Robinson+Cole

KENNETH C. BALDWIN

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

Also admitted in Massachusetts

June 23, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
197 south Street, Vernon, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 117-foot level of the existing 132-foot tower at 197 South Street in Vernon (the "Property"). The tower is owned by Crown Castle. The Council approved Cellco's use of this tower in 1987 (Docket No. 58). Cellco now intends to modify its facility by replacing seven (7) of its existing antennas with one (1) model BXA-70063-6CF, 700 MHz antenna; three (3) model SBNHH-1D65B, 1900 MHz antennas; and three (3) model SBNHH-1D65B, 2100 MHz antennas, all at the same 117-foot level. Cellco also intends to replace three (3) existing remote radio heads ("RRHs") with three (3) newer model RRHs, install six (6) new remote radio heads ("RRHs"), and install one (1) HYBRIFLEX™ antenna cable. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Daniel A. Champagne, Mayor for the Town of Vernon. A copy of this letter is also being sent to Connecticut Water Company, the owner of the Property.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. The replacement antennas and RRHs will be located at the 117-foot level on the 132-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. Far Field Approximation tables for each of Cellco's operating frequencies are included behind Attachment 2. The Far Field calculations demonstrate that Cellco's modified facility will operate well within the RF emissions limits established by the FCC.

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:
Daniel A. Champagne, Vernon Mayor
Connecticut Water Company
Tim Parks

ATTACHMENT 1

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

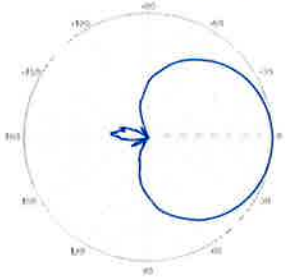
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-18.3 dB	-18.2 dB
Front-to-back ratio (+/-30°)	-33.4 dB	-36.3 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1804 x 285 x 132 mm	71.0 x 11.2 x 5.2 in
Depth with z-brackets	172 mm	6.8 in
Weight without mounting brackets	7.9 kg	17 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.51 m² Side: 0.24 m²	Front: 5.5 ft² Side: 2.6 ft²
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf

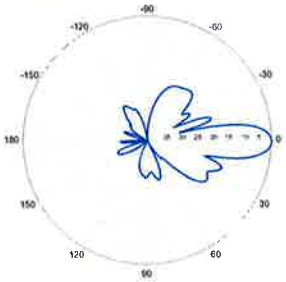
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



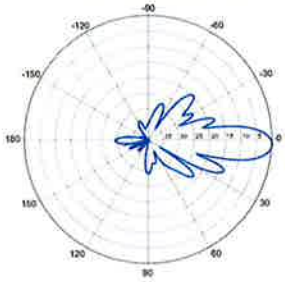
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

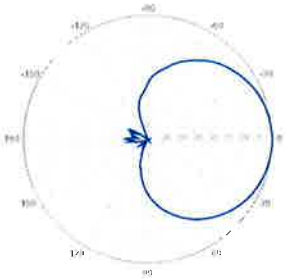


0° | Vertical | 750 MHz

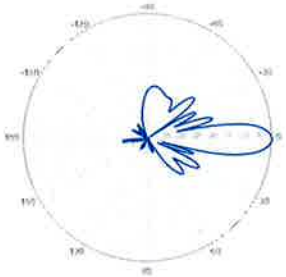
BXA-70063-6CF-EDIN-2



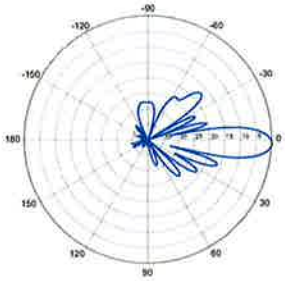
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



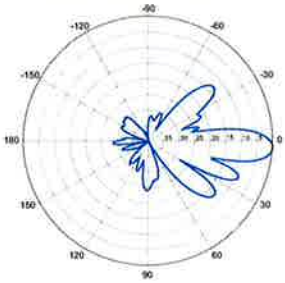
2° | Vertical | 850 MHz

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

BXA-70063-6CF-EDIN-X

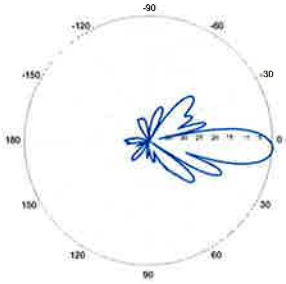
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



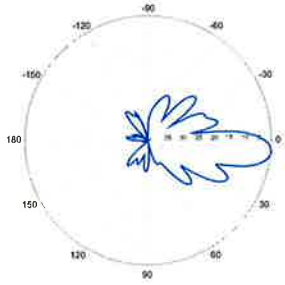
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

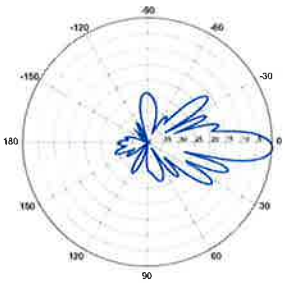


4° | Vertical | 750 MHz

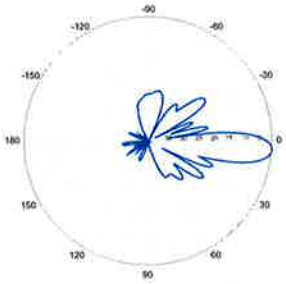
BXA-70063-6CF-EDIN-5



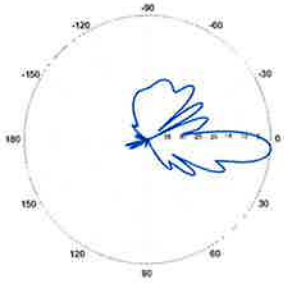
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

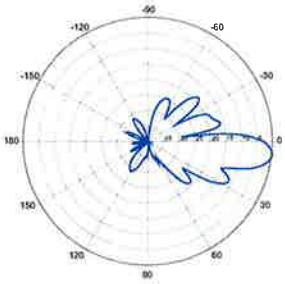


4° | Vertical | 850 MHz



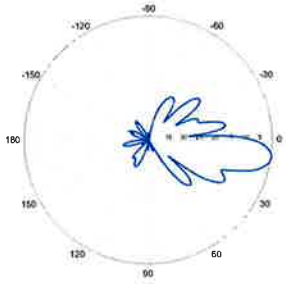
5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



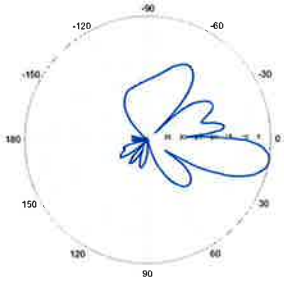
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

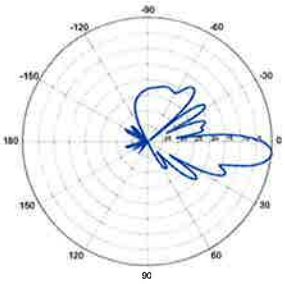


8° | Vertical | 750 MHz

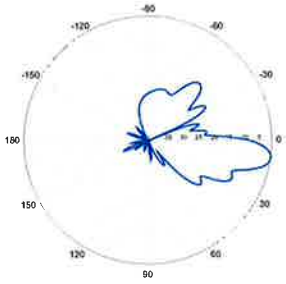
BXA-70063-6CF-EDIN-10



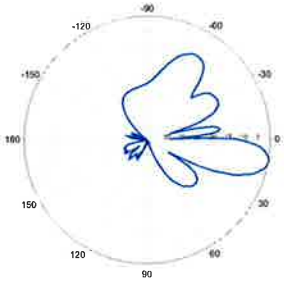
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

SBNHH-1D65B

Andrew® Tri-band Antenna, 698–896 and 2x 1695–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.

- Interleaved dipole technology providing for attractive, low wind load mechanical package

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS, dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
CPR at Boresight, dB	20	23	20	20	17	21
CPR at Sector, dB	14	10	12	10	9	1
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain by all Beam Tilts, average, dBi	14.5	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.6	0 ° | 14.5	0 ° | 17.4	0 ° | 17.8	0 ° | 18.1	0 ° | 18.2
	7 ° | 14.6	7 ° | 14.4	3 ° | 17.5	3 ° | 17.9	3 ° | 18.3	3 ° | 18.4
	14 ° | 14.2	14 ° | 13.6	7 ° | 17.4	7 ° | 17.9	7 ° | 18.2	7 ° | 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	4

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® multiband with internal RET
Band	Multiband
Brand	DualPol® | Teletilt®
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Performance Note	Outdoor usage

Product Specifications

SBNHH-1D65B

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h | 150.0 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

BSAMNT-1 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

Alcatel-Lucent B13 Remote Radio Head 4x30-4R is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

Supporting 2Tx/4Tx MIMO and 4-way Rx diversity, Alcatel-Lucent B13 RRH4x30-4R allows operators to have a compact radio solution to deploy LTE in the 700U band (700 MHz, 3GPP band 13), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B13 RRH4x30-4R product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity and up to 10MHz instantaneous bandwidth.

The Alcatel-Lucent B13 RRH4x30-4R is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

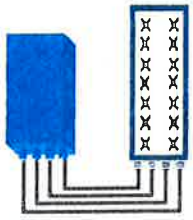
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 700 MHz band (700U, 3GPP band 13)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- 10MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in 700U band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through MIMO4
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



4x30W with 4T4R
or
2x60W with 2T4R

Can be switched between modes via SW w/o site visit

Alcatel·Lucent

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz
Instantaneous bandwidth - #carriers	10MHz – 1 LTE carrier (in 10MHz occupied bandwidth)
LTE carrier bandwidth	10 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure – RX Diversity scheme	2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity
Sizes (HxWxD) in mm (in.) Volume in L Weight in kg (lb) (w/o mounting HW)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield) 38 (with solar shield) 26 (57.2) (with solar shield)
DC voltage range DC power consumption	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 550W typical @100% RF load (in 2Tx or 4TX mode)
Environmental conditions Wind load (@150km/h or 93mph)	-40°C (-40°F) /+55°C (+131°F) IP65 Frontal:<200N / Lateral :<150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate7, 9.8 Gbps) SFP single mode dual fiber
AISG interfaces	1 AISG2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) – 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

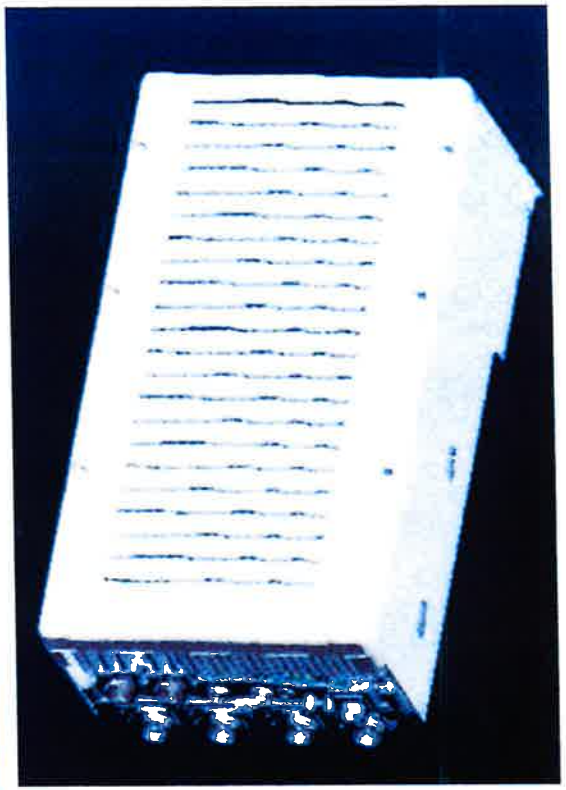
	RRH2x60
RF Output Power	2x60W
Instantaneous Bandwidth	20MHz
Transmitter	2 TX
Receiver 1900 HW version 1900A HW version	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3
Features	AISG 2.0 for RET/TMA
	Internal Smart Bias-T
Power	-48VDC
CPRI Ports	2 CPRI Rate 3 Ports
External Alarms	4 External User Alarms
Monitor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

** Not a Verizon Wireless deployed product

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**

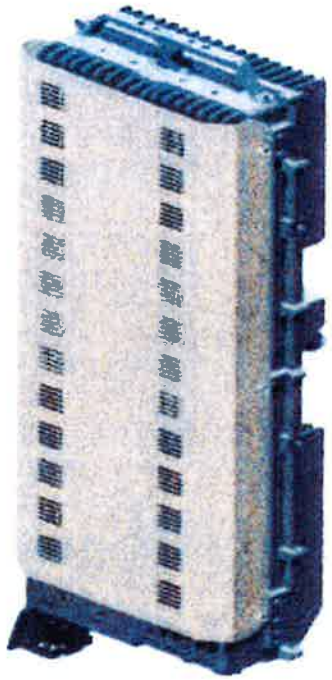


**- Includes solar shield but not mounting brackets (8 lbs.)

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.

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.

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).

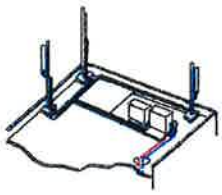
The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

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.

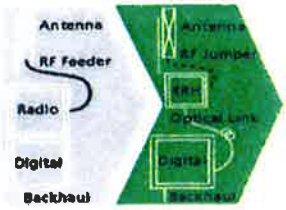
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

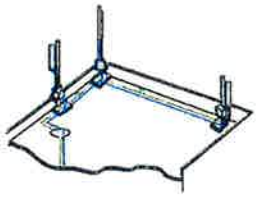
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

- 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

- 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.

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

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

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

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

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

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

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

Alcatel·Lucent

AT THE SPEED OF IDEAS™

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

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

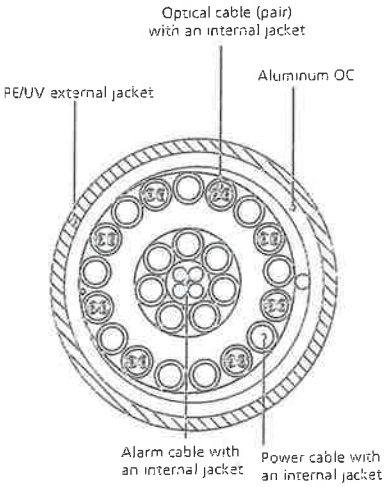


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

Far Field Approximation
with downtilt variation

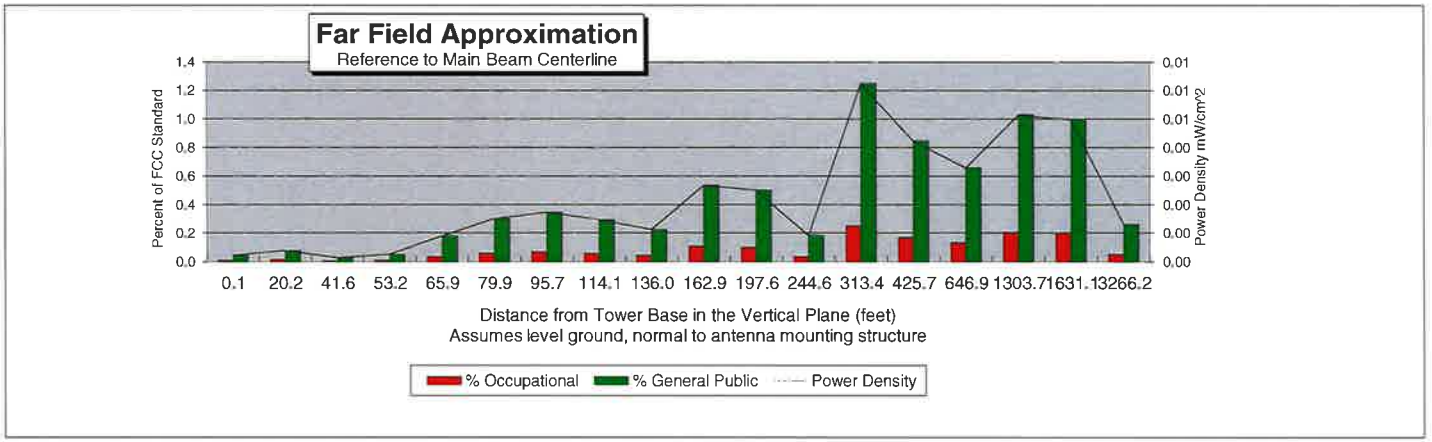
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Vernon, CT
Site #:	
Date:	06/22/15
Name:	Mark Brauer
File Name:	Vernon, CT - FF Power

Operating Freq. (MHz)	746.0
Antenna Height (ft):	117.0
Antenna Gain (dBi):	14.8
Antenna Size (in.):	72.0
Downtilt (degrees):	0.0
Feedline Loss (dB):	0.0
ERP (w):	2100.0
Number of Channels	1



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	114.0	115.8	121.3	125.8	131.7	139.2	148.9	161.3	177.4	198.8	228.1	269.9	333.5	440.7	656.8	1308.7	1635.1	3268.2
Distance from Antenna Structure Base in Horizontal plane	0.1	20.2	41.6	53.2	65.9	79.9	95.7	114.1	136.0	162.9	197.6	244.6	313.4	425.7	646.9	1303.7	1631.1	3266.2
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.3	0.2	0.1	0.2	0.2	0.1
Percent of General Population Standard	0.0	0.1	0.0	0.1	0.2	0.3	0.3	0.3	0.2	0.5	0.5	0.2	1.3	0.8	0.7	1.0	1.0	0.3

Antenna Type SBNHH-1D65B
Max% 1.25%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

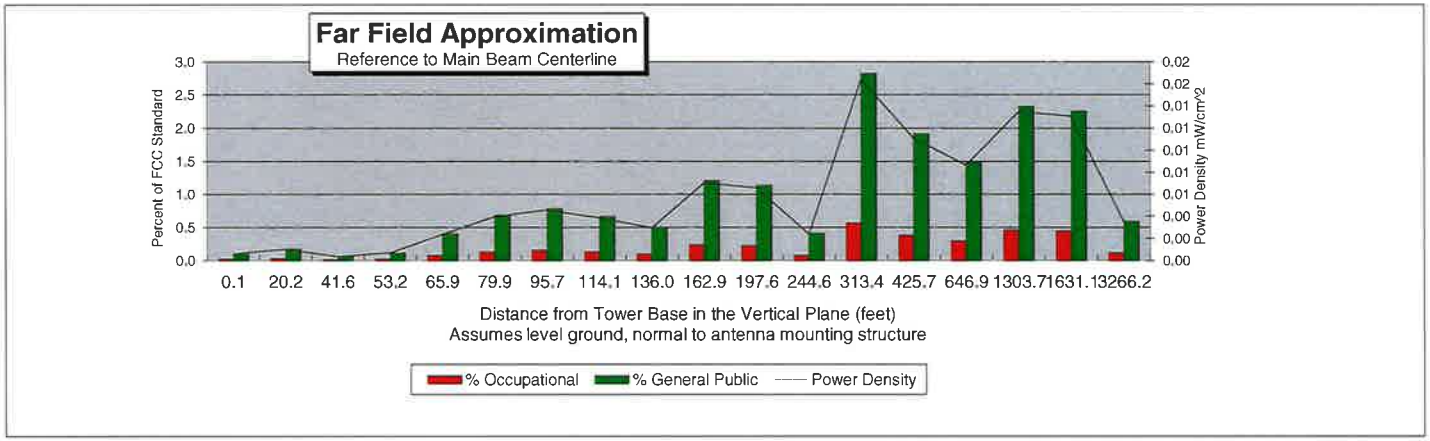
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Vernon, CT
Site #:	
Date:	06/22/15
Name:	Mark Brauer
File Name:	Vernon, CT - FF Power

