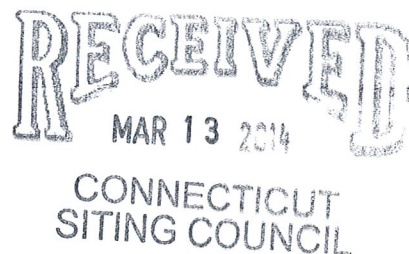


280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

March 10, 2014



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

Re: **EM-VER-022-130405 – 53 Westminster Road, Canterbury, Connecticut
Completion of Construction Activity**

Dear Ms. Bachman:

On May 1, 2013, the Siting Council acknowledged receipt of Cellco's notice of intent to modify its telecommunications facility at 53 Westminster Road in Canterbury. The modification involved the replacement of certain antennas and installation of remote radio heads and new fiber line.

As a condition of the acknowledgement, Cellco was required to provide the Council with a letter stating that the recommendations specified in the structural report were implemented. Attached is a Tower Modification Certification Letter verifying that these conditions have been satisfied. All construction associated with these modifications has now been completed.



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Sincerely,

A handwritten signature in blue ink, appearing to read "Kenneth C. Baldwin".

Kenneth C. Baldwin

Attachment

Copy to:

Sandy M. Carter

Centered on Solutions™

March 4, 2014

Mr. Mark Gauger
Verizon Wireless
99 East River Drive
East Hartford, Connecticut 06108

Re: Existing Telecommunications Facility Tower Modification Certification Letter

Project: Verizon ~ Canterbury
53 Westminster Road
Canterbury, CT 06331

Tower Owner: Crown Castle USA Inc.
3530 Torington Way, Suite 300
Charlotte, NC 28377

Engineer: Paul J. Ford & Company
250 East Broad Street, Suite 1500, Columbus, OH 43215

Centek Project No.: 14055.001

Dear Mr. Gauger,

We are providing this "Existing Telecommunications Facility Tower Modification Certification Letter" with regard to the antenna upgrade by Verizon Wireless at the above referenced project.

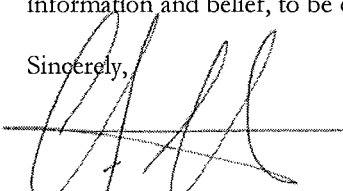
The following are the basis for substantiating compliance with the structural analysis prepared by Paul J. Ford & Company (PJF Project No. 37513-0655) dated February 28, 2013:

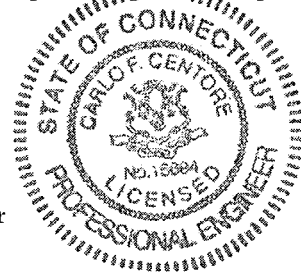
- Review of the PJF Structural Analysis dated 02/28/2013.
- Review of the Tower Engineering Professionals Modification Inspection Report (TEP Project No. 131001.876375) dated 05/14/2013.
- Field observations by Centek personnel of the modifications and coax installation on 02/27/2014 which determined all coax lines and RRH's were installed in general compliance with the recommendations of the structural analysis report prepared by PJF on 02/28/2013.

With the completed modifications, the tower and foundation do not exceed 100 percent of their post-construction structural rating.

The work under this Contract has been reviewed and found, to the Engineer's best knowledge, information and belief, to be completed in general compliance with the documents referenced above.

Sincerely,


Carlo F. Centore, PE
Principal ~ Structural Engineer



CC: Rachel Mayo, Tim Parks, Jim Smith



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

May 1, 2013

Kenneth C. Baldwin, Esq.
Robinson & Cole
280 Trumbull Street
Hartford, CT 06103-3597

RE: **EM-VER-022-130405** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 53 Westminster Road, Canterbury, 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:

- Prior to antenna installation, the modifications depicted in the reinforcement drawings included in the Structural Analysis Report prepared Paul J. Ford and Company dated February 28, 2013, and stamped by Joseph Jacobs shall be implemented;
- Within 45 days following completion of the antenna installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the recommended modifications have been completed and the structure and foundation do not exceed 100 percent of the post-construction structural rating;
- 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 April 4, 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.

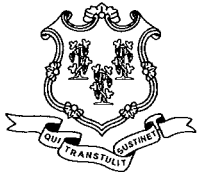
Very truly yours,



Melanie A. Bachman
Acting Executive Director

MAB/CDM/jb

c: The Honorable Brian H. Sear, First Selectman, Town of Canterbury
Steve Sadlowski, Zoning Enforcement Officer, Town of Canterbury
Crown Castle



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 9, 2013

The Honorable Brian H. Sear
First Selectman
Town of Canterbury
P O Box 27
Canterbury, CT 06331-0027

RE: **EM-VER-022-130405** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 53 Westminster Road, Canterbury, Connecticut.

Dear First Selectman Sear:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72, a copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by April 23, 2013.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/jb

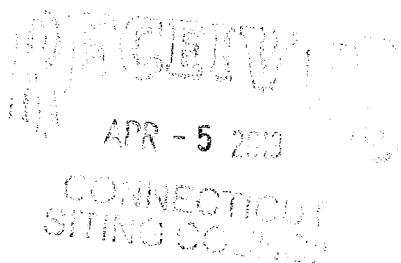
c: Steve Sadlowski, Zoning Enforcement Officer, Town of Canterbury

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

Also admitted in Massachusetts

April 4, 2013

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



Re: **Notice of Exempt Modification – Revised Antenna Configuration
53 Westminster Road, Canterbury, Connecticut**

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) received Connecticut Siting Council (the “Council”) approval to construct a wireless telecommunications facility at 53 Westminster Road in Canterbury on February 8, 2010 (TS-VER-022-011018). The Council approved the installation of twelve (12) antennas at the 170-foot level of the 180-foot tower and a 12’ x 30’ shelter located inside the fenced facility compound. Cellco’s facility has not yet been constructed.

Cellco has decided to update its antenna configuration and now intends to install three (3) model BXA-70063-6CF cellular antennas; three (3) model BXA-171063-12CF PCS antennas; three (3) model BXA-70063-6CF LTE antennas; and three (3) model BXA-171063-12CF AWS antennas on the tower. Cellco also intends to install six (6) remote radio heads (“RRHs”) behind its antennas and one (1) new HYBRIFLEX™ cable inside the monopole tower. Attached behind Tab 1 are the specifications for the new 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 Brian H. Sear, First Selectman for the Town of Canterbury. A copy of this letter is being sent to John Lemire, the owner of the property on which the tower is located.

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



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12165165-v1

Linda Roberts
April 4, 2013
Page 2

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be located at the 170-foot level of the 180-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) 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, with certain modifications, can support Cellco's proposed modifications. (*See* Structural Analysis Report attached behind Tab 3).

For the foregoing reasons, Cellco respectfully submits that the revised antenna configuration at 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:

Brian H. Sear, Canterbury First Selectman
John Lemire
Sandy M. Carter



BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

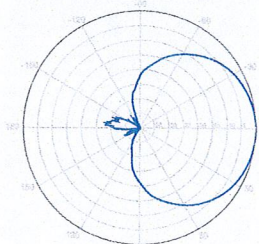
Replace "X" with desired electrical downtilt.

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



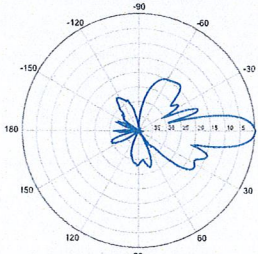
| Electrical Characteristics | 696-900 MHz | | |
|---|---|--|-----------------|
| Frequency bands | 696-806 MHz | 806-900 MHz | |
| Polarization | ±45° | | |
| Horizontal beamwidth | 65° | 63° | |
| Vertical beamwidth | 13° | 11° | |
| Gain | 14.0 dBd (16.1 dBi) | 14.5 dBd (16.6 dBi) | |
| Electrical downtilt (X) | 0, 2, 3, 4, 5, 6, 8, 10 | | |
| Impedance | 50Ω | | |
| VSWR | ≤1.35:1 | | |
| Upper sidelobe suppression (0°) | -18.3 dB | -18.2 dB | |
| Front-to-back ratio (+/-30°) | -33.4 dB | -36.3 dB | |
| Null fill | 5% (-26.02 dB) | | |
| Isolation between ports | < -25 dB | | |
| Input power with EDIN connectors | 500 W | | |
| Input power with NE connectors | 300 W | | |
| Lightning protection | Direct Ground | | |
| Connector(s) | 2 Ports / EDIN or NE / Female / Center (Back) | | |
| Mechanical Characteristics | | | |
| Dimensions Length x Width x Depth | 1804 x 285 x 132 mm | 71.0 x 11.2 x 5.2 in | |
| Depth with z-brackets | 172 mm | 6.8 in | |
| Weight without mounting brackets | 7.9 kg | 17 lbs | |
| Survival wind speed | > 201 km/hr > 125 mph | | |
| Wind area | Front: 0.51 m ² Side: 0.24 m ² | Front: 5.5 ft ² Side: 2.6 ft ² | |
| Wind load @ 161 km/hr (100 mph) | Front: 759 N Side: 391 N | Front: 169 lbf Side: 89 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-70063-6CF-EDIN-X-FP | | |

BXA-70063-6CF-EDIN-X



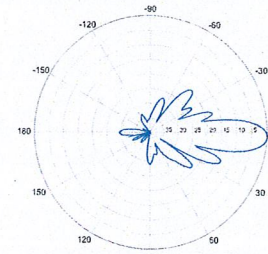
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

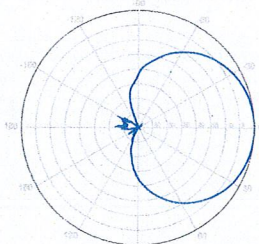


0° | Vertical | 750 MHz

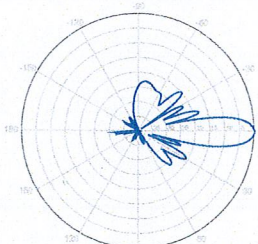
BXA-70063-6CF-EDIN-2



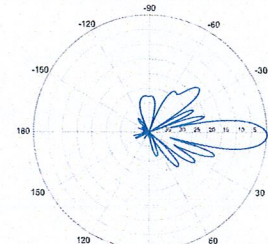
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



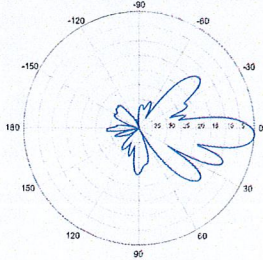
2° | Vertical | 850 MHz

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

BXA-70063-6CF-EDIN-X

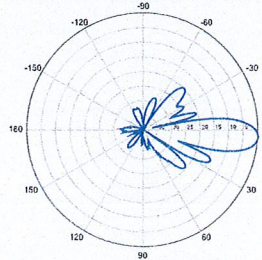
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



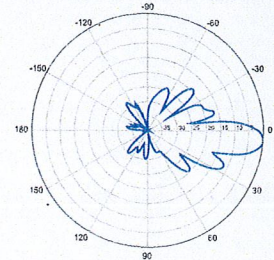
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

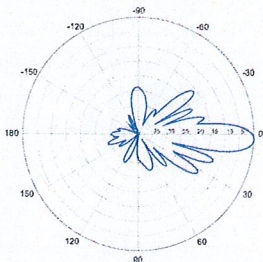


4° | Vertical | 750 MHz

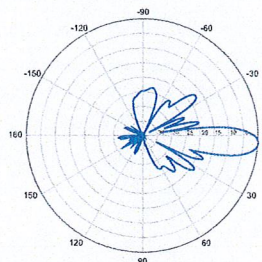
BXA-70063-6CF-EDIN-5



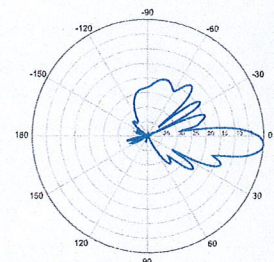
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

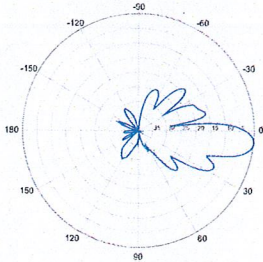


4° | Vertical | 850 MHz



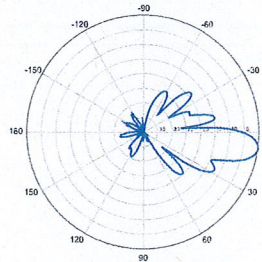
5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



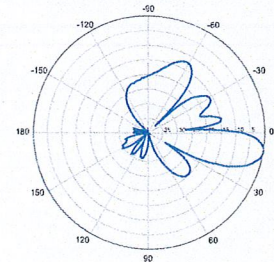
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

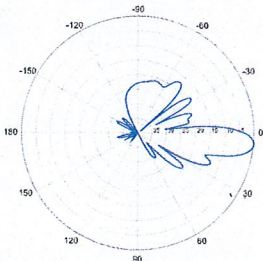


8° | Vertical | 750 MHz

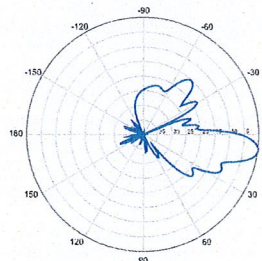
BXA-70063-6CF-EDIN-10



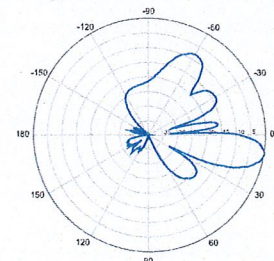
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

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

BXA-171063-12CF-EDIN-X

X-Pol | FET Panel | 63° | 19.0 dBi

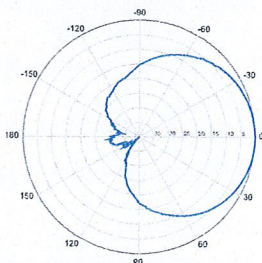
Replace "X" with desired electrical downtilt

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

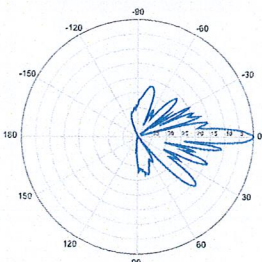


| Electrical Characteristics | 1710-2170 MHz | | | |
|---|---|--|---------------------|--------------|
| Frequency bands | 1710-1880 MHz | 1850-1990 MHz | 1920-2170 MHz | |
| Polarization | ±45° | ±45° | ±45° | |
| Horizontal beamwidth | 68° | 65° | 60° | |
| Vertical beamwidth | 4.5° | 4.5° | 4.5° | |
| 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

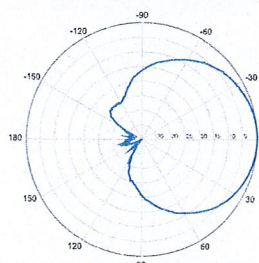


Horizontal | 1710-1880 MHz
BXA-171063-12CF-EDIN-0

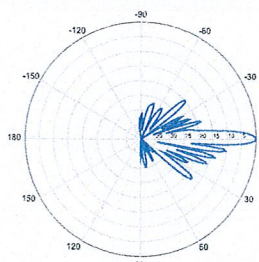


0° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-X

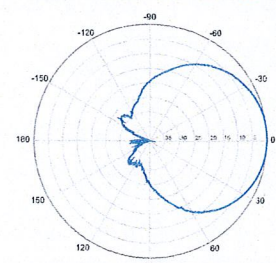


Horizontal | 1850-1990 MHz
BXA-171063-12CF-EDIN-0

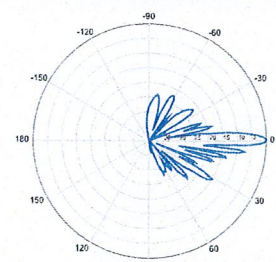


0° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-X



Horizontal | 1920-2170 MHz
BXA-171063-12CF-EDIN-0



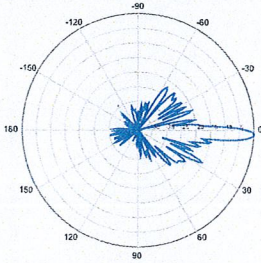
0° | Vertical | 1920-2170 MHz

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

BXA-171063-12CF-EDIN-X

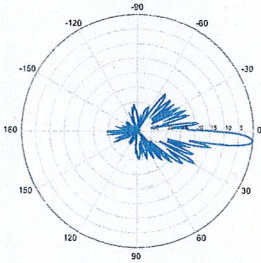
X-Pol | FET Panel | 63° | 19.0 dBi

BXA-171063-12CF-EDIN-2



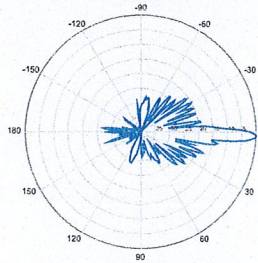
2° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-5



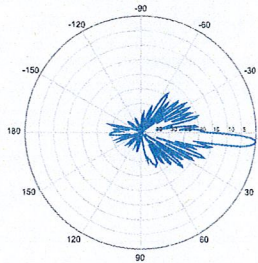
5° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-2



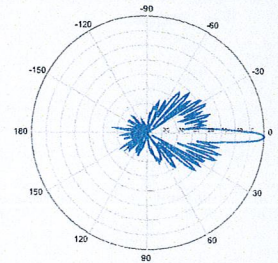
2° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-5



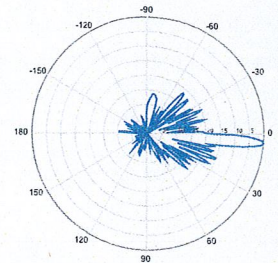
5° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171063-12CF-EDIN-5



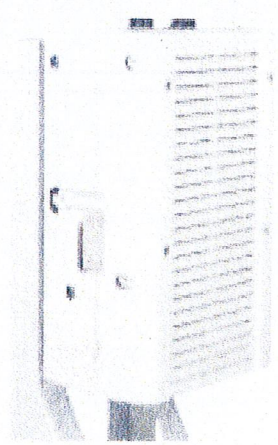
5° | Vertical | 1920-2170 MHz

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.

