Robinson + Cole

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Also admitted in Massachusetts

RECEIVED
JUL 31 2014
CONNECTICUT
SITING COUNCIL

EM-VER-089-130322
Lester Street, New Britain

July 29, 2014

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

Re: **Completion of Construction Activity**

Dear Ms. Bachman:

The purpose of this letter is to notify the Siting Council that construction activity associated with the Cellco Partnership d/b/a Verizon Wireless telecommunications facility modifications listed below has been completed.

EM-VER-083-130308 – 213 Court Street, Middletown, Connecticut
EM-VER-089-130308 – 200 Stanley Street, New Britain, Connecticut
EM-VER-137-130314 – 7 Broadway Avenue Ext., Stonington, Connecticut
EM-VER-148-130312 – 20 Alexander Drive, Wallingford, Connecticut
EM-VER-089-130322 – Lester Street, New Britain, Connecticut
EM-VER-110-130325 – 21-35 East Main Street (a/k/a 1 Central Square), Plainville, Connecticut
EM-VER-155-130322 – 1358 New Britain Avenue, West Hartford, Connecticut
EM-VER-084-130411 – 26185 Research Drive, Milford, Connecticut
EM-VER-104-130401 – 2 Hinkley Hill Road, Norwich, Connecticut
EM-VER-148-130408 – 90 North Plains Industrial Road, Wallingford, Connecticut
EM-VER-159-130411 – 250 Silas Deane Highway, Wethersfield, Connecticut
EM-VER-146-130416 – 197 South Street, Vernon, Connecticut
EM-VER-076-130425 – 252 Ridge Road, Madison, Connecticut
EM-VER-077-130425 – 53 Slater Street, Manchester, Connecticut
EM-VER-129-130425 – 400 Main Street, Somers, Connecticut
EM-VER-052-130430 – Town Farm Road, Farmington, Connecticut
EM-VER-080-130430 – 38 Elm Street, Meriden, Connecticut

EM-VER-014-130509 – 850 West Main Street, Branford, Connecticut
EM-VER-025-130506 – 705 West Johnson Avenue, Cheshire, Connecticut
EM-VER-041-130524 – 135 Henry Hill Road, East Haddam, Connecticut
EM-VER-115-130524 – 54 Waterbury Road, Prospect, Connecticut
EM-VER-156-130524 – 668 Jones Hill Road, West Haven, Connecticut
EM-VER-027-130603 – 48 Cow Hill Road, Clinton, Connecticut
EM-VER-148-130603 – 945 East Center Street, Wallingford, Connecticut

If you have any questions or need any additional information regarding this facility please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Copy to:
Sandy M. Carter

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

April 23, 2013

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103

RE: **EM-VER-089-130322** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at Lester Street (a/k/a Coccomo Circle), New Britain, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated March 20, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

L Roberts

Linda Roberts
Executive Director

LR/CDM/jb

c: The Honorable Timothy E. O'Brien, Jr., Mayor, City of New Britain
Norman Wnuk, Director of License Permit & Inspection/ Chief Bldg. Official, City of New Britain
Crown Castle

ROBINSON & COLE LLP

KENNETH C. BALDWIN

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Also admitted in Massachusetts

EM-VER-089-130322

March 20, 2013

Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Antenna Swap**
Lester Street (a/k/a Coccomo Circle), New Britain, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 145-foot level of the existing 190-foot tower at the above-referenced address. The tower and underlying property are owned by Crown Castle. The Council approved Cellco's shared use of this tower in 2001. Cellco now intends to replace six (6) of its existing antennas with three (3) model BXA-80063-6BF cellular antennas; two (2) model BXA-171063-12CF AWS antennas; and one (1) model BXA-171063-8BF AWS antenna, at the same level on the monopole tower. Cellco also intends to install six (6) remote radio heads ("RRHs") behind its antennas and one (1) HYBRIFLEX™ fiber cable on the inside of the tower. Attached behind Tab 1 are the specifications for the replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Timothy O'Brien, Mayor for the City of New Britain.

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 located at the 145-foot level of the 190-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 modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative General Power Density table for Cellco's modified facility is included behind Tab 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 attached behind Tab 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:
Timothy O'Brien, Mayor
Sandy M. Carter

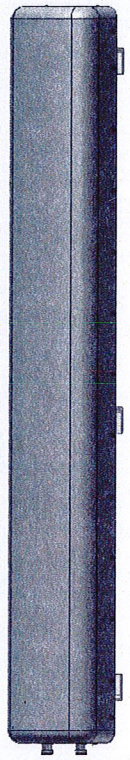
Amphenol ANTENNA SOLUTIONS

BXA-80063-6BF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

Replace "X" with desired electrical downtilt.

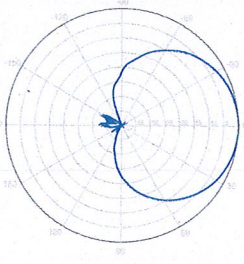
Antenna is also available with N connector(s). Replace "EDIN" with "N" in the model number when ordering.



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 m^2	Side: 0.24 m^2	Front: 5.3 ft^2	Side: 2.5 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 733 N	Side: 386 N	Front: 164 lbf	Side: 88 lbf

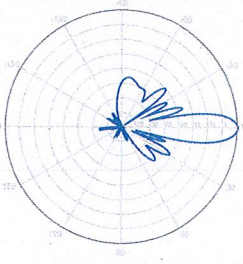
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-80063-6BF-EDIN-X-FP		

BXA-80063-6BF-EDIN-X



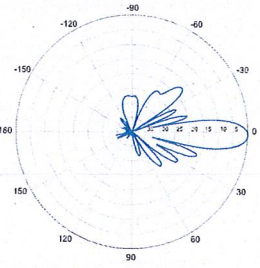
Horizontal

BXA-80063-6BF-EDIN-0



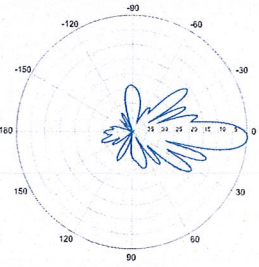
0° | Vertical

BXA-80063-6BF-EDIN-2



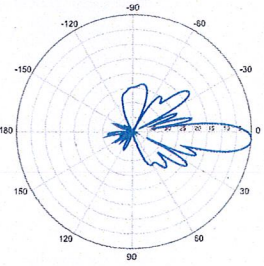
2° | Vertical

BXA-80063-6BF-EDIN-3



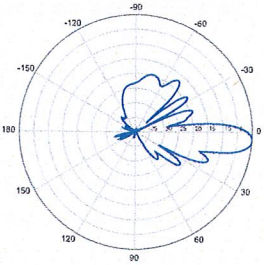
3° | Vertical

BXA-80063-6BF-EDIN-4



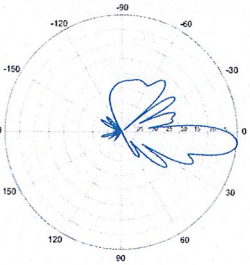
4° | Vertical

BXA-80063-6BF-EDIN-5



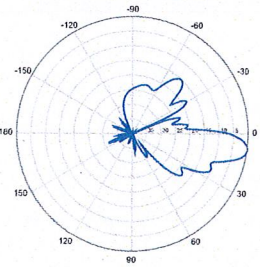
5° | Vertical

BXA-80063-6BF-EDIN-6



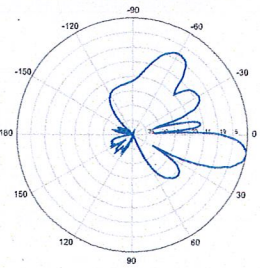
6° | Vertical

BXA-80063-6BF-EDIN-8



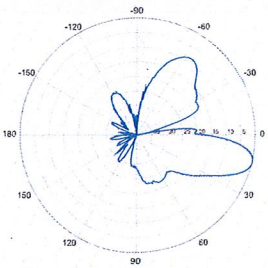
8° | Vertical

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-171063-12CF-EDIN-X

X-Pol | FET Panel | 63° | 19.0 dBi

Replace "X" with desired electrical downtilt.

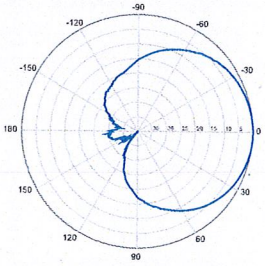
Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	16.1 dBd / 18.2 dBi	16.5 dBd / 18.6 dBi	16.9 dBd / 19.0 dBi
Electrical downtilt (X)	0, 2, 5		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)		
Operating temperature	-40° to +60° C / -40° to +140° F		

Mechanical Characteristics		
Dimensions Length x Width x Depth	1842 x 154 x 105 mm	72.5 x 6.1 x 4.1 in
Depth with z-brackets	133 mm	5.2 in
Weight without mounting brackets	5.8 kg	12.8 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.28 m^2 Side: 0.19 m^2	Front: 3.1 ft^2 Side: 2.1 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N	Front: 103 lbf Side: 68 lbf

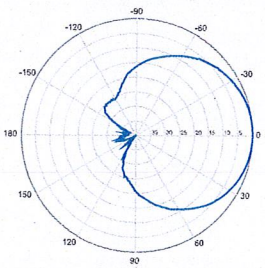
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-12CF-EDIN-X-FP		

