Robinson+Cole

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Also admitted in Massachusetts

August 30, 2016

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

Re: **Notice of Exempt Modification – Facility Modification**
68 Groton Long Point Road, Groton, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the top of the existing 140-foot tower at 68 Groton Long Point Road in Groton, Connecticut (the "Property"). The tower and underlying property are owned by the Town of Groton ("Town"). The Council approved Cellco's use of this tower in 1993. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with three (3) model SBNHH-1D65B, 700 MHz antennas; three (3) model SBNHH-1D65B, 1900 MHz antennas; and three (3) model SBNHH-1D65B, 2100 MHz antennas, all at the same level on the tower. Cellco also intends to replace three (3) remote radio heads ("RRHs") with three (3) newer model RRHs and install six (6) new RRHs and one (1) HYBRIFLEX™ fiber optic antenna cable. Included in Attachment 1 are specifications for Cellco's new 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 Mark R. Oefinger, Town Manager for the Town of Groton.

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

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

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

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

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

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

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

A copy of the Groton Assessor's Parcel Map and property owner information is included in Attachment 4.

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:
Mark R. Oefinger, Town Manager
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

SBNHH-1D65B

Multiband 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	1920–2200	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 (First Lobe), dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
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	1920–2200	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, beampeak to 20° above beampeak, 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 Type	Sector with internal RET
Band	Multiband
Brand	DualPol®
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground

Product Specifications

SBNHH-1D65B

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, frontal	618.0 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Loading, lateral	197.0 N @ 150 km/h 44.3 lbf @ 150 km/h
Wind Loading, rear	728.0 N @ 150 km/h 163.7 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Depth	180.0 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight, without mounting kit	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Internal RET	High band (1) | Low band (1)
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

Packed Dimensions

Depth	296.0 mm | 11.7 in
Length	2025.0 mm | 79.7 in
Width	390.0 mm | 15.4 in
Shipping Weight	31.0 kg | 68.3 lb

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

Product Specifications

SBNHH-1D65B

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.

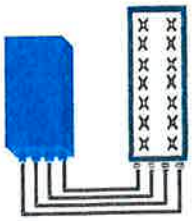
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

ALCATEL-LUCENT
WIRELESS PRODUCT DATASHEET
RRH2X60-1900A-4R FOR BAND 2/25 APPLICATIONS

The Alcatel-Lucent RRH2x60-1900A-4R is a high power, small form factor Remote Radio Head operating in the PCS 1900MHz frequency band for WCDMA and LTE technologies. 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 RRH2x60-1900A-4R is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-1900A-4R integrates all the latest technologies. This allows operators 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.

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

OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-1900A-4R 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).

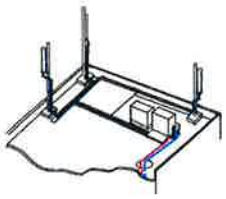
The Alcatel-Lucent RRH2x60-1900A-4R is a very cost-effective solution to deploy LTE MIMO.

EASY INSTALLATION

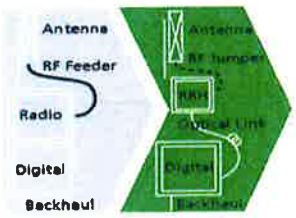
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-1900A-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-1900A-4R is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

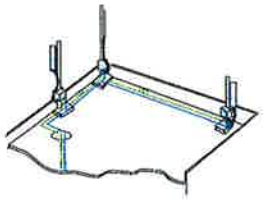
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-190A-4R is compact and weighs about 21 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-1900A-4R integrates two power amplifiers of 60W rating (at each antenna connector)
- RRH2x60-1900A-4R can operate WCDMA only, LTE only or a mix of WCDMA and LTE
- RRH2x60-1900A-4R offers the possibility for WCDMA (non MIMO) to operate the two radio chains independently (2 blocks of 20 MHz anywhere in the band)
- RRH2x60-1900A-4R is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

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

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

- HxWxD : 500x285x208 mm (30l with solar shield)
- Weight : 21 kg (46 lbs) (with solar shield)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption: 460W typ. @2x60W (100%RF)

RF Characteristics

- Supported spectrum: DL 1930-1990 / UL 1850-1910
- Frequency band: 3GPP band 2/25
- Output power: 2x60W at antenna connectors
- Technology supported: W-CDMA and LTE
- Instantaneous bandwidth: 20 MHz (MIMO) or 2x20 MHz (non MIMO)
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -124.8dBm for WCDMA and -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 15km 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: ETS300-019-1-4 class4.1E
- 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
- Safety : IEC60950-1, EN 60825-1
- Regulatory: CE Mark-European Directive 2002/95/EC (RoHS), 2002/96/EC (WEEE), 1999/5/EC (R&TTE)
- Health : EN 50385

Alcatel·Lucent

B66A RRH 4X45 - PHYSICAL CHARACTERISTICS- TARGET 15.1

B4 RRH4x45-4R (AWS-Extension Band)	
Frequency Band	LR15.1 – B4 / LR16.1 B66 (AWS 1 and 3 only)
RF Output Power	2x90W/4x45W (SW configurable)
Operational range	2110-2180 MHz, DL/ 1710-1780 MHz UL
Instantaneous Bandwidth	70MHz
Configuration (HW readiness)	LTE: 2T2R, 2T4R, 4T4R
Carrier Bandwidths	5, 10, 15 and 20 MHz
Interfaces	2x CPRI Rate 7 Ports Antenna Connectors 4.3-10
AISG Support	AISG 2.0 for RET Internal Smart Bias T
Monitor Ports	NA (Spec An to replace ports)
Environmental	GR487 Compliance / GR3178 Compliance (with exceptions)
Mounting options	Pole/Wall
Connectors location	All bottom
External Alarms	4
Annual Return Rate (Target)	<2%
Operating Temperature	-40 C to +55 C (without solar load)

- Commercial Product Will include B66 support of AWS 1 and 3.
- Lower AWS 3 UL Not in 3GPP Band 66 Definition

Physical Dimensions – Not to Exceed		
	W/O Solar Shield	With Solar Shield
Dimensions HxWxD	H = 26in (H=660mm) W = 11.4in (W=290mm) D = 5.9in (D=150mm)	H = 26.6in (H=675mm) W = 12in (W=304mm) D = 6.8n (D=173mm)
Volume	29l	35.5l
Weight		64lbs / 29kg

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

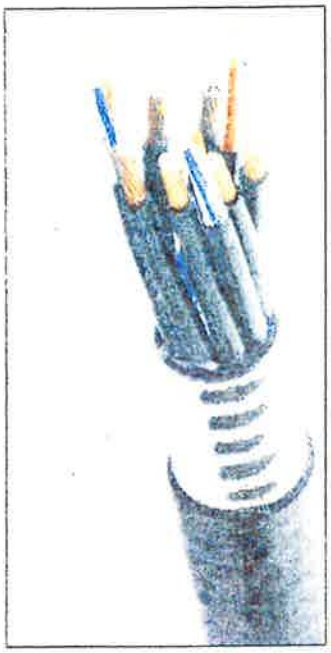


Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

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

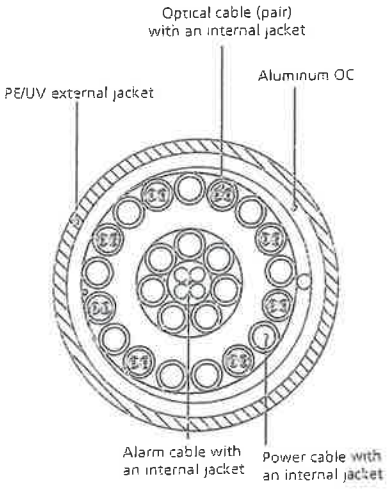


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Groton								
Tower Height: 140ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T	1	500	133	880	0.0111	0.5867	0.19%	
*AT&T	6	296	133	880	0.0396	0.5867	0.67%	
*AT&T	3	427	133	1900	0.0286	1.0000	0.29%	
*AT&T	1	500	133	740	0.0111	0.4933	0.23%	
*Municipal					0.0146	1.0000	0.15%	
*Municipal				460	0.0022	0.3067	0.07%	
Verizon PCS	**1**	**3215**	**142**	**0.0573**	**1970**	**1.0000**	**5.73%**	
Verizon Cellular	**9**	**233**	**142**	**0.0374**	**869**	**0.5793**	**6.45%**	
Verizon AWS	**1**	**1581**	**142**	**0.0282**	**2145**	**1.0000**	**2.82%**	
Verizon 700	**1**	**1050**	**142**	**0.0187**	**746**	**0.497333**	**3.76%**	
								20.37%
* Source: Siting Council								

ATTACHMENT 3

PJF PAUL J. FORD & COMPANY

Report Date: July 21, 2016

Client: On Air Engineering, LLC
88 Foundry Pond Road
Cold Spring, NY 10516
Attn: David Weinpahl, P.E.
Phone: 201.456.4624

Structure: Existing 140-ft Self Support Tower
Site Name: Groton CT
Site Address: 68 Groton Long Point Road
City, County, State: Groton, New London County, CT
Latitude, Longitude: 41° 20' 36.80" N, 72° 00' 34.80" W

PJF Project: 42916-0002.001.8700 Revision

Paul J. Ford and Company is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above mentioned tower. The purpose of this analysis is to determine the acceptability of the tower stress level.

Analysis Criteria:

Reference Standard: TIA/EIA-222-F Standard, "Structural Standard for Antenna Supporting Structures and Antennas" & 2005 CT State Building Code
Basic Wind Speed: 85 mph fastest mile wind speed without ice
Wind Speed with Ice: 74 mph fastest mile speed with 0.50" radial ice
Service Wind Speed: 50.0 mph (Operational) without ice

Proposed Appurtenance Loads:

The structure was analyzed with the addition of the proposed appurtenance loads shown in Table 1 combined with the existing loads shown in Table 2 of this report.

