						B 0.000	0.000	1.564	1.564	100.00	0.000	0.000
						C 0.000	0.000	1.564	1.564	100.00	0.000	1.540
L12 53.5000-39.7500	46.5374	1.103	3.99	1.3026	44.608	A 0.000	0.000	44.608	44.608	100.00	0.000	0.000
						B 0.000	0.000	44.608	44.608	100.00	0.000	0.000
						C 0.000	0.000	44.608	44.608	100.00	0.000	41.997
L13 39.7500-35.0000	37.3616	1.036	3.75	1.2688	15.841	A 0.000	0.000	15.841	15.841	100.00	0.000	0.000
						B 0.000	0.000	15.841	15.841	100.00	0.000	0.000
						C 0.000	0.000	15.841	15.841	100.00	0.000	14.508
L14 35.0000-25.0000	29.9569	1	3.62	1.2500	34.632	A 0.000	0.000	34.632	34.632	100.00	0.000	0.000
						B 0.000	0.000	34.632	34.632	100.00	0.000	0.000
						C 0.000	0.000	34.632	34.632	100.00	0.000	29.947
L15 25.0000-14.5000	19.7049	1	3.62	1.2500	38.176	A 0.000	0.000	38.176	38.176	100.00	0.000	0.000
						B 0.000	0.000	38.176	38.176	100.00	0.000	0.000
						C 0.000	0.000	38.176	38.176	100.00	0.000	31.444
L16 14.5000-12.5000	13.4984	1	3.62	1.2500	7.482	A 0.000	0.000	7.482	7.482	100.00	0.000	0.000
						B 0.000	0.000	7.482	7.482	100.00	0.000	0.000
						C 0.000	0.000	7.482	7.482	100.00	0.000	5.989
L17 12.5000-5.5000	8.9809	1	3.62	1.2500	26.718	A 0.000	0.000	26.718	26.718	100.00	0.000	0.000
						B 0.000	0.000	26.718	26.718	100.00	0.000	0.000
						C 0.000	0.000	26.718	26.718	100.00	0.000	20.963
L18 5.5000-4.7500	5.1248	1	3.62	1.2500	2.912	A 0.000	0.000	2.912	2.912	100.00	0.000	0.000
						B 0.000	0.000	2.912	2.912	100.00	0.000	0.000
						C 0.000	0.000	2.912	2.912	100.00	0.000	2.246
L19 4.7500-0.0000	2.3665	1	3.62	1.2500	18.660	A 0.000	0.000	18.660	18.660	100.00	0.000	0.000
						B 0.000	0.000	18.660	18.660	100.00	0.000	0.000
						C 0.000	0.000	18.660	18.660	100.00	0.000	14.225

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e ft ²	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 120.0000-96.7500	108.0012	1.403	8.98	47.176	A 0.000	0.000	47.176	47.176	100.00	0.000	0.000
					B 0.000	0.000	47.176	47.176	100.00	0.000	0.000
					C 0.000	0.000	47.176	47.176	100.00	0.000	18.153
L2 96.7500-91.5800	94.1485	1.349	8.64	11.727	A 0.000	0.000	11.727	11.727	100.00	0.000	0.000
					B 0.000	0.000	11.727	11.727	100.00	0.000	0.000

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L3 91.5800-90.0833	90.8303	1.335	8.55	3.479	C	0.000	11.727		100.00	0.000	4.793
					A	0.000	3.479	3.479	100.00	0.000	0.000
					B	0.000	3.479		100.00	0.000	0.000
L4 90.0833-78.0000	83.9576	1.306	8.36	29.468	C	0.000	3.479		100.00	0.000	1.846
					A	0.000	29.468	29.468	100.00	0.000	0.000
					B	0.000	29.468		100.00	0.000	0.000
L5 78.0000-76.7500	77.3735	1.276	8.16	3.127	C	0.000	29.468		100.00	0.000	14.903
					A	0.000	3.127	3.127	100.00	0.000	0.000
					B	0.000	3.127		100.00	0.000	0.000
L6 76.7500-72.0000	74.3626	1.261	8.07	12.159	C	0.000	3.127		100.00	0.000	1.542
					A	0.000	12.159	12.159	100.00	0.000	0.000
					B	0.000	12.159		100.00	0.000	0.000
L7 72.0000-70.2500	71.1234	1.245	7.97	4.576	C	0.000	4.576		100.00	0.000	0.000
					A	0.000	4.576	4.576	100.00	0.000	0.000
					B	0.000	4.576		100.00	0.000	0.000
L8 70.2500-69.7500	69.9999	1.24	7.93	1.317	C	0.000	4.576		100.00	0.000	2.158
					A	0.000	1.317	1.317	100.00	0.000	0.000
					B	0.000	1.317		100.00	0.000	0.000
L9 69.7500-56.0000	62.7787	1.202	7.69	37.860	C	0.000	1.317		100.00	0.000	0.617
					A	0.000	37.860	37.860	100.00	0.000	0.000
					B	0.000	37.860		100.00	0.000	0.000
L10 56.0000-54.0000	54.9981	1.157	7.41	5.772	C	0.000	37.860		100.00	0.000	16.958
					A	0.000	5.772	5.772	100.00	0.000	0.000
					B	0.000	5.772		100.00	0.000	0.000
L11 54.0000-53.5000	53.7499	1.15	7.36	1.454	C	0.000	5.772		100.00	0.000	3.156
					A	0.000	1.454	1.454	100.00	0.000	0.000
					B	0.000	1.454		100.00	0.000	0.000
L12 53.5000-39.7500	46.5374	1.103	7.06	41.622	C	0.000	1.454		100.00	0.000	0.789
					A	0.000	41.622	41.622	100.00	0.000	0.000
					B	0.000	41.622		100.00	0.000	0.000
L13 39.7500-35.0000	37.3616	1.036	6.63	14.810	C	0.000	41.622		100.00	0.000	21.697
					A	0.000	14.810	14.810	100.00	0.000	0.000
					B	0.000	14.810		100.00	0.000	0.000
L14 35.0000-25.0000	29.9569	1	6.40	32.549	C	0.000	14.810		100.00	0.000	7.495
					A	0.000	32.549	32.549	100.00	0.000	0.000
					B	0.000	32.549		100.00	0.000	0.000
L15 25.0000-14.5000	19.7049	1	6.40	35.989	C	0.000	32.549		100.00	0.000	15.780
					A	0.000	35.989	35.989	100.00	0.000	0.000
					B	0.000	35.989		100.00	0.000	0.000
L16 14.5000-12.5000	13.4984	1	6.40	7.065	C	0.000	35.989		100.00	0.000	16.569
					A	0.000	7.065	7.065	100.00	0.000	0.000
					B	0.000	7.065		100.00	0.000	0.000
L17 12.5000-5.5000	8.9809	1	6.40	25.259	C	0.000	7.065		100.00	0.000	3.156
					A	0.000	25.259	25.259	100.00	0.000	0.000
					B	0.000	25.259		100.00	0.000	0.000
L18 5.5000-4.7500	5.1248	1	6.40	2.755	C	0.000	25.259		100.00	0.000	11.046
					A	0.000	2.755	2.755	100.00	0.000	0.000
					B	0.000	2.755		100.00	0.000	0.000
L19 4.7500-0.0000	2.3665	1	6.40	17.670	C	0.000	2.755		100.00	0.000	1.183
					A	0.000	17.670	17.670	100.00	0.000	0.000
					B	0.000	17.670		100.00	0.000	0.000
					C	0.000	17.670		100.00	0.000	7.495

