Robinson+Cole

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Also admitted in Massachusetts

January 7, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
230 Guinea Road, Monroe, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 218-foot level of the existing 240-foot lattice tower at 230 Guinea Road in Monroe, Connecticut (the "Property"). The tower is owned by Crown Castle. Cellco's shared use of this tower was approved by the Council in 2000. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with three (3) model LNX-8514DS-VTM, 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 new 1900 MHz and 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable. 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 Steve Vavrek, First Selectman for the Town of Monroe. The Town of Monroe 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).

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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 218-foot level of the 240-foot tower.

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

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

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

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

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

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Steve Vavrek, Monroe First Selectman
Sandy M. Carter

ATTACHMENT 1

Product Specifications

COMMSCOPE®

LNX-8514DS-VTM

Andrew® Teletilt® Antenna, 698–896 MHz, 85° horizontal beamwidth, RET compatible

POWERED BY ANDREW.

Electrical Specifications

Frequency Band, MHz	698–806	806–896
Gain by all Beam Tilts, average, dBi	15.7	16.2
Gain by all Beam Tilts Tolerance, dB	±0.3	±0.2
Gain by Beam Tilt, average, dBi	0 ° | 15.7 4 ° | 15.7 8 ° | 15.5	0 ° | 16.3 4 ° | 16.3 8 ° | 16.1
Beamwidth, Horizontal, degrees	85	84
Beamwidth, Horizontal Tolerance, degrees	±1.2	±1.3
Beamwidth, Vertical, degrees	8.6	7.8
Beamwidth, Vertical Tolerance, degrees	±0.5	±0.4
Beam Tilt, degrees	0–8	0–8
USLS, dB	20	22
Front-to-Back Total Power at 180° ± 30°, dB	22	23
CPR at Boresight, dB	18	18
CPR at Sector, dB	12	11
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°

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

Mechanical Specifications

Color | Radome Material	Light gray | Fiberglass, UV resistant
Connector Interface | Location | Quantity	7-16 DIN Female | Bottom | 2
Wind Loading, maximum	879.0 N @ 150 km/h 197.6 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph
Antenna Dimensions, L x W x D	2449.0 mm x 301.0 mm x 181.0 mm | 96.4 in x 11.9 in x 7.1 in
Net Weight	23.1 kg | 50.9 lb
Model with factory installed AISG 2.0 RET	LNX-8514DS-A1M

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	2 Branch RX – LA6.0.1
	1900A HW version	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)

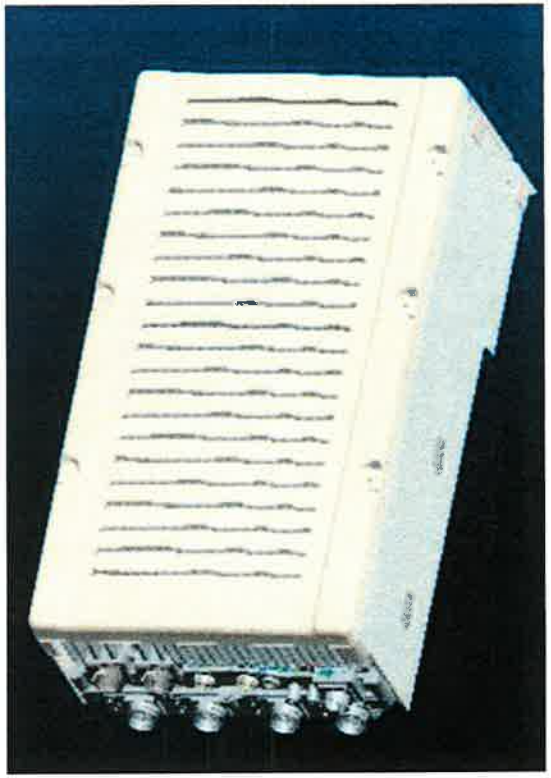
** Not a Verizon Wireless deployed product

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**

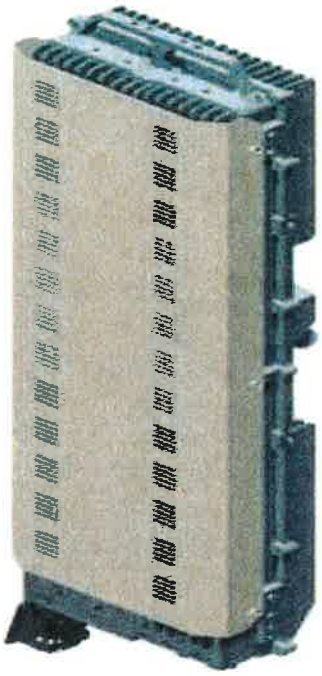


**- Includes solar shield but not mounting brackets (8 lbs.)

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.

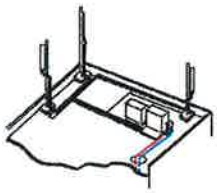
EASY INSTALLATION

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.

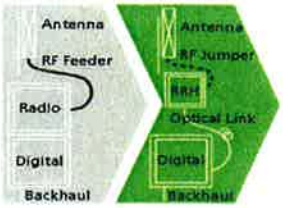
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

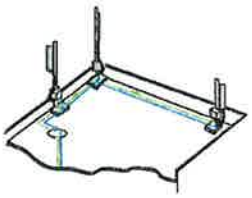
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



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[9] accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

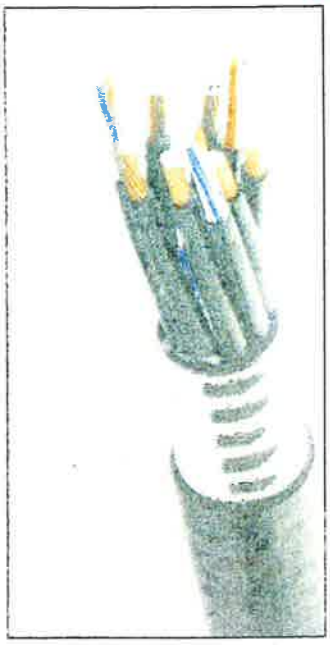


Figure 1: HYBRIFLEX Series

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 (0.295)
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-93-639 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)

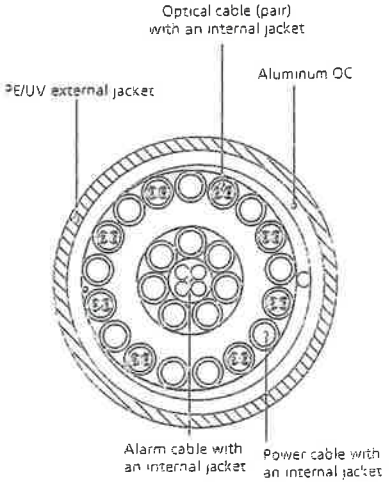


Figure 2: Construction Detail

- This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Monroe								
Tower Height: 240ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*PageNet				0.0127	931.5	0.6210	2.05%	
*RAW Mobile Data				0.0008	936	0.6240	0.13%	
*Nextel			222	0.0142	858	0.5720	2.48%	
*CL&P	2	240	181	0.0053	935.2375	0.6235	0.84%	
*AT&T UMTS	2	565	236	0.0073	880	0.5867	1.24%	
*AT&T UMTS	2	875	236	0.0113	1900	1.0000	1.13%	
*AT&T GSM	1	296	236	0.0019	880	0.5867	0.33%	
*AT&T LTE	1	1117	236	0.0072	734	0.4893	1.47%	
Verizon PCS	**15**	**340**	**218**	**0.0386**	**1970**	**1.0000**	**3.86%**	
Verizon Cellular	**9**	**309**	**218**	**0.0210**	**869**	**0.5793**	**3.63%**	
Verizon AWS	**1**	**741**	**218**	**0.0056**	**2145**	**1.0000**	**0.56%**	
Verizon 700	**1**	**1750**	**218**	**0.0132**	**746**	**0.4973**	**2.66%**	
								20.39%
* Source: Siting Council								

ATTACHMENT 3

Date: **September 22, 2014**

Andrew Bazinet
Crown Castle
3 Corporate Park Drive Suite 101
Clifton Park, NY 12065
(585) 370-4766

GPD Group
520 S. Main St., Suite 2531
Akron, OH 44311
(614) 859-1607
dpalkovic@gpdgroup.com

Subject:	**Structural Modification Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate** **Carrier Site Name:**	 Monroe, CT
Crown Castle Designation:	**Crown Castle BU Number:** **Crown Castle Site Name:** **Crown Castle JDE Job Number:** **Crown Castle Work Order Number:** **Crown Castle Application Number:**	841294 MONROE-GUINEA ROAD 269945 918786 219490 Rev. 11
Engineering Firm Designation:	**GPD Group Project Number:**	2014777.841294.04
Site Data:	**230 GUINEA ROAD, MONROE, Fairfield County, CT** **Latitude *41° 20' 30.7"*, Longitude *-73° 16' 28.3"*** **240 Foot - Self Support Tower**	

Dear Andrew Bazinet,

GPD 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 700217, in accordance with application 219490, revision 11.

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

LC4.5: Modified Structure w/ Existing + Proposed **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard, and the 2005 CT Building Code based upon a wind speed of 85 mph fastest mile.

We at *GPD 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.

Structural analysis prepared by: Ahmmed A. Hammada, EI

Respectfully submitted by:

John N. Kabak, P.E.
Connecticut #: 28336

9/22/2014

TABLE OF CONTENTS

1) INTRODUCTION

The 240 ft. self-support tower designed by Rohn is supported on three legs and has twelve major sections. It has a triangular cross section made of bolted connections with a "K down" bracing configuration from 0.0' to 40.0' and an "X" bracing configuration from 40.0' to 240.0'. The tower is fabricated with round pipe legs. The tower is galvanized and has tower lighting.

The modifications designed by GPD Group Job #: 2009268.80, dated 10/20/2009, have been considered in this analysis. The modifications consist of replacing the diagonal members from 20'-0" to 40'-0" and replacing the diagonal member bolts from 140'-0" to 160'-0".

The modifications designed by GPD (Project #: 2014777.841294.04, dated 9/22/14) were considered in the analysis. They consist of installing rock anchors to the foundations, replacing bent horizontals and replacing diagonals.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 38 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
215.0	218.0	3	Alcatel Lucent	RRH2X60-AWS	1	1-5/8	1,2
		3	Alcatel Lucent	RRH2X60-PCS			
		6	Andrew	HBXX-6517DS-VTM			
		3	Andrew	LNX-8514DS-VTM			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			

Notes:
1) See Appendix B for the proposed coax layout.
2) Antenna centerlines are measured from the top of the foundation centerline.

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
240.0	242.0	1	Decibel	DB806-XC	1	1/2	2
		1	Kathrein	FMO			
	240.0	1		Side Arm Mount [SO 302-3]			
236.0	236.0	6	Powerwave	LGP13519	12 2 2	1-5/8 3/8 3/4	2
		6	Powerwave	LGP21401			
		3	Ericsson	RRUS 11 B12			
		6	Powerwave	RA21.7770.00			
		3	Powerwave	P65-16-XLH-RR			
		1	Raycap	DC6-48-60-18-8F			
		1		Sector Mount [SM 201-3]			
215.0	218.0	6	Andrew	LPA-80080/6CF			1, 2
		3	Andrew	BXA-171085-8BF-EDIN-2			
		1	Andrew	BXA-70063-4CF-EDIN-6	18	1-5/8	2
		2	Andrew	BXA-70063-6CF-2			
	215.0	1		Sector Mount [SM 502-3]			
201.0	207.0	2	Kathrein	OG-4	2	1-1/4	2
	201.0	2		Side Arm Mount [SO 306-1]			
186.0	189.0	1	Andrew	DB589-A	1 1	7/8 1/2	2
	186.0	1		Side Arm Mount [SO 308-1]			
	184.0	1	Andrew	DB589-A			
12.0	12.0	1	Scala	TY-840	1	1/2	2

Notes:
1) Existing antennas and coax to be removed.
2) Antenna centerlines are measured from the top of the foundation centerline.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
GEOTECHNICAL REPORTS	WEI Project #: 2009-901, dated 09/16/2009	4468666	CCISITES
POST-MODIFICATION INSPECTION	GPD Job #: 2009591.00, dated 01/13/2010	4710154	CCISITES
TOWER FOUNDATION DRAWINGS	WEI Project #: 2009-901, dated 9/16/2009	4468667	CCISITES
TOWER REINFORCEMENT DESIGN	GPD Job #: 2009268.80, dated 10/12/2009	4601540	CCISITES
TOWER STRUCTURAL ANALYSIS REPORTS	GPD Job #: 2013723.60427.01, dated 04/03/2013	4601542	CCISITES
TOWER REINFORCEMENT DESIGN	GPD Job #: 2014777.841294.04, dated 9/22/14	D. Palkovic	GPD

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-222-F.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	242 - 222	Leg	ROHN 2.5 STD	1	-15.15	55.08	27.5	Pass
T2	222 - 202	Leg	ROHN 3 EH	37	-45.07	96.05	46.9	Pass
T3	202 - 182	Leg	ROHN 3.5 EH	67	-72.62	110.26	65.9	Pass
T4	182 - 162	Leg	ROHN 4 EH	88	-100.06	139.06	71.9	Pass
T5	162 - 142	Leg	ROHN 5 EH	109	-126.94	206.26	61.5	Pass
T6	142 - 122	Leg	ROHN 5 EH	130	-151.07	177.41	85.2	Pass
T7	122 - 102	Leg	ROHN 6 EH	145	-177.70	264.28	67.2	Pass
T8	102 - 82	Leg	ROHN 6 EH	160	-204.77	264.28	77.5	Pass
T9	82 - 62	Leg	ROHN 6 EH	175	-232.06	264.28	87.8	Pass
T10	62 - 42	Leg	ROHN 8 EHS	190	-259.64	338.70	76.7	Pass
T11	42 - 22	Leg	ROHN 8 EHS	205	-265.10	338.70	78.3	Pass
T12	22 - 2	Leg	ROHN 8 EH	238	-319.26	435.62	73.3	Pass
T1	242 - 222	Diagonal	L1 3/4x1 3/4x3/16	8	-2.52	7.82	32.3	Pass
T2	222 - 202	Diagonal	L1 3/4x1 3/4x3/16	44	-4.28	4.42	96.9	Pass
T3	202 - 182	Diagonal	L2 1/2x2 1/2x3/16	71	-5.41	8.13	66.5	Pass
T4	182 - 162	Diagonal	L2 1/2x2 1/2x1/4	92	-5.95	8.01	74.2	Pass
T5	162 - 142	Diagonal	L2 1/2x2 1/2x5/16	113	-6.58	7.63	86.2	Pass
T6	142 - 122	Diagonal	L3x3x5/16	134	-7.90	9.11	86.8	Pass
T7	122 - 102	Diagonal	L3 1/2x3 1/2x1/4	149	-8.70	10.08	86.3	Pass
T8	102 - 82	Diagonal	L4x4x5/16	164	-9.57	15.67	61.1	Pass
T9	82 - 62	Diagonal	L4x4x5/16	178	-10.41	13.31	78.2	Pass
T10	62 - 42	Diagonal	L4x4x5/16	193	-11.27	11.58	97.3	Pass
T11	42 - 22	Diagonal	ROHN 3 STD	212	-19.56	27.95	70.0	Pass
T12	22 - 2	Diagonal	ROHN 3 STD	245	-19.45	26.71	72.8	Pass
T11	42 - 22	Horizontal	ROHN 2.5 STD	208	-10.92	13.37	81.7	Pass
T12	22 - 2	Horizontal	ROHN 3 STD	241	-11.44	22.38	51.1	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	242 - 222	Top Girt	L1 3/4x1 3/4x3/16	6	-0.27	2.71	9.8	Pass
T2	222 - 202	Top Girt	L1 3/4x1 3/4x3/16	41	-0.36	2.71	13.2	Pass
T11	42 - 22	Redund Horz 1 Bracing	ROHN 1.5 STD	210	-4.60	11.31	40.7	Pass
T12	22 - 2	Redund Horz 1 Bracing	ROHN 1.5 STD	243	-5.54	9.69	57.1	Pass
T11	42 - 22	Redund Diag 1 Bracing	ROHN 2 STD	211	-4.14	7.72	53.6	Pass
T12	22 - 2	Redund Diag 1 Bracing	ROHN 2 STD	244	-4.69	7.32	64.1	Pass
T11	42 - 22	Redund Hip 1 Bracing	ROHN 1.5 STD	233	-0.03	10.23	0.3	Pass
T12	22 - 2	Redund Hip 1 Bracing	ROHN 1.5 STD	266	-0.02	8.72	0.3	Pass
T11	42 - 22	Redund Hip Diagonal Bracing	ROHN 1.5 STD	234	-0.04	1.84	2.4	Pass
T12	22 - 2	Redund Hip Diagonal Bracing	ROHN 1.5 STD	267	-0.04	1.68	2.4	Pass
T11	42 - 22	Inner Bracing	ROHN 2 STD	237	-0.01	4.12	0.6	Pass
T12	22 - 2	Inner Bracing	ROHN 2 STD	270	-0.01	3.51	0.6	Pass
							Summary	
						Leg (T9)	87.8	Pass
						Diagonal (T10)	97.3	Pass
						Horizontal (T11)	81.7	Pass
						Top Girt (T2)	13.2	Pass
						Redund Horz 1 Bracing (T12)	57.1	Pass
						Redund Diag 1 Bracing (T12)	64.1	Pass
						Redund Hip 1 Bracing (T11)	0.3	Pass
						Redund Hip Diagonal Bracing (T11)	2.4	Pass
						Inner Bracing (T12)	0.6	Pass
						Bolt Checks	99.0	Pass
						Rating =	99.0	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC4.5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
	Anchor Rods	0	62.1	Pass
1	Base Foundation	0	53.5	Pass
1	Base Foundation Soil Interaction	0	78.7	Pass

Structure Rating (max from all components) =	99%

4.1) Recommendations

The modified tower and its modified foundations will be satisfactory for the proposed loading once the GPD designed modifications (Project #: 2014777.841294.04, dated 9/18/14) have been properly installed.

5) DISCLAIMER OF WARRANTIES

GPD GROUP has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD GROUP in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

This analysis is limited to the designated maximum wind and seismic conditions per the governing tower standards and code. Wind forces resulting in tower vibrations near the structure's resonant frequencies were not considered in this analysis and are outside the scope of this analysis. Lateral loading from any dynamic response was not evaluated under a time-domain based fatigue analysis.

GPD GROUP does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD GROUP provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the capability of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the code specified amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD GROUP, but are beyond the scope of this report.

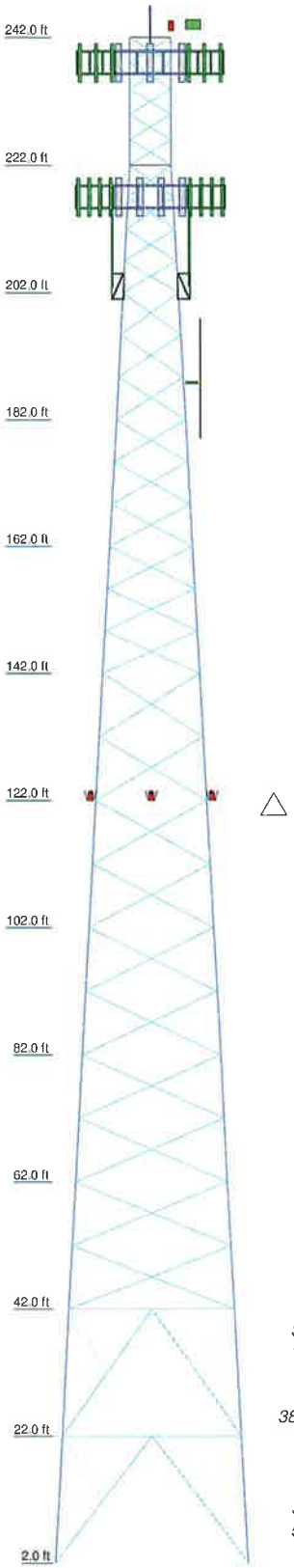
Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal. Legs carry axial loads and derive their strength from shorter unbraced lengths by the presence of redundant members and their connection to the diagonals with bolts or welds. If the bolts or welds are removed without providing any substitute to the frame, the leg is subjected to a higher unbraced length that immediately reduces its load carrying capacity. If a diagonal is also removed in addition to the connection, the unbraced length of the leg is greatly increased, jeopardizing its load carrying capacity. Failure of one leg can result in a tower collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the tower.

