Robinson+Cole

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January 15, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
Ogg Meadow Road, Orange, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the top of the existing 160-foot tower off Ogg Meadow Road in Orange (the "Property"). The tower is owned by Crown Castle. Cellco's use of this tower was approved by the Council in 1997 (Docket No. 177a). Cellco now intends to modify its facility by replacing all of its existing antennas with three (3) model BXA-70040-6CF, 700 MHz antennas; two (2) model BXA-80063-6BF, 850 MHz antennas; one (1) model BXA-80063-4CF, 850 MHz antenna; two (2) model HBXX-6517DS-VTM, 1900 MHz antennas; one (1) model HBXX-6516DS-VTM, 1900 MHz antenna; two (2) model HBXX-6517DS-VTM, 2100 MHz antennas; and one (1) model HBXX-6516DS-VTM, 2100 MHz antenna, all at the same level on the tower. Cellco also intends to install six (6) remote radio heads ("RRHs") behind its 1900 MHz and 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable, attached to the outside of the monopole tower. Included in Attachment 1 are specifications for the replacement antennas, RRHs and HYBRIFLEX™ cables.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to James Zeoli, First Selectman of the Town of Orange. A copy of this letter is also being sent to South Central CT Regional Water Authority, the owner of the Property.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed on its existing antenna platform at the top of the 160-foot tower.

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

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

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table 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:
James Zeoli, Orange First Selectman
South Central CT Regional Water Authority
Sandy M. Carter

ATTACHMENT 1

BXA-70040-6CF-EDIN-X

X-Pol | FET Panel | 40° | 16.0 dBd

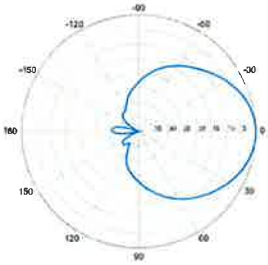
Replace 'X' with desired electrical downtilt.

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

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	42°	40°
Vertical beamwidth	12°	10°
Gain	15.5 dBd (17.6 dBi)	16.0 dBd (18.1 dBi)
Electrical downtilt (X)	0, 2, 4, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-12.1 dB	-13.4 dB
Front-to-back ratio (+/-30°)	-35.8 dB	-38.0 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1806 x 606 x 200 mm	71.1 x 23.9 x 7.9 in
Depth with z-brackets	240 mm	9.4 in
Weight without mounting brackets	17 kg	38 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 1.09 m^2 Side: 0.36 m^2	Front: 11.8 ft^2 Side: 3.9 ft^2
Wind load @ 161 km/hr (100 mph)	Front:1564 N Side: 547 N	Front: 350 lbf Side: 123 lbf

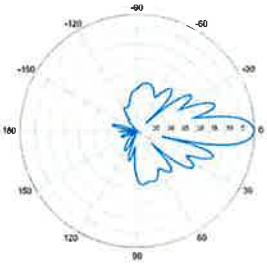
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	This model cannot be used in a standard FP concealment configuration		

BXA-70040-6CF-EDIN-X



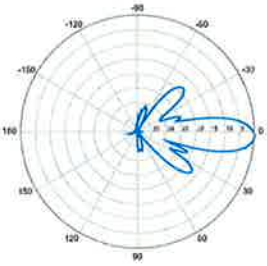
Horizontal | 750 MHz

BXA-70040-6CF-EDIN-0



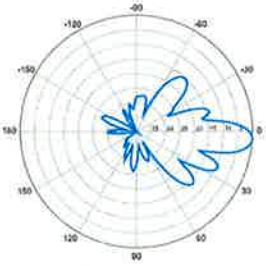
0° | Vertical | 750 MHz

BXA-70040-6CF-EDIN-2



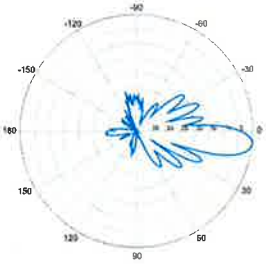
2° | Vertical | 750 MHz

BXA-70040-6CF-EDIN-4

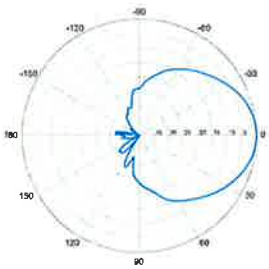


4° | Vertical | 750 MHz

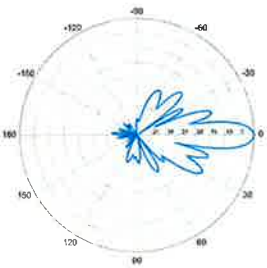
BXA-70040-6CF-EDIN-6



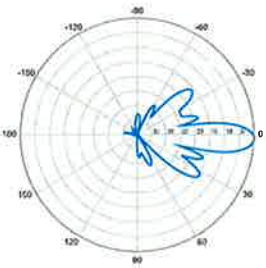
6° | Vertical | 750 MHz



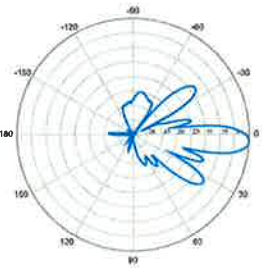
Horizontal | 850 MHz



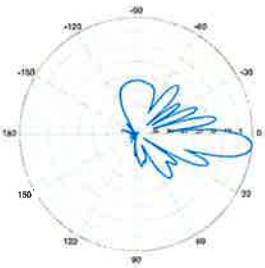
0° | Vertical | 850 MHz



2° | Vertical | 850 MHz



4° | Vertical | 850 MHz



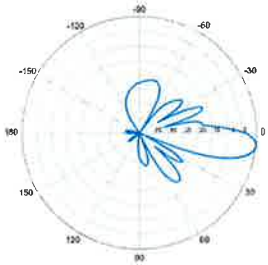
6° | Vertical | 850 MHz

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

BXA-70040-6CF-EDIN-X

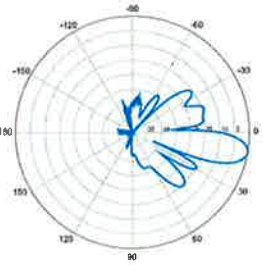
X-Pol | FET Panel | 40° | 16.0 dBd

BXA-70040-6CF-EDIN-8

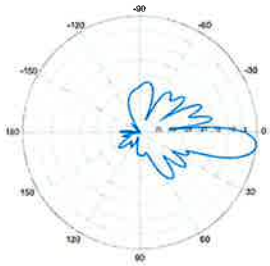


8° | Vertical | 750 MHz

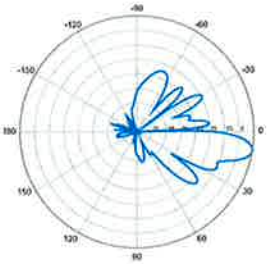
BXA-70040-6CF-EDIN-10



10° | Vertical | 750 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

BXA-80063-6BF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

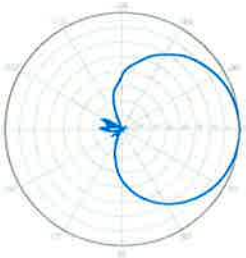
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics				
Frequency bands	806-900 MHz*			
*Optional frequency band for iDEN	806-941 MHz (specify when ordering)			
Polarization	±45°			
Horizontal beamwidth	63°			
Vertical beamwidth	11°			
Gain	14.5 dBd (16.6 dBi)			
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10, 15			
Impedance	50Ω			
VSWR	≤1.4:1			
Upper sidelobe suppression (0°)	-18.2 dB			
Front-to-back ratio (+/-30°)	-36.3 dB			
Null fill	5% (-26.02 dB)			
Isolation between ports	< -25 dB			
Input power with EDIN connectors	500 W			
Input power with N connectors	300 W			
Lightning protection	Direct Ground			
Connector(s)	2 Ports / EDIN or N / Female / Bottom			
Mechanical Characteristics				
Dimensions Length x Width x Depth	1742 x 285 x 135 mm		68.6 x 11.2 x 5.3 in	
Depth with z-brackets	175 mm		6.9 in	
Weight without mounting brackets	8.7 kg		19.2 lbs	
Survival wind speed	> 201 km/hr		> 125 mph	
Wind area	Front: 0.50 m²	Side: 0.24 m²	Front: 5.3 ft²	Side: 2.5 ft²
Wind load @ 161 km/hr (100 mph)	Front: 733 N	Side: 386 N	Front: 164 lbf	Side: 88 lbf

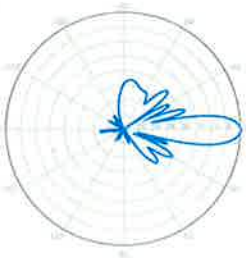
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-80063-6BF-EDIN-X-FP		

BXA-80063-6BF-EDIN-X



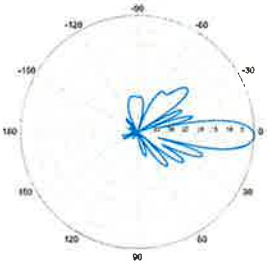
Horizontal

BXA-80063-6BF-EDIN-0



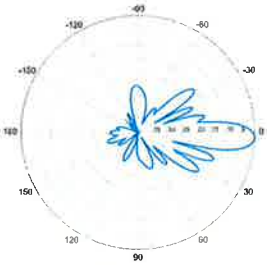
0° | Vertical

BXA-80063-6BF-EDIN-2



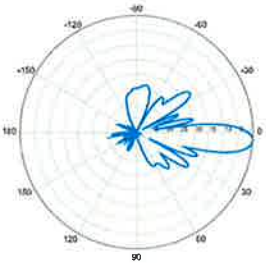
2° | Vertical

BXA-80063-6BF-EDIN-3



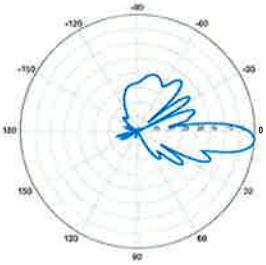
3° | Vertical

BXA-80063-6BF-EDIN-4



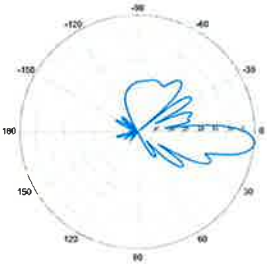
4° | Vertical

BXA-80063-6BF-EDIN-5



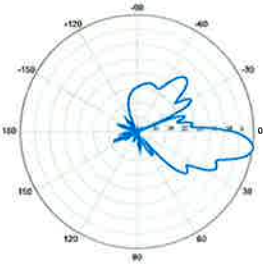
5° | Vertical

BXA-80063-6BF-EDIN-6



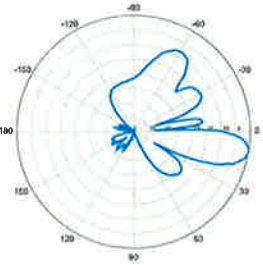
6° | Vertical

BXA-80063-6BF-EDIN-8



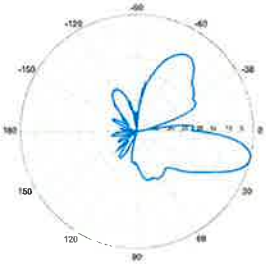
8° | Vertical

BXA-80063-6BF-EDIN-10



10° | Vertical

BXA-80063-6BF-EDIN-15



15° | Vertical

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

BXA-80063-4CF-EDIN-X

X-Pol | FET Panel | 63° | 13.0 dBd

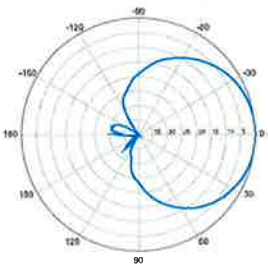
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics				
Frequency bands	806-900 MHz*			
*Optional frequency band for iDEN	806-941 MHz (specify when ordering)			
Polarization	±45°			
Horizontal beamwidth	63°			
Vertical beamwidth	15°			
Gain	13.0 dBd (15.1 dBi)			
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14			
Impedance	50Ω			
VSWR	≤1.4:1			
Upper sidelobe suppression (0°)	-22.1 dB			
Front-to-back ratio (+/-30°)	-34.9 dB			
Null fill	5% (-26.02 dB)			
Isolation between ports	< -25 dB			
Input power with EDIN connectors	500 W			
Input power with NE connectors	300 W			
Lightning protection	Direct Ground			
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)			
Mechanical Characteristics				
Dimensions Length x Width x Depth	1205 x 285 x 133 mm		47.4 x 11.2 x 5.2 in	
Depth with z-brackets	173 mm		6.8 in	
Weight without mounting brackets	4.5 kg		9.9 lbs	
Survival wind speed	> 201 km/hr		> 125 mph	
Wind area	Front: 0.34 m²	Side: 0.16 m²	Front: 3.7 ft²	Side: 1.7 ft²
Wind load @ 161 km/hr (100 mph)	Front: 498 N	Side: 260 N	Front: 111 lbf	Side: 55 lbf

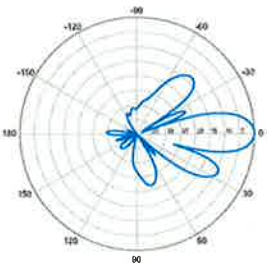
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit	36210006	40-115 mm 1.57-4.5 in	4.1 kg 9 lbs
Concealment Configurations	For concealment configurations, order BXA-80063-4CF-EDIN-X-FP		

BXA-80063-4CF-EDIN-X



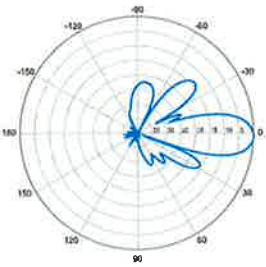
Horizontal

BXA-80063-4CF-EDIN-0



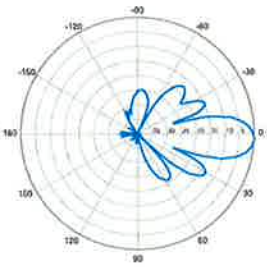
0° | Vertical

BXA-80063-4CF-EDIN-2



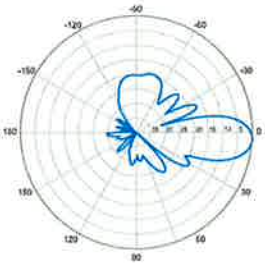
2° | Vertical

BXA-80063-4CF-EDIN-3



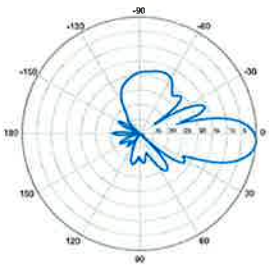
3° | Vertical

BXA-80063-4CF-EDIN-4



4° | Vertical

BXA-80063-4CF-EDIN-5



5° | Vertical

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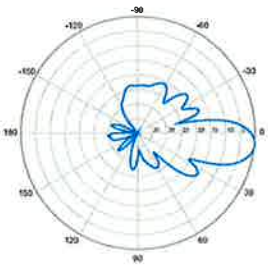
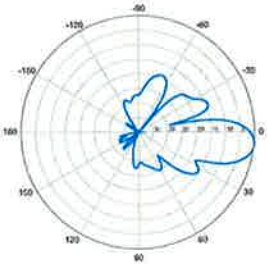


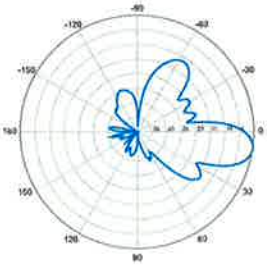
6° | Vertical

BXA-80063-4CF-EDIN-8



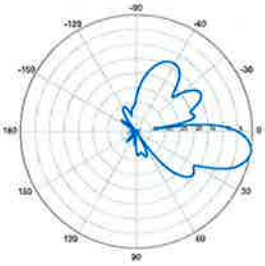
8° | Vertical

BXA-80063-4CF-EDIN-9



9° | Vertical

BXA-80063-4CF-EDIN-10

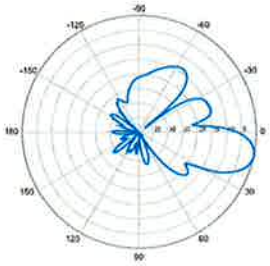


10° | Vertical

BXA-80063-4CF-EDIN-X

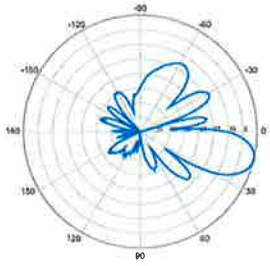
X-Pol | FET Panel | 63° | 13.0 dBd

BXA-80063-4CF-EDIN-12



12° | Vertical

BXA-80063-4CF-EDIN-14



14° | Vertical

Product Specifications

COMMSCOPE®

HBXX-6517DS-VTM

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

POWERED BY ANDREW.

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 18.4 3 ° | 18.7 6 ° | 18.4	0 ° | 18.4 3 ° | 18.7 6 ° | 18.5	0 ° | 18.7 3 ° | 18.9 6 ° | 18.6
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°

**Values calculated using NGMN Alliance N-P-BASTA v9.6*

Mechanical Specifications

Color | Radome Material	Light gray | PVC, UV resistant
Connector Interface | Location | Quantity	7-16 DIN Female | Bottom | 4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph
Antenna Dimensions, L x W x D	1903.0 mm x 305.0 mm x 166.0 mm | 74.9 in x 12.0 in x 6.5 in
Net Weight	19.5 kg | 43.0 lb
Model with factory installed AISG 2.0 RET	HBXX-6517DS-A2M

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

HBXX-6516DS-VTM

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

- Each DualPol® array can be independently adjusted for greater flexibility
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Ideal choice for site collocations and tough zoning restrictions
- Great solution to maximize network coverage and capacity
- The values presented on this datasheet have been calculated based on N-P-BASTA White Paper version 9.6 by the NGMN Alliance

Electrical Specifications

Frequency Band, MHz	**1710–1880**	**1850–1990**	**1920–2180**
Gain by all Beam Tilts, average, dBi	17.2	17.2	17.5
Gain by all Beam Tilts Tolerance, dB	±0.3	±0.3	±0.5
Gain by Beam Tilt, average, dBi	0 ° | 17.0	0 ° | 17.1	0 ° | 17.4
	5 ° | 17.3	5 ° | 17.4	5 ° | 17.7
	10 ° | 17.0	10 ° | 17.0	10 ° | 17.2
Beamwidth, Horizontal, degrees	67	66	64
Beamwidth, Horizontal Tolerance, degrees	±2.7	±2.3	±3.5
Beamwidth, Vertical, degrees	7.5	7.0	6.6
Beamwidth, Vertical Tolerance, degrees	±0.5	±0.4	±0.4
Beam Tilt, degrees	0–10	0–10	0–10
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	26	26	26
CPR at Boresight, dB	22	22	22
CPR at Sector, dB	9	9	9
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® single band, quad
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2180 MHz
Number of Ports, all types	4

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Low loss circuit board
Radome Material	PVC, UV resistant
RF Connector Interface	7-16 DIN Female

Product Specifications

HBXX-6516DS-VTM

RF Connector Location	Bottom
RF Connector Quantity, total	4
Wind Loading, maximum	419.0 N @ 150 km/h 94.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	166.0 mm | 6.5 in
Length	1294.0 mm | 50.9 in
Width	305.0 mm | 12.0 in
Net Weight	13.9 kg | 30.6 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	HBXX-6516DS-R2M
Model with Factory Installed AISG 2.0 Actuator	HBXX-6516DS-A2M
RET System	Teletilt®

Regulatory Compliance/Certifications

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

Included Products

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

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

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

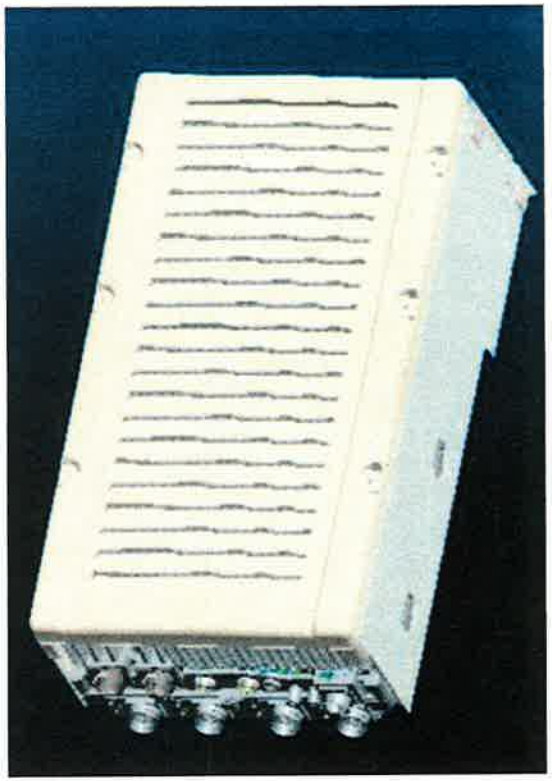
** Not a Verizon Wireless deployed product

Alcatel·Lucent

NEW PCS RF MODULES FOR VZW
RRH2X60 - HW CHARACTERISTICS

LR14.3

	RRH2x60
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC
	Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (downward facing)
Dimensions	22"(h) x 12"(w)x 9.4" (d)**
Weight	55lb**

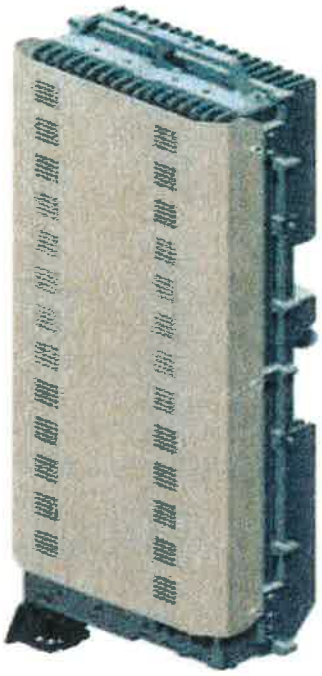


**- Includes solar shield but not mounting brackets (8 lbs.)

Alcatel·Lucent

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

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



A distributed Node B expands the deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of a Node B to be installed separately, within the same site or several kilometers apart.

