Robinson+Cole

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Also admitted in Massachusetts

December 13, 2018

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification**
880 Post Road East, Westport, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 160-foot level on the existing 180-foot Connecticut State Police tower at 880 Post Road East in Westport, Connecticut (the "Property"). The tower and underlying property are owned by the State of Connecticut. The Council approved Cellco's use of the existing tower in 1990. Cellco now intends to replace six (6) of its existing antennas with three (3) model JAHH-65B-R3B, 700/2100 MHz antennas and three (3) model JAHH-65B-R3B, 850/1900 MHz antennas, all at the same level on the tower. Cellco also intends to remove three (3) remote radio heads ("RRHs") and install nine (9) new RRHs behind its antennas and two (2) HYBRIFLEX™ fiber optic antenna cables. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cables.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to James Marpe, Westport's First Selectman, Mary Young, Westport's Planning & Zoning Director; and the State of Connecticut, the owner of the Property.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed at the 160-foot level of the 180-foot tower.

18741146-v1

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

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

6. The tower and its foundation, with certain modifications, can support Cellco's proposed modifications. (*See* Detailed Structural Analysis and Evaluation prepared by AECOM included in Attachment 3).

A copy of the parcel map and owner information for the Property is included in Attachment 4. A Certificate of Mailing verifying that this filing was sent to municipal officials and the owner of the Property is included in Attachment 5.

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:
James Marpe, First Selectman
Mary Young, Planning & Zoning Director
State of Connecticut
Tim Parks

ATTACHMENT 1

8-port sector antenna, 2x 698–787, 2x 824–894 and 4x 1695–2360 MHz, 65° HPBW, 3x RET and low bands have diplexers. Internal SBT's on first LB (Port 1) and first HB(Port 5).

- Internal SBT on low and high band allow remote RET control from the radio over the RF jumper cable
- One RET for 700MHz, one RET for 850MHz, and one RET for both high bands to ensure same tilt level for 4x Rx or 4x MIMO
- Internal filter on low band and interleaved dipole technology providing for attractive, low wind load mechanical package
- Separate RS-485 RET input/output for low and high band

Electrical Specifications

Frequency Band, MHz	**698–787**	**824–894**	**1695–1880**	**1850–1990**	**1920–2200**	**2300–2360**
Gain, dBi	14.5	15.8	18.0	18.4	18.5	18.8
Beamwidth, Horizontal, degrees	67	65	63	63	65	68
Beamwidth, Vertical, degrees	12.4	10.5	5.7	5.2	4.9	4.4
Beam Tilt, degrees	2–14	2–14	0–10	0–10	0–10	0–10
USLS (First Lobe), dB	18	18	20	20	21	23
Front-to-Back Ratio at 180°, dB	32	34	31	35	36	38
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 at 50°C, maximum, watts	200	200	300	300	300	250
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

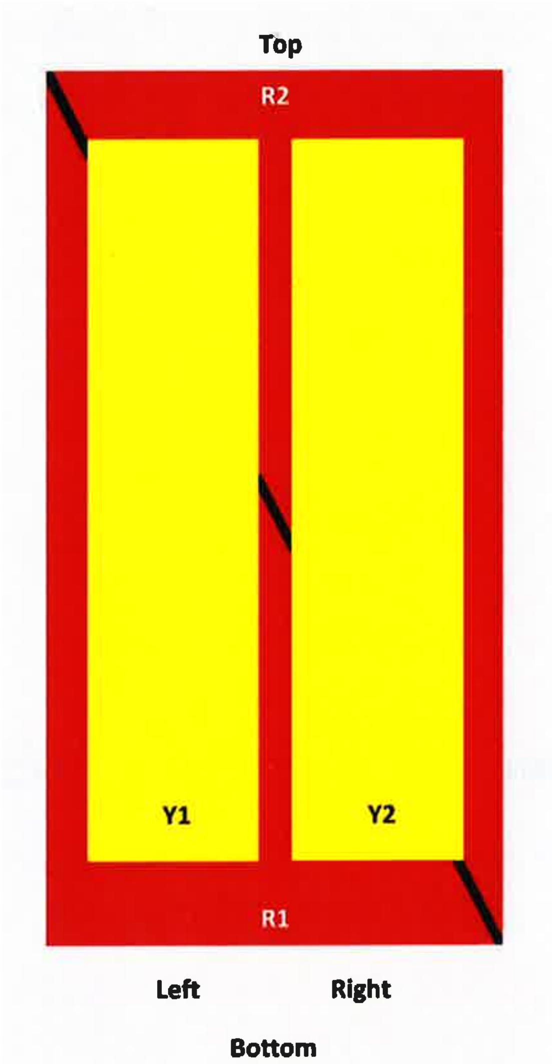
Frequency Band, MHz	**698–787**	**824–894**	**1695–1880**	**1850–1990**	**1920–2200**	**2300–2360**
Gain by all Beam Tilts, average, dBi	14.3	14.9	17.6	18.1	18.2	18.5
Gain by all Beam Tilts Tolerance, dB	±0.3	±0.5	±0.6	±0.4	±0.5	±0.6
Gain by Beam Tilt, average, dBi	2 ° | 14.3 8 ° | 14.3 14 ° | 14.3	2 ° | 15.0 8 ° | 14.9 14 ° | 15.4	0 ° | 17.2 5 ° | 17.6 10 ° | 17.6	0 ° | 17.6 5 ° | 18.2 10 ° | 18.2	0 ° | 17.7 5 ° | 18.3 10 ° | 18.3	0 ° | 17.9 5 ° | 18.7 10 ° | 18.7
Beamwidth, Horizontal Tolerance, degrees	±1.2	±1.4	±4	±2.4	±2.9	±2.7
Beamwidth, Vertical Tolerance, degrees	±0.9	±0.5	±0.3	±0.2	±0.3	±0.1
USLS, beampeak to 20° above beampeak, dB	18	17	17	18	19	18
Front-to-Back Total Power at 180° ± 30°, dB	25	24	26	29	27	29
CPR at Boresight, dB	22	23	20	21	21	24
CPR at Sector, dB	11	12	11	11	11	8

* 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.

COMMSCOPE®

Array Layout

JAHH-65A-R3B JAHH-65B-R3B JAHH-65C-R3B



Array	Freq (MHz)	Conns	RET (SRET)	AISG RET UID
R1	698-798	1-2	1	ANxxxxxxxxxxxxxxxx1
R2	824-894	3-4	2	ANxxxxxxxxxxxxxxxx2
Y1	1695-2360	5-6	3	ANxxxxxxxxxxxxxxxx3
Y2	1695-2360	7-8		

View from the front of the antenna

(Sizes of colored boxes are not true depictions of array sizes)

General Specifications

Operating Frequency Band 1695 – 2360 MHz | 698 – 787 MHz | 824 – 894 MHz

JAHH-65B-R3B

Antenna Type	Sector
Band	Multiband
Performance Note	Outdoor usage

Mechanical Specifications

RF Connector Quantity, total	8
RF Connector Quantity, low band	4
RF Connector Quantity, high band	4
RF Connector Interface	4.3-10 Female
Color	Light gray
Grounding Type	RF connector body grounded to reflector and mounting bracket
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Location	Bottom
Wind Loading, frontal	301.0 N @ 150 km/h 67.7 lbf @ 150 km/h
Wind Loading, lateral	254.0 N @ 150 km/h 57.1 lbf @ 150 km/h
Wind Loading, maximum	638.0 N @ 150 km/h 143.4 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Length	1828.0 mm | 72.0 in
Width	350.0 mm | 13.8 in
Depth	208.0 mm | 8.2 in
Net Weight, without mounting kit	28.7 kg | 63.3 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Internal Bias Tee	Port 1 | Port 5
Internal RET	High band (1) | Low band (2)
Power Consumption, idle state, maximum	2 W
Power Consumption, normal conditions, maximum	13 W
Protocol	3GPP/AISG 2.0 (Single RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	2 female | 2 male

Packed Dimensions

JAHH-65B-R3B

Length	1975.0 mm | 77.8 in
Width	456.0 mm | 18.0 in
Depth	357.0 mm | 14.1 in
Shipping Weight	42.0 kg | 92.6 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

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.

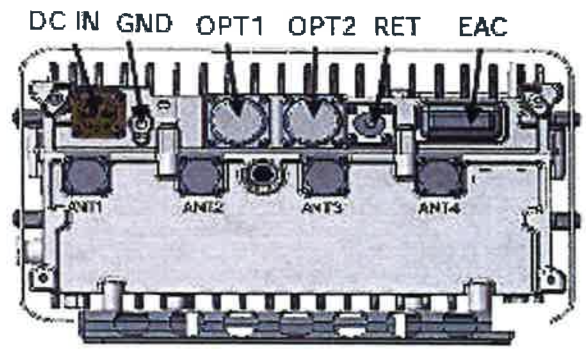
* Footnotes

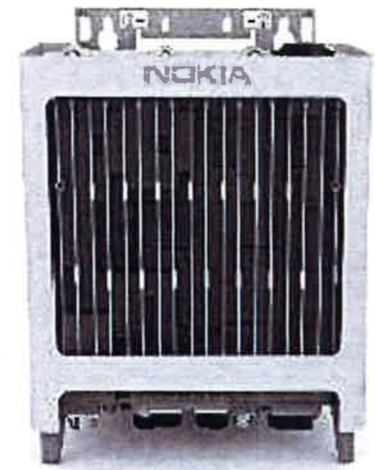
Performance Note	Severe environmental conditions may degrade optimum performance

COMMSCOPE®

AHCA AirScale RRH 4T4R B5 160W

Supported Frequency bands	3GPP band 5
Frequencies	DL 869-894MHz, UL 824-849MHz
Number of TX/RX paths/pipes	4TX/4RX
Instantaneous Bandwidth IBW	25MHz (Full Band)
Occupied Bandwidth OBW	25MHz (Full Band)
Output Power	4T4R @ 40W / 2T4R @ 60W
RF Sharing	LTE, WCDMA, LTE + NB-IoT supported
256 QAM Back Off	No backoff at 40W and 0.8dB at 60W.
Supply Voltage / Voltage Range	DC-48V / -36V to -60V
Typical Power Consumption	365W [50% ETSI Busy Hour Load at 4TX @ 40W]
	529W [100% RF Load at 4 TX @ 40W]
	574W [100% RF Load at 4 TX @ 40W with SBT and AISG ON]
Antenna Ports	4 Ports, 4.3-10+
Optical Ports	2x CPRI 9.8 Gbps
ALD Control Interfaces	AISG3.0 from ANT1,2, 3, 4 and RET (Power supply ANT1 and ANT3)
Other Interfaces	External Alarm MDR-26 Serial connector (4 inputs, 1 Output) DC Circular Power Connector





Operational Temperature Range	-40°C to 55°C (with solar cover)
Dimensions (mm) Height x width x depth	337 x 295 x 165 (radio only) 13.3" x 11.7" x 6.5" 428 x 324 x 208 (with bracket and enclosure) 16.9" x 12.8" x 8.2"
Volume (liters)	16.5
Weight (kg)	16/ 35.3 lb – w/o bracket
Ingress protection class	IP65
Installation options	Pole or Wall, Vertical or Horizontal Book Mount
Surge protection	Class II 5kA

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.

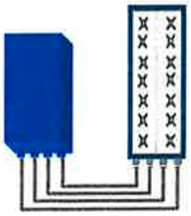
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

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

SAMSUNG

Dual-Band Radio Unit
AWS/PCS (B66/B2)
RFV01U-D1A

Samsung's RFV01U-D1A is a compact remote Radio Unit (RU) designed for deployments that require flexibility in installation and rapid onlining, without compromising on coverage, capacity or operational expenses.

The RFV01U-D1A RU targets dual-band support across Band 66 (AWS) and Band 2 (PCS), making it an ideal product for broad coverage footprints across multiple common mid-range frequencies.

The RU handles all Radio Frequency (RF) processing in a single, compact unit, and is designed to interface via CPRI with Samsung's CDU baseband offerings, in both distributed- and central-RAN configurations.

In addition to its minimal footprint and ease of installation, the RU is also designed to reduce cost of ownership through its integrated spectrum analyzer, which allows for remote RF monitoring, greatly reducing the need for on-site maintenance visits.

Features and Benefits

- Dual-band support for broad frequency coverage
- Minimal footprint reduces site costs
- Rapid, easy installation
- Flexibly deployable in any location
- Remote RF monitoring capability
- Convection cooled, silent operation
- Built-in Broadcast Auxiliary Services (BAS) filter ensures compliant AWS operation without impacting footprint

Key Technical Specifications

Duplex Type: FDD
Operating Frequencies:
B66: DL(2,110-2,180MHz)/UL(1,710-1,780MHz)
B2: DL(1,930-1,990MHz)/UL(1,850-1,910MHz)
Instantaneous Bandwidth:
70MHz(B66) + 60MHz(B2)
RF Chain: 4T4R/2T4R/2T2R
Output Power: Total 320W
DU-RU Interface: CPRI (10Gbps)
Dimensions: 380 x 380 x 255mm (36.8L)
Weight: 38.3kg
Input Power: -48V DC
Operating Temp.: -40 - 55°(w/o solar load)
Cooling: Natural convection

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.

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

Figure 1: HYBRIFLEX Series

Technical Specifications

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

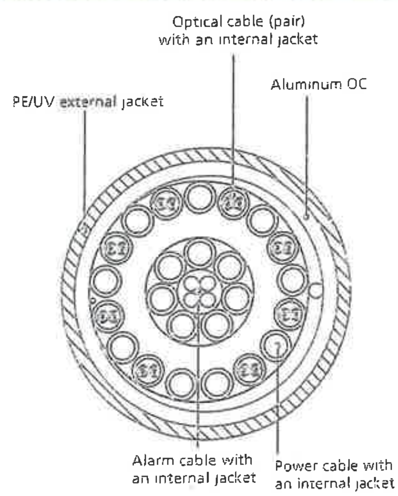


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Westport								
Tower Height: 180'								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T	1	368	133	850	0.0082	0.5667	0.14%	
*AT&T	1	1476	133	737	0.0329	0.4913	0.67%	
*AT&T	1	4842	133	1900	0.1080	1.0000	1.08%	
*AT&T	1	3837	133	2100	0.0856	1.0000	0.86%	
*AT&T	1	1285	133	2300	0.0287	1.0000	0.29%	
*T-Mobile	4	1167	125	1900	0.1185	1.0000	1.19%	
*T-Mobile	1	865	125	700	0.0220	0.4667	0.47%	
*T-Mobile	2	2334	125	2100	0.1185	1.0000	1.19%	
*State Police	1	330	180	42.04	0.0039	0.2000	0.20%	
*State Police	1	51	169	954.4	0.0007	0.6363	0.01%	
Verizon	**1**	**5062**	**160**	**0.0711**	**1970**	**1.0000**	**7.11%**	
Verizon	**3**	**494**	**160**	**0.0208**	**869**	**0.5793**	**3.59%**	
Verizon	**1**	**3709**	**160**	**0.0521**	**880**	**0.5867**	**8.88%**	
Verizon	**1**	**8325**	**160**	**0.1169**	**2145**	**1.0000**	**11.69%**	
Verizon	**1**	**2062**	**160**	**0.0290**	**746**	**0.4973**	**5.82%**	
								43.2%
* Source: Siting Council								

ATTACHMENT 3

AECOM

Submitted to
Verizon Wireless
99 East River Drive
East Hartford, CT 06108

Submitted by
AECOM
500 Enterprise Drive,
Suite 3B
Rocky Hill, CT 06067
November 13, 2018

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 180' SELF SUPPORTING LATTICE TOWER AND FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT

verizonwireless

Site Name: CT State Police Tower
Site Address: 880 Post Road East
Westport, Connecticut
CSP Tower # 32

VZ5-220

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the 180' self-supporting lattice tower located at 880 Post Road East in Westport, Connecticut.

The structural analysis was conducted in accordance with the 2018 Connecticut State Building Code which includes the TIA-222-G[1] Standard, 2015 International Building Code, the 2018 Connecticut State Building Code Amendments, the AISC[2] Load Resistance Factor Design (LRFD), the ASCE 7[3] design Code, and the Connecticut State Police Requirements which include the TIA/EIA-222-F[4].

The antenna loading considered in the analysis consists of all the existing antennas, transmission lines and ancillary items as outlined in the Introduction Section of this report.

The proposed Verizon Wireless (VZW) antenna modifications are listed below:

Antennas and other Appurtenances	Carrier	Antenna Center Elevation
Remove: **(3) Amphenol BXA-171063-12CF-EDIN-2 Panel Antennas** **(1) Andrew LNX-6512DS-T4M Panel Antenna (Beta Sector)** **(2) Powerwave P65-15-XL2 Panel Antenna (Alpha and Gamma Sector)** **(3) Nokia 4x30_B13 RRH Unit (moved to Shelter)**	**VZW (existing)**	**@ 160'**
Install: **(6) Commscope JAHH-65B-R3B Panel Antenna** **(3) Commscope BSAMNT-SBS-2-2 Antenna Mount Assembly for JAHH Panel Antennas (1 per Sector)** **(3) Samsung 4x40_B2/B66 RRH Units** **(3) Nokia 4x40_B5 RRH Units** **(3) Nokia 4x30_B13 RRH Units** **(2) Fiber Optic Cables**	**VZW (Proposed)**	**@ 160'**

1. TIA = Telecommunications Industry Association Structural Standard for Antenna Supporting Structures and Antennas (Version G)

2. AISC = American Institute of Steel Construction (14th Edition)

3. ASCE 7 = American Society of Civil Engineers Standard 7 (2010 Edition)

4. TIA/EIA = Telecommunications Industry Association Structural Standard for Antenna Supporting Structures and Antennas (Version F)

1. EXECUTIVE SUMMARY *(continued)*

The results of the structural analysis indicated that:

1. The existing steel tower structure IS considered structurally adequate for the proposed antenna loading with the wind classification specified above.
2. The existing tower anchor bolts ARE considered structurally adequate for the proposed antenna loading with the classification specified above.
3. The existing foundation IS considered structurally adequate for the proposed antenna loading with the load classification specified above.
4. The existing tower's sway (deflection) is 0.4238 degrees, and the existing tower's twist (rotation) is 0.2452 degrees. These figures combined ARE within the Connecticut State Police requirement of 0.75 degrees for twist (rotation) and sway (deflection) with the load classification specified above.
5. The maximum structural capacity calculated herein is **93.1%**.

The analysis results presented herewith are based on previous tower modifications proposed by AECOM's tower modification analysis report, project 60581632 / SMK-004, signed and sealed on July, 13 2018. No installation of the proposed equipment shall occur until previous tower modifications have been completed.

This analysis is based on:

1) The tower structure's theoretical capacity not including any assessment of the condition of the tower.

2) Original tower report prepared by Rohn Industries, Inc., engineering file 26263DL and drawing C910693 dated February 1, 1991.

3) Soil investigation and foundation capacity report prepared by Dr. Clarence Welti, P.E., P.C., dated October 10, 2002.

4) Tower Mapping and Inventory by D&K Nationwide Communications Inc., performed on March 18, 2016.

5) Previous structural analysis and evaluation provided by AECOM on behalf of Motorola / Connecticut State Police, project PNS-606 / 60509756.06, signed and sealed on September 16, 2016.

6) Previous structural analysis and evaluation performed by AECOM on behalf of Verizon, project number 60519605 / VZ5-202, and on behalf of AT&T, project number 60518646 / SAI-094, signed and sealed on December 28, 2016.

7) Previous structural analysis and modification performed by AECOM on behalf of AT&T, project number 60581632 / SMK-004, signed and sealed on July 13, 2018.

8) Proposed VZW antennas and equipment identified within the Radio Frequency Data Sheet (RFDS), obtained via e-mail, dated August 9, 2018.

9) Antenna and mount configuration as specified on the following page of this report.

1. EXECUTIVE SUMMARY *(continued)*

This report is only valid as per the information and data provided by others for antenna inventory, mounts, tower structure, existing foundation and associated cables. The user of this report shall field verify the antenna, cabling and mount configuration used, as well as the physical condition of the tower members, connections and foundations. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

AECOM, *contracting as URS Corporation AES*

STATE OF CONNECTICUT
RICHARD A. SAMBOR
No. 9057
LICENSED
PROFESSIONAL ENGINEER

Richard A. Sambor, P.E.
Senior Structural Engineer
RAS/mcd

2. INTRODUCTION

The subject tower is located at 880 Post Road East in Westport, Connecticut. The structure is a 180' self-supporting lattice tower manufactured by Rohn Industries Incorporated.

The structural analysis was conducted in accordance with the following:

- TIA-222-G Standard for Standard for a wind velocity of range of 95 mph to 115 mph (3-second gust) and 50 mph (3-second gust) concurrent with 0.75" ice thickness, considered to increase in thickness with height
- 2015 International Building Code with 2018 Connecticut State Building Code Amendments for a wind speed of 101 mph (3-second gust) – increased to county maximum speed due to location within ASCE "Special Wind Region" → 110 mph
- 2010 AISC Load Resistance Factor Design (LRFD)
- 2010 ASCE 7 Minimum Design Loads for Buildings and Other Structures for the ice thickness referenced in the TIA-222-G Standard
- Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) and 90 mph (fastest mile) concurrent with 0.5" ice. Twist (rotation) and sway (deflection) were determined in accordance with Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) concurrent with 0.5" ice, analyzed under the TIA/EIA-222-F design Standard.

The inventory together with the proposed Verizon Wireless antenna arrangement is summarized in the table below:

Antenna Type	***Carrier***	***Mount***	***Antenna Centerline Elevation***	***Cable***
(1) Decibel DB-536 Omni Antenna	D&K-53 CSP-45 (existing)	Mount shared with D&K #48	@ 178'	(1) LDF5-50A
(1) Sinclair SE419-SWBPALDF(D00) Panel Antenna (Troop G (RX))	CSP (existing)	4' Side Arm Mount	@ 175'	(1) LDF4-50A Jumper from below TTA (Tr. G)
(1) Celwave PA6-65 Dish with Radome	D&K-52 CSP-42 (existing)	Dish Standoff	@ 177'	(1) EW-63
(1) Scala AP11-850 antenna	D&K-49 CSP-46 (existing)	*Shared with above mount*	@ 175'	(1) LDF7-50A
(1) Amphenol WPA-700102-4CF-EDIN-9 Panel Antenna (Troop G (TX))	CSP (existing)	*Shared with below Mount*	@ 170'	(1) AVA7-50A
(1) Bird 432E-83I-01T TTA Unit (Troop G)	CSP (existing)	Existing Antenna Mount Frame	@ 170'	(1) AVA7-50A (1) LDF4-50A
(1) Sinclair SE419-SWBPALDF(D00) Panel Antenna	CSP (existing)	*Shared with above Mount*	@ 170'	(1) LDF4-50A Jumper from above TTA (Tr. G)
(1) 4' Yagi Antenna	D&K-51 CSP-1 (existing)	Pipe Mounted to Leg	@ 169'	(1) LDF5-50A

Antenna Type	***Carrier***	***Mount***	***Antenna Centerline Elevation***	***Cable***
(1) (inverted) Scala OGT9-806 Omni Antenna	D&K-48 CSP-49 (existing)	4' Side Arm Mount	@ 164'	(1) LDF7-50A
(6) Commscope JAHH-65B-R3B Panel Antenna (3) Samsung 4x40_B2/B66 RRH Units (3) Nokia 4x40_B5 RRH Units (3) Nokia 4x30_B13 RRH Units	**Verizon (Proposed)**	**(3) Commscope BSAMNT-SBS-2-2 Antenna Mount Assembly for JAHH Panel Antennas (1 per Sector) shared with below mount**	**@ 160'**	**(2) 1 5/8" Fiber Optic Cable**
(1) Amphenol BXA 70080-4CF Panel Antennas (Alpha Sector) (2) Amphenol 70063-4CF Panel Antennas (Beta and Gamma Sectors) (1) Raycap DB-T1-6Z-8AB-0Z Distribution Box	D&K-27 – 46 Verizon (existing)	(3) 15' T-Frames	@ 160'	(4) LDF7-50A (1) 1 5/8" Fiber
(1) (inverted) Scala OGT9-806 Omni Antenna	D&K-47 CSP-48 (existing)	3' Side Arm Mount	@ 159'	(1) LDF7-50A
(6) P65-16-XLH-H-RR Panel Antennas (3) CCI HPA-65R-BUU-6 Panel Antennas (6) RRUS-11 Units (2) DC6-48-60-18-8F Distribution Box (3) TT19-08BP111-001 Twin TMA's (3) RRUS-32 RRH Units	D&K-13 – 26 AT&T (existing)	(3) Existing Antenna Mount Frames	@ 133'	(12) LDF6-50A (2) Fiber Optic Cable (4) DC Cables
(9) TMAs (6) Ericsson Air 21 antennas (3) Commscope LNX-6515DS-VTM Panel Antennas (3) Ericsson RRUS-11 Remote Radio Units	D&K-2 – 12 T-Mobile (existing)	(3) Antenna Frame Mounts (Valmont Site Pro 1 part # LTF12-372)	@ 125'	(18) LDF7-50A (1) LDF4-50A (1) Huber Suhner Hybrid cable

Antenna Type	Carrier	Mount	Antenna Centerline Elevation	Cable
(1) GPS Antenna	D&K-1 CSP-43 (existing)	Leg Mount	@ 61'	(1) LDF4-50A

NOTES: Antenna ID Numbering and elevations obtained from Tower Mapping and Existing inventory via tower climb performed by D&K Nationwide Communications, Inc. on March 18, 2016.

This structural analysis of the communications tower was performed by AECOM for Verizon Wireless (VZW). The purpose of this analysis was to assess the previously modified tower for its existing and proposed antenna loads. This analysis was conducted to evaluate twist (rotation), sway (deflection), stress on the tower, and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

The analysis results presented herewith are based on previous tower modifications proposed by AECOM's tower modification analysis report, project 60581632 / SMK-004, signed and sealed on July, 13 2018. No installation of the proposed equipment shall occur until previous tower modifications have been completed.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with, the TIA-222-G–Structural Standard for Antenna Towers and Antenna Supporting Structures and Antennas, the 2015 International Building Code with 2018 Connecticut State Building Code Amendments and the American Institute of Steel Construction (AISC) Manual of Steel Construction – Load Resistance Factor Design (LRFD)

The structural analysis was conducted using TNX Tower version 8.0.4.0 and used the following conditions for this tower review (following the TIA/EIA-222-G Standard):

- Structure Class 3 – (Essential Communications)
  - NOTE: ASCE 7 and CT State Building Code Applied Risk Category 4 for design wind loads (see below)
- Topographic Category 1 – (No Abrupt Changes in General Topography)
- Exposure Class C – (Open Terrain with scattered obstructions)
- Load Conditions:
  - Two load conditions were evaluated as shown which were compared to design stresses according to AISC and TIA/EIA-222-G Standard.

