ROBINSON & COLE LLP

KENNETH C. BALDWIN

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

Also admitted in Massachusetts

May 12, 2014

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

Re: **Notice of Exempt Modification – Facility Modification**
69 Guinea Road, Stamford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 142-foot level of the existing 160-foot tower at 69 Guinea Road in Stamford, Connecticut (the "Property"). The tower is owned by Crown Castle. The Council approved Cellco's use of this tower in 1998 (Docket No. 180). Cellco now intends to modify its facility by adding three (3) model MGD3-800TX, 2100 MHz antennas, for a total of fifteen (15) antennas, all at the same 142-foot 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 antennas, RRHs and HYBRIFLEX™ cable.

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

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

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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 located at the 142-foot level on the 160-foot tower.

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

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

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

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

6. The tower and its foundation, with certain 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:
David Martin, Stamford Mayor
Global Signal Acquisitions IV LLC
Sandy M. Carter

ATTACHMENT 1

SINGLE-BAND PANEL ANTENNA

BROADBAND 1700-2170 MHZ

MGD3-800TX

1710-1880	1850-1990	1920-2170
H66° V7.2°	H64° V6.6°	H63° V6.3°
Fixed Tilt 0°2,°4,°6,°	Fixed Tilt 0°2,°4,°6,°	Fixed Tilt 0°2,°4,°6,°

ELECTRICAL SPECIFICATIONS

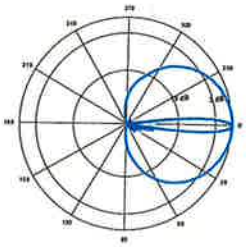
BROADBAND 1710-2170 MHz

Antenna Model	MGD3-800TX		
Polarization	± 45°		
Frequency	1710 - 1880	1850 - 1990	1920 - 2170
Horizontal Beamwidth	66°	64°	63°
Vertical Beamwidth	7.2°	6.6°	6.3°
Gain (dBi)	17.9	18	18.5
Vertical Electrical Tilt	FIXED 0°, 2°, 4°, 6°	FIXED 0°, 2°, 4°, 6°	FIXED 0°, 2°, 4°, 6°
Upper Sidelobe Suppression for the 1st lobe above main beam (dB)	20	20	20
Front-to-Back Ratio /Cpol @ ± 20° (dB)	> 30	> 30	> 30
VSWR	< 1.4 : 1	< 1.4 : 1	< 1.4 : 1
Cross Polar Ratio @ ± 60° (dB)	> 10	> 10	> 10
Isolation Between Ports (dB)	> 30	> 30	> 30
Maximum Power Per Input (W)	250		
Intermodulation (dBc)	< - 150		
Impedance (Ω)	50		

MECHANICAL SPECIFICATIONS

Connectors	2 X 7/16 Female
Connector Position	Bottom
Survival Wind Speed mph (km/h)	124 (200)
Front Windload lbs (N) @ 160 km/h	83 (370)
Lateral Windload lbs (N) @ 160 km/h	38 (170)
Radome Color	Grey, paintable
Temperature Range F (°C)	-67° to 140° (-55° to +60°)
Humidity	100%
Antenna Weight lbs (kg)	15.43 (7)
Antenna Dimension in (mm) H X W X D	53 X 6.29 X 3.54 (1340 X 160 X 90)

H&V Pattern



RYMSA Telecom Group (Headquarters)

RYMSA TELECOM GROUP

www.rymsawireless.com

RYMSA México

RYMSA Wireless U.S.A.

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

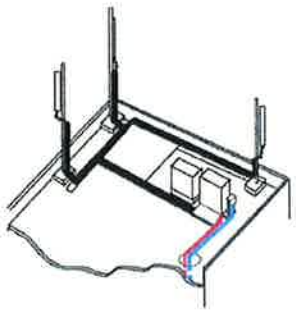
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation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

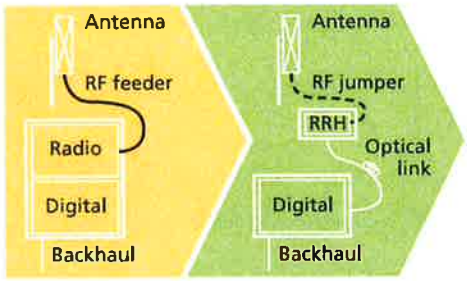
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

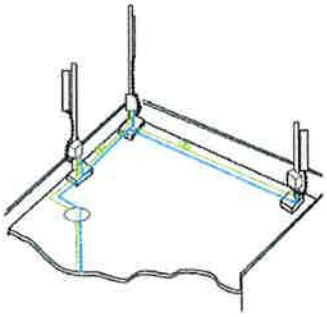
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility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

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CPG2809100912 (09)

Alcatel·Lucent

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Mechanical Properties			
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
Electrical Properties			
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	.068 (0.205)
DC-Resistance Power Cable, 8.4mm² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Fiber Optic Properties			
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
DC Power Cable Properties			
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Environmental			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

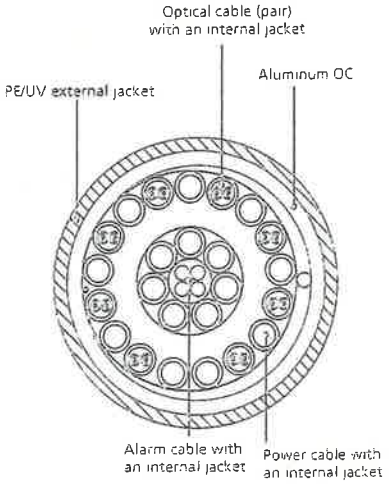


Figure 2: Construction Detail

* This data is provisional and subject to change

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

ATTACHMENT 2

	General	Power	Density					
Site Name: Riverbank (Stamford)								
Tower Height: 160Ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*T-Mobile GSM/UMTS	2	12	118	0.0006	1950	1.0000	0.06%	
*T-Mobile UMTS	2	12	118	0.0006	2100	1.0000	0.06%	
*T-Mobile LTE	2	24	118	0.0012	2100	1.0000	0.12%	
*Metricom			98	0.0002	920	0.6133	0.03%	
*Sprint CDMA/LTE	2	693	160.4	0.0194	1900	1.0000	1.94%	
*Sprint CDMA/LTE	1	390	160.4	0.0055	850	0.5667	0.96%	
*Nextel			130	0.0106		0.5720	1.85%	
*AT&T UMTS	1	500	148	0.0082	880	0.5867	1.40%	
*AT&T UMTS	1	500	148	0.0082	1900	1.0000	0.82%	
*AT&T GSM	6	296	148	0.0292	880	0.5867	4.97%	
*AT&T GSM	6	427	148	0.0421	1900	1.0000	4.21%	
*AT&T LTE	1	500	148	0.0082	740	0.4933	1.66%	
Verizon	**15**	**417**	**142**	**0.1115**	**1970**	**1.0000**	**11.15%**	
Verizon	**9**	**391**	**142**	**0.0628**	**869**	**0.5793**	**10.83%**	
Verizon	**1**	**1750**	**142**	**0.0312**	**2145**	**1.0000**	**3.12%**	
Verizon	**1**	**682**	**142**	**0.0122**	**698**	**0.4653**	**2.61%**	
								45.81%
* Source: Siting Council								

ATTACHMENT 3

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

Date: **March 25, 2014**

Andrew Bazinet
Crown Castle
46 Broadway
Albany, NY 12204

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

Subject: Structural Modification Report

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Riverbank
Crown Castle Designation:	**Crown Castle BU Number:**	806953
	Crown Castle Site Name:	BRG 2044 (A) 943097
	Crown Castle JDE Job Number:	246651
	Crown Castle Work Order Number:	704036
	Crown Castle Application Number:	200735 Rev. 3
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-2318 BP
Site Data:	**69 Guinea RD(Camp Rocky Craig), Stamford, Fairfield County, CT** **Latitude *41° 6' 6.35"*, Longitude *-73° 35' 41.45"*** **160 Foot - Monopole Tower**	

Dear Andrew Bazinet,

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 611786, in accordance with application 200735, revision 3.

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

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

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 CT State Building Code based upon 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:

Joshua Frybarger, E.I.T. BKK
Structural Designer

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by VALMONT in August of 1999. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 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
139.0	142.0	3	alcatel lucent	RRH2X40-AWS	1	1 5/8	-
		3	rymsa	RYMSA MG D3-800TX w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
158.0	158.0	3	alcatel lucent	TME-1900MHz RRH (65MHz) w/ Mount Pipe	-	-	2
		3	alcatel lucent	TME-800MHz RRH w/ mount pipe			
		2	tower mounts	Pipe Mount [PM 601-3]			
157.0	160.0	6	decibel	DB980H90E-M w/Mount Pipe	6	1 5/8	3
	158.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	3 1	1 1/4 5/8	2
		3	alcatel lucent	TD-RRH8x20-25			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
	157.0	9	rfs celwave	ACU-A20-N			
		1	tower mounts	Platform Mount [LP 713-1]	-	-	1
149.0	151.0	6	powerwave	7770.00 w/ Mount Pipe	12 2 1	1 5/8 3/8 5/8	1
		6	powerwave	LGP21401			
		6	powerwave	LGP21901			
	149.0	3	ericsson	RRUS-11			
		3	powerwave	P65-16-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 713-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
139.0	142.0	1	gps	GPS_A	1	1/2	3
		6	andrew	DB846F65ZAXY w/ Mount Pipe	12	1 5/8	1
		3	powerwave technologies	P65.16.XL.2 w/ Mount Pipe			
		3	rymsa	RYMSA MG D3-800TV w/ Mount Pipe			
	139.0	6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 713-1]			
126.0	128.0	9	decibel	DB844H90E-XY w/Mount Pipe	9	1 1/4	3
	126.0	1	tower mounts	Platform Mount [LP 712-1]			
116.0	118.0	3	comm. components.	DTMA-1819-DD-12	-	-	3
		3	ems wireless	RR90-17-02DP w/ Mount Pipe			
		3	rfs celwave	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20			
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1 5/8	2
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
	116.0	1	tower mounts	Platform Mount [LP 712-1]	12	1 5/8	1
84.0	84.0	1	gps	GPS_A	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, 7/20/98	1104116	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Towerkraft, 2622, 7/30/98	1104113	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont, 18917-69, 8/5/99	823122	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 41705-162, 8/30/09	1251715	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37512-1595, 10/1/12	3332716	CCISITES

3.1) Analysis Method

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

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) Based on pictures, (3) Powerwave LGP21401 and (3) Powerwave LGP21901 at the 149' level have been considered to be shielded by the existing antennas.
6) Any extraneous mount pipes at 116' are to be removed when the reserved loading is installed.
7) Monopole will be reinforced in conformance with the 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	160 - 111.33	Pole	TP31.29x19.6x0.25	1	-9.41	1252.07	90.0	Pass
L2	111.33 - 86.25	Pole	TP36.797x29.6683x0.3438	2	-16.63	2097.93	97.2	Pass
L3	86.25 - 80.75	Pole	TP38.1149x36.797x0.5054	3	-18.08	2587.75	85.1	Pass
L4	80.75 - 79	Pole	TP38.5342x38.1149x0.4221	4	-18.47	2619.68	85.4	Pass
L5	79 - 50.0833	Pole	TP44.787x38.5342x0.4063	5	-25.43	3018.50	98.4	Pass
L6	50.0833 - 36.33	Pole	TP48.088x44.787x0.5368	6	-27.69	3374.40	93.2	Pass
L7	36.33 - 32.25	Pole	TP48.2559x45.4135x0.5632	7	-33.10	3676.67	93.6	Pass
L8	32.25 - 15.5	Pole	TP52.278x48.2559x0.5525	8	-39.08	3918.65	96.7	Pass
L9	15.5 - 14.5	Pole	TP52.5182x52.278x0.6092	9	-39.48	4338.39	88.0	Pass
L10	14.5 - 0	Pole	TP56x52.5182x0.4902	10	-44.54	4432.50	92.3	Pass
							Summary	
						Pole (L5)	98.4	Pass
						Rating =	98.4	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	86.1	Pass
1	Base Plate	0	69.3	Pass
1	Base Foundation Structural Steel	0	74.4	Pass
1	Base Foundation Soil Interaction	0	99.9	Pass