Operating Freq. (MHz)	**869.0**
Antenna Height (ft):	**117.0**
Antenna Gain (dBi):	**16.6**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
ERP (w):	**3647.0**
Number of Channels	**9**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	114.0	115.8	121.3	125.8	131.7	139.2	148.9	161.3	177.4	198.8	228.1	269.9	333.5	440.7	656.8	1308.7	1635.1	3268.2
Distance from Antenna Structure Base in Horizontal plane	0.1	20.2	41.6	53.2	65.9	79.9	95.7	114.1	136.0	162.9	197.6	244.6	313.4	425.7	646.9	1303.7	1631.1	3266.2
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.02	0.01	0.01	0.01	0.01	0.00
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.6	0.4	0.3	0.5	0.5	0.1
Percent of General Population Standard	0.1	0.2	0.1	0.1	0.4	0.7	0.8	0.7	0.5	1.2	1.1	0.4	2.8	1.9	1.5	2.3	2.3	0.6

Antenna Type LBX-6515DS
Max% 2.83%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

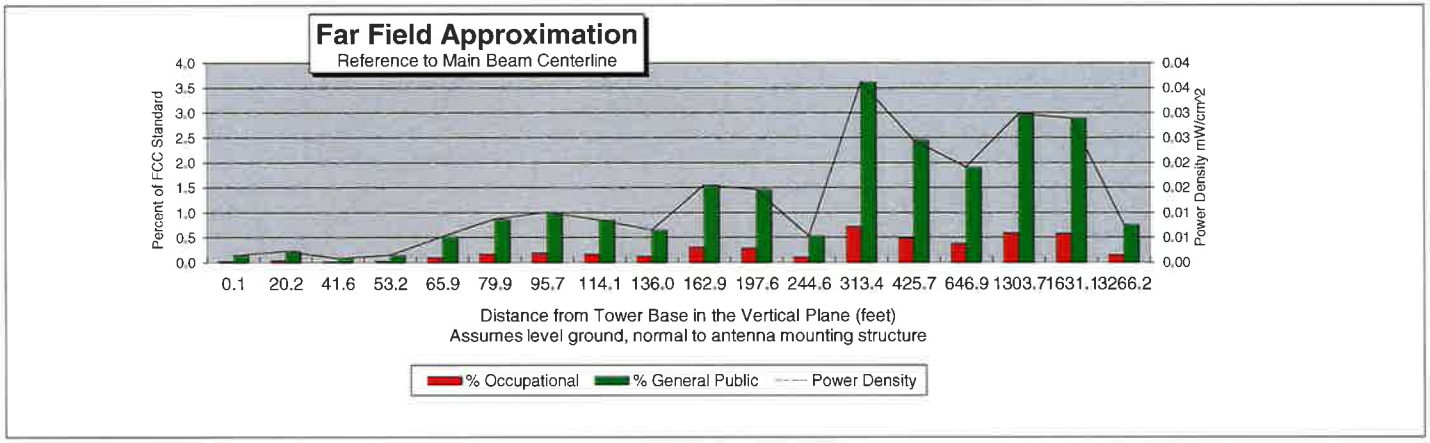
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Vernon, CT
Site #:	
Date:	06/22/15
Name:	Mark Brauer
File Name:	Vernon, CT - FF Power

Operating Freq. (MHz)	**1970.0**
Antenna Height (ft):	**117.0**
Antenna Gain (dBi):	**18.8**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
ERP (w):	**4855.0**
Number of Channels	**11**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	114.0	115.8	121.3	125.8	131.7	139.2	148.9	161.3	177.4	198.8	228.1	269.9	333.5	440.7	656.8	1308.7	1635.1	3268.2
Distance from Antenna Structure Base in Horizontal plane	0.1	20.2	41.6	53.2	65.9	79.9	95.7	114.1	136.0	162.9	197.6	244.6	313.4	425.7	646.9	1303.7	1631.1	3266.2
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.04	0.02	0.02	0.03	0.03	0.01
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1	0.3	0.3	0.1	0.7	0.5	0.4	0.6	0.6	0.2
Percent of General Population Standard	0.1	0.2	0.1	0.1	0.5	0.9	1.0	0.8	0.6	1.5	1.5	0.5	3.6	2.4	1.9	3.0	2.9	0.8

Antenna Type SBNHH-1D65B
Max% 3.62%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

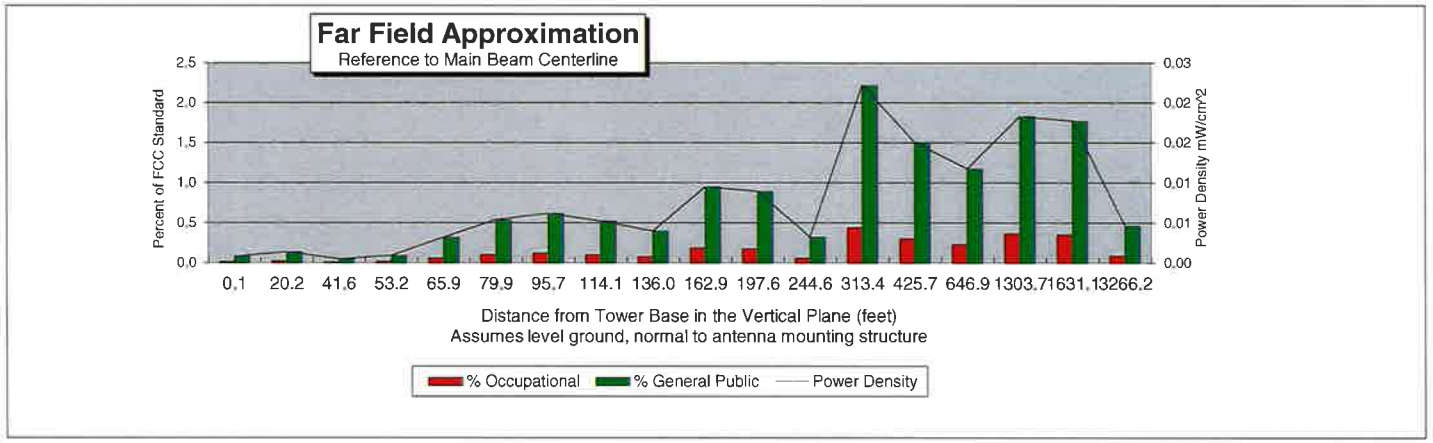
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Vernon, CT
Site #:	
Date:	06/22/15
Name:	Mark Brauer
File Name:	Vernon, CT - FF Power

Operating Freq. (MHz)	**2145.0**
Antenna Height (ft):	**117.0**
Antenna Gain (dBi):	**18.1**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
ERP (w):	**3500.0**
Number of Channels	**1**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	114.0	115.8	121.3	125.8	131.7	139.2	148.9	161.3	177.4	198.8	228.1	269.9	333.5	440.7	656.8	1308.7	1635.1	3268.2	
Distance from Antenna Structure Base in Horizontal plane	0.1	20.2	41.6	53.2	65.9	79.9	95.7	114.1	136.0	162.9	197.6	244.6	313.4	425.7	646.9	1303.7	1631.1	3266.2	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.02	0.02	0.01	0.02	0.02	0.00	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.4	0.3	0.2	0.4	0.4	0.1	
Percent of General Population Standard	0.1	0.1	0.0	0.1	0.3	0.5	0.6	0.5	0.4	0.9	0.9	0.3	2.2	1.5	1.2	1.8	1.8	0.5	

Antenna Type SBNHH-1D65B
Max% 2.22%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

ATTACHMENT 3

Date: **May 15, 2015**

Jay Patton
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(980) 209-8250

SSOE Group
320 Seven Springs Way, Suite 350
Brentwood, TN 37027
(615) 661-7585
jthibodaux@ssoe.com

Subject:	**Structural Modification Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate** **Carrier Site Name:**	 Vernon, 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:**	806377 HRT 084 943242 332829 1059741 294447 Rev. 0
Engineering Firm Designation:	**SSOE Group Project Number:**	015-00428-01 BC 0066
Site Data:	**197 South Street, Vernon, CT 06066, Tolland County** **Latitude *41° 51' 12.51"*, Longitude *-72° 27' 7.52"*** **132 Foot – Modified Rohn Self Support Tower**	

Dear Mr. Jay Patton,

SSOE 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 786427, in accordance with application 294447, revision 0.

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

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

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

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

We at *SSOE 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: Johnathon R. Thibodaux, EI

Respectfully submitted by:

STATE OF CONNECTICUT BARRY W. BURGESS NO. 26165 LICENSED PROFESSIONAL ENGINEER

5/15/15

Barry W. Burgess, PE
Section Manager

TABLE OF CONTENTS

1) INTRODUCTION

The existing 132' tower is supported on three legs and has seven major sections. It has a triangular cross section made of bolted connections, with an "X" frame configuration. The tower is fabricated with pipe legs and angle diagonals.

The tower was originally designed for Motorola, Inc. and Metro Mobile CTS by Rohn in accordance with E.I.A. Zone "A" with 0.5" radial ice.

All modifications designed by L&W Engineering (W.O. #: 2106-2, dated 10/31/95), which consisted of replacing tower diagonals from the 100' to 120' elevations, have been considered.

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, 28 mph with 1.0" 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
117.0	117.0	3	Alcatel Lucent	RRH2X60-PCS	1	1-5/8	1
		3	Alcatel Lucent	RRH2x60-700			
		3	Alcatel Lucent	RRH2x60-AWS			
		6	Andrew	SBNHH-1D65B w/ Mount Pipe			
		1	Antel	BXA-70063-6CF-2 w/ Mount Pipe			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			

Notes:
1) See Appendix B for the proposed coax layout.

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
130.0	130.0	3	Alcatel Lucent	TD-RRH8x20-25	1	1-1/4	1
		3	RFS Celwave	APXVTM14-C-120 w/ Mount Pipe			
		1		Sector Mount [SM 803-3]			
		3	RFS Celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	
		3	Alcatel Lucent	800MHz 2X50W RRH W/FILTER			
		3	Alcatel Lucent	1900MHz RRH (65MHz)			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
117.0	118.0	6	RFS Celwave	FD9R6004/2C-3L			
	117.0	3	Alcatel Lucent	RRH2X40-AWS			2
		3	RFS Celwave	APX18-206516L-CT2 w/ Mount Pipe			
		3	RFS Celwave	APX18-206517-CT2 w/ Mount Pipe			
		1	Andrew	LBX-6515DS-T0M w/ Mount Pipe			
		2	Andrew	LBX-6515DS-T0M w/ Mount Pipe	12 1	7/8 1-5/8	
		2	Andrew	LNX-6514DS-T4M w/ Mount Pipe			
		1	Andrew	LNX-6514DS-T6M w/ Mount Pipe			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		1		Sector Mount [SM 504-3]			
104.0	106.0	1	Raycap	DC6-48-60-18-8F	1 2 12	3/8 ¾ 7/8	
		2	Andrew	SBNH-1D6565C w/ Mount Pipe			
		3	Communication Components	DTMABP7819VG12A			
		6	Kathrein	782-10250			
		3	Kathrein	800 10121 w/ Mount Pipe			
		4	KMW Communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	Ericsson	RRUS-11			
	104.0	3	Kathrein	860 10025			1
		3	Communication Components	DTMABP7819VG12A			
		3	Ericsson	RRUS-11			
		1		Sector Mount [SM 504-3]			
92.0	92.0	3	Kathrein	742 213 w/ Mount Pipe	6	1-5/8	
84.0	84.0	3	Ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1 12	1-5/8 7/8	
		3	Ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	Ericsson	KRY 112 144/1			
		1		Sector Mount [SM 308-3]			
61.0	61.0	1	Maxrad	MPRC2449	2	3/8	
		1	Redline Communications	RDL-3000			
		1		Side Arm Mount [SO 311-1]			
58.0	61.0	1	Maxrad	GPS-TMG-20N	1	½	
	58.0	1	Tower Mounts	Side Arm Mount [SO 311-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
46.0	47.0	1	Lucent	KS24019-L112A	1	½	
	46.0	1		Side Arm Mount [SO 701-1]			

Notes:
1) Reserved loading.
2) Existing equipment to be removed; has not been considered in analysis.

Table 3 – Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
127.0	127.0	4	Celwave	PD10017	-	-
		4	Generic	3' Side Arm Mount	-	-
124.0	124.0	2	Generic	8' Ø STD Dishes	-	-
112.0	112.0	6	Celwave	PD1132	-	-
		3	Generic	6' Side Arm Mount	-	-
80.0	80.0	1	Celwave	PD1109	-	-
		1	Generic	6' Side Arm Mount	-	-

4) ANALYSIS PROCEDURE

Table 4 – Documents Provided

Document	Remarks	Reference	Source
Original Tower Drawings	Rohn File #: 22731JC, dated 7/24/87	Doc ID#: 529704	Crown DMZ
Foundation Drawings	ERI Project #: ST/536, dated 3/11/97	Doc ID#: 1014812	Crown DMZ
Geotechnical Reports	FDH Project #: 04-1212E, dated 12/30/04	Doc ID#: 1014866	Crown DMZ
Modification Drawings	L&W Work Order #: 2106-2, dated 10/31/95	Doc ID#: 2240842	Crown DMZ
Modification Drawings	SSOE Project #: 015-00428-01, WO #: 1059741, dated 5/15/15	N/A	Attached

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) The tower and foundation were constructed in accordance with their original design and maintained per the manufacturer's specifications, are in good condition, and the tower is twist free and plumb.
2) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
3) All equipment model numbers, quantities, and centerline elevations are as provided in the CCI CAD package, dated 3/20/15 with any adjustments as noted below.

This analysis may be affected if any assumptions are not valid or have been made in error. SSOE 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	132 - 124	Leg	ROHN 2 STD	2	-3.48	32.30	10.8	Pass
T2	124 - 120	Leg	ROHN 2 STD	20	-6.69	32.30	20.7	Pass
T3	120 - 100	Leg	ROHN 2.5 STD	30	-33.52	50.25	66.7	Pass
T4	100 - 93.3333	Leg	ROHN 3 STD	59	-43.51	62.82	69.3	Pass
T5	93.3333 - 86.6667	Leg	ROHN 3 STD	68	-54.28	62.82	86.4	Pass
T6	86.6667 - 80	Leg	ROHN 3 STD	77	-65.10	78.55	82.9	Pass
T7	80 - 60	Leg	ROHN 3 XX-STR	89	-97.05	143.51	67.6	Pass
T8	60 - 40	Leg	ROHN 4 X-STR	110	-126.08	139.07	90.7	Pass
T9	40 - 20	Leg	ROHN 5 X-STR	131	-150.98	177.46	85.1	Pass
T10	20 - 10	Leg	ROHN 5 X-STR	146	-164.39	177.46	92.6	Pass
T11	10 - 0	Leg	ROHN 5 X-STR	155	-176.27	217.53	81.0	Pass
T1	132 - 124	Diagonal	L1 3/4x1 3/4x3/16	9	-1.78	7.67	23.2 33.5 (b)	Pass
T2	124 - 120	Diagonal	L1 3/4x1 3/4x3/16	25	-1.62	7.65	21.2 29.2 (b)	Pass
T3	120 - 100	Diagonal	L2x2x3/16	36	-4.73	6.70	70.6 73.7 (b)	Pass
T4	100 - 93.3333	Diagonal	L2 1/2x2 1/2x3/16	63	-5.40	10.06	53.7 73.8 (b)	Pass
T5	93.3333 - 86.6667	Diagonal	L2 1/2x2 1/2x3/16	72	-5.31	9.14	58.0 72.6 (b)	Pass
T6	86.6667 - 80	Diagonal	L2 1/2x2 1/2x3/16	81	-5.89	7.99	73.7 78.6 (b)	Pass
T7	80 - 60	Diagonal	L2 1/2x2 1/2x3/16	93	-5.99	6.32	94.8	Pass
T8	60 - 40	Diagonal	L3x3x3/16	114	-6.43	8.79	73.1 77.7 (b)	Pass
T9	40 - 20	Diagonal	L3x3x1/4	136	-7.38	7.82	94.3	Pass
T10	20 - 10	Diagonal	L3 1/2x3 1/2x1/4	151	-7.42	11.56	64.1 67.5 (b)	Pass
T11	10 - 0	Diagonal	L3 1/2x3 1/2x1/4	159	-7.70	10.33	74.6	Pass
T6	86.6667 - 80	Secondary Horizontal	L1 1/2x1 1/2x3/16	85	-1.13	2.48	45.5	Pass
T11	10 - 0	Secondary Horizontal	L2 1/2x2 1/2x3/16	163	-3.06	3.86	79.2	Pass
T1	132 - 124	Top Girt	L2x2x3/16	6	-0.13	4.03	3.3	Pass
T3	120 - 100	Top Girt	L2x2x3/16	33	-0.10	5.10	2.0	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
							Summary	
						Leg (T10)	92.6	Pass
						Diagonal (T7)	94.8	Pass
						Secondary Horizontal (T11)	79.2	Pass
						Top Girt (T1)	3.3	Pass
						Bolt Checks	85.9	Pass
						Rating =	**94.8**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity – LC4

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Foundation Structural		36.6%	Pass
1	Foundation Soil Interaction		96.5%	Pass
	Anchor Rods		90.2%	Pass

Structure Rating (max from all components) =	**96.5%**

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

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads once the modifications proposed by SSOE Group (Project #: 015-00428-01, WO #: 1059741, dated 5/15/15) are installed.

5) DISCLAIMER OF WARRANTIES

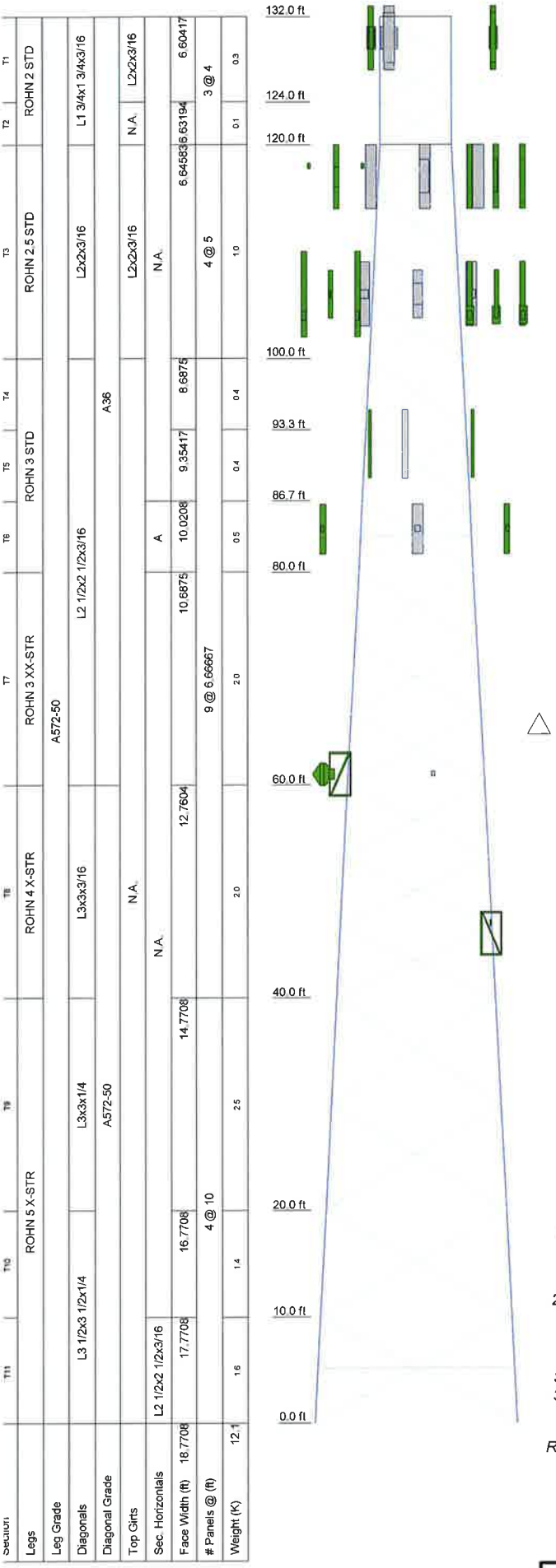
SSOE Group has not performed a site visit to the tower to verify member sizes or antenna/coax loading. SSOE Group shall be contacted immediately if the existing conditions are not as represented on the tower elevation contained in this report in order to evaluate the significance of the discrepancy. SSOE Group has not performed a condition assessment of the tower foundation. This report does not replace a full tower inspection

The engineering services rendered by SSOE Group in connection with this structural analysis are limited to an analysis of the tower structure and theoretical capacity of its main structural members. Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as part of our work. We recommend that material of suitable size and strength be purchased from a reputable tower manufacturer.

