Robinson+Cole

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Also admitted in Massachusetts

August 26, 2016

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

Re: **Notice of Exempt Modification – Facility Modification**
53 Dayton Road, Waterford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains fifteen (15) antennas at the 135-foot level on the existing 180-foot tower at the Cohanzie Fire Department, 53 Dayton Road in Waterford, Connecticut (the "Property"). The tower and underlying property are owned by Cohanzie Fire Company No. 5, Inc. The Council approved Cellco's shared use of this tower in 1998. Cellco now intends to modify its facility by removing all of its existing antennas, and replacing them with nine (9) new antennas (three (3) model LNX-6512DS-VTM, 850 MHz antennas; three (3) model SBNHH-1D65B, 1900 MHz antennas; and three (3) model SBNHH-1D65B, 700/2100 MHz antennas), at the same 135-foot level on the tower. Cellco also intends to replace six (6) remote radio heads ("RRHs") and install three (3) new RRHs and one (1) HYBRIFLEX™ fiber optic 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 M. Steward, First Selectman for the Town of Waterford. A copy of this letter is also being sent to Cohanzie Fire Company No. 5, Inc., the owner of the Property and the tower.

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 at the 135-foot level of the 180-foot tower.

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

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

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

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

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

A copy of the Waterford 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,

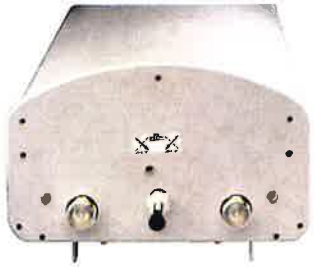
Kenneth C. Baldwin

Enclosures
Copy to:
Daniel M. Steward, Waterford Frist Selectman
Cohanzie Fire Company No. 5, Inc.
Timothy Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®



LNX-6512DS-VTM | LNX-6512DS-A1M

Single Band Antenna, 698–896 MHz, 65° horizontal beamwidth, RET compatible

- Excellent choice to maximize both coverage and capacity in suburban and rural applications
- Ideal choice for site collocations and tough zoning restrictions
- Extended elevation tilt for maximum flexibility in urban core areas
- Remote beam tilt management is an optional feature using Andrew's Teletilt® system
- The RF connectors are designed for IP67 rating and the radome for IP56 rating

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain, dBi	14.1	15.0
Beamwidth, Horizontal, degrees	65	65
Beamwidth, Vertical, degrees	19.0	17.0
Beam Tilt, degrees	0–15	0–15
USLS, typical, dB	17	18
Front-to-Back Ratio at 180°, dB	28	28
CPR at Boresight, dB	12	12
CPR at Sector, dB	10	10
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	**698–806**	**806–896**
Beamwidth, Horizontal Tolerance, degrees	±3	±3

* 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
Band	Single band
Brand	DualPol®
Operating Frequency Band	698 – 896 MHz
Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum
Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	2

Product Specifications

LNX-6512DS-VTM | LNX-6512DS-A1M

Wind Loading, maximum	379.8 N @ 150 km/h 85.4 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1232.0 mm | 48.5 in
Width	301.0 mm | 11.9 in
Net Weight, without mounting kit	13.0 kg | 28.7 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator LNX-6512DS-A1M

Packed Dimensions

Depth	284.0 mm | 11.2 in
Length	1548.0 mm | 60.9 in
Width	411.0 mm | 16.2 in
Shipping Weight	29.5 kg | 65.0 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

Included Products

DB380 — Pipe Mounting Kit for 2.4"-4.5" (60-115mm) OD round members on wide panel antennas. Includes 2 clamp sets and double nuts.

DB5083 — Downtilt Mounting Kit for 2.4"-4.5" (60 - 115 mm) OD round members. Includes a heavy-duty, galvanized steel downtilt mounting bracket assembly and associated hardware. This kit is compatible with the DB380 pipe mount kit for panel antennas that are equipped with two mounting brackets.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

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.

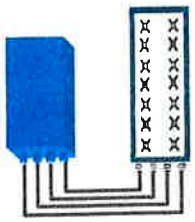
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

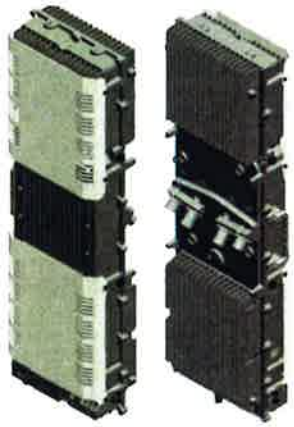
Can be switched between modes via SW w/o site visit

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
B4 RRH2X60-4R FOR AWS BAND APPLICATIONS

The Alcatel-Lucent B4 RRH2x60-4R 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 B4 RRH2x60-4R 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 B4 RRH2x60-4R 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.

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

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

OPTIMIZED TCO

The Alcatel-Lucent B4 RRH2x60-4R 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 B4 RRH2x60-4R is a very cost-effective solution to deploy LTE MIMO.

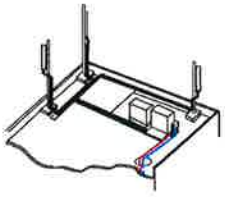
EASY INSTALLATION

The B4 RRH2x60-4R 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.

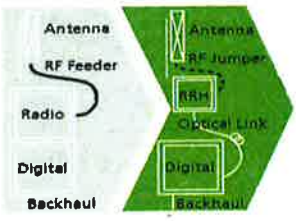
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent B4 RRH2x60-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent B4 RRH2x60-4R is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

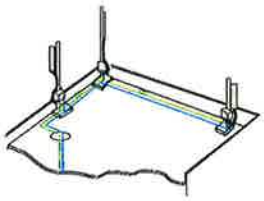
Installation can easily be done by a single person as the Alcatel–Lucent B4 RRH2x60-4R is compact and weighs about 25 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- B4 RRH2x60-4R integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- B4 RRH2x60-4R is optimized for LTE operation
- B4 RRH2x60-4R is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

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

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

- HxWxD : 930x270x146 mm (with solar shield)
- Weight : 25 kg (55 lbs) (with solar shield)

Electrical Data

- Power Supply : -48V DC (-38 to -57V)
- Power Consumption: 346W typ. @2x30W (100%RF), 560W typ. @2x60W (100%RF)

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 (3-6) 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 300m using MM fiber, up to 15km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Four 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
- 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)

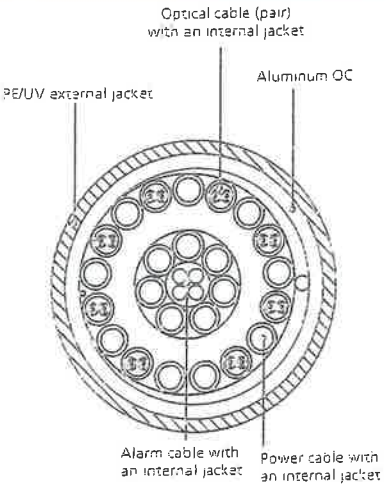


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Waterford								
Tower Height: 180ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T	2	414	160	850	0.0126	0.5667	0.22%	
*AT&T	2	656	160	1900	0.0199	1.0000	0.20%	
*AT&T	2	620	160	850	0.0188	0.5667	0.33%	
*AT&T	2	2154	160	2300	0.0653	1.0000	0.65%	
*AT&T	2	1328	160	700	0.0403	0.4667	0.86%	
*AT&T	2	2255	160	1900	0.0684	1.0000	0.68%	
*T-Mobile	4	1167	164	1900/2100	0.0672	1.0000	0.67%	
*T-Mobile	2	2334	164	2100	0.0672	1.0000	0.67%	
*T-Mobile	1	865	164	700	0.0125	0.4667	0.27%	
*MetroPCS	3	727	125	2140	0.0554	1.0000	0.55%	
*Public Safety	3	100	185	150	0.0034	0.2000	0.17%	
*Public Safety	1	100	185	150	0.0011	0.2000	0.06%	
Verizon PCS	**1**	**3270**	**135**	**0.0645**	**1970**	**1.0000**	**6.45%**	
Verizon Cellular	**9**	**258**	**135**	**0.0458**	**869**	**0.5793**	**7.91%**	
Verizon AWS	**1**	**6907**	**135**	**0.1363**	**2145**	**1.0000**	**13.63%**	
Verizon 700	**1**	**1595**	**135**	**0.0315**	**746**	**0.4973**	**6.33%**	
								39.66%
* Source: Siting Council								

ATTACHMENT 3

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

180-ft Existing ROHN Lattice Tower

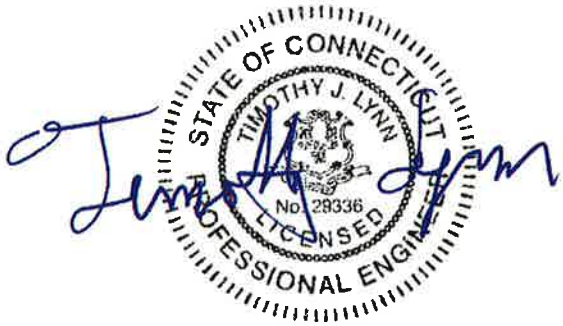
Proposed Verizon Wireless
Antenna Installation

Verizon Site Ref: Waterford

53 Dayton Road
Waterford, CT

Centek Project No. 15001.009

~~Date: February 6, 2015~~
Rev 1: August 15, 2016



Prepared for:

Verizon Wireless
99 East River Road, 9th Floor
East Hartford, CT 06108

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by Verizon Wireless on the existing lattice tower located in Waterford, Connecticut.

The host tower is a 180-ft, nine-section, three legged, self-supporting tapered lattice tower originally designed and manufactured by ROHN Industries Inc., Eng file no. 38103AE, dated August 24, 1998. The tower geometry, structure member sizes and anchor bolt properties were obtained from a previous structural analysis report prepared by Centek Engineering job no. 12124.CO24 signed and sealed January 14, 2013. Original foundation loading was obtained from a structural analysis report prepared by URS Corporation, signed and sealed on November 8, 2002.

Antenna and appurtenance inventory were taken from the aforementioned Centek structural report and a Verizon RF data sheet.

The tower consists of nine (9) tapered vertical sections with steel pipe legs conforming to ASTM A572-50. Horizontal and diagonal lateral support bracing consists of steel pipe construction conforming to ASTM A36M-42. The vertical tower sections are connected by bolted flange plates with the diagonal and horizontal bracing to pipe legs consisting of bolted connections. The width of the tower face is 8.54-ft at the top and 25.48-ft at the base.

Verizon Wireless proposes the removal of fifteen (15) panel antennas and six (6) remote radio heads and the installation of nine (9) panel antennas, nine (9) remote radio heads and one (1) main distribution box mounted on the existing boom gates. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing tower supports several communication antennas. The existing and proposed loads considered in the analysis consist of the following:

- TOWN (Existing):
  Antennas: Five (5) 15-ft Omni-directional whip antennas, two (2) 9-ft Omni-directional whip antennas and one (1) 8-ft Omni-directional whip antenna mounted on two (2) 6-ft side-arms and one (1) lightweight T-Arm to the top of the the tower.
  Coax Cables: One (1) 1-5/8" ∅ and seven (7) 7/8" ∅ coax cables (face mounted).
- T-Mobile (Existing):
  Antennas: Six (6) EMS RR90-17-02DP panel antennas, three (3) RFS APX16DWV-16DWVS panel antennas, six (6) 14"x8"x4" TMAs and three (3) 14"x9"x5" TMA's mounted to three (3) 10-ft T-Arms with a RAD center elevation of 163-ft above grade level.
  Coax Cables: Eighteen (18) 1-5/8" ∅ coax cables (face mounted).

- AT&T (Existing):
  Antennas: Six (6) Powerwave 7770 panel antennas, two (2) Andrew SBNH-1D6565C panel antennas, one (1) Powerwave P65-17-XLH-RR panel antennas, six (6) Powerwave LGP21401 TMA's, six (6) Powerwave LGP13519 Diplexers, six (6) Ericsson RRUS-11 remote radio heads and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted on three (3) 14' boom gates at a RAD center elevation of 157-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables and one (1) 3" dia. flex conduit (face mounted).
- TOWN (Existing):
  Antennas: One (1) 12-ft Omni-directional whip antenna mounted on a 6-ft side-arm with an elevation of 146-ft above grade level.
  Coax Cables: One (1) 7/8" ∅ coax cable (face mounted).
- MetroPCS (Existing):
  Antennas: Three (3) Kathrein 800-10504 panel antennas mounted to three (3) 10-ft T-Arms with a RAD center elevation of 126.5-ft above grade level.
  Coax Cables: Six (6) 7/8" ∅ coax cables (face mounted).
- VERIZON (Existing):
  GPS: One (1) GPS antenna mounted on a 1-ft standoff arm with a RAD center elevation of 51-ft above grade level.
  Coax Cables: One (1) 1/2" ∅ coax cable (face mounted).
- VERIZON (Existing to Remain):
  Antennas: One (1) RFS DB-T1-6Z-8AB-0Z main distribution box mounted to three (3) existing 14-ft boom gates with a RAD center elevation of 135-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables and one (1) 1-5/8" ∅ fiber cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- VERIZON (Existing to Remove):
  Antennas: One (1) Antel BXA-70063-6CF panel antenna, two (2) Swedcom SLCP 2x6015 panel antennas, two (2) Antel LPA-80063-4CF panel antennnas, four (4) Swedcom SC-E 6014 rev2 panel antennas, two (2) Antel BXA-171063-12BF panel antennas, one (1) Swedcom SACP 2x5516 panel antenna, three (3) Antel BXA-171063-8CF panel antennas, three (3) Alcatel-Lucent RRH-2x40-AWS remote radio heads and three (3) Alcatel-Lucent RRH-2x40-07U mounted to three (3) existing 14-ft boom gates with a RAD center elevation of 135-ft above grade level.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- **VERIZON (Proposed):**
  Antennas: Six (6) Andrew SBNHH-1D65B panel antennas, three (3) Andrew LNX-6512DS panel antennas, three (3) Alcatel-Lucent RRH2x60-700 remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads, three (3) Alcatel-Lucent RRH4x45/2x90-AWS remote radio and one (1) RFS DB-T1-6Z-8AB-0Z main distribution box mounted to three (3) existing 14-ft boom gates with a RAD center elevation of 135-ft above existing grade.
  Coax Cables: One (1) 1-5/8" ∅ fiber cable mounted to the exterior of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables should be routed as specified in section 3 of this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (fastest mile) with no ice and a 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC[1] and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation of the tower analysis.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice on the tower structure and its components.

Basic Wind Speed:	New London; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Waterford; v = 115 mph (3 second gust) equivalent to v = 95 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	Appendix-K wind speed controls.	
Load Cases:	Load Case 1; 95 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 82 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 82 mph wind speed velocity represents 75% of the wind pressure generated by the 95 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

[1] The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

- Calculated stresses were found to be within allowable limits. In Load Case 2, per tnxTower "Section Capacity Table", this tower was found to be at **65.3%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T9)	0'-0"-20'-0"	48.1%	**PASS**
Diagonal (T4)	100'-0"-120'-0"	63.8%	**PASS**
Secondary Horizontal (T4)	100'-0"-120'-0"	65.3%	**PASS**

Foundation and Anchors

The existing foundation information was unavailable for use in this structural analysis. Review of the foundation design consisted of a comparison of the proposed applied loads obtained from the tower design calculations; governing Load Case 2 with the original tower loading obtained from the aforementioned URS structural design report signed and sealed on November 8, 2002.

- The tower reactions developed from the governing Load Case 2 were used in the verification of the foundation:

Reactions	Vector	Proposed Base Reactions
Base	Shear	**69 kips**
	Compression	**82 kips**
	Moment	**7216 kip-ft**
Leg	Shear	**42 kips**
	Uplift	**299 kips**
	Compression	**354 kips**

- The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	27.5%	**PASS**

- The foundation was found to be within allowable limits.

Tower Reactions	Original Tower Reactions	Proposed Reactions	Result
Leg Compression	732.9 kips	354 kips	**PASS**
Leg Uplift	621.3 kips	299 kips	**PASS**
Leg Shear	141.8 kips	42 kips	**PASS**
Overturning Moment	14472.6 kip-ft	7216 kip-ft	**PASS**

Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by Verizon Wireless. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

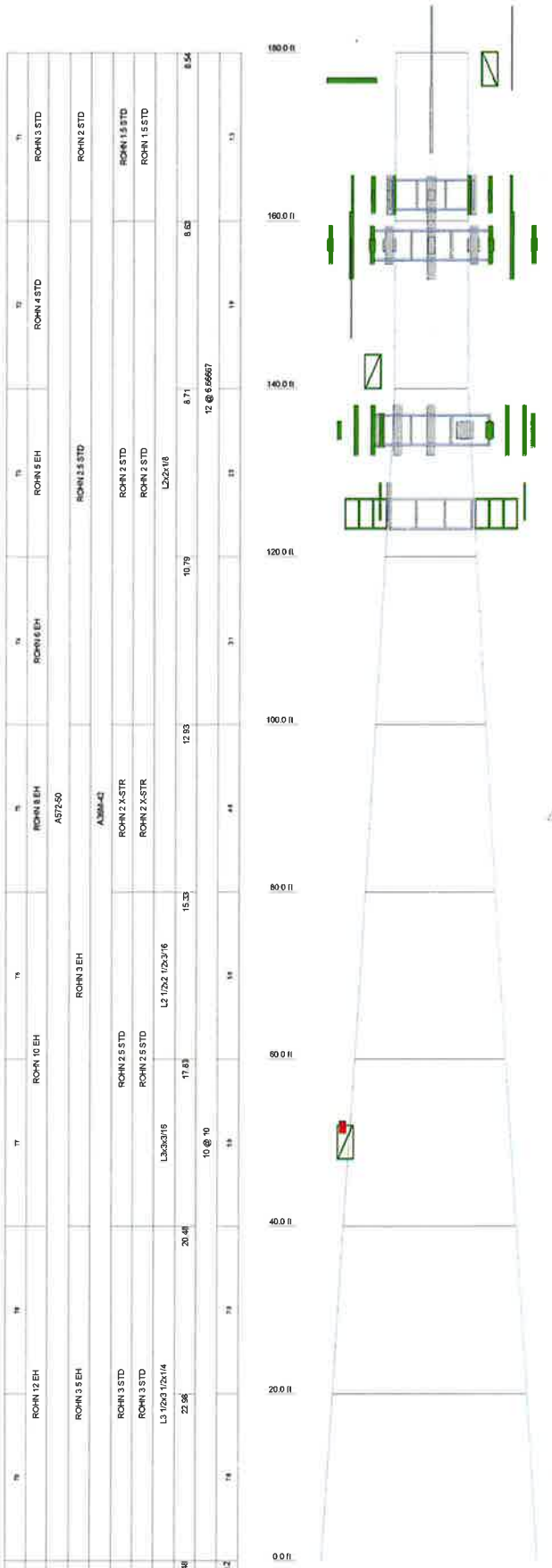
- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISATower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.



Section	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs		ROHN 12 EH		ROHN 10 EH		ROHN 8 EH	ROHN 6 EH	ROHN 5 EH	ROHN 4 STD	ROHN 3 STD
Leg Grade						A572-50				
Diagonals		ROHN 3.5 EH			ROHN 3 EH			ROHN 2.5 STD		ROHN 2 STD
Diagonal Grade						A36M-42				
Top Girts		ROHN 3 STD		ROHN 2.5 STD		ROHN 2 X-STR		ROHN 2 STD		ROHN 1.5 STD
Horizontals		ROHN 3 STD		ROHN 2.5 STD		ROHN 2 X-STR		ROHN 2 STD		ROHN 1.5 STD
Inner Bracing		L3 1/2x3 1/2x1/4		L3x3x3/16		L2 1/2x2 1/2x3/16		L2x2x1/8		
Face Width (ft)	25.48	22.98	20.48	17.83	15.33	12.83	10.79	8.71	6.63	4.54
# Panels @ (ft)		1 @ 5	10 @ 10					12 @ 6.66667		
Weight (K)	40.2	1.8	7.2	5.5	5.5	4.4	3.1	2.3	1.9	1.3

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
15' 2.5" Dia omni (Town)	180	(2) LGP13519 Diplexer (ATT - Existing)	157
15' 2.5" Dia omni (Town)	180	SBNH-1D6565C (ATT - Existing)	157
15' 2.5" Dia omni (Town)	180	SBNH-1D6565C (ATT - Existing)	157
Rohn 6' Side-Arm(1) (Town)	178	P65-17-XLH-RR (ATT - Existing)	157
Rohn 6' Side-Arm(1) (Town)	178	(2) RRUS-11 (ATT - Existing)	157
Filler (Town)	177	(2) RRUS-11 (ATT - Existing)	157
15' 2.5" Dia omni (Town)	177	(2) RRUS-11 (ATT - Existing)	157
15' 2.5" Dia omni (Town)	177	DC6-48-60-18-8F Surge Arrestor (ATT - Existing)	157
Pipe 15' T-Frame Sector Mount (1) (Town)	177	Rohn 6'x14' Boom Gate (3) (ATT - Existing)	157
8' x 3" Dia Omni (Town)	176	12' x 2" Dia Omni (Town)	148
9-ft Omni (Town)	176	Rohn 6' Side-Arm(1) (Town)	142
9-ft Omni (Town)	176	LNX-6512DS (Verizon - Proposed)	135
APX16DWV-16DWV-S-E-ACU (T-Mobile - Existing)	163	SBNHH-1D65B (Verizon - Proposed)	135
		SBNHH-1D65B (Verizon - Proposed)	135
RR90-17-02DP (T-Mobile - Existing)	163	LNX-6512DS (Verizon - Proposed)	135
RR90-17-02DP (T-Mobile - Existing)	163	SBNHH-1D65B (Verizon - Proposed)	135
APX16DWV-16DWV-S-E-ACU (T-Mobile - Existing)	163	SBNHH-1D65B (Verizon - Proposed)	135
		LNX-6512DS (Verizon - Proposed)	135
RR90-17-02DP (T-Mobile - Existing)	163	SBNHH-1D65B (Verizon - Proposed)	135
RR90-17-02DP (T-Mobile - Existing)	163	SBNHH-1D65B (Verizon - Proposed)	135
APX16DWV-16DWV-S-E-ACU (T-Mobile - Existing)	163	RRH4x30-B13 (Verizon - Proposed)	135
		RRH4x30-B13 (Verizon - Proposed)	135
RR90-17-02DP (T-Mobile - Existing)	163	RRH4x30-B13 (Verizon - Proposed)	135
RR90-17-02DP (T-Mobile - Existing)	163	RRH4x45/2x90-AWS (Verizon - Proposed)	135
(2) 14"x8"x4" TMA (T-Mobile - Existing)	163	RRH4x45/2x90-AWS (Verizon - Proposed)	135
(2) 14"x8"x4" TMA (T-Mobile - Existing)	163	RRH4x45/2x90-AWS (Verizon - Proposed)	135
(2) 14"x8"x4" TMA (T-Mobile - Existing)	163	RRH2x60-PCS (Verizon - Proposed)	135
14"x9"x5" TMA (T-Mobile - Existing)	163	RRH2x60-PCS (Verizon - Proposed)	135
14"x9"x5" TMA (T-Mobile - Existing)	163	RRH2x60-PCS (Verizon - Proposed)	135
14"x9"x5" TMA (T-Mobile - Existing)	163	DB-T1-6Z-8AB-0Z (Verizon - Existing)	135
Valmont 10' Wireless Frame (3) (T-Mobile - Existing)	163	DB-T1-6Z-8AB-0Z (Verizon - Proposed)	135
		Rohn 6'x14' Boom Gate (3) (Verizon - Existing)	135
(2) 7770.00 (ATT - Existing)	157	800-10504 (MetroPCS - Existing)	126.5
(2) 7770.00 (ATT - Existing)	157	800-10504 (MetroPCS - Existing)	126.5
(2) 7770.00 (ATT - Existing)	157	800-10504 (MetroPCS - Existing)	126.5
(2) LGP21401 TMA (ATT - Existing)	157	10-ft T-Frame (MetroPCS - Existing)	125
(2) LGP21401 TMA (ATT - Existing)	157	10-ft T-Frame (MetroPCS - Existing)	125
(2) LGP21401 TMA (ATT - Existing)	157	10-ft T-Frame (MetroPCS - Existing)	125
(2) LGP13519 Diplexer (ATT - Existing)	157	GPS (Verizon - Existing)	51
(2) LGP13519 Diplexer (ATT - Existing)	157	1' Standoff Pipe (Verizon - Existing)	50