The Alcatel-Lucent RRH2x60-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

SUPERIOR RF PERFORMANCE

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

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

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

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

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

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

OPTIMIZED TCO

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

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

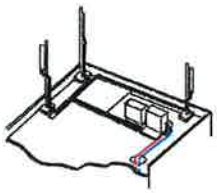
EASY INSTALLATION

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

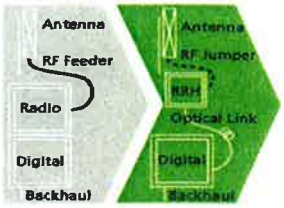
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

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

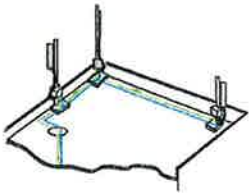
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

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

BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and silent solutions, with minimum impact on the neighborhood, which ease the deployment
- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

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

Electrical Data

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

RF Characteristics

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

Connectivity

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

Environmental specifications

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

Safety and Regulatory Data

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

Alcatel·Lucent

AT THE SPEED OF IDEAS™

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

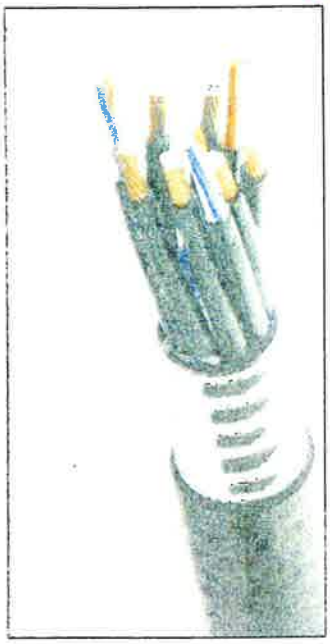


Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable 8.4mm²(8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-99-689 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

* This data is provisional and subject to change

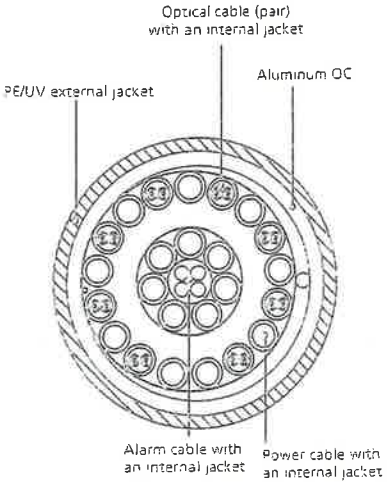


Figure 2: Construction Detail

ATTACHMENT 2

	General	Power	Density					
Site Name: Orange 2								
Tower Height: Verizon @ 160ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	1	500	152	0.0078	880	0.5867	1.33%	
*AT&T UMTS	1	500	152	0.0078	1900	1.0000	0.78%	
*AT&T GSM	11	296	152	0.0507	880	0.5867	8.64%	
*AT&T GSM	6	427	152	0.0399	1900	1.0000	3.99%	
*AT&T LTE	1	500	152	0.0078	740	0.4933	1.58%	
*Pocket (now MetroPCS)	3	631	100	0.0681	2130	1.0000	6.81%	
*Clearwire	2	153	110	0.0091	2496	1.0000	0.91%	
*Clearwire	1	211	110	0.0063	11 GHz	1.0000	0.63%	
*Nextel	9	100	117	0.0236	851	0.5673	4.17%	
*Sprint CDMA/LTE	4	693	137	0.0531	1900	1.0000	5.31%	
*Sprint CDMA/LTE	1	390	137	0.0075	850	0.5667	1.32%	
*Sprint CDMA/LTE	2	693	137	0.0266	2500	1.0000	2.66%	
*T-Mobile GSM/UMTS	4	12	129	0.0010	1950	1.0000	0.10%	
*T-Mobile UMTS/LTE	4	12	129	0.0010	2100	1.0000	0.10%	
*Metricom			70	0.0004	920	0.6133	0.07%	
*Metricom			70	0.0050	2400	1.0000	0.50%	
*XM Sat Radio	2	312	105	0.0204	2337.49	1.0000	2.04%	
Verizon PCS	**7**	**371**	**162**	**0.0356**	**1970**	**1.0000**	**3.56%**	
Verizon Cellular	**9**	**374**	**162**	**0.0461**	**869**	**0.5793**	**7.96%**	
Verizon AWS	**1**	**2812**	**162**	**0.0385**	**2145**	**1.0000**	**3.85%**	
Verizon 700	**1**	**977**	**162**	**0.0134**	**746**	**0.4973**	**2.69%**	
								58.97%
* Source: Siting Council								

ATTACHMENT 3

Date: **January 8, 2015**

Mitchell Abbott
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6612

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351
crown@tepgroup.net

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	806939
	Crown Castle Site Name:	NHV 2071 143137
	Crown Castle JDE Job Number:	316678
	Crown Castle Work Order Number:	990239
	Crown Castle Application Number:	274596 Rev. 2
Engineering Firm Designation:	**TEP Project Number:**	51192.28170
Site Data:	**800 Ogg Meadow Road, Orange, New Haven County, CT 06477** **Latitude *41° 18' 28.36"*, Longitude *-73° 01' 56.22"*** **160 Foot - Monopole Tower**	

Dear Mitchell Abbott,

Tower Engineering Professionals 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 744716, in accordance with application 274596, revision 2.

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 analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, ASCE 7-05 Minimum Design Loads for Buildings and Other Structures and the 2005 Connecticut Building Code based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Tables 1 and 2 and the attached drawing for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals* 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: Ardalan Arabi, E.I. / JSC

Respectfully submitted by:

Graham M. Andres, P.E.

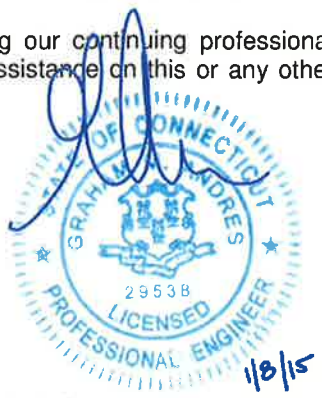


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TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160-ft monopole tower designed by Valmont Industries, Inc. in June of 1998. The tower was originally designed for a wind speed of 90 mph per EIA/TIA-222-F for the appurtenances listed in Table 3. The tower has been modified per reinforcement drawings prepared by Paul J. Ford and Company in October of 2013. TEP did not visit the site. All information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

The analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and ASCE 7-05 Minimum Design Loads for Buildings and Other Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch escalating 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
158.0	162.0	3	Alcatel Lucent	RRH2X60-AWS	1	1-5/8	1
		3	Alcatel Lucent	RRH2X60-PCS			
		2	Amphenol	BXA-80063-6BF-EDIN-X w/ Mount Pipe			
		3	Antel	BXA-70040/6CF w/ Mount Pipe			
		1	Antel	BXA-80063/4CF w/ Mount Pipe			
		2	Commscope	HBXX-6516DS-A2M w/ Mount Pipe			
		4	Commscope	HBXX-6517DS-A2M w/ Mount Pipe			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			

Notes:
1) See "Appendix B – Base Level Drawing" for assumed feed line configuration.

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
158.0	165.0	1	GPS	GPS_A	1	1/2	1
	162.0	6	RFS Celwave	FD9R6004/2C-3L	12	1-5/8	
		1	Antel	BXA-171063-8BF-2 w/ Mount Pipe	-	-	2
		2	Antel	BXA-70063-4CF-EDIN-X w/ Mount Pipe			
		1	Antel	BXA-70063-6CF-EDIN-6 w/ Mount Pipe			
		2	Antel	LPA-80063/4CF w/ Mount Pipe			
		2	Antel	LPA-80063/6CF w/ Mount Pipe			
		2	Antel	BXA-171063-12BF w/ Mount Pipe			
		2	Swedcom	SC-E 6014 rev2 w/ Mount Pipe			
	158.0	1	Tower Mounts	Platform Mount [LP 602-1]	-	-	1
156.0	170.0	3	EMS Wireless	RR90-17-00DP	6	1-5/8	3
		4	Nokia	CS72993.07			
		1	Tower Mounts	Pipe Mount [PM 601-3]			
147.0	152.0	6	Ericsson	RRUS-11	1 2 12	3/8 5/8 1-1/4	1
		3	Kathrein	800 10121 w/ Mount Pipe			
		6	Powerwave Technologies	P65-16-XLH-RR w/ Mount Pipe			
		6	Powerwave Technologies	TTAW-07BP111-001			
		1	Raycap	DC6-48-60-18-8F			
	147.0	1	Tower Mounts	Platform Mount [LP 602-1]			
137.0	137.0	3	RFS Celwave	APXVTM14-C-120 w/ Mount Pipe	1	1-1/4	4
		3	Alcatel Lucent	TD-RRH8x20-25			
		3	Alcatel Lucent	800MHZ RRH	3	1-1/4	1
		3	Alcatel Lucent	800 External Notch Filter			
		9	RFS Celwave	ACU-A20-N			
		3	RFS Celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	Alcatel Lucent	1900MHz RRH (65MHz)			
		1	Tower Mounts	Platform Mount [LP 602-1]			
127.0	129.0	3	Ericsson	Air 21 B2A B4P w/ Mount Pipe	13	1-5/8	1
		3	Ericsson	KRY 112 144/1			
	127.0	1	Tower Mounts	Platform Mount [LP 713-1]			
		1	Tower Mounts	Miscellaneous [NA 507-1]			
	118.0	12	Decibel	DB844H90-XY w/ Mount Pipe	12	1-1/4	3

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
107.0	110.0	1	Andrew	PX2F-52	3 3	1/2 5/8	1
		1	Andrew	VHLP2-11			
		3	Argus Technologies	LLPX310R w/ Mount Pipe			
		2	Dragonwave	Horizon Compact			
		3	Samsung Telecommunications	Wimax Dap Head			
	107.0	1	Tower Mounts	Side Arm Mount [SO 101-3]			
100.0	100.0	3	RFS Celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8	1
		1	Tower Mounts	Pipe Mount [PM 601-3]			
80.0	81.0	1	Kathrein	OG-860/1920/GPS-A	1	1/2	1
	80.0	2	Tower Mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing equipment
2) Existing equipment; to be removed
3) Abandoned equipment; not considered in this analysis
4) Reserved equipment

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
157.0	157.0	12	Swedcom	ALP 9011	-	-
147.0	147.0	12	Swedcom	ALP 110 11-N	-	-
137.0	137.0	12	Decibel	DB980H	-	-
127.0	127.0	12	Swedcom	ALP 9011	-	-
117.0	117.0	12	Swedcom	ALP 9011	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Geotechnical Report	FDH Engineering, Inc.	1257473	CCISites
Supplemental Geotechnical Report	FDH Engineering, Inc.	5475208	CCISites
Tower Foundation Mapping	FDH Engineering, Inc.	1060127	CCISites
Tower Foundation Drawings	Valmont Industries, Inc.	1060127	CCISites
Tower Manufacturer Drawings	Valmont Industries, Inc.	822032	CCISites
Tower Reinforcement Drawings	Paul J. Ford and Company	4025748	CCISites
Post-Modification Inspection	SGS	4489413	CCISites

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

For analysis of monopole shaft reinforcements, the plates are modeled as linear appurtenances along the exterior of the pole. The loads calculated from tnxTower are then exported to a proprietary calculation sheet created by Tower Engineering Professionals, Inc. that analyzes each reinforcing element along each critical axis and presents percent capacities for each element and the pole shaft along each critical axis. The actual percent capacity of the tower structure including the reinforcing elements is reported in Table 5 - Section Capacity (Summary).

3.2) Assumptions

1) The tower and foundation were built in accordance with the manufacturer's specifications.
2) The tower and foundation 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 "Appendix B – Base Level Drawing".
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by the standard.
5) All tower components are in sufficient condition to carry their full design capacity.
6) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance. See Table 7.
7) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not perform a site visit to verify the size, condition or capacity of the antenna mounts and did not analyze antennas supporting mounts as part of this structural analysis report.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_{allow} (K)	% Capacity	Pass / Fail
L1	160.00-121.33	Pole	TP29.77×21.65×0.2500	1	Note 1	Note 1	79.2	Pass
L2	126.00-81.33	Pole	TP37.67×28.29×0.3750	2	Note 1	Note 1	87.9	Pass
L3	87.00-41.42	Pole	TP45.30×35.73×0.5000	3	Note 1	Note 1	92.1	Pass
L4	48.00-0.00	Pole	TP53.00×42.92×0.5625	4	Note 1	Note 1	82.9	Pass
M1b	30.50-0.00	Mod (Ex)	CCI-65FP-085125	1	Note 1	Note 1	87.5	Pass
M2	50.50-23.50	Mod (Ex)	CCI-65FP-065125	2	Note 1	Note 1	89.5	Pass
M3	50.50-30.50	Mod (Ex)	CCI-65FP-065125	3	Note 1	Note 1	89.5	Pass
M4	70.50-50.50	Mod (Ex)	CCI-65FP-065125	4	Note 1	Note 1	87.2	Pass
M5	104.75-84.75	Mod (Ex)	CCI-65FP-060100	5	Note 1	Note 1	88.0	Pass
							Summary	
						Pole (L3)	92.1	Pass
						Mod (M2)	89.5	Pass
						RATING =	**92.1**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	-	85.6	Pass
1	Base Plate	-	69.1	Pass
1	Base Foundation Soil Interaction	-	47.6	Pass
1	Base Foundation Structural	-	86.2	Pass

Structure Rating (max from all components) =	92.1%

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

Table 7 - Dish Twist/Sway Results for 50 mph Service Wind Speed

Elevation (ft)	Dish Model	Beam Deflection		
		Deflection (in)	Tilt (deg)	Twist (deg)
110.0	Andrew VHLP2-11	16.6890	1.5367	0.0042
	Andrew PX2F-52			

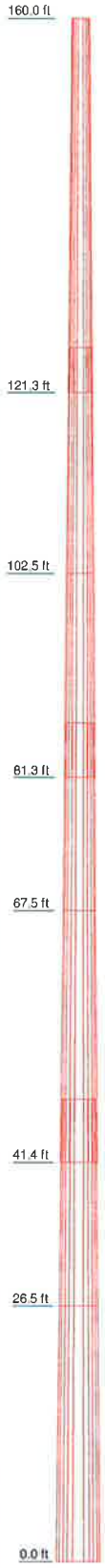
4.1) Recommendations

1) If the load differs from that described in Tables 1 and 2 of this report, "Appendix B – Base Level Drawing" or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	5	6	7
Length (ft)	38.6700	23.5000	21.1700	19.5000	26.0800	21.5000	26.5000
Number of Sides	12	12	12	12	12	12	12
Thickness (in)	0.2500	0.3750	0.5477	0.5000	0.6955	0.7427	0.7006
Socket Length (ft)	4.6700		5.6700		6.5800		
Top Dia (in)	21.6500	28.2990	33.2242	35.7290	39.8237	42.9180	47.4339
Bot Dia (in)	29.7700	33.2242	37.6700	39.8237	45.3000	47.4339	53.0000
Grade	MPRF-Fy=65ksi, Density=100%						
Weight (K)	2.7	2.9	3.1	4.0	6.0	5.9	8.1

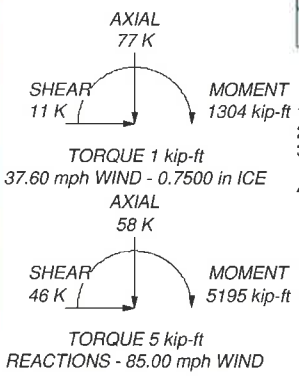


DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
GPS_A	158	1900MHz RRH (65MHz)	137
(2) FD9R6004/2C-3L	158	1900MHz RRH (65MHz)	137
(2) FD9R6004/2C-3L	158	800MHZ RRH	137
(2) FD9R6004/2C-3L	158	800MHZ RRH	137
BXA-80063/4CF w/ Mount Pipe	158	800MHZ RRH	137
BXA-80063-6BF-EDIN-X w/ Mount Pipe	158	APXVTM14-C-120 w/ Mount Pipe	137
		APXVTM14-C-120 w/ Mount Pipe	137
BXA-80063-6BF-EDIN-X w/ Mount Pipe	158	APXVTM14-C-120 w/ Mount Pipe	137
BXA-70040/6CF w/ Mount Pipe	158	TD-RRH8x20-25	137
BXA-70040/6CF w/ Mount Pipe	158	TD-RRH8x20-25	137
BXA-70040/6CF w/ Mount Pipe	158	TD-RRH8x20-25	137
(2) HBXX-6516DS-A2M w/ Mount Pipe	158	2.4" Dia. x 6' Mount Pipe	137
(2) HBXX-6517DS-A2M w/ Mount Pipe	158	2.4" Dia. x 6' Mount Pipe	137
(2) HBXX-6517DS-A2M w/ Mount Pipe	158	2.4" Dia. x 6' Mount Pipe	137
RRH2X60-AWS	158	2.4" Dia. x 6' Mount Pipe	137
RRH2X60-AWS	158	2.4" Dia. x 6' Mount Pipe	137
RRH2X60-AWS	158	2.4" Dia. x 6' Mount Pipe	137
RRH2X60-PCS	158	Platform Mount [LP 602-1]	137
RRH2X60-PCS	158	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	127
RRH2X60-PCS	158	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	127
DB-T1-6Z-8AB-0Z	158	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	127
Platform Mount [LP 602-1]	158	KRY 112 144/1	127
800 10121 w/ Mount Pipe	147	KRY 112 144/1	127
800 10121 w/ Mount Pipe	147	KRY 112 144/1	127
800 10121 w/ Mount Pipe	147	Platform Mount [LP 713-1]	127
P65-16-XLH-RR w/ Mount Pipe	147	Miscellaneous [NA 507-1]	127
P65-16-XLH-RR w/ Mount Pipe	147	LLPX310R w/ Mount Pipe	107
P65-16-XLH-RR w/ Mount Pipe	147	LLPX310R w/ Mount Pipe	107
P65-16-XLH-RR w/ Mount Pipe	147	LLPX310R w/ Mount Pipe	107
P65-16-XLH-RR w/ Mount Pipe	147	WIMAX DAP HEAD	107
(2) TTAW-07BP111-001	147	WIMAX DAP HEAD	107
(2) TTAW-07BP111-001	147	WIMAX DAP HEAD	107
(2) TTAW-07BP111-001	147	HORIZON COMPACT	107
(2) RRUS-11	147	HORIZON COMPACT	107
(2) RRUS-11	147	2.4" Dia. x 6' Mount Pipe	107
(2) RRUS-11	147	2.4" Dia. x 6' Mount Pipe	107
DC6-48-60-18-8F	147	2.4" Dia. x 6' Mount Pipe	107
2.4" Dia. x 6' Mount Pipe	147	Side Arm Mount [SO 101-3]	107
2.4" Dia. x 6' Mount Pipe	147	VHLP2-11	107
2.4" Dia. x 6' Mount Pipe	147	PX2F-52	107
Platform Mount [LP 602-1]	147	APXV18-206517S-C w/ Mount Pipe	100
APXVSPP18-C-A20 w/ Mount Pipe	137	Pipe Mount [PM 601-3]	100
APXVSPP18-C-A20 w/ Mount Pipe	137	APXV18-206517S-C w/ Mount Pipe	100
APXVSPP18-C-A20 w/ Mount Pipe	137	APXV18-206517S-C w/ Mount Pipe	100
800 EXTERNAL NOTCH FILTER	137	2.4" Dia. x 6' Mount Pipe	80
800 EXTERNAL NOTCH FILTER	137	Side Arm Mount [SO 701-1]	80
800 EXTERNAL NOTCH FILTER	137	Side Arm Mount [SO 701-1]	80
(3) ACU-A20-N	137	OG-860/1920/GPS-A	80
(3) ACU-A20-N	137	2.4" Dia. x 6' Mount Pipe	80
(3) ACU-A20-N	137		
1900MHz RRH (65MHz)	137		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
MPRF-Fy=65ksi, Density=100%	65 ksi	80 ksi			



TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85.00 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 37.60 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50.00 mph wind.

