Robinson+Cole

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Also admitted in Massachusetts

December 22, 2014

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

Re: **Notice of Exempt Modification – Facility Modification**
340 Bloomfield Avenue, Windsor, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 127-foot level of the existing 148-foot tower at 340 Bloomfield Avenue in Windsor (the "Property"). The tower is owned by Crown Castle. The Council approved Cellco's shared use of this tower in 2004. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with three (3) model BXA-70063-4CF, 850 MHZ antennas; three (3) model HBXX-6517DS-VTM, 1900 MHZ antennas; and three (3) model HBXX-6517DS-VTM, 2100 MHZ antennas, all at the same level on the tower. Cellco also intends to install six (6) remote radio heads ("RRHs") behind its 1900 MHz and 2100 MHz antennas and two (2) HYBRIFLEX™ antenna cables, attached to the outside of the monopole tower. Included in Attachment 1 are specifications for the replacement antennas, RRHs and HYBRIFLEX™ cables.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Peter Souza, Windsor's Town Manager and Mayor Donald Trinks. The Town of Windsor is the owner of the Property.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed on its existing antenna platform at the 127-foot level.

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:
Donald Trinks, Windsor Mayor
Peter Souza, Windsor Town Manager
Sandy M. Carter

ATTACHMENT 1

BXA-70063-4CF-EDIN-X

X-Pol | FET Panel | 63° | 13.0 dBd

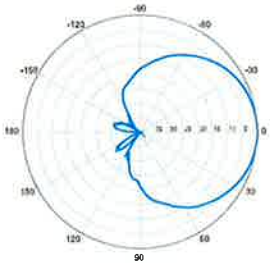
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	17°	15°
Gain	12.5 dBd (14.6 dBi)	13.0 dBd (15.1 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-16.3 dB	-22.1 dB
Front-to-back ratio (+/-30°)	-36.1 dB	-34.9 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1205 x 285 x 133 mm	47.4 x 11.2 x 5.2 in
Depth with z-brackets	173 mm	6.8 in
Weight without mounting brackets	4.5 kg	9.9 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.34 m² Side: 0.16 m²	Front: 3.7 ft² Side: 1.7 ft²
Wind load @ 161 km/hr (100 mph)	Front: 498 N Side: 260 N	Front: 111 lbf Side: 55 lbf

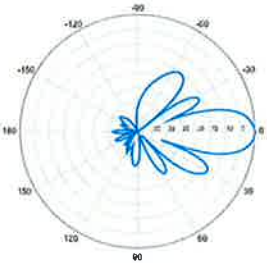
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit	36210006	40-115 mm 1.57-4.5 in	4.1 kg 9 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-4CF-EDIN-X-FP		

BXA-70063-4CF-EDIN-X



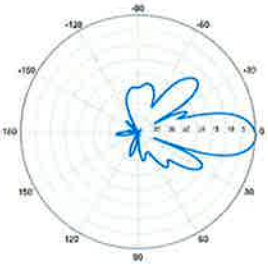
Horizontal | 750 MHz

BXA-70063-4CF-EDIN-0



0° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-2

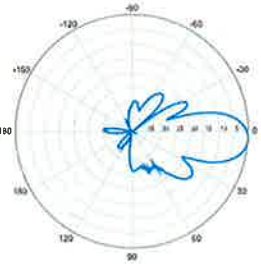


2° | Vertical | 750 MHz

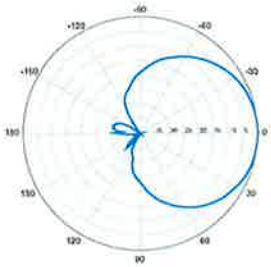
BXA-70063-4CF-EDIN-3

3° | Vertical | 750 MHz

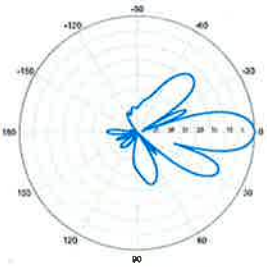
BXA-70063-4CF-EDIN-4



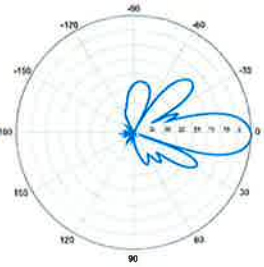
4° | Vertical | 750 MHz



Horizontal | 850 MHz

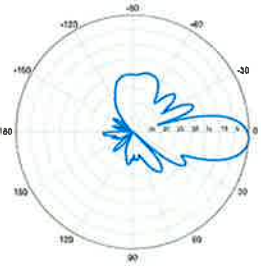


0° | Vertical | 850 MHz



2° | Vertical | 850 MHz

3° | Vertical | 850 MHz



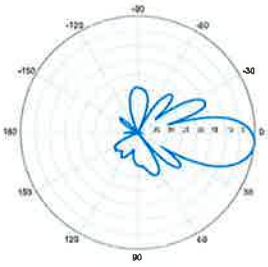
4° | Vertical | 850 MHz

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

BXA-70063-4CF-EDIN-X

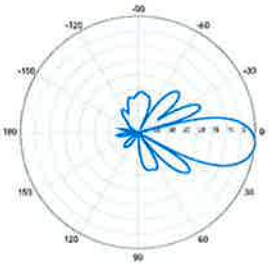
X-Pol | FET Panel | 63° | 13.0 dBd

BXA-70063-4CF-EDIN-5



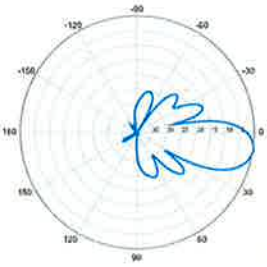
5° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-6



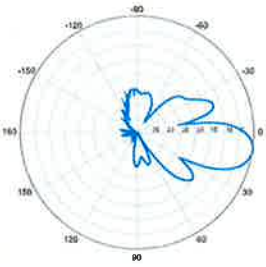
6° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-8



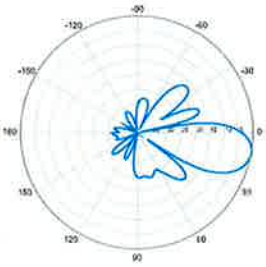
8° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-9

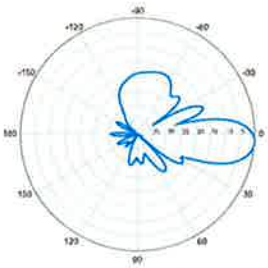


9° | Vertical | 750 MHz

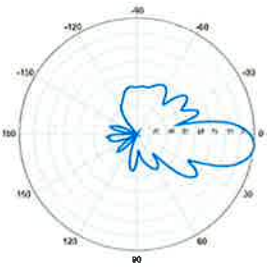
BXA-70063-4CF-EDIN-10



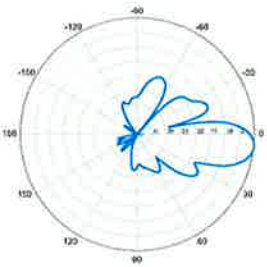
10° | Vertical | 750 MHz



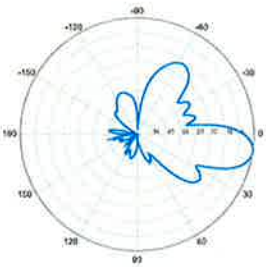
5° | Vertical | 850 MHz



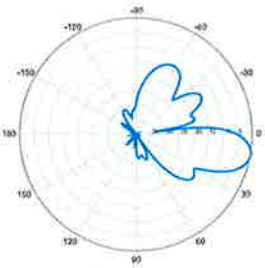
6° | Vertical | 850 MHz



8° | Vertical | 850 MHz

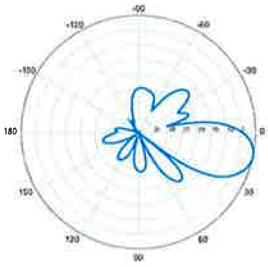


9° | Vertical | 850 MHz



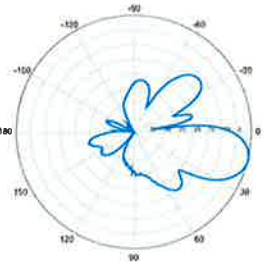
10° | Vertical | 850 MHz

BXA-70063-4CF-EDIN-12

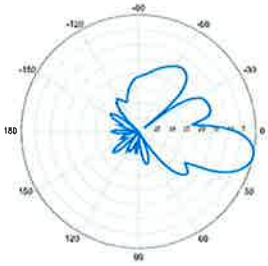


12° | Vertical | 750 MHz

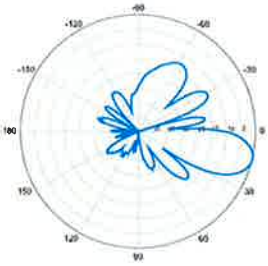
BXA-70063-4CF-EDIN-14



14° | Vertical | 750 MHz



12° | Vertical | 850 MHz



14° | Vertical | 850 MHz

Product Specifications

COMMSCOPE®

HBXX-6517DS-VTM

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

POWERED BY ANDREW.

Electrical Specifications

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

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

Mechanical Specifications

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

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

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

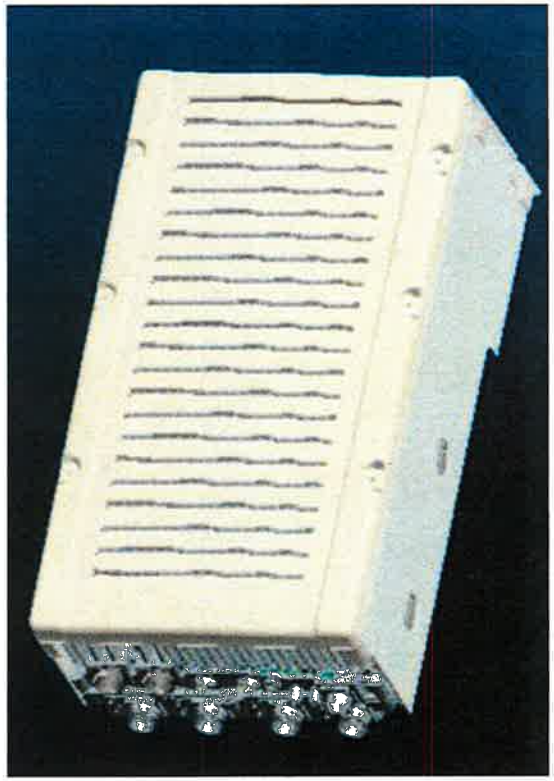
** Not a Verizon Wireless deployed product

Alcatel·Lucent

NEW PCS RF MODULES FOR VZW
RRH2X60 - HW CHARACTERISTICS

LR14.3

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

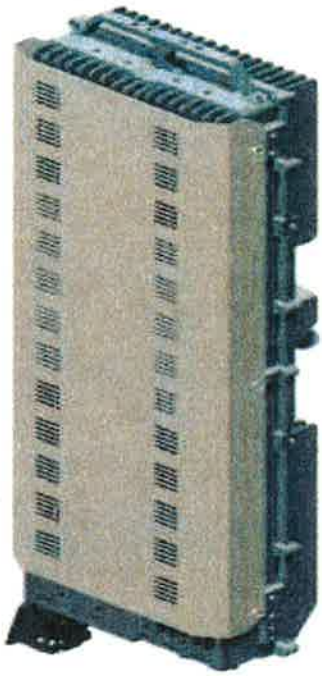


**- Includes solar shield but not mounting brackets (8 lbs.)

Alcatel·Lucent

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

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



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

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

SUPERIOR RF PERFORMANCE

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

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

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

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

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

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

OPTIMIZED TCO

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

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

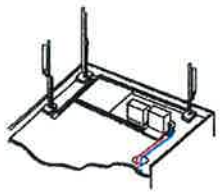
EASY INSTALLATION

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

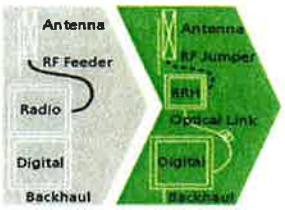
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

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

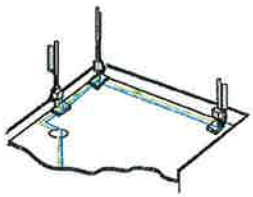
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

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

BENEFITS

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

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

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

Electrical Data

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

RF Characteristics

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

Connectivity

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

Environmental specifications

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

Safety and Regulatory Data

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

Alcatel·Lucent

AT THE SPEED OF IDEAS™

Product Data Sheet **HB158-1-08U8-S8J18**

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

Product Description

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

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

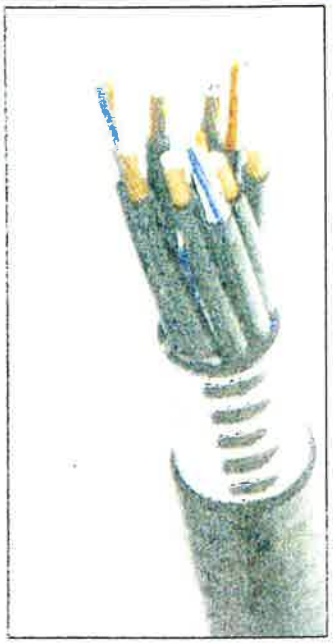


Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	.068 (0.205)
DC-Resistance Power Cable, 8.4mm²/8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0 UL1666 RoHS Compliant
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-93-638 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

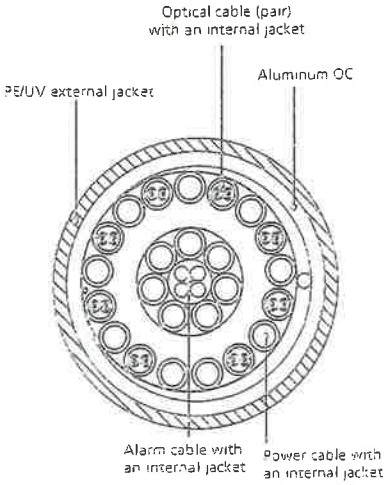


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Windsor 3								
Tower Height: 148ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	2	565	148.5	0.0184	880	0.5867	3.14%	
*AT&T UMTS	2	1077	148.5	0.0351	1900	1.0000	3.51%	
*AT&T GSM	1	283	148.5	0.0046	880	0.5867	0.79%	
*AT&T GSM	4	646	148.5	0.0421	1900	1.0000	4.21%	
*AT&T LTE	1	1615	148.5	0.0263	740	0.4933	5.34%	
*T-Mobile LTE	2	24	143	0.0008	2100	1.0000	0.08%	
*T-Mobile GSM/UMTS	2	12	143	0.0004	1950	1.0000	0.04%	
*T-Mobile UMTS	2	12	143	0.0004	2100	1.0000	0.04%	
*Clearwire	2	153	130	0.0065	2496	1.0000	0.65%	
*Clearwire	1	211	130	0.0045	23 GHz	1.0000	0.45%	
*Sprint CDMA/LTE	3	35	110	0.0031	1900	1.0000	0.31%	
*Sprint CDMA/LTE	1	20	110	0.0006	850	0.5667	0.10%	
*Sprint CDMA/LTE	2	35	110	0.0021	2500	1.0000	0.21%	
*Town			var.				8.83%	
Verizon PCS	**11**	**430**	**127**	**0.1054**	**1970**	**1.0000**	**10.54%**	
Verizon Cellular	**9**	**399**	**127**	**0.0801**	**869**	**0.5793**	**13.82%**	
Verizon AWS	**1**	**1750**	**127**	**0.0390**	**2145**	**1.0000**	**3.90%**	
Verizon 700	**1**	**1050**	**127**	**0.0234**	**746**	**0.4973**	**4.71%**	
								60.69%
* Source: Siting Council								

ATTACHMENT 3

October 29, 2014

Mr. Timothy Howell
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Charlotte, NC 28277
(724) 416-2758

B+T GRP

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Tulsa, OK 74119
(918) 587-4630
ModDwgs@btgrp.com

Subject: **Structural Modification Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Windsor 3, CT
Crown Castle Designation:	**Crown Castle BU Number:**	855662
	Crown Castle Site Name:	Windsorcentral
	Crown Castle JDE Job Number:	309331
	Crown Castle Work Order Number:	947550
	Crown Castle Application Number:	266648 Rev. 0
Engineering Firm Designation:	**B+T Group Project Number:**	91728.005.01
Site Data:	**340 Bloomfield Avenue, Windsor, CT, Hartford County**	
	Latitude *41° 51' 9.34"*, Longitude *-72° 39' 37.79"*	
	148 Foot - Monopole	

Dear Mr. Howell,

B+T Group 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 717477, in accordance with application 266648, revision 0.

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: TSA specified load case with proposed modifications **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

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

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

We at *B+T Group* 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:
B+T Engineering, Inc.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
10/29/14

Robert M. Frazier E.I.
Project Engineer

Chad E. Tuttle, P.E.
President

tnxTower Report - version 6.1.4.1

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1) INTRODUCTION

This tower is a 148 ft Monopole designed by Summit Manufacturing, Inc. in November of 2000. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
126.0	127.0	3	Alcatel Lucent	RRH2X60-AWS	2	1 5/8	--
		3	Alcatel Lucent	RRH2X60-PCS			
		6	Andrew	HBXX-6517DS-A2M			
		3	Antel	BXA-70063-4CF-EDIN-X			
		2	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
147.0	155.0	1	RFS Celwave	PD320-2	12 3 1	1 5/8 1 1/4 7/8	1
	147.0	3	Ericsson	RRUS-11			
		6	Kathrein	800 10121			
		12	Kathrein	860 10025			
		2	KMW Communications	AM-X-CD-16-65-00T-RET			
		12	Powerwave	LGP 13519			
		1	Powerwave	P65-15-XLH-RR			
		1	Raycap	DC6-48-60-18-8F			
		1	--	Platform Mount [LP 1201-1]			
142.0	143.0	3	Commscope	LNX-6515DS-VTM	1	1 5/8	2
		3	Ericsson	ERICSSON AIR 21 B2A B4P			
		3	Ericsson	ERICSSON AIR 21 B4A B2P			
	142.0	3	Ericsson	RRUS 11 B12			
		3	Ericsson	KRY 112 144/1	12	1 5/8	1
		1	--	Platform Mount [LP 1201-1]			
126.0	127.0	**6**	**Decibel**	**DB844G65ZAXY**	--	--	**3**
		3	**Rymsa Wireless**	**MGD5-800TX**			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		1	Antel	BXA-70080-6CF-4			
		2	Powerwave	P65-16-XL-R			
		3	RFS Celwave	FD9R6004/2C-3L	12	1 5/8	1
	126.0	3	RFS Celwave	FD9R6004/2C-3L			
		1	--	Platform Mount [LP 403-1]			
111.0	113.0	3	Alcatel Lucent	TME-800MHz 2X50W RRH W/FILTER			
	111.0	3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz	--	--	1
		1	--	Pipe Mount [PM 601-3]			
109.0	118.0	1	Decibel	DB205-L	--	--	1
	113.0	1	Sinclair	SD212-SF3P2SNM			
	110.0	3	Alcatel Lucent	TD-RRH8x20-25	3	5/16	2
		3	RFS Celwave	APXVTM14-C-120	1	5/8	
		4	RFS Celwave	APXVSPP18-C-A20	3	1 1/4	1
	109.0	1	--	Platform Mount [LP 1201-1]	3	7/8	
81.0	83.0	1	Sinclair	SRL-227			
	81.0	1	--	Side Arm Mount [SO 702-3]	2	7/8	1
	76.0	1	Sinclair	SD212			
74.0	75.0	1	Radiowaves	HP2-23	1	1/4	1
	74.0	1	--	Pipe Mount [PM 601-1]			
50.0	51.0	1	Pctel	GPS-TMG-HR-26N	1	1/2	1
	50.0	1	--	Side Arm Mount [SO 701-1]			

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

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
148	148	12	Allgon	7184.12 Sector	--	--
		1	Generic	14' Low Profile Platform		
143	143	1	Generic	14' Low Profile Platform	--	--
		12	Swedcom	ALP-9212-N		
128	128	1	Generic	14' Low Profile Platform	--	--
		12	Swedcom	ALP-9212-N		
113	113	1	Generic	14' Low Profile Platform	--	--
		12	Swedcom	ALP-9212-N		
98	98	1	Generic	14' Low Profile Platform	--	--
		12	Swedcom	ALP-9212-N		
83	83	1	Generic	14' Low Profile Platform	--	--
		12	Swedcom	ALP-9212-N		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Locate, Rev. 0	266648	CCIsites
Tower Manufacturer Drawing	Summit Manufacturing, LLC. Job No. 11986	4864315	CCIsites
Tower Mapping	BTE Management Group, Job No. 15085	4840493	CCIsites
Foundation Drawing	Summit Manufacturing, LLC. Job No. 11986	4864324	CCIsites
Geotech Report	PJF, Project No. A00007-T144	4857883	CCIsites
Antenna Configuration	Previous failing SA by Jacobs Engineering Group, Inc. Project No. 938789	5336192	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) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Mount areas and weights are assumed based on photographs provided.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary) - LC4.7

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	148 - 116	Pole	TP30.241x24x0.219	1	-10.211	--	47.0	Pass[1]
L2	116 - 93.5	Pole	TP34.191x29.072x0.25	2	-17.378	--	86.2	Pass[1]
L3	93.5 - 74.75	Pole	TP37.847x34.191x0.421	3	-20.439	--	76.9	Pass[1]
L4	74.75 - 57.75	Pole	TP40.663x36.421x0.467	4	-26.475	--	84.7	Pass[1]
L5	57.75 - 39.5	Pole	TP44.222x40.663x0.511	5	-30.269	--	81.8	Pass[1]
L6	39.5 - 31.75	Pole	TP45.108x42.524x0.565	6	-35.614	--	80.2	Pass[1]
L7	31.75 - 0	Pole	TP51.3x45.108x0.522	7	-47.029	--	83.2	Pass[1]
							Summary	
						Pole (L2)	86.2	Pass[1]
						Rating =	86.2	Pass[1]

Table 6 - Tower Component Stresses vs. Capacity - LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	89.7	Pass
1	Base Plate	Base	89.8	Pass
1	Base Foundation Soil Interaction	Base	99.7	Pass

Structure Rating (max from all components) =	99.7%

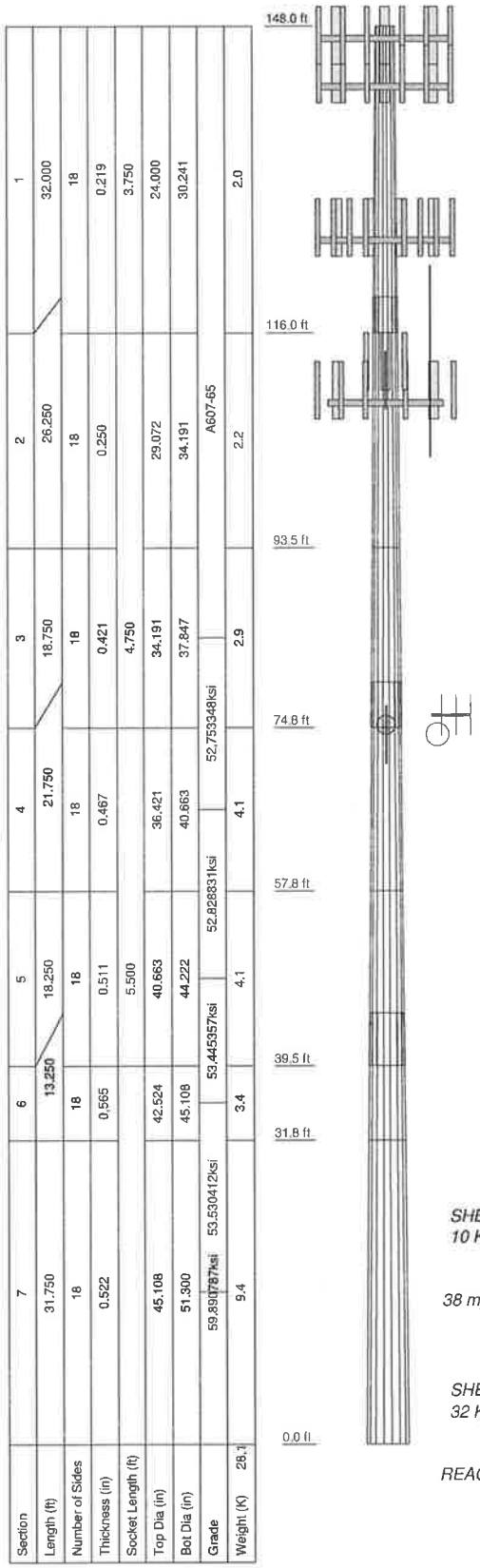
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

1) All modifications proposed in this report shall be installed in accordance with the attached drawings (Appendix D) for the determined available structural capacity to be effective.