Summary of Analysis Results:

Existing Structure: Pass
Existing Foundation: Pass

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

Respectfully submitted by:

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Structural Designer
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STATE OF CONNECTICUT
JOSEPH PACHICARAHNACOBS
No. PEN 22731
LICENSED
PROFESSIONAL ENGINEER

JUL 20 2016

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1) INTRODUCTION

This tower is a 140-ft Self Support tower designed by Rohn. PJF was not provided the original manufacturer drawings. The geometry was obtained from the previous structural analysis.

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, 73.6 mph with 0.5 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
142.0	142.0	9	andrew	SBNHH-1D65B w/ Mount Pipe	1	Hybrid	-
		3	alcatel lucent	RRH2X60-700			
		3	alcatel lucent	RRH4x45-AWS			
		3	alcatel lucent	RRH2X60-PCS			
		1	raycap	DB-T1-6Z-8AB-0Z			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
142.0	142.0	3	amphenol	BXA-171063-8BF-EDIN-X w/ Mount Pipe	-	-	2
		3	amphenol	BXA-185090-8CF-EDIN-2 w/ Mount Pipe			
		3	alcatel lucent	RRH2X40-AWS			
		3	andrew	LNX-6512DS-T4M w/ Mount Pipe			
		3	amphenol	BXA-80080-4CF-EDIN-0 w/ Mount Pipe	12 1	1-5/8 Hybrid	1
		6	rfs	RFS FD9R6004/1C-3L			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount			
129.0	129.0	6	kmw communications	AM-X-CD-14-65-00T-RET w/ Mount Pipe	12 1 2	1-1/4 5/8 3/4	1
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	miscl	TMA			
		6	ericsson	RRU			
		1	raycap	DC6-48-60-18-8F			
		3	tower mounts	Sector Mount			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
121.0	121.0	1	decibel	DB212-2-A	1	7/8	1
119.0	119.0	1	decibel	DB212-2-A	-	-	1
104.0	104.0	1	decibel	DB212-2-A	1	7/8	1
101.0	112.0	1	decibel	DB540K-E	3 1	1-1/4 1-5/8	1
	111.0	1	celwave	PD220			
	108.0	1	decibel	DB810T3E-XT			
	101.0	1	celwave	PD1121			
		3	tower mounts	Generic 3.5' x 6' sidearm			
97.0	97.0	1	celwave	PD1121	-	-	1
		1	tower mounts	10' x 2" Sch 40 Pipe Mount			
96.0	96.0	1	decibel	DB212-2-A	-	-	1
90.0	90.0	1	decibel	DB212-2-A	1	7/8	1
68.0	68.0	1	decibel	DB212-2-A	-	-	1
67.0	94.0	1	decibel	DB810T3E-XT	1 1	1-5/8 1-1/4	1
	90.0	1	celwave	PD340-140			
	67.0	2	tower mounts	Generic 3.5' x 6' sidearm			
67.0	67.0	2	misc	obstruction lights	1	1/2	1
66.0	66.0	1	miscl	Camera - 12" T x 8" W x 8" L	2	3/4	1
58.0	58.0	1	microwave dishes	3' std w/ HP	1	1/2	1
54.0	65.0	3	celwave	PD220	3	7/8	1
	54.0	3	tower mounts	Generic 3.5' x 6' sidearm			
43.0	43.0	1	microwave dishes	2 ft standard	4	1/4	1
		1	miscl	TMA			
		1	miscl	panel			
		1	tower mounts	Generic 3' x 4' sidearm			
35.0	35.0	1	microwave dishes	2 ft standard	-	-	1
		1	miscl	TMA			
		1	tower mounts	Generic 3' x 4' sidearm			
33.0	43.0	1	generic	20 ft x 2" omni whip	1	7/8	1
	33.0	1	tower mounts	Generic 3.5' x 6' sidearm			

Notes:
1) Existing Equipment
2) Equipment to be removed; not considered

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference
Previous Tower Analysis	URS, 12/6/2012	36917393
Foundation Drawings	PJF, 6/2/1998	35131AE
Geotechnical Report	Deisser, 5/30/1998	L-155

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	140 - 120	Leg	Pipe 2.875" x 0.276" (2.5 EH)	1	-43.14	72.29	59.7	Pass
T2	120 - 100	Leg	Pipe 3.5" x 0.300" (3 EH)	37	-74.66	102.73	72.7	Pass
T3	100 - 80	Leg	Pipe 4.5" x 0.337" (4 EH)	70	-101.96	151.47	67.3	Pass
T4	80 - 60	Leg	Pipe 5.5" x 0.375" (5 EH)	97	-127.42	203.59	62.6	Pass
T5	60 - 40	Leg	Pipe 6.625" x 0.340" (6 EHS)	118	-153.52	236.42	64.9	Pass
T6	40 - 20	Leg	Pipe 6.625" x 0.432" (6 EH)	139	-178.68	295.25	60.5	Pass
T7	20 - 0	Leg	Pipe 8.625" x 0.375" (8 EHS)	160	-200.05	332.85	60.1	Pass
T1	140 - 120	Diagonal	L 2 x 2 x 1/4	14	-5.07	17.44	29.1	Pass
T2	120 - 100	Diagonal	L 2 x 2 x 1/4	44	-4.06	14.00	29.0	Pass
T3	100 - 80	Diagonal	L 2 x 2 x 1/4	77	-4.54	8.93	50.9	Pass
T4	80 - 60	Diagonal	L 2.5 x 2.5 x 1/4	104	-5.11	11.12	45.9	Pass
T5	60 - 40	Diagonal	L 2.5 x 2.5 x 1/4	125	-5.26	8.56	61.4	Pass
T6	40 - 20	Diagonal	L 3 x 3 x 1/4	146	-5.36	11.71	45.8	Pass
T7	20 - 0	Diagonal	L 3.5 x 3.5 x 1/4	164	-6.29	12.98	48.5	Pass
T1	140 - 120	Top Girt	L 2 x 2 x 1/4	5	-0.92	17.31	5.3	Pass
							Summary	
						Leg (T2)	72.7	Pass
						Diagonal (T5)	61.4	Pass
						Top Girt (T1)	5.3	Pass
						Bolt Checks	62.5	Pass
						RATING =	**72.7**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	-	48.5	Pass
1	Base Foundation Structural	-	30.9	Pass
1	Base Foundation Soil Interaction	-	64.5	Pass

Structure Rating (max from all components) =	72.7%

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 and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

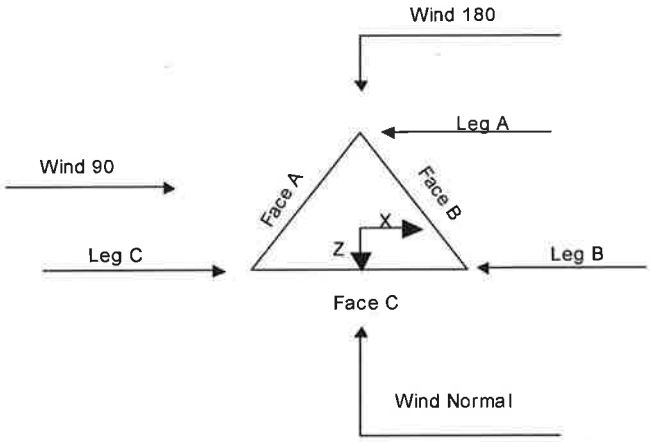
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 140.00 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 2.63 ft at the top and 16.85 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

1) Tower is located in New London County, Connecticut.
2) Basic wind speed of 85.00 mph.
3) Nominal ice thickness of 0.50 in.
4) Ice density of 56 pcf.
5) A wind speed of 73.61 mph is used in combination with ice.
6) Deflections calculated using a wind speed of 50.00 mph.
7) A non-linear (P-delta) analysis was used.
8) Pressures are calculated at each section.
9) Stress ratio used in tower member design is 1.333.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	140.00-120.00			2.63	1	20.00
T2	120.00-100.00			4.66	1	20.00
T3	100.00-80.00			6.69	1	20.00
T4	80.00-60.00			8.72	1	20.00
T5	60.00-40.00			10.75	1	20.00
T6	40.00-20.00			12.79	1	20.00
T7	20.00-0.00			14.82	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	140.00-120.00	3.98	X Brace	No	No	0.00	1.00
T2	120.00-100.00	3.97	X Brace	No	No	1.00	1.00
T3	100.00-80.00	4.96	X Brace	No	No	1.00	1.00
T4	80.00-60.00	6.61	X Brace	No	No	1.00	1.00
T5	60.00-40.00	6.61	X Brace	No	No	1.00	1.00
T6	40.00-20.00	6.61	X Brace	No	No	1.00	1.00
T7	20.00-0.00	9.96	X Brace	No	No	1.00	0.00