Structure Rating (max from all components) =	99.9%

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

4.1) Recommendations

See attached modification 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 thickness is considered to increase with height.
5) Ice density of 56.00 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) 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*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	160.0000-111.3300	48.6700	4.67	12	19.6000	31.2900	0.2500	1.0000	A572-65 (65 ksi)
L2	111.3300-86.2500	29.7500	0.00	12	29.6683	36.7970	0.3438	1.3752	A572-65 (65 ksi)
L3	86.2500-80.7500	5.5000	0.00	12	36.7970	38.1149	0.5054	2.0217	Reinf 52.86 ksi (53 ksi)
L4	80.7500-79.0000	1.7500	0.00	12	38.1149	38.5342	0.4221	1.6884	Reinf 63.23 ksi (63 ksi)
L5	79.0000-50.0833	28.9167	0.00	12	38.5342	44.7870	0.4063	1.6252	A572-65 (65 ksi)
L6	50.0833-36.3300	13.7533	6.67	12	44.7870	48.0880	0.5368	2.1472	Reinf 53.12 ksi (53 ksi)
L7	36.3300-32.2500	10.7500	0.00	12	45.4135	48.2559	0.5632	2.2528	Reinf 53.15 ksi (53 ksi)
L8	32.2500-15.5000	16.7500	0.00	12	48.2559	52.2780	0.5525	2.2101	Reinf 53.24 ksi (53 ksi)
L9	15.5000-14.5000	1.0000	0.00	12	52.2780	52.5181	0.6092	2.4368	Reinf 53.27 ksi (53 ksi)
L10	14.5000-0.0000	14.5000		12	52.5181	56.0000	0.4902	1.9608	Reinf 63.25 ksi (63 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	20.2914	15.5768	744.4315	6.9273	10.1528	73.3228	1508.4200	7.6664	4.5828	18.331
	32.3938	24.9872	3072.8897	11.1123	16.2082	189.5883	6226.5076	12.2979	7.7157	30.863
L2	31.8734	32.4633	3563.2009	10.4982	15.3682	231.8556	7220.0110	15.9774	7.0297	20.447
	38.0950	40.3550	6844.6814	13.0502	19.0608	359.0968	13869.1803	19.8615	8.9402	26.004
L3	38.0950	59.0639	9929.3009	12.9924	19.0608	520.9271	20119.4556	29.0695	8.5070	16.831
	39.4594	61.2088	11050.7840	13.4642	19.7435	559.7177	22391.8845	30.1251	8.8602	17.53
L4	39.4594	51.2318	9290.5395	13.4940	19.7435	470.5620	18825.1518	25.2147	9.0835	21.519
	39.8935	51.8017	9604.0722	13.6441	19.9607	481.1488	19460.4541	25.4952	9.1959	21.786
L5	39.8935	49.8822	9255.8639	13.6498	19.9607	463.7041	18754.8897	24.5505	9.2383	22.738
	46.3669	58.0627	14597.2613	15.8883	23.1997	629.2012	29578.0089	28.5767	10.9140	26.862
L6	46.3669	76.4863	19116.1459	15.8416	23.1997	823.9835	38734.4943	37.6442	10.5643	19.68
	49.7844	82.1921	23721.3157	17.0233	24.9096	952.2967	48065.8167	40.4524	11.4490	21.328
L7	48.8413	81.3362	20883.3728	16.0564	23.5242	887.7402	42315.3750	40.0312	10.6614	18.93
	49.9582	86.4909	25110.7480	17.0740	24.9965	1004.5687	50881.1834	42.5682	11.4232	20.283
L8	49.9582	84.8713	24651.5551	17.0778	24.9965	986.1985	49950.7340	41.7710	11.4518	20.726
	54.1222	92.0272	31427.6223	18.5177	27.0800	1160.5467	63680.8833	45.2930	12.5297	22.677
L9	54.1222	101.3564	34537.7645	18.4974	27.0800	1275.3968	69982.8744	49.8846	12.3778	20.318
	54.3708	101.8275	35021.5471	18.5834	27.2044	1287.3485	70963.1492	50.1164	12.4422	20.423
L10	54.3708	82.1249	28374.8700	18.6260	27.2044	1043.0250	57495.1794	40.4194	12.7611	26.032
	57.9755	87.6209	34461.3861	19.8725	29.0080	1187.9959	69828.1111	43.1243	13.6942	27.935

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
HB058-M12-XXXF(5/8")	A	No	CaAa (Out Of Face)	157.0000 - 0.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.01
						4" Ice	0.0000	0.02
HB114-1-0813U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	157.0000 - 116.0000	1	No Ice	0.1540	0.00
						1/2" Ice	0.2540	0.00
						1" Ice	0.3540	0.00
						2" Ice	0.5540	0.01
						4" Ice	0.9540	0.03
HB114-1-0813U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	157.0000 - 116.0000	2	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.01
						4" Ice	0.0000	0.03
HB114-1-0813U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	116.0000 - 0.0000	3	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.01
						4" Ice	0.0000	0.03
***								
LCF158-50JA-A0(1 5/8")	C	No	Inside Pole	149.0000 - 0.0000	12	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
FB-L98B-002-75000(3/8")	C	No	Inside Pole	149.0000 - 0.0000	2	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
WR-VG82ST-BRDA(5/8")	C	No	Inside Pole	149.0000 - 0.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
HB158-1-08U8-S8J18(1-5/8)	B	No	CaAa (Out Of Face)	139.0000 - 0.0000	1	No Ice	0.1980	0.00
						1/2" Ice	0.2980	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						1" Ice	0.3980	0.00
						2" Ice	0.5980	0.01
						4" Ice	0.9980	0.03
561(1-5/8")	B	No	Inside Pole	139.0000 - 0.0000	12	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
***								
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	A	No	CaAa (Out Of Face)	116.0000 - 0.0000	1	No Ice	0.1625	0.00
						1/2" Ice	0.2625	0.00
						1" Ice	0.3625	0.00
						2" Ice	0.5625	0.01
						4" Ice	0.9625	0.03
LDF7-50A(1-5/8")	A	No	Inside Pole	116.0000 - 0.0000	12	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
LDF4-50A(1/2")	A	No	Inside Pole	84.0000 - 0.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	12.2500 - 1.7500	1	No Ice	0.1250	0.00
						1/2" Ice	0.2361	0.00
						1" Ice	0.3472	0.00
						2" Ice	0.5694	0.00
						4" Ice	1.0139	0.00
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	78.5000 - 77.0000	1	No Ice	0.1250	0.00
						1/2" Ice	0.2361	0.00
						1" Ice	0.3472	0.00
						2" Ice	0.5694	0.00
						4" Ice	1.0139	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	52.2500 - 12.2500	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
						2" Ice	0.6111	0.00
						4" Ice	1.0556	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	88.5000 - 78.5000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
						2" Ice	0.6111	0.00
						4" Ice	1.0556	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.0000-111.3300	A	0.000	0.000	0.000	7.073	0.23
		B	0.000	0.000	0.000	5.479	0.48
		C	0.000	0.000	0.000	0.000	0.05
L2	111.3300-86.2500	A	0.000	0.000	0.000	4.076	0.37
		B	0.000	0.000	0.000	4.966	0.44
		C	0.000	0.000	0.000	0.375	0.03
L3	86.2500-80.7500	A	0.000	0.000	0.000	0.894	0.08
		B	0.000	0.000	0.000	1.089	0.10
		C	0.000	0.000	0.000	0.917	0.01
L4	80.7500-79.0000	A	0.000	0.000	0.000	0.284	0.03
		B	0.000	0.000	0.000	0.346	0.03
		C	0.000	0.000	0.000	0.292	0.00
L5	79.0000-50.0833	A	0.000	0.000	0.000	4.699	0.43
		B	0.000	0.000	0.000	5.726	0.51

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
		C	0.000	0.000	0.000	0.632	0.04
L6	50.0833-36.3300	A	0.000	0.000	0.000	2.235	0.20
		B	0.000	0.000	0.000	2.723	0.24
		C	0.000	0.000	0.000	2.292	0.02
L7	36.3300-32.2500	A	0.000	0.000	0.000	0.663	0.06
		B	0.000	0.000	0.000	0.808	0.07
		C	0.000	0.000	0.000	0.680	0.01
L8	32.2500-15.5000	A	0.000	0.000	0.000	2.722	0.25
		B	0.000	0.000	0.000	3.317	0.29
		C	0.000	0.000	0.000	2.792	0.02
L9	15.5000-14.5000	A	0.000	0.000	0.000	0.163	0.01
		B	0.000	0.000	0.000	0.198	0.02
		C	0.000	0.000	0.000	0.167	0.00
L10	14.5000-0.0000	A	0.000	0.000	0.000	2.356	0.22
		B	0.000	0.000	0.000	2.871	0.25
		C	0.000	0.000	0.000	1.688	0.02

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.0000-111.3300	A	0.887	0.000	0.000	0.000	15.179	0.70
		B		0.000	0.000	0.000	10.390	0.57
		C		0.000	0.000	0.000	0.000	0.05
L2	111.3300-86.2500	A	0.855	0.000	0.000	0.000	8.527	0.69
		B		0.000	0.000	0.000	9.417	0.52
		C		0.000	0.000	0.000	0.819	0.03
L3	86.2500-80.7500	A	0.838	0.000	0.000	0.000	1.816	0.15
		B		0.000	0.000	0.000	2.011	0.11
		C		0.000	0.000	0.000	1.941	0.01
L4	80.7500-79.0000	A	0.834	0.000	0.000	0.000	0.576	0.05
		B		0.000	0.000	0.000	0.638	0.04
		C		0.000	0.000	0.000	0.616	0.00
L5	79.0000-50.0833	A	0.812	0.000	0.000	0.000	9.397	0.76
		B		0.000	0.000	0.000	10.423	0.59
		C		0.000	0.000	0.000	1.384	0.04
L6	50.0833-36.3300	A	0.774	0.000	0.000	0.000	4.365	0.35
		B		0.000	0.000	0.000	4.853	0.28
		C		0.000	0.000	0.000	4.659	0.02
L7	36.3300-32.2500	A	0.753	0.000	0.000	0.000	1.295	0.10
		B		0.000	0.000	0.000	1.440	0.08
		C		0.000	0.000	0.000	1.382	0.01
L8	32.2500-15.5000	A	0.750	0.000	0.000	0.000	5.234	0.42
		B		0.000	0.000	0.000	5.829	0.34
		C		0.000	0.000	0.000	5.583	0.02
L9	15.5000-14.5000	A	0.750	0.000	0.000	0.000	0.313	0.03
		B		0.000	0.000	0.000	0.348	0.02
		C		0.000	0.000	0.000	0.333	0.00
L10	14.5000-0.0000	A	0.750	0.000	0.000	0.000	4.531	0.37
		B		0.000	0.000	0.000	5.046	0.29
		C		0.000	0.000	0.000	3.812	0.02

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.0000-111.3300	0.1433	-0.1146	0.2313	-0.2267
L2	111.3300-86.2500	0.2084	-0.0733	0.3353	-0.1532
L3	86.2500-80.7500	0.0348	0.0255	0.0120	0.0317
L4	80.7500-79.0000	0.0349	0.0255	0.0121	0.0318
L5	79.0000-50.0833	0.2059	-0.0709	0.3245	-0.1448
L6	50.0833-36.3300	0.0358	0.0262	0.0142	0.0330
L7	36.3300-32.2500	0.0359	0.0263	0.0143	0.0332

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L8	32.2500-15.5000	0.0362	0.0264	0.0150	0.0333
L9	15.5000-14.5000	0.0363	0.0265	0.0152	0.0336
L10	14.5000-0.0000	0.0966	-0.0076	0.0909	-0.0093

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
TME-800MHz RRH w/ mount pipe	A	From Face	2.0000 0.00 0.00	0.00	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.5250 4.1044 4.5973 5.6293 7.8776	3.4935 4.1955 4.7751 5.9880 8.6287	0.07 0.11 0.15 0.25 0.56
TME-800MHz RRH w/ mount pipe	B	From Face	2.0000 0.00 0.00	0.00	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.5250 4.1044 4.5973 5.6293 7.8776	3.4935 4.1955 4.7751 5.9880 8.6287	0.07 0.11 0.15 0.25 0.56
TME-800MHz RRH w/ mount pipe	C	From Face	2.0000 0.00 0.00	0.00	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.5250 4.1044 4.5973 5.6293 7.8776	3.4935 4.1955 4.7751 5.9880 8.6287	0.07 0.11 0.15 0.25 0.56
TME-1900MHz RRH (65MHz) w/ Mount Pipe	A	From Face	2.0000 0.00 0.00	0.00	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.6979 2.9362 3.1832 3.7030 4.8463	2.7708 3.0111 3.2600 3.7837 4.9348	0.06 0.08 0.11 0.18 0.35
TME-1900MHz RRH (65MHz) w/ Mount Pipe	B	From Face	2.0000 0.00 0.00	0.00	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.6979 2.9362 3.1832 3.7030 4.8463	2.7708 3.0111 3.2600 3.7837 4.9348	0.06 0.08 0.11 0.18 0.35
TME-1900MHz RRH (65MHz) w/ Mount Pipe	C	From Face	2.0000 0.00 0.00	0.00	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.6979 2.9362 3.1832 3.7030 4.8463	2.7708 3.0111 3.2600 3.7837 4.9348	0.06 0.08 0.11 0.18 0.35
(2) Pipe Mount [PM 601-3]	C	None		0.00	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.3900 5.4800 6.5700 8.7500 13.1100	4.3900 5.4800 6.5700 8.7500 13.1100	0.20 0.24 0.28 0.36 0.53
***									
APXVTM14-C-120 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	157.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.1342 7.6618 8.1830 9.2563 11.5262	4.9591 5.7544 6.4723 8.0099 11.4120	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.00	157.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.1342 7.6618 8.1830 9.2563 11.5262	4.9591 5.7544 6.4723 8.0099 11.4120	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	157.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.1342 7.6618 8.1830 9.2563 11.5262	4.9591 5.7544 6.4723 8.0099 11.4120	0.08 0.13 0.19 0.34 0.75
TD-RRH8x20-25	A	From Face	4.0000 0.00 1.00	0.00	157.0000	No Ice 1/2" Ice 1" Ice	4.7198 5.0138 5.3165	1.7027 1.9196 2.1453	0.07 0.10 0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	5.9478	2.6224	0.20
						4" Ice	7.3141	3.6805	0.40
TD-RRH8x20-25	B	From Face	4.0000	0.00	157.0000	No Ice	4.7198	1.7027	0.07
			0.00			1/2" Ice	5.0138	1.9196	0.10
			1.00			1" Ice	5.3165	2.1453	0.13
						2" Ice	5.9478	2.6224	0.20
						4" Ice	7.3141	3.6805	0.40
TD-RRH8x20-25	C	From Face	4.0000	0.00	157.0000	No Ice	4.7198	1.7027	0.07
			0.00			1/2" Ice	5.0138	1.9196	0.10
			1.00			1" Ice	5.3165	2.1453	0.13
						2" Ice	5.9478	2.6224	0.20
						4" Ice	7.3141	3.6805	0.40
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.0000	0.00	157.0000	No Ice	8.4975	6.9458	0.08
			0.00			1/2" Ice	9.1490	8.1266	0.15
			1.00			1" Ice	9.7672	9.0212	0.23
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.0000	0.00	157.0000	No Ice	8.4975	6.9458	0.08
			0.00			1/2" Ice	9.1490	8.1266	0.15
			1.00			1" Ice	9.7672	9.0212	0.23
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.0000	0.00	157.0000	No Ice	8.4975	6.9458	0.08
			0.00			1/2" Ice	9.1490	8.1266	0.15
			1.00			1" Ice	9.7672	9.0212	0.23
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
800 EXTERNAL NOTCH FILTER	A	From Face	4.0000	0.00	157.0000	No Ice	0.7701	0.3747	0.01
			0.00			1/2" Ice	0.8898	0.4647	0.02
			1.00			1" Ice	1.0181	0.5634	0.02
						2" Ice	1.3007	0.7868	0.04
						4" Ice	1.9696	1.3372	0.11
800 EXTERNAL NOTCH FILTER	B	From Face	4.0000	0.00	157.0000	No Ice	0.7701	0.3747	0.01
			0.00			1/2" Ice	0.8898	0.4647	0.02
			1.00			1" Ice	1.0181	0.5634	0.02
						2" Ice	1.3007	0.7868	0.04
						4" Ice	1.9696	1.3372	0.11
800 EXTERNAL NOTCH FILTER	C	From Face	4.0000	0.00	157.0000	No Ice	0.7701	0.3747	0.01
			0.00			1/2" Ice	0.8898	0.4647	0.02
			1.00			1" Ice	1.0181	0.5634	0.02
						2" Ice	1.3007	0.7868	0.04
						4" Ice	1.9696	1.3372	0.11
(3) ACU-A20-N	A	From Face	4.0000	0.00	157.0000	No Ice	0.0778	0.1361	0.00
			0.00			1/2" Ice	0.1210	0.1890	0.00
			0.00			1" Ice	0.1728	0.2506	0.00
						2" Ice	0.3025	0.3997	0.01
						4" Ice	0.6654	0.8015	0.04
(3) ACU-A20-N	B	From Face	4.0000	0.00	157.0000	No Ice	0.0778	0.1361	0.00
			0.00			1/2" Ice	0.1210	0.1890	0.00
			0.00			1" Ice	0.1728	0.2506	0.00
						2" Ice	0.3025	0.3997	0.01
						4" Ice	0.6654	0.8015	0.04
(3) ACU-A20-N	C	From Face	4.0000	0.00	157.0000	No Ice	0.0778	0.1361	0.00
			0.00			1/2" Ice	0.1210	0.1890	0.00
			0.00			1" Ice	0.1728	0.2506	0.00
						2" Ice	0.3025	0.3997	0.01
						4" Ice	0.6654	0.8015	0.04
Platform Mount [LP 713-1]	A	None		0.00	157.0000	No Ice	31.2700	31.2700	1.51
						1/2" Ice	39.6800	39.6800	1.93
						1" Ice	48.0900	48.0900	2.35
						2" Ice	64.9100	64.9100	3.19
						4" Ice	98.5500	98.5500	4.86
***									
(2) 7770.00 w/ Mount Pipe	A	From Face	4.0000	0.00	149.0000	No Ice	6.1194	4.2543	0.06
			0.00			1/2" Ice	6.6258	5.0137	0.10