Basic Wind Speed:

- TIA-222-G:
  - Fairfield County (Wind Speed Range): V = 90 mph - 110 mph (3-second gust) [Annex of TIA-222-G 2006]
- IBC 2015 w/ 2018 CT State Building Code Amendment:
  - (2015) IBC Section 1609.1.1 – Determination of Wind Loads – Exception 5 "Designs using TIA-222" applies for determination of Design Wind Load obtained as "V.ult" are to be converted to "V.asd" when applying the TIA-222-G design Standard (under Section 1609.3) for Basic Wind Speed.
  - (2018) CT State Building Code Amendment to the IBC Section 1609.3 wind loads are obtained from Appendix N of the State Building Code.
    - V.asd = 101 mph (3-Second Gust) Wind Design Parameter for the Town of Southbury, Connecticut for Risk Category four (IV) for essential communications (Connecticut State Police).
    - NOTE: Due to the location of the Tower and Risk Category for the structure, the wind speed shall be increased to the TIA-222-G maximum listed speed (indicated above) to address additional wind effects within the "Special Wind Region" designated by ASCE and indicated within the "Wind-Borne Debris Region" per the CT State Building Code.

LOAD CONDITION 1 = 110 MPH (3-SECOND GUST) WIND LOAD (WITHOUT ICE) + TOWER DEAD LOAD
Load Condition 2 = 50 mph (3-second gust) Wind Load (with ice) + Ice Load + Tower Dead Load

Ice thickness used for this analysis is **0.75 inch** (assumed to start at the base of the tower) and is considered to increase in thickness with height. The initial ice thickness for design is referenced in the Annex of TIA-222-G and follows the same design criteria as the ASCE 7 Standard.

The load condition below implements the design requirements of the Connecticut State Police for the tower structures deflection limits with the allowable deflection limit of the combination of the tower's sway (deflection) and twist (rotation) under the TIA/EIA-222-F design Standard. This design limit required the design combined value of sway (deflection) and twist (rotation) to be under 0.75 degrees following the TIA/EIA-222-F design Standard.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS (cont.)

Load Condition 3 = 90 mph (fastest mile) Wind Load (with Ice) + Ice Load + Dead Load

Seismic event consideration factors/values for design:

- S.s = 0.226 (2018 CT State Building Code – Location Specific Value)
- S.1 = 0.067 (2018 CT State Building Code – Location Specific Value)
- Site Classification = "D"
- Seismic Design Category = "A" – (2015 International Building Code)
- F.a = 1.6 (Obtained from TIA-222-G Table 2-12 Considering above conditions)
- F.v = 2.4 (Obtained from TIA-222-G Table 2-13 Considering above conditions)

Strength Limit State Load Combinations (TIA-222-G Section 2.3.2):

The structural analysis herein has considered the following load combinations within the analysis:

1. ***1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.6 Wind load without ice***
2. 1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.0 Dead weight of ice due to factored ice thickness + 1.0 Concurrent wind load with factored ice thickness + 1.0 Load effects due to temperature
3. 1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.0 Earthquake Load

NOTE 1: The above **bolded** load combination is considered to create the governing design loads per the results of the analysis.

NOTE 2: The above "Dead Load Guy Assemblies" are not considered as part of the analysis and are considered as a value of zero.

NOTE 3: The "Load effects due to temperature" do not apply for structures that are self-supporting (from the TIA-222-G Standard)

4. FINDINGS AND EVALUATION

The combined axial and bending stresses on the tower structure were evaluated to compare with the strength design in accordance with AISC (LRFD). The results of an initial analysis indicated that the existing tower, anchor bolts and foundation HAS enough capacity to support the proposed loading conditions.

The tower sway (deflection) is 0.4238 degrees and the tower twist (rotation) is 0.2452 degrees. These figures combined ARE within the Connecticut State Police specification of 0.75 degrees for sway (deflection) and twist (rotation).

Tower Base Reactions (TIA-222-G):

Description	Ultimate Reactions (Geotech 10/10/2002) (TIA-222-G)	Current (Factored) TIA-222-G	Stress (% capacity)	Pass/ Fail
Pier Compression (kips)	665	421	63.3	Pass
Pier Uplift (kips)	492	384	78.0	Pass
Overall Overturning (kip-ft)	---	9605	---	---
Overall Shear (kips)	---	101	---	---
Shear per Leg (kips)	---	59	---	---

Tower Component Stress vs. Capacity Summary:

Component / (Section No.)	Controlling Component/ Elevation	Stress (% capacity)	Pass/ Fail	Comments:
Tower Leg (T7)	ROHN 6 EH / 90' – 100'	87.4	Pass	
Diagonal (T9)	ROHN 3 STD / 60' – 80'	87.3	Pass	
Horizontal (T11)	ROHN 2.5 STD / 30'-40'	93.1	Pass	
Top Girt (T12)	ROHN 2.5 STD / 20'-30'	85.9	Pass	
Redund Horz 1 Bracing (T13)	ROHN 1.5 STD / 0'-20'	33.1	Pass	
Redund Diag 1 Bracing (T13)	Pipe 1.5x0.200 / 0'-20'	41.9	Pass	
Redund Hip 1 Bracing (T13)	ROHN 2.5 STD / 0'-20'	0.1	Pass	
Inner Bracing (T5)	L2x2x1/8 / 120'-126.667'	6.1	Pass	
Tower Bolt	(6) 3/4" A325N Bolts / Leg Flange / 100'	87.4	Pass	
Anchor Bolts – Uplift & Shear Capacity (TIA-222-G – 4.9.9)	1" Dia. / Tension	81.1	Pass	(10) ASTM A 354 – Gr BC Bolts – 1" Diameter

4. FINDINGS AND EVALUATION (cont.)

Maximum Deformations – Proposed Condition

TIA-222-G Section 2.8.2 - Limit State Deformations

1. A rotation of 4 degrees about the vertical axis (twist) or any horizontal axis (sway) of the structure
2. A horizontal displacement (in feet) of 3% of the height of the structure.

Load Case Description	Current		Allowable	
	Sway (degree)	Displacement (Feet)	Sway (degree)	Displacement (Feet)
Service Wind Load	0.1152	0.2083	4.0	5.40

Tower Twist & Sway at Top (Connecticut State Police Requirements – TIA/EIA-222-F):

Description	Current	Total	Allowable
Tower Twist (degrees)	0.2452	0.6690	0.750
Tower Sway (degrees)	0.4238		

5. CONCLUSIONS

The results of the structural analysis indicated that:

1. The existing steel tower structure IS considered structurally adequate for the proposed antenna loading with the wind classification specified above.
2. The existing tower anchor bolts ARE considered structurally adequate for the proposed antenna loading with the classification specified above.
3. The existing foundation IS considered structurally adequate for the proposed antenna loading with the load classification specified above.
4. The existing tower's sway (deflection) is 0.4238 degrees, and the existing tower's twist (rotation) is 0.2452 degrees. These figures combined ARE within the Connecticut State Police requirement of 0.75 degrees for twist (rotation) and sway (deflection) with the load classification specified above.
5. The maximum structural capacity calculated herein is **93.1%**.

The analysis results presented herewith are based on previous tower modifications proposed by AECOM's tower modification analysis report, project 60581632 / SMK-004, signed and sealed on July, 13 2018. No installation of the proposed equipment shall occur until previous tower modifications have been completed.

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations are in good condition without defects and were properly constructed to support original design loads as specified in the original design documents.

AECOM is not responsible for any modifications completed prior to or hereafter in which AECOM is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

AECOM hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact AECOM. AECOM disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The tower owner shall refer to TIA-222-G Section 14.2 for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. It is also recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

6. DRAWINGS AND DATA

SEISMIC BASE SHEAR ANALYSIS

AECOM

Seismic (Vs) Base Shear Implementing ANSI/TIA–222-G, IBC 2015 & Connecticut State Building Code of 2018

Calculation of Seismic Base Shear Implementing ANSI/TIA-222-G, IBC 2015 & & CT State Building Code 2018.

Location: Westport, CT -Site Class "D"

$S_{DS} = \frac{2}{3} F_A S_S$, where $S_S = 0.226$ and $F_A = 1.6$ $S_{DS} = \frac{2}{3} F_A S_S = \frac{2}{3} * 1.6 * 0.226 = 0.241$

$S_{D1} = \frac{2}{3} F_V S_1$, where $S_1 = 0.067$ and $F_V = 2.4$ $S_{D1} = \frac{2}{3} F_V S_1 = \frac{2}{3} * 2.4 * 0.067 = 0.107$

TIA-222-G SECTION 2.7 EARTHQUAKE LOADS (PROCEDURES):

1. Importance Factor "I" (tables 2-3 TIA-222-G) = 1.5 (Structure Class 3)

ANSI/TIA-222-G 2.7.7.1 (TOTAL BASE SEISMIC SHEAR (Vs)

W=DL TOWER	=	34.20	Kips	
W=Antennas/Mounts	=	11.36	Kips	
W=Cables	=	7.882	Kips	
		53.442	Kip	= WT Total = "W"

$$V_s = \frac{S_{DS} * W * I}{R} = \frac{0.241 * 53.4427 kips * 1.5}{3.0} = 6.4398\ kips,$$

where R = 3.0 for Lattice Tower

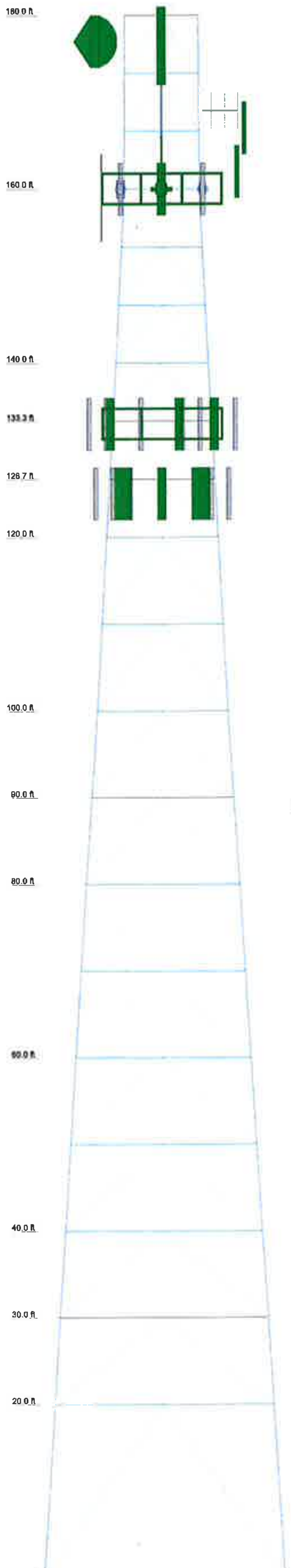
$$V_{S.min} = \frac{0.5 * S_{D1} * W * I}{R} = \frac{0.5 * 0.107 * 53.4427 kips * 1.5}{3.0} = 1.4296\ kips$$

*By visual inspection, the above "Base Shear" value when considering the following Load Combination is less that the base shear of wind on structure.

$1.2 * DL + 1.0\,E < 1.2\,DL + 1.6\,W$, (59.0 Kips), therefore seismic effect on structure Does NOT control Design.

TNX TOWER INPUT / OUTPUT SUMMARY

Section	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	1/3 9.6250x0.375 on ROHN 8 EH Leg Pipe	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe			ROHN 8 EHS	ROHN 6 EH		ROHN 6 EHS	ROHN 5 EH			ROHN 4 STD	ROHN 3 STD
Leg Grade	A572-42				A572-50								
Diagonals	P3.5x.226				ROHN 3 STD			Pipe 2.5 XXS	ROHN 2 XXS	ROHN 2 EH		ROHN 2 STD	
Diagonal Grade	A572-50												
Top Girts	N.A.	ROHN 2.5 EH	N.A.			ROHN 2 STD	N.A.		ROHN 2 STD		N.A.		ROHN 1.5 STD
Horizontals	P3.5x.226	N.A.	ROHN 2.5 STD			N.A.	ROHN 2 STD		N.A.		ROHN 2 STD	ROHN 1.5 STD	
Red. Horizontals	ROHN 1.5 STD	N.A.											
Red. Diagonals	ROHN 2 STD	N.A.											
Red. Hips	ROHN 2.5 STD	N.A.											
Inner Bracing	ROHN 2 STD	L3 1/2x3 1/2x1/4			L3x3x3/16	L2 1/2x2 1/2x3/16			L2x2x1/8				
Face Width (ft) 27.677	25.177	23.927	22.677	20.177	17.677	16.3595	15.042	12.792	12.0977	11.4033	10.709	8.625	8.542
# Panels @ (ft)	1 @ 20	10 @ 10							8 @ 8.66667				
Weight (K) 34.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
AP11-850/090/ADT w/Mount Pipe (DNK-54 / CSP-47)	178	4x40_B5|B13 RRH Unit (PROPOSED -Verizon)	160
4'x4" Pipe Mount (DNK-52)	177	4x30_B13 RRH Unit (PROPOSED -Verizon)	160
PA8-65AC (DNK-52 / CSP-42)	177	2" Dia 10' Omni (DNK-47 / CSP-48)	159
SE419-SWBPALDF Panel Antenna (Troop G SZ)	175	3' Side Arm (DNK-47 / CSP-48)	159
2" Dia 10' Omni (DNK-48 / CSP-49)	171	Pirod 15' T-Frame Sector Mount (1) (ATT)	133
4' Standoff (DNK-48,53)	171	Pirod 15' T-Frame Sector Mount (1) (ATT)	133
2" Dia 10' Omni (DNK-53 / CSP-45)	171	Pirod 15' T-Frame Sector Mount (1) (ATT)	133
WPA-700102-4CF-EDIN-X w/ Mount Kit (Troop G TX)	170	P65-16-XLH-RR (ATT)	133
432E-83I-01T TTA Unit (Troop G)	170	RRUS-11 (ATT)	133
SE419-SWBPALDF(D00) (Troop G RX)	170	HPA-65R-BUU-H6 Panel (ATT)	133
6' Side-Arm (Troop G)	170	RRUS-32 (ATT)	133
3' Yagi (DNK-51 / CSP-1)	169	DC6-48-60-18-8F (Squid) Suppressor (ATT)	133
AP11-850/090/ADT w/Mount Pipe (DNK-49 / CSP-48)	162	P65-16-XLH-RR (ATT)	133
5' Standoff (DNK-49 / CSP-48)	162	RRUS-11 (ATT)	133
8'x2 1/2" Pipe Mount (DNK-50 / CSP-60)	162	HPA-65R-BUU-H6 Panel (ATT)	133
Pirod 15' T-Frame Sector Mount (1) (Verizon)	160	RRUS-32 (ATT)	133
Pirod 15' T-Frame Sector Mount (1) (Verizon)	160	P65-16-XLH-RR (ATT)	133
Pirod 15' T-Frame Sector Mount (1) (Verizon)	160	RRUS-11 (ATT)	133
JAHH-65B-R3B Panel Antenna (PROPOSED -Verizon)	160	HPA-65R-BUU-H6 Panel (ATT)	133
JAHH-65B-R3B Panel Antenna (PROPOSED -Verizon)	160	RRUS-32 (ATT)	133
BXA-70080-4CF-EDIN Panel (Verizon)	160	800-10798 Kathrein Panel (ATT)	133
BXA-171063-12CF Panel Antenna (Verizon)	160	RRUS-32 B66 (ATT)	133
BSAMNT-SBS-2-2 (JAHH Bracket (for 2)) (PROPOSED -Verizon)	160	RRUS-32 (ATT)	133
4x40 B2_B66 Dual Band RRH Unit (PROPOSED -Verizon)	160	DBC0061F1V51-2 Combiner Units (ATT)	133
4x40_B5|B13 RRH Unit (PROPOSED -Verizon)	160	800-10798 Kathrein Panel (ATT)	133
4x30_B13 RRH Unit (PROPOSED -Verizon)	160	RRUS-32 B66 (ATT)	133
DB-T1-6Z-8AB-0Z Distribution Box (Verizon)	160	RRUS-32 (ATT)	133
JAHH-65B-R3B Panel Antenna (PROPOSED -Verizon)	160	DBC0061F1V51-2 Combiner Units (ATT)	133
JAHH-65B-R3B Panel Antenna (PROPOSED -Verizon)	160	800-10798 Kathrein Panel (ATT)	133
BXA-70063-4CF Panel Antenna (Verizon)	160	RRUS-32 B66 (ATT)	133
BXA-171063-12CF Panel Antenna (Verizon)	160	RRUS-32 (ATT)	133
BSAMNT-SBS-2-2 (JAHH Bracket (for 2)) (PROPOSED -Verizon)	160	DBC0061F1V51-2 Combiner Units (ATT)	133
4x40 B2_B66 Dual Band RRH Unit (PROPOSED -Verizon)	160	DC6-48-60-18-8F (Squid) Suppressor (ATT)	133
4x40_B5|B13 RRH Unit (PROPOSED -Verizon)	160	TMA (T-Mobile)	125
4x30_B13 RRH Unit (PROPOSED -Verizon)	160	AIR21 B2A/B4P (T-Mobile)	125
JAHH-65B-R3B Panel Antenna (PROPOSED -Verizon)	160	RRUS-11 (T-Mobile)	125
JAHH-65B-R3B Panel Antenna (PROPOSED -Verizon)	160	RRUS-11 (T-Mobile)	125
BXA-70063-4CF Panel Antenna (Verizon)	160	RRUS-11 (T-Mobile)	125
BXA-171063-12CF Panel Antenna (Verizon)	160	TMA (T-Mobile)	125
BSAMNT-SBS-2-2 (JAHH Bracket (for 2)) (PROPOSED -Verizon)	160	TMA (T-Mobile)	125
4x40 B2_B66 Dual Band RRH Unit (PROPOSED -Verizon)	160	LNX-6515DS-VTM (T-Mobile)	125
		LTF12=372 Sector Mount (1) (T-Mobile)	125
		LTF12=372 Sector Mount (1) (T-Mobile)	125
		LTF12=372 Sector Mount (1) (T-Mobile)	125
		AIR21 B2A/B4P (T-Mobile)	125
		AIR21 B2A/B4P (T-Mobile)	125
		AIR21 B2A/B4P (T-Mobile)	125
		LNX-6515DS-VTM (T-Mobile)	125
		LNX-6515DS-VTM (T-Mobile)	125
		AIR21 B2A/B4P (T-Mobile)	125
		AIR21 B2A/B4P (T-Mobile)	125
		4' Standoff (DNK-1 / GPS)	60
		GPS (DNK-1 / GPS)	60

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 110 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. P-Delta for analysis does not apply for this case - TIA-222-G Section 3.5
8. NOTE: The location of the tower lies within a "Special Wind Region" for Structure Class 3 / Risk Category 4, therefore the maximum applied wind speed will be used for TIA-222-G with Importance Factor applied (1.15)
9. TOWER RATING: 93.1%

ALL REACTIONS ARE FACTORED

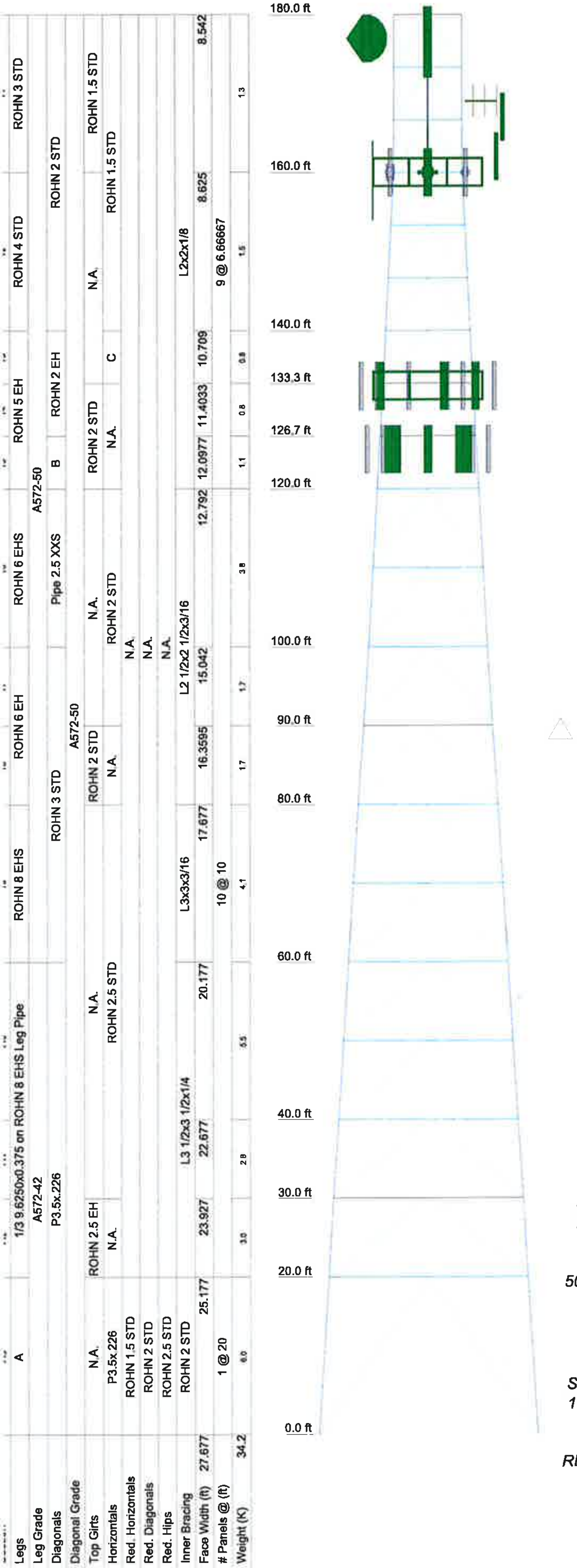
MAX. CORNER REACTIONS AT BASE:
DOWN: 421 K
SHEAR: 59 K

UPLIFT: -384 K
SHEAR: 55 K

AXIAL 190 K
SHEAR 23 K
MOMENT 2480 kip-ft
TORQUE 38 kip-ft
50 mph WIND - 0.7500 in ICE

AXIAL 61 K
SHEAR 101 K
MOMENT 9605 kip-ft
TORQUE 190 kip-ft
REACTIONS - 110 mph WIND

AECOM 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-529-8882 FAX: 860-529-3991	Job: ***180' CSP Lattice Tower - Analysis*** Project: ***Westport, Connecticut*** Client: VZ5-220 / Verizon Wireless Drawn by: MCD App'd: Code: TIA-222-G Date: 11/13/18 Scale: NTS Path: Dwg No. E-1



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	1/3 9.6250x0.375 on ROHN 8 EH Leg Pipe	C	ROHN 2 STD
B	ROHN 2 XXS		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 110 mph basic wind in accordance with the TIA-222-G Standard.
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8. NOTE: The location of the tower lies within a "Special Wind Region" for Structure Class 3 / Risk Category 4, therefore the maximum applied wind speed will be used for TIA-222-G with Importance Factor applied (1.15)
9. TOWER RATING: 93.1%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 421 K
SHEAR: 59 K

UPLIFT: -384 K
SHEAR: 55 K

AXIAL 190 K
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50 mph WIND - 0.7500 in ICE

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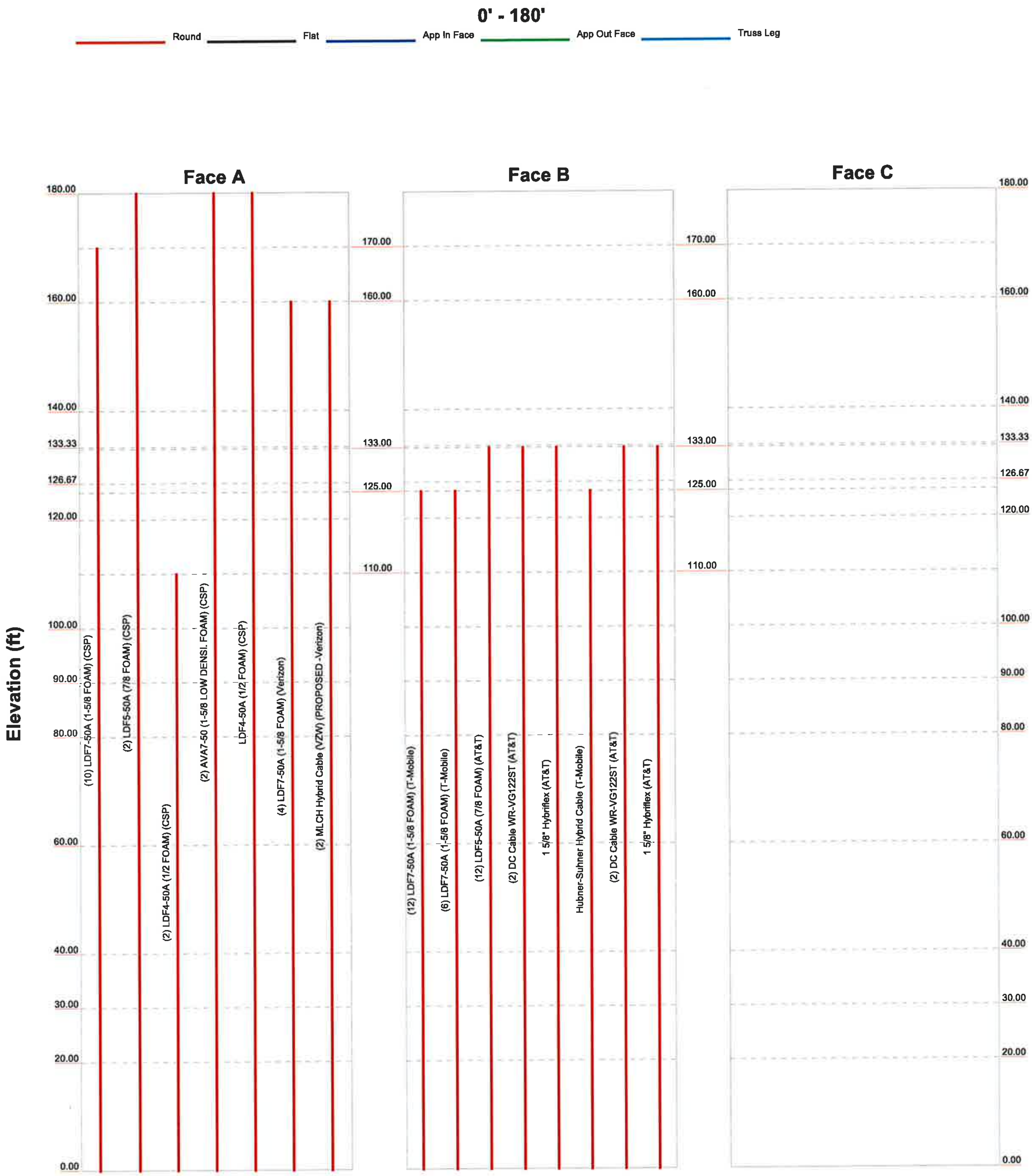
TORQUE 190 kip-ft
REACTIONS - 110 mph WIND

AECOM 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-529-8882 FAX: 860-529-3991	Job: **180' CSP Lattice Tower - Analysis** Project: **Westport, Connecticut** Client: VZ5-220 / Verizon Wireless Drawn by: MCD App'd: Code: TIA-222-G Date: 11/13/18 Scale: N Path: Dwg No.