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36M-42	42 ksi	60 ksi

TOWER DESIGN NOTES

1. Tower designed for a 95 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 82 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. Weld together tower sections have flange connections.
5. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
6. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
7. Welds are fabricated with ER-70S-6 electrodes.
8. TOWER RATING: 65.3%

MAX. CORNER REACTIONS AT BASE:
DOWN: 354 K
SHEAR 42 K

UPLIFT: -299 K
SHEAR: 39 K

AXIAL
82 K

SHEAR
69 K

MOMENT
7216 kip-ft

TORQUE 113 kip-ft
82 mph WIND - 0.5000 in ICE

AXIAL
57 K

SHEAR
66 K

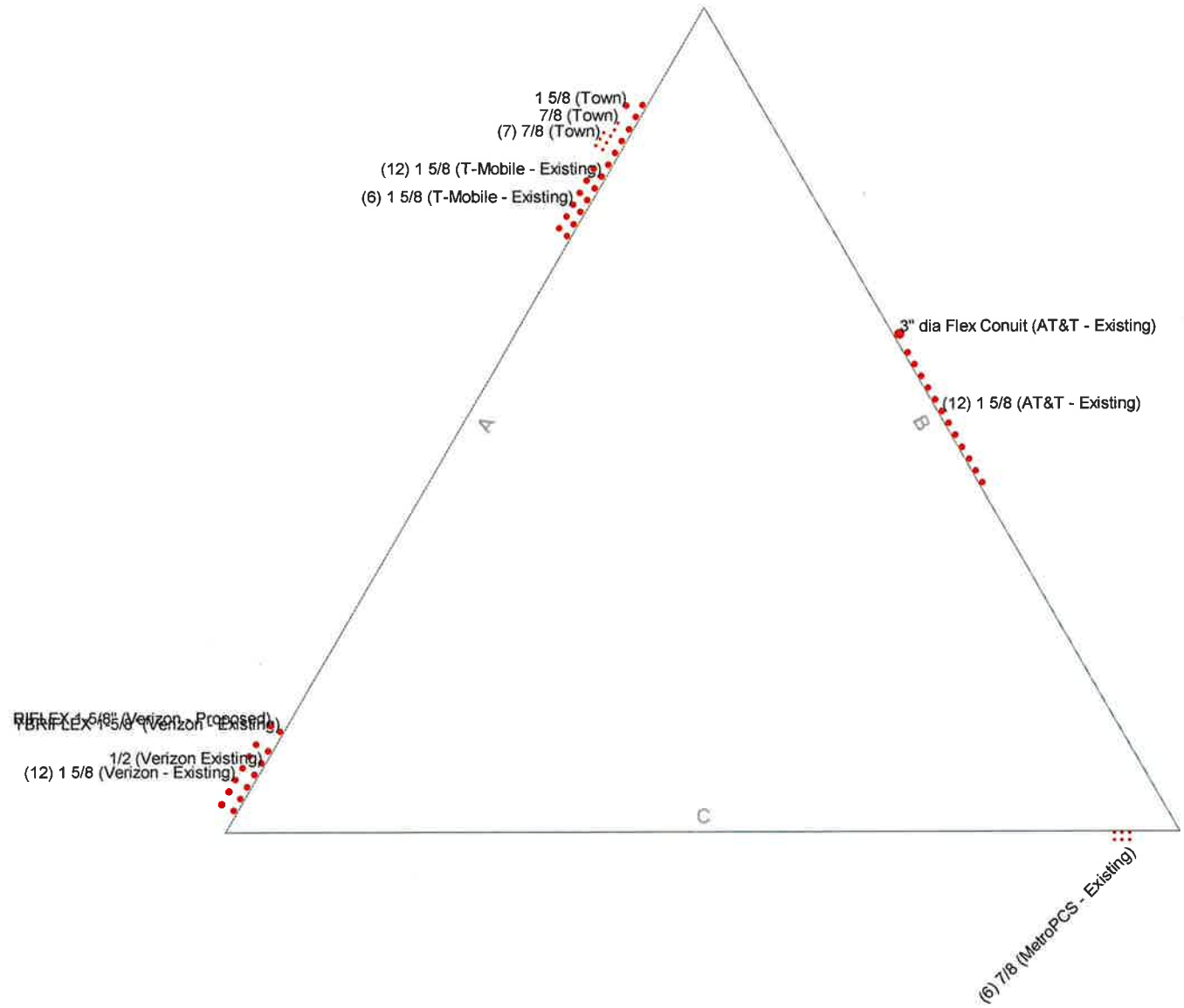
MOMENT
6788 kip-ft

TORQUE 102 kip-ft
REACTIONS - 95 mph WIND

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

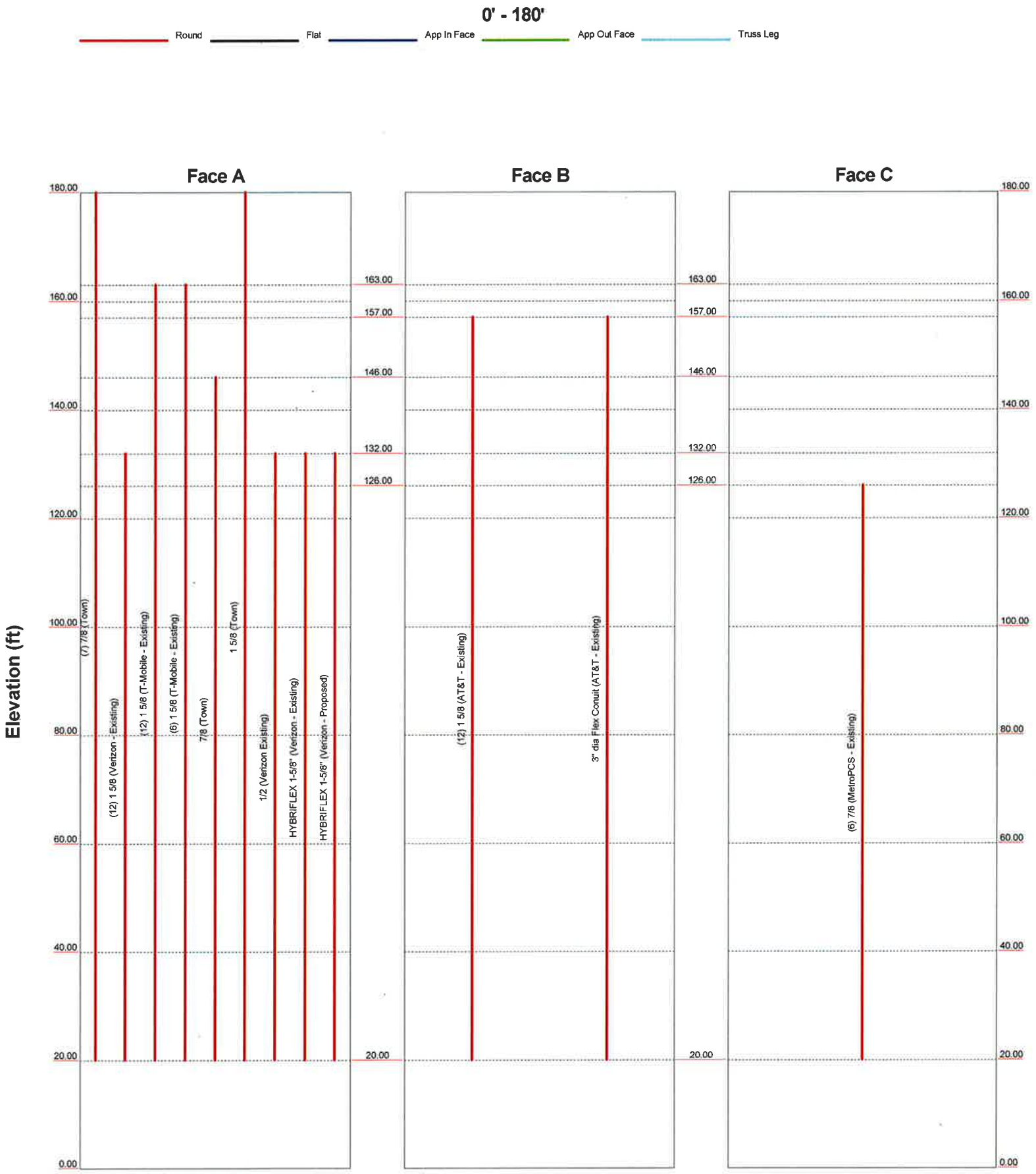
Job:	15001.009 - Waterford
Project:	180' Lattice Tower - 53 Dayton Road Waterford, CT
Client: Verizon Wireless	Drawn by: TJL / Appd:
Code: TIA/EIA-222-F	Date: 08/15/16 / Scale: NTS
Path:	Dwg No. E-1

Round Flat App In Face App Out Face



Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: **15001.009 - Waterford**			
Project: **180' Lattice Tower - 53 Dayton Road Waterford,**			
Client: Verizon Wireless	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 08/15/16	Scale: NTS	
Path:		Dwg No. E-7	



Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job:	15001.009 - Waterford		
Project:	180' Lattice Tower - 53 Dayton Road Waterford,		
Client: Verizon Wireless	Drawn by: TJL		App'd:
Code: TIA/EIA-222-F	Date: 08/15/16		Scale: NTS
Path:			Dwg No. E-7

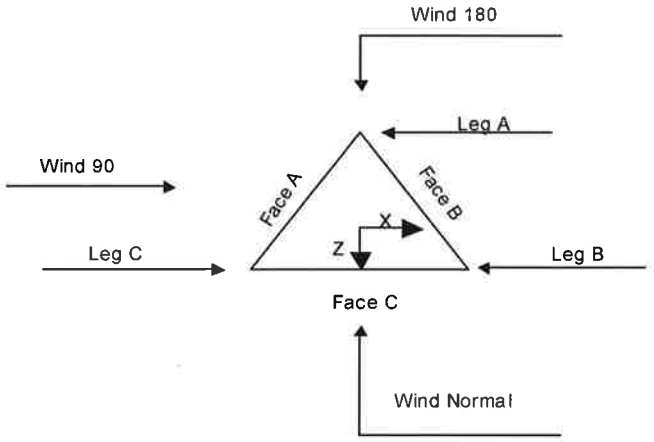
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 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 8.54 ft at the top and 25.48 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 95 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 82 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
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	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	180.00-160.00			8.54	1	20.00
T2	160.00-140.00			8.63	1	20.00
T3	140.00-120.00			8.71	1	20.00
T4	120.00-100.00			10.79	1	20.00
T5	100.00-80.00			12.93	1	20.00
T6	80.00-60.00			15.33	1	20.00
T7	60.00-40.00			17.83	1	20.00
T8	40.00-20.00			20.48	1	20.00
T9	20.00-0.00			22.98	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	180.00-160.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T2	160.00-140.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T3	140.00-120.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T4	120.00-100.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T5	100.00-80.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T6	80.00-60.00	10.00	K Brace Down	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T7	60.00-40.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T8	40.00-20.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T9	20.00-0.00	10.00	K Brace Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-160.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A36M-42 (42 ksi)
T2 160.00-140.00	Pipe	ROHN 4 STD	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A36M-42 (42 ksi)
T3 140.00-120.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A36M-42 (42 ksi)
T4 120.00-100.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A36M-42 (42 ksi)
T5 100.00-80.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Pipe	ROHN 3 EH	A36M-42 (42 ksi)
T6 80.00-60.00	Pipe	ROHN 10 EH	A572-50 (50 ksi)	Pipe	ROHN 3 EH	A36M-42 (42 ksi)
T7 60.00-40.00	Pipe	ROHN 10 EH	A572-50 (50 ksi)	Pipe	ROHN 3 EH	A36M-42 (42 ksi)
T8 40.00-20.00	Pipe	ROHN 12 EH	A572-50 (50 ksi)	Pipe	ROHN 3.5 EH	A36M-42 (42 ksi)
T9 20.00-0.00	Pipe	ROHN 12 EH	A572-50 (50 ksi)	Pipe	ROHN 3.5 EH	A36M-42 (42 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 180.00-160.00	Pipe	ROHN 1.5 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T2 160.00-140.00	Pipe	ROHN 2 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T3 140.00-120.00	Pipe	ROHN 2 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T4 120.00-100.00	Pipe	ROHN 2 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T5 100.00-80.00	Pipe	ROHN 2 X-STR	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T6 80.00-60.00	Pipe	ROHN 2.5 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T7 60.00-40.00	Pipe	ROHN 2.5 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T8 40.00-20.00	Pipe	ROHN 3 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T9 20.00-0.00	Pipe	ROHN 3 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180.00-160.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T2 160.00-140.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T3 140.00-120.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T4 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T5 100.00-80.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 X-STR	A572-50 (50 ksi)
T6 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A36 (36 ksi)
T7 60.00-40.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A36 (36 ksi)
T8 40.00-20.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 STD	A36 (36 ksi)
T9 20.00-0.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 STD	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
T1 180.00-160.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A572-50 (50 ksi)
T2 160.00-140.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A572-50 (50 ksi)
T3 140.00-120.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A572-50 (50 ksi)
T4 120.00-100.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A572-50 (50 ksi)
T5 100.00-80.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A572-50 (50 ksi)
T6 80.00-60.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A572-50 (50 ksi)
T7 60.00-40.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A572-50 (50 ksi)
T8 40.00-20.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T9 20.00-0.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	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 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X 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	Yes	Yes	1	1	1	1	1	1	1	1
180.00-160.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
160.00-140.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T9 20.00-0.00	Yes	Yes	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 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		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 180.00-160.00	Flange	0.8750 A325N	4	0.6250 A325N	3	0.6250 A325N	2	0.3750 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T2 160.00-140.00	Flange	1.0000 A325N	4	0.6250 A325N	3	0.6250 A325N	2	0.3750 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T3 140.00-120.00	Flange	1.0000 A325N	6	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T4 120.00-100.00	Flange	1.0000 A325N	8	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T5 100.00-80.00	Flange	1.0000 A325N	12	0.7500 A325N	3	0.7500 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	2	0.6250 A325N	0
T6 80.00-60.00	Flange	1.0000 A325N	12	0.7500 A325N	3	0.7500 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	2	0.6250 A325N	0
T7 60.00-40.00	Flange	1.0000 A325N	16	0.7500 A325N	3	0.7500 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	2	0.6250 A325N	0
T8 40.00-20.00	Flange	1.0000 A325N	16	0.7500 A325N	3	0.7500 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	2	0.6250 A325N	0
T9 20.00-0.00	Flange	1.0000 A354-BC	24	0.7500 A325N	3	0.7500 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	2	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8	B	Yes	Ar (CfAe)	157.00 - 20.00	0.0000	0	12	12	1.9800	1.9800		1.04

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
(AT&T - Existing) 7/8	A	Yes	Ar (CfAe)	180.00 - 20.00	4.0000	0.33	7	4	1.1100	1.1100		0.54
(Town) 1 5/8	A	Yes	Ar (CfAe)	132.00 - 20.00	0.0000	-0.44	12	6	1.9800	1.9800		1.04
(Verizon - Existing) 7/8	C	Yes	Ar (CfAe)	126.00 - 20.00	0.0000	-0.44	6	3	1.1100	1.1100		0.54
(MetroPCS - Existing) 1 5/8	A	Yes	Ar (CfAe)	163.00 - 20.00	0.0000	0.3	12	12	1.9800	1.9800		1.04
(T-Mobile - Existing) 1 5/8	A	Yes	Ar (CfAe)	163.00 - 20.00	3.0000	0.26	6	6	1.9800	1.9800		1.04
(T-Mobile - Existing) 7/8	A	Yes	Ar (CfAe)	146.00 - 20.00	4.0000	0.35	1	1	1.1100	1.1100		0.54
(Town) 1 5/8	A	Yes	Ar (CfAe)	180.00 - 20.00	4.0000	0.37	1	1	1.9800	1.9800		1.04
(Town) 1/2	A	Yes	Ar (CfAe)	132.00 - 20.00	0.0000	-0.42	1	1	0.5800	0.5800		0.25
(Verizon Existing) HYBRIFLEX 1-5/8"	A	Yes	Ar (CfAe)	132.00 - 20.00	0.0000	-0.38	1	1	0.0000	1.9800		1.90
(Verizon - Existing) HYBRIFLEX 1-5/8"	A	Yes	Ar (CfAe)	132.00 - 20.00	3.0000	-0.38	1	1	0.0000	1.9800		1.90
(Verizon - Proposed) 3" dia Flex Conuit	B	Yes	Ar (CfAe)	157.00 - 20.00	0.0000	-0.1	1	1	3.0000	3.0000		5.00
(AT&T - Existing)												

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	180.00-160.00	A	19.610	0.000	0.000	0.000	0.15
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	160.00-140.00	A	70.655	0.000	0.000	0.000	0.47
		B	37.910	0.000	0.000	0.000	0.30
		C	0.000	0.000	0.000	0.000	0.00
T3	140.00-120.00	A	88.370	0.000	0.000	0.000	0.68
		B	44.600	0.000	0.000	0.000	0.35
		C	1.665	0.000	0.000	0.000	0.02
T4	120.00-100.00	A	99.317	0.000	0.000	0.000	0.81
		B	44.600	0.000	0.000	0.000	0.35
		C	5.550	0.000	0.000	0.000	0.06
T5	100.00-80.00	A	99.317	0.000	0.000	0.000	0.81
		B	44.600	0.000	0.000	0.000	0.35
		C	5.550	0.000	0.000	0.000	0.06
T6	80.00-60.00	A	99.317	0.000	0.000	0.000	0.81

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	44.600	0.000	0.000	0.000	0.35
		C	5.550	0.000	0.000	0.000	0.06
T7	60.00-40.00	A	99.317	0.000	0.000	0.000	0.81
		B	44.600	0.000	0.000	0.000	0.35
		C	5.550	0.000	0.000	0.000	0.06
T8	40.00-20.00	A	99.317	0.000	0.000	0.000	0.81
		B	44.600	0.000	0.000	0.000	0.35
		C	5.550	0.000	0.000	0.000	0.06
T9	20.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

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	180.00-160.00	A	0.500	32.443	0.000	0.000	0.000	0.40
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	160.00-140.00	A	0.500	109.488	0.000	0.000	0.000	1.19
		B		56.327	0.000	0.000	0.000	0.64
		C		0.000	0.000	0.000	0.000	0.00
T3	140.00-120.00	A	0.500	137.370	0.000	0.000	0.000	1.68
		B		66.267	0.000	0.000	0.000	0.76
		C		3.165	0.000	0.000	0.000	0.05
T4	120.00-100.00	A	0.500	154.317	0.000	0.000	0.000	1.98
		B		66.267	0.000	0.000	0.000	0.76
		C		10.550	0.000	0.000	0.000	0.18
T5	100.00-80.00	A	0.500	154.317	0.000	0.000	0.000	1.98
		B		66.267	0.000	0.000	0.000	0.76
		C		10.550	0.000	0.000	0.000	0.18
T6	80.00-60.00	A	0.500	154.317	0.000	0.000	0.000	1.98
		B		66.267	0.000	0.000	0.000	0.76
		C		10.550	0.000	0.000	0.000	0.18
T7	60.00-40.00	A	0.500	154.317	0.000	0.000	0.000	1.98
		B		66.267	0.000	0.000	0.000	0.76
		C		10.550	0.000	0.000	0.000	0.18
T8	40.00-20.00	A	0.500	154.317	0.000	0.000	0.000	1.98
		B		66.267	0.000	0.000	0.000	0.76
		C		10.550	0.000	0.000	0.000	0.18
T9	20.00-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00

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	180.00-160.00	A	1.540	3.701	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	160.00-140.00	A	6.750	14.337	0.000	0.000

