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Also admitted in Massachusetts

June 4, 2014

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

Re: **Notice of Exempt Modification – Facility Modification**
North Street, Greenwich, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the top of the existing 175-foot tower off North Street in Greenwich, Connecticut (the "Property"). The antennas maintain a centerline height of approximately 176 feet above ground level. The tower and Property are owned by Crown Castle. The Council approved Cellco's use of this tower in 1988 (Docket No. 86). Cellco now intends to modify its facility by adding three (3) model BXA-171063-12BF, 2100 MHz antennas, for a total of fifteen (15) antennas, all at the same level on the tower. Cellco also intends to install three (3) remote radio heads ("RRHs") behind its 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable attached to the outside the monopole. Included in Attachment 1 are specifications for Cellco's replacement antenna, 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 Peter Tesei, First Selectman of the Town of Greenwich.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's additional three (3) antennas and RRHs will be installed at a centerline height of 176 feet on the existing tower.

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

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

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A General Power Density table for Cellco's modified facility is included in Attachment 2.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation with certain structural modifications can support Cellco's proposed modifications. (*See* Structural Modification Report included in Attachment 3).

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Peter Tesei, First Selectman
Sandy M. Carter

ATTACHMENT 1

BXA-171063-12BF-EDIN-X

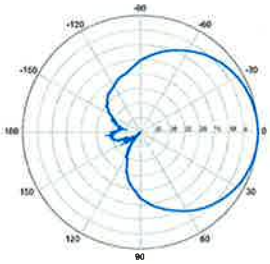
Replace "X" with desired electrical downtilt

X-Pol | FET Panel | 63° | 19.0 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	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, 4, 5		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	< -25 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	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 m² Side: 0.19 m²		Front: 3.1 ft² Side: 2.1 ft²
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N		Front: 103 lbf Side: 68 lbf

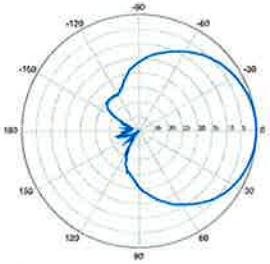
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-12BF-EDIN-X-FP		

BXA-171063-12BF-EDIN-X



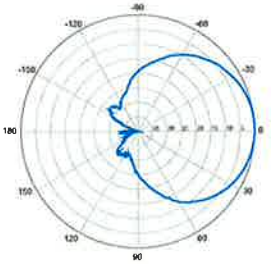
Horizontal | 1710-1880 MHz

BXA-171063-12BF-EDIN-X



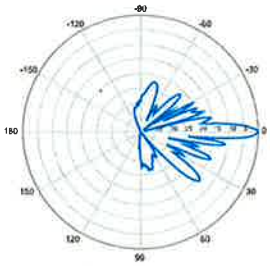
Horizontal | 1850-1990 MHz

BXA-171063-12BF-EDIN-X



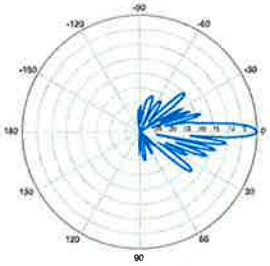
Horizontal | 1920-2170 MHz

BXA-171063-12BF-EDIN-0



0° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-0



0° | Vertical | 1850-1990 MHz

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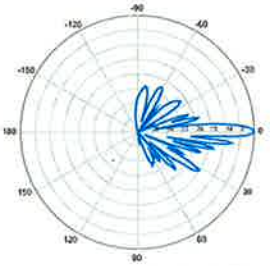
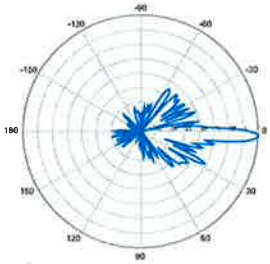


0° | Vertical | 1920-2170 MHz

BXA-171063-12BF-EDIN-X

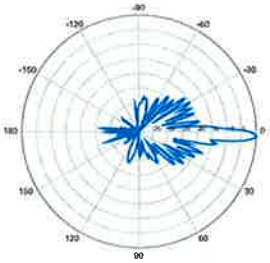
X-Pol | FET Panel | 63° | 19.0 dBi

BXA-171063-12BF-EDIN-2



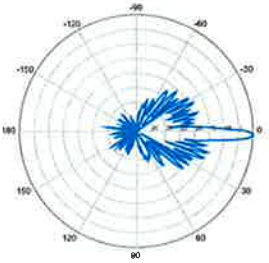
2° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-2



2° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171063-12BF-EDIN-4

4° | Vertical | 1710-1880 MHz

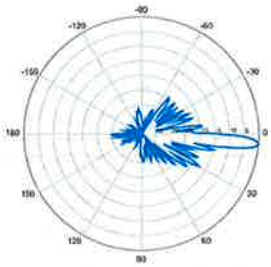
BXA-171063-12BF-EDIN-4

4° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-4

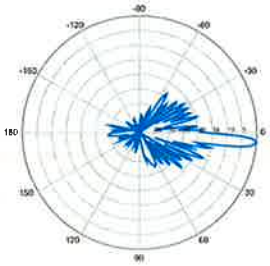
4° | Vertical | 1920-2170 MHz

BXA-171063-12BF-EDIN-5



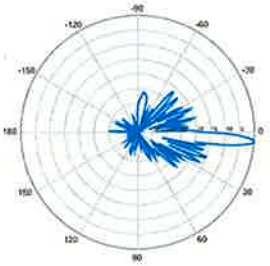
5° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-5



5° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-5



5° | Vertical | 1920-2170 MHz

Alcatel-Lucent RRH2x40-AWS

REMOTE RADIO HEAD

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

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

The Alcatel-Lucent RRH2x40-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information. The Alcatel-Lucent RRH2x40-AWS has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to four-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 20 MHz of bandwidth.

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

Fast, low-cost installation and deployment

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

Excellent RF performance

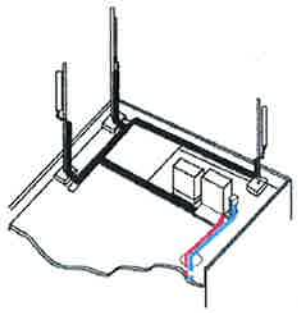
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation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

Features

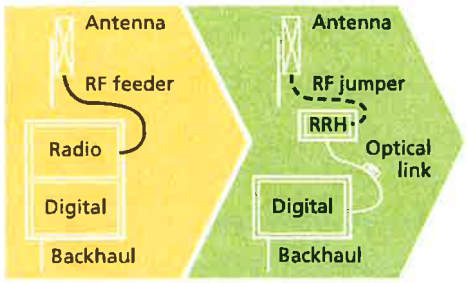
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

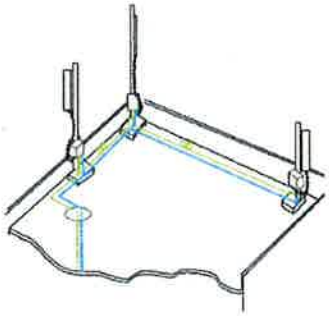
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility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



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

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

Power

- Power supply: -48VDC

Operating environment

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

RF characteristics

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

Optical characteristics

Type/number of fibers

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

Optical fiber length

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

Digital Ports and Alarms

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

Alcatel·Lucent

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	.068 (0.205)
DC-Resistance Power Cable, 8.4mm²(8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL34-V0, UL1666 RoHS Compliant
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

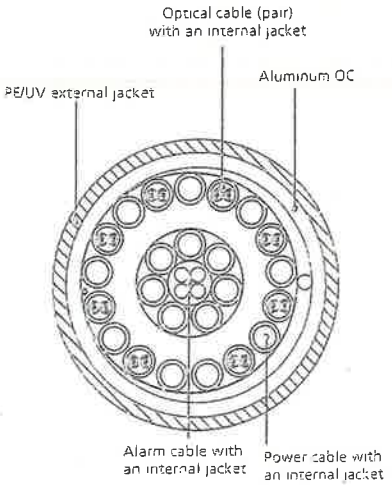


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

Site Name: BANKSVILLE, CT
Cumulative Power Density

Operator	Operating Frequency	Number of Trans.	ERP Per Trans.	Total ERP	Distance to Target	Calculated Power Density	Maximum Permissable Exposure*	Fraction of MPE
	(MHz)		(watts)	(watts)	(feet)	(mW/cm^2)	(mW/cm^2)	(%)
VZW PCS	1970	15	299	4485	176	0.0521	1.0	5.21%
VZW Cellular	869	9	235	2115	176	0.0246	0.579333333	4.24%
VZW AWS	2145	1	668	668	176	0.0078	1.0	0.78%
VZW 700	698	1	1750	1750	176	0.0203	0.465333333	4.37%
Total Percentage of Maximum Permissible Exposure								14.59%

*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Part 1 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1-1992

MHz = Megahertz
mW/cm^2 = milliwatts per square centimeter
ERP = Effective Radiated Power

Absolute worst case maximum values used.

ATTACHMENT 3

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **April 16, 2014**

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
Pittsford, NY 14534
585.899.3445

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

Subject: **Structural Modification Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Banksville, CT
Crown Castle Designation:	**Crown Castle BU Number:**	807132
	Crown Castle Site Name:	BRG 133 943050
	Crown Castle JDE Job Number:	246093
	Crown Castle Work Order Number:	686635
	Crown Castle Application Number:	200498 Rev. 9
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37513-2761 BP
Site Data:	**1081 North Street, Greenwich, Fairfield County, CT** **Latitude *41° 8' 22.91"*, Longitude *-73° 38' 29.58"*** **175 Foot - Monopole Tower**	

Dear Steve Tuttle,

Paul J. Ford and Company is pleased to submit this **"Structural Modification 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 602289, in accordance with application 200498, revision 9.

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:

LC4.5: Modified Structure w/ Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing 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 0.75 inch ice thickness and 50 mph under service loads.

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

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

Respectfully submitted by:

Joey Meinerding, E.I.
Structural Designer BKK

tnxTower Report - version 6.1.4.1

APR 17 2014

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **April 16, 2014**

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8 Parkmeadow Drive
Pittsford, NY 14534
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tnxTower Report - version 6.1.4.1

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1) INTRODUCTION

This tower is a 175 ft. Monopole tower designed by SSI SERVICES in October of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of 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 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
174.0	176.0	3	alcatel lucent	RRH2X40-AWS w/ Mount Pipe	1	1-5/8	--
	175.0	3	antel	BXA-171063-12BF-EDIN-X w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing 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
174.0	175.0	2	antel	ADA-85408580CF w/ Mount Pipe	11 2	1-1/4 1-5/8	1
		2	antel	BXA-80080/4CF w/ Mount Pipe			
		2	decibel	932DG90T2E-M w/ Mount Pipe			
		3	powerwave technologies	P65.16.XL.2 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
	174.0	1	tower mounts	Platform Mount [LP 602-1]			
162.0	162.0	6	ericsson	RRUS-11	1 2 4 4	3/8 3/4 1-1/4 1-5/8	1
		2	kathrein	800 10121 w/ Mount Pipe			
		2	powerwave technologies	7770.00 w/ Mount Pipe			
		8	powerwave technologies	LGP2140X			
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 303-1]			
156.0	156.0	1	tower mounts	Platform Mount [LP 602-1]	--	--	1
144.0	144.0	3	ems wireless	RR90-17-02DP w/ Mount Pipe	6	1-5/8	1
		6	ericsson	KRY 112 71			
		1	tower mounts	Pipe Mount [PM 601-3]			
129.0	134.5	1	antel	BCR-87010:90	1	1-1/4	1
	129.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 14215O1600, 04/09/2014	4837566	CCISITES
4-POST-MODIFICATION INSPECTION	B&T, 83626.003, 07/26/2012	3279736	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	SSI/PJF, 37600-0057, 10/26/2000	1057735	CCISITES
4-TOWER MANUFACTURER DRAWINGS	SSI/PJF, 37600-0057, 10/26/2000	1057736	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37513-2761 BP, 04/16/2014	--	PJF

3.1) Analysis Method

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

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.
5) Monopole will be reinforced in conformance with the attached proposed modification drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	175 - 145.5	Pole	TP27.435x22.125x0.2188	1	-5.83	965.83	47.4	Pass
L2	145.5 - 95.5	Pole	TP35.997x26.1874x0.3125	2	-12.83	1814.93	95.3	Pass
L3	95.5 - 83.25	Pole	TP37.5769x34.382x0.375	3	-16.76	2335.32	94.6	Pass
L4	83.25 - 65.5	Pole	TP40.7716x37.5769x0.5255	4	-21.39	2885.66	92.2	Pass
L5	65.5 - 64	Pole	TP41.0416x40.7716x0.5244	5	-21.79	2897.82	93.1	Pass
L6	64 - 46.58	Pole	TP44.177x41.0416x0.616	6	-25.30	3568.83	83.4	Pass
L7	46.58 - 43.25	Pole	TP44.0268x41.7895x0.6421	7	-30.39	3806.59	86.0	Pass
L8	43.25 - 42.58	Pole	TP44.1474x44.0268x0.6815	8	-30.64	3959.48	83.2	Pass
L9	42.58 - 42	Pole	TP44.2518x44.1474x0.7773	9	-30.88	4615.69	72.0	Pass
L10	42 - 35.5	Pole	TP45.422x44.2518x0.6708	10	-33.25	4105.15	84.4	Pass
L11	35.5 - 18	Pole	TP48.5724x45.422x0.6982	11	-40.21	4638.43	83.7	Pass
L12	18 - 17.5	Pole	TP48.6624x48.5724x0.6976	12	-40.42	4645.66	83.8	Pass
L13	17.5 - 17	Pole	TP48.7524x48.6624x0.697	13	-40.62	4645.13	84.1	Pass
L14	17 - 0	Pole	TP51x48.7524x0.6585	14	-47.46	4928.50	88.5	Pass
							Summary	
						Pole (L2)	95.3	Pass
						RATING =	95.3	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	96.4	Pass
1	Base Plate	0	64.5	Pass
1	Base Foundation	0	89.6	Pass