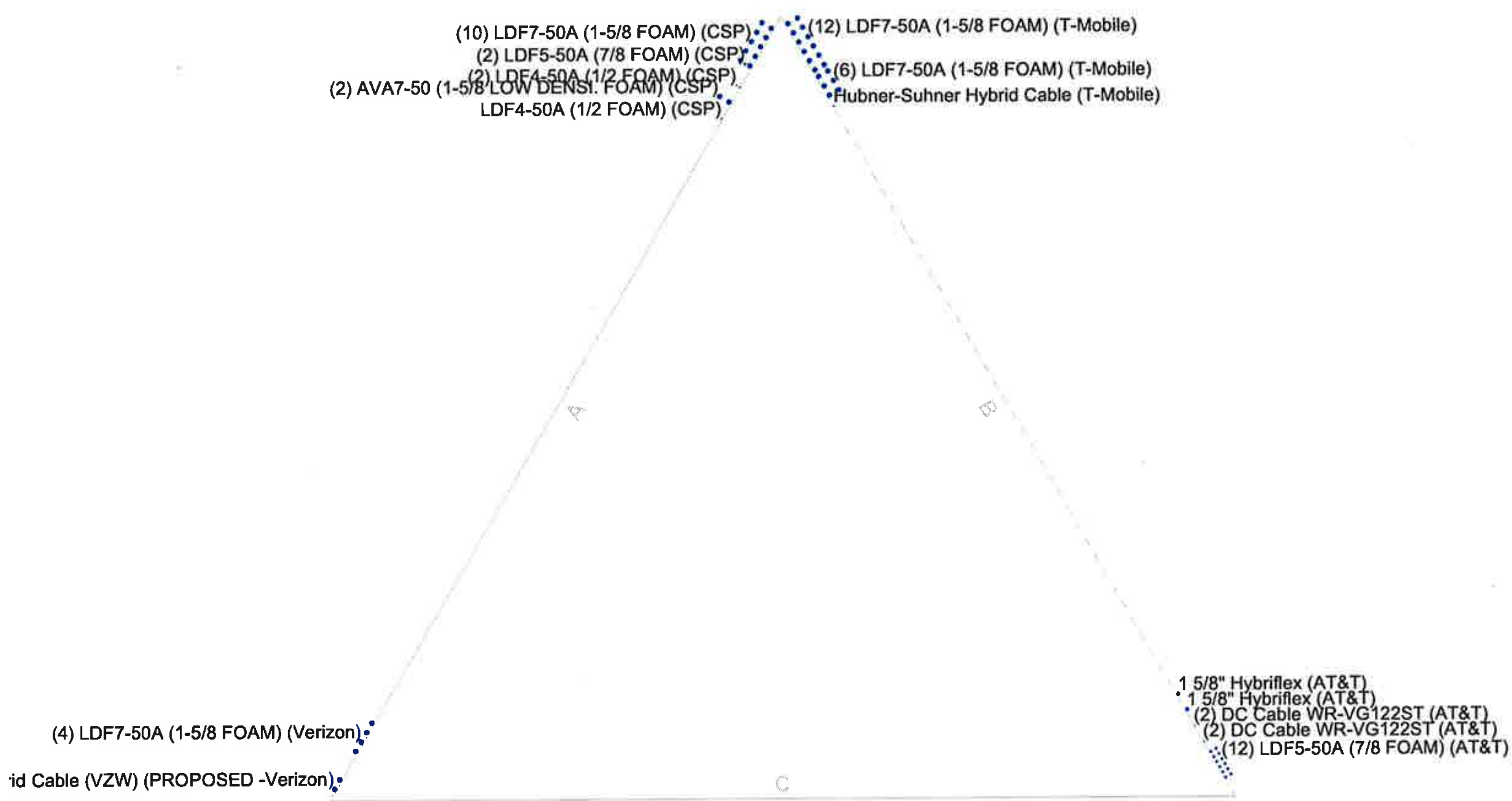
TNX TOWER FEEDLINE DISTRIBUTION



AECOM 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-529-8882 FAX: 860-529-3991	Job: ***180' CSP Lattice Tower - Analysis***				
	Project: ***Westport, Connecticut***				
	Client: VZ5-220 / Verizon Wireless	Drawn by: MCD	App'd:		
	Code: TIA-222-G	Date: 11/13/18	Scale: N		
	Path:		Dwg No.		

TNX TOWER FEEDLINE PLAN

Round Flat App In Face App Out Face

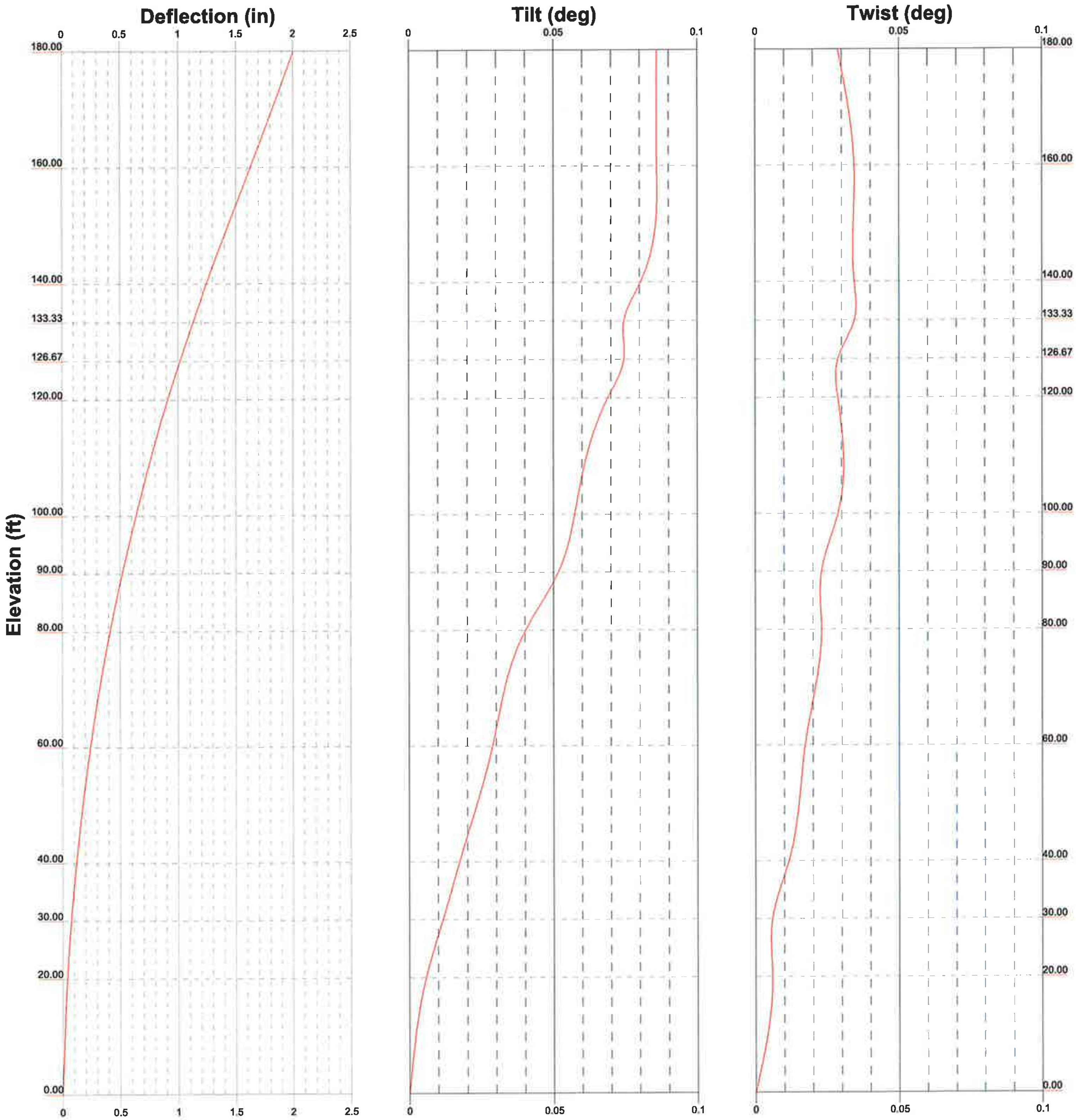


AECOM 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-529-8882 FAX: 860-529-3991	Job: ***180' CSP Lattice Tower - Analysis*** Project: ***Westport, Connecticut*** Client: VZ5-220 / Verizon Wireless Drawn by: MCD App'd: Code: TIA-222-G Date: 11/13/18 Scale: N Path: Dwg No.

TNX TOWER DEFLECTION, TILT, AND TWIST

TIA-222-G - Service - 60 mph

Maximum Values



AECOM	Job: ***180' CSP Lattice Tower - Analysis***		
500 Enterprise Drive, Suite 3B	Project: ***Westport, Connecticut***		
Rocky Hill, CT	Client: VZ5-220 / Verizon Wireless	Drawn by: MCD	App'd:
Phone: 860-529-8882	Code: TIA-222-G	Date: 11/13/18	Scale: N
FAX: 860-529-3991	Path:		Dwg No.

DETAILED OUTPUT

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 27.68 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

- Basic wind speed of 110 mph.
- Structure Class III.
- Exposure Category C.
- Topographic Category 1.
- Crest Height 0.00 ft.
- Nominal ice thickness of 0.7500 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Deflections calculated using a wind speed of 60 mph.
- P-Delta for analysis does not apply for this case - TIA-222-G Section 3.5.
- NOTE: The location of the tower lies within a "Special Wind Region" for Structure Class 3 / Risk Category 4, therefore the maximum applied wind speed will be used for TIA-222-G with Importance Factor applied (1.15).
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
√ Use Code Stress Ratios
√ Use Code Safety Factors - Guys
Escalate Ice
Always Use Max Kz
Use Special Wind Profile
√ Include Bolts In Member Capacity
Leg Bolts Are At Top Of Section
√ Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
√ SR Members Have Cut Ends
SR Members Are Concentric

Distribute Leg Loads As Uniform
Assume Legs Pinned
Assume Rigid Index Plate
√ Use Clear Spans For Wind Area
√ Use Clear Spans For KL/r
Retension Guys To Initial Tension
√ Bypass Mast Stability Checks
Use Azimuth Dish Coefficients
√ Project Wind Area of Appurt.
Autocalc Torque Arm Areas
Add IBC .6D+W Combination
√ Sort Capacity Reports By Component
Triangulate Diamond Inner Bracing
Treat Feed Line Bundles As Cylinder
Ignore KL/ry For 60 Deg. Angle Legs

Use ASCE 10 X-Brace Ly Rules
√ Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
√ SR Leg Bolts Resist Compression
√ All Leg Panels Have Same Allowable
Offset Girt At Foundation
√ Consider Feed Line Torque
√ Include Angle Block Shear Check
Use TIA-222-G Bracing Resist. Exemption
Use TIA-222-G Tension Splice Exemption

Poles

√ Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets
Pole Without Linear Attachments
Pole With Shroud Or No Appurtenances
Outside and Inside Corner Radii Are Known

AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT
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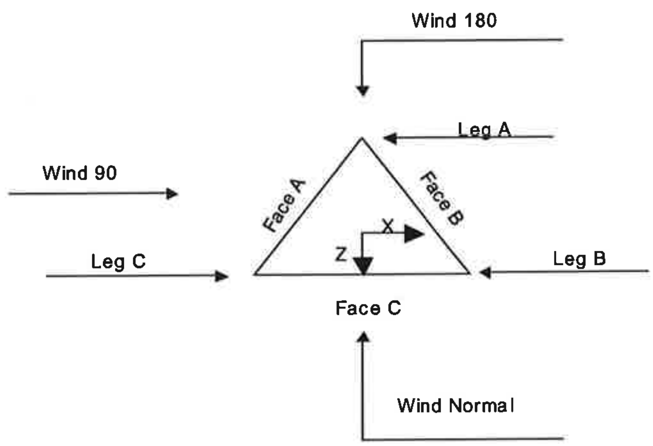

Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation (ft)	Assembly Database	Description	Section Width (ft)	Number of Sections	Section Length (ft)
T1	180.00-160.00			8.54	1	20.00
T2	160.00-140.00			8.63	1	20.00
T3	140.00-133.33			10.71	1	6.67
T4	133.33-126.67			11.40	1	6.67
T5	126.67-120.00			12.10	1	6.67
T6	120.00-100.00			12.79	1	20.00
T7	100.00-90.00			15.04	1	10.00
T8	90.00-80.00			16.36	1	10.00
T9	80.00-60.00			17.68	1	20.00
T10	60.00-40.00			20.18	1	20.00
T11	40.00-30.00			22.68	1	10.00
T12	30.00-20.00			23.93	1	10.00
T13	20.00-0.00			25.18	1	20.00

Tower Section Geometry *(cont'd)*

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)
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

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*
T3	140.00-133.33	6.67	K Brace Down	No	Yes	0.0000	0.0000
T4	133.33-126.67	6.67	K Brace Down	No	Yes	0.0000	0.0000
T5	126.67-120.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T6	120.00-100.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T7	100.00-90.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T8	90.00-80.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T9	80.00-60.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T10	60.00-40.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T11	40.00-30.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T12	30.00-20.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T13	20.00-0.00	20.00	K1 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	A572-50 (50 ksi)
T2 160.00-140.00	Pipe	ROHN 4 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T3 140.00-133.33	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 2 EH	A572-50 (50 ksi)
T4 133.33-126.67	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 2 EH	A572-50 (50 ksi)
T5 126.67-120.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 2 XXS	A572-50 (50 ksi)
T6 120.00-100.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Pipe	Pipe 2.5 XXS	A572-50 (50 ksi)
T7 100.00-90.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T8 90.00-80.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T9 80.00-60.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T10 60.00-40.00	Arbitrary Shape	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	A572-42 (42 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)
T11 40.00-30.00	Arbitrary Shape	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	A572-42 (42 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)
T12 30.00-20.00	Arbitrary Shape	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	A572-42 (42 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)
T13 20.00-0.00	Arbitrary Shape	1/3 9.6250x0.375 on ROHN 8 EH Leg Pipe	A572-42 (42 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation *ft*	*Top Girt Type*	*Top Girt Size*	*Top Girt Grade*	*Bottom Girt Type*	*Bottom Girt Size*	*Bottom Girt Grade*
T4 133.33-126.67	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T5 126.67-120.00	Pipe	ROHN 2 STD	A572-50	Solid Round		A36

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
			(50 ksi)			(36 ksi)
T8 90.00-80.00	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Single Angle		A36 (36 ksi)
T12 30.00-20.00	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
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 1.5 STD	A572-50 (50 ksi)
T3 140.00-133.33	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T4 133.33-126.67	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T5 126.67-120.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T6 120.00-100.00	None	Single Angle		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T7 100.00-90.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T8 90.00-80.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T9 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T10 60.00-40.00	None	Single Angle		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T11 40.00-30.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T12 30.00-20.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T13 20.00-0.00	None	Flat Bar		A36 (36 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 180.00-160.00	Solid Round		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T2 160.00-140.00	Solid Round		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T3 140.00-133.33	Solid Round		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T4 133.33-126.67	Solid Round		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T5 126.67-120.00	Solid Round		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T6 120.00-100.00	Single Angle		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 100.00-90.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T8 90.00-80.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T9 80.00-60.00	Solid Round		A36 (36 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T10 60.00-40.00	Single Angle		A36 (36 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T11 40.00-30.00	Single Angle		A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T12 30.00-20.00	Single Angle		A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T13 20.00-0.00	Solid Round		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T13 20.00-0.00	A572-50 (50 ksi)	Horizontal (1)	Pipe	ROHN 1.5 STD	0.8
		Diagonal (1)	Pipe	ROHN 2 STD	0.8
		Hip (1)	Pipe	ROHN 2.5 STD	0.8

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 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 140.00-133.33	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 133.33-126.67	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 126.67-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 100.00-90.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

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
T8 90.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T10 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T11 40.00-30.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T12 30.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T13 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 180.00-160.00	Yes	Yes	1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
T2 160.00-140.00	Yes	Yes	1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
T3 140.00-133.33	Yes	Yes	1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
T4 133.33-126.67	Yes	Yes	1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
T5 126.67-120.00	Yes	Yes	1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
T6 120.00-100.00	Yes	Yes	1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
T7 100.00-90.00	Yes	Yes	1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
T8 90.00-80.00	Yes	Yes	1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
T9 80.00-60.00	Yes	Yes	1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
T10 60.00-40.00	Yes	Yes	1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
T11 40.00-30.00	Yes	Yes	1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
T12 30.00-20.00	Yes	Yes	1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
T13 20.00-0.00	Yes	Yes	1	1 / 1	0.5 / 0.5	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	0.75	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	0.75	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 140.00-133.33	0.0000	0.75	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 133.33-126.67	0.0000	0.75	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 126.67-120.00	0.0000	0.75	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 120.00-100.00	0.0000	0.75	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 100.00-90.00	0.0000	0.75	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 90.00-80.00	0.0000	0.75	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 80.00-60.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 60.00-40.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 40.00-30.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 30.00-20.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T13 20.00-0.00	0.0000	0.75	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	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 180.00-160.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T2 160.00-140.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T3 140.00-133.33	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T4 133.33-126.67	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T5 126.67-120.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T6 120.00-100.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T7 100.00-90.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T8 90.00-80.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T9 80.00-60.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T10 60.00-40.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T11 40.00-30.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T12 30.00-20.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T13 20.00-0.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

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	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T2 160.00-140.00	Flange	0.8750 A325N	4	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T3 140.00-133.33	Flange	0.7500 A325N	6	0.6250 A325N	3	0.6250 A325N	2	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T4 133.33-126.67	Flange	0.7500 A325N	6	0.6250 A325N	3	0.6250 A325N	2	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T5 126.67-120.00	Flange	0.7500 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
T6 120.00-100.00	Flange	0.7500 A325N	6	0.6250 A325N	3	0.6250 A325N	2	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T7 100.00-90.00	Flange	0.7500 A325N	6	0.6250 A325N	3	0.6250 A325N	2	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T8 90.00-80.00	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
T9 80.00-60.00	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
T10 60.00-40.00	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
T11 40.00-30.00	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
T12 30.00-20.00	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
T13 20.00-0.00	Flange	1.0000 A325N	8	0.6250 A325X	3	0.6250 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	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF7-50A (1-5/8 FOAM)	B	No	No	Ar (CaAa)	125.00 - 0.00	0.0000	-0.46	12	6	1.9800	1.9800		0.82

Description	*Face or Leg*	*Allow Shield*	*Exclude From Torque Calculation*	*Component Type*	*Placement* *ft*	*Face Offset* *in*	*Lateral Offset (Frac FW)*	*#*	*# Per Row*	*Clear Spacing* *in*	*Width or Diameter* *in*	*Perimeter* *in*	*Weight* *plf*
(T-Mobile)													
LDF7-50A (1-5/8 FOAM) (T-Mobile)	B	No	No	Ar (CaAa)	125.00 - 0.00	0.0000	-0.41	6	3	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (CSP)	A	No	No	Ar (CaAa)	170.00 - 0.00	0.0000	0.46	10	5	1.9800	1.9800		0.82
LDF5-50A (7/8 FOAM) (CSP)	A	No	No	Ar (CaAa)	180.00 - 0.00	0.0000	0.435	2	1	1.0900	1.0900		0.33
LDF4-50A (1/2 FOAM) (CSP)	A	No	No	Ar (CaAa)	110.00 - 0.00	0.0000	0.41	2	1	0.6300	0.6300		0.15
LDF5-50A (7/8 FOAM) (AT&T)	B	No	No	Ar (CaAa)	133.00 - 0.00	0.0000	0.46	12	6	1.0900	1.0900		0.33
DC Cable WR-VG122ST (AT&T)	B	No	No	Ar (CaAa)	133.00 - 0.00	0.0000	0.43	2	2	0.4000	0.4000		0.25
1 5/8" Hybriflex (AT&T)	B	No	No	Ar (CaAa)	133.00 - 0.00	0.0000	0.37	1	1	1.6250	1.6250		1.13
Hubner-Suhner Hybrid Cable (T-Mobile)	B	No	No	Ar (CaAa)	125.00 - 0.00	0.0000	-0.385	1	1	0.7087	0.7087		0.48
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP)	A	No	No	Ar (CaAa)	180.00 - 0.00	0.0000	0.39	2	1	1.9800	1.9800		0.72
LDF4-50A (1/2 FOAM) (CSP) *** VZW Inventory 08/09/2018	A	No	No	Ar (CaAa)	180.00 - 0.00	0.0000	0.37	1	1	0.6300	0.6300		0.15
LDF7-50A (1-5/8 FOAM) (Verizon)	A	No	No	Ar (CaAa)	160.00 - 0.00	0.0000	-0.42	4	4	1.9800	1.9800		0.82
MLCH Hybrid Cable (VZW) (PROPOSED -Verizon) *** VZW Inventory 08/09/2018 *** SMK-004 ATT	A	No	No	Ar (CaAa)	160.00 - 0.00	0.0000	-0.48	2	2	2.0126	2.0126		3.04
DC Cable WR-VG122ST (AT&T)	B	No	No	Ar (CaAa)	133.00 - 0.00	0.0000	0.41	2	2	0.4000	0.4000		0.25
1 5/8" Hybriflex (AT&T)	B	No	No	Ar (CaAa)	133.00 - 0.00	0.0000	0.39	1	1	1.6250	1.6250		1.13

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C_AA_A ft²/ft	Weight plf
*** VZW Inventory 08/09/2018								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
T1	180.00-160.00	A	0.000	0.000	33.340	0.000	0.13
		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	0.000	0.000	77.030	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
T3	140.00-133.33	A	0.000	0.000	25.677	0.000	0.13
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T4	133.33-126.67	A	0.000	0.000	25.677	0.000	0.13
		B	0.000	0.000	11.356	0.000	0.05
		C	0.000	0.000	0.000	0.000	0.00
T5	126.67-120.00	A	0.000	0.000	25.677	0.000	0.13
		B	0.000	0.000	30.128	0.000	0.12
		C	0.000	0.000	0.000	0.000	0.00
T6	120.00-100.00	A	0.000	0.000	78.290	0.000	0.40
		B	0.000	0.000	108.557	0.000	0.45
		C	0.000	0.000	0.000	0.000	0.00
T7	100.00-90.00	A	0.000	0.000	39.775	0.000	0.20
		B	0.000	0.000	54.279	0.000	0.22
		C	0.000	0.000	0.000	0.000	0.00
T8	90.00-80.00	A	0.000	0.000	39.775	0.000	0.20
		B	0.000	0.000	54.279	0.000	0.22
		C	0.000	0.000	0.000	0.000	0.00
T9	80.00-60.00	A	0.000	0.000	79.550	0.000	0.40
		B	0.000	0.000	108.557	0.000	0.45
		C	0.000	0.000	0.000	0.000	0.00
T10	60.00-40.00	A	0.000	0.000	79.550	0.000	0.40
		B	0.000	0.000	108.557	0.000	0.45
		C	0.000	0.000	0.000	0.000	0.00
T11	40.00-30.00	A	0.000	0.000	39.775	0.000	0.20
		B	0.000	0.000	54.279	0.000	0.22
		C	0.000	0.000	0.000	0.000	0.00
T12	30.00-20.00	A	0.000	0.000	39.775	0.000	0.20
		B	0.000	0.000	54.279	0.000	0.22
		C	0.000	0.000	0.000	0.000	0.00
T13	20.00-0.00	A	0.000	0.000	79.550	0.000	0.40
		B	0.000	0.000	108.557	0.000	0.45
		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 *ft²*	A_F *ft²*	C_AA_A *In Face ft²*	C_AA_A *Out Face ft²*	*Weight K*
T1	180.00-160.00	A	2.209	0.000	0.000	94.841	0.000	1.83
		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	2.182	0.000	0.000	203.570	0.000	3.94
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T3	140.00-133.33	A	2.161	0.000	0.000	67.602	0.000	1.30
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T4	133.33-126.67	A	2.151	0.000	0.000	67.467	0.000	1.30
		B		0.000	0.000	33.185	0.000	0.54
		C		0.000	0.000	0.000	0.000	0.00
T5	126.67-120.00	A	2.139	0.000	0.000	67.325	0.000	1.29
		B		0.000	0.000	65.734	0.000	1.33
		C		0.000	0.000	0.000	0.000	0.00
T6	120.00-100.00	A	2.115	0.000	0.000	210.826	0.000	3.98
		B		0.000	0.000	226.990	0.000	4.72
		C		0.000	0.000	0.000	0.000	0.00
T7	100.00-90.00	A	2.084	0.000	0.000	109.609	0.000	2.03
		B		0.000	0.000	112.784	0.000	2.33
		C		0.000	0.000	0.000	0.000	0.00
T8	90.00-80.00	A	2.061	0.000	0.000	109.094	0.000	2.01
		B		0.000	0.000	112.252	0.000	2.31
		C		0.000	0.000	0.000	0.000	0.00
T9	80.00-60.00	A	2.021	0.000	0.000	216.416	0.000	3.94
		B		0.000	0.000	222.674	0.000	4.55
		C		0.000	0.000	0.000	0.000	0.00
T10	60.00-40.00	A	1.955	0.000	0.000	213.430	0.000	3.82
		B		0.000	0.000	219.587	0.000	4.43
		C		0.000	0.000	0.000	0.000	0.00
T11	40.00-30.00	A	1.886	0.000	0.000	105.188	0.000	1.85
		B		0.000	0.000	108.214	0.000	2.16
		C		0.000	0.000	0.000	0.000	0.00
T12	30.00-20.00	A	1.824	0.000	0.000	103.797	0.000	1.79
		B		0.000	0.000	106.776	0.000	2.10
		C		0.000	0.000	0.000	0.000	0.00
T13	20.00-0.00	A	1.664	0.000	0.000	200.491	0.000	3.30
		B		0.000	0.000	206.196	0.000	3.93
		C		0.000	0.000	0.000	0.000	0.00