GPD GROUP makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD GROUP will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD GROUP pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

TNXTOWER OUTPUT



Section	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	ROHN 8 EH	ROHN 8 EHS			ROHN 6 EH		ROHN 5 EH		ROHN 4 EH	ROHN 3.5 EH	ROHN 3 EH	ROHN 2.5 STD
Leg Grade	A572-50											
Diagonals	ROHN 3 STD			L4x4x5/16		L3 1/2x3 1/2x1/4	L3x3x5/16	L2 1/2x2 1/2x5/16	L2 1/2x2 1/2x1/4	L2 1/2x2 1/2x3/16	L1 3/4x1 3/4x3/16	
Diagonal Grade				A572-50			A36					
Top Girts						N.A.					L1 3/4x1 3/4x3/16	
Horizontals	ROHN 3 STD	ROHN 2.5 STD					N.A.					
Red. Horizontals		ROHN 1.5 STD					N.A.					
Red. Diagonals		ROHN 2 STD					N.A.					
Red. Hips		ROHN 1.5 STD					N.A.					
Inner Bracing		ROHN 2 STD					N.A.					
Face Width (ft)	30.1771	25.8835	23.7367	21.59	19.4432	17.2964	15.1496	13.0028	10.8561	8.70928	6.5625	
# Panels @ (ft)	1 @ 19.9167	1 @ 20		10 @ 10			9 @ 6.66667			4 @ 5	5 @ 4	
Weight (K)	35.9	5.1	4.3	4.8	4.1	4.0	3.2	2.6	1.9	1.4	1.1	0.9

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Flash Beacon Lighting	242	(2) HBXX-6517DS-VTM w/ Mount Pipe	217
DB806-XC	242	(2) HBXX-6517DS-VTM w/ Mount Pipe	217
FMO	242	LNX-8514DS-VTM w/ Mount Pipe	217
Side Arm Mount [SO 302-3]	242	LNX-8514DS-VTM w/ Mount Pipe	217
(2) RA21.7770.00	238	LNX-8514DS-VTM w/ Mount Pipe	217
(2) RA21.7770.00	238	RRH2X60-AWS	217
(2) RA21.7770.00	238	RRH2X60-AWS	217
P65-16-XLH-RR	238	RRH2X60-AWS	217
P65-16-XLH-RR	238	RRH2X60-PCS	217
P65-16-XLH-RR	238	RRH2X60-PCS	217
(2) LGP13519	238	RRH2X60-PCS	217
(2) LGP13519	238	DB-T1-6Z-8AB-0Z	217
(2) LGP13519	238	Sector Mount [SM 502-3]	217
(2) LGP21401	238	OG-4	203
(2) LGP21401	238	OG-4	203
(2) LGP21401	238	Side Arm Mount [SO 306-1]	203
RRUS 11 B12	238	Side Arm Mount [SO 306-1]	203
RRUS 11 B12	238	DB589-A	188
RRUS 11 B12	238	DB589-A	188
DC6-48-60-18-8F Surge Suppression Unit	238	Side Arm Mount [SO 308-1]	188
		17' Side Light Mount	122
Sector Mount [SM 201-3]	238	17' Side Light Mount	122
BXA-70063-6CF-2 w/ Mount Pipe	217	Side Light	122
BXA-70063-4CF-EDIN-6 w/ Mount Pipe	217	Side Light	122
		Side Light	122
BXA-70063-6CF-2 w/ Mount Pipe	217	TY-840	14
(2) HBXX-6517DS-VTM w/ Mount Pipe	217		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99%

MAX. CORNER REACTIONS AT BASE:
DOWN: 318 K
SHEAR: 35 K

UPLIFT: -267 K
SHEAR: 31 K

AXIAL
110 K

SHEAR
18 K

MOMENT
2484 kip-ft

TORQUE 19 kip-ft
38 mph WIND - 0.7500 in ICE

AXIAL
53 K

SHEAR
59 K

MOMENT
7843 kip-ft

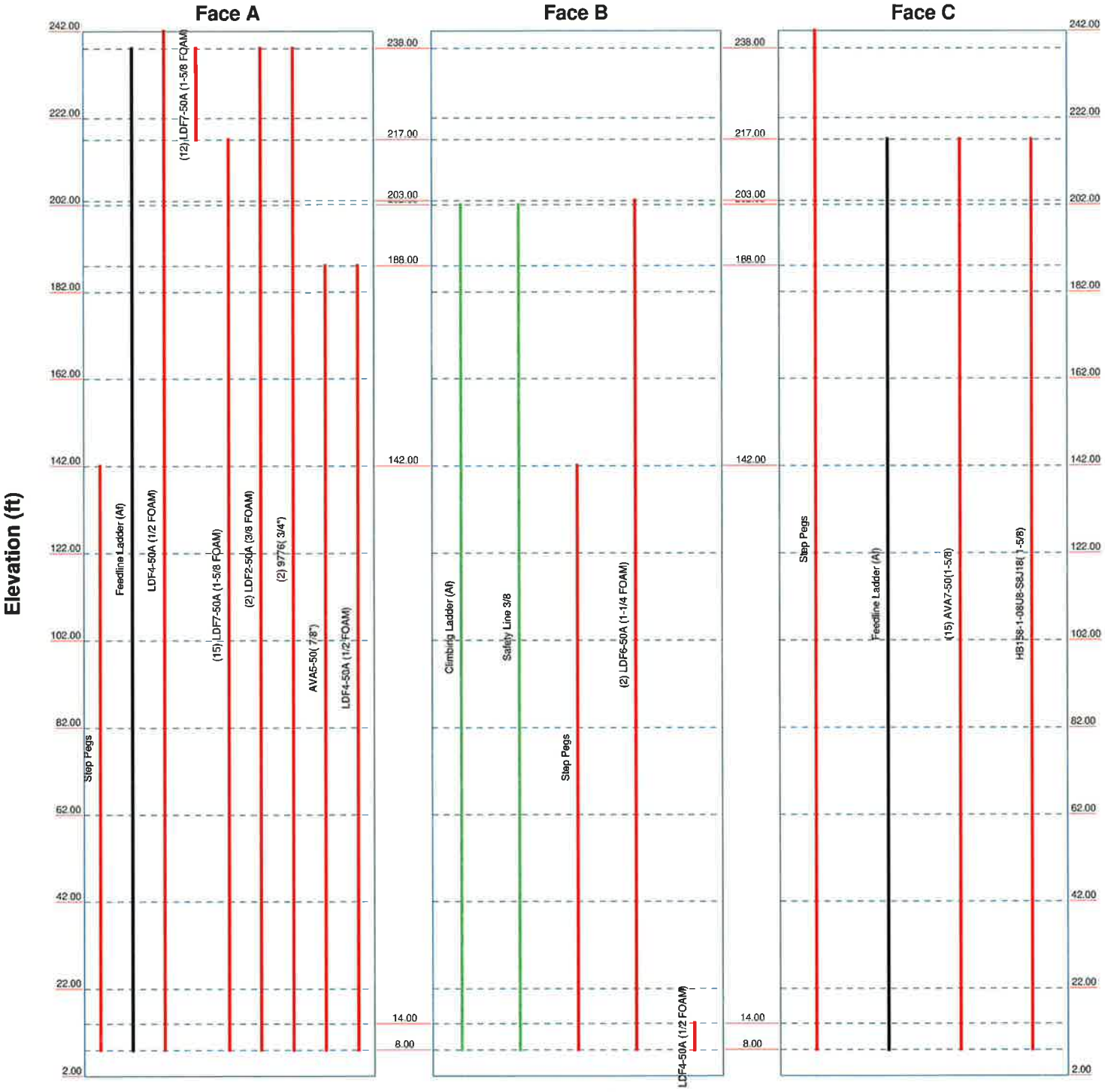
TORQUE 74 kip-ft
REACTIONS - 85 mph WIND

GPD Group
520 S. Main St., Suite 2531
Akron, OH 44311
Phone: 330-572-2100
FAX: 330-572-2101

Job:	BU #: 841294 MONROE-GUINEA ROAD
Project:	2014777.841294.04
Client: Crown Castle USA, Inc	Drawn by: ahammada App'd:
Code: TIA/EIA-222-F	Date: 09/22/14 Scale: NTS
Path: C:\Users\ahammada\Desktop\New folder (2)\841294.eri	Dwg No. E-1

Feed Line Distribution Chart
2' - 242'

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



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Job:	BU #: 841294 MONROE-GUINEA ROAD		
Project:	2014777.841294.04		
Client: Crown Castle USA, Inc	Drawn by: ahammada	App'd:	
Code: TIA/EIA-222-F	Date: 09/22/14	Scale: NTS	
Path: C:\Users\ahammada\Desktop\New folder (2)\841294.eri		Dwg No. E-7	

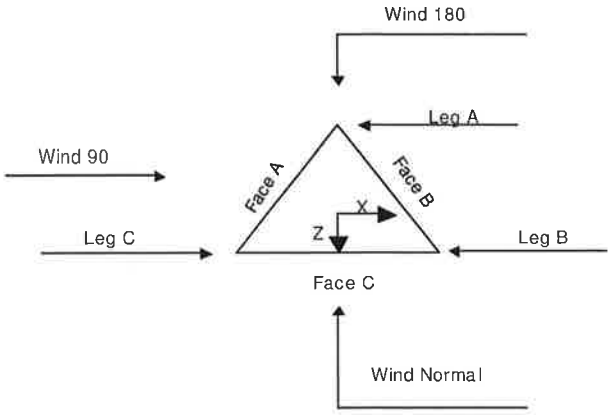
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 242.00 ft above the ground line.
The base of the tower is set at an elevation of 2.00 ft above the ground line.
The face width of the tower is 6.56 ft at the top and 30.18 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

1) Tower is located in Fairfield County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) Pressures are calculated at each section.
10) Stress ratio used in tower member design is 1.333.
11) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	242.00-222.00			6.56	1	20.00
T2	222.00-202.00			6.56	1	20.00
T3	202.00-182.00			8.71	1	20.00
T4	182.00-162.00			10.86	1	20.00
T5	162.00-142.00			13.00	1	20.00
T6	142.00-122.00			15.15	1	20.00
T7	122.00-102.00			17.30	1	20.00
T8	102.00-82.00			19.44	1	20.00
T9	82.00-62.00			21.59	1	20.00
T10	62.00-42.00			23.74	1	20.00
T11	42.00-22.00			25.88	1	20.00
T12	22.00-2.00			28.03	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	242.00-222.00	4.00	X Brace	No	No	0.0000	0.0000
T2	222.00-202.00	5.00	X Brace	No	No	0.0000	0.0000
T3	202.00-182.00	6.67	X Brace	No	No	0.0000	0.0000
T4	182.00-162.00	6.67	X Brace	No	No	0.0000	0.0000
T5	162.00-142.00	6.67	X Brace	No	No	0.0000	0.0000
T6	142.00-122.00	10.00	X Brace	No	No	0.0000	0.0000
T7	122.00-102.00	10.00	X Brace	No	No	0.0000	0.0000
T8	102.00-82.00	10.00	X Brace	No	No	0.0000	0.0000
T9	82.00-62.00	10.00	X Brace	No	No	0.0000	0.0000
T10	62.00-42.00	10.00	X Brace	No	No	0.0000	0.0000
T11	42.00-22.00	20.00	K1 Down	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T12	22.00-2.00	19.92	K1 Down	No	Yes	0.0000	1.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 242.00-222.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 222.00-202.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T3 202.00-182.00	Pipe	ROHN 3.5 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 182.00-162.00	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T5 162.00-142.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)
T6 142.00-122.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A572-50 (50 ksi)
T7 122.00-102.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T8 102.00-82.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L4x4x5/16	A572-50 (50 ksi)
T9 82.00-62.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L4x4x5/16	A572-50 (50 ksi)
T10 62.00-42.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L4x4x5/16	A572-50 (50 ksi)
T11 42.00-22.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T12 22.00-2.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 242.00-222.00	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Flat Bar		A36 (36 ksi)
T2 222.00-202.00	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Equal Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T11 42.00-22.00	None	Solid Round		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T12 22.00-2.00	None	Solid Round		A36 (36 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T11 42.00-22.00	Solid Round		A36 (36 ksi)	Pipe	ROHN 2 STD	A36 (36 ksi)
T12 22.00-2.00	Solid Round		A36 (36 ksi)	Pipe	ROHN 2 STD	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T11 42.00-22.00	A36 (36 ksi)	Horizontal (1)	Pipe	ROHN 1.5 STD	1
		Diagonal (1)	Pipe	ROHN 2 STD	1
		Hip (1)	Pipe	ROHN 1.5 STD	1
		Hip Diagonal		ROHN 1.5 STD	1
T12 22.00-2.00	A36 (36 ksi)	Horizontal (1)	Pipe	ROHN 1.5 STD	1
		Diagonal (1)	Pipe	ROHN 2 STD	1
		Hip (1)	Pipe	ROHN 1.5 STD	1
		Hip Diagonal		ROHN 1.5 STD	1

Tower Section Geometry *(cont'd)*

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
T1 242.00-222.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 222.00-202.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 202.00-182.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 182.00-162.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 162.00-142.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 142.00-122.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 122.00-102.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 102.00-82.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 82.00-62.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T10 62.00-42.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T11 42.00-22.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T12 22.00-2.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1 242.00-222.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T2 222.00-202.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T3 202.00-182.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T4 182.00-162.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T5 162.00-142.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T6 142.00-122.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T7 122.00-102.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T8 102.00-82.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T9 82.00-62.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T10 62.00-42.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T11 42.00-22.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T12 22.00-2.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

[1]Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 242.00-222.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 222.00-202.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 202.00-182.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 182.00-162.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 162.00-142.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 142.00-122.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 122.00-102.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 102.00-82.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 82.00-62.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 62.00-42.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 42.00-22.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 22.00-2.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1 242.00-222.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 222.00-202.00	Flange	0.8750 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 202.00-182.00	Flange	0.8750 A325N	4	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 182.00-162.00	Flange	1.0000 A325N	4	0.5000 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 162.00-142.00	Flange	1.0000 A325N	4	0.5000 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 142.00-122.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 122.00-102.00	Flange	1.0000 A325N	6	0.6250 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 102.00-82.00	Flange	1.0000 A325N	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 82.00-62.00	Flange	1.0000 A325N	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 62.00-42.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T11 42.00-22.00	Flange	1.0000 A325N	8	0.7500 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	2	0.6250 A325N	0
T12 22.00-2.00	Flange	1.0000 A354-BC	10	0.7500 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	2	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Step Pegs	C	Yes	Ar (CfAe)	242.00 - 8.00	0.0000	0.5	1	1	0.8000	0.8000		2.72
Step Pegs	A	Yes	Ar (CfAe)	142.00 - 8.00	0.0000	0.5	1	1	0.8000	0.8000		2.72
Step Pegs	B	Yes	Ar (CfAe)	142.00 - 8.00	0.0000	0.5	1	1	0.8000	0.8000		2.72
Feedline Ladder (Af)	C	Yes	Af (CfAe)	217.00 - 8.00	0.0000	-0.4	1	1	3.0000	3.0000	12.0000	8.40
Feedline Ladder (Af)	A	Yes	Af (CfAe)	238.00 - 8.00	0.0000	-0.4	1	1	2.5000	2.5000	5.5000	8.40
LDF4-50A (1/2 FOAM)	A	Yes	Ar (CfAe)	242.00 - 8.00	0.0000	0.47	1	1	0.6300	0.6300		0.15
LDF7-50A (1-5/8 FOAM)	A	Yes	Ar (CfAe)	238.00 - 217.00	0.0000	-0.4	12	6	1.0000	1.9800		0.82
LDF7-50A (1-5/8 FOAM)	A	Yes	Ar (CfAe)	217.00 - 8.00	0.0000	-0.4	15	9	1.0000	1.9800		0.82
LDF2-50A (3/8 FOAM)	A	Yes	Ar (CfAe)	238.00 - 8.00	0.0000	-0.35	2	1	0.4400	0.4400		0.08
9776(3/4")	A	Yes	Ar (CfAe)	238.00 - 8.00	0.0000	-0.35	2	1	0.7350	0.7350		0.31
AVA7-50(1-5/8)	C	Yes	Ar (CfAe)	217.00 - 8.00	0.0000	-0.4	15	9	1.0000	2.0100		0.70
HB158-1-08U8-S8J18(1-5/8)	C	Yes	Ar (CfAe)	217.00 - 8.00	0.0000	-0.325	1	1	1.0000	1.9800		1.30
LDF6-50A (1-1/4 FOAM)	B	Yes	Ar (CfAe)	203.00 - 8.00	0.0000	0.5	2	2	1.0000	1.5500		0.66
AVA5-50(	A	Yes	Ar (CfAe)	188.00 - 8.00	0.0000	-0.485	1	1	1.0000	1.1020		0.30

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
7/8")												
LDF4-50A (1/2 FOAM)	A	Yes	Ar (CfAe)	188.00 - 8.00	0.0000	-0.485	1	1	0.6300	0.6300		0.15
LDF4-50A (1/2 FOAM)	B	Yes	Ar (CfAe)	14.00 - 8.00	0.0000	0.45	1	1	0.6300	0.6300		0.15

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
Climbing Ladder (Af)	B	No	CaAa (Out Of Face)	202.00 - 8.00	1	No Ice	0.64	4.81
						1/2" Ice	0.75	6.97
						1" Ice	0.86	9.48
						2" Ice	1.08	15.54
						4" Ice	1.53	31.80
Safety Line 3/8	B	No	CaAa (Out Of Face)	202.00 - 8.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
						2" Ice	0.44	2.34
						4" Ice	0.84	4.46

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
T1	242.00-222.00	A	18.457	3.333	0.000	0.000	0.31
		B	0.000	0.000	0.000	0.000	0.00
		C	1.333	0.000	0.000	0.000	0.05
T2	222.00-202.00	A	30.233	4.167	0.000	0.000	0.42
		B	0.258	0.000	0.000	0.000	0.00
		C	26.421	3.750	0.000	0.000	0.36
T3	202.00-182.00	A	33.574	4.167	0.000	0.000	0.44
		B	5.167	0.000	0.000	13.550	0.13
		C	34.783	5.000	0.000	0.000	0.46
T4	182.00-162.00	A	35.595	4.167	0.000	0.000	0.44
		B	5.167	0.000	0.000	13.550	0.13
		C	34.783	5.000	0.000	0.000	0.46
T5	162.00-142.00	A	35.595	4.167	0.000	0.000	0.44
		B	5.167	0.000	0.000	13.550	0.13
		C	34.783	5.000	0.000	0.000	0.46
T6	142.00-122.00	A	36.928	4.167	0.000	0.000	0.50
		B	6.500	0.000	0.000	13.550	0.18
		C	34.783	5.000	0.000	0.000	0.46
T7	122.00-102.00	A	36.928	4.167	0.000	0.000	0.50
		B	6.500	0.000	0.000	13.550	0.18
		C	34.783	5.000	0.000	0.000	0.46
T8	102.00-82.00	A	36.928	4.167	0.000	0.000	0.50
		B	6.500	0.000	0.000	13.550	0.18
		C	34.783	5.000	0.000	0.000	0.46
T9	82.00-62.00	A	36.928	4.167	0.000	0.000	0.50
		B	6.500	0.000	0.000	13.550	0.18
		C	34.783	5.000	0.000	0.000	0.46
T10	62.00-42.00	A	36.928	4.167	0.000	0.000	0.50
		B	6.500	0.000	0.000	13.550	0.18
		C	34.783	5.000	0.000	0.000	0.46
T11	42.00-22.00	A	36.928	4.167	0.000	0.000	0.50
		B	6.500	0.000	0.000	13.550	0.18
		C	34.783	5.000	0.000	0.000	0.46
T12	22.00-2.00	A	25.850	2.917	0.000	0.000	0.35

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
		B	4.865	0.000	0.000	9.485	0.13
		C	24.348	3.500	0.000	0.000	0.32

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
T1	242.00-222.00	A	0.948	15.998	24.885	0.000	0.000	1.06
		B		0.000	0.000	0.000	0.000	0.00
		C		4.493	0.000	0.000	0.000	0.09
T2	222.00-202.00	A	0.938	18.809	42.258	0.000	0.000	1.49
		B		0.285	0.212	0.000	0.000	0.01
		C		14.134	35.413	0.000	0.000	1.20
T3	202.00-182.00	A	0.926	21.380	45.959	0.000	0.000	1.57
		B		5.672	4.250	0.000	21.374	0.34
		C		17.248	47.192	0.000	0.000	1.56
T4	182.00-162.00	A	0.914	27.482	45.932	0.000	0.000	1.62
		B		5.631	4.250	0.000	21.271	0.34
		C		17.127	47.165	0.000	0.000	1.55
T5	162.00-142.00	A	0.901	27.212	45.902	0.000	0.000	1.60
		B		5.586	4.250	0.000	21.157	0.34
		C		16.992	47.135	0.000	0.000	1.54
T6	142.00-122.00	A	0.886	31.196	45.868	0.000	0.000	1.68
		B		9.822	4.250	0.000	21.030	0.42
		C		16.841	47.102	0.000	0.000	1.52
T7	122.00-102.00	A	0.868	30.792	45.830	0.000	0.000	1.66
		B		9.706	4.250	0.000	20.884	0.42
		C		16.668	47.063	0.000	0.000	1.51
T8	102.00-82.00	A	0.848	30.319	45.785	0.000	0.000	1.64
		B		9.571	4.250	0.000	20.713	0.41
		C		16.465	47.018	0.000	0.000	1.49
T9	82.00-62.00	A	0.824	29.746	45.730	0.000	0.000	1.61
		B		9.407	4.250	0.000	20.505	0.40
		C		16.219	46.964	0.000	0.000	1.47
T10	62.00-42.00	A	0.792	29.010	45.660	0.000	0.000	1.58
		B		9.197	4.250	0.000	20.239	0.39
		C		15.904	46.893	0.000	0.000	1.45
T11	42.00-22.00	A	0.750	28.028	45.567	0.000	0.000	1.54
		B		8.917	4.250	0.000	19.883	0.38
		C		15.483	46.800	0.000	0.000	1.42
T12	22.00-2.00	A	0.750	19.620	31.897	0.000	0.000	1.08
		B		7.307	2.975	0.000	13.918	0.28
		C		10.838	32.760	0.000	0.000	0.99

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	242.00-222.00	A	0.000	4.189	2.020	3.867
		B	0.000	0.000	0.000	0.000
		C	0.000	0.451	0.124	0.416
T2	222.00-202.00	A	0.000	5.137	2.655	4.794
		B	0.000	0.041	0.020	0.038
		C	0.000	4.163	2.329	3.885
T3	202.00-182.00	A	0.000	3.838	2.859	5.178
		B	0.000	0.557	0.391	0.751
		C	0.000	3.675	3.013	4.959
T4	182.00-162.00	A	0.000	3.901	2.849	5.333
		B	0.000	0.518	0.370	0.708
		C	0.000	3.423	2.851	4.679

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T5	162.00-142.00	A	0.000	3.695	2.751	5.128
		B	0.000	0.490	0.357	0.681
		C	0.000	3.247	2.752	4.506
T6	142.00-122.00	A	0.000	2.708	2.415	4.586
		B	0.000	0.488	0.382	0.827
		C	0.000	2.253	2.338	3.815
T7	122.00-102.00	A	0.000	2.558	2.730	5.154
		B	0.000	0.460	0.432	0.927
		C	0.000	2.133	2.643	4.298
T8	102.00-82.00	A	0.000	2.424	3.048	5.715
		B	0.000	0.435	0.482	1.025
		C	0.000	2.027	2.951	4.779
T9	82.00-62.00	A	0.000	2.293	2.995	5.567
		B	0.000	0.410	0.474	0.995
		C	0.000	1.924	2.899	4.671
T10	62.00-42.00	A	0.000	2.151	2.954	5.431
		B	0.000	0.383	0.467	0.967
		C	0.000	1.813	2.860	4.577
T11	42.00-22.00	A	2.657	7.464	0.000	0.000
		B	0.420	1.320	0.000	0.000
		C	2.572	6.329	0.000	0.000
T12	22.00-2.00	A	1.864	5.163	0.000	0.000
		B	0.315	1.019	0.000	0.000
		C	1.804	4.378	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	242.00-222.00	-8.7807	3.0909	-6.5678	1.7944
T2	222.00-202.00	-2.9794	10.2337	-3.3112	7.4013
T3	202.00-182.00	3.7051	12.4111	1.9061	10.1144
T4	182.00-162.00	3.7319	14.5286	1.1838	12.2126
T5	162.00-142.00	4.1273	15.9079	1.3558	13.6223
T6	142.00-122.00	5.2341	18.0128	2.5113	15.4538
T7	122.00-102.00	5.4026	18.3452	2.7071	16.2232
T8	102.00-82.00	5.7036	19.1350	2.9434	17.2027
T9	82.00-62.00	6.1532	20.5832	3.2150	18.6194
T10	62.00-42.00	6.1610	20.5580	3.3359	19.1210
T11	42.00-22.00	7.0237	23.5203	3.7562	21.1776
T12	22.00-2.00	6.0649	19.7669	3.5918	18.1719