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job: *NHV 2071 143137 (BU 806939)*			
Project: *TEP No. 51192.28170*			
Client: Crown Castle	Drawn by: aaarabi	App'd:	
Code: TIA/EIA-222-F	Date: 01/08/15	Scale: NTS	
Path:		Dwg No. E-1	

Tower Input Data

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

Tower is located in New Haven County, Connecticut.
Basic wind speed of 85.00 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56.00 pcf.
A wind speed of 37.60 mph is used in combination with ice.
Deflections calculated using a wind speed of 50.00 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	160.0000-121.3300	38.6700	4.67	12	21.6500	29.7700	0.2500	1.0000	MPRF-Fy=65ksi, Density=100% (65 ksi)
L2	121.3300-102.5000	23.5000	0.00	12	28.2890	33.2242	0.3750	1.5000	MPRF-Fy=65ksi, Density=100% (65 ksi)
L3	102.5000-81.3300	21.1700	5.67	12	33.2242	37.6700	0.5477	2.1906	MPRF-Fy=65ksi,

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
L4	81.3300-67.5000	19.5000	0.00	12	35.7290	39.8237	0.5000	2.0000	Density=100% (65 ksi) MPRF-Fy=65ksi, Density=100% (65 ksi)
L5	67.5000-41.4200	26.0800	6.58	12	39.8237	45.3000	0.6955	2.7818	MPRF-Fy=65ksi, Density=100% (65 ksi)
L6	41.4200-26.5000	21.5000	0.00	12	42.9180	47.4339	0.7427	2.9709	MPRF-Fy=65ksi, Density=100% (65 ksi)
L7	26.5000-0.0000	26.5000		12	47.4339	53.0000	0.7006	2.8025	MPRF-Fy=65ksi, Density=100% (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.4137	17.2270	1006.9853	7.6612	11.2147	89.7916	2040.4253	8.4786	5.1322	20.529
	30.8202	23.7636	2643.2053	10.5682	15.4209	171.4045	5355.8505	11.6957	7.3084	29.233
L2	30.3023	33.7062	3352.2725	9.9932	14.6537	228.7663	6792.6129	16.5891	6.5765	17.537
	34.3962	39.6654	5463.1838	11.7600	17.2101	317.4403	11069.8916	19.5221	7.8991	21.064
L3	34.3962	57.6230	7853.3208	11.6982	17.2101	456.3201	15912.9571	28.3603	7.4364	13.579
	38.9989	65.4630	11514.7049	13.2898	19.5131	590.1025	23331.9140	32.2189	8.6279	15.754
L4	38.2220	56.7187	8984.8902	12.6120	18.5076	485.4697	18205.8234	27.9152	8.2354	16.471
	41.2285	63.3111	12496.0731	14.0779	20.6287	605.7629	25320.4320	31.1598	9.3327	18.665
L5	41.2285	87.6225	17123.0512	14.0079	20.6287	830.0615	34695.9441	43.1251	8.8089	12.666
	46.8980	99.8860	25365.8133	15.9684	23.4654	1080.9879	51398.0148	49.1609	10.2766	14.777
L6	45.8628	100.8642	22900.1962	15.0988	22.2315	1030.0777	46402.0060	49.6423	9.5115	12.806
	49.1072	111.6642	31072.0357	16.7154	24.5708	1264.5941	62960.3685	54.9577	10.7218	14.436
L7	49.1072	105.4307	29390.3934	16.7305	24.5708	1196.1533	59552.9051	51.8898	10.8346	15.464
	54.8696	117.9879	41192.3296	18.7232	27.4540	1500.4127	83466.8275	58.0700	12.3263	17.593

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 160.0000-121.3300				1	1	1		
L2 121.3300-102.5000				1	1	1		
L3 102.5000-81.3300				1	1	0.688032		
L4 81.3300-67.5000				1	1	1		
L5 67.5000-41.42				1	1	0.722204		

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
00								
L6 41.4200-26.5000				1	1	0.760277		
L7 26.5000-0.0000				1	1	0.804976		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
HJ7-50A(1-5/8")	C	No	Inside Pole	158.0000 - 0.0000	12	No Ice	0.0000	1.04
						1/2" Ice	0.0000	1.04
						1" Ice	0.0000	1.04
						2" Ice	0.0000	1.04
						4" Ice	0.0000	1.04
LDF4-50A(1/2")	C	No	Inside Pole	158.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	70.5000 - 0.0000	1	No Ice	0.0000	1.30
						1/2" Ice	0.0000	2.81
						1" Ice	0.0000	4.94
						2" Ice	0.0000	11.02
						4" Ice	0.0000	30.52
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	158.0000 - 70.5000	1	No Ice	0.1980	1.30
						1/2" Ice	0.2980	2.81
						1" Ice	0.3980	4.94
						2" Ice	0.5980	11.02
						4" Ice	0.9980	30.52
**								
2" Flexible Conduit	A	No	Inside Pole	147.0000 - 0.0000	1	No Ice	0.0000	0.34
						1/2" Ice	0.0000	0.34
						1" Ice	0.0000	0.34
						2" Ice	0.0000	0.34
						4" Ice	0.0000	0.34
LDF6-50A(1-1/4")	B	No	Inside Pole	147.0000 - 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
FB-L98B-002-75000(3/8")	B	No	Inside Pole	147.0000 - 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")	B	No	Inside Pole	147.0000 - 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
**								
HB114-1-0813U4-M5J(	B	No	Inside Pole	137.0000 - 0.0000	3	No Ice	0.0000	1.20

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft²/ft	Weight plf
1 1/4")						1/2" Ice	0.0000	1.20
						1" Ice	0.0000	1.20
						2" Ice	0.0000	1.20
						4" Ice	0.0000	1.20
HB114-21U3M12-XXX F(1-1/4")	B	No	Inside Pole	137.0000 - 0.0000	1	No Ice	0.0000	1.22
						1/2" Ice	0.0000	1.22
						1" Ice	0.0000	1.22
						2" Ice	0.0000	1.22
						4" Ice	0.0000	1.22
**								
FLC 158-50J(1-5/8")	B	No	Inside Pole	127.0000 - 0.0000	12	No Ice	0.0000	0.92
						1/2" Ice	0.0000	0.92
						1" Ice	0.0000	0.92
						2" Ice	0.0000	0.92
						4" Ice	0.0000	0.92
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	B	No	CaAa (Out Of Face)	107.0000 - 0.0000	1	No Ice	0.0000	1.07
						1/2" Ice	0.0000	2.37
						1" Ice	0.0000	4.28
						2" Ice	0.0000	9.93
						4" Ice	0.0000	28.56
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	B	No	CaAa (Out Of Face)	127.0000 - 107.0000	1	No Ice	0.1625	1.07
						1/2" Ice	0.2625	2.37
						1" Ice	0.3625	4.28
						2" Ice	0.5625	9.93
						4" Ice	0.9625	28.56
**								
HJ4.5-50(5/8")	A	No	CaAa (Out Of Face)	107.0000 - 0.0000	3	No Ice	0.0000	0.40
						1/2" Ice	0.0000	1.24
						1" Ice	0.0000	2.69
						2" Ice	0.0000	7.42
						4" Ice	0.0000	24.22
EC4-50(1/2")	A	No	Inside Pole	107.0000 - 0.0000	3	No Ice	0.0000	0.16
						1/2" Ice	0.0000	0.16
						1" Ice	0.0000	0.16
						2" Ice	0.0000	0.16
						4" Ice	0.0000	0.16
2" Flexible Conduit	A	No	CaAa (Out Of Face)	107.0000 - 0.0000	1	No Ice	0.2000	0.34
						1/2" Ice	0.3000	1.87
						1" Ice	0.4000	4.01
						2" Ice	0.6000	10.11
						4" Ice	1.0000	29.66
2" Flexible Conduit	A	No	CaAa (Out Of Face)	107.0000 - 0.0000	1	No Ice	0.0000	0.34
						1/2" Ice	0.0000	1.87
						1" Ice	0.0000	4.01
						2" Ice	0.0000	10.11
						4" Ice	0.0000	29.66
**								
CR 50 1873(1-5/8")	B	No	Inside Pole	100.0000 - 0.0000	6	No Ice	0.0000	0.83
						1/2" Ice	0.0000	0.83
						1" Ice	0.0000	0.83
						2" Ice	0.0000	0.83
						4" Ice	0.0000	0.83
*****								
LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	80.0000 - 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
**								
Safety Line 3/8	C	No	CaAa (Out Of Face)	160.0000 - 10.0000	1	No Ice	0.0375	0.22
						1/2" Ice	0.1375	0.75

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.2375	1.28
						2" Ice	0.4375	2.34
						4" Ice	0.8375	4.46
Step Pegs (5/8" SR) 7-in. w/30" step	C	No	CaAa (Out Of Face)	160.0000 - 10.0000	1	No Ice	0.0350	0.49
						1/2" Ice	0.1350	1.01
						1" Ice	0.2350	2.07
						2" Ice	0.4350	6.09
						4" Ice	0.8350	21.46
**								
CCI-65FP-085125	C	No	CaAa (Out Of Face)	30.5000 - 0.0000	1	No Ice	0.2083	36.15
						1/2" Ice	0.3194	37.36
						1" Ice	0.4306	38.92
						2" Ice	0.6528	43.07
						4" Ice	1.0972	55.51
CCI-65FP-085125	A	No	CaAa (Out Of Face)	30.5000 - 0.0000	1	No Ice	0.0000	36.15
						1/2" Ice	0.0000	37.36
						1" Ice	0.0000	38.92
						2" Ice	0.0000	43.07
						4" Ice	0.0000	55.51
CCI-65FP-085125	B	No	CaAa (Out Of Face)	30.5000 - 0.0000	1	No Ice	0.0000	36.15
						1/2" Ice	0.0000	37.36
						1" Ice	0.0000	38.92
						2" Ice	0.0000	43.07
						4" Ice	0.0000	55.51
*****								
CCI-65FP-065125	C	No	CaAa (Out Of Face)	50.5000 - 30.5000	1	No Ice	0.2083	27.65
						1/2" Ice	0.3194	28.73
						1" Ice	0.4306	30.15
						2" Ice	0.6528	34.04
						4" Ice	1.0972	45.97
CCI-65FP-065125	A	No	CaAa (Out Of Face)	50.5000 - 30.5000	1	No Ice	0.0000	27.65
						1/2" Ice	0.0000	28.73
						1" Ice	0.0000	30.15
						2" Ice	0.0000	34.04
						4" Ice	0.0000	45.97
CCI-65FP-065125	B	No	CaAa (Out Of Face)	50.5000 - 23.5000	1	No Ice	0.0000	27.65
						1/2" Ice	0.0000	28.73
						1" Ice	0.0000	30.15
						2" Ice	0.0000	34.04
						4" Ice	0.0000	45.97
****								
CCI-65FP-065125	C	No	CaAa (Out Of Face)	70.5000 - 50.5000	1	No Ice	0.2083	27.65
						1/2" Ice	0.3194	28.73
						1" Ice	0.4306	30.15
						2" Ice	0.6528	34.04
						4" Ice	1.0972	45.97
CCI-65FP-065125	A	No	CaAa (Out Of Face)	70.5000 - 50.5000	1	No Ice	0.0000	27.65
						1/2" Ice	0.0000	28.73
						1" Ice	0.0000	30.15
						2" Ice	0.0000	34.04
						4" Ice	0.0000	45.97
CCI-65FP-065125	B	No	CaAa (Out Of Face)	70.5000 - 50.5000	1	No Ice	0.0000	27.65
						1/2" Ice	0.0000	28.73
						1" Ice	0.0000	30.15
						2" Ice	0.0000	34.04
						4" Ice	0.0000	45.97
****								
CCI-65FP-060100	C	No	CaAa (Out Of Face)	104.7500 - 84.7500	1	No Ice	0.0000	20.42
						1/2" Ice	0.0000	21.37
						1" Ice	0.0000	22.66
						2" Ice	0.0000	26.29

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
CCI-65FP-060100	A	No	CaAa (Out Of Face)	104.7500 - 84.7500	1	4" Ice	0.0000	37.70
						No Ice	0.0000	20.42
						1/2" Ice	0.0000	21.37
						1" Ice	0.0000	22.66
						2" Ice	0.0000	26.29
						4" Ice	0.0000	37.70
CCI-65FP-060100	B	No	CaAa (Out Of Face)	104.7500 - 84.7500	1	No Ice	0.0000	20.42
						1/2" Ice	0.0000	21.37
						1" Ice	0.0000	22.66
						2" Ice	0.0000	26.29
						4" Ice	0.0000	37.70

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.0000-121.3300	A	0.000	0.000	0.000	0.000	0.01
	0	B	0.000	0.000	0.000	0.921	0.36
		C	0.000	0.000	0.000	10.064	0.54
L2	121.3300-102.5000	A	0.000	0.000	0.000	0.900	0.06
	0	B	0.000	0.000	0.000	2.329	0.53
		C	0.000	0.000	0.000	5.094	0.32
L3	102.5000-81.3300	A	0.000	0.000	0.000	4.234	0.42
		B	0.000	0.000	0.000	0.000	1.00
		C	0.000	0.000	0.000	5.726	0.67
L4	81.3300-67.5000	A	0.000	0.000	0.000	2.766	0.12
		B	0.000	0.000	0.000	0.000	0.50
		C	0.000	0.000	0.000	3.772	0.29
L5	67.5000-41.4200	A	0.000	0.000	0.000	5.216	0.79
		B	0.000	0.000	0.000	0.000	1.52
		C	0.000	0.000	0.000	7.324	1.11
L6	41.4200-26.5000	A	0.000	0.000	0.000	2.984	0.49
		B	0.000	0.000	0.000	0.000	1.01
		C	0.000	0.000	0.000	4.190	0.67
L7	26.5000-0.0000	A	0.000	0.000	0.000	5.300	1.03
		B	0.000	0.000	0.000	0.000	1.85
		C	0.000	0.000	0.000	6.717	1.34

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.0000-121.3300	A	0.892	0.000	0.000	0.000	0.000	0.01
	0	B		0.000	0.000	0.000	1.933	0.38
		C		0.000	0.000	0.000	30.401	0.74
L2	121.3300-102.5000	A	0.868	0.000	0.000	0.000	1.703	0.12
	0	B		0.000	0.000	0.000	4.885	0.58
		C		0.000	0.000	0.000	15.170	0.43
L3	102.5000-81.3300	A	0.848	0.000	0.000	0.000	7.824	0.70
		B		0.000	0.000	0.000	0.000	1.08
		C		0.000	0.000	0.000	16.496	0.81
L4	81.3300-67.5000	A	0.827	0.000	0.000	0.000	5.111	0.29
		B		0.000	0.000	0.000	0.000	0.55

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	10.864	0.38
L5	67.5000-41.4200	A	0.796	0.000	0.000	0.000	9.368	1.12
		B		0.000	0.000	0.000	0.000	1.63
		C		0.000	0.000	0.000	20.241	1.32
L6	41.4200-26.5000	A	0.752	0.000	0.000	0.000	5.359	0.68
		B		0.000	0.000	0.000	0.000	1.09
		C		0.000	0.000	0.000	11.579	0.79
L7	26.5000-0.0000	A	0.750	0.000	0.000	0.000	9.275	1.34
		B		0.000	0.000	0.000	0.000	1.97
		C		0.000	0.000	0.000	16.084	1.53

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.0000-121.3300	-0.2693	0.1913	-0.6518	0.4346
L2	121.3300-102.5000	-0.1651	0.1873	-0.4762	0.4355
L3	102.5000-81.3300	-0.3031	-0.0838	-0.7045	0.0209
L4	81.3300-67.5000	-0.3087	-0.0831	-0.7262	0.0249
L5	67.5000-41.4200	-0.3213	-0.0787	-0.7427	0.0319
L6	41.4200-26.5000	-0.3240	-0.0794	-0.7571	0.0325
L7	26.5000-0.0000	-0.2960	-0.0998	-0.6215	-0.0583

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
GPS_A	B	From Centroid-Leg	4.0000 -6.00 7.00		60.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2975 0.3739 0.4589 0.6549 1.1506	0.2975 0.3739 0.4589 0.6549 1.1506	0.00 0.00 0.01 0.02 0.08
(2) FD9R6004/2C-3L	A	From Centroid-Leg	4.0000 -6.00 4.00		20.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3665 0.4506 0.5433 0.7546 1.2808	0.0846 0.1362 0.1965 0.3430 0.7396	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	B	From Centroid-Leg	4.0000 -6.00 4.00		20.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3665 0.4506 0.5433 0.7546 1.2808	0.0846 0.1362 0.1965 0.3430 0.7396	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	C	From Centroid-Leg	4.0000 -6.00 4.00		30.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3665 0.4506 0.5433 0.7546 1.2808	0.0846 0.1362 0.1965 0.3430 0.7396	0.00 0.01 0.01 0.02 0.06
BXA-80063/4CF w/ Mount Pipe	A	From Centroid-Le	4.0000 -6.00		20.0000	158.0000	No Ice 1/2" Ice	5.3988 5.8435	3.4238 4.0221	0.03 0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		g	4.00			1" Ice	6.2986	4.6369	0.12
						2" Ice	7.2405	5.9176	0.23
						4" Ice	9.2612	8.9263	0.56
BXA-80063-6BF-EDIN-X w/ Mount Pipe	B	From Centroid-Le g	4.0000 -6.00 4.00	20.0000	158.0000	No Ice	7.7073	5.6302	0.04
						1/2" Ice	8.3278	6.7191	0.10
						1" Ice	8.9191	7.5606	0.17
						2" Ice	10.1316	9.2937	0.33
						4" Ice	12.6769	12.9684	0.79
BXA-80063-6BF-EDIN-X w/ Mount Pipe	C	From Centroid-Le g	4.0000 -6.00 4.00	30.0000	158.0000	No Ice	7.7073	5.6302	0.04
						1/2" Ice	8.3278	6.7191	0.10
						1" Ice	8.9191	7.5606	0.17
						2" Ice	10.1316	9.2937	0.33
						4" Ice	12.6769	12.9684	0.79
BXA-70040/6CF w/ Mount Pipe	A	From Centroid-Le g	4.0000 -2.00 4.00	20.0000	158.0000	No Ice	16.7762	7.3834	0.06
						1/2" Ice	17.5081	8.5639	0.16
						1" Ice	18.2035	9.4582	0.27
						2" Ice	19.6221	11.2839	0.52
						4" Ice	22.5799	15.4116	1.18
BXA-70040/6CF w/ Mount Pipe	B	From Centroid-Le g	4.0000 -2.00 4.00	20.0000	158.0000	No Ice	16.7762	7.3834	0.06
						1/2" Ice	17.5081	8.5639	0.16
						1" Ice	18.2035	9.4582	0.27
						2" Ice	19.6221	11.2839	0.52
						4" Ice	22.5799	15.4116	1.18
BXA-70040/6CF w/ Mount Pipe	C	From Centroid-Le g	4.0000 -2.00 4.00	0.0000	158.0000	No Ice	16.7762	7.3834	0.06
						1/2" Ice	17.5081	8.5639	0.16
						1" Ice	18.2035	9.4582	0.27
						2" Ice	19.6221	11.2839	0.52
						4" Ice	22.5799	15.4116	1.18
(2) HBXX-6516DS-A2M w/ Mount Pipe	A	From Centroid-Le g	4.0000 4.00 4.00	20.0000	158.0000	No Ice	6.1758	4.5251	0.05
						1/2" Ice	6.6547	5.2049	0.10
						1" Ice	7.1374	5.8987	0.15
						2" Ice	8.1341	7.3732	0.29
						4" Ice	10.2560	10.5560	0.67
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Centroid-Le g	4.0000 4.00 4.00	20.0000	158.0000	No Ice	8.9758	6.9629	0.07
						1/2" Ice	9.6473	8.1817	0.14
						1" Ice	10.2909	9.1436	0.21
						2" Ice	11.5946	11.0219	0.40
						4" Ice	14.3212	15.0267	0.91
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Centroid-Le g	4.0000 4.00 4.00	0.0000	158.0000	No Ice	8.9758	6.9629	0.07
						1/2" Ice	9.6473	8.1817	0.14
						1" Ice	10.2909	9.1436	0.21
						2" Ice	11.5946	11.0219	0.40
						4" Ice	14.3212	15.0267	0.91
RRH2X60-AWS	A	From Centroid-Le g	4.0000 6.00 4.00	20.0000	158.0000	No Ice	3.9569	1.8157	0.06
						1/2" Ice	4.2724	2.0752	0.08
						1" Ice	4.5965	2.3603	0.11
						2" Ice	5.2705	2.9566	0.17
						4" Ice	6.7224	4.2529	0.35
RRH2X60-AWS	B	From Centroid-Le g	4.0000 6.00 4.00	20.0000	158.0000	No Ice	3.9569	1.8157	0.06
						1/2" Ice	4.2724	2.0752	0.08
						1" Ice	4.5965	2.3603	0.11
						2" Ice	5.2705	2.9566	0.17
						4" Ice	6.7224	4.2529	0.35
RRH2X60-AWS	C	From Centroid-Le g	4.0000 6.00 4.00	0.0000	158.0000	No Ice	3.9569	1.8157	0.06
						1/2" Ice	4.2724	2.0752	0.08
						1" Ice	4.5965	2.3603	0.11
						2" Ice	5.2705	2.9566	0.17

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	6.7224	4.2529	0.35
RRH2X60-PCS	A	From Centroid-Leg	4.0000 2.00 4.00	20.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.5667 2.7914 3.0247 3.5173 4.6062	2.0106 2.2184 2.4349 2.8938 3.9152	0.06 0.08 0.10 0.16 0.31
RRH2X60-PCS	B	From Centroid-Leg	4.0000 2.00 4.00	20.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.5667 2.7914 3.0247 3.5173 4.6062	2.0106 2.2184 2.4349 2.8938 3.9152	0.06 0.08 0.10 0.16 0.31
RRH2X60-PCS	C	From Centroid-Leg	4.0000 2.00 4.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.5667 2.7914 3.0247 3.5173 4.6062	2.0106 2.2184 2.4349 2.8938 3.9152	0.06 0.08 0.10 0.16 0.31
DB-T1-6Z-8AB-0Z	B	From Centroid-Leg	4.0000 -2.00 4.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.6000 5.9154 6.2395 6.9136 8.3654	2.3333 2.5580 2.7914 3.2840 4.3728	0.04 0.08 0.12 0.21 0.45
Platform Mount [LP 602-1]	B	None		0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	32.0300 38.7100 45.3900 58.7500 85.4700	32.0300 38.7100 45.3900 58.7500 85.4700	1.34 1.80 2.26 3.17 5.00
**									
**									
800 10121 w/ Mount Pipe	A	From Centroid-Leg	4.0000 -6.00 5.00	20.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.6851 6.1819 6.6761 7.6953 9.8576	4.5996 5.3507 6.0464 7.5263 10.8324	0.07 0.11 0.17 0.30 0.68
800 10121 w/ Mount Pipe	B	From Centroid-Leg	4.0000 -6.00 5.00	21.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.6851 6.1819 6.6761 7.6953 9.8576	4.5996 5.3507 6.0464 7.5263 10.8324	0.07 0.11 0.17 0.30 0.68
800 10121 w/ Mount Pipe	C	From Centroid-Leg	4.0000 -6.00 5.00	20.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.6851 6.1819 6.6761 7.6953 9.8576	4.5996 5.3507 6.0464 7.5263 10.8324	0.07 0.11 0.17 0.30 0.68
P65-16-XLH-RR w/ Mount Pipe	A	From Centroid-Leg	4.0000 2.00 5.00	20.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6375 9.2903 9.9098 11.1763 13.8289	6.3625 7.5378 8.4270 10.2390 14.0988	0.08 0.14 0.22 0.39 0.89
P65-16-XLH-RR w/ Mount Pipe	B	From Centroid-Leg	4.0000 2.00 5.00	21.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6375 9.2903 9.9098 11.1763 13.8289	6.3625 7.5378 8.4270 10.2390 14.0988	0.08 0.14 0.22 0.39 0.89
P65-16-XLH-RR w/ Mount Pipe	C	From Centroid-Leg	4.0000 2.00 5.00	20.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.6375 9.2903 9.9098 11.1763	6.3625 7.5378 8.4270 10.2390	0.08 0.14 0.22 0.39