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	-1.9322	-19.0732	-2.3936	-21.1713
T2	160.00-140.00	-11.0571	-18.4030	-14.2138	-15.2080
T3	140.00-133.33	-11.7859	-19.7660	-15.3192	-16.4459
T4	133.33-126.67	1.9207	-11.1455	0.9486	-7.1824
T5	126.67-120.00	3.5799	-26.3670	2.5854	-18.6053
T6	120.00-100.00	4.0882	-33.0944	2.9261	-25.1138
T7	100.00-90.00	4.3822	-36.3791	2.9926	-28.5490
T8	90.00-80.00	4.6726	-38.9077	3.1696	-30.5369
T9	80.00-60.00	4.8314	-40.3772	3.3227	-32.5863

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T10	60.00-40.00	4.1182	-36.4929	3.2338	-33.8676
T11	40.00-30.00	4.3832	-38.9131	3.3367	-36.1972
T12	30.00-20.00	4.5528	-40.4585	3.3610	-37.7302
T13	20.00-0.00	4.9176	-43.8043	3.2964	-40.8432

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	4	LDF7-50A (1-5/8 FOAM)	160.00 - 170.00	0.6000	0.6000
T1	5	LDF5-50A (7/8 FOAM)	160.00 - 180.00	0.6000	0.6000
T1	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	160.00 - 180.00	0.6000	0.6000
T1	15	LDF4-50A (1/2 FOAM)	160.00 - 180.00	0.6000	0.6000
T2	4	LDF7-50A (1-5/8 FOAM)	140.00 - 160.00	0.6000	0.6000
T2	5	LDF5-50A (7/8 FOAM)	140.00 - 160.00	0.6000	0.6000
T2	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	140.00 - 160.00	0.6000	0.6000
T2	15	LDF4-50A (1/2 FOAM)	140.00 - 160.00	0.6000	0.6000
T2	17	LDF7-50A (1-5/8 FOAM)	140.00 - 160.00	0.6000	0.6000
T2	18	MLCH Hybrid Cable (VZW)	140.00 - 160.00	0.6000	0.6000
T3	4	LDF7-50A (1-5/8 FOAM)	133.33 - 140.00	0.6000	0.6000
T3	5	LDF5-50A (7/8 FOAM)	133.33 - 140.00	0.6000	0.6000
T3	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	133.33 - 140.00	0.6000	0.6000
T3	15	LDF4-50A (1/2 FOAM)	133.33 - 140.00	0.6000	0.6000
T3	17	LDF7-50A (1-5/8 FOAM)	133.33 - 140.00	0.6000	0.6000
T3	18	MLCH Hybrid Cable (VZW)	133.33 - 140.00	0.6000	0.6000
T4	4	LDF7-50A (1-5/8 FOAM)	126.67 - 133.33	0.6000	0.6000
T4	5	LDF5-50A (7/8 FOAM)	126.67 - 133.33	0.6000	0.6000
T4	8	LDF5-50A (7/8 FOAM)	126.67 - 133.00	0.6000	0.6000
T4	9	DC Cable WR-VG122ST	126.67 - 133.00	0.6000	0.6000
T4	12	1 5/8" Hybriflex	126.67 - 133.00	0.6000	0.6000
T4	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	126.67 - 133.33	0.6000	0.6000
T4	15	LDF4-50A (1/2 FOAM)	126.67 - 133.33	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	17	LDF7-50A (1-5/8 FOAM)	126.67 - 133.33	0.6000	0.6000
T4	18	MLCH Hybrid Cable (VZW)	126.67 - 133.33	0.6000	0.6000
T4	21	DC Cable WR-VG122ST	126.67 - 133.00	0.6000	0.6000
T4	22	1 5/8" Hybriflex	126.67 - 133.00	0.6000	0.6000
T5	2	LDF7-50A (1-5/8 FOAM)	120.00 - 125.00	0.6000	0.6000
T5	3	LDF7-50A (1-5/8 FOAM)	120.00 - 125.00	0.6000	0.6000
T5	4	LDF7-50A (1-5/8 FOAM)	120.00 - 126.67	0.6000	0.6000
T5	5	LDF5-50A (7/8 FOAM)	120.00 - 126.67	0.6000	0.6000
T5	8	LDF5-50A (7/8 FOAM)	120.00 - 126.67	0.6000	0.6000
T5	9	DC Cable WR-VG122ST	120.00 - 126.67	0.6000	0.6000
T5	12	1 5/8" Hybriflex	120.00 - 126.67	0.6000	0.6000
T5	13	Hubner-Suhner Hybrid Cable	120.00 - 125.00	0.6000	0.6000
T5	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	120.00 - 126.67	0.6000	0.6000
T5	15	LDF4-50A (1/2 FOAM)	120.00 - 126.67	0.6000	0.6000
T5	17	LDF7-50A (1-5/8 FOAM)	120.00 - 126.67	0.6000	0.6000
T5	18	MLCH Hybrid Cable (VZW)	120.00 - 126.67	0.6000	0.6000
T5	21	DC Cable WR-VG122ST	120.00 - 126.67	0.6000	0.6000
T5	22	1 5/8" Hybriflex	120.00 - 126.67	0.6000	0.6000
T6	2	LDF7-50A (1-5/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T6	3	LDF7-50A (1-5/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T6	4	LDF7-50A (1-5/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T6	5	LDF5-50A (7/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T6	6	LDF4-50A (1/2 FOAM)	100.00 - 110.00	0.6000	0.6000
T6	8	LDF5-50A (7/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T6	9	DC Cable WR-VG122ST	100.00 - 120.00	0.6000	0.6000
T6	12	1 5/8" Hybriflex	100.00 - 120.00	0.6000	0.6000
T6	13	Hubner-Suhner Hybrid Cable	100.00 - 120.00	0.6000	0.6000
T6	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 120.00	0.6000	0.6000
T6	15	LDF4-50A (1/2 FOAM)	100.00 - 120.00	0.6000	0.6000
T6	17	LDF7-50A (1-5/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T6	18	MLCH Hybrid Cable (VZW)	100.00 - 120.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	21	DC Cable WR-VG122ST	100.00 - 120.00	0.6000	0.6000
T6	22	1 5/8" Hybriflex	100.00 - 120.00	0.6000	0.6000
T7	2	LDF7-50A (1-5/8 FOAM)	90.00 - 100.00	0.6000	0.6000
T7	3	LDF7-50A (1-5/8 FOAM)	90.00 - 100.00	0.6000	0.6000
T7	4	LDF7-50A (1-5/8 FOAM)	90.00 - 100.00	0.6000	0.6000
T7	5	LDF5-50A (7/8 FOAM)	90.00 - 100.00	0.6000	0.6000
T7	6	LDF4-50A (1/2 FOAM)	90.00 - 100.00	0.6000	0.6000
T7	8	LDF5-50A (7/8 FOAM)	90.00 - 100.00	0.6000	0.6000
T7	9	DC Cable WR-VG122ST	90.00 - 100.00	0.6000	0.6000
T7	12	1 5/8" Hybriflex	90.00 - 100.00	0.6000	0.6000
T7	13	Hubner-Suhner Hybrid Cable	90.00 - 100.00	0.6000	0.6000
T7	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	90.00 - 100.00	0.6000	0.6000
T7	15	LDF4-50A (1/2 FOAM)	90.00 - 100.00	0.6000	0.6000
T7	17	LDF7-50A (1-5/8 FOAM)	90.00 - 100.00	0.6000	0.6000
T7	18	MLCH Hybrid Cable (VZW)	90.00 - 100.00	0.6000	0.6000
T7	21	DC Cable WR-VG122ST	90.00 - 100.00	0.6000	0.6000
T7	22	1 5/8" Hybriflex	90.00 - 100.00	0.6000	0.6000
T8	2	LDF7-50A (1-5/8 FOAM)	80.00 - 90.00	0.6000	0.6000
T8	3	LDF7-50A (1-5/8 FOAM)	80.00 - 90.00	0.6000	0.6000
T8	4	LDF7-50A (1-5/8 FOAM)	80.00 - 90.00	0.6000	0.6000
T8	5	LDF5-50A (7/8 FOAM)	80.00 - 90.00	0.6000	0.6000
T8	6	LDF4-50A (1/2 FOAM)	80.00 - 90.00	0.6000	0.6000
T8	8	LDF5-50A (7/8 FOAM)	80.00 - 90.00	0.6000	0.6000
T8	9	DC Cable WR-VG122ST	80.00 - 90.00	0.6000	0.6000
T8	12	1 5/8" Hybriflex	80.00 - 90.00	0.6000	0.6000
T8	13	Hubner-Suhner Hybrid Cable	80.00 - 90.00	0.6000	0.6000
T8	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	80.00 - 90.00	0.6000	0.6000
T8	15	LDF4-50A (1/2 FOAM)	80.00 - 90.00	0.6000	0.6000
T8	17	LDF7-50A (1-5/8 FOAM)	80.00 - 90.00	0.6000	0.6000
T8	18	MLCH Hybrid Cable (VZW)	80.00 - 90.00	0.6000	0.6000
T8	21	DC Cable WR-VG122ST	80.00 - 90.00	0.6000	0.6000
T8	22	1 5/8" Hybriflex	80.00 - 90.00	0.6000	0.6000
T9	2	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T9	3	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T9	4	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T9	5	LDF5-50A (7/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T9	6	LDF4-50A (1/2 FOAM)	60.00 - 80.00	0.6000	0.6000
T9	8	LDF5-50A (7/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T9	9	DC Cable WR-VG122ST	60.00 - 80.00	0.6000	0.6000
T9	12	1 5/8" Hybriflex	60.00 - 80.00	0.6000	0.6000
T9	13	Hubner-Suhner Hybrid Cable	60.00 - 80.00	0.6000	0.6000
T9	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	60.00 - 80.00	0.6000	0.6000
T9	15	LDF4-50A (1/2 FOAM)	60.00 - 80.00	0.6000	0.6000
T9	17	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T9	18	MLCH Hybrid Cable (VZW)	60.00 - 80.00	0.6000	0.6000
T9	21	DC Cable WR-VG122ST	60.00 - 80.00	0.6000	0.6000
T9	22	1 5/8" Hybriflex	60.00 - 80.00	0.6000	0.6000
T10	2	LDF7-50A (1-5/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T10	3	LDF7-50A (1-5/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T10	4	LDF7-50A (1-5/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T10	5	LDF5-50A (7/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T10	6	LDF4-50A (1/2 FOAM)	40.00 - 60.00	0.6000	0.6000
T10	8	LDF5-50A (7/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T10	9	DC Cable WR-VG122ST	40.00 - 60.00	0.6000	0.6000
T10	12	1 5/8" Hybriflex	40.00 - 60.00	0.6000	0.6000
T10	13	Hubner-Suhner Hybrid Cable	40.00 - 60.00	0.6000	0.6000
T10	14	AVA7-50 (1-5/8 LOW	40.00 - 60.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		DENSI. FOAM)			
T10	15	LDF4-50A (1/2 FOAM)	40.00 - 60.00	0.6000	0.6000
T10	17	LDF7-50A (1-5/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T10	18	MLCH Hybrid Cable (VZW)	40.00 - 60.00	0.6000	0.6000
T10	21	DC Cable WR-VG122ST	40.00 - 60.00	0.6000	0.6000
T10	22	1 5/8" Hybriflex	40.00 - 60.00	0.6000	0.6000
T11	2	LDF7-50A (1-5/8 FOAM)	30.00 - 40.00	0.6000	0.6000
T11	3	LDF7-50A (1-5/8 FOAM)	30.00 - 40.00	0.6000	0.6000
T11	4	LDF7-50A (1-5/8 FOAM)	30.00 - 40.00	0.6000	0.6000
T11	5	LDF5-50A (7/8 FOAM)	30.00 - 40.00	0.6000	0.6000
T11	6	LDF4-50A (1/2 FOAM)	30.00 - 40.00	0.6000	0.6000
T11	8	LDF5-50A (7/8 FOAM)	30.00 - 40.00	0.6000	0.6000
T11	9	DC Cable WR-VG122ST	30.00 - 40.00	0.6000	0.6000
T11	12	1 5/8" Hybriflex	30.00 - 40.00	0.6000	0.6000
T11	13	Hubner-Suhner Hybrid Cable	30.00 - 40.00	0.6000	0.6000
T11	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	30.00 - 40.00	0.6000	0.6000
T11	15	LDF4-50A (1/2 FOAM)	30.00 - 40.00	0.6000	0.6000
T11	17	LDF7-50A (1-5/8 FOAM)	30.00 - 40.00	0.6000	0.6000
T11	18	MLCH Hybrid Cable (VZW)	30.00 - 40.00	0.6000	0.6000
T11	21	DC Cable WR-VG122ST	30.00 - 40.00	0.6000	0.6000
T11	22	1 5/8" Hybriflex	30.00 - 40.00	0.6000	0.6000
T12	2	LDF7-50A (1-5/8 FOAM)	20.00 - 30.00	0.6000	0.6000
T12	3	LDF7-50A (1-5/8 FOAM)	20.00 - 30.00	0.6000	0.6000
T12	4	LDF7-50A (1-5/8 FOAM)	20.00 - 30.00	0.6000	0.6000
T12	5	LDF5-50A (7/8 FOAM)	20.00 - 30.00	0.6000	0.6000
T12	6	LDF4-50A (1/2 FOAM)	20.00 - 30.00	0.6000	0.6000
T12	8	LDF5-50A (7/8 FOAM)	20.00 - 30.00	0.6000	0.6000
T12	9	DC Cable WR-VG122ST	20.00 - 30.00	0.6000	0.6000
T12	12	1 5/8" Hybriflex	20.00 - 30.00	0.6000	0.6000
T12	13	Hubner-Suhner Hybrid Cable	20.00 - 30.00	0.6000	0.6000
T12	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	20.00 - 30.00	0.6000	0.6000
T12	15	LDF4-50A (1/2 FOAM)	20.00 - 30.00	0.6000	0.6000
T12	17	LDF7-50A (1-5/8 FOAM)	20.00 - 30.00	0.6000	0.6000
T12	18	MLCH Hybrid Cable (VZW)	20.00 - 30.00	0.6000	0.6000
T12	21	DC Cable WR-VG122ST	20.00 - 30.00	0.6000	0.6000
T12	22	1 5/8" Hybriflex	20.00 - 30.00	0.6000	0.6000
T13	2	LDF7-50A (1-5/8 FOAM)	0.00 - 20.00	0.6000	0.6000
T13	3	LDF7-50A (1-5/8 FOAM)	0.00 - 20.00	0.6000	0.6000
T13	4	LDF7-50A (1-5/8 FOAM)	0.00 - 20.00	0.6000	0.6000
T13	5	LDF5-50A (7/8 FOAM)	0.00 - 20.00	0.6000	0.6000
T13	6	LDF4-50A (1/2 FOAM)	0.00 - 20.00	0.6000	0.6000
T13	8	LDF5-50A (7/8 FOAM)	0.00 - 20.00	0.6000	0.6000
T13	9	DC Cable WR-VG122ST	0.00 - 20.00	0.6000	0.6000
T13	12	1 5/8" Hybriflex	0.00 - 20.00	0.6000	0.6000
T13	13	Hubner-Suhner Hybrid Cable	0.00 - 20.00	0.6000	0.6000
T13	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	0.00 - 20.00	0.6000	0.6000
T13	15	LDF4-50A (1/2 FOAM)	0.00 - 20.00	0.6000	0.6000
T13	17	LDF7-50A (1-5/8 FOAM)	0.00 - 20.00	0.6000	0.6000
T13	18	MLCH Hybrid Cable (VZW)	0.00 - 20.00	0.6000	0.6000
T13	21	DC Cable WR-VG122ST	0.00 - 20.00	0.6000	0.6000
T13	22	1 5/8" Hybriflex	0.00 - 20.00	0.6000	0.6000

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
AIR21 B2A/B4P (T-Mobile)	A	From Face	3.00 -4.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	6.05 6.42 6.80	5.54 6.19 6.85	0.11 0.17 0.23
AIR21 B2A/B4P (T-Mobile)	B	From Face	3.00 -4.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	6.05 6.42 6.80	5.54 6.19 6.85	0.11 0.17 0.23
AIR21 B2A/B4P (T-Mobile)	C	From Face	3.00 -4.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	6.05 6.42 6.80	5.54 6.19 6.85	0.11 0.17 0.23
TMA (T-Mobile)	A	From Face	3.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	1.06 1.21 1.37	0.45 0.57 0.71	0.02 0.03 0.03
TMA (T-Mobile)	B	From Face	3.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	1.06 1.21 1.37	0.45 0.57 0.71	0.02 0.03 0.03
TMA (T-Mobile)	C	From Face	3.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	1.06 1.21 1.37	0.45 0.57 0.71	0.02 0.03 0.03
LNX-6515DS-VTM (T-Mobile)	A	From Face	3.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	11.39 12.01 12.63	9.92 11.38 12.46	0.09 0.18 0.28
LNX-6515DS-VTM (T-Mobile)	B	From Face	3.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	11.39 12.01 12.63	9.92 11.38 12.46	0.09 0.18 0.28
LNX-6515DS-VTM (T-Mobile)	C	From Face	3.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	11.39 12.01 12.63	9.92 11.38 12.46	0.09 0.18 0.28
AIR21 B2A/B4P (T-Mobile)	A	From Face	3.00 4.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	6.05 6.42 6.80	5.54 6.19 6.85	0.11 0.17 0.23
AIR21 B2A/B4P (T-Mobile)	B	From Face	3.00 4.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	6.05 6.42 6.80	5.54 6.19 6.85	0.11 0.17 0.23
AIR21 B2A/B4P (T-Mobile)	C	From Face	3.00 4.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	6.05 6.42 6.80	5.54 6.19 6.85	0.11 0.17 0.23
LTF12=372 Sector Mount (1) (T-Mobile)	A	None		0.0000	125.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73
LTF12=372 Sector Mount (1) (T-Mobile)	B	None		0.0000	125.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73
LTF12=372 Sector Mount (1) (T-Mobile)	C	None		0.0000	125.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73
RRUS-11 (T-Mobile)	A	From Face	3.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	2.57 2.76 2.97	1.07 1.21 1.36	0.05 0.07 0.09
RRUS-11 (T-Mobile)	B	From Face	3.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	2.57 2.76 2.97	1.07 1.21 1.36	0.05 0.07 0.09
RRUS-11 (T-Mobile)	C	From Face	3.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	2.57 2.76 2.97	1.07 1.21 1.36	0.05 0.07 0.09

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
GPS (DNK-1 / GPS)	C	From Face	1.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00
4' Standoff (DNK-1 / GPS)	C	None		0.0000	60.00	No Ice 1/2" Ice 1" Ice	3.42 3.67 3.92	3.42 3.67 3.92	0.11 0.15 0.19
2" Dia 10' Omni (DNK-47 / CSP-48)	C	From Leg	3.00 0.00 0.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	2.00 3.03 4.06	2.00 3.03 4.06	0.01 0.03 0.04
3' Side Arm (DNK-47 / CSP-48)	C	None		0.0000	159.00	No Ice 1/2" Ice 1" Ice	2.72 4.91 7.10	2.72 4.91 7.10	0.05 0.09 0.13
2" Dia 10' Omni (DNK-48 / CSP-49)	A	From Leg	4.00 0.00 -3.00	0.0000	171.00	No Ice 1/2" Ice 1" Ice	2.00 3.03 4.06	2.00 3.03 4.06	0.01 0.03 0.04
4' Standoff (DNK-48,53)	A	None		0.0000	171.00	No Ice 1/2" Ice 1" Ice	3.42 3.67 3.92	3.42 3.67 3.92	0.11 0.15 0.19
2" Dia 10' Omni (DNK-53 / CSP-45)	A	From Leg	4.00 0.00 3.00	0.0000	171.00	No Ice 1/2" Ice 1" Ice	2.00 3.03 4.06	2.00 3.03 4.06	0.01 0.03 0.04
AP11-850/090/ADT w/Mount Pipe (DNK-49 / CSP-46)	B	From Leg	5.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice	5.31 5.93 6.44	3.92 4.96 5.72	0.04 0.08 0.14
5' Standoff (DNK-49 / CSP-46)	B	None		0.0000	162.00	No Ice 1/2" Ice 1" Ice	3.42 3.67 3.92	3.42 3.67 3.92	0.11 0.15 0.19
8'x2 1/2" Pipe Mount (DNK-50 / CSP-60)	C	None		0.0000	162.00	No Ice 1/2" Ice 1" Ice	2.20 3.13 3.62	2.20 3.13 3.62	0.04 0.06 0.08
3' Yagi (DNK-51 / CSP-1)	B	From Leg	0.50 0.00 0.00	0.0000	169.00	No Ice 1/2" Ice 1" Ice	2.08 3.79 5.52	2.08 3.79 5.52	0.03 0.05 0.09
4'x4" Pipe Mount (DNK-52)	C	None		0.0000	177.00	No Ice 1/2" Ice 1" Ice	1.00 1.58 1.84	1.00 1.58 1.84	0.04 0.06 0.07
AP11-850/090/ADT w/Mount Pipe (DNK-54 / CSP-47)	B	None		0.0000	178.00	No Ice 1/2" Ice 1" Ice	5.31 5.93 6.44	3.92 4.96 5.72	0.04 0.08 0.14
WPA-700102-4CF-EDIN-X w/ Mount Kit (Troop G TX)	B	From Leg	6.00 0.00 3.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	3.58 3.88 4.20	3.66 4.21 4.77	0.04 0.08 0.12
432E-83I-01T TTA Unit (Troop G)	B	From Leg	3.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	2.85 3.06 3.28	0.97 1.11 1.26	0.03 0.04 0.07
SE419-SWBPALDF(D00) (Troop G RX)	B	From Leg	6.00 0.00 -3.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	25.03 25.87 26.71	9.80 10.44 11.09	0.05 0.18 0.31
SE419-SWBPALDF Panel Antenna (Troop G SZ)	B	None		0.0000	175.00	No Ice 1/2" Ice 1" Ice	11.64 12.29 12.95	7.88 8.51 9.14	0.05 0.11 0.19
6' Side-Arm (Troop G)	B	None		0.0000	170.00	No Ice 1/2" Ice 1" Ice	10.60 15.40 20.20	10.60 15.40 20.20	0.14 0.21 0.28
*** VZW Antennas 08/09/2018									
Pirod 15' T-Frame Sector	A	None		0.0000	160.00	No Ice	15.00	15.00	0.50

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
Mount (1)						1/2" Ice	20.60	20.60	0.65
(Verizon)						1" Ice	26.20	26.20	0.80
Pirod 15' T-Frame Sector	B	None		0.0000	160.00	No Ice	15.00	15.00	0.50
Mount (1)						1/2" Ice	20.60	20.60	0.65
(Verizon)						1" Ice	26.20	26.20	0.80
Pirod 15' T-Frame Sector	C	None		0.0000	160.00	No Ice	15.00	15.00	0.50
Mount (1)						1/2" Ice	20.60	20.60	0.65
(Verizon)						1" Ice	26.20	26.20	0.80
JAHH-65B-R3B Panel	A	From Face	3.00	0.0000	160.00	No Ice	9.11	7.64	0.13
Antenna			0.00			1/2" Ice	9.58	8.53	0.20
(PROPOSED -Verizon)			0.00			1" Ice	10.05	9.37	0.29
JAHH-65B-R3B Panel	A	From Face	3.00	0.0000	160.00	No Ice	9.11	7.64	0.13
Antenna			0.00			1/2" Ice	9.58	8.53	0.20
(PROPOSED -Verizon)			0.00			1" Ice	10.05	9.37	0.29
BXA-70080-4CF-EDIN	A	From Face	3.00	0.0000	160.00	No Ice	3.62	5.10	0.05
Panel			0.00			1/2" Ice	3.94	5.70	0.09
(Verizon)			0.00			1" Ice	4.26	6.29	0.14
BXA-171063-12CF Panel	A	From Face	3.00	0.0000	160.00	No Ice	4.80	5.28	0.06
Antenna			0.00			1/2" Ice	5.25	6.15	0.10
(Verizon)			0.00			1" Ice	5.71	6.97	0.16
BSAMNT-SBS-2-2 (JAHH	A	From Face	3.00	0.0000	160.00	No Ice	3.48	3.30	0.12
Bracket (for 2))			0.00			1/2" Ice	4.60	4.43	0.18
(PROPOSED -Verizon)			0.00			1" Ice	5.37	5.19	0.24
4x40 B2_B66 Dual Band	A	From Face	3.00	0.0000	160.00	No Ice	1.88	1.25	0.10
RRH Unit			0.00			1/2" Ice	2.05	1.39	0.12
(PROPOSED -Verizon)			0.00			1" Ice	2.22	1.54	0.14
4x40_B5|B13 RRH Unit	A	From Face	3.00	0.0000	160.00	No Ice	1.88	1.01	0.08
(PROPOSED -Verizon)			0.00			1/2" Ice	2.05	1.14	0.10
			0.00			1" Ice	2.22	1.28	0.12
4x30_B13 RRH Unit	A	From Face	3.00	0.0000	160.00	No Ice	2.16	1.62	0.07
(PROPOSED -Verizon)			0.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.11
DB-T1-6Z-8AB-0Z	A	From Face	3.00	0.0000	160.00	No Ice	4.80	2.00	0.05
Distribution Box			0.00			1/2" Ice	5.07	2.19	0.08
(Verizon)			0.00			1" Ice	5.35	2.39	0.12
JAHH-65B-R3B Panel	B	From Face	3.00	0.0000	160.00	No Ice	9.11	7.64	0.13
Antenna			0.00			1/2" Ice	9.58	8.53	0.20
(PROPOSED -Verizon)			0.00			1" Ice	10.05	9.37	0.29
JAHH-65B-R3B Panel	B	From Face	3.00	0.0000	160.00	No Ice	9.11	7.64	0.13
Antenna			0.00			1/2" Ice	9.58	8.53	0.20
(PROPOSED -Verizon)			0.00			1" Ice	10.05	9.37	0.29
BXA-70063-4CF Panel	B	From Face	3.00	0.0000	160.00	No Ice	7.65	6.27	0.06
Antenna			0.00			1/2" Ice	8.10	7.15	0.13
(Verizon)			0.00			1" Ice	8.56	7.97	0.20
BXA-171063-12CF Panel	B	From Face	3.00	0.0000	160.00	No Ice	4.80	5.28	0.06
Antenna			0.00			1/2" Ice	5.25	6.15	0.10
(Verizon)			0.00			1" Ice	5.71	6.97	0.16
BSAMNT-SBS-2-2 (JAHH	B	From Face	3.00	0.0000	160.00	No Ice	3.48	3.30	0.12
Bracket (for 2))			0.00			1/2" Ice	4.60	4.43	0.18
(PROPOSED -Verizon)			0.00			1" Ice	5.37	5.19	0.24
4x40 B2_B66 Dual Band	B	From Face	3.00	0.0000	160.00	No Ice	1.88	1.25	0.10
RRH Unit			0.00			1/2" Ice	2.05	1.39	0.12
(PROPOSED -Verizon)			0.00			1" Ice	2.22	1.54	0.14
4x40_B5|B13 RRH Unit	B	From Face	3.00	0.0000	160.00	No Ice	1.88	1.01	0.08
(PROPOSED -Verizon)			0.00			1/2" Ice	2.05	1.14	0.10
			0.00			1" Ice	2.22	1.28	0.12
4x30_B13 RRH Unit	B	From Face	3.00	0.0000	160.00	No Ice	2.16	1.62	0.07