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
			2.00			1" Ice	7.1283	5.7109	0.16
						2" Ice	8.1643	7.1553	0.29
						4" Ice	10.3599	10.4117	0.66
(2) 7770.00 w/ Mount Pipe	B	From Face	4.0000	0.00	149.0000	No Ice	6.1194	4.2543	0.06
			0.00			1/2" Ice	6.6258	5.0137	0.10
			2.00			1" Ice	7.1283	5.7109	0.16
						2" Ice	8.1643	7.1553	0.29
						4" Ice	10.3599	10.4117	0.66
(2) 7770.00 w/ Mount Pipe	C	From Face	4.0000	0.00	149.0000	No Ice	6.1194	4.2543	0.06
			0.00			1/2" Ice	6.6258	5.0137	0.10
			2.00			1" Ice	7.1283	5.7109	0.16
						2" Ice	8.1643	7.1553	0.29
						4" Ice	10.3599	10.4117	0.66
P65-16-XLH-RR w/ Mount Pipe	A	From Face	4.0000	0.00	149.0000	No Ice	8.6375	6.3625	0.08
			0.00			1/2" Ice	9.2903	7.5378	0.14
			0.00			1" Ice	9.9098	8.4270	0.22
						2" Ice	11.1763	10.2390	0.39
						4" Ice	13.8289	14.0988	0.89
P65-16-XLH-RR w/ Mount Pipe	B	From Face	4.0000	0.00	149.0000	No Ice	8.6375	6.3625	0.08
			0.00			1/2" Ice	9.2903	7.5378	0.14
			0.00			1" Ice	9.9098	8.4270	0.22
						2" Ice	11.1763	10.2390	0.39
						4" Ice	13.8289	14.0988	0.89
P65-16-XLH-RR w/ Mount Pipe	C	From Face	4.0000	0.00	149.0000	No Ice	8.6375	6.3625	0.08
			0.00			1/2" Ice	9.2903	7.5378	0.14
			0.00			1" Ice	9.9098	8.4270	0.22
						2" Ice	11.1763	10.2390	0.39
						4" Ice	13.8289	14.0988	0.89
LGP21401	A	From Face	4.0000	0.00	149.0000	No Ice	1.2880	0.2326	0.01
			0.00			1/2" Ice	1.4453	0.3134	0.02
			2.00			1" Ice	1.6112	0.4028	0.03
						2" Ice	1.9690	0.6076	0.05
						4" Ice	2.7882	1.1210	0.14
LGP21401	B	From Face	4.0000	0.00	149.0000	No Ice	1.2880	0.2326	0.01
			0.00			1/2" Ice	1.4453	0.3134	0.02
			2.00			1" Ice	1.6112	0.4028	0.03
						2" Ice	1.9690	0.6076	0.05
						4" Ice	2.7882	1.1210	0.14
LGP21401	C	From Face	4.0000	0.00	149.0000	No Ice	1.2880	0.2326	0.01
			0.00			1/2" Ice	1.4453	0.3134	0.02
			2.00			1" Ice	1.6112	0.4028	0.03
						2" Ice	1.9690	0.6076	0.05
						4" Ice	2.7882	1.1210	0.14
LGP21401	A	From Face	4.0000	0.00	149.0000	No Ice	0.0000	0.0000	0.01
			0.00			1/2" Ice	0.0000	0.0000	0.02
			2.00			1" Ice	0.0000	0.0000	0.03
						2" Ice	0.0000	0.0000	0.05
						4" Ice	0.0000	0.0000	0.14
LGP21401	B	From Face	4.0000	0.00	149.0000	No Ice	0.0000	0.0000	0.01
			0.00			1/2" Ice	0.0000	0.0000	0.02
			2.00			1" Ice	0.0000	0.0000	0.03
						2" Ice	0.0000	0.0000	0.05
						4" Ice	0.0000	0.0000	0.14
LGP21401	C	From Face	4.0000	0.00	149.0000	No Ice	0.0000	0.0000	0.01
			0.00			1/2" Ice	0.0000	0.0000	0.02
			2.00			1" Ice	0.0000	0.0000	0.03
						2" Ice	0.0000	0.0000	0.05
						4" Ice	0.0000	0.0000	0.14
LGP21901	A	From Face	4.0000	0.00	149.0000	No Ice	0.2695	0.1838	0.01
			0.00			1/2" Ice	0.3432	0.2483	0.01
			2.00			1" Ice	0.4255	0.3216	0.01
						2" Ice	0.6160	0.4940	0.02
						4" Ice	1.1009	0.9425	0.07
LGP21901	B	From Face	4.0000	0.00	149.0000	No Ice	0.2695	0.1838	0.01
			0.00			1/2" Ice	0.3432	0.2483	0.01