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	120 - 96.75	Pole	Max Tension	30	0.00	0.00	-0.00
			Max. Compression	14	-27.94	2.98	-1.76
			Max. Mx	11	-8.85	409.87	-6.24
			Max. My	8	-8.93	7.41	-398.30
			Max. Vy	11	-25.74	409.87	-6.24
			Max. Vx	8	25.11	7.41	-398.30
			Max. Torque	11			-2.23
L2	96.75 - 91.58	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35.94	3.99	-2.35
			Max. Mx	11	-11.49	575.54	-7.25
			Max. My	8	-11.58	8.70	-560.66
			Max. Vy	11	-32.43	575.54	-7.25
			Max. Vx	8	31.80	8.70	-560.66
			Max. Torque	11			-2.23
L3	91.58 - 90.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-36.52	4.29	-2.52
			Max. Mx	11	-11.77	624.31	-7.55
			Max. My	8	-11.86	9.07	-608.47
			Max. Vy	11	-32.69	624.31	-7.55
			Max. Vx	8	32.06	9.07	-608.47
			Max. Torque	11			-2.19
L4	90.0833 - 78	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-40.16	6.01	-3.51
			Max. Mx	11	-13.75	902.94	-9.19
			Max. My	8	-13.83	11.15	-881.74
			Max. Vy	11	-34.15	902.94	-9.19
			Max. Vx	8	33.52	11.15	-881.74
			Max. Torque	11			-2.18
L5	78 - 76.75	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L6	76.75 - 72	Pole	Max. Compression	14	-43.41	7.05	-4.11
			Max. Mx	11	-15.75	1076.25	-10.18
			Max. My	8	-15.83	12.40	-1051.83
			Max. Vy	11	-35.11	1076.25	-10.18
			Max. Vx	8	34.48	12.40	-1051.83
			Max. Torque	11			-2.07
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-45.79	8.07	-4.70
			Max. Mx	11	-17.19	1245.11	-11.13
			Max. My	8	-17.27	13.59	-1217.63
L7	72 - 70.25	Pole	Max. Vy	11	-35.95	1245.11	-11.13
			Max. Vx	8	35.32	13.59	-1217.63
			Max. Torque	11			-2.06
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-46.69	8.45	-4.92
			Max. Mx	11	-17.74	1308.33	-11.48
			Max. My	8	-17.81	14.03	-1279.72
			Max. Vy	11	-36.26	1308.33	-11.48
			Max. Vx	8	35.63	14.03	-1279.72
			Max. Torque	11			-2.02
L8	70.25 - 69.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-46.94	8.57	-4.99
			Max. Mx	11	-17.90	1326.49	-11.58
			Max. My	8	-17.97	14.16	-1297.55
			Max. Vy	11	-36.35	1326.49	-11.58
			Max. Vx	8	35.71	14.16	-1297.55
			Max. Torque	11			-2.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-53.79	11.66	-6.77
			Max. Mx	11	-22.12	1842.45	-14.35
L9	69.75 - 56	Pole	Max. My	8	-22.18	17.63	-1804.62
			Max. Vy	11	-38.68	1842.45	-14.35
			Max. Vx	8	38.05	17.63	-1804.62
			Max. Torque	8			-2.01
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-54.90	12.12	-7.04
			Max. Mx	11	-22.86	1920.22	-14.75
			Max. My	8	-22.91	18.14	-1881.09
			Max. Vy	11	-39.05	1920.22	-14.75
			Max. Vx	8	38.41	18.14	-1881.09
L10	56 - 54	Pole	Max. Torque	8			-2.05
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-55.16	12.24	-7.11
			Max. Mx	11	-23.03	1939.78	-14.85
			Max. My	8	-23.09	18.27	-1900.32
			Max. Vy	11	-39.13	1939.78	-14.85
			Max. Vx	8	38.50	18.27	-1900.32
			Max. Torque	8			-2.06
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-59.51	14.34	-8.32
L11	54 - 53.5	Pole	Max. Mx	11	-25.78	2298.92	-16.68
			Max. My	8	-25.83	20.55	-2253.65
			Max. Vy	11	-40.64	2298.92	-16.68
			Max. Vx	8	40.01	20.55	-2253.65
			Max. Torque	8			-2.24
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-66.13	16.57	-9.61
			Max. Mx	11	-30.35	2693.50	-18.60
			Max. My	8	-30.38	22.96	-2642.09
			Max. Vy	11	-42.32	2693.50	-18.60
L12	53.5 - 39.75	Pole	Max. Vx	8	41.68	22.96	-2642.09
			Max. Torque	8			-2.43
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-71.56	18.91	-10.96
			Max. Mx	11	-34.11	3124.48	-20.63
			Max. My	8	-34.14	25.50	-3066.63
			Max. Vy	11	-43.85	3124.48	-20.63
			Max. Vx	8	43.22	25.50	-3066.63
			Max. Torque	8			-2.43
			Max Tension	1	0.00	0.00	0.00
L13	39.75 - 35	Pole	Max. Compression	14	-66.13	16.57	-9.61
			Max. Mx	11	-30.35	2693.50	-18.60
			Max. My	8	-30.38	22.96	-2642.09
			Max. Vy	11	-42.32	2693.50	-18.60
			Max. Vx	8	41.68	22.96	-2642.09
			Max. Torque	8			-2.43
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-71.56	18.91	-10.96
			Max. Mx	11	-34.11	3124.48	-20.63
			Max. My	8	-34.14	25.50	-3066.63
L14	35 - 25	Pole	Max. Vy	11	-43.85	3124.48	-20.63
			Max. Vx	8	43.22	25.50	-3066.63
			Max. Torque	8			-2.43
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-71.56	18.91	-10.96
			Max. Mx	11	-34.11	3124.48	-20.63
			Max. My	8	-34.14	25.50	-3066.63
			Max. Vy	11	-43.85	3124.48	-20.63
			Max. Vx	8	43.22	25.50	-3066.63
			Max. Torque	8			-2.43

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L15	25 - 14.5	Pole	Max. Torque	8			-2.63
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-77.66	21.44	-12.42
			Max. Mx	11	-38.43	3593.67	-22.76
			Max. My	8	-38.45	28.17	-3529.08
			Max. Vy	11	-45.49	3593.67	-22.76
			Max. Vx	8	44.86	28.17	-3529.08
L16	14.5 - 12.5	Pole	Max. Torque	8			-2.84
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-78.89	21.92	-12.70
			Max. Mx	11	-39.31	3685.00	-23.16
			Max. My	8	-39.33	28.67	-3619.14
			Max. Vy	11	-45.80	3685.00	-23.16
			Max. Vx	8	45.18	28.67	-3619.14
L17	12.5 - 5.5	Pole	Max. Torque	8			-2.89
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-83.19	23.66	-13.70
			Max. Mx	11	-42.41	4009.61	-24.58
			Max. My	8	-42.42	30.45	-3939.29
			Max. Vy	11	-46.91	4009.61	-24.58
			Max. Vx	8	46.29	30.45	-3939.29
L18	5.5 - 4.75	Pole	Max. Torque	8			-3.04
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-83.64	23.85	-13.81
			Max. Mx	11	-42.74	4044.85	-24.73
			Max. My	8	-42.74	30.64	-3974.05
			Max. Vy	11	-47.02	4044.85	-24.73
			Max. Vx	8	46.40	30.64	-3974.05
L19	4.75 - 0	Pole	Max. Torque	8			-3.06
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-86.48	25.07	-14.52
			Max. Mx	11	-44.76	4270.05	-25.69
			Max. My	8	-44.76	31.84	-4196.24
			Max. Vy	11	-47.76	4270.05	-25.69
			Max. Vx	8	47.15	31.84	-4196.24
			Max. Torque	8			-3.17

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	86.48	-0.00	0.00
	Max. H _x	11	44.78	47.74	-0.18
	Max. H _z	2	44.78	0.30	47.03
	Max. M _x	2	4180.95	0.30	47.03
	Max. M _z	5	4232.03	-47.49	-0.02
	Max. Torsion	2	1.86	0.30	47.03
	Min. Vert	5	44.78	-47.49	-0.02
	Min. H _x	5	44.78	-47.49	-0.02
	Min. H _z	8	44.78	0.22	-47.12
	Min. M _x	8	-4196.24	0.22	-47.12
	Min. M _z	11	-4270.05	47.74	-0.18
	Min. Torsion	8	-3.17	0.22	-47.12

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overtuning Moment, M _x kip-ft	Overtuning Moment, M _z kip-ft	Torque kip-ft
Dead Only	44.78	-0.00	0.00	1.84	3.19	0.00