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
Flash Beacon Lighting	B	From Leg	0.00	0.0000	242.00	No Ice	2.70	2.70	0.05
			0.00			1/2" Ice	3.10	3.10	0.07
			1.00			1" Ice	3.50	3.50	0.09
						2" Ice	4.30	4.30	0.13
						4" Ice	5.90	5.90	0.21
DB806-XC	A	From Leg	4.00	0.0000	242.00	No Ice	1.14	1.14	0.02
			0.00			1/2" Ice	1.68	1.68	0.03
			2.00				2.03	2.03	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	2.75	2.75	0.08
						2" Ice	4.32	4.32	0.21
						4" Ice			
FMO	B	From Leg	4.00 0.00 2.00	0.0000	242.00	No Ice	9.80	9.80	0.01
						1/2" Ice	10.28	10.28	0.18
						1" Ice	10.78	10.78	0.36
						2" Ice	11.79	11.79	0.75
						4" Ice	13.91	13.91	1.63
Side Arm Mount [SO 302-3]	B	None		0.0000	242.00	No Ice	5.56	5.56	0.17
						1/2" Ice	8.44	8.44	0.26
						1" Ice	11.32	11.32	0.36
						2" Ice	17.08	17.08	0.56
						4" Ice	28.60	28.60	0.96
(2) RA21.7770.00	A	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice	6.74	3.47	0.04
						1/2" Ice	7.22	3.86	0.08
						1" Ice	7.71	4.26	0.12
						2" Ice	8.73	5.08	0.22
						4" Ice	10.85	6.86	0.50
(2) RA21.7770.00	B	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice	6.74	3.47	0.04
						1/2" Ice	7.22	3.86	0.08
						1" Ice	7.71	4.26	0.12
						2" Ice	8.73	5.08	0.22
						4" Ice	10.85	6.86	0.50
(2) RA21.7770.00	C	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice	6.74	3.47	0.04
						1/2" Ice	7.22	3.86	0.08
						1" Ice	7.71	4.26	0.12
						2" Ice	8.73	5.08	0.22
						4" Ice	10.85	6.86	0.50
P65-16-XLH-RR	A	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice	8.40	4.70	0.05
						1/2" Ice	8.95	5.15	0.10
						1" Ice	9.51	5.60	0.15
						2" Ice	10.65	6.53	0.28
						4" Ice	13.03	8.52	0.61
P65-16-XLH-RR	B	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice	8.40	4.70	0.05
						1/2" Ice	8.95	5.15	0.10
						1" Ice	9.51	5.60	0.15
						2" Ice	10.65	6.53	0.28
						4" Ice	13.03	8.52	0.61
P65-16-XLH-RR	C	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice	8.40	4.70	0.05
						1/2" Ice	8.95	5.15	0.10
						1" Ice	9.51	5.60	0.15
						2" Ice	10.65	6.53	0.28
						4" Ice	13.03	8.52	0.61
(2) LGP13519	A	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice	0.34	0.21	0.01
						1/2" Ice	0.42	0.28	0.01
						1" Ice	0.51	0.36	0.01
						2" Ice	0.73	0.55	0.02
						4" Ice	1.25	1.03	0.07
(2) LGP13519	B	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice	0.34	0.21	0.01
						1/2" Ice	0.42	0.28	0.01
						1" Ice	0.51	0.36	0.01
						2" Ice	0.73	0.55	0.02
						4" Ice	1.25	1.03	0.07
(2) LGP13519	C	From Leg	1.00 0.00	0.0000	238.00	No Ice	0.34	0.21	0.01
						1/2"	0.42	0.28	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	0.51	0.36	0.01
						1" Ice	0.73	0.55	0.02
						2" Ice	1.25	1.03	0.07
						4" Ice			
(2) LGP21401	A	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	B	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	C	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.01 0.02 0.03 0.05 0.14
RRUS 11 B12	A	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.31 3.55 3.80 4.33 5.50	1.36 1.54 1.73 2.13 3.04	0.05 0.07 0.10 0.15 0.31
RRUS 11 B12	B	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.31 3.55 3.80 4.33 5.50	1.36 1.54 1.73 2.13 3.04	0.05 0.07 0.10 0.15 0.31
RRUS 11 B12	C	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.31 3.55 3.80 4.33 5.50	1.36 1.54 1.73 2.13 3.04	0.05 0.07 0.10 0.15 0.31
DC6-48-60-18-8F Surge Suppression Unit	A	From Leg	1.00 0.00 0.00	0.0000	238.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.47 1.67 1.88 2.33 3.38	1.47 1.67 1.88 2.33 3.38	0.02 0.04 0.06 0.11 0.24
Sector Mount [SM 201-3]	B	None		0.0000	238.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	26.69 37.60 48.51 70.33 113.97	26.69 37.60 48.51 70.33 113.97	1.08 1.49 1.90 2.71 4.34
BXA-70063-6CF-2 w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	0.0000	217.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
BXA-70063-4CF-EDIN-6 w/ Mount Pipe	B	From Leg	4.00 0.00 3.00	0.0000	217.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.84 6.30 7.24 9.26	3.69 4.29 4.91 6.26 9.29	0.03 0.07 0.12 0.23 0.58
BXA-70063-6CF-2 w/	C	From Leg	4.00	0.0000	217.00	No Ice	7.97	5.80	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.00				1/2" Ice	8.61	6.95	0.10
			3.00				1" Ice	9.22	7.82	0.17
							2" Ice	10.46	9.60	0.34
							4" Ice	13.07	13.37	0.80
(2) HBXX-6517DS-VTM w/ Mount Pipe	A	From Leg	4.00		0.0000	217.00	No Ice	9.16	7.14	0.07
			0.00				1/2" Ice	9.91	8.44	0.14
			3.00				1" Ice	10.63	9.58	0.22
							2" Ice	12.03	11.55	0.41
							4" Ice	14.95	15.73	0.94
(2) HBXX-6517DS-VTM w/ Mount Pipe	B	From Leg	4.00		0.0000	217.00	No Ice	9.16	7.14	0.07
			0.00				1/2" Ice	9.91	8.44	0.14
			3.00				1" Ice	10.63	9.58	0.22
							2" Ice	12.03	11.55	0.41
							4" Ice	14.95	15.73	0.94
(2) HBXX-6517DS-VTM w/ Mount Pipe	C	From Leg	4.00		0.0000	217.00	No Ice	9.16	7.14	0.07
			0.00				1/2" Ice	9.91	8.44	0.14
			3.00				1" Ice	10.63	9.58	0.22
							2" Ice	12.03	11.55	0.41
							4" Ice	14.95	15.73	0.94
LNX-8514DS-VTM w/ Mount Pipe	A	From Leg	4.00		0.0000	217.00	No Ice	8.83	9.95	0.07
			0.00				1/2" Ice	9.53	11.47	0.15
			3.00				1" Ice	10.24	13.01	0.24
							2" Ice	11.59	15.35	0.45
							4" Ice	14.40	20.21	1.04
LNX-8514DS-VTM w/ Mount Pipe	B	From Leg	4.00		0.0000	217.00	No Ice	8.83	9.95	0.07
			0.00				1/2" Ice	9.53	11.47	0.15
			3.00				1" Ice	10.24	13.01	0.24
							2" Ice	11.59	15.35	0.45
							4" Ice	14.40	20.21	1.04
LNX-8514DS-VTM w/ Mount Pipe	C	From Leg	4.00		0.0000	217.00	No Ice	8.83	9.95	0.07
			0.00				1/2" Ice	9.53	11.47	0.15
			3.00				1" Ice	10.24	13.01	0.24
							2" Ice	11.59	15.35	0.45
							4" Ice	14.40	20.21	1.04
RRH2X60-AWS	A	From Leg	4.00		0.0000	217.00	No Ice	3.96	2.16	0.06
			0.00				1/2" Ice	4.27	2.44	0.08
			3.00				1" Ice	4.60	2.73	0.11
							2" Ice	5.27	3.34	0.18
							4" Ice	6.72	4.66	0.36
RRH2X60-AWS	B	From Leg	4.00		0.0000	217.00	No Ice	3.96	2.16	0.06
			0.00				1/2" Ice	4.27	2.44	0.08
			3.00				1" Ice	4.60	2.73	0.11
							2" Ice	5.27	3.34	0.18
							4" Ice	6.72	4.66	0.36
RRH2X60-AWS	C	From Leg	4.00		0.0000	217.00	No Ice	3.96	2.16	0.06
			0.00				1/2" Ice	4.27	2.44	0.08
			3.00				1" Ice	4.60	2.73	0.11
							2" Ice	5.27	3.34	0.18
							4" Ice	6.72	4.66	0.36
RRH2X60-PCS	A	From Leg	4.00		0.0000	217.00	No Ice	2.57	2.01	0.06
			0.00				1/2" Ice	2.79	2.22	0.08
			3.00				1" Ice	3.02	2.43	0.10
							2" Ice	3.52	2.89	0.16
							4" Ice	4.61	3.92	0.31

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
RRH2X60-PCS	B	From Leg	4.00 0.00 3.00	0.0000	217.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
RRH2X60-PCS	C	From Leg	4.00 0.00 3.00	0.0000	217.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
DB-T1-6Z-8AB-0Z	C	From Leg	4.00 0.00 3.00	0.0000	217.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.60 5.92 6.24 6.91 8.37	2.33 2.56 2.79 3.28 4.37	0.04 0.08 0.12 0.21 0.45
Sector Mount [SM 502-3]	B	None		0.0000	217.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	33.02 47.36 61.70 90.38 147.74	33.02 47.36 61.70 90.38 147.74	1.67 2.22 2.77 3.88 6.08
OG-4	B	From Leg	2.00 0.00 6.00	0.0000	203.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.00 7.14 7.86 9.34 12.41	6.00 7.14 7.86 9.34 12.41	0.02 0.06 0.11 0.23 0.58
OG-4	C	From Leg	2.00 0.00 6.00	0.0000	203.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.00 7.14 7.86 9.34 12.41	6.00 7.14 7.86 9.34 12.41	0.02 0.06 0.11 0.23 0.58
Side Arm Mount [SO 306-1]	B	From Leg	1.00 0.00 0.00	0.0000	203.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.98 1.70 2.42 3.86 6.74	2.18 3.80 5.42 8.66 15.14	0.04 0.06 0.08 0.12 0.20
Side Arm Mount [SO 306-1]	C	From Leg	1.00 0.00 0.00	0.0000	203.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.98 1.70 2.42 3.86 6.74	2.18 3.80 5.42 8.66 15.14	0.04 0.06 0.08 0.12 0.20
DB589-A	B	From Leg	3.00 0.00 3.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.76 4.17 5.59 8.49 12.44	2.76 4.17 5.59 8.49 12.44	0.01 0.03 0.06 0.15 0.44
DB589-A	B	From Leg	3.00 0.00 -2.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.76 4.17 5.59 8.49 12.44	2.76 4.17 5.59 8.49 12.44	0.01 0.03 0.06 0.15 0.44
Side Arm Mount [SO 308-1]	B	From Leg	1.50 0.00 0.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.98 1.70 2.42 3.86 6.74	3.03 5.22 7.41 11.79 20.55	0.05 0.08 0.10 0.16 0.26

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			
17' Side Light Mount	A	From Face	0.50 0.00 0.00	0.0000	122.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.27 3.42 4.58 6.93 11.78	2.27 3.42 4.58 6.93 11.78	0.06 1.15 2.26 4.55 9.38
17' Side Light Mount	C	From Face	0.50 0.00 0.00	0.0000	122.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.27 3.42 4.58 6.93 11.78	2.27 3.42 4.58 6.93 11.78	0.06 1.15 2.26 4.55 9.38
Side Light	A	From Leg	1.00 0.00 0.00	0.0000	122.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.33 0.47 0.60 0.87 1.40	0.33 0.47 0.60 0.87 1.40	0.01 0.01 0.01 0.01 0.01
Side Light	B	From Leg	1.00 0.00 0.00	0.0000	122.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.33 0.47 0.60 0.87 1.40	0.33 0.47 0.60 0.87 1.40	0.01 0.01 0.01 0.01 0.01
Side Light	C	From Leg	1.00 0.00 0.00	0.0000	122.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.33 0.47 0.60 0.87 1.40	0.33 0.47 0.60 0.87 1.40	0.01 0.01 0.01 0.01 0.01
TY-840	B	From Face	1.00 0.00 0.00	0.0000	14.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.25 0.45 0.65 1.05 1.85	0.25 0.45 0.65 1.05 1.85	0.00 0.00 0.00 0.01 0.01

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

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

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	242 - 222	7.968	35	0.3216	0.0547
T2	222 - 202	6.619	35	0.3075	0.0492
T3	202 - 182	5.347	35	0.2785	0.0445
T4	182 - 162	4.226	35	0.2401	0.0385
T5	162 - 142	3.271	35	0.2017	0.0326
T6	142 - 122	2.461	35	0.1713	0.0275
T7	122 - 102	1.787	35	0.1387	0.0236
T8	102 - 82	1.227	35	0.1142	0.0194
T9	82 - 62	0.777	35	0.0887	0.0163
T10	62 - 42	0.432	35	0.0625	0.0131
T11	42 - 22	0.186	27	0.0397	0.0099
T12	22 - 2	0.057	27	0.0174	0.0047

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
242.00	Flash Beacon Lighting	35	7.968	0.3216	0.0547	258306
238.00	(2) RA21.7770.00	35	7.696	0.3194	0.0535	258306
217.00	BXA-70063-6CF-2 w/ Mount Pipe	35	6.290	0.3017	0.0481	49598
203.00	OG-4	35	5.407	0.2802	0.0448	30392
188.00	DB589-A	35	4.544	0.2521	0.0404	28014
122.00	17' Side Light Mount	35	1.787	0.1387	0.0236	44282
14.00	TY-840	27	0.029	0.0099	0.0027	101014

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	242 - 222	22.851	10	0.9198	0.1581

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T2	222 - 202	18.992	10	0.8800	0.1422
T3	202 - 182	15.349	10	0.7976	0.1285
T4	182 - 162	12.135	10	0.6882	0.1111
T5	162 - 142	9.397	10	0.5784	0.0942
T6	142 - 122	7.071	10	0.4913	0.0794
T7	122 - 102	5.137	10	0.3979	0.0682
T8	102 - 82	3.529	10	0.3278	0.0560
T9	82 - 62	2.237	10	0.2545	0.0471
T10	62 - 42	1.246	10	0.1792	0.0379
T11	42 - 22	0.538	10	0.1140	0.0285
T12	22 - 2	0.163	2	0.0500	0.0135

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
242.00	Flash Beacon Lighting	10	22.851	0.9198	0.1581	92423
238.00	(2) RA21.7770.00	10	22.073	0.9137	0.1547	92423
217.00	BXA-70063-6CF-2 w/ Mount Pipe	10	18.051	0.8635	0.1388	17611
203.00	OG-4	10	15.522	0.8026	0.1293	10686
188.00	DB589-A	10	13.048	0.7224	0.1166	9812
122.00	17' Side Light Mount	10	5.137	0.3979	0.0682	15474
14.00	TY-840	2	0.083	0.0285	0.0078	35120

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	242	Leg	A325N	0.7500	4	3.18	19.44	0.164 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	2.50	3.81	0.657 ✔	1.333	Member Block Shear
		Top Girt	A325N	0.5000	1	0.25	3.81	0.066 ✔	1.333	Member Block Shear
T2	222	Leg	A325N	0.8750	4	9.64	26.46	0.364 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	4.29	3.81	1.128 ✔	1.333	Member Block Shear
		Top Girt	A325N	0.5000	1	0.37	3.81	0.096 ✔	1.333	Member Block Shear
T3	202	Leg	A325N	0.8750	4	15.95	26.46	0.603 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	5.38	4.08	1.320 ✔	1.333	Member Bearing
T4	182	Leg	A325N	1.0000	4	22.09	34.56	0.639 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.5000	1	5.90	5.44	1.086 ✔	1.333	Member Bearing
T5	162	Leg	A325N	1.0000	4	27.92	34.56	0.808 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.5000	1	6.58	5.89	1.117 ✔	1.333	Bolt Shear
T6	142	Leg	A325N	1.0000	6	22.06	34.56	0.638 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	7.90	6.44	1.227 ✔	1.333	Bolt Shear
T7	122	Leg	A325N	1.0000	6	25.80	34.56	0.747 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	8.62	7.62	1.131 ✔	1.333	Member Bearing
T8	102	Leg	A325N	1.0000	6	29.52	34.56	0.854 ✔	1.333	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325N	0.7500	1	9.57	9.28	1.031 ✓	1.333	Bolt Shear
T9	82	Leg	A325N	1.0000	6	33.22	34.56	0.961 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	10.41	9.28	1.122 ✓	1.333	Bolt Shear
T10	62	Leg	A325N	1.0000	8	27.67	34.56	0.801 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	11.27	9.28	1.215 ✓	1.333	Bolt Shear
T11	42	Leg	A325N	1.0000	8	28.05	34.56	0.812 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	3	6.52	9.28	0.703 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.7500	2	5.46	9.28	0.589 ✓	1.333	Bolt Shear
T12	22	Leg	A354-BC	1.0000	10	26.88	32.40	0.830 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	3	6.48	9.28	0.699 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.7500	2	5.72	9.28	0.616 ✓	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

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 P / P_a
T1	242 - 222	ROHN 2.5 STD	20.00	4.00	50.7 K=1.00	24.247	1.7040	-15.15	41.32	0.367 ✓
T2	222 - 202	ROHN 3 EH	20.04	5.01	52.9 K=1.00	23.892	3.0159	-45.07	72.06	0.625 ✓
T3	202 - 182	ROHN 3.5 EH	20.04	6.68	61.3 K=1.00	22.487	3.6784	-72.62	82.72	0.878 ✓
T4	182 - 162	ROHN 4 EH	20.04	6.68	54.3 K=1.00	23.670	4.4074	-100.06	104.32	0.959 ✓
T5	162 - 142	ROHN 5 EH	20.04	6.68	43.6 K=1.00	25.318	6.1114	-126.94	154.73	0.820 ✓
T6	142 - 122	ROHN 5 EH	20.04	10.02	65.4 K=1.00	21.777	6.1114	-151.07	133.09	1.135 ✓
T7	122 - 102	ROHN 6 EH	20.04	10.02	54.8 K=1.00	23.589	8.4049	-177.70	198.26	0.896 ✓
T8	102 - 82	ROHN 6 EH	20.04	10.02	54.8 K=1.00	23.589	8.4049	-204.77	198.26	1.033 ✓
T9	82 - 62	ROHN 6 EH	20.04	10.02	54.8 K=1.00	23.589	8.4049	-232.06	198.26	1.170 ✓
T10	62 - 42	ROHN 8 EHS	20.04	10.02	40.6 K=1.00	25.753	9.8666	-259.64	254.09	1.022 ✓
T11	42 - 22	ROHN 8 EHS	20.04	10.02	40.6 K=1.00	25.753	9.8666	-265.10	254.09	1.043 ✓
T12	22 - 2	ROHN 8 EH	20.04	9.98	41.6 K=1.00	25.605	12.7627	-319.26	326.80	0.977 ✓

Diagonal Design Data (Compression)

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 $\frac{P}{P_a}$
T1	242 - 222	L1 3/4x1 3/4x3/16	7.69	3.60	125.7 K=1.00	9.447	0.6211	-2.52	5.87	0.430 ✔
T2	222 - 202	L1 3/4x1 3/4x3/16	9.81	4.79	167.3 K=1.00	5.335	0.6211	-4.28	3.31	1.291 ✔
T3	202 - 182	L2 1/2x2 1/2x3/16	12.44	6.13	148.6 K=1.00	6.764	0.9020	-5.41	6.10	0.886 ✔
T4	182 - 162	L2 1/2x2 1/2x1/4	14.30	7.03	171.9 K=1.00	5.053	1.1900	-5.95	6.01	0.989 ✔
T5	162 - 142	L2 1/2x2 1/2x5/16	16.23	7.95	195.1 K=1.00	3.923	1.4600	-6.58	5.73	1.149 ✔
T6	142 - 122	L3x3x5/16	19.52	9.68	197.3 K=1.00	3.838	1.7800	-7.90	6.83	1.157 ✔
T7	122 - 102	L3 1/2x3 1/2x1/4	21.39	10.57	182.7 K=1.00	4.473	1.6900	-8.70	7.56	1.151 ✔
T8	102 - 82	L4x4x5/16	23.31	11.51	174.6 K=1.00	4.897	2.4000	-9.57	11.75	0.814 ✔
T9	82 - 62	L4x4x5/16	25.27	12.49	189.5 K=1.00	4.160	2.4000	-10.41	9.98	1.043 ✔
T10	62 - 42	L4x4x5/16	27.25	13.39	203.1 K=1.00	3.621	2.4000	-11.27	8.69	1.297 ✔
T11	42 - 22	KL/R > 200 (C) - 193 ROHN 3 STD	24.43	12.21	126.0 K=1.00	9.410	2.2285	-19.56	20.97	0.933 ✔
T12	22 - 2	ROHN 3 STD	24.99	12.50	128.9 K=1.00	8.992	2.2285	-19.45	20.04	0.971 ✔

Horizontal Design Data (Compression)

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 $\frac{P}{P_a}$
T11	42 - 22	ROHN 2.5 STD	25.88	12.58	159.3 K=1.00	5.884	1.7040	-10.92	10.03	1.089 ✔
T12	22 - 2	ROHN 3 STD	28.03	13.65	140.8 K=1.00	7.535	2.2285	-11.44	16.79	0.681 ✔

Top Girt Design Data (Compression)

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 $\frac{P}{P_a}$
T1	242 - 222	L1 3/4x1 3/4x3/16	6.56	6.11	213.6 K=1.00	3.272	0.6211	-0.27	2.03	0.131 ✔
T2	222 - 202	KL/R > 200 (C) - 6 L1 3/4x1 3/4x3/16 KL/R > 200 (C) - 41	6.56	6.11	213.6 K=1.00	3.272	0.6211	-0.36	2.03	0.176 ✔

Redundant Horizontal (1) Design Data (Compression)

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 $\frac{P}{P_a}$
T11	42 - 22	ROHN 1.5 STD	6.47	6.11	117.7 K=1.00	10.611	0.7995	-4.60	8.48	0.542 ✔
T12	22 - 2	ROHN 1.5 STD	7.01	6.65	128.1 K=1.00	9.095	0.7995	-5.54	7.27	0.762 ✔

Redundant Diagonal (1) Design Data (Compression)

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 $\frac{P}{P_a}$
T11	42 - 22	ROHN 2 STD	11.63	10.92	166.5 K=1.00	5.389	1.0745	-4.14	5.79	0.714 ✔
T12	22 - 2	ROHN 2 STD	11.88	11.21	170.9 K=1.00	5.110	1.0745	-4.69	5.49	0.855 ✔

Redundant Hip (1) Design Data (Compression)