APPENDIX A

tnxTOWER OUTPUT



Section	7	6	5	4	3	2	1
Length (ft)	31.750	13.250	18.250	21.750	18.750	26.250	32.000
Number of Sides	18	18	18	18	18	18	18
Thickness (in)	0.522	0.565	0.511	0.467	0.421	0.250	0.219
Socket Length (ft)			5.500		4.750		3.750
Top Dia (in)	45.108	42.524	40.663	36.421	34.191	29.072	24.000
Bot Dia (in)	51.300	45.108	44.222	40.663	37.847	34.191	30.241
Grade	59.890787ksi	53.530412ksi	53.445357ksi	52.828831ksi	52.753348ksi	A607-65	
Weight (K)	9.4	3.4	4.1	4.1	2.9	2.2	2.0

AXIAL 72 K
SHEAR 10 K
TORQUE 1 kip-ft
38 mph WIND - 1.000 i
AXIAL 47 K
SHEAR 32 K
TORQUE 3 kip-ft
REACTIONS - 80 mph

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) 800 10121 w/ Mount Pipe (E)	147	BXA-70063-4CF-EDIN-X w/ Mount Pipe (P)	126
(2) 800 10121 w/ Mount Pipe (E)	147	BXA-70063-4CF-EDIN-X w/ Mount Pipe (P)	126
(2) 800 10121 w/ Mount Pipe (E)	147	BXA-70063-4CF-EDIN-X w/ Mount Pipe (P)	126
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	147	RRH2X60-AWS (P)	126
P65-15-XLH-RR w/ Mount Pipe (E)	147	RRH2X60-AWS (P)	126
(4) LGP 13519 (E)	147	RRH2X60-AWS (P)	126
(4) LGP 13519 (E)	147	RRH2X60-PCS (P)	126
(4) LGP 13519 (E)	147	RRH2X60-PCS (P)	126
RRUS-11 (E)	147	RRH2X60-PCS (P)	126
RRUS-11 (E)	147	DB-T1-6Z-8AB-0Z (P)	126
RRUS-11 (E)	147	DB-T1-6Z-8AB-0Z (P)	126
(8) 860 10025 (E)	147	Platform Mount [LP 403-1] (E)	126
(4) 860 10025 (E)	147	P65-16-XL-R w/ Mount Pipe (E)	126
DC6-48-60-18-8F (E)	147	TME-800MHz 2X50W RRH W/FILTER (E)	111
PD320-2 (E)	147	TME-800MHz 2X50W RRH W/FILTER (E)	111
6' x 2" Mount Pipe (E)	147	PCS 1900MHz 4x45W-65MHz (E)	111
Platform Mount [LP 1201-1] (E)	147	PCS 1900MHz 4x45W-65MHz (E)	111
Detuner Mount (E)	147	PCS 1900MHz 4x45W-65MHz (E)	111
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (R)	142	Pipe Mount [PM 601-3] (E)	111
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (R)	142	TME-800MHz 2X50W RRH W/FILTER (E)	111
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (R)	142	APXVTM14-C-120 w/ Mount Pipe (R)	109
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (R)	142	APXVTM14-C-120 w/ Mount Pipe (R)	109
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (R)	142	TD-RRH8x20-25 (R)	109
LNX-6515DS-VTM w/ Mount Pipe (R)	142	TD-RRH8x20-25 (R)	109
LNX-6515DS-VTM w/ Mount Pipe (R)	142	TD-RRH8x20-25 (R)	109
LNX-6515DS-VTM w/ Mount Pipe (R)	142	APXVSPP18-C-A20 w/ Mount Pipe (E)	109
RRUS 11 B12 (R)	142	APXVSPP18-C-A20 w/ Mount Pipe (E)	109
RRUS 11 B12 (R)	142	(2) APXVSPP18-C-A20 w/ Mount Pipe (E)	109
RRUS 11 B12 (R)	142	DB205-L (E)	109
KRY 112 144/1 (E)	142	SD212-SF3P2SNM (E)	109
KRY 112 144/1 (E)	142	6' x 2" Mount Pipe (E)	109
KRY 112 144/1 (E)	142	(2) 6' x 2" Mount Pipe (E)	109
6' x 2" Mount Pipe (E)	142	(2) 6' x 2" Mount Pipe (E)	109
6' x 2" Mount Pipe (E)	142	Platform Mount [LP 1201-1] (E)	109
6' x 2" Mount Pipe (E)	142	APXVTM14-C-120 w/ Mount Pipe (R)	109
Platform Mount [LP 1201-1] (E)	142	Detuner Mount (E)	95
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (R)	142	4' x 2" Pipe Mount (E)	81
P65-16-XL-R w/ Mount Pipe (E)	126	4' x 2" Pipe Mount (E)	81
BXA-70080-6CF-4 w/ Mount Pipe (E)	126	4' x 2" Pipe Mount (E)	81
FD9R6004/2C-3L (E)	126	Side Arm Mount [SO 702-3] (E)	81
FD9R6004/2C-3L (E)	126	SRL-227 (E)	81
FD9R6004/2C-3L (E)	126	SD212 (E)	81
FD9R6004/2C-3L (E)	126	Pipe Mount [PM 601-1] (E)	74
FD9R6004/2C-3L (E)	126	HP2-23 (E)	74
FD9R6004/2C-3L (E)	126	4' x 2" Pipe Mount (E)	50
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	126	GPS-TMG-HR-26N (E)	50
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	126	Detuner Mount (E)	50
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	126	Side Arm Mount [SO 701-1] (E)	50
		Detuner Mount (E)	15

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi	53.445357ksi	53 ksi	68 ksi
52.753348ksi	53 ksi	68 ksi	53.530412ksi	54 ksi	69 ksi
52.828831ksi	53 ksi	68 ksi	59.890787ksi	60 ksi	75 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 86.2%

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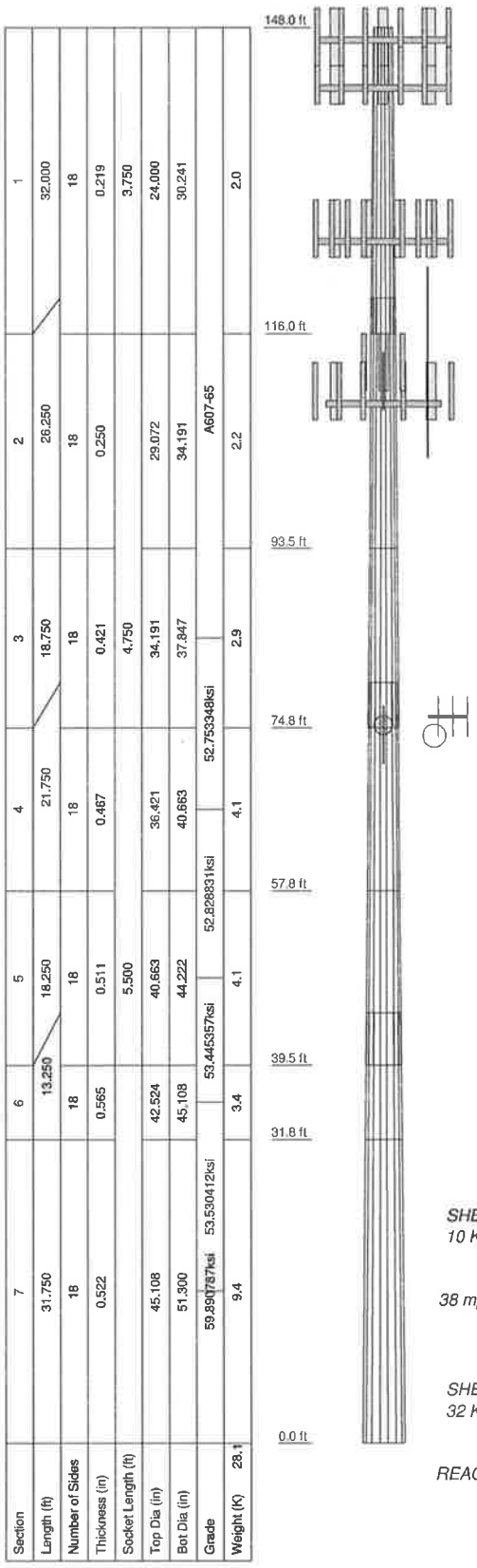
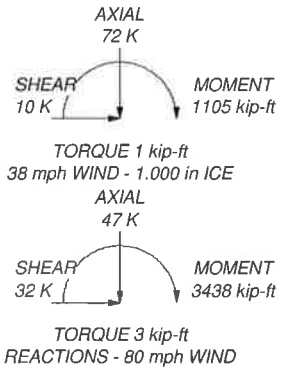
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 587-4630

Job: 91728.005.01 - Windsor Central, CT (BU# 855662)			
Project:			
Client: Crown Castle	Drawn by: Anil S. Poojary	App'd:	
Code: TIA/EIA-222-F	Date: 10/17/14	Scale: NTS	
Path:		Dwg No. E-1	



Section	1	2	3	4	5	6	7
Length (ft)	32.000	26.250	18.750	21.750	18.250	13.250	31.750
Number of Sides	18	18	18	18	18	18	18
Thickness (in)	0.219	0.250	0.421	0.467	0.511	0.565	0.522
Socket Length (ft)	3.750		4.750		5.500		
Top Dia (in)	24.000	29.072	34.191	36.421	40.663	42.524	45.108
Bot Dia (in)	30.241	34.191	37.847	40.663	44.222	45.108	51.300
Grade	A607-65			52.753348ksi	52.828831ksi	53.445357ksi	53.530412ksi / 59.890787ksi
Weight (K)	2.0	2.2	2.9	4.1	4.1	3.4	9.4



MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi	53.445357ksi	53 ksi	68 ksi
52.753348ksi	53 ksi	68 ksi	53.530412ksi	54 ksi	69 ksi
52.828831ksi	53 ksi	68 ksi	59.890787ksi	60 ksi	75 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 86.2%

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 587-4630

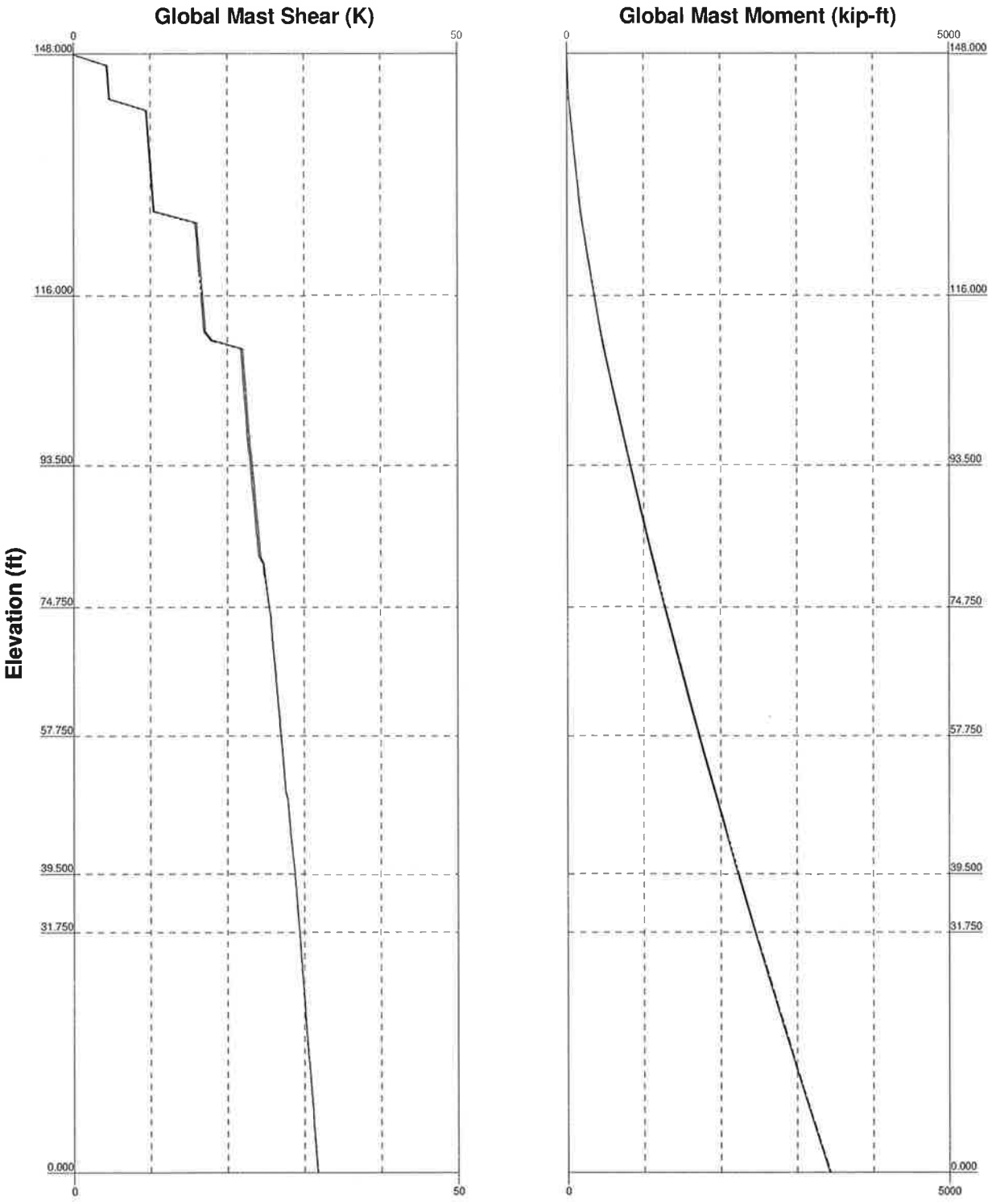
Job: 91728.005.01 - Windsor Central, CT (BU# 855662)			
Project:			
Client: Crown Castle	Drawn by: Anil S. Poojary	App'd:	
Code: TIA/EIA-222-F	Date: 10/17/14	Scale: NTS	
Path:		Dwg No. E-1	

TIA/EIA-222-F - 80 mph/38 mph 1.000 in Ice

Vx ---------- Vz

Maximum Values

Mx ---------- Mz



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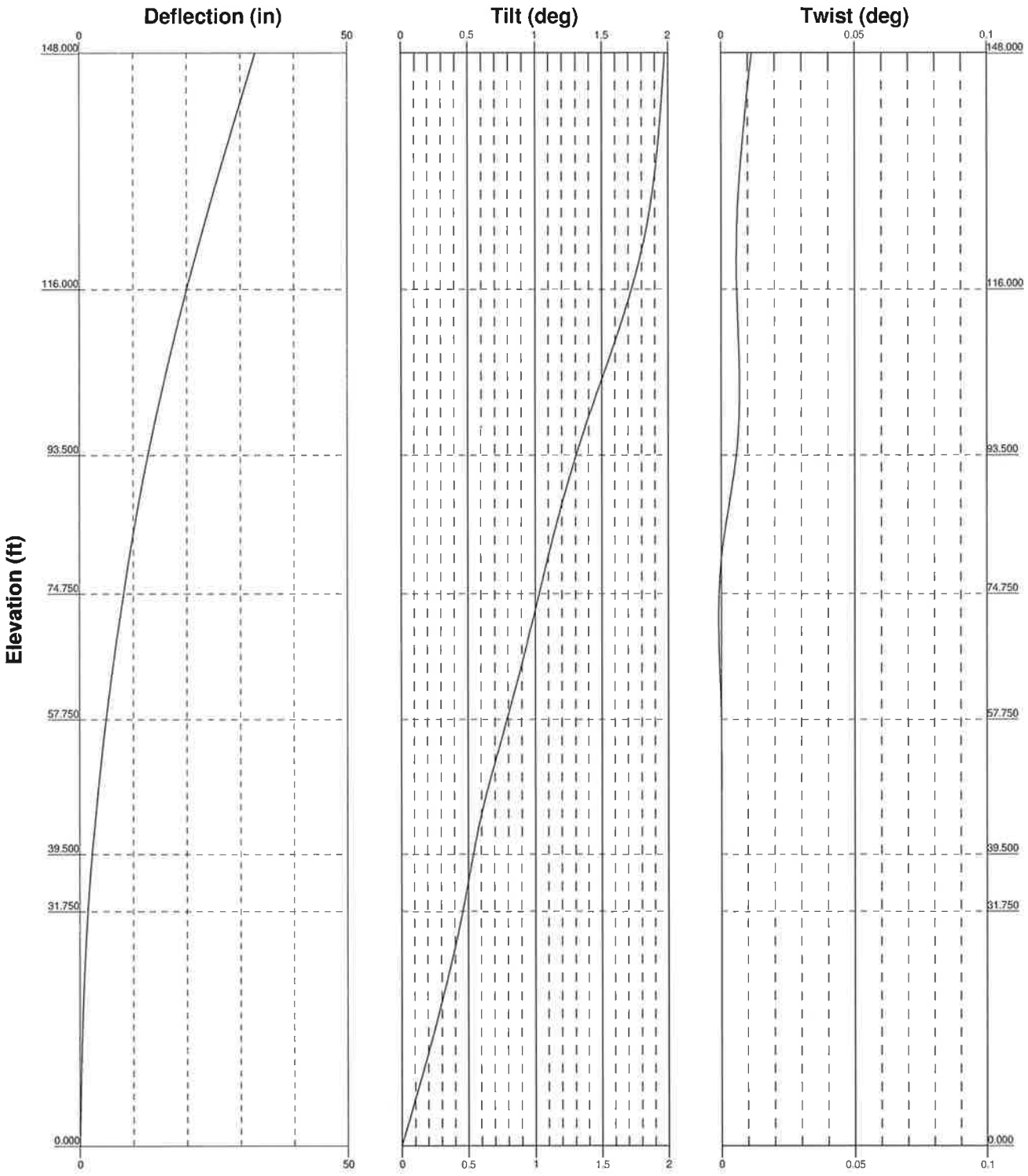
Job: 91728.005.01 - Windsor Central, CT (BU# 855662)			
Project:			
Client: Crown Castle	Drawn by: Anil S. Poojary	App'd:	
Code: TIA/EIA-222-F	Date: 10/17/14	Scale: NTS	
Path:		Dwg No. E-4	

TIA/EIA-222-F - Service - 50 mph

Maximum Values



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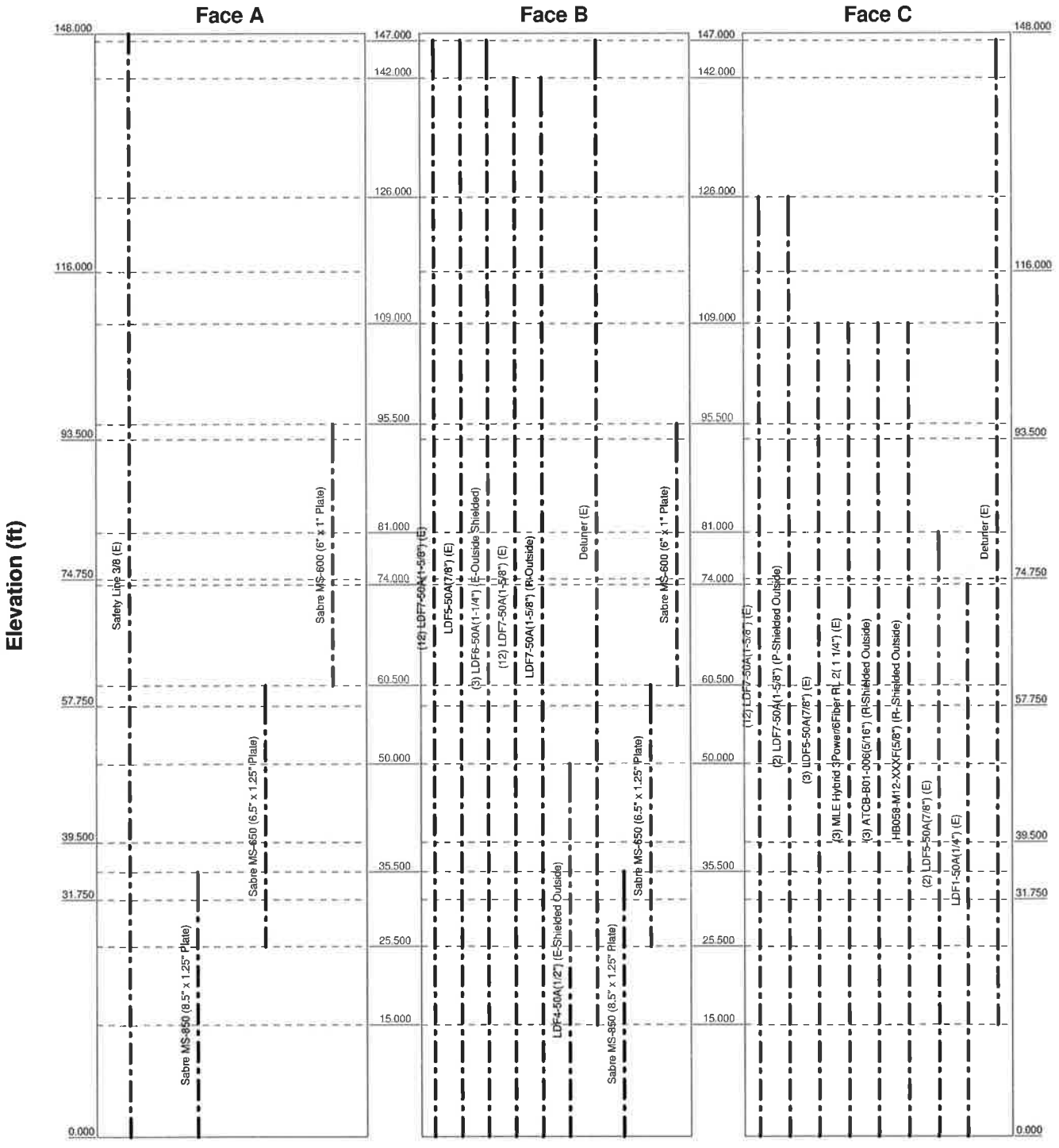
FAX: (918) 587-4630

Job: 91728.005.01 - Windsor Central, CT (BU# 855662)			
Project:			
Client: Crown Castle	Drawn by: Anil S. Poojary	App'd:	
Code: TIA/EIA-222-F	Date: 10/17/14	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 148'

Round — Flat — App In Face — App Out Face — Truss Leg



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Phone: (918) 587-4630
FAX: (918) 587-4630

Job: 91728.005.01 - Windsor Central, CT (BU# 855662)			
Project:			
Client: Crown Castle	Drawn by: Anil S. Poojary	App'd:	
Code: TIA/EIA-222-F	Date: 10/17/14	Scale: NTS	
Path:		Dwg No. E-7	

tnxTower	Job	Page
	91728.005.01 - Windsor Central, CT (BU# 855662)	1 of 36
B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 587-4630	Project	Date 15:43:33 10/17/14
	Client Crown Castle	Designed by Anil S. Poojary

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 Hartford County, Connecticut.
2) Basic wind speed of 80 mph.
3) Nominal ice thickness of 1.000 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.000 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50.000 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) TOWER RATING: 86.2%.
10) A non-linear (P-delta) analysis was used.
11) Pressures are calculated at each section.
12) Stress ratio used in pole design is 1.333.
13) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	148.000-116.000	32.000	3.750	18	24.000	30.241	0.219	0.875	A607-65 (65 ksi)
L2	116.000-93.500	26.250	0.000	18	29.072	34.191	0.250	1.000	A607-65 (65 ksi)
L3	93.500-74.750	18.750	4.750	18	34.191	37.847	0.421	1.682	52.753348ksi (53 ksi)
L4	74.750-57.750	21.750	0.000	18	36.421	40.663	0.467	1.867	52.828831ksi (53 ksi)
L5	57.750-39.500	18.250	5.500	18	40.663	44.222	0.511	2.045	53.445357ksi (53 ksi)
L6	39.500-31.750	13.250	0.000	18	42.524	45.108	0.565	2.262	53.530412ksi (54 ksi)
L7	31.750-0.000	31.750		18	45.108	51.300	0.522	2.086	59.890787ksi (60 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	24.370	16.512	1179.768	8.442	12.192	96.766	2361.088	8.257	3.839	17.55
	30.708	20.845	2373.680	10.658	15.362	154.512	4750.483	10.424	4.937	22.571
L2	30.263	22.870	2400.285	10.232	14.769	162.526	4803.728	11.437	4.677	18.707
	34.718	26.932	3919.682	12.049	17.369	225.672	7844.521	13.469	5.578	22.31
L3	34.718	45.084	6495.710	11.988	17.369	373.985	12999.968	22.546	5.277	12.547
	38.431	49.965	8842.189	13.286	19.226	459.901	17696.012	24.987	5.921	14.077
L4	37.923	53.270	8699.854	12.764	18.502	470.218	17411.156	26.640	5.588	11.972
	41.290	59.555	12156.721	14.270	20.657	588.514	24329.438	29.783	6.335	13.571
L5	41.290	65.150	13269.407	14.254	20.657	642.380	26556.275	32.581	6.257	12.239
	44.904	70.925	17120.363	15.517	22.465	762.098	34263.253	35.469	6.883	13.465
L6	44.269	75.301	16748.886	14.895	21.602	775.327	33519.810	37.658	6.489	11.477
	45.804	79.938	20037.684	15.813	22.915	874.435	40101.735	39.977	6.944	12.281
L7	45.804	73.808	18537.479	15.828	22.915	808.967	37099.350	36.911	7.021	13.462
	52.091	84.057	27382.443	18.026	26.060	1050.730	54800.916	42.037	8.111	15.552

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 148.000-116.000				1	1	1		
L2 116.000-93.500				1	1	1		
L3 93.500-74.750				1	1	0.967368		
L4 74.750-57.750				1	1	0.974999		
L5 57.750-39.500				1	1	0.967245		
L6 39.500-31.750				1	1	0.971676		

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
L7 31.750-0.000				1	1	1.10118		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
LDF7-50A(1-5/8") (E)	B	No	Inside Pole	147.000 - 0.000	0.000	0	12	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001 0.001
LDF5-50A(7/8") (E)	B	No	Inside Pole	147.000 - 0.000	0.000	0	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000 0.000
LDF6-50A(1-1/4") (E-Outside Shielded)	B	No	CaAa (Out Of Face)	147.000 - 0.000	0.000	0	3	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.001 0.002 0.004 0.009 0.028
$										
LDF7-50A(1-5/8") (E)	B	No	Inside Pole	142.000 - 0.000	0.000	0	12	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001 0.001
LDF7-50A(1-5/8") (R-Outside)	B	No	CaAa (Out Of Face)	142.000 - 0.000	0.000	0	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.198 0.298 0.398 0.598 0.998	0.001 0.002 0.004 0.011 0.030
$										
LDF7-50A(1-5/8") (E)	C	No	Inside Pole	126.000 - 0.000	0.000	0	12	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001 0.001
LDF7-50A(1-5/8") (P-Shielded Outside)	C	No	CaAa (Out Of Face)	126.000 - 0.000	0.000	0	2	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.001 0.002 0.004 0.011 0.030
$										
LDF5-50A(7/8") (E)	C	No	Inside Pole	109.000 - 0.000	0.000	0	3	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000 0.000
MLE Hybrid 3Power/6Fiber RL 2(1 1/4") (E)	C	No	Inside Pole	109.000 - 0.000	0.000	0	3	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001 0.001
ATCB-B01-00	C	No	CaAa (Out Of Face)	109.000 - 0.000	0.000	0	3	No Ice	0.000	0.000