BXA-171063-12CF-EDIN-X



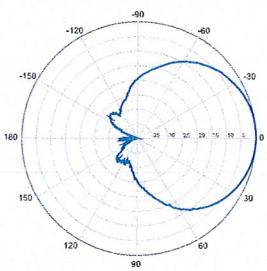
Horizontal | 1710-1880 MHz

BXA-171063-12CF-EDIN-X



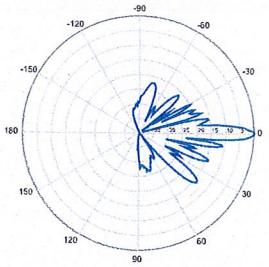
Horizontal | 1850-1990 MHz

BXA-171063-12CF-EDIN-X



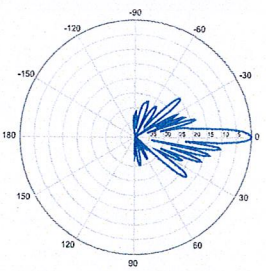
Horizontal | 1920-2170 MHz

BXA-171063-12CF-EDIN-0



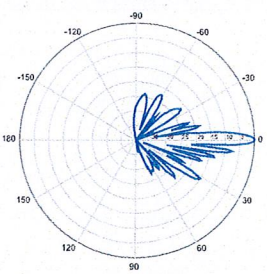
0° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-0

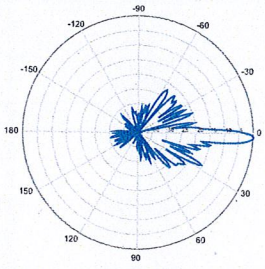


0° | Vertical | 1920-2170 MHz

BXA-171063-12CF-EDIN-X

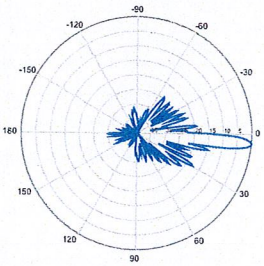
X-Pol | FET Panel | 63° | 19.0 dBi

BXA-171063-12CF-EDIN-2



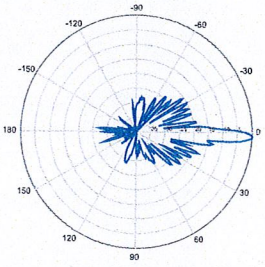
2° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-5



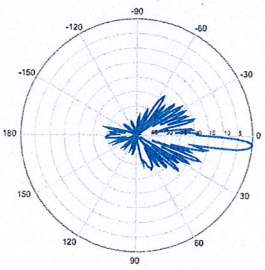
5° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-2



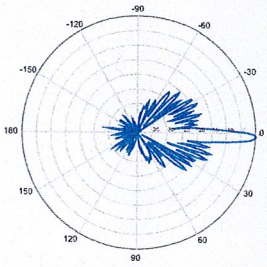
2° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-5



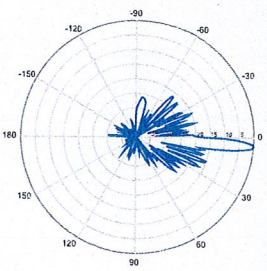
5° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171063-12CF-EDIN-5



5° | Vertical | 1920-2170 MHz

Amphenol ANTENNA SOLUTIONS

BXA-171063-8BF-EDIN-X

Replace "X" with desired electrical downtilt.

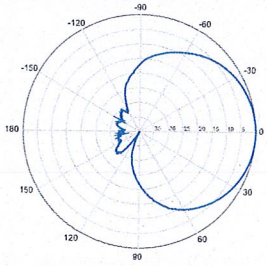
X-Pol | FET Panel | 63° | 17.4 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	7°	7°	7°
Gain	14.5 dBd / 16.6 dBi	14.9 dBd / 17.0 dBi	15.3 dBd / 17.4 dBi
Electrical downtilt (X)	0, 2, 4, 8		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back isolation	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		

Mechanical Characteristics		
Dimensions Length x Width x Depth	1232 x 154 x 105 mm	48.5 x 6.1 x 4.1 in
Depth with t-brackets	133 mm	5.2 in
Weight without mounting brackets	4.8 kg	10.5 lbs
Survival wind speed	296 km/hr	184 mph
Wind area	Front: 0.19 m² Side: 0.14 m²	Front: 2.0 ft² Side: 1.5 ft²
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N	Front: 63 lbf Side: 50 lbf

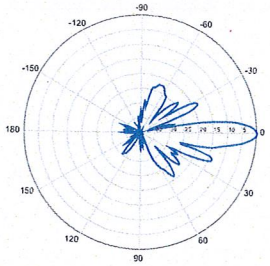
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-8BF-EDIN-X-FP		

BXA-171063-8BF-EDIN-X



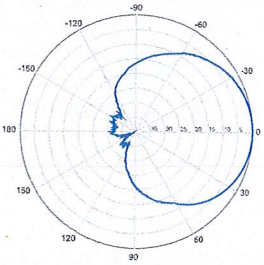
Horizontal | 1710-1880 MHz

BXA-171063-8BF-EDIN-0



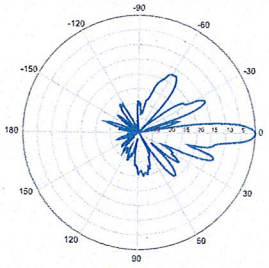
0° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-X



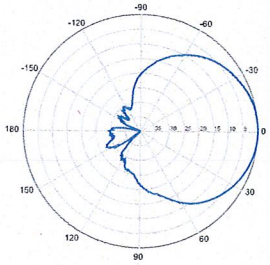
Horizontal | 1850-1990 MHz

BXA-171063-8BF-EDIN-0



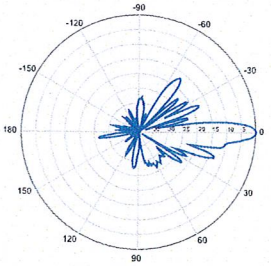
0° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-X



Horizontal | 1920-2170 MHz

BXA-171063-8BF-EDIN-0

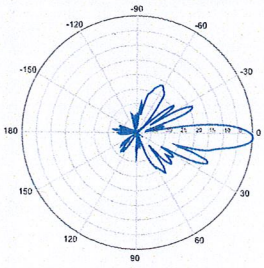


0° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-X

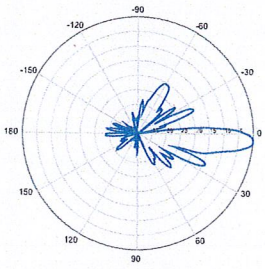
X-Pol | FET Panel | 63° | 17.4 dBi

BXA-171063-8BF-EDIN-2



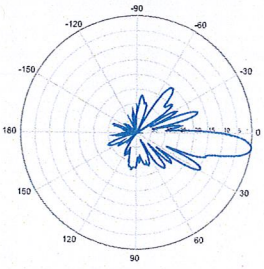
2° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-4



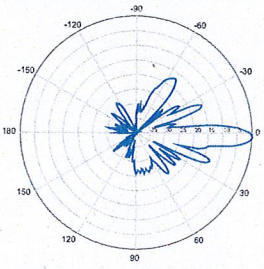
4° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-8



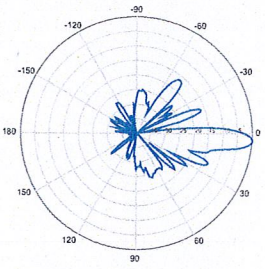
8° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-2



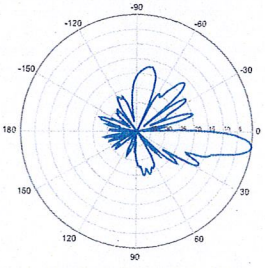
2° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-4



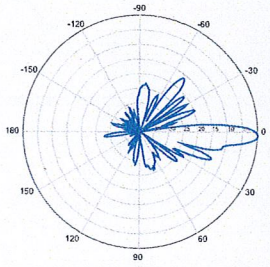
4° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-8



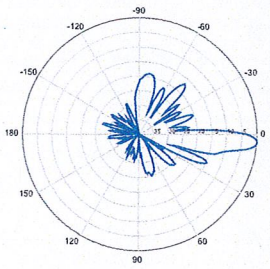
8° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-2



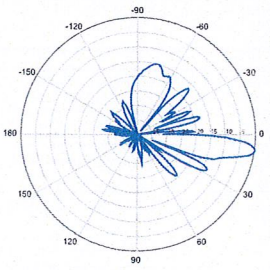
2° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-4



4° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-8

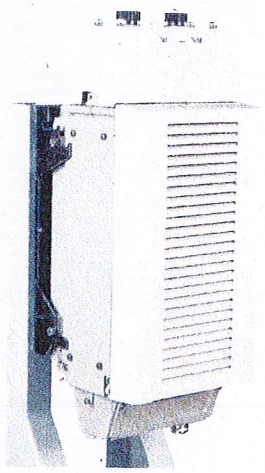


8° | Vertical | 1920-2170 MHz

Alcatel-Lucent RRH2x40-AWS

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-AWS is a high-power, small form-factor Remote Radio Head (RRH) operating in the AWS frequency band (1700/2100MHz - 3GPP Band 4). The Alcatel-Lucent RRH2x40-AWS is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.



A distributed eNodeB expands 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 an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-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. The Alcatel-Lucent RRH2x40-AWS has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to four-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 20 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-AWS is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-AWS is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-AWS is compact and weighs less than 20 kg (44 lb), 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 — a fraction of the time required for a traditional BTS.

Excellent RF performance

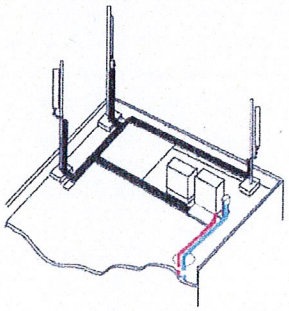
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced. The Alcatel-Lucent RRH2x40-AWS provides more RF power while at the same time consuming less electricity.