Structure Rating (max from all components) =	96.4%

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

4.1) Recommendations

Install the proposed modifications per the attached 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 Fairfield County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice density of 56.00 pcf.
5) A wind speed of 38 mph is used in combination with ice.
6) Temperature drop of 50 °F.
7) Deflections calculated using a wind speed of 50 mph.
8) A non-linear (P-delta) analysis was used.
9) Pressures are calculated at each section.
10) Stress ratio used in pole design is 1.333.
11) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	175.00-145.50	29.50	4.50	12	22.1250	27.4350	0.2188	0.8752	A572-65 (65 ksi)
L2	145.50-95.50	54.50	5.50	12	26.1874	35.9970	0.3125	1.2500	A572-65 (65 ksi)
L3	95.50-83.25	17.75	0.00	12	34.3820	37.5769	0.3750	1.5000	A572-65 (65 ksi)
L4	83.25-65.50	17.75	0.00	12	37.5769	40.7716	0.5255	2.1020	Reinf 52.98 ksi (53 ksi)
L5	65.50-64.00	1.50	0.00	12	40.7716	41.0416	0.5244	2.0975	Reinf 52.96 ksi (53 ksi)
L6	64.00-46.58	17.42	6.42	12	41.0416	44.1770	0.6160	2.4640	Reinf 53.05 ksi (53 ksi)
L7	46.58-43.25	9.75	0.00	12	41.7895	44.0268	0.6421	2.5684	Reinf 53.06 ksi (53 ksi)
L8	43.25-42.58	0.67	0.00	12	44.0268	44.1474	0.6815	2.7261	Reinf 51.90 ksi (52 ksi)
L9	42.58-42.00	0.58	0.00	12	44.1474	44.2518	0.7773	3.1090	Reinf 53.04 ksi (53 ksi)
L10	42.00-35.50	6.50	0.00	12	44.2518	45.4220	0.6708	2.6832	Reinf 53.10 ksi

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
L11	35.50-18.00	17.50	0.00	12	45.4220	48.5724	0.6982	2.7930	(53 ksi) Reinf 53.88 ksi (54 ksi)
L12	18.00-17.50	0.50	0.00	12	48.5724	48.6624	0.6976	2.7905	Reinf 53.91 ksi (54 ksi)
L13	17.50-17.00	0.50	0.00	12	48.6624	48.7524	0.6970	2.7880	Reinf 53.85 ksi (54 ksi)
L14	17.00-0.00	17.00		12	48.7524	51.0000	0.6585	2.6340	Reinf 57.73 ksi (58 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.9055	15.4337	945.3449	7.8424	11.4608	82.4854	1915.5251	7.5960	5.3431	24.42
	28.4028	19.1748	1812.8906	9.7434	14.2113	127.5666	3673.4079	9.4372	6.7662	30.924
L2	27.9497	26.0366	2224.9891	9.2632	13.5651	164.0234	4508.4311	12.8144	6.1807	19.778
	37.2668	35.9075	5836.2071	12.7751	18.6464	312.9930	11825.737 8	17.6726	8.8097	28.191
L3	36.6198	41.0635	6061.4927	12.1745	17.8099	340.3441	12282.227 6	20.2102	8.2094	21.892
	38.9024	44.9213	7935.3740	13.3183	19.4648	407.6778	16079.219 2	22.1089	9.0656	24.175
L4	38.9024	62.6950	10985.690 4	13.2644	19.4648	564.3870	22259.987 1	30.8566	8.6623	16.484
	42.2099	68.1009	14079.500 4	14.4081	21.1197	666.6522	28528.884 9	33.5172	9.5185	18.113
L5	42.2099	67.9576	14050.665 6	14.4085	21.1197	665.2869	28470.457 9	33.4467	9.5215	18.158
	42.4894	68.4135	14335.323 7	14.5052	21.2596	674.3001	29047.252 2	33.6710	9.5938	18.296
L6	42.4894	80.1850	16726.019 6	14.4724	21.2596	786.7529	33891.450 4	39.4646	9.3483	15.176
	45.7354	86.4041	20927.437 7	15.5948	22.8837	914.5134	42404.662 4	42.5255	10.1886	16.54
L7	44.7888	85.0735	18385.041 2	14.7308	21.6470	849.3132	37253.077 8	41.8706	9.4788	14.762
	45.5798	89.6991	21549.952 8	15.5317	22.8059	944.9306	43666.046 8	44.1472	10.0784	15.696
L8	45.5798	95.1222	22811.320 9	15.5176	22.8059	1000.2396	46221.920 6	46.8163	9.9727	14.633
	45.7047	95.3869	23002.287 7	15.5608	22.8683	1005.8574	46608.871 1	46.9466	10.0050	14.68
L9	45.7047	108.5444	26060.000 8	15.5265	22.8683	1139.5669	52804.626 7	53.4222	9.7485	12.542
	45.8128	108.8057	26248.666 2	15.5639	22.9224	1145.1088	53186.914 0	53.5508	9.7764	12.578
L10	45.8128	94.1339	22820.536 6	15.6020	22.9224	995.5552	46240.594 1	46.3298	10.0617	15
	47.0243	96.6614	24708.562 3	16.0209	23.5286	1050.1515	50066.246 1	47.5738	10.3753	15.467
L11	47.0243	100.5538	25672.018 4	16.0111	23.5286	1091.0998	52018.469 2	49.4895	10.3018	14.754
	50.2858	107.6370	31488.340 6	17.1389	25.1605	1251.4991	63803.915 1	52.9757	11.1461	15.963
L12	50.2858	107.5428	31461.603 0	17.1392	25.1605	1250.4364	63749.737 3	52.9293	11.1478	15.98
	50.3790	107.7451	31639.410 8	17.1714	25.2071	1255.1771	64110.024 1	53.0288	11.1719	16.014
L13	50.3790	107.6507	31612.517 5	17.1716	25.2071	1254.1102	64055.531 1	52.9824	11.1736	16.031
	50.4722	107.8527	31790.820 1	17.2038	25.2538	1258.8552	64416.820 5	53.0818	11.1977	16.066
L14	50.4722	101.9754	30106.606 5	17.2176	25.2538	1192.1636	61004.147 1	50.1892	11.3009	17.162

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	52.7991	106.7410	34527.8646	18.0223	26.4180	1306.9825	69962.8147	52.5347	11.9032	18.077

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 175.00-145.50				1	1	1		
L2 145.50-95.50				1	1	1		
L3 95.50-83.25				1	1	1		
L4 83.25-65.50				1	1	1		
L5 65.50-64.00				1	1	1		
L6 64.00-46.58				1	1	1		
L7 46.58-43.25				1	1	1		
L8 43.25-42.58				1	1	1		
L9 42.58-42.00				1	1	1		
L10 42.00-35.50				1	1	1		
L11 35.50-18.00				1	1	1		
L12 18.00-17.50				1	1	1		
L13 17.50-17.00				1	1	1		
L14 17.00-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF6-50A(1-1/4")	C	No	Inside Pole	174.00 - 0.00	11	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
LDF7-50A(1-5/8")	C	No	Inside Pole	174.00 - 0.00	2	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	174.00 - 0.00	1	No Ice	0.20	0.00
						1/2" Ice	0.30	0.00
						1" Ice	0.40	0.00
**********								
LDF6-50A(1-1/4")	C	No	Inside Pole	162.00 - 0.00	4	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
2" Conduit	C	No	Inside Pole	162.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
FB-L98B-002-75000(3/8")	C	No	Inside Pole	162.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	162.00 - 0.00	2	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	162.00 - 0.00	2	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						1" Ice	0.00	0.00
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	162.00 - 0.00	2	No Ice	0.20	0.00
						1/2" Ice	0.30	0.00
						1" Ice	0.40	0.00
**********								
**********								
LDF7-50A(1-5/8")	C	No	Inside Pole	144.00 - 0.00	6	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
**********								
LDF6-50A(1-1/4")	C	No	CaAa (Out Of Face)	129.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
**********								
Aero MP3-05	C	No	CaAa (Out Of Face)	45.50 - 0.00	1	No Ice	0.35	0.00
						1/2" Ice	0.40	0.00
						1" Ice	0.66	0.00
Aero MP3-04	C	No	CaAa (Out Of Face)	65.50 - 45.50	1	No Ice	0.27	0.00
						1/2" Ice	0.38	0.00
						1" Ice	0.49	0.00
**********								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	85.50 - 65.50	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	175.00-145.50	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	12.177	0.44
L2	145.50-95.50	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	29.700	1.22
L3	95.50-83.25	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	7.652	0.30
L4	83.25-65.50	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	13.502	0.44
L5	65.50-64.00	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	1.295	0.04
L6	64.00-46.58	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	15.034	0.43
L7	46.58-43.25	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	3.051	0.08
L8	43.25-42.58	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	0.631	0.02
L9	42.58-42.00	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	0.546	0.01
L10	42.00-35.50	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	6.122	0.16
L11	35.50-18.00	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	16.481	0.43
L12	18.00-17.50	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	0.471	0.01

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L13	17.50-17.00	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	0.471	0.01
L14	17.00-0.00	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	16.011	0.42

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	175.00-145.50	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	21.402	0.68
L2	145.50-95.50	A	0.750	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	52.200	1.93
L3	95.50-83.25	A	0.750	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	13.539	0.49
L4	83.25-65.50	A	0.750	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	24.448	0.71
L5	65.50-64.00	A	0.750	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	2.220	0.06
L6	64.00-46.58	A	0.750	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	25.776	0.69
L7	46.58-43.25	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.136	0.13
L8	43.25-42.58	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.053	0.03
L9	42.58-42.00	A	0.750	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	0.912	0.02
L10	42.00-35.50	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.220	0.26
L11	35.50-18.00	A	0.750	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	27.516	0.70
L12	18.00-17.50	A	0.750	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	0.786	0.02
L13	17.50-17.00	A	0.750	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	0.786	0.02
L14	17.00-0.00	A	0.750	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	26.729	0.68

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	175.00-145.50	-0.4590	0.2650	-0.6856	0.3958
L2	145.50-95.50	-0.6292	0.3633	-0.9383	0.5417

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L3	95.50-83.25	-0.6739	0.3891	-1.0235	0.5909
L4	83.25-65.50	-0.8014	0.4627	-1.2253	0.7074
L5	65.50-64.00	-0.8946	0.5165	-1.3070	0.7546
L6	64.00-46.58	-0.9019	0.5207	-1.3239	0.7643
L7	46.58-43.25	-0.9509	0.5490	-1.3739	0.7932
L8	43.25-42.58	-0.9738	0.5622	-1.3971	0.8066
L9	42.58-42.00	-0.9743	0.5625	-1.3982	0.8072
L10	42.00-35.50	-0.9771	0.5641	-1.4045	0.8109
L11	35.50-18.00	-0.9863	0.5694	-1.4250	0.8227
L12	18.00-17.50	-0.9927	0.5731	-1.4395	0.8311
L13	17.50-17.00	-0.9930	0.5733	-1.4402	0.8315
L14	17.00-0.00	-0.9974	0.5759	-1.4503	0.8373

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) ADA-85408580CF w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	5.40 5.84 6.30	3.42 4.02 4.64	0.03 0.07 0.12
BXA-80080/4CF w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	5.49 5.94 6.40	4.03 4.65 5.30	0.03 0.08 0.13
BXA-80080/4CF w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	5.49 5.94 6.40	4.03 4.65 5.30	0.03 0.08 0.13
932DG90T2E-M w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	3.77 4.19 4.65	3.33 4.01 4.66	0.03 0.06 0.10
932DG90T2E-M w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	3.77 4.19 4.65	3.33 4.01 4.66	0.03 0.06 0.10
P65.16.XL.2 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	8.64 9.29 9.91	5.78 6.95 7.83	0.06 0.12 0.19
P65.16.XL.2 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	8.64 9.29 9.91	5.78 6.95 7.83	0.06 0.12 0.19
P65.16.XL.2 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	8.64 9.29 9.91	5.78 6.95 7.83	0.06 0.12 0.19
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	0.37 0.45 0.54	0.08 0.14 0.20	0.00 0.01 0.01
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	0.37 0.45 0.54	0.08 0.14 0.20	0.00 0.01 0.01
(2) FD9R6004/2C-3L	C	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice	0.37 0.45 0.54	0.08 0.14 0.20	0.00 0.01 0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
BXA-171063-12BF-EDIN-X w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	5.04 5.59 6.11	5.30 6.47 7.36	0.04 0.08 0.14
BXA-171063-12BF-EDIN-X w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	5.04 5.59 6.11	5.30 6.47 7.36	0.04 0.08 0.14
BXA-171063-12BF-EDIN-X w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	5.04 5.59 6.11	5.30 6.47 7.36	0.04 0.08 0.14
RRH2X40-AWS w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	2.52 2.75 2.99	1.75 2.04 2.35	0.06 0.08 0.10
RRH2X40-AWS w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	2.52 2.75 2.99	1.75 2.04 2.35	0.06 0.08 0.10
RRH2X40-AWS w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	2.52 2.75 2.99	1.75 2.04 2.35	0.06 0.08 0.10
DB-T1-6Z-8AB-0Z	C	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	5.60 5.92 6.24	2.33 2.56 2.79	0.04 0.08 0.12
Platform Mount [LP 602-1]	C	None		0.000	174.00	No Ice 1/2" Ice 1" Ice	32.03 38.71 45.39	32.03 38.71 45.39	1.34 1.80 2.26
**********									
P65-16-XLH-RR w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	8.64 9.29 9.91	6.36 7.54 8.43	0.08 0.14 0.22
P65-16-XLH-RR w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	8.64 9.29 9.91	6.36 7.54 8.43	0.08 0.14 0.22
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	8.64 9.29 9.91	6.36 7.54 8.43	0.08 0.14 0.22
(2) 800 10121 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	6.03 6.71 7.30	4.95 6.02 6.81	0.07 0.12 0.18
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	6.12 6.63 7.13	4.25 5.01 5.71	0.06 0.10 0.16
(2) RRUS-11	A	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	3.25 3.49 3.74	1.37 1.55 1.74	0.05 0.07 0.09
(2) RRUS-11	B	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	3.25 3.49 3.74	1.37 1.55 1.74	0.05 0.07 0.09
(2) RRUS-11	C	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice	3.25 3.49 3.74	1.37 1.55 1.74	0.05 0.07 0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
(4) LGP2140X	A	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	1.26 1.42 1.58	0.38 0.49 0.62	0.01 0.02 0.03
(4) LGP2140X	B	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	1.26 1.42 1.58	0.38 0.49 0.62	0.01 0.02 0.03
DC6-48-60-18-8F	C	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	2.57 2.80 3.04	2.57 2.80 3.04	0.02 0.04 0.07
2.375" OD x 5' Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	1.19 1.50 1.81	1.19 1.50 1.81	0.02 0.03 0.04
2.375" OD x 5' Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	1.19 1.50 1.81	1.19 1.50 1.81	0.02 0.03 0.04
(3) 2.375" OD x 5' Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	1.19 1.50 1.81	1.19 1.50 1.81	0.02 0.03 0.04
Platform Mount [LP 303-1]	C	None		0.000	162.00	No Ice 1/2" Ice 1" Ice	14.66 18.87 23.08	14.66 18.87 23.08	1.25 1.48 1.71
**********									
Platform Mount [LP 602-1]	C	None		0.000	156.00	No Ice 1/2" Ice 1" Ice	32.03 38.71 45.39	32.03 38.71 45.39	1.34 1.80 2.26
**********									
RR90-17-02DP w/ Mount Pipe	A	From Leg	1.00 0.00 0.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	4.59 5.09 5.58	3.32 4.09 4.78	0.03 0.07 0.12
RR90-17-02DP w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	4.59 5.09 5.58	3.32 4.09 4.78	0.03 0.07 0.12
RR90-17-02DP w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	4.59 5.09 5.58	3.32 4.09 4.78	0.03 0.07 0.12
(2) KRY 112 71	A	From Leg	1.00 0.00 0.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	0.68 0.80 0.93	0.45 0.56 0.68	0.01 0.02 0.03
(2) KRY 112 71	B	From Leg	1.00 0.00 0.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	0.68 0.80 0.93	0.45 0.56 0.68	0.01 0.02 0.03
(2) KRY 112 71	C	From Leg	1.00 0.00 0.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	0.68 0.80 0.93	0.45 0.56 0.68	0.01 0.02 0.03
Pipe Mount [PM 601-3]	C	None		0.000	144.00	No Ice 1/2" Ice 1" Ice	4.39 5.48 6.57	4.39 5.48 6.57	0.20 0.24 0.28
**********									
BCR-87010:90	A	From Leg	3.00	0.000	129.00	No Ice	4.79	4.79	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00				1/2" Ice	5.95	5.95	0.07
			5.50				1" Ice	6.67	6.67	0.11
Side Arm Mount [SO 701-1]	A	None			0.000	129.00	No Ice	0.85	1.67	0.07
							1/2" Ice	1.14	2.34	0.08
							1" Ice	1.43	3.01	0.09