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 140.00-120.00	Pipe	Pipe 2.875" x 0.276" (2.5 EH)	A618-50 (50 ksi)	Equal Angle	L 2 x 2 x 1/4	A36 (36 ksi)
T2 120.00-100.00	Pipe	Pipe 3.5" x 0.300" (3 EH)	A618-50 (50 ksi)	Equal Angle	L 2 x 2 x 1/4	A36 (36 ksi)
T3 100.00-80.00	Pipe	Pipe 4.5" x 0.337" (4 EH)	A618-50 (50 ksi)	Equal Angle	L 2 x 2 x 1/4	A36 (36 ksi)
T4 80.00-60.00	Pipe	Pipe 5.5" x 0.375" (5 EH)	A618-50 (50 ksi)	Equal Angle	L 2.5 x 2.5 x 1/4	A36 (36 ksi)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T5 60.00-40.00	Pipe	Pipe 6.625" x 0.340" (6 EHS)	A618-50 (50 ksi)	Equal Angle	L 2.5 x 2.5 x 1/4	A36 (36 ksi)
T6 40.00-20.00	Pipe	Pipe 6.625" x 0.432" (6 EH)	A618-50 (50 ksi)	Equal Angle	L 3 x 3 x 1/4	A572-50 (50 ksi)
T7 20.00-0.00	Pipe	Pipe 8.625" x 0.375" (8 EHS)	A618-50 (50 ksi)	Equal Angle	L 3.5 x 3.5 x 1/4	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 140.00-120.00	Equal Angle	L 2 x 2 x 1/4	A36 (36 ksi)	Single Angle		A36 (36 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	Double Angle Stitch Bolt Spacing Redundants in
T1 140.00-120.00	0.00	0.25	A36 (36 ksi)	1	1	1.1	Mid-Pt	Mid-Pt	Mid-Pt
T2 120.00-100.00	0.00	0.25	A36 (36 ksi)	1	1	1.1	Mid-Pt	Mid-Pt	Mid-Pt
T3 100.00-80.00	0.00	0.25	A36 (36 ksi)	1	1	1.1	Mid-Pt	Mid-Pt	Mid-Pt
T4 80.00-60.00	0.00	0.25	A36 (36 ksi)	1	1	1.1	Mid-Pt	Mid-Pt	Mid-Pt
T5 60.00-40.00	0.00	0.25	A36 (36 ksi)	1	1	1.1	Mid-Pt	Mid-Pt	Mid-Pt
T6 40.00-20.00	0.00	0.25	A36 (36 ksi)	1	1	1.1	Mid-Pt	Mid-Pt	Mid-Pt
T7 20.00-0.00	0.00	0.38	A36 (36 ksi)	1	1	1.1	Mid-Pt	Mid-Pt	Mid-Pt

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 140.00-120.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 120.00-100.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 100.00-80.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 80.00-60.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 60.00-40.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 40.00-20.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 20.00-0.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		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 140.00-120.00	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
T2 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
T3 100.00-80.00	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
T4 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
T5 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
T6 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
T7 20.00-0.00	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 140.00-120.00	Flange	0.88 A325N	4	0.63 A325N	1	0.63 A325N	1	0.50 A325N	0	0.50 A325N	0	0.50 A325N	0	0.50 A325N	0
T2 120.00-100.00	Flange	1.00 A325N	4	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T3 100.00-80.00	Flange	1.00 A325N	4	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T4 80.00-60.00	Flange	1.00 A325N	6	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T5 60.00-40.00	Flange	1.00 A325N	6	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T6 40.00-20.00	Flange	1.00 A325N	8	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T7 20.00-0.00	Flange	1.00 A354-BC	8	0.75 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	0 Diagonal ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF6-50 (1 1/4" foam) ****	B	Yes	Ar (CfAe)	129.00 - 6.00	3.00	-0.3	12	12	1.55 0.50	1.55		0.66
LDF7-50A (1 5/8" foam) ****	A	Yes	Ar (CfAe)	140.00 - 6.00	3.00	-0.3	14	7	1.00 0.50	1.98		0.92
LDF5-50A (7/8" foam)	C	Yes	Ar (CfAe)	121.00 - 6.00	3.00	-0.34	1	1	1.09 0.50	1.09		0.33
LDF5-50A (7/8" foam)	C	Yes	Ar (CfAe)	104.00 - 6.00	3.00	-0.355	1	1	1.09 0.50	1.09		0.33
LDF6-50 (1 1/4" foam)	C	Yes	Ar (CfAe)	101.00 - 6.00	3.00	-0.28	3	3	1.55 0.50	1.55		0.66
LDF7-50A (1 5/8" foam)	C	Yes	Ar (CfAe)	101.00 - 6.00	3.00	-0.38	2	2	1.00 0.50	1.98		0.92
LDF5-50A (7/8" foam)	C	Yes	Ar (CfAe)	90.00 - 6.00	3.00	-0.325	1	1	1.09 0.50	1.09		0.33
LDF7-50A (1	C	Yes	Ar (CfAe)	94.00 - 6.00	3.00	-0.38	1	1	1.00	1.98		0.92

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
5/8" foam)									0.50			
LDF6-50 (1 1/4" foam)	C	Yes	Ar (CfAe)	90.00 - 6.00	3.00	-0.28	1	1	1.55 0.50	1.55		0.66
LDF4-50A (1/2" foam)	C	Yes	Ar (CfAe)	67.00 - 6.00	3.00	-0.24	1	1	0.63 0.50	0.63		0.15
1 1/4" Rigid Conduit (1" EMT)	C	Yes	Ar (CfAe)	66.00 - 6.00	-3.00	-0.3	2	2	1.16 0.50	1.16		0.67
LDF4-50A (1/2" foam)	C	Yes	Ar (CfAe)	58.00 - 6.00	3.00	-0.23	1	1	0.63 0.50	0.63		0.15
LDF5-50A (7/8" foam)	C	Yes	Ar (CfAe)	54.00 - 6.00	3.00	-0.415	3	3	1.09 0.50	1.09		0.33
LDF1-50A(1/4")	C	Yes	Ar (CfAe)	43.00 - 6.00	-3.00	-0.305	4	4	0.34 0.50	0.34		0.06
LDF5-50A (7/8" foam) ****	C	Yes	Ar (CfAe)	33.00 - 6.00	3.00	-0.44	1	1	1.09 0.50	1.09		0.33
LDF4-50A (1/2" foam) ****	C	Yes	Ar (CfAe)	140.00 - 6.00	3.00	-0.23	1	1	0.63 0.50	0.63		0.15
LDF4.5-50 (5/8" foam)	B	Yes	Ar (CfAe)	129.00 - 6.00	3.00	-0.4	1	1	0.86 0.50	0.86		0.15
RLSS 8AWG DC(3/4")	B	Yes	Ar (CfAe)	129.00 - 6.00	3.00	-0.42	2	2	0.73 0.50	0.73		0.49
HB158-1-08U8-S8F18(1 5/8") ****	A	Yes	Ar (CfAe)	60.00 - 6.00	3.00	-0.375	1	1	1.00 0.50	1.98		1.70
1.5" flat Cable Ladder Rail	A	Yes	Af (CfAe)	140.00 - 6.00	0.00	-0.35	2	2	36.00 0.50	1.50	6.00	1.80
1.5" flat Cable Ladder Rail	B	Yes	Af (CfAe)	129.00 - 6.00	0.00	-0.35	2	2	36.00 0.50	1.50	6.00	1.80
1.5" flat Cable Ladder Rail ****	C	Yes	Af (CfAe)	140.00 - 6.00	0.00	-0.35	2	2	36.00 0.50	1.50	6.00	1.80

Discrete Tower Loads

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
5/8" X 6' Lightning Rod	C	From Leg	0.00 0.00 3.00	0.000	145.00	No Ice 1/2" Ice	0.38 0.99	0.38 0.99	0.01 0.01
Flash Beacon Lighting ****	C	None		0.000	145.00	No Ice 1/2" Ice	2.70 3.10	2.70 3.10	0.05 0.07
Platform Mount [LP 602-1]	C	None		0.000	142.00	No Ice 1/2" Ice	32.03 38.71	32.03 38.71	1.34 1.80
BXA-80080-4CF-EDIN-4 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	142.00	No Ice 1/2" Ice	3.93 4.36	3.97 4.58	0.03 0.07
BXA-80080-4CF-EDIN-4 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	142.00	No Ice 1/2" Ice	3.93 4.36	3.97 4.58	0.03 0.07
BXA-80080-4CF-EDIN-4	C	From Leg	4.00	0.000	142.00	No Ice	3.93	3.97	0.03

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*
w/ Mount Pipe			0.00			1/2"	4.36	4.58	0.07
			0.00			Ice			
(2) RFS FD9R6004/1C-3L	A	From Leg	4.00	0.000	142.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			0.00			Ice			
(2) RFS FD9R6004/1C-3L	B	From Leg	4.00	0.000	142.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			0.00			Ice			
(2) RFS FD9R6004/1C-3L	C	From Leg	4.00	0.000	142.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			0.00			Ice			
DB-T1-6Z-8AB-0Z	C	From Leg	4.00	0.000	142.00	No Ice	5.60	2.33	0.04
			0.00			1/2"	5.92	2.56	0.08
			0.00			Ice			
(3) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00	0.000	142.00	No Ice	8.65	7.42	0.08
			0.00			1/2"	9.28	8.45	0.15
			0.00			Ice			
(3) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00	0.000	142.00	No Ice	8.65	7.42	0.08
			0.00			1/2"	9.28	8.45	0.15
			0.00			Ice			
(3) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00	0.000	142.00	No Ice	8.65	7.42	0.08
			0.00			1/2"	9.28	8.45	0.15
			0.00			Ice			
(3) RRH2X60-PCS	A	From Leg	4.00	0.000	142.00	No Ice	2.57	2.01	0.06
			0.00			1/2"	2.79	2.22	0.08
			0.00			Ice			
(3) RRH2x60-700	B	From Leg	4.00	0.000	142.00	No Ice	3.96	1.82	0.06
			0.00			1/2"	4.27	2.08	0.08
			0.00			Ice			
(3) RRH4x45-AWS	C	From Leg	4.00	0.000	142.00	No Ice	3.01	1.83	0.07
			0.00			1/2"	3.26	2.05	0.09
			0.00			Ice			
DB-T1-6Z-8AB-0Z	C	From Leg	4.00	0.000	142.00	No Ice	5.60	2.33	0.04
			0.00			1/2"	5.92	2.56	0.08
			0.00			Ice			
****									
(2) AM-X-CD-14-65-00T-RET w/ Mount Pipe	A	From Leg	4.00	0.000	129.00	No Ice	5.74	4.02	0.05
			0.00			1/2"	6.20	4.63	0.10
			0.00			Ice			
(2) AM-X-CD-14-65-00T-RET w/ Mount Pipe	B	From Leg	4.00	0.000	129.00	No Ice	5.74	4.02	0.05
			0.00			1/2"	6.20	4.63	0.10
			0.00			Ice			
(2) AM-X-CD-14-65-00T-RET w/ Mount Pipe	C	From Leg	4.00	0.000	129.00	No Ice	5.74	4.02	0.05
			0.00			1/2"	6.20	4.63	0.10
			0.00			Ice			
7770.00 w/ Mount Pipe	A	From Leg	4.00	0.000	129.00	No Ice	6.22	4.82	0.09
			0.00			1/2"	6.71	5.51	0.14
			0.00			Ice			
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.000	129.00	No Ice	6.22	4.82	0.09
			0.00			1/2"	6.71	5.51	0.14
			0.00			Ice			
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.000	129.00	No Ice	6.22	4.82	0.09
			0.00			1/2"	6.71	5.51	0.14
			0.00			Ice			
(2) RRU-11	A	From Leg	4.00	0.000	129.00	No Ice	1.91	1.47	0.04
			0.00			1/2"	2.10	1.65	0.06
			0.00			Ice			
(2) RRU-11	B	From Leg	4.00	0.000	129.00	No Ice	1.91	1.47	0.04
			0.00			1/2"	2.10	1.65	0.06
			0.00			Ice			
(2) RRU-11	C	From Leg	4.00	0.000	129.00	No Ice	1.91	1.47	0.04
			0.00			1/2"	2.10	1.65	0.06
			0.00			Ice			
(2) TMA (10" x 10" x 3.5")	A	From Leg	4.00	0.000	129.00	No Ice	0.97	0.34	0.02
			0.00			1/2"	1.11	0.43	0.02