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

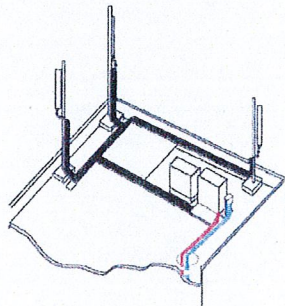
capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving costly coverage holes. However, many of these sites can host an Alcatel-Lucent 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 weighs 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

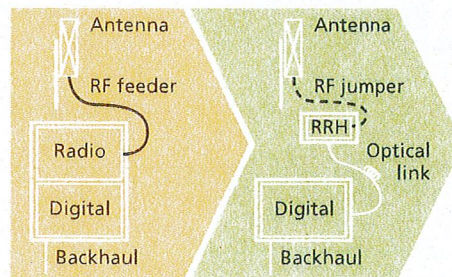
Because of its small size and weight, the Alcatel-Lucent RRH2x40-07-U can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-07-U where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and 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.



Macro

Features

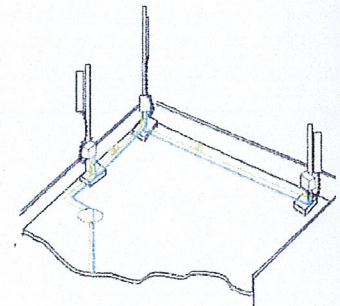
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless), noise-free, and heaterless unit
- Best-in-class power efficiency, with significantly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



RRH for space-constrained cell sites

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



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

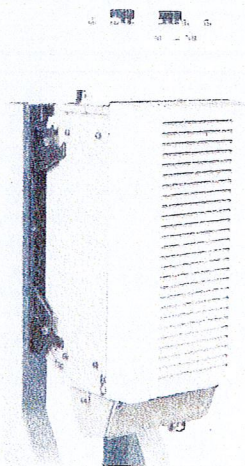
- Six external alarms
- Two optical ports to support daisy-chaining

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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

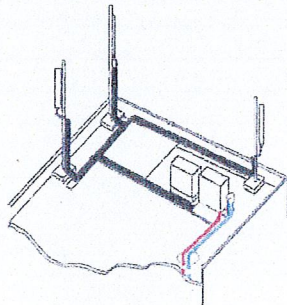
capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent 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

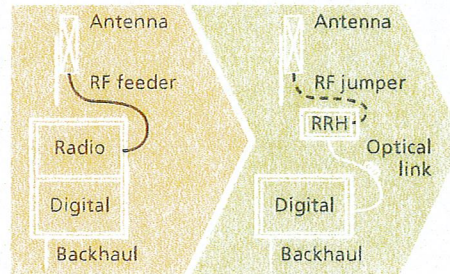
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation 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.



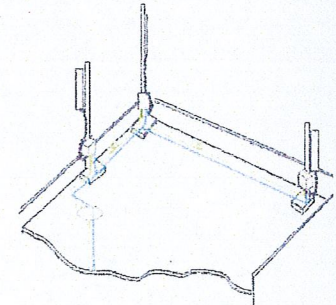
Macro

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



RRH for space-constrained cell sites



Distributed

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

Technical specifications

Physical dimensions

- Height: 620 mm (24.4 in.)
- Width: 270 mm (10.63 in.)
- Depth: 170mm (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

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

Product Description

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

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

Features/Benefits

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

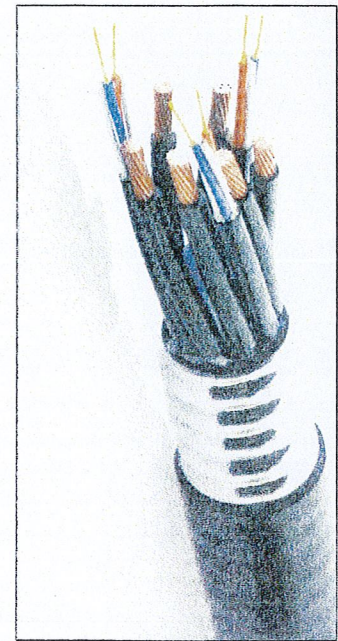


Figure 1: HYBRIFLEX Series

Technical Specifications

| | | | |
|--|--------------------------------|-------------------|---|
| 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, 8.4mm ² (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) | | [mm (AWG)] | 8.4 (8) |
| Quantity, Wire Count (Power) | | | 16 (8 pairs) |
| Size (Alarm) | | [mm (AWG)] | 0.8 (18) |
| Quantity, Wire Count (Alarm) | | | 4 (2 pairs) |
| Type | | | UV protected |
| Strands | | | 19 |
| Primary Jacket Diameter, Nominal | | [mm (in)] | 6.8 (0.27) |
| Standards (Meets or exceeds) | | | NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant |
| Environment | | | |
| Installation Temperature | | [°C (°F)] | -40 to +65 (-40 to 149) |
| Operation Temperature | | [°C (°F)] | -40 to +65 (-40 to 149) |

* This data is provisional and subject to change.

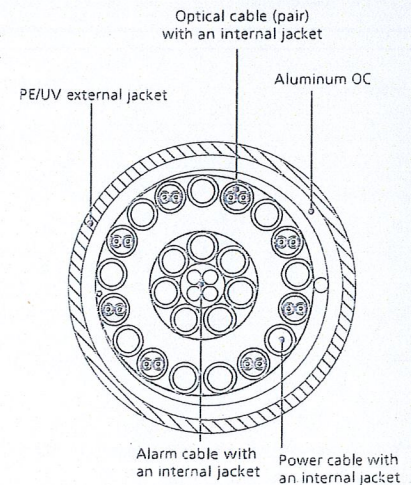


Figure 2: Construction Detail

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

| Site Name: Canterbury Tower Height: Verizon @ 170ft | | General | Power | Density | | | | | | |
|--|------------|-------------|------------|------------------|-------------|--------------------|--------------|-------|--|---------------|
| CARRIER | # OF CHAN. | WATTS ERP | HEIGHT | CALC. POWER DENS | FREQ. | MAX. PERMISS. EXP. | FRACTION MPE | Total | | |
| *Sprint | 11 | 122 | 180 | 0.0149 | 1962 | 1.0000 | 1.49% | | | |
| *AT&T UMTS | 2 | 565 | 161 | 0.0157 | 880 | 0.5867 | 2.67% | | | |
| *AT&T UMTS | 2 | 875 | 161 | 0.0243 | 1900 | 1.0000 | 2.43% | | | |
| *AT&T LTE | 1 | 1771 | 161 | 0.0246 | 734 | 0.4893 | 5.02% | | | |
| *AT&T GSM | 4 | 525 | 161 | 0.0291 | 1900 | 1.0000 | 2.91% | | | |
| *AT&T GSM | 1 | 283 | 161 | 0.0039 | 880 | 0.5867 | 0.67% | | | |
| Verizon PCS | 11 | 227 | 170 | 0.0311 | 1970 | 1.0000 | 3.11% | | | |
| Verizon Cellular | 9 | 242 | 170 | 0.0271 | 869 | 0.5793 | 4.68% | | | |
| Verizon AWS | 1 | 1750 | 170 | 0.0218 | 2145 | 1.0000 | 2.18% | | | |
| Verizon 700 | 1 | 1050 | 170 | 0.0131 | 698 | 0.4653 | 2.81% | | | 27.96% |
| * Source: Siting Council | | | | | | | | | | |



PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: February 28, 2013

Sean Dempsey
Crown Castle USA Inc.
3530 Torington Way Suite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street, Suite 1500
Columbus, OH 43215
614.221.6679
dwolosiansky@pjfweb.com

Subject: Structural Analysis Report

Carrier Designation: Verizon Wireless Co-Locate
Carrier Site Number: 118601
Carrier Site Name: Canterbury CT

Crown Castle Designation: Crown Castle BU Number: 876375
Crown Castle Site Name: CANTERBURY / LEMIRE
Crown Castle JDE Job Number: 225945
Crown Castle Work Order Number: 581240
Crown Castle Application Number: 179729 Rev. 2

Engineering Firm Designation: Paul J Ford and Company Project Number: 37513-0655

Site Data: 53 Westminster Rd., CANTERBURY, Windham County, CT
Latitude 41° 42' 7.15", Longitude -71° 58' 50.11"
180 Foot - Monopole Tower

Dear Sean Dempsey,

Paul J Ford and Company is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 525829, in accordance with application 179729, revision 2.

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

LC4.7: Modified Structure w/ Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

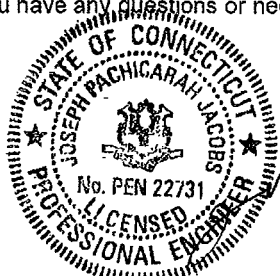
All modifications and equipment proposed in this report shall be installed in accordance with the referenced drawings for the determined available structural capacity to be effective.

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

Respectfully submitted by:

Dean Wolosiansky, E.I.T.
Structural Engineer

tnxTower Report - version 6.0.3.0



MAR 04 2013



PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: **February 28, 2013**

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Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street, Suite 1500
Columbus, OH 43215
614.221.6679
dwolosiansky@pjfweb.com

Subject: Structural Analysis Report

Carrier Designation: **Verizon Wireless Co-Locate**
Carrier Site Number: 118601
Carrier Site Name: Canterbury CT

Crown Castle Designation: **Crown Castle BU Number:** 876375
Crown Castle Site Name: CANTERBURY / LEMIRE
Crown Castle JDE Job Number: 225945
Crown Castle Work Order Number: 581240
Crown Castle Application Number: 179729 Rev. 2

Engineering Firm Designation: **Paul J Ford and Company Project Number:** 37513-0655

Site Data: **53 Westminster Rd., CANTERBURY, Windham County, CT**
Latitude 41° 42' 7.15", Longitude -71° 58' 50.11"
180 Foot - Monopole Tower

Dear Sean Dempsey,

Paul J Ford and Company is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 525829, in accordance with application 179729, revision 2.

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

LC4.7: Modified Structure w/ Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

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

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

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Structural Engineer

tnxTower Report - version 6.0.3.0

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1) INTRODUCTION

This tower is a 180 ft Monopole. The original manufacturer is unknown. FDH, Inc. provided a monopole mapping in May 2009. The tower has been modified per reinforcement drawings prepared by Paul J. Ford and Company in July of 2009. Reinforcement consists of addition of base plate stiffeners.

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 85 mph with no ice, 37.6 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) |
|---------------------|----------------------------|--------------------|----------------------|--------------------------------------|----------------------|---------------------|
| 170.0 | 170.0 | 3 | alcatel lucent | RRH2X40-07-U | 13 | 1-5/8 |
| | | 3 | alcatel lucent | RRH2x40-AWS | | |
| | | 6 | antel | BXA-171063-12CF-EDIN-X w/ Mount Pipe | | |
| | | 6 | antel | BXA-70063-6CF-EDIN-4 w/ Mount Pipe | | |
| | | 1 | rfs celwave | DB-T1-6Z-8AB-0Z | | |
| | | 1 | tower mounts | Platform Mount [LP 303-1] | | |

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 | |
|---------------------|----------------------------|--------------------|------------------------|-------------------------------------|---------------------------|---------------------|------|---|
| 180.0 | 183.0 | 6 | decibel | DB980H90E-M w/ Mount Pipe | 6 | 1-5/8 | 1 | |
| | 180.0 | 1 | tower mounts | Platform Mount [LP 601-1] | | | | |
| 160.0 | 161.0 | 3 | kmw communications | AM-X-CD-17-65-00T-RET w/ Mount Pipe | 3 | 3/8 | 2 | |
| | | 6 | powerwave technologies | 7770.00 w/ Mount Pipe | 12 | 1-1/4 | 1 | |
| | | 1 | raycap | DC6-48-60-18-8F | - | - | 2 | |
| | 160.0 | 160.0 | 6 | powerwave technologies | LGP21401 | - | - | 1 |
| | | | 6 | powerwave technologies | LGP21901 | | | |
| | | | 1 | tower mounts | Platform Mount [LP 303-1] | | | |
| 158.0 | 159.0 | 6 | ericsson | RRUS-11 | | | 2 | |
| | 158.0 | 1 | tower mounts | Side Arm Mount [SO 102-3] | | | | |
| 78.0 | 79.0 | 1 | spectracom | 8225 | 1 | 1/2 | 1 | |
| | 78.0 | 1 | tower mounts | Side Arm Mount [SO 701-1] | | | | |

- Notes:
 1) Existing Equipment
 2) Reserved Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

| Document | Remarks | Reference | Source |
|--|------------------------------|-----------|----------|
| 4-GEOTECHNICAL REPORTS | Wolti, 1/24/2000 | 1615348 | CCISITES |
| 4-TOWER FOUNDATION MAPPING | FDH, 09-04033E N1, 4/15/2009 | 1615408 | CCISITES |
| 4-TOWER MAPPING | MTi, 2009415, 6/3/2009 | 2428368 | CCISITES |
| 4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA | PJF, 37509-0930, 5/15/2009 | 2435769 | CCISITES |
| 4-POST-MODIFICATION INSPECTION | PJF, 37509-0930, 7/21/2009 | 2464622 | CCISITES |
| 4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA | PJF, 37512-2172 11/2/12 | 3364133 | CCISITES |