Features

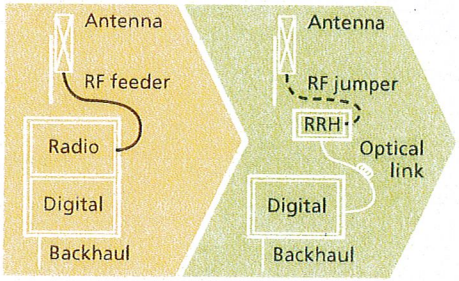
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

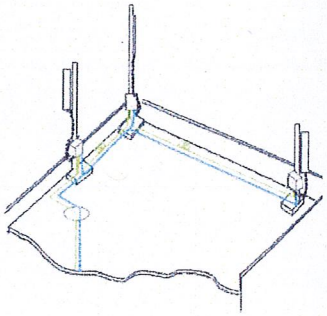
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 620 mm (24.4 in.)
- Width: 270 mm (10.63 in.)
- Depth: 170m (6.7 in.)
- Weight (without mounting kit): less than 20 kg (44 lb)

Power

- Power supply: -48VDC

Operating environment

- Outdoor temperature range:
  - ¬ With solar load: -40°C to +50°C (-40°F to +122°F)
  - ¬ Without solar load: -40°C to +55°C (-40°F to +131°F)
- Passive convection cooling (no fans)
- Enclosure protection
  - ¬ IP65 (International Protection rating)

RF characteristics

- Frequency band: 1700/2100 MHz (AWS); 3GPP Band 4
- Bandwidth: up to 20 MHz
- RF output power at antenna port: 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way with optional Rx Diversity module
- Noise figure: below 2.0 dB typical
- Antenna-Line Device features
  - ¬ TMA and Remote electrical tilt (RET) support via AISG v2.0

Optical characteristics

Type/number of fibers

- Single-mode variant
  - ¬ One Single Mode Single Fiber per RRH2x, carrying UL and DL using CWDM
  - ¬ Single mode dual fiber (SM/DF)
- Multi-mode variant
  - ¬ Two Multi-mode fibers per RRH2x: one carrying UL, the other carrying DL

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Digital Ports and Alarms

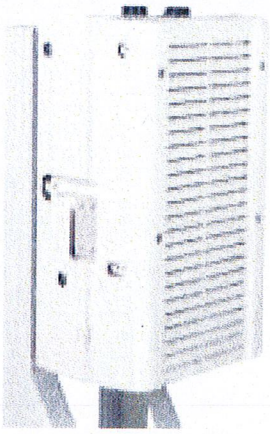
- Two optical ports to support daisy-chaining
- Six external alarms

Alcatel·Lucent

Alcatel-Lucent RRH2x40-07-U

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-07-U is a high-power, small form-factor Remote Radio Head (RRH) operating in the North American Digital Dividend / 700MHz frequency band (3GPP Band 13). The Alcatel-Lucent RRH2x40-07-U is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.



A distributed eNodeB expands 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 an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-07-U 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. The Alcatel-Lucent RRH2x40-07-U has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to two-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 10 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-07-U is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-07-U installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-07-U is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-07-U is compact and weights less than 23 kg (50 lb), 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 — a fraction of the time required for a traditional BTS.

Excellent RF performance

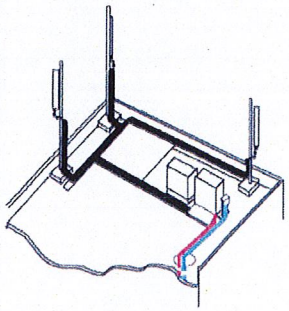
Because of its small size and weight, the Alcatel-Lucent RRH2x40-07-U can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-07-U where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced. The Alcatel-Lucent RRH2x40-07-U provides more RF power while at the same time consuming less electricity.

Features

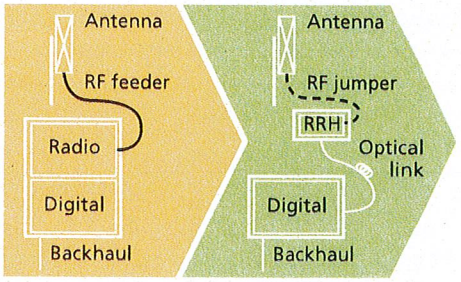
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless), noise-free, and heaterless unit
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

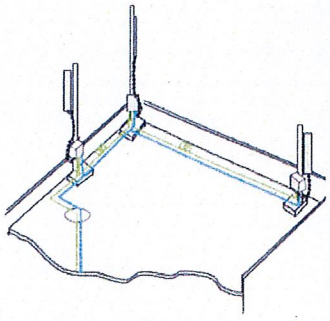
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 390 mm (15.4 in.)
- Width: 380 mm (15 in.)
- Depth: 210 mm (8.2 in.)
- Weight (without mounting kit): less than 23 kg (50 lb)

Power

- Power supply: -48V

Operating environment

- Outdoor temperature range:
  - ¬ With solar load: -40°C to +50°C (-40°F to +122°F)
  - ¬ Without solar load: -40°C to +55°C (-40°F to +131°F)
- Passive convection cooling (no fans)
- Enclosure protection
  - ¬ IP65 (International Protection rating)

RF characteristics

- Frequency band: 700 MHz; 3GPP Band 13
- Bandwidth: up to 10 MHz
- RF output power at antenna port:
  - ¬ 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way
- Noise figure: below 2.5 dB typical
- ALD features
  - ¬ TMA
  - ¬ Remote electrical tilt (RET) support (AISG v2.0)

Optical characteristics

Type/number of fibers

- Up to 3.12 Gb/s line bit rate
- Single-mode variant
  - ¬ One SM fiber (9/125 µm) per RRH2x, carrying UL and DL using CWDM (at 1550/1310 nm)
- Multi-mode variant
  - ¬ Two MM fibers (50/125 µm) per RRH2x: one carrying UL, the other carrying DL (at 850 nm)

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Alarms and ports

- Six external alarms
- Two optical ports to support daisy-chaining

CPG2809100913 (09)

Alcatel·Lucent

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.

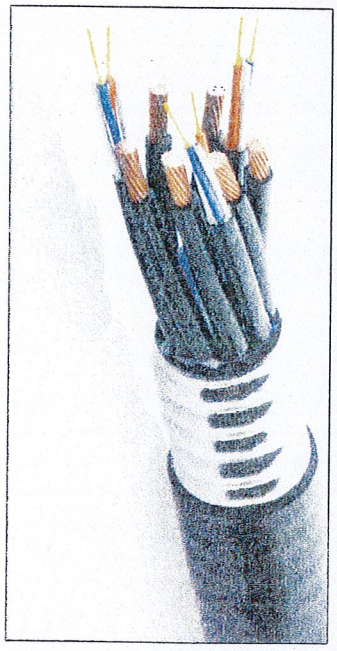


Figure 1: HYBRIFLEX Series

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

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

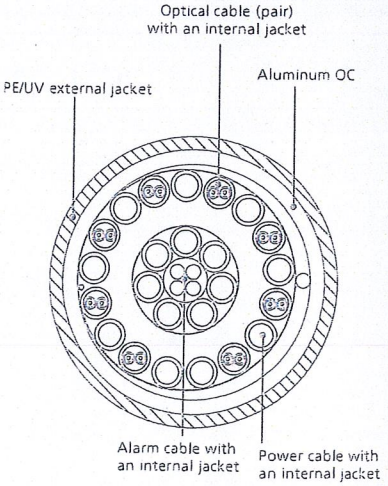


Figure 2: Construction Detail

	General	Power	Density					
Site Name: New Britain 3								
Tower Height: Verizon @ 145ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	2	1077	190	0.0215	1900	1.0000	2.15%	
*AT&T UMTS	2	565	190	0.0113	880	0.5867	1.92%	
*AT&T GSM	1	283	190	0.0028	880	0.5867	0.48%	
*AT&T GSM	4	646	190	0.0257	1900	1.0000	2.57%	
*AT&T LTE	1	1313	189	0.0132	734	0.4893	2.70%	
*T-Mobile GSM/UMTS	2	12	163	0.0003	1950	1.0000	0.03%	
*T-Mobile UMTS	2	12	163	0.0003	2100	1.0000	0.03%	
*T-Mobile LTE	2	24	163	0.0006	2100	1.0000	0.06%	
Verizon PCS	**11**	**254**	**145**	**0.0478**	**1970**	**1.0000**	**4.78%**	
Verizon Cellular	**9**	**260**	**145**	**0.0400**	**869**	**0.5793**	**6.91%**	
Verizon AWS	**1**	**1750**	**145**	**0.0299**	**2145**	**1.0000**	**2.99%**	
Verizon 700	**1**	**1050**	**145**	**0.0180**	**698**	**0.4653**	**3.86%**	
								28.49%
* Source: Siting Council								

Date: **January 24, 2013**

Veronica Harris
Crown Castle
1200 McArthur Blvd
Mahwah, NJ 07430

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	119668
	Carrier Site Name:	New Britain 3 CT
Crown Castle Designation:	**Crown Castle BU Number:**	803175
	Crown Castle Site Name:	CT NEW BRITAIN 3 CAC 803175
	Crown Castle JDE Job Number:	214765
	Crown Castle Work Order Number:	568828
	Crown Castle Application Number:	174007 Rev. 5
Engineering Firm Designation:	**Crown Castle Project Number:**	568828
Site Data:	**Lester Road, New Britain, Hartford County, CT**	
	Latitude *41° 41' 11.8"*, Longitude *-72° 45' 27.8"*	
	188 Foot - Monopole Tower	

Dear Veronica Harris,

Crown Castle 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 568828, in accordance with application 174007, revision 5.