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
(PROPOSED -Verizon)			0.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.11
JAHH-65B-R3B Panel	C	From Face	3.00	0.0000	160.00	No Ice	9.11	7.64	0.13
Antenna			0.00			1/2" Ice	9.58	8.53	0.20
(PROPOSED -Verizon)			0.00			1" Ice	10.05	9.37	0.29
JAHH-65B-R3B Panel	C	From Face	3.00	0.0000	160.00	No Ice	9.11	7.64	0.13
Antenna			0.00			1/2" Ice	9.58	8.53	0.20
(PROPOSED -Verizon)			0.00			1" Ice	10.05	9.37	0.29
BXA-70063-4CF Panel	C	From Face	3.00	0.0000	160.00	No Ice	7.65	6.27	0.06
Antenna			0.00			1/2" Ice	8.10	7.15	0.13
(Verizon)			0.00			1" Ice	8.56	7.97	0.20
BXA-171063-12CF Panel	C	From Face	3.00	0.0000	160.00	No Ice	4.80	5.28	0.06
Antenna			0.00			1/2" Ice	5.25	6.15	0.10
(Verizon)			0.00			1" Ice	5.71	6.97	0.16
BSAMNT-SBS-2-2 (JAHH	C	From Face	3.00	0.0000	160.00	No Ice	3.48	3.30	0.12
Bracket (for 2))			0.00			1/2" Ice	4.60	4.43	0.18
(PROPOSED -Verizon)			0.00			1" Ice	5.37	5.19	0.24
4x40 B2_B66 Dual Band	C	From Face	3.00	0.0000	160.00	No Ice	1.88	1.25	0.10
RRH Unit			0.00			1/2" Ice	2.05	1.39	0.12
(PROPOSED -Verizon)			0.00			1" Ice	2.22	1.54	0.14
4x40_B5|B13 RRH Unit	C	From Face	3.00	0.0000	160.00	No Ice	1.88	1.01	0.08
(PROPOSED -Verizon)			0.00			1/2" Ice	2.05	1.14	0.10
			0.00			1" Ice	2.22	1.28	0.12
4x30_B13 RRH Unit	C	From Face	3.00	0.0000	160.00	No Ice	2.16	1.62	0.07
(PROPOSED -Verizon)			0.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.11
*** VZW Antennas									
08/09/2018									
*** AT&T/SMK-004									
Antennas - Existing									
Pirod 15' T-Frame Sector	A	None		0.0000	133.00	No Ice	15.00	15.00	0.50
Mount (1)						1/2" Ice	20.60	20.60	0.65
(AT&T)						1" Ice	26.20	26.20	0.80
Pirod 15' T-Frame Sector	B	None		0.0000	133.00	No Ice	15.00	15.00	0.50
Mount (1)						1/2" Ice	20.60	20.60	0.65
(AT&T)						1" Ice	26.20	26.20	0.80
Pirod 15' T-Frame Sector	C	None		0.0000	133.00	No Ice	15.00	15.00	0.50
Mount (1)						1/2" Ice	20.60	20.60	0.65
(AT&T)						1" Ice	26.20	26.20	0.80
P65-16-XLH-RR	A	From Face	3.00	0.0000	133.00	No Ice	8.40	4.70	0.06
(AT&T)			-6.00			1/2" Ice	8.95	5.15	0.11
			0.00			1" Ice	9.51	5.60	0.16
RRUS-11	A	From Face	3.00	0.0000	133.00	No Ice	2.99	1.25	0.05
(AT&T)			-6.00			1/2" Ice	3.23	1.41	0.07
			0.00			1" Ice	3.47	1.59	0.09
HPA-65R-BUU-H6 Panel	A	From Face	3.00	0.0000	133.00	No Ice	9.49	6.91	0.07
(AT&T)			-2.00			1/2" Ice	9.96	7.87	0.14
			0.00			1" Ice	10.43	8.70	0.22
RRUS-32	A	From Face	3.00	0.0000	133.00	No Ice	3.20	1.85	0.06
(AT&T)			-2.00			1/2" Ice	3.46	2.08	0.08
			0.00			1" Ice	3.73	2.31	0.11
DC6-48-60-18-8F (Squid)	A	From Face	3.00	0.0000	133.00	No Ice	1.27	1.27	0.02
Suppressor			0.00			1/2" Ice	1.46	1.46	0.04
(AT&T)			0.00			1" Ice	1.66	1.66	0.05
P65-16-XLH-RR	B	From Face	3.00	0.0000	133.00	No Ice	8.40	4.70	0.06
(AT&T)			-6.00			1/2" Ice	8.95	5.15	0.11
			0.00			1" Ice	9.51	5.60	0.16

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
RRUS-11	B	From Face	3.00	0.0000	133.00	No Ice	2.99	1.25	0.05
(AT&T)			-6.00			1/2" Ice	3.23	1.41	0.07
			0.00			1" Ice	3.47	1.59	0.09
HPA-65R-BUU-H6 Panel	B	From Face	3.00	0.0000	133.00	No Ice	9.49	6.91	0.07
(AT&T)			-2.00			1/2" Ice	9.96	7.87	0.14
			0.00			1" Ice	10.43	8.70	0.22
RRUS-32	B	From Face	3.00	0.0000	133.00	No Ice	3.20	1.85	0.06
(AT&T)			-2.00			1/2" Ice	3.46	2.08	0.08
			0.00			1" Ice	3.73	2.31	0.11
P65-16-XLH-RR	C	From Face	3.00	0.0000	133.00	No Ice	8.40	4.70	0.06
(AT&T)			-6.00			1/2" Ice	8.95	5.15	0.11
			0.00			1" Ice	9.51	5.60	0.16
RRUS-11	C	From Face	3.00	0.0000	133.00	No Ice	2.99	1.25	0.05
(AT&T)			-6.00			1/2" Ice	3.23	1.41	0.07
			0.00			1" Ice	3.47	1.59	0.09
HPA-65R-BUU-H6 Panel	C	From Face	3.00	0.0000	133.00	No Ice	9.49	6.91	0.07
(AT&T)			-2.00			1/2" Ice	9.96	7.87	0.14
			0.00			1" Ice	10.43	8.70	0.22
RRUS-32	C	From Face	3.00	0.0000	133.00	No Ice	3.20	1.85	0.06
(AT&T)			-2.00			1/2" Ice	3.46	2.08	0.08
			0.00			1" Ice	3.73	2.31	0.11
*** AT&T/SMK-004 Antennas - Existing									
*** AT&T/SMK-004 Antennas - Proposed									
800-10798 Kathrein Panel	A	From Face	3.00	0.0000	133.00	No Ice	11.31	7.25	0.11
(AT&T)			6.00			1/2" Ice	11.92	8.37	0.19
			0.00			1" Ice	12.54	9.27	0.28
RRUS-32 B66	A	From Face	3.00	0.0000	133.00	No Ice	3.20	1.85	0.06
(AT&T)			6.00			1/2" Ice	3.46	2.08	0.08
			0.00			1" Ice	3.73	2.31	0.11
RRUS-32	A	From Face	3.00	0.0000	133.00	No Ice	3.20	1.85	0.06
(AT&T)			-2.00			1/2" Ice	3.46	2.08	0.08
			0.00			1" Ice	3.73	2.31	0.11
DBC0061F1V51-2 Combiner Units	A	From Face	3.00	0.0000	133.00	No Ice	0.48	0.51	0.03
(AT&T)			6.00			1/2" Ice	0.58	0.60	0.03
			0.00			1" Ice	0.68	0.71	0.04
800-10798 Kathrein Panel	B	From Face	3.00	0.0000	133.00	No Ice	11.31	7.25	0.11
(AT&T)			6.00			1/2" Ice	11.92	8.37	0.19
			0.00			1" Ice	12.54	9.27	0.28
RRUS-32 B66	B	From Face	3.00	0.0000	133.00	No Ice	3.20	1.85	0.06
(AT&T)			6.00			1/2" Ice	3.46	2.08	0.08
			0.00			1" Ice	3.73	2.31	0.11
RRUS-32	B	From Face	3.00	0.0000	133.00	No Ice	3.20	1.85	0.06
(AT&T)			-2.00			1/2" Ice	3.46	2.08	0.08
			0.00			1" Ice	3.73	2.31	0.11
DBC0061F1V51-2 Combiner Units	B	From Face	3.00	0.0000	133.00	No Ice	0.48	0.51	0.03
(AT&T)			6.00			1/2" Ice	0.58	0.60	0.03
			0.00			1" Ice	0.68	0.71	0.04
800-10798 Kathrein Panel	C	From Face	3.00	0.0000	133.00	No Ice	11.31	7.25	0.11
(AT&T)			6.00			1/2" Ice	11.92	8.37	0.19
			0.00			1" Ice	12.54	9.27	0.28
RRUS-32 B66	C	From Face	3.00	0.0000	133.00	No Ice	3.20	1.85	0.06
(AT&T)			-2.00			1/2" Ice	3.46	2.08	0.08
			0.00			1" Ice	3.73	2.31	0.11
RRUS-32	C	From Face	3.00	0.0000	133.00	No Ice	3.20	1.85	0.06
(AT&T)			6.00			1/2" Ice	3.46	2.08	0.08

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert*	*Azimuth Adjustment*	*Placement*		*C_AA_A Front*	*C_AA_A Side*	*Weight*
			ft *ft* *ft*	*°*	*ft*		*ft²*	*ft²*	*K*
			0.00			1" Ice	3.73	2.31	0.11
DBC0061F1V51-2 Combiner Units (AT&T)	C	From Face	3.00	0.0000	133.00	No Ice	0.48	0.51	0.03
			6.00			1/2" Ice	0.58	0.60	0.03
			0.00			1" Ice	0.68	0.71	0.04
DC6-48-60-18-8F (Squid) Suppressor (AT&T)	C	From Face	3.00	0.0000	133.00	No Ice	1.27	1.27	0.02
			0.00			1/2" Ice	1.46	1.46	0.04
			0.00			1" Ice	1.66	1.66	0.05
*** AT&T/SMK-004 Antennas - Proposed									

Dishes

Description	*Face or Leg*	*Dish Type*	*Offset Type*	*Offsets: Horz Lateral Vert*	*Azimuth Adjustment*	*3 dB Beam Width*	*Elevation*	*Outside Diameter*		*Aperture Area*	*Weight*
				ft	*°*	*°*	*ft*	*ft*		*ft²*	*K*
PA6-65AC (DNK-52 / CSP-42)	C	Paraboloid w/Radome	From Leg	1.00	Worst		177.00	6.00	No Ice	28.27	0.09
				0.00					1/2" Ice	29.05	0.24
				0.00					1" Ice	29.83	0.39

222-G Verification Constants

Constant	*Value*
Wind Importance Factor Without Ice	1.15
Wind Importance Factor With Ice Factor	1
Ice Importance Factor	1.25
K_d	0.85
Z_g	900
α	9.5
K_{zmin}	0.85
K_e	1
K_t	1
f	1

222-G Section Verification ArRr By Element

Section Elevation	*Elem. Num.*	*Size*	*C*	*C w/Ice*	*Face*	*e*	*e w/Ice*	*A_r*	*A_r w/Ice*	*A_rR_r*	*A_rR_r w/Ice*
ft								*ft²*	*ft²*	*ft²*	*ft²*
T1 180.00-160.00	1	ROHN 3 STD	40.93	39.248	C	0.139	0.354	5.833	13.197	3.055	8.151
	1	ROHN 3 STD	40.93	39.248	A	0.139	0.354	5.833	13.197	3.055	8.151
	2	ROHN 3 STD	40.93	39.248	C	0.139	0.354	5.833	13.197	3.055	8.151

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft²	A_r w/Ice ft²	A_rR_r ft²	A_rR_r w/Ice ft²
	2	ROHN 3 STD	40.93	39.248	B	0.139	0.354	5.833	13.197	3.055	8.151
	3	ROHN 3 STD	40.93	39.248	B	0.139	0.354	5.833	13.197	3.055	8.151
	3	ROHN 3 STD	40.93	39.248	A	0.139	0.354	5.833	13.197	3.055	8.151
	4	ROHN 1.5 STD	22.219	31.317	C	0.139	0.354	1.306	4.344	0.740	2.683
	5	ROHN 1.5 STD	22.219	31.317	B	0.139	0.354	1.306	4.344	0.740	2.683
	6	ROHN 1.5 STD	22.219	31.317	A	0.139	0.354	1.306	4.344	0.740	2.683
	7	ROHN 1.5 STD	22.219	31.317	C	0.139	0.354	1.315	4.373	0.745	2.701
	8	ROHN 2 STD	27.774	33.671	C	0.139	0.354	1.518	4.343	0.860	2.682
	9	ROHN 2 STD	27.774	33.671	C	0.139	0.354	1.518	4.343	0.860	2.682
	10	ROHN 1.5 STD	22.219	31.317	B	0.139	0.354	1.315	4.373	0.745	2.701
	11	ROHN 2 STD	27.774	33.671	B	0.139	0.354	1.518	4.343	0.860	2.682
	12	ROHN 2 STD	27.774	33.671	B	0.139	0.354	1.518	4.343	0.860	2.682
	13	ROHN 1.5 STD	22.219	31.317	A	0.139	0.354	1.315	4.373	0.745	2.701
	14	ROHN 2 STD	27.774	33.671	A	0.139	0.354	1.518	4.343	0.860	2.682
	15	ROHN 2 STD	27.774	33.671	A	0.139	0.354	1.518	4.343	0.860	2.682
	19	ROHN 1.5 STD	22.219	31.317	C	0.139	0.354	1.311	4.358	0.743	2.692
	20	ROHN 2 STD	27.774	33.671	C	0.139	0.354	1.517	4.338	0.859	2.680
	21	ROHN 2 STD	27.774	33.671	C	0.139	0.354	1.517	4.338	0.859	2.680
	22	ROHN 1.5 STD	22.219	31.317	B	0.139	0.354	1.311	4.358	0.743	2.692
	23	ROHN 2 STD	27.774	33.671	B	0.139	0.354	1.517	4.338	0.859	2.680
	24	ROHN 2 STD	27.774	33.671	B	0.139	0.354	1.517	4.338	0.859	2.680
	25	ROHN 1.5 STD	22.219	31.317	A	0.139	0.354	1.311	4.358	0.743	2.692
	26	ROHN 2 STD	27.774	33.671	A	0.139	0.354	1.517	4.338	0.859	2.680
	27	ROHN 2 STD	27.774	33.671	A	0.139	0.354	1.517	4.338	0.859	2.680
	31	ROHN 2 STD	27.774	33.671	C	0.139	0.354	1.515	4.333	0.858	2.677
	32	ROHN 2 STD	27.774	33.671	C	0.139	0.354	1.515	4.333	0.858	2.677
	33	ROHN 2 STD	27.774	33.671	B	0.139	0.354	1.515	4.333	0.858	2.677
	34	ROHN 2 STD	27.774	33.671	B	0.139	0.354	1.515	4.333	0.858	2.677
	35	ROHN 2 STD	27.774	33.671	A	0.139	0.354	1.515	4.333	0.858	2.677
	36	ROHN 2 STD	27.774	33.671	A	0.139	0.354	1.515	4.333	0.858	2.677
					A		Sum:	24.699	65.497	13.494	40.456
					B			24.699	65.497	13.494	40.456
					C			24.699	65.497	13.494	40.456
T2 160.00-140.00	40	ROHN 4 STD	51.935	43.357	C	0.144	0.34	7.514	14.798	3.550	9.061
	40	ROHN 4 STD	51.935	43.357	A	0.144	0.34	7.514	14.798	3.550	9.061
	41	ROHN 4 STD	51.935	43.357	C	0.144	0.34	7.514	14.798	3.550	9.061
	41	ROHN 4 STD	51.935	43.357	B	0.144	0.34	7.514	14.798	3.550	9.061
	42	ROHN 4 STD	51.935	43.357	B	0.144	0.34	7.514	14.798	3.550	9.061
	42	ROHN 4 STD	51.935	43.357	A	0.144	0.34	7.514	14.798	3.550	9.061
	43	ROHN 1.5 STD	21.928	30.638	C	0.144	0.34	1.526	5.031	0.865	3.080
	44	ROHN 2 STD	27.41	32.962	C	0.144	0.34	1.634	4.635	0.926	2.838
	45	ROHN 2 STD	27.41	32.962	C	0.144	0.34	1.634	4.635	0.926	2.838
	46	ROHN 1.5 STD	21.928	30.638	B	0.144	0.34	1.526	5.031	0.865	3.080
	47	ROHN 2 STD	27.41	32.962	B	0.144	0.34	1.634	4.635	0.926	2.838
	48	ROHN 2 STD	27.41	32.962	B	0.144	0.34	1.634	4.635	0.926	2.838
	49	ROHN 1.5 STD	21.928	30.638	A	0.144	0.34	1.526	5.031	0.865	3.080
	50	ROHN 2 STD	27.41	32.962	A	0.144	0.34	1.634	4.635	0.926	2.838
	51	ROHN 2 STD	27.41	32.962	A	0.144	0.34	1.634	4.635	0.926	2.838
	55	ROHN 1.5 STD	21.928	30.638	C	0.144	0.34	1.416	4.668	0.803	2.858
	56	ROHN 2 STD	27.41	32.962	C	0.144	0.34	1.589	4.508	0.901	2.760
	57	ROHN 2 STD	27.41	32.962	C	0.144	0.34	1.589	4.508	0.901	2.760
	58	ROHN 1.5 STD	21.928	30.638	B	0.144	0.34	1.416	4.668	0.803	2.858
	59	ROHN 2 STD	27.41	32.962	B	0.144	0.34	1.589	4.508	0.901	2.760
	60	ROHN 2 STD	27.41	32.962	B	0.144	0.34	1.589	4.508	0.901	2.760
	61	ROHN 1.5 STD	21.928	30.638	A	0.144	0.34	1.416	4.668	0.803	2.858
	62	ROHN 2 STD	27.41	32.962	A	0.144	0.34	1.589	4.508	0.901	2.760
	63	ROHN 2 STD	27.41	32.962	A	0.144	0.34	1.589	4.508	0.901	2.760
	67	ROHN 1.5 STD	21.928	30.638	C	0.144	0.34	1.319	4.349	0.748	2.663
	68	ROHN 2 STD	27.41	32.962	C	0.144	0.34	1.546	4.385	0.876	2.685

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft^2	A_r w/Ice ft^2	A_rR_r ft^2	A_rR_r w/Ice ft^2
	69	ROHN 2 STD	27.41	32.962	C	0.144	0.34	1.546	4.385	0.876	2.685
	70	ROHN 1.5 STD	21.928	30.638	B	0.144	0.34	1.319	4.349	0.748	2.663
	71	ROHN 2 STD	27.41	32.962	B	0.144	0.34	1.546	4.385	0.876	2.685
	72	ROHN 2 STD	27.41	32.962	B	0.144	0.34	1.546	4.385	0.876	2.685
	73	ROHN 1.5 STD	21.928	30.638	A	0.144	0.34	1.319	4.349	0.748	2.663
	74	ROHN 2 STD	27.41	32.962	A	0.144	0.34	1.546	4.385	0.876	2.685
	75	ROHN 2 STD	27.41	32.962	A	0.144	0.34	1.546	4.385	0.876	2.685
					A		Sum:	28.825	70.700	14.923	43.287
					B			28.825	70.700	14.923	43.287
					C			28.825	70.700	14.923	43.287
T3 140.00-133.33	79	ROHN 5 EH	63.577	47.888	C	0.151	0.33	3.096	5.502	1.304	3.351
	79	ROHN 5 EH	63.577	47.888	A	0.151	0.33	3.096	5.502	1.304	3.351
	80	ROHN 5 EH	63.577	47.888	C	0.151	0.33	3.096	5.502	1.304	3.351
	80	ROHN 5 EH	63.577	47.888	B	0.151	0.33	3.096	5.502	1.304	3.351
	81	ROHN 5 EH	63.577	47.888	B	0.151	0.33	3.096	5.502	1.304	3.351
	81	ROHN 5 EH	63.577	47.888	A	0.151	0.33	3.096	5.502	1.304	3.351
	82	ROHN 2 STD	27.143	32.444	C	0.151	0.33	2.045	5.768	1.161	3.513
	83	ROHN 2 EH	27.2	32.469	C	0.151	0.33	1.670	4.702	0.948	2.863
	84	ROHN 2 EH	27.2	32.469	C	0.151	0.33	1.670	4.702	0.948	2.863
	85	ROHN 2 STD	27.143	32.444	B	0.151	0.33	2.045	5.768	1.161	3.513
	86	ROHN 2 EH	27.2	32.469	B	0.151	0.33	1.670	4.702	0.948	2.863
	87	ROHN 2 EH	27.2	32.469	B	0.151	0.33	1.670	4.702	0.948	2.863
	88	ROHN 2 STD	27.143	32.444	A	0.151	0.33	2.045	5.768	1.161	3.513
	89	ROHN 2 EH	27.2	32.469	A	0.151	0.33	1.670	4.702	0.948	2.863
	90	ROHN 2 EH	27.2	32.469	A	0.151	0.33	1.670	4.702	0.948	2.863
					A		Sum:	11.577	26.175	5.663	15.941
					B			11.577	26.175	5.663	15.941
					C			11.577	26.175	5.663	15.941
T4 133.33-126.67	94	ROHN 5 EH	63.243	47.532	C	0.145	0.319	3.096	5.490	1.299	3.321
	94	ROHN 5 EH	63.243	47.532	A	0.145	0.319	3.096	5.490	1.299	3.321
	95	ROHN 5 EH	63.243	47.532	C	0.145	0.319	3.096	5.490	1.299	3.321
	95	ROHN 5 EH	63.243	47.532	B	0.145	0.319	3.096	5.490	1.299	3.321
	96	ROHN 5 EH	63.243	47.532	B	0.145	0.319	3.096	5.490	1.299	3.321
	96	ROHN 5 EH	63.243	47.532	A	0.145	0.319	3.096	5.490	1.299	3.321
	97	ROHN 2 STD	27	32.17	C	0.145	0.319	2.165	6.086	1.228	3.682
	98	ROHN 2 STD	27	32.17	B	0.145	0.319	2.165	6.086	1.228	3.682
	99	ROHN 2 STD	27	32.17	A	0.145	0.319	2.165	6.086	1.228	3.682
	100	ROHN 2 EH	27.057	32.194	C	0.145	0.319	1.717	4.821	0.974	2.916
	101	ROHN 2 EH	27.057	32.194	C	0.145	0.319	1.717	4.821	0.974	2.916
	102	ROHN 2 EH	27.057	32.194	B	0.145	0.319	1.717	4.821	0.974	2.916
	103	ROHN 2 EH	27.057	32.194	B	0.145	0.319	1.717	4.821	0.974	2.916
	104	ROHN 2 EH	27.057	32.194	A	0.145	0.319	1.717	4.821	0.974	2.916
	105	ROHN 2 EH	27.057	32.194	A	0.145	0.319	1.717	4.821	0.974	2.916
					A		Sum:	11.792	26.708	5.774	16.157
					B			11.792	26.708	5.774	16.157
					C			11.792	26.708	5.774	16.157
T5 126.67-120.00	109	ROHN 5 EH	62.894	47.161	C	0.14	0.308	3.096	5.477	1.297	3.295
	109	ROHN 5 EH	62.894	47.161	A	0.14	0.308	3.096	5.477	1.297	3.295
	110	ROHN 5 EH	62.894	47.161	C	0.14	0.308	3.096	5.477	1.297	3.295
	110	ROHN 5 EH	62.894	47.161	B	0.14	0.308	3.096	5.477	1.297	3.295
	111	ROHN 5 EH	62.894	47.161	B	0.14	0.308	3.096	5.477	1.297	3.295
	111	ROHN 5 EH	62.894	47.161	A	0.14	0.308	3.096	5.477	1.297	3.295
	112	ROHN 2 STD	26.851	31.884	C	0.14	0.308	2.303	6.451	1.305	3.881
	113	ROHN 2 STD	26.851	31.884	B	0.14	0.308	2.303	6.451	1.305	3.881
	114	ROHN 2 STD	26.851	31.884	A	0.14	0.308	2.303	6.451	1.305	3.881
	115	ROHN 2 XXS	26.851	31.884	C	0.14	0.308	1.763	4.938	0.999	2.971
	116	ROHN 2 XXS	26.851	31.884	C	0.14	0.308	1.763	4.938	0.999	2.971