3.1) Analysis Method

tnxTower (version 6.0.3.0), 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) Monopole was reinforced in conformance with the referenced modification drawings dated 5/15/2009.
- 5) Monopole will be reinforced in conformance with the referenced proposed modification drawings dated 11/2/2012.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

| Section No. | Elevation (ft) | Component Type | Size | Critical Element | P (K) | SF*P_allow (K) | % Capacity | Pass / Fail |
|-------------|-----------------|----------------|--------------------------|------------------|--------|----------------|------------|-------------|
| L1 | 180 - 134 | Pole | TP26.374x17.62x0.25 | 1 | -6.97 | 1052.14 | 93.7 | Pass |
| L2 | 134 - 117.75 | Pole | TP28.9665x25.2555x0.3125 | 2 | -9.69 | 1477.54 | 99.6 | Pass |
| L3 | 117.75 - 110.25 | Pole | TP30.3938x28.9665x0.4168 | 3 | -10.95 | 1958.48 | 83.9 | Pass |
| L4 | 110.25 - 88.5 | Pole | TP34.533x30.3938x0.3951 | 4 | -14.00 | 2101.43 | 94.5 | Pass |
| L5 | 88.5 - 82.75 | Pole | TP35.0023x32.934x0.4552 | 5 | -16.60 | 2504.03 | 88.6 | Pass |
| L6 | 82.75 - 55.25 | Pole | TP40.2357x35.0023x0.452 | 6 | -22.77 | 2836.82 | 94.8 | Pass |
| L7 | 55.25 - 43 | Pole | TP42.567x40.2357x0.4645 | 7 | -24.49 | 3036.36 | 92.3 | Pass |
| L8 | 43 - 28.75 | Pole | TP44.5288x40.6389x0.4579 | 8 | -29.41 | 3152.76 | 98.2 | Pass |
| L9 | 28.75 - 0 | Pole | TP50x44.5288x0.4627 | 9 | -36.00 | 3484.49 | 98.7 | Pass |
| | | | | | | | Summary | |

| Section No. | Elevation (ft) | Component Type | Size | Critical Element | P (K) | SF*P_allow (K) | % Capacity | Pass / Fail |
|-------------|----------------|----------------|------|------------------|-------|----------------|------------|-------------|
| | | | | | | Pole (L2) | 99.6 | Pass |
| | | | | | | Rating = | 99.6 | Pass |

Table 5 - Tower Component Stresses vs. Capacity

| Notes | Component | Elevation (ft) | % Capacity | Pass / Fail |
|-------|----------------------------------|----------------|------------|-------------|
| 1 | Anchor Rods | 0 | 90.5 | Pass |
| 1 | Base Plate | 0 | 92.2 | Pass |
| 1,2 | Base Foundation Steel | 0 | 98.8 | Pass |
| 1 | Base Foundation Soil Interaction | 0 | 95.9 | Pass |

| | |
|---|--------------|
| Structure Rating (max from all components) = | 99.6% |
|---|--------------|

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Capacities up to 105% are considered acceptable based on analysis methods used.

4.1) Recommendations

Monopole will be reinforced with the referenced reinforcement drawings

APPENDIX A
TNXTOWER OUTPUT

Tower Input Data

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

- 1) Tower is located in Windham County, Connecticut.
- 2) Basic wind speed of 85 mph.
- 3) Nominal ice thickness of 1.0000 in.
- 4) Ice thickness is considered to increase with height.
- 5) Ice density of 56 pcf.
- 6) A wind speed of 38 mph is used in combination with ice.
- 7) Temperature drop of 50 °F.
- 8) Deflections calculated using a wind speed of 50 mph.
- 9) A non-linear (P-delta) analysis was used.
- 10) Pressures are calculated at each section.
- 11) Stress ratio used in pole design is 1.333.

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 | 180.00-134.00 | 46.00 | 3.25 | 18 | 17.6200 | 26.3740 | 0.2500 | 1.0000 | A572-65 (65 ksi) |
| L2 | 134.00-117.75 | 19.50 | 0.00 | 18 | 25.2555 | 28.9665 | 0.3125 | 1.2500 | A572-65 (65 ksi) |
| L3 | 117.75-110.25 | 7.50 | 0.00 | 18 | 28.9665 | 30.3938 | 0.4168 | 1.6671 | Reinf 61.75 ksi (62 ksi) |
| L4 | 110.25-88.50 | 21.75 | 4.25 | 18 | 30.3938 | 34.5330 | 0.3951 | 1.5805 | Reinf 62.86 ksi (63 ksi) |
| L5 | 88.50-82.75 | 10.00 | 0.00 | 18 | 32.9340 | 35.0023 | 0.4552 | 1.8206 | Reinf 62.73 ksi (63 ksi) |
| L6 | 82.75-55.25 | 27.50 | 0.00 | 18 | 35.0023 | 40.2357 | 0.4520 | 1.8081 | Reinf 62.14 ksi (62 ksi) |
| L7 | 55.25-43.00 | 12.25 | 5.25 | 18 | 40.2357 | 42.5670 | 0.4645 | 1.8579 | Reinf 62.65 ksi (63 ksi) |
| L8 | 43.00-28.75 | 19.50 | 0.00 | 18 | 40.6389 | 44.5288 | 0.4579 | 1.8316 | Reinf 62.70 ksi (63 ksi) |
| L9 | 28.75-0.00 | 28.75 | | 18 | 44.5288 | 50.0000 | 0.4627 | 1.8507 | Reinf 61.94 ksi (62 ksi) |

Tapered Pole Properties

| Section | Tip Dia. in | Area in ² | I in ⁴ | r in | C in | I/C in ³ | J in ⁴ | I/Q in ² | w in | w/t |
|---------|----------------|-------------------------|----------------------|---------|---------|------------------------|----------------------|------------------------|---------|--------|
| L1 | 17.8918 | 13.7831 | 525.3925 | 6.1664 | 8.9510 | 58.6968 | 1051.4762 | 6.8929 | 2.6611 | 10.644 |
| | 26.7809 | 20.7294 | 1787.3245 | 9.2740 | 13.3980 | 133.4024 | 3577.0008 | 10.3667 | 4.2018 | 16.807 |
| L2 | 26.2732 | 24.7403 | 1944.6481 | 8.8548 | 12.8298 | 151.5728 | 3891.8550 | 12.3725 | 3.8950 | 12.464 |
| | 29.4134 | 28.4212 | 2948.1540 | 10.1722 | 14.7150 | 200.3505 | 5900.1872 | 14.2133 | 4.5481 | 14.554 |
| L3 | 29.4134 | 37.7673 | 3889.1689 | 10.1352 | 14.7150 | 264.2999 | 7783.4552 | 18.8872 | 4.3646 | 10.472 |
| | 30.8627 | 39.6554 | 4502.1198 | 10.6418 | 15.4401 | 291.5870 | 9010.1637 | 19.8315 | 4.6158 | 11.075 |
| L4 | 30.8627 | 37.6217 | 4277.4039 | 10.6495 | 15.4401 | 277.0329 | 8560.4360 | 18.8144 | 4.6539 | 11.778 |
| | 35.0657 | 42.8127 | 6303.5184 | 12.1189 | 17.5428 | 359.3230 | 12615.331 | 21.4104 | 5.3824 | 13.622 |
| L5 | 34.3346 | 46.9214 | 6253.2832 | 11.5300 | 16.7304 | 373.7666 | 12514.794 | 23.4652 | 4.9953 | 10.975 |
| | 35.5422 | 49.9095 | 7525.6498 | 12.2642 | 17.7812 | 423.2373 | 15061.202 | 24.9595 | 5.3593 | 11.775 |
| L6 | 35.5422 | 49.5707 | 7475.9298 | 12.2653 | 17.7812 | 420.4411 | 14961.696 | 24.7901 | 5.3648 | 11.868 |
| | 40.8564 | 57.0794 | 11413.718 | 14.1232 | 20.4398 | 558.4079 | 22842.454 | 28.5451 | 6.2859 | 13.906 |

| Section | Tip Dia. in | Area in ² | I in ⁴ | r in | C in | I/C in ³ | J in ⁴ | I/Q in ² | w in | w/t |
|---------|----------------|-------------------------|----------------------|---------|---------|------------------------|----------------------|------------------------|---------|--------|
| L7 | 40.8564 | 58.6331 | 11717.072 4 | 14.1188 | 20.4398 | 573.2493 | 23449.562 5 | 29.3221 | 6.2640 | 13.486 |
| | 43.2237 | 62.0700 | 13900.667 8 | 14.9464 | 21.6240 | 642.8341 | 27819.626 4 | 31.0409 | 6.6743 | 14.369 |
| L8 | 42.3293 | 58.3968 | 11911.566 1 | 14.2643 | 20.6446 | 576.9829 | 23838.805 8 | 29.2040 | 6.3466 | 13.86 |
| | 45.2157 | 64.0501 | 15716.708 1 | 15.6452 | 22.6206 | 694.7953 | 31454.096 6 | 32.0312 | 7.0312 | 15.356 |
| L9 | 45.2157 | 64.7131 | 15875.943 3 | 15.6435 | 22.6206 | 701.8347 | 31772.776 5 | 32.3627 | 7.0228 | 15.178 |
| | 50.7713 | 72.7478 | 22553.950 4 | 17.5857 | 25.4000 | 887.9508 | 45137.577 9 | 36.3808 | 7.9857 | 17.26 |

| Tower Elevation | Gusset Area (per face) | Gusset Thickness | Gusset Grade | Adjust. Factor A _r | Adjust. Factor A _r | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals | Double Angle Stitch Bolt Spacing Horizontals |
|------------------|------------------------|------------------|--------------|-------------------------------|-------------------------------|--------------|--|--|
| ft | ft ² | in | | | | | in | in |
| L1 180.00-134.00 | | | | 1 | 1 | 1 | | |
| L2 134.00-117.75 | | | | 1 | 1 | 1 | | |
| L3 117.75-110.25 | | | | 1 | 1 | 1 | | |
| L4 110.25-88.50 | | | | 1 | 1 | 1 | | |
| L5 88.50-82.75 | | | | 1 | 1 | 1 | | |
| L6 82.75-55.25 | | | | 1 | 1 | 1 | | |
| L7 55.25-43.00 | | | | 1 | 1 | 1 | | |
| L8 43.00-28.75 | | | | 1 | 1 | 1 | | |
| L9 28.75-0.00 | | | | 1 | 1 | 1 | | |

Feed Line/Linear Appurtenances - Entered As Area

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Total Number | C _A A _A | Weight |
|-------------------------|-------------|--------------|----------------|---------------|--------------|-------------------------------|--------|
| | | | | | | ft ² /ft | plf |
| LDF7-50A(1-5/8") | C | No | Inside Pole | 180.00 - 0.00 | 6 | No Ice | 0.00 |
| | | | | | | 1/2" Ice | 0.00 |
| | | | | | | 1" Ice | 0.00 |
| | | | | | | 2" Ice | 0.00 |
| | | | | | | 4" Ice | 0.00 |
| LDF6-50A(1-1/4") | C | No | Inside Pole | 160.00 - 0.00 | 12 | No Ice | 0.00 |
| | | | | | | 1/2" Ice | 0.00 |
| | | | | | | 1" Ice | 0.00 |
| | | | | | | 2" Ice | 0.00 |
| | | | | | | 4" Ice | 0.00 |
| FB-L98B-002-75000(3/8") | C | No | Inside Pole | 160.00 - 0.00 | 1 | No Ice | 0.00 |
| | | | | | | 1/2" Ice | 0.00 |
| | | | | | | 1" Ice | 0.00 |
| | | | | | | 2" Ice | 0.00 |
| | | | | | | 4" Ice | 0.00 |
| WR-VG122ST-BRDA(3/8) | C | No | Inside Pole | 160.00 - 0.00 | 2 | No Ice | 0.00 |
| | | | | | | 1/2" Ice | 0.00 |
| | | | | | | 1" Ice | 0.00 |
| | | | | | | 2" Ice | 0.00 |
| | | | | | | 4" Ice | 0.00 |
| LDF4-50A(1/2") | C | No | Inside Pole | 78.00 - 0.00 | 1 | No Ice | 0.00 |
| | | | | | | 1/2" Ice | 0.00 |
| | | | | | | 1" Ice | 0.00 |
| | | | | | | 2" Ice | 0.00 |
| | | | | | | 4" Ice | 0.00 |
| LDF7-50A(1-5/8") | C | No | Inside Pole | 170.00 - 0.00 | 13 | No Ice | 0.00 |
| | | | | | | 1/2" Ice | 0.00 |
| | | | | | | 1" Ice | 0.00 |
| | | | | | | 2" Ice | 0.00 |
| | | | | | | 4" Ice | 0.00 |

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Total Number | | C _A A _A ft ² /ft | Weight plf |
|-------------------------|-------------|--------------|--------------------|-----------------|--------------|----------|--|---------------|
| | | | | | | 1" Ice | 0.00 | 0.82 |
| | | | | | | 2" Ice | 0.00 | 0.82 |
| | | | | | | 4" Ice | 0.00 | 0.82 |
| ** | | | | | | | | |
| 1" Flat Reinforcement | C | No | CaAa (Out Of Face) | 57.00 - 0.00 | 1 | No Ice | 0.17 | 0.00 |
| | | | | | | 1/2" Ice | 0.28 | 0.00 |
| | | | | | | 1" Ice | 0.39 | 0.00 |
| | | | | | | 2" Ice | 0.61 | 0.00 |
| | | | | | | 4" Ice | 1.06 | 0.00 |
| 3/4" Flat Reinforcement | C | No | CaAa (Out Of Face) | 119.00 - 57.00 | 1 | No Ice | 0.13 | 0.00 |
| | | | | | | 1/2" Ice | 0.24 | 0.00 |
| | | | | | | 1" Ice | 0.35 | 0.00 |
| | | | | | | 2" Ice | 0.57 | 0.00 |
| | | | | | | 4" Ice | 1.01 | 0.00 |
| * | | | | | | | | |

Feed Line/Linear Appurtenances Section Areas

| Tower Section n | Tower Elevation ft | Face | A _R ft ² | A _F ft ² | C _A A _A In Face ft ² | C _A A _A Out Face ft ² | Weight K |
|-----------------|--------------------|------|-----------------------------------|-----------------------------------|---|--|-------------|
| L1 | 180.00-134.00 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.83 |
| L2 | 134.00-117.75 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 0.156 | 0.39 |
| L3 | 117.75-110.25 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 0.938 | 0.18 |
| L4 | 110.25-88.50 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 2.719 | 0.52 |
| L5 | 88.50-82.75 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 0.719 | 0.14 |
| L6 | 82.75-55.25 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 3.511 | 0.66 |
| L7 | 55.25-43.00 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 2.042 | 0.30 |
| L8 | 43.00-28.75 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 2.375 | 0.34 |
| L9 | 28.75-0.00 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 4.792 | 0.69 |