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	13.8289	14.0988	0.89
P65-16-XLH-RR w/ Mount Pipe	A	From Centroid-Leg	4.0000 6.00 5.00	30.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6375 9.2903 9.9098 11.1763 13.8289	6.3625 7.5378 8.4270 10.2390 14.0988	0.08 0.14 0.22 0.39 0.89
P65-16-XLH-RR w/ Mount Pipe	B	From Centroid-Leg	4.0000 6.00 5.00	30.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6375 9.2903 9.9098 11.1763 13.8289	6.3625 7.5378 8.4270 10.2390 14.0988	0.08 0.14 0.22 0.39 0.89
P65-16-XLH-RR w/ Mount Pipe	C	From Centroid-Leg	4.0000 6.00 5.00	30.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6375 9.2903 9.9098 11.1763 13.8289	6.3625 7.5378 8.4270 10.2390 14.0988	0.08 0.14 0.22 0.39 0.89
(2) TTAW-07BP111-001	A	From Centroid-Leg	4.0000 -2.00 5.00	20.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.6449 0.7568 0.8773 1.1444 1.7822	0.5198 0.6232 0.7354 0.9856 1.5896	0.02 0.02 0.03 0.05 0.12
(2) TTAW-07BP111-001	B	From Centroid-Leg	4.0000 -2.00 5.00	21.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.6449 0.7568 0.8773 1.1444 1.7822	0.5198 0.6232 0.7354 0.9856 1.5896	0.02 0.02 0.03 0.05 0.12
(2) TTAW-07BP111-001	C	From Centroid-Leg	4.0000 -2.00 5.00	20.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.6449 0.7568 0.8773 1.1444 1.7822	0.5198 0.6232 0.7354 0.9856 1.5896	0.02 0.02 0.03 0.05 0.12
(2) RRUS-11	A	From Centroid-Leg	4.0000 6.00 5.00	30.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.9419 3.1718 3.4103 3.9133 5.0229	1.2460 1.4124 1.5874 1.9633 2.8188	0.06 0.07 0.10 0.15 0.30
(2) RRUS-11	B	From Centroid-Leg	4.0000 6.00 5.00	30.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.9419 3.1718 3.4103 3.9133 5.0229	1.2460 1.4124 1.5874 1.9633 2.8188	0.06 0.07 0.10 0.15 0.30
(2) RRUS-11	C	From Centroid-Leg	4.0000 6.00 5.00	30.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.9419 3.1718 3.4103 3.9133 5.0229	1.2460 1.4124 1.5874 1.9633 2.8188	0.06 0.07 0.10 0.15 0.30
DC6-48-60-18-8F	A	From Centroid-Leg	4.0000 6.00 5.00	30.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2664 1.4564 1.6575 2.0931 3.0975	1.2664 1.4564 1.6575 2.0931 3.0975	0.02 0.04 0.05 0.10 0.21
2.4" Dia. x 6' Mount Pipe	A	From Centroid-Leg	4.0000 -2.00 0.00	0.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	0.02 0.04 0.06 0.10 0.25
2.4" Dia. x 6' Mount Pipe	B	From	4.0000	0.0000	147.0000	No Ice	1.4250	1.4250	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		Centroid-Leg	-2.00 0.00			1/2" Ice	1.9305	1.9305	0.04
						1" Ice	2.3162	2.3162	0.06
						2" Ice	3.1485	3.1485	0.10
						4" Ice	5.0577	5.0577	0.25
2.4" Dia. x 6' Mount Pipe	C	From Centroid-Leg	4.0000 -2.00 0.00	0.0000	147.0000	No Ice	1.4250	1.4250	0.02
						1/2" Ice	1.9305	1.9305	0.04
						1" Ice	2.3162	2.3162	0.06
						2" Ice	3.1485	3.1485	0.10
						4" Ice	5.0577	5.0577	0.25
Platform Mount [LP 602-1]	B	None		0.0000	147.0000	No Ice	32.0300	32.0300	1.34
						1/2" Ice	38.7100	38.7100	1.80
						1" Ice	45.3900	45.3900	2.26
						2" Ice	58.7500	58.7500	3.17
						4" Ice	85.4700	85.4700	5.00
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APXVSPP18-C-A20 w/ Mount Pipe	A	From Centroid-Face	4.0000 0.00 0.00	20.0000	137.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.23
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Centroid-Face	4.0000 0.00 0.00	-20.0000	137.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.23
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Centroid-Face	4.0000 6.00 0.00	-20.0000	137.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.23
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
800 EXTERNAL NOTCH FILTER	A	From Centroid-Face	4.0000 0.00 0.00	20.0000	137.0000	No Ice	0.7701	0.3747	0.01
						1/2" Ice	0.8898	0.4647	0.02
						1" Ice	1.0181	0.5634	0.02
						2" Ice	1.3007	0.7868	0.04
						4" Ice	1.9696	1.3372	0.11
800 EXTERNAL NOTCH FILTER	B	From Centroid-Face	4.0000 0.00 0.00	-20.0000	137.0000	No Ice	0.7701	0.3747	0.01
						1/2" Ice	0.8898	0.4647	0.02
						1" Ice	1.0181	0.5634	0.02
						2" Ice	1.3007	0.7868	0.04
						4" Ice	1.9696	1.3372	0.11
800 EXTERNAL NOTCH FILTER	C	From Centroid-Face	4.0000 6.00 0.00	-20.0000	137.0000	No Ice	0.7701	0.3747	0.01
						1/2" Ice	0.8898	0.4647	0.02
						1" Ice	1.0181	0.5634	0.02
						2" Ice	1.3007	0.7868	0.04
						4" Ice	1.9696	1.3372	0.11
(3) ACU-A20-N	A	From Centroid-Face	4.0000 0.00 0.00	20.0000	137.0000	No Ice	0.0778	0.1361	0.00
						1/2" Ice	0.1210	0.1890	0.00
						1" Ice	0.1728	0.2506	0.00
						2" Ice	0.3025	0.3997	0.01
						4" Ice	0.6654	0.8015	0.04
(3) ACU-A20-N	B	From Centroid-Face	4.0000 0.00 0.00	-20.0000	137.0000	No Ice	0.0778	0.1361	0.00
						1/2" Ice	0.1210	0.1890	0.00
						1" Ice	0.1728	0.2506	0.00
						2" Ice	0.3025	0.3997	0.01
						4" Ice	0.6654	0.8015	0.04
(3) ACU-A20-N	C	From Centroid-Fa	4.0000 6.00	-20.0000	137.0000	No Ice	0.0778	0.1361	0.00
						1/2" Ice	0.1210	0.1890	0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		ce	0.00			1" Ice	0.1728	0.2506	0.00
						2" Ice	0.3025	0.3997	0.01
						4" Ice	0.6654	0.8015	0.04
1900MHz RRH (65MHz)	A	From Centroid-Face	4.0000 0.00 0.00	20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.6979 2.9362 3.1832 3.7030 4.8463	2.7708 3.0111 3.2600 3.7837 4.9348	0.06 0.08 0.11 0.18 0.35
1900MHz RRH (65MHz)	B	From Centroid-Face	4.0000 0.00 0.00	-20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.6979 2.9362 3.1832 3.7030 4.8463	2.7708 3.0111 3.2600 3.7837 4.9348	0.06 0.08 0.11 0.18 0.35
1900MHz RRH (65MHz)	C	From Centroid-Face	4.0000 6.00 0.00	-20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.6979 2.9362 3.1832 3.7030 4.8463	2.7708 3.0111 3.2600 3.7837 4.9348	0.06 0.08 0.11 0.18 0.35
800MHZ RRH	A	From Centroid-Face	4.0000 0.00 0.00	20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4899 2.7061 2.9310 3.4068 4.4620	2.0685 2.2705 2.4812 2.9284 3.9265	0.05 0.07 0.10 0.16 0.32
800MHZ RRH	B	From Centroid-Face	4.0000 0.00 0.00	-20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4899 2.7061 2.9310 3.4068 4.4620	2.0685 2.2705 2.4812 2.9284 3.9265	0.05 0.07 0.10 0.16 0.32
800MHZ RRH	C	From Centroid-Face	4.0000 6.00 0.00	-20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4899 2.7061 2.9310 3.4068 4.4620	2.0685 2.2705 2.4812 2.9284 3.9265	0.05 0.07 0.10 0.16 0.32
APXVTM14-C-120 w/ Mount Pipe	A	From Centroid-Face	4.0000 -6.00 0.00	20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.1342 7.6618 8.1830 9.2563 11.5262	4.9591 5.7544 6.4723 8.0099 11.4120	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Centroid-Face	4.0000 -6.00 0.00	-20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.1342 7.6618 8.1830 9.2563 11.5262	4.9591 5.7544 6.4723 8.0099 11.4120	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Centroid-Face	4.0000 -6.00 0.00	-20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.1342 7.6618 8.1830 9.2563 11.5262	4.9591 5.7544 6.4723 8.0099 11.4120	0.08 0.13 0.19 0.34 0.75
TD-RRH8x20-25	A	From Centroid-Face	4.0000 -6.00 0.00	20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.7198 5.0138 5.3165 5.9478 7.3141	1.7027 1.9196 2.1453 2.6224 3.6805	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	B	From Centroid-Face	4.0000 -6.00 0.00	-20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.7198 5.0138 5.3165 5.9478	1.7027 1.9196 2.1453 2.6224	0.07 0.10 0.13 0.20

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	7.3141	3.6805	0.40
TD-RRH8x20-25	C	From Centroid-Face	4.0000 -6.00 0.00	-20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.7198 5.0138 5.3165 5.9478 7.3141	1.7027 1.9196 2.1453 2.6224 3.6805	0.07 0.10 0.13 0.20 0.40
2.4" Dia. x 6' Mount Pipe	A	From Centroid-Face	4.0000 4.00 0.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	0.02 0.04 0.06 0.10 0.25
2.4" Dia. x 6' Mount Pipe	B	From Centroid-Face	4.0000 4.00 0.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	0.02 0.04 0.06 0.10 0.25
2.4" Dia. x 6' Mount Pipe	C	From Centroid-Face	4.0000 0.00 0.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	0.02 0.04 0.06 0.10 0.25
2.4" Dia. x 6' Mount Pipe	A	From Centroid-Face	4.0000 6.00 0.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	0.02 0.04 0.06 0.10 0.25
2.4" Dia. x 6' Mount Pipe	B	From Centroid-Face	4.0000 6.00 0.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	0.02 0.04 0.06 0.10 0.25
2.4" Dia. x 6' Mount Pipe	C	From Centroid-Face	4.0000 0.00 0.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	0.02 0.04 0.06 0.10 0.25
Platform Mount [LP 602-1]	B	None		0.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	32.0300 38.7100 45.3900 58.7500 85.4700	32.0300 38.7100 45.3900 58.7500 85.4700	1.34 1.80 2.26 3.17 5.00
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ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Centroid-Face	4.0000 -6.00 2.00	0.0000	127.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.8253 7.3471 7.8631 8.9261 11.1755	5.6424 6.4800 7.2567 8.8640 12.2932	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Centroid-Face	4.0000 -6.00 2.00	30.0000	127.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.8253 7.3471 7.8631 8.9261 11.1755	5.6424 6.4800 7.2567 8.8640 12.2932	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Centroid-Face	4.0000 -6.00 2.00	0.0000	127.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.8253 7.3471 7.8631 8.9261 11.1755	5.6424 6.4800 7.2567 8.8640 12.2932	0.11 0.17 0.23 0.38 0.81

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
KRY 112 144/1	A	From Centroid-Face	4.0000 -6.00 2.00	0.0000	127.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.4083 0.4969 0.5941 0.8145 1.3590	0.2042 0.2733 0.3511 0.5326 0.9992	0.01 0.01 0.02 0.03 0.08
KRY 112 144/1	B	From Centroid-Face	4.0000 -6.00 2.00	30.0000	127.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.4083 0.4969 0.5941 0.8145 1.3590	0.2042 0.2733 0.3511 0.5326 0.9992	0.01 0.01 0.02 0.03 0.08
KRY 112 144/1	C	From Centroid-Face	4.0000 -6.00 2.00	0.0000	127.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.4083 0.4969 0.5941 0.8145 1.3590	0.2042 0.2733 0.3511 0.5326 0.9992	0.01 0.01 0.02 0.03 0.08
Platform Mount [LP 713-1]	B	None		0.0000	127.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	31.2700 39.6800 48.0900 64.9100 98.5500	31.2700 39.6800 48.0900 64.9100 98.5500	1.51 1.93 2.35 3.19 4.86
Miscellaneous [NA 507-1]	B	None		0.0000	127.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.8000 6.7000 8.6000 12.4000 20.0000	4.8000 6.7000 8.6000 12.4000 20.0000	0.25 0.29 0.34 0.44 0.64
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LLPX310R w/ Mount Pipe	A	From Leg	1.0000 1.50 3.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.9817 5.3757 5.7798 6.6182 8.4370	2.8743 3.3975 3.9374 5.1249 7.8945	0.04 0.08 0.12 0.23 0.53
LLPX310R w/ Mount Pipe	B	From Leg	1.0000 1.50 3.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.9817 5.3757 5.7798 6.6182 8.4370	2.8743 3.3975 3.9374 5.1249 7.8945	0.04 0.08 0.12 0.23 0.53
LLPX310R w/ Mount Pipe	C	From Leg	1.0000 1.50 3.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.9817 5.3757 5.7798 6.6182 8.4370	2.8743 3.3975 3.9374 5.1249 7.8945	0.04 0.08 0.12 0.23 0.53
WIMAX DAP HEAD	A	From Leg	1.0000 1.50 3.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.8044 1.9877 2.1795 2.5891 3.5121	0.7778 0.9182 1.0673 1.3914 2.1432	0.03 0.04 0.06 0.09 0.20
WIMAX DAP HEAD	B	From Leg	1.0000 1.50 3.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.8044 1.9877 2.1795 2.5891 3.5121	0.7778 0.9182 1.0673 1.3914 2.1432	0.03 0.04 0.06 0.09 0.20
WIMAX DAP HEAD	C	From Leg	1.0000 1.50 3.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.8044 1.9877 2.1795 2.5891 3.5121	0.7778 0.9182 1.0673 1.3914 2.1432	0.03 0.04 0.06 0.09 0.20
HORIZON COMPACT	A	From Leg	1.0000	-17.0000	107.0000	No Ice	0.8409	0.4340	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			-1.50 3.00			1/2" Ice	0.9658	0.5297	0.02
						1" Ice	1.0993	0.6341	0.03
						2" Ice	1.3922	0.8687	0.05
						4" Ice	2.0819	1.4417	0.12
HORIZON COMPACT	B	From Leg	1.0000 -1.50 3.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.8409 0.9658 1.0993 1.3922 2.0819	0.4340 0.5297 0.6341 0.8687 1.4417	0.01 0.02 0.03 0.05 0.12
2.4" Dia. x 6' Mount Pipe	A	From Leg	1.0000 0.00 0.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	0.02 0.04 0.06 0.10 0.25
2.4" Dia. x 6' Mount Pipe	B	From Leg	1.0000 0.00 0.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	0.02 0.04 0.06 0.10 0.25
2.4" Dia. x 6' Mount Pipe	C	From Leg	1.0000 0.00 0.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	0.02 0.04 0.06 0.10 0.25
Side Arm Mount [SO 101-3]	B	None		0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.5000 8.9000 10.3000 13.1000 18.7000	7.5000 8.9000 10.3000 13.1000 18.7000	0.25 0.33 0.41 0.58 0.90
**									
APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.0000 0.00 0.00	30.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.4042 5.9597 6.4808 7.5467 9.9193	4.7000 5.8600 6.7338 8.5150 12.2774	0.05 0.10 0.15 0.28 0.68
APXV18-206517S-C w/ Mount Pipe	B	From Leg	1.0000 0.00 0.00	30.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.4042 5.9597 6.4808 7.5467 9.9193	4.7000 5.8600 6.7338 8.5150 12.2774	0.05 0.10 0.15 0.28 0.68
APXV18-206517S-C w/ Mount Pipe	C	From Leg	1.0000 0.00 0.00	30.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.4042 5.9597 6.4808 7.5467 9.9193	4.7000 5.8600 6.7338 8.5150 12.2774	0.05 0.10 0.15 0.28 0.68
Pipe Mount [PM 601-3]	B	None		0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.3900 5.4800 6.5700 8.7500 13.1100	4.3900 5.4800 6.5700 8.7500 13.1100	0.20 0.24 0.28 0.36 0.53
**									
OG-860/1920/GPS-A	A	From Leg	3.0000 0.00 1.00	0.0000	80.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.1444 0.2333 0.3333 0.5667 1.1667	0.1444 0.2333 0.3333 0.5667 1.1667	0.00 0.00 0.01 0.02 0.05
2.4" Dia. x 6' Mount Pipe	A	From Leg	3.0000	0.0000	80.0000	No Ice	1.4250	1.4250	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00				1/2" Ice	1.9305	1.9305	0.04
			0.00				1" Ice	2.3162	2.3162	0.06
							2" Ice	3.1485	3.1485	0.10
							4" Ice	5.0577	5.0577	0.25
2.4" Dia. x 6' Mount Pipe	C	From Leg	3.0000		0.0000	80.0000	No Ice	1.4250	1.4250	0.02
			0.00				1/2" Ice	1.9305	1.9305	0.04
			0.00				1" Ice	2.3162	2.3162	0.06
							2" Ice	3.1485	3.1485	0.10
							4" Ice	5.0577	5.0577	0.25
Side Arm Mount [SO 701-1]	C	None			0.0000	80.0000	No Ice	0.8500	1.6700	0.07
							1/2" Ice	1.1400	2.3400	0.08
							1" Ice	1.4300	3.0100	0.09
							2" Ice	2.0100	4.3500	0.12
							4" Ice	3.1700	7.0300	0.18
Side Arm Mount [SO 701-1]	A	None			0.0000	80.0000	No Ice	0.8500	1.6700	0.07
							1/2" Ice	1.1400	2.3400	0.08
							1" Ice	1.4300	3.0100	0.09
							2" Ice	2.0100	4.3500	0.12
							4" Ice	3.1700	7.0300	0.18

***

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-11	C	Paraboloid w/Radome	From Leg	2.0000		-17.0000		107.0000	2.0000	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
PX2F-52	B	Paraboloid w/Shroud (HP)	From Leg	2.0000		0.0000		107.0000	2.0917	No Ice	3.4400	0.02
				0.00						1/2" Ice	3.7200	0.04
				3.00						1" Ice	3.9900	0.06
										2" Ice	4.5500	0.09
										4" Ice	5.6700	0.17

**

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 45 deg - No Ice
4	Dead+Wind 90 deg - No Ice
5	Dead+Wind 135 deg - No Ice
6	Dead+Wind 180 deg - No Ice

Comb. No.	Description
7	Dead+Wind 225 deg - No Ice
8	Dead+Wind 270 deg - No Ice
9	Dead+Wind 315 deg - No Ice
10	Dead+Ice
11	Dead+Wind 0 deg+Ice
12	Dead+Wind 45 deg+Ice
13	Dead+Wind 90 deg+Ice
14	Dead+Wind 135 deg+Ice
15	Dead+Wind 180 deg+Ice
16	Dead+Wind 225 deg+Ice
17	Dead+Wind 270 deg+Ice
18	Dead+Wind 315 deg+Ice
19	Dead+Wind 0 deg - Service
20	Dead+Wind 45 deg - Service
21	Dead+Wind 90 deg - Service
22	Dead+Wind 135 deg - Service
23	Dead+Wind 180 deg - Service
24	Dead+Wind 225 deg - Service
25	Dead+Wind 270 deg - Service
26	Dead+Wind 315 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	160 - 121.33	Pole	Max Tension	11	0.00	-0.00	-0.00
			Max. Compression	10	-22.30	1.69	-0.62
			Max. Mx	8	-10.54	531.54	-2.58
			Max. My	6	-10.44	3.07	-543.62
			Max. Vy	8	-25.26	531.54	-2.58
			Max. Vx	2	-25.86	-1.77	543.29
			Max. Torque	6			-4.49
L2	121.33 - 102.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-29.05	1.81	-0.83
			Max. Mx	8	-15.65	1173.35	-1.31
			Max. My	6	-15.57	1.90	-1199.25
			Max. Vy	4	30.10	-1171.60	0.99
			Max. Vx	2	-30.70	-0.03	1199.22
			Max. Torque	2			4.46
L3	102.5 - 81.33	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-34.41	1.87	-0.65
			Max. Mx	8	-19.90	1668.07	0.33
			Max. My	2	-19.82	2.15	1703.42
			Max. Vy	4	33.22	-1666.51	-0.34
			Max. Vx	2	-33.81	2.15	1703.42
			Max. Torque	2			4.49
L4	81.33 - 67.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-42.45	2.19	-0.28
			Max. Mx	8	-26.74	2347.95	2.45
			Max. My	2	-26.69	4.94	2395.21
			Max. Vy	4	36.36	-2346.46	-1.98
			Max. Vx	2	-36.96	4.94	2395.21
			Max. Torque	2			4.78
L5	67.5 - 41.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-50.76	2.34	-0.05
			Max. Mx	8	-34.11	3082.64	4.52
			Max. My	2	-34.07	7.65	3141.79
			Max. Vy	4	39.06	-3081.37	-3.65