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft^2	A_r w/Ice ft^2	A_rR_r ft^2	A_rR_r w/Ice ft^2
	117	ROHN 2 XXS	26.851	31.884	B	0.14	0.308	1.763	4.938	0.999	2.971
	118	ROHN 2 XXS	26.851	31.884	B	0.14	0.308	1.763	4.938	0.999	2.971
	119	ROHN 2 XXS	26.851	31.884	A	0.14	0.308	1.763	4.938	0.999	2.971
	120	ROHN 2 XXS	26.851	31.884	A	0.14	0.308	1.763	4.938	0.999	2.971
					A		Sum:	12.020	27.281	5.895	16.413
					B			12.020	27.281	5.895	16.413
					C			12.020	27.281	5.895	16.413
T6 120.00-100.00	124	ROHN 6 EHS	74.004	51.395	C	0.133	0.265	11.065	18.129	4.542	10.675
	124	ROHN 6 EHS	74.004	51.395	A	0.133	0.265	11.065	18.129	4.542	10.675
	125	ROHN 6 EHS	74.004	51.395	C	0.133	0.265	11.065	18.129	4.542	10.675
	125	ROHN 6 EHS	74.004	51.395	B	0.133	0.265	11.065	18.129	4.542	10.675
	126	ROHN 6 EHS	74.004	51.395	B	0.133	0.265	11.065	18.129	4.542	10.675
	126	ROHN 6 EHS	74.004	51.395	A	0.133	0.265	11.065	18.129	4.542	10.675
	127	ROHN 2 STD	26.53	31.272	C	0.133	0.265	2.645	7.356	1.497	4.331
	128	Pipe 2.5 XXS	32.115	33.639	C	0.133	0.265	2.889	7.139	1.634	4.204
	129	Pipe 2.5 XXS	32.115	33.639	C	0.133	0.265	2.889	7.139	1.634	4.204
	130	ROHN 2 STD	26.53	31.272	B	0.133	0.265	2.645	7.356	1.497	4.331
	131	Pipe 2.5 XXS	32.115	33.639	B	0.133	0.265	2.889	7.139	1.634	4.204
	132	Pipe 2.5 XXS	32.115	33.639	B	0.133	0.265	2.889	7.139	1.634	4.204
	133	ROHN 2 STD	26.53	31.272	A	0.133	0.265	2.645	7.356	1.497	4.331
	134	Pipe 2.5 XXS	32.115	33.639	A	0.133	0.265	2.889	7.139	1.634	4.204
	135	Pipe 2.5 XXS	32.115	33.639	A	0.133	0.265	2.889	7.139	1.634	4.204
	139	ROHN 2 STD	26.53	31.272	C	0.133	0.265	2.440	6.786	1.381	3.995
	140	Pipe 2.5 XXS	32.115	33.639	C	0.133	0.265	2.804	6.930	1.586	4.080
	141	Pipe 2.5 XXS	32.115	33.639	C	0.133	0.265	2.804	6.930	1.586	4.080
	142	ROHN 2 STD	26.53	31.272	B	0.133	0.265	2.440	6.786	1.381	3.995
	143	Pipe 2.5 XXS	32.115	33.639	B	0.133	0.265	2.804	6.930	1.586	4.080
	144	Pipe 2.5 XXS	32.115	33.639	B	0.133	0.265	2.804	6.930	1.586	4.080
	145	ROHN 2 STD	26.53	31.272	A	0.133	0.265	2.440	6.786	1.381	3.995
	146	Pipe 2.5 XXS	32.115	33.639	A	0.133	0.265	2.804	6.930	1.586	4.080
	147	Pipe 2.5 XXS	32.115	33.639	A	0.133	0.265	2.804	6.930	1.586	4.080
					A		Sum:	38.601	78.538	18.400	46.244
					B			38.601	78.538	18.400	46.244
					C			38.601	78.538	18.400	46.244
T7 100.00-90.00	151	ROHN 6 EH	72.871	50.321	C	0.131	0.252	5.537	9.020	2.265	5.282
	151	ROHN 6 EH	72.871	50.321	A	0.131	0.252	5.537	9.020	2.265	5.282
	152	ROHN 6 EH	72.871	50.321	C	0.131	0.252	5.537	9.020	2.265	5.282
	152	ROHN 6 EH	72.871	50.321	B	0.131	0.252	5.537	9.020	2.265	5.282
	153	ROHN 6 EH	72.871	50.321	B	0.131	0.252	5.537	9.020	2.265	5.282
	153	ROHN 6 EH	72.871	50.321	A	0.131	0.252	5.537	9.020	2.265	5.282
	154	ROHN 2 STD	26.123	30.506	C	0.131	0.252	2.868	7.901	1.623	4.627
	155	ROHN 3 STD	38.498	35.751	C	0.131	0.252	3.643	7.981	1.945	4.674
	156	ROHN 3 STD	38.498	35.751	C	0.131	0.252	3.643	7.981	1.945	4.674
	157	ROHN 2 STD	26.123	30.506	B	0.131	0.252	2.868	7.901	1.623	4.627
	158	ROHN 3 STD	38.498	35.751	B	0.131	0.252	3.643	7.981	1.945	4.674
	159	ROHN 3 STD	38.498	35.751	B	0.131	0.252	3.643	7.981	1.945	4.674
	160	ROHN 2 STD	26.123	30.506	A	0.131	0.252	2.868	7.901	1.623	4.627
	161	ROHN 3 STD	38.498	35.751	A	0.131	0.252	3.643	7.981	1.945	4.674
	162	ROHN 3 STD	38.498	35.751	A	0.131	0.252	3.643	7.981	1.945	4.674
					A		Sum:	21.227	41.903	10.043	24.538
					B			21.227	41.903	10.043	24.538
					C			21.227	41.903	10.043	24.538
T8 90.00-80.00	166	ROHN 6 EH	72.022	49.523	C	0.124	0.24	5.537	8.982	2.247	5.232
	166	ROHN 6 EH	72.022	49.523	A	0.124	0.24	5.537	8.982	2.247	5.232
	167	ROHN 6 EH	72.022	49.523	C	0.124	0.24	5.537	8.982	2.247	5.232
	167	ROHN 6 EH	72.022	49.523	B	0.124	0.24	5.537	8.982	2.247	5.232
	168	ROHN 6 EH	72.022	49.523	B	0.124	0.24	5.537	8.982	2.247	5.232
	168	ROHN 6 EH	72.022	49.523	A	0.124	0.24	5.537	8.982	2.247	5.232
	169	ROHN 2 STD	25.819	29.939	C	0.124	0.24	3.129	8.559	1.769	4.986

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft^2	A_r w/Ice ft^2	A_rR_r ft^2	A_rR_r w/Ice ft^2
	170	ROHN 2 STD	25.819	29.939	B	0.124	0.24	3.129	8.559	1.769	4.986
	171	ROHN 2 STD	25.819	29.939	A	0.124	0.24	3.129	8.559	1.769	4.986
	172	ROHN 3 STD	38.05	35.123	C	0.124	0.24	3.773	8.216	2.019	4.786
	173	ROHN 3 STD	38.05	35.123	C	0.124	0.24	3.773	8.216	2.019	4.786
	174	ROHN 3 STD	38.05	35.123	B	0.124	0.24	3.773	8.216	2.019	4.786
	175	ROHN 3 STD	38.05	35.123	B	0.124	0.24	3.773	8.216	2.019	4.786
	176	ROHN 3 STD	38.05	35.123	A	0.124	0.24	3.773	8.216	2.019	4.786
	177	ROHN 3 STD	38.05	35.123	A	0.124	0.24	3.773	8.216	2.019	4.786
					A		Sum:	21.747	42.954	10.301	25.023
					B			21.747	42.954	10.301	25.023
					C			21.747	42.954	10.301	25.023
T9 80.00-60.00	181	ROHN 8 EHS	91.868	57.192	C	0.135	0.242	14.412	21.168	5.926	12.341
	181	ROHN 8 EHS	91.868	57.192	A	0.135	0.242	14.412	21.168	5.926	12.341
	182	ROHN 8 EHS	91.868	57.192	C	0.135	0.242	14.412	21.168	5.926	12.341
	182	ROHN 8 EHS	91.868	57.192	B	0.135	0.242	14.412	21.168	5.926	12.341
	183	ROHN 8 EHS	91.868	57.192	B	0.135	0.242	14.412	21.168	5.926	12.341
	183	ROHN 8 EHS	91.868	57.192	A	0.135	0.242	14.412	21.168	5.926	12.341
	184	ROHN 2.5 STD	30.623	31.233	C	0.135	0.242	4.362	10.497	2.470	6.120
	185	ROHN 3 STD	37.28	34.054	C	0.135	0.242	3.997	8.614	2.161	5.022
	186	ROHN 3 STD	37.28	34.054	C	0.135	0.242	3.997	8.614	2.161	5.022
	187	ROHN 2.5 STD	30.623	31.233	B	0.135	0.242	4.362	10.497	2.470	6.120
	188	ROHN 3 STD	37.28	34.054	B	0.135	0.242	3.997	8.614	2.161	5.022
	189	ROHN 3 STD	37.28	34.054	B	0.135	0.242	3.997	8.614	2.161	5.022
	190	ROHN 2.5 STD	30.623	31.233	A	0.135	0.242	4.362	10.497	2.470	6.120
	191	ROHN 3 STD	37.28	34.054	A	0.135	0.242	3.997	8.614	2.161	5.022
	192	ROHN 3 STD	37.28	34.054	A	0.135	0.242	3.997	8.614	2.161	5.022
	196	ROHN 2.5 STD	30.623	31.233	C	0.135	0.242	4.103	9.872	2.323	5.756
	197	ROHN 3 STD	37.28	34.054	C	0.135	0.242	3.865	8.329	2.089	4.856
	198	ROHN 3 STD	37.28	34.054	C	0.135	0.242	3.865	8.329	2.089	4.856
	199	ROHN 2.5 STD	30.623	31.233	B	0.135	0.242	4.103	9.872	2.323	5.756
	200	ROHN 3 STD	37.28	34.054	B	0.135	0.242	3.865	8.329	2.089	4.856
	201	ROHN 3 STD	37.28	34.054	B	0.135	0.242	3.865	8.329	2.089	4.856
	202	ROHN 2.5 STD	30.623	31.233	A	0.135	0.242	4.103	9.872	2.323	5.756
	203	ROHN 3 STD	37.28	34.054	A	0.135	0.242	3.865	8.329	2.089	4.856
	204	ROHN 3 STD	37.28	34.054	A	0.135	0.242	3.865	8.329	2.089	4.856
					A		Sum:	53.013	96.590	25.145	56.312
					B			53.013	96.590	25.145	56.312
					C			53.013	96.590	25.145	56.312
T10 60.00-40.00	211	ROHN 2.5 STD	29.557	29.563	C	0.135	0.223	4.959	11.701	2.807	6.774
	212	P3.5x.226	41.123	34.465	C	0.135	0.223	4.879	9.647	2.546	5.585
	213	P3.5x.226	41.123	34.465	C	0.135	0.223	4.879	9.647	2.546	5.585
	214	ROHN 2.5 STD	29.557	29.563	B	0.135	0.223	4.959	11.701	2.807	6.774
	215	P3.5x.226	41.123	34.465	B	0.135	0.223	4.879	9.647	2.546	5.585
	216	P3.5x.226	41.123	34.465	B	0.135	0.223	4.879	9.647	2.546	5.585
	217	ROHN 2.5 STD	29.557	29.563	A	0.135	0.223	4.959	11.701	2.807	6.774
	218	P3.5x.226	41.123	34.465	A	0.135	0.223	4.879	9.647	2.546	5.585
	219	P3.5x.226	41.123	34.465	A	0.135	0.223	4.879	9.647	2.546	5.585
	223	ROHN 2.5 STD	29.557	29.563	C	0.135	0.223	4.662	11.001	2.639	6.368
	224	P3.5x.226	41.123	34.465	C	0.135	0.223	4.720	9.334	2.464	5.403
	225	P3.5x.226	41.123	34.465	C	0.135	0.223	4.720	9.334	2.464	5.403
	226	ROHN 2.5 STD	29.557	29.563	B	0.135	0.223	4.662	11.001	2.639	6.368
	227	P3.5x.226	41.123	34.465	B	0.135	0.223	4.720	9.334	2.464	5.403
	228	P3.5x.226	41.123	34.465	B	0.135	0.223	4.720	9.334	2.464	5.403
	229	ROHN 2.5 STD	29.557	29.563	A	0.135	0.223	4.662	11.001	2.639	6.368
	230	P3.5x.226	41.123	34.465	A	0.135	0.223	4.720	9.334	2.464	5.403
	231	P3.5x.226	41.123	34.465	A	0.135	0.223	4.720	9.334	2.464	5.403
					A		Sum:	28.819	60.663	15.467	35.119
					B			28.819	60.663	15.467	35.119
					C			28.819	60.663	15.467	35.119
T11 40.00-30.00	238	ROHN 2.5 STD	28.468	27.899	C	0.128	0.211	5.258	12.158	2.974	7.009

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft^2	A_r w/Ice ft^2	A_rR_r ft^2	A_rR_r w/Ice ft^2
	239	P3.5x.226	39.608	32.62	C	0.128	0.211	5.041	9.794	2.662	5.647
	240	P3.5x.226	39.608	32.62	C	0.128	0.211	5.041	9.794	2.662	5.647
	241	ROHN 2.5 STD	28.468	27.899	B	0.128	0.211	5.258	12.158	2.974	7.009
	242	P3.5x.226	39.608	32.62	B	0.128	0.211	5.041	9.794	2.662	5.647
	243	P3.5x.226	39.608	32.62	B	0.128	0.211	5.041	9.794	2.662	5.647
	244	ROHN 2.5 STD	28.468	27.899	A	0.128	0.211	5.258	12.158	2.974	7.009
	245	P3.5x.226	39.608	32.62	A	0.128	0.211	5.041	9.794	2.662	5.647
	246	P3.5x.226	39.608	32.62	A	0.128	0.211	5.041	9.794	2.662	5.647
					A		Sum:	15.339	31.745	8.298	18.302
					B			15.339	31.745	8.298	18.302
					C			15.339	31.745	8.298	18.302
T12 30.00-20.00	253	ROHN 2.5 EH	27.477	26.422	C	0.124	0.203	5.558	12.609	3.142	7.251
	254	ROHN 2.5 EH	27.477	26.422	B	0.124	0.203	5.558	12.609	3.142	7.251
	255	ROHN 2.5 EH	27.477	26.422	A	0.124	0.203	5.558	12.609	3.142	7.251
	256	P3.5x.226	38.229	30.98	C	0.124	0.203	5.205	9.951	2.781	5.723
	257	P3.5x.226	38.229	30.98	C	0.124	0.203	5.205	9.951	2.781	5.723
	258	P3.5x.226	38.229	30.98	B	0.124	0.203	5.205	9.951	2.781	5.723
	259	P3.5x.226	38.229	30.98	B	0.124	0.203	5.205	9.951	2.781	5.723
	260	P3.5x.226	38.229	30.98	A	0.124	0.203	5.205	9.951	2.781	5.723
	261	P3.5x.226	38.229	30.98	A	0.124	0.203	5.205	9.951	2.781	5.723
					A		Sum:	15.968	32.511	8.705	18.697
					B			15.968	32.511	8.705	18.697
					C			15.968	32.511	8.705	18.697
T13 20.00-0.00	268	P3.5x.226	36.252	28.15	C	0.111	0.177	8.149	14.929	4.424	8.522
	269	P3.5x.226	36.252	28.15	C	0.111	0.177	7.900	14.473	4.289	8.262
	270	ROHN 1.5 STD	17.22	20.083	C	0.111	0.177	0.940	2.586	0.531	1.476
	271	ROHN 2 STD	21.525	21.908	C	0.111	0.177	2.130	5.115	1.203	2.920
	272	P3.5x.226	36.252	28.15	C	0.111	0.177	7.900	14.473	4.289	8.262
	273	ROHN 1.5 STD	17.22	20.083	C	0.111	0.177	0.940	2.586	0.531	1.476
	274	ROHN 2 STD	21.525	21.908	C	0.111	0.177	2.130	5.115	1.203	2.920
	275	P3.5x.226	36.252	28.15	B	0.111	0.177	8.149	14.929	4.424	8.522
	276	P3.5x.226	36.252	28.15	B	0.111	0.177	7.900	14.473	4.289	8.262
	277	ROHN 1.5 STD	17.22	20.083	B	0.111	0.177	0.940	2.586	0.531	1.476
	278	ROHN 2 STD	21.525	21.908	B	0.111	0.177	2.130	5.115	1.203	2.920
	279	P3.5x.226	36.252	28.15	B	0.111	0.177	7.900	14.473	4.289	8.262
	280	ROHN 1.5 STD	17.22	20.083	B	0.111	0.177	0.940	2.586	0.531	1.476
	281	ROHN 2 STD	21.525	21.908	B	0.111	0.177	2.130	5.115	1.203	2.920
	283	P3.5x.226	36.252	28.15	A	0.111	0.177	8.149	14.929	4.424	8.522
	284	P3.5x.226	36.252	28.15	A	0.111	0.177	7.900	14.473	4.289	8.262
	285	ROHN 1.5 STD	17.22	20.083	A	0.111	0.177	0.940	2.586	0.531	1.476
	286	ROHN 2 STD	21.525	21.908	A	0.111	0.177	2.130	5.115	1.203	2.920
	287	P3.5x.226	36.252	28.15	A	0.111	0.177	7.900	14.473	4.289	8.262
	288	ROHN 1.5 STD	17.22	20.083	A	0.111	0.177	0.940	2.586	0.531	1.476
	289	ROHN 2 STD	21.525	21.908	A	0.111	0.177	2.130	5.115	1.203	2.920
					A		Sum:	30.089	59.277	16.468	33.837
					B			30.089	59.277	16.468	33.837
					C			30.089	59.277	16.468	33.837

222-G Section Verification Tables - No Ice

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T1 180.00-160.00	170.00		1.415	1	1		43	A	0.139	13.494
								B	0.139	13.494
								C	0.139	13.494
T2 160.00-140.00	150.00		1.378	1	1		42	A	0.144	14.923
								B	0.144	14.923
								C	0.144	14.923
T3 140.00-133.33	136.67		1.352	1	1		41	A	0.151	5.663
								B	0.151	5.663
								C	0.151	5.663
T4 133.33-126.67	130.00		1.337	1	1		40	A	0.145	5.774
								B	0.145	5.774
								C	0.145	5.774
T5 126.67-120.00	123.33		1.323	1	1		40	A	0.14	5.895
								B	0.14	5.895
								C	0.14	5.895
T6 120.00-100.00	110.00		1.291	1	1		39	A	0.133	18.400
								B	0.133	18.400
								C	0.133	18.400
T7 100.00-90.00	95.00		1.252	1	1		38	A	0.131	10.043
								B	0.131	10.043
								C	0.131	10.043
T8 90.00-80.00	85.00		1.223	1	1		37	A	0.124	10.301
								B	0.124	10.301
								C	0.124	10.301
T9 80.00-60.00	70.00		1.174	1	1		36	A	0.135	25.145
								B	0.135	25.145
								C	0.135	25.145
T10 60.00-40.00	50.00		1.094	1	1		33	A	0.135	15.467
								B	0.135	15.467
								C	0.135	15.467
T11 40.00-30.00	35.00		1.015	1	1		31	A	0.128	8.298
								B	0.128	8.298
								C	0.128	8.298
T12 30.00-20.00	25.00		0.945	1	1		29	A	0.124	8.705
								B	0.124	8.705
								C	0.124	8.705
T13 20.00-0.00	10.00		0.85	1	1		26	A	0.111	16.468
								B	0.111	16.468
								C	0.111	16.468

222-G Section Verification Tables - Ice

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T1 180.00-160.00	170.00	170.00	1.415	1	1	2.2090	8	A	0.354	40.456
								B	0.354	40.456
								C	0.354	40.456
T2 160.00-140.00	150.00	150.00	1.378	1	1	2.1815	7	A	0.34	43.287
								B	0.34	43.287
								C	0.34	43.287
T3 140.00-133.33	136.67	136.67	1.352	1	1	2.1613	7	A	0.33	15.941
								B	0.33	15.941
								C	0.33	15.941
T4 133.33-126.67	130.00	130.00	1.337	1	1	2.1505	7	A	0.319	16.157
								B	0.319	16.157

Section Elevation *ft*	z_{wind} *ft*	z_{ice} *ft*	K_z	K_h	K_{zt}	t_z *in*	q_z *psf*	Face	e	A_rR_r ft^2
								C	0.319	16.157
T5 126.67-120.00	123.33	123.33	1.323	1	1	2.1392	7	A	0.308	16.413
								B	0.308	16.413
								C	0.308	16.413
T6 120.00-100.00	110.00	110.00	1.291	1	1	2.1149	7	A	0.265	46.244
								B	0.265	46.244
								C	0.265	46.244
T7 100.00-90.00	95.00	95.00	1.252	1	1	2.0841	7	A	0.252	24.538
								B	0.252	24.538
								C	0.252	24.538
T8 90.00-80.00	85.00	85.00	1.223	1	1	2.0611	7	A	0.24	25.023
								B	0.24	25.023
								C	0.24	25.023
T9 80.00-60.00	70.00	70.00	1.174	1	1	2.0214	6	A	0.242	56.312
								B	0.242	56.312
								C	0.242	56.312
T10 60.00-40.00	50.00	50.00	1.094	1	1	1.9546	6	A	0.223	35.119
								B	0.223	35.119
								C	0.223	35.119
T11 40.00-30.00	35.00	35.00	1.015	1	1	1.8861	6	A	0.211	18.302
								B	0.211	18.302
								C	0.211	18.302
T12 30.00-20.00	25.00	25.00	0.945	1	1	1.8237	5	A	0.203	18.697
								B	0.203	18.697
								C	0.203	18.697
T13 20.00-0.00	10.00	10.00	0.85	1	1	1.6640	5	A	0.177	33.837
								B	0.177	33.837
								C	0.177	33.837

222-G Section Verification Tables - Service

Section Elevation *ft*	z_{wind} *ft*	z_{ice} *ft*	K_z	K_h	K_{zt}	t_z *in*	q_z *psf*	Face	e	A_rR_r ft^2
T1 180.00-160.00	170.00		1.415	1	1		11	A	0.139	13.494
								B	0.139	13.494
								C	0.139	13.494
T2 160.00-140.00	150.00		1.378	1	1		11	A	0.144	14.923
								B	0.144	14.923
								C	0.144	14.923
T3 140.00-133.33	136.67		1.352	1	1		11	A	0.151	5.663
								B	0.151	5.663
								C	0.151	5.663
T4 133.33-126.67	130.00		1.337	1	1		10	A	0.145	5.774
								B	0.145	5.774
								C	0.145	5.774
T5 126.67-120.00	123.33		1.323	1	1		10	A	0.14	5.895
								B	0.14	5.895
								C	0.14	5.895
T6 120.00-100.00	110.00		1.291	1	1		10	A	0.133	18.400
								B	0.133	18.400
								C	0.133	18.400
T7 100.00-90.00	95.00		1.252	1	1		10	A	0.131	10.043
								B	0.131	10.043
								C	0.131	10.043
T8 90.00-80.00	85.00		1.223	1	1		10	A	0.124	10.301

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft^2
								B	0.124	10.301
								C	0.124	10.301
T9 80.00-60.00	70.00		1.174	1	1		9	A	0.135	25.145
								B	0.135	25.145
								C	0.135	25.145
T10 60.00-40.00	50.00		1.094	1	1		9	A	0.135	15.467
								B	0.135	15.467
								C	0.135	15.467
T11 40.00-30.00	35.00		1.015	1	1		8	A	0.128	8.298
								B	0.128	8.298
								C	0.128	8.298
T12 30.00-20.00	25.00		0.945	1	1		7	A	0.124	8.705
								B	0.124	8.705
								C	0.124	8.705
T13 20.00-0.00	10.00		0.85	1	1		7	A	0.111	16.468
								B	0.111	16.468
								C	0.111	16.468

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1 180.00-160.00	170.00	1.415	43	177.503	A	0.000	24.699	11.667	47.24	33.340	0.000
					B	0.000	24.699		47.24	0.000	0.000
					C	0.000	24.699		47.24	0.000	0.000
T2 160.00-140.00	150.00	1.378	42	200.850	A	0.000	28.825	15.027	52.13	77.030	0.000
					B	0.000	28.825		52.13	0.000	0.000
					C	0.000	28.825		52.13	0.000	0.000
T3 140.00-133.33	136.67	1.352	41	76.803	A	0.000	11.577	6.192	53.49	25.677	0.000
					B	0.000	11.577		53.49	0.000	0.000
					C	0.000	11.577		53.49	0.000	0.000
T4 133.33-126.67	130.00	1.337	40	81.431	A	0.000	11.792	6.192	52.51	25.677	0.000
					B	0.000	11.792		52.51	11.356	0.000
					C	0.000	11.792		52.51	0.000	0.000
T5 126.67-120.00	123.33	1.323	40	86.060	A	0.000	12.020	6.192	51.52	25.677	0.000
					B	0.000	12.020		51.52	30.128	0.000
					C	0.000	12.020		51.52	0.000	0.000
T6 120.00-100.00	110.00	1.291	39	289.399	A	0.000	38.601	22.130	57.33	78.290	0.000
					B	0.000	38.601		57.33	108.557	0.000
					C	0.000	38.601		57.33	0.000	0.000
T7 100.00-90.00	95.00	1.252	38	162.540	A	0.000	21.227	11.074	52.17	39.775	0.000
					B	0.000	21.227		52.17	54.279	0.000
					C	0.000	21.227		52.17	0.000	0.000
T8 90.00-80.00	85.00	1.223	37	175.715	A	0.000	21.747	11.074	50.92	39.775	0.000
					B	0.000	21.747		50.92	54.279	0.000
					C	0.000	21.747		50.92	0.000	0.000
T9 80.00-60.00	70.00	1.174	36	392.943	A	0.000	53.013	28.825	54.37	79.550	0.000
					B	0.000	53.013		54.37	108.557	0.000
					C	0.000	53.013		54.37	0.000	0.000
T10 60.00-40.00	50.00	1.094	33	440.971	A	30.496	28.819	30.496	51.41	79.550	0.000
					B	30.496	28.819		51.41	108.557	0.000
					C	30.496	28.819		51.41	0.000	0.000

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
T11 40.00-30.00	35.00	1.015	31	239.236	A	15.248	15.339	15.248	49.85	39.775	0.000
					B	15.248	15.339		49.85	54.279	0.000
					C	15.248	15.339		49.85	0.000	0.000
T12 30.00-20.00	25.00	0.945	29	251.736	A	15.248	15.968	15.248	48.85	39.775	0.000
					B	15.248	15.968		48.85	54.279	0.000
					C	15.248	15.968		48.85	0.000	0.000
T13 20.00-0.00	10.00	0.85	26	541.368	A	30.078	30.089	30.078	49.99	79.550	0.000
					B	30.078	30.089		49.99	108.557	0.000
					C	30.078	30.089		49.99	0.000	0.000