SSOE 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. SSOE 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 contained in this report. The maximum liability of SSOE Group pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

TNXTOWER OUTPUT



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L1 1/2x1 1/2x3/16		

MATERIAL STRENGTH

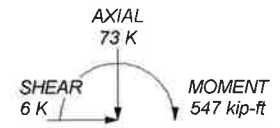
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

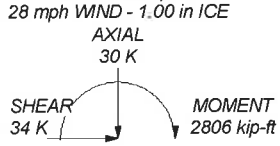
1. Tower is located in Tolland County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 94.8%

MAX. CORNER REACTIONS AT BASE:
DOWN: 183 K
SHEAR: 21 K

UPLIFT: -155 K
SHEAR: 18 K



TORQUE 3 kip-ft
28 mph WIND - 1.00 in ICE



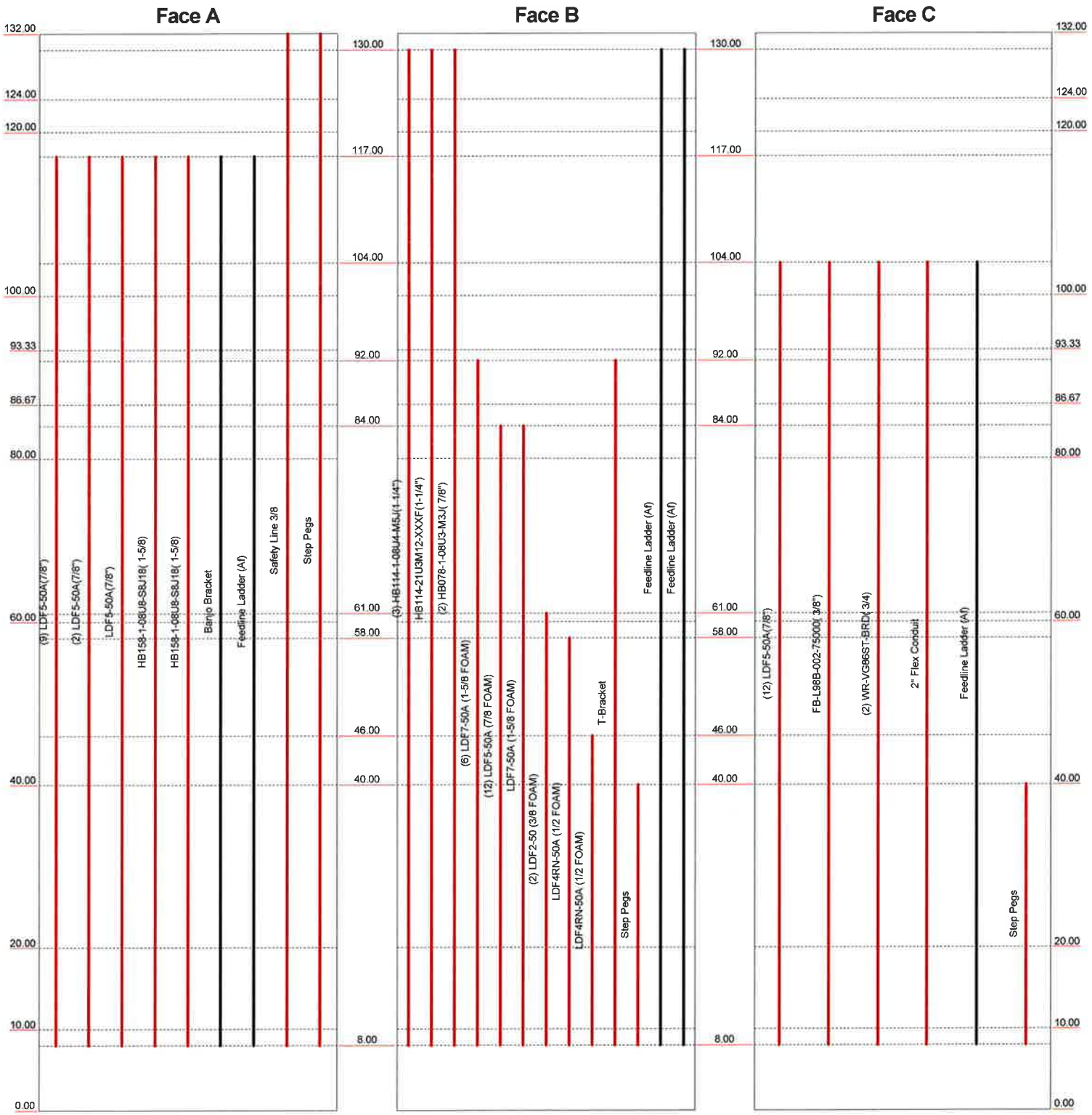
TORQUE 22 kip-ft
REACTIONS - 85 mph WIND

SSOE Group
320 Seven Springs Way, Suite 220
Brentwood, TN 37027
Phone: (615) 661-7585
FAX: (615) 661-7569

Job: BU 806377 HRT 084 943242			
Project: 015-00428-01			
Client: CCI	Drawn by: 15277	App'd:	
Code: TIA/EIA-222-F	Date: 05/15/15	Scale: N	
Path: F:\A Mods In Progress\806377 - HRT 084\tnx\806377_Proposed_Mods_2.eri		Dwg No.	

0' - 132'

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



SSOE Group
320 Seven Springs Way, Suite 220
Brentwood, TN 37027
Phone: (615) 661-7585
FAX: (615) 661-7569

Job: BU 806377 HRT 084 943242			
Project: 015-00428-01			
Client: CCI	Drawn by: 15277	App'd:	
Code: TIA/EIA-222-F	Date: 05/15/15	Scale: N	
Path: F:\A Mods In Progress\806377 - HRT 084\tnx\806377_Proposed_Mods_2.eri		Dwg No.	

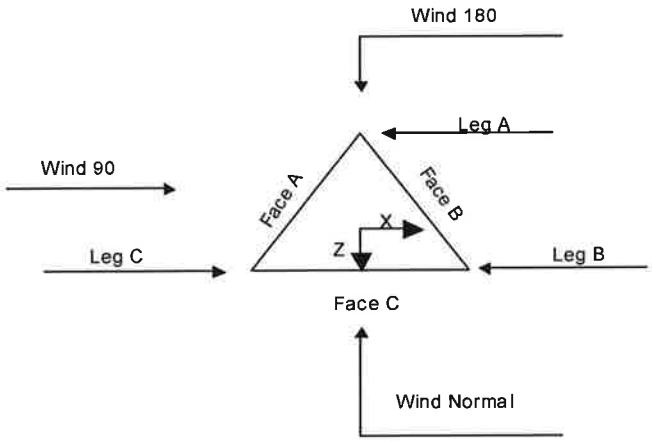
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 132.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 6.60 ft at the top and 18.77 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Tolland County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 1.00 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 28 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
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	132.00-124.00			6.60	1	8.00
T2	124.00-120.00			6.63	1	4.00
T3	120.00-100.00			6.65	1	20.00
T4	100.00-93.33			8.69	1	6.67
T5	93.33-86.67			9.35	1	6.67
T6	86.67-80.00			10.02	1	6.67
T7	80.00-60.00			10.69	1	20.00
T8	60.00-40.00			12.76	1	20.00
T9	40.00-20.00			14.77	1	20.00
T10	20.00-10.00			16.77	1	10.00
T11	10.00-0.00			17.77	1	10.00

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	132.00-124.00	4.00	X Brace	No	No	0.00	0.00
T2	124.00-120.00	4.00	X Brace	No	No	0.00	0.00
T3	120.00-100.00	5.00	X Brace	No	No	0.00	0.00
T4	100.00-93.33	6.67	X Brace	No	No	0.00	0.00
T5	93.33-86.67	6.67	X Brace	No	No	0.00	0.00
T6	86.67-80.00	6.67	X Brace	No	Yes	0.00	0.00
T7	80.00-60.00	6.67	X Brace	No	No	0.00	0.00
T8	60.00-40.00	6.67	X Brace	No	No	0.00	0.00
T9	40.00-20.00	10.00	X Brace	No	No	0.00	0.00
T10	20.00-10.00	10.00	X Brace	No	No	0.00	0.00
T11	10.00-0.00	10.00	X Brace	No	Yes	0.00	0.00

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 132.00-124.00	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 124.00-120.00	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T3 120.00-100.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 100.00-93.33	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 93.33-86.67	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 86.67-80.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 80.00-60.00	Pipe	ROHN 3 XX-STR	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T8 60.00-40.00	Pipe	ROHN 4 X-STR	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A572-50 (50 ksi)
T9 40.00-20.00	Pipe	ROHN 5 X-STR	A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A572-50 (50 ksi)
T10 20.00-10.00	Pipe	ROHN 5 X-STR	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T11 10.00-0.00	Pipe	ROHN 5 X-STR	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	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 132.00-124.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Flat Bar		A36 (36 ksi)
T3 120.00-100.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Flat Bar		A36 (36 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
T6 86.67-80.00	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T11 10.00-0.00	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)

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 132.00-124.00	0.00	0.00	A36 (36 ksi)	1	1	1.05	36.00	36.00
T2 124.00-120.00	0.00	0.00	A36 (36 ksi)	1	1	1.05	36.00	36.00
T3 120.00-100.00	0.00	0.00	A36 (36 ksi)	1	1	1.05	36.00	36.00
T4 100.00-93.33	0.00	0.00	A36 (36 ksi)	1	1	1.05	36.00	36.00
T5 93.33-86.67	0.00	0.00	A36 (36 ksi)	1	1	1.05	36.00	36.00
T6 86.67-80.00	0.00	0.00	A36 (36 ksi)	1	1	1.05	36.00	36.00
T7 80.00-60.00	0.00	0.00	A36 (36 ksi)	1	1	1.05	36.00	36.00
T8 60.00-40.00	0.00	0.00	A36 (36 ksi)	1	1	1.05	36.00	36.00
T9 40.00-20.00	0.00	0.00	A36 (36 ksi)	1	1	1.05	36.00	36.00
T10 20.00-10.00	0.00	0.00	A36 (36 ksi)	1	1	1.05	36.00	36.00
T11 10.00-0.00	0.00	0.00	A36 (36 ksi)	1	1	1.05	36.00	36.00

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 132.00-124.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 124.00-120.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 120.00-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 100.00-93.33	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	0.5 0.5	1 1
T5 93.33-86.67	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	0.5 0.5	1 1
T6 86.67-80.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	0.5 0.5	1 1
T7 80.00-60.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 60.00-40.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 40.00-20.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 20.00-10.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	0.5 0.5	1 1
T11 10.00-0.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	0.5 0.5	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		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 132.00-124.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T2 124.00-120.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T3 120.00-100.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T4 100.00-93.33	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T5 93.33-86.67	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T6 86.67-80.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T7 80.00-60.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T8 60.00-40.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T9 40.00-20.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T10 20.00-10.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T11 10.00-0.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 132.00-124.00	Flange	0.00 A325N	0	0.63 A325N	1	0.63 A325N	1	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0
T2 124.00-120.00	Flange	0.63 A325N	4	0.63 A325N	1	0.63 A325N	1	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0
T3 120.00-100.00	Flange	0.75 A325N	4	0.63 A325N	1	0.50 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0
T4 100.00-93.33	Flange	0.88 A325N	0	0.63 A325N	1	0.50 A325N	0	0.00 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0
T5 93.33-86.67	Flange	0.88 A325N	0	0.63 A325N	1	0.63 A325N	0	0.00 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0
T6 86.67-80.00	Flange	0.88 A325N	0	0.63 A325N	1	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	1
T7 80.00-60.00	Flange	0.88 A325N	4	0.63 A325N	1	0.50 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0
T8 60.00-40.00	Flange	1.00 A325N	4	0.63 A325N	1	0.50 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0
T9 40.00-20.00	Flange	1.00 A325N	4	0.63 A325N	1	0.50 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0
T10 20.00-10.00	Flange	1.00 A449	0	0.75 A325N	1	0.63 A325N	0	0.00 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0
T11 10.00-0.00	Flange	1.00 A449	4	0.75 A325N	1	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	0	0.63 A325N	1

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 klf
HB114-1-08U4-M5J(1 1/4")	B	Yes	Ar (CfAe)	130.00 - 8.00	0.00	0.4	3	3	1.00	1.54		0.00
HB114-21U3M12-XXXF(1-1/4")	B	Yes	Ar (CfAe)	130.00 - 8.00	0.00	0.45	1	1	1.00	1.54		0.00
HB078-1-08U3-M3J(7/8")	B	Yes	Ar (CfAe)	130.00 - 8.00	0.00	-0.35	2	2	1.00	1.09		0.00
LDF5-50A(7/8")	A	Yes	Ar (CfAe)	117.00 - 8.00	0.00	0.4	9	9	1.00	1.09		0.00
LDF5-50A(7/8")	A	Yes	Ar (CfAe)	117.00 - 8.00	2.00	0.2	2	1	1.00	1.09		0.00
LDF5-50A(7/8")	A	Yes	Ar (CfAe)	117.00 - 8.00	0.00	0.27	1	1	1.00	1.09		0.00
HB158-1-08U8-S8J18(1-5/8)	A	Yes	Ar (CfAe)	117.00 - 8.00	1.00	0.3	1	1	1.00	1.98		0.00
HB158-1-08U8-S8J18(1-5/8)	A	Yes	Ar (CfAe)	117.00 - 8.00	0.00	0.4	1	1	1.00	1.98		0.00
LDF5-50A(7/8")	C	Yes	Ar (CfAe)	104.00 - 8.00	0.00	-0.4	12	12	1.00	1.09		0.00
FB-L98B-002-75000(3/8")	C	Yes	Ar (CfAe)	104.00 - 8.00	0.00	-0.47	1	1	1.00	0.00		0.00
WR-VG86ST-BRD(3/4)	C	Yes	Ar (CfAe)	104.00 - 8.00	0.00	-0.45	2	1	1.00	0.00		0.00
2" Flex Conduit	C	Yes	Ar (CfAe)	104.00 - 8.00	0.00	-0.45	1	1	1.00	2.00		0.00
LDF7-50A (1-5/8 FOAM)	B	No	Ar (Leg)	92.00 - 8.00	0.00	0.08	6	2	1.00	1.98		0.00
LDF5-50A (7/8 FOAM)	B	No	Ar (Leg)	84.00 - 8.00	0.00	0.05	12	3	1.00	1.09		0.00
LDF7-50A (1-5/8 FOAM)	B	No	Ar (Leg)	84.00 - 8.00	0.00	0.06	1	1	1.00	1.98		0.00
LDF2-50 (3/8 FOAM)	B	Yes	Ar (CfAe)	61.00 - 8.00	0.00	-0.35	2	2	1.00	0.44		0.00
LDF4RN-50A (1/2 FOAM)	B	Yes	Ar (CfAe)	58.00 - 8.00	0.00	-0.43	1	1	1.00	0.63		0.00
LDF4RN-50A (1/2 FOAM)	B	Yes	Ar (CfAe)	46.00 - 8.00	0.00	0.45	1	1	1.00	0.63		0.00
Banjo Bracket	A	Yes	Af (CfAe)	117.00 - 8.00	0.00	0.33	1	1	1.00	0.00	0.00	0.01
Feedline Ladder (Af)	A	Yes	Af (CfAe)	117.00 - 8.00	0.00	0.4	1	1	1.00	3.00	12.00	0.01
Safety Line 3/8	A	No	Ar (Leg)	132.00 - 8.00	0.00	0	1	1	1.00	0.38		0.00
Step Pegs	A	No	Ar (Leg)	132.00 - 8.00	0.00	0	1	1	1.00	0.80		0.00
T-Bracket	B	No	Ar (Leg)	92.00 - 8.00	0.00	0	1	1	1.00	1.00		0.01
Step Pegs	B	No	Ar (Leg)	40.00 - 8.00	0.00	0	1	1	1.00	0.80		0.00
Feedline Ladder (Af)	B	Yes	Af (CfAe)	130.00 - 8.00	0.00	0.4	1	1	1.00	3.00	12.00	0.01
Feedline Ladder (Af)	B	Yes	Af (CfAe)	130.00 - 8.00	0.00	-0.4	1	1	1.00	3.00	12.00	0.01
Feedline Ladder (Af)	C	Yes	Af (CfAe)	104.00 - 8.00	0.00	-0.4	1	1	1.00	3.00	12.00	0.01
Step Pegs	C	No	Ar (Leg)	40.00 - 8.00	0.00	0	1	1	1.00	0.80		0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	132.00-124.00	A	0.783	0.000	0.000	0.000	0.02
		B	4.953	3.000	0.000	0.000	0.14
		C	0.000	0.000	0.000	0.000	0.00
T2	124.00-120.00	A	0.392	0.000	0.000	0.000	0.01
		B	3.172	2.000	0.000	0.000	0.09
		C	0.000	0.000	0.000	0.000	0.00
T3	120.00-100.00	A	24.554	4.250	0.000	0.000	0.48
		B	15.858	10.000	0.000	0.000	0.46
		C	5.027	1.000	0.000	0.000	0.06
T4	100.00-93.33	A	9.514	1.667	0.000	0.000	0.19
		B	5.286	3.333	0.000	0.000	0.15
		C	8.378	1.667	0.000	0.000	0.09
T5	93.33-86.67	A	9.514	1.667	0.000	0.000	0.19
		B	7.491	3.333	0.000	0.000	0.23
		C	10.582	1.667	0.000	0.000	0.09
T6	86.67-80.00	A	9.514	1.667	0.000	0.000	0.19
		B	9.792	3.333	0.000	0.000	0.27
		C	12.883	1.667	0.000	0.000	0.09
T7	80.00-60.00	A	28.542	5.000	0.000	0.000	0.56
		B	32.948	10.000	0.000	0.000	0.85
		C	42.150	5.000	0.000	0.000	0.28
T8	60.00-40.00	A	28.542	5.000	0.000	0.000	0.56
		B	35.602	10.000	0.000	0.000	0.86
		C	42.150	5.000	0.000	0.000	0.28
T9	40.00-20.00	A	29.875	5.000	0.000	0.000	0.56
		B	37.775	10.000	0.000	0.000	0.91
		C	44.817	5.000	0.000	0.000	0.33
T10	20.00-10.00	A	14.938	2.500	0.000	0.000	0.28
		B	18.887	5.000	0.000	0.000	0.46
		C	22.408	2.500	0.000	0.000	0.17
T11	10.00-0.00	A	2.987	0.500	0.000	0.000	0.06
		B	3.777	1.000	0.000	0.000	0.09
		C	4.482	0.500	0.000	0.000	0.03