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-39.66	7.65	3141.79
			Max. Torque	2			4.85
L6	41.42 - 26.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-63.06	2.31	0.10
			Max. Mx	8	-45.04	3954.59	6.70
			Max. My	2	-45.01	10.44	4026.87
			Max. Vy	4	41.94	-3953.94	-5.61
			Max. Vx	2	-42.53	10.44	4026.87
			Max. Torque	2			4.93
L7	26.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-77.28	2.33	0.38
			Max. Mx	8	-58.07	5107.00	9.42
			Max. My	2	-58.07	13.89	5195.20
			Max. Vy	4	45.12	-5106.95	-7.94
			Max. Vx	2	-45.70	13.89	5195.20
			Max. Torque	2			5.03

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	11	77.28	0.03	11.12
	Max. H_x	8	58.09	45.08	0.10
	Max. H_z	2	58.09	0.13	45.68
	Max. M_x	2	5195.20	0.13	45.68
	Max. M_z	4	5106.95	-45.10	-0.08
	Max. Torsion	2	5.03	0.13	45.68
	Min. Vert	1	58.09	0.00	0.00
	Min. H_x	4	58.09	-45.10	-0.08
	Min. H_z	6	58.09	-0.10	-45.62
	Min. M_x	6	-5189.09	-0.10	-45.62
	Min. M_z	8	-5107.00	45.08	0.10
	Min. Torsion	6	-4.91	-0.10	-45.62

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	58.09	0.00	0.00	0.34	0.82	0.00
Dead+Wind 0 deg - No Ice	58.09	-0.13	-45.68	-5195.20	13.89	-5.03
Dead+Wind 45 deg - No Ice	58.09	31.87	-32.23	-3667.05	-3609.87	-3.29
Dead+Wind 90 deg - No Ice	58.09	45.10	0.08	7.94	-5106.95	0.24
Dead+Wind 135 deg - No Ice	58.09	31.92	32.28	3670.39	-3612.36	3.64
Dead+Wind 180 deg - No Ice	58.09	0.10	45.62	5189.09	-8.75	4.91
Dead+Wind 225 deg - No Ice	58.09	-31.85	32.20	3664.55	3609.48	3.26
Dead+Wind 270 deg - No Ice	58.09	-45.08	-0.10	-9.42	5107.00	-0.26
Dead+Wind 315 deg - No Ice	58.09	-31.92	-32.33	-3675.92	3614.75	-3.66
Dead+Ice	77.28	-0.00	0.00	-0.38	2.33	-0.00
Dead+Wind 0 deg+Ice	77.28	-0.03	-11.12	-1304.42	4.88	-1.23
Dead+Wind 45 deg+Ice	77.28	7.79	-7.85	-921.39	-908.28	-0.72
Dead+Wind 90 deg+Ice	77.28	11.02	0.01	0.81	-1285.28	0.17

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 135 deg+Ice	77.28	7.79	7.86	920.49	-908.08	0.96
Dead+Wind 180 deg+Ice	77.28	0.02	11.11	1302.14	0.83	1.20
Dead+Wind 225 deg+Ice	77.28	-7.78	7.84	919.93	912.74	0.72
Dead+Wind 270 deg+Ice	77.28	-11.01	-0.02	-2.04	1289.83	-0.17
Dead+Wind 315 deg+Ice	77.28	-7.79	-7.87	-922.63	913.17	-0.97
Dead+Wind 0 deg - Service	58.09	-0.05	-15.81	-1799.87	5.39	-1.76
Dead+Wind 45 deg - Service	58.09	11.03	-11.15	-1270.35	-1250.18	-1.15
Dead+Wind 90 deg - Service	58.09	15.61	0.03	2.97	-1768.85	0.09
Dead+Wind 135 deg - Service	58.09	11.04	11.17	1271.96	-1251.04	1.27
Dead+Wind 180 deg - Service	58.09	0.04	15.78	1798.21	-2.45	1.71
Dead+Wind 225 deg - Service	58.09	-11.02	11.14	1269.94	1251.20	1.15
Dead+Wind 270 deg - Service	58.09	-15.60	-0.04	-3.03	1770.01	-0.09
Dead+Wind 315 deg - Service	58.09	-11.05	-11.19	-1273.41	1253.02	-1.28

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-58.09	0.00	0.00	58.09	0.00	0.000%
2	-0.13	-58.09	-45.68	0.13	58.09	45.68	0.000%
3	31.87	-58.09	-32.23	-31.87	58.09	32.23	0.000%
4	45.10	-58.09	0.08	-45.10	58.09	-0.08	0.000%
5	31.92	-58.09	32.28	-31.92	58.09	-32.28	0.000%
6	0.10	-58.09	45.62	-0.10	58.09	-45.62	0.000%
7	-31.85	-58.09	32.20	31.85	58.09	-32.20	0.000%
8	-45.08	-58.09	-0.10	45.08	58.09	0.10	0.000%
9	-31.92	-58.09	-32.33	31.92	58.09	32.33	0.000%
10	0.00	-77.28	0.00	0.00	77.28	0.00	0.000%
11	-0.03	-77.28	-11.12	0.03	77.28	11.12	0.000%
12	7.79	-77.28	-7.85	-7.79	77.28	7.85	0.000%
13	11.02	-77.28	0.01	-11.02	77.28	-0.01	0.000%
14	7.79	-77.28	7.86	-7.79	77.28	-7.86	0.000%
15	0.02	-77.28	11.11	-0.02	77.28	-11.11	0.000%
16	-7.78	-77.28	7.84	7.78	77.28	-7.84	0.000%
17	-11.01	-77.28	-0.02	11.01	77.28	0.02	0.000%
18	-7.79	-77.28	-7.87	7.79	77.28	7.87	0.000%
19	-0.05	-58.09	-15.81	0.05	58.09	15.81	0.000%
20	11.03	-58.09	-11.15	-11.03	58.09	11.15	0.000%
21	15.61	-58.09	0.03	-15.61	58.09	-0.03	0.000%
22	11.04	-58.09	11.17	-11.04	58.09	-11.17	0.000%
23	0.04	-58.09	15.78	-0.04	58.09	-15.78	0.000%
24	-11.02	-58.09	11.14	11.02	58.09	-11.14	0.000%
25	-15.60	-58.09	-0.04	15.60	58.09	0.04	0.000%
26	-11.05	-58.09	-11.19	11.05	58.09	11.19	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00009011
3	Yes	5	0.00000001	0.00097332
4	Yes	4	0.00000001	0.00038386
5	Yes	5	0.00000001	0.00097388

6	Yes	5	0.00000001	0.00007994
7	Yes	5	0.00000001	0.00097620
8	Yes	4	0.00000001	0.00028524
9	Yes	5	0.00000001	0.00097881
10	Yes	4	0.00000001	0.00000178
11	Yes	4	0.00000001	0.00058843
12	Yes	5	0.00000001	0.00012946
13	Yes	4	0.00000001	0.00032748
14	Yes	5	0.00000001	0.00013030
15	Yes	4	0.00000001	0.00057022
16	Yes	5	0.00000001	0.00013184
17	Yes	4	0.00000001	0.00032843
18	Yes	5	0.00000001	0.00013266
19	Yes	4	0.00000001	0.00054884
20	Yes	5	0.00000001	0.00009056
21	Yes	4	0.00000001	0.00015532
22	Yes	5	0.00000001	0.00009075
23	Yes	4	0.00000001	0.00051852
24	Yes	5	0.00000001	0.00009140
25	Yes	4	0.00000001	0.00015264
26	Yes	5	0.00000001	0.00009183

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 121.33	37.275	19	2.2235	0.0087
L2	126 - 102.5	22.416	19	1.8243	0.0059
L3	102.5 - 81.33	14.358	19	1.4026	0.0033
L4	87 - 67.5	10.195	19	1.1597	0.0023
L5	67.5 - 41.42	6.010	19	0.8485	0.0015
L6	48 - 26.5	3.090	19	0.5825	0.0009
L7	26.5 - 0	0.941	19	0.3438	0.0005

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
158.0000	GPS_A	19	36.355	2.2044	0.0090	19856
147.0000	800 10121 w/ Mount Pipe	19	31.335	2.0953	0.0082	7636
137.0000	APXVSPP18-C-A20 w/ Mount Pipe	19	26.933	1.9808	0.0073	4315
127.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	19	22.808	1.8402	0.0063	3048
110.0000	VHLP2-11	19	16.689	1.5367	0.0042	3001
107.0000	LLPX310R w/ Mount Pipe	19	15.730	1.4817	0.0038	3017
100.0000	APXV18-206517S-C w/ Mount Pipe	19	13.631	1.3611	0.0032	3216
80.0000	OG-860/1920/GPS-A	19	8.552	1.0481	0.0021	3867

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 121.33	107.369	2	6.4033	0.0242
L2	126 - 102.5	64.611	2	5.2586	0.0167
L3	102.5 - 81.33	41.404	2	4.0445	0.0093
L4	87 - 67.5	29.406	2	3.3447	0.0066
L5	67.5 - 41.42	17.339	2	2.4479	0.0042
L6	48 - 26.5	8.917	2	1.6808	0.0025
L7	26.5 - 0	2.715	2	0.9921	0.0013

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
158.0000	GPS_A	2	104.721	6.3487	0.0266	7051
147.0000	800 10121 w/ Mount Pipe	2	90.280	6.0365	0.0240	2710
137.0000	APXVSPP18-C-A20 w/ Mount Pipe	2	77.613	5.7087	0.0213	1529
127.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	2	65.741	5.3045	0.0182	1078
110.0000	VHLP2-11	2	48.119	4.4308	0.0120	1054
107.0000	LLPX310R w/ Mount Pipe	2	45.356	4.2724	0.0110	1059
100.0000	APXV18-206517S-C w/ Mount Pipe	2	39.308	3.9251	0.0092	1126
80.0000	OG-860/1920/GPS-A	2	24.669	3.0231	0.0059	1349

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	160 - 158.211	TP29.77x21.65x0.25	38.6700	0.0000	0.0	39.000	17.5295	-0.13	683.65	0.000
	158.211 - 156.421					39.000	17.8320	-1.84	695.45	0.003
	156.421 - 154.632					39.000	18.1345	-1.97	707.24	0.003
	154.632 - 152.842					39.000	18.4369	-2.11	719.04	0.003
	152.842 - 151.053					39.000	18.7394	-2.24	730.84	0.003
	151.053 - 149.263					39.000	19.0419	-2.38	742.63	0.003
	149.263 - 147.474					39.000	19.3444	-2.52	754.43	0.003
	147.474 - 145.684					39.000	19.6469	-4.65	766.23	0.006
	145.684 - 143.895					39.000	19.9494	-4.80	778.02	0.006
	143.895 - 142.105					39.000	20.2518	-4.96	789.82	0.006
	142.105 - 140.316					39.000	20.5543	-5.12	801.62	0.006
	140.316 - 138.526					39.000	20.8568	-5.29	813.42	0.007
	138.526 - 136.737					39.000	21.1593	-7.42	825.21	0.009
	136.737 - 134.947					39.000	21.4618	-7.60	837.01	0.009
	134.947 - 133.158					39.000	21.7643	-7.79	848.81	0.009
	133.158 - 131.368					39.000	22.0668	-7.97	860.60	0.009
	131.368 - 129.579					39.000	22.3692	-8.17	872.40	0.009
	129.579 - 127.789					39.000	22.6717	-8.37	884.20	0.009
	127.789 - 126					39.000	22.9742	-10.44	895.99	0.012
	126 - 121.33					39.000	23.7636	-4.66	926.78	0.005
L2	126 - 121.33	TP33.2242x28.289x0.375	23.5000	0.0000	0.0	39.000	34.8904	-6.80	1360.73	0.005
	121.33 - 120.284					39.000	35.1557	-11.67	1371.07	0.009

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 $\frac{P}{P_a}$
	120.284 - 119.238					39.000	35.4209	-11.86	1381.42	0.009
	119.238 - 118.192					39.000	35.6862	-12.05	1391.76	0.009
	118.192 - 117.146					39.000	35.9515	-12.24	1402.11	0.009
	117.146 - 116.099					39.000	36.2168	-12.43	1412.45	0.009
	116.099 - 115.053					39.000	36.4820	-12.63	1422.80	0.009
	115.053 - 114.007					39.000	36.7473	-12.83	1433.15	0.009
	114.007 - 112.961					39.000	37.0126	-13.02	1443.49	0.009
	112.961 - 111.915					39.000	37.2779	-13.22	1453.84	0.009
	111.915 - 110.869					39.000	37.5431	-13.42	1464.18	0.009
	110.869 - 109.823					39.000	37.8084	-13.66	1474.53	0.009
	109.823 - 108.777					39.000	38.0737	-13.87	1484.87	0.009
	108.777 - 107.731					39.000	38.3390	-14.07	1495.22	0.009
	107.731 - 106.684					39.000	38.6043	-14.72	1505.57	0.010
	106.684 - 105.638					39.000	38.8695	-14.93	1515.91	0.010
	105.638 - 104.592					39.000	39.1348	-15.14	1526.26	0.010
	104.592 - 103.546					39.000	39.4001	-15.36	1536.60	0.010
	103.546 - 102.5					39.000	39.6654	-15.57	1546.95	0.010
L3	102.5 - 101.467	TP37.67x33.2242x0.5477	21.1700	0.0000	0.0	39.000	58.0057	-15.83	2262.22	0.007
	101.467 - 100.433					39.000	58.3884	-16.08	2277.15	0.007
	100.433 - 99.4					39.000	58.7711	-16.63	2292.07	0.007
	99.4 - 98.3667					39.000	59.1538	-16.89	2307.00	0.007
	98.3667 - 97.3333					39.000	59.5364	-17.15	2321.92	0.007
	97.3333 - 96.3					39.000	59.9191	-17.41	2336.85	0.007
	96.3 - 95.2667					39.000	60.3018	-17.67	2351.77	0.008
	95.2667 - 94.2333					39.000	60.6845	-17.94	2366.69	0.008
	94.2333 - 93.2					39.000	61.0671	-18.20	2381.62	0.008
	93.2 - 92.1667					39.000	61.4498	-18.47	2396.54	0.008
	92.1667 - 91.1333					39.000	61.8325	-18.74	2411.47	0.008
	91.1333 - 90.1					39.000	62.2152	-19.01	2426.39	0.008
	90.1 - 89.0667					39.000	62.5979	-19.28	2441.32	0.008
	89.0667 - 88.0333					39.000	62.9805	-19.55	2456.24	0.008
	88.0333 - 87					39.000	63.3632	-19.82	2471.17	0.008
	87 - 81.33					39.000	65.4630	-11.82	2553.06	0.005
L4	87 - 81.33	TP39.8237x35.729x0.5	19.5000	0.0000	0.0	39.000	58.6356	-10.53	2286.79	0.005
	81.33 - 80.2662					39.000	58.9952	-22.69	2300.81	0.010
	80.2662 - 79.2023					39.000	59.3549	-23.16	2314.84	0.010
	79.2023 - 78.1385					39.000	59.7145	-23.47	2328.87	0.010
	78.1385 - 77.0746					39.000	60.0742	-23.78	2342.89	0.010
	77.0746 - 76.0108					39.000	60.4338	-24.10	2356.92	0.010
	76.0108 - 74.9469					39.000	60.7935	-24.42	2370.95	0.010
	74.9469 - 73.8831					39.000	61.1532	-24.74	2384.97	0.010
	73.8831 - 72.8192					39.000	61.5128	-25.06	2399.00	0.010
	72.8192 - 71.7554					39.000	61.8725	-25.38	2413.03	0.011
	71.7554 - 70.6915					39.000	62.2321	-25.70	2427.05	0.011
	70.6915 - 69.6277					39.000	62.5918	-26.03	2441.08	0.011
	69.6277 - 68.5638					39.000	62.9514	-26.36	2455.11	0.011
	68.5638 - 67.5					39.000	63.3111	-26.69	2469.13	0.011
L5	67.5 - 66.4737	TP45.3x39.8237x0.6955	26.0800	0.0000	0.0	39.000	88.1051	-27.07	3436.10	0.008
	66.4737 - 65.4474					39.000	88.5877	-27.44	3454.92	0.008
	65.4474 - 64.4211					39.000	89.0703	-27.82	3473.74	0.008
	64.4211 - 63.3947					39.000	89.5529	-28.20	3492.56	0.008
	63.3947 - 62.3684					39.000	90.0355	-28.58	3511.38	0.008
	62.3684 - 61.3421					39.000	90.5181	-28.97	3530.20	0.008
	61.3421 - 60.3158					39.000	91.0007	-29.35	3549.03	0.008
	60.3158 - 59.2895					39.000	91.4833	-29.74	3567.85	0.008
	59.2895 - 58.2632					39.000	91.9659	-30.12	3586.67	0.008
	58.2632 - 57.2368					39.000	92.4485	-30.51	3605.49	0.008
	57.2368 - 56.2105					39.000	92.9311	-30.90	3624.31	0.009
	56.2105 - 55.1842					39.000	93.4137	-31.29	3643.13	0.009
	55.1842 - 54.1579					39.000	93.8963	-31.69	3661.96	0.009

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 $\frac{P}{P_a}$
	54.1579 - 53.1316					39.000	94.3789	-32.08	3680.78	0.009
	53.1316 - 52.1053					39.000	94.8615	-32.47	3699.60	0.009
	52.1053 - 51.0789					39.000	95.3441	-32.87	3718.42	0.009
	51.0789 - 50.0526					39.000	95.8267	-33.27	3737.24	0.009
	50.0526 - 49.0263					39.000	96.3093	-33.67	3756.06	0.009
	49.0263 - 48					39.000	96.7919	-34.07	3774.88	0.009
	48 - 41.42					39.000	99.8860	-18.94	3895.55	0.005
L6	48 - 41.42	TP47.4339x42.918x0.7427	21.5000	0.0000	0.0	39.000	104.1700	-19.35	4062.61	0.005
	41.42 - 40.3543					39.000	104.7050	-38.79	4083.49	0.009
	40.3543 - 39.2886					39.000	105.2400	-39.26	4104.37	0.010
	39.2886 - 38.2229					39.000	105.7760	-39.73	4125.25	0.010
	38.2229 - 37.1571					39.000	106.3110	-40.20	4146.12	0.010
	37.1571 - 36.0914					39.000	106.8460	-40.68	4167.00	0.010
	36.0914 - 35.0257					39.000	107.3820	-41.15	4187.88	0.010
	35.0257 - 33.96					39.000	107.9170	-41.63	4208.76	0.010
	33.96 - 32.8943					39.000	108.4520	-42.11	4229.64	0.010
	32.8943 - 31.8286					39.000	108.9880	-42.59	4250.51	0.010
	31.8286 - 30.7629					39.000	109.5230	-43.07	4271.39	0.010
	30.7629 - 29.6971					39.000	110.0580	-43.55	4292.27	0.010
	29.6971 - 28.6314					39.000	110.5940	-44.04	4313.15	0.010
	28.6314 - 27.5657					39.000	111.1290	-44.53	4334.03	0.010
	27.5657 - 26.5					39.000	111.6640	-45.01	4354.91	0.010
L7	26.5 - 25.175	TP53x47.4339x0.7006	26.5000	0.0000	0.0	39.000	106.0590	-45.64	4136.28	0.011
	25.175 - 23.85					39.000	106.6860	-46.27	4160.77	0.011
	23.85 - 22.525					39.000	107.3140	-46.91	4185.26	0.011
	22.525 - 21.2					39.000	107.9420	-47.54	4209.74	0.011
	21.2 - 19.875					39.000	108.5700	-48.18	4234.23	0.011
	19.875 - 18.55					39.000	109.1980	-48.83	4258.72	0.011
	18.55 - 17.225					39.000	109.8260	-49.47	4283.20	0.012
	17.225 - 15.9					39.000	110.4540	-50.12	4307.69	0.012
	15.9 - 14.575					39.000	111.0810	-50.77	4332.18	0.012
	14.575 - 13.25					39.000	111.7090	-51.42	4356.66	0.012
	13.25 - 11.925					39.000	112.3370	-52.07	4381.15	0.012
	11.925 - 10.6					39.000	112.9650	-52.73	4405.64	0.012
	10.6 - 9.275					39.000	113.5930	-53.39	4430.12	0.012
	9.275 - 7.95					39.000	114.2210	-54.05	4454.61	0.012
	7.95 - 6.625					39.000	114.8490	-54.71	4479.09	0.012
	6.625 - 5.3					39.000	115.4760	-55.38	4503.58	0.012
	5.3 - 3.975					39.000	116.1040	-56.05	4528.07	0.012
	3.975 - 2.65					39.000	116.7320	-56.72	4552.55	0.012
	2.65 - 1.325					39.000	117.3600	-57.39	4577.04	0.013
	1.325 - 0					39.000	117.9880	-58.07	4601.53	0.013