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 $\frac{P}{P_a}$
T11	42 - 22	ROHN 1.5 STD	6.47	6.47	124.7 K=1.00	9.596	0.7995	-0.03	7.67	0.004 ✔
T12	22 - 2	ROHN 1.5 STD	7.01	7.01	135.1 K=1.00	8.186	0.7995	-0.02	6.54	0.004 ✔

Redundant Hip Diagonal Design Data (Compression)

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 $\frac{P}{P_a}$
T11	42 - 22	ROHN 1.5 STD	15.26	15.26	294.2 K=1.00	1.726	0.7995	-0.04	1.38	0.032 ✔
T12	22 - 2	KL/R > 250 (C) - 234 ROHN 1.5 STD KL/R > 250 (C) - 267	15.95	15.95	307.4 K=1.00	1.580	0.7995	-0.04	1.26	0.032 ✔

Inner Bracing Design Data (Compression)

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 $\frac{P}{P_a}$
T11	42 - 22	ROHN 2 STD	12.94	12.94	197.3 K=1.00	3.836	1.0745	-0.01	4.12	0.002* ✔
T12	22 - 2	ROHN 2 STD	14.02	14.02	213.7 K=1.00	3.271	1.0745	-0.01	3.51	0.002* ✔

* DL controls

Tension Checks

Leg Design Data (Tension)

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 $\frac{P}{P_a}$
T1	242 - 222	ROHN 2.5 STD	20.00	4.00	50.7	30.000	1.7040	12.72	51.12	0.249 ✔
T2	222 - 202	ROHN 3 EH	20.04	5.01	52.9	30.000	3.0159	38.55	90.48	0.426 ✔
T3	202 - 182	ROHN 3.5 EH	20.04	6.68	61.3	30.000	3.6784	63.81	110.35	0.578 ✔
T4	182 - 162	ROHN 4 EH	20.04	6.68	54.3	30.000	4.4074	88.35	132.22	0.668 ✔
T5	162 - 142	ROHN 5 EH	20.04	6.68	43.6	30.000	6.1114	111.67	183.34	0.609 ✔
T6	142 - 122	ROHN 5 EH	20.04	10.02	65.4	30.000	6.1114	132.37	183.34	0.722 ✔
T7	122 - 102	ROHN 6 EH	20.04	10.02	54.8	30.000	8.4049	154.79	252.15	0.614 ✔
T8	102 - 82	ROHN 6 EH	20.04	10.02	54.8	30.000	8.4049	177.10	252.15	0.702 ✔
T9	82 - 62	ROHN 6 EH	20.04	10.02	54.8	30.000	8.4049	199.31	252.15	0.790 ✔
T10	62 - 42	ROHN 8 EHS	20.04	10.02	40.6	30.000	9.8666	221.38	296.00	0.748 ✔
T11	42 - 22	ROHN 8 EHS	20.04	10.02	40.6	30.000	9.8666	224.72	296.00	0.759 ✔
T12	22 - 2	ROHN 8 EH	20.04	9.98	41.6	30.000	12.7627	268.83	382.88	0.702 ✔

Diagonal Design Data (Tension)

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 $\frac{P}{P_a}$
T1	242 - 222	L1 3/4x1 3/4x3/16	7.69	3.60	82.7	29.000	0.3779	2.50	10.96	0.228 ✔
T2	222 - 202	L1 3/4x1 3/4x3/16	9.35	4.56	104.3	29.000	0.3779	4.29	10.96	0.392 ✔
T3	202 - 182	L2 1/2x2 1/2x3/16	12.44	6.13	96.1	29.000	0.5886	5.38	17.07	0.315 ✔
T4	182 - 162	L2 1/2x2 1/2x1/4	14.30	7.03	111.4	29.000	0.7753	5.90	22.48	0.263 ✔
T5	162 - 142	L2 1/2x2 1/2x5/16	16.23	7.95	127.0	29.000	0.9485	6.58	27.51	0.239 ✔
T6	142 - 122	L3x3x5/16	19.52	9.68	127.6	32.500	1.1592	7.86	37.67	0.209 ✔
T7	122 - 102	L3 1/2x3 1/2x1/4	21.39	10.57	117.7	32.500	1.1269	8.62	36.62	0.235 ✔
T8	102 - 82	L4x4x5/16	23.31	11.51	112.7	32.500	1.5949	9.51	51.84	0.183 ✔
T9	82 - 62	L4x4x5/16	25.27	12.49	122.2	32.500	1.5949	10.30	51.84	0.199 ✔
T10	62 - 42	L4x4x5/16	27.25	13.39	130.9	32.500	1.5949	11.18	51.84	0.216 ✔

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 $\frac{P}{P_a}$
T11	42 - 22	ROHN 3 STD	24.43	12.21	126.0	30.000	2.2285	18.86	66.85	0.282 ✔
T12	22 - 2	ROHN 3 STD	24.99	12.50	128.9	30.000	2.2285	18.76	66.85	0.281 ✔

Horizontal Design Data (Tension)

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 $\frac{P}{P_a}$
T11	42 - 22	ROHN 2.5 STD	25.88	12.58	159.3	30.000	1.7040	10.92	51.12	0.214 ✔
T12	22 - 2	ROHN 3 STD	28.03	13.65	140.8	30.000	2.2285	11.44	66.85	0.171 ✔

Top Girt Design Data (Tension)

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 $\frac{P}{P_a}$
T1	242 - 222	L1 3/4x1 3/4x3/16	6.56	6.11	141.3	29.000	0.3779	0.25	10.96	0.023 ✔
T2	222 - 202	L1 3/4x1 3/4x3/16	6.56	6.11	141.3	29.000	0.3779	0.37	10.96	0.034 ✔

Redundant Horizontal (1) Design Data (Tension)

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 $\frac{P}{P_a}$
T11	42 - 22	ROHN 1.5 STD	6.47	6.11	117.7	21.600	0.7995	4.60	17.27	0.266 ✔
T12	22 - 2	ROHN 1.5 STD	7.01	6.65	128.1	21.600	0.7995	5.54	17.27	0.321 ✔

Redundant Diagonal (1) Design Data (Tension)

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 $\frac{P}{P_a}$
T11	42 - 22	ROHN 2 STD	11.63	10.92	166.5	21.600	1.0745	4.14	23.21	0.178 ✔
T12	22 - 2	ROHN 2 STD	11.88	11.21	170.9	21.600	1.0745	4.69	23.21	0.202 ✔

Redundant Hip (1) Design Data (Tension)

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 $\frac{P}{P_a}$
T11	42 - 22	ROHN 1.5 STD	6.47	6.47	124.7	21.600	0.7995	0.02	17.27	0.001 ✔
T12	22 - 2	ROHN 1.5 STD	7.01	7.01	135.1	21.600	0.7995	0.01	17.27	0.001 ✔

Redundant Hip Diagonal Design Data (Tension)

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 $\frac{P}{P_a}$
T11	42 - 22	ROHN 1.5 STD	15.26	15.26	294.2	21.600	0.7995	0.04	17.27	0.003 ✔
T12	22 - 2	ROHN 1.5 STD	15.95	15.95	307.4	21.600	0.7995	0.04	17.27	0.002 ✔

Inner Bracing Design Data (Tension)

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 $\frac{P}{P_a}$
T11	42 - 22	ROHN 2 STD	12.94	12.94	197.3	21.600	1.0745	0.00	23.21	0.000 ✔

Section Capacity Table

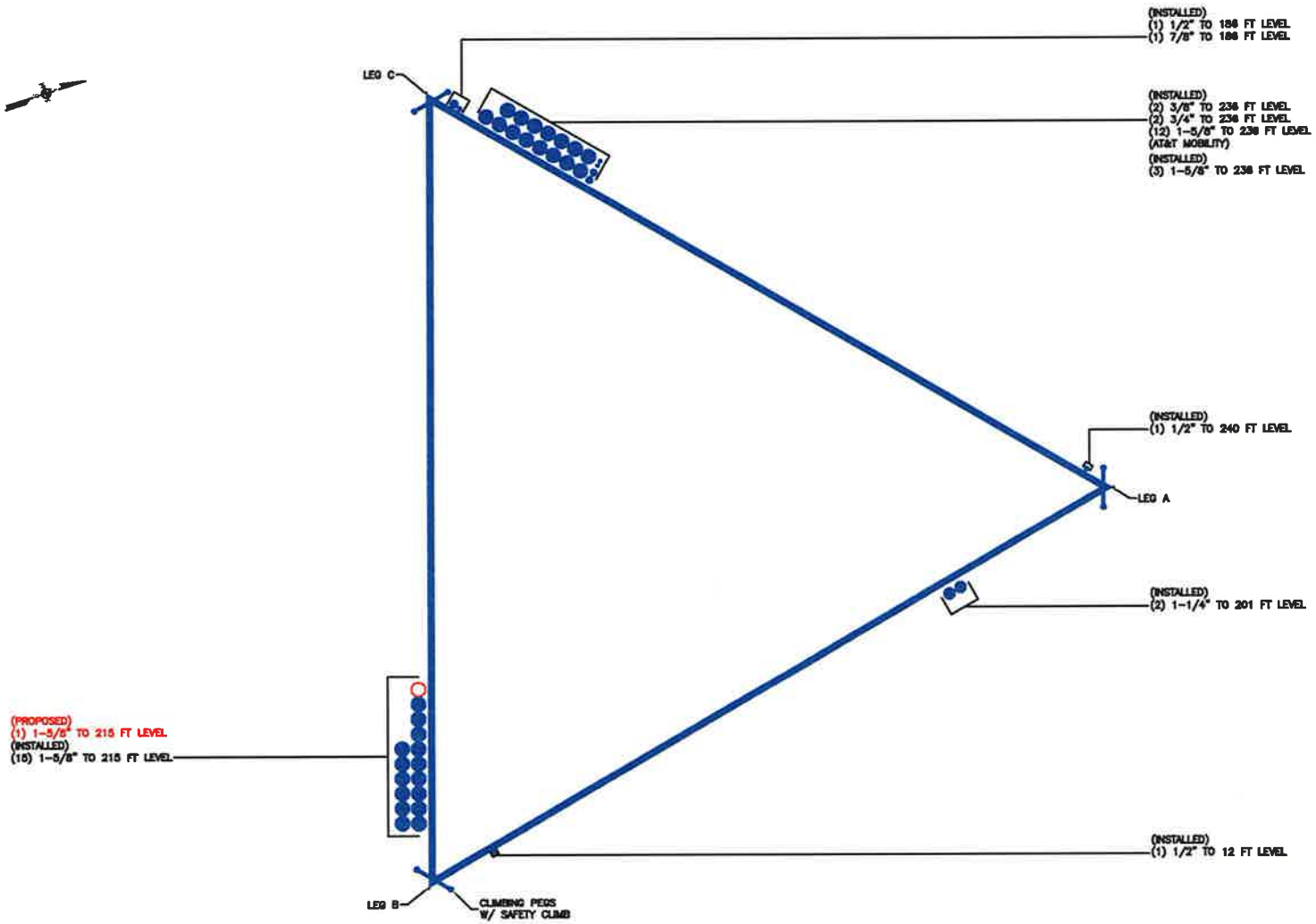
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	242 - 222	Leg	ROHN 2.5 STD	1	-15.15	55.08	27.5	Pass
T2	222 - 202	Leg	ROHN 3 EH	37	-45.07	96.05	46.9	Pass
T3	202 - 182	Leg	ROHN 3.5 EH	67	-72.62	110.26	65.9	Pass
T4	182 - 162	Leg	ROHN 4 EH	88	-100.06	139.06	71.9	Pass
T5	162 - 142	Leg	ROHN 5 EH	109	-126.94	206.26	61.5	Pass
T6	142 - 122	Leg	ROHN 5 EH	130	-151.07	177.41	85.2	Pass
T7	122 - 102	Leg	ROHN 6 EH	145	-177.70	264.28	67.2	Pass
T8	102 - 82	Leg	ROHN 6 EH	160	-204.77	264.28	77.5	Pass
T9	82 - 62	Leg	ROHN 6 EH	175	-232.06	264.28	87.8	Pass
T10	62 - 42	Leg	ROHN 8 EHS	190	-259.64	338.70	76.7	Pass
T11	42 - 22	Leg	ROHN 8 EHS	205	-265.10	338.70	78.3	Pass
T12	22 - 2	Leg	ROHN 8 EH	238	-319.26	435.62	73.3	Pass
T1	242 - 222	Diagonal	L1 3/4x1 3/4x3/16	8	-2.52	7.82	32.3	Pass
T2	222 - 202	Diagonal	L1 3/4x1 3/4x3/16	44	-4.28	4.42	96.9	Pass
T3	202 - 182	Diagonal	L2 1/2x2 1/2x3/16	71	-5.41	8.13	66.5	Pass
T4	182 - 162	Diagonal	L2 1/2x2 1/2x1/4	92	-5.95	8.01	74.2	Pass
T5	162 - 142	Diagonal	L2 1/2x2 1/2x5/16	113	-6.58	7.63	86.2	Pass
T6	142 - 122	Diagonal	L3x3x5/16	134	-7.90	9.11	86.8	Pass
T7	122 - 102	Diagonal	L3 1/2x3 1/2x1/4	149	-8.70	10.08	86.3	Pass
T8	102 - 82	Diagonal	L4x4x5/16	164	-9.57	15.67	61.1	Pass
T9	82 - 62	Diagonal	L4x4x5/16	178	-10.41	13.31	78.2	Pass
T10	62 - 42	Diagonal	L4x4x5/16	193	-11.27	11.58	97.3	Pass
T11	42 - 22	Diagonal	ROHN 3 STD	212	-19.56	27.95	70.0	Pass
T12	22 - 2	Diagonal	ROHN 3 STD	245	-19.45	26.71	72.8	Pass
T11	42 - 22	Horizontal	ROHN 2.5 STD	208	-10.92	13.37	81.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T12	22 - 2	Horizontal	ROHN 3 STD	241	-11.44	22.38	51.1	Pass
T1	242 - 222	Top Girt	L1 3/4x1 3/4x3/16	6	-0.27	2.71	9.8	Pass
T2	222 - 202	Top Girt	L1 3/4x1 3/4x3/16	41	-0.36	2.71	13.2	Pass
T11	42 - 22	Redund Horz 1 Bracing	ROHN 1.5 STD	210	-4.60	11.31	40.7	Pass
T12	22 - 2	Redund Horz 1 Bracing	ROHN 1.5 STD	243	-5.54	9.69	57.1	Pass
T11	42 - 22	Redund Diag 1 Bracing	ROHN 2 STD	211	-4.14	7.72	53.6	Pass
T12	22 - 2	Redund Diag 1 Bracing	ROHN 2 STD	244	-4.69	7.32	64.1	Pass
T11	42 - 22	Redund Hip 1 Bracing	ROHN 1.5 STD	233	-0.03	10.23	0.3	Pass
T12	22 - 2	Redund Hip 1 Bracing	ROHN 1.5 STD	266	-0.02	8.72	0.3	Pass
T11	42 - 22	Redund Hip Diagonal Bracing	ROHN 1.5 STD	234	-0.04	1.84	2.4	Pass
T12	22 - 2	Redund Hip Diagonal Bracing	ROHN 1.5 STD	267	-0.04	1.68	2.4	Pass
T11	42 - 22	Inner Bracing	ROHN 2 STD	237	-0.01	4.12	0.6	Pass
T12	22 - 2	Inner Bracing	ROHN 2 STD	270	-0.01	3.51	0.6	Pass

Summary	ELC:	Load Case 5
Leg (T9)	87.8	Pass
Diagonal (T10)	97.3	Pass
Horizontal (T11)	81.7	Pass
Top Girt (T2)	13.2	Pass
Redund Horz 1 Bracing (T12)	57.1	Pass
Redund Diag 1 Bracing (T12)	64.1	Pass
Redund Hip 1 Bracing (T11)	0.3	Pass
Redund Hip Diagonal Bracing (T11)	2.4	Pass
Inner Bracing (T12)	0.6	Pass
Bolt Checks	99.0	Pass
Rating =	99.0	Pass

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 841294 TOWER ID: C_BASELEVEL

CROWN REGION ADDRESS

USA

DRAWN BY: VJL
CHECKED BY: AGT
DRAWING DATE: 18/03/14

SITE NUMBER:
SITE NAME:

SITE NAME

MONROE-QUINEA ROAD

BUSINESS UNIT NUMBER

841294

SITE ADDRESS

230 QUINEA ROAD
MONROE, CT 06468
FAIRFIELD COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING

SCALE: N.T.S. | 1

PLOT DATE: 8/7/2014 FILE NAME: 841294_BASELEVEL.dwg

APPENDIX C

ADDITIONAL CALCULATIONS

GPD GROUP

Mat Foundation Analysis
BU #: 841294, Monroe-Guinea Road
2014777.841294.04

General Info	
Code	TIA/EIA-222-F (LRFD)
Bearing On	Rock
Foundation Type	Mono Pad
Pier Type	Round
Reinforcing Known	Yes
Max Capacity	1.1

Tower Reactions		
Moment, M	0	k-ft
Axial, P	518	k
Shear, V	35	k

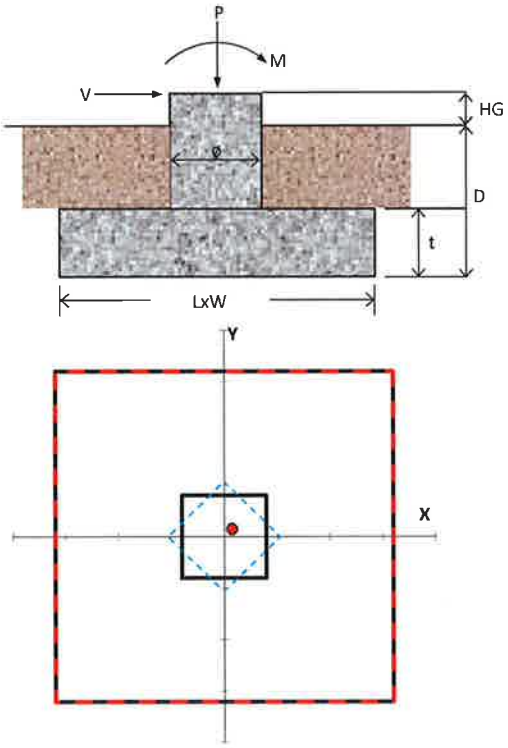
Pad & Pier Geometry		
Pier Diameter, ø	4	ft
Pad Length, L	16	ft
Pad Width, W	16	ft
Pad Thickness, t	3	ft
Depth, D	9	ft
Height Above Grade, HG	2	ft

Pad & Pier Reinforcing		
Rebar Fy	60	ksi
Concrete Fc'	3	ksi
Clear Cover	4	in
Reinforced Top & Bottom?	Yes	
Pad Reinforcing Size	# 6	
Pad Quantity Per Layer	16	
Pier Rebar Size	# 10	
Pier Quantity of Rebar	13	

Soil Properties		
Soil Type	Granular	
Soil Unit Weight	120	pcf
Angle of Friction, ø	34	°
Bearing Type	Net	
Ultimate Bearing	60	ksf
Water Table Depth	99	ft
Frost Depth	3.5	ft

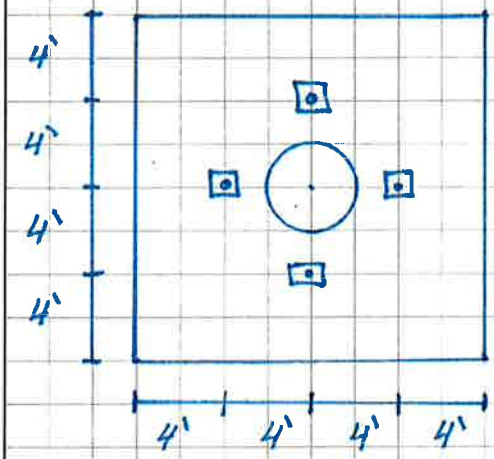
Bearing Summary			Load Case
Qxmax	4.62	ksf	1.2D+1.6W
Qymax	4.62	ksf	1.2D+1.6W
Qmax @ 45°	4.94	ksf	1.2D+1.6W
$Q_{(all)\ Gross}$	45.81	ksf	
Controlling Capacity	**10.8%**	**Pass**	

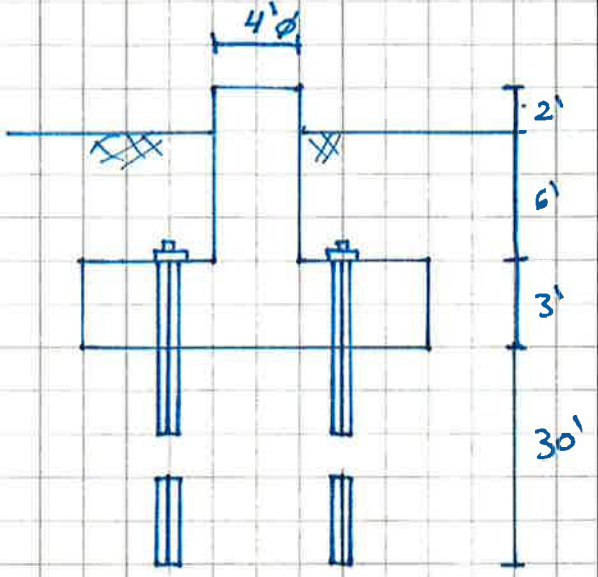
Overturning Summary (Required FS=1.0)			Load Case
FS(ot)x	11.41	≥1.0	0.9D+1.6W
FS(ot)y	11.41	≥1.0	0.9D+1.6W
Controlling Capacity	**8.8%**	**Pass**	



GPD GROUP.
Gleuss, Pyle, Schomer, Burns & DeHaven, Inc.

Job 2014777.84/294.04
Sheet No. 1 of 3
Calculated by AH Date 9/17/14
Checked by _____ Date _____





Rock Anchor #9 Williams A615-75, (4) per Foundation

Grout f_c' = 5000 psi

Grout-rock bond - 25 psi

Soil unit wt. = 120 pcf (0' to 9') ϕ = 34°, Rock unit weight = 150 pcf

concrete weight = 0.15 Kcf $(16' \times 16' \times 3' + 8' \frac{\pi(4')^2}{4}$ = 130.28 K

Soil weight = 284.24 K

Anchor Capacity: steel = 0.33 (100 Ksi) $\frac{\pi (1.128'')^2}{4}$

steel = 32.98 K per Anchor

GPD GROUP
Gluss, Pyle, Schomer, Burns & DeHaven, Inc.

Job 2014777.84/294.04
Sheet No. 2 of 3
Calculated by AH Date 9/17/14
Checked by _____ Date _____

Anchor capacity

Rock-grout bond = $4'' (\pi)(20ft)(12\ in/ft)(25psi)\left(\frac{1K}{1000lb}\right)$

= 75.4 K per anchor

Tendon-grout bond = 240.56 K per anchor

Rock pullout -

Cone volume = $\frac{\pi(20')(20'\tan 30°)^2}{3}$ = 2792.53 ft^3

Wt. of cone = 0.15 Kcf (2792.53 ft^3) = 418.88 K

Case-Steel

Capacity = $\frac{130.28 + 284.24K}{2} + 4(32.98)$ = 339.17K

Rating = $\frac{267}{339.17}$ = 78.7%

GPD GROUP.
Glass, Pyle, Schomer, Burns & DeHaven, Inc.