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert ft ft ft*	*Azimuth Adjustment ° ft*	*Placement*		*C_AA_A Front* ft^2	*C_AA_A Side* ft^2	*Weight* K
			0.00			Ice			
(2) TMA (10" x 10" x 3.5")	B	From Leg	4.00	0.000	129.00	No Ice	0.97	0.34	0.02
			0.00			1/2"	1.11	0.43	0.02
			0.00			Ice			
(2) TMA (10" x 10" x 3.5")	C	From Leg	4.00	0.000	129.00	No Ice	0.97	0.34	0.02
			0.00			1/2"	1.11	0.43	0.02
			0.00			Ice			
DC6-48-60-18-8F	C	From Leg	4.00	0.000	129.00	No Ice	1.47	1.47	0.02
			0.00			1/2"	1.67	1.67	0.04
			0.00			Ice			
Sector Mount [SM 502-3]	C	From Leg	4.00	0.000	129.00	No Ice	33.02	33.02	1.67
			0.00			1/2"	47.36	47.36	2.22
			0.00			Ice			
****									
DB212-2-A	A	From Leg	2.00	0.000	121.00	No Ice	4.00	4.00	0.03
			0.00			1/2"	8.02	8.02	0.07
			0.00			Ice			
DB212-2-A	C	From Leg	2.00	0.000	119.00	No Ice	4.00	4.00	0.03
			0.00			1/2"	8.02	8.02	0.07
			0.00			Ice			
DB540K-E	C	From Leg	6.00	0.000	112.00	No Ice	4.50	4.50	0.07
			0.00			1/2"	6.33	6.33	0.10
			0.00			Ice			
PD220	A	From Leg	6.00	0.000	111.00	No Ice	3.56	3.56	0.02
			0.00			1/2"	7.13	7.13	0.05
			0.00			Ice			
DB810T3E-XT	B	From Leg	6.00	0.000	108.00	No Ice	4.53	4.53	0.05
			0.00			1/2"	6.07	6.07	0.08
			0.00			Ice			
DB212-2-A	C	From Leg	6.00	0.000	104.00	No Ice	4.00	4.00	0.03
			0.00			1/2"	8.02	8.02	0.07
			0.00			Ice			
PD1121	C	From Leg	6.00	0.000	101.00	No Ice	0.41	0.41	0.00
			0.00			1/2"	1.52	1.52	0.01
			0.00			Ice			
Generic 3.5' x 6' sidearm	A	From Leg	3.00	0.000	101.00	No Ice	3.00	6.00	0.40
			0.00			1/2"	4.00	7.50	0.45
			0.00			Ice			
Generic 3.5' x 6' sidearm	B	From Leg	3.00	0.000	101.00	No Ice	3.00	6.00	0.40
			0.00			1/2"	4.00	7.50	0.45
			0.00			Ice			
Generic 3.5' x 6' sidearm	C	From Leg	3.00	0.000	101.00	No Ice	3.00	6.00	0.40
			0.00			1/2"	4.00	7.50	0.45
			0.00			Ice			
****									
10' x 2" Sch 40 Pipe Mount	C	From Leg	6.00	0.000	97.00	No Ice	2.38	2.38	0.04
			0.00			1/2"	3.40	3.40	0.05
			0.00			Ice			
PD1121	C	From Leg	6.00	0.000	97.00	No Ice	0.41	0.41	0.00
			0.00			1/2"	1.52	1.52	0.01
			0.00			Ice			
**									
DB212-2-A	A	From Leg	1.00	0.000	96.00	No Ice	4.00	4.00	0.03
			0.00			1/2"	8.02	8.02	0.07
			0.00			Ice			
DB810T3E-XT	B	From Leg	1.00	0.000	94.00	No Ice	4.53	4.53	0.05
			0.00			1/2"	6.07	6.07	0.08
			0.00			Ice			
PD340-140	A	From Leg	6.00	0.000	90.00	No Ice	5.36	5.36	0.04
			0.00			1/2"	8.72	8.72	0.07
			0.00			Ice			
DB212-2-A	C	From Leg	1.00	0.000	90.00	No Ice	4.00	4.00	0.03
			0.00			1/2"	8.02	8.02	0.07
			0.00			Ice			
DB212-2-A	C	From Leg	1.00	0.000	68.00	No Ice	4.00	4.00	0.03

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral ft* / *Vert ft* / *ft*	*Azimuth Adjustment °*	*Placement ft*		*C_AA_A Front ft^2*	*C_AA_A Side ft^2*	*Weight K*
			0.00			1/2" Ice	8.02	8.02	0.07
			0.00						
Obstruction light	B	From Leg	0.50	0.000	67.00	No Ice	0.80	0.80	0.01
			0.00			1/2" Ice	0.94	0.94	0.02
			0.00						
Obstruction light	C	From Leg	0.50	0.000	67.00	No Ice	0.80	0.80	0.01
			0.00			1/2" Ice	0.94	0.94	0.02
			0.00						
Generic 3.5' x 6' sidearm	B	From Leg	1.00	0.000	67.00	No Ice	3.00	6.00	0.40
			0.00			1/2" Ice	4.00	7.50	0.45
			0.00						
Generic 3.5' x 6' sidearm	C	From Leg	1.00	0.000	67.00	No Ice	3.00	6.00	0.40
			0.00			1/2" Ice	4.00	7.50	0.45
			0.00						
****									
Camera - 12" T x 8" W x 8" L	B	From Leg	1.00	0.000	66.00	No Ice	0.93	0.93	0.01
			0.00			1/2" Ice	1.07	1.07	0.02
			0.00						
**									
PD220	A	From Leg	6.00	0.000	65.00	No Ice	3.56	3.56	0.02
			0.00			1/2" Ice	7.13	7.13	0.05
			0.00						
PD220	B	From Leg	6.00	0.000	65.00	No Ice	3.56	3.56	0.02
			0.00			1/2" Ice	7.13	7.13	0.05
			0.00						
PD220	C	From Leg	6.00	0.000	65.00	No Ice	3.56	3.56	0.02
			0.00			1/2" Ice	7.13	7.13	0.05
			0.00						
Generic 3.5' x 6' sidearm	A	From Leg	3.00	0.000	54.00	No Ice	3.00	6.00	0.40
			0.00			1/2" Ice	4.00	7.50	0.45
			0.00						
Generic 3.5' x 6' sidearm	B	From Leg	3.00	0.000	54.00	No Ice	3.00	6.00	0.40
			0.00			1/2" Ice	4.00	7.50	0.45
			0.00						
Generic 3.5' x 6' sidearm	C	From Leg	3.00	0.000	54.00	No Ice	3.00	6.00	0.40
			0.00			1/2" Ice	4.00	7.50	0.45
			0.00						
****									
20 ft x 2" omni whip	A	From Leg	6.00	0.000	43.00	No Ice	4.07	4.07	0.04
			0.00			1/2" Ice	6.13	6.13	0.07
			0.00						
Generic 3' x 4' sidearm	B	From Leg	3.00	0.000	43.00	No Ice	1.50	3.00	0.19
			0.00			1/2" Ice	3.00	4.00	0.28
			0.00						
TMA (10" x 10" x 3.5")	B	From Leg	2.00	0.000	43.00	No Ice	0.97	0.34	0.02
			0.00			1/2" Ice	1.11	0.43	0.02
			0.00						
TMA (10" x 10" x 3.5")	B	From Leg	2.00	0.000	41.50	No Ice	0.97	0.34	0.02
			0.00			1/2" Ice	1.11	0.43	0.02
			0.00						
TMA (10" x 10" x 3.5")	B	From Leg	2.00	0.000	47.00	No Ice	0.97	0.34	0.02
			0.00			1/2" Ice	1.11	0.43	0.02
			0.00						
Generic 3' x 4' sidearm	B	From Leg	3.00	0.000	37.00	No Ice	1.50	3.00	0.19
			0.00			1/2" Ice	3.00	4.00	0.28
			0.00						
Generic 3.5' x 6' sidearm	B	From Leg	3.00	0.000	33.00	No Ice	3.00	6.00	0.40
			0.00			1/2" Ice	4.00	7.50	0.45
			0.00						
****									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
3' std w/ HP	B	Paraboloid w/Shroud (HP)	From Leg	2.00 0.00 0.00	0.000		58.00	3.00	No Ice 1/2" Ice	7.07 7.47	0.10 0.14
2 ft standard	B	Paraboloid w/o Radome	From Leg	2.00 0.00 0.00	0.000		43.00	2.00	No Ice 1/2" Ice	3.14 3.41	0.01 0.06
2 ft standard	B	Paraboloid w/o Radome	From Leg	2.00 0.00 0.00	0.000		35.00	2.00	No Ice 1/2" Ice	3.14 3.41	0.01 0.06
*****											