Discrete Tower Loads

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment t | Placement ft | C _A A _A Front ft ² | C _A A _A Side ft ² | Weight K | |
|------------------------|-------------|-------------|--|-------------------------|-----------------|---|--|-------------|------|
| Lighting Rod 5/8" x 5' | C | From Leg | 0.00 | 0.0000 | 180.00 | No Ice | 0.31 | 0.31 | 0.03 |
| | | | 0.00 | | | 1/2" Ice | 0.83 | 0.83 | 0.03 |
| | | | 2.50 | | | Ice | 1.32 | 1.32 | 0.04 |
| | | | | | | 1" Ice | 1.96 | 1.96 | 0.07 |
| | | | | | | 2" Ice | 3.34 | 3.34 | 0.16 |
| | | | | | 4" Ice | | | | |
| *** | | | | | | | | | |
| *** | | | | | | | | | |
| (2) DB980H90E-M w/ | A | From Leg | 4.00 | -30.0000 | 180.00 | No Ice | 4.04 | 3.62 | 0.03 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment t ° | Placement ft | C _A A _A Front ft ² | C _A A _A Side ft ² | Weight K | |
|---|-------------|-------------|--|------------------------------|-----------------|--|---|---|--------------------------------------|
| Mount Pipe | | | 0.00 3.00 | | | 1/2" Ice 1" Ice 2" Ice 4" Ice | 4.50 4.95 5.87 8.05 10.00 | 4.48 5.22 6.74 10.00 | 0.06 0.11 0.22 0.55 |
| (2) DB980H90E-M w/ Mount Pipe | B | From Leg | 4.00 0.00 3.00 | -30.0000 | 180.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 4.04 4.50 4.95 5.87 8.05 | 3.62 4.48 5.22 6.74 10.00 | 0.03 0.06 0.11 0.22 0.55 |
| (2) DB980H90E-M w/ Mount Pipe | C | From Leg | 4.00 0.00 3.00 | -30.0000 | 180.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 4.04 4.50 4.95 5.87 8.05 | 3.62 4.48 5.22 6.74 10.00 | 0.03 0.06 0.11 0.22 0.55 |
| * Platform Mount [LP 601-1] | C | From Leg | 0.00 0.00 0.00 | -30.0000 | 180.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 28.47 33.59 38.71 48.95 69.43 | 28.47 33.59 38.71 48.95 69.43 | 1.12 1.51 1.91 2.69 4.26 |
| (2) 5' x 2' Pipe Mount | A | From Leg | 4.00 0.00 0.00 | -30.0000 | 180.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 1.00 1.39 1.70 2.35 3.78 | 1.00 1.39 1.70 2.35 3.78 | 0.03 0.04 0.05 0.08 0.20 |
| 5' x 2' Pipe Mount | B | From Leg | 4.00 0.00 0.00 | -30.0000 | 180.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 1.00 1.39 1.70 2.35 3.78 | 1.00 1.39 1.70 2.35 3.78 | 0.03 0.04 0.05 0.08 0.20 |
| (2) 5' x 2' Pipe Mount | C | From Leg | 4.00 0.00 0.00 | -30.0000 | 180.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 1.00 1.39 1.70 2.35 3.78 | 1.00 1.39 1.70 2.35 3.78 | 0.03 0.04 0.05 0.08 0.20 |
| 8-ft Ladder | B | From Leg | 2.00 0.00 -4.00 | -30.0000 | 180.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 7.07 9.73 11.19 13.98 18.89 | 7.07 9.73 11.19 13.98 18.89 | 0.04 0.07 0.08 0.11 0.15 |
| ***** ***** (2) 7770.00 w/ Mount Pipe | A | From Leg | 4.00 0.00 1.00 | 10.0000 | 160.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 6.12 6.63 7.13 8.16 10.36 | 4.25 5.01 5.71 7.16 10.41 | 0.06 0.10 0.16 0.29 0.66 |
| (2) LGP21401 | A | From Leg | 4.00 0.00 0.00 | 10.0000 | 160.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 1.29 1.45 1.61 1.97 2.79 | 0.23 0.31 0.40 0.61 1.12 | 0.01 0.02 0.03 0.05 0.14 |
| (2) LGP21901 | A | From Leg | 4.00 0.00 0.00 | 10.0000 | 160.00 | No Ice 1/2" Ice | 0.27 0.34 0.43 | 0.18 0.25 0.32 | 0.01 0.01 0.01 |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _A A _A Front | C _A A _A Side | Weight |
|-------------------------------------|-------------|-------------|----------|---------|--------------------|-----------|-------------------------------------|------------------------------------|--------|
| | | | Horz | Lateral | | | | | |
| | | | | | | | ft ² | ft ² | K |
| | | | | | | 1" Ice | 0.62 | 0.49 | 0.02 |
| | | | | | | 2" Ice | 1.10 | 0.94 | 0.07 |
| | | | | | | 4" Ice | | | |
| AM-X-CD-17-65-00T-RET w/ Mount Pipe | A | From Leg | 4.00 | 10.0000 | 160.00 | No Ice | 11.55 | 8.94 | 0.09 |
| | | | 0.00 | | | 1/2" | 12.27 | 10.45 | 0.17 |
| | | | 1.00 | | | Ice | 13.00 | 11.99 | 0.27 |
| | | | | | | 1" Ice | 14.45 | 14.31 | 0.50 |
| | | | | | | 2" Ice | 17.71 | 19.14 | 1.12 |
| | | | | | | 4" Ice | | | |
| (2) 7770.00 w/ Mount Pipe | B | From Leg | 4.00 | 20.0000 | 160.00 | No Ice | 6.12 | 4.25 | 0.06 |
| | | | 0.00 | | | 1/2" | 6.63 | 5.01 | 0.10 |
| | | | 1.00 | | | Ice | 7.13 | 5.71 | 0.16 |
| | | | | | | 1" Ice | 8.16 | 7.16 | 0.29 |
| | | | | | | 2" Ice | 10.36 | 10.41 | 0.66 |
| | | | | | | 4" Ice | | | |
| (2) LGP21401 | B | From Leg | 4.00 | 10.0000 | 160.00 | No Ice | 1.29 | 0.23 | 0.01 |
| | | | 0.00 | | | 1/2" | 1.45 | 0.31 | 0.02 |
| | | | 0.00 | | | Ice | 1.61 | 0.40 | 0.03 |
| | | | | | | 1" Ice | 1.97 | 0.61 | 0.05 |
| | | | | | | 2" Ice | 2.79 | 1.12 | 0.14 |
| | | | | | | 4" Ice | | | |
| (2) LGP21901 | B | From Leg | 4.00 | 10.0000 | 160.00 | No Ice | 0.27 | 0.18 | 0.01 |
| | | | 0.00 | | | 1/2" | 0.34 | 0.25 | 0.01 |
| | | | 0.00 | | | Ice | 0.43 | 0.32 | 0.01 |
| | | | | | | 1" Ice | 0.62 | 0.49 | 0.02 |
| | | | | | | 2" Ice | 1.10 | 0.94 | 0.07 |
| | | | | | | 4" Ice | | | |
| AM-X-CD-17-65-00T-RET w/ Mount Pipe | B | From Leg | 4.00 | 20.0000 | 160.00 | No Ice | 11.55 | 8.94 | 0.09 |
| | | | 0.00 | | | 1/2" | 12.27 | 10.45 | 0.17 |
| | | | 1.00 | | | Ice | 13.00 | 11.99 | 0.27 |
| | | | | | | 1" Ice | 14.45 | 14.31 | 0.50 |
| | | | | | | 2" Ice | 17.71 | 19.14 | 1.12 |
| | | | | | | 4" Ice | | | |
| DC6-48-60-18-8F | B | From Leg | 4.00 | 10.0000 | 160.00 | No Ice | 1.47 | 1.47 | 0.02 |
| | | | 0.00 | | | 1/2" | 1.67 | 1.67 | 0.04 |
| | | | 1.00 | | | Ice | 1.88 | 1.88 | 0.06 |
| | | | | | | 1" Ice | 2.33 | 2.33 | 0.11 |
| | | | | | | 2" Ice | 3.38 | 3.38 | 0.24 |
| | | | | | | 4" Ice | | | |
| (2) 7770.00 w/ Mount Pipe | C | From Leg | 4.00 | 10.0000 | 160.00 | No Ice | 6.12 | 4.25 | 0.06 |
| | | | 0.00 | | | 1/2" | 6.63 | 5.01 | 0.10 |
| | | | 1.00 | | | Ice | 7.13 | 5.71 | 0.16 |
| | | | | | | 1" Ice | 8.16 | 7.16 | 0.29 |
| | | | | | | 2" Ice | 10.36 | 10.41 | 0.66 |
| | | | | | | 4" Ice | | | |
| (2) LGP21401 | C | From Leg | 4.00 | 10.0000 | 160.00 | No Ice | 1.29 | 0.23 | 0.01 |
| | | | 0.00 | | | 1/2" | 1.45 | 0.31 | 0.02 |
| | | | 0.00 | | | Ice | 1.61 | 0.40 | 0.03 |
| | | | | | | 1" Ice | 1.97 | 0.61 | 0.05 |
| | | | | | | 2" Ice | 2.79 | 1.12 | 0.14 |
| | | | | | | 4" Ice | | | |
| (2) LGP21901 | C | From Leg | 4.00 | 10.0000 | 160.00 | No Ice | 0.27 | 0.18 | 0.01 |
| | | | 0.00 | | | 1/2" | 0.34 | 0.25 | 0.01 |
| | | | 0.00 | | | Ice | 0.43 | 0.32 | 0.01 |
| | | | | | | 1" Ice | 0.62 | 0.49 | 0.02 |
| | | | | | | 2" Ice | 1.10 | 0.94 | 0.07 |
| | | | | | | 4" Ice | | | |
| AM-X-CD-17-65-00T-RET w/ Mount Pipe | C | From Leg | 4.00 | 10.0000 | 160.00 | No Ice | 11.55 | 8.94 | 0.09 |
| | | | 0.00 | | | 1/2" | 12.27 | 10.45 | 0.17 |
| | | | 1.00 | | | Ice | 13.00 | 11.99 | 0.27 |
| | | | | | | 1" Ice | 14.45 | 14.31 | 0.50 |
| | | | | | | 2" Ice | 17.71 | 19.14 | 1.12 |
| | | | | | | 4" Ice | | | |
| * Platform Mount [LP 303-1] | C | From Leg | 0.00 | 10.0000 | 160.00 | No Ice | 14.66 | 14.66 | 1.25 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment t ° | Placement ft | | C _A A _A Front ft ² | C _A A _A Side ft ² | Weight K |
|---------------------------|-------------|-------------|--|------------------------------|-----------------|--------|--|---|-------------|
| | | | 0.00 | | | 1/2" | 18.87 | 18.87 | 1.48 |
| | | | 0.00 | | | Ice | 23.08 | 23.08 | 1.71 |
| | | | | | | 1" Ice | 31.50 | 31.50 | 2.18 |
| | | | | | | 2" Ice | 48.34 | 48.34 | 3.10 |
| | | | | | | 4" Ice | | | |
| ***** | | | | | | | | | |
| 8225 | B | From Leg | 4.00 | 40.0000 | 78.00 | No Ice | 0.89 | 0.89 | 0.00 |
| | | | 0.00 | | | 1/2" | 1.08 | 1.08 | 0.01 |
| | | | 1.00 | | | Ice | 1.28 | 1.28 | 0.02 |
| | | | | | | 1" Ice | 1.72 | 1.72 | 0.05 |
| | | | | | | 2" Ice | 2.69 | 2.69 | 0.14 |
| | | | | | | 4" Ice | | | |
| ***** | | | | | | | | | |
| Side Arm Mount [SO 701-1] | B | From Leg | 0.00 | 40.0000 | 78.00 | No Ice | 0.85 | 1.67 | 0.07 |
| | | | 0.00 | | | 1/2" | 1.14 | 2.34 | 0.08 |
| | | | 0.00 | | | Ice | 1.43 | 3.01 | 0.09 |
| | | | | | | 1" Ice | 2.01 | 4.35 | 0.12 |
| | | | | | | 2" Ice | 3.17 | 7.03 | 0.18 |
| | | | | | | 4" Ice | | | |
| ***** | | | | | | | | | |
| (2) RRUS-11 | A | From Leg | 2.00 | 10.0000 | 158.00 | No Ice | 4.42 | 1.19 | 0.06 |
| | | | 0.00 | | | 1/2" | 4.71 | 1.35 | 0.08 |
| | | | 1.00 | | | Ice | 5.00 | 1.53 | 0.11 |
| | | | | | | 1" Ice | 5.61 | 1.90 | 0.18 |
| | | | | | | 2" Ice | 6.94 | 2.75 | 0.37 |
| | | | | | | 4" Ice | | | |
| (2) RRUS-11 | B | From Leg | 2.00 | 10.0000 | 158.00 | No Ice | 4.42 | 1.19 | 0.06 |
| | | | 0.00 | | | 1/2" | 4.71 | 1.35 | 0.08 |
| | | | 1.00 | | | Ice | 5.00 | 1.53 | 0.11 |
| | | | | | | 1" Ice | 5.61 | 1.90 | 0.18 |
| | | | | | | 2" Ice | 6.94 | 2.75 | 0.37 |
| | | | | | | 4" Ice | | | |
| (2) RRUS-11 | C | From Leg | 2.00 | 10.0000 | 158.00 | No Ice | 4.42 | 1.19 | 0.06 |
| | | | 0.00 | | | 1/2" | 4.71 | 1.35 | 0.08 |
| | | | 1.00 | | | Ice | 5.00 | 1.53 | 0.11 |
| | | | | | | 1" Ice | 5.61 | 1.90 | 0.18 |
| | | | | | | 2" Ice | 6.94 | 2.75 | 0.37 |
| | | | | | | 4" Ice | | | |
| ***** | | | | | | | | | |
| Side Arm Mount [SO 102-3] | C | From Leg | 0.00 | 10.0000 | 158.00 | No Ice | 3.00 | 3.00 | 0.08 |
| | | | 0.00 | | | 1/2" | 3.48 | 3.48 | 0.11 |
| | | | 0.00 | | | Ice | 3.96 | 3.96 | 0.14 |
| | | | | | | 1" Ice | 4.92 | 4.92 | 0.20 |
| | | | | | | 2" Ice | 6.84 | 6.84 | 0.32 |
| | | | | | | 4" Ice | | | |
| ***** | | | | | | | | | |
| RRH2X40-07-U | A | From Leg | 4.00 | 0.0000 | 170.00 | No Ice | 2.25 | 1.23 | 0.05 |
| | | | 0.00 | | | 1/2" | 2.45 | 1.39 | 0.07 |
| | | | 0.00 | | | Ice | 2.66 | 1.55 | 0.09 |
| | | | | | | 1" Ice | 3.10 | 1.91 | 0.13 |
| | | | | | | 2" Ice | 4.10 | 2.73 | 0.27 |
| | | | | | | 4" Ice | | | |
| RRH2X40-07-U | B | From Leg | 4.00 | 0.0000 | 170.00 | No Ice | 2.25 | 1.23 | 0.05 |
| | | | 0.00 | | | 1/2" | 2.45 | 1.39 | 0.07 |
| | | | 0.00 | | | Ice | 2.66 | 1.55 | 0.09 |
| | | | | | | 1" Ice | 3.10 | 1.91 | 0.13 |
| | | | | | | 2" Ice | 4.10 | 2.73 | 0.27 |
| | | | | | | 4" Ice | | | |
| RRH2X40-07-U | C | From Leg | 4.00 | 0.0000 | 170.00 | No Ice | 2.25 | 1.23 | 0.05 |
| | | | 0.00 | | | 1/2" | 2.45 | 1.39 | 0.07 |
| | | | 0.00 | | | Ice | 2.66 | 1.55 | 0.09 |
| | | | | | | 1" Ice | 3.10 | 1.91 | 0.13 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustmen t ° | Placement ft | C _A A _A Front ft ² | C _A A _A Side ft ² | Weight K | |
|--|-------------|-------------|---|-----------------------------|-----------------|--|---|-------------|------|
| | | | | | | 2" Ice | 4.10 | 2.73 | 0.27 |
| (2) BXA-70063-6CF-EDIN-4 w/ Mount Pipe | A | From Leg | 4.00 0.00 0.00 | 0.0000 | 170.00 | 4" Ice | 7.97 | 5.40 | 0.04 |
| | | | | | | No Ice | 7.97 | 5.40 | 0.04 |
| | | | | | | 1/2" Ice | 8.61 | 6.55 | 0.10 |
| | | | | | | Ice | 9.22 | 7.41 | 0.17 |
| | | | | | | 1" Ice | 10.46 | 9.18 | 0.33 |
| (2) BXA-70063-6CF-EDIN-4 w/ Mount Pipe | B | From Leg | 4.00 0.00 0.00 | 0.0000 | 170.00 | 2" Ice | 13.07 | 12.93 | 0.79 |
| | | | | | | 4" Ice | 7.97 | 5.40 | 0.04 |
| | | | | | | No Ice | 7.97 | 5.40 | 0.04 |
| | | | | | | 1/2" Ice | 8.61 | 6.55 | 0.10 |
| | | | | | | Ice | 9.22 | 7.41 | 0.17 |
| (2) BXA-70063-6CF-EDIN-4 w/ Mount Pipe | C | From Leg | 4.00 0.00 0.00 | 0.0000 | 170.00 | 1" Ice | 10.46 | 9.18 | 0.33 |
| | | | | | | 2" Ice | 13.07 | 12.93 | 0.79 |
| | | | | | | 4" Ice | 7.97 | 5.40 | 0.04 |
| | | | | | | No Ice | 7.97 | 5.40 | 0.04 |
| | | | | | | 1/2" Ice | 8.61 | 6.55 | 0.10 |
| (2) BXA-171063-12CF-EDIN-X w/ Mount Pipe | A | From Leg | 4.00 0.00 0.00 | 0.0000 | 170.00 | Ice | 9.22 | 7.41 | 0.17 |
| | | | | | | 1" Ice | 10.46 | 9.18 | 0.33 |
| | | | | | | 2" Ice | 13.07 | 12.93 | 0.79 |
| | | | | | | 4" Ice | 7.97 | 5.40 | 0.04 |
| | | | | | | No Ice | 7.97 | 5.40 | 0.04 |
| (2) BXA-171063-12CF-EDIN-X w/ Mount Pipe | B | From Leg | 4.00 0.00 0.00 | 0.0000 | 170.00 | 1/2" Ice | 8.61 | 6.55 | 0.10 |
| | | | | | | Ice | 9.22 | 7.41 | 0.17 |
| | | | | | | 1" Ice | 10.46 | 9.18 | 0.33 |
| | | | | | | 2" Ice | 13.07 | 12.93 | 0.79 |
| | | | | | | 4" Ice | 7.97 | 5.40 | 0.04 |
| (2) BXA-171063-12CF-EDIN-X w/ Mount Pipe | C | From Leg | 4.00 0.00 0.00 | 0.0000 | 170.00 | No Ice | 5.03 | 5.29 | 0.04 |
| | | | | | | 1/2" Ice | 5.58 | 6.46 | 0.08 |
| | | | | | | Ice | 6.10 | 7.35 | 0.14 |
| | | | | | | 1" Ice | 7.17 | 9.15 | 0.27 |
| | | | | | | 2" Ice | 9.44 | 12.95 | 0.68 |
| RRH2x40-AWS | A | From Leg | 4.00 0.00 0.00 | 0.0000 | 170.00 | 4" Ice | 5.03 | 5.29 | 0.04 |
| | | | | | | No Ice | 5.03 | 5.29 | 0.04 |
| | | | | | | 1/2" Ice | 5.58 | 6.46 | 0.08 |
| | | | | | | Ice | 6.10 | 7.35 | 0.14 |
| | | | | | | 1" Ice | 7.17 | 9.15 | 0.27 |
| RRH2x40-AWS | B | From Leg | 4.00 0.00 0.00 | 0.0000 | 170.00 | 2" Ice | 9.44 | 12.95 | 0.68 |
| | | | | | | 4" Ice | 5.03 | 5.29 | 0.04 |
| | | | | | | No Ice | 5.03 | 5.29 | 0.04 |
| | | | | | | 1/2" Ice | 5.58 | 6.46 | 0.08 |
| | | | | | | Ice | 6.10 | 7.35 | 0.14 |
| RRH2x40-AWS | C | From Leg | 4.00 0.00 0.00 | 0.0000 | 170.00 | 1" Ice | 7.17 | 9.15 | 0.27 |
| | | | | | | 2" Ice | 9.44 | 12.95 | 0.68 |
| | | | | | | 4" Ice | 5.03 | 5.29 | 0.04 |
| | | | | | | No Ice | 5.03 | 5.29 | 0.04 |
| | | | | | | 1/2" Ice | 5.58 | 6.46 | 0.08 |
| DB-T1-6Z-8AB-0Z | A | From Leg | 4.00 0.00 0.00 | 0.0000 | 170.00 | Ice | 6.10 | 7.35 | 0.14 |
| | | | | | | 1" Ice | 7.17 | 9.15 | 0.27 |
| | | | | | | 2" Ice | 9.44 | 12.95 | 0.68 |
| | | | | | | 4" Ice | 5.03 | 5.29 | 0.04 |
| | | | | | | No Ice | 5.03 | 5.29 | 0.04 |
| Platform Mount [LP 303-1] | C | From Leg | 0.00 0.00 | 30.0000 | 170.00 | 1/2" Ice | 5.92 | 2.56 | 0.08 |
| | | | | | | No Ice | 14.66 | 14.66 | 1.25 |
| | | | | | | 1/2" Ice | 18.87 | 18.87 | 1.48 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert | Azimuth Adjustment t | Placement | C _A A _A Front | C _A A _A Side | Weight |
|-------------|-------------|-------------|----------------------------|----------------------|-----------|-------------------------------------|------------------------------------|--------|
| | | | ft ft ft | ° | ft | ft ² | ft ² | K |
| | | | 0.00 | | Ice | 23.08 | 23.08 | 1.71 |
| | | | | | 1" Ice | 31.50 | 31.50 | 2.18 |
| | | | | | 2" Ice | 48.34 | 48.34 | 3.10 |
| | | | | | 4" Ice | | | |