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

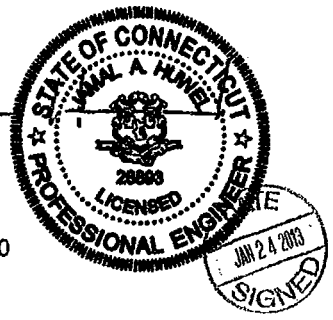
LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 80 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Crown Castle* 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: Stefanie Long, Engineer I / MRC
Respectfully submitted by:



Jamal A. Huwel, P.E.
Manager Engineering

tnxTower Report - version 6.0.4.0

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1) INTRODUCTION

This tower is a 188 ft Monopole tower designed by SUMMIT in December of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 38 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
145.0	145.0	3	alcatel lucent	RRH 2x40-700 W/SOLAR	1	1 5/8	-
		3	alcatel lucent	RRH2x40-AWS			
		2	antel	BXA-171063-12CF-EDIN-2 w/ Mount Pipe			
		1	antel	BXA-171063-8BF-EDIN-2 w/ Mount Pipe			
		3	antel	BXA-80063/6 w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
188.0	189.0	6	ericsson	RRUS-11	6 1 2	1-5/8 3/8 3/4	1
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
	188.0	1	tower mounts	Platform Mount [LP 715-1]			
177.0	177.0	1	tower mounts	Platform Mount [LP 601-1]	-	-	4
160.0	163.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1-5/8	2
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20	12	1-5/8	1
	160.0	1	tower mounts	Platform Mount [LP 601-1]			

145.0	150.0	1	gps	GPS_A	12 1	1-5/8 1/2	1
	145.0	3	andrew	LNX-6512DS-T4M w/ Mount Pipe			
		3	antel	BXA-185090/8CFx2 w/ Mount Pipe			
		6	antel	WPA-80090/4CF w/ Mount Pipe	-	-	3
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 601-1]	-	-	1

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed; not considered in this analysis
4) Empty Mount Considered in this analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
188	188	12	Generic	1' x 5' x 3" Panel Antenna	-	-
177	177	12	Generic	1' x 5' x 3" Panel Antenna	-	-
162	162	12	Generic	1' x 5' x 3" Panel Antenna	-	-
147	147	12	Generic	1' x 5' x 3" Panel Antenna	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clough, Harbour & Associates, LLP.	679661	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	TEP (Mapping Report)	679660	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit Engineering,LLC.	679659	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle 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	188 - 137	Pole	TP32.711x22x0.25	1	-10.166	1302.250	56.9	Pass
L2	137 - 90.25	Pole	TP42.03x31.318x0.313	2	-17.806	2094.290	80.5	Pass
L3	90.25 - 44.5	Pole	TP51.014x40.302x0.375	3	-28.491	3048.944	80.1	Pass
L4	44.5 - 0	Pole	TP59.61x48.899x0.5	4	-46.777	4876.780	65.6	Pass
							Summary	
						Pole (L2)	80.5	Pass
						Rating =	80.5	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	69.1	Pass
1	Base Plate	0	70.8	Pass
1	Base Foundation	0	79.5	Pass

Structure Rating (max from all components) =	80.5%

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

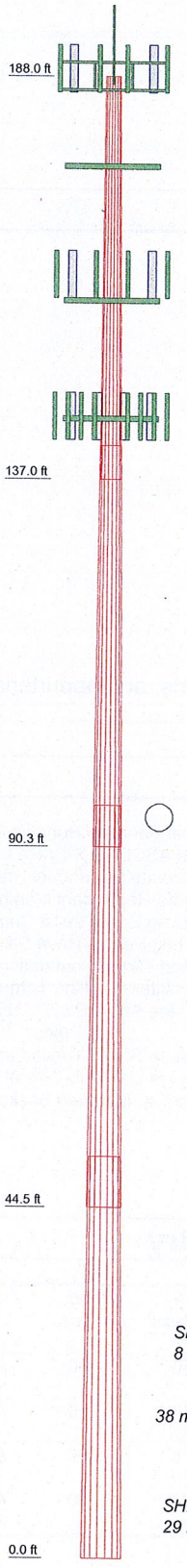
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4
Length (ft)	51.000	51.000	51.000	51.000
Number of Sides	18	18	18	18
Thickness (in)	0.250	0.313	0.375	0.500
Socket Length (ft)	4.250	5.250	6.500	
Top Dia (in)	22.000	31.318	40.302	48.899
Bot Dia (in)	32.711	42.030	51.014	59.610
Grade	A607-65			
Weight (K)	3.7	6.3	9.4	14.8



AXIAL 68 K
SHEAR 8 K
MOMENT 1151 kip-ft
TORQUE 0 kip-ft
38 mph WIND - 1.000 in ICE

AXIAL 47 K
SHEAR 29 K
MOMENT 3829 kip-ft
TORQUE 0 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 5/8" x 8'	192	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160
AM-X-CD-16-65-00T-RET w/ Mount Pipe	188	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160
AM-X-CD-16-65-00T-RET w/ Mount Pipe	188	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160
AM-X-CD-16-65-00T-RET w/ Mount Pipe	188	Platform Mount [LP 601-1]	160
7770.00 w/ Mount Pipe	188	LNX-6512DS-T4M w/ Mount Pipe	145
7770.00 w/ Mount Pipe	188	LNX-6512DS-T4M w/ Mount Pipe	145
7770.00 w/ Mount Pipe	188	LNX-6512DS-T4M w/ Mount Pipe	145
(2) LGP21401	188	BXA-185090/8CFx2 w/ Mount Pipe	145
(2) LGP21401	188	BXA-185090/8CFx2 w/ Mount Pipe	145
(2) LGP21401	188	BXA-185090/8CFx2 w/ Mount Pipe	145
(2) RRUS-11	188	GPS_A	145
(2) RRUS-11	188	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	145
(2) RRUS-11	188	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	145
DC6-48-60-18-8F	188	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	145
(2) 6' x 2" Mount Pipe	188	BXA-80063/6 w/ Mount Pipe	145
(2) 6' x 2" Mount Pipe	188	BXA-80063/6 w/ Mount Pipe	145
(2) 6' x 2" Mount Pipe	188	BXA-80063/6 w/ Mount Pipe	145
Platform Mount [LP 715-1]	188	RRH 2x40-700 W/SOLAR	145
(2) 8'x2" Antenna Mount Pipe	177	RRH 2x40-700 W/SOLAR	145
(2) 8'x2" Antenna Mount Pipe	177	RRH 2x40-700 W/SOLAR	145
(2) 8'x2" Antenna Mount Pipe	177	RRH2x40-AWS	145
Platform Mount [LP 601-1]	177	RRH2x40-AWS	145
ATMAA1412D-1A20	160	RRH2x40-AWS	145
ATMAA1412D-1A20	160	DB-T1-6Z-8AB-0Z	145
ATMAA1412D-1A20	160	Platform Mount [LP 601-1]	145
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160		
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160		
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 80.5%

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Job: BU# 803175			
Project:			
Client: Crown Castle	Drawn by: SLong	App'd:	
Code: TIA/EIA-222-F	Date: 01/23/13	Scale: NTS	
Path: R:\SA Models - Letters\Work Area\SLong\803175\803175.eri		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:

5) Tower is located in Hartford County, Connecticut.
6) Basic wind speed of 80 mph.
7) Nominal ice thickness of 1.000 in.
8) Ice thickness is considered to increase with height.
9) Ice density of 56.000 pcf.
10) A wind speed of 38 mph is used in combination with ice.
11) Temperature drop of 50.000 °F.
12) Deflections calculated using a wind speed of 50 mph.
13) A non-linear (P-delta) analysis was used.
14) Pressures are calculated at each section.
15) Stress ratio used in pole design is 1.333.
16) Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

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	188.000-137.000	51.000	4.250	18	22.000	32.711	0.250	1.000	A607-65 (65 ksi)
L2	137.000-90.250	51.000	5.250	18	31.318	42.030	0.313	1.250	A607-65 (65 ksi)
L3	90.250-44.500	51.000	6.500	18	40.302	51.014	0.375	1.500	A607-65 (65 ksi)
L4	44.500-0.000	51.000		18	48.899	59.610	0.500	2.000	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.339	17.259	1031.483	7.721	11.176	92.294	2064.324	8.631	3.432	13.728
	33.216	25.758	3429.020	11.524	16.617	206.354	6862.553	12.881	5.317	21.269
L2	32.708	30.754	3735.323	11.007	15.910	234.782	7475.561	15.380	4.962	15.879
	42.678	41.379	9098.069	14.810	21.351	426.114	18208.109	20.693	6.847	21.911
L3	42.044	47.524	9571.647	14.174	20.474	467.512	19155.889	23.766	6.433	17.155
	51.801	60.273	19526.797	17.977	25.915	753.491	39079.287	30.142	8.318	22.183
L4	51.039	76.809	22730.963	17.182	24.841	915.074	45491.836	38.412	7.726	15.452
	60.530	93.808	41409.240	20.984	30.282	1367.459	82872.966	46.913	9.611	19.223

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 188.000-137.000				1	1	1		
L2 137.000-90.250				1	1	1		
L3 90.250-44.500				1	1	1		
L4 44.500-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
**										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF7-50A(1-5/8")	B	No	Inside Pole	188.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
FB-L98B-002-75000(3/8")	B	No	Inside Pole	188.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
WR-VG86ST-BRD(3/4)	B	No	Inside Pole	188.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
**								
LCF158-50J(1-5/8")	C	No	Inside Pole	160.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
MLE Hybrid	C	No	Inside Pole	160.000 - 0.000	1	No Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
9Power/18Fiber RL 2(1 5/8)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
**								
LCF12-50J(1/2)	B	No	Inside Pole	145.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
LCF158-50J(1-5/8")	B	No	Inside Pole	145.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
HB158-1-08U8-S8J18(1-5/8)	B	No	Inside Pole	145.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
**								

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	188.000-137.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.414
		C	0.000	0.000	0.000	0.000	0.279
L2	137.000-90.250	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.872
		C	0.000	0.000	0.000	0.000	0.566
L3	90.250-44.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.853
		C	0.000	0.000	0.000	0.000	0.554
L4	44.500-0.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.830
		C	0.000	0.000	0.000	0.000	0.539