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Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead+Wind 0 deg - No Ice	44.78	-0.30	-47.03	-4180.95	39.88	-1.86
Dead+Wind 30 deg - No Ice	44.78	23.62	-40.71	-3618.01	-2098.64	-1.85
Dead+Wind 60 deg - No Ice	44.78	41.16	-23.36	-2070.71	-3668.55	-1.34
Dead+Wind 90 deg - No Ice	44.78	47.49	0.02	3.85	-4232.03	-0.05
Dead+Wind 120 deg - No Ice	44.78	41.13	23.50	2090.64	-3663.90	1.08
Dead+Wind 150 deg - No Ice	44.78	23.52	41.01	3659.32	-2084.49	2.95
Dead+Wind 180 deg - No Ice	44.78	-0.22	47.12	4196.24	31.84	3.17
Dead+Wind 210 deg - No Ice	44.78	-23.78	40.83	3637.00	2125.98	2.40
Dead+Wind 240 deg - No Ice	44.78	-41.32	23.58	2102.32	3695.69	1.53
Dead+Wind 270 deg - No Ice	44.78	-47.74	0.18	25.69	4270.05	1.19
Dead+Wind 300 deg - No Ice	44.78	-41.23	-23.54	-2091.61	3683.63	-0.62
Dead+Wind 330 deg - No Ice	44.78	-23.92	-40.73	-3619.82	2141.49	-1.73
Dead+Ice+Temp	86.48	0.00	-0.00	14.52	25.07	0.00
Dead+Wind 0 deg+Ice+Temp	86.48	-0.06	-11.44	-1041.20	32.63	-0.75
Dead+Wind 30 deg+Ice+Temp	86.48	5.73	-9.90	-899.53	-504.23	-0.64
Dead+Wind 60 deg+Ice+Temp	86.48	9.98	-5.69	-509.73	-898.04	-0.36
Dead+Wind 90 deg+Ice+Temp	86.48	11.51	-0.00	14.31	-1039.51	0.12
Dead+Wind 120 deg+Ice+Temp	86.48	9.97	5.71	541.27	-896.29	0.53
Dead+Wind 150 deg+Ice+Temp	86.48	5.70	9.96	936.38	-499.84	1.00
Dead+Wind 180 deg+Ice+Temp	86.48	-0.05	11.46	1072.94	32.27	1.03
Dead+Wind 210 deg+Ice+Temp	86.48	-5.77	9.93	932.10	559.24	0.76
Dead+Wind 240 deg+Ice+Temp	86.48	-10.01	5.74	545.13	953.01	0.39
Dead+Wind 270 deg+Ice+Temp	86.48	-11.56	0.04	20.62	1096.87	0.14
Dead+Wind 300 deg+Ice+Temp	86.48	-9.99	-5.72	-513.16	949.60	-0.42
Dead+Wind 330 deg+Ice+Temp	86.48	-5.79	-9.90	-899.23	561.46	-0.75
Dead+Wind 0 deg - Service	44.78	-0.09	-14.51	-1290.06	14.57	-0.56
Dead+Wind 30 deg - Service	44.78	7.29	-12.56	-1116.40	-646.07	-0.57
Dead+Wind 60 deg - Service	44.78	12.70	-7.21	-638.41	-1131.08	-0.42
Dead+Wind 90 deg - Service	44.78	14.66	0.01	2.49	-1304.98	-0.01
Dead+Wind 120 deg - Service	44.78	12.69	7.25	647.16	-1129.64	0.34
Dead+Wind 150 deg - Service	44.78	7.26	12.66	1131.77	-641.71	0.89
Dead+Wind 180 deg - Service	44.78	-0.07	14.54	1297.58	12.09	0.96
Dead+Wind 210 deg - Service	44.78	-7.34	12.60	1124.88	659.04	0.74
Dead+Wind 240 deg - Service	44.78	-12.75	7.28	650.78	1143.99	0.47
Dead+Wind 270 deg - Service	44.78	-14.73	0.06	9.24	1321.40	0.39
Dead+Wind 300 deg - Service	44.78	-12.73	-7.27	-644.87	1140.25	-0.19
Dead+Wind 330 deg - Service	44.78	-7.38	-12.57	-1116.97	663.82	-0.53

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-44.78	0.00	0.00	44.78	-0.00	0.000%
2	-0.30	-44.78	-47.03	0.30	44.78	47.03	0.001%
3	23.62	-44.78	-40.71	-23.62	44.78	40.71	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
4	41.16	-44.78	-23.36	-41.16	44.78	23.36	0.000%
5	47.50	-44.78	0.02	-47.49	44.78	-0.02	0.004%
6	41.13	-44.78	23.50	-41.13	44.78	-23.50	0.000%
7	23.52	-44.78	41.01	-23.52	44.78	-41.01	0.000%
8	-0.22	-44.78	47.12	0.22	44.78	-47.12	0.000%
9	-23.78	-44.78	40.83	23.78	44.78	-40.83	0.000%
10	-41.32	-44.78	23.58	41.32	44.78	-23.58	0.000%
11	-47.74	-44.78	0.18	47.74	44.78	-0.18	0.001%
12	-41.23	-44.78	-23.54	41.23	44.78	23.54	0.000%
13	-23.92	-44.78	-40.73	23.92	44.78	40.73	0.000%
14	0.00	-86.48	0.00	-0.00	86.48	0.00	0.000%
15	-0.06	-86.48	-11.44	0.06	86.48	11.44	0.000%
16	5.73	-86.48	-9.90	-5.73	86.48	9.90	0.000%
17	9.98	-86.48	-5.69	-9.98	86.48	5.69	0.000%
18	11.51	-86.48	-0.00	-11.51	86.48	0.00	0.000%
19	9.97	-86.48	5.71	-9.97	86.48	-5.71	0.000%
20	5.70	-86.48	9.96	-5.70	86.48	-9.96	0.000%
21	-0.05	-86.48	11.46	0.05	86.48	-11.46	0.000%
22	-5.77	-86.48	9.93	5.77	86.48	-9.93	0.000%
23	-10.01	-86.48	5.74	10.01	86.48	-5.74	0.000%
24	-11.56	-86.48	0.04	11.56	86.48	-0.04	0.000%
25	-9.99	-86.48	-5.72	9.99	86.48	5.72	0.000%
26	-5.79	-86.48	-9.90	5.79	86.48	9.90	0.000%
27	-0.09	-44.78	-14.52	0.09	44.78	14.51	0.006%
28	7.29	-44.78	-12.56	-7.29	44.78	12.56	0.000%
29	12.70	-44.78	-7.21	-12.70	44.78	7.21	0.000%
30	14.66	-44.78	0.01	-14.66	44.78	-0.01	0.006%
31	12.69	-44.78	7.25	-12.69	44.78	-7.25	0.000%
32	7.26	-44.78	12.66	-7.26	44.78	-12.66	0.000%
33	-0.07	-44.78	14.54	0.07	44.78	-14.54	0.002%
34	-7.34	-44.78	12.60	7.34	44.78	-12.60	0.000%
35	-12.75	-44.78	7.28	12.75	44.78	-7.28	0.001%
36	-14.74	-44.78	0.06	14.73	44.78	-0.06	0.002%
37	-12.73	-44.78	-7.27	12.73	44.78	7.27	0.001%
38	-7.38	-44.78	-12.57	7.38	44.78	12.57	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	12	0.00000001	0.00010935
3	Yes	15	0.00000001	0.00005138
4	Yes	15	0.00000001	0.00005340
5	Yes	11	0.00004295	0.00011483
6	Yes	15	0.00000001	0.00005300
7	Yes	15	0.00000001	0.00005139
8	Yes	13	0.00000001	0.00005291
9	Yes	15	0.00000001	0.00005477
10	Yes	15	0.00000001	0.00005297
11	Yes	12	0.00000001	0.00006533
12	Yes	15	0.00000001	0.00005354
13	Yes	15	0.00000001	0.00005395
14	Yes	9	0.00000001	0.00014713
15	Yes	14	0.00000001	0.00004971
16	Yes	14	0.00000001	0.00005602
17	Yes	14	0.00000001	0.00005645
18	Yes	14	0.00000001	0.00004953
19	Yes	14	0.00000001	0.00005788
20	Yes	14	0.00000001	0.00005777
21	Yes	14	0.00000001	0.00005137
22	Yes	14	0.00000001	0.00006105
23	Yes	14	0.00000001	0.00006116
24	Yes	14	0.00000001	0.00005245
25	Yes	14	0.00000001	0.00005931

26	Yes	14	0.00000001	0.00005919
27	Yes	10	0.00014946	0.00014604
28	Yes	12	0.00000001	0.00010113
29	Yes	12	0.00000001	0.00011361
30	Yes	10	0.00014945	0.00013015
31	Yes	12	0.00000001	0.00010954
32	Yes	12	0.00000001	0.00010066
33	Yes	11	0.00000001	0.00007282
34	Yes	12	0.00000001	0.00011937
35	Yes	12	0.00000001	0.00010610
36	Yes	11	0.00000001	0.00005536
37	Yes	12	0.00000001	0.00011146
38	Yes	12	0.00000001	0.00011303