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	132.00-124.00	A	1.177	3.921	0.000	0.000	0.000	0.06
		B		9.536	8.154	0.000	0.000	0.35
		C		0.000	0.000	0.000	0.000	0.00
T2	124.00-120.00	A	1.170	1.952	0.000	0.000	0.000	0.03
		B		5.681	5.430	0.000	0.000	0.23
		C		0.000	0.000	0.000	0.000	0.00
T3	120.00-100.00	A	1.155	36.272	32.302	0.000	0.000	1.43
		B		28.166	27.085	0.000	0.000	1.14
		C		4.111	9.177	0.000	0.000	0.24
T4	100.00-93.33	A	1.138	13.518	12.641	0.000	0.000	0.55
		B		9.290	9.002	0.000	0.000	0.37
		C		6.773	15.282	0.000	0.000	0.40
T5	93.33-86.67	A	1.128	13.442	12.627	0.000	0.000	0.54
		B		12.565	10.312	0.000	0.000	0.57
		C		10.059	16.599	0.000	0.000	0.39
T6	86.67-80.00	A	1.118	13.362	12.611	0.000	0.000	0.54
		B		15.831	12.021	0.000	0.000	0.75
		C		13.336	18.316	0.000	0.000	0.39
T7	80.00-60.00	A	1.094	39.545	37.731	0.000	0.000	1.59
		B		52.044	38.867	0.000	0.000	2.47
		C		44.418	57.682	0.000	0.000	1.15
T8	60.00-40.00	A	1.051	38.535	37.538	0.000	0.000	1.54
		B		60.227	40.955	0.000	0.000	2.53
		C		43.263	57.586	0.000	0.000	1.11
T9	40.00-20.00	A	1.000	42.008	37.311	0.000	0.000	1.48
		B		66.492	40.728	0.000	0.000	2.59
		C		51.233	57.472	0.000	0.000	1.17

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
T10	20.00-10.00	A	1.000	21.004	18.656	0.000	0.000	0.74
		B		33.246	20.364	0.000	0.000	1.29
		C		25.617	28.736	0.000	0.000	0.58
T11	10.00-0.00	A	1.000	4.201	3.731	0.000	0.000	0.15
		B		6.649	4.073	0.000	0.000	0.26
		C		5.123	5.747	0.000	0.000	0.12

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	132.00-124.00	A	0.000	0.000	0.000	0.000
		B	0.000	2.024	0.760	1.543
		C	0.000	0.000	0.000	0.000
T2	124.00-120.00	A	0.000	0.000	0.000	0.000
		B	0.000	1.102	0.407	0.824
		C	0.000	0.000	0.000	0.000
T3	120.00-100.00	A	0.000	6.219	2.365	5.383
		B	0.000	4.902	2.106	4.243
		C	0.000	1.379	0.531	1.193
T4	100.00-93.33	A	0.000	1.685	0.818	1.851
		B	0.000	1.128	0.619	1.240
		C	0.000	1.590	0.781	1.747
T5	93.33-86.67	A	0.000	1.626	0.799	1.801
		B	0.000	1.088	0.604	1.206
		C	0.000	1.535	0.762	1.701
T6	86.67-80.00	A	0.000	2.234	0.980	2.203
		B	0.000	1.495	0.742	1.475
		C	0.000	2.111	0.935	2.082
T7	80.00-60.00	A	0.000	4.438	2.272	5.069
		B	0.000	2.991	1.725	3.416
		C	0.000	4.202	2.168	4.800
T8	60.00-40.00	A	0.000	4.057	2.633	5.789
		B	0.000	3.419	2.220	4.879
		C	0.000	3.855	2.512	5.501
T9	40.00-20.00	A	0.000	2.695	1.871	4.042
		B	0.000	2.401	1.627	3.601
		C	0.000	2.572	1.785	3.857
T10	20.00-10.00	A	0.000	1.314	1.064	2.300
		B	0.000	1.171	0.926	2.049
		C	0.000	1.254	1.016	2.195
T11	10.00-0.00	A	0.000	0.373	0.276	0.596
		B	0.000	0.332	0.240	0.531
		C	0.000	0.356	0.263	0.569

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	132.00-124.00	4.87	-1.72	2.41	-2.44
T2	124.00-120.00	6.83	-2.01	3.66	-2.59
T3	120.00-100.00	5.69	-8.97	3.37	-8.31
T4	100.00-93.33	11.04	-5.13	8.98	-5.29
T5	93.33-86.67	12.82	-3.89	10.14	-4.38
T6	86.67-80.00	13.69	-2.43	10.36	-2.94
T7	80.00-60.00	16.70	-2.22	13.17	-3.05
T8	60.00-40.00	17.19	-2.89	14.27	-3.98
T9	40.00-20.00	19.78	-2.66	16.98	-3.31
T10	20.00-10.00	20.43	-2.71	17.88	-3.44

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T11	10.00-0.00	5.99	-0.77	5.81	-1.06

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	3.15 -2.46 0.00	-38.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
TD-RRH8x20-25	A	From Leg	3.15 -2.46 0.00	-38.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	3.15 -2.46 0.00	-38.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.26 8.81 9.36 10.50 12.88	6.71 7.66 8.49 10.20 13.98	0.08 0.14 0.22 0.39 0.87
1900MHZ RRH (65MHz)	A	From Leg	3.15 -2.46 0.00	-38.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	0.06 0.08 0.11 0.18 0.35
800MHz 2x50W RRH W/FILTER	A	From Leg	3.15 -2.46 0.00	-38.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	3.15 -2.46 0.00	-38.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
TD-RRH8x20-25	B	From Leg	3.15 -2.46 0.00	-38.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	3.15 -2.46 0.00	-38.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.26 8.81 9.36 10.50 12.88	6.71 7.66 8.49 10.20 13.98	0.08 0.14 0.22 0.39 0.87
800MHz 2x50W RRH W/FILTER	B	From Leg	3.15 -2.46 0.00	-38.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34

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
1900MHZ RRH (65MHz)	B	From Leg	3.15 -2.46 0.00	-38.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	0.06 0.08 0.11 0.18 0.35
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	2.68 -2.97 0.00	-48.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
TD-RRH8x20-25	C	From Leg	2.68 -2.97 0.00	-48.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	2.68 -2.97 0.00	-48.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.26 8.81 9.36 10.50 12.88	6.71 7.66 8.49 10.20 13.98	0.08 0.14 0.22 0.39 0.87
800MHz 2x50W RRH W/FILTER	C	From Leg	2.68 -2.97 0.00	-48.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
1900MHZ RRH (65MHz)	C	From Leg	2.68 -2.97 0.00	-48.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	0.06 0.08 0.11 0.18 0.35
Sector Mount [SM 803-3]	C	None		0.00	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	40.40 51.20 62.00 83.60 126.80	40.40 51.20 62.00 83.60 126.80	0.98 1.23 1.47 1.95 2.91
LBX-6515DS-T0M w/ Mount Pipe	A	From Leg	3.91 0.83 0.00	12.00	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.92 9.58 10.20 11.47 14.13	6.10 7.27 8.16 9.97 13.79	0.05 0.11 0.19 0.36 0.85
(2) FD9R6004/2C-3L	A	From Leg	3.91 0.83 1.00	12.00	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	3.91 0.83 0.00	12.00	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.40 8.95 9.51 10.66 13.06	6.82 7.78 8.61 10.33 14.12	0.06 0.13 0.20 0.38 0.86
DB-T1-6Z-8AB-0Z	A	From Leg	3.91 0.83 0.00	12.00	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00

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			
RRH2x60-AWS	A	From Leg	3.91 0.83 0.00	12.00	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH2X60-PCS	A	From Leg	3.91 0.83 0.00	12.00	117.00	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
LNX-6514DS-T4M w/ Mount Pipe	A	From Leg	3.91 0.83 0.00	12.00	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.57 9.22 9.84 11.10 13.75	7.00 8.19 9.08 10.90 14.93	0.06 0.13 0.20 0.38 0.89
RRH2x60-700	A	From Leg	3.91 0.83 0.00	12.00	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
LBX-6515DS-T0M w/ Mount Pipe	B	From Leg	3.53 -1.88 0.00	-28.00	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.92 9.58 10.20 11.47 14.13	6.10 7.27 8.16 9.97 13.79	0.05 0.11 0.19 0.36 0.85
(2) FD9R6004/2C-3L	B	From Leg	3.53 -1.88 1.00	-28.00	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	3.53 -1.88 0.00	-28.00	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.40 8.95 9.51 10.66 13.06	6.82 7.78 8.61 10.33 14.12	0.06 0.13 0.20 0.38 0.86
RRH2x60-AWS	B	From Leg	3.53 -1.88 0.00	-28.00	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
DB-T1-6Z-8AB-0Z	B	From Leg	3.53 -1.88 0.00	-28.00	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00
RRH2X60-PCS	B	From Leg	3.53 -1.88 0.00	-28.00	117.00	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
LNX-6514DS-T4M w/ Mount Pipe	B	From Leg	3.53 -1.88 0.00	-28.00	117.00	No Ice 1/2" Ice 1" Ice	8.57 9.22 9.84 11.10	7.00 8.19 9.08 10.90	0.06 0.13 0.20 0.38

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	13.75	14.93	0.89
						4" Ice			
RRH2x60-700	B	From Leg	3.53 -1.88 0.00	-28.00	117.00	No Ice	3.96	1.82	0.06
						1/2" Ice	4.27	2.08	0.08
						1" Ice	4.60	2.36	0.11
						2" Ice	5.27	2.96	0.17
						4" Ice	6.72	4.25	0.35
LNX-6514DS-T6M w/ Mount Pipe	C	From Leg	3.71 1.50 0.00	22.00	117.00	No Ice	8.57	7.00	0.06
						1/2" Ice	9.22	8.19	0.13
						1" Ice	9.84	9.08	0.20
						2" Ice	11.10	10.90	0.38
						4" Ice	13.75	14.93	0.89
(2) FD9R6004/2C-3L	C	From Leg	3.71 1.50 1.00	22.00	117.00	No Ice	0.37	0.08	0.00
						1/2" Ice	0.45	0.14	0.01
						1" Ice	0.54	0.20	0.01
						2" Ice	0.75	0.34	0.02
						4" Ice	1.28	0.74	0.06
SBNHH-1D65B w/ Mount Pipe	C	From Leg	3.71 1.50 0.00	22.00	117.00	No Ice	8.40	6.82	0.06
						1/2" Ice	8.95	7.78	0.13
						1" Ice	9.51	8.61	0.20
						2" Ice	10.66	10.33	0.38
						4" Ice	13.06	14.12	0.86
RRH2x60-AWS	C	From Leg	3.71 1.50 0.00	22.00	117.00	No Ice	3.96	1.82	0.06
						1/2" Ice	4.27	2.08	0.08
						1" Ice	4.60	2.36	0.11
						2" Ice	5.27	2.96	0.17
						4" Ice	6.72	4.25	0.35
BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	3.71 1.50 0.00	22.00	117.00	No Ice	7.97	5.80	0.04
						1/2" Ice	8.61	6.95	0.10
						1" Ice	9.22	7.82	0.17
						2" Ice	10.46	9.60	0.34
						4" Ice	13.07	13.37	0.80
RRH2x60-700	C	From Leg	3.71 1.50 0.00	22.00	117.00	No Ice	3.96	1.82	0.06
						1/2" Ice	4.27	2.08	0.08
						1" Ice	4.60	2.36	0.11
						2" Ice	5.27	2.96	0.17
						4" Ice	6.72	4.25	0.35
SBNHH-1D65B w/ Mount Pipe	C	From Leg	3.71 1.50 0.00	32.00	117.00	No Ice	8.40	6.82	0.06
						1/2" Ice	8.95	7.78	0.13
						1" Ice	9.51	8.61	0.20
						2" Ice	10.66	10.33	0.38
						4" Ice	13.06	14.12	0.86
RRH2X60-PCS	C	From Leg	3.71 1.50 0.00	32.00	117.00	No Ice	2.57	2.01	0.06
						1/2" Ice	2.79	2.22	0.08
						1" Ice	3.02	2.43	0.10
						2" Ice	3.52	2.89	0.16
						4" Ice	4.61	3.92	0.31
Sector Mount [SM 504-3]	C	None		0.00	117.00	No Ice	34.25	34.25	1.71
						1/2" Ice	48.98	48.98	2.29
						1" Ice	63.71	63.71	2.86
						2" Ice	93.17	93.17	4.02
						4" Ice	152.09	152.09	6.33
800 10121 w/ Mount Pipe	A	From Leg	4.00 0.14 2.00	2.00	104.00	No Ice	5.69	4.60	0.07
						1/2" Ice	6.18	5.34	0.11
						1" Ice	6.67	6.04	0.17

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	7.69	7.51	0.30
						2" Ice	9.84	10.82	0.67
						4" Ice			
(2) 782-10250	A	From Leg	4.00 0.14 2.00	2.00	104.00	No Ice	0.52	0.27	0.01
						1/2" Ice	0.63	0.36	0.01
						1" Ice	0.75	0.46	0.02
						2" Ice	1.01	0.69	0.03
						4" Ice	1.63	1.24	0.09
860 10025	A	From Leg	4.00 0.14 2.00	2.00	104.00	No Ice	0.18	0.15	0.00
						1/2" Ice	0.25	0.21	0.00
						1" Ice	0.33	0.29	0.01
						2" Ice	0.51	0.47	0.01
						4" Ice	0.98	0.93	0.05
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0.14 2.00	2.00	104.00	No Ice	8.50	6.30	0.07
						1/2" Ice	9.15	7.48	0.14
						1" Ice	9.77	8.37	0.21
						2" Ice	11.03	10.18	0.38
						4" Ice	13.68	14.02	0.87
(2) RRUS-11	A	From Leg	4.00 0.14 2.00	2.00	104.00	No Ice	0.00	1.37	0.05
						1/2" Ice	0.00	1.55	0.07
						1" Ice	0.00	1.74	0.09
						2" Ice	0.00	2.14	0.15
						4" Ice	0.00	3.04	0.31
DC6-48-60-18-8F	A	From Leg	4.00 0.14 2.00	2.00	104.00	No Ice	2.22	2.22	0.02
						1/2" Ice	2.44	2.44	0.04
						1" Ice	2.66	2.66	0.06
						2" Ice	3.15	3.15	0.12
						4" Ice	4.21	4.21	0.27
(2) DTMABP7819VG12A	A	From Leg	4.00 0.14 2.00	2.00	104.00	No Ice	1.14	0.39	0.02
						1/2" Ice	1.28	0.49	0.03
						1" Ice	1.44	0.59	0.04
						2" Ice	1.77	0.83	0.06
						4" Ice	2.54	1.41	0.14
800 10121 w/ Mount Pipe	B	From Leg	4.00 0.14 2.00	2.00	104.00	No Ice	5.69	4.60	0.07
						1/2" Ice	6.18	5.34	0.11
						1" Ice	6.67	6.04	0.17
						2" Ice	7.69	7.51	0.30
						4" Ice	9.84	10.82	0.67
(2) 782-10250	B	From Leg	4.00 0.14 2.00	2.00	104.00	No Ice	0.52	0.27	0.01
						1/2" Ice	0.63	0.36	0.01
						1" Ice	0.75	0.46	0.02
						2" Ice	1.01	0.69	0.03
						4" Ice	1.63	1.24	0.09
860 10025	B	From Leg	4.00 0.14 2.00	2.00	104.00	No Ice	0.18	0.15	0.00
						1/2" Ice	0.25	0.21	0.00
						1" Ice	0.33	0.29	0.01
						2" Ice	0.51	0.47	0.01
						4" Ice	0.98	0.93	0.05
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00 0.14 2.00	2.00	104.00	No Ice	8.50	6.30	0.07
						1/2" Ice	9.15	7.48	0.14
						1" Ice	9.77	8.37	0.21
						2" Ice	11.03	10.18	0.38
						4" Ice	13.68	14.02	0.87
(3) RRUS-11	B	From Leg	4.00 0.14	2.00	104.00	No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
(2) DTMABP7819VG12A	B	From Leg	4.00 0.14 0.00	2.00	104.00	No Ice	1.14	0.39	0.02
						1/2"	1.28	0.49	0.03
						Ice	1.44	0.59	0.04
						1" Ice	1.77	0.83	0.06
						2" Ice	2.54	1.41	0.14
						4" Ice			
800 10121 w/ Mount Pipe	C	From Leg	3.91 0.83 2.00	12.00	104.00	No Ice	5.69	4.60	0.07
						1/2"	6.18	5.34	0.11
						Ice	6.67	6.04	0.17
						1" Ice	7.69	7.51	0.30
						2" Ice	9.84	10.82	0.67
						4" Ice			
(2) 782-10250	C	From Leg	3.91 0.83 2.00	12.00	104.00	No Ice	0.52	0.27	0.01
						1/2"	0.63	0.36	0.01
						Ice	0.75	0.46	0.02
						1" Ice	1.01	0.69	0.03
						2" Ice	1.63	1.24	0.09
						4" Ice			
860 10025	C	From Leg	3.91 0.83 2.00	12.00	104.00	No Ice	0.18	0.15	0.00
						1/2"	0.25	0.21	0.00
						Ice	0.33	0.29	0.01
						1" Ice	0.51	0.47	0.01
						2" Ice	0.98	0.93	0.05
						4" Ice			
(2) SBNH-1D6565C w/ Mount Pipe	C	From Leg	3.91 0.83 2.00	12.00	104.00	No Ice	11.68	9.84	0.09
						1/2"	12.40	11.37	0.18
						Ice	13.14	12.91	0.28
						1" Ice	14.60	15.27	0.52
						2" Ice	17.87	20.14	1.16
						4" Ice			
RRUS-11	C	From Leg	3.91 0.83 2.00	12.00	104.00	No Ice	0.00	1.37	0.05
						1/2"	0.00	1.55	0.07
						Ice	0.00	1.74	0.09
						1" Ice	0.00	2.14	0.15
						2" Ice	0.00	3.04	0.31
						4" Ice			
(2) DTMABP7819VG12A	C	From Leg	3.91 0.83 0.00	12.00	104.00	No Ice	1.14	0.39	0.02
						1/2"	1.28	0.49	0.03
						Ice	1.44	0.59	0.04
						1" Ice	1.77	0.83	0.06
						2" Ice	2.54	1.41	0.14
						4" Ice			
Sector Mount [SM 504-3]	C	None		0.00	104.00	No Ice	34.25	34.25	1.71
						1/2"	48.98	48.98	2.29
						Ice	63.71	63.71	2.86
						1" Ice	93.17	93.17	4.02
						2" Ice	152.09	152.09	6.33
						4" Ice			
742 213 w/ Mount Pipe	A	From Leg	0.03 -1.00 0.00	-88.00	92.00	No Ice	5.37	4.62	0.05
						1/2"	5.95	6.00	0.09
						Ice	6.50	6.98	0.15
						1" Ice	7.61	8.85	0.28
						2" Ice	9.93	12.79	0.68
						4" Ice			
742 213 w/ Mount Pipe	B	From Leg	0.03 -1.00 0.00	-88.00	92.00	No Ice	5.37	4.62	0.05
						1/2"	5.95	6.00	0.09
						Ice	6.50	6.98	0.15
						1" Ice	7.61	8.85	0.28
						2" Ice	9.93	12.79	0.68
						4" Ice			
742 213 w/ Mount Pipe	C	From Leg	0.03	-88.00	92.00	No Ice	5.37	4.62	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			-1.00			1/2"	5.95	6.00	0.09
			0.00			Ice	6.50	6.98	0.15
						1" Ice	7.61	8.85	0.28
						2" Ice	9.93	12.79	0.68
						4" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00	2.00	84.00	No Ice	6.83	5.64	0.11
			0.14			1/2"	7.35	6.48	0.17
			0.00			Ice	7.86	7.26	0.23
						1" Ice	8.93	8.86	0.38
						2" Ice	11.18	12.29	0.81
						4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00	2.00	84.00	No Ice	6.83	5.64	0.11
			0.14			1/2"	7.35	6.48	0.17
			0.00			Ice	7.86	7.26	0.23
						1" Ice	8.93	8.86	0.38
						2" Ice	11.18	12.29	0.81
						4" Ice			
KRY 112 144/1	A	From Leg	4.00	2.00	84.00	No Ice	0.41	0.20	0.01
			0.14			1/2"	0.50	0.27	0.01
			0.00			Ice	0.59	0.35	0.02
						1" Ice	0.81	0.53	0.03
						2" Ice	1.36	1.00	0.08
						4" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00	2.00	84.00	No Ice	6.83	5.64	0.11
			0.14			1/2"	7.35	6.48	0.17
			0.00			Ice	7.86	7.26	0.23
						1" Ice	8.93	8.86	0.38
						2" Ice	11.18	12.29	0.81
						4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00	2.00	84.00	No Ice	6.83	5.64	0.11
			0.14			1/2"	7.35	6.48	0.17
			0.00			Ice	7.86	7.26	0.23
						1" Ice	8.93	8.86	0.38
						2" Ice	11.18	12.29	0.81
						4" Ice			
KRY 112 144/1	B	From Leg	4.00	2.00	84.00	No Ice	0.41	0.20	0.01
			0.14			1/2"	0.50	0.27	0.01
			0.00			Ice	0.59	0.35	0.02
						1" Ice	0.81	0.53	0.03
						2" Ice	1.36	1.00	0.08
						4" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00	2.00	84.00	No Ice	6.83	5.64	0.11
			0.14			1/2"	7.35	6.48	0.17
			0.00			Ice	7.86	7.26	0.23
						1" Ice	8.93	8.86	0.38
						2" Ice	11.18	12.29	0.81
						4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00	2.00	84.00	No Ice	6.83	5.64	0.11
			0.14			1/2"	7.35	6.48	0.17
			0.00			Ice	7.86	7.26	0.23
						1" Ice	8.93	8.86	0.38
						2" Ice	11.18	12.29	0.81
						4" Ice			
KRY 112 144/1	C	From Leg	4.00	2.00	84.00	No Ice	0.41	0.20	0.01
			0.14			1/2"	0.50	0.27	0.01
			0.00			Ice	0.59	0.35	0.02
						1" Ice	0.81	0.53	0.03
						2" Ice	1.36	1.00	0.08
						4" Ice			
Sector Mount [SM 308-3]	C	None		0.00	84.00	No Ice	22.34	22.34	0.38
						1/2"	31.70	31.70	0.83
						Ice	41.06	41.06	1.28
						1" Ice	59.78	59.78	2.19
						2" Ice	97.22	97.22	3.99
						4" Ice			