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
		B	3.622	7.376	0.000	0.000
		C	0.000	0.000	0.000	0.000
T3	140.00-120.00	A	7.894	16.838	0.000	0.000
		B	3.984	8.122	0.000	0.000
		C	0.149	0.388	0.000	0.000
T4	120.00-100.00	A	8.238	17.588	0.000	0.000
		B	3.700	7.553	0.000	0.000
		C	0.460	1.202	0.000	0.000
T5	100.00-80.00	A	6.853	14.104	0.000	0.000
		B	3.077	6.056	0.000	0.000
		C	0.383	0.964	0.000	0.000
T6	80.00-60.00	A	6.823	13.860	0.000	0.000
		B	3.064	5.952	0.000	0.000
		C	0.381	0.948	0.000	0.000
T7	60.00-40.00	A	6.496	13.207	0.000	0.000
		B	2.917	5.672	0.000	0.000
		C	0.363	0.903	0.000	0.000
T8	40.00-20.00	A	7.340	14.416	0.000	0.000
		B	3.296	6.191	0.000	0.000
		C	0.410	0.986	0.000	0.000
T9	20.00-0.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180.00-160.00	-2.5110	-8.8573	-2.8369	-9.9858
T2	160.00-140.00	0.4387	-17.3492	0.2639	-18.5426
T3	140.00-120.00	-2.2856	-15.1624	-2.6116	-16.2555
T4	120.00-100.00	-3.9779	-14.5578	-4.2551	-15.5271
T5	100.00-80.00	-4.3188	-16.1422	-4.7599	-17.7619
T6	80.00-60.00	-4.4830	-17.0389	-5.0436	-19.1588
T7	60.00-40.00	-4.9944	-19.2366	-5.6165	-21.6388
T8	40.00-20.00	-4.9432	-19.2367	-5.6900	-22.1641
T9	20.00-0.00	0.0000	0.0000	0.0000	0.0000

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
15' 2.5" Dia omni	C	From Leg	3.00	0.0000	177.00	No Ice	3.75	3.75	0.05
(Town)			0.00			1/2" Ice	5.28	5.28	0.08
			7.50						
15' 2.5" Dia omni	C	From Leg	3.00	0.0000	177.00	No Ice	3.75	3.75	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
(Town)			0.00 7.50			1/2" Ice	5.28	5.28	0.08
Filter	C	From Leg	3.00	0.0000	177.00	No Ice	0.44	0.44	0.01
(Town)			0.00 0.00			1/2" Ice	0.55	0.55	0.02
15' 2.5" Dia omni	C	From Leg	0.00	0.0000	180.00	No Ice	3.75	3.75	0.05
(Town)			0.00 7.50			1/2" Ice	5.28	5.28	0.08
15' 2.5" Dia omni	A	From Leg	0.00	0.0000	180.00	No Ice	3.75	3.75	0.05
(Town)			0.00 7.50			1/2" Ice	5.28	5.28	0.08
9-ft Omni	A	From Leg	6.00	0.0000	176.00	No Ice	2.25	2.25	0.03
(Town)			0.00 4.50			1/2" Ice	3.18	3.18	0.05
8' x 3" Dia Omni	A	From Leg	6.00	0.0000	176.00	No Ice	2.40	2.40	0.03
(Town)			0.00 -4.00			1/2" Ice	3.19	3.19	0.04
15' 2.5" Dia omni	B	From Leg	0.00	0.0000	180.00	No Ice	3.75	3.75	0.05
(Town)			0.00 7.50			1/2" Ice	5.28	5.28	0.08
9-ft Omni	B	From Leg	6.00	0.0000	176.00	No Ice	2.25	2.25	0.03
(Town)			0.00 4.50			1/2" Ice	3.18	3.18	0.05
Rohn 6' Side-Arm(1)	A	From Leg	3.00	0.0000	178.00	No Ice	6.00	6.00	0.14
(Town)			0.00 0.00			1/2" Ice	8.50	8.50	0.21
Rohn 6' Side-Arm(1)	B	From Leg	3.00	0.0000	178.00	No Ice	6.00	6.00	0.14
(Town)			0.00 0.00			1/2" Ice	8.50	8.50	0.21
Pirod 15' T-Frame Sector Mount (1)	C	From Leg	6.00	0.0000	177.00	No Ice	15.00	15.00	0.50
(Town)			0.00 0.00			1/2" Ice	20.60	20.60	0.65
APX16DWV-16DWV-S-E-A CU	A	From Leg	3.00	0.0000	163.00	No Ice	6.70	2.00	0.04
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	7.13	2.33	0.07
RR90-17-02DP	A	From Leg	3.00	0.0000	163.00	No Ice	4.36	1.97	0.02
(T-Mobile - Existing)			-5.00 0.00			1/2" Ice	4.77	2.31	0.04
RR90-17-02DP	A	From Leg	3.00	0.0000	163.00	No Ice	4.36	1.97	0.02
(T-Mobile - Existing)			5.00 0.00			1/2" Ice	4.77	2.31	0.04
APX16DWV-16DWV-S-E-A CU	B	From Leg	3.00	0.0000	163.00	No Ice	6.70	2.00	0.04
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	7.13	2.33	0.07
RR90-17-02DP	B	From Leg	3.00	0.0000	163.00	No Ice	4.36	1.97	0.02
(T-Mobile - Existing)			-5.00 0.00			1/2" Ice	4.77	2.31	0.04
RR90-17-02DP	B	From Leg	3.00	0.0000	163.00	No Ice	4.36	1.97	0.02
(T-Mobile - Existing)			5.00 0.00			1/2" Ice	4.77	2.31	0.04
APX16DWV-16DWV-S-E-A CU	C	From Leg	3.00	0.0000	163.00	No Ice	6.70	2.00	0.04
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	7.13	2.33	0.07
RR90-17-02DP	C	From Leg	3.00	0.0000	163.00	No Ice	4.36	1.97	0.02
(T-Mobile - Existing)			-5.00 0.00			1/2" Ice	4.77	2.31	0.04
RR90-17-02DP	C	From Leg	3.00	0.0000	163.00	No Ice	4.36	1.97	0.02

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
(T-Mobile - Existing)			5.00 0.00			1/2" Ice	4.77	2.31	0.04
(2) 14"x8"x4" TMA	A	From Leg	3.00	0.0000	163.00	No Ice	1.09	0.54	0.04
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	1.24	0.67	0.05
(2) 14"x8"x4" TMA	B	From Leg	3.00	0.0000	163.00	No Ice	1.09	0.54	0.04
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	1.24	0.67	0.05
(2) 14"x8"x4" TMA	C	From Leg	3.00	0.0000	163.00	No Ice	1.09	0.54	0.04
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	1.24	0.67	0.05
14"x9"x5" TMA	A	From Leg	3.00	0.0000	163.00	No Ice	1.23	0.68	0.04
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	1.38	0.81	0.05
14"x9"x5" TMA	B	From Leg	3.00	0.0000	163.00	No Ice	1.23	0.68	0.04
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	1.38	0.81	0.05
14"x9"x5" TMA	C	From Leg	3.00	0.0000	163.00	No Ice	1.23	0.68	0.04
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	1.38	0.81	0.05
Valmont 10' Wireless Frame	A	From Leg	3.00	0.0000	163.00	No Ice	30.70	30.70	0.71
(3)			0.00			1/2" Ice	42.00	42.00	0.86
(T-Mobile - Existing)			0.00						
(2) 7770.00	A	From Leg	6.00	0.0000	157.00	No Ice	5.88	2.93	0.04
(AT&T - Existing)			0.00 0.00			1/2" Ice	6.31	3.27	0.07
(2) 7770.00	B	From Leg	6.00	0.0000	157.00	No Ice	5.88	2.93	0.04
(AT&T - Existing)			0.00 0.00			1/2" Ice	6.31	3.27	0.07
(2) 7770.00	C	From Leg	6.00	0.0000	157.00	No Ice	5.88	2.93	0.04
(AT&T - Existing)			0.00 0.00			1/2" Ice	6.31	3.27	0.07
(2) LGP21401 TMA	A	From Leg	6.00	0.0000	157.00	No Ice	0.95	0.37	0.02
(AT&T - Existing)			0.00 0.00			1/2" Ice	1.09	0.48	0.02
(2) LGP21401 TMA	B	From Leg	6.00	0.0000	157.00	No Ice	0.95	0.37	0.02
(AT&T - Existing)			0.00 0.00			1/2" Ice	1.09	0.48	0.02
(2) LGP21401 TMA	C	From Leg	6.00	0.0000	157.00	No Ice	0.95	0.37	0.02
(AT&T - Existing)			0.00 0.00			1/2" Ice	1.09	0.48	0.02
(2) LGP13519 Diplexer	A	From Leg	6.00	0.0000	157.00	No Ice	0.27	0.18	0.01
(AT&T - Existing)			0.00 0.00			1/2" Ice	0.34	0.25	0.01
(2) LGP13519 Diplexer	B	From Leg	6.00	0.0000	157.00	No Ice	0.27	0.18	0.01
(AT&T - Existing)			0.00 0.00			1/2" Ice	0.34	0.25	0.01
(2) LGP13519 Diplexer	C	From Leg	6.00	0.0000	157.00	No Ice	0.27	0.18	0.01
(AT&T - Existing)			0.00 0.00			1/2" Ice	0.34	0.25	0.01
SBNH-1D6565C	A	From Leg	6.00	0.0000	157.00	No Ice	11.41	7.70	0.06
(AT&T - Existing)			0.00 0.00			1/2" Ice	12.03	8.29	0.13
SBNH-1D6565C	B	From Leg	6.00	0.0000	157.00	No Ice	11.41	7.70	0.06
(AT&T - Existing)			0.00 0.00			1/2" Ice	12.03	8.29	0.13
P65-17-XLH-RR	C	From Leg	6.00	0.0000	157.00	No Ice	11.47	6.80	0.06

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
(AT&T - Existing)			0.00 0.00			1/2" Ice	12.08	7.38	0.12
(2) RRUS-11	A	From Leg	6.00	0.0000	157.00	No Ice	2.99	1.25	0.05
(AT&T - Existing)			0.00 0.00			1/2" Ice	3.23	1.41	0.07
(2) RRUS-11	B	From Leg	6.00	0.0000	157.00	No Ice	2.99	1.25	0.05
(AT&T - Existing)			0.00 0.00			1/2" Ice	3.23	1.41	0.07
(2) RRUS-11	C	From Leg	6.00	0.0000	157.00	No Ice	2.99	1.25	0.05
(AT&T - Existing)			0.00 0.00			1/2" Ice	3.23	1.41	0.07
DC6-48-60-18-8F Surge Arrestor	A	From Leg	6.00	0.0000	157.00	No Ice	2.23	2.23	0.02
(AT&T - Existing)			0.00 0.00			1/2" Ice	2.45	2.45	0.04
Rohn 6'x14' Boom Gate (3)	A	From Leg	3.00	0.0000	157.00	No Ice	52.00	52.00	1.75
(AT&T - Existing)			0.00 0.00			1/2" Ice	61.90	61.90	2.19
12' x 2" Dia Omni	C	From Leg	6.00	0.0000	146.00	No Ice	2.40	2.40	0.03
(Town)			0.00 6.00			1/2" Ice	3.63	3.63	0.05
Rohn 6' Side-Arm(1)	C	From Leg	3.00	0.0000	142.00	No Ice	6.00	6.00	0.14
(Town)			0.00 0.00			1/2" Ice	8.50	8.50	0.21
LNX-6512DS	A	From Leg	5.00	0.0000	135.00	No Ice	5.61	3.35	0.03
(Verizon - Proposed)			-6.00 0.00			1/2" Ice	6.01	3.71	0.06
SBNHH-1D65B	A	From Leg	5.00	0.0000	135.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			-4.00 0.00			1/2" Ice	8.88	5.79	0.09
SBNHH-1D65B	A	From Leg	5.00	0.0000	135.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			0.00 0.00			1/2" Ice	8.88	5.79	0.09
LNX-6512DS	B	From Leg	5.00	0.0000	135.00	No Ice	5.61	3.35	0.03
(Verizon - Proposed)			-6.00 0.00			1/2" Ice	6.01	3.71	0.06
SBNHH-1D65B	B	From Leg	5.00	0.0000	135.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			-4.00 0.00			1/2" Ice	8.88	5.79	0.09
SBNHH-1D65B	B	From Leg	5.00	0.0000	135.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			0.00 0.00			1/2" Ice	8.88	5.79	0.09
LNX-6512DS	C	From Leg	5.00	0.0000	135.00	No Ice	5.61	3.35	0.03
(Verizon - Proposed)			-6.00 0.00			1/2" Ice	6.01	3.71	0.06
SBNHH-1D65B	C	From Leg	5.00	0.0000	135.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			-4.00 0.00			1/2" Ice	8.88	5.79	0.09
SBNHH-1D65B	C	From Leg	5.00	0.0000	135.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			0.00 0.00			1/2" Ice	8.88	5.79	0.09
RRH4x30-B13	A	From Leg	5.00	0.0000	135.00	No Ice	2.52	1.89	0.06
(Verizon - Proposed)			4.00 0.00			1/2" Ice	2.74	2.09	0.08
RRH4x30-B13	B	From Leg	5.00	0.0000	135.00	No Ice	2.52	1.89	0.06
(Verizon - Proposed)			4.00 0.00			1/2" Ice	2.74	2.09	0.08
RRH4x30-B13	C	From Leg	5.00	0.0000	135.00	No Ice	2.52	1.89	0.06

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
(Verizon - Proposed)			4.00 0.00			1/2" Ice	2.74	2.09	0.08
RRH4x45/2x90-AWS	A	From Leg	5.00	0.0000	135.00	No Ice	3.01	1.91	0.08
(Verizon - Proposed)			4.00 0.00			1/2" Ice	3.26	2.13	0.10
RRH4x45/2x90-AWS	B	From Leg	5.00	0.0000	135.00	No Ice	3.01	1.91	0.08
(Verizon - Proposed)			4.00 0.00			1/2" Ice	3.26	2.13	0.10
RRH4x45/2x90-AWS	C	From Leg	5.00	0.0000	135.00	No Ice	3.01	1.91	0.08
(Verizon - Proposed)			4.00 0.00			1/2" Ice	3.26	2.13	0.10
RRH2x60-PCS	A	From Leg	5.00	0.0000	135.00	No Ice	2.51	1.55	0.06
(Verizon - Proposed)			4.00 0.00			1/2" Ice	2.73	1.74	0.07
RRH2x60-PCS	B	From Leg	5.00	0.0000	135.00	No Ice	2.51	1.55	0.06
(Verizon - Proposed)			4.00 0.00			1/2" Ice	2.73	1.74	0.07
RRH2x60-PCS	C	From Leg	5.00	0.0000	135.00	No Ice	2.51	1.55	0.06
(Verizon - Proposed)			4.00 0.00			1/2" Ice	2.73	1.74	0.07
DB-T1-6Z-8AB-0Z	A	From Leg	5.00	0.0000	135.00	No Ice	5.60	2.33	0.04
(Verizon - Existing)			4.00 0.00			1/2" Ice	5.92	2.56	0.08
DB-T1-6Z-8AB-0Z	B	From Leg	5.00	0.0000	135.00	No Ice	5.60	2.33	0.04
(Verizon - Proposed)			4.00 0.00			1/2" Ice	5.92	2.56	0.08
Rohn 6'x14' Boom Gate (3)	A	From Leg	3.00	0.0000	135.00	No Ice	52.00	52.00	1.75
(Verizon - Existing)			0.00 0.00			1/2" Ice	61.90	61.90	2.19
800-10504	A	From Leg	4.00	0.0000	126.50	No Ice	3.35	1.86	0.02
(MetroPCS - Existing)			-5.00 0.00			1/2" Ice	3.70	2.19	0.04
800-10504	B	From Leg	4.00	0.0000	126.50	No Ice	3.35	1.86	0.02
(MetroPCS - Existing)			-5.00 0.00			1/2" Ice	3.70	2.19	0.04
800-10504	C	From Leg	4.00	0.0000	126.50	No Ice	3.35	1.86	0.02
(MetroPCS - Existing)			-5.00 0.00			1/2" Ice	3.70	2.19	0.04
10-ft T-Frame	A	From Leg	3.00	0.0000	125.00	No Ice	13.60	13.60	0.38
(MetroPCS - Existing)			0.00 0.00			1/2" Ice	17.50	17.50	0.53
10-ft T-Frame	B	From Leg	3.00	0.0000	125.00	No Ice	13.60	13.60	0.38
(MetroPCS - Existing)			0.00 0.00			1/2" Ice	17.50	17.50	0.53
10-ft T-Frame	C	From Leg	3.00	0.0000	125.00	No Ice	13.60	13.60	0.38
(MetroPCS - Existing)			0.00 0.00			1/2" Ice	17.50	17.50	0.53
1' Standoff Pipe	C	From Leg	0.50	0.0000	50.00	No Ice	0.16	0.16	0.01
(Verizon - Existing)			0.00 0.00			1/2" Ice	0.23	0.23	0.01
GPS	C	From Leg	1.00	0.0000	51.00	No Ice	1.00	1.00	0.01
(Verizon - Existing)			0.00 0.00			1/2" Ice	1.50	1.50	0.01

Tower Pressures - No Ice

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 180.00-160.00	170.00	1.597	37	177.533	A	0.000	42.770	11.667	27.28	0.000	0.000
					B	0.000	24.700		47.23	0.000	0.000
					C	0.000	24.700		47.23	0.000	0.000
T2 160.00-140.00	150.00	1.541	36	180.900	A	0.000	94.781	15.000	15.83	0.000	0.000
					B	0.000	65.164		23.02	0.000	0.000
					C	0.000	30.876		48.58	0.000	0.000
T3 140.00-120.00	130.00	1.48	34	204.284	A	0.000	115.854	18.577	16.03	0.000	0.000
					B	0.000	75.994		24.44	0.000	0.000
					C	0.000	36.894		50.35	0.000	0.000
T4 120.00-100.00	110.00	1.411	33	248.257	A	0.000	132.140	22.125	16.74	0.000	0.000
					B	0.000	81.962		26.99	0.000	0.000
					C	0.000	46.152		47.94	0.000	0.000
T5 100.00-80.00	90.00	1.332	31	297.001	A	0.000	140.177	28.819	20.56	0.000	0.000
					B	0.000	89.236		32.30	0.000	0.000
					C	0.000	52.880		54.50	0.000	0.000
T6 80.00-60.00	70.00	1.24	29	349.552	A	0.000	150.274	35.927	23.91	0.000	0.000
					B	0.000	99.317		36.17	0.000	0.000
					C	0.000	62.950		57.07	0.000	0.000
T7 60.00-40.00	50.00	1.126	26	401.056	A	0.000	152.880	35.938	23.51	0.000	0.000
					B	0.000	101.742		35.32	0.000	0.000
					C	0.000	65.246		55.08	0.000	0.000
T8 40.00-20.00	30.00	1	23	455.891	A	0.000	165.382	42.611	25.76	0.000	0.000
					B	0.000	114.709		37.15	0.000	0.000
					C	0.000	78.545		54.25	0.000	0.000
T9 20.00-0.00	10.00	1	23	505.891	A	0.000	76.126	42.611	55.97	0.000	0.000
					B	0.000	76.126		55.97	0.000	0.000
					C	0.000	76.126		55.97	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 180.00-160.00	170.00	1.597	28	0.5000	179.200	A	0.000	62.677	15.000	23.93	0.000	0.000
						B	0.000	33.935		44.20	0.000	0.000
						C	0.000	33.935		44.20	0.000	0.000
T2 160.00-140.00	150.00	1.541	27	0.5000	182.567	A	0.000	135.244	18.333	13.56	0.000	0.000
						B	0.000	89.044		20.59	0.000	0.000
						C	0.000	40.093		45.73	0.000	0.000
T3 140.00-120.00	130.00	1.48	26	0.5000	205.953	A	0.000	165.484	21.916	13.24	0.000	0.000
						B	0.000	103.096		21.26	0.000	0.000
						C	0.000	47.728		45.92	0.000	0.000
T4 120.00-100.00	110.00	1.411	24	0.5000	249.927	A	0.000	188.194	25.465	13.53	0.000	0.000
						B	0.000	110.180		23.11	0.000	0.000
						C	0.000	60.813		41.87	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T5 100.00-80.00	90.00	1.332	23	0.5000	298.671	A	0.000	197.357	32.160	16.30	0.000	0.000
						B	0.000	117.354		27.40	0.000	0.000
						C	0.000	66.730		48.19	0.000	0.000
T6 80.00-60.00	70.00	1.24	21	0.5000	351.222	A	0.000	208.274	39.269	18.85	0.000	0.000
						B	0.000	128.133		30.65	0.000	0.000
						C	0.000	77.420		50.72	0.000	0.000
T7 60.00-40.00	50.00	1.126	20	0.5000	402.726	A	0.000	211.927	39.281	18.54	0.000	0.000
						B	0.000	131.413		29.89	0.000	0.000
						C	0.000	80.465		48.82	0.000	0.000
T8 40.00-20.00	30.00	1	17	0.5000	457.561	A	0.000	224.765	45.953	20.44	0.000	0.000
						B	0.000	144.941		31.70	0.000	0.000
						C	0.000	94.429		48.66	0.000	0.000
T9 20.00-0.00	10.00	1	17	0.5000	507.561	A	0.000	88.317	45.953	52.03	0.000	0.000
						B	0.000	88.317		52.03	0.000	0.000
						C	0.000	88.317		52.03	0.000	0.000