Tower Pressure - With Ice

$G_H = 0.850$

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	1.415	8	2.2090	184.867	A	0.000	65.497	26.393	40.30	94.841	0.000
						B	0.000	65.497		40.30	0.000	0.000
						C	0.000	65.497		40.30	0.000	0.000
T2 160.00-140.00	150.00	1.378	7	2.1815	208.132	A	0.000	70.700	29.597	41.86	203.570	0.000
						B	0.000	70.700		41.86	0.000	0.000
						C	0.000	70.700		41.86	0.000	0.000
T3 140.00-133.33	136.67	1.352	7	2.1613	79.207	A	0.000	26.175	11.004	42.04	67.602	0.000
						B	0.000	26.175		42.04	0.000	0.000
						C	0.000	26.175		42.04	0.000	0.000
T4 133.33-126.67	130.00	1.337	7	2.1505	83.824	A	0.000	26.708	10.980	41.11	67.467	0.000
						B	0.000	26.708		41.11	33.185	0.000
						C	0.000	26.708		41.11	0.000	0.000
T5 126.67-120.00	123.33	1.323	7	2.1392	88.440	A	0.000	27.281	10.955	40.15	67.325	0.000
						B	0.000	27.281		40.15	65.734	0.000
						C	0.000	27.281		40.15	0.000	0.000
T6 120.00-100.00	110.00	1.291	7	2.1149	296.460	A	0.000	78.538	36.259	46.17	210.826	0.000
						B	0.000	78.538		46.17	226.990	0.000
						C	0.000	78.538		46.17	0.000	0.000
T7 100.00-90.00	95.00	1.252	7	2.0841	166.021	A	0.000	41.903	18.041	43.05	109.609	0.000
						B	0.000	41.903		43.05	112.784	0.000
						C	0.000	41.903		43.05	0.000	0.000
T8 90.00-80.00	85.00	1.223	7	2.0611	179.158	A	0.000	42.954	17.964	41.82	109.094	0.000
						B	0.000	42.954		41.82	112.252	0.000
						C	0.000	42.954		41.82	0.000	0.000
T9 80.00-60.00	70.00	1.174	6	2.0214	399.694	A	0.000	96.590	42.336	43.83	216.416	0.000
						B	0.000	96.590		43.83	222.674	0.000
						C	0.000	96.590		43.83	0.000	0.000
T10 60.00-40.00	50.00	1.094	6	1.9546	447.499	A	39.205	60.663	39.205	39.26	213.430	0.000
						B	39.205	60.663		39.26	219.587	0.000
						C	39.205	60.663		39.26	0.000	0.000
T11 40.00-30.00	35.00	1.015	6	1.8861	242.385	A	19.450	31.745	19.450	37.99	105.188	0.000
						B	19.450	31.745		37.99	108.214	0.000
						C	19.450	31.745		37.99	0.000	0.000
T12 30.00-20.00	25.00	0.945	5	1.8237	254.781	A	19.311	32.511	19.311	37.26	103.797	0.000
						B	19.311	32.511		37.26	106.776	0.000
						C	19.311	32.511		37.26	0.000	0.000
T13 20.00-0.00	10.00	0.85	5	1.6640	546.926	A	37.493	59.277	37.493	38.74	200.491	0.000
						B	37.493	59.277		38.74	206.196	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
						C	37.493	59.277		38.74	0.000	0.000

Tower Pressure - Service

$G_H = 0.850$

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	1.415	11	177.503	A	0.000	24.699	11.667	47.24	33.340	0.000
					B	0.000	24.699		47.24	0.000	0.000
					C	0.000	24.699		47.24	0.000	0.000
T2 160.00-140.00	150.00	1.378	11	200.850	A	0.000	28.825	15.027	52.13	77.030	0.000
					B	0.000	28.825		52.13	0.000	0.000
					C	0.000	28.825		52.13	0.000	0.000
T3 140.00-133.33	136.67	1.352	11	76.803	A	0.000	11.577	6.192	53.49	25.677	0.000
					B	0.000	11.577		53.49	0.000	0.000
					C	0.000	11.577		53.49	0.000	0.000
T4 133.33-126.67	130.00	1.337	10	81.431	A	0.000	11.792	6.192	52.51	25.677	0.000
					B	0.000	11.792		52.51	11.356	0.000
					C	0.000	11.792		52.51	0.000	0.000
T5 126.67-120.00	123.33	1.323	10	86.060	A	0.000	12.020	6.192	51.52	25.677	0.000
					B	0.000	12.020		51.52	30.128	0.000
					C	0.000	12.020		51.52	0.000	0.000
T6 120.00-100.00	110.00	1.291	10	289.399	A	0.000	38.601	22.130	57.33	78.290	0.000
					B	0.000	38.601		57.33	108.557	0.000
					C	0.000	38.601		57.33	0.000	0.000
T7 100.00-90.00	95.00	1.252	10	162.540	A	0.000	21.227	11.074	52.17	39.775	0.000
					B	0.000	21.227		52.17	54.279	0.000
					C	0.000	21.227		52.17	0.000	0.000
T8 90.00-80.00	85.00	1.223	10	175.715	A	0.000	21.747	11.074	50.92	39.775	0.000
					B	0.000	21.747		50.92	54.279	0.000
					C	0.000	21.747		50.92	0.000	0.000
T9 80.00-60.00	70.00	1.174	9	392.943	A	0.000	53.013	28.825	54.37	79.550	0.000
					B	0.000	53.013		54.37	108.557	0.000
					C	0.000	53.013		54.37	0.000	0.000
T10 60.00-40.00	50.00	1.094	9	440.971	A	30.496	28.819	30.496	51.41	79.550	0.000
					B	30.496	28.819		51.41	108.557	0.000
					C	30.496	28.819		51.41	0.000	0.000
T11 40.00-30.00	35.00	1.015	8	239.236	A	15.248	15.339	15.248	49.85	39.775	0.000
					B	15.248	15.339		49.85	54.279	0.000
					C	15.248	15.339		49.85	0.000	0.000
T12 30.00-20.00	25.00	0.945	7	251.736	A	15.248	15.968	15.248	48.85	39.775	0.000
					B	15.248	15.968		48.85	54.279	0.000
					C	15.248	15.968		48.85	0.000	0.000
T13 20.00-0.00	10.00	0.85	7	541.368	A	30.078	30.089	30.078	49.99	79.550	0.000
					B	30.078	30.089		49.99	108.557	0.000
					C	30.078	30.089		49.99	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	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.13	1.25	A	0.139	2.812	43	1	1	13.494	2.11	105.53	C
			B	0.139	2.812		1	1	13.494			
			C	0.139	2.812		1	1	13.494			
T2 160.00-140.00	0.40	1.50	A	0.144	2.796	42	1	1	14.923	3.12	155.98	C
			B	0.144	2.796		1	1	14.923			
			C	0.144	2.796		1	1	14.923			
T3 140.00-133.33	0.13	0.83	A	0.151	2.769	41	1	1	5.663	1.08	162.22	C
			B	0.151	2.769		1	1	5.663			
			C	0.151	2.769		1	1	5.663			
T4 133.33-126.67	0.18	0.84	A	0.145	2.791	40	1	1	5.774	1.32	197.93	C
			B	0.145	2.791		1	1	5.774			
			C	0.145	2.791		1	1	5.774			
T5 126.67-120.00	0.26	1.08	A	0.14	2.81	40	1	1	5.895	1.70	255.57	C
			B	0.14	2.81		1	1	5.895			
			C	0.14	2.81		1	1	5.895			
T6 120.00-100.00	0.85	3.82	A	0.133	2.834	39	1	1	18.400	5.46	272.93	C
			B	0.133	2.834		1	1	18.400			
			C	0.133	2.834		1	1	18.400			
T7 100.00-90.00	0.43	1.68	A	0.131	2.844	38	1	1	10.043	2.74	273.89	C
			B	0.131	2.844		1	1	10.043			
			C	0.131	2.844		1	1	10.043			
T8 90.00-80.00	0.43	1.72	A	0.124	2.87	37	1	1	10.301	2.71	270.71	C
			B	0.124	2.87		1	1	10.301			
			C	0.124	2.87		1	1	10.301			
T9 80.00-60.00	0.85	4.10	A	0.135	2.828	36	1	1	25.145	5.56	277.95	C
			B	0.135	2.828		1	1	25.145			
			C	0.135	2.828		1	1	25.145			
T10 60.00-40.00	0.85	5.50	A	0.135	2.829	33	1	1	45.962	6.84	341.90	C
			B	0.135	2.829		1	1	45.962			
			C	0.135	2.829		1	1	45.962			
T11 40.00-30.00	0.43	2.84	A	0.128	2.855	31	1	1	23.546	3.23	322.90	C
			B	0.128	2.855		1	1	23.546			
			C	0.128	2.855		1	1	23.546			
T12 30.00-20.00	0.43	3.03	A	0.124	2.869	29	1	1	23.953	3.05	304.51	C
			B	0.124	2.869		1	1	23.953			
			C	0.124	2.869		1	1	23.953			
T13 20.00-0.00	0.85	6.02	A	0.111	2.92	26	1	1	46.546	5.44	272.10	C
			B	0.111	2.92		1	1	46.546			
			C	0.111	2.92		1	1	46.546			
Sum Weight:	6.19	34.20						OTM	3421.56 kip-ft	44.35		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.13	1.25	A	0.139	2.812	43	0.825	1	13.494	2.11	105.53	C
			B	0.139	2.812		0.825	1	13.494			
			C	0.139	2.812		0.825	1	13.494			
T2 160.00-140.00	0.40	1.50	A	0.144	2.796	42	0.825	1	14.923	3.12	155.98	C
			B	0.144	2.796		0.825	1	14.923			
			C	0.144	2.796		0.825	1	14.923			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T3 140.00-133.33	0.13	0.83	A	0.151	2.769	41	0.825	1	5.663	1.08	162.22	C
			B	0.151	2.769		0.825	1	5.663			
			C	0.151	2.769		0.825	1	5.663			
T4 133.33-126.67	0.18	0.84	A	0.145	2.791	40	0.825	1	5.774	1.32	197.93	C
			B	0.145	2.791		0.825	1	5.774			
			C	0.145	2.791		0.825	1	5.774			
T5 126.67-120.00	0.26	1.08	A	0.14	2.81	40	0.825	1	5.895	1.70	255.57	C
			B	0.14	2.81		0.825	1	5.895			
			C	0.14	2.81		0.825	1	5.895			
T6 120.00-100.00	0.85	3.82	A	0.133	2.834	39	0.825	1	18.400	5.46	272.93	C
			B	0.133	2.834		0.825	1	18.400			
			C	0.133	2.834		0.825	1	18.400			
T7 100.00-90.00	0.43	1.68	A	0.131	2.844	38	0.825	1	10.043	2.74	273.89	C
			B	0.131	2.844		0.825	1	10.043			
			C	0.131	2.844		0.825	1	10.043			
T8 90.00-80.00	0.43	1.72	A	0.124	2.87	37	0.825	1	10.301	2.71	270.71	C
			B	0.124	2.87		0.825	1	10.301			
			C	0.124	2.87		0.825	1	10.301			
T9 80.00-60.00	0.85	4.10	A	0.135	2.828	36	0.825	1	25.145	5.56	277.95	C
			B	0.135	2.828		0.825	1	25.145			
			C	0.135	2.828		0.825	1	25.145			
T10 60.00-40.00	0.85	5.50	A	0.135	2.829	33	0.825	1	40.626	6.41	320.65	C
			B	0.135	2.829		0.825	1	40.626			
			C	0.135	2.829		0.825	1	40.626			
T11 40.00-30.00	0.43	2.84	A	0.128	2.855	31	0.825	1	20.878	3.03	303.01	C
			B	0.128	2.855		0.825	1	20.878			
			C	0.128	2.855		0.825	1	20.878			
T12 30.00-20.00	0.43	3.03	A	0.124	2.869	29	0.825	1	21.285	2.86	285.88	C
			B	0.124	2.869		0.825	1	21.285			
			C	0.124	2.869		0.825	1	21.285			
T13 20.00-0.00	0.85	6.02	A	0.111	2.92	26	0.825	1	41.283	5.11	255.29	C
			B	0.111	2.92		0.825	1	41.283			
			C	0.111	2.92		0.825	1	41.283			
Sum Weight:	6.19	34.20						OTM	3385.32 kip-ft	43.21		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.13	1.25	A	0.139	2.812	43	0.8	1	13.494	2.11	105.53	C
			B	0.139	2.812		0.8	1	13.494			
			C	0.139	2.812		0.8	1	13.494			
T2 160.00-140.00	0.40	1.50	A	0.144	2.796	42	0.8	1	14.923	3.12	155.98	C
			B	0.144	2.796		0.8	1	14.923			
			C	0.144	2.796		0.8	1	14.923			
T3 140.00-133.33	0.13	0.83	A	0.151	2.769	41	0.8	1	5.663	1.08	162.22	C
			B	0.151	2.769		0.8	1	5.663			
			C	0.151	2.769		0.8	1	5.663			
T4 133.33-126.67	0.18	0.84	A	0.145	2.791	40	0.8	1	5.774	1.32	197.93	C
			B	0.145	2.791		0.8	1	5.774			
			C	0.145	2.791		0.8	1	5.774			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T5 126.67-120.00	0.26	1.08	A	0.14	2.81	40	0.8	1	5.895	1.70	255.57	C
			B	0.14	2.81		0.8	1	5.895			
			C	0.14	2.81		0.8	1	5.895			
T6 120.00-100.00	0.85	3.82	A	0.133	2.834	39	0.8	1	18.400	5.46	272.93	C
			B	0.133	2.834		0.8	1	18.400			
			C	0.133	2.834		0.8	1	18.400			
T7 100.00-90.00	0.43	1.68	A	0.131	2.844	38	0.8	1	10.043	2.74	273.89	C
			B	0.131	2.844		0.8	1	10.043			
			C	0.131	2.844		0.8	1	10.043			
T8 90.00-80.00	0.43	1.72	A	0.124	2.87	37	0.8	1	10.301	2.71	270.71	C
			B	0.124	2.87		0.8	1	10.301			
			C	0.124	2.87		0.8	1	10.301			
T9 80.00-60.00	0.85	4.10	A	0.135	2.828	36	0.8	1	25.145	5.56	277.95	C
			B	0.135	2.828		0.8	1	25.145			
			C	0.135	2.828		0.8	1	25.145			
T10 60.00-40.00	0.85	5.50	A	0.135	2.829	33	0.8	1	39.863	6.35	317.61	C
			B	0.135	2.829		0.8	1	39.863			
			C	0.135	2.829		0.8	1	39.863			
T11 40.00-30.00	0.43	2.84	A	0.128	2.855	31	0.8	1	20.497	3.00	300.17	C
			B	0.128	2.855		0.8	1	20.497			
			C	0.128	2.855		0.8	1	20.497			
T12 30.00-20.00	0.43	3.03	A	0.124	2.869	29	0.8	1	20.904	2.83	283.22	C
			B	0.124	2.869		0.8	1	20.904			
			C	0.124	2.869		0.8	1	20.904			
T13 20.00-0.00	0.85	6.02	A	0.111	2.92	26	0.8	1	40.531	5.06	252.89	C
			B	0.111	2.92		0.8	1	40.531			
			C	0.111	2.92		0.8	1	40.531			
Sum Weight:	6.19	34.20						OTM	3380.15 kip-ft	43.04		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.13	1.25	A	0.139	2.812	43	0.85	1	13.494	2.11	105.53	C
			B	0.139	2.812		0.85	1	13.494			
			C	0.139	2.812		0.85	1	13.494			
T2 160.00-140.00	0.40	1.50	A	0.144	2.796	42	0.85	1	14.923	3.12	155.98	C
			B	0.144	2.796		0.85	1	14.923			
			C	0.144	2.796		0.85	1	14.923			
T3 140.00-133.33	0.13	0.83	A	0.151	2.769	41	0.85	1	5.663	1.08	162.22	C
			B	0.151	2.769		0.85	1	5.663			
			C	0.151	2.769		0.85	1	5.663			
T4 133.33-126.67	0.18	0.84	A	0.145	2.791	40	0.85	1	5.774	1.32	197.93	C
			B	0.145	2.791		0.85	1	5.774			
			C	0.145	2.791		0.85	1	5.774			
T5 126.67-120.00	0.26	1.08	A	0.14	2.81	40	0.85	1	5.895	1.70	255.57	C
			B	0.14	2.81		0.85	1	5.895			
			C	0.14	2.81		0.85	1	5.895			
T6 120.00-100.00	0.85	3.82	A	0.133	2.834	39	0.85	1	18.400	5.46	272.93	C
			B	0.133	2.834		0.85	1	18.400			
			C	0.133	2.834		0.85	1	18.400			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T7 100.00-90.00	0.43	1.68	A	0.131	2.844	38	0.85	1	10.043	2.74	273.89	C
			B	0.131	2.844		0.85	1	10.043			
			C	0.131	2.844		0.85	1	10.043			
T8 90.00-80.00	0.43	1.72	A	0.124	2.87	37	0.85	1	10.301	2.71	270.71	C
			B	0.124	2.87		0.85	1	10.301			
			C	0.124	2.87		0.85	1	10.301			
T9 80.00-60.00	0.85	4.10	A	0.135	2.828	36	0.85	1	25.145	5.56	277.95	C
			B	0.135	2.828		0.85	1	25.145			
			C	0.135	2.828		0.85	1	25.145			
T10 60.00-40.00	0.85	5.50	A	0.135	2.829	33	0.85	1	41.388	6.47	323.68	C
			B	0.135	2.829		0.85	1	41.388			
			C	0.135	2.829		0.85	1	41.388			
T11 40.00-30.00	0.43	2.84	A	0.128	2.855	31	0.85	1	21.259	3.06	305.85	C
			B	0.128	2.855		0.85	1	21.259			
			C	0.128	2.855		0.85	1	21.259			
T12 30.00-20.00	0.43	3.03	A	0.124	2.869	29	0.85	1	21.666	2.89	288.54	C
			B	0.124	2.869		0.85	1	21.666			
			C	0.124	2.869		0.85	1	21.666			
T13 20.00-0.00	0.85	6.02	A	0.111	2.92	26	0.85	1	42.035	5.15	257.70	C
			B	0.111	2.92		0.85	1	42.035			
			C	0.111	2.92		0.85	1	42.035			
Sum Weight:	6.19	34.20						OTM	3390.50 kip-ft	43.37		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 180.00-160.00	1.83	5.32	A	0.354	2.162	8	1	1	40.456	0.94	47.23	C
			B	0.354	2.162		1	1	40.456			
			C	0.354	2.162		1	1	40.456			
T2 160.00-140.00	3.94	5.86	A	0.34	2.196	7	1	1	43.287	1.38	69.22	C
			B	0.34	2.196		1	1	43.287			
			C	0.34	2.196		1	1	43.287			
T3 140.00-133.33	1.30	2.46	A	0.33	2.218	7	1	1	15.941	0.47	71.17	C
			B	0.33	2.218		1	1	15.941			
			C	0.33	2.218		1	1	15.941			
T4 133.33-126.67	1.83	2.52	A	0.319	2.248	7	1	1	16.157	0.60	89.71	C
			B	0.319	2.248		1	1	16.157			
			C	0.319	2.248		1	1	16.157			
T5 126.67-120.00	2.62	2.80	A	0.308	2.274	7	1	1	16.413	0.72	107.48	C
			B	0.308	2.274		1	1	16.413			
			C	0.308	2.274		1	1	16.413			
T6 120.00-100.00	8.70	8.60	A	0.265	2.393	7	1	1	46.244	2.23	111.47	C
			B	0.265	2.393		1	1	46.244			
			C	0.265	2.393		1	1	46.244			
T7 100.00-90.00	4.36	4.29	A	0.252	2.43	7	1	1	24.538	1.12	111.78	C
			B	0.252	2.43		1	1	24.538			
			C	0.252	2.43		1	1	24.538			
T8 90.00-80.00	4.32	4.40	A	0.24	2.469	7	1	1	25.023	1.10	110.04	C
			B	0.24	2.469		1	1	25.023			
			C	0.24	2.469		1	1	25.023			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T9 80.00-60.00	8.49	10.15	A	0.242	2.463	6	1	1	56.312	2.18	109.16	C
			B	0.242	2.463		1	1	56.312			
			C	0.242	2.463		1	1	56.312			
T10 60.00-40.00	8.25	12.99	A	0.223	2.52	6	1	1	74.324	2.26	113.07	C
			B	0.223	2.52		1	1	74.324			
			C	0.223	2.52		1	1	74.324			
T11 40.00-30.00	4.00	6.58	A	0.211	2.559	6	1	1	37.752	1.05	105.40	C
			B	0.211	2.559		1	1	37.752			
			C	0.211	2.559		1	1	37.752			
T12 30.00-20.00	3.89	6.73	A	0.203	2.585	5	1	1	38.008	0.98	98.16	C
			B	0.203	2.585		1	1	38.008			
			C	0.203	2.585		1	1	38.008			
T13 20.00-0.00	7.23	11.95	A	0.177	2.675	5	1	1	71.329	1.71	85.45	C
			B	0.177	2.675		1	1	71.329			
			C	0.177	2.675		1	1	71.329			
Sum Weight:	60.78	84.66						OTM	1388.58 kip-ft	16.75		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 180.00-160.00	1.83	5.32	A	0.354	2.162	8	0.825	1	40.456	0.94	47.23	C
			B	0.354	2.162		0.825	1	40.456			
			C	0.354	2.162		0.825	1	40.456			
T2 160.00-140.00	3.94	5.86	A	0.34	2.196	7	0.825	1	43.287	1.38	69.22	C
			B	0.34	2.196		0.825	1	43.287			
			C	0.34	2.196		0.825	1	43.287			
T3 140.00-133.33	1.30	2.46	A	0.33	2.218	7	0.825	1	15.941	0.47	71.17	C
			B	0.33	2.218		0.825	1	15.941			
			C	0.33	2.218		0.825	1	15.941			
T4 133.33-126.67	1.83	2.52	A	0.319	2.248	7	0.825	1	16.157	0.60	89.71	C
			B	0.319	2.248		0.825	1	16.157			
			C	0.319	2.248		0.825	1	16.157			
T5 126.67-120.00	2.62	2.80	A	0.308	2.274	7	0.825	1	16.413	0.72	107.48	C
			B	0.308	2.274		0.825	1	16.413			
			C	0.308	2.274		0.825	1	16.413			
T6 120.00-100.00	8.70	8.60	A	0.265	2.393	7	0.825	1	46.244	2.23	111.47	C
			B	0.265	2.393		0.825	1	46.244			
			C	0.265	2.393		0.825	1	46.244			
T7 100.00-90.00	4.36	4.29	A	0.252	2.43	7	0.825	1	24.538	1.12	111.78	C
			B	0.252	2.43		0.825	1	24.538			
			C	0.252	2.43		0.825	1	24.538			
T8 90.00-80.00	4.32	4.40	A	0.24	2.469	7	0.825	1	25.023	1.10	110.04	C
			B	0.24	2.469		0.825	1	25.023			
			C	0.24	2.469		0.825	1	25.023			
T9 80.00-60.00	8.49	10.15	A	0.242	2.463	6	0.825	1	56.312	2.18	109.16	C
			B	0.242	2.463		0.825	1	56.312			
			C	0.242	2.463		0.825	1	56.312			
T10 60.00-40.00	8.25	12.99	A	0.223	2.52	6	0.825	1	67.463	2.17	108.70	C
			B	0.223	2.52		0.825	1	67.463			
			C	0.223	2.52		0.825	1	67.463			