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	160 - 158.211	TP29.77x21.65x0.25	0.18	0.024	39.000	0.001	0.00	0.000	39.000	0.000
	158.211 - 156.421		36.69	4.574	39.000	0.117	0.00	0.000	39.000	0.000
	156.421 - 154.632		51.38	6.192	39.000	0.159	0.00	0.000	39.000	0.000
	154.632 - 152.842		66.43	7.745	39.000	0.199	0.00	0.000	39.000	0.000
	152.842 - 151.053		81.86	9.237	39.000	0.237	0.00	0.000	39.000	0.000
	151.053 - 149.263		97.67	10.671	39.000	0.274	0.00	0.000	39.000	0.000
	149.263 - 147.474		113.86	12.052	39.000	0.309	0.00	0.000	39.000	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 $\frac{f_{by}}{F_{by}}$
	147.474 - 145.684		156.59	16.067	39.000	0.412	0.00	0.000	39.000	0.000
	145.684 - 143.895		183.84	18.292	39.000	0.469	0.00	0.000	39.000	0.000
	143.895 - 142.105		211.47	20.415	39.000	0.523	0.00	0.000	39.000	0.000
	142.105 - 140.316		239.50	22.442	39.000	0.575	0.00	0.000	39.000	0.000
	140.316 - 138.526		267.93	24.379	39.000	0.625	0.00	0.000	39.000	0.000
	138.526 - 136.737		298.22	26.361	39.000	0.676	0.00	0.000	39.000	0.000
	136.737 - 134.947		337.36	28.983	39.000	0.743	0.00	0.000	39.000	0.000
	134.947 - 133.158		376.91	31.482	39.000	0.807	0.00	0.000	39.000	0.000
	133.158 - 131.368		416.86	33.867	39.000	0.868	0.00	0.000	39.000	0.000
	131.368 - 129.579		457.21	36.143	39.000	0.927	0.00	0.000	39.000	0.000
	129.579 - 127.789		497.96	38.317	39.000	0.982	0.00	0.000	39.000	0.000
	127.789 - 126		543.63	40.731	39.000	1.044	0.00	0.000	39.000	0.000
	126 - 121.33		277.00	19.393	39.000	0.497	0.00	0.000	39.000	0.000
L2	126 - 121.33	TP33.2242x28.289x0.375	388.91	19.030	39.000	0.488	0.00	0.000	39.000	0.000
	121.33 - 120.284		693.73	33.433	39.000	0.857	0.00	0.000	39.000	0.000
	120.284 - 119.238		721.70	34.258	39.000	0.878	0.00	0.000	39.000	0.000
	119.238 - 118.192		749.81	35.062	39.000	0.899	0.00	0.000	39.000	0.000
	118.192 - 117.146		778.08	35.846	39.000	0.919	0.00	0.000	39.000	0.000
	117.146 - 116.099		806.49	36.609	39.000	0.939	0.00	0.000	39.000	0.000
	116.099 - 115.053		835.05	37.353	39.000	0.958	0.00	0.000	39.000	0.000
	115.053 - 114.007		863.76	38.078	39.000	0.976	0.00	0.000	39.000	0.000
	114.007 - 112.961		892.62	38.785	39.000	0.994	0.00	0.000	39.000	0.000
	112.961 - 111.915		921.63	39.474	39.000	1.012	0.00	0.000	39.000	0.000
	111.915 - 110.869		950.80	40.146	39.000	1.029	0.00	0.000	39.000	0.000
	110.869 - 109.823		980.23	40.807	39.000	1.046	0.00	0.000	39.000	0.000
	109.823 - 108.777		1009.91	41.455	39.000	1.063	0.00	0.000	39.000	0.000
	108.777 - 107.731		1039.73	42.087	39.000	1.079	0.00	0.000	39.000	0.000
	107.731 - 106.684		1072.34	42.809	39.000	1.098	0.00	0.000	39.000	0.000
	106.684 - 105.638		1103.83	43.464	39.000	1.114	0.00	0.000	39.000	0.000
	105.638 - 104.592		1135.48	44.102	39.000	1.131	0.00	0.000	39.000	0.000
	104.592 - 103.546		1167.29	44.726	39.000	1.147	0.00	0.000	39.000	0.000
	103.546 - 102.5		1199.25	45.335	39.000	1.162	0.00	0.000	39.000	0.000
L3	102.5 - 101.467	TP37.67x33.2242x0.5477	1231.01	31.943	39.000	0.819	0.00	0.000	39.000	0.000
	101.467 - 100.433		1262.94	32.340	39.000	0.829	0.00	0.000	39.000	0.000
	100.433 - 99.4		1295.55	32.741	39.000	0.840	0.00	0.000	39.000	0.000
	99.4 - 98.3667		1328.68	33.142	39.000	0.850	0.00	0.000	39.000	0.000
	98.3667 - 97.3333		1361.97	33.533	39.000	0.860	0.00	0.000	39.000	0.000
	97.3333 - 96.3		1395.42	33.916	39.000	0.870	0.00	0.000	39.000	0.000
	96.3 - 95.2667		1429.02	34.289	39.000	0.879	0.00	0.000	39.000	0.000
	95.2667 - 94.2333		1462.77	34.655	39.000	0.889	0.00	0.000	39.000	0.000
	94.2333 - 93.2		1496.68	35.012	39.000	0.898	0.00	0.000	39.000	0.000
	93.2 - 92.1667		1530.73	35.360	39.000	0.907	0.00	0.000	39.000	0.000
	92.1667 - 91.1333		1564.96	35.701	39.000	0.915	0.00	0.000	39.000	0.000
	91.1333 - 90.1		1599.33	36.035	39.000	0.924	0.00	0.000	39.000	0.000
	90.1 - 89.0667		1633.88	36.361	39.000	0.932	0.00	0.000	39.000	0.000
	89.0667 - 88.0333		1668.57	36.680	39.000	0.941	0.00	0.000	39.000	0.000
	88.0333 - 87		1703.43	36.992	39.000	0.949	0.00	0.000	39.000	0.000
	87 - 81.33		1019.80	20.738	39.000	0.532	0.00	0.000	39.000	0.000
L4	87 - 81.33	TP39.8237x35.729x0.5	878.03	20.298	39.000	0.520	0.00	0.000	39.000	0.000
	81.33 - 80.2662		1934.90	44.184	39.000	1.133	0.00	0.000	39.000	0.000
	80.2662 - 79.2023		1972.39	44.492	39.000	1.141	0.00	0.000	39.000	0.000
	79.2023 - 78.1385		2010.05	44.793	39.000	1.149	0.00	0.000	39.000	0.000
	78.1385 - 77.0746		2047.86	45.087	39.000	1.156	0.00	0.000	39.000	0.000
	77.0746 - 76.0108		2085.82	45.375	39.000	1.163	0.00	0.000	39.000	0.000
	76.0108 - 74.9469		2123.95	45.656	39.000	1.171	0.00	0.000	39.000	0.000
	74.9469 - 73.8831		2162.23	45.930	39.000	1.178	0.00	0.000	39.000	0.000
	73.8831 - 72.8192		2200.67	46.198	39.000	1.185	0.00	0.000	39.000	0.000
	72.8192 - 71.7554		2239.26	46.459	39.000	1.191	0.00	0.000	39.000	0.000
	71.7554 - 70.6915		2278.01	46.715	39.000	1.198	0.00	0.000	39.000	0.000
	70.6915 - 69.6277		2316.93	46.965	39.000	1.204	0.00	0.000	39.000	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 $\frac{f_{by}}{F_{by}}$
	69.6277 - 68.5638		2355.99	47.210	39.000	1.211	0.00	0.000	39.000	0.000
	68.5638 - 67.5		2395.22	47.449	39.000	1.217	0.00	0.000	39.000	0.000
L5	67.5 - 66.4737	TP45.3x39.8237x0.6955	2433.21	34.789	39.000	0.892	0.00	0.000	39.000	0.000
	66.4737 - 65.4474		2471.34	34.947	39.000	0.896	0.00	0.000	39.000	0.000
	65.4474 - 64.4211		2509.62	35.101	39.000	0.900	0.00	0.000	39.000	0.000
	64.4211 - 63.3947		2548.03	35.252	39.000	0.904	0.00	0.000	39.000	0.000
	63.3947 - 62.3684		2586.60	35.400	39.000	0.908	0.00	0.000	39.000	0.000
	62.3684 - 61.3421		2625.31	35.544	39.000	0.911	0.00	0.000	39.000	0.000
	61.3421 - 60.3158		2664.16	35.685	39.000	0.915	0.00	0.000	39.000	0.000
	60.3158 - 59.2895		2703.16	35.824	39.000	0.919	0.00	0.000	39.000	0.000
	59.2895 - 58.2632		2742.30	35.959	39.000	0.922	0.00	0.000	39.000	0.000
	58.2632 - 57.2368		2781.59	36.091	39.000	0.925	0.00	0.000	39.000	0.000
	57.2368 - 56.2105		2821.03	36.220	39.000	0.929	0.00	0.000	39.000	0.000
	56.2105 - 55.1842		2860.61	36.347	39.000	0.932	0.00	0.000	39.000	0.000
	55.1842 - 54.1579		2900.33	36.471	39.000	0.935	0.00	0.000	39.000	0.000
	54.1579 - 53.1316		2940.21	36.592	39.000	0.938	0.00	0.000	39.000	0.000
	53.1316 - 52.1053		2980.23	36.711	39.000	0.941	0.00	0.000	39.000	0.000
	52.1053 - 51.0789		3020.40	36.827	39.000	0.944	0.00	0.000	39.000	0.000
	51.0789 - 50.0526		3060.72	36.941	39.000	0.947	0.00	0.000	39.000	0.000
	50.0526 - 49.0263		3101.18	37.052	39.000	0.950	0.00	0.000	39.000	0.000
	49.0263 - 48		3141.80	37.161	39.000	0.953	0.00	0.000	39.000	0.000
	48 - 41.42		1709.02	18.972	39.000	0.486	0.00	0.000	39.000	0.000
L6	48 - 41.42	TP47.4339x42.918x0.7427	1697.15	18.526	39.000	0.475	0.00	0.000	39.000	0.000
	41.42 - 40.3543		3449.62	37.269	39.000	0.956	0.00	0.000	39.000	0.000
	40.3543 - 39.2886		3493.19	37.354	39.000	0.958	0.00	0.000	39.000	0.000
	39.2886 - 38.2229		3536.92	37.436	39.000	0.960	0.00	0.000	39.000	0.000
	38.2229 - 37.1571		3580.77	37.516	39.000	0.962	0.00	0.000	39.000	0.000
	37.1571 - 36.0914		3624.76	37.595	39.000	0.964	0.00	0.000	39.000	0.000
	36.0914 - 35.0257		3668.89	37.671	39.000	0.966	0.00	0.000	39.000	0.000
	35.0257 - 33.96		3713.16	37.745	39.000	0.968	0.00	0.000	39.000	0.000
	33.96 - 32.8943		3757.56	37.817	39.000	0.970	0.00	0.000	39.000	0.000
	32.8943 - 31.8286		3802.10	37.887	39.000	0.971	0.00	0.000	39.000	0.000
	31.8286 - 30.7629		3846.78	37.956	39.000	0.973	0.00	0.000	39.000	0.000
	30.7629 - 29.6971		3891.60	38.023	39.000	0.975	0.00	0.000	39.000	0.000
	29.6971 - 28.6314		3936.56	38.087	39.000	0.977	0.00	0.000	39.000	0.000
	28.6314 - 27.5657		3981.65	38.151	39.000	0.978	0.00	0.000	39.000	0.000
	27.5657 - 26.5		4026.88	38.212	39.000	0.980	0.00	0.000	39.000	0.000
L7	26.5 - 25.175	TP53x47.4339x0.7006	4083.32	40.477	39.000	1.038	0.00	0.000	39.000	0.000
	25.175 - 23.85		4139.97	40.554	39.000	1.040	0.00	0.000	39.000	0.000
	23.85 - 22.525		4196.82	40.628	39.000	1.042	0.00	0.000	39.000	0.000
	22.525 - 21.2		4253.88	40.699	39.000	1.044	0.00	0.000	39.000	0.000
	21.2 - 19.875		4311.13	40.768	39.000	1.045	0.00	0.000	39.000	0.000
	19.875 - 18.55		4368.61	40.834	39.000	1.047	0.00	0.000	39.000	0.000
	18.55 - 17.225		4426.29	40.898	39.000	1.049	0.00	0.000	39.000	0.000
	17.225 - 15.9		4484.18	40.960	39.000	1.050	0.00	0.000	39.000	0.000
	15.9 - 14.575		4542.27	41.020	39.000	1.052	0.00	0.000	39.000	0.000
	14.575 - 13.25		4600.58	41.077	39.000	1.053	0.00	0.000	39.000	0.000
	13.25 - 11.925		4659.10	41.133	39.000	1.055	0.00	0.000	39.000	0.000
	11.925 - 10.6		4717.82	41.187	39.000	1.056	0.00	0.000	39.000	0.000
	10.6 - 9.275		4776.77	41.238	39.000	1.057	0.00	0.000	39.000	0.000
	9.275 - 7.95		4835.91	41.288	39.000	1.059	0.00	0.000	39.000	0.000
	7.95 - 6.625		4895.27	41.336	39.000	1.060	0.00	0.000	39.000	0.000
	6.625 - 5.3		4954.83	41.382	39.000	1.061	0.00	0.000	39.000	0.000
	5.3 - 3.975		5014.61	41.427	39.000	1.062	0.00	0.000	39.000	0.000
	3.975 - 2.65		5074.60	41.469	39.000	1.063	0.00	0.000	39.000	0.000
	2.65 - 1.325		5134.80	41.511	39.000	1.064	0.00	0.000	39.000	0.000
	1.325 - 0		5195.22	41.550	39.000	1.065	0.00	0.000	39.000	0.000

Pole Shear Design Data

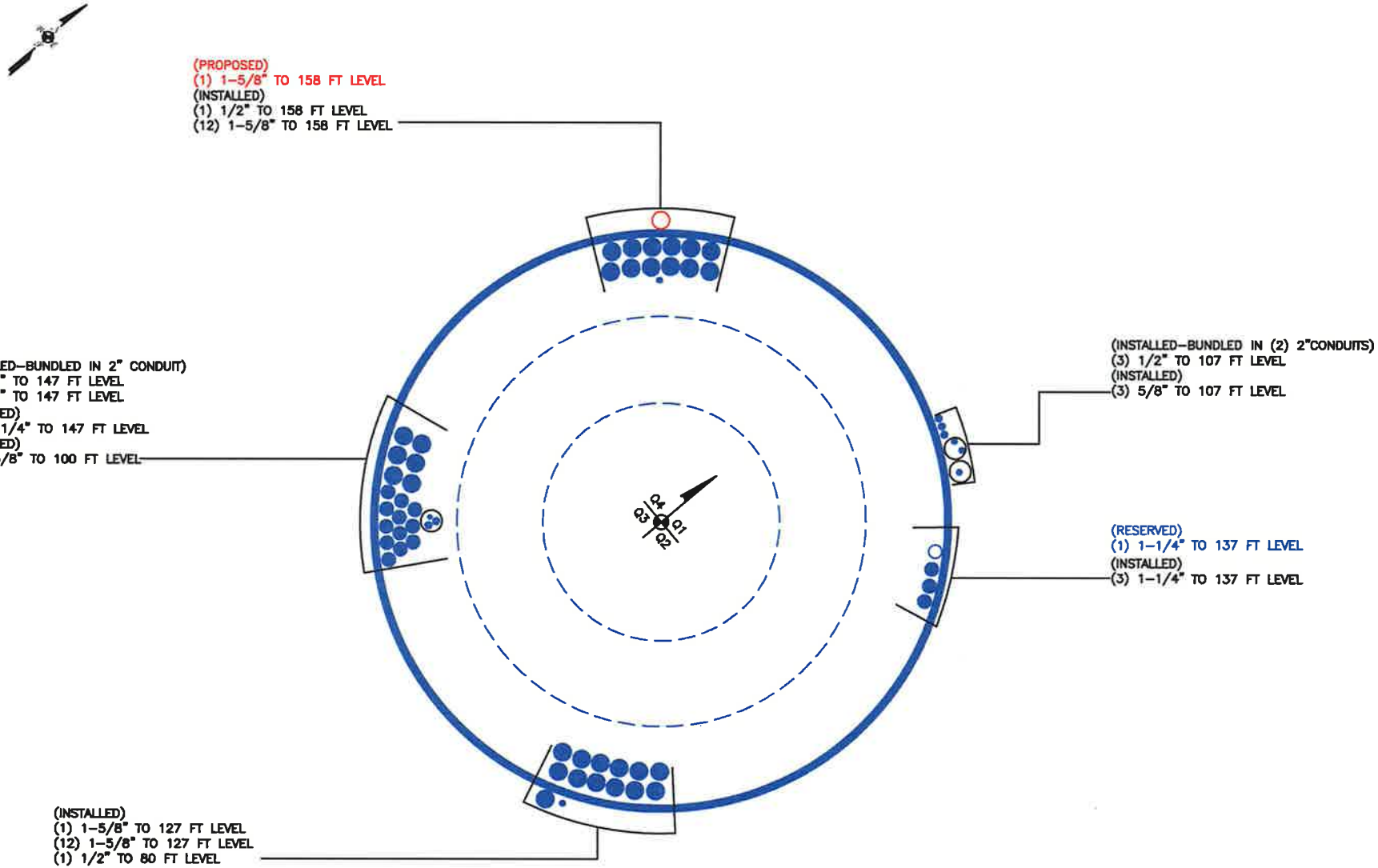
Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	160 - 158.211	TP29.77x21.65x0.25	0.20	0.011	26.000	0.001	0.00	0.000	26.000	0.000
	158.211 - 156.421		8.11	0.455	26.000	0.036	0.14	0.008	26.000	0.000
	156.421 - 154.632		8.31	0.458	26.000	0.036	0.14	0.008	26.000	0.000
	154.632 - 152.842		8.52	0.462	26.000	0.036	0.15	0.008	26.000	0.000
	152.842 - 151.053		8.73	0.466	26.000	0.036	0.15	0.008	26.000	0.000
	151.053 - 149.263		8.94	0.469	26.000	0.037	0.16	0.008	26.000	0.000
	149.263 - 147.474		9.15	0.473	26.000	0.037	0.16	0.008	26.000	0.000
	147.474 - 145.684		15.12	0.770	26.000	0.060	0.21	0.010	26.000	0.000
	145.684 - 143.895		15.34	0.769	26.000	0.060	0.21	0.010	26.000	0.000
	143.895 - 142.105		15.55	0.768	26.000	0.060	0.21	0.009	26.000	0.000
	142.105 - 140.316		15.77	0.767	26.000	0.060	0.20	0.009	26.000	0.000
	140.316 - 138.526		16.00	0.767	26.000	0.060	0.20	0.008	26.000	0.000
	138.526 - 136.737		21.77	1.029	26.000	0.082	4.47	0.186	26.000	0.007
	136.737 - 134.947		21.99	1.025	26.000	0.080	4.47	0.181	26.000	0.007
	134.947 - 133.158		22.22	1.021	26.000	0.080	4.47	0.176	26.000	0.007
	133.158 - 131.368		22.44	1.017	26.000	0.079	4.48	0.172	26.000	0.007
	131.368 - 129.579		22.67	1.013	26.000	0.079	4.48	0.167	26.000	0.006
	129.579 - 127.789		22.90	1.010	26.000	0.079	4.49	0.163	26.000	0.006
	127.789 - 126		25.86	1.125	26.000	0.088	4.49	0.159	26.000	0.006
	126 - 121.33		11.21	0.472	26.000	0.038	1.80	0.059	26.000	0.002
L2	126 - 121.33	TP33.2242x28.289x0.375	15.32	0.439	26.000	0.036	2.52	0.058	26.000	0.002
	121.33 - 120.284		26.67	0.759	26.000	0.060	4.32	0.098	26.000	0.004
	120.284 - 119.238		26.81	0.757	26.000	0.060	4.32	0.096	26.000	0.004
	119.238 - 118.192		26.95	0.755	26.000	0.059	4.32	0.095	26.000	0.004
	118.192 - 117.146		27.09	0.754	26.000	0.059	4.32	0.094	26.000	0.004
	117.146 - 116.099		27.24	0.752	26.000	0.059	4.32	0.092	26.000	0.004
	116.099 - 115.053		27.38	0.750	26.000	0.059	4.32	0.091	26.000	0.003
	115.053 - 114.007		27.52	0.749	26.000	0.059	4.32	0.090	26.000	0.003
	114.007 - 112.961		27.67	0.748	26.000	0.059	4.33	0.088	26.000	0.003
	112.961 - 111.915		27.81	0.746	26.000	0.059	4.33	0.087	26.000	0.003
	111.915 - 110.869		27.96	0.745	26.000	0.059	4.33	0.086	26.000	0.003
	110.869 - 109.823		28.30	0.748	26.000	0.058	4.33	0.085	26.000	0.003
	109.823 - 108.777		28.44	0.747	26.000	0.059	4.33	0.084	26.000	0.003
	108.777 - 107.731		28.59	0.746	26.000	0.059	4.34	0.083	26.000	0.003
	107.731 - 106.684		30.04	0.778	26.000	0.061	4.34	0.081	26.000	0.003
	106.684 - 105.638		30.19	0.777	26.000	0.061	4.31	0.080	26.000	0.003
	105.638 - 104.592		30.34	0.775	26.000	0.061	4.32	0.079	26.000	0.003
	104.592 - 103.546		30.49	0.774	26.000	0.061	4.32	0.078	26.000	0.003
	103.546 - 102.5		30.64	0.772	26.000	0.061	4.32	0.077	26.000	0.003
L3	102.5 - 101.467	TP37.67x33.2242x0.5477	30.84	0.532	26.000	0.042	4.44	0.054	26.000	0.002
	101.467 - 100.433		30.99	0.531	26.000	0.041	4.45	0.053	26.000	0.002
	100.433 - 99.4		32.00	0.544	26.000	0.043	4.45	0.053	26.000	0.002
	99.4 - 98.3667		32.15	0.543	26.000	0.042	4.45	0.052	26.000	0.002
	98.3667 - 97.3333		32.30	0.542	26.000	0.042	4.46	0.051	26.000	0.002
	97.3333 - 96.3		32.44	0.541	26.000	0.042	4.46	0.051	26.000	0.002
	96.3 - 95.2667		32.59	0.541	26.000	0.042	4.46	0.050	26.000	0.002
	95.2667 - 94.2333		32.75	0.540	26.000	0.042	4.47	0.050	26.000	0.002
	94.2333 - 93.2		32.90	0.539	26.000	0.042	4.47	0.049	26.000	0.002
	93.2 - 92.1667		33.05	0.538	26.000	0.042	4.47	0.048	26.000	0.002
	92.1667 - 91.1333		33.20	0.537	26.000	0.042	4.48	0.048	26.000	0.002
	91.1333 - 90.1		33.35	0.536	26.000	0.042	4.48	0.047	26.000	0.002
	90.1 - 89.0667		33.51	0.535	26.000	0.042	4.48	0.047	26.000	0.002
	89.0667 - 88.0333		33.66	0.534	26.000	0.042	4.49	0.046	26.000	0.002
	88.0333 - 87		33.81	0.534	26.000	0.042	4.49	0.046	26.000	0.002
	87 - 81.33		18.90	0.289	26.000	0.023	2.43	0.023	26.000	0.001
L4	87 - 81.33	TP39.8237x35.729x0.5	15.90	0.271	26.000	0.021	2.08	0.023	26.000	0.001
	81.33 - 80.2662		34.93	0.592	26.000	0.046	4.51	0.048	26.000	0.002
	80.2662 - 79.2023		35.34	0.595	26.000	0.047	4.74	0.050	26.000	0.002