Tower Pressure - Service

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 180.00-160.00	170.00	1.597	10	177.533	A	0.000	42.770	11.667	27.28	0.000	0.000
					B	0.000	24.700		47.23	0.000	0.000
					C	0.000	24.700		47.23	0.000	0.000
T2 160.00-140.00	150.00	1.541	10	180.900	A	0.000	94.781	15.000	15.83	0.000	0.000
					B	0.000	65.164		23.02	0.000	0.000
					C	0.000	30.876		48.58	0.000	0.000
T3 140.00-120.00	130.00	1.48	9	204.284	A	0.000	115.854	18.577	16.03	0.000	0.000
					B	0.000	75.994		24.44	0.000	0.000
					C	0.000	36.894		50.35	0.000	0.000
T4 120.00-100.00	110.00	1.411	9	248.257	A	0.000	132.140	22.125	16.74	0.000	0.000
					B	0.000	81.962		26.99	0.000	0.000
					C	0.000	46.152		47.94	0.000	0.000
T5 100.00-80.00	90.00	1.332	9	297.001	A	0.000	140.177	28.819	20.56	0.000	0.000
					B	0.000	89.236		32.30	0.000	0.000
					C	0.000	52.880		54.50	0.000	0.000
T6 80.00-60.00	70.00	1.24	8	349.552	A	0.000	150.274	35.927	23.91	0.000	0.000
					B	0.000	99.317		36.17	0.000	0.000
					C	0.000	62.950		57.07	0.000	0.000
T7 60.00-40.00	50.00	1.126	7	401.056	A	0.000	152.880	35.938	23.51	0.000	0.000
					B	0.000	101.742		35.32	0.000	0.000
					C	0.000	65.246		55.08	0.000	0.000
T8 40.00-20.00	30.00	1	6	455.891	A	0.000	165.382	42.611	25.76	0.000	0.000
					B	0.000	114.709		37.15	0.000	0.000
					C	0.000	78.545		54.25	0.000	0.000
T9 20.00-0.00	10.00	1	6	505.891	A	0.000	76.126	42.611	55.97	0.000	0.000
					B	0.000	76.126		55.97	0.000	0.000
					C	0.000	76.126		55.97	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.241	2.465	0.6	1	1	25.645	2.62	130.75	A
180.00-160.00			B	0.139	2.812	0.58	1	1	14.323			
			C	0.139	2.812	0.58	1	1	14.323			
T2	0.77	1.83	A	0.524	1.871	0.71	1	1	67.295	5.02	251.25	A
160.00-140.00			B	0.36	2.148	0.636	1	1	41.456			
			C	0.171	2.697	0.585	1	1	18.058			
T3	1.05	2.50	A	0.567	1.828	0.734	1	1	85.040	5.96	297.82	A
140.00-120.00			B	0.372	2.122	0.641	1	1	48.680			
			C	0.181	2.662	0.587	1	1	21.644			
T4	1.23	3.13	A	0.532	1.862	0.714	1	1	94.413	6.42	321.01	A
120.00-100.00			B	0.33	2.219	0.626	1	1	51.275			
			C	0.186	2.644	0.588	1	1	27.120			
T5	1.23	4.62	A	0.472	1.939	0.684	1	1	95.826	6.41	320.47	A
100.00-80.00			B	0.3	2.295	0.616	1	1	54.973			
			C	0.178	2.671	0.586	1	1	30.997			
T6	1.23	5.62	A	0.43	2.008	0.664	1	1	99.821	6.43	321.71	A
80.00-60.00			B	0.284	2.339	0.611	1	1	60.700			
			C	0.18	2.664	0.587	1	1	36.922			
T7	1.23	5.88	A	0.381	2.102	0.644	1	1	98.471	6.04	301.86	A
60.00-40.00			B	0.254	2.426	0.603	1	1	61.332			
			C	0.163	2.725	0.583	1	1	38.071			
T8	1.23	7.52	A	0.363	2.142	0.637	1	1	105.367	5.85	292.30	A
40.00-20.00			B	0.252	2.433	0.602	1	1	69.088			
			C	0.172	2.691	0.585	1	1	45.960			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	0.582	1	1	44.271	3.18	158.77	C
			B	0.15	2.77	0.582	1	1	44.271			
			C	0.15	2.77	0.582	1	1	44.271			
Sum Weight:	8.11	40.16						OTM	4215.10 kip-ft	47.92		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.241	2.465	0.6	0.825	1	25.645	2.62	130.75	A
180.00-160.00			B	0.139	2.812	0.58	0.825	1	14.323			
			C	0.139	2.812	0.58	0.825	1	14.323			
T2	0.77	1.83	A	0.524	1.871	0.71	0.825	1	67.295	5.02	251.25	A
160.00-140.00			B	0.36	2.148	0.636	0.825	1	41.456			
			C	0.171	2.697	0.585	0.825	1	18.058			
T3	1.05	2.50	A	0.567	1.828	0.734	0.825	1	85.040	5.96	297.82	A
140.00-120.00			B	0.372	2.122	0.641	0.825	1	48.680			
			C	0.181	2.662	0.587	0.825	1	21.644			
T4	1.23	3.13	A	0.532	1.862	0.714	0.825	1	94.413	6.42	321.01	A
120.00-100.00			B	0.33	2.219	0.626	0.825	1	51.275			
			C	0.186	2.644	0.588	0.825	1	27.120			
T5	1.23	4.62	A	0.472	1.939	0.684	0.825	1	95.826	6.41	320.47	A
100.00-80.00			B	0.3	2.295	0.616	0.825	1	54.973			
			C	0.178	2.671	0.586	0.825	1	30.997			
T6	1.23	5.62	A	0.43	2.008	0.664	0.825	1	99.821	6.43	321.71	A
80.00-60.00			B	0.284	2.339	0.611	0.825	1	60.700			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.18	2.664	0.587	0.825	1	36.922			
T7	1.23	5.88	A	0.381	2.102	0.644	0.825	1	98.471	6.04	301.86	A
60.00-40.00			B	0.254	2.426	0.603	0.825	1	61.332			
			C	0.163	2.725	0.583	0.825	1	38.071			
T8	1.23	7.52	A	0.363	2.142	0.637	0.825	1	105.367	5.85	292.30	A
40.00-20.00			B	0.252	2.433	0.602	0.825	1	69.088			
			C	0.172	2.691	0.585	0.825	1	45.960			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	0.582	0.825	1	44.271	3.18	158.77	C
			B	0.15	2.77	0.582	0.825	1	44.271			
			C	0.15	2.77	0.582	0.825	1	44.271			
Sum Weight:	8.11	40.16						OTM	4215.10 kip-ft	47.92		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.241	2.465	0.6	0.8	1	25.645	2.62	130.75	A
180.00-160.00			B	0.139	2.812	0.58	0.8	1	14.323			
			C	0.139	2.812	0.58	0.8	1	14.323			
T2	0.77	1.83	A	0.524	1.871	0.71	0.8	1	67.295	5.02	251.25	A
160.00-140.00			B	0.36	2.148	0.636	0.8	1	41.456			
			C	0.171	2.697	0.585	0.8	1	18.058			
T3	1.05	2.50	A	0.567	1.828	0.734	0.8	1	85.040	5.96	297.82	A
140.00-120.00			B	0.372	2.122	0.641	0.8	1	48.680			
			C	0.181	2.662	0.587	0.8	1	21.644			
T4	1.23	3.13	A	0.532	1.862	0.714	0.8	1	94.413	6.42	321.01	A
120.00-100.00			B	0.33	2.219	0.626	0.8	1	51.275			
			C	0.186	2.644	0.588	0.8	1	27.120			
T5	1.23	4.62	A	0.472	1.939	0.684	0.8	1	95.826	6.41	320.47	A
100.00-80.00			B	0.3	2.295	0.616	0.8	1	54.973			
			C	0.178	2.671	0.586	0.8	1	30.997			
T6	1.23	5.62	A	0.43	2.008	0.664	0.8	1	99.821	6.43	321.71	A
80.00-60.00			B	0.284	2.339	0.611	0.8	1	60.700			
			C	0.18	2.664	0.587	0.8	1	36.922			
T7	1.23	5.88	A	0.381	2.102	0.644	0.8	1	98.471	6.04	301.86	A
60.00-40.00			B	0.254	2.426	0.603	0.8	1	61.332			
			C	0.163	2.725	0.583	0.8	1	38.071			
T8	1.23	7.52	A	0.363	2.142	0.637	0.8	1	105.367	5.85	292.30	A
40.00-20.00			B	0.252	2.433	0.602	0.8	1	69.088			
			C	0.172	2.691	0.585	0.8	1	45.960			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	0.582	0.8	1	44.271	3.18	158.77	C
			B	0.15	2.77	0.582	0.8	1	44.271			
			C	0.15	2.77	0.582	0.8	1	44.271			
Sum Weight:	8.11	40.16						OTM	4215.10 kip-ft	47.92		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.241	2.465	0.6	0.85	1	25.645	2.62	130.75	A
180.00-160.00			B	0.139	2.812	0.58	0.85	1	14.323			
			C	0.139	2.812	0.58	0.85	1	14.323			
T2	0.77	1.83	A	0.524	1.871	0.71	0.85	1	67.295	5.02	251.25	A
160.00-140.00			B	0.36	2.148	0.636	0.85	1	41.456			
			C	0.171	2.697	0.585	0.85	1	18.058			
T3	1.05	2.50	A	0.567	1.828	0.734	0.85	1	85.040	5.96	297.82	A
140.00-120.00			B	0.372	2.122	0.641	0.85	1	48.680			
			C	0.181	2.662	0.587	0.85	1	21.644			
T4	1.23	3.13	A	0.532	1.862	0.714	0.85	1	94.413	6.42	321.01	A
120.00-100.00			B	0.33	2.219	0.626	0.85	1	51.275			
			C	0.186	2.644	0.588	0.85	1	27.120			
T5	1.23	4.62	A	0.472	1.939	0.684	0.85	1	95.826	6.41	320.47	A
100.00-80.00			B	0.3	2.295	0.616	0.85	1	54.973			
			C	0.178	2.671	0.586	0.85	1	30.997			
T6	1.23	5.62	A	0.43	2.008	0.664	0.85	1	99.821	6.43	321.71	A
80.00-60.00			B	0.284	2.339	0.611	0.85	1	60.700			
			C	0.18	2.664	0.587	0.85	1	36.922			
T7	1.23	5.88	A	0.381	2.102	0.644	0.85	1	98.471	6.04	301.86	A
60.00-40.00			B	0.254	2.426	0.603	0.85	1	61.332			
			C	0.163	2.725	0.583	0.85	1	38.071			
T8	1.23	7.52	A	0.363	2.142	0.637	0.85	1	105.367	5.85	292.30	A
40.00-20.00			B	0.252	2.433	0.602	0.85	1	69.088			
			C	0.172	2.691	0.585	0.85	1	45.960			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	0.582	0.85	1	44.271	3.18	158.77	C
			B	0.15	2.77	0.582	0.85	1	44.271			
			C	0.15	2.77	0.582	0.85	1	44.271			
Sum Weight:	8.11	40.16						OTM	4215.10 kip-ft	47.92		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.40	1.84	A	0.35	2.172	0.632	1	1	39.636	2.67	133.55	A
180.00-160.00			B	0.189	2.632	0.588	1	1	19.964			
			C	0.189	2.632	0.588	1	1	19.964			
T2	1.84	2.52	A	0.741	1.784	0.85	1	1	114.941	6.14	306.94	A
160.00-140.00			B	0.488	1.916	0.691	1	1	61.558			
			C	0.22	2.532	0.595	1	1	23.839			
T3	2.49	3.27	A	0.804	1.819	0.899	1	1	148.813	7.78	388.85	A
140.00-120.00			B	0.501	1.899	0.698	1	1	71.940			
			C	0.232	2.493	0.597	1	1	28.512			
T4	2.92	4.01	A	0.753	1.789	0.859	1	1	161.691	7.92	396.19	A
120.00-100.00			B	0.441	1.989	0.669	1	1	73.723			
			C	0.243	2.458	0.6	1	1	36.500			
T5	2.92	5.54	A	0.661	1.779	0.793	1	1	156.442	7.20	359.97	A
100.00-80.00			B	0.393	2.078	0.649	1	1	76.132			
			C	0.223	2.52	0.595	1	1	39.735			
T6	2.92	6.73	A	0.593	1.809	0.749	1	1	156.068	6.80	339.80	A
80.00-60.00			B	0.365	2.138	0.638	1	1	81.733			
			C	0.22	2.529	0.595	1	1	46.048			
T7	2.92	7.09	A	0.526	1.868	0.711	1	1	150.729	6.16	307.94	A
60.00-40.00			B	0.326	2.228	0.624	1	1	82.042			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.2	2.597	0.59	1	1	47.503			
T8	2.92	9.00	A	0.491	1.912	0.693	1	1	155.777	5.78	289.19	A
40.00-20.00			B	0.317	2.252	0.621	1	1	90.033			
			C	0.206	2.575	0.592	1	1	55.876			
T9 20.00-0.00	0.00	9.40	A	0.174	2.685	0.585	1	1	51.704	2.70	134.82	C
			B	0.174	2.685	0.585	1	1	51.704			
			C	0.174	2.685	0.585	1	1	51.704			
Sum Weight:	19.33	49.38						OTM	4889.58 kip-ft	53.14		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.40	1.84	A	0.35	2.172	0.632	0.825	1	39.636	2.67	133.55	A
180.00-160.00			B	0.189	2.632	0.588	0.825	1	19.964			
			C	0.189	2.632	0.588	0.825	1	19.964			
T2	1.84	2.52	A	0.741	1.784	0.85	0.825	1	114.941	6.14	306.94	A
160.00-140.00			B	0.488	1.916	0.691	0.825	1	61.558			
			C	0.22	2.532	0.595	0.825	1	23.839			
T3	2.49	3.27	A	0.804	1.819	0.899	0.825	1	148.813	7.78	388.85	A
140.00-120.00			B	0.501	1.899	0.698	0.825	1	71.940			
			C	0.232	2.493	0.597	0.825	1	28.512			
T4	2.92	4.01	A	0.753	1.789	0.859	0.825	1	161.691	7.92	396.19	A
120.00-100.00			B	0.441	1.989	0.669	0.825	1	73.723			
			C	0.243	2.458	0.6	0.825	1	36.500			
T5	2.92	5.54	A	0.661	1.779	0.793	0.825	1	156.442	7.20	359.97	A
100.00-80.00			B	0.393	2.078	0.649	0.825	1	76.132			
			C	0.223	2.52	0.595	0.825	1	39.735			
T6	2.92	6.73	A	0.593	1.809	0.749	0.825	1	156.068	6.80	339.80	A
80.00-60.00			B	0.365	2.138	0.638	0.825	1	81.733			
			C	0.22	2.529	0.595	0.825	1	46.048			
T7	2.92	7.09	A	0.526	1.868	0.711	0.825	1	150.729	6.16	307.94	A
60.00-40.00			B	0.326	2.228	0.624	0.825	1	82.042			
			C	0.2	2.597	0.59	0.825	1	47.503			
T8	2.92	9.00	A	0.491	1.912	0.693	0.825	1	155.777	5.78	289.19	A
40.00-20.00			B	0.317	2.252	0.621	0.825	1	90.033			
			C	0.206	2.575	0.592	0.825	1	55.876			
T9 20.00-0.00	0.00	9.40	A	0.174	2.685	0.585	0.825	1	51.704	2.70	134.82	C
			B	0.174	2.685	0.585	0.825	1	51.704			
			C	0.174	2.685	0.585	0.825	1	51.704			
Sum Weight:	19.33	49.38						OTM	4889.58 kip-ft	53.14		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.40	1.84	A	0.35	2.172	0.632	0.8	1	39.636	2.67	133.55	A
180.00-160.00			B	0.189	2.632	0.588	0.8	1	19.964			
			C	0.189	2.632	0.588	0.8	1	19.964			
T2	1.84	2.52	A	0.741	1.784	0.85	0.8	1	114.941	6.14	306.94	A
160.00-140.00			B	0.488	1.916	0.691	0.8	1	61.558			
			C	0.22	2.532	0.595	0.8	1	23.839			
T3	2.49	3.27	A	0.804	1.819	0.899	0.8	1	148.813	7.78	388.85	A
140.00-120.00			B	0.501	1.899	0.698	0.8	1	71.940			
			C	0.232	2.493	0.597	0.8	1	28.512			
T4	2.92	4.01	A	0.753	1.789	0.859	0.8	1	161.691	7.92	396.19	A
120.00-100.00			B	0.441	1.989	0.669	0.8	1	73.723			
			C	0.243	2.458	0.6	0.8	1	36.500			
T5	2.92	5.54	A	0.661	1.779	0.793	0.8	1	156.442	7.20	359.97	A
100.00-80.00			B	0.393	2.078	0.649	0.8	1	76.132			
			C	0.223	2.52	0.595	0.8	1	39.735			
T6	2.92	6.73	A	0.593	1.809	0.749	0.8	1	156.068	6.80	339.80	A
80.00-60.00			B	0.365	2.138	0.638	0.8	1	81.733			
			C	0.22	2.529	0.595	0.8	1	46.048			
T7	2.92	7.09	A	0.526	1.868	0.711	0.8	1	150.729	6.16	307.94	A
60.00-40.00			B	0.326	2.228	0.624	0.8	1	82.042			
			C	0.2	2.597	0.59	0.8	1	47.503			
T8	2.92	9.00	A	0.491	1.912	0.693	0.8	1	155.777	5.78	289.19	A
40.00-20.00			B	0.317	2.252	0.621	0.8	1	90.033			
			C	0.206	2.575	0.592	0.8	1	55.876			
T9 20.00-0.00	0.00	9.40	A	0.174	2.685	0.585	0.8	1	51.704	2.70	134.82	C
			B	0.174	2.685	0.585	0.8	1	51.704			
			C	0.174	2.685	0.585	0.8	1	51.704			
Sum Weight:	19.33	49.38						OTM	4889.58 kip-ft	53.14		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.40	1.84	A	0.35	2.172	0.632	0.85	1	39.636	2.67	133.55	A
180.00-160.00			B	0.189	2.632	0.588	0.85	1	19.964			
			C	0.189	2.632	0.588	0.85	1	19.964			
T2	1.84	2.52	A	0.741	1.784	0.85	0.85	1	114.941	6.14	306.94	A
160.00-140.00			B	0.488	1.916	0.691	0.85	1	61.558			
			C	0.22	2.532	0.595	0.85	1	23.839			
T3	2.49	3.27	A	0.804	1.819	0.899	0.85	1	148.813	7.78	388.85	A
140.00-120.00			B	0.501	1.899	0.698	0.85	1	71.940			
			C	0.232	2.493	0.597	0.85	1	28.512			
T4	2.92	4.01	A	0.753	1.789	0.859	0.85	1	161.691	7.92	396.19	A
120.00-100.00			B	0.441	1.989	0.669	0.85	1	73.723			
			C	0.243	2.458	0.6	0.85	1	36.500			
T5	2.92	5.54	A	0.661	1.779	0.793	0.85	1	156.442	7.20	359.97	A
100.00-80.00			B	0.393	2.078	0.649	0.85	1	76.132			
			C	0.223	2.52	0.595	0.85	1	39.735			
T6	2.92	6.73	A	0.593	1.809	0.749	0.85	1	156.068	6.80	339.80	A
80.00-60.00			B	0.365	2.138	0.638	0.85	1	81.733			
			C	0.22	2.529	0.595	0.85	1	46.048			
T7	2.92	7.09	A	0.526	1.868	0.711	0.85	1	150.729	6.16	307.94	A
60.00-40.00			B	0.326	2.228	0.624	0.85	1	82.042			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.2	2.597	0.59	0.85	1	47.503			
T8	2.92	9.00	A	0.491	1.912	0.693	0.85	1	155.777	5.78	289.19	A
40.00-20.00			B	0.317	2.252	0.621	0.85	1	90.033			
			C	0.206	2.575	0.592	0.85	1	55.876			
T9 20.00-0.00	0.00	9.40	A	0.174	2.685	0.585	0.85	1	51.704	2.70	134.82	C
			B	0.174	2.685	0.585	0.85	1	51.704			
			C	0.174	2.685	0.585	0.85	1	51.704			
Sum Weight:	19.33	49.38						OTM	4889.58 kip-ft	53.14		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.241	2.465	0.6	1	1	25.645	0.72	36.22	A
180.00-160.00			B	0.139	2.812	0.58	1	1	14.323			
			C	0.139	2.812	0.58	1	1	14.323			
T2	0.77	1.83	A	0.524	1.871	0.71	1	1	67.295	1.39	69.60	A
160.00-140.00			B	0.36	2.148	0.636	1	1	41.456			
			C	0.171	2.697	0.585	1	1	18.058			
T3	1.05	2.50	A	0.567	1.828	0.734	1	1	85.040	1.65	82.50	A
140.00-120.00			B	0.372	2.122	0.641	1	1	48.680			
			C	0.181	2.662	0.587	1	1	21.644			
T4	1.23	3.13	A	0.532	1.862	0.714	1	1	94.413	1.78	88.92	A
120.00-100.00			B	0.33	2.219	0.626	1	1	51.275			
			C	0.186	2.644	0.588	1	1	27.120			
T5	1.23	4.62	A	0.472	1.939	0.684	1	1	95.826	1.78	88.77	A
100.00-80.00			B	0.3	2.295	0.616	1	1	54.973			
			C	0.178	2.671	0.586	1	1	30.997			
T6	1.23	5.62	A	0.43	2.008	0.664	1	1	99.821	1.78	89.12	A
80.00-60.00			B	0.284	2.339	0.611	1	1	60.700			
			C	0.18	2.664	0.587	1	1	36.922			
T7	1.23	5.88	A	0.381	2.102	0.644	1	1	98.471	1.67	83.62	A
60.00-40.00			B	0.254	2.426	0.603	1	1	61.332			
			C	0.163	2.725	0.583	1	1	38.071			
T8	1.23	7.52	A	0.363	2.142	0.637	1	1	105.367	1.62	80.97	A
40.00-20.00			B	0.252	2.433	0.602	1	1	69.088			
			C	0.172	2.691	0.585	1	1	45.960			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	0.582	1	1	44.271	0.88	43.98	C
			B	0.15	2.77	0.582	1	1	44.271			
			C	0.15	2.77	0.582	1	1	44.271			
Sum Weight:	8.11	40.16						OTM	1167.62 kip-ft	13.27		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.241	2.465	0.6	0.825	1	25.645	0.72	36.22	A
180.00-160.00			B	0.139	2.812	0.58	0.825	1	14.323			
			C	0.139	2.812	0.58	0.825	1	14.323			
T2	0.77	1.83	A	0.524	1.871	0.71	0.825	1	67.295	1.39	69.60	A
160.00-140.00			B	0.36	2.148	0.636	0.825	1	41.456			
			C	0.171	2.697	0.585	0.825	1	18.058			
T3	1.05	2.50	A	0.567	1.828	0.734	0.825	1	85.040	1.65	82.50	A
140.00-120.00			B	0.372	2.122	0.641	0.825	1	48.680			
			C	0.181	2.662	0.587	0.825	1	21.644			
T4	1.23	3.13	A	0.532	1.862	0.714	0.825	1	94.413	1.78	88.92	A
120.00-100.00			B	0.33	2.219	0.626	0.825	1	51.275			
			C	0.186	2.644	0.588	0.825	1	27.120			
T5	1.23	4.62	A	0.472	1.939	0.684	0.825	1	95.826	1.78	88.77	A
100.00-80.00			B	0.3	2.295	0.616	0.825	1	54.973			
			C	0.178	2.671	0.586	0.825	1	30.997			
T6	1.23	5.62	A	0.43	2.008	0.664	0.825	1	99.821	1.78	89.12	A
80.00-60.00			B	0.284	2.339	0.611	0.825	1	60.700			
			C	0.18	2.664	0.587	0.825	1	36.922			
T7	1.23	5.88	A	0.381	2.102	0.644	0.825	1	98.471	1.67	83.62	A
60.00-40.00			B	0.254	2.426	0.603	0.825	1	61.332			
			C	0.163	2.725	0.583	0.825	1	38.071			
T8	1.23	7.52	A	0.363	2.142	0.637	0.825	1	105.367	1.62	80.97	A
40.00-20.00			B	0.252	2.433	0.602	0.825	1	69.088			
			C	0.172	2.691	0.585	0.825	1	45.960			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	0.582	0.825	1	44.271	0.88	43.98	C
			B	0.15	2.77	0.582	0.825	1	44.271			
			C	0.15	2.77	0.582	0.825	1	44.271			
Sum Weight:	8.11	40.16						OTM	1167.62 kip-ft	13.27		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.241	2.465	0.6	0.8	1	25.645	0.72	36.22	A
180.00-160.00			B	0.139	2.812	0.58	0.8	1	14.323			
			C	0.139	2.812	0.58	0.8	1	14.323			
T2	0.77	1.83	A	0.524	1.871	0.71	0.8	1	67.295	1.39	69.60	A
160.00-140.00			B	0.36	2.148	0.636	0.8	1	41.456			
			C	0.171	2.697	0.585	0.8	1	18.058			
T3	1.05	2.50	A	0.567	1.828	0.734	0.8	1	85.040	1.65	82.50	A
140.00-120.00			B	0.372	2.122	0.641	0.8	1	48.680			
			C	0.181	2.662	0.587	0.8	1	21.644			
T4	1.23	3.13	A	0.532	1.862	0.714	0.8	1	94.413	1.78	88.92	A
120.00-100.00			B	0.33	2.219	0.626	0.8	1	51.275			
			C	0.186	2.644	0.588	0.8	1	27.120			
T5	1.23	4.62	A	0.472	1.939	0.684	0.8	1	95.826	1.78	88.77	A
100.00-80.00			B	0.3	2.295	0.616	0.8	1	54.973			
			C	0.178	2.671	0.586	0.8	1	30.997			
T6	1.23	5.62	A	0.43	2.008	0.664	0.8	1	99.821	1.78	89.12	A
80.00-60.00			B	0.284	2.339	0.611	0.8	1	60.700			
			C	0.18	2.664	0.587	0.8	1	36.922			
T7	1.23	5.88	A	0.381	2.102	0.644	0.8	1	98.471	1.67	83.62	A
60.00-40.00			B	0.254	2.426	0.603	0.8	1	61.332			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.163	2.725	0.583	0.8	1	38.071			
T8	1.23	7.52	A	0.363	2.142	0.637	0.8	1	105.367	1.62	80.97	A
40.00-20.00			B	0.252	2.433	0.602	0.8	1	69.088			
			C	0.172	2.691	0.585	0.8	1	45.960			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	0.582	0.8	1	44.271	0.88	43.98	C
			B	0.15	2.77	0.582	0.8	1	44.271			
			C	0.15	2.77	0.582	0.8	1	44.271			
Sum Weight:	8.11	40.16						OTM	1167.62 kip-ft	13.27		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.241	2.465	0.6	0.85	1	25.645	0.72	36.22	A
180.00-160.00			B	0.139	2.812	0.58	0.85	1	14.323			
			C	0.139	2.812	0.58	0.85	1	14.323			
T2	0.77	1.83	A	0.524	1.871	0.71	0.85	1	67.295	1.39	69.60	A
160.00-140.00			B	0.36	2.148	0.636	0.85	1	41.456			
			C	0.171	2.697	0.585	0.85	1	18.058			
T3	1.05	2.50	A	0.567	1.828	0.734	0.85	1	85.040	1.65	82.50	A
140.00-120.00			B	0.372	2.122	0.641	0.85	1	48.680			
			C	0.181	2.662	0.587	0.85	1	21.644			
T4	1.23	3.13	A	0.532	1.862	0.714	0.85	1	94.413	1.78	88.92	A
120.00-100.00			B	0.33	2.219	0.626	0.85	1	51.275			
			C	0.186	2.644	0.588	0.85	1	27.120			
T5	1.23	4.62	A	0.472	1.939	0.684	0.85	1	95.826	1.78	88.77	A
100.00-80.00			B	0.3	2.295	0.616	0.85	1	54.973			
			C	0.178	2.671	0.586	0.85	1	30.997			
T6	1.23	5.62	A	0.43	2.008	0.664	0.85	1	99.821	1.78	89.12	A
80.00-60.00			B	0.284	2.339	0.611	0.85	1	60.700			
			C	0.18	2.664	0.587	0.85	1	36.922			
T7	1.23	5.88	A	0.381	2.102	0.644	0.85	1	98.471	1.67	83.62	A
60.00-40.00			B	0.254	2.426	0.603	0.85	1	61.332			
			C	0.163	2.725	0.583	0.85	1	38.071			
T8	1.23	7.52	A	0.363	2.142	0.637	0.85	1	105.367	1.62	80.97	A
40.00-20.00			B	0.252	2.433	0.602	0.85	1	69.088			
			C	0.172	2.691	0.585	0.85	1	45.960			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	0.582	0.85	1	44.271	0.88	43.98	C
			B	0.15	2.77	0.582	0.85	1	44.271			
			C	0.15	2.77	0.582	0.85	1	44.271			
Sum Weight:	8.11	40.16						OTM	1167.62 kip-ft	13.27		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	21.15					
Bracing Weight	19.01					
Total Member Self-Weight	40.16			-50.26	14.12	
Total Weight	57.49			-50.26	14.12	
Wind 0 deg - No Ice		-0.04	-65.61	-6930.92	18.89	-20.21
Wind 30 deg - No Ice		32.75	-56.80	-6006.71	-3419.33	-68.48
Wind 45 deg - No Ice		46.33	-46.36	-4912.25	-4843.98	-86.39
Wind 60 deg - No Ice		56.76	-32.77	-3486.46	-5937.55	-98.41
Wind 90 deg - No Ice		65.56	0.04	-45.49	-6861.03	-101.96
Wind 120 deg - No Ice		56.80	32.84	3394.20	-5942.32	-78.20
Wind 135 deg - No Ice		46.39	46.42	4818.47	-4850.72	-57.81
Wind 150 deg - No Ice		32.81	56.84	5910.95	-3427.58	-33.48
Wind 180 deg - No Ice		0.04	65.61	6830.40	9.35	20.21
Wind 210 deg - No Ice		-32.75	56.80	5906.18	3447.57	68.48
Wind 225 deg - No Ice		-46.33	46.36	4811.73	4872.22	86.39
Wind 240 deg - No Ice		-56.76	32.77	3385.94	5965.80	98.41
Wind 270 deg - No Ice		-65.56	-0.04	-55.03	6889.28	101.96
Wind 300 deg - No Ice		-56.80	-32.84	-3494.72	5970.57	78.20
Wind 315 deg - No Ice		-46.39	-46.42	-4919.00	4878.96	57.81
Wind 330 deg - No Ice		-32.81	-56.84	-6011.47	3455.83	33.48
Member Ice	9.22					
Total Weight Ice	81.51			-84.28	28.39	
Wind 0 deg - Ice		-0.03	-69.03	-7378.52	32.11	-24.00
Wind 30 deg - Ice		34.47	-59.77	-6399.42	-3613.36	-77.14
Wind 45 deg - Ice		48.77	-48.79	-5239.46	-5123.75	-96.67
Wind 60 deg - Ice		59.74	-34.49	-3728.18	-6283.03	-109.61
Wind 90 deg - Ice		69.00	0.03	-80.56	-7261.56	-112.72
Wind 120 deg - Ice		59.77	34.54	3566.06	-6286.75	-85.62
Wind 135 deg - Ice		48.81	48.83	5076.16	-5129.01	-62.73
Wind 150 deg - Ice		34.52	59.80	6234.58	-3619.80	-35.57
Wind 180 deg - Ice		0.03	69.03	7209.97	24.68	24.00
Wind 210 deg - Ice		-34.47	59.77	6230.87	3670.15	77.14
Wind 225 deg - Ice		-48.77	48.79	5070.91	5180.54	96.67
Wind 240 deg - Ice		-59.74	34.49	3559.63	6339.82	109.61
Wind 270 deg - Ice		-69.00	-0.03	-87.99	7318.35	112.72
Wind 300 deg - Ice		-59.77	-34.54	-3734.62	6343.54	85.62
Wind 315 deg - Ice		-48.81	-48.83	-5244.71	5185.80	62.73
Wind 330 deg - Ice		-34.52	-59.80	-6403.14	3676.59	35.57
Total Weight	57.49			-50.26	14.12	
Wind 0 deg - Service		-0.01	-18.17	-1937.60	6.54	-5.60
Wind 30 deg - Service		9.07	-15.73	-1681.58	-945.87	-18.97
Wind 45 deg - Service		12.83	-12.84	-1378.41	-1340.51	-23.93
Wind 60 deg - Service		15.72	-9.08	-983.46	-1643.44	-27.26
Wind 90 deg - Service		18.16	0.01	-30.28	-1899.25	-28.24
Wind 120 deg - Service		15.73	9.10	922.54	-1644.76	-21.66
Wind 135 deg - Service		12.85	12.86	1317.08	-1342.38	-16.01
Wind 150 deg - Service		9.09	15.74	1619.71	-948.16	-9.27
Wind 180 deg - Service		0.01	18.17	1874.40	3.90	5.60
Wind 210 deg - Service		-9.07	15.73	1618.38	956.32	18.97
Wind 225 deg - Service		-12.83	12.84	1315.21	1350.95	23.93
Wind 240 deg - Service		-15.72	9.08	920.26	1653.89	27.26
Wind 270 deg - Service		-18.16	-0.01	-32.92	1909.70	28.24
Wind 300 deg - Service		-15.73	-9.10	-985.74	1655.21	21.66
Wind 315 deg - Service		-12.85	-12.86	-1380.28	1352.82	16.01
Wind 330 deg - Service		-9.09	-15.74	-1682.90	958.60	9.27