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 175.00-145.50	159.72	1.569	0.03	60.917	A	0.000	60.917	60.917	100.00	0.000	0.000
					B	0.000	60.917		100.00	0.000	0.000
					C	0.000	60.917		100.00	0.000	12.177
L2 145.50-95.50	119.68	1.445	0.03	131.238	A	0.000	131.238	131.238	100.00	0.000	0.000
					B	0.000	131.238		100.00	0.000	0.000
					C	0.000	131.238		100.00	0.000	29.700
L3 95.50-83.25	89.31	1.329	0.02	37.234	A	0.000	37.234	37.234	100.00	0.000	0.000
					B	0.000	37.234		100.00	0.000	0.000
					C	0.000	37.234		100.00	0.000	7.652
L4 83.25-65.50	74.25	1.261	0.02	57.945	A	0.000	57.945	57.945	100.00	0.000	0.000
					B	0.000	57.945		100.00	0.000	0.000
					C	0.000	57.945		100.00	0.000	13.502
L5 65.50-64.00	64.75	1.212	0.02	5.113	A	0.000	5.113	5.113	100.00	0.000	0.000
					B	0.000	5.113		100.00	0.000	0.000
					C	0.000	5.113		100.00	0.000	1.295
L6 64.00-46.58	55.18	1.158	0.02	61.855	A	0.000	61.855	61.855	100.00	0.000	0.000
					B	0.000	61.855		100.00	0.000	0.000
					C	0.000	61.855		100.00	0.000	15.034
L7 46.58-43.25	44.91	1.092	0.02	12.111	A	0.000	12.111	12.111	100.00	0.000	0.000
					B	0.000	12.111		100.00	0.000	0.000
					C	0.000	12.111		100.00	0.000	3.051
L8 43.25-42.58	42.91	1.078	0.02	2.462	A	0.000	2.462	2.462	100.00	0.000	0.000
					B	0.000	2.462		100.00	0.000	0.000
					C	0.000	2.462		100.00	0.000	0.631
L9 42.58-42.00	42.29	1.073	0.02	2.136	A	0.000	2.136	2.136	100.00	0.000	0.000
					B	0.000	2.136		100.00	0.000	0.000
					C	0.000	2.136		100.00	0.000	0.546
L10 42.00-35.50	38.74	1.047	0.02	24.287	A	0.000	24.287	24.287	100.00	0.000	0.000
					B	0.000	24.287		100.00	0.000	0.000
					C	0.000	24.287		100.00	0.000	6.122
L11 35.50-18.00	26.65	1	0.02	68.538	A	0.000	68.538	68.538	100.00	0.000	0.000
					B	0.000	68.538		100.00	0.000	0.000
					C	0.000	68.538		100.00	0.000	16.481
L12 18.00-17.50	17.75	1	0.02	2.026	A	0.000	2.026	2.026	100.00	0.000	0.000
					B	0.000	2.026		100.00	0.000	0.000
					C	0.000	2.026		100.00	0.000	0.471
L13 17.50-17.00	17.25	1	0.02	2.029	A	0.000	2.029	2.029	100.00	0.000	0.000
					B	0.000	2.029		100.00	0.000	0.000
					C	0.000	2.029		100.00	0.000	0.471
L14 17.00-0.00	8.44	1	0.02	70.658	A	0.000	70.658	70.658	100.00	0.000	0.000
					B	0.000	70.658		100.00	0.000	0.000
					C	0.000	70.658		100.00	0.000	16.011

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 175.00-145.50	159.72	1.569	0.01	0.7500	64.605	A	0.000	64.605	64.605	100.00	0.000	0.000
						B	0.000	64.605		100.00	0.000	0.000
						C	0.000	64.605		100.00	0.000	21.402
L2 145.50-95.50	119.68	1.445	0.01	0.7500	137.488	A	0.000	137.488	137.488	100.00	0.000	0.000
						B	0.000	137.488		100.00	0.000	0.000
						C	0.000	137.488		100.00	0.000	52.200
L3 95.50-83.25	89.31	1.329	0.00	0.7500	38.766	A	0.000	38.766	38.766	100.00	0.000	0.000
						B	0.000	38.766		100.00	0.000	0.000
						C	0.000	38.766		100.00	0.000	13.539
L4 83.25-65.50	74.25	1.261	0.00	0.7500	60.164	A	0.000	60.164	60.164	100.00	0.000	0.000
						B	0.000	60.164		100.00	0.000	0.000
						C	0.000	60.164		100.00	0.000	24.448
L5 65.50-64.00	64.75	1.212	0.00	0.7500	5.301	A	0.000	5.301	5.301	100.00	0.000	0.000
						B	0.000	5.301		100.00	0.000	0.000
						C	0.000	5.301		100.00	0.000	2.220
L6 64.00-46.58	55.18	1.158	0.00	0.7500	64.032	A	0.000	64.032	64.032	100.00	0.000	0.000
						B	0.000	64.032		100.00	0.000	0.000
						C	0.000	64.032		100.00	0.000	25.776
L7 46.58-43.25	44.91	1.092	0.00	0.7500	12.528	A	0.000	12.528	12.528	100.00	0.000	0.000
						B	0.000	12.528		100.00	0.000	0.000
						C	0.000	12.528		100.00	0.000	5.136
L8 43.25-42.58	42.91	1.078	0.00	0.7500	2.545	A	0.000	2.545	2.545	100.00	0.000	0.000
						B	0.000	2.545		100.00	0.000	0.000
						C	0.000	2.545		100.00	0.000	1.053
L9 42.58-42.00	42.29	1.073	0.00	0.7500	2.209	A	0.000	2.209	2.209	100.00	0.000	0.000
						B	0.000	2.209		100.00	0.000	0.000
						C	0.000	2.209		100.00	0.000	0.912
L10 42.00-35.50	38.74	1.047	0.00	0.7500	25.099	A	0.000	25.099	25.099	100.00	0.000	0.000
						B	0.000	25.099		100.00	0.000	0.000
						C	0.000	25.099		100.00	0.000	10.220
L11 35.50-18.00	26.65	1	0.00	0.7500	70.725	A	0.000	70.725	70.725	100.00	0.000	0.000
						B	0.000	70.725		100.00	0.000	0.000
						C	0.000	70.725		100.00	0.000	27.516
L12 18.00-17.50	17.75	1	0.00	0.7500	2.088	A	0.000	2.088	2.088	100.00	0.000	0.000
						B	0.000	2.088		100.00	0.000	0.000
						C	0.000	2.088		100.00	0.000	0.786
L13 17.50-17.00	17.25	1	0.00	0.7500	2.092	A	0.000	2.092	2.092	100.00	0.000	0.000
						B	0.000	2.092		100.00	0.000	0.000
						C	0.000	2.092		100.00	0.000	0.786
L14 17.00-0.00	8.44	1	0.00	0.7500	72.783	A	0.000	72.783	72.783	100.00	0.000	0.000
						B	0.000	72.783		100.00	0.000	0.000
						C	0.000	72.783		100.00	0.000	26.729

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 175.00-145.50	159.72	1.569	0.01	60.917	A	0.000	60.917	60.917	100.00	0.000	0.000
					B	0.000	60.917		100.00	0.000	0.000
					C	0.000	60.917		100.00	0.000	12.177
L2 145.50-	119.68	1.445	0.01	131.23	A	0.000	131.238	131.238	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
95.50				8	B	0.000	131.238		100.00	0.000	0.000
					C	0.000	131.238		100.00	0.000	29.700
L3 95.50-83.25	89.31	1.329	0.01	37.234	A	0.000	37.234	37.234	100.00	0.000	0.000
					B	0.000	37.234		100.00	0.000	0.000
					C	0.000	37.234		100.00	0.000	7.652
L4 83.25-65.50	74.25	1.261	0.01	57.945	A	0.000	57.945	57.945	100.00	0.000	0.000
					B	0.000	57.945		100.00	0.000	0.000
					C	0.000	57.945		100.00	0.000	13.502
L5 65.50-64.00	64.75	1.212	0.01	5.113	A	0.000	5.113	5.113	100.00	0.000	0.000
					B	0.000	5.113		100.00	0.000	0.000
					C	0.000	5.113		100.00	0.000	1.295
L6 64.00-46.58	55.18	1.158	0.01	61.855	A	0.000	61.855	61.855	100.00	0.000	0.000
					B	0.000	61.855		100.00	0.000	0.000
					C	0.000	61.855		100.00	0.000	15.034
L7 46.58-43.25	44.91	1.092	0.01	12.111	A	0.000	12.111	12.111	100.00	0.000	0.000
					B	0.000	12.111		100.00	0.000	0.000
					C	0.000	12.111		100.00	0.000	3.051
L8 43.25-42.58	42.91	1.078	0.01	2.462	A	0.000	2.462	2.462	100.00	0.000	0.000
					B	0.000	2.462		100.00	0.000	0.000
					C	0.000	2.462		100.00	0.000	0.631
L9 42.58-42.00	42.29	1.073	0.01	2.136	A	0.000	2.136	2.136	100.00	0.000	0.000
					B	0.000	2.136		100.00	0.000	0.000
					C	0.000	2.136		100.00	0.000	0.546
L10 42.00-35.50	38.74	1.047	0.01	24.287	A	0.000	24.287	24.287	100.00	0.000	0.000
					B	0.000	24.287		100.00	0.000	0.000
					C	0.000	24.287		100.00	0.000	6.122
L11 35.50-18.00	26.65	1	0.01	68.538	A	0.000	68.538	68.538	100.00	0.000	0.000
					B	0.000	68.538		100.00	0.000	0.000
					C	0.000	68.538		100.00	0.000	16.481
L12 18.00-17.50	17.75	1	0.01	2.026	A	0.000	2.026	2.026	100.00	0.000	0.000
					B	0.000	2.026		100.00	0.000	0.000
					C	0.000	2.026		100.00	0.000	0.471
L13 17.50-17.00	17.25	1	0.01	2.029	A	0.000	2.029	2.029	100.00	0.000	0.000
					B	0.000	2.029		100.00	0.000	0.000
					C	0.000	2.029		100.00	0.000	0.471
L14 17.00-0.00	8.44	1	0.01	70.658	A	0.000	70.658	70.658	100.00	0.000	0.000
					B	0.000	70.658		100.00	0.000	0.000
					C	0.000	70.658		100.00	0.000	16.011

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp

Comb. No.	Description
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	175 - 145.5	Pole	Max Tension	30	0.00	0.00	-0.00
			Max. Compression	14	-12.06	-0.36	0.46
			Max. Mx	5	-5.86	-240.63	0.08
			Max. My	2	-5.83	-0.03	242.46
			Max. Vy	11	-14.96	240.25	0.30
			Max. Vx	2	-15.08	-0.03	242.46
			Max. Torque	7			0.74
L2	145.5 - 95.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.54	0.67	0.24
			Max. Mx	11	-12.85	1201.61	4.55
			Max. My	2	-12.84	4.46	1209.82
			Max. Vy	11	-23.55	1201.61	4.55
			Max. Vx	2	-23.68	4.46	1209.82
			Max. Torque	11			-1.35
L3	95.5 - 83.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.12	1.12	-0.02
			Max. Mx	11	-16.78	1644.83	6.04
			Max. My	2	-16.76	6.11	1655.13
			Max. Vy	11	-26.33	1644.83	6.04
			Max. Vx	8	26.46	-5.68	-1654.80
			Max. Torque	11			-1.20
L4	83.25 - 65.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.44	1.63	-0.32
			Max. Mx	11	-21.40	2136.98	7.50
			Max. My	2	-21.39	7.78	2149.34
			Max. Vy	11	-29.15	2136.98	7.50
			Max. Vx	8	29.28	-7.09	-2149.16
			Max. Torque	11			-1.13
L5	65.5 - 64	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.90	1.68	-0.34
			Max. Mx	11	-21.80	2180.89	7.63
			Max. My	2	-21.79	7.92	2193.42
			Max. Vy	11	-29.40	2180.89	7.63
			Max. Vx	8	29.52	-7.20	-2193.25
			Max. Torque	11			-1.02
L6	64 - 46.58	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35.86	2.02	-0.54
			Max. Mx	11	-25.31	2513.61	8.53
			Max. My	2	-25.30	8.95	2527.40
			Max. Vy	11	-31.11	2513.61	8.53
			Max. Vx	8	31.24	-8.06	-2527.33
			Max. Torque	11			-1.01
L7	46.58 - 43.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.41	2.33	-0.72