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 $\frac{f_{vt}}{F_{vt}}$
	79.2023 - 78.1385		35.48	0.594	26.000	0.046	4.75	0.050	26.000	0.002
	78.1385 - 77.0746		35.63	0.593	26.000	0.046	4.75	0.049	26.000	0.002
	77.0746 - 76.0108		35.77	0.592	26.000	0.046	4.75	0.049	26.000	0.002
	76.0108 - 74.9469		35.92	0.591	26.000	0.046	4.76	0.048	26.000	0.002
	74.9469 - 73.8831		36.07	0.590	26.000	0.046	4.76	0.048	26.000	0.002
	73.8831 - 72.8192		36.22	0.589	26.000	0.046	4.76	0.047	26.000	0.002
	72.8192 - 71.7554		36.36	0.588	26.000	0.046	4.77	0.047	26.000	0.002
	71.7554 - 70.6915		36.51	0.587	26.000	0.046	4.77	0.046	26.000	0.002
	70.6915 - 69.6277		36.66	0.586	26.000	0.046	4.77	0.046	26.000	0.002
	69.6277 - 68.5638		36.81	0.585	26.000	0.046	4.78	0.045	26.000	0.002
	68.5638 - 67.5		36.96	0.584	26.000	0.046	4.78	0.045	26.000	0.002
L5	67.5 - 66.4737	TP45.3x39.8237x0.6955	37.09	0.421	26.000	0.033	4.79	0.032	26.000	0.001
	66.4737 - 65.4474		37.23	0.420	26.000	0.033	4.79	0.032	26.000	0.001
	65.4474 - 64.4211		37.37	0.420	26.000	0.033	4.79	0.031	26.000	0.001
	64.4211 - 63.3947		37.51	0.419	26.000	0.033	4.80	0.031	26.000	0.001
	63.3947 - 62.3684		37.66	0.418	26.000	0.033	4.80	0.031	26.000	0.001
	62.3684 - 61.3421		37.80	0.418	26.000	0.033	4.80	0.030	26.000	0.001
	61.3421 - 60.3158		37.94	0.417	26.000	0.033	4.81	0.030	26.000	0.001
	60.3158 - 59.2895		38.08	0.416	26.000	0.033	4.81	0.030	26.000	0.001
	59.2895 - 58.2632		38.22	0.416	26.000	0.032	4.82	0.030	26.000	0.001
	58.2632 - 57.2368		38.36	0.415	26.000	0.032	4.82	0.029	26.000	0.001
	57.2368 - 56.2105		38.51	0.414	26.000	0.032	4.82	0.029	26.000	0.001
	56.2105 - 55.1842		38.65	0.414	26.000	0.032	4.83	0.029	26.000	0.001
	55.1842 - 54.1579		38.79	0.413	26.000	0.032	4.83	0.028	26.000	0.001
	54.1579 - 53.1316		38.93	0.413	26.000	0.032	4.83	0.028	26.000	0.001
	53.1316 - 52.1053		39.08	0.412	26.000	0.032	4.84	0.028	26.000	0.001
	52.1053 - 51.0789		39.22	0.411	26.000	0.032	4.84	0.028	26.000	0.001
	51.0789 - 50.0526		39.37	0.411	26.000	0.032	4.85	0.027	26.000	0.001
	50.0526 - 49.0263		39.51	0.410	26.000	0.032	4.85	0.027	26.000	0.001
	49.0263 - 48		39.66	0.410	26.000	0.032	4.85	0.027	26.000	0.001
	48 - 41.42		20.71	0.207	26.000	0.016	2.46	0.013	26.000	0.000
L6	48 - 41.42	TP47.4339x42.918x0.7427	20.05	0.192	26.000	0.015	2.43	0.012	26.000	0.000
	41.42 - 40.3543		40.85	0.390	26.000	0.030	4.88	0.025	26.000	0.001
	40.3543 - 39.2886		40.98	0.389	26.000	0.030	4.89	0.024	26.000	0.001
	39.2886 - 38.2229		41.11	0.389	26.000	0.030	4.89	0.024	26.000	0.001
	38.2229 - 37.1571		41.24	0.388	26.000	0.030	4.90	0.024	26.000	0.001
	37.1571 - 36.0914		41.37	0.387	26.000	0.030	4.90	0.024	26.000	0.001
	36.0914 - 35.0257		41.49	0.386	26.000	0.030	4.90	0.024	26.000	0.001
	35.0257 - 33.96		41.62	0.386	26.000	0.030	4.91	0.023	26.000	0.001
	33.96 - 32.8943		41.75	0.385	26.000	0.030	4.91	0.023	26.000	0.001
	32.8943 - 31.8286		41.88	0.384	26.000	0.030	4.91	0.023	26.000	0.001
	31.8286 - 30.7629		42.01	0.384	26.000	0.030	4.92	0.023	26.000	0.001
	30.7629 - 29.6971		42.14	0.383	26.000	0.030	4.92	0.023	26.000	0.001
	29.6971 - 28.6314		42.27	0.382	26.000	0.030	4.93	0.022	26.000	0.001
	28.6314 - 27.5657		42.40	0.382	26.000	0.030	4.93	0.022	26.000	0.001
	27.5657 - 26.5		42.53	0.381	26.000	0.030	4.93	0.022	26.000	0.001
L7	26.5 - 25.175	TP53x47.4339x0.7006	42.69	0.403	26.000	0.031	4.94	0.023	26.000	0.001
	25.175 - 23.85		42.85	0.402	26.000	0.031	4.94	0.023	26.000	0.001
	23.85 - 22.525		43.01	0.401	26.000	0.031	4.95	0.022	26.000	0.001
	22.525 - 21.2		43.16	0.400	26.000	0.031	4.95	0.022	26.000	0.001
	21.2 - 19.875		43.32	0.399	26.000	0.031	4.96	0.022	26.000	0.001
	19.875 - 18.55		43.48	0.398	26.000	0.031	4.96	0.022	26.000	0.001
	18.55 - 17.225		43.64	0.397	26.000	0.031	4.97	0.022	26.000	0.001
	17.225 - 15.9		43.79	0.396	26.000	0.031	4.97	0.021	26.000	0.001
	15.9 - 14.575		43.95	0.396	26.000	0.031	4.98	0.021	26.000	0.001
	14.575 - 13.25		44.11	0.395	26.000	0.031	4.98	0.021	26.000	0.001
	13.25 - 11.925		44.27	0.394	26.000	0.031	4.99	0.021	26.000	0.001
	11.925 - 10.6		44.43	0.393	26.000	0.031	4.99	0.020	26.000	0.001
	10.6 - 9.275		44.58	0.392	26.000	0.031	4.99	0.020	26.000	0.001

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 $\frac{f_{vt}}{F_{vt}}$
	9.275 - 7.95		44.74	0.392	26.000	0.031	5.00	0.020	26.000	0.001
	7.95 - 6.625		44.90	0.391	26.000	0.031	5.00	0.020	26.000	0.001
	6.625 - 5.3		45.06	0.390	26.000	0.030	5.01	0.020	26.000	0.001
	5.3 - 3.975		45.22	0.389	26.000	0.030	5.01	0.019	26.000	0.001
	3.975 - 2.65		45.38	0.389	26.000	0.030	5.02	0.019	26.000	0.001
	2.65 - 1.325		45.54	0.388	26.000	0.030	5.02	0.019	26.000	0.001
	1.325 - 0		45.70	0.387	26.000	0.030	5.03	0.019	26.000	0.001

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 806939 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Pole (L3)	92.1%	Pass
Mod (M2)	89.5%	Pass

NHV 2071 143137 (BU 806939)
TEP #: 51192.28170
Analysis: AAA 1/8/2015
Check: JSC 1/8/2015

Monopole Reinforcement_v1.3.6 - TIA-222-F

Mod #	Modification Type	Termination Length (ft)	Bot. Elevation (ft)	Top Elevation (ft)	Termination Length (ft)	Modification Location (° or Flat/Point #)	Location (F/P)	Lateral Offset (in)
1a	CCI-65FP-085125	0.00	0.00	30.50		8	Flats	0.00
1b	CCI-65FP-085125	0.00	0.00	30.50		3 11	Flats	0.00
2	CCI-65FP-065125		23.50	50.50		7	Flats	0.00
3	CCI-65FP-065125	-4.00	30.50	50.50		3 11	Flats	0.00
4	CCI-65FP-065125	-3.00	50.50	70.50		3 7 11	Flats	0.00
5	CCI-65FP-060100		84.75	104.75		2 6 10	Flats	0.00

MODIFICATION PROPERTIES

#	Modification	Default Termination (ft)	Stitch (in)	k	Drill Hole (in)	Bolt/Weld Capacity (k)	A_G (in²)	F_Y (ksi)	F_U (ksi)
1	CCI-65FP-085125	4.00	17.00	0.80	1.1875	30.0	10.63	65.0	80.0
2	CCI-65FP-065125	3.00	19.00	0.80	1.1875	30.0	8.13	65.0	80.0
5	CCI-65FP-060100	2.25	16.00	0.80	1.1875	30.0	6.00	65.0	80.0

Tower Engineering Professionals, Inc.
326 Tryon Road | Raleigh, NC 27603-3530 | Office: (919) 661-6351 | Fax: (919) 661-6350 | www.tepgroup.net

Pole (L3)	92.1%	Pass
Mod (M2)	89.5%	Pass

NHV 2071 143137 (BU 806939)

TEP #: 51192.2817

Analysis: AAA 1/8/2015

Check: JSC 1/8/2015

Monopole Reinforcement_v1.3.6 - TIA-222-F - Capacities

Section No.	Elevation (ft)	Type	Size	Critical Element	P (k)	Pa (k)	% Capacity	Pass/Fail
L1	160.00-121.33	Pole	TP29.77×21.65×0.2500	1	Note 1	Note 1	79.2	Pass
L2	126.00-81.33	Pole	TP37.67×28.29×0.3750	2	Note 1	Note 1	87.9	Pass
L3	87.00-41.42	Pole	TP45.30×35.73×0.5000	3	Note 1	Note 1	92.1	Pass
L4	48.00-0.00	Pole	TP53.00×42.92×0.5625	4	Note 1	Note 1	82.9	Pass
M1b	30.50-0.00	Mod (Ex)	CCI-65FP-085125	1	Note 1	Note 1	87.5	Pass
M2	50.50-23.50	Mod (Ex)	CCI-65FP-065125	2	Note 1	Note 1	89.5	Pass
M3	50.50-30.50	Mod (Ex)	CCI-65FP-065125	3	Note 1	Note 1	89.5	Pass
M4	70.50-50.50	Mod (Ex)	CCI-65FP-065125	4	Note 1	Note 1	87.2	Pass
M5	104.75-84.75	Mod (Ex)	CCI-65FP-060100	5	Note 1	Note 1	88.0	Pass

	Summary	
Pole (L3)	92.1	Pass
Mod (M2)	89.5	Pass
RATING =	**92.1**	**Pass**

*Note 1: See additional documentation in following sheets for details.

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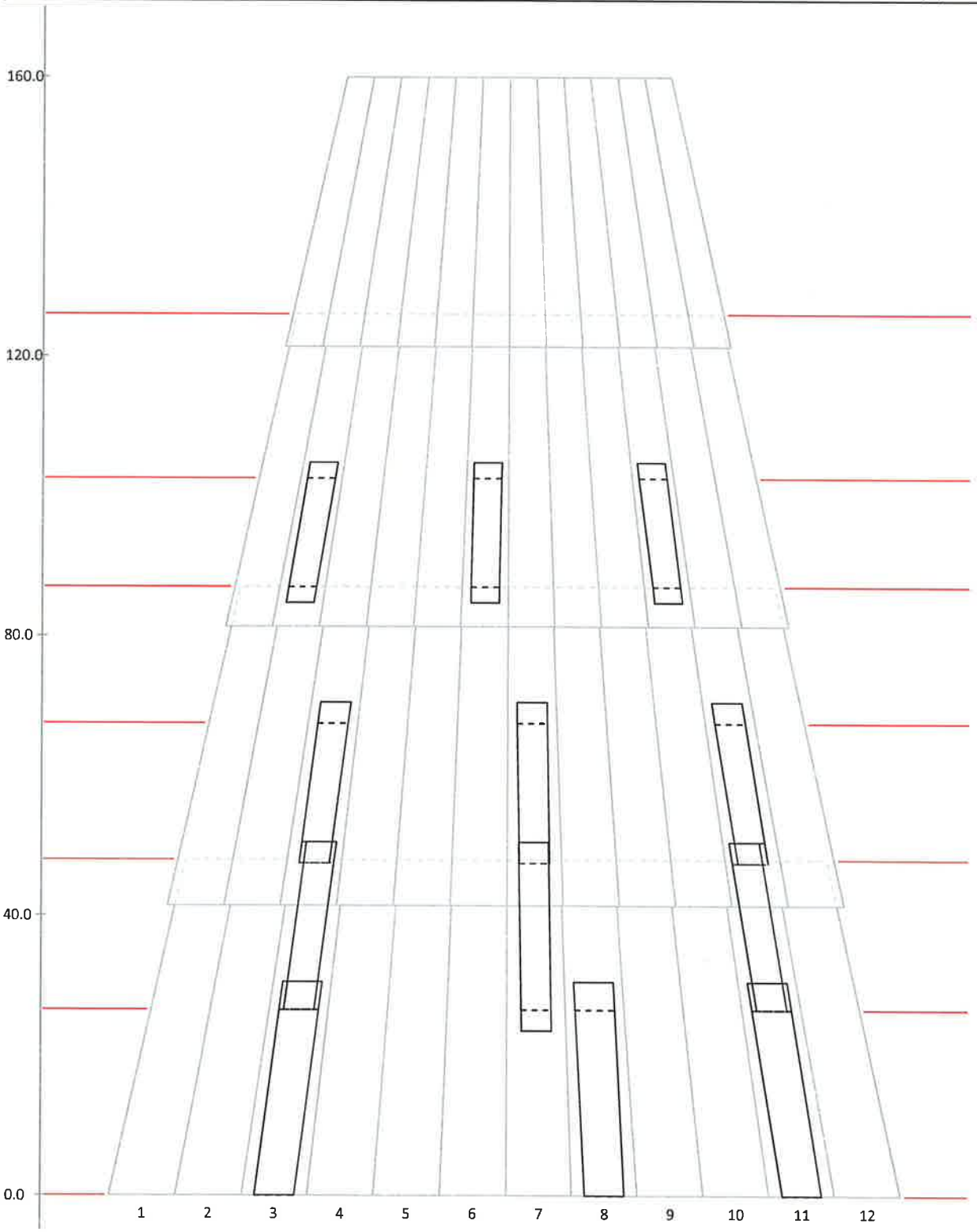
Reinforcement Layout



Elevation: 0.00-ft

Loads	
Axial:	58.1 k
Moment:	5,195.2 k·ft
Shear:	45.7 k
Torsion:	5.0 k·ft

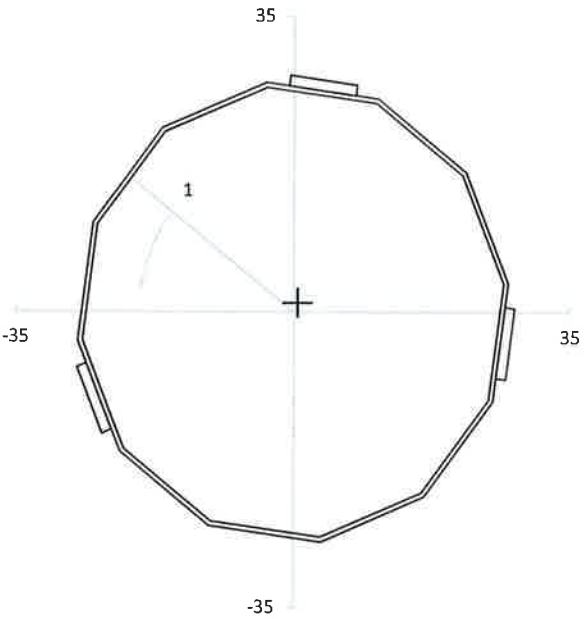
Pole Info	
OD:	53.00 in
t:	0.5625 in
Pole A_G:	94.98 in^2
Pole I_G:	33,334.2 in^4

Equivalent Loads to Pole	
Axial:	43.5 k
Moment:	4,174.5 k·ft
Shear:	34.2 k
Torsion:	5.0 k·ft

Controlling	
Angle:	307.80°
I_{CONT}:	42,239.1 in^4
A_G:	126.85 in^2

Shear Flow	
Controlling Mod:	2
q:	0.296 k/in
Bolt/Weld Cap:	30.0 k/bolt
Max Spacing:	101.19 in
Stitch:	17.00 in
Capacity:	16.8%

Minimum	
Angle:	149.35°
I_{MIN}:	41,192.3 in^4
t_{EFF}:	0.7006 in



Pole Segment: L4, F_Y = 65 ksi

POLE CAPACITY

Angle (°)	Y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	F_A (ksi)	F_B (ksi)	Capacity
317.95	28.40	41495.5	0.458	42.675	52.000	52.000	82.9%

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	Y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	F_T (ksi)	F_C (ksi)	Capacity
1a	1	198.00	26.47	45563.3	0.458	36.219	44.041	45.490	83.3%
1b	1	62.80	27.96	48921.2	0.458	35.636	44.041	45.490	82.0%
1b	2	307.80	25.79	42239.1	0.458	38.064	44.041	45.490	87.5%

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Elevation: 26.50-ft

Loads	
Axial:	45.0 k
Moment:	4,026.9 k·ft
Shear:	42.5 k
Torsion:	4.9 k·ft

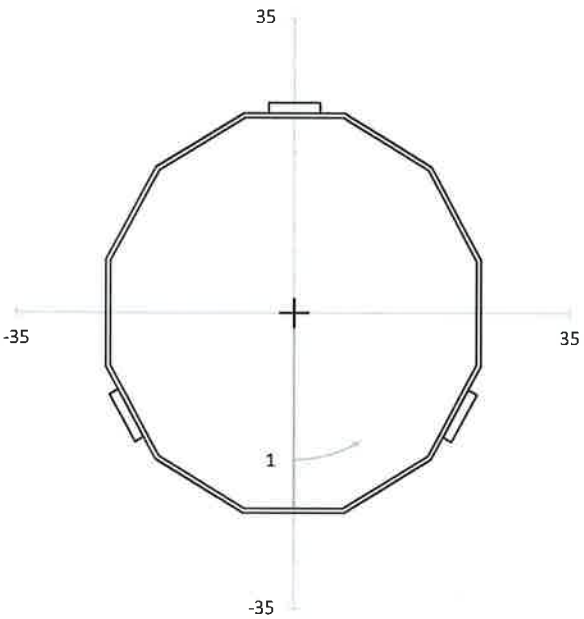
Equivalent Loads to Pole	
Axial:	35.0 k
Moment:	3,085.2 k·ft
Shear:	33.0 k
Torsion:	4.9 k·ft

Shear Flow	
Controlling Mod:	3
q:	0.271 k/in
Bolt/Weld Cap:	30.0 k/bolt
Max Spacing:	110.81 in
Stitch:	19.00 in
Capacity:	17.1%

Pole Info	
OD:	47.43 in
t:	0.5625 in
Pole A_G:	84.90 in^2
Pole I_G:	23,806.1 in^4

Controlling	
Angle:	180.00°
I_G:	31,072.0 in^4
A_G:	109.27 in^2

Minimum	
Angle:	2.05°
I_{MIN}:	31,072.0 in^4
t_{EFF}:	0.7427 in



Pole Segment: L4, F_Y = 65 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	F_A (ksi)	F_B (ksi)	Capacity
165.00	24.57	31072.0	0.412	38.212	52.000	52.000	74.3%