Job 2014777.84|294.04
Sheet No. 3 of 3
Calculated by AH Date 9/17/14
Checked by _____ Date _____

For Existing rebar check - pad

ACI 318-11 (10.5)

Rebar unknown - Assume $A_{s\,min} = 0.0033(36in)(16ft)(12in/ft)$

$= 22.8096\ in^2$

Assume (30) #8 @ 12" top & bottom $\Rightarrow A_s = 23.7\ in^2$

$Q_{max} = 4.56\ ksf$ $Q_{min} = 3.09\ ksf$ @ pier face $= 3.82\ ksf$

$M_{u(soil)} = (4.56 - 3.82)\left(\frac{2}{3}\right)(6')(6')(1') + 3.82(6')(6')(1')(0.5)$

$= 86.52\ K\,ft/ft$

M_u weight $= 1.3(0.12\ kcf(6') + 0.15\ kcf(3'))(6')(1')(12) = 27.38\ K\,ft/ft$

$M_u = 86.52 - 27.38 = 59.14\ K\text{-}ft = 709.68\ K\text{-}in/ft$

$$a = \frac{A_s f_y}{0.85 f'_c} = \frac{0.79\ in^2(60\ ksi)}{0.85(3\ ksi)(12in)} = 1.55$$

$$\phi M_n = \phi A_s f_y\left(d - \frac{a}{2}\right) = 0.9(0.79\ in^2)(60\ ksi)\left(31.875 - \frac{1.55}{2}\right)$$

$\phi M_n = 1327$

$$\text{Rating} = \frac{709.7}{1327} = 53.5\%$$

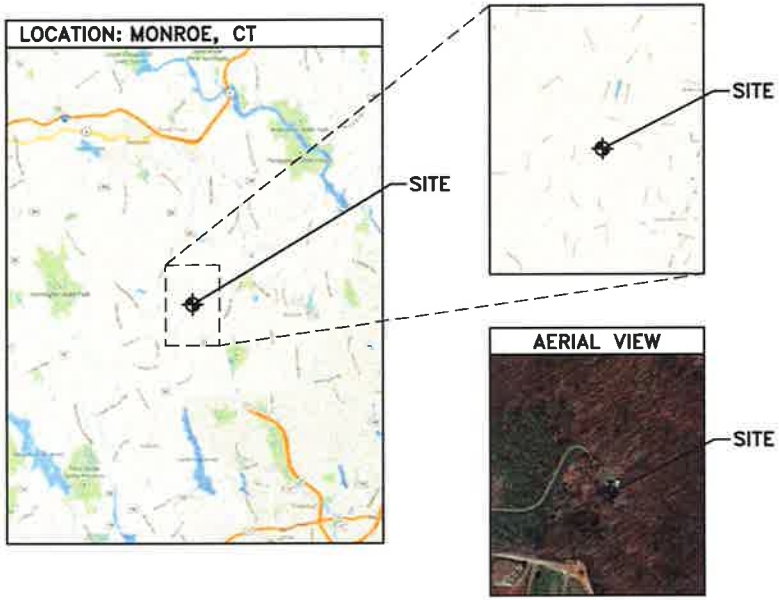
APPENDIX D

MODIFICATION DRAWING

MONROE-GUINEA ROAD

BU #: 841294

240' MODIFIED SELF SUPPORT TOWER



PROJECT SUMMARY	
TOWER OWNER:	CROWN CASTLE
TOWER TYPE:	SELF SUPPORT
GOVERNING CODE:	TIA/EIA-222-F, 2006 IBC, & 2005 CTBC
LATITUDE:	41° 20' 30.7" N
LONGITUDE:	73° 18' 28.3" W
STRUCTURAL DESIGN DRAWING:	CCI / WO. # 900233
STRUCTURAL ANALYSIS REPORT:	GPD / WO. # 918786
STRUCTURAL ANALYSIS DATE:	08/06/14
APPLICATION ID:	219490
REVISION #:	REV. 11
COSITES DOCUMENT ID:	5229548
OWNER CONTACT:	MR. ANDREW BAZINET 48 BROADWAY ALBANY, NY 12204 (585) 370-4786
ENGINEER CONTACT:	MR. DAN PALKOVIC 520 SOUTH MAIN STREET, SUITE 2531 AKRON, OH 44311 (614) 859-1607

PROJECT OVERVIEW:
THE LISTED DRAWINGS REPRESENT MODIFICATIONS TO THE EXISTING TOWER BY REPLACING EXISTING DIAGONAL MEMBERS, REPLACING EXISTING DIAGONAL BOLTS, REPLACING EXISTING BENT MEMBERS, AND INSTALLING NEW ROCK ANCHORS TO THE EXISTING FOUNDATION PADS.

DRAWING INDEX
T-01 TITLE SHEET
N-01 PROJECT NOTES
S-01 TOWER ELEVATION & MODIFICATION SCHEDULE
S-02 MODIFICATION DETAILS & SECTIONS
S-03 ADDITIONAL DETAILS & SECTIONS
F-01 FOUNDATION DETAILS & PARTIAL SITE PLAN
MI-01 MODIFICATION INSPECTION CHECKLIST

GPD GROUP

CROWN CASTLE

REV	DATE	DESCRIPTION

CROWN CASTLE
230 GUINEA ROAD
MONROE, CT 06468

TITLE SHEET

ISSUED FOR:
PERMIT
BID
CONSTRUCTION
RECORD

PROJECT MANAGER	DESIGNER
JS	AH

JOB NO: 2014777 841294.04

T-01

GENERAL NOTES

1. THE MODIFICATIONS REPRESENTED WITHIN THESE DRAWINGS ARE BASED ON A STRUCTURAL ANALYSIS REPORT BY GPD GROUP (PROJECT #: 2014777.841294.03, DATED AUGUST 8, 2014). ALL MODIFICATIONS MUST BE INSTALLED TO BRING THE TOWER INTO CONFORMANCE WITH TIA/EIA-222-F, 2006 IBC, AND 2005 CTBC.
2. THESE MODIFICATIONS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF TIA/EIA-222-F, 2006 IBC, 2005 CTBC, AWS, AND AISC MATERIALS AND SERVICES PROVIDED BY THE CONTRACTOR SHALL CONFORM TO THE ABOVE MENTIONED CODES AND THE CONTRACT SPECIFICATIONS.
3. TOWER INFORMATION WAS OBTAINED IN THE FORM OF STRUCTURAL ANALYSIS BY GPD (JOB #: 2013723.80427.01, DATED APRIL 3, 2013) AND MODIFICATION DRAWINGS BY GPD (JOB #: 2008285.80, DATED OCTOBER 12, 2009). CONTRACTOR SHALL OBTAIN AND BECOME FAMILIAR WITH THE REFERENCED TOWER DOCUMENTS.
4. THIS DESIGN ASSUMES THE TOWER AND FOUNDATIONS HAVE BEEN WELL MAINTAINED, IN GOOD CONDITION, AND ARE WITHOUT DEFECT. BENT MEMBERS, CORRODED MEMBERS, LOOSE BOLTS, CRACKED WELDS AND OTHER MEMBER DEFECTS HAVE NOT BEEN CONSIDERED. THE TOWER IS ASSUMED TO BE PLUMB AND THE SITE IS ASSUMED TO BE LEVEL. THIS DESIGN IS BEING PROVIDED WITHOUT THE BENEFIT OF A CONDITION ASSESSMENT BY GPD GROUP. CONTRACTOR SHALL COMMISSION A COMPLETE CONDITION ASSESSMENT PRIOR TO ORDERING ANY REINFORCING MATERIALS. CONTRACTOR SHALL SUPPLY CONDITION ASSESSMENT TO ENGINEER FOR REVIEW, SEE CONTRACTOR NOTES.
5. MANUFACTURER TOLERANCES, FIELD ADJUSTMENTS, INCORRECT STACKING, AND TEMPERATURE CAN CAUSE DIMENSION DISCREPANCIES. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO ORDERING MATERIALS. ALL FIELD MEASUREMENTS MUST BE REPORTED TO ENGINEER.
6. ALL NEW STEEL SHALL BE HOT-DIPPED GALVANIZED FOR FULL WEATHER PROTECTION. FOR HIGH STRENGTH STEEL, FASTENERS WHERE HOT-DIPPED GALVANIZING IS NOT PERMITTED DACROMET F1136 GRADE 3 COATING (OR ENGINEER APPROVED EQUIVALENT) SHALL BE USED. ALL GALVANIZING COMPOUNDS MUST BE IN ACCORDANCE WITH CROWN DOCUMENT ENG-SUL-10148. IN ADDITION ALL NEW STEEL SHALL BE PAINTED TO MATCH EXISTING STEEL. CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION TO PROTECT STEEL BY ANY OTHER MEANS.
7. ALL EXISTING PAINTED/GALVANIZED SURFACES DAMAGED DURING REHAB SHALL BE WIRE BRUSHED CLEAN, REPAIRED BY COLD GALVANIZING BRUSH APPLIED PAINT (ZRC OR EQUAL), AND REPAINTED TO MATCH THE EXISTING FINISH (IF APPLICABLE).
8. CAULKING SHALL BE PROVIDED AROUND PERIMETER OF ANY AND ALL MODIFICATION MEMBERS TO ENSURE COMPLETE SEAL BETWEEN EXISTING STRUCTURE AND REINFORCING MEMBERS. SEALANT IS TO BE EXTERIOR GRADE, PAINTABLE SILICONE CAULKING AS MANUFACTURED BY DOW AND ACCEPTABLE TO GPD.
9. LOADINGS:

   WIND LOADS:

   FASTEST MILE WIND SPEED (PER: TIA/EIA-222-F & 2006 IBC) (FAIRFIELD COUNTY, CONNECTICUT) — 85 MPH

   ICE LOADS:

   3/4" RADIAL BASE ICE
   FASTEST MILE WIND SPEED (CONCURRENT W/ ICE) — 38 MPH
10. STRUCTURAL STEEL:

    SPECIFICATIONS (LATEST EDITION OF AISC)

    MATERIALS

PLATES	ASTM A572 (GR 50)
BRACING ANGLES	ASTM A36 (GR 36)
ROCK ANCHORS	WILLIAMS #9 ANCHORS ASTM A615 (GR 75)
BOLTS	A325 U.N.O. (ALL BOLT HOLES STANDARD SIZE U.N.O.)
NUTS	LOCKING (STRUCTURAL GRADE)
WASHERS	ASTM F436
HOT DIPPED GALVANIZING	ASTM A123
PAINT	NEW STEEL TO BE PAINTED TO MATCH EXISTING TOWER

11. ALL MATERIAL UTILIZED FOR THIS PROJECT MUST BE NEW AND FREE OF ANY DEFECTS. ANY MATERIAL SUBSTITUTIONS, INCLUDING BUT NOT LIMITED TO ALTERED SIZES AND/OR STRENGTHS, MUST BE APPROVED BY THE OWNER AND ENGINEER IN WRITING.
12. ALL BOLT ASSEMBLIES FOR STRUCTURAL MEMBERS REPRESENTED IN THIS DRAWING REQUIRE LOCKING DEVICES TO BE INSTALLED IN ACCORDANCE WITH TIA/EIA-222-F SECTION 1.3.3 REQUIREMENTS.
13. ALL SUBSTITUTES PROPOSED BY THE CONTRACTOR SHALL BE APPROVED IN WRITING BY THE ENGINEER. CONTRACTOR SHALL PROVIDE DOCUMENTATION TO ENGINEER FOR DETERMINING IF SUBSTITUTE IS SUITABLE FOR USE AND MEETS THE ORIGINAL DESIGN CRITERIA. DIFFERENCES FROM THE ORIGINAL DESIGN, INCLUDING MAINTENANCE, REPAIR AND REPLACEMENT, SHALL BE NOTED. ESTIMATES OF COSTS/CREDITS ASSOCIATED WITH THE SUBSTITUTION (INCLUDING RE-DESIGN COSTS AND COSTS TO SUB-CONTRACTORS) SHALL BE PROVIDED TO THE ENGINEER. CONTRACTOR SHALL PROVIDE ADDITIONAL DOCUMENTATION AND/OR SPECIFICATIONS TO THE ENGINEER AS REQUESTED.
14. PROVIDE STRUCTURAL STEEL SHOP DRAWINGS TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION.
15. UNLESS NOTED OTHERWISE, ALL NEW MEMBERS SHALL MAINTAIN THE EXISTING MEMBER WORK LINES AND NOT INTRODUCE ECCENTRICITIES INTO THE STRUCTURE.
16. THE ENGINEER (GPD GROUP) SHALL MAKE POST INSTALLATION OBSERVATION FOR TOWER AND FOUNDATION. CONTRACTOR SHALL COORDINATE THE ON-SITE INSTALLATION OBSERVATION W/ ENGINEER (GPD GROUP) AT LEAST 5 BUSINESS DAYS PRIOR TO THE CONCRETE POUR FOR EACH FOUNDATION MODIFICATION. CONTRACTOR SHALL COORDINATE W/ENGINEER (GPD GROUP) WITHIN 72 HOURS AFTER 100% COMPLETION OF THE TOWER MODIFICATION INSTALLATION. INSTALLATION OF PROPOSED LOADING WITHOUT ENGINEER APPROVAL IS PROHIBITED. INSTALLATION OF THE PROPOSED LOADING IS BY OTHERS, AND IS BEYOND THE SCOPE OF THESE DRAWINGS.

CONTRACTOR NOTES

1. ALL CONTRACTORS AND LOWER TIER CONTRACTORS MUST ACKNOWLEDGE IN WRITING TO TOWER OWNER AND GPD GROUP THAT THEY HAVE OBTAINED, UNDERSTAND, AND WILL FOLLOW TOWER OWNER STANDARDS OF PRACTICE, CONSTRUCTION GUIDELINES, ALL SITE AND TOWER SAFETY PROCEDURES, ALL PRODUCT LIMITATIONS AND INSTALLATION PROCEDURES USED ON SITE, AND PROPOSED MODIFICATIONS DESCRIBED. RECEIPT OF ACKNOWLEDGMENT MUST OCCUR PRIOR TO BEGINNING CONSTRUCTION OR CLIMBING. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO PROVIDE THIS DOCUMENTATION FOR TOWER OWNER AND GPD GROUP ON COMPANY LETTERHEAD AND THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO OBTAIN THIS DOCUMENTATION FROM LOWER TIER SUBCONTRACTORS (ON SUBCONTRACTOR LETTERHEAD) AND DELIVER IT TO TOWER OWNER AND GPD GROUP.
2. IF THE CONTRACTOR DISCOVERS ANY EXISTING CONDITIONS THAT ARE NOT REPRESENTED ON THESE DRAWINGS, OR ANY CONDITIONS THAT WOULD INTERFERE WITH THE INSTALLATION OF THE MODIFICATIONS, GPD GROUP SHALL BE CONTACTED IMMEDIATELY TO EVALUATE THE SIGNIFICANCE OF THE DEVIATION.
3. IT IS ASSUMED THAT ANY STRUCTURAL MODIFICATION WORK SPECIFIED ON THESE PLANS WILL BE ACCOMPLISHED BY KNOWLEDGEABLE WORKMEN WITH TOWER CONSTRUCTION EXPERIENCE. THIS INCLUDES PROVIDING THE NECESSARY CERTIFICATIONS TO THE TOWER OWNER AND ENGINEER.
4. THESE DRAWINGS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION METHODS, MEANS, TECHNIQUES, SEQUENCES, AND PROCEDURES.
5. CONSTRUCTION WORK PRESENTS UNIQUE THREATS TO HEALTH AND SAFETY. THE CONTRACTOR IS RESPONSIBLE TO EDUCATE THEIR WORK FORCE OF THESE DANGERS AND LIMIT THEIR EXPOSURE TO HAZARDS. THIS EDUCATION SHALL INCLUDE BUT NOT BE LIMITED TO APPLICABLE TRAINING COURSES AND CERTIFICATIONS, PROPER PERSONAL PROTECTIVE EQUIPMENT USAGE, DAILY TAILGATE MEETINGS AND ANY OTHER PREVENTATIVE MEASURES WHICH MAY BE REASONABLY EXPECTED. THE CONTRACTOR AND ALL SUB-CONTRACTORS SHALL BE RESPONSIBLE FOR THE SAFETY OF THE WORK AREA, ADJACENT AREAS AND ANY PROPERTY OCCUPANTS WHO MAY BE AFFECTED BY THE WORK UNDER CONTRACT. THE CONTRACTOR SHALL REVIEW ALL LANDOWNER, PRIME CONTRACTOR, CARRIER, OSHA, AND LOCAL SAFETY GUIDELINES AND AT ALL TIMES SHALL CONFORM TO THE MOST RESTRICTIVE OF THESE STANDARDS TO ENSURE A SAFE WORKPLACE.
6. TOWER WORK PRESENTS ADDITIONAL THREATS TO HEALTH AND SAFETY. ALL TOWER WORKERS WORKING ON A TOWER MUST BE ADEQUATELY TRAINED AND MONITORED TO ENSURE THAT SAFE WORK PRACTICES ARE LEARNED AND FOLLOWED. AS REQUIRED BY OSHA, WHEN WORKING ON EXISTING COMMUNICATION TOWERS, EMPLOYEES MUST BE PROVIDED WITH APPROPRIATE FALL PROTECTION, TRAINED IN USE THIS FALL PROTECTION PROPERLY, AND THE USE OF FALL PROTECTION MUST BE CONSISTENTLY SUPERVISED AND ENFORCED BY THE CONTRACTOR.
7. ALL SAFETY EQUIPMENT SHALL BE INSPECTED ACCORDING TO ALL OSHA AND INDUSTRY SCHEDULED INTERVALS AND ALL INSPECTIONS SHALL BE DOCUMENTED PER APPLICABLE CODES AND STANDARDS.
8. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING; ANY PROBLEMS WITH ACCESS, INTERFERENCE, ETC. SHALL BE RESOLVED PRIOR TO MOBILIZATION. THE CONTRACTOR MUST VISIT THE SITE PRIOR TO ORDERING ANY MATERIAL AND MUST RESOLVE ALL ISSUES WITH THE TOWER PREVENTING A CONTINUOUS INSTALLATION. CONTRACTOR SHALL NOTE ALL ANTENNAS, MOUNTS, COAX, LIGHTING, CLIMBING SUPPORTS, STEP BOLTS, PORT HOLES, AND ANY OTHER TOWER APPURTENANCES IN THE REGION OF THE MODIFICATIONS. SEE GENERAL NOTES #4 AND #5 THIS SHEET.
9. CONTRACTOR IS RESPONSIBLE FOR TEMPORARILY REMOVING ALL COAX, T-BRACKETS, ANTENNA MOUNTS, AND ANY OTHER TOWER APPURTENANCE THAT MAY INTERFERE WITH THE TOWER MODIFICATIONS. ALL TOWER APPURTENANCES MUST BE REPLACED AND/OR RESTORED TO ITS ORIGINAL LOCATION. ANY CARRIER DOWNTIME MUST BE COORDINATED WITH THE TOWER OWNER IN WRITING.
10. SOME ATTACHMENTS MAY REQUIRE CUSTOM MODIFICATIONS TO PROPERLY FIT THE MODIFIED REGION OF THE STRUCTURE. THESE CUSTOMIZATIONS ARE DESIGNED BY OTHERS AND MUST BE APPROVED BY THE ENGINEER PRIOR TO REMOVING SUCH ATTACHMENTS. ANY CARRIER DOWNTIME MUST BE COORDINATED WITH THE TOWER OWNER IN WRITING.
11. CONTRACTOR SHALL ONLY WORK WITHIN THE LIMITS OF THE TOWER OWNER'S PROPERTY OR LEASE AREA AND APPROVED EASEMENTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY WORK IS WITHIN THESE BOUNDARIES. CONTRACTOR SHALL EMPLOY A SURVEYOR AS REQUIRED. ANY WORK OUTSIDE THESE BOUNDARIES SHALL BE APPROVED IN WRITING BY THE LAND OWNER PRIOR TO MOBILIZATION. CONSTRUCTION STAKING AND BOUNDARY MARKING IS THE RESPONSIBILITY OF THE CONTRACTOR.
12. TOWERS ARE DESIGNED TO CARRY GRAVITY, WIND, AND ICE LOADS. ALL MEMBERS, LEGS, DIAGONALS, STRUTS, AND REDUNDANT MEMBERS PROVIDE STRUCTURAL STABILITY TO THE TOWER WITH LITTLE REDUNDANCY. ABSENCE OR REMOVAL OF A MEMBER CAN TRIGGER CATASTROPHIC FAILURE UNLESS A SUBSTITUTE IS PROVIDED BEFORE ANY REMOVAL. LEGS CARRY AXIAL LOADS AND DERIVE THEIR STRENGTH FROM SHORTER UN-BRACED LENGTHS BY THE PRESENCE OF REDUNDANT MEMBERS AND THEIR CONNECTION TO THE DIAGONALS WITH BOLTS OR WELDS. IF THE BOLTS OR WELDS ARE REMOVED WITHOUT PROVIDING ANY SUBSTITUTE TO THE FRAME, THE LEG IS SUBJECTED TO A HIGHER UN-BRACED LENGTH THAT IMMEDIATELY REDUCES ITS LOAD CARRYING CAPACITY. IF A DIAGONAL IS ALSO REMOVED IN ADDITION TO THE CONNECTION, THE UN-BRACED LENGTH OF THE LEG IS GREATLY INCREASED, JEOPARDIZING ITS LOAD CARRYING CAPACITY. FAILURE OF ONE LEG CAN RESULT IN A TOWER COLLAPSE BECAUSE THERE IS NO REDUNDANCY. REDUNDANT MEMBERS AND DIAGONALS ARE CRITICAL TO THE STABILITY OF THE TOWER.
13. **WORK SHALL ONLY BE PERFORMED DURING CALM DRY DAYS (WINDS LESS THAN 10-MPH). CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY LOCAL TOWER SHORING, TEMPORARY GLOBAL TOWER SHORING, AND ALL SHORING OF SURROUNDING BUILDINGS, PIPES, AND OTHER OUTDOOR SITE OBSTRUCTIONS. ALL SHORING, TEMPORARY BRACING, AND TEMPORARY SUPPORTS ARE THE RESPONSIBILITY OF THE CONTRACTOR.**
14. MODIFICATIONS SHOWN SHALL BE INSTALLED ON ALL THREE (3) TOWER LEGS/FACES.
15. ALL MODIFICATIONS PERFORMED ON THIS TOWER SHALL BE COMPLETED IN ACCORDANCE WITH THE REQUIREMENTS OF TIA-1019-A CONSTRUCTION STANDARDS.
16. **WELDING OR CUTTING TORCH CUTTING OR OPEN FLAME OF ANY TYPE IS PROHIBITED ON THIS STRUCTURE AND ON THE EXISTING ANTENNA MOUNTS.**
17. ALL MANUFACTURERS HARDWARE AND ASSEMBLY INSTRUCTIONS SHALL BE FOLLOWED EXACTLY. DEVIATION FROM THE INSTRUCTIONS IS UNACCEPTABLE AND REQUIRES WRITTEN APPROVAL FROM ENGINEER.