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	11	-30.40	2825.17	9.32
			Max. My	8	-30.39	-8.82	-2840.10
			Max. Vy	11	-32.74	2825.17	9.32
			Max. Vx	8	32.87	-8.82	-2840.10
			Max. Torque	10			-1.00
L8	43.25 - 42.58	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.68	2.35	-0.73
			Max. Mx	11	-30.65	2847.14	9.38
			Max. My	8	-30.64	-8.88	-2862.15
			Max. Vy	11	-32.84	2847.14	9.38
			Max. Vx	8	32.97	-8.88	-2862.15
			Max. Torque	10			-0.99
L9	42.58 - 42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.95	2.37	-0.74
			Max. Mx	11	-30.89	2866.21	9.43
			Max. My	8	-30.88	-8.92	-2881.30
			Max. Vy	11	-32.93	2866.21	9.43
			Max. Vx	8	33.06	-8.92	-2881.30
			Max. Torque	10			-0.99
L10	42 - 35.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-44.59	2.58	-0.87
			Max. Mx	11	-33.26	3083.29	9.95
			Max. My	8	-33.26	-9.43	-3099.18
			Max. Vy	11	-33.87	3083.29	9.95
			Max. Vx	8	34.00	-9.43	-3099.18
			Max. Torque	10			-0.99
L11	35.5 - 18	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-52.27	3.18	-1.21
			Max. Mx	11	-40.21	3697.37	11.36
			Max. My	8	-40.21	-10.77	-3715.40
			Max. Vy	11	-36.32	3697.37	11.36
			Max. Vx	8	36.45	-10.77	-3715.40
			Max. Torque	3			1.05
L12	18 - 17.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-52.50	3.20	-1.22
			Max. Mx	11	-40.42	3715.55	11.40
			Max. My	8	-40.42	-10.80	-3733.64
			Max. Vy	11	-36.39	3715.55	11.40
			Max. Vx	8	36.52	-10.80	-3733.64
			Max. Torque	3			1.05
L13	17.5 - 17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-52.73	3.22	-1.23
			Max. Mx	11	-40.63	3733.76	11.44
			Max. My	8	-40.62	-10.84	-3751.91
			Max. Vy	11	-36.46	3733.76	11.44
			Max. Vx	8	36.59	-10.84	-3751.91
			Max. Torque	3			1.06
L14	17 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-60.25	3.84	-1.59
			Max. Mx	11	-47.46	4373.56	12.78
			Max. My	8	-47.46	-12.12	-4393.75
			Max. Vy	11	-38.81	4373.56	12.78
			Max. Vx	8	38.93	-12.12	-4393.75
			Max. Torque	3			1.19

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	60.25	0.00	-0.00
	Max. H_x	11	47.47	38.80	0.08
	Max. H_z	2	47.47	0.08	38.92
	Max. M_x	2	4393.27	0.08	38.92

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. M_z	5	4371.74	-38.80	-0.08
	Max. Torsion	3	1.19	-19.33	33.67
	Min. Vert	2	47.47	0.08	38.92
	Min. H_x	5	47.47	-38.80	-0.08
	Min. H_z	8	47.47	-0.08	-38.92
	Min. M_x	8	-4393.75	-0.08	-38.92
	Min. M_z	11	-4373.56	38.80	0.08
	Min. Torsion	9	-1.19	19.33	-33.67

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	47.47	-0.00	-0.00	0.24	0.89	0.00
Dead+Wind 0 deg - No Ice	47.47	-0.08	-38.92	-4393.27	13.94	-1.07
Dead+Wind 30 deg - No Ice	47.47	19.33	-33.67	-3798.69	-2174.41	-1.19
Dead+Wind 60 deg - No Ice	47.47	33.56	-19.39	-2185.57	-3779.91	-0.99
Dead+Wind 90 deg - No Ice	47.47	38.80	0.08	13.27	-4371.74	-0.53
Dead+Wind 120 deg - No Ice	47.47	33.64	19.53	2208.58	-3792.86	0.07
Dead+Wind 150 deg - No Ice	47.47	19.47	33.75	3812.12	-2196.92	0.66
Dead+Wind 180 deg - No Ice	47.47	0.08	38.92	4393.75	-12.12	1.06
Dead+Wind 210 deg - No Ice	47.47	-19.33	33.67	3799.17	2176.22	1.19
Dead+Wind 240 deg - No Ice	47.47	-33.56	19.39	2186.06	3781.72	0.99
Dead+Wind 270 deg - No Ice	47.47	-38.80	-0.08	-12.78	4373.56	0.53
Dead+Wind 300 deg - No Ice	47.47	-33.64	-19.53	-2208.09	3794.68	-0.07
Dead+Wind 330 deg - No Ice	47.47	-19.47	-33.75	-3811.64	2198.75	-0.66
Dead+Ice+Temp	60.25	-0.00	0.00	1.59	3.84	0.00
Dead+Wind 0 deg+Ice+Temp	60.25	-0.01	-9.09	-1055.32	6.15	-0.38
Dead+Wind 30 deg+Ice+Temp	60.25	4.52	-7.86	-912.63	-520.86	-0.38
Dead+Wind 60 deg+Ice+Temp	60.25	7.85	-4.53	-524.98	-907.25	-0.27
Dead+Wind 90 deg+Ice+Temp	60.25	9.07	0.01	3.78	-1049.46	-0.09
Dead+Wind 120 deg+Ice+Temp	60.25	7.86	4.56	531.96	-909.41	0.11
Dead+Wind 150 deg+Ice+Temp	60.25	4.55	7.88	918.03	-524.61	0.28
Dead+Wind 180 deg+Ice+Temp	60.25	0.01	9.09	1058.55	1.83	0.38
Dead+Wind 210 deg+Ice+Temp	60.25	-4.52	7.86	915.87	528.84	0.38
Dead+Wind 240 deg+Ice+Temp	60.25	-7.85	4.53	528.21	915.23	0.27
Dead+Wind 270 deg+Ice+Temp	60.25	-9.07	-0.01	-0.55	1057.45	0.09
Dead+Wind 300 deg+Ice+Temp	60.25	-7.86	-4.56	-528.72	917.39	-0.11
Dead+Wind 330 deg+Ice+Temp	60.25	-4.55	-7.88	-914.80	532.59	-0.28
Dead+Wind 0 deg - Service	47.47	-0.03	-13.47	-1522.35	5.43	-0.37
Dead+Wind 30 deg - Service	47.47	6.69	-11.65	-1316.21	-752.90	-0.41
Dead+Wind 60 deg - Service	47.47	11.61	-6.71	-757.21	-1309.25	-0.35
Dead+Wind 90 deg - Service	47.47	13.42	0.03	4.75	-1514.42	-0.19
Dead+Wind 120 deg - Service	47.47	11.64	6.76	765.50	-1313.76	0.02
Dead+Wind 150 deg - Service	47.47	6.74	11.68	1321.20	-760.72	0.22
Dead+Wind 180 deg - Service	47.47	0.03	13.47	1522.83	-3.60	0.37
Dead+Wind 210 deg - Service	47.47	-6.69	11.65	1316.69	754.72	0.41
Dead+Wind 240 deg -	47.47	-11.61	6.71	757.69	1311.07	0.35

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Service Dead+Wind 270 deg - Service	47.47	-13.42	-0.03	-4.27	1516.24	0.19
Dead+Wind 300 deg - Service	47.47	-11.64	-6.76	-765.03	1315.58	-0.02
Dead+Wind 330 deg - Service	47.47	-6.74	-11.68	-1320.72	762.54	-0.22

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-47.47	0.00	0.00	47.47	0.00	0.000%
2	-0.08	-47.47	-38.92	0.08	47.47	38.92	0.007%
3	19.33	-47.47	-33.67	-19.33	47.47	33.67	0.000%
4	33.56	-47.47	-19.39	-33.56	47.47	19.39	0.000%
5	38.80	-47.47	0.08	-38.80	47.47	-0.08	0.007%
6	33.64	-47.47	19.53	-33.64	47.47	-19.53	0.000%
7	19.47	-47.47	33.75	-19.47	47.47	-33.75	0.000%
8	0.08	-47.47	38.92	-0.08	47.47	-38.92	0.007%
9	-19.33	-47.47	33.67	19.33	47.47	-33.67	0.000%
10	-33.56	-47.47	19.39	33.56	47.47	-19.39	0.000%
11	-38.80	-47.47	-0.08	38.80	47.47	0.08	0.007%
12	-33.64	-47.47	-19.53	33.64	47.47	19.53	0.000%
13	-19.47	-47.47	-33.75	19.47	47.47	33.75	0.000%
14	0.00	-60.25	0.00	0.00	60.25	-0.00	0.000%
15	-0.01	-60.25	-9.09	0.01	60.25	9.09	0.000%
16	4.52	-60.25	-7.86	-4.52	60.25	7.86	0.000%
17	7.85	-60.25	-4.53	-7.85	60.25	4.53	0.000%
18	9.07	-60.25	0.01	-9.07	60.25	-0.01	0.000%
19	7.86	-60.25	4.56	-7.86	60.25	-4.56	0.000%
20	4.55	-60.25	7.88	-4.55	60.25	-7.88	0.000%
21	0.01	-60.25	9.09	-0.01	60.25	-9.09	0.000%
22	-4.52	-60.25	7.86	4.52	60.25	-7.86	0.000%
23	-7.85	-60.25	4.53	7.85	60.25	-4.53	0.000%
24	-9.07	-60.25	-0.01	9.07	60.25	0.01	0.000%
25	-7.86	-60.25	-4.56	7.86	60.25	4.56	0.000%
26	-4.55	-60.25	-7.88	4.55	60.25	7.88	0.000%
27	-0.03	-47.47	-13.47	0.03	47.47	13.47	0.003%
28	6.69	-47.47	-11.65	-6.69	47.47	11.65	0.001%
29	11.61	-47.47	-6.71	-11.61	47.47	6.71	0.001%
30	13.43	-47.47	0.03	-13.42	47.47	-0.03	0.003%
31	11.64	-47.47	6.76	-11.64	47.47	-6.76	0.001%
32	6.74	-47.47	11.68	-6.74	47.47	-11.68	0.001%
33	0.03	-47.47	13.47	-0.03	47.47	-13.47	0.003%
34	-6.69	-47.47	11.65	6.69	47.47	-11.65	0.001%
35	-11.61	-47.47	6.71	11.61	47.47	-6.71	0.001%
36	-13.43	-47.47	-0.03	13.42	47.47	0.03	0.003%
37	-11.64	-47.47	-6.76	11.64	47.47	6.76	0.001%
38	-6.74	-47.47	-11.68	6.74	47.47	11.68	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00007409	0.00008824
3	Yes	20	0.00000001	0.00008254
4	Yes	20	0.00000001	0.00008405
5	Yes	15	0.00007417	0.00008196
6	Yes	20	0.00000001	0.00008375

7	Yes	20	0.00000001	0.00008482
8	Yes	15	0.00007409	0.00007535
9	Yes	20	0.00000001	0.00008398
10	Yes	20	0.00000001	0.00008218
11	Yes	15	0.00007416	0.00011883
12	Yes	20	0.00000001	0.00008516
13	Yes	20	0.00000001	0.00008439
14	Yes	6	0.00000001	0.00000001
15	Yes	18	0.00000001	0.00008374
16	Yes	18	0.00000001	0.00009031
17	Yes	18	0.00000001	0.00009024
18	Yes	18	0.00000001	0.00008318
19	Yes	18	0.00000001	0.00009059
20	Yes	18	0.00000001	0.00009083
21	Yes	18	0.00000001	0.00008376
22	Yes	18	0.00000001	0.00009087
23	Yes	18	0.00000001	0.00009062
24	Yes	18	0.00000001	0.00008366
25	Yes	18	0.00000001	0.00009112
26	Yes	18	0.00000001	0.00009118
27	Yes	15	0.00007987	0.00003435
28	Yes	16	0.00000001	0.00009563
29	Yes	16	0.00000001	0.00010116
30	Yes	15	0.00007987	0.00003509
31	Yes	16	0.00000001	0.00009727
32	Yes	16	0.00000001	0.00010086
33	Yes	15	0.00007986	0.00003402
34	Yes	16	0.00000001	0.00010069
35	Yes	16	0.00000001	0.00009456
36	Yes	15	0.00007986	0.00003619
37	Yes	16	0.00000001	0.00010234
38	Yes	16	0.00000001	0.00009934

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	175 - 145.5	44.313	38	2.379	0.002
L2	150 - 95.5	32.140	38	2.212	0.002
L3	101 - 83.25	13.284	38	1.351	0.001
L4	83.25 - 65.5	8.763	38	1.043	0.001
L5	65.5 - 64	5.381	38	0.776	0.000
L6	64 - 46.58	5.141	38	0.754	0.000
L7	53 - 43.25	3.569	38	0.611	0.000
L8	43.25 - 42.58	2.394	38	0.525	0.000
L9	42.58 - 42	2.321	38	0.517	0.000
L10	42 - 35.5	2.259	38	0.511	0.000
L11	35.5 - 18	1.619	38	0.430	0.000
L12	18 - 17.5	0.424	38	0.223	0.000
L13	17.5 - 17	0.400	38	0.217	0.000
L14	17 - 0	0.378	38	0.212	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
174.00	(2) ADA-85408580CF w/ Mount Pipe	38	43.815	2.375	0.002	22310
162.00	P65-16-XLH-RR w/ Mount Pipe	38	37.877	2.312	0.002	8580
156.00	Platform Mount [LP 602-1]	38	34.972	2.269	0.002	5870
144.00	RR90-17-02DP w/ Mount Pipe	38	29.403	2.139	0.002	4143
129.00	BCR-87010:90	38	23.031	1.896	0.002	3518

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	175 - 145.5	127.371	13	6.848	0.007
L2	150 - 95.5	92.456	13	6.368	0.006
L3	101 - 83.25	38.278	13	3.894	0.002
L4	83.25 - 65.5	25.262	13	3.006	0.001
L5	65.5 - 64	15.517	13	2.238	0.001
L6	64 - 46.58	14.825	13	2.173	0.001
L7	53 - 43.25	10.293	13	1.762	0.001
L8	43.25 - 42.58	6.906	13	1.514	0.001
L9	42.58 - 42	6.695	13	1.491	0.001
L10	42 - 35.5	6.515	13	1.473	0.001
L11	35.5 - 18	4.669	13	1.240	0.000
L12	18 - 17.5	1.222	13	0.644	0.000
L13	17.5 - 17	1.155	13	0.627	0.000
L14	17 - 0	1.091	13	0.610	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
174.00	(2) ADA-85408580CF w/ Mount Pipe	13	125.943	6.835	0.007	7968
162.00	P65-16-XLH-RR w/ Mount Pipe	13	108.914	6.655	0.007	3062
156.00	Platform Mount [LP 602-1]	13	100.580	6.531	0.007	2094
144.00	RR90-17-02DP w/ Mount Pipe	13	84.599	6.157	0.006	1473
129.00	BCR-87010:90	13	66.302	5.460	0.005	1244