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	F_T (ksi)	F_C (ksi)	Capacity
2	1	180.00	24.34	31072.0	0.412	37.856	42.735	43.077	89.5%
3	1	60.00	24.34	31072.0	0.412	37.856	42.735	43.077	89.5%
3	2	300.00	24.34	31072.0	0.412	37.856	42.735	43.077	89.5%

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Elevation: 48.00-ft

Loads	
Axial:	34.1 k
Moment:	3,141.8 k-ft
Shear:	39.7 k
Torsion:	4.9 k-ft

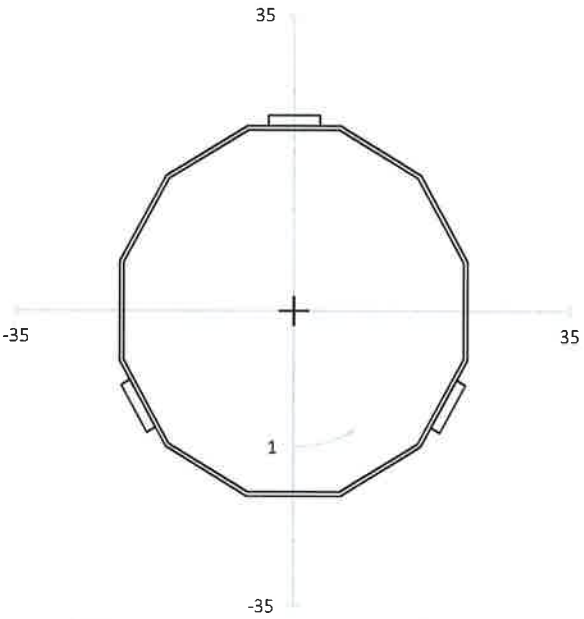
Equivalent Loads to Pole	
Axial:	25.3 k
Moment:	2,289.6 k-ft
Shear:	29.4 k
Torsion:	4.9 k-ft

Shear Flow	
Controlling Mod:	5
q:	0.315 k/in
Bolt/Weld Cap:	30.0 k/bolt
Max Spacing:	95.15 in
Stitch:	19.00 in
Capacity:	20.0%

Pole Info	
OD:	43.92 in
t:	0.5000 in
Pole A_G:	69.90 in^2
Pole I_G:	16,820.2 in^4

Controlling	
Angle:	180.00°
I_G:	23,080.8 in^4
A_G:	94.28 in^2

Minimum	
Angle:	0.00°
I_{MIN}:	23,080.8 in^4
t_{EFF}:	0.6955 in



Pole Segment: L3, F_Y = 65 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	F_A (ksi)	F_B (ksi)	Capacity
165.00	22.75	23080.8	0.361	37.161	52.000	52.000	72.2%

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	F_T (ksi)	F_C (ksi)	Capacity
4	1	60.00	22.58	23080.8	0.361	36.890	42.735	43.077	87.2%
4	2	180.00	22.58	23080.8	0.361	36.890	42.735	43.077	87.2%
4	3	300.00	22.58	23080.8	0.361	36.890	42.735	43.077	87.2%

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Elevation: 67.50-ft

Loads	
Axial:	26.7 k
Moment:	2,395.2 k-ft
Shear:	37.0 k
Torsion:	4.8 k-ft

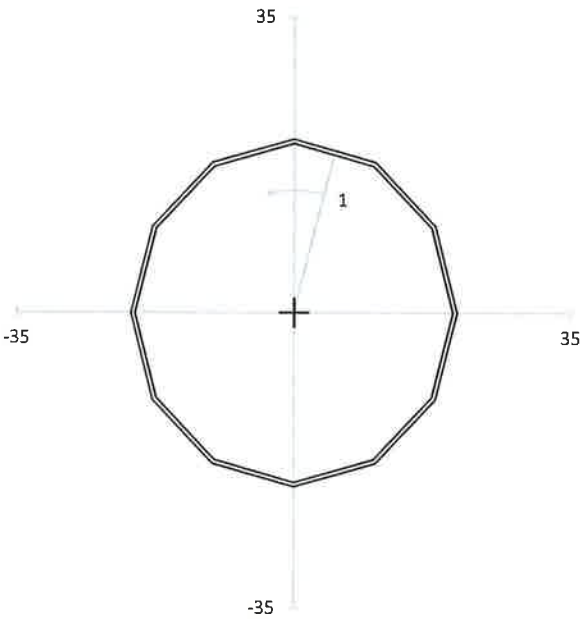
Equivalent Loads to Pole	
Axial:	26.7 k
Moment:	2,395.2 k-ft
Shear:	37.0 k
Torsion:	4.8 k-ft

Shear Flow N/A

Pole Info	
OD:	39.82 in
t:	0.5000 in
Pole A_G:	63.31 in^2
Pole I_G:	12,496.1 in^4

Controlling	
Angle:	15.00°
I_G:	12,496.1 in^4
A_G:	63.31 in^2

Minimum	
Angle:	0.00°
I_{MIN}:	12,496.1 in^4
t_{EFF}:	0.5000 in



Pole Segment: L3, F_Y = 65 ksi

POLE CAPACITY

Angle (°)	Y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	F_A (ksi)	F_B (ksi)	Capacity
15.00	20.63	12496.1	0.421	47.449	52.000	52.000	92.1%

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	Y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	F_T (ksi)	F_C (ksi)	Capacity

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Elevation: 87.00-ft

Loads	
Axial:	19.8 k
Moment:	1,703.4 k·ft
Shear:	33.8 k
Torsion:	4.5 k·ft

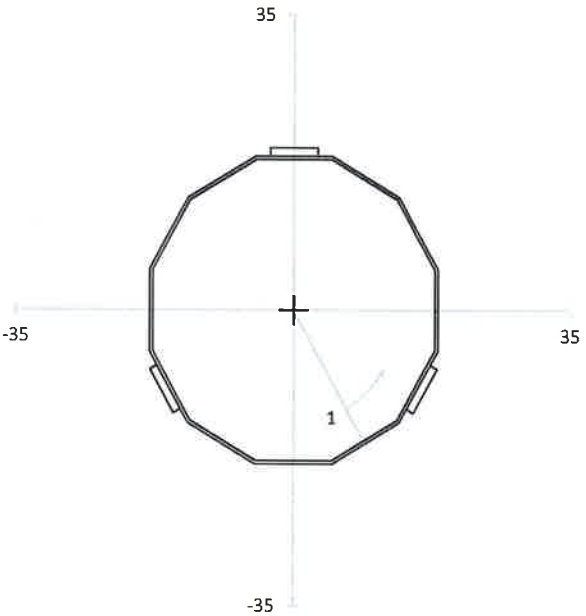
Pole Info	
OD:	36.48 in
t:	0.3750 in
Pole A_G:	43.60 in²
Pole I_G:	7,253.5 in⁴

Equivalent Loads to Pole	
Axial:	14.0 k
Moment:	1,183.3 k·ft
Shear:	23.9 k
Torsion:	4.5 k·ft

Controlling	
Angle:	150.00°
I_G:	10,441.8 in⁴
A_G:	61.60 in²

Shear Flow	
Controlling Mod:	6
q:	0.364 k/in
Bolt/Weld Cap:	30.0 k/bolt
Max Spacing:	82.39 in
Stitch:	16.00 in
Capacity:	19.4%

Minimum	
Angle:	139.60°
I_{MIN}:	10,441.8 in⁴
t_{EFF}:	0.5477 in



Pole Segment: L2, F_Y = 65 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in⁴)	σ_A (ksi)	σ_B (ksi)	F_A (ksi)	F_B (ksi)	Capacity
135.00	18.90	10441.8	0.322	36.992	52.000	52.000	71.8%

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	y_{CONT} (in)	I (in⁴)	σ_A (ksi)	σ_B (ksi)	F_T (ksi)	F_C (ksi)	Capacity
5	1	30.00	18.74	10441.8	0.322	36.685	42.057	42.222	88.0%
5	2	150.00	18.74	10441.8	0.322	36.685	42.057	42.222	88.0%
5	3	270.00	18.74	10441.8	0.322	36.685	42.057	42.222	88.0%

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Elevation: 102.50-ft

Loads	
Axial:	15.6 k
Moment:	1,199.3 k-ft
Shear:	30.6 k
Torsion:	4.3 k-ft

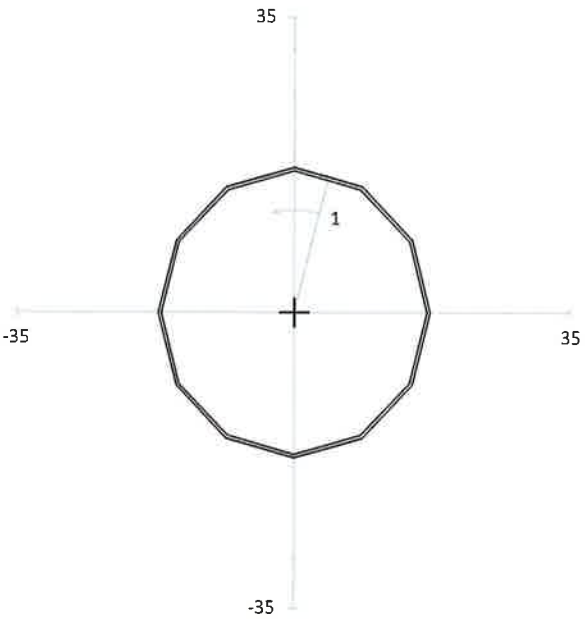
Equivalent Loads to Pole	
Axial:	15.6 k
Moment:	1,199.3 k-ft
Shear:	30.6 k
Torsion:	4.3 k-ft

Shear Flow N/A

Pole Info	
OD:	33.22 in
t:	0.3750 in
Pole A_G:	39.67 in^2
Pole I_G:	5,463.2 in^4

Controlling	
Angle:	15.00°
I_G:	5,463.2 in^4
A_G:	39.67 in^2

Minimum	
Angle:	0.00°
I_{MIN}:	5,463.2 in^4
t_{EFF}:	0.3750 in



Pole Segment: L2, F_Y = 65 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	F_A (ksi)	F_B (ksi)	Capacity
15.00	17.21	5463.2	0.393	45.335	52.000	52.000	87.9%

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	F_T (ksi)	F_C (ksi)	Capacity

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Elevation: 126.00-ft

Loads	
Axial:	10.4 k
Moment:	543.6 k-ft
Shear:	25.9 k
Torsion:	4.3 k-ft

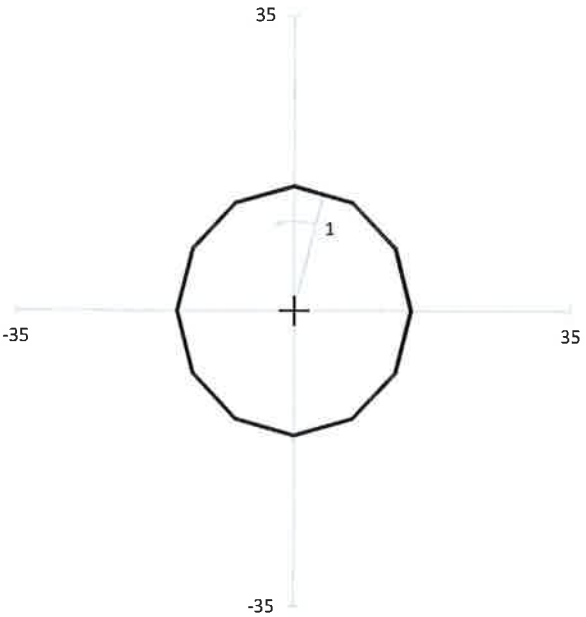
Pole Info	
OD:	28.79 in
t:	0.2500 in
Pole A_G:	22.97 in^2
Pole I_G:	2,388.4 in^4

Equivalent Loads to Pole	
Axial:	10.4 k
Moment:	543.6 k-ft
Shear:	25.9 k
Torsion:	4.3 k-ft

Controlling	
Angle:	15.00°
I_G:	2,388.4 in^4
A_G:	22.97 in^2

Shear Flow N/A

Minimum	
Angle:	0.00°
I_{MIN}:	2,388.4 in^4
t_{EFF}:	0.2500 in



Pole Segment: L1, F_Y = 65 ksi

POLE CAPACITY

Angle (°)	Y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	F_A (ksi)	F_B (ksi)	Capacity
15.00	14.91	2388.4	0.454	40.731	52.000	52.000	79.2%

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	Y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	F_T (ksi)	F_C (ksi)	Capacity

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Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *806939*
Site Name: *NHV 2071 143137*
App #: *274596 Rev. 2*

Pole Manufacturer:	*Other*

Reactions		
Moment:	5195	ft-kips
Axial:	58	kips
Shear:	46	kips

Anchor Rod Data		
Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	61.37	in

Plate Data		
Diam:	67.37	in
Thick:	3	in
Grade:	60	ksi
Single-Rod B-eff:	7.10	in

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	53	in
Thick:	0.563	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Results

		Rigid
Maximum Rod Tension:	166.9 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	85.6% **Pass**	

Base Plate Results Flexural Check

		Rigid
Base Plate Stress:	41.4 ksi	Service ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	69.1% **Pass**	Y.L. Length: 30.94

n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a

* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

TOWER ENGINEERING PROFESSIONALS

JOB:	NHV 2071 143137 (BU 806939)		
SHEET NUMBER:	1	OF	2
CALCULATED BY:	AAA	DATE	1/8/2015
CHECKED BY:	JSC	DATE	1/8/2015

Pad and Pier Foundation for Monopole - TIA-222-F

Q_a, ALLOWABLE SOIL PRESS. (ksf)	12.50
NET or GROSS	NET
SOIL DENSITY (pcf)	120

F'c (ksi)	4
F'y (ksi)	60

Base Reactions LC1: Maximum Wind

M, MOMENT (k-ft)	5195.0
P_t, TOTAL DOWNLOAD (k)	58.0
H, HORIZONTAL SHEAR (k)	46.0

Base Reaction LC 2: Ice Wind + Ice

M (k-ft)	1304.0
P_t (k)	77.0
H (k)	11.0

Try:

L (ft.)	B (ft.)	t (ft.)	Soil depth to TOP of mat (ft.)	Soil depth to BOT. of mat (ft.)	Pier dia./width (ft.)	Pier Height, h (cu.ft.)	Pier Shape
30	30	3.5	6	9.5	7.00	6.50	Round

W_m, Weight of Mat (k) =	472.5
W_p, Weight of Pier (k) =	37.5
W_s, WEIGHT OF SOIL (k) =	620.3

Concrete Vol. (cu yd) 125.93

CHECK DESIGN CRITERIA

CHECK STABILITY:

	LC1	LC2		
Mst= P * (L/2) + (Vf+s * L/2) =	17824.7 k-ft	18109.7 k-ft		
Mot = M+H*(t+h) =	5655.0 k-ft	1414 k-ft		
SF =Mot/Mst =	3.15 > 1.5	12.81 > 1.5	**Capacity:**	**47.6%**

CHECK BEARING PRESSURE

	LC1	LC2		
P = P_t + Wf + Ws =	1188.3 k	1207.3 k		
e = M / P =	4.76 ft	1.17 ft		
L/6 =	5.00 ft	5.00 ft		
Width of Wedge, L' =	30.00 ft	30.00 ft		
0 Deg Wind: Qmax =	1.44 ksf	0.52 ksf		
45 Deg Wind: Qmax =	1.98 ksf	0.65 ksf	**Capacity:**	**15.9%**

TOWER ENGINEERING PROFESSIONALS

JOB:	NHV 2071 143137 (BU 806939)		
SHEET NUMBER:	2	OF	2
CALCULATED BY:	AAA	DATE	1/8/2015
CHECKED BY:	JSC	DATE	1/8/2015

CHECK ONE WAY SHEAR

Vu = 730.6 k
Vc = 1285.0 k

Capacity: 56.85%

CHECK TWO WAY SHEAR: PUNCHING + UNBALANCED MOMENT

v_u = 44.2 psi
φv_c = 189.7 psi

Capacity: 23.32%

CALCULATE REINFORCING REQUIRED

F'c = 4.0 ksi F'y = 60.0 ksi

Temp & Shrinkage reinforcing, $A_{s,\,temp}$ = 0.40 in^2/ft (ACI 318 Sec. 10.5.4)

BOTTOM REINFORCING

Bar Size = 11
Bar Spacing, c-c: 12.9
d = 36.9 in.
Mu= 1074.5 in-k/ft

φMn=0.9*As*Fy*d(1-0.59*As*Fy/(b*d*F'c))

Solution: As,req = 0.54 in^2/ft

Check, As = 1.45 in^2/ft

Capacity: 37.53%

TOP REINFORCING

Bar Size = 11
Bar Spacing, c-c: 12.9
d= 36.9 in.
Mu= 855.5 in-k/ft

φMn=0.9*As*Fy*d(1-0.59*As*Fy/(b*d*F'c))

Solution: As,req = 0.43 in^2/ft **As,req > As,t, use As,req**

Bar Spacing, c-c:

Check, As = 1.45 in^2/ft **Top Reinforcing O.K.**

Capacity: 29.82%

	PASS	PASS	NHV 2071 143137 (BU 806939)
Results Summary:	LC1	LC2	TEP #: 51192.28170
Soil Interaction:	N/A	N/A	Analysis: AAA 1/8/2015
Foundation Structural:	86.2%	21.5%	Check: JSC 1/8/2015

Drilled Caisson Tool - Input

Code Revisions: TIA-222-F ACI 318-05

Tower Type: Monopole

	LC1	LC2	
Moment:	5,264.00	1,320.50	kip-ft
Axial (download):	58.00	77.00	kip
Shear:	46.00	11.00	kip
Axial (uplift):			kip

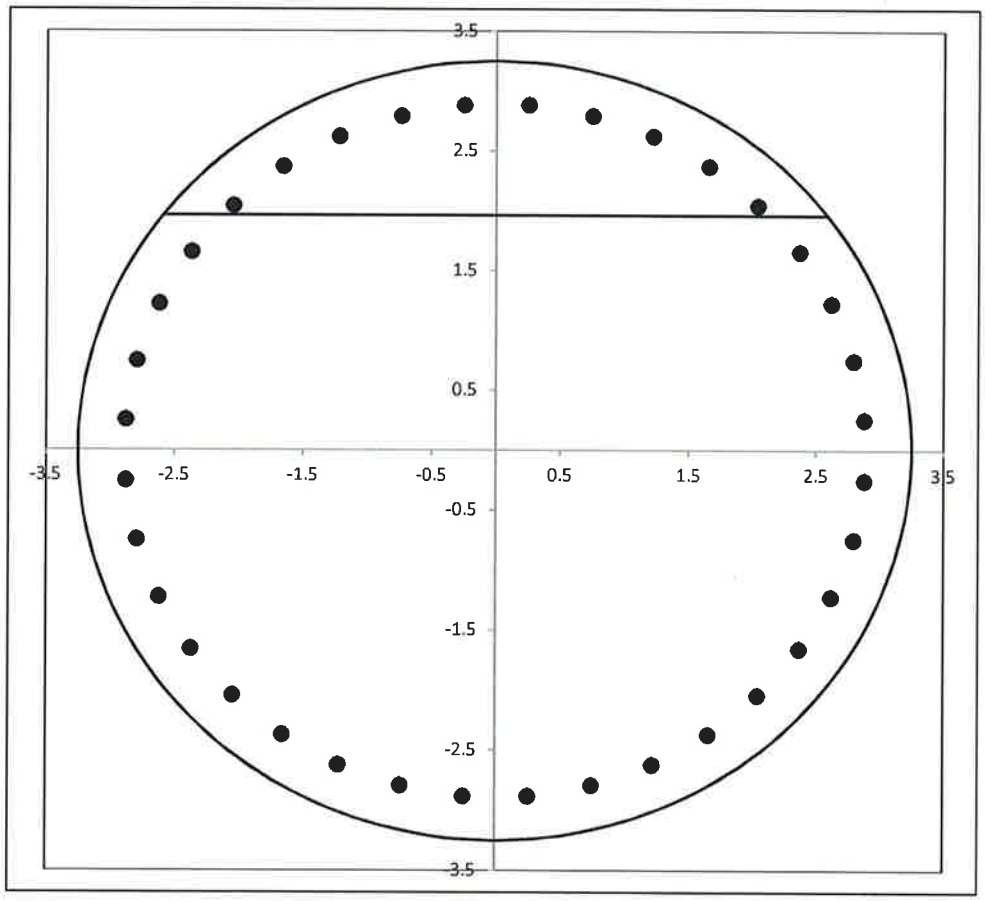
Shaft Information

Diameter:	6.50	ft
Projection:	0.50	ft
Caisson Length:	1.50	ft
f'c:	4.000	ksi
Max εc:	0.003	in/in

Cage 1 Reinforcement

Tie Bar Size:	5	*(fy = 60.0 ksi)*
Clear Cover to Tie:	3.00	*in (Cage Ø = 69.34in)*
Tie Bar Spacing:	12.00	in
Vertical Bar Size:	11	
Vertical Bar Quantity:	36	*(ρ =1.175%)*
fy:	60.0	ksi
E:	29,000	ksi

Reinforcement Capacity



		LC1	LC2	
	Vu =	59.8	59.8	kip
	Vc =	608.1	609.3	kip
fy,tie = 60.0	Vs =	228.0	228.0	kip
	ϕVn =	627.0	627.9	kip
	Capacity =	9.5%	9.5%	
		PASS	PASS	

		LC1	LC2	
	Mu =	6843.2	1716.7	kip-ft
	ϕMn =	7939.3	7989.9	kip-ft
	Capacity =	86.2%	21.5%	
		PASS	PASS	