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
Side Arm Mount [SO 311-1]	C	From Leg	0.00 1.50 0.00	90.00	61.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	2.97 4.39 5.81 8.65 14.33	3.51 5.33 7.15 10.79 18.07	0.06 0.09 0.13 0.19 0.32
RDL-3000	C	From Leg	0.00 3.00 0.00	90.00	61.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	1.18 1.32 1.48 1.82 2.59	0.28 0.37 0.48 0.71 1.28	0.01 0.01 0.02 0.04 0.12
Side Arm Mount [SO 311-1]	A	From Leg	1.27 0.79 0.00	32.00	58.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	2.97 4.39 5.81 8.65 14.33	3.51 5.33 7.15 10.79 18.07	0.06 0.09 0.13 0.19 0.32
GPS-TMG-20N	A	From Leg	2.54 1.59 3.00	32.00	58.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	0.16 0.21 0.28 0.44 0.86	0.16 0.21 0.28 0.44 0.86	0.00 0.00 0.01 0.01 0.05
Side Arm Mount [SO 701-1]	B	From Leg	0.70 1.32 0.00	62.00	46.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
KS24019-L112A	B	From Leg	1.41 2.65 1.00	62.00	46.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	0.16 0.22 0.30 0.48 0.95	0.16 0.22 0.30 0.48 0.95	0.01 0.01 0.01 0.02 0.06

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
MPRC2449	C	Paraboloid w/Radome	From Leg	0.00 3.00 0.00	90.00		61.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.69 3.98 4.27 4.84 6.00	0.02 0.04 0.06 0.11 0.19

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice

Comb. No.	Description
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	132 - 124	Leg	Max Tension	4	1.78	0.21	-0.00
			Max. Compression	6	-3.48	-0.21	-0.00
			Max. Mx	8	-0.44	0.89	0.02
			Max. My	3	-0.76	-0.00	0.92
			Max. Vy	2	-0.69	0.48	-0.02
			Max. Vx	3	0.70	-0.00	-0.46
		Diagonal	Max Tension	13	1.82	0.00	0.00
			Max. Compression	7	-1.78	0.00	0.00
			Max. Mx	16	0.23	0.01	-0.00
			Max. My	7	-1.76	0.00	0.00
			Max. Vy	16	-0.02	0.01	-0.00
			Max. Vx	7	-0.00	0.00	0.00
		Top Girt	Max Tension	4	0.15	0.00	0.00
			Max. Compression	6	-0.13	0.00	0.00
			Max. Mx	14	0.01	-0.05	0.00
			Max. My	19	0.02	0.00	0.00
			Max. Vy	14	0.03	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T2	124 - 120	Leg	Max Tension	4	4.81	-0.44	0.02
			Max. Compression	6	-6.69	0.41	0.03
			Max. Mx	4	4.81	-0.44	0.02
			Max. My	11	-0.95	-0.02	-0.47
			Max. Vy	4	0.17	-0.44	0.02
			Max. Vx	11	0.18	-0.02	-0.47
		Diagonal	Max Tension	7	1.59	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	13	-1.62	0.00	0.00
			Max. Mx	18	0.13	0.01	-0.00
			Max. My	3	-1.46	0.00	-0.00
			Max. Vy	18	-0.02	0.01	-0.00
			Max. Vx	3	0.00	0.00	-0.00
T3	120 - 100	Leg	Max Tension	4	26.64	-0.51	0.01
			Max. Compression	2	-33.52	0.22	-0.01
			Max. Mx	4	7.02	1.34	0.04
			Max. My	11	-2.28	-0.05	1.52
			Max. Vy	4	1.07	-0.80	0.04
			Max. Vx	5	-1.15	-0.02	0.75
		Diagonal	Max Tension	13	4.67	0.00	0.00
			Max. Compression	7	-4.73	0.00	0.00
			Max. Mx	16	0.19	0.02	0.00
			Max. My	13	-4.64	-0.00	-0.01
			Max. Vy	16	0.02	0.02	0.00
			Max. Vx	13	0.00	0.00	0.00
		Top Girt	Max Tension	12	0.19	0.00	0.00
			Max. Compression	6	-0.10	0.00	0.00
			Max. Mx	14	0.06	-0.05	0.00
			Max. My	19	0.07	0.00	0.00
			Max. Vy	14	0.03	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T4	100 - 93.3333	Leg	Max Tension	4	35.82	-0.09	-0.00
			Max. Compression	6	-43.51	0.12	0.03
			Max. Mx	12	35.18	-0.28	-0.01
			Max. My	5	-4.11	-0.03	0.48
			Max. Vy	8	-0.06	-0.26	0.01
			Max. Vx	5	0.13	-0.03	0.48
		Diagonal	Max Tension	7	5.35	0.00	0.00
			Max. Compression	7	-5.40	0.00	0.00
			Max. Mx	6	4.93	0.04	-0.00
			Max. My	5	-4.86	-0.01	0.01
			Max. Vy	15	-0.03	0.04	0.00
			Max. Vx	25	0.00	0.00	0.00
T5	93.3333 - 86.6667	Leg	Max Tension	4	45.51	-0.35	-0.01
			Max. Compression	6	-54.28	0.29	0.02
			Max. Mx	12	44.69	-0.36	-0.02
			Max. My	3	-4.70	-0.03	-0.68
			Max. Vy	10	0.12	0.13	0.00
			Max. Vx	3	0.19	-0.03	-0.68
		Diagonal	Max Tension	7	5.26	0.00	0.00
			Max. Compression	7	-5.31	0.00	0.00
			Max. Mx	15	0.66	0.04	-0.00
			Max. My	13	-5.23	-0.01	-0.01
			Max. Vy	17	0.03	0.04	-0.00
			Max. Vx	13	0.00	0.00	0.00
T6	86.6667 - 80	Leg	Max Tension	4	54.94	-0.35	-0.01
			Max. Compression	6	-65.10	0.29	0.02
			Max. Mx	8	52.52	0.40	0.03
			Max. My	3	-5.03	-0.03	-0.68
			Max. Vy	6	-0.33	-0.12	-0.01
			Max. Vx	3	-0.52	-0.03	-0.68
		Diagonal	Max Tension	7	5.70	0.00	0.00
			Max. Compression	7	-5.89	0.00	0.00
			Max. Mx	6	4.91	0.05	-0.00
			Max. My	18	0.81	0.05	0.01
			Max. Vy	15	-0.03	0.05	0.01
			Max. Vx	18	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	6	1.13	0.00	0.00
			Max. Compression	6	-1.13	0.00	0.00
			Max. Mx	14	0.23	-0.09	0.00
			Max. My	19	0.39	0.00	0.00
			Max. Vy	14	0.03	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T7	80 - 60	Leg	Max Tension	4	82.81	-0.12	-0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	6	-97.05	0.22	0.02
			Max. Mx	12	63.81	-0.35	-0.02
			Max. My	3	-5.94	-0.01	-0.51
			Max. Vy	8	0.10	-0.22	0.02
			Max. Vx	3	-0.12	-0.01	-0.51
		Diagonal	Max Tension	7	6.01	0.00	0.00
			Max. Compression	7	-6.02	0.00	0.00
			Max. Mx	17	0.59	0.06	-0.01
			Max. My	19	-0.03	0.05	0.01
			Max. Vy	17	0.04	0.06	-0.01
			Max. Vx	19	0.00	0.00	0.00
T8	60 - 40	Leg	Max Tension	4	107.87	-0.41	-0.02
			Max. Compression	6	-126.08	0.46	0.05
			Max. Mx	25	-1.37	-0.57	-0.01
			Max. My	3	-9.04	0.02	-0.34
			Max. Vy	25	0.16	-0.57	-0.01
			Max. Vx	2	0.09	-0.21	-0.34
		Diagonal	Max Tension	13	6.31	0.00	0.00
			Max. Compression	7	-6.43	0.00	0.00
			Max. Mx	19	0.82	0.09	-0.01
			Max. My	20	-0.85	0.05	0.01
			Max. Vy	17	0.05	0.08	0.01
			Max. Vx	19	0.00	0.00	0.00
T9	40 - 20	Leg	Max Tension	4	128.78	-0.60	-0.03
			Max. Compression	6	-150.98	0.76	0.06
			Max. Mx	25	-1.69	-0.98	-0.01
			Max. My	3	-9.90	-0.06	-0.79
			Max. Vy	25	0.19	-0.98	-0.01
			Max. Vx	3	-0.17	-0.06	-0.79
		Diagonal	Max Tension	13	7.18	0.00	0.00
			Max. Compression	13	-7.38	0.00	0.00
			Max. Mx	17	0.25	0.12	-0.01
			Max. My	13	-7.10	0.01	-0.02
			Max. Vy	17	0.06	0.12	-0.01
			Max. Vx	20	-0.00	0.00	0.00
T10	20 - 10	Leg	Max Tension	4	139.81	-0.13	-0.03
			Max. Compression	6	-164.39	-0.15	0.00
			Max. Mx	25	0.73	-0.98	-0.01
			Max. My	3	-11.72	-0.10	-1.42
			Max. Vy	25	-0.22	-0.98	-0.01
			Max. Vx	3	0.23	-0.10	-1.42
		Diagonal	Max Tension	13	7.31	0.00	0.00
			Max. Compression	13	-7.42	0.00	0.00
			Max. Mx	17	-0.17	0.20	-0.02
			Max. My	13	-7.39	0.01	-0.03
			Max. Vy	17	0.08	0.20	-0.02
			Max. Vx	20	-0.00	0.00	0.00
T11	10 - 0	Leg	Max Tension	4	149.82	-0.13	-0.03
			Max. Compression	6	-176.27	0.00	-0.00
			Max. Mx	6	-176.10	1.04	0.01
			Max. My	3	-12.09	-0.10	-1.42
			Max. Vy	6	-0.28	1.04	0.01
			Max. Vx	3	-0.41	-0.10	-1.42
		Diagonal	Max Tension	13	7.44	0.00	0.00
			Max. Compression	7	-7.70	0.00	0.00
			Max. Mx	6	6.17	0.15	-0.01
			Max. My	19	1.57	0.11	0.02
			Max. Vy	18	0.07	0.11	0.02
			Max. Vx	19	0.00	0.00	0.00
		Secondary Horizontal	Max Tension	6	3.06	0.00	0.00
			Max. Compression	6	-3.06	0.00	0.00
			Max. Mx	14	0.46	-0.36	0.00
			Max. My	14	0.50	0.00	0.01
			Max. Vy	14	-0.08	0.00	0.00
			Max. Vx	14	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	10	179.28	17.82	-10.12
	Max. H_x	10	179.28	17.82	-10.12
	Max. H_z	4	-155.03	-15.61	8.87
	Min. Vert	4	-155.03	-15.61	8.87
	Min. H_x	4	-155.03	-15.61	8.87
	Min. H_z	10	179.28	17.82	-10.12
Leg B	Max. Vert	6	182.70	-17.59	-10.78
	Max. H_x	12	-152.88	15.33	9.39
	Max. H_z	12	-152.88	15.33	9.39
	Min. Vert	12	-152.88	15.33	9.39
	Min. H_x	6	182.70	-17.59	-10.78
	Min. H_z	6	182.70	-17.59	-10.78
Leg A	Max. Vert	2	179.28	0.69	20.33
	Max. H_x	11	11.09	2.60	0.78
	Max. H_z	2	179.28	0.69	20.33
	Min. Vert	8	-150.39	-0.58	-17.71
	Min. H_x	6	-73.75	-2.65	-9.07
	Min. H_z	8	-150.39	-0.58	-17.71

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	30.40	-0.00	0.00	-10.83	-25.60	0.00
Dead+Wind 0 deg - No Ice	30.40	-0.06	-33.03	-2749.66	-20.66	21.79
Dead+Wind 30 deg - No Ice	30.40	16.00	-27.30	-2299.34	-1373.35	13.96
Dead+Wind 60 deg - No Ice	30.40	27.38	-15.49	-1314.82	-2341.19	3.79
Dead+Wind 90 deg - No Ice	30.40	32.11	0.07	-5.20	-2730.89	-7.16
Dead+Wind 120 deg - No Ice	30.40	29.11	16.58	1363.67	-2451.86	-17.38
Dead+Wind 150 deg - No Ice	30.40	16.12	27.40	2284.85	-1383.31	-20.91
Dead+Wind 180 deg - No Ice	30.40	0.06	31.15	2609.49	-30.76	-19.49
Dead+Wind 210 deg - No Ice	30.40	-16.00	27.33	2279.21	1322.26	-13.78
Dead+Wind 240 deg - No Ice	30.40	-29.01	16.47	1354.43	2393.06	-4.19
Dead+Wind 270 deg - No Ice	30.40	-32.09	-0.05	-15.49	2678.12	7.32
Dead+Wind 300 deg - No Ice	30.40	-27.44	-15.61	-1324.65	2295.21	15.99
Dead+Wind 330 deg - No Ice	30.40	-16.11	-27.38	-2305.90	1331.20	21.03
Dead+Ice+Temp	73.00	-0.00	0.00	-20.37	-81.32	0.00
Dead+Wind 0 deg+Ice+Temp	73.00	-0.01	-5.83	-499.42	-80.40	3.40
Dead+Wind 30 deg+Ice+Temp	73.00	2.78	-4.79	-418.47	-313.22	1.91
Dead+Wind 60 deg+Ice+Temp	73.00	4.74	-2.71	-246.49	-478.55	0.16
Dead+Wind 90 deg+Ice+Temp	73.00	5.58	0.01	-19.35	-546.88	-1.60
Dead+Wind 120 deg+Ice+Temp	73.00	5.10	2.93	220.06	-501.29	-3.16
Dead+Wind 150 deg+Ice+Temp	73.00	2.80	4.80	378.94	-315.07	-3.47
Dead+Wind 180 deg+Ice+Temp	73.00	0.01	5.44	433.95	-82.40	-2.99
Dead+Wind 210 deg+Ice+Temp	73.00	-2.78	4.79	377.86	150.42	-1.88
Dead+Wind 240 deg+Ice+Temp	73.00	-5.08	2.91	218.24	337.16	-0.22
Dead+Wind 270 deg+Ice+Temp	73.00	-5.58	-0.01	-21.37	383.90	1.61
Dead+Wind 300 deg+Ice+Temp	73.00	-4.75	-2.73	-248.36	316.79	2.87
Dead+Wind 330	73.00	-2.80	-4.80	-419.66	152.21	3.49

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
deg+Ice+Temp						
Dead+Wind 0 deg - Service	30.40	-0.02	-11.43	-958.52	-23.91	7.54
Dead+Wind 30 deg - Service	30.40	5.54	-9.45	-802.72	-492.01	4.83
Dead+Wind 60 deg - Service	30.40	9.47	-5.36	-461.87	-826.54	1.31
Dead+Wind 90 deg - Service	30.40	11.11	0.02	-8.92	-961.73	-2.47
Dead+Wind 120 deg - Service	30.40	10.07	5.74	464.76	-865.15	-6.01
Dead+Wind 150 deg - Service	30.40	5.58	9.48	783.54	-495.40	-7.24
Dead+Wind 180 deg - Service	30.40	0.02	10.77	895.47	-27.41	-6.74
Dead+Wind 210 deg - Service	30.40	-5.54	9.46	781.58	440.74	-4.76
Dead+Wind 240 deg - Service	30.40	-10.04	5.70	461.56	811.26	-1.45
Dead+Wind 270 deg - Service	30.40	-11.10	-0.02	-12.48	909.92	2.53
Dead+Wind 300 deg - Service	30.40	-9.49	-5.40	-465.26	777.09	5.53
Dead+Wind 330 deg - Service	30.40	-5.57	-9.47	-804.98	443.89	7.28