Maximum Tower Deflections - Service Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|---------------------|-----------------|--------|---------|
| L1 | 180 - 134 | 63.837 | 33 | 3.4032 | 0.0101 |
| L2 | 137.25 - 117.75 | 35.466 | 33 | 2.7012 | 0.0037 |
| L3 | 117.75 - 110.25 | 25.386 | 33 | 2.1945 | 0.0025 |
| L4 | 110.25 - 88.5 | 22.069 | 33 | 2.0290 | 0.0021 |
| L5 | 92.75 - 82.75 | 15.377 | 33 | 1.6249 | 0.0015 |
| L6 | 82.75 - 55.25 | 12.123 | 33 | 1.4589 | 0.0013 |
| L7 | 55.25 - 43 | 5.311 | 33 | 0.9150 | 0.0007 |
| L8 | 48.25 - 28.75 | 4.063 | 33 | 0.7880 | 0.0006 |
| L9 | 28.75 - 0 | 1.411 | 33 | 0.4777 | 0.0003 |

Critical Deflections and Radius of Curvature - Service Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|--------------|---------------------------|-----------------|---------------|--------|---------|------------------------|
| 180.00 | Lighting Rod 5/8" x 5' | 33 | 63.837 | 3.4032 | 0.0102 | 16457 |
| 170.00 | RRH2X40-07-U | 33 | 56.781 | 3.2767 | 0.0084 | 8228 |
| 160.00 | (2) 7770.00 w/ Mount Pipe | 33 | 49.870 | 3.1370 | 0.0068 | 4113 |
| 158.00 | (2) RRUS-11 | 33 | 48.518 | 3.1066 | 0.0065 | 3738 |
| 78.00 | 8225 | 33 | 10.722 | 1.3748 | 0.0012 | 2876 |

Maximum Tower Deflections - Design Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|---------------------|-----------------|--------|---------|
| L1 | 180 - 134 | 182.537 | 8 | 9.7114 | 0.0285 |
| L2 | 137.25 - 117.75 | 101.686 | 8 | 7.7390 | 0.0103 |
| L3 | 117.75 - 110.25 | 72.857 | 8 | 6.2946 | 0.0068 |
| L4 | 110.25 - 88.5 | 63.358 | 8 | 5.8218 | 0.0059 |
| L5 | 92.75 - 82.75 | 44.172 | 8 | 4.6659 | 0.0041 |
| L6 | 82.75 - 55.25 | 34.835 | 8 | 4.1904 | 0.0035 |
| L7 | 55.25 - 43 | 15.271 | 8 | 2.6304 | 0.0019 |
| L8 | 48.25 - 28.75 | 11.684 | 8 | 2.2656 | 0.0016 |
| L9 | 28.75 - 0 | 4.058 | 8 | 1.3741 | 0.0009 |

Critical Deflections and Radius of Curvature - Design Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|--------------|---------------------------|-----------------|---------------|--------|---------|------------------------|
| 180.00 | Lighting Rod 5/8" x 5' | 8 | 182.537 | 9.7114 | 0.0290 | 6108 |
| 170.00 | RRH2X40-07-U | 8 | 162.445 | 9.3624 | 0.0241 | 3052 |
| 160.00 | (2) 7770.00 w/ Mount Pipe | 8 | 142.763 | 8.9744 | 0.0195 | 1522 |
| 158.00 | (2) RRUS-11 | 8 | 138.912 | 8.8886 | 0.0186 | 1383 |
| 78.00 | 8225 | 8 | 30.812 | 3.9493 | 0.0034 | 1012 |

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 | 180 - 134 (1) | TP26.374x17.62x0.25 | 46.00 | 0.00 | 0.0 | 39.000 | 20.2386 | -6.97 | 789.31 | 0.009 |
| L2 | 134 - 117.75 (2) | TP28.9665x25.2555x0.312 5 | 19.50 | 0.00 | 0.0 | 39.000 | 28.4212 | -9.69 | 1108.43 | 0.009 |
| L3 | 117.75 - 110.25 (3) | TP30.3938x28.9665x0.416 8 | 7.50 | 0.00 | 0.0 | 37.050 | 39.6554 | -10.95 | 1469.23 | 0.007 |
| L4 | 110.25 - 88.5 (4) | TP34.533x30.3938x0.3951 | 21.75 | 0.00 | 0.0 | 37.716 | 41.7984 | -14.00 | 1576.47 | 0.009 |
| L5 | 88.5 - 82.75 (5) | TP35.0023x32.934x0.4552 | 10.00 | 0.00 | 0.0 | 37.638 | 49.9095 | -16.60 | 1878.49 | 0.009 |
| L6 | 82.75 - 55.25 (6) | TP40.2357x35.0023x0.452 | 27.50 | 0.00 | 0.0 | 37.284 | 57.0794 | -22.77 | 2128.15 | 0.011 |
| L7 | 55.25 - 43 (7) | TP42.567x40.2357x0.4645 | 12.25 | 0.00 | 0.0 | 37.590 | 60.5971 | -24.49 | 2277.84 | 0.011 |
| L8 | 43 - 28.75 (8) | TP44.5288x40.6389x0.457 9 | 19.50 | 0.00 | 0.0 | 37.620 | 62.8698 | -29.41 | 2365.16 | 0.012 |
| L9 | 28.75 - 0 (9) | TP50x44.5288x0.4627 | 28.75 | 0.00 | 0.0 | 37.164 | 70.3374 | -36.00 | 2614.02 | 0.014 |

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 | 180 - 134 (1) | TP26.374x17.62x0.25 | 511.81 | 48.310 | 39.000 | 1.239 | 0.00 | 0.000 | 39.000 | 0.000 |
| L2 | 134 - 117.75 (2) | TP28.9665x25.2555x0.31 25 | 858.62 | 51.427 | 39.000 | 1.319 | 0.00 | 0.000 | 39.000 | 0.000 |
| L3 | 117.75 - 110.25 (3) | TP30.3938x28.9665x0.41 68 | 999.45 | 41.132 | 37.050 | 1.110 | 0.00 | 0.000 | 37.050 | 0.000 |
| L4 | 110.25 - 88.5 (4) | TP34.533x30.3938x0.395 1 | 1345.5 | 47.156 | 37.716 | 1.250 | 0.00 | 0.000 | 37.716 | 0.000 |
| L5 | 88.5 - 82.75 (5) | TP35.0023x32.934x0.455 2 | 1555.0 | 44.090 | 37.638 | 1.171 | 0.00 | 0.000 | 37.638 | 0.000 |
| L6 | 82.75 - 55.25 (6) | TP40.2357x35.0023x0.45 2 | 2173.1 | 46.699 | 37.284 | 1.253 | 0.00 | 0.000 | 37.284 | 0.000 |
| L7 | 55.25 - 43 (7) | TP42.567x40.2357x0.464 5 | 2339.6 | 45.836 | 37.590 | 1.219 | 0.00 | 0.000 | 37.590 | 0.000 |
| L8 | 43 - 28.75 (8) | TP44.5288x40.6389x0.45 79 | 2719.6 | 48.762 | 37.620 | 1.296 | 0.00 | 0.000 | 37.620 | 0.000 |
| L9 | 28.75 - 0 (9) | TP50x44.5288x0.4627 8 | 3345.2 | 48.376 | 37.164 | 1.302 | 0.00 | 0.000 | 37.164 | 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 | 180 - 134 (1) | TP26.374x17.62x0.25 | 17.08 | 0.844 | 26.000 | 0.065 | 1.04 | 0.048 | 26.000 | 0.002 |
| L2 | 134 - 117.75 (2) | TP28.9665x25.2555x0.31 25 | 18.48 | 0.650 | 26.000 | 0.050 | 1.04 | 0.030 | 26.000 | 0.001 |
| L3 | 117.75 - 110.25 (3) | TP30.3938x28.9665x0.41 68 | 19.09 | 0.481 | 24.700 | 0.039 | 1.04 | 0.021 | 24.700 | 0.001 |
| L4 | 110.25 - 88.5 (4) | TP34.533x30.3938x0.395 1 | 20.48 | 0.490 | 25.144 | 0.039 | 1.06 | 0.018 | 25.144 | 0.001 |
| L5 | 88.5 - 82.75 (5) | TP35.0023x32.934x0.455 2 | 21.38 | 0.428 | 25.092 | 0.034 | 1.07 | 0.015 | 25.092 | 0.001 |
| L6 | 82.75 - 55.25 | TP40.2357x35.0023x0.45 | 23.55 | 0.413 | 24.856 | 0.033 | 0.87 | 0.009 | 24.856 | 0.000 |

| 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 $\frac{f_{vt}}{F_{vt}}$ |
|-------------|-----------------------|-----------------------------|---------------|---------------------|---------------------|-------------------------|--------------------|------------------------|------------------------|-------------------------------|
| L7 | 55.25 - 43 (7) (6) | TP42.567x40.2357x0.464 2 | 24.05 | 0.397 | 25.060 | 0.032 | 0.88 | 0.008 | 25.060 | 0.000 |
| L8 | 43 - 28.75 (8) | TP44.5288x40.6389x0.45 5 | 25.21 | 0.401 | 25.080 | 0.032 | 0.90 | 0.008 | 25.080 | 0.000 |
| L9 | 28.75 - 0 (9) | TP50x44.5288x0.4627 79 | 26.68 | 0.379 | 24.776 | 0.030 | 0.94 | 0.007 | 24.776 | 0.000 |