Load Combinations

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

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	23	206.08	17.81	-10.23
	Max. H_x	23	206.08	17.81	-10.23

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. H_z	4	-170.34	-15.27	8.72
	Min. Vert	4	-170.34	-15.27	8.72
	Min. H_x	4	-170.34	-15.27	8.72
	Min. H_z	23	206.08	17.81	-10.23
Leg B	Max. Vert	19	204.70	-17.86	-10.11
	Max. H_x	12	-171.71	15.44	8.69
	Max. H_z	12	-171.71	15.44	8.69
	Min. Vert	12	-171.71	15.44	8.69
	Min. H_x	19	204.70	-17.86	-10.11
	Min. H_z	19	204.70	-17.86	-10.11
Leg A	Max. Vert	15	203.51	-0.13	20.49
	Max. H_x	24	15.74	1.66	1.29
	Max. H_z	15	203.51	-0.13	20.49
	Min. Vert	8	-172.01	0.10	-17.61
	Min. H_x	18	15.08	-1.66	1.18
	Min. H_z	8	-172.01	0.10	-17.61

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	140 - 120	4.41	35	0.366	0.080
T2	120 - 100	2.98	35	0.294	0.051
T3	100 - 80	1.91	35	0.206	0.028
T4	80 - 60	1.16	35	0.144	0.014
T5	60 - 40	0.63	35	0.099	0.008
T6	40 - 20	0.28	35	0.058	0.003
T7	20 - 0	0.08	35	0.027	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
145.00	5/8" X 6' Lightning Rod	35	4.41	0.366	0.080	40426
142.00	Platform Mount [LP 602-1]	35	4.41	0.366	0.080	40426
129.00	(2) AM-X-CD-14-65-00T-RET w/ Mount Pipe	35	3.59	0.329	0.064	18375
121.00	DB212-2-A	35	3.04	0.298	0.053	10979
119.00	DB212-2-A	35	2.92	0.290	0.050	10623
112.00	DB540K-E	35	2.51	0.258	0.041	11936
111.00	PD220	35	2.45	0.254	0.040	12213
108.00	DB810T3E-XT	35	2.29	0.240	0.036	13125
104.00	DB212-2-A	35	2.10	0.223	0.032	14574
101.00	PD1121	35	1.96	0.210	0.029	15765
97.00	10' x 2" Sch 40 Pipe Mount	35	1.78	0.195	0.025	16947
96.00	DB212-2-A	35	1.74	0.191	0.024	17165
94.00	DB810T3E-XT	35	1.66	0.184	0.023	17586
90.00	PD340-140	35	1.50	0.171	0.020	18488
68.00	DB212-2-A	35	0.82	0.116	0.010	24950
67.00	Obstruction light	35	0.79	0.114	0.009	25322
66.00	Camera - 12" T x 8" W x 8" L	35	0.77	0.111	0.009	25706
65.00	PD220	35	0.74	0.109	0.009	26101
58.00	3' std w/ HP	35	0.59	0.094	0.007	28699
54.00	Generic 3.5' x 6' sidearm	35	0.51	0.086	0.006	29726
47.00	TMA (10" x 10" x 3.5")	35	0.38	0.072	0.005	31617
43.00	2 ft standard	35	0.32	0.064	0.004	32785
41.50	TMA (10" x 10" x 3.5")	35	0.30	0.061	0.003	33144
37.00	Generic 3' x 4' sidearm	35	0.24	0.053	0.003	33254
35.00	2 ft standard	35	0.21	0.050	0.002	32964
33.00	Generic 3.5' x 6' sidearm	35	0.19	0.047	0.002	32655

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	140 - 120	12.36	10	1.001	0.232
T2	120 - 100	8.43	10	0.814	0.151
T3	100 - 80	5.46	23	0.580	0.086
T4	80 - 60	3.33	23	0.408	0.043
T5	60 - 40	1.82	23	0.282	0.022
T6	40 - 20	0.81	23	0.168	0.009
T7	20 - 0	0.22	23	0.078	0.003

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
145.00	5/8" X 6' Lightning Rod	10	12.36	1.001	0.232	15808
142.00	Platform Mount [LP 602-1]	10	12.36	1.001	0.232	15808
129.00	(2) AM-X-CD-14-65-00T-RET w/ Mount Pipe	10	10.12	0.904	0.186	7185
121.00	DB212-2-A	10	8.61	0.825	0.155	4288
119.00	DB212-2-A	10	8.25	0.803	0.148	4138
112.00	DB540K-E	10	7.11	0.721	0.123	4556
111.00	PD220	10	6.96	0.708	0.120	4645
108.00	DB810T3E-XT	23	6.52	0.672	0.110	4934
104.00	DB212-2-A	23	5.97	0.625	0.097	5379
101.00	PD1121	23	5.59	0.591	0.088	5738
97.00	10' x 2" Sch 40 Pipe Mount	23	5.09	0.549	0.077	6111
96.00	DB212-2-A	23	4.98	0.539	0.075	6186
94.00	DB810T3E-XT	23	4.75	0.520	0.070	6332
90.00	PD340-140	23	4.31	0.485	0.061	6645
68.00	DB212-2-A	23	2.36	0.330	0.029	8888
67.00	Obstruction light	23	2.29	0.324	0.028	9018
66.00	Camera - 12" T x 8" W x 8" L	23	2.22	0.318	0.027	9151
65.00	PD220	23	2.15	0.312	0.026	9288
58.00	3' std w/ HP	23	1.70	0.270	0.021	10180
54.00	Generic 3.5' x 6' sidearm	23	1.47	0.246	0.018	10524
47.00	TMA (10" x 10" x 3.5")	23	1.11	0.206	0.013	11117
43.00	2 ft standard	23	0.93	0.184	0.011	11479
41.50	TMA (10" x 10" x 3.5")	23	0.87	0.176	0.010	11586
37.00	Generic 3' x 4' sidearm	23	0.69	0.153	0.008	11584
35.00	2 ft standard	23	0.62	0.143	0.007	11470
33.00	Generic 3.5' x 6' sidearm	23	0.55	0.134	0.006	11351

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	140	Leg	A325N	0.88	4	10.17	26.40	0.385 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.63	1	5.07	6.44	0.788 ✔	1.333	Bolt Shear
		Top Girt	A325N	0.63	1	0.92	6.44	0.142 ✔	1.333	Bolt Shear
T2	120	Leg	A325N	1.00	4	17.22	34.50	0.499 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.63	1	4.30	6.44	0.668 ✔	1.333	Bolt Shear
T3	100	Leg	A325N	1.00	4	23.33	34.48	0.677 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.63	1	4.59	6.44	0.712 ✔	1.333	Bolt Shear
T4	80	Leg	A325N	1.00	6	19.05	34.51	0.552 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.63	1	5.11	6.44	0.792 ✔	1.333	Bolt Shear
T5	60	Leg	A325N	1.00	6	22.41	34.50	0.650 ✔	1.333	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325N	0.63	1	5.26	6.44	0.816 ✓	1.333	Bolt Shear
T6	40	Leg	A325N	1.00	8	19.27	34.52	0.558 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.63	1	5.37	6.44	0.834 ✓	1.333	Bolt Shear
T7	20	Leg	A354-BC	1.00	8	20.93	32.40	0.646 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.75	1	6.29	9.28	0.678 ✓	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	140 - 120	Pipe 2.875" x 0.276" (2.5 EH)	20.03	3.99	51.8 K=1.00	24.06	2.25	-43.14	54.23	0.796 ✓
T2	120 - 100	Pipe 3.5" x 0.300" (3 EH)	20.03	3.97	42.0 K=1.00	25.55	3.02	-74.66	77.07	0.969 ✓
T3	100 - 80	Pipe 4.5" x 0.337" (4 EH)	20.03	4.97	40.4 K=1.00	25.78	4.41	-101.96	113.63	0.897 ✓
T4	80 - 60	Pipe 5.5" x 0.375" (5 EH)	20.03	6.62	43.7 K=1.00	25.30	6.04	-127.42	152.73	0.834 ✓
T5	60 - 40	Pipe 6.625" x 0.340" (6 EHS)	20.03	6.62	35.7 K=1.00	26.42	6.71	-153.52	177.36	0.866 ✓
T6	40 - 20	Pipe 6.625" x 0.432" (6 EH)	20.03	6.62	36.2 K=1.00	26.35	8.40	-178.68	221.49	0.807 ✓
T7	20 - 0	Pipe 8.625" x 0.375" (8 EHS)	20.03	9.98	41.0 K=1.00	25.69	9.72	-200.05	249.70	0.801 ✓

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 P / P_a
T1	140 - 120	L 2 x 2 x 1/4	5.68	2.70	92.2 K=1.11	13.95	0.94	-5.07	13.08	0.388 ✓
T2	120 - 100	L 2 x 2 x 1/4	7.60	3.63	113.5 K=1.02	11.20	0.94	-4.06	10.50	0.386 ✓
T3	100 - 80	L 2 x 2 x 1/4	9.81	4.71	144.6 K=1.00	7.14	0.94	-4.54	6.70	0.679 ✓
T4	80 - 60	L 2.5 x 2.5 x 1/4	12.33	5.97	146.0 K=1.00	7.01	1.19	-5.11	8.34	0.612 ✓
T5	60 - 40	L 2.5 x 2.5 x 1/4	14.09	6.80	166.3 K=1.00	5.40	1.19	-5.26	6.42	0.818 ✓
T6	40 - 20	L 3 x 3 x 1/4	15.92	7.72	156.5 K=1.00	6.10	1.44	-5.36	8.78	0.610 ✓
T7	20 - 0	L 3.5 x 3.5 x 1/4	19.14	9.31	161.0 K=1.00	5.76	1.69	-6.29	9.74	0.646 ✓