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
				2.00			1" Ice	0.4255	0.3216	0.01
							2" Ice	0.6160	0.4940	0.02
							4" Ice	1.1009	0.9425	0.07
LGP21901	C	From Face	4.0000		0.00	149.0000	No Ice	0.2695	0.1838	0.01
			0.00				1/2" Ice	0.3432	0.2483	0.01
				2.00			1" Ice	0.4255	0.3216	0.01
							2" Ice	0.6160	0.4940	0.02
							4" Ice	1.1009	0.9425	0.07
LGP21901	A	From Face	4.0000		0.00	149.0000	No Ice	0.0000	0.0000	0.01
			0.00				1/2" Ice	0.0000	0.0000	0.01
				2.00			1" Ice	0.0000	0.0000	0.01
							2" Ice	0.0000	0.0000	0.02
							4" Ice	0.0000	0.0000	0.07
LGP21901	B	From Face	4.0000		0.00	149.0000	No Ice	0.0000	0.0000	0.01
			0.00				1/2" Ice	0.0000	0.0000	0.01
				2.00			1" Ice	0.0000	0.0000	0.01
							2" Ice	0.0000	0.0000	0.02
							4" Ice	0.0000	0.0000	0.07
LGP21901	C	From Face	4.0000		0.00	149.0000	No Ice	0.0000	0.0000	0.01
			0.00				1/2" Ice	0.0000	0.0000	0.01
				2.00			1" Ice	0.0000	0.0000	0.01
							2" Ice	0.0000	0.0000	0.02
							4" Ice	0.0000	0.0000	0.07
RRUS-11	A	From Face	4.0000		0.00	149.0000	No Ice	3.2486	1.3726	0.05
			0.00				1/2" Ice	3.4905	1.5510	0.07
			0.00				1" Ice	3.7411	1.7380	0.09
							2" Ice	4.2682	2.1381	0.15
							4" Ice	5.4260	3.0418	0.31
RRUS-11	B	From Face	4.0000		0.00	149.0000	No Ice	3.2486	1.3726	0.05
			0.00				1/2" Ice	3.4905	1.5510	0.07
			0.00				1" Ice	3.7411	1.7380	0.09
							2" Ice	4.2682	2.1381	0.15
							4" Ice	5.4260	3.0418	0.31
RRUS-11	C	From Face	4.0000		0.00	149.0000	No Ice	3.2486	1.3726	0.05
			0.00				1/2" Ice	3.4905	1.5510	0.07
			0.00				1" Ice	3.7411	1.7380	0.09
							2" Ice	4.2682	2.1381	0.15
							4" Ice	5.4260	3.0418	0.31
DC6-48-60-18-8F	C	From Face	4.0000		0.00	149.0000	No Ice	2.5667	2.5667	0.02
			0.00				1/2" Ice	2.7978	2.7978	0.04
			0.00				1" Ice	3.0377	3.0377	0.07
							2" Ice	3.5432	3.5432	0.13
							4" Ice	4.6580	4.6580	0.30
Platform Mount [LP 713-1]	A	None			0.00	149.0000	No Ice	31.2700	31.2700	1.51
							1/2" Ice	39.6800	39.6800	1.93
							1" Ice	48.0900	48.0900	2.35
							2" Ice	64.9100	64.9100	3.19
							4" Ice	98.5500	98.5500	4.86
***										
RYMSA MG D3-800TX w/ Mount Pipe	A	From Face	4.0000		0.00	139.0000	No Ice	3.5960	3.4435	0.04
			0.00				1/2" Ice	4.0150	4.1655	0.07
				3.00			1" Ice	4.4296	4.8367	0.11
							2" Ice	5.3815	6.2291	0.21
							4" Ice	7.4264	9.2649	0.52
RYMSA MG D3-800TX w/ Mount Pipe	B	From Face	4.0000		0.00	139.0000	No Ice	3.5960	3.4435	0.04
			0.00				1/2" Ice	4.0150	4.1655	0.07
				3.00			1" Ice	4.4296	4.8367	0.11
							2" Ice	5.3815	6.2291	0.21
							4" Ice	7.4264	9.2649	0.52
RYMSA MG D3-800TX w/ Mount Pipe	C	From Face	4.0000		0.00	139.0000	No Ice	3.5960	3.4435	0.04
			0.00				1/2" Ice	4.0150	4.1655	0.07
				3.00			1" Ice	4.4296	4.8367	0.11
							2" Ice	5.3815	6.2291	0.21
							4" Ice	7.4264	9.2649	0.52
RRH2X40-AWS	A	From Face	4.0000		0.00	139.0000	No Ice	2.9764	1.5960	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	3.2363	1.8239	0.06
			3.00				1" Ice	3.5048	2.0605	0.08
							2" Ice	4.0678	2.5596	0.14
							4" Ice	5.2975	3.6614	0.29
RRH2X40-AWS	B	From Face	4.0000		0.00	139.0000	No Ice	2.9764	1.5960	0.04
			0.00				1/2" Ice	3.2363	1.8239	0.06
			3.00				1" Ice	3.5048	2.0605	0.08
							2" Ice	4.0678	2.5596	0.14
							4" Ice	5.2975	3.6614	0.29
RRH2X40-AWS	C	From Face	4.0000		0.00	139.0000	No Ice	2.9764	1.5960	0.04
			0.00				1/2" Ice	3.2363	1.8239	0.06
			3.00				1" Ice	3.5048	2.0605	0.08
							2" Ice	4.0678	2.5596	0.14
							4" Ice	5.2975	3.6614	0.29
DB-T1-6Z-8AB-0Z	C	From Face	4.0000		0.00	139.0000	No Ice	5.6000	2.3333	0.04
			0.00				1/2" Ice	5.9154	2.5580	0.08
			3.00				1" Ice	6.2395	2.7914	0.12
							2" Ice	6.9136	3.2840	0.21
							4" Ice	8.3654	4.3728	0.45
(2) DB846F65ZAXY w/ Mount Pipe	A	From Face	4.0000		0.00	139.0000	No Ice	7.2708	7.8208	0.05
			0.00				1/2" Ice	7.8773	9.0097	0.11
			3.00				1" Ice	8.4838	9.9124	0.19
							2" Ice	9.7244	11.8119	0.37
							4" Ice	12.3252	15.9785	0.87
(2) DB846F65ZAXY w/ Mount Pipe	B	From Face	4.0000		0.00	139.0000	No Ice	7.2708	7.8208	0.05
			0.00				1/2" Ice	7.8773	9.0097	0.11
			3.00				1" Ice	8.4838	9.9124	0.19
							2" Ice	9.7244	11.8119	0.37
							4" Ice	12.3252	15.9785	0.87
(2) DB846F65ZAXY w/ Mount Pipe	C	From Face	4.0000		0.00	139.0000	No Ice	7.2708	7.8208	0.05
			0.00				1/2" Ice	7.8773	9.0097	0.11
			3.00				1" Ice	8.4838	9.9124	0.19
							2" Ice	9.7244	11.8119	0.37
							4" Ice	12.3252	15.9785	0.87
P65.16.XL.2 w/ Mount Pipe	A	From Face	4.0000		0.00	139.0000	No Ice	8.6375	5.7792	0.06
			0.00				1/2" Ice	9.2903	6.9491	0.12
			3.00				1" Ice	9.9098	7.8329	0.19
							2" Ice	11.1763	9.6341	0.36
							4" Ice	13.8289	13.4365	0.84
P65.16.XL.2 w/ Mount Pipe	B	From Face	4.0000		0.00	139.0000	No Ice	8.6375	5.7792	0.06
			0.00				1/2" Ice	9.2903	6.9491	0.12
			3.00				1" Ice	9.9098	7.8329	0.19
							2" Ice	11.1763	9.6341	0.36
							4" Ice	13.8289	13.4365	0.84
P65.16.XL.2 w/ Mount Pipe	C	From Face	4.0000		0.00	139.0000	No Ice	8.6375	5.7792	0.06
			0.00				1/2" Ice	9.2903	6.9491	0.12
			3.00				1" Ice	9.9098	7.8329	0.19
							2" Ice	11.1763	9.6341	0.36
							4" Ice	13.8289	13.4365	0.84
RYMSA MG D3-800TV w/ Mount Pipe	A	From Face	4.0000		0.00	139.0000	No Ice	3.4773	3.3248	0.04
			0.00				1/2" Ice	3.8534	3.9564	0.07
			3.00				1" Ice	4.2373	4.5989	0.11
							2" Ice	5.1257	5.9338	0.20
							4" Ice	7.0405	8.9033	0.51
RYMSA MG D3-800TV w/ Mount Pipe	B	From Face	4.0000		0.00	139.0000	No Ice	3.4773	3.3248	0.04
			0.00				1/2" Ice	3.8534	3.9564	0.07
			3.00				1" Ice	4.2373	4.5989	0.11
							2" Ice	5.1257	5.9338	0.20
							4" Ice	7.0405	8.9033	0.51
RYMSA MG D3-800TV w/ Mount Pipe	C	From Face	4.0000		0.00	139.0000	No Ice	3.4773	3.3248	0.04
			0.00				1/2" Ice	3.8534	3.9564	0.07
			3.00				1" Ice	4.2373	4.5989	0.11
							2" Ice	5.1257	5.9338	0.20
							4" Ice	7.0405	8.9033	0.51
(2) FD9R6004/2C-3L	A	From Face	4.0000		0.00	139.0000	No Ice	0.3665	0.0846	0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	0.4506	0.1362	0.01
			0.00			1" Ice	0.5433	0.1965	0.01
						2" Ice	0.7546	0.3430	0.02
						4" Ice	1.2808	0.7396	0.06
(2) FD9R6004/2C-3L	B	From Face	4.0000	0.00	139.0000	No Ice	0.3665	0.0846	0.00
			0.00			1/2" Ice	0.4506	0.1362	0.01
			0.00			1" Ice	0.5433	0.1965	0.01
						2" Ice	0.7546	0.3430	0.02
						4" Ice	1.2808	0.7396	0.06
(2) FD9R6004/2C-3L	C	From Face	4.0000	0.00	139.0000	No Ice	0.3665	0.0846	0.00
			0.00			1/2" Ice	0.4506	0.1362	0.01
			0.00			1" Ice	0.5433	0.1965	0.01
						2" Ice	0.7546	0.3430	0.02
						4" Ice	1.2808	0.7396	0.06
Platform Mount [LP 713-1]	A	None		0.00	139.0000	No Ice	31.2700	31.2700	1.51
						1/2" Ice	39.6800	39.6800	1.93
						1" Ice	48.0900	48.0900	2.35
						2" Ice	64.9100	64.9100	3.19
						4" Ice	98.5500	98.5500	4.86
***									
***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Face	4.0000	0.00	116.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2" Ice	7.3471	6.4800	0.17
			2.00			1" Ice	7.8631	7.2567	0.23
						2" Ice	8.9261	8.8640	0.38
						4" Ice	11.1755	12.2932	0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Face	4.0000	0.00	116.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2" Ice	7.3471	6.4800	0.17
			2.00			1" Ice	7.8631	7.2567	0.23
						2" Ice	8.9261	8.8640	0.38
						4" Ice	11.1755	12.2932	0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Face	4.0000	0.00	116.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2" Ice	7.3471	6.4800	0.17
			2.00			1" Ice	7.8631	7.2567	0.23
						2" Ice	8.9261	8.8640	0.38
						4" Ice	11.1755	12.2932	0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Face	4.0000	0.00	116.0000	No Ice	6.8155	5.6334	0.11
			0.00			1/2" Ice	7.3373	6.4717	0.17
			2.00			1" Ice	7.8532	7.2478	0.23
						2" Ice	8.9160	8.8537	0.38
						4" Ice	11.1650	12.2804	0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Face	4.0000	0.00	116.0000	No Ice	6.8155	5.6334	0.11
			0.00			1/2" Ice	7.3373	6.4717	0.17
			2.00			1" Ice	7.8532	7.2478	0.23
						2" Ice	8.9160	8.8537	0.38
						4" Ice	11.1650	12.2804	0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Face	4.0000	0.00	116.0000	No Ice	6.8155	5.6334	0.11
			0.00			1/2" Ice	7.3373	6.4717	0.17
			2.00			1" Ice	7.8532	7.2478	0.23
						2" Ice	8.9160	8.8537	0.38
						4" Ice	11.1650	12.2804	0.81
KRY 112 144/1	A	From Face	4.0000	0.00	116.0000	No Ice	0.4083	0.2042	0.01
			0.00			1/2" Ice	0.4969	0.2733	0.01
			2.00			1" Ice	0.5941	0.3511	0.02
						2" Ice	0.8145	0.5326	0.03
						4" Ice	1.3590	0.9992	0.08
KRY 112 144/1	B	From Face	4.0000	0.00	116.0000	No Ice	0.4083	0.2042	0.01
			0.00			1/2" Ice	0.4969	0.2733	0.01
			2.00			1" Ice	0.5941	0.3511	0.02
						2" Ice	0.8145	0.5326	0.03
						4" Ice	1.3590	0.9992	0.08
KRY 112 144/1	C	From Face	4.0000	0.00	116.0000	No Ice	0.4083	0.2042	0.01
			0.00			1/2" Ice	0.4969	0.2733	0.01
			2.00			1" Ice	0.5941	0.3511	0.02
						2" Ice	0.8145	0.5326	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	1.3590	0.9992	0.08
Platform Mount [LP 712-1]	A	None		0.00	116.0000	No Ice	24.5300	24.5300	1.34
						1/2" Ice	29.9400	29.9400	1.65
						1" Ice	35.3500	35.3500	1.96
						2" Ice	46.1700	46.1700	2.58
						4" Ice	67.8100	67.8100	3.82
***									
GPS_A	C	From Face	4.0000 0.00 0.00	0.00	84.0000	No Ice	0.2975	0.2975	0.00
						1/2" Ice	0.3739	0.3739	0.00
						1" Ice	0.4589	0.4589	0.01
						2" Ice	0.6549	0.6549	0.02
						4" Ice	1.1506	1.1506	0.08
Side Arm Mount [SO 701-1]	C	From Face	2.0000 0.00 0.00	0.00	84.0000	No Ice	0.8500	1.6700	0.07
						1/2" Ice	1.1400	2.3400	0.08
						1" Ice	1.4300	3.0100	0.09
						2" Ice	2.0100	4.3500	0.12
						4" Ice	3.1700	7.0300	0.18

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 160.0000-111.3300	134.1093	1.493	0.03	103.201	A	0.000	103.201	103.201	100.00	0.000	7.073
					B	0.000	103.201		100.00	0.000	5.479
					C	0.000	103.201		100.00	0.000	0.000
L2 111.3300-86.2500	98.4183	1.366	0.03	70.626	A	0.000	70.626	70.626	100.00	0.000	4.076
					B	0.000	70.626		100.00	0.000	4.966
					C	0.000	70.626		100.00	0.000	0.375
L3 86.2500-80.7500	83.4839	1.304	0.02	17.167	A	0.000	17.167	17.167	100.00	0.000	0.894
					B	0.000	17.167		100.00	0.000	1.089
					C	0.000	17.167		100.00	0.000	0.917
L4 80.7500-79.0000	79.8734	1.287	0.02	5.589	A	0.000	5.589	5.589	100.00	0.000	0.284
					B	0.000	5.589		100.00	0.000	0.346
					C	0.000	5.589		100.00	0.000	0.292
L5 79.0000-50.0833	64.1800	1.209	0.02	100.391	A	0.000	100.391	100.391	100.00	0.000	4.699
					B	0.000	100.391		100.00	0.000	5.726
					C	0.000	100.391		100.00	0.000	0.632
L6 50.0833-36.3300	43.1252	1.079	0.02	53.222	A	0.000	53.222	53.222	100.00	0.000	2.235
					B	0.000	53.222		100.00	0.000	2.723
					C	0.000	53.222		100.00	0.000	2.292
L7 36.3300-32.2500	34.2823	1.011	0.02	16.224	A	0.000	16.224	16.224	100.00	0.000	0.663
					B	0.000	16.224		100.00	0.000	0.808
					C	0.000	16.224		100.00	0.000	0.680
L8 32.2500-15.5000	23.7633	1	0.02	70.164	A	0.000	70.164	70.164	100.00	0.000	2.722
					B	0.000	70.164		100.00	0.000	3.317
					C	0.000	70.164		100.00	0.000	2.792
L9 15.5000-14.5000	14.9996	1	0.02	4.367	A	0.000	4.367	4.367	100.00	0.000	0.163
					B	0.000	4.367		100.00	0.000	0.198
					C	0.000	4.367		100.00	0.000	0.167
L10 14.5000-0.0000	7.1725	1	0.02	65.563	A	0.000	65.563	65.563	100.00	0.000	2.356
					B	0.000	65.563		100.00	0.000	2.871
					C	0.000	65.563		100.00	0.000	1.688

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 160.0000-111.3300	134.1093	1.493	0.01	0.8874	110.399	A	0.000	110.399	110.399	100.00	0.000	15.179
						B	0.000	110.399		100.00	0.000	10.390
						C	0.000	110.399		100.00	0.000	0.000
L2 111.3300-86.2500	98.4183	1.366	0.00	0.8551	74.335	A	0.000	74.335	74.335	100.00	0.000	8.527
						B	0.000	74.335		100.00	0.000	9.417
						C	0.000	74.335		100.00	0.000	0.819
L3 86.2500-80.7500	83.4839	1.304	0.00	0.8384	17.936	A	0.000	17.936	17.936	100.00	0.000	1.816
						B	0.000	17.936		100.00	0.000	2.011
						C	0.000	17.936		100.00	0.000	1.941
L4 80.7500-79.0000	79.8734	1.287	0.00	0.8339	5.832	A	0.000	5.832	5.832	100.00	0.000	0.576
						B	0.000	5.832		100.00	0.000	0.638
						C	0.000	5.832		100.00	0.000	0.616
L5 79.0000-50.0833	64.1800	1.209	0.00	0.8123	104.306	A	0.000	104.306	104.306	100.00	0.000	9.397
						B	0.000	104.306		100.00	0.000	10.423
						C	0.000	104.306		100.00	0.000	1.384
L6 50.0833-36.3300	43.1252	1.079	0.00	0.7745	54.998	A	0.000	54.998	54.998	100.00	0.000	4.365
						B	0.000	54.998		100.00	0.000	4.853
						C	0.000	54.998		100.00	0.000	4.659
L7 36.3300-32.2500	34.2823	1.011	0.00	0.7534	16.750	A	0.000	16.750	16.750	100.00	0.000	1.295
						B	0.000	16.750		100.00	0.000	1.440
						C	0.000	16.750		100.00	0.000	1.382
L8 32.2500-15.5000	23.7633	1	0.00	0.7500	72.258	A	0.000	72.258	72.258	100.00	0.000	5.234
						B	0.000	72.258		100.00	0.000	5.829
						C	0.000	72.258		100.00	0.000	5.583
L9 15.5000-14.5000	14.9996	1	0.00	0.7500	4.492	A	0.000	4.492	4.492	100.00	0.000	0.313
						B	0.000	4.492		100.00	0.000	0.348
						C	0.000	4.492		100.00	0.000	0.333
L10 14.5000-0.0000	7.1725	1	0.00	0.7500	67.376	A	0.000	67.376	67.376	100.00	0.000	4.531
						B	0.000	67.376		100.00	0.000	5.046
						C	0.000	67.376		100.00	0.000	3.812

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 160.0000-111.3300	134.1093	1.493	0.01	103.201	A	0.000	103.201	103.201	100.00	0.000	7.073
					B	0.000	103.201		100.00	0.000	5.479
					C	0.000	103.201		100.00	0.000	0.000
L2 111.3300-86.2500	98.4183	1.366	0.01	70.626	A	0.000	70.626	70.626	100.00	0.000	4.076
					B	0.000	70.626		100.00	0.000	4.966
					C	0.000	70.626		100.00	0.000	0.375
L3 86.2500-80.7500	83.4839	1.304	0.01	17.167	A	0.000	17.167	17.167	100.00	0.000	0.894
					B	0.000	17.167		100.00	0.000	1.089
					C	0.000	17.167		100.00	0.000	0.917
L4 80.7500-79.0000	79.8734	1.287	0.01	5.589	A	0.000	5.589	5.589	100.00	0.000	0.284
					B	0.000	5.589		100.00	0.000	0.346
					C	0.000	5.589		100.00	0.000	0.292
L5 79.0000-50.0833	64.1800	1.209	0.01	100.391	A	0.000	100.391	100.391	100.00	0.000	4.699
					B	0.000	100.391		100.00	0.000	5.726
					C	0.000	100.391		100.00	0.000	0.632
L6 50.0833-36.3300	43.1252	1.079	0.01	53.222	A	0.000	53.222	53.222	100.00	0.000	2.235
					B	0.000	53.222		100.00	0.000	2.723
					C	0.000	53.222		100.00	0.000	2.292
L7 36.3300-32.2500	34.2823	1.011	0.01	16.224	A	0.000	16.224	16.224	100.00	0.000	0.663
					B	0.000	16.224		100.00	0.000	0.808
					C	0.000	16.224		100.00	0.000	0.680
L8 32.2500-15.5000	23.7633	1	0.01	70.164	A	0.000	70.164	70.164	100.00	0.000	2.722
					B	0.000	70.164		100.00	0.000	3.317
					C	0.000	70.164		100.00	0.000	2.792
L9 15.5000-	14.9996	1	0.01	4.367	A	0.000	4.367	4.367	100.00	0.000	0.163