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	175 - 145.5 (1)	TP27.435x22.125x0.2188	29.50	0.00	0.0	38.95	18.6041	-5.83	724.55	0.008
L2	145.5 - 95.5 (2)	TP35.997x26.1874x0.3125	54.50	0.00	0.0	39.00	34.9114	-12.83	1361.54	0.009
L3	95.5 - 83.25 (3)	TP37.5769x34.382x0.375	17.75	0.00	0.0	39.00	44.9213	-16.76	1751.93	0.010
L4	83.25 - 65.5 (4)	TP40.7716x37.5769x0.5255	17.75	0.00	0.0	31.79	68.1009	-21.39	2164.79	0.010
L5	65.5 - 64 (5)	TP41.0416x40.7716x0.5244	1.50	0.00	0.0	31.78	68.4135	-21.79	2173.91	0.010
L6	64 - 46.58 (6)	TP44.177x41.0416x0.616	17.42	0.00	0.0	31.83	84.1121	-25.30	2677.29	0.009
L7	46.58 - 43.25 (7)	TP44.0268x41.7895x0.6421	9.75	0.00	0.0	31.84	89.6991	-30.39	2855.66	0.011
L8	43.25 - 42.58 (8)	TP44.1474x44.0268x0.6815	0.67	0.00	0.0	31.14	95.3869	-30.64	2970.35	0.010
L9	42.58 - 42 (9)	TP44.2518x44.1474x0.7773	0.58	0.00	0.0	31.82	108.8060	-30.88	3462.63	0.009
L10	42 - 35.5 (10)	TP45.422x44.2518x0.6708	6.50	0.00	0.0	31.86	96.6614	-33.25	3079.63	0.011
L11	35.5 - 18 (11)	TP48.5724x45.422x0.6982	17.50	0.00	0.0	32.33	107.6370	-40.21	3479.69	0.012
L12	18 - 17.5 (12)	TP48.6624x48.5724x0.6976	0.50	0.00	0.0	32.35	107.7450	-40.42	3485.12	0.012
L13	17.5 - 17 (13)	TP48.7524x48.6624x0.697	0.50	0.00	0.0	32.31	107.8530	-40.62	3484.72	0.012
L14	17 - 0 (14)	TP51x48.7524x0.6585	17.00	0.00	0.0	34.64	106.7410	-47.46	3697.30	0.013

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 $\frac{P}{P_a}$

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	175 - 145.5 (1)	TP27.435x22.125x0.2188	242.46	24.23	38.95	0.622	0.00	0.00	38.95	0.000
L2	145.5 - 95.5 (2)	TP35.997x26.1874x0.3125	1211.72	49.16	39.00	1.260	0.00	0.00	39.00	0.000
L3	95.5 - 83.25 (3)	TP37.5769x34.382x0.375	1657.93	48.80	39.00	1.251	0.00	0.00	39.00	0.000
L4	83.25 - 65.5 (4)	TP40.7716x37.5769x0.5255	2153.03	38.76	31.79	1.219	0.00	0.00	31.79	0.000
L5	65.5 - 64 (5)	TP41.0416x40.7716x0.5244	2197.19	39.10	31.78	1.231	0.00	0.00	31.78	0.000
L6	64 - 46.58 (6)	TP44.177x41.0416x0.616	2531.74	35.07	31.83	1.102	0.00	0.00	31.83	0.000
L7	46.58 - 43.25 (7)	TP44.0268x41.7895x0.6421	2844.92	36.13	31.84	1.135	0.00	0.00	31.84	0.000
L8	43.25 - 42.58 (8)	TP44.1474x44.0268x0.6815	2867.00	34.20	31.14	1.098	0.00	0.00	31.14	0.000
L9	42.58 - 42 (9)	TP44.2518x44.1474x0.7773	2886.17	30.25	31.82	0.950	0.00	0.00	31.82	0.000
L10	42 - 35.5 (10)	TP45.422x44.2518x0.6708	3104.32	35.47	31.86	1.113	0.00	0.00	31.86	0.000
L11	35.5 - 18 (11)	TP48.5724x45.422x0.6982	3721.27	35.68	32.33	1.104	0.00	0.00	32.33	0.000
L12	18 - 17.5 (12)	TP48.6624x48.5724x0.6976	3739.53	35.75	32.35	1.105	0.00	0.00	32.35	0.000
L13	17.5 - 17 (13)	TP48.7524x48.6624x0.697	3757.82	35.82	32.31	1.109	0.00	0.00	32.31	0.000
L14	17 - 0 (14)	TP51x48.7524x0.6585	4400.35	40.40	34.64	1.166	0.00	0.00	34.64	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	175 - 145.5 (1)	TP27.435x22.125x0.2188	15.08	0.81	26.00	0.063	0.49	0.02	26.00	0.001
L2	145.5 - 95.5 (2)	TP35.997x26.1874x0.3125	23.72	0.68	26.00	0.053	0.74	0.01	26.00	0.001
L3	95.5 - 83.25 (3)	TP37.5769x34.382x0.375	26.50	0.59	26.00	0.046	0.55	0.01	26.00	0.000
L4	83.25 - 65.5 (4)	TP40.7716x37.5769x0.5255	29.33	0.43	21.19	0.041	0.33	0.00	21.19	0.000
L5	65.5 - 64 (5)	TP41.0416x40.7716x0.5244	29.57	0.43	21.18	0.041	0.32	0.00	21.18	0.000
L6	64 - 46.58 (6)	TP44.177x41.0416x0.616	31.29	0.37	21.22	0.036	0.15	0.00	21.22	0.000
L7	46.58 - 43.25 (7)	TP44.0268x41.7895x0.6421	32.92	0.37	21.22	0.035	0.01	0.00	21.22	0.000
L8	43.25 - 42.58 (8)	TP44.1474x44.0268x0.6815	33.01	0.35	20.76	0.034	0.01	0.00	20.76	0.000
L9	42.58 - 42 (9)	TP44.2518x44.1474x0.7773	33.10	0.30	21.22	0.029	0.02	0.00	21.22	0.000
L10	42 - 35.5 (10)	TP45.422x44.2518x0.6708	34.05	0.35	21.24	0.034	0.12	0.00	21.24	0.000
L11	35.5 - 18 (11)	TP48.5724x45.422x0.6982	36.50	0.34	21.55	0.032	0.37	0.00	21.55	0.000
L12	18 - 17.5 (12)	TP48.6624x48.5724x0.6976	36.56	0.34	21.56	0.032	0.38	0.00	21.56	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 $\frac{f_{vt}}{F_{vt}}$
L13	17.5 - 17 (13)	TP48.7524x48.6624x0.697	36.63	0.34	21.54	0.032	0.39	0.00	21.54	0.000
L14	17 - 0 (14)	TP51x48.7524x0.6585	38.98	0.37	23.09	0.032	0.66	0.00	23.09	0.000

Pole Interaction Design Data

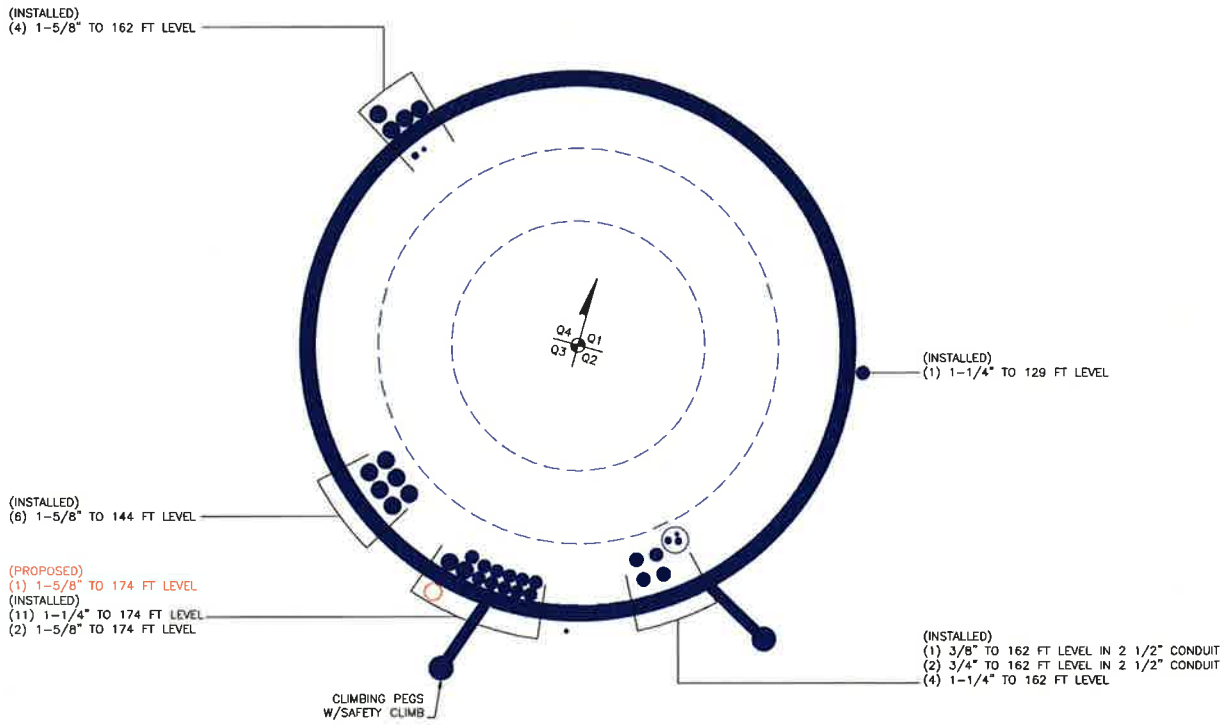
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	175 - 145.5 (1)	0.008	0.622	0.000	0.063	0.001	0.631 ✔	1.333	H1-3+VT ✔
L2	145.5 - 95.5 (2)	0.009	1.260	0.000	0.053	0.001	1.271 ✔	1.333	H1-3+VT ✔
L3	95.5 - 83.25 (3)	0.010	1.251	0.000	0.046	0.000	1.261 ✔	1.333	H1-3+VT ✔
L4	83.25 - 65.5 (4)	0.010	1.219	0.000	0.041	0.000	1.229 ✔	1.333	H1-3+VT ✔
L5	65.5 - 64 (5)	0.010	1.231	0.000	0.041	0.000	1.241 ✔	1.333	H1-3+VT ✔
L6	64 - 46.58 (6)	0.009	1.102	0.000	0.036	0.000	1.112 ✔	1.333	H1-3+VT ✔
L7	46.58 - 43.25 (7)	0.011	1.135	0.000	0.035	0.000	1.146 ✔	1.333	H1-3+VT ✔
L8	43.25 - 42.58 (8)	0.010	1.098	0.000	0.034	0.000	1.109 ✔	1.333	H1-3+VT ✔
L9	42.58 - 42 (9)	0.009	0.950	0.000	0.029	0.000	0.960 ✔	1.333	H1-3+VT ✔
L10	42 - 35.5 (10)	0.011	1.113	0.000	0.034	0.000	1.124 ✔	1.333	H1-3+VT ✔
L11	35.5 - 18 (11)	0.012	1.104	0.000	0.032	0.000	1.116 ✔	1.333	H1-3+VT ✔
L12	18 - 17.5 (12)	0.012	1.105	0.000	0.032	0.000	1.117 ✔	1.333	H1-3+VT ✔
L13	17.5 - 17 (13)	0.012	1.109	0.000	0.032	0.000	1.121 ✔	1.333	H1-3+VT ✔
L14	17 - 0 (14)	0.013	1.166	0.000	0.032	0.000	1.179 ✔	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	175 - 145.5	Pole	TP27.435x22.125x0.2188	1	-5.83	965.83	47.4	Pass
L2	145.5 - 95.5	Pole	TP35.997x26.1874x0.3125	2	-12.83	1814.93	95.3	Pass
L3	95.5 - 83.25	Pole	TP37.5769x34.382x0.375	3	-16.76	2335.32	94.6	Pass
L4	83.25 - 65.5	Pole	TP40.7716x37.5769x0.5255	4	-21.39	2885.66	92.2	Pass
L5	65.5 - 64	Pole	TP41.0416x40.7716x0.5244	5	-21.79	2897.82	93.1	Pass
L6	64 - 46.58	Pole	TP44.177x41.0416x0.616	6	-25.30	3568.83	83.4	Pass
L7	46.58 - 43.25	Pole	TP44.0268x41.7895x0.6421	7	-30.39	3806.59	86.0	Pass
L8	43.25 - 42.58	Pole	TP44.1474x44.0268x0.6815	8	-30.64	3959.48	83.2	Pass
L9	42.58 - 42	Pole	TP44.2518x44.1474x0.7773	9	-30.88	4615.69	72.0	Pass
L10	42 - 35.5	Pole	TP45.422x44.2518x0.6708	10	-33.25	4105.15	84.4	Pass
L11	35.5 - 18	Pole	TP48.5724x45.422x0.6982	11	-40.21	4638.43	83.7	Pass
L12	18 - 17.5	Pole	TP48.6624x48.5724x0.6976	12	-40.42	4645.66	83.8	Pass
L13	17.5 - 17	Pole	TP48.7524x48.6624x0.697	13	-40.62	4645.13	84.1	Pass
L14	17 - 0	Pole	TP51x48.7524x0.6585	14	-47.46	4928.50	88.5	Pass
							Summary	
						Pole (L2)	95.3	Pass
						RATING =	**95.3**	**Pass**

APPENDIX B

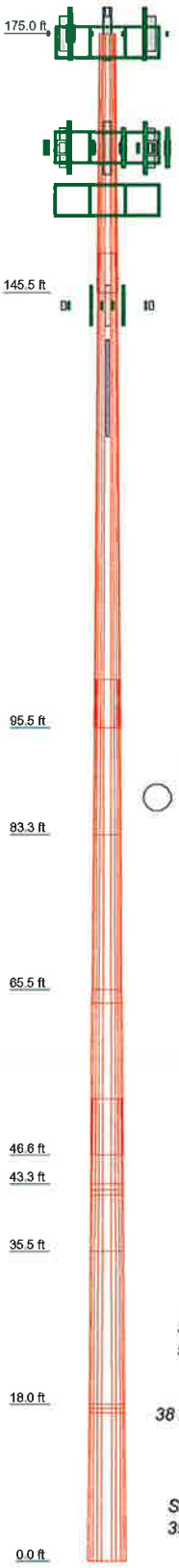
BASE LEVEL DRAWING

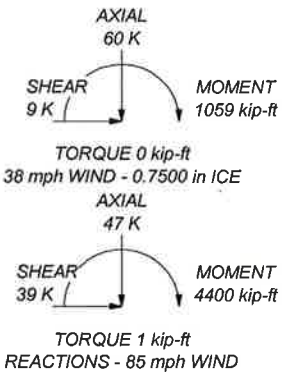

(INSTALLED)
(4) 1-5/8" TO 162 FT LEVEL
(INSTALLED)
(1) 1-1/4" TO 129 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 144 FT LEVEL
(PROPOSED)
(1) 1-5/8" TO 174 FT LEVEL
(INSTALLED)
(11) 1-1/4" TO 174 FT LEVEL
(2) 1-5/8" TO 174 FT LEVEL
(INSTALLED)
(1) 3/8" TO 162 FT LEVEL IN 2 1/2" CONDUIT
(2) 3/4" TO 162 FT LEVEL IN 2 1/2" CONDUIT
(4) 1-1/4" TO 162 FT LEVEL
CLIMBING PEGS
W/SAFETY CLIMB
Q4
Q1
Q3
Q2

APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	10	11	14
Length (ft)	29.50	54.50	17.75	17.75	1.50	17.42	9.79	6.50	17.50	17.00
Number of Sides	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.2188	0.3125	0.3750	0.5255	0.5244	0.8160	0.8421	0.8700	0.8982	0.8585
Socket Length (ft)	4.50	5.50				6.42				
Top Dia (in)	22.1250	26.1874	34.3820	37.5769	40.7716	41.0416	41.2956	44.2500	45.4220	48.7524
Bot Dia (in)	27.4350	35.9970	37.5769	40.7716	41.0416	44.1770	44.5000	45.4200	48.5724	51.0000
Grade	A572-65			Reinf 52.98 ksi	Reinf 52.96 ksi	Reinf 53.05 ksi	Reinf 53.06 ksi	Reinf 51.90 ksi	Reinf 53.10 ksi	Reinf 53.08 ksi
Weight (K)	1.7	5.7	2.8	4.0	0.3	4.9	2.2	2.1	6.2	6.0
	37.4									





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) ADA-85408580CF w/ Mount Pipe	174	P65-16-XLH-RR w/ Mount Pipe	162
BXA-80080/4CF w/ Mount Pipe	174	(2) 800 10121 w/ Mount Pipe	162
BXA-80080/4CF w/ Mount Pipe	174	(2) 7770.00 w/ Mount Pipe	162
932DG90T2E-M w/ Mount Pipe	174	(2) RRUS-11	162
932DG90T2E-M w/ Mount Pipe	174	(2) RRUS-11	162
P65.16.XL.2 w/ Mount Pipe	174	(2) RRUS-11	162
P65.16.XL.2 w/ Mount Pipe	174	(4) LGP2140X	162
P65.16.XL.2 w/ Mount Pipe	174	(4) LGP2140X	162
(2) FD9R6004/2C-3L	174	DC6-48-60-18-8F	162
(2) FD9R6004/2C-3L	174	2.375" OD x 5' Mount Pipe	162
(2) FD9R6004/2C-3L	174	2.375" OD x 5' Mount Pipe	162
BXA-171063-12BF-EDIN-X w/ Mount Pipe	174	(3) 2.375" OD x 5' Mount Pipe	162
		Platform Mount [LP 303-1]	162
BXA-171063-12BF-EDIN-X w/ Mount Pipe	174	Platform Mount [LP 602-1]	156
BXA-171063-12BF-EDIN-X w/ Mount Pipe	174	RR90-17-02DP w/ Mount Pipe	144
		RR90-17-02DP w/ Mount Pipe	144
RRH2X40-AWS w/ Mount Pipe	174	RR90-17-02DP w/ Mount Pipe	144
RRH2X40-AWS w/ Mount Pipe	174	(2) KRY 112 71	144
RRH2X40-AWS w/ Mount Pipe	174	(2) KRY 112 71	144
DB-T1-6Z-8AB-0Z	174	(2) KRY 112 71	144
Platform Mount [LP 602-1]	174	Pipe Mount [PM 601-3]	144
P65-16-XLH-RR w/ Mount Pipe	162	BCR-87010:90	129
P65-16-XLH-RR w/ Mount Pipe	162	Side Arm Mount [SO 701-1]	129

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 53.04 ksi	53 ksi	67 ksi
Reinf 52.98 ksi	53 ksi	67 ksi	Reinf 53.10 ksi	53 ksi	67 ksi
Reinf 52.96 ksi	53 ksi	65 ksi	Reinf 53.88 ksi	54 ksi	68 ksi
Reinf 53.05 ksi	53 ksi	67 ksi	Reinf 53.91 ksi	54 ksi	65 ksi
Reinf 53.06 ksi	53 ksi	67 ksi	Reinf 53.85 ksi	54 ksi	68 ksi
Reinf 51.90 ksi	52 ksi	65 ksi	Reinf 57.73 ksi	58 ksi	73 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield 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 0.75 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 95.3%

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

Job: *176 ft Monopole / BRG 133 943050*			
Project: *PJF 37513-2761 / BU 807132*			
Client: CCI	Drawn by: Joey Meinerding	App'd:	
Code: TIA/EIA-222-F	Date: 04/17/14	Scale: NTS	
Path: T:\376 Crown Castle\2012\37513-2761 BU 807132\WO 600635 BU 807132 - 77003\7513-2761 BP.e		Dwg No. E-1	

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

v4.4 - Effective 7-12-13

Date: 4/17/2014
PJF Project: 37513-2761 BP
Client Ref. # 807132
Site Name: BRG 133 943050
Description: 176' Pole
Owner: CCI
Engineer: JWM

Asymmetric Anchor Rod Analysis

Moment =	4400	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	47.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	39.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	20							

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	0.0	59.30	0.00	3.98	182.61	177.70	177.70	0.00	195.00	91.1%
2	2.250	#18J A615 Gr 75	75	100	22.5	59.30	0.00	3.98	178.80	173.90	173.90	0.00	195.00	89.2%
3	2.250	#18J A615 Gr 75	75	100	45.0	59.30	0.00	3.98	177.74	172.84	172.84	0.00	195.00	88.6%
4	2.250	#18J A615 Gr 75	75	100	67.5	59.30	0.00	3.98	180.38	175.47	175.47	0.00	195.00	90.0%
5	2.250	#18J A615 Gr 75	75	100	90.0	59.30	0.00	3.98	185.48	180.57	180.57	0.00	195.00	92.6%
6	2.250	#18J A615 Gr 75	75	100	112.5	59.30	0.00	3.98	190.43	185.53	185.53	0.00	195.00	95.1%
7	2.250	#18J A615 Gr 75	75	100	135.0	59.30	0.00	3.98	192.88	187.98	187.98	0.00	195.00	96.4%
8	2.250	#18J A615 Gr 75	75	100	157.5	59.30	0.00	3.98	191.85	186.94	186.94	0.00	195.00	95.9%
9	2.250	#18J A615 Gr 75	75	100	180.0	59.30	0.00	3.98	188.13	183.22	183.22	0.00	195.00	94.0%
10	2.250	#18J A615 Gr 75	75	100	202.5	59.30	0.00	3.98	183.88	178.98	178.98	0.00	195.00	91.8%
11	2.250	#18J A615 Gr 75	75	100	225.0	59.30	0.00	3.98	181.52	176.62	176.62	0.00	195.00	90.6%
12	2.250	#18J A615 Gr 75	75	100	247.5	59.30	0.00	3.98	182.22	177.31	177.31	0.00	195.00	90.9%
13	2.250	#18J A615 Gr 75	75	100	270.0	59.30	0.00	3.98	185.14	180.23	180.23	0.00	195.00	92.4%
14	2.250	#18J A615 Gr 75	75	100	292.5	59.30	0.00	3.98	188.06	183.15	183.15	0.00	195.00	93.9%
15	2.250	#18J A615 Gr 75	75	100	315.0	59.30	0.00	3.98	188.86	183.96	183.96	0.00	195.00	94.3%
16	2.250	#18J A615 Gr 75	75	100	337.5	59.30	0.00	3.98	186.73	181.82	181.82	0.00	195.00	93.2%
17	2.000	A193 Gr B7	105	125	10.0	62.50	0.00	3.14	150.36	146.49	146.49	0.00	172.79	84.8%
18	2.000	A193 Gr B7	105	125	80.0	62.50	0.00	3.14	152.20	148.33	148.33	0.00	172.79	85.8%
19	2.000	A193 Gr B7	105	125	190.0	62.50	0.00	3.14	154.65	150.77	150.77	0.00	172.79	87.3%
20	2.000	A193 Gr B7	105	125	280.0	62.50	0.00	3.14	155.15	151.27	151.27	0.00	172.79	87.5%
								76.25						

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

TIA Rev F

Site Data

BU#: *807132*
Site Name: *BRG 133 943050*
App #:

Pole Manufacturer:	*Other*

Reactions		
Moment:	3764.2	ft-kips
Axial:	39.3	kips
Shear:	32.6	kips

Reactions adjusted to account for additional anchor rods.

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

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	59.3	in

Anchor Rod Results

Maximum Rod Tension:	188.0 Kips	Rigid
Allowable Tension:	195.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	96.4% **Pass**	Fty*ASIF

Plate Data		
Diam:	63.5	in
Thick:	2.75	in
Grade:	60	ksi
Single-Rod B-eff:	10.25	in

Base Plate Results Flexural Check

Base Plate Stress:	38.7 ksi	Rigid
Allowable Plate Stress:	60.0 ksi	Service ASD
Base Plate Stress Ratio:	64.5% **Pass**	0.75*Fy*ASIF
		Y.L. Length: 30.26

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

n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Diam:	51	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

* 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

Check Foundation Capacity

PJF job no: 37513-2761
Site: 807132, BRG 133 943050
Location: Greenwich, CT

Assumptions:

1) Foundation attempts to rotate about point at intersection of centerline of foundation and rock surface
2) There is sufficient caisson rotation so that both soil & existing rock anchors develop full resistance to caisson overturning

Pole Base Moment	4400	ft-k	
Pole Base Shear	39	kips	
Depth to Rock Surface	10	ft	
Moment at Rock Surface	4790	ft-k	
Allowable lateral soil moment capacity	1289.5	ft-k	(SF = 2.0)
Remaining moment carried by rock anchors	3500.5	ft-k	
Total OTM Supported by Combined Action	4790.0	ft-k	
Allow. OTM for Combined Action	5198.5	ft-k	(SF = 2.0)
Actual S.F. against overturning	2.23		
% Capacity	89.6%	OK	

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #807132; BRG 133 943050

APP: 200498 REV. 9; WO: 686635

SITE ADDRESS

1081 NORTH STREET
GREENWICH, CONNECTICUT 06831
FAIRFIELD COUNTY

PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.

2. 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.

3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

4. (A.) DTI'S REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. 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 DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

   (B.) EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.

   (C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED ['NON-TC'] BOLTS AND/OR BOLTS WITHOUT DTI'S INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.

5. NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. SEE CCI DOCUMENTS ENG-SOW-1033 'TOWER BASE PLATE NDE' AND ENG-BUL-10051 'NDE 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 NDE SHALL INCLUDE ALL EXISTING REINFORCEMENTS THAT HAVE BEEN WELDED TO THE BASE PLATE. ANY FULL PENETRATION WELDING TO THE BASE PLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NDE SCOPE OF WORK.

PROJECT CONTACTS:

MONOPOLE OWNER:
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
TSA: STEVE TUTTLE
PH: (585) 899-3445
MOD PM: EVA MORALES
EVA.MORALES@CROWNCASTLE.COM
PH: (704) 405-6612

STRUCTURAL ENGINEER OF RECORD (EOR):
PAUL J. FORD AND COMPANY
250 EAST BROAD STREET, SUITE 600
COLUMBUS, OHIO 43215-3708
CONTACT: JOEY MEINERDING AT JMEINERDING@PJFWEB.COM
PHONE: 614-221-6679

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF 2005 CONNECTICUT BUILDING CODE AND THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 85 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 3/4 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-2761), DATED 4-16-2014.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

- SHAFT REINFORCING
- FIELD WELDED STIFFENERS

SHEET INDEX

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CROWN CASTLE
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BU #807132; BRG 133 943050
GREENWICH, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-2761	
DRAWN BY: B.M.S.	
CHECKED BY: J.W.M.	
APPROVED BY:	
DATE: 4-16-2014	
ISSUE DATE OF PERMIT: 4-16-2014	
T-1	

CROWN CASTLE PROJECT: BU #807132; BRG 133 943050; GREENWICH, CONNECTICUT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

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. IF 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 WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY 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-100115) 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 STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. (SECTION NOT USED)

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 INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10066 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 PERFORMED 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 UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   A. GENERAL:
      (1.) PERFORM PERIODIC 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 THE 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.) CALL FOR LABORATORY TEST 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 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 SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
         (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. REPORTS:
      (1.) COMPILE 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 DECIDE 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 #807132; BRG 133 943050
GREENWICH, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-2761	ISSUE DATE OF PERMIT: 4-16-2014
DRAWN BY: B.M.S.	
CHECKED BY: J.W.M.	
APPROVED BY:	S-1
DATE: 4-16-2014	

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 1/3 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 E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED 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 - (NOT REQUIRED)

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 1-800-631-3275 FOR PRODUCT INFORMATION.**
2. 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.
3. 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 TIA/EIA-222-F-1996, 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 TIA/EIA-222-F-1996 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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AJAX BOLT NOTE SHEET: REV. 1.4, 5-20-2013

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

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) 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.

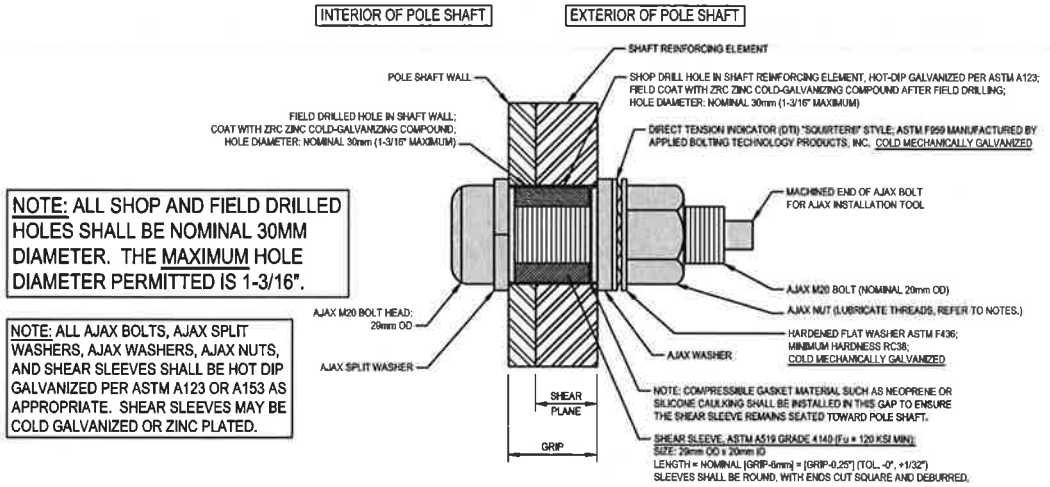
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY 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 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.

TYPICAL AJAX BOLT DETAIL 1/S-3

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POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.18000 IN/FT
SHAFT STEEL:	ASTM A572 GRADE 65
BASE PL STEEL:	ASTM A633 GR. E (60 KSI)
ANCHOR RODS:	2 1/4"ø #18J ASTM A615 GRADE 75

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	29.50	0.2188	54.00	22.125	27.436
2	54.50	0.3125	66.00	26.188	35.987
3	54.42	0.3750	77.00	34.382	44.177
4	43.08	0.4063	85.00	42.272	50.027
5	17.00	0.4375		47.940	51.000
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES					

CONTRACTOR SHALL PROVIDE ASTM A36 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 A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION.