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	188.000-137.000	A	1.210	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.414
		C		0.000	0.000	0.000	0.000	0.279
L2	137.000-90.250	A	1.159	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.872
		C		0.000	0.000	0.000	0.000	0.566
L3	90.250-44.500	A	1.089	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.853
		C		0.000	0.000	0.000	0.000	0.554
L4	44.500-0.000	A	1.000	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.830
		C		0.000	0.000	0.000	0.000	0.539

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	188.000-137.000	0.000	0.000	0.000	0.000
L2	137.000-90.250	0.000	0.000	0.000	0.000
L3	90.250-44.500	0.000	0.000	0.000	0.000
L4	44.500-0.000	0.000	0.000	0.000	0.000

Discrete Tower Loads

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
Lighting Rod 5/8" x 8'	C	None		0.000	192.000	No Ice	0.500	0.500	0.031
						1/2" Ice	1.314	1.314	0.037
						1" Ice	2.144	2.144	0.047
						2" Ice	3.613	3.613	0.084
						4" Ice	5.683	5.683	0.227
**									
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice	8.498	6.304	0.074
						1/2" Ice	9.149	7.479	0.136
						1" Ice	9.767	8.368	0.210
						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice	8.498	6.304	0.074
						1/2" Ice	9.149	7.479	0.136
						1" Ice	9.767	8.368	0.210
						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice	8.498	6.304	0.074
						1/2" Ice	9.149	7.479	0.136
						1" Ice	9.767	8.368	0.210
						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) LGP21401	A	From Leg	4.000 0.000	0.000	188.000	No Ice	1.288	0.233	0.014
						1/2"	1.445	0.313	0.021

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
			1.000			Ice	1.611	0.403	0.030
						1" Ice	1.969	0.608	0.055
						2" Ice	2.788	1.121	0.135
						4" Ice			
(2) LGP21401	B	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.288 1.445 1.611 1.969 2.788	0.233 0.313 0.403 0.608 1.121	0.014 0.021 0.030 0.055 0.135
(2) LGP21401	C	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.288 1.445 1.611 1.969 2.788	0.233 0.313 0.403 0.608 1.121	0.014 0.021 0.030 0.055 0.135
(2) RRUS-11	A	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
(2) RRUS-11	B	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
(2) RRUS-11	C	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
DC6-48-60-18-8F	B	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.266 1.456 1.658 2.093 3.098	1.266 1.456 1.658 2.093 3.098	0.020 0.035 0.053 0.095 0.215
(2) 6' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
(2) 6' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
(2) 6' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
Platform Mount [LP 715-1]	C	None		0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	44.210 53.970 63.730 83.250 122.290	44.210 53.970 63.730 83.250 122.290	1.775 2.323 2.871 3.967 6.159

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) 8'x2" Antenna Mount Pipe	A	From Centroid-Face	3.500 0.000 0.000	0.000	177.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.900 2.728 3.401 4.396 6.498	1.900 2.728 3.401 4.396 6.498	0.030 0.044 0.064 0.120 0.301
(2) 8'x2" Antenna Mount Pipe	B	From Centroid-Face	3.500 0.000 0.000	0.000	177.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.900 2.728 3.401 4.396 6.498	1.900 2.728 3.401 4.396 6.498	0.030 0.044 0.064 0.120 0.301
(2) 8'x2" Antenna Mount Pipe	C	From Centroid-Face	3.500 0.000 0.000	0.000	177.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.900 2.728 3.401 4.396 6.498	1.900 2.728 3.401 4.396 6.498	0.030 0.044 0.064 0.120 0.301
Platform Mount [LP 601-1]	C	None		0.000	177.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.470 33.590 38.710 48.950 69.430	28.470 33.590 38.710 48.950 69.430	1.122 1.514 1.905 2.689 4.255
**									
ATMAA1412D-1A20	A	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.467 0.575 0.691 0.951 1.573	1.167 1.314 1.469 1.806 2.584	0.013 0.021 0.030 0.056 0.137
ATMAA1412D-1A20	B	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.467 0.575 0.691 0.951 1.573	1.167 1.314 1.469 1.806 2.584	0.013 0.021 0.030 0.056 0.137
ATMAA1412D-1A20	C	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.467 0.575 0.691 0.951 1.573	1.167 1.314 1.469 1.806 2.584	0.013 0.021 0.030 0.056 0.137
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.176	5.642 6.480 7.257 8.864 12.293	0.112 0.167 0.231 0.383 0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.176	5.642 6.480 7.257 8.864 12.293	0.112 0.167 0.231 0.383 0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.176	5.642 6.480 7.257 8.864 12.293	0.112 0.167 0.231 0.383 0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	6.825 7.347 7.863 8.926	5.642 6.480 7.257 8.864	0.112 0.167 0.231 0.383

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice 4" Ice	11.176	12.293	0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.176	5.642 6.480 7.257 8.864 12.293	0.112 0.167 0.231 0.383 0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.176	5.642 6.480 7.257 8.864 12.293	0.112 0.167 0.231 0.383 0.807
Platform Mount [LP 601-1]	C	None		0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.470 33.590 38.710 48.950 69.430	28.470 33.590 38.710 48.950 69.430	1.122 1.514 1.905 2.689 4.255
**									
LNX-6512DS-T4M w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.791 6.245 6.709 7.667 9.720	4.501 5.170 5.852 7.269 10.366	0.038 0.084 0.139 0.268 0.636
LNX-6512DS-T4M w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.791 6.245 6.709 7.667 9.720	4.501 5.170 5.852 7.269 10.366	0.038 0.084 0.139 0.268 0.636
LNX-6512DS-T4M w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.791 6.245 6.709 7.667 9.720	4.501 5.170 5.852 7.269 10.366	0.038 0.084 0.139 0.268 0.636
BXA-185090/8CFx2 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.157 3.531 3.941 4.827 6.734	3.330 3.942 4.563 5.855 8.841	0.029 0.059 0.098 0.193 0.486
BXA-185090/8CFx2 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.157 3.531 3.941 4.827 6.734	3.330 3.942 4.563 5.855 8.841	0.029 0.059 0.098 0.193 0.486
BXA-185090/8CFx2 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.157 3.531 3.941 4.827 6.734	3.330 3.942 4.563 5.855 8.841	0.029 0.059 0.098 0.193 0.486
GPS_A	A	From Leg	4.000 0.000 5.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.297 0.374 0.459 0.655 1.151	0.297 0.374 0.459 0.655 1.151	0.001 0.005 0.010 0.025 0.079
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	145.000	No Ice 1/2"	3.179 3.555	3.353 3.971	0.029 0.059

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
			0.000			Ice	3.964	4.595	0.098
						1" Ice	4.853	5.893	0.193
						2" Ice	6.767	8.885	0.487
						4" Ice			
BXA-171063-12CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.000	0.000	145.000	No Ice	5.029	5.289	0.041
			0.000			1/2"	5.583	6.459	0.084
			0.000			Ice	6.103	7.348	0.139
						1" Ice	7.166	9.148	0.273
						2" Ice	9.438	12.948	0.677
						4" Ice			
BXA-171063-12CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.000	0.000	145.000	No Ice	5.029	5.289	0.041
			0.000			1/2"	5.583	6.459	0.084
			0.000			Ice	6.103	7.348	0.139
						1" Ice	7.166	9.148	0.273
						2" Ice	9.438	12.948	0.677
						4" Ice			
BXA-80063/6 w/ Mount Pipe	A	From Leg	4.000	0.000	145.000	No Ice	7.979	5.407	0.040
			0.000			1/2"	8.621	6.558	0.096
			0.000			Ice	9.228	7.422	0.164
						1" Ice	10.473	9.198	0.326
						2" Ice	13.082	12.952	0.786
						4" Ice			
BXA-80063/6 w/ Mount Pipe	B	From Leg	4.000	0.000	145.000	No Ice	7.979	5.407	0.040
			0.000			1/2"	8.621	6.558	0.096
			0.000			Ice	9.228	7.422	0.164
						1" Ice	10.473	9.198	0.326
						2" Ice	13.082	12.952	0.786
						4" Ice			
BXA-80063/6 w/ Mount Pipe	C	From Leg	4.000	0.000	145.000	No Ice	7.979	5.407	0.040
			0.000			1/2"	8.621	6.558	0.096
			0.000			Ice	9.228	7.422	0.164
						1" Ice	10.473	9.198	0.326
						2" Ice	13.082	12.952	0.786
						4" Ice			
RRH 2x40-700 W/SOLAR	A	From Leg	4.000	0.000	145.000	No Ice	3.306	1.944	0.051
			0.000			1/2"	3.550	2.143	0.076
			0.000			Ice	3.802	2.351	0.103
						1" Ice	4.334	2.791	0.169
						2" Ice	5.501	3.777	0.349
						4" Ice			
RRH 2x40-700 W/SOLAR	B	From Leg	4.000	0.000	145.000	No Ice	3.306	1.944	0.051
			0.000			1/2"	3.550	2.143	0.076
			0.000			Ice	3.802	2.351	0.103
						1" Ice	4.334	2.791	0.169
						2" Ice	5.501	3.777	0.349
						4" Ice			
RRH 2x40-700 W/SOLAR	C	From Leg	4.000	0.000	145.000	No Ice	3.306	1.944	0.051
			0.000			1/2"	3.550	2.143	0.076
			0.000			Ice	3.802	2.351	0.103
						1" Ice	4.334	2.791	0.169
						2" Ice	5.501	3.777	0.349
						4" Ice			
RRH2x40-AWS	A	From Leg	4.000	0.000	145.000	No Ice	2.522	1.589	0.044
			0.000			1/2"	2.753	1.795	0.061
			0.000			Ice	2.993	2.010	0.082
						1" Ice	3.499	2.465	0.132
						2" Ice	4.615	3.479	0.275
						4" Ice			
RRH2x40-AWS	B	From Leg	4.000	0.000	145.000	No Ice	2.522	1.589	0.044
			0.000			1/2"	2.753	1.795	0.061
			0.000			Ice	2.993	2.010	0.082
						1" Ice	3.499	2.465	0.132
						2" Ice	4.615	3.479	0.275
						4" Ice			
RRH2x40-AWS	C	From Leg	4.000	0.000	145.000	No Ice	2.522	1.589	0.044