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
14.5000					B	0.000	4.367		100.00	0.000	0.198
					C	0.000	4.367		100.00	0.000	0.167
L10 14.5000-0.0000	7.1725	1	0.01	65.563	A	0.000	65.563	65.563	100.00	0.000	2.356
					B	0.000	65.563		100.00	0.000	2.871
					C	0.000	65.563		100.00	0.000	1.688

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
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	160 - 111.33	Pole	Max Tension	8	0.00	0.00	0.00
			Max. Compression	14	-19.79	-0.11	-0.30
			Max. Mx	5	-9.43	-676.00	-0.09
			Max. My	8	-9.41	-0.03	-680.27
			Max. Vy	5	22.20	-676.00	-0.09
			Max. Vx	8	22.36	-0.03	-680.27
			Max. Torque	11			1.15
L2	111.33 - 86.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-29.71	-0.26	0.31
			Max. Mx	5	-16.65	-1489.31	0.04

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-16.63	-0.08	1498.18
			Max. Vy	5	29.30	-1489.31	0.04
			Max. Vx	2	-29.46	-0.08	1498.18
			Max. Torque	11			1.11
L3	86.25 - 80.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.42	-0.29	0.08
			Max. Mx	5	-18.10	-1652.97	-0.15
			Max. My	8	-18.08	-0.09	-1662.75
			Max. Vy	5	30.22	-1652.97	-0.15
			Max. Vx	2	-30.35	-0.09	1662.40
			Max. Torque	11			1.41
L4	80.75 - 79	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.88	-0.30	0.12
			Max. Mx	5	-18.49	-1706.07	-0.14
			Max. My	8	-18.47	-0.09	-1716.07
			Max. Vy	5	30.49	-1706.07	-0.14
			Max. Vx	2	-30.62	-0.09	1715.74
			Max. Torque	11			1.41
L5	79 - 50.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-39.83	-0.48	0.83
			Max. Mx	5	-25.44	-2644.62	0.06
			Max. My	2	-25.43	-0.15	2658.09
			Max. Vy	5	34.51	-2644.62	0.06
			Max. Vx	2	-34.64	-0.15	2658.09
			Max. Torque	11			1.41
L6	50.0833 - 36.33	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.37	-0.53	1.02
			Max. Mx	5	-27.70	-2892.47	0.12
			Max. My	2	-27.69	-0.17	2906.86
			Max. Vy	5	35.50	-2892.47	0.12
			Max. Vx	2	-35.62	-0.17	2906.86
			Max. Torque	11			1.38
L7	36.33 - 32.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-48.57	-0.60	1.31
			Max. Mx	5	-33.11	-3282.96	0.21
			Max. My	2	-33.10	-0.19	3298.75
			Max. Vy	5	37.10	-3282.96	0.21
			Max. Vx	2	-37.23	-0.19	3298.75
			Max. Torque	11			1.39
L8	32.25 - 15.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-55.20	-0.72	1.77
			Max. Mx	5	-39.08	-3922.82	0.36
			Max. My	2	-39.08	-0.23	3940.81
			Max. Vy	5	39.34	-3922.82	0.36
			Max. Vx	2	-39.46	-0.23	3940.81
			Max. Torque	11			1.39
L9	15.5 - 14.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-55.64	-0.73	1.80
			Max. Mx	5	-39.48	-3962.22	0.37
			Max. My	2	-39.48	-0.23	3980.33
			Max. Vy	5	39.48	-3962.22	0.37
			Max. Vx	2	-39.60	-0.23	3980.33
			Max. Torque	11			1.39
L10	14.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-61.26	-0.84	2.24
			Max. Mx	5	-44.54	-4548.46	0.51
			Max. My	2	-44.54	-0.27	4568.45
			Max. Vy	5	41.42	-4548.46	0.51
			Max. Vx	2	-41.54	-0.27	4568.45
			Max. Torque	11			1.39

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	61.26	0.00	0.00
	Max. H_x	11	44.56	41.40	-0.00
	Max. H_z	2	44.56	-0.00	41.52
	Max. M_x	2	4568.45	-0.00	41.52
	Max. M_z	5	4548.46	-41.40	-0.00
	Max. Torsion	11	1.39	41.40	-0.00
	Min. Vert	1	44.56	0.00	0.00
	Min. H_x	5	44.56	-41.40	-0.00
	Min. H_z	8	44.56	-0.00	-41.52
	Min. M_x	8	-4567.45	-0.00	-41.52
	Min. M_z	11	-4547.92	41.40	-0.00
	Min. Torsion	5	-1.39	-41.40	-0.00

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	44.56	0.00	0.00	-0.50	-0.26	0.00
Dead+Wind 0 deg - No Ice	44.56	0.00	-41.52	-4568.45	-0.27	0.24
Dead+Wind 30 deg - No Ice	44.56	20.70	-35.96	-3956.48	-2274.33	0.89
Dead+Wind 60 deg - No Ice	44.56	35.86	-20.76	-2284.52	-3939.10	1.31
Dead+Wind 90 deg - No Ice	44.56	41.40	0.00	-0.51	-4548.46	1.39
Dead+Wind 120 deg - No Ice	44.56	35.86	20.76	2283.50	-3939.11	1.09
Dead+Wind 150 deg - No Ice	44.56	20.70	35.96	3955.48	-2274.34	0.50
Dead+Wind 180 deg - No Ice	44.56	0.00	41.52	4567.45	-0.27	-0.24
Dead+Wind 210 deg - No Ice	44.56	-20.70	35.96	3955.48	2273.80	-0.91
Dead+Wind 240 deg - No Ice	44.56	-35.86	20.76	2283.50	3938.57	-1.33
Dead+Wind 270 deg - No Ice	44.56	-41.40	0.00	-0.51	4547.92	-1.39
Dead+Wind 300 deg - No Ice	44.56	-35.86	-20.76	-2284.52	3938.56	-1.07
Dead+Wind 330 deg - No Ice	44.56	-20.70	-35.96	-3956.48	2273.79	-0.48
Dead+Ice+Temp	61.26	0.00	0.00	-2.24	-0.84	0.00
Dead+Wind 0 deg+Ice+Temp	61.26	0.00	-9.85	-1135.84	-0.88	0.08
Dead+Wind 30 deg+Ice+Temp	61.26	4.91	-8.53	-983.97	-565.77	0.23
Dead+Wind 60 deg+Ice+Temp	61.26	8.51	-4.92	-569.07	-979.30	0.33
Dead+Wind 90 deg+Ice+Temp	61.26	9.83	-0.00	-2.30	-1130.66	0.34
Dead+Wind 120 deg+Ice+Temp	61.26	8.51	4.92	564.48	-979.30	0.25
Dead+Wind 150 deg+Ice+Temp	61.26	4.91	8.53	979.38	-565.77	0.10
Dead+Wind 180 deg+Ice+Temp	61.26	0.00	9.85	1131.25	-0.88	-0.08
Dead+Wind 210 deg+Ice+Temp	61.26	-4.91	8.53	979.38	564.01	-0.24
Dead+Wind 240 deg+Ice+Temp	61.26	-8.51	4.92	564.48	977.54	-0.33
Dead+Wind 270 deg+Ice+Temp	61.26	-9.83	-0.00	-2.30	1128.90	-0.34
Dead+Wind 300 deg+Ice+Temp	61.26	-8.51	-4.92	-569.07	977.53	-0.25
Dead+Wind 330 deg+Ice+Temp	61.26	-4.91	-8.53	-983.97	564.01	-0.10
Dead+Wind 0 deg - Service	44.56	0.00	-14.37	-1583.65	-0.27	0.08
Dead+Wind 30 deg - Service	44.56	7.16	-12.44	-1371.56	-788.41	0.31
Dead+Wind 60 deg - Service	44.56	12.41	-7.18	-792.08	-1365.37	0.46
Dead+Wind 90 deg - Service	44.56	14.33	0.00	-0.50	-1576.55	0.49
Dead+Wind 120 deg - Service	44.56	12.41	7.18	791.08	-1365.37	0.38
Dead+Wind 150 deg - Service	44.56	7.16	12.44	1370.56	-788.41	0.17
Dead+Wind 180 deg - Service	44.56	0.00	14.37	1582.65	-0.27	-0.08
Dead+Wind 210 deg - Service	44.56	-7.16	12.44	1370.56	787.87	-0.32
Dead+Wind 240 deg - Service	44.56	-12.41	7.18	791.08	1364.83	-0.46
Dead+Wind 270 deg - Service	44.56	-14.33	0.00	-0.50	1576.01	-0.49
Dead+Wind 300 deg - Service	44.56	-12.41	-7.18	-792.08	1364.83	-0.38
Dead+Wind 330 deg - Service	44.56	-7.16	-12.44	-1371.56	787.87	-0.17

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-44.56	0.00	0.00	44.56	0.00	0.000%
2	0.00	-44.56	-41.52	-0.00	44.56	41.52	0.000%
3	20.70	-44.56	-35.96	-20.70	44.56	35.96	0.000%
4	35.86	-44.56	-20.76	-35.86	44.56	20.76	0.000%
5	41.40	-44.56	0.00	-41.40	44.56	-0.00	0.000%
6	35.86	-44.56	20.76	-35.86	44.56	-20.76	0.000%
7	20.70	-44.56	35.96	-20.70	44.56	-35.96	0.000%
8	0.00	-44.56	41.52	-0.00	44.56	-41.52	0.000%
9	-20.70	-44.56	35.96	20.70	44.56	-35.96	0.000%
10	-35.86	-44.56	20.76	35.86	44.56	-20.76	0.000%
11	-41.40	-44.56	0.00	41.40	44.56	-0.00	0.000%
12	-35.86	-44.56	-20.76	35.86	44.56	20.76	0.000%
13	-20.70	-44.56	-35.96	20.70	44.56	35.96	0.000%
14	0.00	-61.26	0.00	0.00	61.26	0.00	0.000%
15	0.00	-61.26	-9.85	-0.00	61.26	9.85	0.000%
16	4.91	-61.26	-8.53	-4.91	61.26	8.53	0.000%
17	8.51	-61.26	-4.92	-8.51	61.26	4.92	0.000%
18	9.83	-61.26	0.00	-9.83	61.26	0.00	0.000%
19	8.51	-61.26	4.92	-8.51	61.26	-4.92	0.000%
20	4.91	-61.26	8.53	-4.91	61.26	-8.53	0.000%
21	0.00	-61.26	9.85	-0.00	61.26	-9.85	0.000%
22	-4.91	-61.26	8.53	4.91	61.26	-8.53	0.000%
23	-8.51	-61.26	4.92	8.51	61.26	-4.92	0.000%
24	-9.83	-61.26	0.00	9.83	61.26	0.00	0.000%
25	-8.51	-61.26	-4.92	8.51	61.26	4.92	0.000%
26	-4.91	-61.26	-8.53	4.91	61.26	8.53	0.000%
27	0.00	-44.56	-14.37	0.00	44.56	14.37	0.000%
28	7.16	-44.56	-12.44	-7.16	44.56	12.44	0.000%
29	12.41	-44.56	-7.18	-12.41	44.56	7.18	0.000%
30	14.33	-44.56	0.00	-14.33	44.56	-0.00	0.000%
31	12.41	-44.56	7.18	-12.41	44.56	-7.18	0.000%
32	7.16	-44.56	12.44	-7.16	44.56	-12.44	0.000%
33	0.00	-44.56	14.37	0.00	44.56	-14.37	0.000%
34	-7.16	-44.56	12.44	7.16	44.56	-12.44	0.000%
35	-12.41	-44.56	7.18	12.41	44.56	-7.18	0.000%
36	-14.33	-44.56	0.00	14.33	44.56	-0.00	0.000%
37	-12.41	-44.56	-7.18	12.41	44.56	7.18	0.000%
38	-7.16	-44.56	-12.44	7.16	44.56	12.44	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00027806
3	Yes	5	0.00000001	0.00087394
4	Yes	5	0.00000001	0.00085191
5	Yes	4	0.00000001	0.00072536
6	Yes	5	0.00000001	0.00087635
7	Yes	5	0.00000001	0.00085947
8	Yes	4	0.00000001	0.00027807
9	Yes	5	0.00000001	0.00085635
10	Yes	5	0.00000001	0.00087802
11	Yes	4	0.00000001	0.00072531
12	Yes	5	0.00000001	0.00085344
13	Yes	5	0.00000001	0.00087068
14	Yes	4	0.00000001	0.00000001
15	Yes	5	0.00000001	0.00040826
16	Yes	5	0.00000001	0.00047592
17	Yes	5	0.00000001	0.00047375
18	Yes	5	0.00000001	0.00040674
19	Yes	5	0.00000001	0.00047459
20	Yes	5	0.00000001	0.00047423
21	Yes	5	0.00000001	0.00040771

22	Yes	5	0.00000001	0.00047331
23	Yes	5	0.00000001	0.00047409
24	Yes	5	0.00000001	0.00040614
25	Yes	5	0.00000001	0.00047320
26	Yes	5	0.00000001	0.00047494
27	Yes	4	0.00000001	0.00015172
28	Yes	5	0.00000001	0.00008391
29	Yes	5	0.00000001	0.00007960
30	Yes	4	0.00000001	0.00020235
31	Yes	5	0.00000001	0.00008429
32	Yes	5	0.00000001	0.00008109
33	Yes	4	0.00000001	0.00015174
34	Yes	5	0.00000001	0.00008048
35	Yes	5	0.00000001	0.00008461
36	Yes	4	0.00000001	0.00020229
37	Yes	5	0.00000001	0.00007985
38	Yes	5	0.00000001	0.00008323