MODIFICATIONS:

(A) INSTALL NEW TRANSITION STIFFENERS AT BASE PLATE. SEE SHEET S-5.

(B) INSTALL NEW SHAFT REINFORCING. SEE CHART.

NEW REINFORCING SCHEDULE

CROWN PART CATALOG NUMBER	BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	MINIMUM AJAX BOLTS PER ELEMENT	MINIMUM TOTAL AJAX BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
CCI-AFP-06512520	0' - 6"	20' - 6"	12	1-1/4" x 6-1/2"	20' - 0"	1	36	36	14	14	19"	553 LBS.
CCI-AFP-06512535	0' - 6"	35' - 6"	3 & 7	1-1/4" x 6-1/2"	35' - 0"	2	45	90	14	14	19"	1934 LBS.
CCI-AFP-06512525	10' - 6"	35' - 6"	11	1-1/4" x 6-1/2"	25' - 0"	1	39	39	14	14	19"	691 LBS.
CCI-AFP-06010030	35' - 6"	65' - 6"	3, 7 & 11	1" x 6"	30' - 0"	3	38	114	10	10	16"	1836 LBS.
CCI-AFP-06010020	65' - 6"	85' - 6"	3, 7 & 11	1" x 6"	20' - 0"	3	31	93	10	10	16"	1224 LBS.
								372				6238 LBS.

NOTES:

1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.

2.) 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 1-800-831-3275 FOR PRODUCT INFORMATION.

3.) #VALUE!

4.) WELDS SHALL BE E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.

5.) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.

6.) ALL SHIMS SHALL BE ASTM A-36.

SPLICE PLATE INSTALLATION CHART

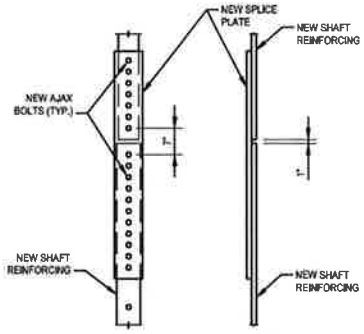
ELEVATION	FLAT PLATE THICKNESS	FLAT PLATE WIDTH	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	WELD LENGTH PER SIDE	TOTAL WELD LENGTH	AJAX BOLTS PER SPLICE*	TOTAL STEEL WEIGHT
35' - 6"	1 1/4"	8 1/2"	6' - 7"	3	-	-	24	547 LBS.
65' - 6"	1"	6"	5' - 7"	3	-	-	20	343 LBS.
						0"		890 LBS.

* BOLTS INCLUDED IN THE TOTAL QUANTITY LISTED IN THE FLAT PLATE INSTALLATION CHART.

NEW SHIM CHART

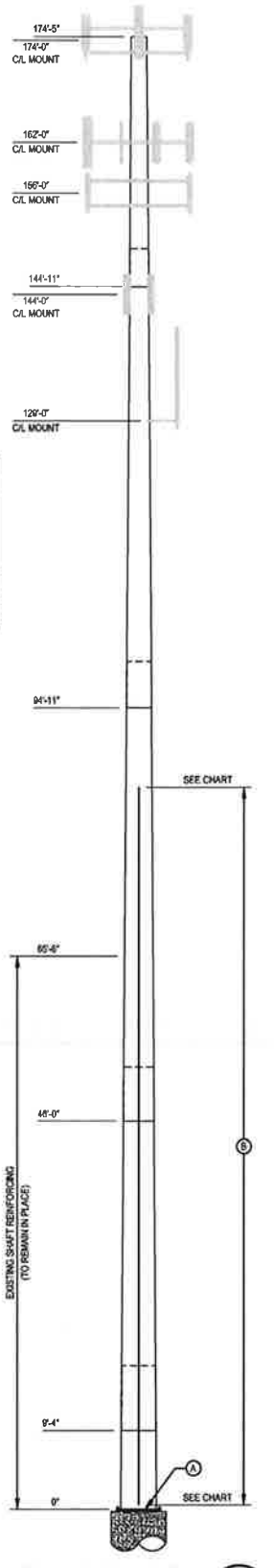
SHIM QUANTITY	SHIM WIDTH	SHIM LENGTH	SHIM THICKNESS	HOLE DIAMETER
12	4"	4"	1/4"	1-1/4"
39	4"	4"	1/16"	1-1/4"

SHIMS ARE FOR BIDDING PURPOSES ONLY. FINAL SHIM REQUIREMENTS TO BE DETERMINED BY CONTRACTOR DURING FABRICATION.



DETAIL 1/S-4

SCALE: NTS



POLE ELEVATION 1/S-4

CROWN CASTLE US PATENT NOS 8,046,972; 8,156,712; 7,849,659; 8,424,269 AND PATENT PENDING

PAUL J. FORD AND COMPANY
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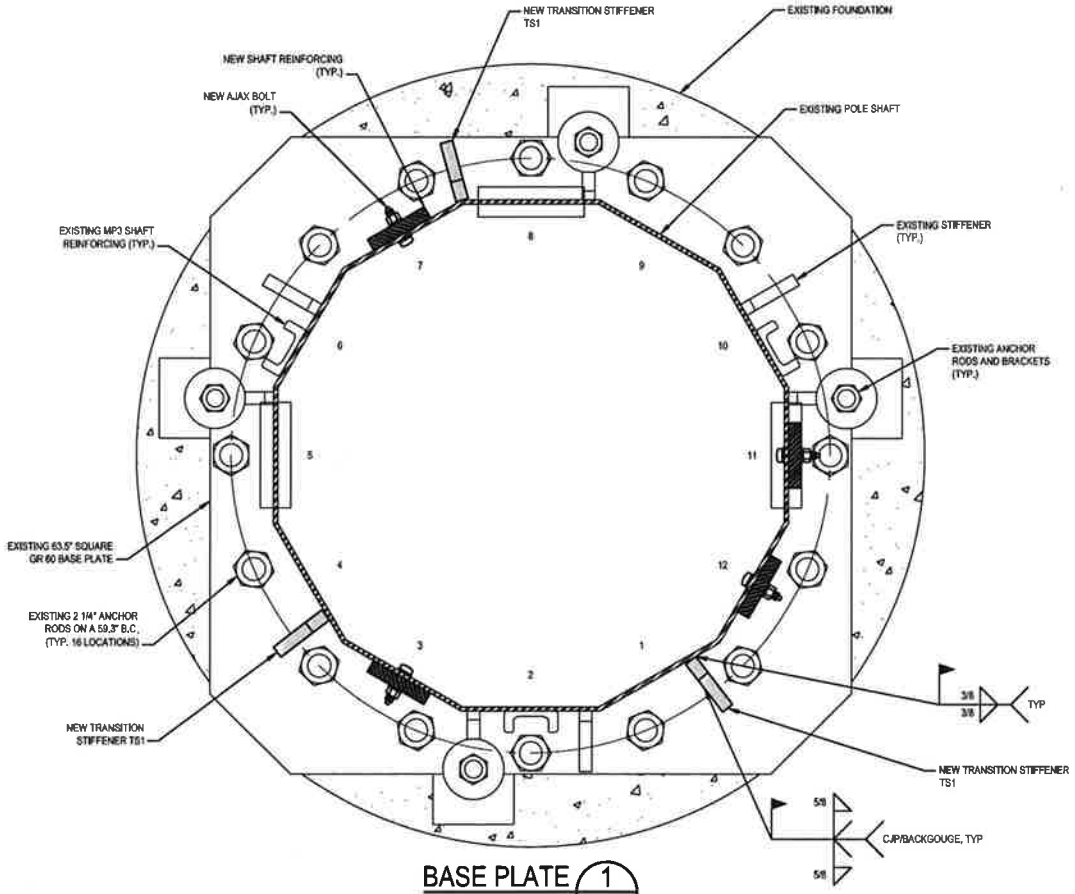
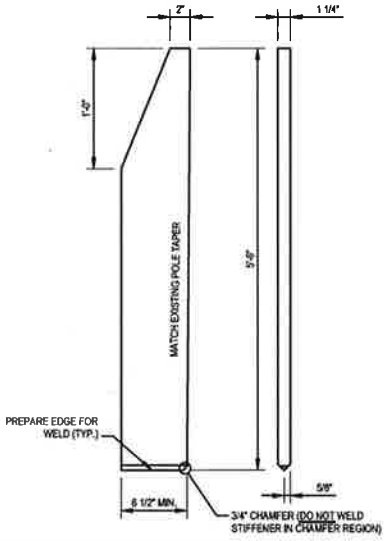
BU #807132; BRG 133 943050
GREENWICH, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-2761	ISSUE DATE OF PERMIT: 4-16-2014
DRAWN BY: B.M.S.	
CHECKED BY: J.W.M.	
APPROVED BY:	S-4
DATE: 4-16-2014	



BASE PLATE 1 / S-5



TRANSITION STIFFENER MK~TS1

(3 REQUIRED) (Fy = 65 KSI)

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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 RESIDES WITH THE EOR AT ALL TIMES

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 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 TO, 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 DENG-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 INSPECTION(S) TO COMMENCE 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 FACILITIES 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 LODGING, 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 MI'S
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 INSPECTION(S) 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 AEV/AESV 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 DURING 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 REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE

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 SHOP 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
NA	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	THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	THIRD PARTY ONSITE BOLT INSPECTION REPORT
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

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BU #807132; BRG 133 943050
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S-6

37513-2761 PERMIT.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #807132; BRG 133 943050

APP: 200498 REV. 9; WO: 686635

SITE ADDRESS

1081 NORTH STREET
GREENWICH, CONNECTICUT 06831
FAIRFIELD COUNTY

PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.

2. 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.

3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

4. (A.) DTI'S REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. 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 DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

   (B.) EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.

   (C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED ['NON-TC'] BOLTS AND/OR BOLTS WITHOUT DTI'S INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.

5. NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. SEE CCI DOCUMENTS ENG-SOW-1033 'TOWER BASE PLATE NDE' AND ENG-BUL-10051 'NDE 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 NDE SHALL INCLUDE ALL EXISTING REINFORCEMENTS THAT HAVE BEEN WELDED TO THE BASE PLATE. ANY FULL PENETRATION WELDING TO THE BASE PLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NDE SCOPE OF WORK.

PROJECT CONTACTS:

MONOPOLE OWNER:
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
TSA: STEVE TUTTLE
PH: (585) 899-3445
MOD PM: EVA MORALES
EVA.MORALES@CROWNCASTLE.COM
PH: (704) 405-6612

STRUCTURAL ENGINEER OF RECORD (EOR):
PAUL J. FORD AND COMPANY
250 EAST BROAD STREET, SUITE 600
COLUMBUS, OHIO 43215-3708
CONTACT: JOEY MEINERDING AT JMEINERDING@PJFWEB.COM
PHONE: 614-221-6679

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF 2005 CONNECTICUT BUILDING CODE AND THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 85 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 3/4 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-2761), DATED 4-16-2014.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING
FIELD WELDED STIFFENERS

SHEET INDEX

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2	GENERAL NOTES
S-3	AJAX BOLT DETAIL
S-4	MONOPOLE PROFILE
S-5	BASE PLATE DETAILS
S-6	MI CHECKLIST

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

APR 17 2014

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CROWN CASTLE PROJECT: BU #807132; BRG 133 943050; GREENWICH, CONNECTICUT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

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. IF 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 WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY 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 STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. (SECTION NOT USED)

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 INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10066 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 PERFORMED 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 UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   A. GENERAL:
      (1.) PERFORM PERIODIC 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 THE 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.) CALL FOR LABORATORY TEST 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 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 SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
         (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. REPORTS:
      (1.) COMPILE 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 DECIDE 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.

APR 17 2014

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BU #807132; BRG 133 943050
GREENWICH, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-2761	ISSUE DATE OF PERMIT: 4-16-2014
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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 1/3 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 E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED 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 - (NOT REQUIRED)

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 1-800-831-3275 FOR PRODUCT INFORMATION.**
2. 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.
3. 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 TIA/EIA-222-F-1996, 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 TIA/EIA-222-F-1996 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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AJAX BOLT NOTE SHEET: REV. 1.4, 5-20-2013

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

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) 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 20 MM (M20) 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.

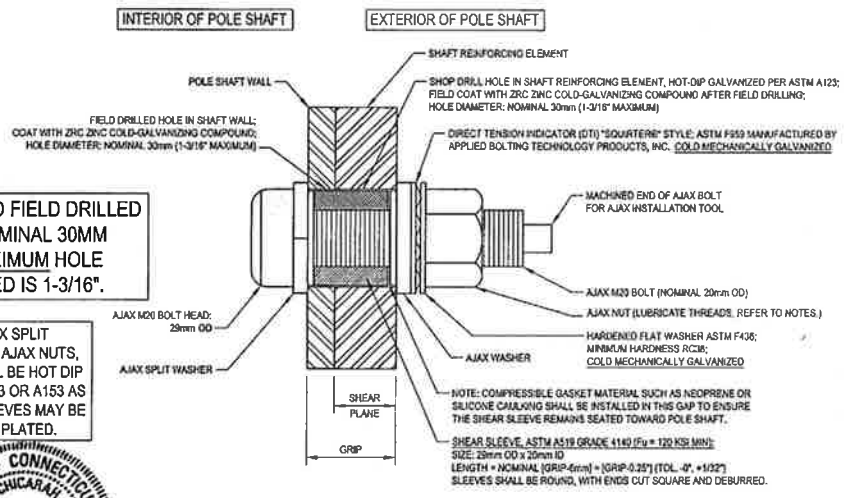
NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE 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 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.



TYPICAL AJAX BOLT DETAIL 1 / S-3

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POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.18000 IN/FT
SHAFT STEEL:	ASTM A572 GRADE 65
BASE PL STEEL:	ASTM A633 GR. E (60 KSI)
ANCHOR RODS:	2 1/4"ø #18J ASTM A615 GRADE 75

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	29.50	0.2188	54.00	22.125	27.435
2	54.50	0.3125	66.00	28.188	35.997
3	54.42	0.3750	77.00	34.382	44.177
4	43.08	0.4063	85.00	42.272	50.027
5	17.00	0.4375		47.940	51.000
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES					

CONTRACTOR SHALL PROVIDE ASTM A36 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 A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION.

MODIFICATIONS:

(A) INSTALL NEW TRANSITION STIFFENERS AT BASE PLATE. SEE SHEET S-5.

(B) INSTALL NEW SHAFT REINFORCING. SEE CHART.