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 96.75	20.75	36	1.53	0.01
L2	96.75 - 91.58	13.63	36	1.32	0.00
L3	91.58 - 90.0833	12.25	36	1.23	0.00
L4	90.0833 - 78	11.87	36	1.21	0.00
L5	81.75 - 76.75	9.84	36	1.11	0.00
L6	76.75 - 72	8.69	36	1.07	0.00
L7	72 - 70.25	7.65	36	1.01	0.00
L8	70.25 - 69.75	7.28	36	0.99	0.00
L9	69.75 - 56	7.18	36	0.99	0.00
L10	56 - 54	4.62	36	0.79	0.00
L11	54 - 53.5	4.29	36	0.77	0.00
L12	53.5 - 39.75	4.21	36	0.76	0.00
L13	44.5 - 35	2.92	36	0.61	0.00
L14	35 - 25	1.80	36	0.50	0.00
L15	25 - 14.5	0.91	36	0.35	0.00
L16	14.5 - 12.5	0.31	36	0.20	0.00
L17	12.5 - 5.5	0.23	36	0.17	0.00
L18	5.5 - 4.75	0.05	36	0.08	0.00
L19	4.75 - 0	0.03	36	0.07	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.0000	VHLP2-11	36	20.75	1.53	0.01	14494
123.0000	PX2F-52	36	20.75	1.53	0.01	14494
122.0000	APXVSPP18-C-A20 w/ Mount Pipe	36	20.75	1.53	0.01	14494
113.0000	(2) DB846F65ZAXY w/ Mount Pipe	36	18.51	1.49	0.00	10353
105.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	36	16.02	1.43	0.00	4831
97.0000	(2) RRUS 11	36	13.70	1.32	0.00	3312
96.0000	(2) 7770.00 w/ Mount Pipe	36	13.42	1.30	0.00	3292

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 96.75	66.97	11	4.95	0.02
L2	96.75 - 91.58	44.00	11	4.25	0.01
L3	91.58 - 90.0833	39.55	11	3.97	0.01
L4	90.0833 - 78	38.31	11	3.91	0.01
L5	81.75 - 76.75	31.76	11	3.59	0.00
L6	76.75 - 72	28.06	11	3.46	0.00
L7	72 - 70.25	24.71	11	3.28	0.00
L8	70.25 - 69.75	23.52	11	3.21	0.00
L9	69.75 - 56	23.19	11	3.19	0.00
L10	56 - 54	14.91	11	2.56	0.00
L11	54 - 53.5	13.85	11	2.48	0.00
L12	53.5 - 39.75	13.59	11	2.45	0.00
L13	44.5 - 35	9.43	11	1.97	0.00
L14	35 - 25	5.81	11	1.61	0.00
L15	25 - 14.5	2.94	11	1.13	0.00
L16	14.5 - 12.5	1.00	11	0.64	0.00
L17	12.5 - 5.5	0.74	11	0.56	0.00
L18	5.5 - 4.75	0.15	11	0.26	0.00
L19	4.75 - 0	0.11	11	0.22	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.0000	VHLP2-11	11	66.97	4.95	0.02	4553
123.0000	PX2F-52	11	66.97	4.95	0.02	4553
122.0000	APXVSP18-C-A20 w/ Mount Pipe	11	66.97	4.95	0.02	4553
113.0000	(2) DB846F65ZAXY w/ Mount Pipe	11	59.75	4.82	0.02	3252
105.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	11	51.73	4.61	0.01	1516
97.0000	(2) RRUS 11	11	44.22	4.26	0.01	1038
96.0000	(2) 7770.00 w/ Mount Pipe	11	43.33	4.21	0.01	1031

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio $\frac{P}{P_a}$
L1	120 - 96.75 (1)	TP26.6976x22x0.25	23.2500	0.0000	0.0	36.00	21.2903	-8.85	766.45	0.012
L2	96.75 - 91.58 (2)	TP27.7422x26.6976x0.321 8	5.1700	0.0000	0.0	32.78	28.4103	-11.49	931.23	0.012
L3	91.58 - 90.0833 (3)	TP28.0446x27.7422x0.481 7	1.4967	0.0000	0.0	28.75	42.7495	-11.77	1229.13	0.010
L4	90.0833 - 78 (4)	TP30.486x28.0446x0.6179	12.0833	0.0000	0.0	28.46	57.9201	-13.75	1648.29	0.008
L5	78 - 76.75 (5)	TP30.2385x28.4925x0.677 8	5.0000	0.0000	0.0	28.40	64.5167	-15.75	1832.53	0.009
L6	76.75 - 72 (6)	TP31.1982x30.2385x0.768 4	4.7500	0.0000	0.0	25.03	75.2880	-17.19	1884.16	0.009
L7	72 - 70.25 (7)	TP31.5518x31.1982x0.786 2	1.7500	0.0000	0.0	27.06	77.8889	-17.74	2107.67	0.008
L8	70.25 - 69.75 (8)	TP31.6528x31.5518x0.706 6	0.5000	0.0000	0.0	25.87	70.4123	-17.90	1821.29	0.010