FOUNDATION NOTES

1. **CONTRACTOR SHALL NOTIFY THE FOLLOWING INDIVIDUALS 5 BUSINESS DAYS PRIOR TO FOUNDATION CONSTRUCTION IN ORDER TO COORDINATE THE VISUAL INSPECTION BY GPD:**
   - –ANDREW GAZINET (CROWN CASTLE) 585-889-3442
   - –DAN PALKOVIC (GPD GROUP) 814-850-1507
   - –BRIAN SMITH (GPD GROUP) 216-927-8848
   - –TRAVIS BOWMAN (GPD GROUP) 330-572-2114
2. EXISTING FOUNDATION INFORMATION BASED UPON A FOUNDATION INVESTIGATION BY WEI (PROJECT #: 2009-901, DATED SEPTEMBER 18, 2009). CONTRACTOR SHALL OBTAIN AND BECOME FAMILIAR WITH THE REFERENCED FOUNDATION DOCUMENT. IF EXISTING FOUNDATION CONDITIONS DIFFER FROM THE REFERENCED DOCUMENT, CONTACT ENGINEER AND TOWER OWNER IMMEDIATELY.
3. CONCRETE WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES, SAFETY REGULATIONS AND UNLESS OTHERWISE NOTED, THE LATEST REVISION OF ACI 318, "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE". PROCEDURES FOR THE PROTECTION OF EXCAVATIONS, EXISTING CONSTRUCTION AND UTILITIES SHALL BE ESTABLISHED PRIOR TO FOUNDATION INSTALLATION.
4. SOIL INFORMATION IS BASED ON A GEOTECHNICAL REPORT BY WEI (PROJECT #: 2009-901, DATED SEPTEMBER 18, 2009). CONTRACTOR SHALL OBTAIN AND IMPLEMENT ALL RECOMMENDATIONS CONTAINED IN THE REFERENCED GEOTECHNICAL REPORT. IF SOIL CONDITIONS ENCOUNTERED ARE DIFFERENT FROM REFERENCED GEOTECHNICAL REPORT, NOTIFY ENGINEER IMMEDIATELY.

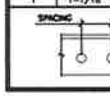
   A. ULTIMATE BEARING = 80 KSF AT A DEPTH OF 9'-0"
   B. UNIT WEIGHT OF SOIL = 120 PCF
   C. GROUNDWATER = NOT ENCOUNTERED
5. BACKFILL SHALL BE CLEAN, FREE OF DEBRIS, AND ORGANIC FREE. CONTRACTOR SHALL UTILIZE CLEAN FILL AS REQUIRED (MIN. UNIT WEIGHT = 120 PCF).
6. ALL BACKFILL SHALL BE CONTROLLED-COMPACTED, PLACED IN A MAXIMUM OF 8" LIFTS, MOISTURE CONDITIONED TO WITHIN THREE PERCENT OF OPTIMUM MOISTURE, AND COMPACTED TO 95% OF STANDARD PROCTOR MAXIMUM DRY DENSITY PER ASTM D698.
7. CARE SHALL BE TAKEN DURING INSTALLATION OF ROCK ANCHORS SO THAT EXISTING REINFORCING STEEL IS NOT DAMAGED. CONTRACTOR SHALL USE X-RAY OR OTHER ENGINEER APPROVED NON-DESTRUCTIVE MEANS TO LOCATE EXISTING REINFORCING STEEL AND ANCHOR BOLTS. CONTACT ENGINEER IMMEDIATELY IF EXISTING STEEL IS ENCOUNTERED.
8. CONTRACTOR SHALL SECURE SITE BACK TO EXISTING CONDITION UNDER SUPERVISION OF OWNER. ALL FENCE, STONE, GEOFABRIC, GROUNDING, AND SURROUNDING GRADE SHALL BE REPLACED AND REPAIRED AS REQUIRED TO ACHIEVE OWNER APPROVAL. POSITIVE DRAINAGE AWAY FROM TOWER SITE SHALL BE MAINTAINED.
9. CONTRACTOR TO VERIFY LOCATION OF ALL EXISTING PUBLIC AND PRIVATE UTILITIES PRIOR TO EXCAVATION. IF NECESSARY UTILITIES SHALL BE RELOCATED PRIOR TO FOUNDATION MODIFICATION. CONSENT FROM THE TOWER OWNER AND EOR MUST BE OBTAINED TO ENCASE UTILITIES IN CONCRETE.

ROCK ANCHORS

1. CONTRACTOR SHALL INSTALL WILLIAMS ANCHORS PER WILLIAMS ANCHOR INSTALLATION PROCEDURES AND GUIDELINES.
2. CONTRACTOR SHALL OBTAIN AND BECOME FAMILIAR WITH WILLIAMS ANCHORS INSTALLATION AND PULL TESTING PROCEDURES AND RECOMMENDATIONS.
3. WILLIAMS ANCHORS ARE TO BE GALVANIZED.
4. ANCHORS ARE TO BE PRESTRESSED TO A LOAD OF 28 K AND LOCKED OFF AT A LOAD OF 25 K. PRESTRESSING RESULTS SHALL BE SUPPLIED TO THE TOWER OWNER AND ENGINEER OF RECORD (GPD GROUP) FOR REFERENCE IN THE POST INSTALLATION OBSERVATION REPORT. CONTRACTOR SHALL CONTACT ENGINEER IMMEDIATELY IF PRESTRESSING RESULTS DO NOT REACH ULTIMATE VALUE OR MIN. DEPTH REQUIRED.
5. SHOP DRAWINGS MUST BE SENT TO DESIGN ENGINEER FOR FINAL APPROVAL PRIOR TO FABRICATION.
6. CONTRACTOR SHALL VERIFY THAT TOWER IS PLUMB PRIOR TO THE INSTALLATION OF ANY TOWER MODIFICATIONS.
7. A WILLIAMS REPRESENTATIVE SHALL BE ON-SITE FOR THE DURATION OF THE ROCK ANCHOR INSTALLATION.

BOLT SCHEDULE

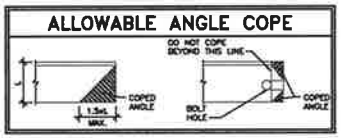
BOLT DIAMETER	STANDARD HOLE	SHORT SLOT	MIN. EDGE DISTANCE	SPACING
1/2	9/16	9/16x11/16	7/8	1-1/2
5/8	11/16	11/16x7/8	1-1/8	1-7/8
3/4	13/16	13/16x1	1-1/4	2-1/4
7/8	15/16	15/16x1-1/8	1-1/2	2-5/8
1	1-1/16	1-1/16x1-5/16	1-3/4	3



-DIMENSIONS GIVEN IN INCHES

-SHORT SLOT HOLES SHALL ONLY BE USED WHEN DEPICTED ON THE PLANS

ALLOWABLE ANGLE COPE



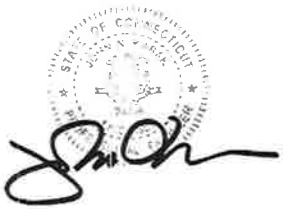
1. ALL DIMENSIONS REPRESENTED IN THE ABOVE TABLES ARE AISC MINIMUM REQUIREMENTS. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS IN FIELD AND NOTIFY ENGINEER IF DISTANCES ARE LESS THAN THOSE PROVIDED.
2. THE DIMENSIONS PROVIDED ARE MINIMUM REQUIREMENTS. ACTUAL DIMENSIONS OF PROPOSED MEMBERS WITHIN THESE DRAWINGS MAY VARY FROM THE AISC MINIMUM REQUIREMENTS.

WORKABLE GAGES

LEG	4	3-1/2	3	2-1/2	2	1-3/4
G	2-1/2	2	1-3/4	1-3/8	1-1/8	1

-DIMENSIONS GIVEN IN INCHES

-MATCH EXISTING WHEN APPLICABLE



GPD GROUP
Civil, Fire, Surveying, Electrical & Structural Engineering, Inc.

CROWN CASTLE

REV	DATE	DESCRIPTION

CROWN CASTLE
230 GUINEA ROAD
MONROE, CT 06468

PROJECT NOTES

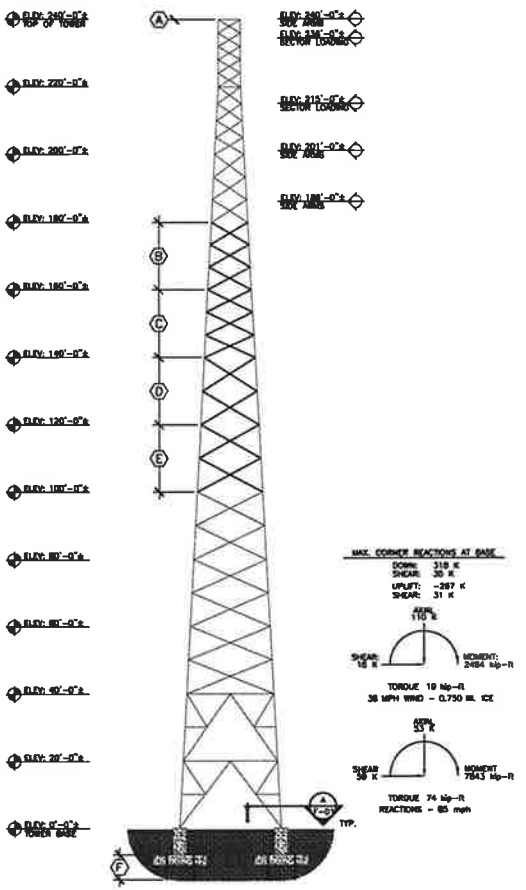
ISSUED FOR
PERMIT
BID
CONSTRUCTION
RECORD

PROJECT MANAGER	DESIGNER
JS	AH

JOB NO: 2014777.841294.04

N-01

NOTE: ANTENNAS AND MOUNTS ARE IN THE MODIFIED REGION OF THE TOWER. VERIFY FOR INTERFERENCES PRIOR TO ORDERING MATERIALS. FOR FULL ANTENNA CONFIGURATION SEE ASSOCIATED PASSING ANALYSIS.



MAX. CORNER REACTIONS AT BASE

DOWN: 318 K
SHEAR: 30 K
UPLIFT: -287 K
SHEAR: 31 K

TORQUE 19 kip-ft
36 MPH WIND - 0.750 in. ICE

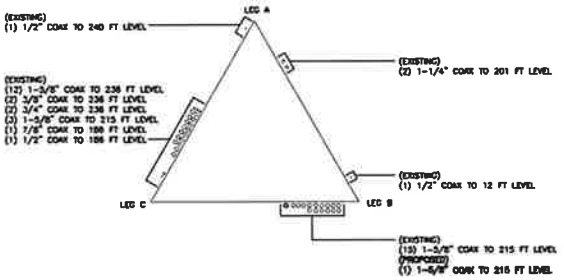
TORQUE 74 kip-ft
REACTIONS - 85 mph

TOWER ELEVATION
1/16"=1'-0"

MODIFICATION SCHEDULE

SYMBOL	ELEVATION	MEMBER TYPE	EXISTING MEMBER	NEW MEMBER	NOTES
A	240'-0"±	TOP GIRTS	L2x2x1/8	L2x2x1/8	REPLACE EXISTING BENT TOP GIRTS WITH NEW SAME SIZE MEMBERS. SEE DETAIL 5/S-03 FOR MORE INFORMATION.
B	180'-0"± TO 180'-0"±	DIAGONAL BOLTS	1/2"ø A325N	1/2"ø A325X	REPLACE EXISTING DIAGONAL BOLTS WITH NEW SAME SIZE X-BOLTS. SEE DETAIL 6/S-03 AND X-BOLT DETAIL ON SHEET S-02.
C	140'-0"± TO 160'-0"±	DIAGONALS	L2-1/2x2-1/2x1/4	L2-1/2x2-1/2x5/16	REPLACE EXISTING DIAGONAL MEMBERS WITH NEW LARGER SIZE MEMBERS. SEE DETAIL 3/S-03 FOR MORE INFORMATION.
D	120'-0"± TO 140'-0"±	DIAGONALS	L3x3x1/4	L3x3x5/16	REPLACE EXISTING DIAGONAL MEMBERS WITH NEW LARGER SIZE MEMBERS. SEE DETAIL 2/S-02 FOR MORE INFORMATION.
E	100'-0"± TO 120'-0"±	DIAGONAL BOLTS	5/8"ø A325N	5/8"ø A325X	REPLACE EXISTING DIAGONAL BOLTS WITH NEW SAME SIZE X-BOLTS SEE DETAIL 1/S-02 AND X-BOLT DETAIL ON SHEET S-02.
F	BELOW GRADE	FOUNDATION	CONCRETE PAD & PIER	ROCK ANCHORS	INSTALL NEW ROCK ANCHORS TO THE EXISTING FOUNDATION. SEE SHEET F-01 FOR MORE INFORMATION.

NOTE: CONTRACTOR SHALL FIELD VERIFY LOCATION OF BENT TOP GIRTS AND ALL CRITICAL DIMENSIONS PRIOR TO ORDERING MATERIALS.



TOWARDS

COAX LAYOUT
N.T.S.

GPD GROUP
Civil, Fire, Interiors, Burns & Greenwich, Inc.

CROWN CASTLE

NO	DATE	DESCRIPTION

CROWN CASTLE
230 GUINEA ROAD
MONROE, CT 06468

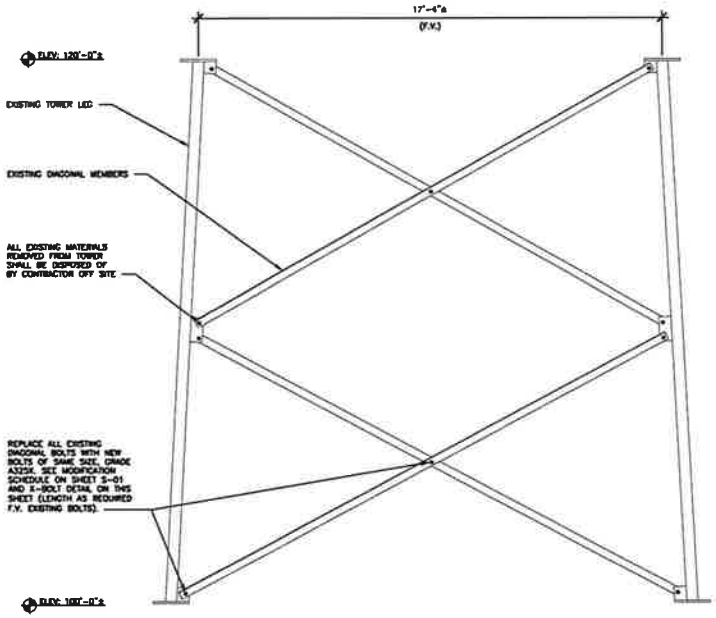
TOWER ELEVATION & MODIFICATION SCHEDULE

ISSUED FOR	
PERMIT	09/20/14
BID	
CONSTRUCTION	
RECORD	

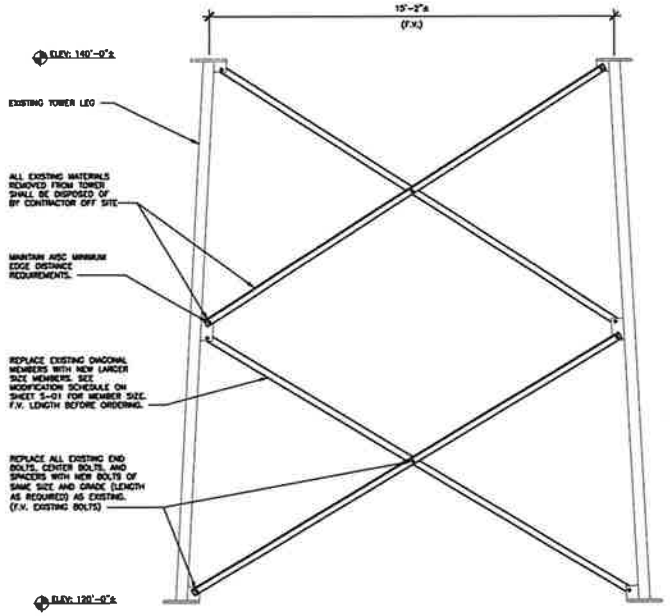
PROJECT MANAGER	DESIGNER
JC	AH

JOB NO
2014777.841294.04

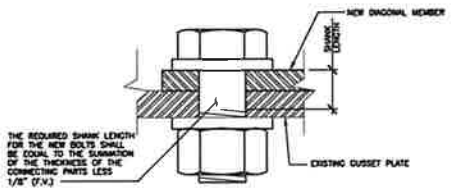
S-01



DETAIL 1
1/2"=1'-0"
S-02



DETAIL 2
1/2"=1'-0"
S-02



X-BOLT
CONNECTION DETAIL
N.T.S.

GPD GROUP

CROWN CASTLE

REV	DATE	DESCRIPTION

CROWN CASTLE
230 GUINEA ROAD
MONROE, CT 06468

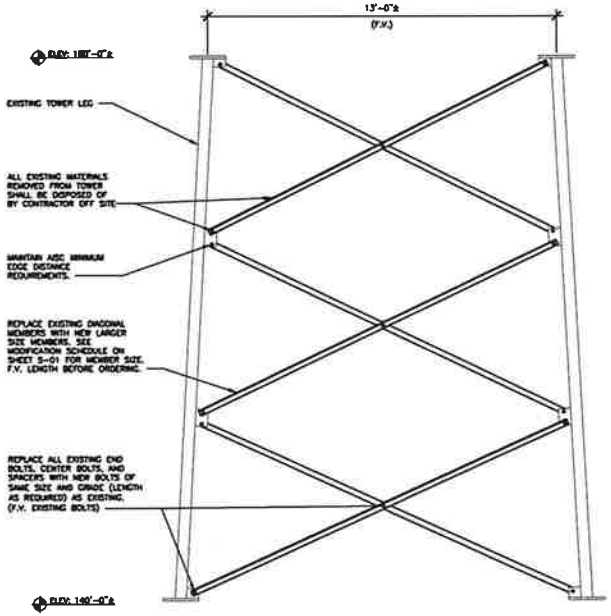
MODIFICATION DETAILS & SECTIONS

ISSUED FOR:	
PERMIT	8/22/14
BID	-
CONSTRUCTION	-
RECORD	-

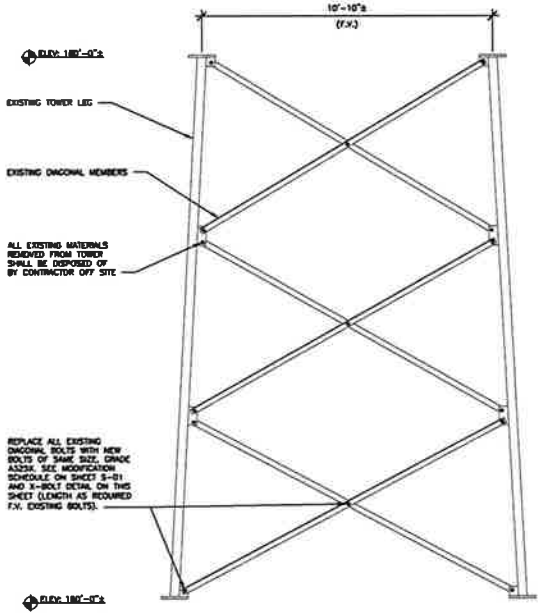
PROJECT MANAGER	DESIGNER
JS	MR

JOB NO
2014777.841294.04

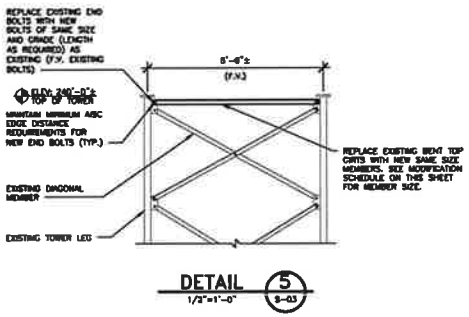
S-02



DETAIL 3 (S-03)
1/2"=1'-0"



DETAIL 4 (S-03)
1/2"=1'-0"



DETAIL 5 (S-03)
1/2"=1'-0"

GPD GROUP

CROWN CASTLE

REV	DATE	DESCRIPTION

CROWN CASTLE
230 GUINEA ROAD
MONROE, CT 06468

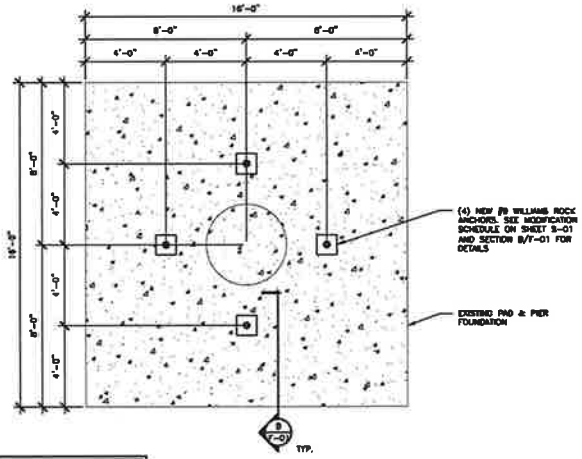
ADDITIONAL DETAILS & SECTIONS

ISSUED FOR	
PERMIT	06/20/14
BID	
CONSTRUCTION	
RECORD	

PROJECT MANAGER	DESIGNER
JR	BH

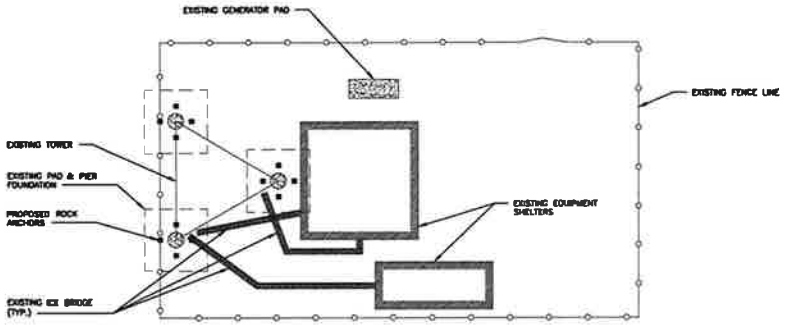
JOB NO
2014777.841294.04

S-03



TOWER BASE FOUNDATION IS BEING EXCAVATED. CONTRACTOR SHALL FULLY SUPPORT TOWER DURING ALL PHASES OF CONSTRUCTION. REFER TO CONTRACTOR NOTES ON SHEET N-01.