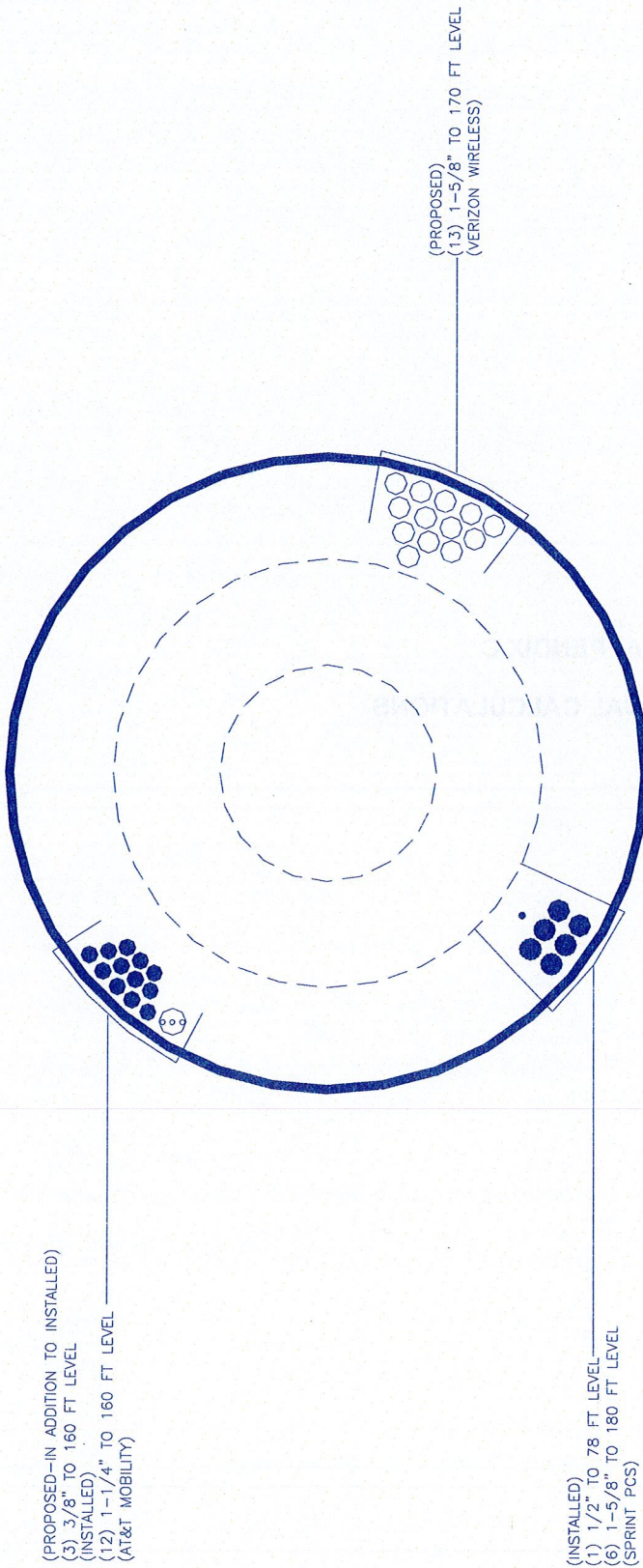
Pole Interaction Design Data

| 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 | 180 - 134 (1) | 0.009 | 1.239 | 0.000 | 0.065 | 0.002 | 1.249 | 1.333 | H1-3+VT ✓ |
| L2 | 134 - 117.75 (2) | 0.009 | 1.319 | 0.000 | 0.050 | 0.001 | 1.328 | 1.333 | H1-3+VT ✓ |
| L3 | 117.75 - 110.25 (3) | 0.007 | 1.110 | 0.000 | 0.039 | 0.001 | 1.118 | 1.333 | H1-3+VT ✓ |
| L4 | 110.25 - 88.5 (4) | 0.009 | 1.250 | 0.000 | 0.039 | 0.001 | 1.260 | 1.333 | H1-3+VT ✓ |
| L5 | 88.5 - 82.75 (5) | 0.009 | 1.171 | 0.000 | 0.034 | 0.001 | 1.181 | 1.333 | H1-3+VT ✓ |
| L6 | 82.75 - 55.25 (6) | 0.011 | 1.253 | 0.000 | 0.033 | 0.000 | 1.264 | 1.333 | H1-3+VT ✓ |
| L7 | 55.25 - 43 (7) | 0.011 | 1.219 | 0.000 | 0.032 | 0.000 | 1.230 | 1.333 | H1-3+VT ✓ |
| L8 | 43 - 28.75 (8) | 0.012 | 1.296 | 0.000 | 0.032 | 0.000 | 1.309 | 1.333 | H1-3+VT ✓ |
| L9 | 28.75 - 0 (9) | 0.014 | 1.302 | 0.000 | 0.030 | 0.000 | 1.316 | 1.333 | H1-3+VT ✓ |

Section Capacity Table

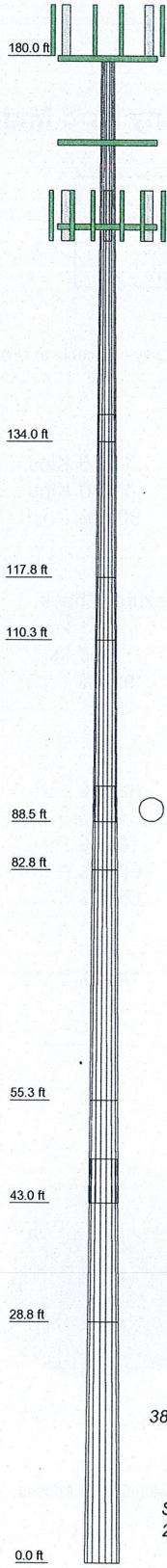
| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | SF*P _{allow} K | % Capacity | Pass Fail |
|-------------|-----------------|----------------|--------------------------|------------------|--------|----------------------------|---------------|--------------|
| L1 | 180 - 134 | Pole | TP26.374x17.62x0.25 | 1 | -6.97 | 1052.14 | 93.7 | Pass |
| L2 | 134 - 117.75 | Pole | TP28.9665x25.2555x0.3125 | 2 | -9.69 | 1477.54 | 99.6 | Pass |
| L3 | 117.75 - 110.25 | Pole | TP30.3938x28.9665x0.4168 | 3 | -10.95 | 1958.48 | 83.9 | Pass |
| L4 | 110.25 - 88.5 | Pole | TP34.533x30.3938x0.3951 | 4 | -14.00 | 2101.43 | 94.5 | Pass |
| L5 | 88.5 - 82.75 | Pole | TP35.0023x32.934x0.4552 | 5 | -16.60 | 2504.03 | 88.6 | Pass |
| L6 | 82.75 - 55.25 | Pole | TP40.2357x35.0023x0.452 | 6 | -22.77 | 2836.82 | 94.8 | Pass |
| L7 | 55.25 - 43 | Pole | TP42.567x40.2357x0.4645 | 7 | -24.49 | 3036.36 | 92.3 | Pass |
| L8 | 43 - 28.75 | Pole | TP44.5288x40.6389x0.4579 | 8 | -29.41 | 3152.76 | 98.2 | Pass |
| L9 | 28.75 - 0 | Pole | TP50x44.5288x0.4627 | 9 | -36.00 | 3484.49 | 98.7 | Pass |
| Summary | | | | | | | | |
| Pole (L2) | | | | | | | 99.6 | Pass |
| RATING = | | | | | | | 99.6 | Pass |

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

| Section | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|--------------------|---------|---------|---------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Length (ft) | 46.00 | 19.50 | 7.50 | 21.75 | 10.00 | 27.50 | 12.25 | 19.50 | 28.75 |
| Number of Sides | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| Thickness (in) | 0.2500 | 0.3125 | 0.4168 | 0.3951 | 0.4552 | 0.4520 | 0.4645 | 0.4579 | 0.4627 |
| Socket Length (ft) | 3.25 | | | 4.25 | | | 5.25 | | |
| Top Dia (in) | 17.6200 | 25.2555 | 28.9665 | 30.3938 | 32.9340 | 35.0023 | 40.2357 | 40.6389 | 44.5288 |
| Bot Dia (in) | 26.3740 | 28.9665 | 30.3938 | 34.5330 | 35.0023 | 40.2357 | 42.5670 | 44.5288 | 50.0000 |
| Grade | A572-95 | | | | | | | | |
| Weight (K) | 2.7 | 1.8 | 1.0 | 3.0 | 1.6 | 5.0 | 2.5 | 4.1 | 6.7 |
| | | | | Reinf 61.75 ksi | Reinf 62.73 ksi | Reinf 62.14 ksi | Reinf 62.65 ksi | Reinf 62.70 ksi | Reinf 61.94 ksi |

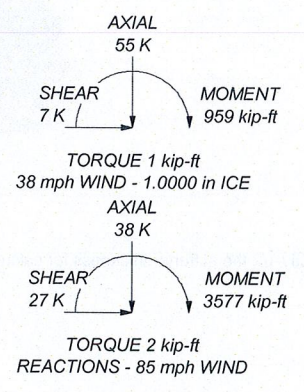


DESIGNED APPURTENANCE LOADING

| TYPE | ELEVATION | TYPE | ELEVATION |
|--|-----------|-------------------------------------|-----------|
| Lighting Rod 5/8" x 5' | 180 | RRH2x40-AWS | 170 |
| (2) DB980H90E-M w/ Mount Pipe | 180 | DB-T1-6Z-8AB-0Z | 170 |
| (2) DB980H90E-M w/ Mount Pipe | 180 | Platform Mount [LP 303-1] | 170 |
| (2) DB980H90E-M w/ Mount Pipe | 180 | (2) 7770.00 w/ Mount Pipe | 160 |
| Platform Mount [LP 601-1] | 180 | (2) LGP21401 | 160 |
| (2) 5' x 2' Pipe Mount | 180 | (2) LGP21901 | 160 |
| 5' x 2' Pipe Mount | 180 | AM-X-CD-17-65-00T-RET w/ Mount Pipe | 160 |
| (2) 5' x 2' Pipe Mount | 180 | (2) 7770.00 w/ Mount Pipe | 160 |
| 8-ft Ladder | 180 | (2) LGP21401 | 160 |
| RRH2X40-07-U | 170 | (2) LGP21901 | 160 |
| RRH2X40-07-U | 170 | AM-X-CD-17-65-00T-RET w/ Mount Pipe | 160 |
| RRH2X40-07-U | 170 | DC6-48-60-18-8F | 160 |
| (2) BXA-70063-6CF-EDIN-4 w/ Mount Pipe | 170 | (2) 7770.00 w/ Mount Pipe | 160 |
| (2) BXA-70063-6CF-EDIN-4 w/ Mount Pipe | 170 | (2) LGP21401 | 160 |
| (2) BXA-70063-6CF-EDIN-4 w/ Mount Pipe | 170 | (2) LGP21901 | 160 |
| (2) BXA-171063-12CF-EDIN-X w/ Mount Pipe | 170 | AM-X-CD-17-65-00T-RET w/ Mount Pipe | 160 |
| (2) BXA-171063-12CF-EDIN-X w/ Mount Pipe | 170 | Platform Mount [LP 303-1] | 160 |
| (2) BXA-171063-12CF-EDIN-X w/ Mount Pipe | 170 | (2) RRUS-11 | 158 |
| (2) BXA-171063-12CF-EDIN-X w/ Mount Pipe | 170 | (2) RRUS-11 | 158 |
| RRH2x40-AWS | 170 | (2) RRUS-11 | 158 |
| RRH2x40-AWS | 170 | Side Arm Mount [SO 102-3] | 158 |
| | | 8225 | 78 |
| | | Side Arm Mount [SO 701-1] | 78 |

TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for a 85 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: 99.6%



| | | | |
|---|--|----------------------------|------------|
|  Paul J Ford and Company 250 E. Broad Street Suite 1500 Columbus, OH 43215 Phone: 614.221.6679 FAX: 614.448.4105 | Job: 180 Ft Monopole - 375123-0655 including MOD 11/2/12 | | |
| | Project: BU#876375 | | |
| | Client: Crown Castle | Drawn by: Dean Wolosiansky | App'd: |
| | Code: TIA/EIA-222-F | Date: 02/28/13 | Scale: NTS |
| | Path: Q:\TOWER\375 Crown Castle\2013\37513-0655 BU 876375\37513-0655 INCLUDING MOD.rvt | Dwg No. E-1 | |

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

TIA Rev F

Site Data

| | |
|------------------------------|-------|
| BU#: 876375 | |
| Site Name: Canterbury/Lemire | |
| App #: 157966 Rev. 2 | |
| Pole Manufacturer: | Other |

| Reactions | | |
|-----------|------|---------|
| Moment: | 3577 | ft-kips |
| Axial: | 38 | kips |
| Shear: | 27 | kips |

| Anchor Rod Data | | |
|-----------------|--------|-----|
| Qty: | 16 | |
| Diam: | 2.25 | in |
| Rod Material: | A615-J | |
| Strength (Fu): | 100 | ksi |
| Yield (Fy): | 75 | ksi |
| Bolt Circle: | 60 | in |

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

Anchor Rod Results

Maximum Rod Tension: 176.5 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 90.5% Pass

| |
|--------------|
| Stiffened |
| Service, ASD |
| Fty*ASIF |

| Plate Data | | |
|-------------------|------|-----|
| Diam: | 65 | in |
| Thick: | 2 | in |
| Grade: | 50 | ksi |
| Single-Rod B-eff: | 9.92 | in |

Base Plate Results

Base Plate Stress: 46.1 ksi
 Allowable Plate Stress: 50.0 ksi
 Base Plate Stress Ratio: 92.2% Pass

Flexural Check

| |
|--------------|
| Stiffened |
| Service, ASD |
| 0.75*Fy*ASIF |
| Y.L. Length: |
| N/A, Roark |

| Stiffener Data (Welding at both sides) | | |
|--|--------|---------------|
| Config: | 1 | * |
| Weld Type: | Fillet | |
| Groove Depth: | 0.5 | <-- Disregard |
| Groove Angle: | 45 | <-- Disregard |
| Fillet H. Weld: | 0.75 | in |
| Fillet V. Weld: | 0.375 | in |
| Width: | 6 | in |
| Height: | 18 | in |
| Thick: | 1 | in |
| Notch: | 0.75 | in |
| Grade: | 50 | ksi |
| Weld str.: | 70 | ksi |

Stiffener Results

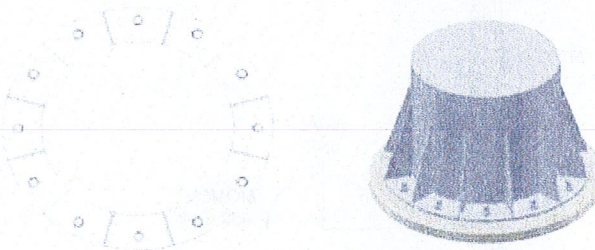
Horizontal Weld : 82.4% Pass
 Vertical Weld: 54.9% Pass
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: 16.9% Pass
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: 65.1% Pass
 Plate Comp. (AISC Bracket): 65.4% Pass

Pole Results

Pole Punching Shear Check: 14.9% Pass

| Pole Data | | |
|--------------------|-------|--------------|
| Diam: | 50 | in |
| Thick: | 0.375 | in |
| Grade: | 65 | ksi |
| # of Sides: | 18 | "0" IF Round |
| Fu | 80 | ksi |
| Reinf. Fillet Weld | 0 | "0" if None |

| Stress Increase Factor | | |
|------------------------|-------|--|
| ASIF: | 1.333 | |



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

Foundation Loads:

Tower leg compression = 38 (kips)
 Horizontal load at top of pier = 27 (kips)
 Overturning moment at top of pier = 3577 (ft-kips)

Design criteria:

Safety factor against overturning = 1.5

Soil Properties:

Soil density = 125 (pcf)
 Allowable soil bearing = 6 (ksf)
 Depth to water table = 99 (ft)

Dimensions:

Pier shape (round or square) S ("R" or "S")
 Pier width = 6.5 (ft)
 Pier height above grade = 1 (ft)
 depth to bottom of footing = 5 (ft)
 Footing thickness = 3 (ft)
 Footing width = 24.5 (ft)
 Footing length = 24.5 (ft)

Concrete:

Concrete strength = 4 (ksi)
 Rebar strength = 60 (ksi)
 ultimate load factor = 1.3