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
			0.000				1/2" Ice	2.753	1.795	0.061
			0.000				1" Ice	2.993	2.010	0.082
							2" Ice	3.499	2.465	0.132
							4" Ice	4.615	3.479	0.275
DB-T1-6Z-8AB-0Z	A	From Leg	4.000		0.000	145.000	No Ice	5.600	2.333	0.044
			0.000				1/2" Ice	5.915	2.558	0.080
			0.000				1" Ice	6.240	2.791	0.120
							2" Ice	6.914	3.284	0.213
							4" Ice	8.365	4.373	0.455
Platform Mount [LP 601-1]	C	None			0.000	145.000	No Ice	28.470	28.470	1.122
							1/2" Ice	33.590	33.590	1.514
							1" Ice	38.710	38.710	1.905
							2" Ice	48.950	48.950	2.689
							4" Ice	69.430	69.430	4.255
**										

Load Combinations

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

Comb. No.	Description
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	188 - 137	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-22.737	-0.266	0.389
			Max. Mx	5	-10.187	-473.305	0.126
			Max. My	2	-10.166	-0.075	473.987
			Max. Vy	5	18.135	-473.305	0.126
			Max. Vx	2	-18.281	-0.075	473.987
			Max. Torque	3			-0.293
L2	137 - 90.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-32.655	-0.266	0.389
			Max. Mx	5	-17.820	-1385.096	0.130
			Max. My	2	-17.806	-0.086	1392.486
			Max. Vy	5	21.727	-1385.096	0.130
			Max. Vx	2	-21.874	-0.086	1392.486
			Max. Torque	2			-0.253
L3	90.25 - 44.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-45.909	-0.266	0.389
			Max. Mx	5	-28.498	-2430.709	0.132
			Max. My	2	-28.491	-0.089	2444.623
			Max. Vy	5	25.183	-2430.709	0.132
			Max. Vx	2	-25.328	-0.089	2444.623
			Max. Torque	2			-0.252
L4	44.5 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-67.532	-0.266	0.389
			Max. Mx	5	-46.777	-3807.324	0.133
			Max. My	2	-46.777	-0.090	3828.586
			Max. Vy	5	28.738	-3807.324	0.133
			Max. Vx	2	-28.880	-0.090	3828.586
			Max. Torque	2			-0.251

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	67.532	-0.000	7.998
	Max. H_x	11	46.792	28.713	0.000
	Max. H_z	2	46.792	-0.000	28.854
	Max. M_x	2	3828.586	-0.000	28.854
	Max. M_z	5	3807.324	-28.713	0.000
	Max. Torsion	8	0.251	-0.000	-28.854
	Min. Vert	1	46.792	0.000	0.000
	Min. H_x	5	46.792	-28.713	0.000
	Min. H_z	8	46.792	-0.000	-28.854
	Min. M_x	8	-3828.323	-0.000	-28.854
	Min. M_z	11	-3807.141	28.713	0.000
	Min. Torsion	2	-0.251	-0.000	28.854

Tower Mast Reaction Summary

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 Only	46.792	0.000	0.000	-0.125	-0.085	0.000
Dead+Wind 0 deg - No Ice	46.792	0.000	-28.854	-3828.586	-0.090	0.251
Dead+Wind 30 deg - No Ice	46.792	14.356	-24.989	-3315.695	-1903.691	0.217
Dead+Wind 60 deg - No Ice	46.792	24.866	-14.427	-1914.388	-3297.249	0.125
Dead+Wind 90 deg - No Ice	46.792	28.713	0.000	-0.133	-3807.324	-0.002
Dead+Wind 120 deg - No Ice	46.792	24.866	14.427	1914.123	-3297.250	-0.127
Dead+Wind 150 deg - No Ice	46.792	14.356	24.989	3315.431	-1903.692	-0.219
Dead+Wind 180 deg - No Ice	46.792	0.000	28.854	3828.323	-0.090	-0.251
Dead+Wind 210 deg - No Ice	46.792	-14.356	24.989	3315.429	1903.511	-0.216
Dead+Wind 240 deg - No Ice	46.792	-24.866	14.427	1914.122	3297.068	-0.124
Dead+Wind 270 deg - No Ice	46.792	-28.713	0.000	-0.133	3807.141	0.002
Dead+Wind 300 deg - No Ice	46.792	-24.866	-14.427	-1914.387	3297.067	0.127
Dead+Wind 330 deg - No Ice	46.792	-14.356	-24.989	-3315.693	1903.510	0.218
Dead+Ice+Temp	67.532	0.000	0.000	-0.389	-0.266	0.000
Dead+Wind 0 deg+Ice+Temp	67.532	0.000	-7.998	-1150.866	-0.309	0.086
Dead+Wind 30 deg+Ice+Temp	67.532	3.979	-6.927	-996.738	-572.454	0.090
Dead+Wind 60 deg+Ice+Temp	67.532	6.892	-3.999	-575.654	-991.294	0.069
Dead+Wind 90 deg+Ice+Temp	67.532	7.958	-0.000	-0.439	-1144.601	0.030
Dead+Wind 120 deg+Ice+Temp	67.532	6.892	3.999	574.775	-991.294	-0.017
Dead+Wind 150 deg+Ice+Temp	67.532	3.979	6.927	995.861	-572.454	-0.059
Dead+Wind 180 deg+Ice+Temp	67.532	0.000	7.998	1149.988	-0.309	-0.086
Dead+Wind 210 deg+Ice+Temp	67.532	-3.979	6.927	995.860	571.837	-0.089
Dead+Wind 240 deg+Ice+Temp	67.532	-6.892	3.999	574.775	990.677	-0.069
Dead+Wind 270 deg+Ice+Temp	67.532	-7.958	-0.000	-0.439	1143.983	-0.030
Dead+Wind 300 deg+Ice+Temp	67.532	-6.892	-3.999	-575.653	990.676	0.017
Dead+Wind 330 deg+Ice+Temp	67.532	-3.979	-6.927	-996.738	571.836	0.059
Dead+Wind 0 deg - Service	46.792	0.000	-11.271	-1497.531	-0.092	0.099
Dead+Wind 30 deg - Service	46.792	5.608	-9.761	-1296.924	-744.634	0.086
Dead+Wind 60 deg - Service	46.792	9.713	-5.636	-748.837	-1289.678	0.049
Dead+Wind 90 deg - Service	46.792	11.216	0.000	-0.133	-1489.173	-0.001
Dead+Wind 120 deg - Service	46.792	9.713	5.636	748.570	-1289.678	-0.050
Dead+Wind 150 deg - Service	46.792	5.608	9.761	1296.658	-744.634	-0.086
Dead+Wind 180 deg - Service	46.792	0.000	11.271	1497.265	-0.092	-0.099
Dead+Wind 210 deg - Service	46.792	-5.608	9.761	1296.657	744.450	-0.086
Dead+Wind 240 deg - Service	46.792	-9.713	5.636	748.570	1289.494	-0.049
Dead+Wind 270 deg - Service	46.792	-11.216	0.000	-0.133	1488.988	0.001
Dead+Wind 300 deg - Service	46.792	-9.713	-5.636	-748.837	1289.494	0.050
Dead+Wind 330 deg - Service	46.792	-5.608	-9.761	-1296.924	744.450	0.086

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.000	-46.792	0.000	0.000	46.792	0.000	0.000%
2	0.000	-46.792	-28.854	-0.000	46.792	28.854	0.000%
3	14.356	-46.792	-24.989	-14.356	46.792	24.989	0.000%
4	24.866	-46.792	-14.427	-24.866	46.792	14.427	0.000%
5	28.713	-46.792	0.000	-28.713	46.792	0.000	0.000%
6	24.866	-46.792	14.427	-24.866	46.792	-14.427	0.000%
7	14.356	-46.792	24.989	-14.356	46.792	-24.989	0.000%
8	0.000	-46.792	28.854	-0.000	46.792	-28.854	0.000%
9	-14.356	-46.792	24.989	14.356	46.792	-24.989	0.000%
10	-24.866	-46.792	14.427	24.866	46.792	-14.427	0.000%
11	-28.713	-46.792	0.000	28.713	46.792	0.000	0.000%
12	-24.866	-46.792	-14.427	24.866	46.792	14.427	0.000%
13	-14.356	-46.792	-24.989	14.356	46.792	24.989	0.000%
14	0.000	-67.532	0.000	0.000	67.532	0.000	0.000%
15	0.000	-67.532	-7.998	-0.000	67.532	7.998	0.000%
16	3.979	-67.532	-6.927	-3.979	67.532	6.927	0.000%
17	6.892	-67.532	-3.999	-6.892	67.532	3.999	0.000%
18	7.958	-67.532	0.000	-7.958	67.532	0.000	0.000%
19	6.892	-67.532	3.999	-6.892	67.532	-3.999	0.000%
20	3.979	-67.532	6.927	-3.979	67.532	-6.927	0.000%
21	0.000	-67.532	7.998	-0.000	67.532	-7.998	0.000%
22	-3.979	-67.532	6.927	3.979	67.532	-6.927	0.000%
23	-6.892	-67.532	3.999	6.892	67.532	-3.999	0.000%
24	-7.958	-67.532	0.000	7.958	67.532	0.000	0.000%
25	-6.892	-67.532	-3.999	6.892	67.532	3.999	0.000%
26	-3.979	-67.532	-6.927	3.979	67.532	6.927	0.000%
27	0.000	-46.792	-11.271	0.000	46.792	11.271	0.000%
28	5.608	-46.792	-9.761	-5.608	46.792	9.761	0.000%
29	9.713	-46.792	-5.636	-9.713	46.792	5.636	0.000%
30	11.216	-46.792	0.000	-11.216	46.792	0.000	0.000%
31	9.713	-46.792	5.636	-9.713	46.792	-5.636	0.000%
32	5.608	-46.792	9.761	-5.608	46.792	-9.761	0.000%
33	0.000	-46.792	11.271	0.000	46.792	-11.271	0.000%
34	-5.608	-46.792	9.761	5.608	46.792	-9.761	0.000%
35	-9.713	-46.792	5.636	9.713	46.792	-5.636	0.000%
36	-11.216	-46.792	0.000	11.216	46.792	0.000	0.000%
37	-9.713	-46.792	-5.636	9.713	46.792	5.636	0.000%
38	-5.608	-46.792	-9.761	5.608	46.792	9.761	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00032566
3	Yes	5	0.00000001	0.00073751
4	Yes	5	0.00000001	0.00073253
5	Yes	4	0.00000001	0.00029923
6	Yes	5	0.00000001	0.00073285
7	Yes	5	0.00000001	0.00073712
8	Yes	4	0.00000001	0.00032565
9	Yes	5	0.00000001	0.00073149
10	Yes	5	0.00000001	0.00073580
11	Yes	4	0.00000001	0.00029916
12	Yes	5	0.00000001	0.00073546
13	Yes	5	0.00000001	0.00073187
14	Yes	4	0.00000001	0.00000001
15	Yes	5	0.00000001	0.00028359
16	Yes	5	0.00000001	0.00039190
17	Yes	5	0.00000001	0.00039018
18	Yes	5	0.00000001	0.00028228
19	Yes	5	0.00000001	0.00038989