SECTION A
3/8"=1'-0"
F-01



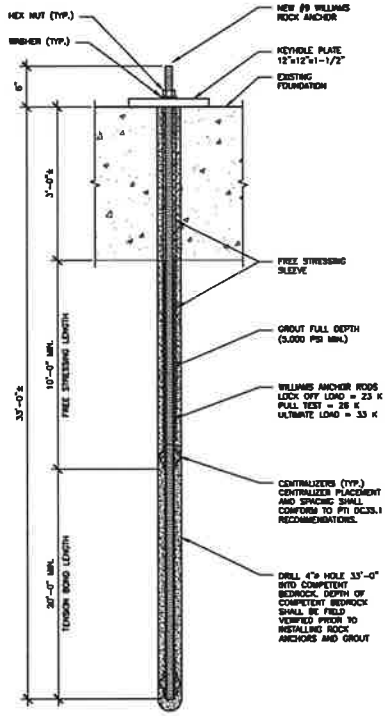
NORTH

CONTRACTOR TO VERIFY LOCATION OF ALL EXISTING PUBLIC AND PRIVATE UTILITIES PRIOR TO EXCAVATION. IF NECESSARY UTILITIES SHALL BE RELOCATED PRIOR TO FOUNDATION MODIFICATION. UTILITIES SHALL NOT BE ENCASED IN CONCRETE.

SITE PLAN

N.T.S.

ALL SITE LAYOUT AND FOUNDATION ORIENTATION INFORMATION IS BASED ON THE TOWER OWNER'S SITE DRAWINGS AND IS CONSIDERED APPROXIMATE. CONTRACTOR SHALL VERIFY ALL SITE DIMENSIONS, ORIENTATION, AND UTILITY LOCATIONS PRIOR TO MOBILIZING (SEE NOTES ON SHEET N-01)



SECTION B
N.T.S.
F-01

811
Know what's below
Call before you dig.

GPD GROUP

CROWN CASTLE

NO	DATE	DESCRIPTION

CROWN CASTLE
230 GUINEA ROAD
MONROE, CT 06468

FOUNDATION DETAILS & PARTIAL SITE PLAN

ISSUED FOR	
PERMIT	09/20/14
BID	
CONSTRUCTION	
RECORD	

PROJECT MANAGER	DESIGNER
JT	AH

JOB NO
2014777 841294.04

F-01

MI CHECKLIST

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

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

GPD GROUP

CROWN CASTLE

REV	DATE	DESCRIPTION

CROWN CASTLE
230 GUINEA ROAD
MONROE, CT 06468

MODIFICATION INSPECTION CHECKLIST

ISSUED FOR:	
PERMIT	08/22/14
BID	-
CONSTRUCTION	
RECORD	-

PROJECT MANAGER	DESIGNER
JE	AH

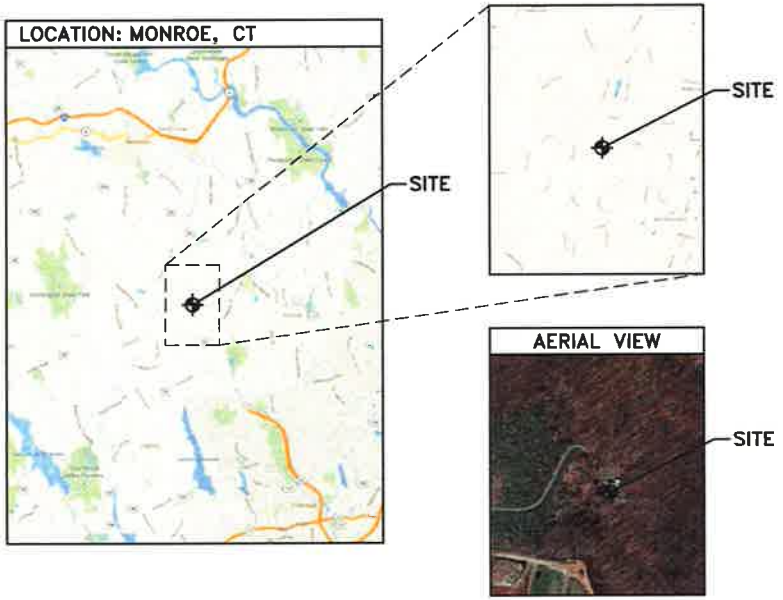
JOB NO
2014777.841294.04

MI-01

MONROE-GUINEA ROAD

BU #: 841294

240' MODIFIED SELF SUPPORT TOWER



PROJECT SUMMARY	
TOWER OWNER:	CROWN CASTLE
TOWER TYPE:	SELF SUPPORT
GOVERNING CODE:	TIA/EIA-222-F, 2006 IBC, & 2005 CTBC
LATITUDE:	41° 20' 30.7" N
LONGITUDE:	73° 16' 28.3" W
STRUCTURAL DESIGN DRAWING:	CCI / WO. # 900233
STRUCTURAL ANALYSIS REPORT:	GPD / WO. # 918788
STRUCTURAL ANALYSIS DATE:	08/06/14
APPLICATION ID:	219490
REVISION #:	REV. 11
CCISITES DOCUMENT ID:	5229548
OWNER CONTACT:	MR. ANDREW BAZINET 46 BROADWAY ALBANY, NY 12204 (585) 370-4766
ENGINEER CONTACT:	MR. DAN PALKOVIC 520 SOUTH MAIN STREET, SUITE 2531 AKRON, OH 44311 (614) 859-1507

PROJECT OVERVIEW:

THE LISTED DRAWINGS REPRESENT MODIFICATIONS TO THE EXISTING TOWER BY REPLACING EXISTING DIAGONAL MEMBERS, REPLACING EXISTING DIAGONAL BOLTS, REPLACING EXISTING BENT MEMBERS, AND INSTALLING NEW ROCK ANCHORS TO THE EXISTING FOUNDATION PADS.

DRAWING INDEX
T-01 TITLE SHEET
N-01 PROJECT NOTES
S-01 TOWER ELEVATION & MODIFICATION SCHEDULE
S-02 MODIFICATION DETAILS & SECTIONS
S-03 ADDITIONAL DETAILS & SECTIONS
F-01 FOUNDATION DETAILS & PARTIAL SITE PLAN
MI-01 MODIFICATION INSPECTION CHECKLIST

GPD GROUP

CROWN CASTLE

REV	DATE	DESCRIPTION

CROWN CASTLE
230 GUINEA ROAD
MONROE, CT 06468

TITLE SHEET

ISSUED FOR:
PERMIT 08/22/14
BID
CONSTRUCTION
RECORD

PROJECT MANAGER: JE
DESIGNER: AH

JOB NO 2014777 841294.04

T-01

GENERAL NOTES

1. THE MODIFICATIONS REPRESENTED WITHIN THESE DRAWINGS ARE BASED ON A STRUCTURAL ANALYSIS REPORT BY GPD GROUP (PROJECT #: 2014777.841294.03, DATED AUGUST 8, 2014). ALL MODIFICATIONS MUST BE INSTALLED TO BRING THE TOWER INTO CONFORMANCE WITH TIA/EIA-222-F, 2006 IBC, AND 2005 CTBC.
2. THESE MODIFICATIONS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF TIA/EIA-222-F, 2006 IBC, 2005 CTBC, AWS, AND AISC. MATERIALS AND SERVICES PROVIDED BY THE CONTRACTOR SHALL CONFORM TO THE ABOVE MENTIONED CODES AND THE CONTRACT SPECIFICATIONS.
3. TOWER INFORMATION WAS OBTAINED IN THE FORM OF STRUCTURAL ANALYSIS BY GPD (JOB #: 2013723.80427.01, DATED APRIL 3, 2013) AND MODIFICATION DRAWINGS BY GPD (JOB #: 2009265.80, DATED OCTOBER 12, 2009). CONTRACTOR SHALL OBTAIN AND BECOME FAMILIAR WITH THE REFERENCED TOWER DOCUMENTS.
4. THIS DESIGN ASSUMES THE TOWER AND FOUNDATIONS HAVE BEEN WELL MAINTAINED, IN GOOD CONDITION, AND ARE WITHOUT DEFECT. BENT MEMBERS, CORRODED MEMBERS, LOOSE BOLTS, CRACKED WELDS AND OTHER MEMBER DEFECTS HAVE NOT BEEN CONSIDERED. THE TOWER IS ASSUMED TO BE PLUMB AND THE SITE IS ASSUMED TO BE LEVEL. THIS DESIGN IS BEING PROVIDED WITHOUT THE BENEFIT OF A CONDITION ASSESSMENT BY GPD GROUP. **CONTRACTOR SHALL COMMISSION A COMPLETE CONDITION ASSESSMENT PRIOR TO ORDERING ANY REINFORCING MATERIALS. CONTRACTOR SHALL SUPPLY CONDITION ASSESSMENT TO ENGINEER FOR REVIEW, SEE CONTRACTOR NOTES.**
5. MANUFACTURER TOLERANCES, FIELD ADJUSTMENTS, INCORRECT STACKING, AND TEMPERATURE CAN CAUSE DIMENSION DISCREPANCIES. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO ORDERING MATERIALS. ALL FIELD MEASUREMENTS MUST BE REPORTED TO ENGINEER.
6. ALL NEW STEEL SHALL BE HOT-DIPPED GALVANIZED FOR FULL WEATHER PROTECTION. FOR HIGH STRENGTH STEEL FASTENERS WHERE HOT-DIPPED GALVANIZING IS NOT PERMITTED DACROMET F1136 GRADE 3 COATING (OR ENGINEER APPROVED EQUIVALENT) SHALL BE USED. ALL GALVANIZING COMPOUNDS MUST BE IN ACCORDANCE WITH CROWN DOCUMENT ENG-BUL-10149. IN ADDITION ALL NEW STEEL SHALL BE PAINTED TO MATCH EXISTING STEEL. CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION TO PROTECT STEEL BY ANY OTHER MEANS.
7. ALL EXISTING PAINTED/GALVANIZED SURFACES DAMAGED DURING REHAB SHALL BE WIRE BRUSHED CLEAN, REPAIRED BY COLD GALVANIZING BRUSH APPLIED PAINT (ZRC OR EQUAL), AND REPAINTED TO MATCH THE EXISTING FINISH (IF APPLICABLE).
8. CAULKING SHALL BE PROVIDED AROUND PERIMETER OF ANY AND ALL MODIFICATION MEMBERS TO ENSURE COMPLETE SEAL BETWEEN EXISTING STRUCTURE AND REINFORCING MEMBERS. SEALANT IS TO BE EXTERIOR GRADE, PAINTABLE SILICONE CAULKING AS MANUFACTURED BY DOW AND ACCEPTABLE TO GPD.
9. LOADINGS:

   WIND LOADS:

   FASTEST MILE WIND SPEED (PER: TIA/EIA-222-F & 2006 IBC) 85 MPH
   (FAIRFIELD COUNTY, CONNECTICUT)

   ICE LOADS:

   3/4" RADIAL BASE ICE
   FASTEST MILE WIND SPEED (CONCURRENT W/ ICE) 38 MPH
10. STRUCTURAL STEEL:

    SPECIFICATIONS (LATEST EDITION OF AISC)

    MATERIALS

PLATES	ASTM A572 (GR 50)
BRACING ANGLES	ASTM A36 (GR 36)
ROCK ANCHORS	WILLIAMS #9 ANCHORS ASTM A615 (GR 75)
BOLTS	A325 U.N.O. (ALL BOLT HOLES STANDARD SIZE U.N.O.)
NUTS	LOCKING (STRUCTURAL GRADE)
WASHERS	ASTM F436
HOT DIPPED GALVANIZING	ASTM A123
PAINT	NEW STEEL TO BE PAINTED TO MATCH EXISTING TOWER

11. ALL MATERIAL UTILIZED FOR THIS PROJECT MUST BE NEW AND FREE OF ANY DEFECTS. ANY MATERIAL SUBSTITUTIONS, INCLUDING BUT NOT LIMITED TO ALTERED SIZES AND/OR STRENGTHS, MUST BE APPROVED BY THE OWNER AND ENGINEER IN WRITING.
12. ALL BOLT ASSEMBLIES FOR STRUCTURAL MEMBERS REPRESENTED IN THIS DRAWING REQUIRE LOCKING DEVICES TO BE INSTALLED IN ACCORDANCE WITH TIA/EIA-222-F SECTION 1.3.3 REQUIREMENTS.
13. ALL SUBSTITUTES PROPOSED BY THE CONTRACTOR SHALL BE APPROVED IN WRITING BY THE ENGINEER. CONTRACTOR SHALL PROVIDE DOCUMENTATION TO ENGINEER FOR DETERMINING IF SUBSTITUTE IS SUITABLE FOR USE AND MEETS THE ORIGINAL DESIGN CRITERIA. DIFFERENCES FROM THE ORIGINAL DESIGN, INCLUDING MAINTENANCE, REPAIR AND REPLACEMENT, SHALL BE NOTED. ESTIMATES OF COSTS/CREDITS ASSOCIATED WITH THE SUBSTITUTION (INCLUDING RE-DESIGN COSTS AND COSTS TO SUB-CONTRACTORS) SHALL BE PROVIDED TO THE ENGINEER. CONTRACTOR SHALL PROVIDE ADDITIONAL DOCUMENTATION AND/OR SPECIFICATIONS TO THE ENGINEER AS REQUESTED.
14. PROVIDE STRUCTURAL STEEL SHOP DRAWINGS TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION.
15. UNLESS NOTED OTHERWISE, ALL NEW MEMBERS SHALL MAINTAIN THE EXISTING MEMBER WORK LINES AND NOT INTRODUCE ECCENTRICITIES INTO THE STRUCTURE.
16. THE ENGINEER (GPD GROUP) SHALL MAKE POST INSTALLATION OBSERVATION FOR TOWER AND FOUNDATION. CONTRACTOR SHALL COORDINATE THE ON-SITE INSTALLATION OBSERVATION W/ ENGINEER (GPD GROUP) AT LEAST 5 BUSINESS DAYS PRIOR TO THE CONCRETE POUR FOR EACH FOUNDATION MODIFICATION. CONTRACTOR SHALL COORDINATE W/ENGINEER (GPD GROUP) WITHIN 72 HOURS AFTER 100% COMPLETION OF THE TOWER MODIFICATION INSTALLATION. INSTALLATION OF PROPOSED LOADING WITHOUT ENGINEER APPROVAL IS PROHIBITED. INSTALLATION OF THE PROPOSED LOADING IS BY OTHERS, AND IS BEYOND THE SCOPE OF THESE DRAWINGS.

CONTRACTOR NOTES

1. ALL CONTRACTORS AND LOWER TIER CONTRACTORS MUST ACKNOWLEDGE IN WRITING TO TOWER OWNER AND GPD GROUP THAT THEY HAVE OBTAINED, UNDERSTAND, AND WILL FOLLOW TOWER OWNER STANDARDS OF PRACTICE, CONSTRUCTION GUIDELINES, ALL SITE AND TOWER SAFETY PROCEDURES, ALL PRODUCT LIMITATIONS AND INSTALLATION PROCEDURES USED ON SITE, AND PROPOSED MODIFICATIONS DESCRIBED. RECEIPT OF ACKNOWLEDGMENT MUST OCCUR PRIOR TO BEGINNING CONSTRUCTION OR CLIMBING. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO PROVIDE THIS DOCUMENTATION FOR TOWER OWNER AND GPD GROUP ON COMPANY LETTERHEAD AND THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO OBTAIN THIS DOCUMENTATION FROM LOWER TIER SUBCONTRACTORS (ON SUBCONTRACTOR LETTERHEAD) AND DELIVER IT TO TOWER OWNER AND GPD GROUP.
2. IF THE CONTRACTOR DISCOVERS ANY EXISTING CONDITIONS THAT ARE NOT REPRESENTED ON THESE DRAWINGS, OR ANY CONDITIONS THAT WOULD INTERFERE WITH THE INSTALLATION OF THE MODIFICATIONS, GPD GROUP SHALL BE CONTACTED IMMEDIATELY TO EVALUATE THE SIGNIFICANCE OF THE DEVIATION.
3. IT IS ASSUMED THAT ANY STRUCTURAL MODIFICATION WORK SPECIFIED ON THESE PLANS WILL BE ACCOMPLISHED BY KNOWLEDGEABLE WORKMEN WITH TOWER CONSTRUCTION EXPERIENCE. THIS INCLUDES PROVIDING THE NECESSARY CERTIFICATIONS TO THE TOWER OWNER AND ENGINEER.
4. THESE DRAWINGS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION METHODS, MEANS, TECHNIQUES, SEQUENCES, AND PROCEDURES.
5. CONSTRUCTION WORK PRESENTS UNIQUE THREATS TO HEALTH AND SAFETY. THE CONTRACTOR IS RESPONSIBLE TO EDUCATE THEIR WORK FORCE OF THESE DANGERS AND LIMIT THEIR EXPOSURE TO HAZARDS. THIS EDUCATION SHALL INCLUDE BUT NOT BE LIMITED TO APPLICABLE TRAINING COURSES AND CERTIFICATIONS, PROPER PERSONAL PROTECTIVE EQUIPMENT USAGE, DAILY TAILGATE MEETINGS AND ANY OTHER PREVENTATIVE MEASURES WHICH MAY BE REASONABLY EXPECTED. THE CONTRACTOR AND ALL SUB-CONTRACTORS SHALL BE RESPONSIBLE FOR THE SAFETY OF THE WORK AREA, ADJACENT AREAS AND ANY PROPERTY OCCUPANTS WHO MAY BE AFFECTED BY THE WORK UNDER CONTRACT. THE CONTRACTOR SHALL REVIEW ALL LANDOWNER, PRIME CONTRACTOR, CARRIER, OSHA, AND LOCAL SAFETY GUIDELINES AND AT ALL TIMES SHALL CONFORM TO THE MOST RESTRICTIVE OF THESE STANDARDS TO ENSURE A SAFE WORKPLACE.
6. TOWER WORK PRESENTS ADDITIONAL THREATS TO HEALTH AND SAFETY. ALL TOWER WORKERS WORKING ON A TOWER MUST BE ADEQUATELY TRAINED AND MONITORED TO ENSURE THAT SAFE WORK PRACTICES ARE LEARNED AND FOLLOWED. AS REQUIRED BY OSHA, WHEN WORKING ON EXISTING COMMUNICATION TOWERS, EMPLOYEES MUST BE PROVIDED WITH APPROPRIATE FALL PROTECTION, TRAINED TO USE THIS FALL PROTECTION PROPERLY, AND THE USE OF FALL PROTECTION MUST BE CONSISTENTLY SUPERVISED AND ENFORCED BY THE CONTRACTOR.
7. ALL SAFETY EQUIPMENT SHALL BE INSPECTED ACCORDING TO ALL OSHA AND INDUSTRY SCHEDULED INTERVALS AND ALL INSPECTIONS SHALL BE DOCUMENTED PER APPLICABLE CODES AND STANDARDS.
8. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING; ANY PROBLEMS WITH ACCESS, INTERFERENCE, ETC. SHALL BE RESOLVED PRIOR TO MOBILIZATION. THE CONTRACTOR MUST VISIT THE SITE PRIOR TO ORDERING ANY MATERIAL AND MUST RESOLVE ALL ISSUES WITH THE OWNER PREVENTING A CONTINUOUS INSTALLATION. CONTRACTOR SHALL NOTE ALL ANTENNAS, MOUNTS, COAX, LIGHTING, CLIMBING SUPPORTS, STEP BOLTS, PORT HOLES, AND ANY OTHER TOWER APPURTENANCES IN THE REGION OF THE MODIFICATIONS. SEE GENERAL NOTES #4 AND #5 THIS SHEET.
9. CONTRACTOR IS RESPONSIBLE FOR TEMPORARILY REMOVING ALL COAX, T-BRACKETS, ANTENNA MOUNTS, AND ANY OTHER TOWER APPURTENANCE THAT MAY INTERFERE WITH THE TOWER MODIFICATIONS. ALL TOWER APPURTENANCES MUST BE REPLACED AND/OR RESTORED TO ITS ORIGINAL LOCATION. ANY CARRIER DOWNTIME MUST BE COORDINATED WITH THE TOWER OWNER IN WRITING.
10. SOME ATTACHMENTS MAY REQUIRE CUSTOM MODIFICATIONS TO PROPERLY FIT THE MODIFIED REGION OF THE STRUCTURE. THESE CUSTOMIZATIONS ARE DESIGNED BY OTHERS AND MUST BE APPROVED BY THE ENGINEER PRIOR TO REMOVING SUCH ATTACHMENTS. ANY CARRIER DOWNTIME MUST BE COORDINATED WITH THE TOWER OWNER IN WRITING.
11. CONTRACTOR SHALL ONLY WORK WITHIN THE LIMITS OF THE TOWER OWNER'S PROPERTY OR LEASE AREA AND APPROVED EASEMENTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY WORK IS WITHIN THESE BOUNDARIES. CONTRACTOR SHALL EMPLOY A SURVEYOR AS REQUIRED. ANY WORK OUTSIDE THESE BOUNDARIES SHALL BE APPROVED IN WRITING BY THE LAND OWNER PRIOR TO MOBILIZATION. CONSTRUCTION STAKING AND BOUNDARY MARKING IS THE RESPONSIBILITY OF THE CONTRACTOR.
12. TOWERS ARE DESIGNED TO CARRY GRAVITY, WIND, AND ICE LOADS. ALL MEMBERS, LEGS, DIAGONALS, STRUTS, AND REDUNDANT MEMBERS PROVIDE STRUCTURAL STABILITY TO THE TOWER WITH LITTLE REDUNDANCY. ABSENCE OR REMOVAL OF A MEMBER CAN TRIGGER CATASTROPHIC FAILURE UNLESS A SUBSTITUTE IS PROVIDED BEFORE ANY REMOVAL. LEGS CARRY AXIAL LOADS AND DERIVE THEIR STRENGTH FROM SHORTER UN-BRACED LENGTHS BY THE PRESENCE OF REDUNDANT MEMBERS AND THEIR CONNECTION TO THE DIAGONALS WITH BOLTS OR WELDS. IF THE BOLTS OR WELDS ARE REMOVED WITHOUT PROVIDING ANY SUBSTITUTE TO THE FRAME, THE LEG IS SUBJECTED TO A HIGHER UN-BRACED LENGTH THAT IMMEDIATELY REDUCES ITS LOAD CARRYING CAPACITY. IF A DIAGONAL IS ALSO REMOVED IN ADDITION TO THE CONNECTION, THE UN-BRACED LENGTH OF THE LEG IS GREATLY INCREASED, JEOPARDIZING ITS LOAD CARRYING CAPACITY. FAILURE OF ONE LEG CAN RESULT IN A TOWER COLLAPSE BECAUSE THERE IS NO REDUNDANCY. REDUNDANT MEMBERS AND DIAGONALS ARE CRITICAL TO THE STABILITY OF THE TOWER.
13. **WORK SHALL ONLY BE PERFORMED DURING CALM DRY DAYS (WINDS LESS THAN 10-MPH). CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY LOCAL TOWER SHORING, TEMPORARY GLOBAL TOWER SHORING, AND ALL SHORING OF SURROUNDING BUILDINGS, PADS, AND OTHER OUTDOOR SITE OBSTRUCTIONS. ALL SHORING, TEMPORARY BRACING, AND TEMPORARY SUPPORTS ARE THE RESPONSIBILITY OF THE CONTRACTOR.**
14. MODIFICATIONS SHOWN SHALL BE INSTALLED ON ALL THREE (3) TOWER LEGS/FACES.
15. ALL MODIFICATIONS PERFORMED ON THIS TOWER SHALL BE COMPLETED IN ACCORDANCE WITH THE REQUIREMENTS OF TIA-1019-A CONSTRUCTION STANDARDS.
16. **ABSOLUTELY NO WELDING, TORCH CUTTING, OR OPEN FLAME OF ANY TYPE IS PERMITTED ON THIS STRUCTURE AND ON THE CONSTRUCTION SITE.**
17. ALL MANUFACTURERS HARDWARE AND ASSEMBLY INSTRUCTIONS SHALL BE FOLLOWED EXACTLY. DEVIATION FROM THE INSTRUCTIONS IS UNACCEPTABLE AND REQUIRES WRITTEN APPROVAL FROM ENGINEER.