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 111.33	40.78	33	2.42	0.00
L2	116 - 86.25	20.25	27	1.84	0.00
L3	86.25 - 80.75	10.48	27	1.25	0.00
L4	80.75 - 79	9.08	27	1.17	0.00
L5	79 - 50.0833	8.66	27	1.14	0.00
L6	50.0833 - 36.33	3.35	27	0.61	0.00
L7	43 - 32.25	2.51	27	0.52	0.00
L8	32.25 - 15.5	1.43	27	0.42	0.00
L9	15.5 - 14.5	0.34	27	0.21	0.00
L10	14.5 - 0	0.29	27	0.20	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
158.0000	TME-800MHz RRH w/ mount pipe	33	39.77	2.40	0.00	22044
157.0000	APXVTM14-C-120 w/ Mount Pipe	33	39.27	2.38	0.00	22044
149.0000	(2) 7770.00 w/ Mount Pipe	33	35.28	2.30	0.00	10020
139.0000	RYMSA MG D3-800TX w/ Mount Pipe	27	30.41	2.19	0.00	5247
116.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	27	20.25	1.84	0.00	2562
84.0000	GPS_A	27	9.90	1.22	0.00	3361

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 111.33	117.33	8	6.95	0.01
L2	116 - 86.25	58.33	2	5.29	0.00
L3	86.25 - 80.75	30.21	2	3.62	0.00
L4	80.75 - 79	26.18	2	3.38	0.00
L5	79 - 50.0833	24.96	2	3.29	0.00
L6	50.0833 - 36.33	9.65	2	1.77	0.00
L7	43 - 32.25	7.23	2	1.49	0.00
L8	32.25 - 15.5	4.13	2	1.21	0.00
L9	15.5 - 14.5	0.97	2	0.59	0.00
L10	14.5 - 0	0.85	2	0.56	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
158.0000	TME-800MHz RRH w/ mount pipe	8	114.44	6.89	0.01	7856
157.0000	APXVTM14-C-120 w/ Mount Pipe	8	113.00	6.86	0.01	7856
149.0000	(2) 7770.00 w/ Mount Pipe	8	101.54	6.62	0.01	3569
139.0000	RYMSA MG D3-800TX w/ Mount Pipe	2	87.54	6.29	0.01	1867
116.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	2	58.33	5.29	0.00	907
84.0000	GPS_A	2	28.53	3.52	0.00	1175

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	160 - 111.33 (1)	TP31.29x19.6x0.25	48.6700	0.0000	0.0	39.00	24.0842	-9.41	939.29	0.010
L2	111.33 - 86.25 (2)	TP36.797x29.6683x0.3438	29.7500	0.0000	0.0	39.00	40.3550	-16.63	1573.84	0.011
L3	86.25 - 80.75 (3)	TP38.1149x36.797x0.5054	5.5000	0.0000	0.0	31.72	61.2088	-18.08	1941.30	0.009
L4	80.75 - 79 (4)	TP38.5342x38.1149x0.4221	1.7500	0.0000	0.0	37.94	51.8017	-18.47	1965.25	0.009
L5	79 - 50.0833 (5)	TP44.787x38.5342x0.4063	28.9167	0.0000	0.0	39.00	58.0627	-25.43	2264.44	0.011
L6	50.0833 - 36.33 (6)	TP48.088x44.787x0.5368	13.7533	0.0000	0.0	31.87	79.4249	-27.69	2531.43	0.011
L7	36.33 - 32.25 (7)	TP48.2559x45.4135x0.5632	10.7500	0.0000	0.0	31.89	86.4909	-33.10	2758.19	0.012
L8	32.25 - 15.5 (8)	TP52.278x48.2559x0.5525	16.7500	0.0000	0.0	31.94	92.0272	-39.08	2939.72	0.013
L9	15.5 - 14.5 (9)	TP52.5182x52.278x0.6092	1.0000	0.0000	0.0	31.96	101.8270	-39.48	3254.61	0.012
L10	14.5 - 0 (10)	TP56x52.5182x0.4902	14.5000	0.0000	0.0	37.95	87.6209	-44.54	3325.21	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	160 - 111.33 (1)	TP31.29x19.6x0.25	680.27	46.36	39.00	1.189	0.00	0.00	39.00	0.000
L2	111.33 - 86.25 (2)	TP36.797x29.6683x0.3438	1498.18	50.07	39.00	1.284	0.00	0.00	39.00	0.000
L3	86.25 - 80.75 (3)	TP38.1149x36.797x0.5054	1662.76	35.65	31.72	1.124	0.00	0.00	31.72	0.000
L4	80.75 - 79 (4)	TP38.5342x38.1149x0.4221	1716.07	42.80	37.94	1.128	0.00	0.00	37.94	0.000
L5	79 - 50.0833 (5)	TP44.787x38.5342x0.4063	2658.08	50.69	39.00	1.300	0.00	0.00	39.00	0.000
L6	50.0833 - 36.33 (6)	TP48.088x44.787x0.5368	2906.86	39.24	31.87	1.231	0.00	0.00	31.87	0.000
L7	36.33 - 32.25 (7)	TP48.2559x45.4135x0.5632	3298.75	39.41	31.89	1.236	0.00	0.00	31.89	0.000
L8	32.25 - 15.5 (8)	TP52.278x48.2559x0.5525	3940.81	40.75	31.94	1.276	0.00	0.00	31.94	0.000
L9	15.5 - 14.5 (9)	TP52.5182x52.278x0.6092	3980.33	37.10	31.96	1.161	0.00	0.00	31.96	0.000
L10	14.5 - 0 (10)	TP56x52.5182x0.4902	4568.45	46.15	37.95	1.216	0.00	0.00	37.95	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	160 - 111.33 (1)	TP31.29x19.6x0.25	22.36	0.93	26.00	0.073	0.06	0.00	26.00	0.000
L2	111.33 - 86.25 (2)	TP36.797x29.6683x0.3438	29.46	0.73	26.00	0.057	0.13	0.00	26.00	0.000
L3	86.25 - 80.75 (3)	TP38.1149x36.797x0.5054	30.35	0.50	21.14	0.048	0.13	0.00	21.14	0.000
L4	80.75 - 79 (4)	TP38.5342x38.1149x0.4221	30.62	0.59	25.29	0.047	0.13	0.00	25.29	0.000
L5	79 - 50.0833 (5)	TP44.787x38.5342x0.4063	34.64	0.60	26.00	0.047	0.20	0.00	26.00	0.000
L6	50.0833 - 36.33 (6)	TP48.088x44.787x0.5368	35.62	0.45	21.25	0.043	0.21	0.00	21.25	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L7	36.33 - 32.25 (7)	TP48.2559x45.4135x0.5632	37.23	0.43	21.26	0.041	0.21	0.00	21.26	0.000
L8	32.25 - 15.5 (8)	TP52.278x48.2559x0.5525	39.46	0.43	21.30	0.041	0.22	0.00	21.30	0.000
L9	15.5 - 14.5 (9)	TP52.5182x52.278x0.6092	39.60	0.39	21.31	0.037	0.22	0.00	21.31	0.000
L10	14.5 - 0 (10)	TP56x52.5182x0.4902	41.54	0.47	25.30	0.038	0.24	0.00	25.30	0.000

Pole Interaction Design Data

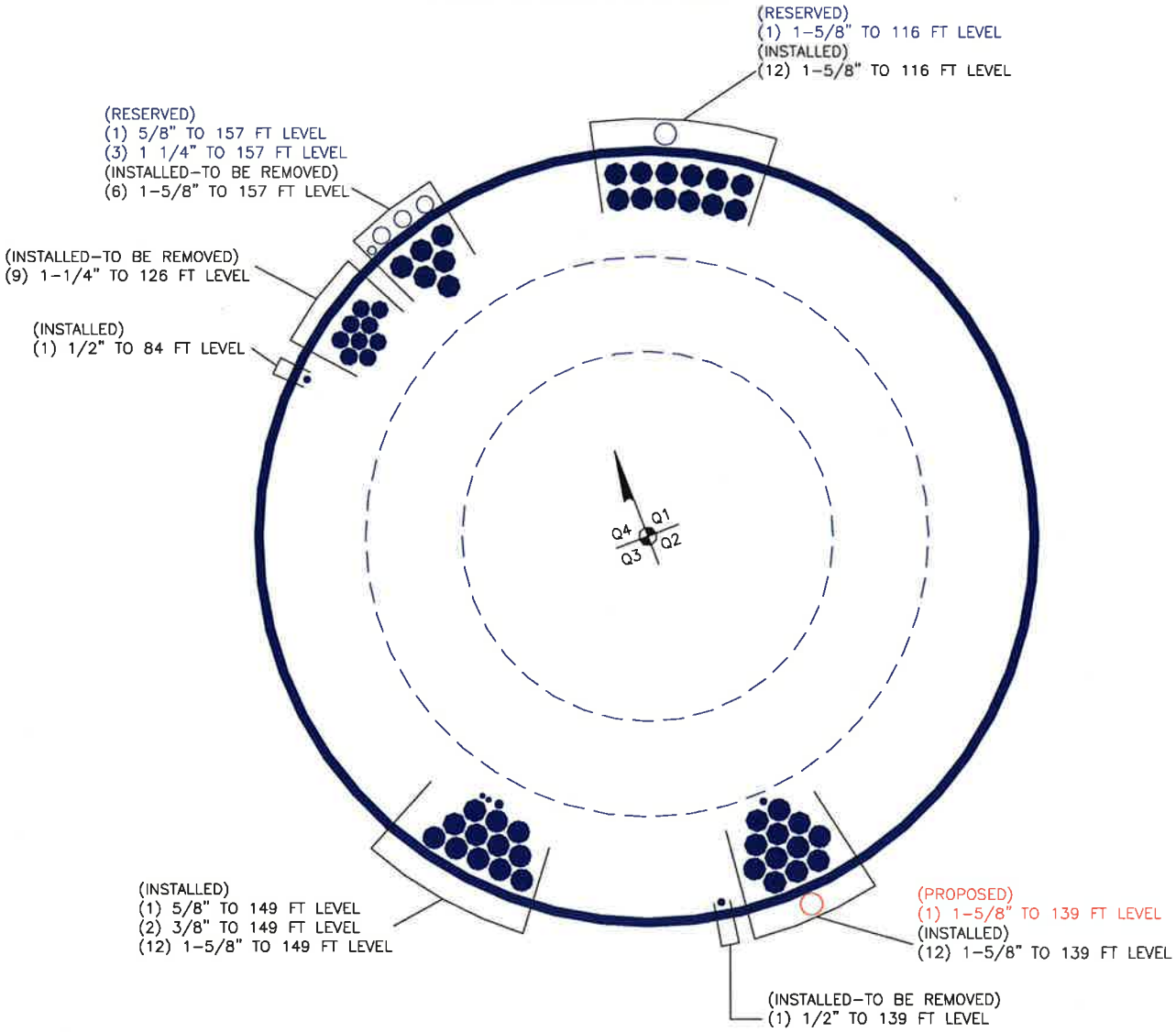
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 111.33 (1)	0.010	1.189	0.000	0.073	0.000	1.200 ✔	1.333	H1-3+VT ✔
L2	111.33 - 86.25 (2)	0.011	1.284	0.000	0.057	0.000	1.295 ✔	1.333	H1-3+VT ✔
L3	86.25 - 80.75 (3)	0.009	1.124	0.000	0.048	0.000	1.134 ✔	1.333	H1-3+VT ✔
L4	80.75 - 79 (4)	0.009	1.128	0.000	0.047	0.000	1.138 ✔	1.333	H1-3+VT ✔
L5	79 - 50.0833 (5)	0.011	1.300	0.000	0.047	0.000	1.312 ✔	1.333	H1-3+VT ✔
L6	50.0833 - 36.33 (6)	0.011	1.231	0.000	0.043	0.000	1.243 ✔	1.333	H1-3+VT ✔
L7	36.33 - 32.25 (7)	0.012	1.236	0.000	0.041	0.000	1.248 ✔	1.333	H1-3+VT ✔
L8	32.25 - 15.5 (8)	0.013	1.276	0.000	0.041	0.000	1.289 ✔	1.333	H1-3+VT ✔
L9	15.5 - 14.5 (9)	0.012	1.161	0.000	0.037	0.000	1.173 ✔	1.333	H1-3+VT ✔
L10	14.5 - 0 (10)	0.013	1.216	0.000	0.038	0.000	1.230 ✔	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	160 - 111.33	Pole	TP31.29x19.6x0.25	1	-9.41	1252.07	90.0	Pass
L2	111.33 - 86.25	Pole	TP36.797x29.6683x0.3438	2	-16.63	2097.93	97.2	Pass
L3	86.25 - 80.75	Pole	TP38.1149x36.797x0.5054	3	-18.08	2587.75	85.1	Pass
L4	80.75 - 79	Pole	TP38.5342x38.1149x0.4221	4	-18.47	2619.68	85.4	Pass
L5	79 - 50.0833	Pole	TP44.787x38.5342x0.4063	5	-25.43	3018.50	98.4	Pass
L6	50.0833 - 36.33	Pole	TP48.088x44.787x0.5368	6	-27.69	3374.40	93.2	Pass
L7	36.33 - 32.25	Pole	TP48.2559x45.4135x0.5632	7	-33.10	3676.67	93.6	Pass
L8	32.25 - 15.5	Pole	TP52.278x48.2559x0.5525	8	-39.08	3918.65	96.7	Pass
L9	15.5 - 14.5	Pole	TP52.5182x52.278x0.6092	9	-39.48	4338.39	88.0	Pass
L10	14.5 - 0	Pole	TP56x52.5182x0.4902	10	-44.54	4432.50	92.3	Pass
							Summary	
						Pole (L5)	98.4	Pass
						RATING =	**98.4**	**Pass**