20	Yes	5	0.00000001	0.00039103
21	Yes	5	0.00000001	0.00028321
22	Yes	5	0.00000001	0.00038932
23	Yes	5	0.00000001	0.00038992
24	Yes	5	0.00000001	0.00028190
25	Yes	5	0.00000001	0.00039019
26	Yes	5	0.00000001	0.00039016
27	Yes	4	0.00000001	0.00009384
28	Yes	5	0.00000001	0.00007477
29	Yes	5	0.00000001	0.00007368
30	Yes	4	0.00000001	0.00008939
31	Yes	5	0.00000001	0.00007372
32	Yes	5	0.00000001	0.00007466
33	Yes	4	0.00000001	0.00009380
34	Yes	5	0.00000001	0.00007348
35	Yes	5	0.00000001	0.00007431
36	Yes	4	0.00000001	0.00008934
37	Yes	5	0.00000001	0.00007427
38	Yes	5	0.00000001	0.00007359

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	188 - 137	48.444	27	2.400	0.001
L2	141.25 - 90.25	26.507	27	1.958	0.000
L3	95.5 - 44.5	11.123	27	1.197	0.000
L4	51 - 0	2.933	27	0.534	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
192.000	Lighting Rod 5/8" x 8'	27	48.444	2.400	0.002	32375
188.000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	27	48.444	2.400	0.002	32375
177.000	(2) 8'x2" Antenna Mount Pipe	27	43.001	2.316	0.001	14715
160.000	ATMAA1412D-1A20	27	34.819	2.171	0.001	5780
145.000	LNX-6512DS-T4M w/ Mount Pipe	27	28.087	2.006	0.001	3763

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	188 - 137	123.594	2	6.125	0.004
L2	141.25 - 90.25	67.674	2	4.998	0.001
L3	95.5 - 44.5	28.418	2	3.058	0.000
L4	51 - 0	7.496	2	1.364	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
192.000	Lighting Rod 5/8" x 8'	2	123.594	6.125	0.004	12924
188.000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	2	123.594	6.125	0.004	12924
177.000	(2) 8'x2" Antenna Mount Pipe	2	109.722	5.913	0.003	5873
160.000	ATMAA1412D-1A20	2	88.867	5.541	0.002	2304
145.000	LNX-6512DS-T4M w/ Mount Pipe	2	71.705	5.122	0.001	1497

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	188 - 137 (1)	TP32.711x22x0.25	51.000	0.000	0.0	39.000	25.049	-10.166	976.932	0.010
L2	137 - 90.25 (2)	TP42.03x31.318x0.313	51.000	0.000	0.0	39.000	40.285	-17.806	1571.110	0.011
L3	90.25 - 44.5 (3)	TP51.014x40.302x0.375	51.000	0.000	0.0	39.000	58.648	-28.491	2287.280	0.012
L4	44.5 - 0 (4)	TP59.61x48.899x0.5	51.000	0.000	0.0	39.000	93.808	-46.777	3658.500	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	188 - 137 (1)	TP32.711x22x0.25	473.988	29.151	39.000	0.747	0.000	0.000	39.000	0.000
L2	137 - 90.25 (2)	TP42.03x31.318x0.313	1392.483	41.381	39.000	1.061	0.000	0.000	39.000	0.000
L3	90.25 - 44.5 (3)	TP51.014x40.302x0.375	2444.625	41.128	39.000	1.055	0.000	0.000	39.000	0.000
L4	44.5 - 0 (4)	TP59.61x48.899x0.5	3828.583	33.597	39.000	0.861	0.000	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	188 - 137 (1)	TP32.711x22x0.25	18.281	0.730	26.000	0.056	0.253	0.008	26.000	0.000
L2	137 - 90.25 (2)	TP42.03x31.318x0.313	21.874	0.543	26.000	0.042	0.252	0.004	26.000	0.000
L3	90.25 - 44.5 (3)	TP51.014x40.302x0.375	25.328	0.432	26.000	0.033	0.251	0.002	26.000	0.000
L4	44.5 - 0 (4)	TP59.61x48.899x0.5	28.880	0.308	26.000	0.024	0.251	0.001	26.000	0.000

Pole Interaction Design Data

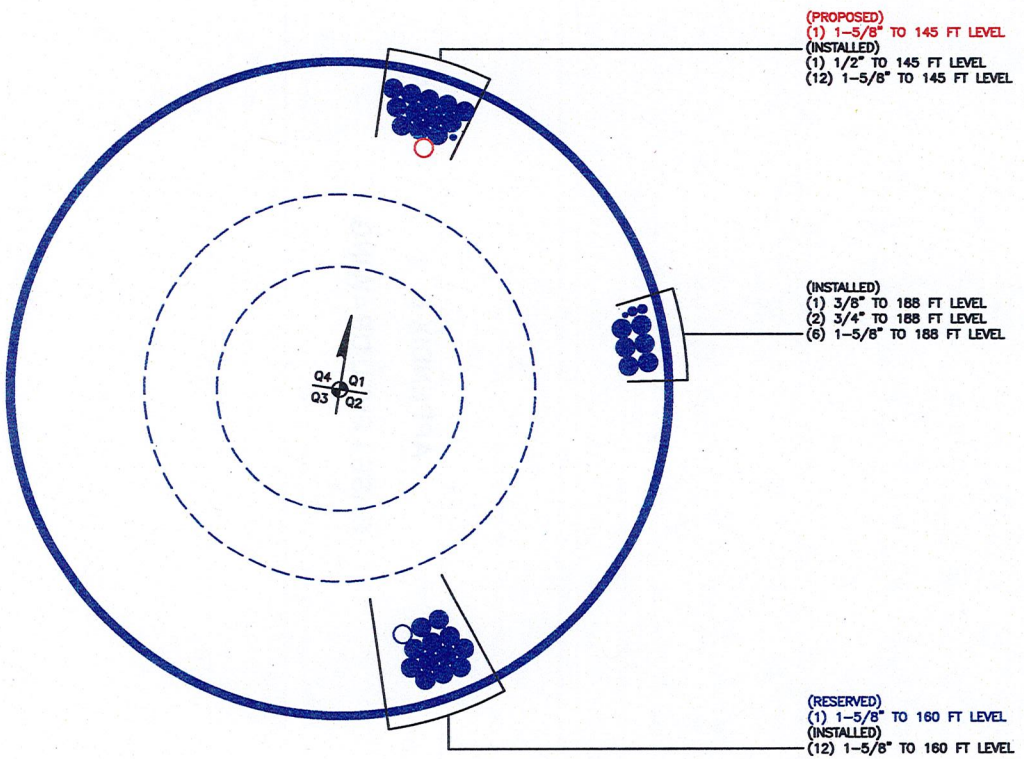
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	188 - 137 (1)	0.010	0.747	0.000	0.056	0.000	0.759 ✓	1.333	H1-3+VT ✓
L2	137 - 90.25 (2)	0.011	1.061	0.000	0.042	0.000	1.073 ✓	1.333	H1-3+VT ✓
L3	90.25 - 44.5 (3)	0.012	1.055	0.000	0.033	0.000	1.067 ✓	1.333	H1-3+VT ✓
L4	44.5 - 0 (4)	0.013	0.861	0.000	0.024	0.000	0.874 ✓	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	188 - 137	Pole	TP32.711x22x0.25	1	-10.166	1302.250	56.9	Pass
L2	137 - 90.25	Pole	TP42.03x31.318x0.313	2	-17.806	2094.290	80.5	Pass
L3	90.25 - 44.5	Pole	TP51.014x40.302x0.375	3	-28.491	3048.944	80.1	Pass
L4	44.5 - 0	Pole	TP59.61x48.899x0.5	4	-46.777	4876.780	65.6	Pass
							Summary	
							Pole (L2) 80.5	Pass
							RATING = **80.5**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 803175 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Maximum Allowable Moment of a Circular Pier