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
6(5/16") (R-Shielded Outside)								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
HB058-M12-XXXF(5/8") (R- Shielded Outside)	C	No	CaAa (Out Of Face)	109.000 - 0.000	0.000	0	1	No Ice	0.000	0.000
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.002
								2" Ice	0.000	0.007
								4" Ice	0.000	0.024
$										
LDF5-50A(7/8") (E)	C	No	Inside Pole	81.000 - 0.000	0.000	0	2	No Ice	0.000	0.000
								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
$										
LDF1-50A(1/4") (E)	C	No	Inside Pole	74.000 - 0.000	0.000	0	1	No Ice	0.000	0.000
								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
$										
LDF4-50A(1/2") (E-Shielded Outside)	B	No	CaAa (Out Of Face)	50.000 - 0.000	0.000	0	1	No Ice	0.000	0.000
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.002
								2" Ice	0.000	0.007
								4" Ice	0.000	0.023
$										
Safety Line 3/8 (E)	A	No	CaAa (Out Of Face)	148.000 - 0.000	0.000	0	1	No Ice	0.037	0.000
								1/2" Ice	0.137	0.001
								1" Ice	0.238	0.001
								2" Ice	0.437	0.002
								4" Ice	0.838	0.004
$										
Detuner (E)	C	No	CaAa (Out Of Face)	147.000 - 15.000	24.000	0	1	No Ice	0.037	0.000
								1/2" Ice	0.137	0.001
								1" Ice	0.238	0.001
								2" Ice	0.437	0.002
								4" Ice	0.838	0.004
Detuner (E)	B	No	CaAa (Out Of Face)	147.000 - 15.000	24.000	0	1	No Ice	0.037	0.000
								1/2" Ice	0.137	0.001
								1" Ice	0.238	0.001
								2" Ice	0.437	0.002
								4" Ice	0.838	0.004
$										
Sabre MS-850 (8.5" x 1.25" Plate)	A	No	CaAa (Out Of Face)	35.500 - 0.000	0.000	0	1	No Ice	0.208	0.000
								1/2" Ice	0.292	0.000
								1" Ice	0.375	0.000
								2" Ice	0.542	0.000
								4" Ice	0.875	0.000
Sabre MS-850 (8.5" x 1.25" Plate)	B	No	CaAa (Out Of Face)	35.500 - 0.000	0.000	0	1	No Ice	0.208	0.000
								1/2" Ice	0.292	0.000
								1" Ice	0.375	0.000
								2" Ice	0.542	0.000
								4" Ice	0.875	0.000
Sabre MS-650 (6.5" x 1.25" Plate)	A	No	CaAa (Out Of Face)	60.500 - 25.500	0.000	0	1	No Ice	0.208	0.000
								1/2" Ice	0.292	0.000
								1" Ice	0.375	0.000
								2" Ice	0.542	0.000
								4" Ice	0.875	0.000
Sabre MS-650 (6.5" x 1.25"	B	No	CaAa (Out Of Face)	60.500 - 25.500	0.000	0	1	No Ice	0.208	0.000
								1/2" Ice	0.292	0.000

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
Plate)								1" Ice	0.375	0.000
								2" Ice	0.542	0.000
								4" Ice	0.875	0.000
Sabre MS-600 (6" x 1" Plate)	A	No	CaAa (Out Of Face)	95.500 - 60.500	0.000	0	1	No Ice	0.167	0.000
								1/2" Ice	0.250	0.000
								1" Ice	0.333	0.000
								2" Ice	0.500	0.000
								4" Ice	0.833	0.000
Sabre MS-600 (6" x 1" Plate)	B	No	CaAa (Out Of Face)	95.500 - 60.500	0.000	0	1	No Ice	0.167	0.000
								1/2" Ice	0.250	0.000
								1" Ice	0.333	0.000
								2" Ice	0.500	0.000
								4" Ice	0.833	0.000

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	148.000-116.000	A	0.000	0.000	0.000	1.200	0.007
		B	0.000	0.000	0.000	6.311	0.661
		C	0.000	0.000	0.000	1.163	0.122
L2	116.000-93.500	A	0.000	0.000	0.000	1.177	0.005
		B	0.000	0.000	0.000	5.632	0.518
		C	0.000	0.000	0.000	0.844	0.317
L3	93.500-74.750	A	0.000	0.000	0.000	3.828	0.004
		B	0.000	0.000	0.000	7.541	0.432
		C	0.000	0.000	0.000	0.703	0.289
L4	74.750-57.750	A	0.000	0.000	0.000	3.585	0.004
		B	0.000	0.000	0.000	6.951	0.392
		C	0.000	0.000	0.000	0.637	0.270
L5	57.750-39.500	A	0.000	0.000	0.000	4.486	0.004
		B	0.000	0.000	0.000	8.100	0.422
		C	0.000	0.000	0.000	0.684	0.290
L6	39.500-31.750	A	0.000	0.000	0.000	2.686	0.002
		B	0.000	0.000	0.000	4.221	0.180
		C	0.000	0.000	0.000	0.291	0.123
L7	31.750-0.000	A	0.000	0.000	0.000	9.107	0.007
		B	0.000	0.000	0.000	14.831	0.733
		C	0.000	0.000	0.000	0.628	0.501

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	148.000-116.000	A	1.180	0.000	0.000	0.000	8.755	0.047
		B		0.000	0.000	0.000	19.768	1.206
		C		0.000	0.000	0.000	8.481	0.255
L2	116.000-93.500	A	1.148	0.000	0.000	0.000	6.883	0.033
		B		0.000	0.000	0.000	16.650	0.931
		C		0.000	0.000	0.000	6.156	0.607
L3	93.500-74.750	A	1.119	0.000	0.000	0.000	11.518	0.026
		B		0.000	0.000	0.000	19.426	0.748
		C		0.000	0.000	0.000	4.898	0.527
L4	74.750-57.750	A	1.087	0.000	0.000	0.000	10.558	0.024

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
		B		0.000	0.000	0.000	17.727	0.678
		C		0.000	0.000	0.000	4.441	0.486
L5	57.750-39.500	A	1.047	0.000	0.000	0.000	11.495	0.024
		B		0.000	0.000	0.000	18.931	0.722
		C		0.000	0.000	0.000	4.507	0.499
L6	39.500-31.750	A	1.009	0.000	0.000	0.000	6.317	0.010
		B		0.000	0.000	0.000	9.475	0.314
		C		0.000	0.000	0.000	1.914	0.212
L7	31.750-0.000	A	1.000	0.000	0.000	0.000	21.791	0.041
		B		0.000	0.000	0.000	30.865	1.226
		C		0.000	0.000	0.000	3.978	0.822

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.000-116.000	0.191	0.109	0.293	0.162
L2	116.000-93.500	0.246	0.121	0.388	0.191
L3	93.500-74.750	0.390	0.019	0.592	0.030
L4	74.750-57.750	0.402	0.015	0.616	0.028
L5	57.750-39.500	0.438	-0.006	0.645	0.012
L6	39.500-31.750	0.527	-0.067	0.762	-0.073
L7	31.750-0.000	0.485	-0.054	0.737	-0.141

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) 800 10121 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.685 6.182 6.676 7.695 9.858	4.600 5.351 6.046 7.526 10.832	0.066 0.114 0.168 0.298 0.675
(2) 800 10121 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.685 6.182 6.676 7.695 9.858	4.600 5.351 6.046 7.526 10.832	0.066 0.114 0.168 0.298 0.675
(2) 800 10121 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.685 6.182 6.676 7.695 9.858	4.600 5.351 6.046 7.526 10.832	0.066 0.114 0.168 0.298 0.675
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.074 0.139 0.212 0.385 0.874
P65-15-XLH-RR w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	147.000	No Ice 1/2" Ice	5.838 6.292	3.665 4.278	0.048 0.092

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
(E)			0.000			1" Ice	6.756	4.902	0.142
						2" Ice	7.716	6.235	0.262
						4" Ice	9.772	9.277	0.611
(4) LGP 13519	A	From Leg	4.000	0.000	147.000	No Ice	0.338	0.207	0.005
(E)			0.000			1/2" Ice	0.422	0.280	0.008
			0.000			1" Ice	0.515	0.362	0.012
						2" Ice	0.726	0.551	0.024
						4" Ice	1.252	1.034	0.071
(4) LGP 13519	B	From Leg	4.000	0.000	147.000	No Ice	0.338	0.207	0.005
(E)			0.000			1/2" Ice	0.422	0.280	0.008
			0.000			1" Ice	0.515	0.362	0.012
						2" Ice	0.726	0.551	0.024
						4" Ice	1.252	1.034	0.071
(4) LGP 13519	C	From Leg	4.000	0.000	147.000	No Ice	0.338	0.207	0.005
(E)			0.000			1/2" Ice	0.422	0.280	0.008
			0.000			1" Ice	0.515	0.362	0.012
						2" Ice	0.726	0.551	0.024
						4" Ice	1.252	1.034	0.071
RRUS-11	A	From Leg	4.000	0.000	147.000	No Ice	3.249	1.373	0.048
(E)			0.000			1/2" Ice	3.491	1.551	0.068
			0.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
RRUS-11	B	From Leg	4.000	0.000	147.000	No Ice	3.249	1.373	0.048
(E)			0.000			1/2" Ice	3.491	1.551	0.068
			0.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
RRUS-11	C	From Leg	4.000	0.000	147.000	No Ice	3.249	1.373	0.048
(E)			0.000			1/2" Ice	3.491	1.551	0.068
			0.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
(8) 860 10025	B	From Leg	4.000	0.000	147.000	No Ice	0.163	0.136	0.001
(E)			0.000			1/2" Ice	0.229	0.199	0.003
			0.000			1" Ice	0.302	0.270	0.005
						2" Ice	0.476	0.439	0.014
						4" Ice	0.927	0.879	0.051
(4) 860 10025	C	From Leg	4.000	0.000	147.000	No Ice	0.163	0.136	0.001
(E)			0.000			1/2" Ice	0.229	0.199	0.003
			0.000			1" Ice	0.302	0.270	0.005
						2" Ice	0.476	0.439	0.014
						4" Ice	0.927	0.879	0.051
DC6-48-60-18-8F	A	From Leg	4.000	0.000	147.000	No Ice	2.567	2.567	0.019
(E)			0.000			1/2" Ice	2.798	2.798	0.041
			0.000			1" Ice	3.038	3.038	0.067
						2" Ice	3.543	3.543	0.129
						4" Ice	4.658	4.658	0.299
PD320-2	A	From Leg	4.000	0.000	147.000	No Ice	1.800	1.000	0.015
(E)			0.000			1/2" Ice	3.408	2.017	0.022
			8.000			1" Ice	5.016	3.034	0.029
						2" Ice	8.232	5.068	0.043
						4" Ice	14.664	9.136	0.071
6' x 2" Mount Pipe	A	From Leg	0.000	0.000	147.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231

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
Platform Mount [LP 1201-1] (E)	C	None		0.000	147.000	No Ice	23.100	23.100	2.100
						1/2" Ice	26.800	26.800	2.500
						1" Ice	30.500	30.500	2.900
						2" Ice	37.900	37.900	3.700
						4" Ice	52.700	52.700	5.300
$									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (R)	A	From Leg	4.000 0.000 1.000	0.000	142.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (R)	B	From Leg	4.000 0.000 1.000	0.000	142.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (R)	C	From Leg	4.000 0.000 1.000	0.000	142.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (R)	A	From Leg	4.000 0.000 1.000	0.000	142.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (R)	B	From Leg	4.000 0.000 1.000	0.000	142.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (R)	C	From Leg	4.000 0.000 1.000	0.000	142.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
LNX-6515DS-VTM w/ Mount Pipe (R)	A	From Leg	4.000 0.000 1.000	0.000	142.000	No Ice	11.683	9.842	0.083
						1/2" Ice	12.404	11.366	0.173
						1" Ice	13.135	12.914	0.273
						2" Ice	14.601	15.267	0.506
						4" Ice	17.875	20.139	1.151
LNX-6515DS-VTM w/ Mount Pipe (R)	B	From Leg	4.000 0.000 1.000	0.000	142.000	No Ice	11.683	9.842	0.083
						1/2" Ice	12.404	11.366	0.173
						1" Ice	13.135	12.914	0.273
						2" Ice	14.601	15.267	0.506
						4" Ice	17.875	20.139	1.151
LNX-6515DS-VTM w/ Mount Pipe (R)	C	From Leg	4.000 0.000 1.000	0.000	142.000	No Ice	11.683	9.842	0.083
						1/2" Ice	12.404	11.366	0.173
						1" Ice	13.135	12.914	0.273
						2" Ice	14.601	15.267	0.506
						4" Ice	17.875	20.139	1.151
RRUS 11 B12 (R)	A	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice	3.306	1.361	0.051
						1/2" Ice	3.550	1.540	0.072
						1" Ice	3.802	1.728	0.095
						2" Ice	4.334	2.130	0.153
						4" Ice	5.501	3.038	0.314
RRUS 11 B12 (R)	B	From Leg	4.000 0.000	0.000	142.000	No Ice	3.306	1.361	0.051
						1/2" Ice	3.550	1.540	0.072

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
			0.000			1" Ice	3.802	1.728	0.095
						2" Ice	4.334	2.130	0.153
						4" Ice	5.501	3.038	0.314
RRUS 11 B12	C	From Leg	4.000	0.000	142.000	No Ice	3.306	1.361	0.051
(R)			0.000			1/2" Ice	3.550	1.540	0.072
			0.000			1" Ice	3.802	1.728	0.095
						2" Ice	4.334	2.130	0.153
						4" Ice	5.501	3.038	0.314
KRY 112 144/1	A	From Leg	4.000	0.000	142.000	No Ice	0.408	0.204	0.011
(E)			0.000			1/2" Ice	0.497	0.273	0.014
			0.000			1" Ice	0.594	0.351	0.019
						2" Ice	0.815	0.533	0.032
						4" Ice	1.359	0.999	0.082
KRY 112 144/1	B	From Leg	4.000	0.000	142.000	No Ice	0.408	0.204	0.011
(E)			0.000			1/2" Ice	0.497	0.273	0.014
			0.000			1" Ice	0.594	0.351	0.019
						2" Ice	0.815	0.533	0.032
						4" Ice	1.359	0.999	0.082
KRY 112 144/1	C	From Leg	4.000	0.000	142.000	No Ice	0.408	0.204	0.011
(E)			0.000			1/2" Ice	0.497	0.273	0.014
			0.000			1" Ice	0.594	0.351	0.019
						2" Ice	0.815	0.533	0.032
						4" Ice	1.359	0.999	0.082
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	142.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	142.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	142.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Platform Mount [LP 1201-1]	C	None		0.000	142.000	No Ice	23.100	23.100	2.100
(E)						1/2" Ice	26.800	26.800	2.500
						1" Ice	30.500	30.500	2.900
						2" Ice	37.900	37.900	3.700
						4" Ice	52.700	52.700	5.300
$									
P65-16-XL-R w/ Mount Pipe	A	From Leg	4.000	0.000	126.000	No Ice	8.637	6.362	0.057
(E)			0.000			1/2" Ice	9.290	7.538	0.122
			1.000			1" Ice	9.910	8.427	0.196
						2" Ice	11.176	10.239	0.371
						4" Ice	13.829	14.099	0.864
P65-16-XL-R w/ Mount Pipe	B	From Leg	4.000	0.000	126.000	No Ice	8.637	6.362	0.057
(E)			0.000			1/2" Ice	9.290	7.538	0.122
			1.000			1" Ice	9.910	8.427	0.196
						2" Ice	11.176	10.239	0.371
						4" Ice	13.829	14.099	0.864
BXA-70080-6CF-4 w/ Mount Pipe	C	From Leg	4.000	0.000	126.000	No Ice	6.006	6.203	0.043
(E)			0.000			1/2" Ice	6.562	7.359	0.098
			1.000			1" Ice	7.083	8.229	0.160
						2" Ice	8.167	10.019	0.310

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	10.691	13.840	0.750
FD9R6004/2C-3L (E)	A	From Leg	4.000 0.000 1.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
FD9R6004/2C-3L (E)	B	From Leg	4.000 0.000 1.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
FD9R6004/2C-3L (E)	C	From Leg	4.000 0.000 1.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
FD9R6004/2C-3L (E)	A	From Leg	4.000 0.000 0.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
FD9R6004/2C-3L (E)	B	From Leg	4.000 0.000 0.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
FD9R6004/2C-3L (E)	C	From Leg	4.000 0.000 0.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	A	From Leg	4.000 0.000 1.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.976 9.647 10.291 11.595 14.321	6.963 8.182 9.144 11.022 15.027	0.067 0.137 0.215 0.398 0.914
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	B	From Leg	4.000 0.000 1.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.976 9.647 10.291 11.595 14.321	6.963 8.182 9.144 11.022 15.027	0.067 0.137 0.215 0.398 0.914
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	C	From Leg	4.000 0.000 1.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.976 9.647 10.291 11.595 14.321	6.963 8.182 9.144 11.022 15.027	0.067 0.137 0.215 0.398 0.914
BXA-70063-4CF-EDIN-X w/ Mount Pipe (P)	A	From Leg	4.000 0.000 1.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.399 5.844 6.299 7.240 9.261	3.693 4.295 4.913 6.258 9.285	0.028 0.070 0.118 0.235 0.576
BXA-70063-4CF-EDIN-X w/ Mount Pipe (P)	B	From Leg	4.000 0.000 1.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.399 5.844 6.299 7.240 9.261	3.693 4.295 4.913 6.258 9.285	0.028 0.070 0.118 0.235 0.576
BXA-70063-4CF-EDIN-X w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	126.000	No Ice 1/2" Ice	5.399 5.844	3.693 4.295	0.028 0.070

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
(P)			1.000			1" Ice	6.299	4.913	0.118
						2" Ice	7.240	6.258	0.235
						4" Ice	9.261	9.285	0.576
RRH2X60-AWS	A	From Leg	4.000	0.000	126.000	No Ice	3.957	1.816	0.060
(P)			0.000			1/2" Ice	4.272	2.075	0.083
			1.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2X60-AWS	B	From Leg	4.000	0.000	126.000	No Ice	3.957	1.816	0.060
(P)			0.000			1/2" Ice	4.272	2.075	0.083
			1.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2X60-AWS	C	From Leg	4.000	0.000	126.000	No Ice	3.957	1.816	0.060
(P)			0.000			1/2" Ice	4.272	2.075	0.083
			1.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2X60-PCS	A	From Leg	4.000	0.000	126.000	No Ice	2.567	2.032	0.055
(P)			0.000			1/2" Ice	2.791	2.240	0.075
			1.000			1" Ice	3.025	2.458	0.099
						2" Ice	3.517	2.918	0.156
						4" Ice	4.606	3.942	0.314
RRH2X60-PCS	B	From Leg	4.000	0.000	126.000	No Ice	2.567	2.032	0.055
(P)			0.000			1/2" Ice	2.791	2.240	0.075
			1.000			1" Ice	3.025	2.458	0.099
						2" Ice	3.517	2.918	0.156
						4" Ice	4.606	3.942	0.314
RRH2X60-PCS	C	From Leg	4.000	0.000	126.000	No Ice	2.567	2.032	0.055
(P)			0.000			1/2" Ice	2.791	2.240	0.075
			1.000			1" Ice	3.025	2.458	0.099
						2" Ice	3.517	2.918	0.156
						4" Ice	4.606	3.942	0.314
DB-T1-6Z-8AB-0Z	B	From Leg	4.000	0.000	126.000	No Ice	5.600	2.333	0.044
(P)			0.000			1/2" Ice	5.915	2.558	0.080
			1.000			1" Ice	6.240	2.791	0.120
						2" Ice	6.914	3.284	0.213
						4" Ice	8.365	4.373	0.455
DB-T1-6Z-8AB-0Z	C	From Leg	4.000	0.000	126.000	No Ice	5.600	2.333	0.044
(P)			0.000			1/2" Ice	5.915	2.558	0.080
			1.000			1" Ice	6.240	2.791	0.120
						2" Ice	6.914	3.284	0.213
						4" Ice	8.365	4.373	0.455
Platform Mount [LP 403-1]	C	None		0.000	126.000	No Ice	18.850	18.850	1.500
(E)						1/2" Ice	24.300	24.300	1.797
						1" Ice	29.750	29.750	2.093
						2" Ice	40.650	40.650	2.686
						4" Ice	62.450	62.450	3.872
$									
TME-800MHz 2X50W RRH W/FILTER	A	From Leg	1.000	0.000	111.000	No Ice	2.401	2.254	0.064
(E)			0.000			1/2" Ice	2.613	2.460	0.086
			2.000			1" Ice	2.833	2.675	0.111
						2" Ice	3.300	3.132	0.172
						4" Ice	4.337	4.148	0.338
TME-800MHz 2X50W RRH W/FILTER	B	From Leg	1.000	0.000	111.000	No Ice	2.401	2.254	0.064
(E)			0.000			1/2" Ice	2.613	2.460	0.086
			2.000			1" Ice	2.833	2.675	0.111
						2" Ice	3.300	3.132	0.172

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	4.337	4.148	0.338
TME-800MHz 2X50W RRH W/FILTER (E)	C	From Leg	1.000 0.000 2.000	0.000	111.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.401 2.613 2.833 3.300 4.337	2.254 2.460 2.675 3.132 4.148	0.064 0.086 0.111 0.172 0.338
PCS 1900MHz 4x45W-65MHz (E)	A	From Leg	1.000 0.000 0.000	0.000	111.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.709 2.948 3.195 3.716 4.862	2.611 2.847 3.092 3.608 4.744	0.060 0.083 0.110 0.173 0.347
PCS 1900MHz 4x45W-65MHz (E)	B	From Leg	1.000 0.000 0.000	0.000	111.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.709 2.948 3.195 3.716 4.862	2.611 2.847 3.092 3.608 4.744	0.060 0.083 0.110 0.173 0.347
PCS 1900MHz 4x45W-65MHz (E)	C	From Leg	1.000 0.000 0.000	0.000	111.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.709 2.948 3.195 3.716 4.862	2.611 2.847 3.092 3.608 4.744	0.060 0.083 0.110 0.173 0.347
Pipe Mount [PM 601-3] (E)	C	None		0.000	111.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.390 5.480 6.570 8.750 13.110	4.390 5.480 6.570 8.750 13.110	0.195 0.237 0.280 0.365 0.534
$									
APXVTM14-C-120 w/ Mount Pipe (R)	A	From Leg	4.000 0.000 1.000	0.000	109.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.132 0.193 0.339 0.753
APXVTM14-C-120 w/ Mount Pipe (R)	B	From Leg	4.000 0.000 1.000	0.000	109.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.132 0.193 0.339 0.753
APXVTM14-C-120 w/ Mount Pipe (R)	C	From Leg	4.000 0.000 1.000	0.000	109.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.132 0.193 0.339 0.753
TD-RRH8x20-25 (R)	B	From Leg	4.000 0.000 1.000	0.000	109.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.720 5.014 5.316 5.948 7.314	1.703 1.920 2.145 2.622 3.680	0.070 0.097 0.128 0.201 0.397
TD-RRH8x20-25 (R)	C	From Leg	4.000 0.000 1.000	0.000	109.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.720 5.014 5.316 5.948 7.314	1.703 1.920 2.145 2.622 3.680	0.070 0.097 0.128 0.201 0.397
TD-RRH8x20-25 (R)	A	From Leg	4.000 0.000 1.000	0.000	109.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.720 5.014 5.316 5.948 7.314	1.703 1.920 2.145 2.622 3.680	0.070 0.097 0.128 0.201 0.397
APXVSPP18-C-A20 w/	A	From Leg	4.000	0.000	109.000	No Ice	8.498	6.946	0.083

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
Mount Pipe			0.000			1/2" Ice	9.149	8.127	0.151
(E)			1.000			1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
APXVSPP18-C-A20 w/	B	From Leg	4.000	0.000	109.000	No Ice	8.498	6.946	0.083
Mount Pipe			0.000			1/2" Ice	9.149	8.127	0.151
(E)			1.000			1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
(2) APXVSPP18-C-A20 w/	C	From Leg	4.000	0.000	109.000	No Ice	8.498	6.946	0.083
Mount Pipe			0.000			1/2" Ice	9.149	8.127	0.151
(E)			1.000			1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
DB205-L	B	From Leg	4.000	0.000	109.000	No Ice	1.717	1.717	0.036
(E)			0.000			1/2" Ice	3.450	3.450	0.052
			9.000			1" Ice	5.200	5.200	0.078
						2" Ice	8.750	8.750	0.164
						4" Ice	15.687	15.687	0.472
SD212-SF3P2SNM	B	From Leg	4.000	0.000	109.000	No Ice	2.160	2.160	0.021
(E)			0.000			1/2" Ice	3.960	3.960	0.050
			4.000			1" Ice	5.760	5.760	0.079
						2" Ice	9.360	9.360	0.137
						4" Ice	16.560	16.560	0.253
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	109.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
(2) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	109.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
(2) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	109.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Platform Mount [LP 1201-1]	C	None		0.000	109.000	No Ice	23.100	23.100	2.100
(E)						1/2" Ice	26.800	26.800	2.500
						1" Ice	30.500	30.500	2.900
						2" Ice	37.900	37.900	3.700
						4" Ice	52.700	52.700	5.300
$									
SRL-227	A	From Leg	4.000	0.000	81.000	No Ice	4.625	1.448	0.035
(E)			0.000			1/2" Ice	9.386	3.733	0.071
			2.000			1" Ice	14.147	6.018	0.106
						2" Ice	23.669	10.588	0.178
						4" Ice	42.713	19.728	0.320
SD212	B	From Leg	4.000	0.000	81.000	No Ice	3.000	3.000	0.016
(E)			0.000			1/2" Ice	4.032	4.032	0.174
			-5.000			1" Ice	5.064	5.064	0.341
						2" Ice	7.128	7.128	0.701
						4" Ice	11.256	11.256	1.531
4' x 2" Pipe Mount	A	From Leg	4.000	0.000	81.000	No Ice	0.785	0.785	0.029
(E)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044