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	140 - 120	L 2 x 2 x 1/4	2.63	2.15	93.0 K=1.41	13.84	0.94	-0.92	12.99	0.071 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	140 - 120	Pipe 2.875" x 0.276" (2.5 EH)	20.03	0.08	1.1	30.00	2.25	40.69	67.61	0.602 ✔
T2	120 - 100	Pipe 3.5" x 0.300" (3 EH)	20.03	0.08	0.9	30.00	3.02	68.88	90.48	0.761 ✔
T3	100 - 80	Pipe 4.5" x 0.337" (4 EH)	20.03	0.08	0.7	30.00	4.41	93.32	132.22	0.706 ✔
T4	80 - 60	Pipe 5.5" x 0.375" (5 EH)	20.03	0.08	0.6	30.00	6.04	114.28	181.13	0.631 ✔
T5	60 - 40	Pipe 6.625" x 0.340" (6 EHS)	20.03	0.08	0.5	30.00	6.71	134.47	201.40	0.668 ✔
T6	40 - 20	Pipe 6.625" x 0.432" (6 EH)	20.03	0.08	0.5	30.00	8.40	154.14	252.15	0.611 ✔
T7	20 - 0	Pipe 8.625" x 0.375" (8 EHS)	20.03	9.98	41.0	30.00	9.72	167.44	291.58	0.574 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	140 - 120	L 2 x 2 x 1/4	5.68	2.70	55.6	29.00	0.56	4.73	16.32	0.290 ✔
T2	120 - 100	L 2 x 2 x 1/4	6.28	2.98	61.1	29.00	0.56	4.03	16.32	0.247 ✔
T3	100 - 80	L 2 x 2 x 1/4	9.38	4.50	91.0	29.00	0.56	4.50	16.32	0.275 ✔
T4	80 - 60	L 2.5 x 2.5 x 1/4	12.33	5.97	95.1	29.00	0.75	4.97	21.80	0.228 ✔
T5	60 - 40	L 2.5 x 2.5 x 1/4	14.09	6.80	108.1	29.00	0.75	5.13	21.80	0.235 ✔
T6	40 - 20	L 3 x 3 x 1/4	14.71	7.12	93.4	32.50	0.94	5.25	30.53	0.172 ✔
T7	20 - 0	L 3.5 x 3.5 x 1/4	19.14	9.31	104.0	32.50	1.10	5.94	35.86	0.166 ✔

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	140 - 120	L 2 x 2 x 1/4	2.63	2.15	47.1	29.00	0.56	0.87	16.32	0.053

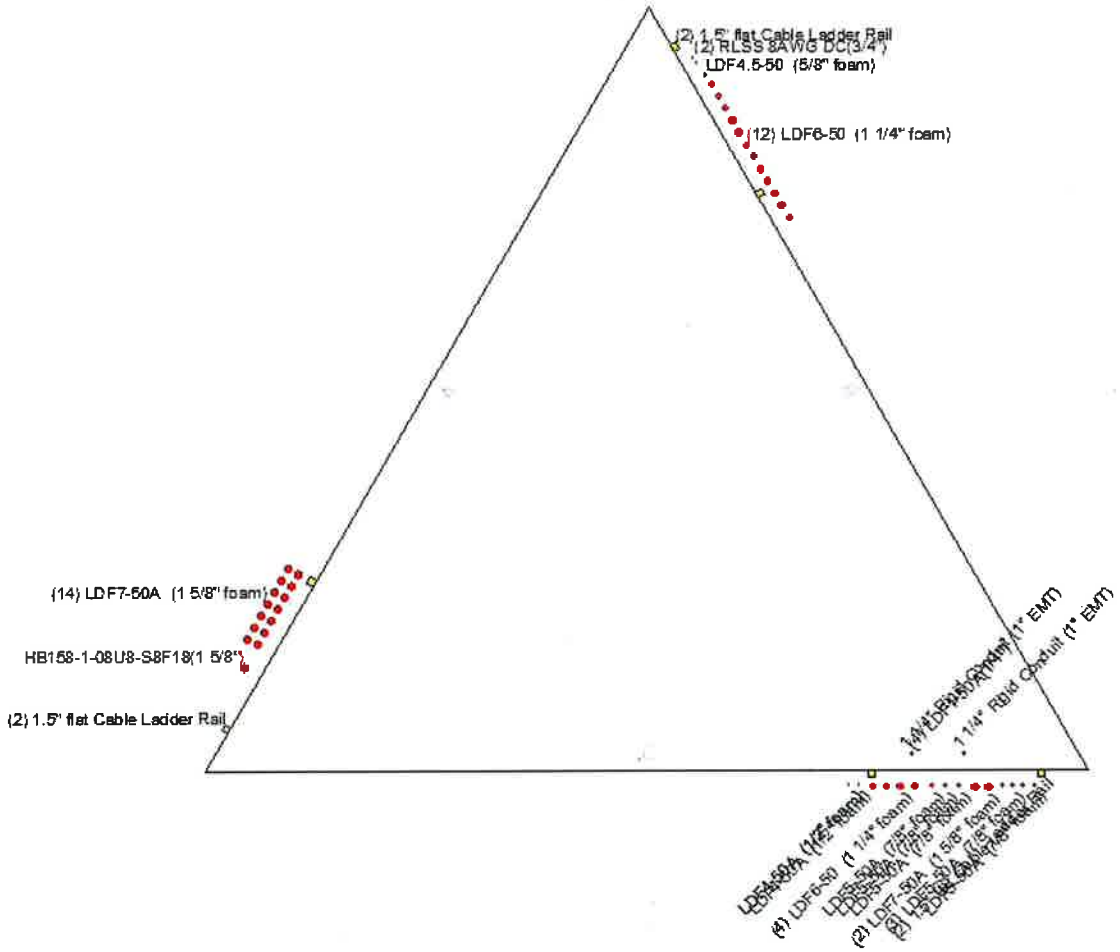
Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
										✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	140 - 120	Leg	Pipe 2.875" x 0.276" (2.5 EH)	1	-43.14	72.29	59.7	Pass
T2	120 - 100	Leg	Pipe 3.5" x 0.300" (3 EH)	37	-74.66	102.73	72.7	Pass
T3	100 - 80	Leg	Pipe 4.5" x 0.337" (4 EH)	70	-101.96	151.47	67.3	Pass
T4	80 - 60	Leg	Pipe 5.5" x 0.375" (5 EH)	97	-127.42	203.59	62.6	Pass
T5	60 - 40	Leg	Pipe 6.625" x 0.340" (6 EHS)	118	-153.52	236.42	64.9	Pass
T6	40 - 20	Leg	Pipe 6.625" x 0.432" (6 EH)	139	-178.68	295.25	60.5	Pass
T7	20 - 0	Leg	Pipe 8.625" x 0.375" (8 EHS)	160	-200.05	332.85	60.1	Pass
T1	140 - 120	Diagonal	L 2 x 2 x 1/4	14	-5.07	17.44	29.1	Pass
T2	120 - 100	Diagonal	L 2 x 2 x 1/4	44	-4.06	14.00	29.0	Pass
T3	100 - 80	Diagonal	L 2 x 2 x 1/4	77	-4.54	8.93	50.9	Pass
T4	80 - 60	Diagonal	L 2.5 x 2.5 x 1/4	104	-5.11	11.12	45.9	Pass
T5	60 - 40	Diagonal	L 2.5 x 2.5 x 1/4	125	-5.26	8.56	61.4	Pass
T6	40 - 20	Diagonal	L 3 x 3 x 1/4	146	-5.36	11.71	45.8	Pass
T7	20 - 0	Diagonal	L 3.5 x 3.5 x 1/4	164	-6.29	12.98	48.5	Pass
T1	140 - 120	Top Girt	L 2 x 2 x 1/4	5	-0.92	17.31	5.3	Pass
							Summary	
						Leg (T2)	72.7	Pass
						Diagonal (T5)	61.4	Pass
						Top Girt (T1)	5.3	Pass
						Bolt Checks	62.5	Pass
						RATING =	**72.7**	**Pass**

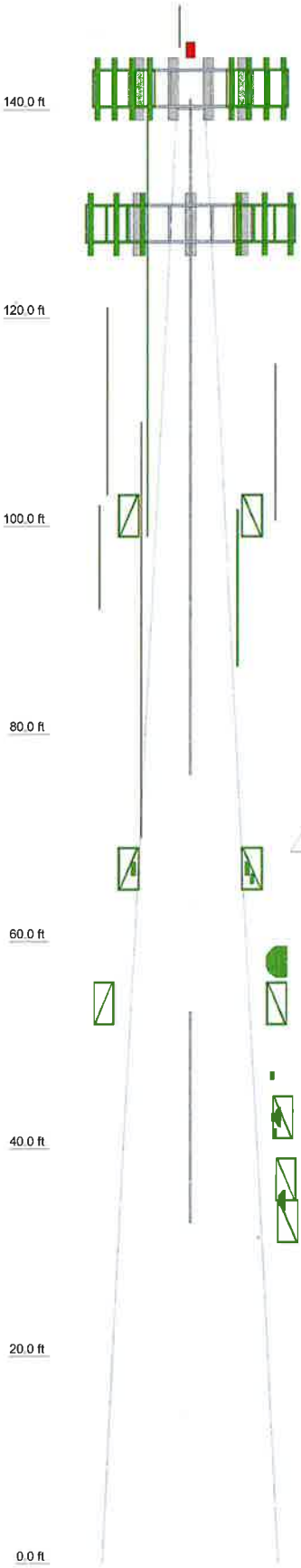
APPENDIX B

BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS



Section	T1	T2	T3	T4	T5	T6	T7
Legs	Pipe 2.875" x 0.276" (2.5 EH)	Pipe 3.5" x 0.300" (3 EH)	Pipe 4.5" x 0.337" (4 EH)	Pipe 5.5" x 0.375" (5 EH)	Pipe 6.625" x 0.340" (6 EHS)	Pipe 6.625" x 0.432" (6 EH)	Pipe 8.625" x 0.375" (8 EHS)
Leg Grade	A618-50						
Diagonals	L 2 x 2 x 1/4			L 2.5 x 2.5 x 1/4		L 3 x 3 x 1/4	L 3.5 x 3.5 x 1/4
Diagonal Grade	A36						A572-50
Top Girts	L 2 x 2 x 1/4			N.A.			
Face Width (ft)	2.63	4.66	6.69	8.72	10.75	12.79	14.82
# Panels @ (ft)	5 @ 3.98333	5 @ 3.96667	4 @ 4.95833	9 @ 6.61111			2 @ 9.95833
Weight (K)	1.1	1.4	1.8	2.3	2.8	3.4	3.6