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Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L9	69.75 - 56 (9)	TP34.4308x31.6528x0.704 7	13.7500	0.0000	0.0	28.67	76.5313	-22.12	2194.00	0.010
L10	56 - 54 (10)	TP34.8349x34.4308x0.830 7	2.0000	0.0000	0.0	28.86	90.9542	-22.86	2624.94	0.009
L11	54 - 53.5 (11)	TP34.9359x34.8349x0.743 9	0.5000	0.0000	0.0	31.28	81.8968	-23.03	2562.06	0.009
L12	53.5 - 39.75 (12)	TP37.714x34.9359x0.621 12	13.7500	0.0000	0.0	33.22	72.2506	-25.78	2399.88	0.011
L13	39.75 - 35 (13)	TP38.0487x35.5123x0.753 6	9.5000	0.0000	0.0	33.26	90.4964	-30.35	3009.73	0.010
L14	35 - 25 (14)	TP40.069x38.0487x0.7306	10.0000	0.0000	0.0	33.38	92.5474	-34.11	3089.05	0.011
L15	25 - 14.5 (15)	TP42.1905x40.069x0.7714	10.5000	0.0000	0.0	33.47	102.884 0	-38.43	3443.93	0.011
L16	14.5 - 12.5 (16)	TP42.5945x42.1905x0.815 5	2.0000	0.0000	0.0	33.52	109.712 0	-39.31	3677.10	0.011
L17	12.5 - 5.5 (17)	TP44.0088x42.5945x0.798 7	7.0000	0.0000	0.0	33.60	111.127 0	-42.41	3733.87	0.011
L18	5.5 - 4.75 (18)	TP44.1603x44.0088x0.741 3	0.7500	0.0000	0.0	34.40	103.638 0	-42.74	3564.93	0.012
L19	4.75 - 0 (19)	TP45.12x44.1603x0.7319	4.7500	0.0000	0.0	35.38	104.613 0	-44.76	3700.79	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	120 - 96.75 (1)	TP26.6976x22x0.25	409.92	35.79	36.00	0.994	0.00	0.00	36.00	0.000
L2	96.75 - 91.58 (2)	TP27.7422x26.6976x0.32 18	575.59	36.40	32.78	1.111	0.00	0.00	32.78	0.000
L3	91.58 - 90.0833 (3)	TP28.0446x27.7422x0.48 17	624.35	26.26	28.75	0.913	0.00	0.00	28.75	0.000
L4	90.0833 - 78 (4)	TP30.486x28.0446x0.617 9	902.98	26.63	28.46	0.936	0.00	0.00	28.46	0.000
L5	78 - 76.75 (5)	TP30.2385x28.4925x0.67 78	1076.2	28.11	28.40	0.990	0.00	0.00	28.40	0.000
L6	76.75 - 72 (6)	TP31.1982x30.2385x0.76 84	1245.1	27.14	25.03	1.084	0.00	0.00	25.03	0.000
L7	72 - 70.25 (7)	TP31.5518x31.1982x0.78 62	1308.3	27.27	27.06	1.008	0.00	0.00	27.06	0.000
L8	70.25 - 69.75 (8)	TP31.6528x31.5518x0.70 66	1326.5	30.32	25.87	1.172	0.00	0.00	25.87	0.000
L9	69.75 - 56 (9)	TP34.4308x31.6528x0.70 47	1842.5	35.49	28.67	1.238	0.00	0.00	28.67	0.000
L10	56 - 54 (10)	TP34.8349x34.4308x0.83 07	1920.2	30.98	28.86	1.073	0.00	0.00	28.86	0.000
L11	54 - 53.5 (11)	TP34.9359x34.8349x0.74 39	1939.8	34.47	31.28	1.102	0.00	0.00	31.28	0.000
L12	53.5 - 39.75 (12)	TP37.714x34.9359x0.621 8	2298.9	43.62	33.22	1.313	0.00	0.00	33.22	0.000
L13	39.75 - 35 (13)	TP38.0487x35.5123x0.75 36	2693.5	39.65	33.26	1.192	0.00	0.00	33.26	0.000
L14	35 - 25 (14)	TP40.069x38.0487x0.730 6	3124.5	42.57	33.38	1.275	0.00	0.00	33.38	0.000
L15	25 - 14.5 (15)	TP42.1905x40.069x0.771 4	3593.7	41.84	33.47	1.250	0.00	0.00	33.47	0.000
L16	14.5 - 12.5 (16)	TP42.5945x42.1905x0.81 55	3685.0	39.92	33.52	1.191	0.00	0.00	33.52	0.000
L17	12.5 - 5.5 (17)	TP44.0088x42.5945x0.79 87	4009.6	41.42	33.60	1.233	0.00	0.00	33.60	0.000
L18	5.5 - 4.75 (18)	TP44.1603x44.0088x0.74 13	4044.9	44.52	34.40	1.294	0.00	0.00	34.40	0.000
L19	4.75 - 0 (19)	TP45.12x44.1603x0.7319	4270.1 3	45.52	35.38	1.287	0.00	0.00	35.38	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
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Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	120 - 96.75 (1)	TP26.6976x22x0.25	25.74	1.21	24.00	0.102	2.23	0.09	24.00	0.004
L2	96.75 - 91.58 (2)	TP27.7422x26.6976x0.3218	32.43	1.14	21.85	0.106	2.20	0.07	21.85	0.003
L3	91.58 - 90.0833 (3)	TP28.0446x27.7422x0.4817	32.69	0.76	19.17	0.081	2.19	0.04	19.17	0.002
L4	90.0833 - 78 (4)	TP30.486x28.0446x0.6179	34.15	0.59	18.97	0.063	2.12	0.03	18.97	0.002
L5	78 - 76.75 (5)	TP30.2385x28.4925x0.6778	35.11	0.54	18.94	0.058	2.07	0.03	18.94	0.001
L6	76.75 - 72 (6)	TP31.1982x30.2385x0.7684	35.95	0.48	16.68	0.058	2.03	0.02	16.68	0.001
L7	72 - 70.25 (7)	TP31.5518x31.1982x0.7862	36.27	0.47	18.04	0.052	2.02	0.02	18.04	0.001
L8	70.25 - 69.75 (8)	TP31.6528x31.5518x0.7066	36.35	0.52	17.24	0.061	2.00	0.02	17.24	0.001
L9	69.75 - 56 (9)	TP34.4308x31.6528x0.7047	38.68	0.51	19.11	0.054	1.88	0.02	19.11	0.001
L10	56 - 54 (10)	TP34.8349x34.4308x0.8307	39.05	0.43	19.24	0.045	1.86	0.01	19.24	0.001
L11	54 - 53.5 (11)	TP34.9359x34.8349x0.7439	39.14	0.48	20.86	0.047	1.85	0.02	20.86	0.001
L12	53.5 - 39.75 (12)	TP37.714x34.9359x0.621	40.64	0.56	22.14	0.052	1.75	0.02	22.14	0.001
L13	39.75 - 35 (13)	TP38.0487x35.5123x0.7536	42.32	0.47	22.17	0.043	1.64	0.01	22.17	0.001
L14	35 - 25 (14)	TP40.069x38.0487x0.7306	43.85	0.47	22.25	0.043	1.52	0.01	22.25	0.000
L15	25 - 14.5 (15)	TP42.1905x40.069x0.7714	45.49	0.44	22.32	0.040	1.39	0.01	22.32	0.000
L16	14.5 - 12.5 (16)	TP42.5945x42.1905x0.8155	45.80	0.42	22.34	0.038	1.37	0.01	22.34	0.000
L17	12.5 - 5.5 (17)	TP44.0088x42.5945x0.7987	46.91	0.42	22.40	0.038	1.28	0.01	22.40	0.000
L18	5.5 - 4.75 (18)	TP44.1603x44.0088x0.7413	47.02	0.45	22.93	0.040	1.27	0.01	22.93	0.000
L19	4.75 - 0 (19)	TP45.12x44.1603x0.7319	47.76	0.46	23.58	0.039	1.21	0.01	23.58	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P P_a	Ratio f_{bx} F_{bx}	Ratio f_{by} F_{by}	Ratio f_v F_v	Ratio f_{vt} F_{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	120 - 96.75 (1)	0.012	0.994	0.000	0.102	0.004	1.009	1.333	H1-3+VT ✓
L2	96.75 - 91.58 (2)	0.012	1.111	0.000	0.106	0.003	1.126	1.333	H1-3+VT ✓
L3	91.58 - 90.0833 (3)	0.010	0.913	0.000	0.081	0.002	0.925	1.333	H1-3+VT ✓
L4	90.0833 - 78 (4)	0.008	0.936	0.000	0.063	0.002	0.945	1.333	H1-3+VT ✓
L5	78 - 76.75 (5)	0.009	0.990	0.000	0.058	0.001	0.999	1.333	H1-3+VT ✓