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-30.40	0.00	0.00	30.40	-0.00	0.000%
2	-0.06	-30.40	-33.04	0.06	30.40	33.03	0.032%
3	16.01	-30.40	-27.31	-16.00	30.40	27.30	0.035%
4	27.38	-30.40	-15.50	-27.38	30.40	15.49	0.011%
5	32.13	-30.40	0.07	-32.11	30.40	-0.07	0.035%
6	29.13	-30.40	16.59	-29.11	30.40	-16.58	0.032%
7	16.12	-30.40	27.41	-16.12	30.40	-27.40	0.034%
8	0.06	-30.40	31.15	-0.06	30.40	-31.15	0.011%
9	-16.01	-30.40	27.34	16.00	30.40	-27.33	0.034%
10	-29.03	-30.40	16.47	29.01	30.40	-16.47	0.031%
11	-32.10	-30.40	-0.05	32.09	30.40	0.05	0.035%
12	-27.45	-30.40	-15.62	27.44	30.40	15.61	0.011%
13	-16.11	-30.40	-27.40	16.11	30.40	27.38	0.035%
14	0.00	-73.00	0.00	0.00	73.00	-0.00	0.002%
15	-0.01	-73.00	-5.83	0.01	73.00	5.83	0.003%
16	2.78	-73.00	-4.79	-2.78	73.00	4.79	0.003%
17	4.74	-73.00	-2.71	-4.74	73.00	2.71	0.003%
18	5.59	-73.00	0.01	-5.58	73.00	-0.01	0.003%
19	5.10	-73.00	2.93	-5.10	73.00	-2.93	0.003%
20	2.80	-73.00	4.80	-2.80	73.00	-4.80	0.003%
21	0.01	-73.00	5.44	-0.01	73.00	-5.44	0.002%
22	-2.78	-73.00	4.79	2.78	73.00	-4.79	0.002%
23	-5.09	-73.00	2.91	5.08	73.00	-2.91	0.002%
24	-5.58	-73.00	-0.01	5.58	73.00	0.01	0.002%
25	-4.76	-73.00	-2.73	4.75	73.00	2.73	0.002%
26	-2.80	-73.00	-4.80	2.80	73.00	4.80	0.003%
27	-0.02	-30.40	-11.43	0.02	30.40	11.43	0.016%
28	5.54	-30.40	-9.45	-5.54	30.40	9.45	0.017%
29	9.47	-30.40	-5.36	-9.47	30.40	5.36	0.017%
30	11.12	-30.40	0.02	-11.11	30.40	-0.02	0.017%
31	10.08	-30.40	5.74	-10.07	30.40	-5.74	0.017%
32	5.58	-30.40	9.48	-5.58	30.40	-9.48	0.016%
33	0.02	-30.40	10.78	-0.02	30.40	-10.77	0.016%
34	-5.54	-30.40	9.46	5.54	30.40	-9.46	0.016%
35	-10.04	-30.40	5.70	10.04	30.40	-5.70	0.016%
36	-11.11	-30.40	-0.02	11.10	30.40	0.02	0.016%
37	-9.50	-30.40	-5.40	9.49	30.40	5.40	0.017%
38	-5.58	-30.40	-9.48	5.57	30.40	9.47	0.016%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00006384
2	Yes	6	0.00043137	0.00090057
3	Yes	6	0.00047519	0.00099048
4	Yes	7	0.00000001	0.00049321
5	Yes	6	0.00047396	0.00098771
6	Yes	6	0.00043067	0.00089861
7	Yes	6	0.00047144	0.00098206
8	Yes	7	0.00000001	0.00049179
9	Yes	6	0.00047227	0.00098439
10	Yes	6	0.00043022	0.00089851
11	Yes	6	0.00047408	0.00098883
12	Yes	7	0.00000001	0.00049361
13	Yes	6	0.00047443	0.00098913
14	Yes	6	0.00000001	0.00034433
15	Yes	7	0.00000001	0.00071571
16	Yes	7	0.00000001	0.00073349
17	Yes	7	0.00000001	0.00074341
18	Yes	7	0.00000001	0.00073732
19	Yes	7	0.00000001	0.00072073
20	Yes	7	0.00000001	0.00067523
21	Yes	7	0.00000001	0.00062931
22	Yes	7	0.00000001	0.00059127
23	Yes	7	0.00000001	0.00058564
24	Yes	7	0.00000001	0.00059357
25	Yes	7	0.00000001	0.00062960
26	Yes	7	0.00000001	0.00067160
27	Yes	6	0.00000001	0.00093049
28	Yes	6	0.00000001	0.00096020
29	Yes	6	0.00048653	0.00098565
30	Yes	6	0.00000001	0.00095918
31	Yes	6	0.00000001	0.00092836
32	Yes	6	0.00000001	0.00095114
33	Yes	6	0.00000001	0.00097763
34	Yes	6	0.00000001	0.00095167
35	Yes	6	0.00000001	0.00092565
36	Yes	6	0.00000001	0.00095710
37	Yes	6	0.00000001	0.00098412
38	Yes	6	0.00000001	0.00095714

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	132	Diagonal	A325N	0.63	1	1.82	4.08	0.446 ✔	1.333	Member Block Shear
		Top Girt	A325N	0.63	1	0.15	4.55	0.032 ✔	1.333	Member Block Shear
T2	124	Leg	A325N	0.63	4	1.20	13.50	0.089 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.63	1	1.59	4.08	0.389 ✔	1.333	Member Block Shear
T3	120	Leg	A325N	0.75	4	6.66	19.43	0.343 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.63	1	4.67	4.76	0.982 ✔	1.333	Member Block Shear
T4	100	Diagonal	A325N	0.63	1	5.35	5.44	0.984 ✔	1.333	Member Bearing
T5	93.3333	Diagonal	A325N	0.63	1	5.26	5.44	0.967 ✔	1.333	Member Bearing

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
T6	86.6667	Diagonal	A325N	0.63	1	5.70	5.44	1.048 ✔	1.333	Member Bearing
		Secondary Horizontal	A325N	0.63	1	1.13	3.19	0.353 ✔	1.333	Member Block Shear
T7	80	Leg	A325N	0.88	4	20.70	26.46	0.782 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.63	1	6.01	5.44	1.105 ✔	1.333	Member Bearing
T8	60	Leg	A325N	1.00	4	26.97	34.56	0.780 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.63	1	6.31	6.09	1.036 ✔	1.333	Member Bearing
T9	40	Leg	A325N	1.00	4	32.19	34.56	0.932 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.63	1	7.38	6.44	1.145 ✔	1.333	Bolt Shear
T10	20	Diagonal	A325N	0.75	1	7.31	8.13	0.899 ✔	1.333	Member Bearing
T11	10	Leg	A449	1.00	4	37.42	31.10	1.203 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.75	1	7.44	8.13	0.915 ✔	1.333	Member Bearing
		Secondary Horizontal	A325N	0.63	1	3.06	5.10	0.600 ✔	1.333	Member Bearing

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	132 - 124	ROHN 2 STD	8.00	4.00	61.0 K=1.00	22.55	1.07	-3.48	24.23	0.144 ✔
T2	124 - 120	ROHN 2 STD	4.00	4.00	61.0 K=1.00	22.55	1.07	-6.69	24.23	0.276 ✔
T3	120 - 100	ROHN 2.5 STD	20.03	5.01	63.4 K=1.00	22.12	1.70	-33.52	37.70	0.889 ✔
T4	100 - 93.3333	ROHN 3 STD	6.68	6.68	68.9 K=1.00	21.15	2.23	-43.51	47.12	0.923 ✔
T5	93.3333 - 86.6667	ROHN 3 STD	6.68	6.68	68.9 K=1.00	21.15	2.23	-54.28	47.12	1.152 ✔
T6	86.6667 - 80	ROHN 3 STD	6.68	3.45	35.5 K=1.00	26.44	2.23	-65.10	58.92	1.105 ✔
T7	80 - 60	ROHN 3 XX-STR	20.04	6.68	76.5 K=1.00	19.69	5.47	-97.05	107.66	0.901 ✔
T8	60 - 40	ROHN 4 X-STR	20.03	6.68	54.3 K=1.00	23.67	4.41	-126.08	104.33	1.208 ✔
T9	40 - 20	ROHN 5 X-STR	20.03	10.02	65.4 K=1.00	21.78	6.11	-150.98	133.13	1.134 ✔
T10	20 - 10	ROHN 5 X-STR	10.02	10.02	65.4 K=1.00	21.78	6.11	-164.39	133.13	1.235 ✔
T11	10 - 0	ROHN 5 X-STR	10.02	5.15	33.6 K=1.00	26.70	6.11	-176.27	163.19	1.080 ✔

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	132 - 124	L1 3/4x1 3/4x3/16	7.74	3.63	126.9 K=1.00	9.27	0.62	-1.78	5.76	0.310 ✔
T2	124 - 120	L1 3/4x1 3/4x3/16	7.75	3.64	127.1 K=1.00	9.24	0.62	-1.62	5.74	0.283 ✔
T3	120 - 100	L2x2x3/16	9.80	4.79	145.8 K=1.00	7.03	0.71	-4.73	5.02	0.941 ✔
T4	100 - 93.3333	L2 1/2x2 1/2x3/16	11.22	5.51	133.6 K=1.00	8.37	0.90	-5.40	7.55	0.715 ✔
T5	93.3333 - 86.6667	L2 1/2x2 1/2x3/16	11.76	5.78	140.1 K=1.00	7.60	0.90	-5.31	6.86	0.774 ✔
T6	86.6667 - 80	L2 1/2x2 1/2x3/16	12.32	6.18	149.9 K=1.00	6.65	0.90	-5.89	6.00	0.983 ✔
T7	80 - 60	L2 1/2x2 1/2x3/16	14.09	6.95	168.5 K=1.00	5.26	0.90	-5.99	4.74	1.263 ✔
T8	60 - 40	L3x3x3/16	15.90	7.80	157.1 K=1.00	6.05	1.09	-6.43	6.59	0.975 ✔
T9	40 - 20	L3x3x1/4	19.10	9.45	191.5 K=1.00	4.07	1.44	-7.38	5.86	1.258 ✔
T10	20 - 10	L3 1/2x3 1/2x1/4	19.96	9.87	170.6 K=1.00	5.13	1.69	-7.42	8.67	0.855 ✔
T11	10 - 0	L3 1/2x3 1/2x1/4	20.83	10.44	180.4 K=1.00	4.59	1.69	-7.70	7.75	0.994 ✔

Secondary 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 $\frac{P}{P_a}$
T6	86.6667 - 80	L1 1/2x1 1/2x3/16	10.34	10.05	205.6 K=0.50	3.53	0.53	-1.13	1.86	0.606 ✔
T11	10 - 0	L2 1/2x2 1/2x3/16	18.26	17.79	215.7 K=0.50	3.21	0.90	-3.06	2.90	1.056 ✔

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	132 - 124	L2x2x3/16	6.60	6.17	187.8 K=1.00	4.23	0.71	-0.13	3.03	0.044 ✔
T3	120 - 100	L2x2x3/16	6.65	6.45	167.0 K=0.85	5.36	0.71	-0.10	3.83	0.027 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
T1	132 - 124	ROHN 2 STD	8.00	4.00	61.0	30.00	1.07	1.78	32.24	0.055 ✔
T2	124 - 120	ROHN 2 STD	4.00	4.00	61.0	30.00	1.07	4.81	32.24	0.149 ✔
T3	120 - 100	ROHN 2.5 STD	20.03	5.01	63.4	30.00	1.70	26.64	51.12	0.521 ✔
T4	100 - 93.3333	ROHN 3 STD	6.68	6.68	68.9	30.00	2.23	35.82	66.85	0.536 ✔
T5	93.3333 - 86.6667	ROHN 3 STD	6.68	6.68	68.9	30.00	2.23	45.51	66.85	0.681 ✔
T6	86.6667 - 80	ROHN 3 STD	6.68	3.45	35.5	30.00	2.23	54.94	66.85	0.822 ✔
T7	80 - 60	ROHN 3 XX-STR	20.04	6.68	76.5	30.00	5.47	82.81	163.99	0.505 ✔
T8	60 - 40	ROHN 4 X-STR	20.03	6.68	54.3	30.00	4.41	107.87	132.22	0.816 ✔
T9	40 - 20	ROHN 5 X-STR	20.03	10.02	65.4	30.00	6.11	128.78	183.36	0.702 ✔
T10	20 - 10	ROHN 5 X-STR	10.02	10.02	65.4	30.00	6.11	139.82	183.36	0.763 ✔
T11	10 - 0	ROHN 5 X-STR	10.02	5.15	33.6	30.00	6.11	149.82	183.36	0.817 ✔

Diagonal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
T1	132 - 124	L1 3/4x1 3/4x3/16	7.74	3.63	84.0	29.00	0.36	1.82	10.45	0.174 ✔
T2	124 - 120	L1 3/4x1 3/4x3/16	7.75	3.64	84.1	29.00	0.36	1.59	10.45	0.152 ✔
T3	120 - 100	L2x2x3/16	9.80	4.79	95.5	29.00	0.43	4.67	12.49	0.374 ✔
T4	100 - 93.3333	L2 1/2x2 1/2x3/16	11.22	5.51	86.9	29.00	0.57	5.35	16.56	0.323 ✔
T5	93.3333 - 86.6667	L2 1/2x2 1/2x3/16	11.76	5.78	91.1	29.00	0.57	5.26	16.56	0.318 ✔
T6	86.6667 - 80	L2 1/2x2 1/2x3/16	12.32	6.18	95.4	29.00	0.57	5.70	16.56	0.344 ✔
T7	80 - 60	L2 1/2x2 1/2x3/16	12.89	6.36	100.0	29.00	0.57	6.01	16.56	0.363 ✔
T8	60 - 40	L3x3x3/16	15.90	7.80	101.3	32.50	0.71	6.31	23.14	0.273 ✔
T9	40 - 20	L3x3x1/4	19.10	9.45	123.5	32.50	0.94	7.18	30.53	0.235 ✔
T10	20 - 10	L3 1/2x3 1/2x1/4	19.96	9.87	110.1	32.50	1.10	7.31	35.86	0.204 ✔
T11	10 - 0	L3 1/2x3 1/2x1/4	20.83	10.44	114.9	32.50	1.10	7.44	35.86	0.207 ✔

Secondary 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 $\frac{P}{P_a}$
T6	86.6667 - 80	L1 1/2x1 1/2x3/16	10.34	10.05	264.1	29.00	0.29	1.13	8.41	0.134 ✔
T11	10 - 0	L2 1/2x2 1/2x3/16	18.26	17.79	274.5	29.00	0.57	3.06	16.56	0.185 ✔

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	132 - 124	L2x2x3/16	6.60	6.17	124.6	29.00	0.43	0.15	12.49	0.012 ✔
T3	120 - 100	L2x2x3/16	6.65	6.45	125.4	21.60	0.71	0.19	15.44	0.012 ✔

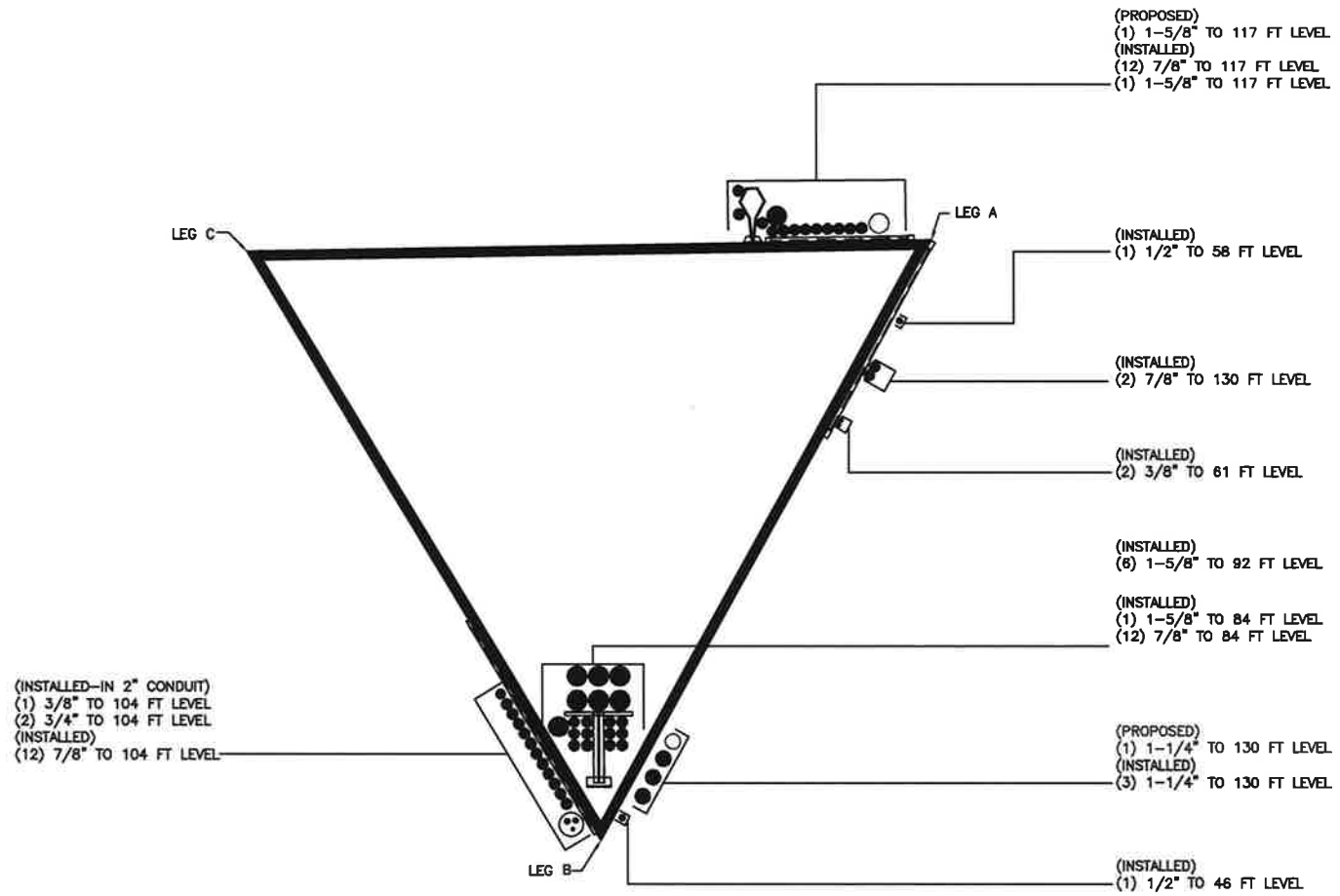
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	132 - 124	Leg	ROHN 2 STD	2	-3.48	32.30	10.8	Pass
T2	124 - 120	Leg	ROHN 2 STD	20	-6.69	32.30	20.7	Pass
T3	120 - 100	Leg	ROHN 2.5 STD	30	-33.52	50.25	66.7	Pass
T4	100 - 93.3333	Leg	ROHN 3 STD	59	-43.51	62.82	69.3	Pass
T5	93.3333 - 86.6667	Leg	ROHN 3 STD	68	-54.28	62.82	86.4	Pass
T6	86.6667 - 80	Leg	ROHN 3 STD	77	-65.10	78.55	82.9	Pass
T7	80 - 60	Leg	ROHN 3 XX-STR	89	-97.05	143.51	67.6	Pass
T8	60 - 40	Leg	ROHN 4 X-STR	110	-126.08	139.07	90.7	Pass
T9	40 - 20	Leg	ROHN 5 X-STR	131	-150.98	177.46	85.1	Pass
T10	20 - 10	Leg	ROHN 5 X-STR	146	-164.39	177.46	92.6	Pass
T11	10 - 0	Leg	ROHN 5 X-STR	155	-176.27	217.53	81.0 90.2 (b)	Pass
T1	132 - 124	Diagonal	L1 3/4x1 3/4x3/16	9	-1.78	7.67	23.2 33.5 (b)	Pass
T2	124 - 120	Diagonal	L1 3/4x1 3/4x3/16	25	-1.62	7.65	21.2 29.2 (b)	Pass
T3	120 - 100	Diagonal	L2x2x3/16	36	-4.73	6.70	70.6 73.7 (b)	Pass
T4	100 - 93.3333	Diagonal	L2 1/2x2 1/2x3/16	63	-5.40	10.06	53.7 73.8 (b)	Pass
T5	93.3333 - 86.6667	Diagonal	L2 1/2x2 1/2x3/16	72	-5.31	9.14	58.0 72.6 (b)	Pass
T6	86.6667 - 80	Diagonal	L2 1/2x2 1/2x3/16	81	-5.89	7.99	73.7 78.6 (b)	Pass
T7	80 - 60	Diagonal	L2 1/2x2 1/2x3/16	93	-5.99	6.32	94.8	Pass
T8	60 - 40	Diagonal	L3x3x3/16	114	-6.43	8.79	73.1 77.7 (b)	Pass
T9	40 - 20	Diagonal	L3x3x1/4	136	-7.38	7.82	94.3	Pass
T10	20 - 10	Diagonal	L3 1/2x3 1/2x1/4	151	-7.42	11.56	64.1 67.5 (b)	Pass
T11	10 - 0	Diagonal	L3 1/2x3 1/2x1/4	159	-7.70	10.33	74.6	Pass
T6	86.6667 - 80	Secondary Horizontal	L1 1/2x1 1/2x3/16	85	-1.13	2.48	45.5	Pass
T11	10 - 0	Secondary Horizontal	L2 1/2x2 1/2x3/16	163	-3.06	3.86	79.2	Pass
T1	132 - 124	Top Girt	L2x2x3/16	6	-0.13	4.03	3.3	Pass
T3	120 - 100	Top Girt	L2x2x3/16	33	-0.10	5.10	2.0	Pass
						Summary	ELC:	LC7