Total Weight: 16.2

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
5/8" X 6' Lightning Rod	145	DB212-2-A	119
Flash Beacon Lighting	145	DB540K-E	112
Platform Mount [LP 602-1]	142	PD220	111
BXA-80080-4CF-EDIN-4 w/ Mount Pipe	142	DB810T3E-XT	108
		DB212-2-A	104
BXA-80080-4CF-EDIN-4 w/ Mount Pipe	142	PD1121	101
		Generic 3.5' x 6' sidearm	101
BXA-80080-4CF-EDIN-4 w/ Mount Pipe	142	Generic 3.5' x 6' sidearm	101
		Generic 3.5' x 6' sidearm	101
(2) RFS FD9R6004/1C-3L	142	10' x 2" Sch 40 Pipe Mount	97
(2) RFS FD9R6004/1C-3L	142	PD1121	97
(2) RFS FD9R6004/1C-3L	142	DB212-2-A	96
DB-T1-6Z-8AB-0Z	142	DB810T3E-XT	94
(3) SBNHH-1D65B w/ Mount Pipe	142	PD340-140	90
(3) SBNHH-1D65B w/ Mount Pipe	142	DB212-2-A	90
(3) SBNHH-1D65B w/ Mount Pipe	142	DB212-2-A	88
(3) RRH2X60-PCS	142	Obstruction light	67
(3) RRH2x60-700	142	Obstruction light	67
(3) RRH4x45-AWS	142	Generic 3.5' x 6' sidearm	67
DB-T1-6Z-8AB-0Z	142	Generic 3.5' x 6' sidearm	67
(2) AM-X-CD-14-65-00T-RET w/ Mount Pipe	129	Camera - 12" T x 8" W x 8" L	66
(2) AM-X-CD-14-65-00T-RET w/ Mount Pipe	129	PD220	65
		PD220	65
(2) AM-X-CD-14-65-00T-RET w/ Mount Pipe	129	PD220	65
		3' std w/ HP	58
7770.00 w/ Mount Pipe	129	Generic 3.5' x 6' sidearm	54
7770.00 w/ Mount Pipe	129	Generic 3.5' x 6' sidearm	54
7770.00 w/ Mount Pipe	129	Generic 3.5' x 6' sidearm	54
(2) RRU-11	129	TMA (10" x 10" x 3.5")	47
(2) RRU-11	129	TMA (10" x 10" x 3.5")	43
(2) RRU-11	129	Generic 3' x 4' sidearm	43
(2) TMA (10" x 10" x 3.5")	129	20 ft x 2" omni whip	43
(2) TMA (10" x 10" x 3.5")	129	2 ft standard	43
(2) TMA (10" x 10" x 3.5")	129	TMA (10" x 10" x 3.5")	41.5
DC6-48-60-18-8F	129	Generic 3' x 4' sidearm	37
Sector Mount [SM 502-3]	129	2 ft standard	35
DB212-2-A	121	Generic 3.5' x 6' sidearm	33

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A618-50	50 ksi	70 ksi	A572-50	50 ksi	65 ksi
A36	36 ksi	58 ksi			

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 85.00 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 73.61 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50.00 mph wind.
5. TOWER RATING: 72.7%

MAX. CORNER REACTIONS AT BASE:

DOWN: 206 K
SHEAR: 21 K

UPLIFT: -172 K
SHEAR: 18 K

AXIAL
49 K

SHEAR
32 K

MOMENT
2767 kip-ft

TORQUE 5 kip-ft
73.61 mph WIND - 0.50 in ICE

AXIAL
32 K

SHEAR
31 K

MOMENT
2744 kip-ft

TORQUE 6 kip-ft
REACTIONS - 85.00 mph WIND

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

Job: 140-ft SST / Groton, CT			
Project: Groton CT / PJF 42916-0002			
Client: On Air Engineering	Drawn by: Rebekah Dorris	App'd:	
Code: TIA/EIA-222-F	Date: 07/20/16	Scale: N	
Path:		Dwg No.	

foundation loads

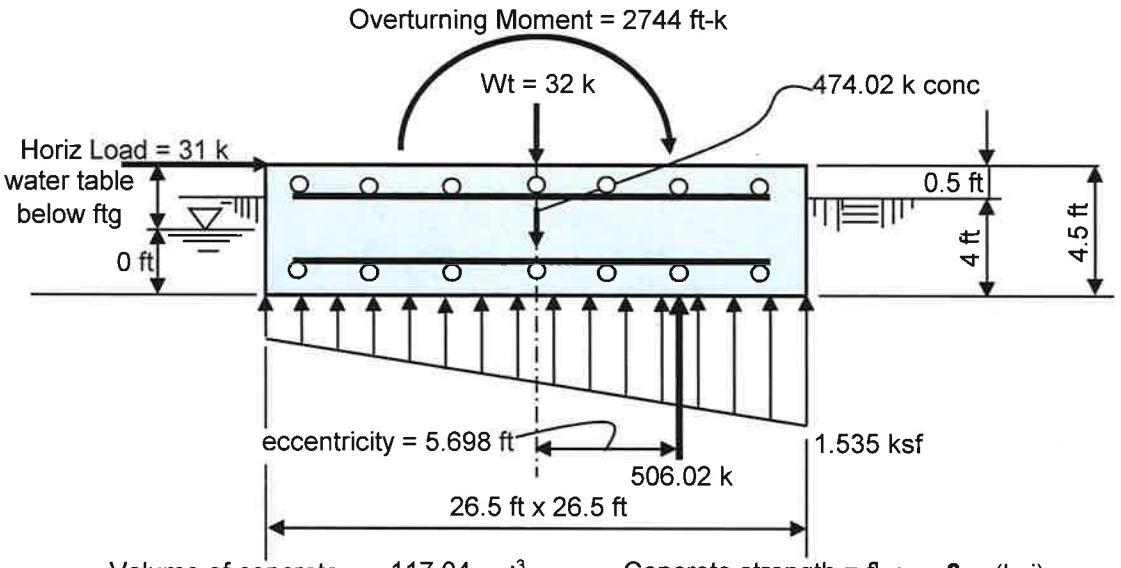
Tower or Pole Weight =	**32**	kips
Total Horizontal Force =	**31**	kips
Overturning Moment =	**2744**	ft-kips

soil properties

Safety factor against overturning =	**1.5**	
Soil density =	**125**	pcf
Allowable soil bearing =	**5**	ksf
Depth to water table =	**99**	ft

mat dimensions

depth to bottom of footing =	**4**	ft
Footing thickness =	**4.5**	ft
Footing Width =	**26.5**	ft
Footing Length =	**26.5**	ft
Tower/Pole Center Offset =	**0**	ft



Volume of concrete = 117.04 yd^3 Concrete strength = f'_c = **3** (ksi)

Rebar = (140) #8 bars by 26 ft long

reinforcing steel = **(35) #8 @ 9.18 in o.c. ea way top and bottom**

Summary of analysis results

Overturning Moment: (Stress Ratio = 0.645) **< CONTROLLING CRITERIA**

Calculated Overturning Moment = 2883.5 ft-kips

Resisting Moment = 6704.7 ft-kips

Factor of Safety against overturning = 2.325 **> 1.5 okay**

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

minimum cover over rebar = **3** inches

Soil Bearing (Stress Ratio = 0.307)

Net Soil Bearing Resistance = 5 ksf

Calculated Soil Bearing Pressure = 1.535 **ksf < 5 ksf okay**

Bending Moment (Stress Ratio = 0.309)

Ultimate Bending Moment Resistance = 6032 ft-kips

Calculated Ultimate Bending Moment = 1865 **ft-kips < 6032 ft-kips okay**

Bending Shear (Stress Ratio = 0.167)

Ultimate Bending Shear Resistance = 1293 kips

Calculated Ultimate Bending Shear = 216 **kips < 1293 kips okay**

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES BY PAUL J. FORD AND COMPANY

1) Paul J. Ford and Company has not performed a site visit to verify the tower member sizes or the antenna/coax loading. If the existing conditions are not as represented on these drawings, we should be contacted immediately to evaluate the significance of the deviation.

2) No allowance was made for any damaged, missing, or rusted members. The analysis of this tower assumes that no physical deterioration has occurred in any of the structural components of the tower and that all the tower members have the same load carrying capacity as the day the tower was erected.

3) It is not possible to have all the very detailed information to perform a very thorough analysis of every structural sub-component of an existing tower. The structural analysis by Paul J. Ford and Company verifies the adequacy of the main structural members of the tower. Paul J. Ford and Company provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc.