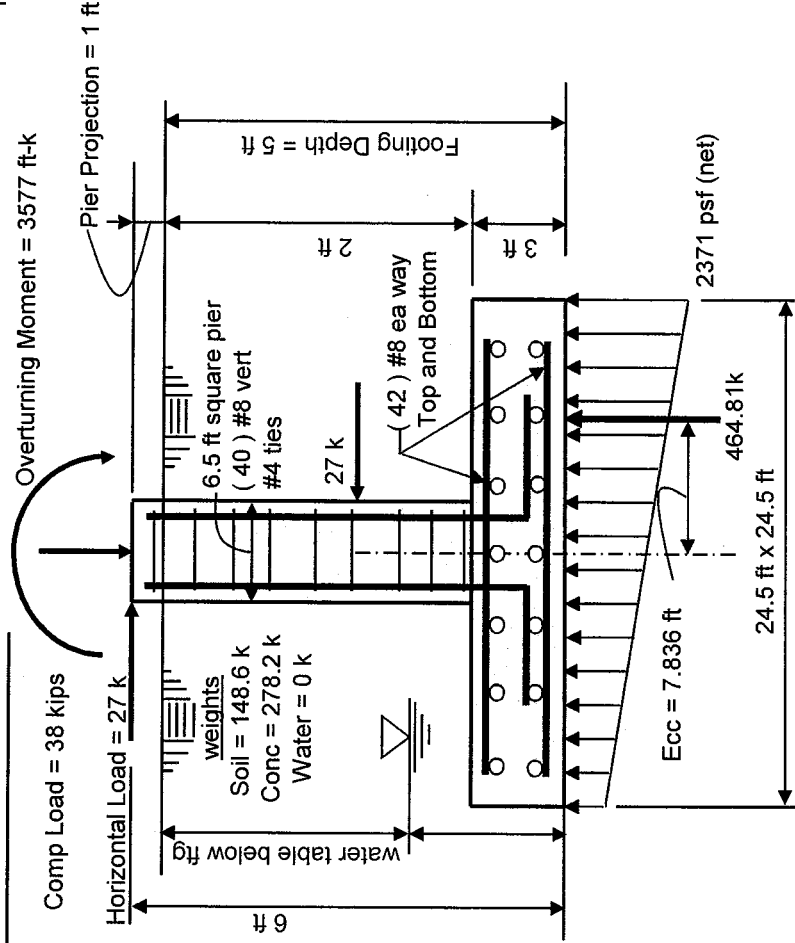
Reinforcing Steel:

minimum cover over rebar = 3 inches
 size of pad rebar = #8 bar
 quantity of pad rebar = 42 (ea direction)

Reinforcing Steel:

size of vert rebar in pier = #8 bar
 vertical rebar quantity = 40
 size of pier ties = #4 bar
 minimum cover over rebar = 3 inches

Total volume of concrete = 68.7 cu yd



| Summary of analysis results | |
|---|---|
| Maximum Net Soil Bearing = 2,371 ksf | Ult Bending Shear Capacity = 126 psi |
| Allowable Net Soil Bearing = 6 ksf | Ult Bending Shear Stress = 41 psi |
| Soil Bearing Stress Ratio = 0.4 Okay | Bending Shear Stress Ratio = 0.33 Okay |
| Ftg Overturning Resistance = 5694 ft-kips | Pad Bending Moment Capacity = 4555 ft-k |
| Overturning Moment = 3642 ft-kips | Pad Bending Moment = 1956 ft-k |
| Required Overturning Safety Factor = 1.5 | Bending Moment Stress Ratio = 0.43 OK |
| Overturning Safety Factor = 1.563 | Ratio = 0.96 Okay |

General Information:

=====
 File Name: G:\TOWER\375_Crown_Castle\2013\37513-0655 BU 876375\Helpful Docs\37513-0655 SPCOLUMN.col
 Project: 37512-2172
 Column: Pad and Pier Engineer: CMC
 Code: ACI 318-02 Units: English

 Run Option: Investigation Slenderness: Not considered
 Run Axis: X-axis Column Type: Architectural

Material Properties:

=====
 f'c = 4 ksi fy = 60 ksi
 Ec = 3605 ksi Es = 29000 ksi
 Ultimate strain = 0.003 in/in
 Betal = 0.85

Section:

=====
 Rectangular: Width = 78 in Depth = 78 in

 Gross section area, Ag = 6084 in^2
 Ix = 3.08459e+006 in^4 Iy = 3.08459e+006 in^4
 rx = 22.5167 in ry = 22.5167 in
 Xo = 0 in Yo = 0 in

Reinforcement:

=====
 Bar Set: ASTM A615

| Size | Diam (in) | Area (in^2) | Size | Diam (in) | Area (in^2) | Size | Diam (in) | Area (in^2) |
|------|-----------|-------------|------|-----------|-------------|------|-----------|-------------|
| # 3 | 0.38 | 0.11 | # 4 | 0.50 | 0.20 | # 5 | 0.63 | 0.31 |
| # 6 | 0.75 | 0.44 | # 7 | 0.88 | 0.60 | # 8 | 1.00 | 0.79 |
| # 9 | 1.13 | 1.00 | # 10 | 1.27 | 1.27 | # 11 | 1.41 | 1.56 |
| # 14 | 1.69 | 2.25 | # 18 | 2.26 | 4.00 | | | |

Confinement: Tied; #4 ties with #10 bars, #4 with larger bars.
 phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

Layout: Circular
 Pattern: All Sides Equal (Cover to transverse reinforcement)
 Total steel area: As = 30.81 in^2 at rho = 0.51% (Note: rho < 1.0%)
 Minimum clear spacing = 4.63 in

39 #8 Cover = 3 in

Factored Loads and Moments with Corresponding Capacities:

=====

| No. | Pu kip | Mux k-ft | PhiMnx k-ft | PhiMn/Mu NA | depth in | Dt depth in | eps_t | Phi |
|-----|-----------|-------------|----------------|-------------|-------------|----------------|---------|-------|
| 1 | 57.01 | 4755.40 | 4814.43 | 1.012 | 10.77 | 73.89 | 0.01762 | 0.900 |

*** End of output ***

$$\frac{1}{1.012} = \underline{\underline{98.8\%}}$$

CROWN CASTLE PROJECT, BU #876375, CANTERBURY/LEMIRE, CANTERBURY, CT
 MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2012)

UPON THE SUCCESSFUL AND COMPLETE INSTALLATION OF THE REINFORCING SYSTEM SPECIFIED IN THESE PLANS, THE REINFORCED POLE MEETS THE WIND DESIGN RECOMMENDATIONS OF THE TIA/EIA-222-F-1996 STANDARD FOR WIND SPEEDS OF 65 MPH AND 39 MPH + 1" RADIAL ICE

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
2. THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA/EIA-222-F BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
3. MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WAIVER TENSORS, GUY OR TIE DOWNS THAT BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE, "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY CUTTING AND WELDING PLAN (DOC# ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT."
5. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED UTILITY STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. LOW HEAT WELDING PROCEDURES: (NOT REQUIRED)

C. SPECIAL INSPECTION AND TESTING

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTOR AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10036 FOR SPECIFICATION.
 2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERMITTED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
 3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
 4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
 - (A) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
 - (B) THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
 5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL VERIFY THE QUALITY OF THE WORK PERFORMED BY THE CONTRACTOR. THE TESTING AGENCY SHALL VERIFY THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
 - A. GENERAL
 - (1) PERFORM CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
 - B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)
 - C. (CONCRETE TESTING PER ACI - (NOT REQUIRED))
 - D. STRUCTURAL STEEL
 - (1) CHECK FOR CORROSION OF STEEL ON THE JOB WITH THE PLANS.
 - (2) CHECK MILL CERTIFICATIONS.
 - (3) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
 - (4) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
 - (5) VERIFY FOR DEFECTS AND REPORTS WHEN IN DOUBT.
 - (6) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
 - (7) CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
 - (8) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.
 - E. WELDING
 - (1) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
 - (2) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED IN AND IN ACCORDANCE WITH AWS D1.1.
 - (3) APPROVE FIELD WELDING SEQUENCE.
 - (A) A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
 - (4) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
 - (A) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
 - (B) VERIFY FOR DEFECTS AND REPORTS WHEN IN DOUBT.
 - (C) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
 - (D) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
 - (E) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
 - (F) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
 - (G) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
 - (H) REVIEW THE REPORTS BY TESTING LABS.
 - (I) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
 - (J) INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
 - (K) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
 - F. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS:
 - (1) PRIOR TO CONSTRUCTION, TESTING AGENCY SHALL INSPECT CONDITION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENERS IF PRESENT. THE INSPECTOR SHALL USE THE FOLLOWING INSPECTION METHODS, OR COMBINATION OF METHODS, AS REQUIRED TO IDENTIFY ANY CRACKS: VISUAL, MAGNETIC PARTICLE, AND/OR ULTRA-SONIC. IN ADDITION, OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. THE TESTING AGENCY SHALL PROVIDE CAREFUL AND THOROUGH DOCUMENTATION OF THIS INSPECTION TO THE OWNER AND THE ENGINEER. TESTING AGENCY SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNER'S REQUIRED PROCESSES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, FRACTURES, DISTRESS, AND/OR CORROSION TO THE OWNER AND ENGINEER.
 - (2) AFTER CONSTRUCTION, TESTING AGENCY SHALL INSPECT ANY AND ALL FIELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION IN THE PREVIOUS NOTE 5.F.(1.) ABOVE.
 - (3) REFER TO CROWN CASTLE DOCUMENTS ENG-SOW-10033 AND ENG-BUL-10051 FOR SPECIFICATIONS.
 - G. REPORTS:
 - (1) COMPLETE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.
6. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DETERMINE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.



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BU #876375; CANTERBURY/LEMIRE
CANTERBURY, CT
 MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

| | |
|---------------------------|------------------------------------|
| PROJECT No: 37512-2172 | ISSUE DATE OF PERMIT: 11-2-2012 |
| DRAWN BY: S.S. | |
| CHECKED BY: D.S.K. | |
| APPROVED BY: Blick | S-1 |
| DATE: 11-2-2012 | |

- D. **STRUCTURAL STEEL**
 - 1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
 - A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
 - (A) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS"
 - (B) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
 - (C) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).
 - B. BY THE AMERICAN WELDING SOCIETY (AWS):
 - (A) "STRUCTURAL WELDING CODE-STEEL D1.1"
 - (B) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"
 - 2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
 - 3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/8 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
 - 4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E60XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 - 5. ALL WELD CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
 - 6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 - 7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
 - 8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
 - 9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
 - 10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
 - 11. FIELD CUTTING OF STEEL
 - (A) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
 - (B) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
 - (C) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
- E. **BASE PLATE GROUT**
1. NEW GROUT FOR THE POLE BASE SHALL BE NON-SHRINK, NON-METALLIC, GROUT (EUCONS GROUT BY EUCLID, OR APPROVED EQUAL) WITH A 7,000 PSI MINIMUM COMPRESSIVE STRENGTH. PVC DRAINAGE PIPES SHALL BE PROVIDED FROM INSIDE THE POLE SHAFT OUT THROUGH THE GROUT SPACE UNDER THE BASE PLATE IN ORDER TO ALLOW MOISTURE TO ADEQUATELY DRAIN FROM THE INTERIOR OF THE POLE SHAFT. CONTRACTOR SHALL SUBMIT PROPOSED GROUT SPECIFICATION INFORMATION TO THE OWNER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CONTRACTOR SHALL FOLLOW GROUT MANUFACTURER'S SPECIFICATIONS FOR COLD WEATHER GROUTING PROCEDURES (IF NECESSARY) AND THE TESTING AGENCY SHALL PREPARE GROUT SAMPLE SPECIMENS FOR COMPRESSIVE STRENGTH TESTING AND VERIFICATION.
2. GROUT SHALL BE INSTALLED TIGHT UNDER BASE PLATE WITH NO VOIDS REMAINING BETWEEN TOP OF EXISTING CONCRETE AND UNDERSIDE OF EXISTING BASE PLATE (EXCEPT FOR DRAIN PIPES). GROUT COMPLETELY SOLID (EXCEPT FOR DRAIN PIPES) UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.
- F. **FOUNDATION WORK - (NOT REQUIRED)**
- G. **CAST-IN-PLACE CONCRETE - (NOT REQUIRED)**
- H. **EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)**
- I. **TOUCH UP OF GALVANIZING**
1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-531-3275 FOR PRODUCT INFORMATION. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
2. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.
- J. **HOT DIP GALVANIZING**
1. HOT DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.
- K. **PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**
1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.
3. THE OWNER SHALL REFER TO TAKEA-222-F-1986, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT. ACCORDING TO TAKEA-222-F-1986 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".



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BU #876375; CANTERBURY/LEMIRE
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| PROJECT No: 37512-2172 | ISSUE DATE OF PERMIT: 11-2-2012 |
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| APPROVED BY: B.K.C. | |
| DATE: 11-2-2012 | S-2 |

NOTE: NO DETAILED INFORMATION REGARDING INTERFERENCES WAS PROVIDED. THEREFORE, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL IMMEDIATELY.

THIS POLE REINFORCEMENT DRAWING IS FOR THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF CO-LOCATION ANALYSIS FOR THIS SITE (PJF#37512-2172), DATED 11-2-2012.

| POLE SPECIFICATIONS | |
|---------------------|-------------------------------------|
| POLE SHAPE TYPE: | 18-SIDED POLYGON |
| TAPER: | 0.19003 IN/FT |
| SHAFT STEEL: | ASTM A572 GRADE 65 |
| BASE PLATE STEEL: | ASTM A572 GR. E (50 KSI) |
| ANCHOR RODS: | 2 1/4" Ø #161 ASTM A618 GRADE 75 |

| SHAFT SECTION DATA | | | | | |
|--------------------|---------------------|----------------------|-----------------|----------------------------|----------|
| SHAFT SECTION | SECTION LENGTH (FT) | PLATE THICKNESS (IN) | LAP SPLICE (IN) | DIAMETER ACROSS FLATS (IN) | |
| | | | | @ TOP | @ BOTTOM |
| 1 | 48.00 | 0.2500 | 38.00 | 17.000 | 26.314 |
| 2 | 48.75 | 0.3125 | 51.00 | 25.250 | 34.583 |
| 3 | 48.75 | 0.3750 | 63.00 | 33.000 | 42.567 |
| 4 | 48.25 | 0.3750 | | 40.818 | 50.000 |

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A58 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND AN EXTRA LONG "SPICE SHIP" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION.

NOTES:

- ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS, DEC. 31, 2009.
- ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS, DEC. 31, 2009.
- ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL ON SHEET S-3 FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
- DTIS REQUIRED: * ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTIS) AND HARDENED WASHERS. DTIS SHALL BE THE SQUIRTERD STYLE, MADE TO ASTM F599 LATEST REVISION, AND HARDENED WASHERS SHALL CONFORM TO ASTM F438 AND HAVE A HARDNESS OF RC 34 OR HIGHER.
- LUBRICATION REQUIRED: * PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW O11 MANUFACTURER'S INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING. REFER TO SHEET S-3.
- AJAX BOLT HOLE SIZE: ALL SH-OP AND FIELD-DRILLED HOLES SHALL BE NOMINAL 3/64" DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1/32". REFER TO SHEET S-3.

* AS OF 5/20/2012 UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-THE-NUT" METHODOLOGY. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-THE-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION BY THE PAF.

NOTE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. PLEASE SEE EN3-SHOW-1003 - TOWER BASE PLATE AND EN3-BUL-1005 - NCE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NOTE SHALL INCLUDE ALL EXISTING REINFORCEMENTS THAT HAVE BEEN WELDED TO THE BASE PLATE. FULL PENETRATION WELDING TO THE BASE PLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NCE SCOPE OF WORK.

REINFORCING BAR SPLICE DETAILS TO BE COORDINATED BY RESPECTIVE CONTRACTORS.

NEW AEROSOLUTIONS MP3 REINFORCING (OPTION #1)

| ELEVATION | FLAT # | REINFORCING ELEMENT |
|------------------|------------|---------------------|
| 5'-0" TO 30'-0" | 18 | MP305 |
| 0'-0" TO 30'-0" | 8 & 12 | MP305 |
| 25'-0" TO 50'-0" | 4, 10 & 16 | MP305 |
| 20'-0" TO 25'-0" | 6, 12 & 18 | MP304 |
| 15'-0" TO 20'-0" | 4, 10 & 16 | MP304 |
| 10'-0" TO 15'-0" | 6, 12 & 18 | MP303 |

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. Fu=105 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE & BOLTS) AND INSTALLATION PROCEDURES.