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						Leg (T10)	92.6	Pass
						Diagonal (T7)	94.8	Pass
						Secondary Horizontal (T11)	79.2	Pass
						Top Girt (T1)	3.3	Pass
						Bolt Checks	90.2	Pass
						Rating =	94.8	Pass

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 808377 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

BU#: *806377*
Site Name: *HRT 084 943242*
App #: *294447 Rev. 0*

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Pad & Pier Data		
Base PL Dist. Above Pier:	3	in
Pier Dist. Above Grade:	27.6	in
Pad Bearing Depth, D:	4.2	ft
Pad Thickness, T:	4.2	ft
Pad Width=Length, L:	24	ft
Pier Cross Section Shape:	Square	<--Pull Down
Enter Pier Side Width:	3.3	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	10.89	ft^2
Pier Height:	2.30	ft
Soil (above pad) Height:	0.00	ft

Soil Parameters		
Unit Weight, γ:	115.0	pcf
Ultimate Bearing Capacity, qn:	30.00	ksf
Strength Reduct. factor, ϕ:	0.75	
Angle of Friction, Φ:	33.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: ϕ*qn:	22.50	ksf
Passive Pres. Coeff., Kp	3.39	

Forces/Moments due to Wind and Lateral Soil		
Minimum of (φ*Ultimate Pad Passive Force, Vu):	44.6	kips
Pad Force Location Above D:	1.40	ft
ϕ(Passive Pressure Moment):	62.37	ft-kips
Factored O.T. M(WL), "1.6W":	4088.8	ft-kips
Factored OT (MW-Msoil), M1	4026.44	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	0.00	ft
Sum of Soil Wedges Wt:	0.00	kips
Soil Wedges ecc, K1:	0.00	ft
Ftg+Soil above Pad wt:	366.6	kips
Unfactored (Total ftg-soil Wt):	366.64	kips
1.2D. **No Soil Wedges**.	475.96	kips
0.9D. **With Soil Wedges**	356.97	kips

Resistance due to Cohesion (Vertical)		
ϕ*(1/2*Cu)(Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	30	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	33	kips
Unfactored WL Moment, M:	2806	ft-kips

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	36	kips
0.90	0.9D+1.6W, Pu:	27	kips
1.35	Vu:	44.55	kips
	Mu:	3788.1	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(**No Soil Wedges**) [Reaction+Conc+Soil]	475.96	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	4026.44	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 =	8.46	ft
Orthogonal qu=	2.80	ksf
qu/ϕ*qn Ratio=	**12.45%**	**Pass**

Diagonal Direction:

ecc2 = (0.707M1)/P1 =	5.98	ft
Diagonal qu=	3.28	ksf
qu/ϕ*qn Ratio=	**14.60%**	**Pass**

Run <-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(**w/ Soil Wedges**) [Reaction+Conc+Soil]	356.97	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	4026.44	ft-kips

Orthogonal ecc3 = M2/P2 =	11.28	ft
Ortho Non Bearing Length,NBL=	22.56	ft
Orthogonal qu=	10.32	ksf
Diagonal qu=	5.51	ksf

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating			
Actual M:	2806.00		
M Orthogonal:	2909.15	**96.45%**	**Pass**
M Diagonal:	2909.15	**96.45%**	**Pass**

Monopole or Self Support Pad Foundation Reinforcing
BU#: 806377 HRT 084 943242
SSOE Project Number: 015-00428-01

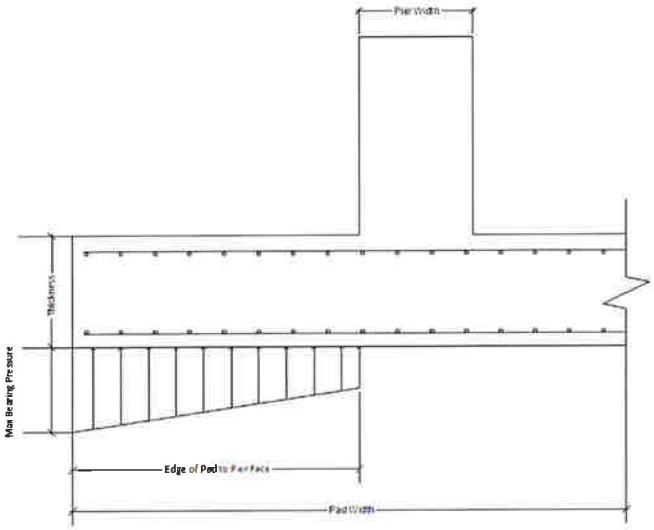
Analysis Code	F
Compression	183 k
Uplift	155 k

Pad Geometry & Reinforcing	
Pad Length	24 ft
Pad Width	24 ft
Pad Thickness	4.2 ft
Pad Top Rebar Size	# 8
Pad Top Rebar Quantity	24
Pad Bottom Rebar Size	# 8
Pad Bottom Rebar Quantity	24
Clear Cover	3 in
f_c'	3 ksi
Rebar Fy	60 ksi
Minimum Steel Assumed?	NO
Pier Shape	Square
Pier Rebar Size	# 9
Pier Rebar Quantity	16
Pier Width	3.3 ft
Pier Height	2.3 ft
Anchor Rod Circle	9.5 in
Anchor Rod Embedment	66.5 in
Pier Tie Size	# 5

Bearing Calculation	
Max Bearing Pressure	9.9 ksf
Edge of Pad to Pier Face	2.20833 ft
Clear Distance Between Piers	15.5 ft
ecc3 (From Crown Spreadsheet)	11.25
Non-Bearing Length	22.5 ft

Reinforcing Calculations		
Minimum Reinforcement Check		
A_s Min =	1.08864 in^2/ft	
As =	1.58 in^2/ft	
		OK
Punching Shear		
φ (Shear) =	0.75	
V_u =	1277.16 k	
ϕV_c =	3488.27 k	
Shear Capacity	36.6%	OK
Pad Flexure		
φ (Tension) =	0.9	
M_u	16.49 k-ft	
ϕM_n =	215.72 k-ft	
Moment Capacity	7.6%	OK
Beam Shear		
V_u	7.50 k	
ϕV_n =	60.84 k	
Shear Capacity	12.3%	OK
Pier Compression		
P_u	237.9 k	
ϕP_n =	3401.2943 k	
Compression Capacity	7.0%	OK
Pier Tension		
Pu=	201.50 k	
ϕPn=	979.05 k	
Tension Capacity =	20.6%	OK
Plain Concrete Interaction		
Moment Capacity	N/A	OK
Shear Capacity	N/A	OK
Pier Compression Capacity	N/A	OK

Overall Capacity	36.6%	OK



APPENDIX D

STRUCTURAL DESIGN DRAWINGS

BU# 806377 - HRT 084 943242

197 SOUTH STREET
VERNON, CT 06066
TOLLAND COUNTY

PROJECT SUMMARY

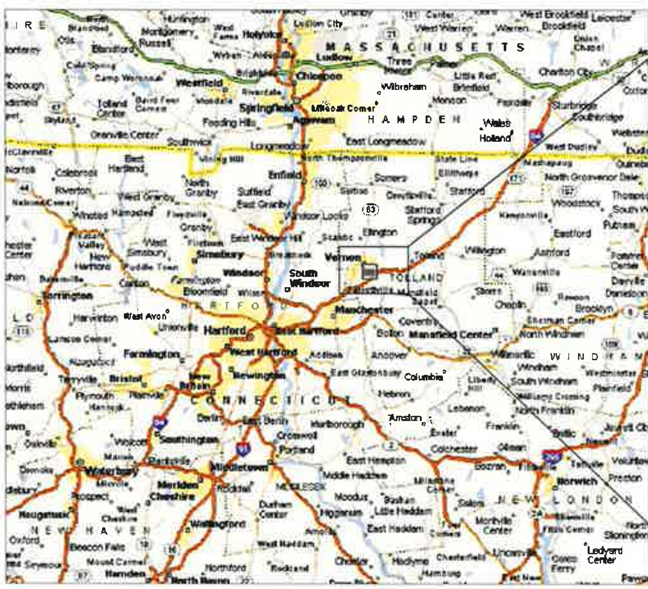
132.0' SELF SUPPORT TOWER
TIA/EIA-222-F, 2005 CTBC
LATITUDE: 41° 51' 12.51"
LONGITUDE: -72° 27' 7.52"

CONTACT INFO

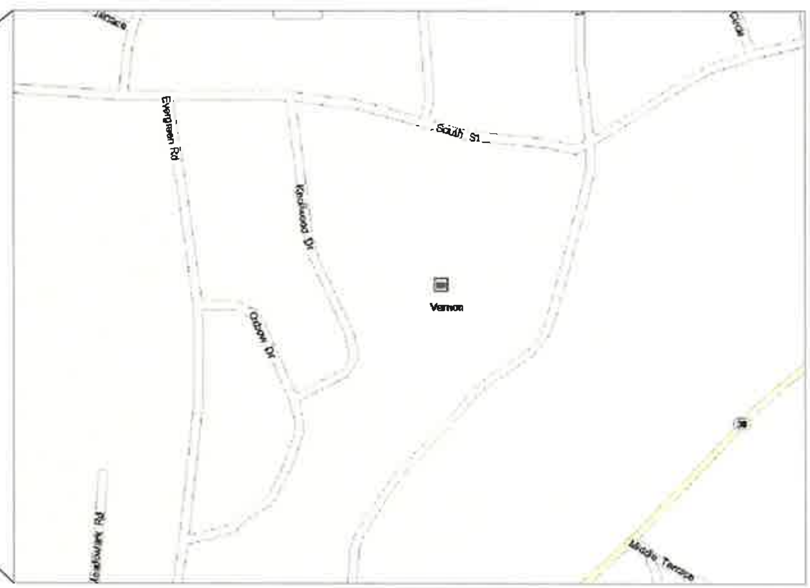
- CROWN CASTLE
  JAY PATTON (980) 209-8250
- SSOE GROUP
  JOHNATHON THIBODAUX (615) 661-7585

DRAWING INDEX

S-001 GENERAL NOTES
S-002 GENERAL NOTES
S-003 MODIFICATION INSPECTION CHECKLIST
S-200 TOWER MODIFICATIONS
S-201 TOWER MODIFICATIONS



VICINITY MAP



LOCATION MAP

SSOE®

5/15/15

PROJECT INFORMATION:

CROWN CASTLE USA
BU 806377
HRT 084 943242

WORK ORDER NO: 1059741

NO.	DATE	SUBJECT
0	05/15/15	ISSUE FOR CONST.

REVISION OR ISSUE

SSOE, Inc.
320 Seven Springs Way, Suite 350
Brentwood, TN 37027
T 615-661-7585

PROJECT NO: 015-00428-01
PROJECT MANAGER: F. WHITE
DESIGNED: J. THIBODAUX
CHECKED: B. BURGESS
DRAWING TITLE:
DRAWING NO:

C:\dgn\d1525806\01 806377 Cover Sheet.dwg

GENERAL NOTES

1. THESE MODIFICATIONS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF THE 2005 CONNECTICUT BUILDING CODE ALONG WITH THE STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, TIA/EIA-222-F. MATERIALS AND SERVICES PROVIDED BY THE CONTRACTOR SHALL CONFORM TO THE ABOVE MENTIONED CODES.
2. 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. THE TOWER IS ASSUMED TO BE PLUMB. THIS DESIGN IS BEING PROVIDED WITHOUT THE BENEFIT OF A CONDITION ASSESSMENT. CONTRACTOR SHALL COMMISSION A COMPLETE CONDITION ASSESSMENT PRIOR TO ORDERING ANY REINFORCEMENT MATERIALS; CONTRACTOR SHALL SUPPLY CONDITION ASSESSMENT TO ENGINEER FOR REVIEW.
3. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PREVENT DAMAGE TO EXISTING STRUCTURES AND UTILITIES. ANY DAMAGE TO EXISTING STRUCTURES AND UTILITIES AS A RESULT OF THE CONTRACTOR'S WORK OR FROM DAMAGE DUE TO OTHER CAUSES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
   a. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES IN THE AREA OF PROPOSED CONSTRUCTION, BY HAND DIGGING IF NECESSARY.
4. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING. ANY PROBLEMS WITH ACCESS, INTERFERENCE, ETC. SHALL BE RESOLVED PRIOR TO BIDDING. THE CONTRACTOR MUST RESOLVE ALL ISSUES WITH THE OWNER PREVENTING A CONTINUOUS INSTALLATION PRIOR TO ORDERING ANY MATERIAL. THE CONTRACTOR SHALL NOTE ALL ANTENNAS, MOUNTS, COAX, LIGHTING, CLIMBING SUPPORTS, STEP BOLTS, PORT HOLES, AND ANY OTHER TOWER APPURTENANCE IN THE REGION OF THE MODIFICATIONS.
5. ANY CARRIER DOWNTIME MUST BE COORDINATED WITH THE TOWER OWNER IN WRITING.
6. 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.
7. CONTRACTOR SHALL VERIFY ALL DIMENSION AND EXISTING CONDITIONS BEFORE BEGINNING WORK, ORDERING MATERIAL, AND PREPARING OF SHOP DRAWINGS. ANY DISCREPANCIES BETWEEN FIELD CONDITIONS AND THE CONTRACT DOCUMENTS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ENGINEER. 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, NOTIFY THE ENGINEER IMMEDIATELY.
8. IT IS ASSUMED THAT ANY STRUCTURAL MODIFICATION WORK SPECIFIED ON THESE PLANS WILL BE ACCOMPLISHED BY KNOWLEDGEABLE WORKMEN WITH TOWER CONSTRUCTION EXPERIENCE.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION METHODS, MEANS, TECHNIQUES, SEQUENCES, AND PROCEDURES.
10. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PROGRAMS IN ACCORDANCE WITH APPLICABLE SAFETY CODES.
11. WORK SHALL ONLY BE PERFORMED DURING CALM DRY DAYS (WINDS LESS THAN 30-MPH). THE STRUCTURE SHOWN ON THE DRAWINGS IS STRUCTURALLY SOUND ONLY IN THE COMPLETED FORM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STRENGTH AND STABILITY OF THE STRUCTURE DURING ERECTION. CONTRACTOR SHALL PROVIDE TEMPORARY SUPPORT, SHORING, BRACING AND ANY OTHER STRUCTURAL SYSTEMS AS REQUIRED TO RESIST ALL FORCES THAT MAY OCCUR DURING HANDLING AND ERECTION UNTIL THE MODIFICATION IS FULLY COMPLETED. TEMPORARY SUPPORTS, BRACING AND OTHER STRUCTURAL SYSTEMS REQUIRED DURING CONSTRUCTION SHALL REMAIN THE CONTRACTOR'S PROPERTY AFTER THEIR USE.
12. ALL MODIFICATIONS PERFORMED ON THIS TOWER SHALL BE COMPLETED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF THE STANDARD FOR INSTALLATION, ALTERATION AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, ANSI/TIA-1019-A.
13. CONNECTIONS BETWEEN ITEMS SUPPORTED BY THE STRUCTURE AND THE STRUCTURE NOT SPECIFICALLY DETAILED IN THE CONTRACT DOCUMENTS ARE THE RESPONSIBILITY OF THE CONTRACTOR. SUCH CONNECTIONS SHALL BE DESIGNED, COORDINATED AND INSPECTED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF THE PROJECT. SUBMIT SIGNED AND SEALED CALCULATIONS DURING SHOP DRAWING REVIEW.
14. DO NOT SCALE DRAWINGS.
15. DO NOT USE THESE DRAWINGS FOR ANY OTHER SITE.
16. THE EXISTING STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE PROPOSED EQUIPMENT SHOWN ON THE DRAWINGS AT THE CODE SPECIFIED WIND SPEEDS. DO NOT INSTALL ANY EQUIPMENT UNTIL THE REINFORCING SYSTEM IS COMPLETED.
17. ALL MATERIAL UTILIZED FOR THIS PROJECT MUST BE NEW AND FREE OF ANY DEFECTS. ANY MATERIAL SUBSTITUTIONS, INCLUDING BUT NOT LIMITED TO ALTERED SIZE AND/OR STRENGTHS, MUST BE APPROVED BY THE OWNER AND ENGINEER IN WRITING.
18. 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.