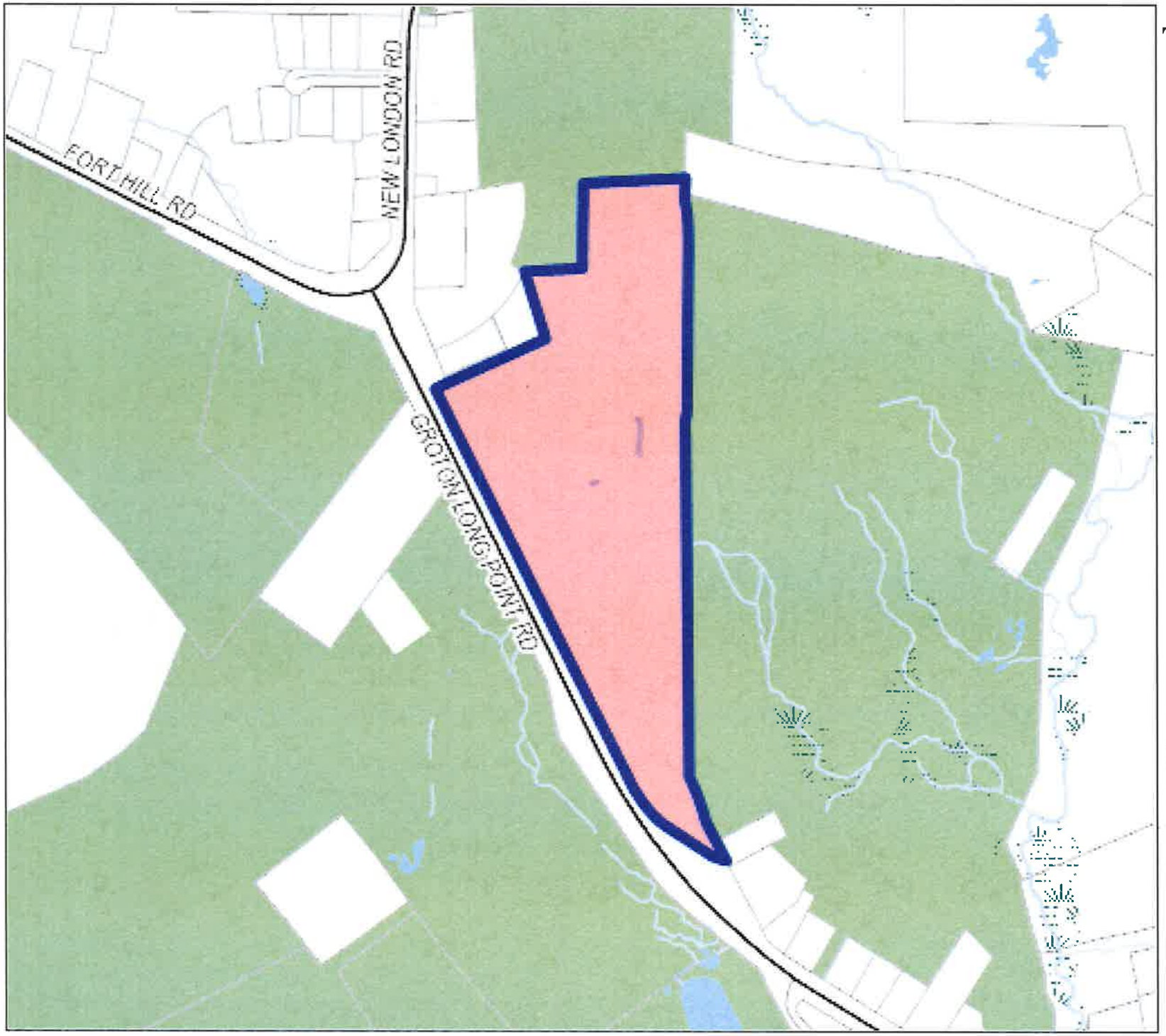
4) It is the owner's responsibility to determine the amount of ice accumulation, if any, that should be considered in the structural analysis.

5) This tower has been analyzed according to the minimum design wind loads recommended by the Telecommunications Industry Association Standard TIA/EIA-222-F. If the owner or local or state agencies require a higher design wind load, Paul J. Ford and Company should be made aware of this requirement.

6) The attached sketches are a schematic representation of the tower that we have analyzed. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions and for the proper fit and clearance in the field.

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

ATTACHMENT 4



Town of Groton

68 GROTON LONG POINT RD

N
W E
S

Disclaimer:

The planimetric and topographic information depicted on this map was compiled by The Sanborn Map Company based on an aerial flight performed in April 2009. The parcel and property line information depicted on this map has been compiled from recorded deeds, maps, assessor records, and other sources of information in the Town of Groton. The intent of this map is to depict a graphical representation of real property information relative to the planimetric features for the Town of Groton and is subject to change as a more accurate survey may disclose. The Town of Groton and the mapping companies assume no legal responsibility for the information contained in this data.
THIS MAP IS NOT TO BE USED FOR THE TRANSFER OF PROPERTY.

Horizontal Datum:
Connecticut State Plane Coordinates, North American Datum of 1983 (NAD83 Feet).

Vertical Datum:
North American Vertical Datum of 1988 (NAVD88).

Date: 8/23/2016

Map Created using GrotonGIS Silverlight Application

Commercial Property Card

Print Date: 8/23/2016

Card 1 of 10

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Account	Location	Zoning	Deed Book/Page	Acres
260810364571 E	68 GROTON LONG POINT RD	RS-20	142/151	28.74

District	Use Code
POQUONNOCK BRIDGE	MUNICIPALITIES

Current Owner

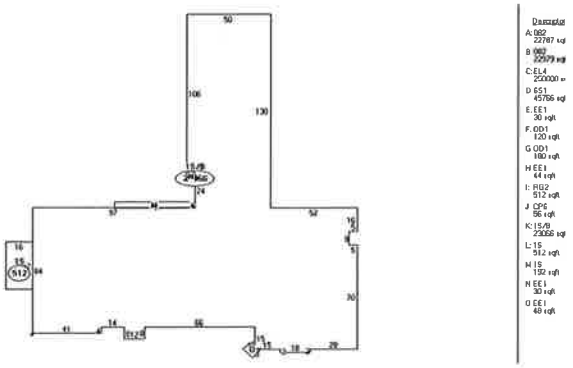
GROTON TOWN OF
POLICE/PUBLIC WORKS/TOWN HALL ANNEX COMPLEX
GROTON CT 06340

Property Picture

Building Information

Building No:	1
Year Built:	1975
No of Units:	1
Structure Type:	POLICE/FIRE STATION
Building Total Area:	45766 sqft.
Grade:	C+
Identical Units:	1

Building Sketch



Valuation

Land:	$1,781,100
Building:	$6,595,100
Total:	$8,376,200
Total Assessed Value:	$5,863,340

Recent Sales

Book/Page	Date	Price

Sketch Legend

Exterior/Interior Information

Levels	Use Type	Ext. Walls	Const. Type	Heating	A/C	Condition
B1 - B1	MULTI-USE OFFICE	BRICK VENEER	FIRE RESIST	HOT AIR	CENTRAL	NORMAL
01 - 01	MULTI-USE OFFICE	BRICK VENEER	WOOD JOIST	HOT AIR	CENTRAL	NORMAL
01 - 01	AUTO PARTS/SERVICE		FIRE RESIST	HOT AIR	NONE	NORMAL

		CONCRETE BLOCK				
01 - 01	MULTI-USE OFFICE	CONCRETE BLOCK	FIRE RESIST	HOT AIR	NONE	NORMAL
01 - 01	MULTI-USE OFFICE	CONCRETE BLOCK	WOOD JOIST	HOT AIR	NONE	NORMAL
B1 - B1	UNFINISHED RES BSMT	N/A	WOOD JOIST	NONE	NONE	NORMAL
01 - 01	MULTI-USE STORAGE	FRAME	WOOD JOIST	HW/STEAM	NONE	NORMAL
B1 - B1	OFFICE BUILDING	N/A	FIRE RESIST	HOT AIR	CENTRAL	NORMAL
B1 - B1	MULTI-USE STORAGE	N/A	FIRE RESIST	HOT AIR	CENTRAL	NORMAL
01 - 01	OFFICE BUILDING	CONCRETE NON-LOAD BEARING	FIRE RESIST	HOT AIR	CENTRAL	NORMAL
01 - 01	AUDITORIUM/THEATER	CONCRETE NON-LOAD BEARING	FIRE RESIST	HOT AIR	CENTRAL	NORMAL
01 - 01	AUTO PARTS/SERVICE	CONCRETE BLOCK	WOOD JOIST	UNIT HEAT	NONE	NORMAL
01 - 01	AUTO PARTS/SERVICE	METAL,LIGHT	WOOD JOIST	UNIT HEAT	NONE	NORMAL
01 - 01	MULTI-USE OFFICE	METAL,LIGHT	WOOD JOIST	UNIT HEAT	NONE	NORMAL
M1 - M1	MULTI-USE OFFICE	METAL,LIGHT	WOOD JOIST	UNIT HEAT	NONE	NORMAL
01 - 01	MULTI-USE OFFICE	METAL,LIGHT	WOOD JOIST	UNIT HEAT	NONE	NORMAL
01 - 01	WAREHOUSE	FRAME	WOOD JOIST	HOT AIR	NONE	NORMAL
02 - 02	WAREHOUSE	FRAME	WOOD JOIST	NONE	NONE	NORMAL
01 - 01	MULTI-USE STORAGE	FRAME	WOOD JOIST	ELECTRIC	NONE	NORMAL
01 - 01	MULTI-USE OFFICE	CONCRETE BLOCK	FIRE RESIST	HW/STEAM	UNIT	NORMAL
01 - 01	MULTI-USE STORAGE	FRAME	WOOD JOIST	NONE	NONE	NORMAL
01 - 01	MULTI-USE STORAGE	FRAME	WOOD JOIST	NONE	NONE	NORMAL
01 - 01	MULTI-USE STORAGE	FRAME	WOOD JOIST	NONE	NONE	NORMAL