APPENDIX B

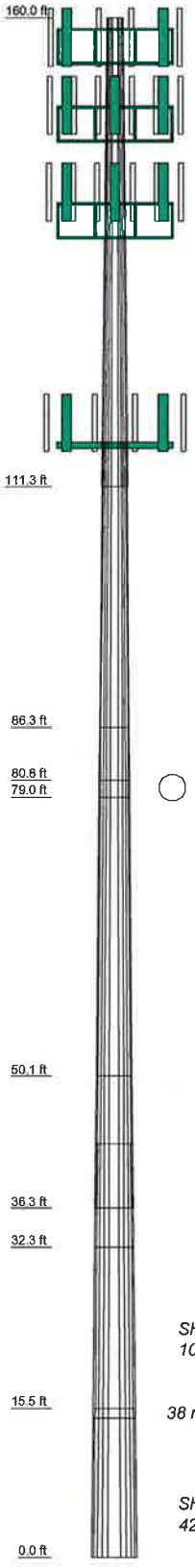
BASE LEVEL DRAWING

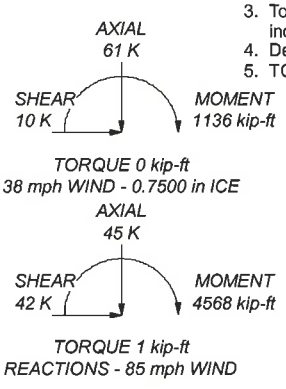


APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9	10
Length (ft)	48.6700	29.7500	5.5000	1.7500	28.9167	13.7533	10.7500	16.7500	1.0000	14.5000
Number of Sides	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.2500	0.3438	0.5054	0.4220	0.4063	0.5368	0.5632	0.5525	0.6092	0.4902
Socket Length (ft)	4.6700					6.6700				
Top Dia (in)	19.6000	29.6683	36.7970	38.1149	38.5342	44.7870	45.4135	48.2559	52.2780	52.5181
Bot Dia (in)	31.2900	36.7970	38.1149	38.5342	44.7870	48.0880	48.2559	52.2780	52.5181	56.0000
Grade	A572-65		Reinf 52.86 ksi	Reinf 63.23 ksi	A572-65	Reinf 53.12 ksi	Reinf 53.15 ksi	Reinf 53.24 ksi	Reinf 53.27 ksi	Reinf 63.25 ksi
Weight (K)	3.4	3.7	1.1	0.3	5.3	3.7	3.1	5.0	0.3	4.2





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
TME-800MHz RRH w/ mount pipe	158	RRUS-11	149
TME-800MHz RRH w/ mount pipe	158	RRUS-11	149
TME-800MHz RRH w/ mount pipe	158	RRUS-11	149
TME-1900MHz RRH (65MHz) w/ Mount Pipe	158	DC6-48-60-18-8F	149
		Platform Mount [LP 713-1]	149
TME-1900MHz RRH (65MHz) w/ Mount Pipe	158	RYMSA MG D3-800TX w/ Mount Pipe	139
		RYMSA MG D3-800TX w/ Mount Pipe	139
TME-1900MHz RRH (65MHz) w/ Mount Pipe	158	RYMSA MG D3-800TX w/ Mount Pipe	139
		RRH2X40-AWS	139
(2) Pipe Mount [PM 601-3]	158	RRH2X40-AWS	139
APXVTM14-C-120 w/ Mount Pipe	157	RRH2X40-AWS	139
APXVTM14-C-120 w/ Mount Pipe	157	DB-T1-6Z-8AB-0Z	139
APXVTM14-C-120 w/ Mount Pipe	157	(2) DB846F65ZAXY w/ Mount Pipe	139
TD-RRH8x20-25	157	(2) DB846F65ZAXY w/ Mount Pipe	139
TD-RRH8x20-25	157	(2) DB846F65ZAXY w/ Mount Pipe	139
TD-RRH8x20-25	157	P65.16.XL.2 w/ Mount Pipe	139
APXVSPP18-C-A20 w/ Mount Pipe	157	P65.16.XL.2 w/ Mount Pipe	139
APXVSPP18-C-A20 w/ Mount Pipe	157	P65.16.XL.2 w/ Mount Pipe	139
APXVSPP18-C-A20 w/ Mount Pipe	157	RYMSA MG D3-800TV w/ Mount Pipe	139
800 EXTERNAL NOTCH FILTER	157	RYMSA MG D3-800TV w/ Mount Pipe	139
800 EXTERNAL NOTCH FILTER	157	RYMSA MG D3-800TV w/ Mount Pipe	139
800 EXTERNAL NOTCH FILTER	157	(2) FD9R6004/2C-3L	139
(3) ACU-A20-N	157	(2) FD9R6004/2C-3L	139
(3) ACU-A20-N	157	(2) FD9R6004/2C-3L	139
(3) ACU-A20-N	157	Platform Mount [LP 713-1]	139
Platform Mount [LP 713-1]	157	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	116
(2) 7770.00 w/ Mount Pipe	149	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	116
(2) 7770.00 w/ Mount Pipe	149		
(2) 7770.00 w/ Mount Pipe	149	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	116
P65-16-XLH-RR w/ Mount Pipe	149	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	116
P65-16-XLH-RR w/ Mount Pipe	149		
P65-16-XLH-RR w/ Mount Pipe	149	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	116
LGP21401	149		
LGP21401	149	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	116
LGP21401	149		
LGP21401	149	KRY 112 144/1	116
LGP21401	149	KRY 112 144/1	116
LGP21401	149	KRY 112 144/1	116
LGP21901	149	Platform Mount [LP 712-1]	116
LGP21901	149	GPS_A	84
LGP21901	149	Side Arm Mount [SO 701-1]	84
LGP21901	149		
LGP21901	149		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 53.15 ksi	53 ksi	65 ksi
Reinf 52.86 ksi	53 ksi	65 ksi	Reinf 53.24 ksi	53 ksi	67 ksi
Reinf 63.23 ksi	63 ksi	80 ksi	Reinf 53.27 ksi	53 ksi	65 ksi
Reinf 53.12 ksi	53 ksi	67 ksi	Reinf 63.25 ksi	63 ksi	80 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. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 98.4%

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

Job: 160' MP; Stamford, CT; BRG 2044 (A) 943097		
Project: PJF 37513-2318 (BU 806953)		
Client: Crown Castle	Drawn by: Joshua Frybarger	App'd:
Code: TIA/EIA-222-F	Date: 03/26/14	Scale: NTS
Path: T:\375 Crown Castle\2013\37513-2318 BU 806953\WD 704030 BU 806953\37513-2318 BP.eri		Dwg No. E-1

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

TIA Rev F

Site Data

BU#: *806953*
Site Name:
App #:

Pole Manufacturer:	*Other*

Reactions		
Moment:	4568	ft-kips
Axial:	45	kips
Shear:	42	kips

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

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	64.48	in

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	167.8 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	86.1% **Pass**	

Plate Data		
Diam:	70.48	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	9.00	in

Base Plate Results Flexural Check

		Stiffened
Base Plate Stress:	33.8 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	56.4% **Pass**	Y.L. Length:
		N/A, Roark

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Both	
Groove Depth:	0.375	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.3125	in
Width:	6	in
Height:	18	in
Thick:	0.75	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Stiffener Results

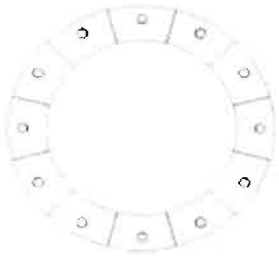
Horizontal Weld :	68.6% **Pass**
Vertical Weld:	52.3% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	18.3% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	69.3% **Pass**
Plate Comp. (AISC Bracket):	69.2% **Pass**

Pole Results

Pole Punching Shear Check:	10.1% **Pass**

Pole Data		
Diam:	56	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

foundation loads

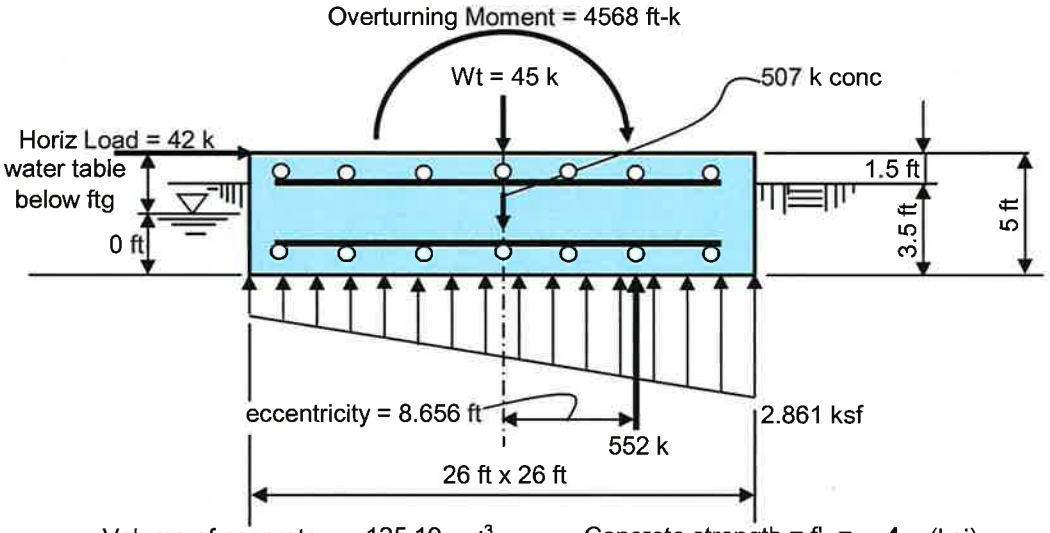
Tower or Pole Weight =	**45**	kips
Total Horizontal Force =	**42**	kips
Overturning Moment =	**4568**	ft-kips

soil properties

Safety factor against overturning =	**1.5**	
Soil density =	**125**	pcf
Allowable soil bearing =	**20**	ksf
Depth to water table =	**99**	ft

mat dimensions

depth to bottom of footing =	**3.5**	ft
Footing thickness =	**5**	ft
Footing Width =	**26**	ft
Footing Length =	**26**	ft
Tower/Pole Center Offset =	**0**	ft



Volume of concrete = 125.19 yd^3 Concrete strength = f'_c = **4** (ksi)

Rebar = (72) #8 bars by 25.5 ft long

reinforcing steel = **(18) #8 @ 18 in o.c. ea way top and bottom**

Summary of analysis results

Overturning Moment: (Stress Ratio = 0.999) < CONTROLLING CRITERIA

Calculated Overturning Moment = 4778 ft-kips

Resisting Moment = 7176 ft-kips

Factor of Safety against overturning = 1.502 **> 1.5 okay**

Rebar strength = F_y = **60** (ksi)

minimum cover over rebar = **3** inches

Soil Bearing (Stress Ratio = 0.143)

Net Soil Bearing Resistance = 20 ksf

Calculated Soil Bearing Pressure = 2.861 **ksf < 20 ksf okay**

Bending Moment (Stress Ratio = 0.744)

Ultimate Bending Moment Resistance = 3526 ft-kips

Calculated Ultimate Bending Moment = 2624 **ft-kips < 3526 ft-kips okay**

Bending Shear (Stress Ratio = 0.245)

Ultimate Bending Shear Resistance = 1643 kips

Calculated Ultimate Bending Shear = 403 **kips < 1643 kips okay**

37513-2318 PERMIT.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #806953; BRG 2044 (A) 943097

APP: 200735 REV. 3; WO: 704036

SITE ADDRESS

69 GUINEA RD. (CAMP ROCKY CRAIG
STAMFORD, CONNECTICUT 06903
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.

PROJECT CONTACTS:

MONOPOLE OWNER:
CROWN CASTLE
46 BROADWAY ALBANY, NY 12204
TSA: ANDREW BAZINET AT ANDREW.BAZINET@CROWNCASTLE.COM
PH: (585) 899-3442
MOD PM: EVA MORALES AT 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: JOSH FRYBARGER AT JFRYBARGER@PJFWEB.COM
PHONE: 614-221-6679

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF 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#37513-2318), DATED 3-25-2014.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING

SHEET INDEX

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CROWN CASTLE
46 BROADWAY ALBANY, NY 12204
PH: (585) 899-3442 FAX: (585) 899-3448

BU #806953; BRG 2044 (A) 943097
STAMFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-2318	ISSUE DATE OF PERMIT: 3-25-2014
DRAWN BY: T.A.N.	
CHECKED BY: J.J.F.	
APPROVED BY:	T-1
DATE: 3-25-2014	

CROWN CASTLE PROJECT: BU #806953; BRG 2044 (A) 943097; STAMFORD, 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 CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.

B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)

C. CONCRETE TESTING PER ACI - (NOT REQUIRED)

D. STRUCTURAL STEEL
   (1.) CHECK 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: - (NOT REQUIRED)

F. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS: - (NOT REQUIRED)

G. 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 #806953; BRG 2044 (A) 943097
STAMFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

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CHECKED BY: J.J.F.	
APPROVED BY:	S-1
DATE: 3-25-2014	

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 1-800-831-3275 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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BU #806953; BRG 2044 (A) 943097
STAMFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-2318	ISSUE DATE OF PERMIT: 3-25-2014
DRAWN BY: T.A.N.	
CHECKED BY: J.J.F.	
APPROVED BY:	S-2
DATE: 3-25-2014	

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.