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
						2" Ice	1.814	1.814	0.072
						4" Ice	3.111	3.111	0.167
4' x 2" Pipe Mount	B	From Leg	4.000	0.000	81.000	No Ice	0.785	0.785	0.029
(E)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
						4" Ice	3.111	3.111	0.167
4' x 2" Pipe Mount	C	From Leg	4.000	0.000	81.000	No Ice	0.785	0.785	0.029
(E)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
						4" Ice	3.111	3.111	0.167
Side Arm Mount [SO 702-3]	C	None		0.000	81.000	No Ice	3.220	3.220	0.081
(E)						1/2" Ice	4.150	4.150	0.114
						1" Ice	5.080	5.080	0.147
						2" Ice	6.940	6.940	0.213
						4" Ice	10.660	10.660	0.345
$									
Pipe Mount [PM 601-1]	A	From Leg	0.500	0.000	74.000	No Ice	3.000	0.900	0.065
(E)			0.000			1/2" Ice	3.740	1.120	0.079
			0.000			1" Ice	4.480	1.340	0.093
						2" Ice	5.960	1.780	0.122
						4" Ice	8.920	2.660	0.178
$$									
GPS-TMG-HR-26N	A	From Leg	3.000	0.000	50.000	No Ice	0.243	0.156	0.001
(E)			0.000			1/2" Ice	0.312	0.213	0.003
			1.000			1" Ice	0.390	0.279	0.006
						2" Ice	0.571	0.437	0.017
						4" Ice	1.038	0.857	0.059
4' x 2" Pipe Mount	A	From Leg	3.000	0.000	50.000	No Ice	0.785	0.785	0.029
(E)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
						4" Ice	3.111	3.111	0.167
Side Arm Mount [SO 701-1]	A	From Leg	3.000	0.000	50.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
						4" Ice	3.170	7.030	0.177
$									
Detuner Mount	C	None		0.000	147.000	No Ice	2.830	2.830	0.195
(E)						1/2" Ice	3.920	3.920	0.237
						1" Ice	5.010	5.010	0.279
						2" Ice	7.190	7.190	0.363
						4" Ice	11.550	11.550	0.531
Detuner Mount	C	None		0.000	95.000	No Ice	2.830	2.830	0.195
(E)						1/2" Ice	3.920	3.920	0.237
						1" Ice	5.010	5.010	0.279
						2" Ice	7.190	7.190	0.363
						4" Ice	11.550	11.550	0.531
Detuner Mount	C	None		0.000	50.000	No Ice	2.830	2.830	0.195
(E)						1/2" Ice	3.920	3.920	0.237
						1" Ice	5.010	5.010	0.279
						2" Ice	7.190	7.190	0.363
						4" Ice	11.550	11.550	0.531
Detuner Mount	C	None		0.000	15.000	No Ice	2.830	2.830	0.195
(E)						1/2" Ice	3.920	3.920	0.237
						1" Ice	5.010	5.010	0.279

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
						2" Ice	7.190	7.190	0.363
						4" Ice	11.550	11.550	0.531
*********									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HP2-23 (E)	A	Paraboloid w/Shroud (HP)	From Leg	1.000 / 0.000 / 1.000	0.000		74.000	2.042	No Ice	3.274	0.027
									1/2" Ice	3.547	0.045
									1" Ice	3.819	0.063
									2" Ice	4.365	0.100
									4" Ice	5.456	0.173
$$											

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

Comb. No.	Description
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	148 - 116	Pole	Max Tension	36	0.000	-0.000	0.000
			Max. Compression	14	-22.049	-2.234	-2.342
			Max. Mx	5	-10.215	-292.885	-2.063
			Max. My	8	-10.240	-2.020	-289.408
			Max. Vy	5	16.490	-292.885	-2.063
			Max. Vx	8	16.290	-2.020	-289.408
			Max. Torque	3			-2.329
L2	116 - 93.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-34.530	-2.237	-4.517
			Max. Mx	5	-17.380	-830.155	-4.535
			Max. My	8	-17.402	-3.945	-821.566
			Max. Vy	5	23.272	-830.155	-4.535
			Max. Vx	8	23.041	-3.945	-821.566
			Max. Torque	4			-3.247
L3	93.5 - 74.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-39.175	-4.215	-5.356
			Max. Mx	5	-20.442	-1164.819	-5.349
			Max. My	8	-20.455	-4.915	-1153.218
			Max. Vy	5	24.898	-1164.819	-5.349
			Max. Vx	8	24.782	-4.915	-1153.218
			Max. Torque	4			-3.527
L4	74.75 - 57.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-47.112	-4.444	-5.646
			Max. Mx	5	-26.479	-1730.313	-6.425
			Max. My	8	-26.482	-6.332	-1718.513
			Max. Vy	5	26.980	-1730.313	-6.425
			Max. Vx	8	27.012	-6.332	-1718.513
			Max. Torque	10			3.416
L5	57.75 - 39.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-51.947	-4.565	-5.300
			Max. Mx	5	-30.272	-2081.747	-6.687
			Max. My	8	-30.275	-7.153	-2069.837
			Max. Vy	5	28.204	-2081.747	-6.687
			Max. Vx	8	28.214	-7.153	-2069.837
			Max. Torque	10			3.397
L6	39.5 - 31.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-58.586	-4.698	-5.675
			Max. Mx	5	-35.616	-2463.496	-7.412
			Max. My	8	-35.619	-8.002	-2451.762
			Max. Vy	5	29.374	-2463.496	-7.412
			Max. Vx	8	29.385	-8.002	-2451.762
			Max. Torque	10			3.094
L7	31.75 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-72.272	-5.046	-6.577
			Max. Mx	5	-47.029	-3432.596	-9.104
			Max. My	8	-47.029	-9.988	-3421.345

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	5	31.707	-3432.596	-9.104
			Max. Vx	8	31.720	-9.988	-3421.345
			Max. Torque	10			3.140

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	21	72.272	-0.012	-9.917
	Max. H_x	11	47.045	31.683	0.073
	Max. H_z	2	47.045	0.060	31.668
	Max. M_x	2	3417.601	0.060	31.668
	Max. M_z	5	3432.596	-31.683	-0.047
	Max. Torsion	10	3.140	27.389	-15.832
	Min. Vert	1	47.045	0.000	0.000
	Min. H_x	5	47.045	-31.683	-0.047
	Min. H_z	8	47.045	-0.060	-31.697
	Min. M_x	8	-3421.345	-0.060	-31.697
	Min. M_z	11	-3431.176	31.683	0.073
	Min. Torsion	4	-3.103	-27.397	15.806

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear$_x$ K	Shear$_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	47.045	0.000	0.000	0.745	-0.678	0.000
Dead+Wind 0 deg - No Ice	47.045	-0.060	-31.668	-3417.601	8.589	2.103
Dead+Wind 30 deg - No Ice	47.045	15.774	-27.405	-2955.676	-1707.425	3.031
Dead+Wind 60 deg - No Ice	47.045	27.397	-15.806	-1702.153	-2967.277	3.103
Dead+Wind 90 deg - No Ice	47.045	31.683	0.047	9.103	-3432.596	2.333
Dead+Wind 120 deg - No Ice	47.045	27.449	15.936	1721.839	-2975.921	1.038
Dead+Wind 150 deg - No Ice	47.045	15.885	27.494	2968.732	-1724.017	-0.611
Dead+Wind 180 deg - No Ice	47.045	0.060	31.697	3421.345	-9.988	-2.100
Dead+Wind 210 deg - No Ice	47.045	-15.781	27.434	2959.472	1706.547	-3.027
Dead+Wind 240 deg - No Ice	47.045	-27.389	15.832	1705.764	2965.256	-3.140
Dead+Wind 270 deg - No Ice	47.045	-31.683	-0.073	-9.473	3431.176	-2.336
Dead+Wind 300 deg - No Ice	47.045	-27.457	-15.909	-1718.209	2975.112	-1.003
Dead+Wind 330 deg - No Ice	47.045	-15.878	-27.465	-2964.917	1722.086	0.610
Dead+Ice+Temp	72.272	0.000	0.000	6.577	-5.046	0.000
Dead+Wind 0 deg+Ice+Temp	72.272	-0.012	-9.910	-1088.976	-3.416	1.030
Dead+Wind 30 deg+Ice+Temp	72.272	4.905	-8.578	-941.507	-548.489	1.215
Dead+Wind 60 deg+Ice+Temp	72.272	8.511	-4.951	-540.129	-948.283	1.063
Dead+Wind 90 deg+Ice+Temp	72.272	9.837	0.008	8.156	-1095.462	0.624
Dead+Wind 120 deg+Ice+Temp	72.272	8.520	4.978	557.041	-949.838	0.044
Dead+Wind 150 deg+Ice+Temp	72.272	4.926	8.598	957.205	-551.606	-0.568
Dead+Wind 180 deg+Ice+Temp	72.272	0.012	9.917	1102.937	-6.857	-1.029
Dead+Wind 210 deg+Ice+Temp	72.272	-4.906	8.586	955.484	538.353	-1.214
Dead+Wind 240 deg+Ice+Temp	72.272	-8.508	4.958	554.060	937.843	-1.073
Dead+Wind 270 deg+Ice+Temp	72.272	-9.837	-0.015	4.715	1085.185	-0.624
Dead+Wind 300 deg+Ice+Temp	72.272	-8.522	-4.971	-543.107	939.726	-0.034
Dead+Wind 330 deg+Ice+Temp	72.272	-4.925	-8.590	-943.225	541.194	0.569
Dead+Wind 0 deg - Service	47.045	-0.023	-12.370	-1335.719	2.919	0.827

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+Wind 30 deg - Service	47.045	6.162	-10.705	-1155.114	-668.010	1.191
Dead+Wind 60 deg - Service	47.045	10.702	-6.174	-665.016	-1160.594	1.221
Dead+Wind 90 deg - Service	47.045	12.376	0.019	4.053	-1342.532	0.919
Dead+Wind 120 deg - Service	47.045	10.722	6.225	673.705	-1163.985	0.411
Dead+Wind 150 deg - Service	47.045	6.205	10.740	1161.212	-674.504	-0.238
Dead+Wind 180 deg - Service	47.045	0.023	12.382	1338.161	-4.347	-0.826
Dead+Wind 210 deg - Service	47.045	-6.164	10.716	1157.580	666.784	-1.193
Dead+Wind 240 deg - Service	47.045	-10.699	6.185	667.412	1158.924	-1.237
Dead+Wind 270 deg - Service	47.045	-12.376	-0.028	-3.212	1341.101	-0.920
Dead+Wind 300 deg - Service	47.045	-10.725	-6.215	-671.305	1162.794	-0.394
Dead+Wind 330 deg - Service	47.045	-6.202	-10.728	-1158.743	672.872	0.240

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-47.045	0.000	0.000	47.045	0.000	0.000%
2	-0.060	-47.045	-31.668	0.060	47.045	31.668	0.000%
3	15.774	-47.045	-27.405	-15.774	47.045	27.405	0.000%
4	27.397	-47.045	-15.806	-27.397	47.045	15.806	0.000%
5	31.683	-47.045	0.047	-31.683	47.045	-0.047	0.000%
6	27.449	-47.045	15.936	-27.449	47.045	-15.936	0.000%
7	15.885	-47.045	27.494	-15.885	47.045	-27.494	0.000%
8	0.060	-47.045	31.697	-0.060	47.045	-31.697	0.000%
9	-15.781	-47.045	27.434	15.781	47.045	-27.434	0.000%
10	-27.389	-47.045	15.832	27.389	47.045	-15.832	0.000%
11	-31.683	-47.045	-0.073	31.683	47.045	0.073	0.000%
12	-27.457	-47.045	-15.909	27.457	47.045	15.909	0.000%
13	-15.878	-47.045	-27.465	15.878	47.045	27.465	0.000%
14	0.000	-72.272	0.000	-0.000	72.272	-0.000	0.000%
15	-0.012	-72.272	-9.909	0.012	72.272	9.910	0.000%
16	4.904	-72.272	-8.578	-4.905	72.272	8.578	0.000%
17	8.510	-72.272	-4.951	-8.511	72.272	4.951	0.000%
18	9.837	-72.272	0.008	-9.837	72.272	-0.008	0.000%
19	8.520	-72.272	4.978	-8.520	72.272	-4.978	0.000%
20	4.926	-72.272	8.598	-4.926	72.272	-8.598	0.000%
21	0.012	-72.272	9.917	-0.012	72.272	-9.917	0.000%
22	-4.906	-72.272	8.586	4.906	72.272	-8.586	0.000%
23	-8.508	-72.272	4.958	8.508	72.272	-4.958	0.000%
24	-9.837	-72.272	-0.015	9.837	72.272	0.015	0.000%
25	-8.522	-72.272	-4.971	8.522	72.272	4.971	0.000%
26	-4.925	-72.272	-8.590	4.925	72.272	8.590	0.000%
27	-0.023	-47.045	-12.370	0.023	47.045	12.370	0.000%
28	6.162	-47.045	-10.705	-6.162	47.045	10.705	0.000%
29	10.702	-47.045	-6.174	-10.702	47.045	6.174	0.000%
30	12.376	-47.045	0.019	-12.376	47.045	-0.019	0.000%
31	10.722	-47.045	6.225	-10.722	47.045	-6.225	0.000%
32	6.205	-47.045	10.740	-6.205	47.045	-10.740	0.000%
33	0.023	-47.045	12.381	-0.023	47.045	-12.382	0.000%
34	-6.164	-47.045	10.716	6.164	47.045	-10.716	0.000%
35	-10.699	-47.045	6.185	10.699	47.045	-6.185	0.000%
36	-12.376	-47.045	-0.028	12.376	47.045	0.028	0.000%
37	-10.725	-47.045	-6.215	10.725	47.045	6.215	0.000%
38	-6.202	-47.045	-10.728	6.202	47.045	10.728	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00007390
3	Yes	6	0.00000001	0.00005571
4	Yes	6	0.00000001	0.00004969
5	Yes	5	0.00000001	0.00012491
6	Yes	6	0.00000001	0.00005497
7	Yes	6	0.00000001	0.00005355
8	Yes	5	0.00000001	0.00009224
9	Yes	6	0.00000001	0.00004987
10	Yes	6	0.00000001	0.00005639
11	Yes	5	0.00000001	0.00010594
12	Yes	6	0.00000001	0.00005198
13	Yes	6	0.00000001	0.00005288
14	Yes	4	0.00000001	0.00012756
15	Yes	5	0.00000001	0.00076297
16	Yes	5	0.00000001	0.00095889
17	Yes	5	0.00000001	0.00093889
18	Yes	5	0.00000001	0.00077538
19	Yes	5	0.00000001	0.00097285
20	Yes	5	0.00000001	0.00097484
21	Yes	5	0.00000001	0.00077974
22	Yes	5	0.00000001	0.00094453
23	Yes	5	0.00000001	0.00096346
24	Yes	5	0.00000001	0.00076317
25	Yes	5	0.00000001	0.00093373
26	Yes	5	0.00000001	0.00093303
27	Yes	4	0.00000001	0.00044791
28	Yes	5	0.00000001	0.00014036
29	Yes	5	0.00000001	0.00011394
30	Yes	4	0.00000001	0.00063064
31	Yes	5	0.00000001	0.00013576
32	Yes	5	0.00000001	0.00012933
33	Yes	4	0.00000001	0.00048021
34	Yes	5	0.00000001	0.00011478
35	Yes	5	0.00000001	0.00014350
36	Yes	4	0.00000001	0.00059548
37	Yes	5	0.00000001	0.00012165
38	Yes	5	0.00000001	0.00012566

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 116	32.741	31	1.979	0.011
L2	119.75 - 93.5	21.413	31	1.779	0.006
L3	93.5 - 74.75	12.752	31	1.305	0.003
L4	79.5 - 57.75	9.232	31	1.093	0.002
L5	57.75 - 39.5	4.874	31	0.790	0.001
L6	45 - 31.75	3.012	31	0.604	0.001
L7	31.75 - 0	1.509	31	0.458	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.000	(2) 800 10121 w/ Mount Pipe	31	32.327	1.975	0.011	24101
142.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	31	30.259	1.955	0.010	20084
126.000	P65-16-XL-R w/ Mount Pipe	31	23.804	1.853	0.007	5476
111.000	TME-800MHz 2X50W RRH W/FILTER	31	18.252	1.637	0.005	3543
109.000	APXVTM14-C-120 w/ Mount Pipe	31	17.564	1.599	0.005	3411
95.000	Detuner Mount	31	13.174	1.331	0.003	2746
81.000	SRL-227	31	9.580	1.114	0.002	4645
75.000	HP2-23	31	8.220	1.031	0.002	4674
74.000	Pipe Mount [PM 601-1]	31	8.002	1.018	0.002	4561
50.000	GPS-TMG-HR-26N	31	3.690	0.673	0.001	4737
15.000	Detuner Mount	31	0.458	0.235	0.000	6145

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 116	83.492	6	5.044	0.027
L2	119.75 - 93.5	54.649	6	4.541	0.016
L3	93.5 - 74.75	32.568	6	3.333	0.008
L4	79.5 - 57.75	23.583	6	2.792	0.005
L5	57.75 - 39.5	12.454	6	2.019	0.003
L6	45 - 31.75	7.698	6	1.544	0.002
L7	31.75 - 0	3.856	6	1.171	0.002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.000	(2) 800 10121 w/ Mount Pipe	6	82.437	5.035	0.027	9637
142.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	6	77.174	4.987	0.025	8030
126.000	P65-16-XL-R w/ Mount Pipe	6	60.740	4.727	0.019	2187
111.000	TME-800MHz 2X50W RRH W/FILTER	6	46.594	4.178	0.013	1408
109.000	APXVTM14-C-120 w/ Mount Pipe	6	44.840	4.083	0.013	1355
95.000	Detuner Mount	6	33.644	3.400	0.008	1085
81.000	SRL-227	6	24.471	2.845	0.006	1830
75.000	HP2-23	6	20.999	2.635	0.005	1840
74.000	Pipe Mount [PM 601-1]	6	20.443	2.600	0.005	1794
50.000	GPS-TMG-HR-26N	6	9.431	1.720	0.003	1858
15.000	Detuner Mount	6	1.171	0.602	0.001	2405

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	148 - 146.513	TP30.241x24x0.219	32.000	0.000	0.0	39.000	16.713	-6.117	651.805	0.009*
	146.513 - 145.026					39.000	16.914	-3.016	659.657	0.005
	145.026 - 143.539					39.000	17.116	-3.130	667.510	0.005
	143.539 - 142.053					39.000	17.317	-3.245	675.362	0.005
	142.053 - 140.566					39.000	17.518	-6.234	683.214	0.009
	140.566 - 139.079					39.000	17.720	-6.353	691.066	0.009
	139.079 - 137.592					39.000	17.921	-6.473	698.918	0.009
	137.592 - 136.105					39.000	18.122	-6.594	706.770	0.009
	136.105 - 134.618					39.000	18.324	-6.718	714.623	0.009
	134.618 - 133.132					39.000	18.525	-6.843	722.475	0.009
	133.132 - 131.645					39.000	18.726	-6.969	730.327	0.010
	131.645 - 130.158					39.000	18.928	-7.097	738.179	0.010
	130.158 - 128.671					39.000	19.129	-7.226	746.031	0.010
	128.671 - 127.184					39.000	19.330	-7.358	753.883	0.010
	127.184 - 125.697					39.000	19.532	-9.644	761.735	0.013
	125.697 - 124.211					39.000	19.733	-9.783	769.588	0.013
	124.211 - 122.724					39.000	19.934	-9.923	777.440	0.013
	122.724 - 121.237					39.000	20.136	-10.066	785.292	0.013
	121.237 - 119.75					39.000	20.337	-10.211	793.144	0.013
	119.75 - 116					39.000	20.845	-5.127	812.948	0.006
L2	119.75 - 116	TP34.191x29.072x0.25	26.250	0.000	0.0	39.000	23.451	-5.728	914.573	0.006
	116 - 114.816					39.000	23.634	-11.005	921.720	0.012
	114.816 - 113.632					39.000	23.817	-11.151	928.866	0.012
	113.632 - 112.447					39.000	24.000	-11.299	936.012	0.012
	112.447 - 111.263					39.000	24.184	-11.448	943.158	0.012
	111.263 - 110.079					39.000	24.367	-12.108	950.304	0.013
	110.079 - 108.895					39.000	24.550	-15.029	957.450	0.016
	108.895 - 107.711					39.000	24.733	-15.186	964.596	0.016
	107.711 -					39.000	24.917	-15.345	971.742	0.016

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 $\frac{P}{P_a}$
	106.526									
	106.526 - 105.342					39.000	25.100	-15.506	978.888	0.016
	105.342 - 104.158					39.000	25.283	-15.668	986.034	0.016
	104.158 - 102.974					39.000	25.466	-15.832	993.180	0.016
	102.974 - 101.789					39.000	25.649	-15.996	1000.330	0.016
	101.789 - 100.605					39.000	25.833	-16.163	1007.470	0.016
	100.605 - 99.4211					39.000	26.016	-16.331	1014.620	0.016
	99.4211 - 98.2368					39.000	26.199	-16.500	1021.760	0.016
	98.2368 - 97.0526					39.000	26.382	-16.670	1028.910	0.016
	97.0526 - 95.8684					39.000	26.566	-16.842	1036.060	0.016
	95.8684 - 94.6842					39.000	26.749	-17.204	1043.200	0.016
	94.6842 - 93.5					39.000	26.932	-17.378	1050.350	0.017
L3	93.5 - 92.5	TP37.847x34.191x0.421	18.750	0.000	0.0	31.652	45.344	-17.582	1435.240	0.012
	92.5 - 91.5					31.652	45.605	-17.780	1443.480	0.012
	91.5 - 90.5					31.652	45.865	-17.979	1451.720	0.012
	90.5 - 89.5					31.652	46.125	-18.179	1459.960	0.012
	89.5 - 88.5					31.652	46.386	-18.381	1468.200	0.013
	88.5 - 87.5					31.652	46.646	-18.583	1476.440	0.013
	87.5 - 86.5					31.652	46.906	-18.786	1484.680	0.013
	86.5 - 85.5					31.652	47.167	-18.991	1492.920	0.013
	85.5 - 84.5					31.652	47.427	-19.196	1501.160	0.013
	84.5 - 83.5					31.652	47.687	-19.403	1509.400	0.013
	83.5 - 82.5					31.652	47.947	-19.610	1517.640	0.013
	82.5 - 81.5					31.652	48.208	-19.819	1525.880	0.013
	81.5 - 80.5					31.652	48.468	-20.228	1534.120	0.013
	80.5 - 79.5					31.652	48.729	-20.439	1542.360	0.013
	79.5 - 74.75					31.652	49.965	-10.691	1581.490	0.007
L4	79.5 - 74.75	TP40.663x36.421x0.467	21.750	0.000	0.0	31.697	54.642	-11.581	1732.010	0.007
	74.75 - 73.75					31.697	54.931	-22.581	1741.170	0.013
	73.75 - 72.75					31.697	55.220	-22.816	1750.330	0.013
	72.75 - 71.75					31.697	55.509	-23.052	1759.490	0.013
	71.75 - 70.75					31.697	55.798	-23.290	1768.650	0.013
	70.75 - 69.75					31.697	56.087	-23.528	1777.810	0.013
	69.75 - 68.75					31.697	56.376	-23.767	1786.970	0.013
	68.75 - 67.75					31.697	56.665	-24.008	1796.130	0.013
	67.75 - 66.75					31.697	56.954	-24.250	1805.290	0.013
	66.75 - 65.75					31.697	57.243	-24.493	1814.450	0.013
	65.75 - 64.75					31.697	57.532	-24.736	1823.610	0.014
	64.75 - 63.75					31.697	57.821	-24.982	1832.770	0.014
	63.75 - 62.75					31.697	58.110	-25.228	1841.930	0.014
	62.75 - 61.75					31.697	58.399	-25.475	1851.080	0.014
	61.75 - 60.75					31.697	58.688	-25.723	1860.240	0.014
	60.75 - 59.75					31.697	58.977	-25.973	1869.400	0.014
	59.75 - 58.75					31.697	59.266	-26.224	1878.560	0.014
	58.75 - 57.75					31.697	59.555	-26.475	1887.720	0.014
L5	57.75 - 56.6875	TP44.222x40.663x0.511	18.250	0.000	0.0	32.067	65.486	-26.761	2099.950	0.013
	56.6875 - 55.625					32.067	65.822	-27.047	2110.730	0.013
	55.625 - 54.5625					32.067	66.158	-27.335	2121.510	0.013
	54.5625 - 53.5					32.067	66.494	-27.624	2132.290	0.013
	53.5 - 52.4375					32.067	66.831	-27.915	2143.070	0.013

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
	52.4375 - 51.375					32.067	67.167	-28.206	2153.860	0.013
	51.375 - 50.3125					32.067	67.503	-28.500	2164.640	0.013
	50.3125 - 49.25					32.067	67.839	-29.078	2175.420	0.013
	49.25 - 48.1875					32.067	68.176	-29.374	2186.200	0.013
	48.1875 - 47.125					32.067	68.512	-29.671	2196.980	0.014
	47.125 - 46.0625					32.067	68.848	-29.970	2207.770	0.014
	46.0625 - 45					32.067	69.184	-30.269	2218.550	0.014
	45 - 39.5					32.067	70.925	-15.927	2274.360	0.007
L6	45 - 39.5	TP45.108x42.524x0.565	13.250	0.000	0.0	32.118	77.226	-17.232	2480.360	0.007
	39.5 - 38.3929					32.118	77.613	-33.519	2492.800	0.013
	38.3929 - 37.2857					32.118	78.001	-33.864	2505.250	0.014
	37.2857 - 36.1786					32.118	78.388	-34.211	2517.690	0.014
	36.1786 - 35.0714					32.118	78.776	-34.560	2530.140	0.014
	35.0714 - 33.9643					32.118	79.163	-34.910	2542.580	0.014
	33.9643 - 32.8571					32.118	79.551	-35.261	2555.030	0.014
	32.8571 - 31.75					32.118	79.938	-35.614	2567.470	0.014
L7	31.75 - 30.1625	TP51.3x45.108x0.522	31.750	0.000	0.0	35.935	74.320	-36.139	2670.660	0.014
	30.1625 - 28.575					35.935	74.833	-36.673	2689.070	0.014
	28.575 - 26.9875					35.935	75.345	-37.210	2707.490	0.014
	26.9875 - 25.4					35.935	75.858	-37.751	2725.910	0.014
	25.4 - 23.8125					35.935	76.370	-38.294	2744.320	0.014
	23.8125 - 22.225					35.935	76.883	-38.841	2762.740	0.014
	22.225 - 20.6375					35.935	77.395	-39.391	2781.150	0.014
	20.6375 - 19.05					35.935	77.908	-39.944	2799.570	0.014
	19.05 - 17.4625					35.935	78.420	-40.501	2817.980	0.014
	17.4625 - 15.875					35.935	78.933	-41.060	2836.400	0.014
	15.875 - 14.2875					35.935	79.445	-41.818	2854.820	0.015
	14.2875 - 12.7					35.935	79.957	-42.384	2873.230	0.015
	12.7 - 11.1125					35.935	80.470	-42.953	2891.650	0.015
	11.1125 - 9.525					35.935	80.982	-43.526	2910.060	0.015
	9.525 - 7.9375					35.935	81.495	-44.102	2928.480	0.015
	7.9375 - 6.35					35.935	82.007	-44.681	2946.890	0.015
	6.35 - 4.7625					35.935	82.520	-45.263	2965.310	0.015
	4.7625 - 3.175					35.935	83.032	-45.848	2983.730	0.015
	3.175 - 1.5875					35.935	83.545	-46.437	3002.140	0.015
	1.5875 - 0					35.935	84.057	-47.029	3020.560	0.016