120 Ft Monopole Tower Structural Analysis
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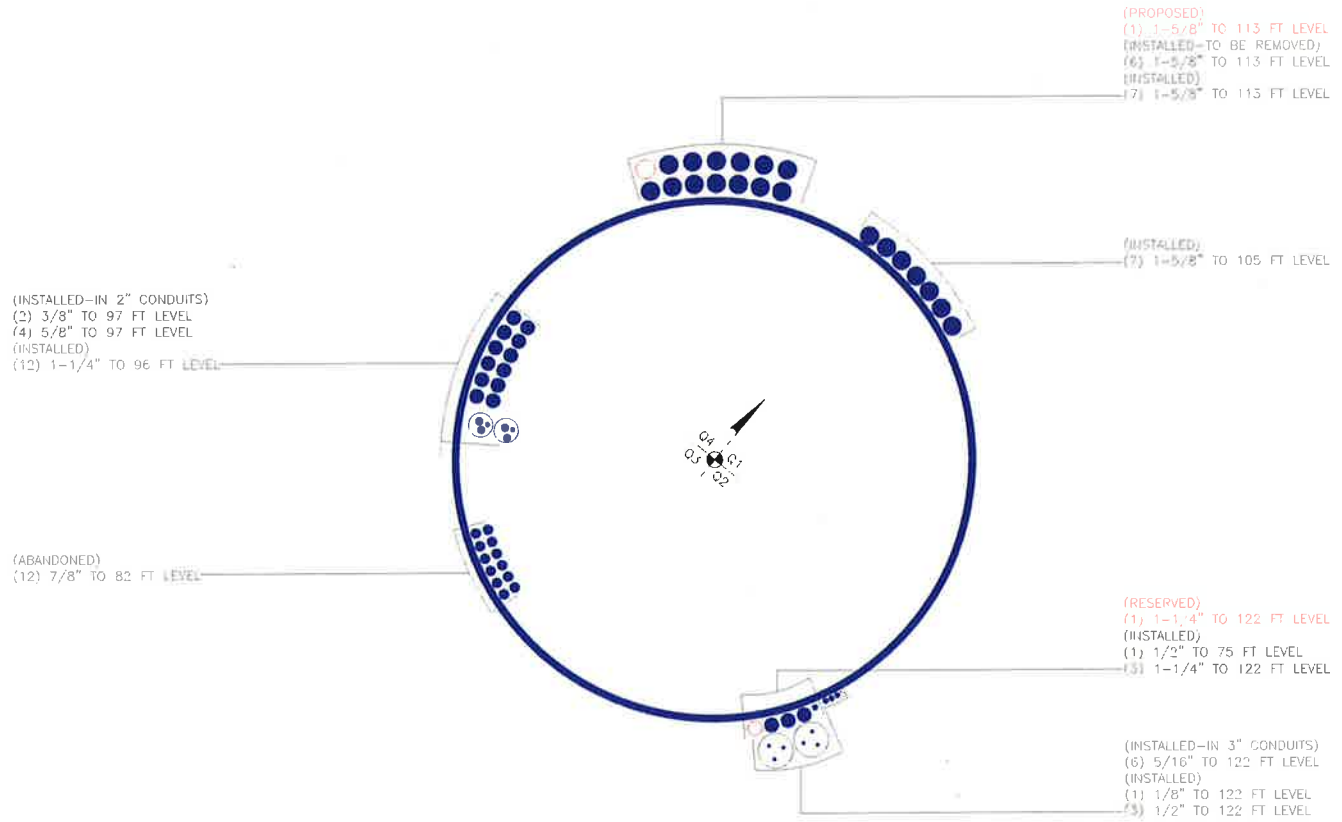
Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		P	f_{bx}	f_{by}	f_v	f_{vt}			
		P_a	F_{bx}	F_{by}	F_v	F_{vt}			
L6	76.75 - 72 (6)	0.009	1.084	0.000	0.058	0.001	1.094	1.333	H1-3+VT ✓
L7	72 - 70.25 (7)	0.008	1.008	0.000	0.052	0.001	1.017	1.333	H1-3+VT ✓
L8	70.25 - 69.75 (8)	0.010	1.172	0.000	0.061	0.001	1.183	1.333	H1-3+VT ✓
L9	69.75 - 56 (9)	0.010	1.238	0.000	0.054	0.001	1.249	1.333	H1-3+VT ✓
L10	56 - 54 (10)	0.009	1.073	0.000	0.045	0.001	1.083	1.333	H1-3+VT ✓
L11	54 - 53.5 (11)	0.009	1.102	0.000	0.047	0.001	1.111	1.333	H1-3+VT ✓
L12	53.5 - 39.75 (12)	0.011	1.313	0.000	0.052	0.001	1.325	1.333	H1-3+VT ✓
L13	39.75 - 35 (13)	0.010	1.192	0.000	0.043	0.001	1.203	1.333	H1-3+VT ✓
L14	35 - 25 (14)	0.011	1.275	0.000	0.043	0.000	1.287	1.333	H1-3+VT ✓
L15	25 - 14.5 (15)	0.011	1.250	0.000	0.040	0.000	1.261	1.333	H1-3+VT ✓
L16	14.5 - 12.5 (16)	0.011	1.191	0.000	0.038	0.000	1.202	1.333	H1-3+VT ✓
L17	12.5 - 5.5 (17)	0.011	1.233	0.000	0.038	0.000	1.244	1.333	H1-3+VT ✓
L18	5.5 - 4.75 (18)	0.012	1.294	0.000	0.040	0.000	1.307	1.333	H1-3+VT ✓
L19	4.75 - 0 (19)	0.012	1.287	0.000	0.039	0.000	1.299	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail	
L1	120 - 96.75	Pole	TP26.6976x22x0.25	1	-8.85	1021.68	75.7	Pass	
L2	96.75 - 91.58	Pole	TP27.7422x26.6976x0.3218	2	-11.49	1241.33	84.5	Pass	
L3	91.58 - 90.0833	Pole	TP28.0446x27.7422x0.4817	3	-11.77	1638.43	69.4	Pass	
L4	90.0833 - 78	Pole	TP30.486x28.0446x0.6179	4	-13.75	2197.17	70.9	Pass	
L5	78 - 76.75	Pole	TP30.2385x28.4925x0.6778	5	-15.75	2442.76	75.0	Pass	
L6	76.75 - 72	Pole	TP31.1982x30.2385x0.7684	6	-17.19	2511.59	82.1	Pass	
L7	72 - 70.25	Pole	TP31.5518x31.1982x0.7862	7	-17.74	2809.52	76.3	Pass	
L8	70.25 - 69.75	Pole	TP31.6528x31.5518x0.7066	8	-17.90	2427.78	88.8	Pass	
L9	69.75 - 56	Pole	TP34.4308x31.6528x0.7047	9	-22.12	2924.60	93.7	Pass	
L10	56 - 54	Pole	TP34.8349x34.4308x0.8307	10	-22.86	3499.04	81.2	Pass	
L11	54 - 53.5	Pole	TP34.9359x34.8349x0.7439	11	-23.03	3415.23	83.4	Pass	
L12	53.5 - 39.75	Pole	TP37.714x34.9359x0.621	12	-25.78	3199.04	99.4	Pass	
L13	39.75 - 35	Pole	TP38.0487x35.5123x0.7536	13	-30.35	4011.97	90.2	Pass	
L14	35 - 25	Pole	TP40.069x38.0487x0.7306	14	-34.11	4117.70	96.5	Pass	
L15	25 - 14.5	Pole	TP42.1905x40.069x0.7714	15	-38.43	4590.76	94.6	Pass	
L16	14.5 - 12.5	Pole	TP42.5945x42.1905x0.8155	16	-39.31	4901.57	90.2	Pass	
L17	12.5 - 5.5	Pole	TP44.0088x42.5945x0.7987	17	-42.41	4977.25	93.4	Pass	
L18	5.5 - 4.75	Pole	TP44.1603x44.0088x0.7413	18	-42.74	4752.05	98.0	Pass	
L19	4.75 - 0	Pole	TP45.12x44.1603x0.7319	19	-44.76	4933.15	97.5	Pass	
							Summary		
							Pole (L12)	99.4	Pass
							RATING =	99.4	Pass

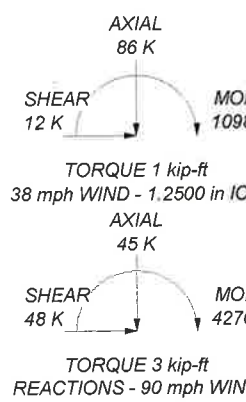
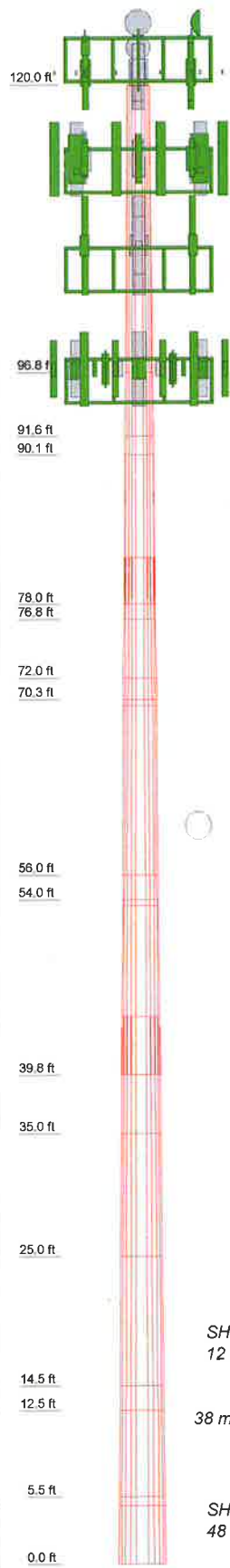
APPENDIX B
BASE LEVEL DRAWING

120 Ft Monopole Tower Structural Analysis
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APPENDIX C
ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Length (ft)	23.2500	1.49675	1.700	12.0833	5.0000	0.300604	0.7500	13.7500	0.500000	13.7500	0.500000	13.7500	0.500000	10.0000	10.5000	2.0000	7.0000	12.0000	7.0000	12.0000
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.2500	0.48170	0.3218	0.6179	0.6778	0.7047	0.7047	0.7047	0.7047	0.7047	0.7047	0.6210	0.7536	0.7306	0.7306	0.7306	0.7306	0.7306	0.7306	0.7306
Socket Length (ft)				3.7500								4.7500								
Top Dia (in)	22.0000	27.74226	6.976	28.0446	31.6528	34.3648	34.3648	34.3648	34.3648	34.3648	34.3648	34.9359	35.5123	38.0487	40.0690	42.1904	44.1663	44.1663	44.1663	44.1663
Bot Dia (in)	26.6976	28.04487	7.422	30.4860	33.05981	34.4308	34.4308	34.4308	34.4308	34.4308	34.4308	37.7140	38.0487	40.0690	42.1904	44.1663	44.1663	44.1663	44.1663	44.1663
Grade	A607-60	Reinf 54.63 ksi	Reinf 47.92 ksi	Reinf 47.92 ksi	Reinf 47.92 ksi	Reinf 47.92 ksi	Reinf 47.92 ksi	Reinf 47.92 ksi	Reinf 47.92 ksi	Reinf 47.92 ksi	Reinf 47.92 ksi	Reinf 55.36 ksi	Reinf 55.43 ksi	Reinf 55.43 ksi	Reinf 55.43 ksi	Reinf 55.43 ksi	Reinf 55.43 ksi	Reinf 55.43 ksi	Reinf 55.43 ksi	Reinf 55.43 ksi
Weight (K)	1.5	0.2	0.5	2.3	1.1	1.2	0.5	3.4	0.6	3.3	2.8	3.1	3.6	2.6	0.7	2.6	0.3	1.7	0.3	29.7