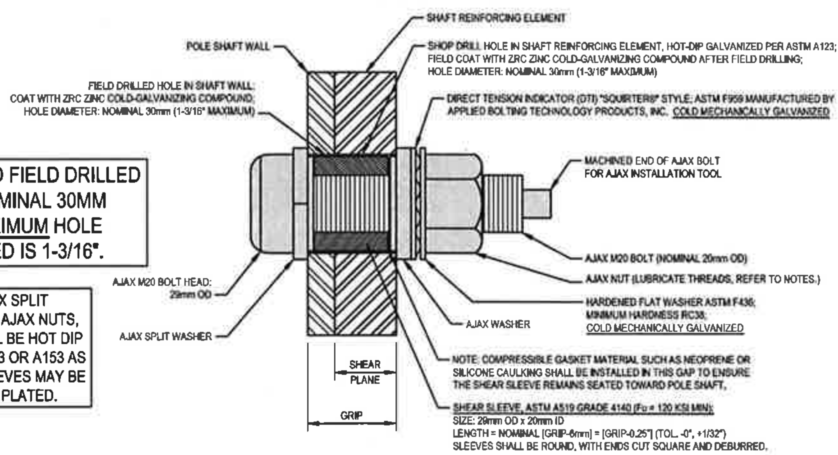
NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE 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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BU #806953; BRG 2044 (A) 943097
STAMFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-2318	ISSUE DATE OF PERMIT: 3-25-2014
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CHECKED BY: J.J.F.	
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37513-2318 PERMIT.DWG

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.2401 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	@ BOTTOM
1	48.67	0.2500	54.00	19.5000	31.2900
2	42.75	0.3438	69.00	29.6683	39.9120
3	42.67	0.4063	80.00	37.8486	48.0880
4	43.00	0.4375		45.6745	56.0000
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES					

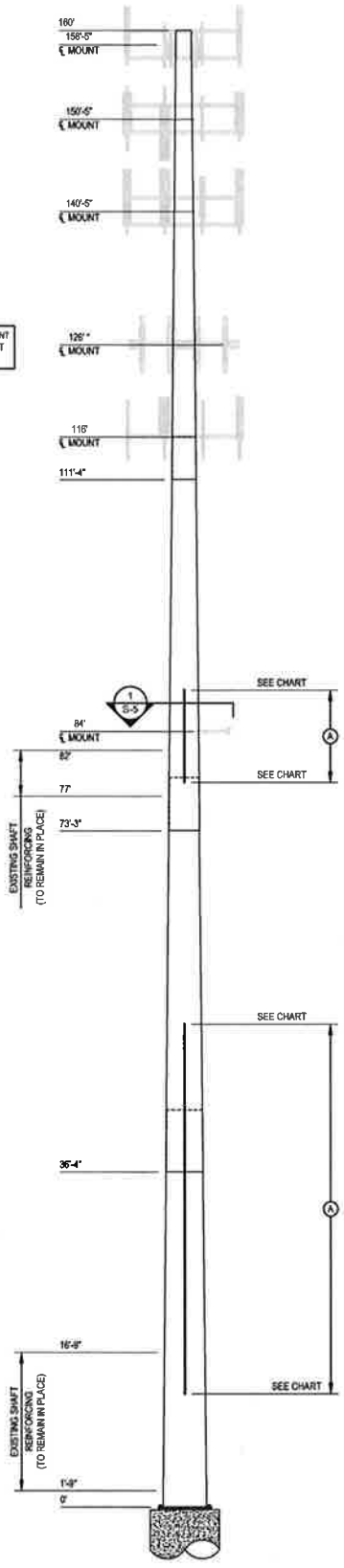
CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND ALL TERMINATION POINTS, AS REQUIRED.

MODIFICATIONS:

(A) INSTALL NEW SHAFT REINFORCING, SEE CHART.

(B) REMOVE EXISTING MOUNT AND EQUIPMENT AT EL. 126'±

*(B) EXISTING MOUNTS AND EQUIPMENT AT 126'± TO BE REMOVED AS PART OF THE MODIFICATION.



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

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37513-2318 PERMIT.DWG

NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE											
CROWN CASTLE CATALOG PART 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-06010020	12' - 3"	32' - 3"	3, 7 & 11	1" x 6"	20' - 0"	3	31	93	10	10	16"	1225 LBS.
CCI-AFP-06010020	32' - 4"	52' - 4"	3, 7 & 11	1" x 6"	20' - 0"	3	31	93	10	10	16"	1225 LBS.
CCI-AFP-06010010	78' - 6"	88' - 6"	3, 7 & 11	1" x 6"	10' - 0"	3	23	69	10	10	16"	612 LBS.
								255				3062 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.) ALL REINFORCING SHALL BE ASTM A572 GR. 65.

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

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

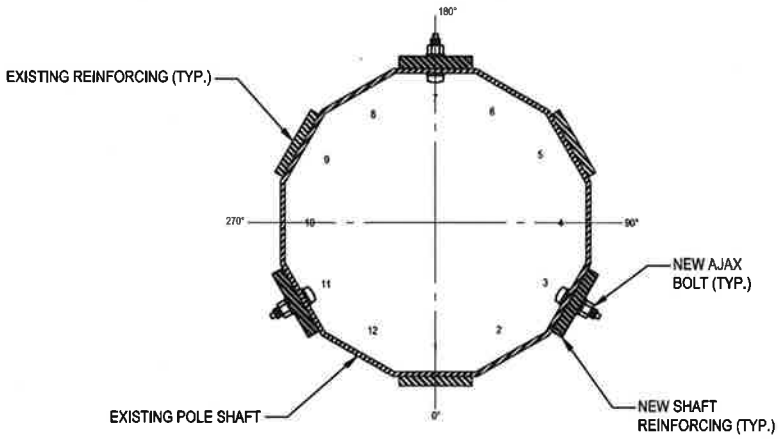
6.) ALL SHIMS SHALL BE ASTM A-36.

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
32' - 3"	1"	6"	5' - 7"	3	-	-	20	457 LBS.
						0'		457 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
21	4"	4"	1/4"	1-1/4"
39	4"	4"	1/16"	1-1/4"

SHIM QUANTITIES ARE APPROXIMATE AND ARE FOR BIDDING PURPOSES



SECTION 1 / S-5

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BU #806953; BRG 2044 (A) 943097
STAMFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-2318	ISSUE DATE OF PERMIT: 3-25-2014
DRAWN BY: T.A.N.	
CHECKED BY: J.J.F.	
APPROVED BY:	S-5
DATE: 3-25-2014	

37513-2318 PERMIT.DWG

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
NA	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
NA	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 DTTS 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 #806953; BRG 2044 (A) 943097
STAMFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

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37513-2318 PERMIT.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #806953; BRG 2044 (A) 943097

APP: 200735 REV. 3; WO: 704036

SITE ADDRESS

69 GUINEA RD. (CAMP ROCKY CRAIG
STAMFORD, CONNECTICUT 06903
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.

PROJECT CONTACTS:

MONOPOLE OWNER:
CROWN CASTLE
46 BROADWAY ALBANY, NY 12204
TSA: ANDREW BAZINET AT ANDREW.BAZINET@CROWNCASTLE.COM
PH: (585) 899-3442
MOD PM: EVA MORALES AT 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: JOSH FRYBARGER AT JFRYBARGER@PJFWEB.COM
PHONE: 614-221-6679

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF 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#37513-2318), DATED 3-25-2014.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING

SHEET INDEX

STATE OF CONNECTICUT * KEVIN P. BAUMAN * NO. 17891 LICENSED PROFESSIONAL ENGINEER

3-26-2014

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CROWN CASTLE PROJECT: BU #806953; BRG 2044 (A) 943097; STAMFORD, 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 CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.

B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)

C. CONCRETE TESTING PER ACI - (NOT REQUIRED)

D. STRUCTURAL STEEL
   (1.) CHECK 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: - (NOT REQUIRED)

F. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS: - (NOT REQUIRED)

G. 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.

STATE OF CONNECTICUT
KEVIN P. BAUMAN
NO. 17891
LICENSED
PROFESSIONAL ENGINEER
3-26-2014

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BU #806953; BRG 2044 (A) 943097
STAMFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No:	37513-2318
DRAWN BY:	T.A.N.
CHECKED BY:	J.J.F.
APPROVED BY:	BKK
DATE:	3-25-2014

ISSUE DATE OF PERMIT: 3-25-2014

S-1

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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BU #806953; BRG 2044 (A) 943097
STAMFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-2318	ISSUE DATE OF PERMIT: 3-25-2014
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APPROVED BY: BKK	S-2
DATE: 3-25-2014	

37513-2318 PERMIT.DWG

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.

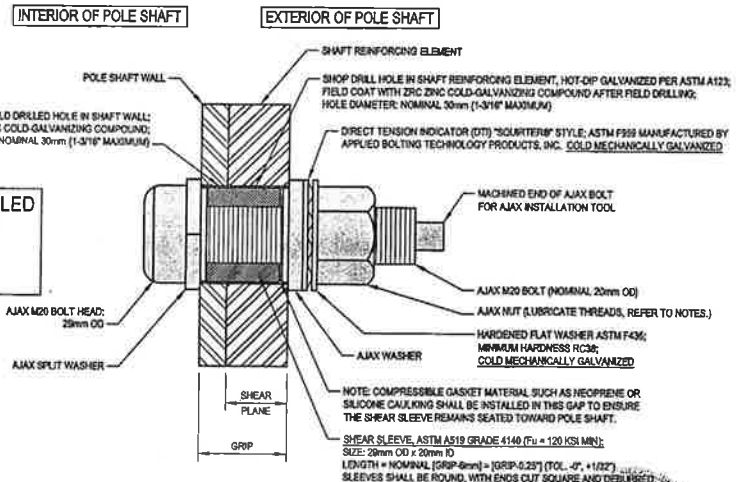
NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE 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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APPROVED BY:	B.K.K.
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S-3

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POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.2401 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	@ BOTTOM
1	48.67	0.2500	54.00	19.8000	31.2900
2	42.75	0.3438	69.00	29.6683	39.8120
3	42.67	0.4063	80.00	37.8466	48.0880
4	43.00	0.4375		45.6745	56.0000

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

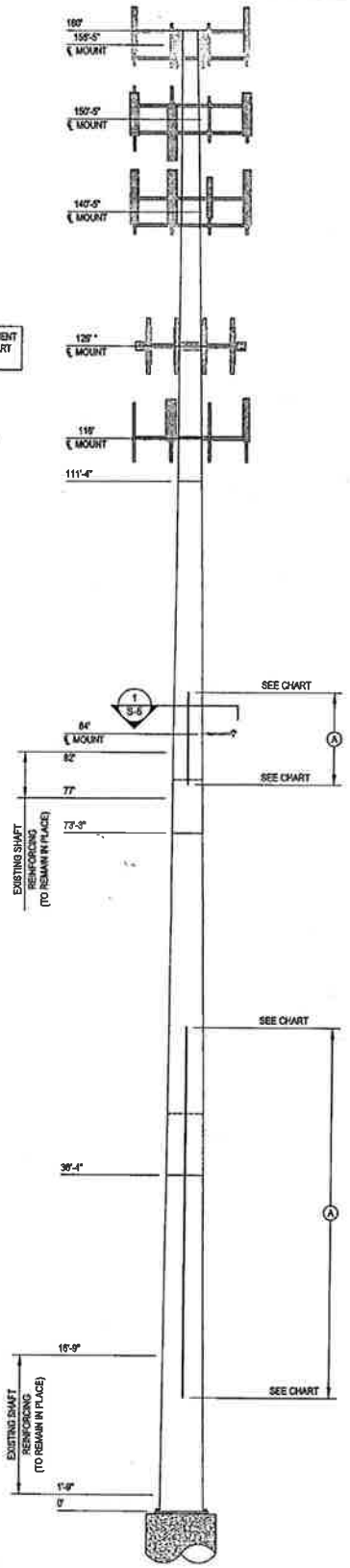
CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND ALL TERMINATION POINTS, AS REQUIRED.

MODIFICATIONS:

(A) INSTALL NEW SHAFT REINFORCING. SEE CHART.

(B) REMOVE EXISTING MOUNT AND EQUIPMENT AT EL. 126'±

* (B) EXISTING MOUNTS AND EQUIPMENT AT 126'± TO BE REMOVED AS PART OF THE MODIFICATION.



POLE ELEVATION 1 S-4

3-26-2014

CROWN CASTLE US PATENT NOS 8,048,972; 8,156,712; 7,849,659; 8,424,269 AND PATENT PENDING

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NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE												
CROWN CASTLE CATALOG PART 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-06010020	12'-3"	32'-3"	3,7 & 11	1"x6"	20'-0"	3	31	93	10	10	16"	1225 LBS.
CCI-AFP-06010020	32'-4"	52'-4"	3,7 & 11	1"x6"	20'-0"	3	31	93	10	10	16"	1225 LBS.
CCI-AFP-06010010	78'-6"	88'-6"	3,7 & 11	1"x6"	10'-0"	3	23	69	10	10	16"	612 LBS.
								255				3062 LBS.

NOTES:

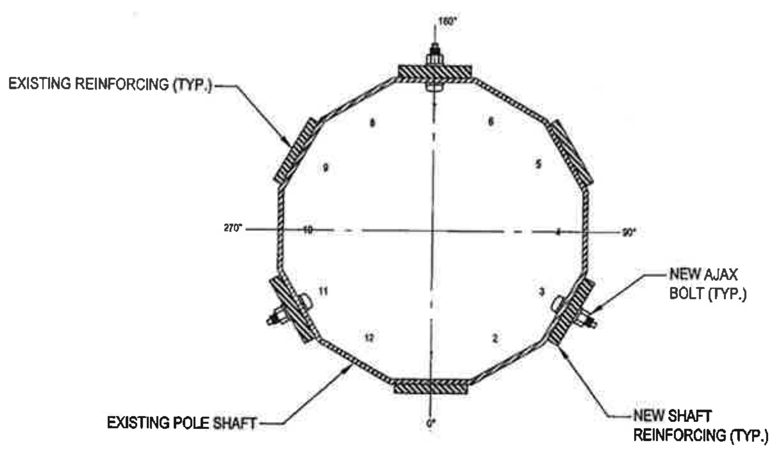
1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM 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.) ALL REINFORCING SHALL BE ASTM A572 GR. 65.
4.) WELDS ARE ASSUMED 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
32'-3"	1"	8"	5'-7"	3	-	-	20	457 LBS.
						0"		457 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
21	4"	4"	1/4"	1-1/4"
39	4"	4"	1/16"	1-1/4"

SHIM QUANTITIES ARE APPROXIMATE AND ARE FOR BIDDING PURPOSES



SECTION 1 / S-5

STATE OF CONNECTICUT KEVIN P. BAUMAN NO. 17891 LICENSED PROFESSIONAL ENGINEER

3-26-2014

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BU #806953; BRG 2044 (A) 943097
STAMFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-2318
DRAWN BY: T.A.N.
CHECKED BY: J.J.F.
APPROVED BY: BKK
DATE: 3-25-2014

ISSUE DATE OF PERMIT: 3-25-2014

S-5

37513-2318 PERMIT.DWG

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
NA	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
NA	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

STATE OF CONNECTICUT
KEVIN P. BAUMAN
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