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 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	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

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 160	Leg	Max Tension	32	4.84	-0.19	-0.24
			Max. Compression	19	-7.78	1.25	0.03
			Max. Mx	5	3.71	-1.39	0.80
			Max. My	14	-1.75	-0.00	-2.28
			Max. Vy	10	0.75	-1.39	-0.03
			Max. Vx	14	1.24	-0.00	-2.28
		Diagonal	Max Tension	20	3.84	0.00	0.00
			Max. Compression	20	-3.93	0.00	0.00
			Max. Mx	34	2.53	0.02	0.00
			Max. My	22	-0.23	0.00	0.00
			Max. Vy	34	0.01	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
		Horizontal	Max Tension	20	2.13	-0.01	-0.00
			Max. Compression	28	-2.08	0.00	0.00
			Max. Mx	32	0.09	-0.02	-0.00
			Max. My	32	-0.33	-0.02	-0.00
			Max. Vy	32	-0.01	-0.02	-0.00
			Max. Vx	32	0.00	-0.02	-0.00
		Top Girt	Max Tension	27	0.76	-0.01	0.00
			Max. Compression	19	-0.75	-0.01	-0.00
			Max. Mx	32	-0.16	-0.01	-0.00
			Max. My	27	-0.12	-0.01	-0.00
			Max. Vy	32	-0.01	-0.01	-0.00
			Max. Vx	19	-0.00	-0.01	0.00
		Inner Bracing	Max Tension	19	0.01	0.00	0.00
			Max. Compression	19	-0.01	0.00	0.00
			Max. Mx	18	-0.00	-0.01	0.00
			Max. My	19	0.00	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T2	160 - 140	Leg	Max Tension	15	31.71	-0.62	-0.30
			Max. Compression	19	-39.90	0.54	0.11
			Max. Mx	10	7.61	1.80	-0.03
			Max. My	6	-1.90	0.00	-3.16
			Max. Vy	10	-1.08	-1.39	-0.03
			Max. Vx	6	1.87	0.00	2.28
		Diagonal	Max Tension	21	12.89	0.00	0.00
			Max. Compression	21	-13.02	0.00	0.00
			Max. Mx	34	10.97	0.03	0.00
			Max. My	22	-2.68	0.00	0.00
			Max. Vy	34	-0.02	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
		Horizontal	Max Tension	21	7.18	-0.01	0.00
			Max. Compression	29	-7.10	-0.03	-0.00
			Max. Mx	32	0.42	-0.05	-0.02
			Max. My	5	-2.84	-0.03	-0.02
			Max. Vy	32	-0.02	-0.05	-0.02
			Max. Vx	5	0.00	-0.03	-0.02
		Top Girt	Max Tension	5	5.24	-0.01	0.01
			Max. Compression	13	-5.18	-0.02	-0.01
			Max. Mx	32	-2.04	-0.03	-0.01
			Max. My	5	-2.58	-0.02	-0.02
			Max. Vy	32	-0.02	-0.03	-0.01
			Max. Vx	15	0.00	-0.02	-0.02
		Inner Bracing	Max Tension	13	0.09	0.00	0.00
			Max. Compression	13	-0.09	0.00	0.00
			Max. Mx	18	-0.00	-0.01	0.00
			Max. My	32	-0.01	0.00	0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	32	-0.00	0.00	0.00
T3	140 - 120	Leg	Max Tension	15	73.07	-0.38	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	19	-88.65	0.53	0.01
			Max. Mx	10	38.37	1.51	0.04
			Max. My	6	-8.97	-0.08	-2.34
			Max. Vy	10	1.57	-1.09	0.04
			Max. Vx	14	2.28	-0.06	-1.41
		Diagonal	Max Tension	29	16.19	0.00	0.00
			Max. Compression	29	-16.35	0.00	0.00
			Max. Mx	34	13.77	0.05	0.00
			Max. My	22	-4.69	0.00	0.00
			Max. Vy	34	-0.02	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
		Horizontal	Max Tension	21	10.13	-0.02	0.01
			Max. Compression	29	-10.39	-0.03	-0.01
			Max. Mx	32	0.89	-0.05	-0.02
			Max. My	27	-0.72	-0.04	-0.02
			Max. Vy	32	-0.02	-0.05	-0.02
			Max. Vx	27	0.01	-0.04	-0.02
		Top Girt	Max Tension	22	7.50	-0.01	0.01
			Max. Compression	30	-8.04	-0.03	-0.01
			Max. Mx	32	-3.64	-0.04	-0.02
			Max. My	24	3.13	0.00	0.02
			Max. Vy	32	-0.02	-0.04	-0.02
			Max. Vx	24	-0.00	0.00	0.02
		Inner Bracing	Max Tension	30	0.14	0.00	0.00
			Max. Compression	30	-0.14	0.00	0.00
			Max. Mx	18	-0.00	-0.01	0.00
			Max. My	32	-0.01	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	32	-0.00	0.00	0.00
T4	120 - 100	Leg	Max Tension	15	117.54	-0.39	0.02
			Max. Compression	19	-139.17	1.53	0.10
			Max. Mx	32	117.24	-1.53	-0.44
			Max. My	31	-15.88	0.00	-2.00
			Max. Vy	27	0.25	-1.51	-0.11
			Max. Vx	23	-0.39	0.00	1.99
		Diagonal	Max Tension	29	16.26	0.00	0.00
			Max. Compression	29	-16.45	0.00	0.00
			Max. Mx	34	13.79	0.06	0.00
			Max. My	22	-5.08	0.00	0.00
			Max. Vy	34	-0.03	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
		Horizontal	Max Tension	29	11.01	0.00	0.00
			Max. Compression	29	-11.22	-0.03	-0.00
			Max. Mx	32	1.35	-0.05	-0.02
			Max. My	27	-1.19	-0.04	-0.02
			Max. Vy	32	-0.02	-0.05	-0.02
			Max. Vx	27	0.00	-0.04	-0.02
		Top Girt	Max Tension	21	10.53	-0.02	0.01
			Max. Compression	29	-10.81	-0.03	-0.01
			Max. Mx	32	-3.31	-0.04	-0.02
			Max. My	27	-0.03	-0.04	-0.02
			Max. Vy	32	-0.02	-0.04	-0.02
			Max. Vx	27	0.00	-0.04	-0.02
		Inner Bracing	Max Tension	29	0.19	0.00	0.00
			Max. Compression	29	-0.19	0.00	0.00
			Max. Mx	18	-0.00	-0.02	0.00
			Max. My	32	-0.01	0.00	0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	32	0.00	0.00	0.00
T5	100 - 80	Leg	Max Tension	32	152.29	-1.12	-0.07
			Max. Compression	19	-178.68	1.37	0.04

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	32	132.09	-1.53	-0.44
			Max. My	31	-16.17	0.00	-2.00
			Max. Vy	27	-0.17	-1.51	-0.11
			Max. Vx	23	0.29	0.00	1.99
		Diagonal	Max Tension	29	19.66	0.00	0.00
			Max. Compression	29	-19.95	0.00	0.00
			Max. Mx	20	18.26	0.15	0.00
			Max. My	22	-5.85	0.00	0.00
			Max. Vy	20	-0.05	0.00	0.00
			Max. Vx	22	0.00	0.00	0.00
		Horizontal	Max Tension	21	11.54	-0.04	0.00
			Max. Compression	29	-11.86	-0.05	-0.00
			Max. Mx	32	1.71	-0.07	-0.02
			Max. My	27	-1.55	-0.07	-0.02
			Max. Vy	32	-0.03	-0.07	-0.02
			Max. Vx	27	0.00	-0.07	-0.02
		Top Girt	Max Tension	21	11.25	-0.03	0.00
			Max. Compression	29	-11.72	-0.05	-0.00
			Max. Mx	32	-3.60	-0.06	-0.02
			Max. My	27	-0.26	-0.06	-0.02
			Max. Vy	32	-0.03	-0.06	-0.02
			Max. Vx	27	0.00	-0.06	-0.02
		Inner Bracing	Max Tension	29	0.20	0.00	0.00
			Max. Compression	29	-0.20	0.00	0.00
			Max. Mx	18	-0.00	-0.02	0.00
			Max. My	32	-0.01	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	32	0.00	0.00	0.00
T6	80 - 60	Leg	Max Tension	32	189.74	-1.99	-0.09
			Max. Compression	19	-222.13	2.15	0.02
			Max. Mx	32	189.37	-2.18	-0.12
			Max. My	31	-19.51	-0.01	-2.11
			Max. Vy	10	0.21	-1.90	-0.02
			Max. Vx	14	0.26	-0.01	-2.05
		Diagonal	Max Tension	29	18.46	0.00	0.00
			Max. Compression	29	-18.83	0.00	0.00
			Max. Mx	20	17.61	0.19	0.00
			Max. My	22	-5.18	0.00	0.00
			Max. Vy	20	-0.06	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
		Horizontal	Max Tension	21	12.18	-0.06	0.01
			Max. Compression	29	-12.45	-0.08	-0.01
			Max. Mx	32	2.11	-0.10	-0.02
			Max. My	27	-1.96	-0.10	-0.02
			Max. Vy	32	-0.04	-0.10	-0.02
			Max. Vx	27	0.00	-0.10	-0.02
		Top Girt	Max Tension	21	11.75	-0.05	0.01
			Max. Compression	29	-12.09	-0.07	-0.01
			Max. Mx	32	-3.34	-0.09	-0.02
			Max. My	27	-0.11	-0.09	-0.03
			Max. Vy	32	-0.04	-0.09	-0.02
			Max. Vx	27	0.00	-0.09	-0.03
		Inner Bracing	Max Tension	29	0.21	0.00	0.00
			Max. Compression	29	-0.21	0.00	0.00
			Max. Mx	18	-0.01	-0.05	0.00
			Max. My	32	-0.01	0.00	0.00
			Max. Vy	18	-0.02	0.00	0.00
			Max. Vx	32	-0.00	0.00	0.00
T7	60 - 40	Leg	Max Tension	32	223.61	-1.81	-0.02
			Max. Compression	19	-262.45	2.42	0.10
			Max. Mx	22	220.57	-2.53	0.49

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	31	-24.03	-0.06	-3.20
			Max. Vy	10	0.21	-2.40	-0.09
			Max. Vx	6	-0.33	-0.04	3.01
		Diagonal	Max Tension	29	17.55	0.00	0.00
			Max. Compression	29	-18.00	0.00	0.00
			Max. Mx	20	16.56	0.23	0.00
			Max. My	22	-4.74	0.00	0.00
			Max. Vy	20	-0.07	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
		Horizontal	Max Tension	21	12.28	-0.09	0.01
			Max. Compression	29	-12.51	-0.10	-0.01
			Max. Mx	32	2.49	-0.12	-0.02
			Max. My	27	-2.34	-0.12	-0.02
			Max. Vy	32	-0.05	-0.12	-0.02
			Max. Vx	27	0.00	-0.12	-0.02
		Top Girt	Max Tension	21	12.17	-0.08	0.01
			Max. Compression	29	-12.52	-0.09	-0.01
			Max. Mx	32	-3.35	-0.11	-0.02
			Max. My	27	-0.17	-0.11	-0.02
			Max. Vy	32	-0.05	-0.11	-0.02
			Max. Vx	27	0.00	-0.11	-0.02
		Inner Bracing	Max Tension	29	0.22	0.00	0.00
			Max. Compression	29	-0.22	0.00	0.00
			Max. Mx	18	-0.01	-0.07	0.00
			Max. My	32	0.18	0.00	0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	32	-0.00	0.00	0.00
T8	40 - 20	Leg	Max Tension	32	254.74	-2.76	-0.00
			Max. Compression	19	-300.93	1.58	-0.02
			Max. Mx	32	254.25	-3.52	-0.03
			Max. My	31	-24.80	-0.06	-3.20
			Max. Vy	24	0.21	2.84	-0.08
			Max. Vx	6	0.24	-0.04	3.01
		Diagonal	Max Tension	29	17.97	0.00	0.00
			Max. Compression	29	-18.64	0.00	0.00
			Max. Mx	20	17.40	0.33	0.00
			Max. My	22	-4.51	0.00	0.00
			Max. Vy	20	-0.09	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
		Horizontal	Max Tension	21	13.74	-0.14	0.01
			Max. Compression	29	-13.64	-0.16	-0.01
			Max. Mx	32	2.85	-0.19	-0.03
			Max. My	27	-2.71	-0.19	-0.03
			Max. Vy	32	-0.07	-0.19	-0.03
			Max. Vx	27	0.00	-0.19	-0.03
		Top Girt	Max Tension	29	13.38	-0.15	-0.01
			Max. Compression	29	-13.43	-0.15	-0.01
			Max. Mx	32	-2.60	-0.18	-0.03
			Max. My	27	0.52	-0.18	-0.03
			Max. Vy	32	-0.07	-0.18	-0.03
			Max. Vx	27	0.00	-0.18	-0.03
		Inner Bracing	Max Tension	29	0.23	0.00	0.00
			Max. Compression	29	-0.23	0.00	0.00
			Max. Mx	18	-0.01	-0.13	0.00
			Max. My	32	0.20	0.00	0.00
			Max. Vy	18	-0.05	0.00	0.00
			Max. Vx	32	-0.00	0.00	0.00
T9	20 - 0	Leg	Max Tension	32	285.08	1.34	-0.01
			Max. Compression	19	-338.09	0.00	-0.00
			Max. Mx	19	-320.07	8.58	-0.01
			Max. My	34	-24.04	4.93	3.36