* DL controls

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	148 - 146.513	TP30.241x24x0.219	2.004	0.242	39.000	0.006	0.000	0.000	39.000	0.000
	146.513 - 145.026		9.790	1.157	39.000	0.030	0.000	0.000	39.000	0.000
	145.026 - 143.539		16.596	1.915	39.000	0.049	0.000	0.000	39.000	0.000
	143.539 - 142.053		23.565	2.656	39.000	0.068	0.000	0.000	39.000	0.000
	142.053 - 140.566		40.351	4.443	39.000	0.114	0.000	0.000	39.000	0.000
	140.566 - 139.079		54.616	5.877	39.000	0.151	0.000	0.000	39.000	0.000
	139.079 - 137.592		69.047	7.264	39.000	0.186	0.000	0.000	39.000	0.000
	137.592 - 136.105		83.643	8.604	39.000	0.221	0.000	0.000	39.000	0.000
	136.105 - 134.618		98.406	9.900	39.000	0.254	0.000	0.000	39.000	0.000
	134.618 - 133.132		113.336	11.155	39.000	0.286	0.000	0.000	39.000	0.000
	133.132 - 131.645		128.434	12.369	39.000	0.317	0.000	0.000	39.000	0.000
	131.645 - 130.158		143.700	13.546	39.000	0.347	0.000	0.000	39.000	0.000
	130.158 - 128.671		159.137	14.685	39.000	0.377	0.000	0.000	39.000	0.000
	128.671 - 127.184		174.743	15.790	39.000	0.405	0.000	0.000	39.000	0.000
	127.184 - 125.697		196.690	17.407	39.000	0.446	0.000	0.000	39.000	0.000
	125.697 - 124.211		220.653	19.130	39.000	0.491	0.000	0.000	39.000	0.000
	124.211 - 122.724		244.784	20.794	39.000	0.533	0.000	0.000	39.000	0.000
	122.724 - 121.237		269.086	22.402	39.000	0.574	0.000	0.000	39.000	0.000
	121.237 - 119.75		293.557	23.956	39.000	0.614	0.000	0.000	39.000	0.000
	119.75 - 116		170.468	13.239	39.000	0.339	0.000	0.000	39.000	0.000
L2	119.75 - 116	TP34.191x29.072x0.25	185.631	13.033	39.000	0.334	0.000	0.000	39.000	0.000
	116 - 114.816		376.096	25.997	39.000	0.667	0.000	0.000	39.000	0.000
	114.816 - 113.632		396.199	26.965	39.000	0.691	0.000	0.000	39.000	0.000
	113.632 - 112.447		416.409	27.907	39.000	0.716	0.000	0.000	39.000	0.000
	112.447 - 111.263		436.726	28.825	39.000	0.739	0.000	0.000	39.000	0.000
	111.263 - 110.079		458.434	29.803	39.000	0.764	0.000	0.000	39.000	0.000
	110.079 - 108.895		483.682	30.975	39.000	0.794	0.000	0.000	39.000	0.000
	108.895 - 107.711		509.787	32.163	39.000	0.825	0.000	0.000	39.000	0.000
	107.711 - 106.526		535.996	33.319	39.000	0.854	0.000	0.000	39.000	0.000
	106.526 - 105.342		562.308	34.444	39.000	0.883	0.000	0.000	39.000	0.000
	105.342 -		588.726	35.539	39.000	0.911	0.000	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	104.158									
	104.158 - 102.974		615.247	36.605	39.000	0.939	0.000	0.000	39.000	0.000
	102.974 - 101.789		641.872	37.644	39.000	0.965	0.000	0.000	39.000	0.000
	101.789 - 100.605		668.602	38.655	39.000	0.991	0.000	0.000	39.000	0.000
	100.605 - 99.4211		695.435	39.640	39.000	1.016	0.000	0.000	39.000	0.000
	99.4211 - 98.2368		722.372	40.599	39.000	1.041	0.000	0.000	39.000	0.000
	98.2368 - 97.0526		749.415	41.534	39.000	1.065	0.000	0.000	39.000	0.000
	97.0526 - 95.8684		776.562	42.445	39.000	1.088	0.000	0.000	39.000	0.000
	95.8684 - 94.6842		803.849	43.334	39.000	1.111	0.000	0.000	39.000	0.000
	94.6842 - 93.5		831.343	44.206	39.000	1.133	0.000	0.000	39.000	0.000
L3	93.5 - 92.5	TP37.847x34.191x0.421	854.650	27.107	31.652	0.856	0.000	0.000	31.652	0.000
	92.5 - 91.5		878.042	27.530	31.652	0.870	0.000	0.000	31.652	0.000
	91.5 - 90.5		901.525	27.945	31.652	0.883	0.000	0.000	31.652	0.000
	90.5 - 89.5		925.100	28.351	31.652	0.896	0.000	0.000	31.652	0.000
	89.5 - 88.5		948.767	28.748	31.652	0.908	0.000	0.000	31.652	0.000
	88.5 - 87.5		972.517	29.138	31.652	0.921	0.000	0.000	31.652	0.000
	87.5 - 86.5		996.358	29.520	31.652	0.933	0.000	0.000	31.652	0.000
	86.5 - 85.5		1020.292	29.895	31.652	0.944	0.000	0.000	31.652	0.000
	85.5 - 84.5		1044.317	30.261	31.652	0.956	0.000	0.000	31.652	0.000
	84.5 - 83.5		1068.425	30.621	31.652	0.967	0.000	0.000	31.652	0.000
	83.5 - 82.5		1092.633	30.974	31.652	0.979	0.000	0.000	31.652	0.000
	82.5 - 81.5		1116.925	31.319	31.652	0.989	0.000	0.000	31.652	0.000
	81.5 - 80.5		1141.133	31.654	31.652	1.000	0.000	0.000	31.652	0.000
	80.5 - 79.5		1166.008	31.997	31.652	1.011	0.000	0.000	31.652	0.000
	79.5 - 74.75		623.750	16.275	31.652	0.514	0.000	0.000	31.652	0.000
L4	79.5 - 74.75	TP40.663x36.421x0.467	661.830	16.047	31.697	0.506	0.000	0.000	31.697	0.000
	74.75 - 73.75		1311.092	31.453	31.697	0.992	0.000	0.000	31.697	0.000
	73.75 - 72.75		1336.800	31.733	31.697	1.001	0.000	0.000	31.697	0.000
	72.75 - 71.75		1362.583	32.008	31.697	1.010	0.000	0.000	31.697	0.000
	71.75 - 70.75		1388.458	32.276	31.697	1.018	0.000	0.000	31.697	0.000
	70.75 - 69.75		1414.417	32.540	31.697	1.027	0.000	0.000	31.697	0.000
	69.75 - 68.75		1440.458	32.798	31.697	1.035	0.000	0.000	31.697	0.000
	68.75 - 67.75		1466.592	33.051	31.697	1.043	0.000	0.000	31.697	0.000
	67.75 - 66.75		1492.808	33.300	31.697	1.051	0.000	0.000	31.697	0.000
	66.75 - 65.75		1519.108	33.543	31.697	1.058	0.000	0.000	31.697	0.000
	65.75 - 64.75		1545.500	33.782	31.697	1.066	0.000	0.000	31.697	0.000
	64.75 - 63.75		1571.96	34.016	31.697	1.073	0.000	0.000	31.697	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
			7							
	63.75 - 62.75		1598.53	34.245	31.697	1.080	0.000	0.000	31.697	0.000
			3							
	62.75 - 61.75		1625.17	34.470	31.697	1.087	0.000	0.000	31.697	0.000
			5							
	61.75 - 60.75		1651.90	34.691	31.697	1.094	0.000	0.000	31.697	0.000
			8							
	60.75 - 59.75		1678.72	34.908	31.697	1.101	0.000	0.000	31.697	0.000
			5							
	59.75 - 58.75		1705.63	35.120	31.697	1.108	0.000	0.000	31.697	0.000
			3							
	58.75 - 57.75		1732.62	35.329	31.697	1.115	0.000	0.000	31.697	0.000
			5							
L5	57.75 -	TP44.222x40.663x0.511	1761.40	32.565	32.067	1.016	0.000	0.000	32.067	0.000
	56.6875		0							
	56.6875 -		1790.26	32.759	32.067	1.022	0.000	0.000	32.067	0.000
	55.625		7							
	55.625 -		1819.21	32.949	32.067	1.028	0.000	0.000	32.067	0.000
	54.5625		7							
	54.5625 - 53.5		1848.26	33.136	32.067	1.033	0.000	0.000	32.067	0.000
			7							
	53.5 - 52.4375		1877.40	33.318	32.067	1.039	0.000	0.000	32.067	0.000
			8							
	52.4375 -		1906.64	33.497	32.067	1.045	0.000	0.000	32.067	0.000
	51.375		2							
	51.375 -		1935.96	33.672	32.067	1.050	0.000	0.000	32.067	0.000
	50.3125		7							
	50.3125 -		1965.30	33.842	32.067	1.055	0.000	0.000	32.067	0.000
	49.25		0							
	49.25 -		1994.99	34.014	32.067	1.061	0.000	0.000	32.067	0.000
	48.1875		2							
	48.1875 -		2024.78	34.182	32.067	1.066	0.000	0.000	32.067	0.000
	47.125		3							
	47.125 -		2054.66	34.346	32.067	1.071	0.000	0.000	32.067	0.000
	46.0625		7							
	46.0625 - 45		2084.63	34.507	32.067	1.076	0.000	0.000	32.067	0.000
			3							
	45 - 39.5		1091.08	17.180	32.067	0.536	0.000	0.000	32.067	0.000
			3							
L6	45 - 39.5	TP45.108x42.524x0.565	1150.46	16.924	32.118	0.527	0.000	0.000	32.118	0.000
			7							
	39.5 - 38.3929		2273.48	33.109	32.118	1.031	0.000	0.000	32.118	0.000
			3							
	38.3929 -		2305.52	33.241	32.118	1.035	0.000	0.000	32.118	0.000
	37.2857		5							
	37.2857 -		2337.65	33.369	32.118	1.039	0.000	0.000	32.118	0.000
	36.1786		8							
	36.1786 -		2369.89	33.495	32.118	1.043	0.000	0.000	32.118	0.000
	35.0714		2							
	35.0714 -		2402.21	33.619	32.118	1.047	0.000	0.000	32.118	0.000
	33.9643		7							
	33.9643 -		2434.65	33.739	32.118	1.050	0.000	0.000	32.118	0.000
	32.8571		0							
	32.8571 -		2467.17	33.857	32.118	1.054	0.000	0.000	32.118	0.000
	31.75		5							
L7	31.75 -	TP51.3x45.108x0.522	2513.97	36.776	35.935	1.023	0.000	0.000	35.935	0.000
	30.1625		5							
	30.1625 -		2560.95	36.949	35.935	1.028	0.000	0.000	35.935	0.000
	28.575		0							
	28.575 -		2608.10	37.116	35.935	1.033	0.000	0.000	35.935	0.000
	26.9875		0							
	26.9875 - 25.4		2655.43	37.278	35.935	1.037	0.000	0.000	35.935	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	25.4 - 23.8125		2702.943	37.435	35.935	1.042	0.000	0.000	35.935	0.000
	23.8125 - 22.225		2750.632	37.586	35.935	1.046	0.000	0.000	35.935	0.000
	22.225 - 20.6375		2798.503	37.733	35.935	1.050	0.000	0.000	35.935	0.000
	20.6375 - 19.05		2846.542	37.875	35.935	1.054	0.000	0.000	35.935	0.000
	19.05 - 17.4625		2894.767	38.012	35.935	1.058	0.000	0.000	35.935	0.000
	17.4625 - 15.875		2943.167	38.144	35.935	1.061	0.000	0.000	35.935	0.000
	15.875 - 14.2875		2991.800	38.273	35.935	1.065	0.000	0.000	35.935	0.000
	14.2875 - 12.7		3040.683	38.399	35.935	1.069	0.000	0.000	35.935	0.000
	12.7 - 11.1125		3089.750	38.521	35.935	1.072	0.000	0.000	35.935	0.000
	11.1125 - 9.525		3138.983	38.638	35.935	1.075	0.000	0.000	35.935	0.000
	9.525 - 7.9375		3188.403	38.752	35.935	1.078	0.000	0.000	35.935	0.000
	7.9375 - 6.35		3237.992	38.862	35.935	1.081	0.000	0.000	35.935	0.000
	6.35 - 4.7625		3287.767	38.968	35.935	1.084	0.000	0.000	35.935	0.000
	4.7625 - 3.175		3337.717	39.071	35.935	1.087	0.000	0.000	35.935	0.000
	3.175 - 1.5875		3387.842	39.170	35.935	1.090	0.000	0.000	35.935	0.000
	1.5875 - 0		3438.142	39.266	35.935	1.093	0.000	0.000	35.935	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	148 - 146.513	TP30.241x24x0.219	0.004	0.000	26.000	0.000	0.000	0.000	26.000	0.000
	146.513 - 145.026		4.521	0.267	26.000	0.021	0.057	0.003	26.000	0.000
	145.026 - 143.539		4.630	0.271	26.000	0.021	0.057	0.003	26.000	0.000
	143.539 - 142.053		4.740	0.274	26.000	0.021	0.057	0.003	26.000	0.000
	142.053 - 140.566		9.537	0.544	26.000	0.042	0.057	0.003	26.000	0.000
	140.566 - 139.079		9.648	0.544	26.000	0.042	0.057	0.003	26.000	0.000
	139.079 - 137.592		9.760	0.545	26.000	0.042	0.057	0.003	26.000	0.000
	137.592 - 136.105		9.872	0.545	26.000	0.042	0.057	0.003	26.000	0.000
	136.105 - 134.618		9.984	0.545	26.000	0.042	0.057	0.003	26.000	0.000
	134.618 - 133.132		10.097	0.545	26.000	0.042	0.057	0.003	26.000	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 $\frac{f_{vt}}{F_{vt}}$
	133.132 - 131.645		10.210	0.545	26.000	0.042	0.057	0.003	26.000	0.000
	131.645 - 130.158		10.324	0.545	26.000	0.042	0.057	0.003	26.000	0.000
	130.158 - 128.671		10.439	0.546	26.000	0.042	0.057	0.003	26.000	0.000
	128.671 - 127.184		10.554	0.546	26.000	0.042	0.057	0.003	26.000	0.000
	127.184 - 125.697		16.061	0.822	26.000	0.063	0.453	0.020	26.000	0.001
	125.697 - 124.211		16.175	0.820	26.000	0.063	0.453	0.019	26.000	0.001
	124.211 - 122.724		16.289	0.817	26.000	0.063	0.453	0.019	26.000	0.001
	122.724 - 121.237		16.403	0.815	26.000	0.063	0.453	0.018	26.000	0.001
	121.237 - 119.75		16.518	0.812	26.000	0.062	0.452	0.018	26.000	0.001
	119.75 - 116		8.138	0.390	26.000	0.030	0.216	0.008	26.000	0.000
L2	119.75 - 116	TP34.191x29.072x0.25	8.708	0.371	26.000	0.029	0.236	0.008	26.000	0.000
	116 - 114.816		16.933	0.716	26.000	0.055	0.452	0.015	26.000	0.001
	114.816 - 113.632		17.023	0.715	26.000	0.055	0.452	0.015	26.000	0.001
	113.632 - 112.447		17.114	0.713	26.000	0.055	0.452	0.015	26.000	0.001
	112.447 - 111.263		17.205	0.711	26.000	0.055	0.452	0.015	26.000	0.001
	111.263 - 110.079		18.095	0.743	26.000	0.057	0.451	0.014	26.000	0.001
	110.079 - 108.895		22.005	0.896	26.000	0.069	1.964	0.061	26.000	0.002
	108.895 - 107.711		22.093	0.893	26.000	0.069	1.963	0.060	26.000	0.002
	107.711 - 106.526		22.181	0.890	26.000	0.068	1.963	0.060	26.000	0.002
	106.526 - 105.342		22.270	0.887	26.000	0.068	1.963	0.059	26.000	0.002
	105.342 - 104.158		22.358	0.884	26.000	0.068	1.962	0.058	26.000	0.002
	104.158 - 102.974		22.446	0.881	26.000	0.068	1.962	0.057	26.000	0.002
	102.974 - 101.789		22.534	0.879	26.000	0.068	1.962	0.056	26.000	0.002
	101.789 - 100.605		22.622	0.876	26.000	0.067	1.961	0.055	26.000	0.002
	100.605 - 99.4211		22.711	0.873	26.000	0.067	1.961	0.055	26.000	0.002
	99.4211 - 98.2368		22.799	0.870	26.000	0.067	1.961	0.054	26.000	0.002
	98.2368 - 97.0526		22.887	0.868	26.000	0.067	1.960	0.053	26.000	0.002
	97.0526 - 95.8684		22.976	0.865	26.000	0.067	1.960	0.052	26.000	0.002
	95.8684 - 94.6842		23.181	0.867	26.000	0.067	1.960	0.052	26.000	0.002
	94.6842 - 93.5		23.270	0.864	26.000	0.066	1.959	0.051	26.000	0.002
L3	93.5 - 92.5	TP37.847x34.191x0.421	23.353	0.515	21.101	0.049	1.959	0.030	21.101	0.001
	92.5 - 91.5		23.442	0.514	21.101	0.049	1.958	0.030	21.101	0.001
	91.5 - 90.5		23.532	0.513	21.101	0.049	1.956	0.029	21.101	0.001
	90.5 - 89.5		23.621	0.512	21.101	0.049	1.955	0.029	21.101	0.001
	89.5 - 88.5		23.711	0.511	21.101	0.048	1.953	0.029	21.101	0.001
	88.5 - 87.5		23.801	0.510	21.101	0.048	1.952	0.028	21.101	0.001

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	87.5 - 86.5		23.891	0.509	21.101	0.048	1.950	0.028	21.101	0.001
	86.5 - 85.5		23.982	0.508	21.101	0.048	1.949	0.028	21.101	0.001
	85.5 - 84.5		24.072	0.508	21.101	0.048	1.947	0.027	21.101	0.001
	84.5 - 83.5		24.163	0.507	21.101	0.048	1.946	0.027	21.101	0.001
	83.5 - 82.5		24.254	0.506	21.101	0.048	1.944	0.027	21.101	0.001
	82.5 - 81.5		24.345	0.505	21.101	0.048	1.943	0.026	21.101	0.001
	81.5 - 80.5		24.832	0.512	21.101	0.049	1.941	0.026	21.101	0.001
	80.5 - 79.5		24.923	0.511	21.101	0.048	1.692	0.023	21.101	0.001
	79.5 - 74.75		12.558	0.251	21.101	0.024	0.825	0.010	21.101	0.000
L4	79.5 - 74.75	TP40.663x36.421x0.467	12.982	0.238	21.131	0.022	0.866	0.010	21.131	0.000
	74.75 - 73.75		25.667	0.467	21.131	0.044	1.576	0.018	21.131	0.001
	73.75 - 72.75		25.752	0.466	21.131	0.044	1.519	0.018	21.131	0.001
	72.75 - 71.75		25.837	0.465	21.131	0.044	1.518	0.017	21.131	0.001
	71.75 - 70.75		25.922	0.465	21.131	0.044	1.516	0.017	21.131	0.001
	70.75 - 69.75		26.007	0.464	21.131	0.044	1.515	0.017	21.131	0.001
	69.75 - 68.75		26.093	0.463	21.131	0.044	1.513	0.017	21.131	0.001
	68.75 - 67.75		26.179	0.462	21.131	0.044	1.512	0.017	21.131	0.001
	67.75 - 66.75		26.264	0.461	21.131	0.044	1.510	0.016	21.131	0.001
	66.75 - 65.75		26.350	0.460	21.131	0.044	1.509	0.016	21.131	0.001
	65.75 - 64.75		26.436	0.460	21.131	0.043	1.507	0.016	21.131	0.001
	64.75 - 63.75		26.523	0.459	21.131	0.043	1.506	0.016	21.131	0.001
	63.75 - 62.75		26.609	0.458	21.131	0.043	1.504	0.016	21.131	0.001
	62.75 - 61.75		26.696	0.457	21.131	0.043	1.503	0.015	21.131	0.001
	61.75 - 60.75		26.782	0.456	21.131	0.043	1.501	0.015	21.131	0.001
	60.75 - 59.75		26.869	0.456	21.131	0.043	1.500	0.015	21.131	0.001
	59.75 - 58.75		26.956	0.455	21.131	0.043	1.498	0.015	21.131	0.001
	58.75 - 57.75		27.043	0.454	21.131	0.043	1.496	0.015	21.131	0.001
L5	57.75 - 56.6875	TP44.222x40.663x0.511	27.130	0.414	21.378	0.039	1.495	0.013	21.378	0.001
	56.6875 - 55.625		27.216	0.413	21.378	0.039	1.493	0.013	21.378	0.001
	55.625 - 54.5625		27.303	0.413	21.378	0.039	1.491	0.013	21.378	0.001
	54.5625 - 53.5		27.390	0.412	21.378	0.039	1.489	0.013	21.378	0.001
	53.5 - 52.4375		27.477	0.411	21.378	0.038	1.487	0.013	21.378	0.001
	52.4375 - 51.375		27.564	0.410	21.378	0.038	1.485	0.013	21.378	0.001
	51.375 - 50.3125		27.652	0.410	21.378	0.038	1.484	0.013	21.378	0.001
	50.3125 - 49.25		27.912	0.411	21.378	0.038	1.482	0.012	21.378	0.001
	49.25 - 48.1875		27.999	0.411	21.378	0.038	1.147	0.010	21.378	0.000
	48.1875 - 47.125		28.087	0.410	21.378	0.038	1.145	0.009	21.378	0.000
	47.125 - 46.0625		28.174	0.409	21.378	0.038	1.143	0.009	21.378	0.000
	46.0625 - 45		28.262	0.408	21.378	0.038	1.142	0.009	21.378	0.000
	45 - 39.5		14.167	0.200	21.378	0.019	0.557	0.004	21.378	0.000
L6	45 - 39.5	TP45.108x42.524x0.565	14.662	0.190	21.412	0.018	0.582	0.004	21.412	0.000
	39.5 - 38.3929		28.900	0.372	21.412	0.035	1.130	0.008	21.412	0.000
	38.3929 - 37.2857		28.988	0.372	21.412	0.035	1.127	0.008	21.412	0.000
	37.2857 - 36.1786		29.077	0.371	21.412	0.035	1.124	0.008	21.412	0.000
	36.1786 - 35.0714		29.165	0.370	21.412	0.035	1.121	0.008	21.412	0.000
	35.0714 - 33.9643		29.254	0.370	21.412	0.035	1.118	0.008	21.412	0.000
	33.9643 - 32.8571		29.343	0.369	21.412	0.034	1.115	0.008	21.412	0.000
	32.8571 -		29.432	0.368	21.412	0.034	1.113	0.007	21.412	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 $\frac{f_{vt}}{F_{vt}}$
	31.75									
L7	31.75 - 30.1625	TP51.3x45.108x0.522	29.551	0.398	23.956	0.033	1.110	0.008	23.956	0.000
	30.1625 - 28.575		29.663	0.396	23.956	0.033	1.106	0.008	23.956	0.000
	28.575 - 26.9875		29.775	0.395	23.956	0.033	1.103	0.008	23.956	0.000
	26.9875 - 25.4		29.888	0.394	23.956	0.033	1.099	0.008	23.956	0.000
	25.4 - 23.8125		30.000	0.393	23.956	0.033	1.096	0.007	23.956	0.000
	23.8125 - 22.225		30.112	0.392	23.956	0.033	1.092	0.007	23.956	0.000
	22.225 - 20.6375		30.225	0.391	23.956	0.033	1.089	0.007	23.956	0.000
	20.6375 - 19.05		30.337	0.389	23.956	0.033	1.085	0.007	23.956	0.000
	19.05 - 17.4625		30.449	0.388	23.956	0.032	1.082	0.007	23.956	0.000
	17.4625 - 15.875		30.562	0.387	23.956	0.032	1.078	0.007	23.956	0.000
	15.875 - 14.2875		30.754	0.387	23.956	0.032	1.075	0.007	23.956	0.000
	14.2875 - 12.7		30.866	0.386	23.956	0.032	1.071	0.007	23.956	0.000
	12.7 - 11.1125		30.979	0.385	23.956	0.032	1.067	0.006	23.956	0.000
	11.1125 - 9.525		31.091	0.384	23.956	0.032	1.064	0.006	23.956	0.000
	9.525 - 7.9375		31.203	0.383	23.956	0.032	1.060	0.006	23.956	0.000
	7.9375 - 6.35		31.315	0.382	23.956	0.032	1.056	0.006	23.956	0.000
	6.35 - 4.7625		31.427	0.381	23.956	0.032	1.053	0.006	23.956	0.000
	4.7625 - 3.175		31.539	0.380	23.956	0.032	1.049	0.006	23.956	0.000
	3.175 - 1.5875		31.651	0.379	23.956	0.032	1.045	0.006	23.956	0.000
	1.5875 - 0		31.763	0.378	23.956	0.032	1.041	0.006	23.956	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{bv}}{F_{bv}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	148 - 146.513	0.009	0.006	0.000	0.000	0.000	0.016* ✓	1.000	H1-3+VT ✓
	146.513 - 145.026	0.005	0.030	0.000	0.021	0.000	0.034 ✓	1.333	H1-3+VT ✓
	145.026 - 143.539	0.005	0.049	0.000	0.021	0.000	0.054 ✓	1.333	H1-3+VT ✓
	143.539 - 142.053	0.005	0.068	0.000	0.021	0.000	0.073 ✓	1.333	H1-3+VT ✓
	142.053 - 140.566	0.009	0.114	0.000	0.042	0.000	0.123 ✓	1.333	H1-3+VT ✓
	140.566 - 139.079	0.009	0.151	0.000	0.042	0.000	0.160 ✓	1.333	H1-3+VT ✓
	139.079 - 137.592	0.009	0.186	0.000	0.042	0.000	0.196 ✓	1.333	H1-3+VT ✓
	137.592 - 136.105	0.009	0.221	0.000	0.042	0.000	0.230 ✓	1.333	H1-3+VT ✓
	136.105 - 134.618	0.009	0.254	0.000	0.042	0.000	0.264 ✓	1.333	H1-3+VT ✓