NEW SABRE FLAT PLATE REINFORCING (OPTION #2)

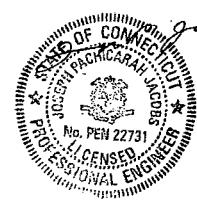
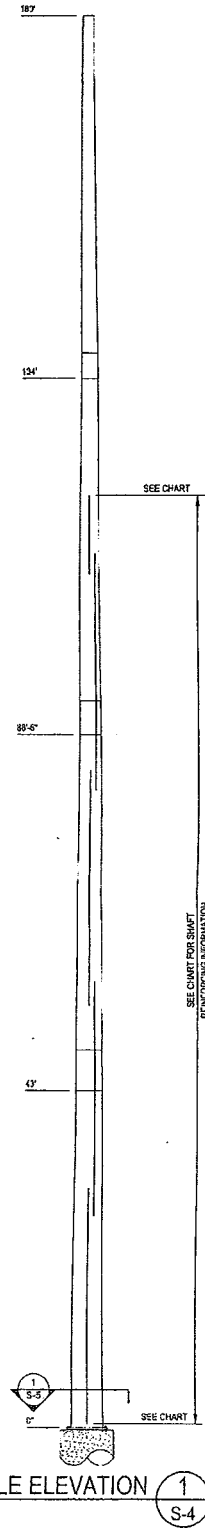
| ELEVATION | FLAT # | REINFORCING ELEMENT |
|------------------|------------|---------------------|
| 5'-0" TO 30'-0" | 18 | MS-650 |
| 0'-0" TO 30'-0" | 8 & 12 | MS-650 |
| 25'-0" TO 50'-0" | 4, 10 & 16 | MS-650 |
| 20'-0" TO 25'-0" | 6, 12 & 18 | MS-600 |
| 15'-0" TO 20'-0" | 4, 10 & 16 | MS-600 |
| 10'-0" TO 15'-0" | 6, 12 & 18 | MS-600 |

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. Fu=105 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE & BOLTS) AND INSTALLATION PROCEDURES.

NEW CCI FLAT PLATE (100 KSI) REINFORCING (OPTION #3)

| ELEVATION | FLAT # | REINFORCING ELEMENT |
|------------------|------------|---------------------|
| 5'-0" TO 30'-0" | 18 | ISP-UR-1004 |
| 0'-0" TO 30'-0" | 8 & 12 | ISP-UR-1004 |
| 25'-0" TO 50'-0" | 4, 10 & 16 | ISP-UR-1004 |
| 20'-0" TO 25'-0" | 6, 12 & 18 | ISP-UR-0754 |
| 15'-0" TO 20'-0" | 4, 10 & 16 | ISP-UR-0754 |
| 10'-0" TO 15'-0" | 6, 12 & 18 | ISP-UR-0754 |

NOTES FOR CROWN REINFORCING (100 KSI) MATERIAL:
 1. DO NOT FIELD WELD DIRECTLY TO THE 100 KSI MATERIAL.
 2. THE 100 KSI MATERIAL SHALL CONFORM TO THE FOLLOWING:
 A. MATERIAL SHALL BE ASTM A514, GRADE A, GRADE E, OR GRADE F, HAVING A MINIMUM TENSILE STRENGTH (Fu) OF 110 KSI AND A MINIMUM YIELD STRENGTH (Fy) OF 100 KSI.
 B. MATERIAL SHALL BE HEAT TREATED, QUENCHED AND TEMPERED PER ASTM A514.
 C. MATERIAL SHALL HAVE CHAMF V-NOTCH (CVN) IMPACT VALUES OF NOT LESS THAN 15 FT-LB AT -20 DEGREES F, IN ACCORDANCE WITH ASTM A514.
 D. MINIMUM INSIDE BEND RADIUS FOR COLD BENDING, PER ASTM A6 TABLE X.4.1, SHALL BE 4.5X MINIMUM.
 E. ANY AND ALL WELDING TO THE MATERIAL SHALL BE PERFORMED ACCORDING TO AN APPROVED WELDING PROCEDURE SPECIFICATION (WPS) SUITABLE FOR THE GRADE AND INTENDED USE AND SERVICE. THE WPS SHALL BE DEVELOPED BY A QUALIFIED CIVIL AND IN ACCORDANCE WITH AWS D1.1. PRIOR TO ANY WORK, FABRICATION OR WELDING, THE WPS SHALL BE SUBMITTED TO CROWN CASTLE AND PAUL J. FORD AND COMPANY FOR REVIEW.



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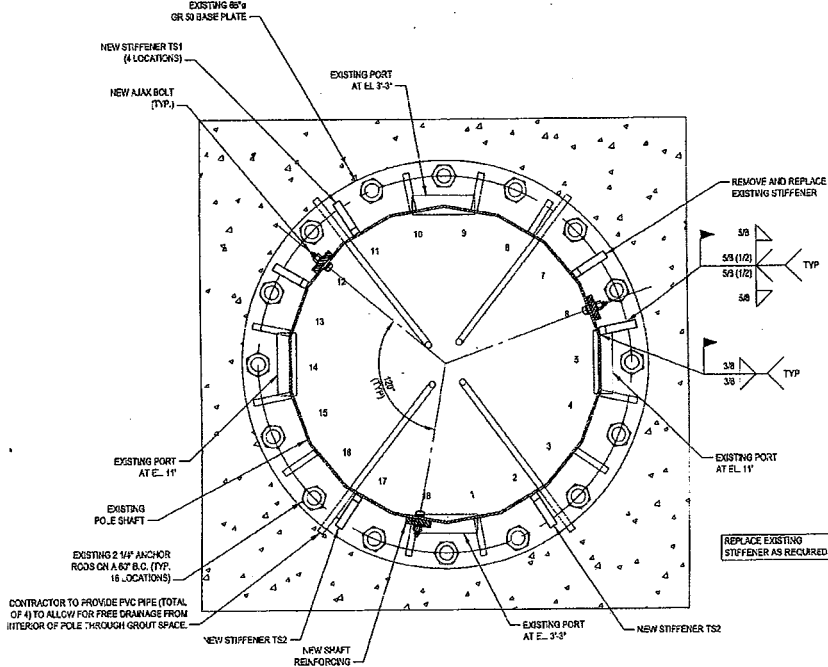
PROJECT No: 37512-2172
 DRAWN BY: S.S.
 CHECKED BY: D.S.K.
 APPROVED BY: [Signature]
 DATE: 11-2-2012

ISSUE DATE OF PRELIM: 11-2-2012

S-4

- SPECIAL INSPECTION OF EXISTING SHWET-TO-FLANGE WELD CONNECTIONS:**
- BEFORE CONSTRUCTION CONTRACTORS, INSPECTION AGENCY SHALL INSPECT CONDITION OF EXISTING SHWET-TO-BASE-PLATE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENERS IF PRESENT. THE CONTRACTORS INSPECTION AGENCY SHALL USE THE FOLLOWING INSPECTION METHODS, OR COMBINATION OF METHODS, AS REQUIRED TO IDENTIFY ANY CRACKS: VISUAL, MAGNETIC PARTICLE, AND/OR ULTRASONIC. IN ADDITION, OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. CONTRACTOR SHALL PROVIDE CAREFUL AND THOROUGH DOCUMENTATION OF THIS INSPECTION TO THE OWNER AND THE ENGINEER BEFORE PROCEEDING WITH WORK. CONTRACTOR SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNER'S REQUIRED PROCEDURES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, FRACTURES, DISTRESS, AND/OR CORROSION TO THE OWNER AND ENGINEER.
 - AFTER CONSTRUCTION, TESTING AGENCY SHALL INSPECT ANY AND ALL FIELD WELDS AND FIELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION BY THE PREVIOUS NOTE (1) ABOVE.

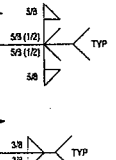
- GENERAL NOTES:**
- AUX BOLTS ARE TO BE 20 mm Ø WITH CORRESPONDING 20 mm Ø SHEAR SLEEVE WITH MATCHING STEEL GRADE. DRILLED HOLE DIAMETERS IN REINFORCING STEEL AND EXISTING SHAFT SHALL BE 1 3/16" MAX.
 - ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-851-3275 FOR PRODUCT INFORMATION.
 - ALL WELD ELECTRODES SHALL BE ER60X.



BASE PLATE 1
S-5

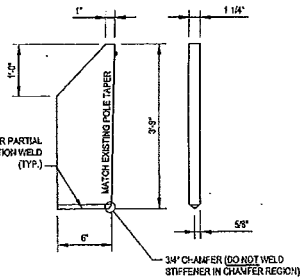
CONTRACTOR TO PROVIDE PVC PIPE (TOTAL OF 1) TO ALLOW FOR FREE DRAINAGE FROM INTERIOR OF POLE THROUGH GROUT SPACE.

REMOVE AND REPLACE EXISTING STIFFENER

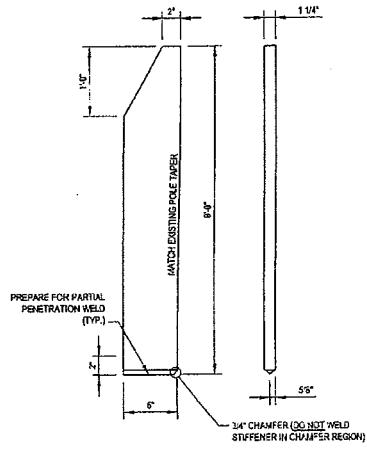


EXISTING PORT AT EL. 1'

REPLACE EXISTING STIFFENER AS REQUIRED



STIFFENER MK-TS1
(4 REQUIRED) (F_y = 65 KSI)



TRANSITION STIFFENER MK-TS2
(2 REQUIRED) (F_y = 65 KSI)



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BU #876375; CANTERBURY/LEMIRE
CANTERBURY, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

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|------------------------------------|
| PROJECT No: 37512-2172 |
| DRAWN BY: S.S. |
| CHECKED BY: D.S.K. |
| APPROVED BY: <i>[Signature]</i> |
| DATE: 11-2-2012 |

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|------------------------------------|
| ISSUE DATE OF PRELIM: 11-2-2012 |
| S-5 |

MODIFICATION INSPECTION NOTES:

GENERAL
 THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY REMAINS WITH THE EOR AT ALL TIMES.

ALL MIs SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (ESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-1073 LIST OF APPROVED MI VENDORS.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 : MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AN ENG-SOW-10007.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTORS TO COINCIDE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION DELAYS ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON-SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LOGGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MIs

IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI (FAILED MI), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION.

MI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTIONS ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEA/ASV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED" MI REPORT FOR THE ORIGINAL PROJECT.

PHOTOGRAPHS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS SHOWING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
 - ** RAW MATERIALS
 - ** PHOTOS OF ALL CRITICAL DETAILS
 - ** FOUNDATION MODIFICATIONS
 - ** WELD PREPARATION
 - ** BOLT INSTALLATION AND TORQUE
 - ** FINAL INSTALLED CONDITION
 - ** SURFACE COATING REPAIRS
- POST CONSTRUCTION PHOTOGRAPHS
 - ** FINAL IN-FIELD CONDITION


PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INSUFFICIENT.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

MI CHECKLIST

| CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR) | REPORT ITEM |
|---|--|
| PRE-CONSTRUCTION | |
| X | MI CHECKLIST DRAWINGS |
| X | EOR APPROVED S-HCP DRAWINGS |
| X | FABRICATION INSPECTION |
| NA | FABRICATOR CERTIFIED WELD INSPECTION |
| X | MATERIAL TEST REPORT (MTR) |
| NA | FABRICATOR NDE INSPECTION |
| X | NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED) |
| X | PACKING SLIPS |
| ADDITIONAL TESTING AND INSPECTIONS: | |
| CONSTRUCTION | |
| X | CONSTRUCTION INSPECTIONS |
| NA | FOUNDATION INSPECTIONS |
| NA | CONCRETE COMP. STRENGTH AND SLUMP TESTS |
| NA | POST INSTALLED ANCHOR ROD VERIFICATION |
| X | BASE PLATE GROUT VERIFICATION |
| X | CONTRACTOR'S CERTIFIED WELD INSPECTION |
| NA | EARTHWORK LIFT AND DENSITY |
| X | ON-SITE COLD GALVANIZING VERIFICATION |
| NA | GUY WIRE TENSION REPORT |
| X | GC AS-BUILT DOCUMENTS |
| X | INSPECTION OF BOLT PRETENSION PER ASC BOLT SPEC. |
| X | INSPECTION OF AXIAL BOLTS AND OTTS PER REQUIREMENTS ON SHEET S-3 |
| ADDITIONAL TESTING AND INSPECTIONS: | |
| POST-CONSTRUCTION | |
| X | MI INSPECTOR REMIUNE OR RECORD DRAWING(S) |
| NA | POST INSTALLED ANCHOR ROD PULL-OUT TESTING |
| X | PHOTOGRAPHS |
| ADDITIONAL TESTING AND INSPECTIONS: | |

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE MI REPORT
 NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT

J. Ford

 NOV 0 2 2012

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BU #876375; CANTERBURY/LEMIRE
CANTERBURY, CT
 MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

| | |
|---------------------------|------------------------------------|
| PROJECT No: 37512-2172 | ISSUE DATE OF PERMIT: 11-2-2012 |
| DRAWN BY: S.S. | |
| CHECKED BY: D.S.K. | S-6 |
| APPROVED BY: | |
| DATE: 11-2-2012 | |

AJAX BOLT NOTE SHEET: REV. 1.2, 01-23-2012

- NOTES:**
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
 2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
 3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
 4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 'ONE-SIDE' BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
 1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
 PHONE 1-800-552-1999
 WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
[HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML](http://www.appliedbolting.com/applied-bolting-distributors.html)

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 3/4" NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

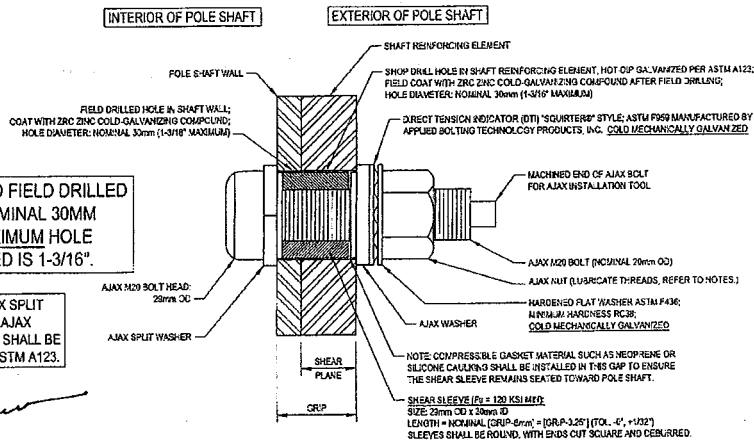
NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

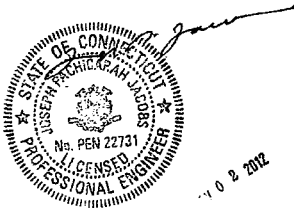
INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.

NOTE: ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16".

NOTE: ALL AJAX BOLTS, AJAX SPLIT WASHERS, AJAX WASHERS, AJAX NUTS, AND SHEAR SLEEVES SHALL BE HOT DIP GALVANIZED PER ASTM A123.



TYPICAL AJAX BOLT DETAIL 1 / S-3



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 DRAWN BY: S.S.
 CHECKED BY: D.S.K.
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 DATE: 11-2-2012

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S-3