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	19	0.95	8.58	-0.01
			Max. Vx	17	0.46	-0.10	3.15
		Diagonal	Max Tension	29	17.64	0.00	0.00
			Max. Compression	29	-18.42	0.00	0.00
			Max. Mx	21	17.07	0.39	0.00
			Max. My	30	3.05	0.00	-0.00
			Max. Vy	21	-0.10	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
		Horizontal	Max Tension	28	14.61	0.00	0.00
			Max. Compression	29	-13.24	-0.14	-0.01
			Max. Mx	15	2.89	-0.17	-0.03
			Max. My	27	-3.07	-0.16	-0.03
			Max. Vy	32	-0.07	-0.16	-0.03
			Max. Vx	27	0.00	-0.16	-0.03
		Top Girt	Max Tension	21	13.46	-0.16	0.01
			Max. Compression	29	-14.26	-0.18	-0.01
			Max. Mx	32	-3.01	-0.20	-0.03
			Max. My	24	-1.68	-0.13	0.03
			Max. Vy	32	-0.08	-0.20	-0.03
			Max. Vx	30	-0.00	-0.13	0.03
		Inner Bracing	Max Tension	29	0.25	0.00	0.00
			Max. Compression	29	-0.25	0.00	0.00
			Max. Mx	18	-0.01	-0.16	0.00
			Max. My	24	0.22	0.00	-0.00
			Max. Vy	18	-0.05	0.00	0.00
			Max. Vx	24	-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	30	349.06	35.24	-23.25
	Max. H_x	30	349.06	35.24	-23.25
	Max. H_z	21	-285.32	-30.37	21.77
	Min. Vert	22	-296.32	-32.16	21.42
	Min. H_x	22	-296.32	-32.16	21.42
	Min. H_z	29	338.07	33.48	-23.54
Leg B	Max. Vert	24	347.11	-35.50	-22.76
	Max. H_x	32	-298.84	32.49	20.99
	Max. H_z	33	-287.87	30.81	21.14
	Min. Vert	32	-298.84	32.49	20.99
	Min. H_x	24	347.11	-35.50	-22.76
	Min. H_z	25	336.15	-33.86	-22.86
Leg A	Max. Vert	19	353.97	-0.56	42.25
	Max. H_x	31	31.17	8.17	1.99
	Max. H_z	19	353.97	-0.56	42.25
	Min. Vert	27	-291.96	0.53	-38.50
	Min. H_x	23	30.84	-8.22	1.96
	Min. H_z	27	-291.96	0.53	-38.50

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	57.49	0.00	0.00	-50.33	14.14	0.00
Dead+Wind 0 deg - No Ice	57.49	-0.04	-65.60	-6785.26	18.92	-20.27
Dead+Wind 30 deg - No Ice	57.49	32.75	-56.79	-5880.65	-3346.45	-68.67
Dead+Wind 45 deg - No Ice	57.49	46.33	-46.36	-4809.42	-4740.94	-86.61
Dead+Wind 60 deg - No Ice	57.49	56.76	-32.77	-3413.87	-5811.39	-98.66
Dead+Wind 90 deg - No Ice	57.49	65.56	0.04	-45.83	-6715.43	-102.23
Dead+Wind 120 deg - No Ice	57.49	56.79	32.83	3321.02	-5816.26	-78.40
Dead+Wind 135 deg - No Ice	57.49	46.38	46.41	4715.15	-4747.79	-57.96
Dead+Wind 150 deg - No Ice	57.49	32.81	56.83	5784.50	-3354.79	-33.56
Dead+Wind 180 deg - No Ice	57.49	0.04	65.60	6684.47	9.44	20.27
Dead+Wind 210 deg - No Ice	57.49	-32.75	56.79	5779.75	3374.93	68.66
Dead+Wind 225 deg - No Ice	57.49	-46.33	46.36	4708.44	4769.43	86.61
Dead+Wind 240 deg - No Ice	57.49	-56.76	32.77	3312.82	5839.85	98.66
Dead+Wind 270 deg - No Ice	57.49	-65.56	-0.04	-55.27	6743.73	102.23
Dead+Wind 300 deg - No Ice	57.49	-56.79	-32.83	-3422.03	5844.44	78.40
Dead+Wind 315 deg - No Ice	57.49	-46.38	-46.41	-4816.07	4775.96	57.96
Dead+Wind 330 deg - No Ice	57.49	-32.81	-56.83	-5885.36	3382.99	33.56
Dead+Ice+Temp	81.51	0.00	0.00	-84.44	28.43	-0.00
Dead+Wind 0 deg+Ice+Temp	81.51	-0.03	-69.02	-7211.28	32.32	-24.11
Dead+Wind 30 deg+Ice+Temp	81.51	34.47	-59.76	-6254.71	-3529.65	-77.42
Dead+Wind 45 deg+Ice+Temp	81.51	48.76	-48.79	-5121.43	-5005.40	-97.01
Dead+Wind 60 deg+Ice+Temp	81.51	59.73	-34.49	-3644.91	-6138.12	-109.99
Dead+Wind 90 deg+Ice+Temp	81.51	68.99	0.03	-80.97	-7094.39	-113.09
Dead+Wind 120 deg+Ice+Temp	81.51	59.76	34.54	3481.83	-6141.92	-85.90
Dead+Wind 135 deg+Ice+Temp	81.51	48.80	48.83	4957.29	-5010.74	-62.94
Dead+Wind 150 deg+Ice+Temp	81.51	34.52	59.79	6089.14	-3536.13	-35.68
Dead+Wind 180 deg+Ice+Temp	81.51	0.03	69.03	7042.15	24.85	24.11
Dead+Wind 210 deg+Ice+Temp	81.51	-34.47	59.76	6085.47	3586.79	77.42
Dead+Wind 225 deg+Ice+Temp	81.51	-48.76	48.79	4952.11	5062.54	97.01
Dead+Wind 240 deg+Ice+Temp	81.51	-59.73	34.49	3475.52	6195.22	110.00
Dead+Wind 270 deg+Ice+Temp	81.51	-68.99	-0.03	-88.22	7151.34	113.09
Dead+Wind 300 deg+Ice+Temp	81.51	-59.76	-34.54	-3651.17	6198.72	85.90
Dead+Wind 315 deg+Ice+Temp	81.51	-48.80	-48.83	-5126.55	5067.53	62.93
Dead+Wind 330 deg+Ice+Temp	81.51	-34.52	-59.79	-6258.32	3592.96	35.67
Dead+Wind 0 deg - Service	57.49	-0.01	-18.17	-1916.02	15.47	-5.62
Dead+Wind 30 deg - Service	57.49	9.07	-15.73	-1665.41	-916.77	-19.02
Dead+Wind 45 deg - Service	57.49	12.83	-12.84	-1368.65	-1303.04	-23.99
Dead+Wind 60 deg - Service	57.49	15.72	-9.08	-982.07	-1599.55	-27.33
Dead+Wind 90 deg - Service	57.49	18.16	0.01	-49.10	-1850.00	-28.32
Dead+Wind 120 deg - Service	57.49	15.73	9.10	883.54	-1600.91	-21.72
Dead+Wind 135 deg - Service	57.49	12.85	12.86	1269.72	-1304.94	-16.05
Dead+Wind 150 deg - Service	57.49	9.09	15.74	1565.93	-919.06	-9.30
Dead+Wind 180 deg - Service	57.49	0.01	18.17	1815.22	12.84	5.61
Dead+Wind 210 deg - Service	57.49	-9.07	15.73	1564.62	945.10	19.02
Dead+Wind 225 deg - Service	57.49	-12.83	12.84	1267.86	1331.39	23.99
Dead+Wind 240 deg - Service	57.49	-15.72	9.08	881.27	1627.93	27.33
Dead+Wind 270 deg - Service	57.49	-18.16	-0.01	-51.71	1878.31	28.31
Dead+Wind 300 deg - Service	57.49	-15.73	-9.10	-984.33	1629.16	21.71
Dead+Wind 315 deg - Service	57.49	-12.85	-12.86	-1370.52	1333.24	16.05
Dead+Wind 330 deg - Service	57.49	-9.09	-15.74	-1666.73	947.37	9.30

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	-57.49	0.00	-0.00	57.49	-0.00	0.000%
2	-0.04	-57.49	-65.61	0.04	57.49	65.60	0.005%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
3	32.75	-57.49	-56.80	-32.75	57.49	56.79	0.005%
4	46.33	-57.49	-46.36	-46.33	57.49	46.36	0.005%
5	56.76	-57.49	-32.77	-56.76	57.49	32.77	0.005%
6	65.56	-57.49	0.04	-65.56	57.49	-0.04	0.005%
7	56.80	-57.49	32.84	-56.79	57.49	-32.83	0.005%
8	46.39	-57.49	46.42	-46.38	57.49	-46.41	0.005%
9	32.81	-57.49	56.84	-32.81	57.49	-56.83	0.005%
10	0.04	-57.49	65.61	-0.04	57.49	-65.60	0.005%
11	-32.75	-57.49	56.80	32.75	57.49	-56.79	0.005%
12	-46.33	-57.49	46.36	46.33	57.49	-46.36	0.005%
13	-56.76	-57.49	32.77	56.76	57.49	-32.77	0.005%
14	-65.56	-57.49	-0.04	65.56	57.49	0.04	0.005%
15	-56.80	-57.49	-32.84	56.79	57.49	32.83	0.005%
16	-46.39	-57.49	-46.42	46.38	57.49	46.41	0.005%
17	-32.81	-57.49	-56.84	32.81	57.49	56.83	0.005%
18	0.00	-81.51	0.00	-0.00	81.51	-0.00	0.000%
19	-0.03	-81.51	-69.03	0.03	81.51	69.02	0.006%
20	34.47	-81.51	-59.77	-34.47	81.51	59.76	0.006%
21	48.77	-81.51	-48.79	-48.76	81.51	48.79	0.006%
22	59.74	-81.51	-34.49	-59.73	81.51	34.49	0.006%
23	69.00	-81.51	0.03	-68.99	81.51	-0.03	0.006%
24	59.77	-81.51	34.54	-59.76	81.51	-34.54	0.006%
25	48.81	-81.51	48.83	-48.80	81.51	-48.83	0.006%
26	34.52	-81.51	59.80	-34.52	81.51	-59.79	0.006%
27	0.03	-81.51	69.03	-0.03	81.51	-69.03	0.006%
28	-34.47	-81.51	59.77	34.47	81.51	-59.76	0.006%
29	-48.77	-81.51	48.79	48.76	81.51	-48.79	0.006%
30	-59.74	-81.51	34.49	59.73	81.51	-34.49	0.006%
31	-69.00	-81.51	-0.03	68.99	81.51	0.03	0.006%
32	-59.77	-81.51	-34.54	59.76	81.51	34.54	0.006%
33	-48.81	-81.51	-48.83	48.80	81.51	48.83	0.006%
34	-34.52	-81.51	-59.80	34.52	81.51	59.79	0.006%
35	-0.01	-57.49	-18.17	0.01	57.49	18.17	0.002%
36	9.07	-57.49	-15.73	-9.07	57.49	15.73	0.002%
37	12.83	-57.49	-12.84	-12.83	57.49	12.84	0.002%
38	15.72	-57.49	-9.08	-15.72	57.49	9.08	0.002%
39	18.16	-57.49	0.01	-18.16	57.49	-0.01	0.002%
40	15.73	-57.49	9.10	-15.73	57.49	-9.10	0.002%
41	12.85	-57.49	12.86	-12.85	57.49	-12.86	0.002%
42	9.09	-57.49	15.74	-9.09	57.49	-15.74	0.002%
43	0.01	-57.49	18.17	-0.01	57.49	-18.17	0.002%
44	-9.07	-57.49	15.73	9.07	57.49	-15.73	0.002%
45	-12.83	-57.49	12.84	12.83	57.49	-12.84	0.002%
46	-15.72	-57.49	9.08	15.72	57.49	-9.08	0.002%
47	-18.16	-57.49	-0.01	18.16	57.49	0.01	0.002%
48	-15.73	-57.49	-9.10	15.73	57.49	9.10	0.002%
49	-12.85	-57.49	-12.86	12.85	57.49	12.86	0.002%
50	-9.09	-57.49	-15.74	9.09	57.49	15.74	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00005311
2	Yes	6	0.00000001	0.00031843
3	Yes	6	0.00000001	0.00032562

4	Yes	6	0.00000001	0.00033058
5	Yes	6	0.00000001	0.00033431
6	Yes	6	0.00000001	0.00033413
7	Yes	6	0.00000001	0.00032565
8	Yes	6	0.00000001	0.00032120
9	Yes	6	0.00000001	0.00031814
10	Yes	6	0.00000001	0.00031791
11	Yes	6	0.00000001	0.00032412
12	Yes	6	0.00000001	0.00032810
13	Yes	6	0.00000001	0.00033154
14	Yes	6	0.00000001	0.00033397
15	Yes	6	0.00000001	0.00032897
16	Yes	6	0.00000001	0.00032477
17	Yes	6	0.00000001	0.00032084
18	Yes	6	0.00000001	0.00009210
19	Yes	6	0.00000001	0.00046136
20	Yes	6	0.00000001	0.00047118
21	Yes	6	0.00000001	0.00047772
22	Yes	6	0.00000001	0.00048256
23	Yes	6	0.00000001	0.00048193
24	Yes	6	0.00000001	0.00046942
25	Yes	6	0.00000001	0.00046268
26	Yes	6	0.00000001	0.00045790
27	Yes	6	0.00000001	0.00045752
28	Yes	6	0.00000001	0.00046740
29	Yes	6	0.00000001	0.00047353
30	Yes	6	0.00000001	0.00047866
31	Yes	6	0.00000001	0.00048200
32	Yes	6	0.00000001	0.00047472
33	Yes	6	0.00000001	0.00046904
34	Yes	6	0.00000001	0.00046393
35	Yes	6	0.00000001	0.00031210
36	Yes	6	0.00000001	0.00031668
37	Yes	6	0.00000001	0.00031962
38	Yes	6	0.00000001	0.00032170
39	Yes	6	0.00000001	0.00032020
40	Yes	6	0.00000001	0.00031071
41	Yes	6	0.00000001	0.00030506
42	Yes	6	0.00000001	0.00030057
43	Yes	6	0.00000001	0.00029923
44	Yes	6	0.00000001	0.00030764
45	Yes	6	0.00000001	0.00031311
46	Yes	6	0.00000001	0.00031788
47	Yes	6	0.00000001	0.00032184
48	Yes	6	0.00000001	0.00031845
49	Yes	6	0.00000001	0.00031577
50	Yes	6	0.00000001	0.00031324

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	2.605	35	0.1328	0.1270
T2	160 - 140	2.043	35	0.1301	0.1271
T3	140 - 120	1.513	35	0.1103	0.1021
T4	120 - 100	1.074	35	0.0877	0.0692
T5	100 - 80	0.722	50	0.0661	0.0432
T6	80 - 60	0.467	50	0.0499	0.0294
T7	60 - 40	0.271	50	0.0365	0.0192

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T8	40 - 20	0.131	50	0.0229	0.0109
T9	20 - 0	0.044	42	0.0115	0.0050

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	15' 2.5" Dia omni	35	2.605	0.1328	0.1270	863706
178.00	Rohn 6' Side-Arm(1)	35	2.548	0.1329	0.1276	863706
177.00	15' 2.5" Dia omni	35	2.520	0.1330	0.1279	863706
176.00	9-ft Omni	35	2.492	0.1330	0.1282	863706
163.00	APX16DWV-16DWV-S-E-ACU	35	2.127	0.1315	0.1285	251692
157.00	(2) 7770.00	35	1.960	0.1281	0.1249	134778
146.00	12' x 2" Dia Omni	35	1.665	0.1173	0.1116	56997
142.00	Rohn 6' Side-Arm(1)	35	1.563	0.1127	0.1054	47287
135.00	LNX-6512DS	35	1.394	0.1046	0.0939	46825
126.50	800-10504	35	1.207	0.0950	0.0796	55474
125.00	10-ft T-Frame	35	1.175	0.0933	0.0772	57342
51.00	GPS	50	0.201	0.0303	0.0152	87340
50.00	1' Standoff Pipe	50	0.194	0.0296	0.0147	88101

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	9.300	19	0.4514	0.4799
T2	160 - 140	7.390	19	0.4410	0.4798
T3	140 - 120	5.568	34	0.3830	0.3900
T4	120 - 100	4.008	34	0.3127	0.2690
T5	100 - 80	2.719	34	0.2405	0.1705
T6	80 - 60	1.769	34	0.1838	0.1169
T7	60 - 40	1.033	34	0.1356	0.0766
T8	40 - 20	0.501	34	0.0855	0.0434
T9	20 - 0	0.167	26	0.0430	0.0201

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	15' 2.5" Dia omni	19	9.300	0.4514	0.4799	374385
178.00	Rohn 6' Side-Arm(1)	19	9.108	0.4515	0.4821	374385
177.00	15' 2.5" Dia omni	19	9.012	0.4515	0.4831	374385
176.00	9-ft Omni	19	8.916	0.4515	0.4840	374385
163.00	APX16DWV-16DWV-S-E-ACU	19	7.675	0.4454	0.4849	108651
157.00	(2) 7770.00	19	7.107	0.4352	0.4719	51860
146.00	12' x 2" Dia Omni	34	6.093	0.4036	0.4240	19845

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
142.00	Rohn 6' Side-Arm(1)	34	5.740	0.3900	0.4017	16330
135.00	LNX-6512DS	34	5.152	0.3657	0.3599	15842
126.50	800-10504	34	4.486	0.3361	0.3079	18205
125.00	10-ft T-Frame	34	4.373	0.3307	0.2988	18697
51.00	GPS	34	0.768	0.1127	0.0605	23459
50.00	1' Standoff Pipe	34	0.742	0.1102	0.0588	23628

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	180	Leg	A325N	0.8750	4	1.21	26.45	0.046 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	1.31	6.44	0.204 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	1.06	6.44	0.165 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	0.38	6.44	0.059 ✓	1.333	Bolt Shear
T2	160	Leg	A325N	1.0000	4	7.93	34.56	0.229 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4.34	6.44	0.673 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	3.59	6.44	0.557 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	2.62	6.44	0.406 ✓	1.333	Bolt Shear
T3	140	Leg	A325N	1.0000	6	12.18	34.56	0.352 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	5.45	6.44	0.846 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	5.20	6.44	0.807 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	4.02	6.44	0.624 ✓	1.333	Bolt Shear
T4	120	Leg	A325N	1.0000	8	14.69	34.56	0.425 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	5.48	6.44	0.851 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	5.61	6.44	0.871 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	5.40	6.44	0.839 ✓	1.333	Bolt Shear
T5	100	Leg	A325N	1.0000	12	12.69	34.56	0.367 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	3	6.65	9.28	0.717 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.7500	2	5.93	9.28	0.639 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.7500	2	5.86	9.28	0.631 ✓	1.333	Bolt Shear
T6	80	Leg	A325N	1.0000	12	15.81	34.56	0.458 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	3	6.28	9.28	0.677 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.7500	2	6.22	9.28	0.671 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.7500	2	6.05	9.28	0.652 ✓	1.333	Bolt Shear
T7	60	Leg	A325N	1.0000	16	13.98	34.56	0.404 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	3	6.00	9.28	0.647 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.7500	2	6.26	9.28	0.674 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.7500	2	6.26	9.28	0.675 ✓	1.333	Bolt Shear
T8	40	Leg	A325N	1.0000	16	15.92	34.56	0.461 ✓	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
T9	20	Diagonal	A325N	0.7500	3	6.21	9.28	0.670 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.7500	2	6.87	9.28	0.740 ✔	1.333	Bolt Shear
		Top Girt	A325N	0.7500	2	6.72	9.28	0.724 ✔	1.333	Bolt Shear
		Leg	A354-BC	1.0000	24	11.88	32.40	0.367 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.7500	3	6.14	9.28	0.662 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.7500	2	7.30	9.28	0.787 ✔	1.333	Bolt Shear
		Top Girt	A325N	0.7500	2	7.13	9.28	0.769 ✔	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	180 - 160	ROHN 3 STD	20.00	6.67	68.8 K=1.00	21.168	2.2285	-7.78	47.17	0.165 ✔
T2	160 - 140	ROHN 4 STD	20.00	6.67	53.0 K=1.00	23.877	3.1741	-39.90	75.79	0.527 ✔
T3	140 - 120	ROHN 5 EH	20.04	6.68	43.6 K=1.00	25.320	6.1120	-88.65	154.75	0.573 ✔
T4	120 - 100	ROHN 6 EH	20.04	6.68	36.5 K=1.00	26.311	8.4049	-139.17	221.14	0.629 ✔
T5	100 - 80	ROHN 8 EH	20.05	10.02	41.8 K=1.00	25.578	12.7627	-178.69	326.44	0.547 ✔
T6	80 - 60	ROHN 10 EH	20.05	10.03	33.2 K=1.00	26.753	16.1007	-222.13	430.75	0.516 ✔
T7	60 - 40	ROHN 10 EH	20.06	10.03	33.2 K=1.00	26.752	16.1007	-262.45	430.73	0.609 ✔
T8	40 - 20	ROHN 12 EH	20.05	10.03	27.8 K=1.00	27.426	19.2423	-300.93	527.73	0.570 ✔
T9	20 - 0	ROHN 12 EH	20.05	10.03	27.8 K=1.00	27.426	19.2423	-338.09	527.73	0.641 ✔