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{bv}}{F_{bv}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	134.618 - 133.132	0.009	0.286	0.000	0.042	0.000	0.296 ✓	1.333	H1-3+VT ✓
	133.132 - 131.645	0.010	0.317	0.000	0.042	0.000	0.327 ✓	1.333	H1-3+VT ✓
	131.645 - 130.158	0.010	0.347	0.000	0.042	0.000	0.357 ✓	1.333	H1-3+VT ✓
	130.158 - 128.671	0.010	0.377	0.000	0.042	0.000	0.387 ✓	1.333	H1-3+VT ✓
	128.671 - 127.184	0.010	0.405	0.000	0.042	0.000	0.415 ✓	1.333	H1-3+VT ✓
	127.184 - 125.697	0.013	0.446	0.000	0.063	0.001	0.460 ✓	1.333	H1-3+VT ✓
	125.697 - 124.211	0.013	0.491	0.000	0.063	0.001	0.504 ✓	1.333	H1-3+VT ✓
	124.211 - 122.724	0.013	0.533	0.000	0.063	0.001	0.547 ✓	1.333	H1-3+VT ✓
	122.724 - 121.237	0.013	0.574	0.000	0.063	0.001	0.588 ✓	1.333	H1-3+VT ✓
	121.237 - 119.75	0.013	0.614	0.000	0.062	0.001	0.628 ✓	1.333	H1-3+VT ✓
	119.75 - 116	0.006	0.339	0.000	0.030	0.000	0.346 ✓	1.333	H1-3+VT ✓
L2	119.75 - 116	0.006	0.334	0.000	0.029	0.000	0.341 ✓	1.333	H1-3+VT ✓
	116 - 114.816	0.012	0.667	0.000	0.055	0.001	0.679 ✓	1.333	H1-3+VT ✓
	114.816 - 113.632	0.012	0.691	0.000	0.055	0.001	0.704 ✓	1.333	H1-3+VT ✓
	113.632 - 112.447	0.012	0.716	0.000	0.055	0.001	0.728 ✓	1.333	H1-3+VT ✓
	112.447 - 111.263	0.012	0.739	0.000	0.055	0.001	0.752 ✓	1.333	H1-3+VT ✓
	111.263 - 110.079	0.013	0.764	0.000	0.057	0.001	0.778 ✓	1.333	H1-3+VT ✓
	110.079 - 108.895	0.016	0.794	0.000	0.069	0.002	0.811 ✓	1.333	H1-3+VT ✓
	108.895 - 107.711	0.016	0.825	0.000	0.069	0.002	0.842 ✓	1.333	H1-3+VT ✓
	107.711 - 106.526	0.016	0.854	0.000	0.068	0.002	0.871 ✓	1.333	H1-3+VT ✓
	106.526 - 105.342	0.016	0.883	0.000	0.068	0.002	0.900 ✓	1.333	H1-3+VT ✓
	105.342 - 104.158	0.016	0.911	0.000	0.068	0.002	0.928 ✓	1.333	H1-3+VT ✓
	104.158 - 102.974	0.016	0.939	0.000	0.068	0.002	0.956 ✓	1.333	H1-3+VT ✓
	102.974 - 101.789	0.016	0.965	0.000	0.068	0.002	0.983 ✓	1.333	H1-3+VT ✓
	101.789 - 100.605	0.016	0.991	0.000	0.067	0.002	1.008 ✓	1.333	H1-3+VT ✓
	100.605 - 99.4211	0.016	1.016	0.000	0.067	0.002	1.034 ✓	1.333	H1-3+VT ✓
	99.4211 - 98.2368	0.016	1.041	0.000	0.067	0.002	1.058	1.333	H1-3+VT ✓

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
	98.2368 - 97.0526	0.016	1.065	0.000	0.067	0.002	1.082	1.333	H1-3+VT
	97.0526 - 95.8684	0.016	1.088	0.000	0.067	0.002	1.106	1.333	H1-3+VT
	95.8684 - 94.6842	0.016	1.111	0.000	0.067	0.002	1.129	1.333	H1-3+VT
	94.6842 - 93.5	0.017	1.133	0.000	0.066	0.002	1.151	1.333	H1-3+VT
L3	93.5 - 92.5	0.012	0.856	0.000	0.049	0.001	0.869	1.333	H1-3+VT
	92.5 - 91.5	0.012	0.870	0.000	0.049	0.001	0.883	1.333	H1-3+VT
	91.5 - 90.5	0.012	0.883	0.000	0.049	0.001	0.896	1.333	H1-3+VT
	90.5 - 89.5	0.012	0.896	0.000	0.049	0.001	0.909	1.333	H1-3+VT
	89.5 - 88.5	0.013	0.908	0.000	0.048	0.001	0.921	1.333	H1-3+VT
	88.5 - 87.5	0.013	0.921	0.000	0.048	0.001	0.934	1.333	H1-3+VT
	87.5 - 86.5	0.013	0.933	0.000	0.048	0.001	0.946	1.333	H1-3+VT
	86.5 - 85.5	0.013	0.944	0.000	0.048	0.001	0.958	1.333	H1-3+VT
	85.5 - 84.5	0.013	0.956	0.000	0.048	0.001	0.969	1.333	H1-3+VT
	84.5 - 83.5	0.013	0.967	0.000	0.048	0.001	0.981	1.333	H1-3+VT
	83.5 - 82.5	0.013	0.979	0.000	0.048	0.001	0.992	1.333	H1-3+VT
	82.5 - 81.5	0.013	0.989	0.000	0.048	0.001	1.003	1.333	H1-3+VT
	81.5 - 80.5	0.013	1.000	0.000	0.049	0.001	1.014	1.333	H1-3+VT
	80.5 - 79.5	0.013	1.011	0.000	0.048	0.001	1.025	1.333	H1-3+VT
	79.5 - 74.75	0.007	0.514	0.000	0.024	0.000	0.521	1.333	H1-3+VT
L4	79.5 - 74.75	0.007	0.506	0.000	0.022	0.000	0.513	1.333	H1-3+VT
	74.75 - 73.75	0.013	0.992	0.000	0.044	0.001	1.006	1.333	H1-3+VT
	73.75 - 72.75	0.013	1.001	0.000	0.044	0.001	1.015	1.333	H1-3+VT
	72.75 - 71.75	0.013	1.010	0.000	0.044	0.001	1.023	1.333	H1-3+VT
	71.75 - 70.75	0.013	1.018	0.000	0.044	0.001	1.032	1.333	H1-3+VT
	70.75 - 69.75	0.013	1.027	0.000	0.044	0.001	1.040	1.333	H1-3+VT
	69.75 - 68.75	0.013	1.035	0.000	0.044	0.001	1.049	1.333	H1-3+VT

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bc}}{F_{bx}}$	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
	68.75 - 67.75	0.013	1.043	0.000	0.044	0.001	1.057	1.333	H1-3+VT
	67.75 - 66.75	0.013	1.051	0.000	0.044	0.001	1.064	1.333	H1-3+VT
	66.75 - 65.75	0.013	1.058	0.000	0.044	0.001	1.072	1.333	H1-3+VT
	65.75 - 64.75	0.014	1.066	0.000	0.043	0.001	1.080	1.333	H1-3+VT
	64.75 - 63.75	0.014	1.073	0.000	0.043	0.001	1.087	1.333	H1-3+VT
	63.75 - 62.75	0.014	1.080	0.000	0.043	0.001	1.095	1.333	H1-3+VT
	62.75 - 61.75	0.014	1.087	0.000	0.043	0.001	1.102	1.333	H1-3+VT
	61.75 - 60.75	0.014	1.094	0.000	0.043	0.001	1.109	1.333	H1-3+VT
	60.75 - 59.75	0.014	1.101	0.000	0.043	0.001	1.116	1.333	H1-3+VT
	59.75 - 58.75	0.014	1.108	0.000	0.043	0.001	1.122	1.333	H1-3+VT
	58.75 - 57.75	0.014	1.115	0.000	0.043	0.001	1.129	1.333	H1-3+VT
L5	57.75 - 56.6875	0.013	1.016	0.000	0.039	0.001	1.029	1.333	H1-3+VT
	56.6875 - 55.625	0.013	1.022	0.000	0.039	0.001	1.035	1.333	H1-3+VT
	55.625 - 54.5625	0.013	1.028	0.000	0.039	0.001	1.041	1.333	H1-3+VT
	54.5625 - 53.5	0.013	1.033	0.000	0.039	0.001	1.047	1.333	H1-3+VT
	53.5 - 52.4375	0.013	1.039	0.000	0.038	0.001	1.052	1.333	H1-3+VT
	52.4375 - 51.375	0.013	1.045	0.000	0.038	0.001	1.058	1.333	H1-3+VT
	51.375 - 50.3125	0.013	1.050	0.000	0.038	0.001	1.064	1.333	H1-3+VT
	50.3125 - 49.25	0.013	1.055	0.000	0.038	0.001	1.069	1.333	H1-3+VT
	49.25 - 48.1875	0.013	1.061	0.000	0.038	0.000	1.075	1.333	H1-3+VT
	48.1875 - 47.125	0.014	1.066	0.000	0.038	0.000	1.080	1.333	H1-3+VT
	47.125 - 46.0625	0.014	1.071	0.000	0.038	0.000	1.085	1.333	H1-3+VT
	46.0625 - 45	0.014	1.076	0.000	0.038	0.000	1.090	1.333	H1-3+VT
	45 - 39.5	0.007	0.536	0.000	0.019	0.000	0.543	1.333	H1-3+VT
L6	45 - 39.5	0.007	0.527	0.000	0.018	0.000	0.534	1.333	H1-3+VT
	39.5 - 38.3929	0.013	1.031	0.000	0.035	0.000	1.045	1.333	H1-3+VT
	38.3929 - 37.2857	0.014	1.035	0.000	0.035	0.000	1.049	1.333	H1-3+VT

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
	37.2857 - 36.1786	0.014	1.039	0.000	0.035	0.000	1.053	1.333	H1-3+VT
	36.1786 - 35.0714	0.014	1.043	0.000	0.035	0.000	1.057	1.333	H1-3+VT
	35.0714 - 33.9643	0.014	1.047	0.000	0.035	0.000	1.061	1.333	H1-3+VT
	33.9643 - 32.8571	0.014	1.050	0.000	0.034	0.000	1.065	1.333	H1-3+VT
	32.8571 - 31.75	0.014	1.054	0.000	0.034	0.000	1.068	1.333	H1-3+VT
L7	31.75 - 30.1625	0.014	1.023	0.000	0.033	0.000	1.037	1.333	H1-3+VT
	30.1625 - 28.575	0.014	1.028	0.000	0.033	0.000	1.042	1.333	H1-3+VT
	28.575 - 26.9875	0.014	1.033	0.000	0.033	0.000	1.047	1.333	H1-3+VT
	26.9875 - 25.4	0.014	1.037	0.000	0.033	0.000	1.052	1.333	H1-3+VT
	25.4 - 23.8125	0.014	1.042	0.000	0.033	0.000	1.056	1.333	H1-3+VT
	23.8125 - 22.225	0.014	1.046	0.000	0.033	0.000	1.060	1.333	H1-3+VT
	22.225 - 20.6375	0.014	1.050	0.000	0.033	0.000	1.064	1.333	H1-3+VT
	20.6375 - 19.05	0.014	1.054	0.000	0.033	0.000	1.069	1.333	H1-3+VT
	19.05 - 17.4625	0.014	1.058	0.000	0.032	0.000	1.072	1.333	H1-3+VT
	17.4625 - 15.875	0.014	1.061	0.000	0.032	0.000	1.076	1.333	H1-3+VT
	15.875 - 14.2875	0.015	1.065	0.000	0.032	0.000	1.080	1.333	H1-3+VT
	14.2875 - 12.7	0.015	1.069	0.000	0.032	0.000	1.084	1.333	H1-3+VT
	12.7 - 11.1125	0.015	1.072	0.000	0.032	0.000	1.087	1.333	H1-3+VT
	11.1125 - 9.525	0.015	1.075	0.000	0.032	0.000	1.090	1.333	H1-3+VT
	9.525 - 7.9375	0.015	1.078	0.000	0.032	0.000	1.094	1.333	H1-3+VT
	7.9375 - 6.35	0.015	1.081	0.000	0.032	0.000	1.097	1.333	H1-3+VT
	6.35 - 4.7625	0.015	1.084	0.000	0.032	0.000	1.100	1.333	H1-3+VT
	4.7625 - 3.175	0.015	1.087	0.000	0.032	0.000	1.103	1.333	H1-3+VT
	3.175 - 1.5875	0.015	1.090	0.000	0.032	0.000	1.106	1.333	H1-3+VT
	1.5875 - 0	0.016	1.093	0.000	0.032	0.000	1.109	1.333	H1-3+VT

* DL controls

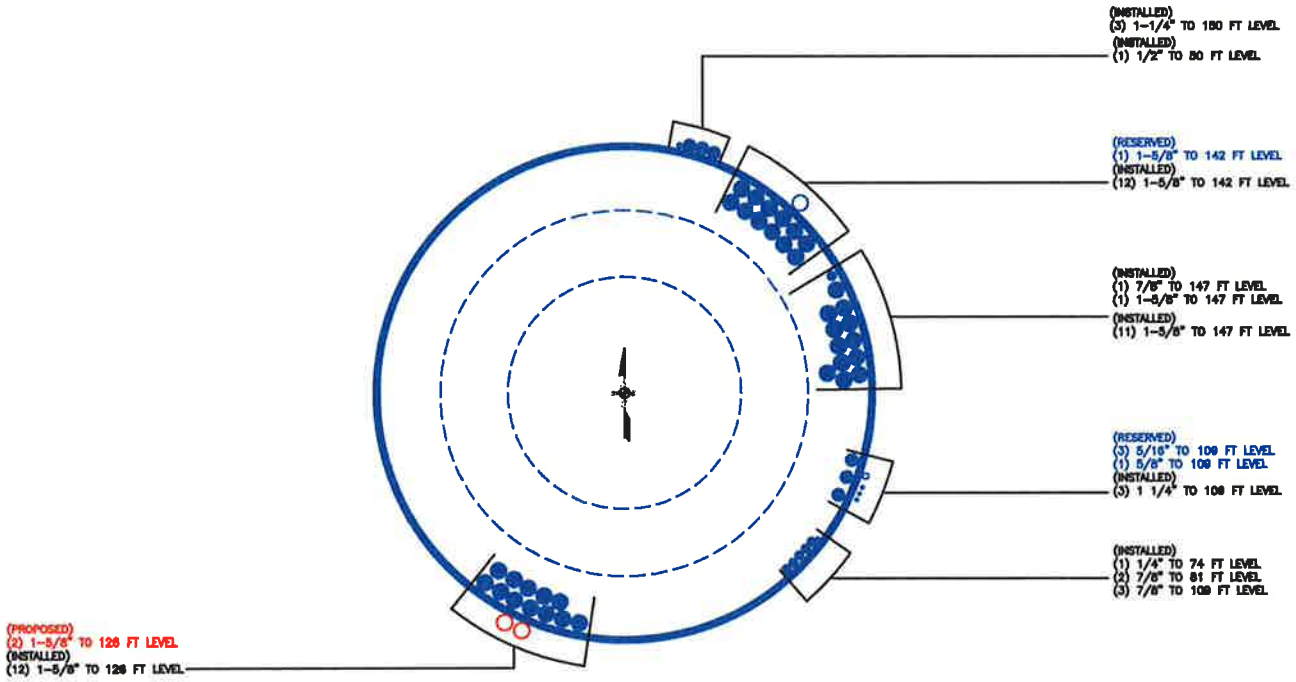
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	148 - 116	Pole	TP30.241x24x0.219	1	-10.211	1057.261	47.0	Pass*
L2	116 - 93.5	Pole	TP34.191x29.072x0.25	2	-17.378	1400.116	86.2	Pass*
L3	93.5 - 74.75	Pole	TP37.847x34.191x0.421	3	-20.439	2055.966	76.9	Pass*
L4	74.75 - 57.75	Pole	TP40.663x36.421x0.467	4	-26.475	2516.331	84.7	Pass*
L5	57.75 - 39.5	Pole	TP44.222x40.663x0.511	5	-30.269	2957.327	81.8	Pass*
L6	39.5 - 31.75	Pole	TP45.108x42.524x0.565	6	-35.614	3422.437	80.2	Pass*
L7	31.75 - 0	Pole	TP51.3x45.108x0.522	7	-47.029	4026.406	83.2	Pass*
							Summary	
						Pole (L2)	86.2	Pass*
						RATING =	**86.2**	**Pass***

*See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 855662 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Rein1

Bottom	Top	Qty	Model	Position	T or T&C
0	31.75		3CFP-085125	F	T&C
31.75	57.75		3CFP-065125	F	T&C
57.75	93.5		3CFP-060100	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Flats (Used for relative orientation only. Actual flat numbers may vary.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		1					1					1					
1						1						1					
1						1						1					

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
	0			F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
	0			F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Reinforcement Capacity

AeroSolutions LLC
Optimizing Your Tower Infrastructure
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Dimensions and Properties														Compression				Axial					
																		ASD-9			LRFD		
Model	Weight (lb/ft)	Area (in^2)	Moment of Inertia (in^4)	Moment of Inertia (in^4)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Length (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ Increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
CCI-XFP-040075	10.2	3.00	0.14	4.00	0.375	0	0.75	4	0	0	1.1875	65	80	0.80	16	1.00	16	87.5	110.0	Rupture	123.8	Rupture
CCI-XFP-045100	15.3	4.50	0.38	7.59	0.5	0	1	4.5	0	0	1.1875	65	80	0.80	20	1.00	20	129.7	173.8	Compress.	195.0	Rupture
CCI-XFP-060100	20.4	6.00	0.50	18.00	0.5	0	1	6	0	0	1.1875	65	80	0.80	16	1.00	16	189.3	252.5	Compress.	285.0	Rupture
CCI-XFP-065125	27.6	8.13	1.06	28.61	0.625	0	1.25	6.5	0	0	1.1875	65	80	0.80	19	1.00	19	260.4	347.2	Compress.	393.8	Rupture
CCI-XFP-085125	36.2	10.63	1.38	63.97	0.625	0	1.25	8.5	0	0	1.1875	65	80	0.80	17	1.00	17	350.0	467.3	Compress.	543.1	Compress.

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

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

Site Data

BU#: *855662*
Site Name: *WINDSORCENTRAL*
App #: *266648 Rev. 0*

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	58	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	57	in
Thick:	2.75	in
Grade:	55	ksi
Clip Distance:	6	in

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

Pole Data		
Diam:	51.3	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

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

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	3438.11628	ft-kips
Unfactored Axial, P:	47.0289	kips
Unfactored Shear, V:	31.762292	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	174.9 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	89.7% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	49.4 ksi
Allowable PL Bending Stress:	55.0 ksi
Base Plate Stress Ratio:	89.8% **Pass**

PL Ref. Data
Yield Line (in): 29.31
Max PL Length: 29.31

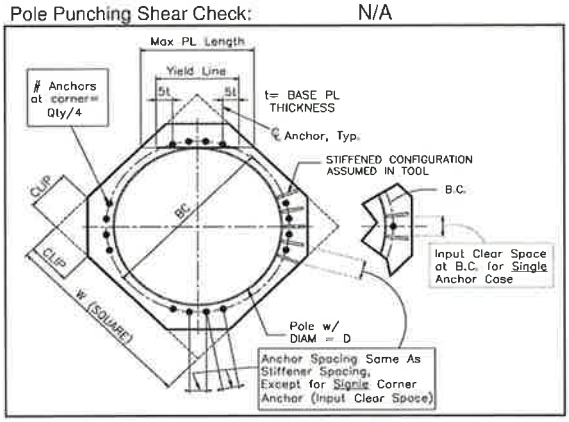
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



CCI Foundation Tool Suite - Monopole Pier - Beta Release

CCI Foundation Tool Suite - v1.0 Date: 16-10-2014

BU:	855662
Site Name:	WINDSORCENTRAL, CT
App Number:	266648 Rev. 0
Work Order:	947550

Monopole Drilled Pier

Input

Criteria

TIA Revision:	F
ACI 318 Revision:	2002
Seismic Category:	B

Forces

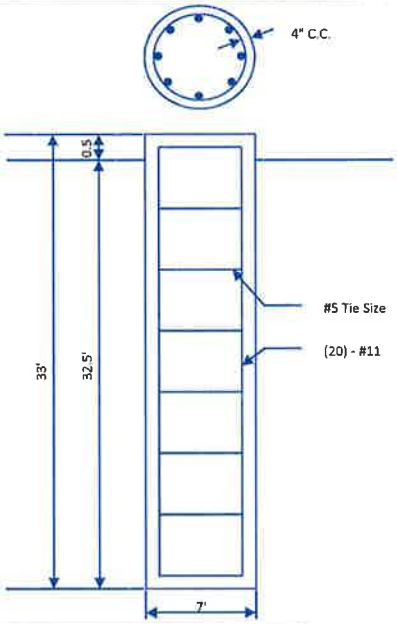
Compression	47 kips
Shear	32 kips
Moment	3438 k-ft
Swelling Force	0 kips

Foundation Dimensions

Pier Diameter:	7 ft
Ext. above grade:	0.5 ft
Depth below grade:	32.5 ft

Material Properties

Number of Rebar:	20
Rebar Size:	11
Tie Size	5
Rebar tensile strength:	60 ksi
Concrete Strength:	3000 psi
Ultimate Concrete Strain	0.003 in/in
Clear Cover to Ties:	4 in



Soil Profile: Soil

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	2	0	2	100	0	0	0	0	0	
2	3	2	5	37.6	0	0	0	0	0	
3	7	5	12	55		35			0	
4	4	12	16	50		31			0	
5	16.5	16	32.5	50	800				4.8	

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	7.04 ft
Max Moment, Mu:	3683.98 k-ft
Soil Safety Factor:	2.01
Safety Factor Req'd:	2
RATING:	99.7%

Soil Axial Capacity

Skin Friction (k):	135.67 kips
End Bearing (k):	92.36 kips
Comp. Capacity (k), ϕCn:	228.03 kips
Comp. (k), Cu:	61.10 kips
RATING:	26.8%

Concrete/Steel Check

Mu (from soil analysis)	4789.17 k-ft
ϕMn	4974.53 k-ft
RATING:	96.3%
rho provided	0.56
rho required	0.33 OK
Rebar Spacing	10.11
Spacing required	22.56 OK
Dev. Length required	25.13
Dev. Length provided	61.78 OK

Overall Foundation Rating: 99.7%

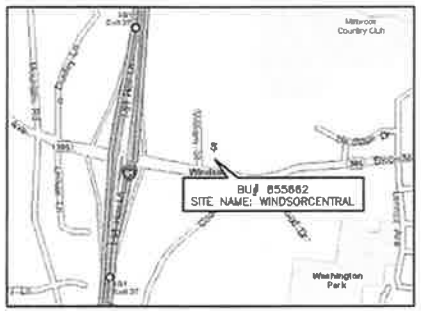
APPENDIX D

TOWER MODIFICATION DRAWINGS

TOWER MODIFICATION DRAWINGS PREPARED FOR: CROWN CASTLE

SITE NAME: WINDSORCENTRAL
BU NUMBER: 855662

SITE ADDRESS:
340 BLOOMFIELD AVENUE
WINDSOR, CT 06095
HARTFORD COUNTY, USA



MAP

DIRECTIONS

UPDATED 6/04 WINDOR-CENTRAL CT-138 I-91 NORTH. FOLLOW THROUGH HARTFORD AND GET OFF AT EXIT 37. AT THE END OF THE RAMP TURN RIGHT FOLLOW TO WINDSOR PUBLIC SAFETY BUILDING MAKE LEFT MONO POLE IS IN THE REAR OF THE BUILDING.

PROJECT CONTACTS:

1. CROWN TOWER STRUCTURAL ANALYST
   TIMOTHY HOWELL
   (980) 209-8242
   TIMOTHY.HOWELL@CROWNCASTLE.COM
   3530 TORINGDON WAY SUITE 300
   CHARLOTTE, NC 28277

2. CROWN PROJECT MANAGER
   JERRY BRUNO
   (781) 970-0069
   JERRY.BRUNO@CROWNCASTLE.COM

3. CROWN CONSTRUCTION MANAGER
   N/A

4. B+T GROUP PROJECT ENGINEER
   ROBBIE FRAZIER
   (918) 587-4630
   RFRAZIER@BTGRP.COM
   1717 S BOULDER AVENUE, SUITE 300
   TULSA, OK 74119

5. B+T GROUP ENGINEER (EOR)
   CHAD E TUTTLE, P.E.
   (918) 587-4630
   CTUTTLE@BTGRP.COM
   1717 S BOULDER AVENUE, SUITE 300
   TULSA, OK 74119

TOWER INFORMATION

TOWER MANUFACTURER / DWG #	SUMMIT MANUFACTURING, LLC. / 11986
TOWER HEIGHT / TYPE	148' MONOPOLE
TOWER LOCATION: DATUM: (NAD 1983)	LAT. 41° 51' 9.3" LONG -72° 39' 37.8" ELEV. 131 FT AMSL
STRUCTURAL DESIGN DRAWING REPORT:	B+T GROUP / WO. # 947550
STRUCTURAL ANALYSIS REPORT:	JACOBS / WO. # 938789
STRUCTURAL ANALYSIS DATE:	10/07/14
APPLICATION ID / REVISION #:	266648 / 0
CCISITES DOCUMENT ID:	5336192

CODE COMPLIANCE

THIS REINFORCEMENT DESIGN IS BASED ON THE REQUIREMENTS OF TIA/EIA-222-F STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES USING FASTEST MILE WIND SPEED OF 80 MPH WITH NO ICE, 38 MPH WITH 1.00 INCH ICE THICKNESS AND 50 MPH UNDER SERVICE LOADS.