FOUNDATION NOTES

1. **CONTRACTOR SHALL NOTIFY THE FOLLOWING INDIVIDUALS 5 BUSINESS DAYS PRIOR TO FOUNDATION CONSTRUCTION IN ORDER TO COORDINATE THE VISUAL INSPECTION BY GPD:**

   -ANDREW BAZINET (CROWN CASTLE) 585-899-3442
   -DAN PALKOVIC (GPD GROUP) 614-859-1607
   -BRIAN SMITH (GPD GROUP) 216-927-8648
   -TRAVIS BOWMAN (GPD GROUP) 330-572-2114
2. EXISTING FOUNDATION INFORMATION BASED UPON A FOUNDATION INVESTIGATION BY WEI (PROJECT #: 2009-901, DATED SEPTEMBER 18, 2009). CONTRACTOR SHALL OBTAIN AND BECOME FAMILIAR WITH THE REFERENCED FOUNDATION DOCUMENT. IF EXISTING FOUNDATION CONDITIONS DIFFER FROM THE REFERENCED DOCUMENT, CONTACT ENGINEER AND TOWER OWNER IMMEDIATELY.
3. CONCRETE WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES, SAFETY REGULATIONS AND UNLESS OTHERWISE NOTED, THE LATEST REVISION OF ACI 318, "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE". PROCEDURES FOR THE PROTECTION OF EXCAVATIONS, EXISTING CONSTRUCTION AND UTILITIES SHALL BE ESTABLISHED PRIOR TO FOUNDATION INSTALLATION.
4. SOIL INFORMATION IS BASED ON A GEOTECHNICAL REPORT BY WEI (PROJECT #: 2009-901, DATED SEPTEMBER 18, 2009). CONTRACTOR SHALL OBTAIN AND IMPLEMENT ALL RECOMMENDATIONS CONTAINED IN THE REFERENCED GEOTECHNICAL REPORT. IF SOIL CONDITIONS ENCOUNTERED ARE DIFFERENT FROM REFERENCED GEOTECHNICAL REPORT, NOTIFY ENGINEER IMMEDIATELY.

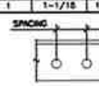
   A. ULTIMATE BEARING = 60 KSF AT A DEPTH OF 9'-0"
   B. UNIT WEIGHT OF SOIL = 120 PCF
   C. GROUNDWATER = NOT ENCOUNTERED
5. BACKFILL SHALL BE CLEAN, FREE OF DEBRIS, AND ORGANIC FREE. CONTRACTOR SHALL UTILIZE CLEAN FILL AS REQUIRED. (MIN. UNIT WEIGHT = 120 PCF).
6. ALL BACKFILL SHALL BE CONTROLLED-COMPACTED, PLACED IN A MAXIMUM OF 8" LIFTS, MOISTURE CONDITIONED TO WITHIN THREE PERCENT OF OPTIMUM MOISTURE, AND COMPACTED TO 95% OF STANDARD PROCTOR MAXIMUM DRY DENSITY PER ASTM D698.
7. CARE SHALL BE TAKEN DURING INSTALLATION OF ROCK ANCHORS SO THAT EXISTING REINFORCING STEEL IS NOT DAMAGED. CONTRACTOR SHALL USE X-RAY OR OTHER ENGINEER APPROVED NON-DESTRUCTIVE MEANS TO LOCATE EXISTING REINFORCING STEEL AND ANCHOR BOLTS. CONTACT ENGINEER IMMEDIATELY IF EXISTING STEEL IS ENCOUNTERED.
8. CONTRACTOR SHALL SECURE SITE BACK TO EXISTING CONDITION UNDER SUPERVISION OF OWNER. ALL FENCE, STONE, GEOFABRIC, GROUNDING, AND SURROUNDING GRADE SHALL BE REPLACED AND REPAIRED AS REQUIRED TO ACHIEVE OWNER APPROVAL. POSITIVE DRAINAGE AWAY FROM TOWER SITE SHALL BE MAINTAINED.
9. CONTRACTOR TO VERIFY LOCATION OF ALL EXISTING PUBLIC AND PRIVATE UTILITIES PRIOR TO EXCAVATION. IF NECESSARY UTILITIES SHALL BE RELOCATED PRIOR TO FOUNDATION MODIFICATION. CONSENT FROM THE TOWER OWNER AND EOR MUST BE OBTAINED TO ENCASE UTILITIES IN CONCRETE.

ROCK ANCHORS

1. CONTRACTOR SHALL INSTALL WILLIAMS ANCHORS PER WILLIAMS ANCHOR INSTALLATION PROCEDURES AND GUIDELINES.
2. CONTRACTOR SHALL OBTAIN AND BECOME FAMILIAR WITH WILLIAMS ANCHORS INSTALLATION AND PULL TESTING PROCEDURES AND RECOMMENDATIONS.
3. WILLIAMS ANCHORS ARE TO BE GALVANIZED.
4. ANCHORS ARE TO BE PRESTRESSED TO A LOAD OF 28 K AND LOCKED OFF AT A LOAD OF 23 K. PRESTRESSING RESULTS SHALL BE SUPPLIED TO THE TOWER OWNER AND ENGINEER OF RECORD (GPD GROUP) FOR REFERENCE IN THE POST INSTALLATION OBSERVATION REPORT. CONTRACTOR SHALL CONTACT ENGINEER IMMEDIATELY IF PRESTRESSING RESULTS DO NOT REACH ULTIMATE VALUE OR MIN. DEPTH REQUIRED.
5. SHOP DRAWINGS MUST BE SENT TO DESIGN ENGINEER FOR FINAL APPROVAL PRIOR TO FABRICATION.
6. CONTRACTOR SHALL VERIFY THAT TOWER IS PLUMB PRIOR TO THE INSTALLATION OF ANY TOWER MODIFICATIONS.
7. A WILLIAMS REPRESENTATIVE SHALL BE ON-SITE FOR THE DURATION OF THE ROCK ANCHOR INSTALLATION.

BOLT SCHEDULE

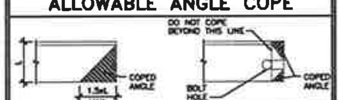
BOLT DIAMETER	STANDARD HOLE	SHORT SLOT	MIN. EDGE DISTANCE	SPACING
1/2	9/16	9/16x11/16	7/8	1-1/2
5/8	11/16	11/16x7/8	1-1/8	1-7/8
3/4	13/16	13/16x1	1-1/4	2-1/4
7/8	15/16	15/16x1-1/8	1-1/2	2-5/8
1	1-1/16	1-1/16x1-5/16	1-3/4	3



-DIMENSIONS GIVEN IN INCHES

-SHORT SLOT HOLES SHALL ONLY BE USED WHEN DEPICTED ON THE PLANS

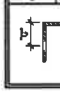
ALLOWABLE ANGLE COPE



1. ALL DIMENSIONS REPRESENTED IN THE ABOVE TABLES ARE AISC MINIMUM REQUIREMENTS. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS IN FIELD AND NOTIFY ENGINEER IF DISTANCES ARE LESS THAN THOSE PROVIDED.
2. THE DIMENSIONS PROVIDED ARE MINIMUM REQUIREMENTS. ACTUAL DIMENSIONS OF PROPOSED MEMBERS WITHIN THESE DRAWINGS MAY VARY FROM THE AISC MINIMUM REQUIREMENTS.

WORKABLE GAGES

LEG	4	3-1/2	3	2-1/2	2	1-3/4
G	2-1/2	2	1-3/4	1-3/8	1-1/8	1



-DIMENSIONS GIVEN IN INCHES

-MATCH EXISTING WHEN APPLICABLE

GPD GROUP
Glaus, Pyle, Schomer, Burns & Dehaven, Inc.

CROWN CASTLE

REV	DATE	DESCRIPTION

CROWN CASTLE
230 GUINEA ROAD
MONROE, CT 06468

PROJECT NOTES

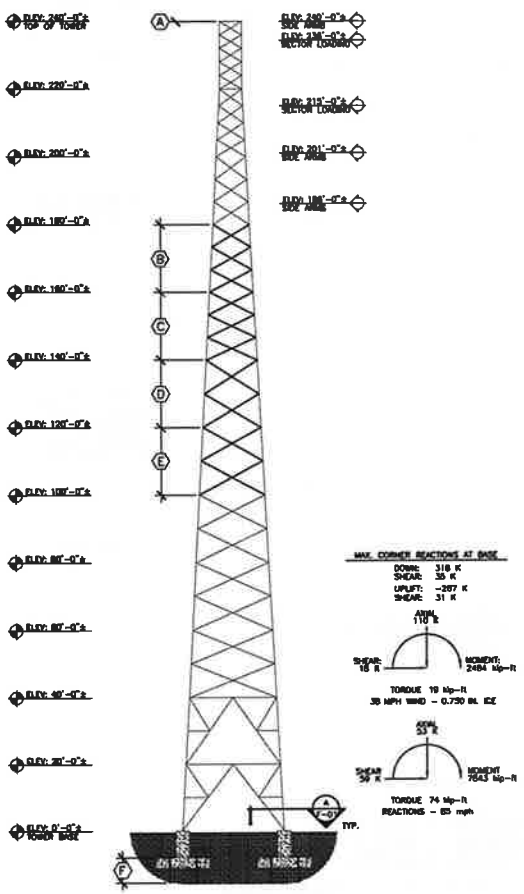
ISSUED FOR	
PERMIT	08/22/14
BID	-
CONSTRUCTION	-
RECORD	-

PROJECT MANAGER	DESIGNER
JC	MY

JOB NO.
2014777.841294.04

N-01

NOTE: ANTENNAS AND MOUNTS ARE IN THE MODIFIED REGION OF THE TOWER. VERIFY FOR INTERFERENCES PRIOR TO ORDERING MATERIALS. FOR FULL ANTENNA CONFIGURATION SEE ASSOCIATED PASSING ANALYSIS.



TOWER ELEVATION
1/16"=1'-0"

MAX. CORNER REACTIONS AT BASE:
DOWN: 318 K
SHEAR: 35 K
UPLIFT: -207 K
SHEAR: 31 K

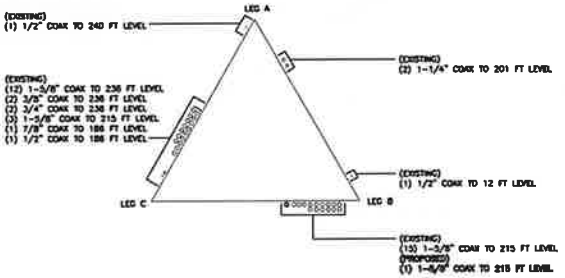
TORQUE 19 kip-ft
30 MPH WIND - 0.750 in. ICE

TORQUE 74 kip-ft
REACTIONS - 85 mph

MODIFICATION SCHEDULE

SYMBOL	ELEVATION	MEMBER TYPE	EXISTING MEMBER	NEW MEMBER	NOTES
A	240'-0"±	TOP GIRTS	L2x2x1/8	L2x2x1/8	REPLACE EXISTING BENT TOP GIRTS WITH NEW SAME SIZE MEMBERS. SEE DETAIL 2/S-03 FOR MORE INFORMATION.
B	180'-0"± TO 180'-0"±	DIAGONAL BOLTS	1/2"ø A325N	1/2"ø A325X	REPLACE EXISTING DIAGONAL BOLTS WITH NEW SAME SIZE X-BOLTS. SEE DETAIL 4/S-03 AND X-BOLT DETAIL ON SHEET S-02.
C	140'-0"± TO 180'-0"±	DIAGONALS	L2-1/2x2-1/2x1/4	L2-1/2x2-1/2x5/16	REPLACE EXISTING DIAGONAL MEMBERS WITH NEW LARGER SIZE MEMBERS. SEE DETAIL 3/S-03 FOR MORE INFORMATION.
D	120'-0"± TO 140'-0"±	DIAGONALS	L3x3x1/4	L3x3x5/16	REPLACE EXISTING DIAGONAL MEMBERS WITH NEW LARGER SIZE MEMBERS. SEE DETAIL 2/S-02 FOR MORE INFORMATION.
E	100'-0"± TO 120'-0"±	DIAGONAL BOLTS	5/8"ø A325N	5/8"ø A325X	REPLACE EXISTING DIAGONAL BOLTS WITH NEW SAME SIZE X-BOLTS SEE DETAIL 1/S-02 AND X-BOLT DETAIL ON SHEET S-02.
F	BELOW GRADE	FOUNDATION	CONCRETE PAD & PIER	ROCK ANCHORS	INSTALL NEW ROCK ANCHORS TO THE EXISTING FOUNDATION. SEE SHEET F-01 FOR MORE INFORMATION.

NOTE: CONTRACTOR SHALL FIELD VERIFY LOCATION OF BENT TOP GIRTS AND ALL CRITICAL DIMENSIONS PRIOR TO ORDERING MATERIALS.



COAX LAYOUT
N.T.S.

NORTH

GPD GROUP
Civil, Traffic, Structural, Electrical & Communications, Inc.

CROWN CASTLE

REV	DATE	DESCRIPTION

CROWN CASTLE
230 GUINEA ROAD
MONROE, CT 06468

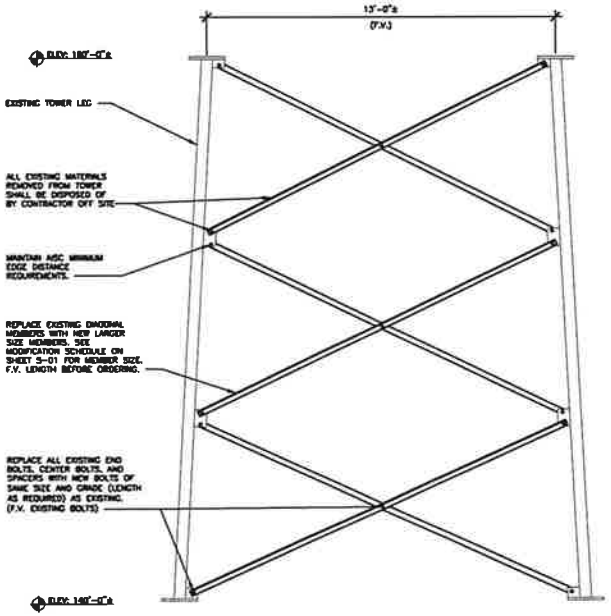
TOWER ELEVATION & MODIFICATION SCHEDULE

ISSUED FOR:	
PERMIT	09/30/14
BID	
CONSTRUCTION	
RECORD	

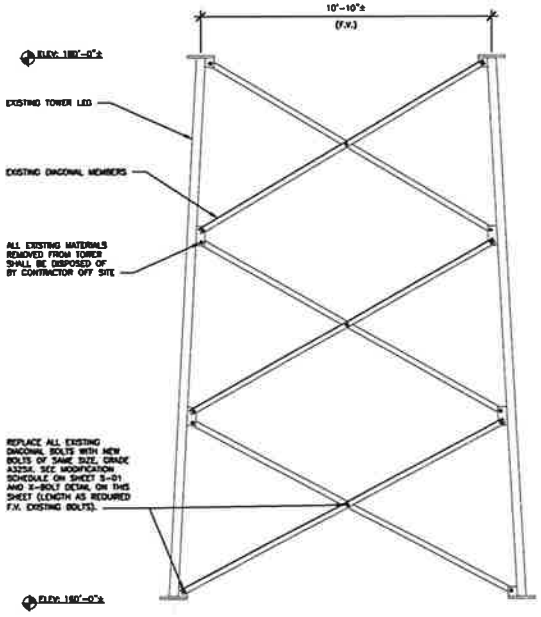
PROJECT MANAGER	DESIGNED
JS	AH

JOB NO
2014777.841294.04

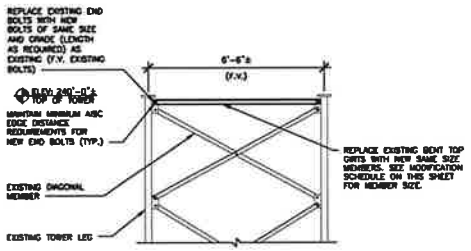
S-01



DETAIL 3
1/2"=1'-0"
S-03



DETAIL 4
1/2"=1'-0"
S-03



DETAIL 5
1/2"=1'-0"
S-03

GPD GROUP

CROWN CASTLE

REV	DATE	DESCRIPTION

CROWN CASTLE
230 GUINEA ROAD
MONROE, CT 06468

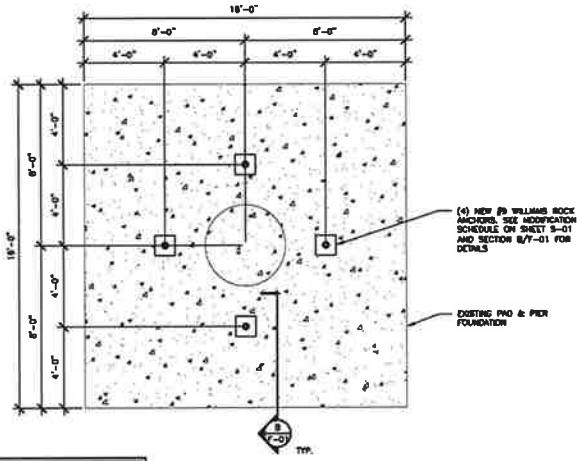
ADDITIONAL DETAILS & SECTIONS

ISSUED FOR	
PERMIT	09/22/14
BID	
CONSTRUCTION	
RECORD	

PROJECT MANAGER	DESIGNER
JS	AH

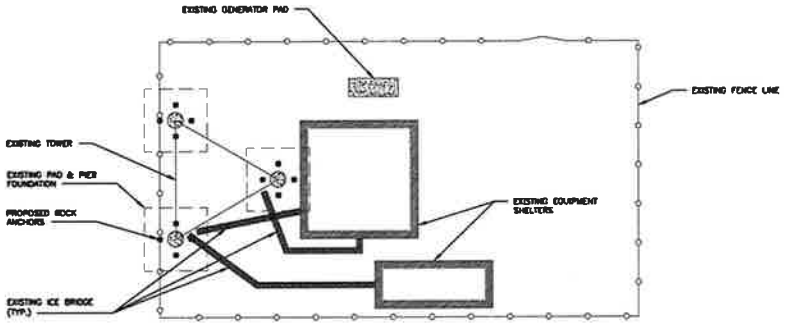
JOB NO
2014777.841294.04

S-03



TOWER BASE FOUNDATION IS BEING EXCAVATED. CONTRACTOR SHALL FULLY SUPPORT TOWER DURING ALL PHASES OF CONSTRUCTION. REFER TO CONTRACTOR NOTES ON SHEET N-01.

SECTION A
3/8"=1'-0"
F-01



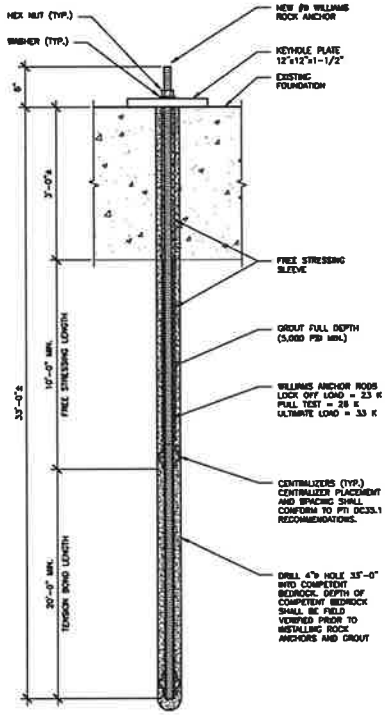
NORTH

CONTRACTOR TO VERIFY LOCATION OF ALL EXISTING PUBLIC AND PRIVATE UTILITIES PRIOR TO EXCAVATION. IF NECESSARY UTILITIES SHALL BE RELOCATED PRIOR TO FOUNDATION MODIFICATIONS. UTILITIES SHALL NOT BE ENCASED IN CONCRETE.

SITE PLAN

N.T.S.

ALL SITE LAYOUT AND FOUNDATION ORIENTATION INFORMATION IS BASED ON THE TOWER OWNER'S SITE DRAWINGS AND IS CONSIDERED APPROXIMATE. CONTRACTOR SHALL VERIFY ALL SITE DIMENSIONS, ORIENTATION, AND UTILITY LOCATIONS PRIOR TO MOBILIZING (SEE NOTES ON SHEET N-01)



SECTION B
N.T.S.
F-01

811
Know what's below
Call before you dig.

GPD GROUP
Clinton, Fyfe, Schorsch, Burns & DeNewer, Inc.

CROWN CASTLE

REV	DATE	DESCRIPTION

CROWN CASTLE
230 GUINEA ROAD
MONROE, CT 06468

FOUNDATION DETAILS & PARTIAL SITE PLAN

ISSUED FOR:	
PERMIT	08/22/14
BID	
CONSTRUCTION	
RECORD	

PROJECT MANAGER	DESIGNER
JS	AH

JOB NO: 2014777 841294.04

F-01

MI CHECKLIST

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

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

GPD GROUP

CROWN CASTLE

REV	DATE	DESCRIPTION

CROWN CASTLE
230 GUINEA ROAD
MONROE, CT 06468

MODIFICATION INSPECTION CHECKLIST

ISSUED FOR	
PERMIT	09/23/14
BID	
CONSTRUCTION	
RECORD	

PROJECT MANAGER	DESIGNED
JS	AH

JOB NO
2014777.841294.04

MI-01