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	180 - 160	ROHN 2 STD	7.94	7.67	117.0 K=1.00	10.914	1.0745	-3.93	11.73	0.336 ✔

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 $\frac{P}{P_a}$
T2	160 - 140	ROHN 2.5 STD	7.96	7.62	96.5 K=1.00	14.505	1.7040	-13.02	24.72	0.527 ✔
T3	140 - 120	ROHN 2.5 STD	8.58	8.21	104.0 K=1.00	13.250	1.7040	-16.35	22.58	0.724 ✔
T4	120 - 100	ROHN 2.5 STD	9.29	8.89	112.6 K=1.00	11.718	1.7040	-16.10	19.97	0.806 ✔
T5	100 - 80	ROHN 3 EH	12.60	12.01	126.9 K=1.00	9.277	3.0159	-19.40	27.98	0.693 ✔
T6	80 - 60	ROHN 3 EH	13.40	12.73	134.4 K=1.00	8.264	3.0159	-18.70	24.92	0.750 ✔
T7	60 - 40	ROHN 3 EH	14.32	13.69	144.6 K=1.00	7.143	3.0159	-17.64	21.54	0.819 ✔
T8	40 - 20	ROHN 3.5 EH	15.24	14.53	133.5 K=1.00	8.383	3.6784	-18.57	30.84	0.602 ✔
T9	20 - 0	ROHN 3.5 EH	16.20	15.52	142.6 K=1.00	7.346	3.6784	-18.15	27.02	0.672 ✔

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 $\frac{P}{P_a}$
T1	180 - 160	ROHN 1.5 STD	8.60	4.15	80.1 K=1.00	18.999	0.7995	-2.08	15.19	0.137 ✔
T2	160 - 140	ROHN 2 STD	8.68	4.15	63.3 K=1.00	22.141	1.0745	-7.10	23.79	0.299 ✔
T3	140 - 120	ROHN 2 STD	10.10	4.82	73.4 K=1.00	20.294	1.0745	-10.39	21.81	0.477 ✔
T4	120 - 100	ROHN 2 STD	12.22	5.83	88.9 K=1.00	17.170	1.0745	-11.22	18.45	0.608 ✔
T5	100 - 80	ROHN 2 X-STR	14.13	6.71	105.0 K=1.00	13.532	1.4773	-11.86	19.99	0.593 ✔
T6	80 - 60	ROHN 2.5 STD	16.58	7.84	99.3 K=1.00	13.063	1.7040	-12.45	22.26	0.559 ✔
T7	60 - 40	ROHN 2.5 STD	19.16	9.13	115.6 K=1.00	10.900	1.7040	-12.51	18.57	0.674 ✔
T8	40 - 20	ROHN 3 STD	21.73	10.33	106.6 K=1.00	12.129	2.2285	-13.64	27.03	0.505 ✔
T9	20 - 0	ROHN 3 STD	24.23	11.58	119.5 K=1.00	10.359	2.2285	-13.24	23.09	0.574 ✔

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	180 - 160	ROHN 1.5 STD	8.54	4.12	79.5	17.139	0.7995	-0.75	13.70	0.055

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 $\frac{P}{P_a}$
					K=1.00					✔
T2	160 - 140	ROHN 2 STD	8.63	4.17	63.6 K=1.00	19.331	1.0745	-5.18	20.77	0.250 ✔
T3	140 - 120	ROHN 2 STD	8.71	4.17	63.5 K=1.00	19.334	1.0745	-8.04	20.78	0.387 ✔
T4	120 - 100	ROHN 2 STD	10.79	5.16	78.7 K=1.00	17.251	1.0745	-10.81	18.54	0.583 ✔
T5	100 - 80	ROHN 2 X-STR	12.93	6.19	96.9 K=1.00	14.443	1.4773	-11.72	21.34	0.549 ✔
T6	80 - 60	ROHN 2.5 STD	15.33	7.31	92.5 K=1.00	15.149	1.7040	-12.09	25.81	0.469 ✔
T7	60 - 40	ROHN 2.5 STD	17.83	8.47	107.2 K=1.00	12.683	1.7040	-12.52	21.61	0.579 ✔
T8	40 - 20	ROHN 3 STD	20.48	9.79	101.0 K=1.00	13.762	2.2285	-13.43	30.67	0.438 ✔
T9	20 - 0	ROHN 3 STD	22.98	10.96	113.0 K=1.00	11.647	2.2285	-14.26	25.96	0.549 ✔

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x2x1/8	4.27	4.27	128.9 K=1.00	8.989	0.4844	-0.01	4.35	0.003 ✔
T2	160 - 140	L2x2x1/8	4.31	4.31	130.3 K=1.00	8.802	0.4844	-0.09	4.26	0.021 ✔
T3	140 - 120	L2x2x1/8	4.35	4.35	131.5 K=1.00	8.641	0.4844	-0.14	4.19	0.033 ✔
T4	120 - 100	L2x2x1/8	5.39	5.39	162.9 K=1.00	5.631	0.4844	-0.19	2.73	0.069 ✔
T5	100 - 80	L2x2x1/8	6.47	6.47	195.1 K=1.00	3.921	0.4844	-0.20	1.90	0.107 ✔
T6	80 - 60	L2 1/2x2 1/2x3/16	7.67	7.67	185.8 K=1.00	4.325	0.9020	-0.21	3.90	0.054 ✔
T7	60 - 40	L3x3x3/16	8.92	8.92	179.5 K=1.00	4.635	1.0900	-0.22	5.05	0.043 ✔
T8	40 - 20	L3 1/2x3 1/2x1/4	10.24	10.24	177.1 K=1.00	4.763	1.6900	-0.23	8.05	0.029 ✔
T9	20 - 0	L3 1/2x3 1/2x1/4	11.49	11.49	198.7 K=1.00	3.783	1.6900	-0.25	6.39	0.039 ✔

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	180 - 160	ROHN 3 STD	20.00	6.67	68.8	30.000	2.2285	4.84	66.85	0.072 ✔
T2	160 - 140	ROHN 4 STD	20.00	6.67	53.0	30.000	3.1741	31.71	95.22	0.333 ✔
T3	140 - 120	ROHN 5 EH	20.04	6.68	43.6	30.000	6.1120	73.07	183.36	0.398 ✔
T4	120 - 100	ROHN 6 EH	20.04	6.68	36.5	30.000	8.4049	117.54	252.15	0.466 ✔
T5	100 - 80	ROHN 8 EH	20.05	10.02	41.8	30.000	12.7627	152.29	382.88	0.398 ✔
T6	80 - 60	ROHN 10 EH	20.05	10.03	33.2	30.000	16.1007	189.74	483.02	0.393 ✔
T7	60 - 40	ROHN 10 EH	20.06	10.03	33.2	30.000	16.1007	223.62	483.02	0.463 ✔
T8	40 - 20	ROHN 12 EH	20.05	10.03	27.8	30.000	19.2423	254.74	577.27	0.441 ✔
T9	20 - 0	ROHN 12 EH	20.05	10.03	27.8	30.000	19.2423	285.08	577.27	0.494 ✔

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	180 - 160	ROHN 2 STD	7.94	7.67	117.0	25.200	1.0745	3.84	27.08	0.142 ✔
T2	160 - 140	ROHN 2.5 STD	7.96	7.62	96.5	25.200	1.7040	12.89	42.94	0.300 ✔
T3	140 - 120	ROHN 2.5 STD	8.58	8.21	104.0	25.200	1.7040	16.19	42.94	0.377 ✔
T4	120 - 100	ROHN 2.5 STD	9.04	8.65	109.5	25.200	1.7040	16.26	42.94	0.379 ✔
T5	100 - 80	ROHN 3 EH	12.25	11.66	123.1	25.200	3.0159	19.66	76.00	0.259 ✔
T6	80 - 60	ROHN 3 EH	12.99	12.32	130.1	25.200	3.0159	18.46	76.00	0.243 ✔
T7	60 - 40	ROHN 3 EH	13.85	13.23	139.7	25.200	3.0159	17.55	76.00	0.231 ✔
T8	40 - 20	ROHN 3.5 EH	14.77	14.07	129.2	25.200	3.6784	17.97	92.70	0.194 ✔
T9	20 - 0	ROHN 3.5 EH	15.71	15.04	138.1	25.200	3.6784	17.64	92.70	0.190 ✔

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 $\frac{P}{P_a}$
T1	180 - 160	ROHN 1.5 STD	8.60	4.15	80.1	30.000	0.7995	2.13	23.98	0.089 ✔
T2	160 - 140	ROHN 2 STD	8.68	4.15	63.3	30.000	1.0745	7.18	32.24	0.223 ✔
T3	140 - 120	ROHN 2 STD	10.10	4.82	73.4	30.000	1.0745	10.13	32.24	0.314 ✔
T4	120 - 100	ROHN 2 STD	12.22	5.83	88.9	30.000	1.0745	11.01	32.24	0.341 ✔
T5	100 - 80	ROHN 2 X-STR	14.13	6.71	105.0	30.000	1.4773	11.54	44.32	0.260 ✔
T6	80 - 60	ROHN 2.5 STD	16.58	7.84	99.3	21.600	1.7040	12.18	36.81	0.331 ✔
T7	60 - 40	ROHN 2.5 STD	19.16	9.13	115.6	21.600	1.7040	12.28	36.81	0.334 ✔
T8	40 - 20	ROHN 3 STD	21.73	10.33	106.6	21.600	2.2285	13.74	48.13	0.285 ✔
T9	20 - 0	ROHN 3 STD	24.23	11.58	119.5	21.600	2.2285	14.61	48.13	0.303 ✔

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	180 - 160	ROHN 1.5 STD	8.54	4.12	79.5	25.200	0.7995	0.76	20.15	0.038 ✔
T2	160 - 140	ROHN 2 STD	8.63	4.17	63.6	25.200	1.0745	5.24	27.08	0.193 ✔
T3	140 - 120	ROHN 2 STD	8.71	4.17	63.5	25.200	1.0745	7.50	27.08	0.277 ✔
T4	120 - 100	ROHN 2 STD	10.79	5.16	78.7	25.200	1.0745	10.53	27.08	0.389 ✔
T5	100 - 80	ROHN 2 X-STR	12.93	6.19	96.9	25.200	1.4773	11.25	37.23	0.302 ✔
T6	80 - 60	ROHN 2.5 STD	15.33	7.31	92.5	25.200	1.7040	11.75	42.94	0.274 ✔
T7	60 - 40	ROHN 2.5 STD	17.83	8.47	107.2	25.200	1.7040	12.17	42.94	0.283 ✔
T8	40 - 20	ROHN 3 STD	20.48	9.79	101.0	25.200	2.2285	13.38	56.16	0.238 ✔
T9	20 - 0	ROHN 3 STD	22.98	10.96	113.0	25.200	2.2285	13.46	56.16	0.240 ✔

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x2x1/8	4.27	4.27	81.8	30.000	0.4844	0.01	14.53	0.001 ✔
T2	160 - 140	L2x2x1/8	4.31	4.31	82.7	30.000	0.4844	0.09	14.53	0.006 ✔
T3	140 - 120	L2x2x1/8	4.35	4.35	83.5	30.000	0.4844	0.14	14.53	0.010 ✔
T4	120 - 100	L2x2x1/8	5.39	5.39	103.4	30.000	0.4844	0.19	14.53	0.013 ✔
T5	100 - 80	L2x2x1/8	6.47	6.47	123.9	30.000	0.4844	0.20	14.53	0.014 ✔
T6	80 - 60	L2 1/2x2 1/2x3/16	7.67	7.67	118.2	30.000	0.9020	0.21	27.06	0.008 ✔
T7	60 - 40	L3x3x3/16	8.92	8.92	113.9	30.000	1.0900	0.22	32.70	0.007 ✔
T8	40 - 20	L3 1/2x3 1/2x1/4	10.24	10.24	112.7	30.000	1.6900	0.23	50.70	0.005 ✔
T9	20 - 0	L3 1/2x3 1/2x1/4	11.49	11.49	126.5	30.000	1.6900	0.25	50.70	0.005 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 3 STD	3	-7.78	62.88	12.4	Pass
T2	160 - 140	Leg	ROHN 4 STD	42	-39.90	101.02	39.5	Pass
T3	140 - 120	Leg	ROHN 5 EH	81	-88.65	206.29	43.0	Pass
T4	120 - 100	Leg	ROHN 6 EH	120	-139.17	294.78	47.2	Pass
T5	100 - 80	Leg	ROHN 8 EH	159	-178.69	435.15	41.1	Pass
T6	80 - 60	Leg	ROHN 10 EH	186	-222.13	574.19	38.7	Pass
T7	60 - 40	Leg	ROHN 10 EH	213	-262.45	574.16	45.7	Pass
T8	40 - 20	Leg	ROHN 12 EH	240	-300.93	703.47	42.8	Pass
T9	20 - 0	Leg	ROHN 12 EH	267	-338.09	703.47	48.1	Pass
T1	180 - 160	Diagonal	ROHN 2 STD	14	-3.93	15.63	25.2	Pass
T2	160 - 140	Diagonal	ROHN 2.5 STD	53	-13.02	32.95	39.5 50.5 (b)	Pass
T3	140 - 120	Diagonal	ROHN 2.5 STD	93	-16.35	30.10	54.3 63.5 (b)	Pass
T4	120 - 100	Diagonal	ROHN 2.5 STD	132	-16.10	26.62	60.5 63.8 (b)	Pass
T5	100 - 80	Diagonal	ROHN 3 EH	171	-19.40	37.30	52.0 53.8 (b)	Pass
T6	80 - 60	Diagonal	ROHN 3 EH	198	-18.70	33.22	56.3	Pass
T7	60 - 40	Diagonal	ROHN 3 EH	225	-17.64	28.72	61.4	Pass
T8	40 - 20	Diagonal	ROHN 3.5 EH	252	-18.57	41.11	45.2 50.3 (b)	Pass
T9	20 - 0	Diagonal	ROHN 3.5 EH	279	-18.15	36.02	50.4	Pass
T1	180 - 160	Horizontal	ROHN 1.5 STD	13	-2.08	20.25	10.3 12.4 (b)	Pass
T2	160 - 140	Horizontal	ROHN 2 STD	52	-7.10	31.71	22.4 41.8 (b)	Pass
T3	140 - 120	Horizontal	ROHN 2 STD	91	-10.39	29.07	35.8 60.5 (b)	Pass
T4	120 - 100	Horizontal	ROHN 2 STD	130	-11.22	24.59	45.6 65.3 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
T5	100 - 80	Horizontal	ROHN 2 X-STR	169	-11.86	26.65	44.5 48.0 (b)	Pass
T6	80 - 60	Horizontal	ROHN 2.5 STD	196	-12.45	29.67	42.0 50.3 (b)	Pass
T7	60 - 40	Horizontal	ROHN 2.5 STD	223	-12.51	24.76	50.5 50.6 (b)	Pass
T8	40 - 20	Horizontal	ROHN 3 STD	250	-13.64	36.03	37.9 55.5 (b)	Pass
T9	20 - 0	Horizontal	ROHN 3 STD	277	-13.24	30.77	43.0 59.0 (b)	Pass
T1	180 - 160	Top Girt	ROHN 1.5 STD	6	-0.75	18.26	4.1 4.4 (b)	Pass
T2	160 - 140	Top Girt	ROHN 2 STD	45	-5.18	27.69	18.7 30.5 (b)	Pass
T3	140 - 120	Top Girt	ROHN 2 STD	84	-8.04	27.69	29.0 46.8 (b)	Pass
T4	120 - 100	Top Girt	ROHN 2 STD	123	-10.81	24.71	43.7 62.9 (b)	Pass
T5	100 - 80	Top Girt	ROHN 2 X-STR	162	-11.72	28.44	41.2 47.4 (b)	Pass
T6	80 - 60	Top Girt	ROHN 2.5 STD	189	-12.09	34.41	35.1 48.9 (b)	Pass
T7	60 - 40	Top Girt	ROHN 2.5 STD	216	-12.52	28.81	43.4 50.6 (b)	Pass
T8	40 - 20	Top Girt	ROHN 3 STD	243	-13.43	40.88	32.9 54.3 (b)	Pass
T9	20 - 0	Top Girt	ROHN 3 STD	270	-14.26	34.60	41.2 57.7 (b)	Pass
T1	180 - 160	Inner Bracing	L2x2x1/8	38	-0.01	5.80	0.2	Pass
T2	160 - 140	Inner Bracing	L2x2x1/8	77	-0.09	5.68	1.6	Pass
T3	140 - 120	Inner Bracing	L2x2x1/8	117	-0.14	5.58	2.5	Pass
T4	120 - 100	Inner Bracing	L2x2x1/8	156	-0.19	3.64	5.1	Pass
T5	100 - 80	Inner Bracing	L2x2x1/8	182	-0.20	2.53	8.0	Pass
T6	80 - 60	Inner Bracing	L2 1/2x2 1/2x3/16	209	-0.21	5.20	4.0	Pass
T7	60 - 40	Inner Bracing	L3x3x3/16	236	-0.22	6.73	3.2	Pass
T8	40 - 20	Inner Bracing	L3 1/2x3 1/2x1/4	264	-0.23	10.73	2.2	Pass
T9	20 - 0	Inner Bracing	L3 1/2x3 1/2x1/4	291	-0.25	8.52	2.9	Pass
							Summary	
						Leg (T9)	48.1	Pass
						Diagonal (T4)	63.8	Pass
						Horizontal (T4)	65.3	Pass
						Top Girt (T4)	62.9	Pass
						Inner Bracing (T5)	8.0	Pass
						Bolt Checks	65.3	Pass
						RATING =	**65.3**	**Pass**

SITE NAME	Waterford CT	ECP - CELL #	2	135
LATITUDE	41-222-40.22 N	LONGITUDE	72-08-21.65 W	
Change RRH 2X40 700 to RRH 2X460 700 Change RRH 2X40 AWS to RRH 4X45 AWS Add RRH 2X60 PCS		SAVE BUTTON		
		STRUCTURE TYPE	Lattice	

700 Mhz - LTE Current Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	eNodeB	eNodeB	eNodeB
ANTENNA TYPE	BXA-70063-6CF_2	SLCP 2X6015	SLCP 2X6015
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	30	150	260
DOWN TILT (MECH/ELEC)	0/0	4/0	4/0
RAD CTR (FT AGL)	134.8	134.8	134.8
TMA - QTY / MODEL	1 ALU RH_2X40 700	1 ALU RH_2X40 700	1 ALU RH_2X40 700
DIPLEXER - QTY / MODEL			
700 Mhz - LTE Future Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	eNodeB	eNodeB	eNodeB
ANTENNA TYPE	SBNHH-1D65B_04DT	SBNHH-1D65B_10DT	SBNHH-1D65B_10DT
QTY OF ANTENNAS PER FACE	0	0	0
ORIENTATION (DEG)	45	150	240
DOWN TILT (MECH/ELEC)	0/4	0/10	0/10
RAD CTR (FT AGL)	134.8	134.8	134.8
TMA - QTY / MODEL	1 ALU RH_2X60 700	1 ALU RH_2X60 700	1 ALU RH_2X60 700
DIPLEXER - QTY / MODEL			
850 Celluar - Current Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	Cellular Mod 4.0B	Cellular Mod 4.0B	Cellular Mod 4.0B
ANTENNA TYPE	LPA-80063-4CF	SC-E 6014 REV 2	SC-E 6014 REV 2
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	30	150	260
DOWN TILT (MECH/ELEC)	4/0	6/0	4/0
RAD CTR (FT AGL)	134.8	134.8	134.8
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
850 Celluar - Future Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	Cellular Mod 4.0B	Cellular Mod 4.0B	Cellular Mod 4.0B
ANTENNA TYPE	LNX-6512DS-A1M	LNX-6512DS-A1M	LNX-6512DS-A1M
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	30	143	260
DOWN TILT (MECH/ELEC)	0/4	0/8	0/4
RAD CTR (FT AGL)	134.8	134.8	134.8
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
DIPLEX WITH LTE CABLE			
1900 PCS - Current Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B
ANTENNA TYPE	BXA-171063-8BF-2	BXA-171063-8BF-2	BXA-171063-8BF-2
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	30	150	260
DOWN TILT (MECH/ELEC)	0/0	4/0	4/0
RAD CTR (FT AGL)	134.8	134.8	134.8
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
1900 PCS - Future Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B
ANTENNA TYPE	SBNHH-1D65B_02DT	SBNHH-1D65B_4DT	SBNHH-1D65B_02DT
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	45	150	240
DOWN TILT (MECH/ELEC)	0/2	0/4	0/4
RAD CTR (FT AGL)	134.8	134.8	134.8
TMA - QTY / MODEL			
RRH - QTY/MODEL	1 ALU RH_2X60-PCS	1 ALU RH_2X60-PCS	1 ALU RH_2X60-PCS
SECTOR DISTRIBUTION BOX			
MAIN DISTRIBUTION BOX			

AWS - LTE Current Config	ALPHA		BETA		GAMMA	
EQUIPMENT TYPE	2100 MHz BBU		2100 MHz BBU		2100 MHz BBU	
ANTENNA TYPE	BXA-171063-12BF_2		SACP 2X5516		BXA-171063-12BF_2	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	30		150		260	
DOWN TILT (MECH/ELEC)	0/0		2/0		0/0	
RAD CTR (FT AGL)	134.8		134.8		134.8	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	1	ALU RH_2X40-AWS	1	ALU RH_2X40-AWS	1	ALU RH_2X40-AWS
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX	1		DB-T1-6Z-8AB-0Z			

AWS - LTE Future Config	ALPHA		BETA		GAMMA	
EQUIPMENT TYPE	2100 MHz BBU		2100 MHz BBU		2100 MHz BBU	
ANTENNA TYPE	SBNHH-1D65B_02DT		SBNHH-1D65B_4DT		SBNHH-1D65B_2DT	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	45		150		240	
DOWN TILT (MECH/ELEC)	0/2		0/4		0/2	
RAD CTR (FT AGL)	134.8		134.8		134.8	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	1	ALU RH_24X45-AWS	1	ALU RH_24X45-AWS	1	ALU RH_24X45-AWS
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX	2		DB-T1-6Z-8AB-0Z			

NUMBER OF CABLE'S NEEDED						ESTIMATED CABLE LENGTH			
MAINLINE SIZE	1 5/8"	TOTAL # OF MAINLINES			12	MAINLINE (FT)			
JUMPER SIZE	1/2 "	TOTAL # OF TOP JUMPERS			36	TOP JUMPER (FT)			0
Equipment Cable Ordering		MAIN CABLE	18	-	6	TOP JUMPER #	24	+	12
FIBER LINE SIZE	1 5/8"	TOTAL # OF FIBER LINES			1	FIBER LINE MODEL #			158-1-08U8-S8.
JUMPER SIZE	5/8"	TOTAL # OF TOP JUMPERS			12	TOP JUMPER MODEL #			058-1-08U1-S1.
Fiber Cable Ordering		FIBER CABLE	1	+	1	TOP JUMPER #	24	+	12

TX / RX FREQUENCIES			TX POWER OUTPUT	
Cellular A-Band	PCS F / AWS-Band	700 Mhz C - E	Cellular (Watts)	20
TX - 869-880,890-891.5 MHz	TX - 1970-1975 / 2145-21	TX - 746-757	PCS (Watts)	60
RX - 824-835,845-846.5 MHz	RX - 1890-1895 / 1745-17	RX - 776-787	LTE (Watts)	90
			AWS(Watts)	60

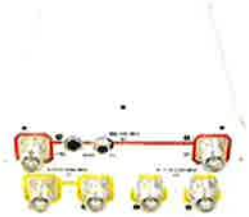
ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1	800	Tx1/Rx0	RED	A7	800	Tx2/Rx0	BLUE	A13	800	Tx3/Rx0	GREEN
A2	1900	Tx1/Rx0	RED/ WHITE	A8	1900	Tx2/Rx0	BLUE/ WHITE	A14	1900	Tx3/Rx0	GREEN/WHITE
A3	700	Tx1/Rx0	RED/ ORANGE	A9	700	Tx2/Rx0	BLUE/ ORANGE	A15	700	Tx3/Rx0	GREEN/ORANGE
A4	700	Tx4/Rx1	RED/RED/ ORANGE	A10	700	Tx5/Rx1	BLUE/BLUE/ ORANGE	A16	700	Tx6/Rx1	GREEN/GREEN/ ORANGE
A5	1900	Tx4/Rx1	RED/RED/ WHITE	A11	1900	Tx5/Rx1	BLUE/BLUE/ WHITE	A17	1900	Tx6/Rx1	GREEN/GREEN/ WHITE
A6	800	Tx4/Rx1	RED/RED	A12	800	Tx5/Rx1	BLUE/BLUE	A18	800	Tx6/Rx1	GREEN/GREEN

RF ENGINEER	RF MANAGER	INITIALS	DATE
Prepared By: Ray Paradis	Rob Hesselbach	RLP	12/26/2014
Revised By: Ray Paradis	Alejandro Restrepo	RLP	8/5/2016

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.