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S1	TITLE SHEET
S2	MODIFICATION INSPECTION NOTES AND CHECKLIST
S3	GENERAL NOTES, AJAX BOLT NOTES AND DETAIL
S4	TOWER ELEV., SCHEDULES & TX LINE DIST. DIAG.
S5	TOWER SECTIONS (0'-35.5', 25.5'-60.5' AND 60.5'-95.5')
S6	IN-LINE SPLICE DETAIL
D1	DETAILS

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/29/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	91728.005.01
PROJECT ENG:	ROBBIE FRAZIER
DRAWN BY:	RA / TEL
CHECKED BY:	ASP

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD E. TUTTLE
No. 23924
PROFESSIONAL ENGINEER
10/29/14

WINDSORCENTRAL
855662
340 BLOOMFIELD AVENUE
WINDSOR, CT
EXISTING 148' MONOPOLE

SHEET TITLE:
TITLE SHEET

SHEET NUMBER	REVISION
S1	0

MI CHECKLIST

REQUIRED	REPORT ITEM	BRIEF DESCRIPTION
	PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWING	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT.
X	EOR APPROVAL	ONCE THE PRE-MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS AS NECESSARY FOR NON-STANDARD PARTS. THESE ARE TO INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLES, MOUNTS, STEP PEGS, SAFETY CLIMBS AND ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICATIONS ON THE TOWER. THESE DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. APPROVED ASSEMBLY/SHOP DRAWINGS SHALL BE SUBMITTED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATION INSPECTION	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR CERTIFIED WELD INSPECTION	A VISUAL OBSERVATION BY A CWI OF A PORTION OF WELDING ON THE PROPOSED STRUCTURAL MEMBERS IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORT (MTR)	MILL CERTIFICATION SHALL BE PROVIDED FOR ALL STEEL AS SPECIFIED IN THE MODIFICATION DRAWINGS AND THIS DOCUMENTATION SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR NDE INSPECTION	CRITICAL SHOP WELDS THAT REQUIRE TESTING (PER ENG-STD-10069) ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED WELD INSPECTOR SHALL PERFORM NON-DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	NDE REPORT OF MONOPOLE BASE PLATE	A NDE (PER ENG-SOW-10033) OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
	CONSTRUCTION (PERFORMED BY CONTRACTOR)	
X	CONSTRUCTION INSPECTIONS	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS.
N/A	FOUNDATION INSPECTIONS	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	CONCRETE COMP. STRENGTH AND SLUMP TESTS	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	POST INSTALLED ANCHOR ROD VERIFICATION	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROWN REQUIREMENTS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	BASE PLATE GROUT VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS INSTALLED IN ACCORDANCE WITH CROWN ENG-PRC-10012 FOR INCLUSION IN THE MI REPORT.
X	CONTRACTOR'S CERTIFIED WELD INSPECTION	A CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST AS NECESSARY ALL FIELD WELDS. CWI SHALL FOLLOW ALL THE PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS ENG-SOW-10068, ENG-STD-10069 AND SRV-STD-10159. A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT. FULL PENETRATION WELDS IN THE VICINITY OF BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.
N/A	EARTHWORK: LIFT AND DENSITY	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	ON SITE COLD GALVANIZING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED IN ACCORDANCE WITH ENG-BUL-10149.
N/A	GUY WIRE TENSION REPORT	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT TO THE MI INSPECTOR INDICATING THE TEMPERATURE AND TENSION IN EVERY GUY CABLE AS PART OF PLUMB AND TENSION PROCEDURE FOR INCLUSION IN THE MI REPORT.
X	GC AS-BUILT DOCUMENTS	THE GENERAL CONTRACTOR SHALL SUBMIT A COPY OF THE CONTRACT DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD.
	POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTORS REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
N/A	POST INSTALLED ANCHOR ROD PULL-OUT TESTING	POST-INSTALLED ANCHOR RODS SHALL BE TESTED IN ACCORDANCE WITH ENG-PRC-10119 AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PHOTOGRAPHS	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI WHICH DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
ADDITIONAL TESTING AND INSPECTIONS:		

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE MI REPORT AND N/A DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT

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 MI 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 AND ENG-SOW-10007.

RECOMMENDATIONS

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

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 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.

REQUIRED PHOTOS

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.

B+T GRP
1717 S. BOULDER AVE
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/29/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	91728.005.01
PROJECT ENG:	ROBBIE FRAZIER
DRAWN BY:	RA / TEL
CHECKED BY:	ASP

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD A. TUTTLE
No. 23324
LICENSED
PROFESSIONAL ENGINEER
10/29/14

WINDSORCENTRAL
855662
340 BLOOMFIELD AVENUE
WINDSOR, CT
EXISTING 140' MONOPOLE

SHEET TITLE
MODIFICATION INSPECTION NOTES AND CHECKLIST

SHEET NUMBER	REVISION
S2	0

NOTES:

1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRE-TENSIONED 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 PRE-TENSIONED 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 HRC 38 OR HIGHER.

5. AS AN ALTERNATIVE TO USING DTI WASHERS, AJAX BOLTS MAY BE PRETENSIONED PER AISC TURN-OF-NUT METHOD.

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 MANUFACTURES'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 05101, USA
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRUBUTORS.HTML

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

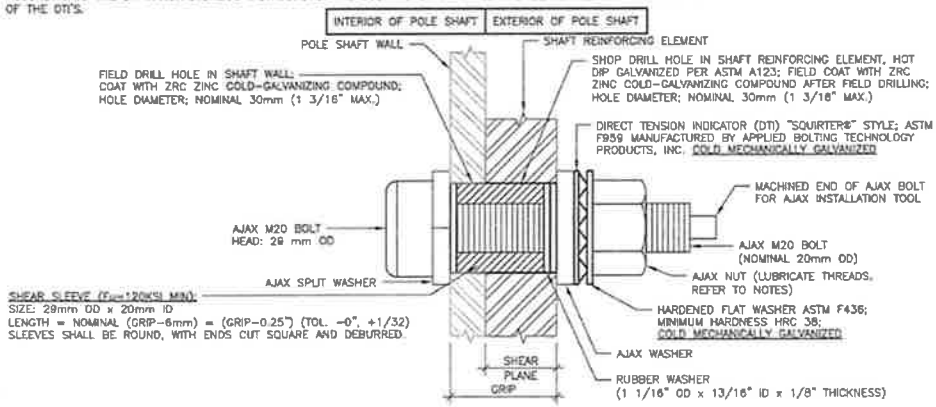
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLT. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF HRC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF HRC 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 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. 32, 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.



1 TYPICAL AJAX BOLT DETAIL
SCALE: N.T.S.

GENERAL NOTES

1.1 ALL WORK SHALL COMPLY WITH THE TIA/EIA-222-F STANDARD AS WELL AS ANY OTHER GOVERNING BUILDING CODES.
1.2 FIELD WORK WILL BE DONE AROUND EXISTING COAXIAL CABLE AND EQUIPMENT. ALL WORK SHALL BE DONE IN A MANNER SUCH THAT NO DAMAGE OCCURS TO THE EXISTING EQUIPMENT OR THE STRUCTURE.
1.3 A MINIMUM OF TWO COATS OF ZINGA COLD GALVANIZING COMPOUND (OR APPROVED EQUIVALENT) SHALL BE APPLIED TO ANY FIELD CUTS OR FIELD DRILLED HOLES.
1.4 THE USE OF A GAS TORCH OR WELDER WILL NOT BE PERMITTED ON THE TOWER WITHOUT THE CONSENT OF THE OWNER.
1.5 IN LIEU OF TEMPORARY BRACING CONTRACTOR MAY HAVE A STABILITY ANALYSIS PERFORMED BY AN ENGINEER LICENSED IN THE STATE THE TOWER IS LOCATED. THE ANALYSIS SHALL USE A MINIMUM WIND SPEED OF 45 mph (3-SEC) PER TIA-1019.

FABRICATION

2.1 ALL WORK SHALL BE DONE IN ACCORDANCE WITH A.I.S.C. "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
2.2 STRUCTURAL STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS:

	YIELD	ASTM SPECS
A. STEEL SHAPES AND PLATES, U.N.O.	65ksi	A572

2.3 ALL NEW MATERIAL INCLUDING STRUCTURAL STEEL AND FASTENERS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 AND A153.
2.4 WELDING SHALL MEET ANSI/AWS D1.1 STRUCTURAL WELDING CODE (LATEST REVISION). ELECTRODES SHALL BE E80 SERIES.
2.5 CONTRACTOR SHALL PROVIDE SHOP FABRICATION DRAWINGS TO B+T GROUP 5 DAYS PRIOR TO FABRICATION.

KEY NOTES

(1) TOWER MODIFICATION I.D.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/29/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	91728 005 01
PROJECT ENG:	ROBBIE FRAZIER
DRAWN BY:	RA / TEL
CHECKED BY:	ASP

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
10/29/14

WINDSORCENTRAL
855662
340 BLOOMFIELD AVENUE
WINDSOR, CT
EXISTING 148' MONOPOLE

SHEET TITLE:
GENERAL NOTES, AJAX BOLT NOTES AND DETAIL

SHEET NUMBER:	REVISION:
S3	0

CCI: FLAT PLATE-BILL OF MATERIALS (65KSI)

BOTTOM ELEVATION	TOP ELEVATION	FLAT PLATE DESIGNATION	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	AJAX BOLTS PER PLATE	TOTAL AJAX BOLT QTY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	TOTAL STEEL WEIGHT	
0'-6"	35'-6"	CCI-SFP-08512535	35'-0"	3	49	147	15	15	17"	3793	LBS.
25'-6"	60'-6"	CCI-SFP-08512535	35'-0"	2	40	80	11	11	19"	1934	LBS.
35'-6"	60'-6"	CCI-SFP-08512525	25'-0"	1	34	34	11	11	19"	891	LBS.
60'-6"	95'-6"	CCI-SFP-08010035	35'-0"	3	39	117	8	8	16"	2142	LBS.
						378				8560	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 FABRICATOR 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. 1-800-831-3275 FOR PRODUCT INFORMATION.
3. ALL SHIMS SHALL BE ASTM A36.
4. HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
5. SHOP WELDS ARE ASSUMED E80XX OR GREATER, PER STANDARD SPLICE DETAIL.
6. IF SCOPE OF MODIFICATION REQUIRES REMOVAL OF TOWER ID TAG, IT MUST BE REPLACED.
7. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE ENGINEER OF RECORD OR TOWER OWNER.
8. WHERE POSSIBLE, CLIMBING HARDWARE SHOULD REMAIN IN-LINE ALONG THE POLE. IF AN OBSTRUCTION CAUSES A LATERAL OFFSET OF 2'-0" OR MORE, CLIMBING ANCHORS SHALL BE PROVIDED AT EACH CHANGE IN ALIGNMENT. IF NEW REINFORCEMENT REQUIRES STEP BOLT BRACKETS, INSTALL PRIOR TO GALVANIZATION OF STEEL.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER FITTING OF REINFORCEMENT ON MONOPOLES. SHIMS FOR MONOPOLE REINFORCEMENT MEMBER SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESSES SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED.

NEW CCI FLAT PLATE (65KSI) REINFORCING ELEMENTS

START ELEVATION	END ELEVATION	QTY	FLAT #	FLAT PLATE *
0.5'	35.5'	3	8, 13 & 18	CCI-SFP-08512535
25.5'	60.5'	2	6 & 12	CCI-SFP-08512535
35.5'	60.5'	1	18	CCI-SFP-08512525
60.5'	95.5'	3	6, 12 & 18	CCI-SFP-08010035

* SEE CMRP 65 KSI PARTS CATALOG EDITION 2 REV. 1 FOR PART DETAILS

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE AND BOLTS) AND INSTALLATION PROCEDURES.

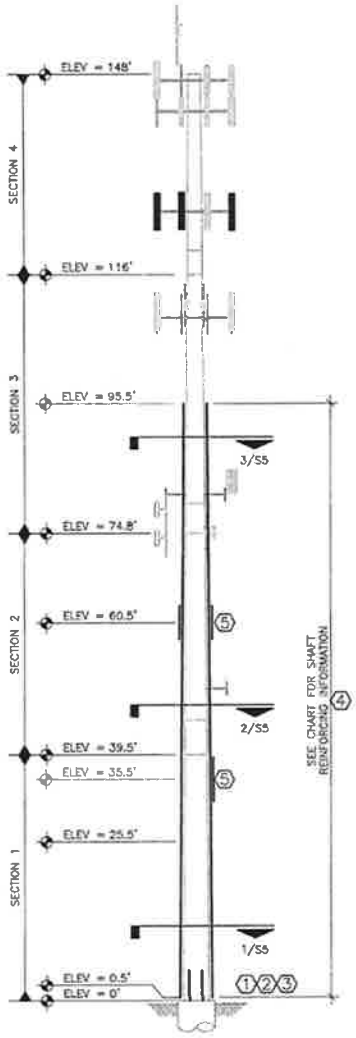
EXISTING MEMBER SCHEDULE

SECTION	NUMBER OF SIDES	THICKNESS	BOTTOM DIAMETER	TOP DIAMETER	LAP SPLICE
1	18	0.375"	51.300"	42.624"	66"
2	18	0.313"	44.222"	36.421"	57"
3	18	0.250"	37.847"	29.072"	45"
4	18	0.219"	30.241"	24.000"	---

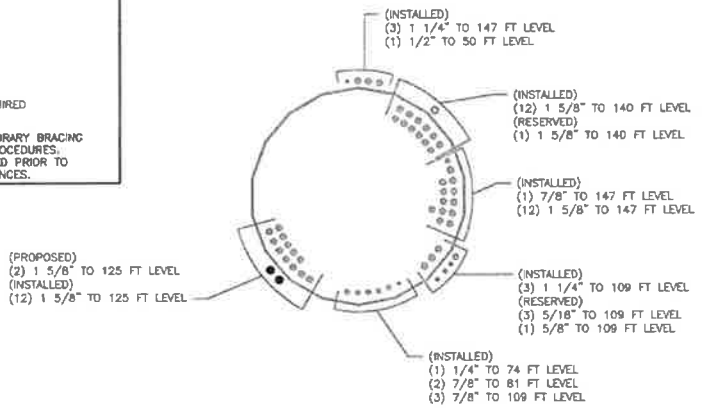
TOWER MODIFICATIONS:

1. CONTRACTOR SHALL BUDGET A SITE VISIT TO CHECK CRITICAL DIMENSIONS AND VERIFY UNKNOWN CONDITIONS PRIOR TO STEEL FABRICATION.
2. THE NEW AND EXISTING TRANSMISSION LINES MUST BE DISTRIBUTED AS SHOWN IN THE TX LINE DIST. DIAGRAM RE: DETAIL 2/S4.
3. INSTALL NEW TRANSITION STIFFENERS RE: SHEET S5.
4. INSTALL NEW REINFORCING ELEMENTS RE: SHEET S5.
5. INSTALL NEW IN-LINE SPLICES RE: SHEET S6.
6. RELOCATE/REPLACE STEP PEGS AS REQUIRED

* CONTRACTOR SHALL PROVIDE TEMPORARY BRACING FOR ALL REMOVE AND REPLACE PROCEDURES.
** MODIFICATIONS SHALL BE COMPLETED PRIOR TO ADDING THE PROPOSED APPURTENANCES.



1 TOWER ELEVATION
SCALE: N.T.S.



2 TX LINE DISTRIBUTION DIAGRAM
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE
SUITE 300
TULSA, OK 74119
PH (918) 587 4630
www.btgrp.com

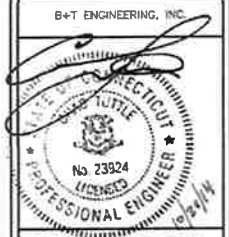
CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/29/14	ISSUED FOR CONSTRUCTION

PROJECT NO: 91728.005.01
PROJECT ENG: ROBBIE FRAZIER
DRAWN BY: RA / TEL
CHECKED BY: ASP

B+T ENGINEERING, INC.

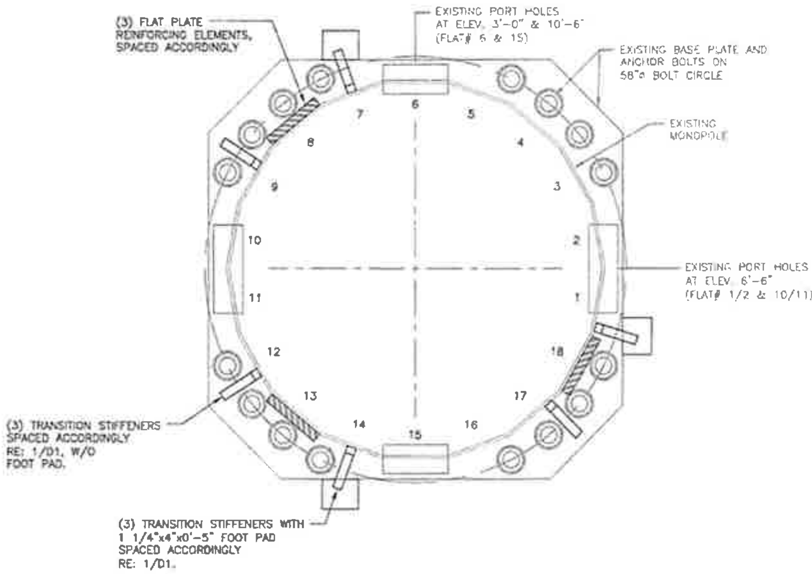


IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

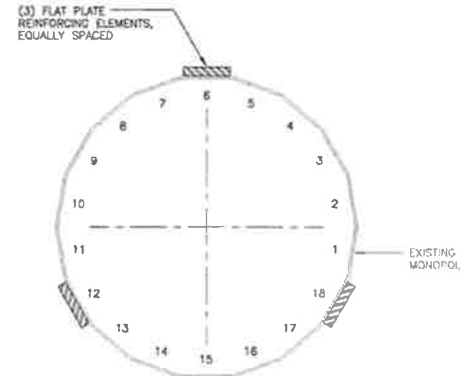
WINDSORCENTRAL
855662
340 BLOOMFIELD AVENUE
WINDSOR, CT
EXISTING 148' MONOPOLE

SHEET TITLE
TOWER ELEV., SCHEDULES, AND TX LINE DIST. DIAGRAM

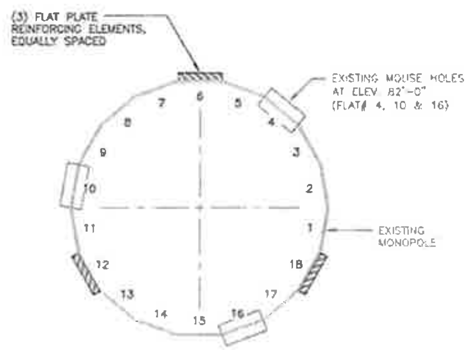
SHEET NUMBER: S4
REVISION: 0



1 TOWER SECTION (0'-35.5')
SCALE: N.T.S.



2 TOWER SECTION (25.5'-60.5')
SCALE: N.T.S.



3 TOWER SECTION (60.5'-95.5')
SCALE: N.T.S.

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1717 S. BOULDER AVE
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
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CROWN CASTLE

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PROJECT ENG	ROBBIE FRAZIER
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B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
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LICENSED
PROFESSIONAL ENGINEER

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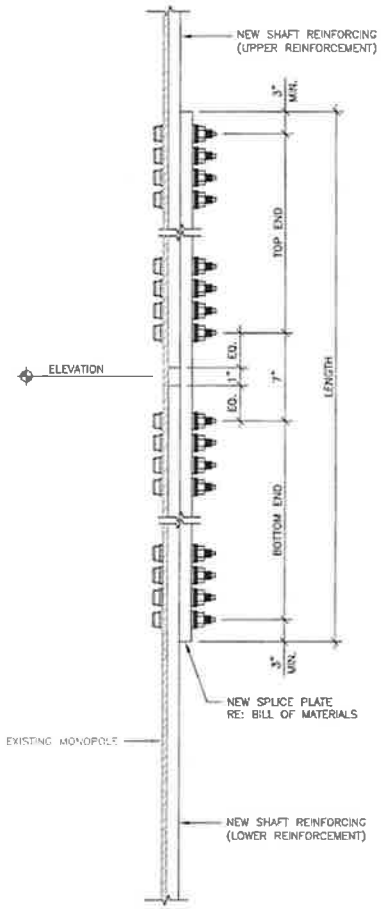
WINDSORCENTRAL
855662
340 BLOOMFIELD AVENUE
WINDSOR, CT
EXISTING 148' MONOPOLE

SHEET TITLE
TOWER SECTIONS
0'-35.5', 25.5'-60.5' AND 60.5'-95.5'

SHEET NUMBER
S5

REVISION
0



1 FLAT PLATE IN-LINE SPLICE DETAIL
SCALE: N.T.S.

SPLICE PLATE-BILL OF MATERIALS (65KSI)

ELEVATION	WIDTH	THICKNESS	LENGTH	QTY	QTY OF BOLTS (TOP END)	QTY OF BOLTS (BOTTOM END)	AJAX BOLTS PER SPLICE	TOTAL AJAX BOLTS	TOTAL STEEL WEIGHT	
35'-6"	6 1/2"	1 1/4"	7'-1"	1	11	15	26	26	196	LBS.
60'-6"	6"	1"	5'-4"	3	8	11	19	57	326	LBS.
							TOTAL:	83	522	LBS.

* O.C. DISTANCE ON TERMINATION BOLTS TO BE 3 IN. U.N.O.
* USE SHIM PLATES AS REQUIRED.
**BOLT QTY INCLUDED IN S4 BILL OF MATERIALS
***STEEL WEIGHT NOT INCLUDED IN S4 BILL OF MATERIALS.

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CROWN CASTLE

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REV	DATE	DESCRIPTION
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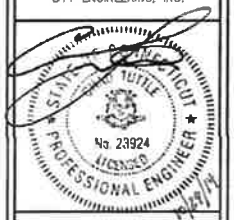
PROJECT NO.	91728.005.01
PROJECT ENG.	BOBBIE FRAZIER
DRAWN BY:	RA / TEL
CHECKED BY:	ASP

B+T ENGINEERING, INC.



WINDSORCENTRAL
855662

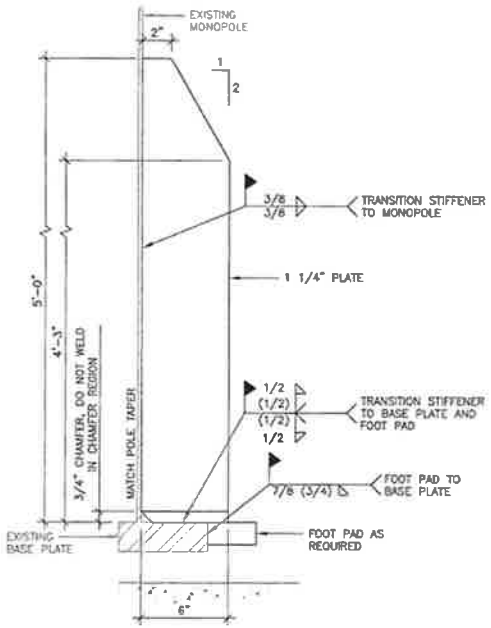
340 BLOOMFIELD AVENUE
WINDSOR, CT

EXISTING 146' MONOPOLE

SHEET TITLE
IN-LINE SPLICE DETAIL

SHEET NUMBER: S6

REVISION: 0



1 CCI-TRANSITION STIFFENER DETAIL
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/29/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	91729.003.01
PROJECT ENG:	ROBBIE FRAZIER
DRAWN BY:	RA / TEL
CHECKED BY:	ASP

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
No 23924
LICENSED
PROFESSIONAL ENGINEER

WINDSORCENTRAL
855662

340 BLOOMFIELD AVENUE
WINDSOR, CT

EXISTING 148' MONOPOLE

SHEET TITLE
DETAILS

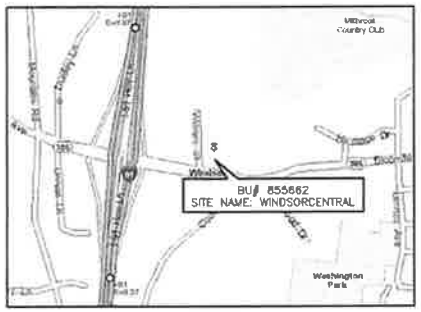
SHEET NUMBER: D1

REVISION: 0

TOWER MODIFICATION DRAWINGS PREPARED FOR: CROWN CASTLE

SITE NAME: WINDSORCENTRAL
BU NUMBER: 855662

SITE ADDRESS:
340 BLOOMFIELD AVENUE
WINDSOR, CT 06095
HARTFORD COUNTY, USA



MAP

DIRECTIONS

UPDATED 6/04 WINDOR-CENTRAL CT-138 !-91 NORTH. FOLLOW THROUGH HARTFORD AND GET OFF AT EXIT 37. AT THE END OF THE RAMP TURN RIGHT FOLLOW TO WINDSOR PUBLIC SAFETY BUILDING MAKE LEFT MONO POLE IS IN THE REAR OF THE BUILDING.