DESIGN LOADS

WIND LOADS

a. BASIC WIND SPEED (FASTEST MILE), V = 85 MPH

b. WIND IMPORTANCE FACTOR, IW 1.0

ICE LOADS

a. ICE WIND SPEED (FASTEST MILE), V = 28 MPH

b. ICE THICKNESS 1 IN

SEISMIC LOADS

a. STRUCTURE CLASSIFICATION = II

b. SITE CLASS D

c. SEISMIC DESIGN CATEGORY = B

d. MAPPED SPECTRAL ACCELERATION

   i. SPECTRAL RESPONSE COEFFICIENT, SS = 0.177 g

   ii. SPECTRAL RESPONSE COEFFICIENT, S1 = 0.064 g

e. RESPONSE MODIFICATION FACTOR, R = 3.0

STRUCTURAL STEEL

1. DESIGN, DETAILING, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING PUBLICATIONS EXCEPT AS SPECIFICALLY INDICATED IN THE CONTRACT DOCUMENTS.
   a. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION 14th EDITION
   b. SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH STRENGTH BOLTS (ASTM A325 OR A490 BOLTS), DECEMBER 31, 2009
   c. AISC 303-10, CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES
2. PERFORM ALL WELDING BY AN APPROVED METHOD IN ACCORDANCE WITH THE AWS D1.1 "STRUCTURAL WELDING CODE" CURRENT EDITION. WELDING ELECTRODES TO BE E70.
3. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING UNLESS OTHERWISE SHOWN:

CHANNELS, ANGLES, PLATES, ETC.	ASTM A36 (GR 36)
BOLT	ASTM A325 (ALL BOLT HOLES STANDARD SIZE U.N.O.)
NUTS	LOCKING STRUCTURAL GRADE
WASHERS	ASTM F436

4. ALL SUBSTITUTIONS PROPOSED BY THE CONTRACTOR SHALL BE APPROVED IN WRITING BY THE ENGINEER. CONTRACTOR SHALL PROVIDE DOCUMENTATION TO ENGINEER FOR VERIFYING THE SUBSTITUTE IS SUITABLE FOR USE AND MEETS 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.
5. PROVIDE STRUCTURAL STEEL SHOP DRAWINGS TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION. THE ENGINEER SHALL HAVE TEN (10) BUSINESS DAYS TO REVIEW UPON RECEIPT.
   a. SUBMIT SHOP DRAWINGS TO SUBMITTALS@SSOE.COM
6. ALL BOLT ASSEMBLES FOR STRUCTURAL MEMBERS REPRESENTED IN THIS DRAWING REQUIRE LOCKING DEVICES TO BE INSTALLED.
7. ALL WELDING ON TOWER STRUCTURES SHALL BE DONE IN ACCORDANCE WITH AWS D1.0 (LATEST EDITION) AND ENG-PLN-10015 CUTTING AND WELDING SAFETY PLAN (REV. D) THIS SHALL INCLUDE A CERTIFIED WELD INSPECTION (CWI) FOR ACCEPTANCE OR REJECTION OF ALL WELDING OPERATIONS, PRE, DURING, AND POST INSTALLATION, USING THE ACCEPTANCE CRITERIA OF AWS D1.1.
8. CONTRACTOR IS RESPONSIBLE FOR COMMISSIONING A THIRD PARTY CERTIFIED WELD INSPECTOR (CWI) THROUGHOUT THE ENTIRETY OF THE PROJECT. A PASSING CWI REPORT SHALL BE PROVIDED TO THE ENGINEER UPON COMPLETION OF THE PROJECT.
9. THE CERTIFIED WELD INSPECTOR SHALL INDICATE, IN A WRITTEN CWI REPORT, THAT ALL WELDING OPERATIONS PRE, DURING, AND POST INSTALLATION WERE CONDUCTED IN ACCORDANCE WITH AWS D1.1 WITH PHOTOGRAPHS AND DOCUMENTATION SUPPORTING THE ACCEPTANCE OR REJECTION OF ALL WELDING. FOR INFORMATION, SEE ENG-SOW-10007 POST MODIFICATION INSPECTION SOW. ALL CWI WELD INSPECTION DOCUMENTATION AND PHOTOS SHALL BE SUBMITTED TO THE MI INSPECTOR.
10. OXY FUEL GAS WELDING OR BRAZING IS STRICTLY PROHIBITED. SPECIFICALLY, NO TORCH CUTTING IS PERMITTED ON SITE. ALL HOLES SHALL BE CUT WITH A GRINDER.
11. COAX IS FLAMMABLE AND CAN CATCH FIRE IF PROPER PRECAUTIONS ARE NOT MADE TO SHIELD COAX FROM ALL WELDING PROCEDURES. ALL COAX SHALL BE SHIELDED AT AND BELOW EACH WELDING PROCEDURE AND ELEVATION. IN ADDITION, COAX SHALL BE PUSHED AWAY FROM TOWER FACE WHERE WELDING IS BEING PERFORMED. INSTALL 3000° (NFPA 701) FIRE BLANKET AROUND ALL COAX.
12. CONTRACTOR SHALL EXERCISE CAUTION WHEN WELDING A GALVANIZED SURFACE.
13. ALL FIELD WELDS SHALL BE TOUCHED UP WITH A GALVANIZING PAINT REPAIR (ZRC OR APPROVED EQUIVALENT).
14. AFTER FINAL INSPECTION, THE AREA OF THE WELDS, THE INSTALLATION AND ALL SURFACES DAMAGED BY WELDING OR GRINDING SHALL BE CLEANED AND COLD GALVANIZED PAINTED IN ACCORDANCE WITH ENG-BUL-10149 COLD GALVANIZING COMPOUNDS, PHOTO DOCUMENTATION IS REQUIRED TO BE SUBMITTED TO THE MI INSPECTOR.

SSOE®

STATE OF CONNECTICUT
BARRY W. BURGESS
NO. 26165
LICENSED PROFESSIONAL ENGINEER

5/15/15

PROJECT INFORMATION:

CROWN CASTLE USA
BU 806377
HRT 084 943242

WORK ORDER NO: 1059741

NO.	DATE	SUBJECT
0	05/15/15	ISSUE FOR CONST.

REVISION OR ISSUE

SSOE, Inc.
320 Seven Springs Way, Suite 350
Brentwood, TN 37027
T 615-661-7585

PROJECT NO: 015-00428-01
PROJECT MANAGER: F. WHITE
DESIGNED: J. THIBODAUX
CHECKED: B. BURGESS

DRAWING TITLE:
GENERAL NOTES

DRAWING NO:
S-001

C:\drgn\1525806\02 806377 S-001 Structural Notes.dwg

STRUCTURAL STEEL CONT.

15. DRILL NO HOLES IN ANY NEW OR EXISTING STRUCTURAL STEEL MEMBERS OTHER THAN THOSE SHOWN ON STRUCTURAL DRAWINGS WITHOUT THE APPROVAL OF THE ENGINEER OF RECORD.

16. WHERE CONNECTIONS ARE NOT FULLY DETAILED ON THESE DRAWINGS, FABRICATOR SHALL DESIGN CONNECTIONS TO RESIST LOADS AND FORCES WHERE SHOWN ON DRAWINGS AND AS OUTLINED IN SPECIFICATIONS.

17. FOR MEMBERS BEING REPLACED, PROVIDE NEW BOLTS AND MATCH EXISTING SIZE AND GRADE. MAINTAIN AISC REQUIREMENTS FOR MINIMUM BOLT DISTANCE AND SPACING.

18. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT IS AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.

19. GALVANIZED ASTM A325 BOLTS SHALL NOT BE REUSED.

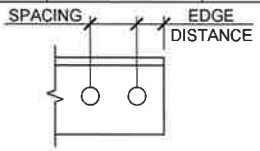
20. ALL NEW STEEL SHALL BE HOT BE DIPPED GALVANIZED FOR FULL WEATHER PROTECTION. ALL GALVANIZING COMPOUNDS MUST BE IN ACCORDANCE WITH CROWN DOCUMENT ENG-BUL-10149. CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION TO PROTECT STEEL BY ANY OTHER MEANS.

21. ALL EXISTING PAINTED/GALVANIZED SURFACES DAMAGED DURING REHAB INCLUDING AREAS UNDER STIFFENER PLATES SHALL BE WIRE BRUSHED CLEAN, REPAIRED BY COLD GALVANIZING BRUSH APPLIED PAINT (ZRC OR EQUAL), AND REPAINTED TO MATCH THE EXISTING FINISH (IF APPLICABLE).

22. ALL HOLES IN STEEL MEMBERS SHALL BE SIZED 1/16" LARGER THAN THE BOLT DIAMETER. SLOTTED OR OVERSIZED HOLES ARE NOT PERMITTED.

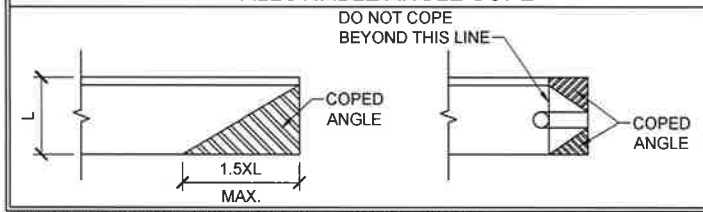
BOLT SCHEDULE

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



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

ALLOWABLE ANGLE COPE

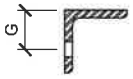


1.) ALL DIMENSIONS REPRESENTED IN THE ABOVE TABLES ARE AISC MINIMUM REQUIREMENTS. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS IN FIELD AND NOTIFY ENGINEER IF DISTANCES ARE LESS THAN THOSE PROVIDED.

2.) THE DIMENSIONS PROVIDED ARE MINIMUM REQUIREMENTS. ACTUAL DIMENSIONSOF PROPOSED MEMBERS WITHIN THESE DRAWINGS MAY VARY FROM THE AISC MINIMUM REQUIREMENTS.

WORKABLE GAGES

ANGLE LEG	4"	3 1/2"	3"	2 1/2"	2"	1 3/4"	1 1/2"
G	2 1/2"	2"	1 3/4"	1 3/8"	1 1/8"	1"	7/8"
PLATE HT. (MIN.)	7"	6 1/2"	6"	5 1/2"	5"	4 3/4"	4 1/2"



NOTE: MATCH EXISTING WHEN APPLICABLE

SSOE®

STATE OF CONNECTICUT BARRY W. BURGESS NO. 26185 LICENSED PROFESSIONAL ENGINEER

5/15/15

PROJECT INFORMATION:

CROWN CASTLE USA
BU 806377
HRT 084 943242

WORK ORDER NO: 1059741

NO.	DATE	SUBJECT
0	05/15/15	ISSUE FOR CONST.

REVISION OR ISSUE

SSOE, Inc.
320 Seven Springs Way, Suite 350
Brentwood, TN 37027
T 615-661-7585

PROJECT NO: 015-00428-01
PROJECT MANAGER: F. WHITE
DESIGNED: J. THIBODAUX
CHECKED: B. BURGESS

DRAWING TITLE:
GENERAL NOTES

DRAWING NO:
S-002

C:\dgn\015280\02 806377 S-001 Structural Notes.dgn

MODIFICATION INSPECTION NOTES

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
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE PER ENG-SOW-10033
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
NA	CONTRACTOR'S CERTIFIED WELD INSPECTION AND NDE REPORTS
NA	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-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

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 CROWN ENG-BUL-10173, "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 PURCHASE ORDER (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 CROWN 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 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 CROWN ENG-SOW-10007.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN 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 THE 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, NOR 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 AN 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 CROWN 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
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

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

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

SSOE®

STATE OF CONNECTICUT BARRY W. BURGESS NO. 26165 LICENSED PROFESSIONAL ENGINEER

5/15/15

PROJECT INFORMATION:

CROWN CASTLE USA
BU 806377
HRT 084 943242

WORK ORDER NO: 1059741

NO.	DATE	SUBJECT
0	05/15/15	ISSUE FOR CONST.

REVISION OR ISSUE

SSOE, Inc.
320 Seven Springs Way, Suite 350
Brentwood, TN 37027
T 615-661-7585

PROJECT NO: 015-00428-01
PROJECT MANAGER: F. WHITE
DESIGNED: J. THIBODAUX
CHECKED: B. BURGESS

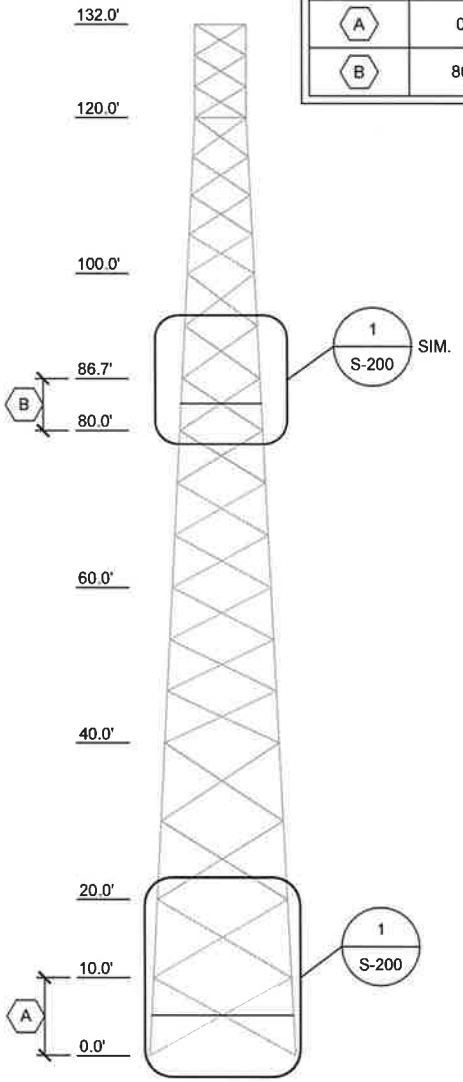
DRAWING TITLE:
MODIFICATION INSPECTION CHECKLIST

DRAWING NO: S-003

C:\drawings\015280\003 806377 S-003 Modification Inspection Checklist.dwg

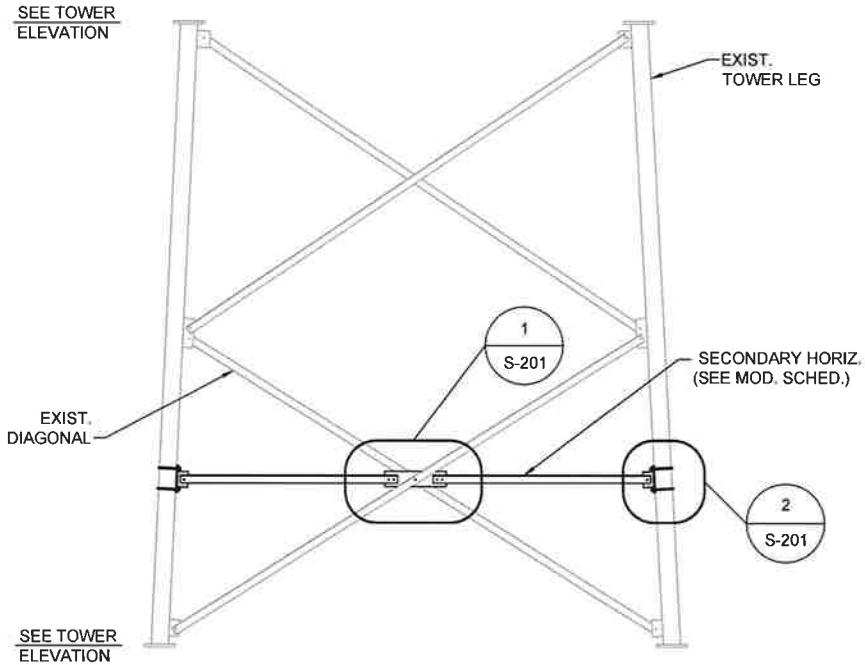
MODIFICATION SCHEDULE - TYPICAL 3 SIDES

SYMBOL	ELEVATION	MEMBER TYPE	EXISTING MEMBER	MODIFIED MEMBER	NOTES	REFERENCE
A	0.0'-10.0'	SECONDARY HORIZONTAL	-	L2 1/2x2 1/2x3/16	INSTALL NEW MEMBER	1/S-200
B	80.0'-86.7'	SECONDARY HORIZONTAL	-	L1 1/2x1 1/2x3/16	INSTALL NEW MEMBER	1/S-200



TOWER ELEVATION

SCALE: 1/16"=1'-0"



1 S-200 TYP. ELEVATION

SCALE: 1/4"=1-0"

SSOE®

STATE OF CONNECTICUT BARRY W. BURGESS NO. 26165 LICENSED PROFESSIONAL ENGINEER

5/15/15

PROJECT INFORMATION:

CROWN CASTLE USA
BU 806377
HRT 084 943242

WORK ORDER NO: 1059741

NO.	DATE	SUBJECT
0	05/15/15	ISSUE FOR CONST.

REVISION OR ISSUE

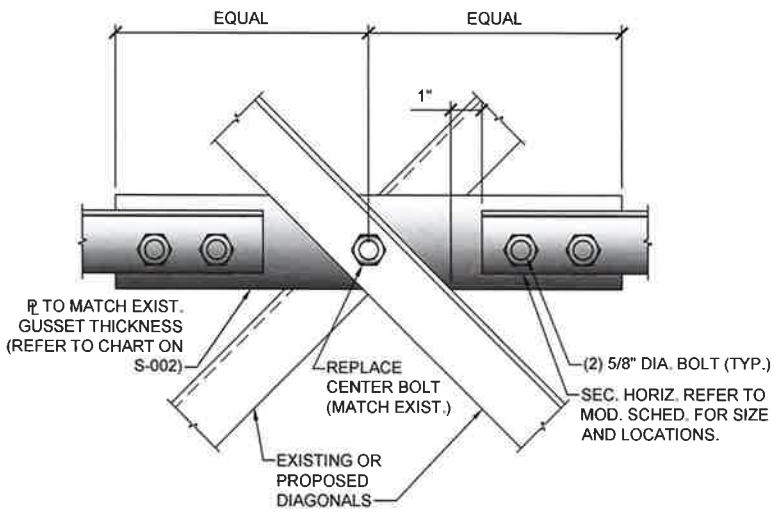
SSOE, Inc.
320 Seven Springs Way, Suite 350
Brentwood, TN 37027
T 615-661-7585

PROJECT NO: 015-00428-01
PROJECT MANAGER: F. WHITE
DESIGNED: J. THIBODAUX
CHECKED: B. BURGESS

DRAWING TITLE:
TOWER MODIFICATIONS

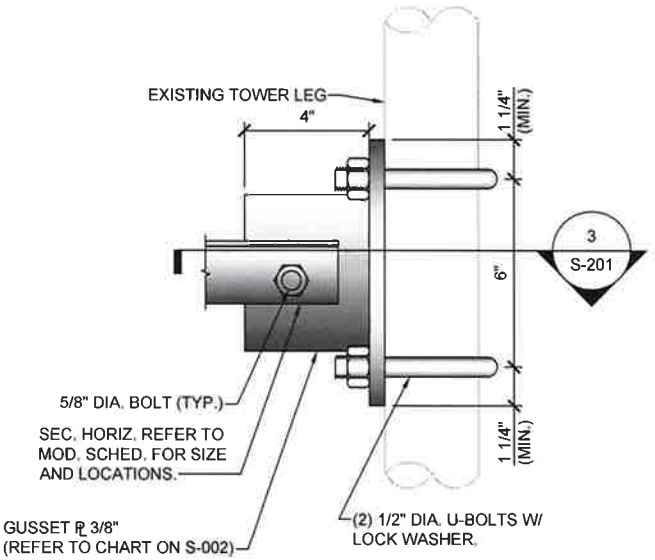
DRAWING NO:
S-200

C:\drgs\1525880804 806377 S-200 CAD Details.dwg



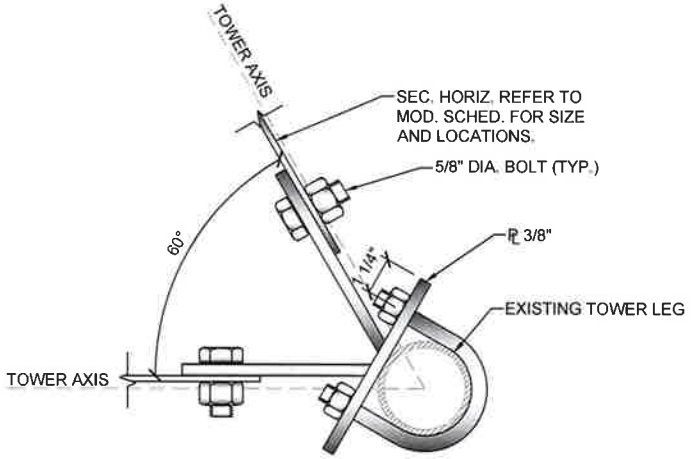
1 S-201 **DETAIL**

SCALE: 3"=1-0"



2 S-201 **DETAIL**

SCALE: 3"=1-0"



3 S-201 **SECTION**

SCALE: 3"=1-0"

SSOE®

STATE OF CONNECTICUT BARRY W. BURGESS NO. 26165 LICENSED PROFESSIONAL ENGINEER

5/15/15

PROJECT INFORMATION:

CROWN CASTLE USA
BU 806377
HRT 084 943242

WORK ORDER NO: 1059741

NO.	DATE	SUBJECT
0	05/15/15	ISSUE FOR CONST.

REVISION OR ISSUE

SSOE, Inc.
320 Seven Springs Way, Suite 350
Brentwood, TN 37027
T 615-661-7585

PROJECT NO: 015-00428-01
PROJECT MANAGER: F. WHITE
DESIGNED: J. THIBODAUX
CHECKED: B. BURGESS

DRAWING TITLE:
TOWER MODIFICATIONS

DRAWING NO:
S-201

C:\Admin\15258\804\806377 S-200 CAD Details.dwg