NEW REINFORCING SCHEDULE												
CROWN PART CATALOG NUMBER	BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	MINIMUM AJAX BOLTS PER ELEMENT	MINIMUM TOTAL AJAX BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
CCI-AFP-06512520	0'-0"	20'-6"	12	1-1/4" x 6-1/2"	20'-0"	1	36	36	14	14	19"	553 LBS.
CCI-AFP-06512535	0'-0"	35'-6"	3 & 7	1-1/4" x 6-1/2"	35'-0"	2	45	90	14	14	19"	1934 LBS.
CCI-AFP-06512525	10'-6"	35'-6"	11	1-1/4" x 6-1/2"	25'-0"	1	39	39	14	14	19"	691 LBS.
CCI-AFP-06010030	35'-6"	65'-6"	3, 7 & 11	1" x 6"	30'-0"	3	38	114	10	10	16"	1836 LBS.
CCI-AFP-06010020	65'-6"	85'-6"	3, 7 & 11	1" x 6"	20'-0"	3	31	93	10	10	16"	1224 LBS.
								372				6238 LBS.

NOTES:

1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.

2.) 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 1-800 831-3275 FOR PRODUCT INFORMATION.

3.) #VALUE!

4.) WELDS SHALL BE E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.

5.) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.

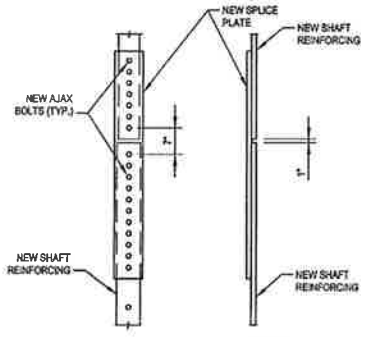
6.) ALL SHIMS SHALL BE ASTM A-36.

SPLICE PLATE INSTALLATION CHART								
ELEVATION	FLAT PLATE THICKNESS	FLAT PLATE WIDTH	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	WELD LENGTH PER SIDE	TOTAL WELD LENGTH	AJAX BOLTS PER SPLICE*	TOTAL STEEL WEIGHT
35'-6"	1 1/4"	6 1/2"	5'-7"	3	-	-	24	547 LBS.
65'-6"	1"	6"	5'-7"	3	-	-	20	343 LBS.
				6"				890 LBS.

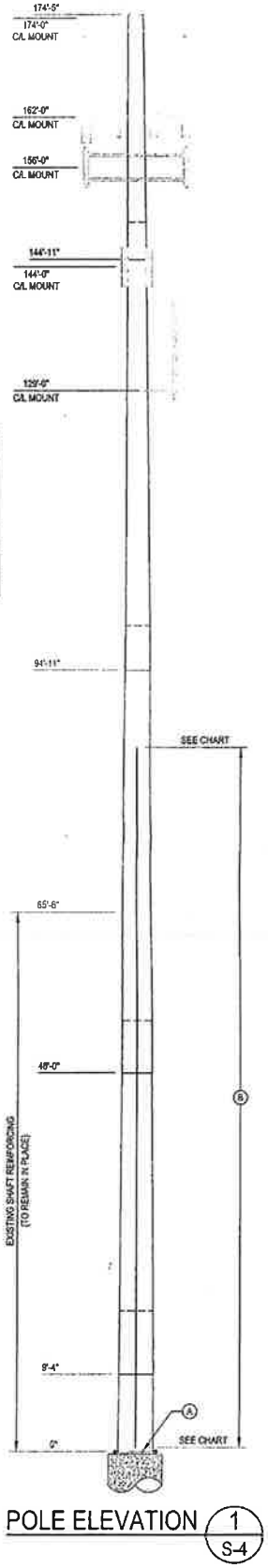
* BOLTS INCLUDED IN THE TOTAL QUANTITY LISTED IN THE FLAT PLATE INSTALLATION CHART.

NEW SHIM CHART				
SHIM QUANTITY	SHIM WIDTH	SHIM LENGTH	SHIM THICKNESS	HOLE DIAMETER
12	4"	4"	1/8"	1-1/4"
39	4"	4"	1/16"	1-1/4"

SHIMS ARE FOR BIDDING PURPOSES ONLY. FINAL SHIM REQUIREMENTS TO BE DETERMINED BY CONTRACTOR DURING FABRICATION.



DETAIL 1/S-4
SCALE: NTS



POLE ELEVATION 1/S-4

STATE OF CONNECTICUT
JOSEPH PACHICARAN JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

"DRAFT"

CROWN CASTLE US PATENT NOS 8,046,972; 8,156,712; 7,849,659; 8,424,259 AND PATENT PENDING

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street - Suite 600 - Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 899-3445 FAX: (585) 899-3448

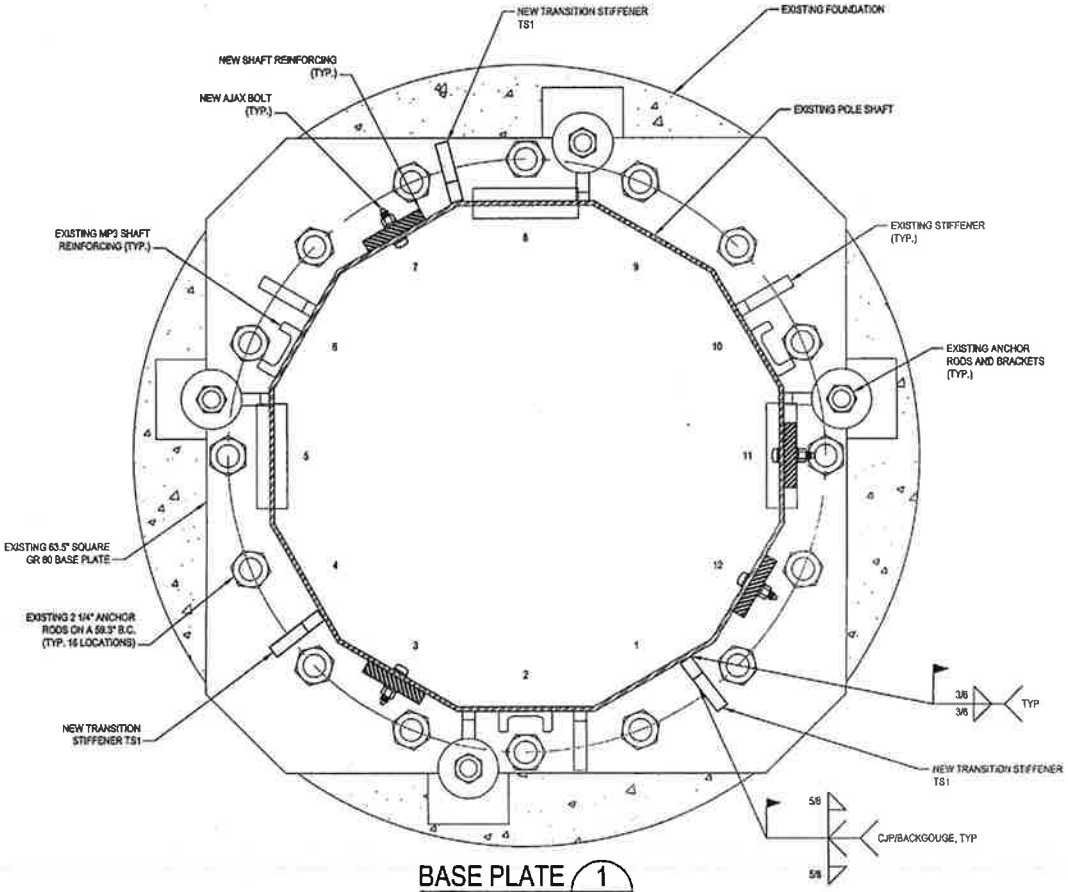
BU #807132; BRG 133 943050
GREENWICH, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-2761
DRAWN BY: B.M.S
CHECKED BY: J.W.M.
APPROVED BY: BKK
DATE: 4-16-2014

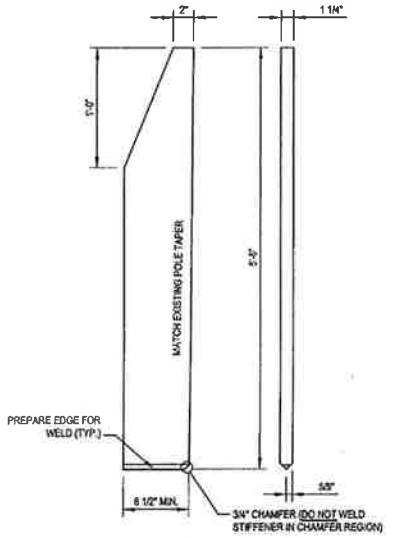
ISSUE DATE OF PERMIT: 4-16-2014

S-4

37513-2761 PERMIT.DWG



BASE PLATE 1 S-5



TRANSITION STIFFENER MK~TS1
(3 REQUIRED) (Fy = 65 KSI)

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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 RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 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 TO, 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 DENG-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 INSPECTION(S) TO COMMENCE 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 FACILITIES 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 LODGING, 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 MI'S
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 INSPECTION(S) 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 AEV/AESV 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 DURING 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 REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

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

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 SHOP 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
NA	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	THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	THIRD PARTY ONSITE BOLT INSPECTION REPORT
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

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BU #807132; BRG 133 943050
GREENWICH, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-2761	ISSUE DATE OF PERMIT: 4-16-2014
DRAWN BY: B.M.S.	
CHECKED BY: J.W.M.	
APPROVED BY: BKR	S-6
DATE: 4-16-2014	

SITE NAME	BANKSVILLE CT	ECP - CELL #	5	93
LATITUDE	41-08-22.35 N	LONGITUDE	73-38-30.45 W	
Additional Comments: 2014 AWS add.		SAVE BUTTON		
		STRUCTURE TYPE	MONOPOLE	

AWS - LTE ANTENNA ADD	ALPHA		BETA		GAMMA	
EQUIPMENT TYPE	2100 MHz eNodeB		2100 MHz eNodeB		2100 MHz eNodeB	
ANTENNA TYPE	BXA-171063-12BF-EDIN-2		BXA-171063-12BF-EDIN-2		BXA-171063-12BF-EDIN-2	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	90		210		330	
DOWN TILT (MECH/DEG)	2		2		2	
RAD CTR (FT AGL)	176		176		176	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	1	ALU RH_2X40-AWS	1	ALU RH_2X40-AWS	1	ALU RH_2X40-AWS
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX	1		DB-T1-6Z-8AB-0Z			

700 Mhz - LTE Current	ALPHA		BETA			
EQUIPMENT TYPE	Lucent		Lucent			
ANTENNA TYPE	P65-16-XL-2		P65-16-XL-2		P65-15-XL-2	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	90		210		330	
DOWN TILT (MECH/DEG)	0		0		0	
RAD CTR (FT AGL)	176		176		176	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
MCPA BRICKS (QTY)						

850 Celluar - Current Config	ALPHA		BETA			
EQUIPMENT TYPE	Modcell 4.0 HD		Modcell 4.0 HD		Modcell 4.0 HD	
ANTENNA TYPE	BXA-80080/4CF		BXA-80080/4CF		ADA85408580CF	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	90		210		330	
DOWN TILT (MECH/DEG)	3		3		0	
RAD CTR (FT AGL)	176		176		176	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
MCPA BRICKS (QTY)						

850 Celluar - Future Config	ALPHA		BETA			
EQUIPMENT TYPE	Modcell 4.0 HD		Modcell 4.0 HD		Modcell 4.0 HD	
ANTENNA TYPE	BXA-80080/4CF		BXA-80080/4CF		ADA85408580CF	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	90		210		330	
DOWN TILT (MECH/DEG)	2		2		0	
RAD CTR (FT AGL)	176		176		176	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL	2	FD9R60042C-3L	2	FD9R60042C-3L	2	FD9R60042C-3L
MCPA BRICKS (QTY)						

1900 Cellular - Current Config	ALPHA		BETA			
EQUIPMENT TYPE	PCS Modcell 4.0		PCS Modcell 4.0		PCS Modcell 4.0	
ANTENNA TYPE	932DG90T2E-M_2		932DG90T2E-M_2		ADA85408580CF	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	90		210		330	
DOWN TILT (MECH/DEG)	0		0		0	
RAD CTR (FT AGL)	176		176		176	
TMA - QTY / MODEL						

DIPLEXER - QTY / MODEL											
MCPA BRICKS (QTY)											
1900 Cellular - Future Config	ALPHA				BETA						
EQUIPMENT TYPE	PCS Modcell 4.0				PCS Modcell 4.0				PCS Modcell 4.0		
ANTENNA TYPE	932DG90T2E-M_2				932DG90T2E-M_2				ADA85408580CF		
QTY OF ANTENNAS PER FACE	1				1				1		
ORIENTATION (DEG)	90				210				330		
DOWN TILT (MECH/DEG)	0				0				0		
RAD CTR (FT AGL)	176				176				176		
TMA - QTY / MODEL											
DIPLEXER - QTY / MODEL											
MCPA BRICKS (QTY)	diplex w/cellular				diplex w/cellular				diplex w/cellular		

NUMBER OF CABLE'S NEEDED				ESTIMATED CABLE LENGTH	
MAINLINE SIZE	1 5/8"	TOTAL # OF MAINLINES	12	MAINLINE (FT)	206
JUMPER SIZE	1/2 "	TOTAL # OF TOP JUMPERS	12	TOP JUMPER (FT)	10
FIBER LINE SIZE	1 5/8"	TOTAL # OF FIBER LINES	1	FIBER LINE MODEL #	8-1-08U8-S
JUMPER SIZE	5/8"	TOTAL # OF TOP JUMPERS	3	TOP JUMPER MODEL #	8-1-08U1-S

TX / RX FREQUENCIES			TX POWER OUTPUT	
Cellular A-Band	PCS F-Band	700 Mhz C - Blo	Cellular (Watts)	20
TX - 869-880,890-891.5 MHz	TX - 1970-1975	TX - 746-757	PCS (Watts)	16
RX - 824-835,845-846.5 MHz	RX - 1890-1895	RX - 776-787	LTE (Watts)	40

ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1	800	Tx1/Rx0	RED	A5	800	Tx2/Rx0	BLUE	A9	800	Tx3/Rx0	GREEN
	1900	Tx1/Rx0	RED/ WHITE		1900	Tx2/Rx0	BLUE/ WHITE				
A2	700	Tx1/Rx0	RED/ ORANGE	A6	700	Tx2/Rx0	BLUE/ ORANGE				
A3	700	Tx4/Rx1	RED/RED/ ORANGE	A7	700	Tx5/Rx1	BLUE/BLUE/ ORANGE				
	1900	Tx4/Rx1	RED/RED/ WHITE		1900	Tx5/Rx1	BLUE/BLUE/ WHITE				
A4	800	Tx4/Rx1	RED/RED	A8	800	Tx5/Rx1	BLUE/BLUE				

RF ENGINEER	RF MANAGER	INITIALS	DATE
Prepared By : Maria Montrose	Robert Hesselbach	MMM	12/10/2013

5_93 BANK 5_93_C 5_93_P BANKSVILLE 5_93_1 5_93_2 5_93_3

Site Configuration