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSP18-C-A20 w/ Mount Pipe	122	AWS-3 RRH4X45	113
APXVSP18-C-A20 w/ Mount Pipe	122	AWS-3 RRH4X45	113
APXVSP18-C-A20 w/ Mount Pipe	122	AWS-3 RRH4X45	113
LLPX310R w/ Mount Pipe	122	DB-T1-6Z-8AB-0Z	113
LLPX310R w/ Mount Pipe	122	Platform Mount [LP 305-1]	113
LLPX310R w/ Mount Pipe	122	(2) DB846F65ZAXY w/ Mount Pipe	113
LLPX310R w/ Mount Pipe	122	(2) LPA-80063/4CF w/ Mount Pipe	113
MT-485025	122	(2) LPA-80063/4CF w/ Mount Pipe	113
800 EXTERNAL NOTCH FILTER	122	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	105
800 EXTERNAL NOTCH FILTER	122	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	105
800 EXTERNAL NOTCH FILTER	122	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	105
(3) ACU-A20-N	122	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	105
(3) ACU-A20-N	122	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	105
(3) ACU-A20-N	122	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	105
PCS 1900MHz 4x45W-65MHz	122	KRY 112 144/1	105
PCS 1900MHz 4x45W-65MHz	122	KRY 112 144/1	105
PCS 1900MHz 4x45W-65MHz	122	KRY 112 144/1	105
800MHZ RRH	122	LNx-6515DS-VTM w/ Mount Pipe	105
800MHZ RRH	122	LNx-6515DS-VTM w/ Mount Pipe	105
800MHZ RRH	122	LNx-6515DS-VTM w/ Mount Pipe	105
FDD_R6_RRH	122	RRUS 11 B12	105
FDD_R6_RRH	122	RRUS 11 B12	105
FDD_R6_RRH	122	RRUS 11 B12	105
APXVTM14-C-120 w/ Mount Pipe	122	Platform Mount [LP 712-1]	105
APXVTM14-C-120 w/ Mount Pipe	122	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	105
APXVTM14-C-120 w/ Mount Pipe	122	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	105
TD-RRH8x20-25	122	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	105
TD-RRH8x20-25	122	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	105
TD-RRH8x20-25	122	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	105
Platform Mount [LP 713-1]	122	DC6-48-60-18-8F	97
2.375" OD x 5' Mount Pipe	122	RRUS-32 B30	97
2.375" OD x 5' Mount Pipe	122	RRUS-32 B30	97
2.375" OD x 5' Mount Pipe	122	RRUS-32 B30	97
PX2F-52	122	DC6-48-60-18-8F	97
VHLP2-11	122	Side Arm Mount [SO 102-3]	97
VHLP2-11	122	(2) 2.375" OD x 3' Mount Pipe	97
ACUTIME 2000	113	(2) 2.375" OD x 3' Mount Pipe	97
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	113	(2) 2.375" OD x 3' Mount Pipe	97
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	113	(2) 2.375" OD x 3' Mount Pipe	97
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	113	(2) RRUS 11	97
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	113	(2) RRUS 11	97
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	113	(2) RRUS 11	97
(2) FD9R6004/2C-3L	113	P65-16-XLH-RR w/ Mount Pipe	96
(2) FD9R6004/2C-3L	113	P65-16-XLH-RR w/ Mount Pipe	96
(2) FD9R6004/2C-3L	113	P65-16-XLH-RR w/ Mount Pipe	96
DB-T1-6Z-8AB-0Z	113	(4) LGP2140X	96
(2) SBNHH-1D65B w/ Mount Pipe	113	(4) LGP2140X	96
(2) SBNHH-1D45B w/ Mount Pipe	113	(4) LGP2140X	96
(2) SBNHH-1D45B w/ Mount Pipe	113	OPA-65R-LCUU-H6 w/ Mount Pipe	96
RRH2x60-700	113	OPA-65R-LCUU-H6 w/ Mount Pipe	96
RRH2x60-700	113	OPA-65R-LCUU-H6 w/ Mount Pipe	96
RRH2x60-700	113	Platform Mount [LP 601-1]	96
RRH2X60-1900	113	(2) 7770.00 w/ Mount Pipe	96
RRH2X60-1900	113	(2) 7770.00 w/ Mount Pipe	96
RRH2X60-1900	113	(2) 7770.00 w/ Mount Pipe	96

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	Reinf 52.14 ksi	52 ksi	66 ksi
Reinf 54.63 ksi	55 ksi	69 ksi	Reinf 55.36 ksi	55 ksi	70 ksi
Reinf 47.92 ksi	48 ksi	60 ksi	Reinf 55.43 ksi	55 ksi	70 ksi
Reinf 47.43 ksi	47 ksi	60 ksi	Reinf 55.63 ksi	56 ksi	70 ksi
Reinf 47.34 ksi	47 ksi	60 ksi	Reinf 55.79 ksi	56 ksi	70 ksi
Reinf 41.71 ksi	42 ksi	53 ksi	Reinf 55.86 ksi	56 ksi	70 ksi
Reinf 45.10 ksi	45 ksi	57 ksi	Reinf 56.00 ksi	56 ksi	70 ksi
Reinf 43.11 ksi	43 ksi	54 ksi	Reinf 57.33 ksi	57 ksi	72 ksi
Reinf 47.78 ksi	48 ksi	60 ksi	Reinf 58.96 ksi	59 ksi	74 ksi
Reinf 48.10 ksi	48 ksi	61 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.25 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99.4%

Paul J Ford and Company
 250 E. Broad Street Suite 600
 Columbus, OH 43215
 Phone: 614.221.6679
 FAX: 614.448.4105

Job: **120' MP; 528 Wheelers Farm RD; Milford,**
 Project: **PJF 37515-1743 / BU 876320**
 Client: **Crown Castle** Drawn by: **Robert Koors** App'd:
 Code: **TIA/EIA-222-F** Date: **03/30/16** Scale: **NTS**
 Path: Dwg No. **E-1**

v4.4 - Effective 7-12-13

Asymmetric Anchor Rod Analysis

Moment = 4270 k-ft
 Axial = 45.0 kips
 Shear = 48.0 kips
 Anchor Qty = 24

TIA Ref. = F
 ASIF = 1.3333
 Max Ratio = 100.0%

Location = Base Plate
 η = N/A for BP, Rev. G Sect. 4.9.9
 Threads = N/A for FP, Rev. G

**** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. ****

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in ²	Area, in ²	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	27.3	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
2	2.250	#18J A615 Gr 75	75	100	39.1	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
3	2.250	#18J A615 Gr 75	75	100	50.9	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
4	2.250	#18J A615 Gr 75	75	100	62.7	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
5	2.250	#18J A615 Gr 75	75	100	117.3	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
6	2.250	#18J A615 Gr 75	75	100	129.1	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
7	2.250	#18J A615 Gr 75	75	100	140.9	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
8	2.250	#18J A615 Gr 75	75	100	152.7	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
9	2.250	#18J A615 Gr 75	75	100	207.3	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
10	2.250	#18J A615 Gr 75	75	100	219.1	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
11	2.250	#18J A615 Gr 75	75	100	230.9	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
12	2.250	#18J A615 Gr 75	75	100	242.7	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
13	2.250	#18J A615 Gr 75	75	100	297.3	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
14	2.250	#18J A615 Gr 75	75	100	309.1	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
15	2.250	#18J A615 Gr 75	75	100	320.9	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
16	2.250	#18J A615 Gr 75	75	100	332.7	58.00	0.00	3.98	184.73	180.09	180.09	0.00	195.00	92.4%
17	1.375	Williams R71	127.7	150	352.1	58.00	0.00	1.68	77.88	75.93	75.93	0.00	110.75	68.6%
18	1.375	Williams R71	127.7	150	7.9	58.00	0.00	1.68	77.88	75.93	75.93	0.00	110.75	68.6%
19	1.375	Williams R71	127.7	150	82.1	58.00	0.00	1.68	77.88	75.93	75.93	0.00	110.75	68.6%
20	1.375	Williams R71	127.7	150	97.9	58.00	0.00	1.68	77.88	75.93	75.93	0.00	110.75	68.6%
21	1.375	Williams R71	127.7	150	172.1	58.00	0.00	1.68	77.88	75.93	75.93	0.00	110.75	68.6%
22	1.375	Williams R71	127.7	150	187.9	58.00	0.00	1.68	77.88	75.93	75.93	0.00	110.75	68.6%
23	1.375	Williams R71	127.7	150	262.1	58.00	0.00	1.68	77.88	75.93	75.93	0.00	110.75	68.6%
24	1.375	Williams R71	127.7	150	277.9	58.00	0.00	1.68	77.88	75.93	75.93	0.00	110.75	68.6%

77.10

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

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

Site Data

BU#:
 Site Name:
 App #:

Anchor Rod Data

Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	58	in
Anchor Spacing:	6	in

Plate Data

W=Side:	57	in
Thick:	3.25	in
Grade:	50	ksi
Clip Distance:	16	in

Stiffener Data (Welding at both sides)

Configuration:	Stiffened	
Weld Type:	Both	**
Groove Depth:	0.5	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.375	in
Width:	9	in
Height:	18	in
Thick:	1	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	80	ksi