PROJECT CONTACTS:

1. CROWN TOWER STRUCTURAL ANALYST
   TIMOTHY HOWELL
   (980) 209-8242
   TIMOTHY.HOWELL@CROWNCASTLE.COM
   3530 TORINGDON WAY SUITE 300
   CHARLOTTE, NC 28277

2. CROWN PROJECT MANAGER
   JERRY BRUNO
   (781) 970-0069
   JERRY.BRUNO@CROWNCASTLE.COM

3. CROWN CONSTRUCTION MANAGER
   N/A

4. B+T GROUP PROJECT ENGINEER
   ROBBIE FRAZIER
   (918) 587-4630
   RFRAZIER@BTGRP.COM
   1717 S BOULDER AVENUE, SUITE 300
   TULSA, OK 74119

5. B+T GROUP ENGINEER (EOR)
   CHAD E TUTTLE, P.E.
   (918) 587-4630
   CTUTTLE@BTGRP.COM
   1717 S BOULDER AVENUE, SUITE 300
   TULSA, OK 74119

TOWER INFORMATION

TOWER MANUFACTURER / DWG #:	SUMMIT MANUFACTURING, LLC. / 11986
TOWER HEIGHT / TYPE:	148' MONOPOLE
TOWER LOCATION: DATUM: (NAD 1983)	LAT. 41° 51' 9.3" LONG. -72° 39' 37.8" ELEV. 131 FT AMSL
STRUCTURAL DESIGN DRAWING REPORT:	B+T GROUP / WO. # 947550
STRUCTURAL ANALYSIS REPORT:	JACOBS / WO. # 938789
STRUCTURAL ANALYSIS DATE:	10/07/14
APPLICATION ID / REVISION #:	266648 / 0
CCISITES DOCUMENT ID:	5336192

CODE COMPLIANCE

THIS REINFORCEMENT DESIGN IS BASED ON THE REQUIREMENTS OF TIA/EIA-222-F STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES USING FASTEST MILE WIND SPEED OF 80 MPH WITH NO ICE, 38 MPH WITH 1.00 INCH ICE THICKNESS AND 50 MPH UNDER SERVICE LOADS.

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S1	TITLE SHEET
S2	MODIFICATION INSPECTION NOTES AND CHECKLIST
S3	GENERAL NOTES, AJAX BOLT NOTES AND DETAIL
S4	TOWER ELEV., SCHEDULES & TX LINE DIST. DIAG.
S5	TOWER SECTIONS (0'-35.5', 25.5'-60.5' AND 60.5'-95.5')
S6	IN-LINE SPLICE DETAIL
D1	DETAILS

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH. (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/29/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	91728.005.01
PROJECT ENG:	ROBBIE FRAZIER
DRAWN BY:	RA / TTL
CHECKED BY:	ASP

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD E. TUTTLE
No. 23924
PROFESSIONAL ENGINEER
10/29/14

WINDSORCENTRAL
855662
340 BLOOMFIELD AVENUE
WINDSOR, CT
EXISTING 148' MONOPOLE

SHEET TITLE:
TITLE SHEET

SHEET NUMBER:	REVISION:
S1	0

MI CHECKLIST

REQUIRED	REPORT ITEM	BRIEF DESCRIPTION
		PRE-CONSTRUCTION
X	MI CHECKLIST DRAWING	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT.
X	EOR APPROVAL	ONCE THE PRE-MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS AS NECESSARY FOR NON-STANDARD PARTS. THESE ARE TO INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLES, MOUNTS, STEP PEGS, SAFETY CLIMBS AND ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICATIONS ON THE TOWER. THESE DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. APPROVED ASSEMBLY/SHOP DRAWINGS SHALL BE SUBMITTED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATION INSPECTION	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR CERTIFIED WELD INSPECTION	A VISUAL OBSERVATION BY A CWI OF A PORTION OF WELDING ON THE PROPOSED STRUCTURAL MEMBERS IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORT (MTR)	MILL CERTIFICATION SHALL BE PROVIDED FOR ALL STEEL AS SPECIFIED IN THE MODIFICATION DRAWINGS AND THIS DOCUMENTATION SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR NDE INSPECTION	CRITICAL SHOP WELDS THAT REQUIRE TESTING (PER ENG-STD-10069) ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED WELD INSPECTOR SHALL PERFORM NON-DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	NDE REPORT OF MONOPOLE BASE PLATE	A NDE (PER ENG-SOW-10033) OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
		CONSTRUCTION (PERFORMED BY CONTRACTOR)
X	CONSTRUCTION INSPECTIONS	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS.
N/A	FOUNDATION INSPECTIONS	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	CONCRETE COMP. STRENGTH AND SLUMP TESTS	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	POST INSTALLED ANCHOR ROD VERIFICATION	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROWN REQUIREMENTS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	BASE PLATE GROUT VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS INSTALLED IN ACCORDANCE WITH CROWN ENG-PRC-10012 FOR INCLUSION IN THE MI REPORT.
X	CONTRACTOR'S CERTIFIED WELD INSPECTION	A CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST AS NECESSARY ALL FIELD WELDS. CWI SHALL FOLLOW ALL THE PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS ENG-SOW-10066, ENG-STD-10069 AND SRV-STD-10159. A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT. FULL PENETRATION WELDS IN THE VICINITY OF BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.
N/A	EARTHWORK: LIFT AND DENSITY	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	ON SITE COLD GALVANIZING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED IN ACCORDANCE WITH ENG-BUL-10149.
N/A	GUY WIRE TENSION REPORT	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT TO THE MI INSPECTOR INDICATING THE TEMPERATURE AND TENSION IN EVERY GUY CABLE AS PART OF PLUMB AND TENSION PROCEDURE FOR INCLUSION IN THE MI REPORT.
X	GC AS-BUILT DOCUMENTS	THE GENERAL CONTRACTOR SHALL SUBMIT A COPY OF THE CONTRACT DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD.
		POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTORS REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
N/A	POST INSTALLED ANCHOR ROD PULL-OUT TESTING	POST-INSTALLED ANCHOR RODS SHALL BE TESTED IN ACCORDANCE WITH ENG-PRC-10119 AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PHOTOGRAPHS	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI WHICH DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
ADDITIONAL TESTING AND INSPECTIONS:		

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE MI REPORT AND N/A DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT

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 MI 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 AND ENG-SOW-10007.

RECOMMENDATIONS

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

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERRABLY 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.

REQUIRED PHOTOS

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.

B+T GRP
1717 S. BOULDER AVE
SUITE 900
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/29/14	ISSUED FOR CONSTRUCTION

PROJECT NO.	91728.005.01
PROJECT ENG.	ROBBIE FRAZIER
DRAWN BY:	RA / TEL
CHECKED BY:	ASP

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHRISTOPHER
No. 23924
LICENSED
PROFESSIONAL ENGINEER
10/29/14

WINDSORCENTRAL
855662
340 BLOOMFIELD AVENUE
WINDSOR, CT
EXISTING 148' MONOPOLE

SHEET TITLE
MODIFICATION INSPECTION NOTES AND CHECKLIST

SHEET NUMBER	REVISION
S2	0

NOTES:

1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRE-TENSIONED 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 PRE-TENSIONED 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 HRC 38 OR HIGHER.

5. AS AN ALTERNATIVE TO USING DTI WASHERS, AJAX BOLTS MAY BE PRETENSIONED PER AISC TURN-OF-NUT METHOD.

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 MANUFACTURES'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 05101, USA
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING~DISTRUBUTORS.HTML

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

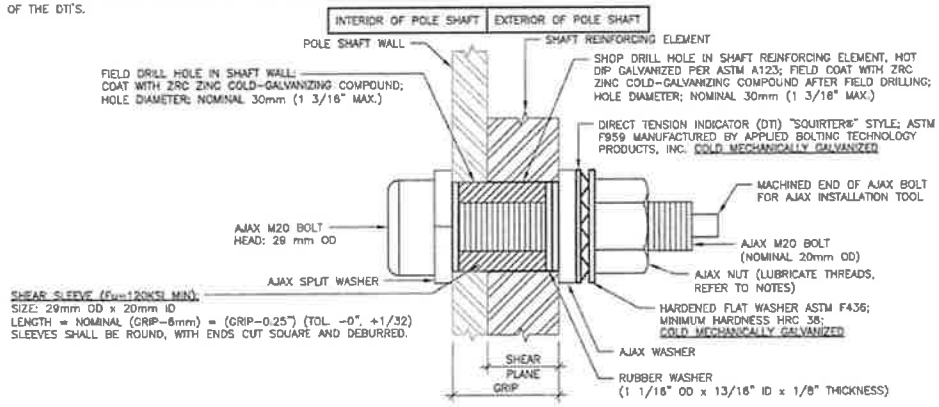
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLT. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF HRC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF HRC 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 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. 32, 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.



1 TYPICAL AJAX BOLT DETAIL
SCALE: N.T.S.

GENERAL NOTES

1.1 ALL WORK SHALL COMPLY WITH THE TIA/EIA-222-F STANDARD AS WELL AS ANY OTHER GOVERNING BUILDING CODES.
1.2 FIELD WORK WILL BE DONE AROUND EXISTING COAXIAL CABLE AND EQUIPMENT. ALL WORK SHALL BE DONE IN A MANNER SUCH THAT NO DAMAGE OCCURS TO THE EXISTING EQUIPMENT OR THE STRUCTURE.
1.3 A MINIMUM OF TWO COATS OF ZINGA COLD GALVANIZING COMPOUND (OR APPROVED EQUIVALENT) SHALL BE APPLIED TO ANY FIELD CUTS OR FIELD DRILLED HOLES.
1.4 THE USE OF A GAS TORCH OR WELDER WILL NOT BE PERMITTED ON THE TOWER WITHOUT THE CONSENT OF THE OWNER.
1.5 IN LIEU OF TEMPORARY BRACING CONTRACTOR MAY HAVE A STABILITY ANALYSIS PERFORMED BY AN ENGINEER LICENSED IN THE STATE THE TOWER IS LOCATED. THE ANALYSIS SHALL USE A MINIMUM WIND SPEED OF 45 mph (3-SEC) PER TIA-1019.

FABRICATION

2.1 ALL WORK SHALL BE DONE IN ACCORDANCE WITH A.I.S.C. "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
2.2 STRUCTURAL STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS:

	YIELD	ASTM SPECS
A. STEEL SHAPES AND PLATES, U.N.O.	65ksi	A572

2.3 ALL NEW MATERIAL INCLUDING STRUCTURAL STEEL AND FASTENERS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 AND A153.
2.4 WELDING SHALL MEET ANSI/AWS D1.1 STRUCTURAL WELDING CODE (LATEST REVISION). ELECTRODES SHALL BE E80 SERIES.
2.5 CONTRACTOR SHALL PROVIDE SHOP FABRICATION DRAWINGS TO B+T GROUP 5 DAYS PRIOR TO FABRICATION.

KEY NOTES

(1) TOWER MODIFICATION I.D.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/29/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	91728.005.01
PROJECT ENG:	ROBBIE FRAZIER
DRAWN BY:	RA / TEL
CHECKED BY:	ASF

B+T ENGINEERING, INC.

WINDSORCENTRAL
855662
340 BLOOMFIELD AVENUE
WINDSOR, CT
EXISTING 148' MONOPOLE

SHEET TITLE
GENERAL NOTES, AJAX BOLT NOTES AND DETAIL

SHEET NUMBER: S3
REVISION: 0

CCI: FLAT PLATE-BILL OF MATERIALS (65KSI)

BOTTOM ELEVATION	TOP ELEVATION	FLAT PLATE DESIGNATION	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	AJAX BOLTS PER PLATE	TOTAL AJAX BOLT QTY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	TOTAL STEEL WEIGHT	
0'-6"	35'-6"	CCI-SFP-08512535	35'-0"	3	49	147	15	15	17"	3793	LBS.
25'-6"	60'-6"	CCI-SFP-08512535	35'-0"	2	40	80	11	11	19"	1934	LBS.
35'-6"	60'-6"	CCI-SFP-08512525	25'-0"	1	34	34	11	11	19"	691	LBS.
60'-6"	95'-6"	CCI-SFP-08010035	35'-0"	3	39	117	8	8	16"	2142	LBS.
						378				8560	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 FABRICATOR 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. 1-800-831-3275 FOR PRODUCT INFORMATION.
3. ALL SHIMS SHALL BE ASTM A36.
4. HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
5. SHOP WELDS ARE ASSUMED E80XX OR GREATER, PER STANDARD SPLICE DETAIL.
6. IF SCOPE OF MODIFICATION REQUIRES REMOVAL OF TOWER ID TAG, IT MUST BE REPLACED.
7. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE ENGINEER OF RECORD OR TOWER OWNER.
8. WHERE POSSIBLE, CLIMBING HARDWARE SHOULD REMAIN IN-LINE ALONG THE POLE. IF AN OBSTRUCTION CAUSES A LATERAL OFFSET OF 2'-0" OR MORE, CLIMBING ANCHORS SHALL BE PROVIDED AT EACH CHANGE IN ALIGNMENT. IF NEW REINFORCEMENT REQUIRES STEP BOLT BRACKETS, INSTALL PRIOR TO GALVANIZATION OF STEEL.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER FITTING OF REINFORCEMENT ON MONOPOLES. SHIMS FOR MONOPOLE REINFORCEMENT MEMBER SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESSES SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED.

NEW CCI FLAT PLATE (65KSI) REINFORCING ELEMENTS

START ELEVATION	END ELEVATION	QTY	FLAT #	FLAT PLATE *
0.5'	35.5'	3	8, 13 & 18	CCI-SFP-08512535
25.5'	60.5'	2	6 & 12	CCI-SFP-08512535
35.5'	60.5'	1	18	CCI-SFP-08512525
60.5'	95.5'	3	6, 12 & 18	CCI-SFP-08010035

* SEE CMRP 65 KSI PARTS CATALOG EDITION 2 REV. 1 FOR PART DETAILS

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE AND BOLTS) AND INSTALLATION PROCEDURES.

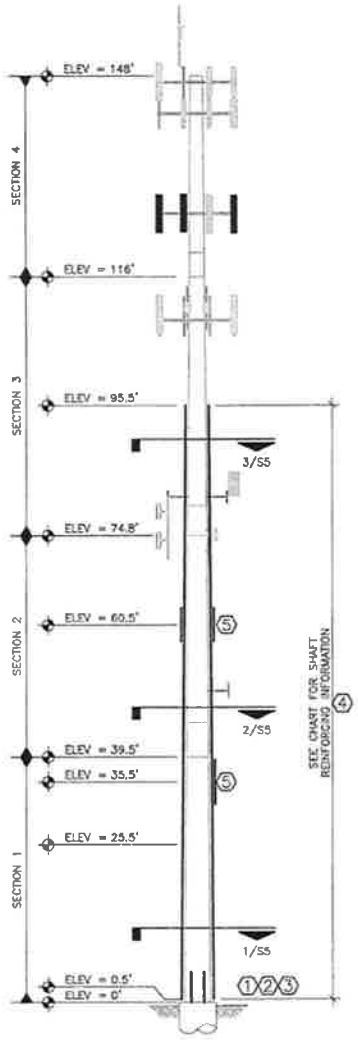
EXISTING MEMBER SCHEDULE

SECTION	NUMBER OF SIDES	THICKNESS	BOTTOM DIAMETER	TOP DIAMETER	LAP SPLICE
1	18	0.375"	51.300"	42.524"	66"
2	18	0.313"	44.222"	36.421"	57"
3	18	0.250"	37.847"	29.072"	45"
4	18	0.219"	30.241"	24.000"	---

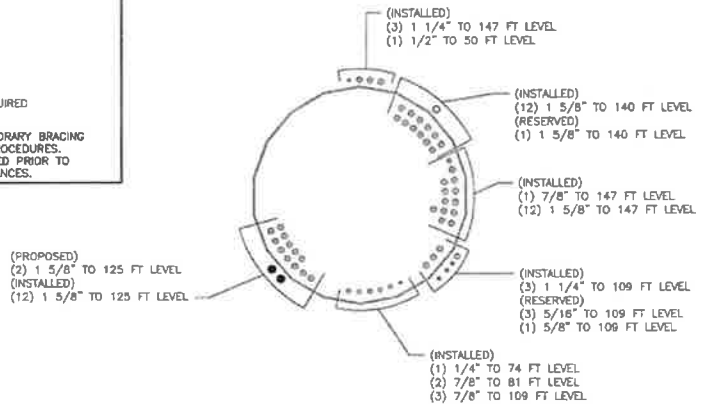
TOWER MODIFICATIONS:

1. CONTRACTOR SHALL BUDGET A SITE VISIT TO CHECK CRITICAL DIMENSIONS AND VERIFY UNKNOWN CONDITIONS PRIOR TO STEEL FABRICATION.
2. THE NEW AND EXISTING TRANSMISSION LINES MUST BE DISTRIBUTED AS SHOWN IN THE TX LINE DIST. DIAGRAM RE: DETAIL 2/S4.
3. INSTALL NEW TRANSITION STIFFENERS RE: SHEET S5.
4. INSTALL NEW REINFORCING ELEMENTS RE: SHEET S5.
5. INSTALL NEW IN-LINE SPLICES RE: SHEET S6.
6. RELOCATE/REPLACE STEP PEGS AS REQUIRED

* CONTRACTOR SHALL PROVIDE TEMPORARY BRACING FOR ALL REMOVE AND REPLACE PROCEDURES.
** MODIFICATIONS SHALL BE COMPLETED PRIOR TO ADDING THE PROPOSED APPURTENANCES.



1 TOWER ELEVATION
SCALE: N.T.S.



2 TX LINE DISTRIBUTION DIAGRAM
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/29/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	91728.005.01
PROJECT ENG:	ROBBIE FRAZIER
DRAWN BY:	RA / TEL
CHECKED BY:	ASP

B+T ENGINEERING, INC.

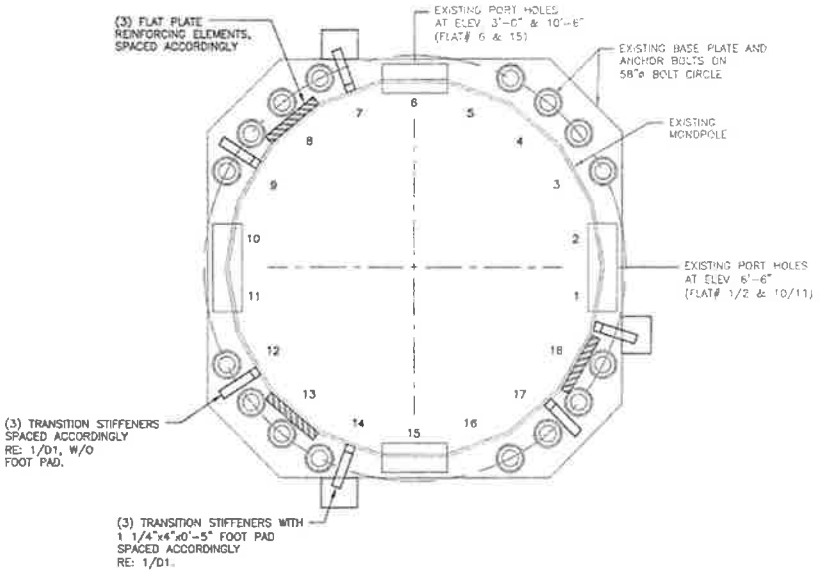
STATE OF CONNECTICUT
ANTHONY S. PUTTLE
No. 23924
LICENSED PROFESSIONAL ENGINEER
10/29/14

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

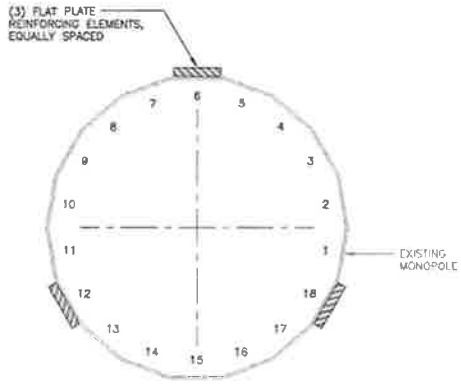
WINDSORCENTRAL
855662
340 BLOOMFIELD AVENUE
WINDSOR, CT
EXISTING 148' MONOPOLE

SHEET TITLE
TOWER ELEV., SCHEDULES, AND TX LINE DIST. DIAGRAM

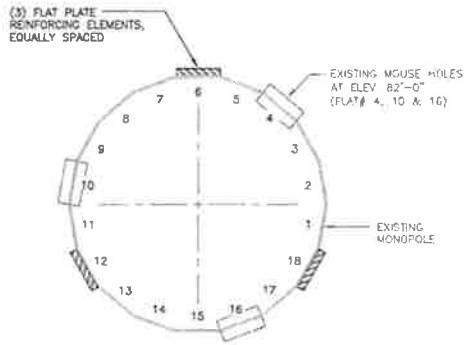
SHEET NUMBER	REVISION
S4	0



1 TOWER SECTION (0'-35.5')
SCALE: N.T.S.



2 TOWER SECTION (25.5'-60.5')
SCALE: N.T.S.



3 TOWER SECTION (60.5'-95.5')
SCALE: N.T.S.

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CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/29/14	ISSUED FOR CONSTRUCTION

PROJECT NO	91728.005.01
PROJECT ENG	ROBBIE FRAZIER
DRAWN BY	RA / TEL
CHECKED BY	ASF

B+T ENGINEERING, INC.

STATE OF CONNECTICUT * CHAD TITLE * No. 23924 LICENSED PROFESSIONAL ENGINEER * 10/29/14

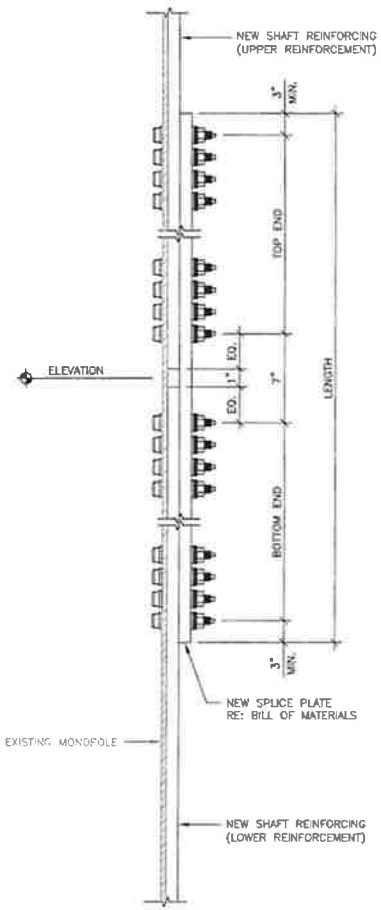
WINDSORCENTRAL
855662

340 BLOOMFIELD AVENUE
WINDSOR, CT

EXISTING 148' MONOPOLE

SHEET TITLE
TOWER SECTIONS
0'-35.5', 25.5'-60.5' AND 60.5'-95.5'

SHEET NUMBER	REVISION
S5	0



1 FLAT PLATE IN-LINE SPLICE DETAIL
SCALE: N.T.S.

SPLICE PLATE-BILL OF MATERIALS (65KSI)

ELEVATION	WIDTH	THICKNESS	LENGTH	QTY	QTY OF BOLTS (TOP END)	QTY OF BOLTS (BOTTOM END)	AJAX BOLTS PER SPLICE	TOTAL AJAX BOLTS	TOTAL STEEL WEIGHT	
35'-8"	6 1/2"	1 1/4"	7'-1"	1	11	15	26	26	196	LBS.
60'-8"	6"	1"	5'-4"	3	8	11	19	57	326	LBS.
							TOTAL:	83	522	LBS.

* O.C. DISTANCE ON TERMINATION BOLTS TO BE 3 IN. U.N.O.
* USE SHIM PLATES AS REQUIRED.
**BOLT QTY INCLUDED IN S4 BILL OF MATERIALS
***STEEL WEIGHT NOT INCLUDED IN S4 BILL OF MATERIALS.

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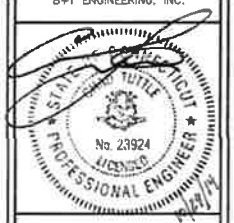
CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/29/14	ISSUED FOR CONSTRUCTION

PROJECT NO: 91728.005.01
PROJECT ENG: ROBBIE FRAZIER
DRAWN BY: RA / TEL
CHECKED BY: ASP

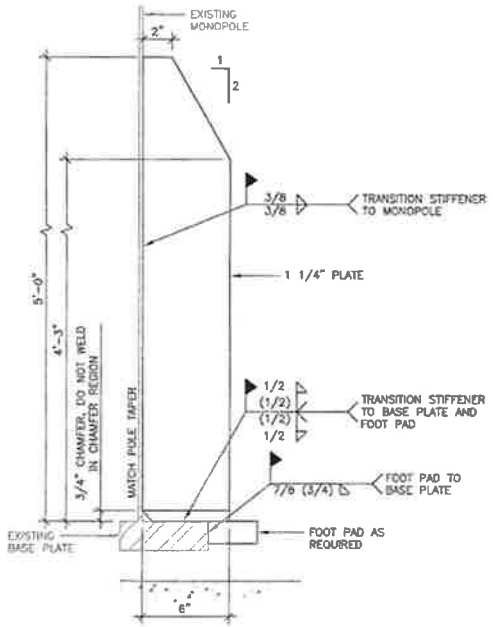
B+T ENGINEERING, INC.



WINDSORCENTRAL
855662
340 BLOOMFIELD AVENUE
WINDSOR, CT
EXISTING 148' MONOPOLE

SHEET TITLE
IN-LINE SPLICE DETAIL

SHEET NUMBER: S6
REVISION: 0



1 CCI-TRANSITION STIFFENER DETAIL
SCALE: N.T.S.

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CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/29/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	91728.005.01
PROJECT ENG:	ROBBIE FRAZIER
DRAWN BY:	RA / TEL
CHECKED BY:	ASP

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
No 23924
LICENSED
PROFESSIONAL ENGINEER

WINDSORCENTRAL
855682

340 BLOOMFIELD AVENUE
WINDSOR, CT

EXISTING 149' MONOPOLE

SHEET TITLE
DETAILS

SHEET NUMBER: D1

REVISION: 0