SBNHH-1D65B

Andrew® Tri-band Antenna, 698–896 and 2 x 1710–2360 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	1710–1880	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	1710–1880	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	1710 – 2360 MHz | 698 – 896 MHz

Mechanical Specifications

Product Specifications

SBNHH-1D65B

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	1828.0 mm | 72.0 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.

Product Specifications

ANDREW®
A CommScope Company

LNX-6512DS-T4M

DualPol® Antenna, 698–896 MHz, 65° horizontal beamwidth, fixed electrical tilt

- Continuous wideband operation
- Great solution to maximize network coverage and capacity
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Patented DualPol® technology
- Ideal choice for site collocations and tough zoning restrictions

CHARACTERISTICS

General Specifications

Antenna Type	DualPol®
Brand	DualPol®
Operating Frequency Band	698 – 896 MHz

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Beamwidth, Horizontal, degrees	65	65
Gain, dBd	12.4	13.3
Gain, dBi	14.5	15.4
Beamwidth, Vertical, degrees	18.7	16.2
Beam Tilt, degrees	4	4
Upper Sidelobe Suppression (USLS), typical, dB	20	20
Front-to-Back Ratio at 180°, dB	30	32
Isolation, dB	30	30
VSWR | Return Loss, db	1.35:1 | 16.5	1.35:1 | 16.5
Intermodulation Products, 3rd Order, 2 x 20 W, dBc	-150	-150
Input Power, maximum, watts	500	500
Polarization	±45°	±45°
Impedance, ohms	50	50
Lightning Protection	dc Ground	dc Ground

Product Specifications

LNX-6512DS-T4M

ANDREW®
A CommScope Company

Mechanical Specifications

Color	Light gray
Connector Interface	7-16 DIN Female
Connector Location	Bottom
Connector Quantity	2
Wind Loading, maximum	379.8 N @ 150 km/h 85.4 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1232.0 mm | 48.5 in
Width	301.0 mm | 11.9 in
Net Weight	12.8 kg | 28.2 lb

Regulatory Compliance/Certifications

Agency
RoHS 2002/95/EC
China RoHS SJ/T 11364-2006

Classification
Compliant by Exemption
Above Maximum Concentration Value (MCV)

INCLUDED PRODUCTS

MTG-L-STD
Downtilt Mounting Kit for panel Antennas

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.

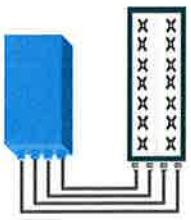
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

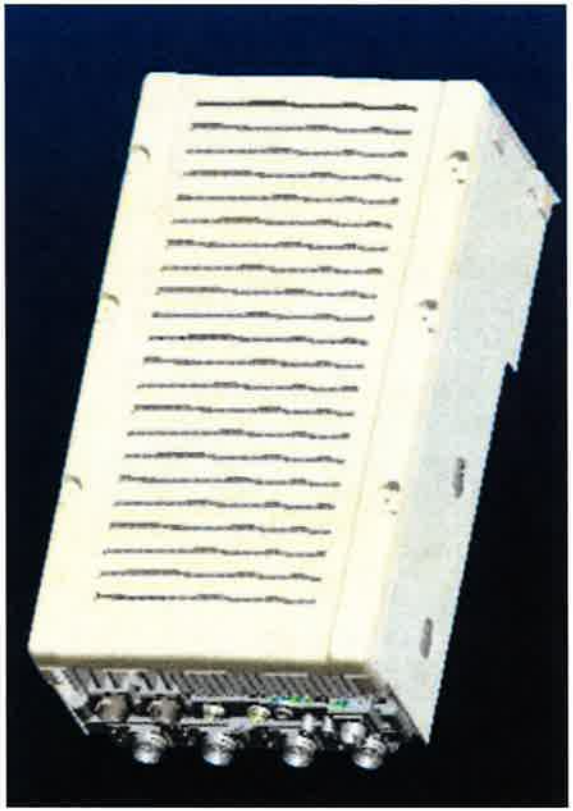
TECHNICAL SPECIFICATIONS

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

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

VZW Network Equipment Reporting Form (NERF)

Vendor	Alcatel-Lucent	Model	B66a RRH 4Tx/4Rx 4x45W or 2x 90W (SW selectable)	Function	RRH for distributed architecture with a CPRI interface between digital and RF processing components. The RRH has 4 Tx ports and 4 Rx ports. Can be SW configured for 2 Tx with 90W rf per port or 4 Tx with 45W rf per port. The RRH has passive cooling only.

*1)Equipment Configuration	*2)Heat Release @50°F Intake Temp [W]		*3)Airflow Rate @ 100% Activity Rate [cfm]		*4)Dimensions [in]		Non-Thermal Data		
	100% Activity	50% Activity	Nominal (70°F)	Max (95°F)	External (WxDxH)	Clear (F/R/S)	Installed Weight [lb]	*5)Sound @ Nominal [L_{WAd}]	*6)Name Plate [W]
Minimum			N/A Convection cooled	N/A Convection cooled	w/o Solar Shield W = 11.4in D = 6.7in H = 25.2in (W=290mm) (D=170mm) (H=640mm)	Front: 12" Rear: 7.5" Right: 12" Left: 12" Top: 12" Bottom: 24"			
Typical			N/A Convection cooled	N/A Convection cooled	with Solar Shield W = 12in D = 7.6in H = 25.8in (W=304mm) (D=193mm) (H=655mm)		62lb 72 lb(w mounting brackets)	N/A Convection cooled	
Full	825W (add 60W for AISG)	TBD	N/A Convection cooled	N/A Convection cooled	N/A			N/A Convection cooled	

*7)Equipment EC-Class	N/A Convection cooled	*10)Fan Speed	N/A Convection cooled	*13)Fan Hot-Swap	N/A Convection cooled	*16)Environ. Tests	N/A Convection cooled	*18)Temp. Rise [°F]	N/A Convection cooled
*8)Non-Optimal EC-Class	N/A Convection cooled	*11)Fan Logic	N/A Convection cooled	*14)Shut-Down	N/A Convection cooled	*17)Allow. Max [°F]	N/A Convection cooled	*19)Rec. Max [°F]	N/A Convection cooled
*9)Exhaust Openings	N/A Convection cooled	*12)Fan Alarm	N/A Convection cooled	*15)Temp. Access	N/A Convection cooled	*17)Allow. Min [°F]	N/A Convection cooled	*19)Rec. Min [°F]	N/A Convection cooled

Power Reporting					
Power Input	-48V	No. Power Supplies	N/A (Customer provided power plant)	Number of Inputs per Power Supply	1
*24)Maximum Demand (total system in Watts)	825W (add 60W for AISG)	Maximum Input (each power supply in Watts)	N/A (Customer provided power plant)	Maximum Output (each power supply in Watts)	58W (to AISG port, 29V/2A)
Power Supply Connection Type	DC entry via Conduit Box	Power Supply Make & Model	N/A (Customer provided power plant)		
Input Protection	no input fuse	Input Protection Make & Model	N/A (Customer provided power plant)		
Redundancy Scheme	N/A				
Nominal Voltage	-48VDC	Maximum Voltage	-57V	Minimum Voltage	-38V
*25)Max Current at Nominal Voltage	17.2A (add 1.2A if AISG port loaded 2A*29V)	*25)Max Current at Maximum Voltage	14.5A (add 1A if AISG port loaded 2A*29V)	*25)Max Current at Minimum Voltage	21.7A (add 1.5A if AISG port loaded 2A*29V)

Return completed forms to Engineering and Operations Support (EOS)

Richard.damiano@verizonwireless.com

Product Data Sheet DB-B1 and DB-T1 Series

DC and Fiber Management Distribution Boxes for HYBRIFLEX™ Cable

Product Description

The RFS Distribution Box design comes with the option for pluggable over voltage protection (OVP) for up to 6 remote radios and the connection for 6 pairs of optical fiber with LC optical fiber cable management. There is a hybrid cable input with a jumper configuration for power and optical fiber to the remote radio heads (RRHs). A custom wall, a 2-inch pole, and an H-Frame mounting bracket are included. Both the compact and standard design are available with lightening protection.

Features/Benefits

- Designed to accommodate varying diameters of HYBRIFLEX™ (combined power and fiber optic) cables – up to 2 inches
- Supports Single- and Multi-Mode Optical fiber
- NEMA 4x rated enclosure – allows **flexibility for indoor or outdoor installation** on a roof or tower top
- Weatherproof enclosure and ports – **improves system reliability**
- Modular design – makes replacement or addition of OVP easy without removal of other components within the box
- Strikesorb OVP technology – protects equipment from damaging surges up to 60 kA on an 8/20 waveform and up to 5 kA on a 10/350 waveform (certain models only)
- Low residual voltage and high impedance – **ideally suited for RRH technology** – won't shut down the RRH the way spark gap technology does (certain models only)

Technical Specifications

Mechanical Specifications

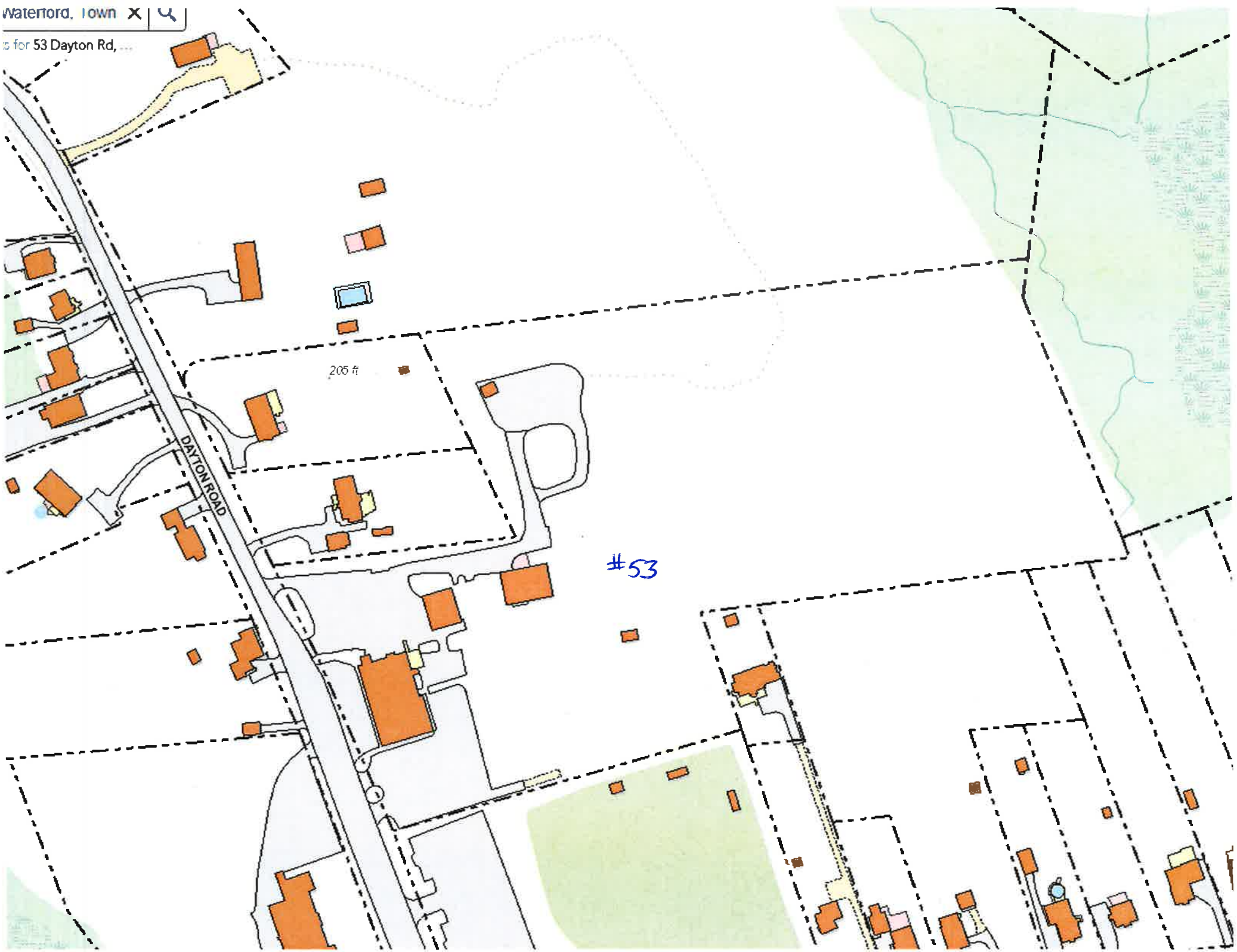
Model Number	DB-B1-6C-8AB-0Z	DB-T1-6Z-8AB-0Z
Enclosure Design	Standard, 6 OVP's	Standard without OVP
Dimensions - H x W x D, mm (in)	610 x 610 x 254 (24 x 24 x 10)	610 x 610 x 254 (24 x 24 x 10)
Weight, kg (lb)	20 (44)	20 (44)
Suppression Connection Method	Compression lug, #2-#14 AWG Copper, #2-#12 Aluminum	
Fiber Connection Method	LC-LC Single- or Multi-mode duplex	
Environmental Rating	NEMA 4x	
Operating Temperature, °C (°F)	-40 to +80 (-40 to +176)	
UV Protection	ISO 4892-2 Method A Xenon-Arc 2160 hrs	

Electrical Specifications

Nominal Operating Voltage	48 VDC	
Nominal Discharge Current (I_n) per UL 1449 3rd Ed	20 kA 8/20 µs	N/A
Maximum Discharge Current (I_{max}) per NEMA LS-1	60 kA 8/20 µs	N/A
Maximum Impulse (Lightning) Current (I_{imp}) per IEC 61643-1	5 kA 10/350 µs	N/A
Maximum Continuous Operating Voltage (U_c)	75 VDC	N/A
Voltage Protection Rating per UL1449 3rd Ed	400 V	N/A
Protection Class as per IEC 61643-1	Class 1	N/A
Strikesorb OVP Compliance	ANSI/UL 1449-3rd Ed	N/A
	IEEE C62.41	N/A
	NEMA LS-1	N/A
	IEC 61643-1	N/A
	IEC 61643-12	N/A
	EN 61643-11	N/A

* This data is provisional and subject to change.

ATTACHMENT 4


Waterford, Town
for 53 Dayton Rd, ...
205 ft
DAYTON ROAD
#53

53 DAYTON ROAD

Location	53 DAYTON ROAD	**Assessment**	$1,294,780
Mblu	92/ / 1844/ /	**Appraisal**	$1,849,680
Acct#	00158300	**PID**	1844
		Building Count	2

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$923,090	$926,590	$1,849,680
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$646,170	$648,610	$1,294,780

Building Information

Building 1 : Section 1

Year Built: 1950
Living Area: 8615
Replacement Cost: $755,799
Building Percent Good: 68

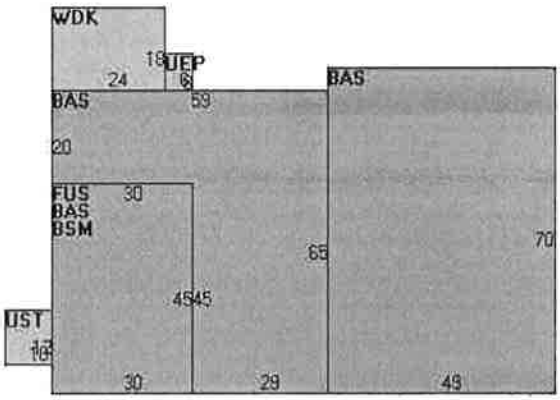
Building Attributes	
Field	**Description**
STYLE	Fire Station
MODEL	Comm/Ind
Grade	Above Ave
Stories:	1.00
Occupancy	1
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	Brick Veneer
Roof Structure	Gambrel
Roof Cover	Asphalt
Interior Wall 1	Plaster
Interior Wall 2	Drywall
Interior Floor 1	Concrete
Interior Floor 2	Comp Tile
Heating Fuel	Oil

Building Photo

(http://images.vgsi.com/photos/WaterfordCTPhotos//\00\00\88

Heating Type	Hot Water
% Central Air	0
Foundation	Poured Conc
Bldg Use	Exempt Comm
Total Rooms	0
Total Bedrms	0
Total Fixtures	22
% Wet Sprinkler	100
% Dry Sprinkler	
1st Floor Use	
Heat/AC	Typical
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
% Finished	60
Class	C
Wall Height	11

Building Layout



Building Sub-Areas			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	7265	7265
FUS	Finished Upper Story	1350	1350
BSM	Basement	1350	0
UEP	Unfin. Enclosed Porch	48	0
UST	Unfinished Utility Area	120	0
WDK	Deck	432	0
		10565	8615

Building 2 : Section 1

Year Built: 1950
Living Area: 3360
Replacement Cost: $347,072
Building Percent Good: 62

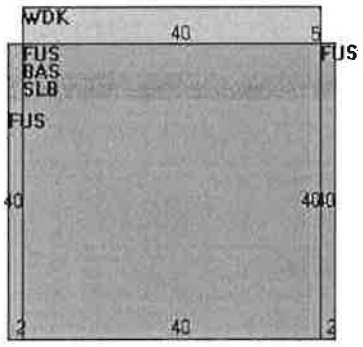
Building Attributes : Bldg 2 of 2	
Field	**Description**
STYLE	Fire Station
MODEL	Comm/Ind
Grade	Above Ave
Stories:	2.00
Occupancy	1
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	Brick Veneer
Roof Structure	Gambrel
Roof Cover	Asphalt
Interior Wall 1	Plaster
Interior Wall 2	Drywall
Interior Floor 1	Concrete

Building Photo

(http://images.vgsi.com/photos/WaterfordCTPhotos//default.jpg

Interior Floor 2	Comp Tile
Heating Fuel	Oil
Heating Type	Forced Hot Air
% Central Air	0
Foundation	Poured Conc
Bldg Use	Exempt Comm
Total Rooms	0
Total Bedrms	0
Total Fixtures	0
% Wet Sprinkler	
% Dry Sprinkler	
1st Floor Use	
Heat/AC	Typical
Frame Type	MASONRY
Baths/Plumbing	LIGHT
% Finished	0
Class	C
Wall Height	11

Building Layout



Building Sub-Areas			Legend
Code	**Description**	**Gross Area**	**Living Area**
FUS	Finished Upper Story	1760	1760
BAS	First Floor	1600	1600
SLB	Slab	1600	0
WDK	Deck	200	0
		5160	3360

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
FBM	Finished Bsmt	475 S.F.	$3,230	1

Land

Land Use

Use Code 920
Description Exempt Comm
Zone R-40
Neighborhood 200
Alt Land Appr No
Category

Land Line Valuation

Size (Acres) 9.91
Frontage 0
Depth 0
Assessed Value $648,610
Appraised Value $926,590

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
FN1	Fence			928 L.F.	$7,660	2
FGR1	Garage	MS	Masonry	220 S.F.	$3,300	1
LSUM	Lump Sum			120000 UNITS	$90,000	2

PAV1	Paving	AS	Asphalt	39900 S.F.	$49,880	1
SHD1	Shed	FR	Frame	800 S.F.	$6,000	1
FN1	Fence			1408 L.F.	$7,740	1
FOP	Porch			1600 S.F.	$24,000	1
LSUM	Lump Sum			4320 UNITS	$2,160	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2010	$0	$0	$3,234,857
2009	$0	$0	$3,234,857
2008	$0	$0	$3,234,857

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2010	$0	$0	$2,264,400
2009	$0	$0	$2,264,400
2008	$0	$0	$2,264,400