Pole Data

Diam:	45.12	in
Thick:	0.375	in
Grade:	60	ksi
# of Sides:	12	"0" IF Round

Stress Increase Factor

ASD ASIF:	1.333
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** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Base Reactions

TIA Revision:	F		Reactions adjusted to account for additional anchor rods.
Unfactored Moment, M:	3526.6	ft-kips	
Unfactored Axial, P:	37.2	kips	
Unfactored Shear, V:	39.6	kips	

Anchor Rod Results

TIA F --> Maximum Rod Tension: 180.1 Kips
 Allowable Tension: 195.0 Kips

See asymmetric spreadsheet

Base Plate Results

Base Plate Stress: 4.4 ksi
 Allowable PL Bending Stress: 26.7 ksi
 Base Plate Stress Ratio: 16.6% **Pass**

Shear Check Only

PL Ref. Data

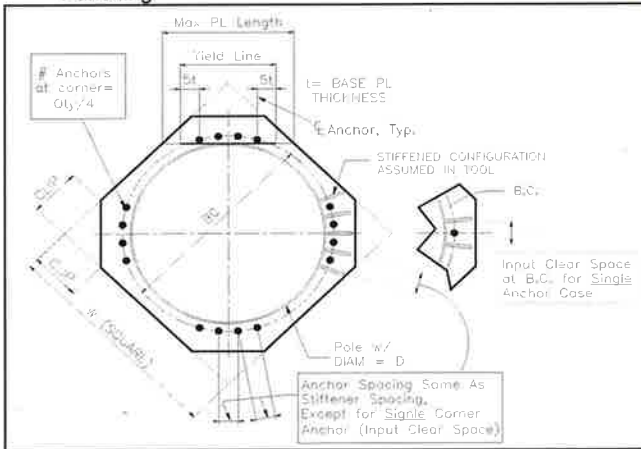
Yield Line (in): N/A, Roark
 Max PL Length: 35.49

Stiffener Results

Horizontal Weld: 52.7% **Pass**
 Vertical Weld: 44.1% **Pass**
 Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$: 15.3% **Pass**
 Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: 54.2% **Pass**
 Plate Comp. (AISC Bracket): 54.0% **Pass**

Pole Results

Pole Punching Shear Check: 15.5% **Pass**



DRILLED PIER SOIL AND STEEL ANALYSIS - TIA/EIA-222-F

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	4270.0		k-ft
Shear, V =	48.0		kips
Axial Load, P =	45.0		kips
OTM =	4294.0	0.0	k-ft @ Ground

Safety Factors / Load Factors / ϕ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-02
Seismic Design Category =	D
Reference Standard =	TIA/EIA-222-F
Use 1.3 Load Factor?	Yes
Load Factor =	1.30

Drilled Pier Parameters

Diameter =	7	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	19	ft
fc' =	3	ksi
ec =	0.003	in/in
L / D Ratio =	2.79	
Mat Ftdn. Cap Width =	12	ft
Mat Ftdn. Cap Length =	12	ft
Depth Below Grade =	6	ft

	Safety Factor	ϕ Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

Steel Parameters

Number of Bars =	32	
Rebar Size =	#11	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#5	
Side Clear Cover to Ties =	4	in

Load Combinations Checked per TIA/EIA-222-F

- Ult. Skin Friction/2.00 + Ult. End Bearing/2.00 + Effective Soil Wt. - Buoyant Conc. Wt. \geq Comp.
- Ult. Skin Friction/2.00 + Buoyant Conc. Wt./1.25 \geq Uplift
- Ult. Skin Friction/1.50 + Buoyant Conc. Wt./1.50 \geq Uplift

Soil Parameters

Water Table Depth =	7.00	ft
Depth to Ignore Soil =	3.33	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?*	Ground	

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)
 Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Direct Embed Pole Shaft Parameters

Dia @ Grade =		in
Dia @ Depth Below Grade =		in
Number of Sides =		
Thickness =		in
Fy =		ksi
Backfill Condition =		

Maximum Capacity Ratios

Maximum Soil Ratio =	100.0%
Maximum Steel Ratio =	100.0%

*Note: The drilled pier foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the drilled pier is based on the recommendations of the site specific geotechnical report. In the absence of any recommendations, the frost depth at the site or one half of the drilled pier diameter (whichever is greater) shall be ignored.

Define Soil Layers

Note: Cohesion = Undrained Shear Strength = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	2	100	0	28	Sand				2
2	1.33	135	0	42	Sand				3.33
3	3.67	135	0	42	Sand				7
4	6.5	135	0	42	Sand	20000			13.5
5	8.5	140	8000		Clay	20000			22
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	15.12	ft, from Grade
Bending Moment, M =	5019.55	k-ft, from COR
Resisting Moment, Ma =	5522.13	k-ft, from COR

MOMENT RATIO = 90.9% OK

Shear, V =	48.00	kips
Resisting Shear, Va =	52.81	kips

SHEAR RATIO = 90.9% OK

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	149.30	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, C =	45.00	kips
Allowable Comp. Cap., Ca =	344.56	kips

COMPRESSION RATIO = 13.1% OK

Steel Results (ACI 318-02):

Minimum Steel Area =	18.47	sq in
Actual Steel Area =	49.92	sq in

Allowable Min Axial, Pa =	-2073.60	kips, Where Ma = 0 k-ft
Allowable Max Axial, Pa =	6799.77	kips, Where Ma = 0 k-ft

Axial Load, P =	107.32	kips @ 6.00 ft Below Grade
Moment, M =	4434.98	k-ft @ 6.00 ft Below Grade
Allowable Moment, Ma =	5903.05	k-ft

MOMENT RATIO = 75.1% OK

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: 876320
 Site Name: 528 Wheelers Farm Rd
 App #:

Enter Load Factors Below:

For M (WL) 1.3 <---- Enter Factor
 For P (DL) 1.3 <---- Enter Factor

Pier Properties

Concrete:

Pier Diameter = 7.0 ft
 Concrete Area = 5541.8 in²

Reinforcement:

Clear Cover to Tie = 4.00 in
 Horiz. Tie Bar Size = 5
 Vert. Cage Diameter = 6.11 ft
 Vert. Cage Diameter = 73.34 in
Vertical Bar Size = 11
 Bar Diameter = 1.41 in
 Bar Area = 1.56 in²
 Number of Bars = 32
 As Total = 49.92 in²
 A s/ Aconc, Rho: 0.0090 0.90%

ACI 10.5, ACI 21.10.4, and IBC 1810.

Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(fc)/Fy: 0.0027
 200 / Fy: 0.0033

Minimum Rho Check:

Actual Req'd Min. Rho: 0.33% Flexural
 Provided Rho: 0.90% **OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = ($\phi=0.65$) Pn		
Pn per ACI 318 (10-2)	8839.70	kips
at Mu=($\phi=0.65$)Mn=	5309.39	ft-kips
Max Tu, ($\phi=0.9$) Tn =	2695.68	kips
at Mu= $\phi=(0.90)$ Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	4434.98	ft-kips (* Note)
Max. Service Shaft P:	107.32	kips
Max Axial Force Type:	Comp.	

(* Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor Shaft Factored Loads

Load Factor	Mu:	5765.474	ft-kips
1.30	Pu:	139.516	kips
1.30			

Material Properties

Concrete Comp. strength, fc =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code = 2002

Seismic Properties

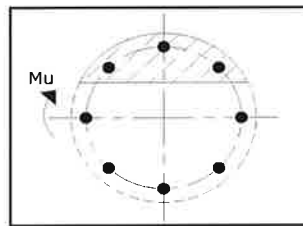
Seismic Design Category = D
 Seismic Risk = High

Solve
(Run)

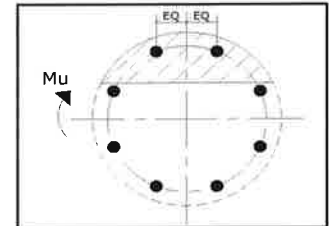
<-- Press Upon Completing All Input

Results:

Governing Orientation Case: 2



Case 1



Case 2

Dist. From Edge to Neutral Axis: 17.35 in

Extreme Steel Strain, et: 0.0106

et > 0.0050, Tension Controlled

Reduction Factor, ϕ : 0.900

Output Note: Negative Pu=Tension

For Axial Compression, ϕ Pn = Pu: 139.52 kips

Drilled Shaft Moment Capacity, ϕ Mn: 7673.97 ft-kips

Drilled Shaft Superimposed Mu: 5765.47 ft-kips

(Mu/ ϕ Mn, Drilled Shaft Flexure CSR): 75.1%