Axial Load (Negative for Compression) = -47.00 kips

Pier Properties

Concrete:

Pier Diameter = 8.0 ft

Concrete Area = 7238.2 in^2

Reinforcement:

Clear Cover = 4.00 in

Cage Diameter = 7.22 ft

Bar Size = 11

Bar Diameter = 1.41 in

Bar Area = 1.56 in^2

Number of Bars = 36

Material Properties

Concrete compressive strength = 3000 psi

Reinforcement yield strength = 60000 psi

Modulus of elasticity = 29000 ksi

Reinforcement yield strain = 0.00207

Limiting compressive strain = 0.003

Seismic Properties

Seismic Zone = 1

Minimum Area of Steel

Required area of steel = 36.19 in^2

Provided area of steel = 56.16 in^2 OK

Axial Loading

Load factor = 1.3

Reduction factor = 0.9

Factored axial load = -67.8889 kips

Neutral Axis

Distance from extreme edge to neutral axis =	17.62	in
Equivalent compression zone factor =	0.85	
Distance from extreme edge to equivalent compression zone factor =	14.98	in
Distance from centroid to neutral axis =	30.38	in

Compression Zone

Area of steel in compression zone =	14.04	in^2
Angle from centroid of pier to intersection of equivalent compression zone and edge of pier =	46.53	deg
Area of concrete in compression =	720.83	in^2
Force in concrete = 0.85 * f`c * Acc =	1838.11	kips
Total reinforcement forces =	-1770.23	kips
Factored axial load =	-67.89	kips
Force in concrete =	-1838.11	kips
Sum of the forces in concrete =	0.00	kips OK

Maximum Moment

First moment of the concrete area in compression about the centoid =	28185.08	in^3
Distance between centroid of concrete in compression and centroid of pier =	39.10	in
Moment of concrete in compression =	71871.94	in-kips
Total reinforcement moment =	60765.99	in-kips
Nominal moment strength of column =	132637.93	in-kips
Factored moment strength of column =	91826.26	in-kips

Maximum Allowable Moment = 7652.19 ft-kips

Individual Bars

Bar #	Angle from first bar (deg)	Distance to centroid (in)	Distance to neutral axis (in)	Distance to equivalent comp. zone (in)	Strain	Area of steel in compression (in^2)	Stress (ksi)	Axial force (kips)
1	0.00	0.00	-30.38	-33.02	-0.0051716	0.00	-60.00	-93.60
2	10.00	7.52	-22.86	-25.50	-0.0038917	0.00	-60.00	-93.60
3	20.00	14.81	-15.57	-18.21	-0.0026507	0.00	-60.00	-93.60
4	30.00	21.65	-8.73	-11.37	-0.0014863	0.00	-43.10	-67.24
5	40.00	27.83	-2.55	-5.19	-0.0004339	0.00	-12.58	-19.63
6	50.00	33.17	2.79	0.14	0.0004746	1.56	13.76	17.49
7	60.00	37.49	7.12	4.47	0.0012115	1.56	35.13	50.83
8	70.00	40.68	10.31	7.66	0.0017545	1.56	50.88	75.40
9	80.00	42.64	12.26	9.62	0.002087	1.56	60.00	89.62
10	90.00	43.30	12.92	10.27	0.002199	1.56	60.00	89.62
11	100.00	42.64	12.26	9.62	0.002087	1.56	60.00	89.62
12	110.00	40.68	10.31	7.66	0.0017545	1.56	50.88	75.40
13	120.00	37.49	7.12	4.47	0.0012115	1.56	35.13	50.83
14	130.00	33.17	2.79	0.14	0.0004746	1.56	13.76	17.49
15	140.00	27.83	-2.55	-5.19	-0.0004339	0.00	-12.58	-19.63
16	150.00	21.65	-8.73	-11.37	-0.0014863	0.00	-43.10	-67.24
17	160.00	14.81	-15.57	-18.21	-0.0026507	0.00	-60.00	-93.60
18	170.00	7.52	-22.86	-25.50	-0.0038917	0.00	-60.00	-93.60
19	180.00	0.00	-30.38	-33.02	-0.0051716	0.00	-60.00	-93.60
20	190.00	-7.52	-37.90	-40.54	-0.0064515	0.00	-60.00	-93.60
21	200.00	-14.81	-45.19	-47.83	-0.0076925	0.00	-60.00	-93.60
22	210.00	-21.65	-52.03	-54.67	-0.0088569	0.00	-60.00	-93.60
23	220.00	-27.83	-58.21	-60.85	-0.0099093	0.00	-60.00	-93.60
24	230.00	-33.17	-63.54	-66.19	-0.0108178	0.00	-60.00	-93.60
25	240.00	-37.49	-67.87	-70.52	-0.0115547	0.00	-60.00	-93.60
26	250.00	-40.68	-71.06	-73.71	-0.0120977	0.00	-60.00	-93.60
27	260.00	-42.64	-73.02	-75.66	-0.0124302	0.00	-60.00	-93.60
28	270.00	-43.30	-73.67	-76.32	-0.0125422	0.00	-60.00	-93.60
29	280.00	-42.64	-73.02	-75.66	-0.0124302	0.00	-60.00	-93.60
30	290.00	-40.68	-71.06	-73.71	-0.0120977	0.00	-60.00	-93.60
31	300.00	-37.49	-67.87	-70.52	-0.0115547	0.00	-60.00	-93.60
32	310.00	-33.17	-63.54	-66.19	-0.0108178	0.00	-60.00	-93.60
33	320.00	-27.83	-58.21	-60.85	-0.0099093	0.00	-60.00	-93.60
34	330.00	-21.65	-52.03	-54.67	-0.0088569	0.00	-60.00	-93.60
35	340.00	-14.81	-45.19	-47.83	-0.0076925	0.00	-60.00	-93.60
36	350.00	-7.52	-37.90	-40.54	-0.0064515	0.00	-60.00	-93.60

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

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

Site Data

BU#: *803175*
Site Name: *CT NEW BRITAIN 3 CAC (*
App #: *174007; Rev. 5*

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	67	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	66	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	12	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
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:	59.61	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

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

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	3829	ft-kips
Unfactored Axial, P:	47	kips
Unfactored Shear, V:	29	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	134.8 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	69.1% Pass

Base Plate Results Flexural Check

Base Plate Stress:	35.4 ksi
Allowable PL Bending Stress:	50.0 ksi
Base Plate Stress Ratio:	70.8% Pass

PL Ref. Data	
Yield Line (in):	33.73
Max PL Length:	33.73

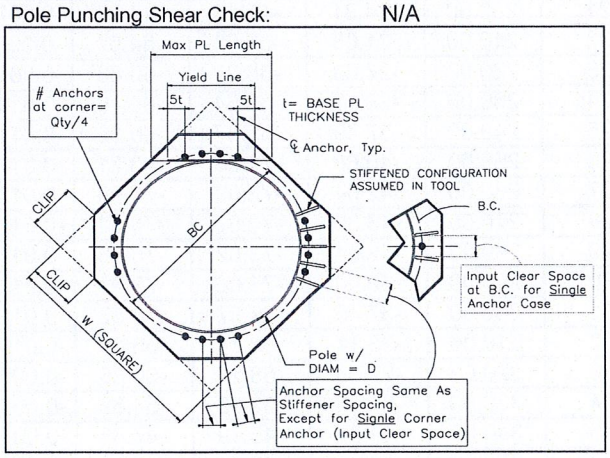
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



Monopole Pier and Pad Foundation

BU # : 803175
Site Name: CT NEW BRITAIN 3 CAC 80
App. Number: 174007; Rev. 5

TIA-222 Revision: F

Design Reactions		
Shear, **S**:	29	kips
Moment, **M**:	3829	ft-kips
Tower Height, **H**:	188	ft
Tower Weight, **Wt**:	47	kips
Base Diameter, **BD**:	4.9675	ft

Foundation Dimensions		
Depth, **D**:	5.917	ft
Pad Width, **W**:	26	ft
Neglected Depth, **N**:	3.33	ft
Thickness, **T**:	3.00	ft
Pier Diameter, **Pd**:	8.00	ft
Ext. Above Grade, **E**:	1.06	ft
BP Dist. Above Pier:	3.5	in.
Clear Cover, **Cc**:	4.0	in

Soil Properties		
Soil Unit Weight, **γ**:	0.110	kcf
Ult. Bearing Capacity, Bc:	18.0	ksf
Angle of Friction, **Φ**:	30	deg
Cohesion, **Co**:	0.000	ksf
Passive Pressure, **Pp**:	0.000	ksf
Base Friction, **μ**:	0.30	

Material Properties		
Rebar Yield Strength, **Fy**:	60000	psi
Concrete Strength, **F'c**:	3000	psi
Concrete Unit Weight, **δc**:	0.150	kcf
Seismic Zone, **z**:	1	

Rebar Properties		
Pier Rebar Size, **Sp**:	11	
Pier Rebar Quanity, **mp**:	36	24
Pad Rebar Size, **Spad**:	11	
Pad Rebar Quanity, **mpad**:	34	12
Pier Tie Size, **St**:	5	4
Tie Quanity, **mt**:	12	5

Design Checks	Capacity/ Availability	Demand/ Limits	Check
Req'd Pier Diam.(ft)	8	6.4675	**OK**
Overturning (ft-kips)	4817.41	3829.00	**79.5%**
Shear Capacity (kips)	91.69	29.00	**31.6%**
Bearing (ksf)	13.50	3.08	**22.8%**
Pad Shear - 1-way (kips)	802.20	440.76	**54.9%**
Pad Shear - 2-way (kips)	2056.45	129.49	**6.3%**
Pad Moment Capacity (k-ft)	6992.13	2826.83	**40.4%**
Pier Moment Capacity (k-ft)	7652.19	3944.33	**51.5%**