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	C_F	q_z *psf*	D_F	D_R	A_E ft^2	*F* *K*	*w* *plf*	*Ctrl. Face*
T11 40.00-30.00	4.00	6.58	A	0.211	2.559	6	0.825	1	34.349	1.01	101.31	C
			B	0.211	2.559		0.825	1	34.349			
			C	0.211	2.559		0.825	1	34.349			
T12 30.00-20.00	3.89	6.73	A	0.203	2.585	5	0.825	1	34.628	0.94	94.34	C
			B	0.203	2.585		0.825	1	34.628			
			C	0.203	2.585		0.825	1	34.628			
T13 20.00-0.00	7.23	11.95	A	0.177	2.675	5	0.825	1	64.768	1.64	82.00	C
			B	0.177	2.675		0.825	1	64.768			
			C	0.177	2.675		0.825	1	64.768			
Sum Weight:	60.78	84.66						OTM	1381.13 kip-ft	16.52		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	C_F	q_z *psf*	D_F	D_R	A_E ft^2	*F* *K*	*w* *plf*	*Ctrl. Face*
T1 180.00-160.00	1.83	5.32	A	0.354	2.162	8	0.8	1	40.456	0.94	47.23	C
			B	0.354	2.162		0.8	1	40.456			
			C	0.354	2.162		0.8	1	40.456			
T2 160.00-140.00	3.94	5.86	A	0.34	2.196	7	0.8	1	43.287	1.38	69.22	C
			B	0.34	2.196		0.8	1	43.287			
			C	0.34	2.196		0.8	1	43.287			
T3 140.00-133.33	1.30	2.46	A	0.33	2.218	7	0.8	1	15.941	0.47	71.17	C
			B	0.33	2.218		0.8	1	15.941			
			C	0.33	2.218		0.8	1	15.941			
T4 133.33-126.67	1.83	2.52	A	0.319	2.248	7	0.8	1	16.157	0.60	89.71	C
			B	0.319	2.248		0.8	1	16.157			
			C	0.319	2.248		0.8	1	16.157			
T5 126.67-120.00	2.62	2.80	A	0.308	2.274	7	0.8	1	16.413	0.72	107.48	C
			B	0.308	2.274		0.8	1	16.413			
			C	0.308	2.274		0.8	1	16.413			
T6 120.00-100.00	8.70	8.60	A	0.265	2.393	7	0.8	1	46.244	2.23	111.47	C
			B	0.265	2.393		0.8	1	46.244			
			C	0.265	2.393		0.8	1	46.244			
T7 100.00-90.00	4.36	4.29	A	0.252	2.43	7	0.8	1	24.538	1.12	111.78	C
			B	0.252	2.43		0.8	1	24.538			
			C	0.252	2.43		0.8	1	24.538			
T8 90.00-80.00	4.32	4.40	A	0.24	2.469	7	0.8	1	25.023	1.10	110.04	C
			B	0.24	2.469		0.8	1	25.023			
			C	0.24	2.469		0.8	1	25.023			
T9 80.00-60.00	8.49	10.15	A	0.242	2.463	6	0.8	1	56.312	2.18	109.16	C
			B	0.242	2.463		0.8	1	56.312			
			C	0.242	2.463		0.8	1	56.312			
T10 60.00-40.00	8.25	12.99	A	0.223	2.52	6	0.8	1	66.483	2.16	108.08	C
			B	0.223	2.52		0.8	1	66.483			
			C	0.223	2.52		0.8	1	66.483			
T11 40.00-30.00	4.00	6.58	A	0.211	2.559	6	0.8	1	33.862	1.01	100.73	C
			B	0.211	2.559		0.8	1	33.862			
			C	0.211	2.559		0.8	1	33.862			
T12 30.00-20.00	3.89	6.73	A	0.203	2.585	5	0.8	1	34.146	0.94	93.80	C
			B	0.203	2.585		0.8	1	34.146			
			C	0.203	2.585		0.8	1	34.146			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T13 20.00-0.00	7.23	11.95	A	0.177	2.675	5	0.8	1	63.831	1.63	81.51	C
			B	0.177	2.675		0.8	1	63.831			
			C	0.177	2.675		0.8	1	63.831			
Sum Weight:	60.78	84.66						OTM	1380.06 kip-ft	16.49		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 180.00-160.00	1.83	5.32	A	0.354	2.162	8	0.85	1	40.456	0.94	47.23	C
			B	0.354	2.162		0.85	1	40.456			
			C	0.354	2.162		0.85	1	40.456			
T2 160.00-140.00	3.94	5.86	A	0.34	2.196	7	0.85	1	43.287	1.38	69.22	C
			B	0.34	2.196		0.85	1	43.287			
			C	0.34	2.196		0.85	1	43.287			
T3 140.00-133.33	1.30	2.46	A	0.33	2.218	7	0.85	1	15.941	0.47	71.17	C
			B	0.33	2.218		0.85	1	15.941			
			C	0.33	2.218		0.85	1	15.941			
T4 133.33-126.67	1.83	2.52	A	0.319	2.248	7	0.85	1	16.157	0.60	89.71	C
			B	0.319	2.248		0.85	1	16.157			
			C	0.319	2.248		0.85	1	16.157			
T5 126.67-120.00	2.62	2.80	A	0.308	2.274	7	0.85	1	16.413	0.72	107.48	C
			B	0.308	2.274		0.85	1	16.413			
			C	0.308	2.274		0.85	1	16.413			
T6 120.00-100.00	8.70	8.60	A	0.265	2.393	7	0.85	1	46.244	2.23	111.47	C
			B	0.265	2.393		0.85	1	46.244			
			C	0.265	2.393		0.85	1	46.244			
T7 100.00-90.00	4.36	4.29	A	0.252	2.43	7	0.85	1	24.538	1.12	111.78	C
			B	0.252	2.43		0.85	1	24.538			
			C	0.252	2.43		0.85	1	24.538			
T8 90.00-80.00	4.32	4.40	A	0.24	2.469	7	0.85	1	25.023	1.10	110.04	C
			B	0.24	2.469		0.85	1	25.023			
			C	0.24	2.469		0.85	1	25.023			
T9 80.00-60.00	8.49	10.15	A	0.242	2.463	6	0.85	1	56.312	2.18	109.16	C
			B	0.242	2.463		0.85	1	56.312			
			C	0.242	2.463		0.85	1	56.312			
T10 60.00-40.00	8.25	12.99	A	0.223	2.52	6	0.85	1	68.443	2.19	109.32	C
			B	0.223	2.52		0.85	1	68.443			
			C	0.223	2.52		0.85	1	68.443			
T11 40.00-30.00	4.00	6.58	A	0.211	2.559	6	0.85	1	34.835	1.02	101.90	C
			B	0.211	2.559		0.85	1	34.835			
			C	0.211	2.559		0.85	1	34.835			
T12 30.00-20.00	3.89	6.73	A	0.203	2.585	5	0.85	1	35.111	0.95	94.89	C
			B	0.203	2.585		0.85	1	35.111			
			C	0.203	2.585		0.85	1	35.111			
T13 20.00-0.00	7.23	11.95	A	0.177	2.675	5	0.85	1	65.705	1.65	82.49	C
			B	0.177	2.675		0.85	1	65.705			
			C	0.177	2.675		0.85	1	65.705			
Sum Weight:	60.78	84.66						OTM	1382.19 kip-ft	16.55		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.13	1.25	A	0.139	2.812	11	1	1	13.494	0.55	27.30	C
			B	0.139	2.812		1	1	13.494			
			C	0.139	2.812		1	1	13.494			
T2 160.00-140.00	0.40	1.50	A	0.144	2.796	11	1	1	14.923	0.81	40.35	C
			B	0.144	2.796		1	1	14.923			
			C	0.144	2.796		1	1	14.923			
T3 140.00-133.33	0.13	0.83	A	0.151	2.769	11	1	1	5.663	0.28	41.97	C
			B	0.151	2.769		1	1	5.663			
			C	0.151	2.769		1	1	5.663			
T4 133.33-126.67	0.18	0.84	A	0.145	2.791	10	1	1	5.774	0.34	51.21	C
			B	0.145	2.791		1	1	5.774			
			C	0.145	2.791		1	1	5.774			
T5 126.67-120.00	0.26	1.08	A	0.14	2.81	10	1	1	5.895	0.44	66.12	C
			B	0.14	2.81		1	1	5.895			
			C	0.14	2.81		1	1	5.895			
T6 120.00-100.00	0.85	3.82	A	0.133	2.834	10	1	1	18.400	1.41	70.61	C
			B	0.133	2.834		1	1	18.400			
			C	0.133	2.834		1	1	18.400			
T7 100.00-90.00	0.43	1.68	A	0.131	2.844	10	1	1	10.043	0.71	70.86	C
			B	0.131	2.844		1	1	10.043			
			C	0.131	2.844		1	1	10.043			
T8 90.00-80.00	0.43	1.72	A	0.124	2.87	10	1	1	10.301	0.70	70.04	C
			B	0.124	2.87		1	1	10.301			
			C	0.124	2.87		1	1	10.301			
T9 80.00-60.00	0.85	4.10	A	0.135	2.828	9	1	1	25.145	1.44	71.91	C
			B	0.135	2.828		1	1	25.145			
			C	0.135	2.828		1	1	25.145			
T10 60.00-40.00	0.85	5.50	A	0.135	2.829	9	1	1	45.962	1.77	88.45	C
			B	0.135	2.829		1	1	45.962			
			C	0.135	2.829		1	1	45.962			
T11 40.00-30.00	0.43	2.84	A	0.128	2.855	8	1	1	23.546	0.84	83.54	C
			B	0.128	2.855		1	1	23.546			
			C	0.128	2.855		1	1	23.546			
T12 30.00-20.00	0.43	3.03	A	0.124	2.869	7	1	1	23.953	0.79	78.78	C
			B	0.124	2.869		1	1	23.953			
			C	0.124	2.869		1	1	23.953			
T13 20.00-0.00	0.85	6.02	A	0.111	2.92	7	1	1	46.546	1.41	70.40	C
			B	0.111	2.92		1	1	46.546			
			C	0.111	2.92		1	1	46.546			
Sum Weight:	6.19	34.20						OTM	885.20 kip-ft	11.47		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.13	1.25	A	0.139	2.812	11	0.825	1	13.494	0.55	27.30	C
			B	0.139	2.812		0.825	1	13.494			
			C	0.139	2.812		0.825	1	13.494			
T2 160.00-140.00	0.40	1.50	A	0.144	2.796	11	0.825	1	14.923	0.81	40.35	C
			B	0.144	2.796		0.825	1	14.923			
			C	0.144	2.796		0.825	1	14.923			
T3 140.00-133.33	0.13	0.83	A	0.151	2.769	11	0.825	1	5.663	0.28	41.97	C
			B	0.151	2.769		0.825	1	5.663			
			C	0.151	2.769		0.825	1	5.663			
T4 133.33-126.67	0.18	0.84	A	0.145	2.791	10	0.825	1	5.774	0.34	51.21	C
			B	0.145	2.791		0.825	1	5.774			
			C	0.145	2.791		0.825	1	5.774			
T5 126.67-120.00	0.26	1.08	A	0.14	2.81	10	0.825	1	5.895	0.44	66.12	C
			B	0.14	2.81		0.825	1	5.895			
			C	0.14	2.81		0.825	1	5.895			
T6 120.00-100.00	0.85	3.82	A	0.133	2.834	10	0.825	1	18.400	1.41	70.61	C
			B	0.133	2.834		0.825	1	18.400			
			C	0.133	2.834		0.825	1	18.400			
T7 100.00-90.00	0.43	1.68	A	0.131	2.844	10	0.825	1	10.043	0.71	70.86	C
			B	0.131	2.844		0.825	1	10.043			
			C	0.131	2.844		0.825	1	10.043			
T8 90.00-80.00	0.43	1.72	A	0.124	2.87	10	0.825	1	10.301	0.70	70.04	C
			B	0.124	2.87		0.825	1	10.301			
			C	0.124	2.87		0.825	1	10.301			
T9 80.00-60.00	0.85	4.10	A	0.135	2.828	9	0.825	1	25.145	1.44	71.91	C
			B	0.135	2.828		0.825	1	25.145			
			C	0.135	2.828		0.825	1	25.145			
T10 60.00-40.00	0.85	5.50	A	0.135	2.829	9	0.825	1	40.626	1.66	82.96	C
			B	0.135	2.829		0.825	1	40.626			
			C	0.135	2.829		0.825	1	40.626			
T11 40.00-30.00	0.43	2.84	A	0.128	2.855	8	0.825	1	20.878	0.78	78.39	C
			B	0.128	2.855		0.825	1	20.878			
			C	0.128	2.855		0.825	1	20.878			
T12 30.00-20.00	0.43	3.03	A	0.124	2.869	7	0.825	1	21.285	0.74	73.96	C
			B	0.124	2.869		0.825	1	21.285			
			C	0.124	2.869		0.825	1	21.285			
T13 20.00-0.00	0.85	6.02	A	0.111	2.92	7	0.825	1	41.283	1.32	66.05	C
			B	0.111	2.92		0.825	1	41.283			
			C	0.111	2.92		0.825	1	41.283			
Sum Weight:	6.19	34.20						OTM	875.83 kip-ft	11.18		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.13	1.25	A	0.139	2.812	11	0.8	1	13.494	0.55	27.30	C
			B	0.139	2.812		0.8	1	13.494			
			C	0.139	2.812		0.8	1	13.494			
T2 160.00-140.00	0.40	1.50	A	0.144	2.796	11	0.8	1	14.923	0.81	40.35	C
			B	0.144	2.796		0.8	1	14.923			
			C	0.144	2.796		0.8	1	14.923			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T3 140.00-133.33	0.13	0.83	A	0.151	2.769	11	0.8	1	5.663	0.28	41.97	C
			B	0.151	2.769		0.8	1	5.663			
			C	0.151	2.769		0.8	1	5.663			
T4 133.33-126.67	0.18	0.84	A	0.145	2.791	10	0.8	1	5.774	0.34	51.21	C
			B	0.145	2.791		0.8	1	5.774			
			C	0.145	2.791		0.8	1	5.774			
T5 126.67-120.00	0.26	1.08	A	0.14	2.81	10	0.8	1	5.895	0.44	66.12	C
			B	0.14	2.81		0.8	1	5.895			
			C	0.14	2.81		0.8	1	5.895			
T6 120.00-100.00	0.85	3.82	A	0.133	2.834	10	0.8	1	18.400	1.41	70.61	C
			B	0.133	2.834		0.8	1	18.400			
			C	0.133	2.834		0.8	1	18.400			
T7 100.00-90.00	0.43	1.68	A	0.131	2.844	10	0.8	1	10.043	0.71	70.86	C
			B	0.131	2.844		0.8	1	10.043			
			C	0.131	2.844		0.8	1	10.043			
T8 90.00-80.00	0.43	1.72	A	0.124	2.87	10	0.8	1	10.301	0.70	70.04	C
			B	0.124	2.87		0.8	1	10.301			
			C	0.124	2.87		0.8	1	10.301			
T9 80.00-60.00	0.85	4.10	A	0.135	2.828	9	0.8	1	25.145	1.44	71.91	C
			B	0.135	2.828		0.8	1	25.145			
			C	0.135	2.828		0.8	1	25.145			
T10 60.00-40.00	0.85	5.50	A	0.135	2.829	9	0.8	1	39.863	1.64	82.17	C
			B	0.135	2.829		0.8	1	39.863			
			C	0.135	2.829		0.8	1	39.863			
T11 40.00-30.00	0.43	2.84	A	0.128	2.855	8	0.8	1	20.497	0.78	77.66	C
			B	0.128	2.855		0.8	1	20.497			
			C	0.128	2.855		0.8	1	20.497			
T12 30.00-20.00	0.43	3.03	A	0.124	2.869	7	0.8	1	20.904	0.73	73.27	C
			B	0.124	2.869		0.8	1	20.904			
			C	0.124	2.869		0.8	1	20.904			
T13 20.00-0.00	0.85	6.02	A	0.111	2.92	7	0.8	1	40.531	1.31	65.43	C
			B	0.111	2.92		0.8	1	40.531			
			C	0.111	2.92		0.8	1	40.531			
Sum Weight:	6.19	34.20						OTM	874.49 kip-ft	11.14		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.13	1.25	A	0.139	2.812	11	0.85	1	13.494	0.55	27.30	C
			B	0.139	2.812		0.85	1	13.494			
			C	0.139	2.812		0.85	1	13.494			
T2 160.00-140.00	0.40	1.50	A	0.144	2.796	11	0.85	1	14.923	0.81	40.35	C
			B	0.144	2.796		0.85	1	14.923			
			C	0.144	2.796		0.85	1	14.923			
T3 140.00-133.33	0.13	0.83	A	0.151	2.769	11	0.85	1	5.663	0.28	41.97	C
			B	0.151	2.769		0.85	1	5.663			
			C	0.151	2.769		0.85	1	5.663			
T4 133.33-126.67	0.18	0.84	A	0.145	2.791	10	0.85	1	5.774	0.34	51.21	C
			B	0.145	2.791		0.85	1	5.774			
			C	0.145	2.791		0.85	1	5.774			

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	*C_F*	*q_z* *psf*	*D_F*	*D_R*	*A_E* *ft²*	*F* *K*	*w* *plf*	*Ctrl. Face*
T5 126.67-120.00	0.26	1.08	A	0.14	2.81	10	0.85	1	5.895	0.44	66.12	C
			B	0.14	2.81		0.85	1	5.895			
			C	0.14	2.81		0.85	1	5.895			
T6 120.00-100.00	0.85	3.82	A	0.133	2.834	10	0.85	1	18.400	1.41	70.61	C
			B	0.133	2.834		0.85	1	18.400			
			C	0.133	2.834		0.85	1	18.400			
T7 100.00-90.00	0.43	1.68	A	0.131	2.844	10	0.85	1	10.043	0.71	70.86	C
			B	0.131	2.844		0.85	1	10.043			
			C	0.131	2.844		0.85	1	10.043			
T8 90.00-80.00	0.43	1.72	A	0.124	2.87	10	0.85	1	10.301	0.70	70.04	C
			B	0.124	2.87		0.85	1	10.301			
			C	0.124	2.87		0.85	1	10.301			
T9 80.00-60.00	0.85	4.10	A	0.135	2.828	9	0.85	1	25.145	1.44	71.91	C
			B	0.135	2.828		0.85	1	25.145			
			C	0.135	2.828		0.85	1	25.145			
T10 60.00-40.00	0.85	5.50	A	0.135	2.829	9	0.85	1	41.388	1.67	83.74	C
			B	0.135	2.829		0.85	1	41.388			
			C	0.135	2.829		0.85	1	41.388			
T11 40.00-30.00	0.43	2.84	A	0.128	2.855	8	0.85	1	21.259	0.79	79.13	C
			B	0.128	2.855		0.85	1	21.259			
			C	0.128	2.855		0.85	1	21.259			
T12 30.00-20.00	0.43	3.03	A	0.124	2.869	7	0.85	1	21.666	0.75	74.65	C
			B	0.124	2.869		0.85	1	21.666			
			C	0.124	2.869		0.85	1	21.666			
T13 20.00-0.00	0.85	6.02	A	0.111	2.92	7	0.85	1	42.035	1.33	66.67	C
			B	0.111	2.92		0.85	1	42.035			
			C	0.111	2.92		0.85	1	42.035			
Sum Weight:	6.19	34.20						OTM	877.17 kip-ft	11.22		

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	16.40					
Bracing Weight	17.80					
Total Member Self-Weight	34.20			-25.27	3.16	
Total Weight	50.76			-25.27	3.16	
Wind 0 deg - No Ice		-0.29	-62.72	-6136.66	51.33	10.48
Wind 30 deg - No Ice		30.78	-53.32	-5266.90	-3023.10	-50.15
Wind 45 deg - No Ice		43.57	-43.33	-4286.99	-4297.90	-76.34
Wind 60 deg - No Ice		53.32	-30.45	-3018.54	-5277.69	-97.33
Wind 90 deg - No Ice		62.07	0.29	22.91	-6132.81	-118.44
Wind 120 deg - No Ice		54.75	31.61	3072.15	-5361.73	-107.81
Wind 135 deg - No Ice		44.44	44.20	4319.23	-4380.67	-91.16
Wind 150 deg - No Ice		31.28	53.61	5264.55	-3106.54	-68.30
Wind 180 deg - No Ice		0.29	61.41	6044.72	-45.02	-10.48
Wind 210 deg - No Ice		-30.78	53.32	5216.37	3029.42	50.15
Wind 225 deg - No Ice		-43.57	43.33	4236.45	4304.21	76.34
Wind 240 deg - No Ice		-54.46	31.11	2988.71	5319.87	97.33
Wind 270 deg - No Ice		-62.07	-0.29	-73.44	6139.12	118.44
Wind 300 deg - No Ice		-53.61	-30.95	-3101.98	5332.18	107.81

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*
Wind 315 deg - No Ice		-44.44	-44.20	-4369.76	4386.99	91.16
Wind 330 deg - No Ice		-31.28	-53.61	-5315.08	3112.86	68.30
Member Ice	50.45					
Total Weight Ice	180.15			-298.58	-16.92	
Wind 0 deg - Ice		-0.05	-22.64	-2549.02	-8.48	1.81
Wind 30 deg - Ice		11.20	-19.41	-2237.77	-1136.51	-17.61
Wind 45 deg - Ice		15.85	-15.81	-1878.64	-1603.88	-25.84
Wind 60 deg - Ice		19.40	-11.14	-1412.23	-1962.72	-32.30
Wind 90 deg - Ice		22.50	0.05	-290.13	-2270.74	-38.34
Wind 120 deg - Ice		19.68	11.36	833.96	-1978.54	-34.11
Wind 135 deg - Ice		16.02	15.97	1296.44	-1618.84	-28.39
Wind 150 deg - Ice		11.29	19.46	1649.05	-1151.15	-20.74
Wind 180 deg - Ice		0.05	22.37	1943.35	-25.37	-1.81
Wind 210 deg - Ice		-11.20	19.41	1640.60	1102.67	17.61
Wind 225 deg - Ice		-15.85	15.81	1281.48	1570.04	25.84
Wind 240 deg - Ice		-19.63	11.28	819.32	1936.24	32.30
Wind 270 deg - Ice		-22.50	-0.05	-307.03	2236.89	38.34
Wind 300 deg - Ice		-19.45	-11.23	-1426.86	1937.32	34.11
Wind 315 deg - Ice		-16.02	-15.97	-1893.60	1584.99	28.39
Wind 330 deg - Ice		-11.29	-19.46	-2246.22	1117.30	20.74
Total Weight	50.76			-25.27	3.16	
Wind 0 deg - Service		-0.07	-16.23	-1580.13	11.75	2.71
Wind 30 deg - Service		7.96	-13.79	-1355.11	-783.65	-12.97
Wind 45 deg - Service		11.27	-11.21	-1101.59	-1113.46	-19.75
Wind 60 deg - Service		13.80	-7.88	-773.42	-1366.94	-25.18
Wind 90 deg - Service		16.06	0.07	13.44	-1588.17	-30.64
Wind 120 deg - Service		14.16	8.18	802.32	-1388.68	-27.89
Wind 135 deg - Service		11.50	11.44	1124.95	-1134.87	-23.58
Wind 150 deg - Service		8.09	13.87	1369.52	-805.24	-17.67
Wind 180 deg - Service		0.07	15.89	1571.36	-13.18	-2.71
Wind 210 deg - Service		-7.96	13.79	1357.06	782.22	12.97
Wind 225 deg - Service		-11.27	11.21	1103.54	1112.03	19.75
Wind 240 deg - Service		-14.09	8.05	780.73	1374.79	25.18
Wind 270 deg - Service		-16.06	-0.07	-11.49	1586.74	30.64
Wind 300 deg - Service		-13.87	-8.01	-795.01	1377.97	27.89
Wind 315 deg - Service		-11.50	-11.44	-1123.00	1133.44	23.58
Wind 330 deg - Service		-8.09	-13.87	-1367.57	803.81	17.67

Load Combinations

Comb. No.	*Description*
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice

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Rocky Hill, CT
Phone: 860-529-8882
FAX: 860-529-3991

Comb. No.	Description
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 160	Leg	Max Tension	9	4.86	-0.39	-0.32

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	12	-6.24	0.04	0.03
			Max. Mx	28	-0.10	-1.03	0.18
			Max. My	32	-0.23	0.07	-1.61
			Max. Vy	28	-0.65	-1.03	0.18
			Max. Vx	16	0.88	-0.07	-1.11
		Diagonal	Max Tension	27	5.31	0.00	0.00
			Max. Compression	26	-5.38	0.00	0.00
			Max. Mx	34	-0.11	0.07	0.00
			Max. Vy	34	0.04	0.00	0.00
		Horizontal	Max Tension	26	2.96	-0.01	0.00
			Max. Compression	11	-2.93	0.00	0.00
			Max. Mx	38	-0.07	-0.04	-0.00
			Max. My	28	-0.64	-0.01	-0.01
			Max. Vy	38	0.04	-0.04	-0.00
			Max. Vx	28	0.00	0.00	0.00
		Top Girt	Max Tension	19	0.65	0.00	0.00
			Max. Compression	2	-0.65	-0.01	-0.00
			Max. Mx	48	-0.04	-0.03	-0.00
			Max. My	2	-0.07	-0.01	0.00
			Max. Vy	48	0.04	-0.03	-0.00
			Max. Vx	2	-0.00	0.00	0.00
		Inner Bracing	Max Tension	2	0.01	0.00	0.00
			Max. Compression	2	-0.01	0.00	0.00
			Max. Mx	34	-0.00	-0.04	0.00
			Max. Vy	34	0.03	0.00	0.00
T2	160 - 140	Leg	Max Tension	29	39.23	-0.16	-0.04
			Max. Compression	12	-44.43	0.27	0.05
			Max. Mx	28	38.47	-0.27	-0.05
			Max. My	26	-4.15	-0.00	-0.42
			Max. Vy	8	-3.23	-0.07	0.10
			Max. Vx	16	-3.18	0.02	-0.00
		Diagonal	Max Tension	27	10.38	0.00	0.00
			Max. Compression	26	-10.45	0.00	0.00
			Max. Mx	34	-0.18	0.09	0.00
			Max. Vy	34	-0.04	0.00	0.00
		Horizontal	Max Tension	29	6.25	-0.00	0.01
			Max. Compression	12	-6.36	0.00	0.00
			Max. Mx	38	-0.16	-0.05	-0.00
			Max. My	12	2.23	-0.00	0.02
			Max. Vy	38	0.05	-0.05	-0.00
			Max. Vx	12	-0.00	-0.00	0.02
		Inner Bracing	Max Tension	13	0.01	0.00	0.00
			Max. Compression	28	-0.01	0.00	0.00
			Max. Mx	34	-0.01	-0.05	0.00
			Max. Vy	34	-0.04	0.00	0.00
T3	140 - 133.333	Leg	Max Tension	29	52.40	-0.27	-0.05
			Max. Compression	12	-58.05	0.18	0.03
			Max. Mx	28	51.62	-0.27	-0.05
			Max. My	26	-4.59	-0.00	-0.42
			Max. Vy	18	-0.10	-0.27	-0.05
			Max. Vx	10	0.20	-0.01	0.42
		Diagonal	Max Tension	21	9.94	0.00	0.00
			Max. Compression	20	-10.06	0.00	0.00
			Max. Mx	34	-0.23	0.11	0.00
			Max. Vy	34	-0.05	0.00	0.00
		Horizontal	Max Tension	20	6.50	0.00	0.00
			Max. Compression	21	-6.47	0.00	0.00
			Max. Mx	48	-0.15	-0.07	-0.00
			Max. My	28	-0.53	-0.03	-0.02
			Max. Vy	48	-0.06	-0.07	-0.00
			Max. Vx	28	-0.00	-0.03	-0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Inner Bracing	Max Tension	13	0.01	0.00	0.00
			Max. Compression	28	-0.01	0.00	0.00
			Max. Mx	34	-0.01	-0.05	0.00
			Max. Vy	34	0.04	0.00	0.00
T4	133.333 - 126.667	Leg	Max Tension	29	64.97	-0.19	-0.03
			Max. Compression	12	-72.59	1.63	0.06
			Max. Mx	28	62.94	-1.70	-0.07
			Max. My	26	-6.60	-0.03	-1.72
			Max. Vy	8	-2.53	-0.18	0.04
			Max. Vx	26	-2.49	-0.00	-0.13
		Diagonal	Max Tension	21	13.53	0.00	0.00
			Max. Compression	20	-13.65	0.00	0.00
			Max. Mx	34	-0.25	0.12	0.00
			Max. Vy	34	-0.05	0.00	0.00
		Top Girt	Max Tension	7	9.28	-0.01	0.01
			Max. Compression	22	-9.30	0.00	0.00
			Max. Mx	48	-0.48	-0.08	-0.01
			Max. My	12	1.43	-0.00	0.02
			Max. Vy	48	-0.06	-0.08	-0.01
			Max. Vx	12	0.00	0.00	0.00
		Inner Bracing	Max Tension	22	0.16	0.00	0.00
			Max. Compression	22	-0.16	0.00	0.00
			Max. Mx	34	0.00	-0.06	0.00
			Max. Vy	34	0.04	0.00	0.00
T5	126.667 - 120	Leg	Max Tension	29	80.91	-1.69	-0.07
			Max. Compression	12	-91.06	1.23	0.26
			Max. Mx	28	79.64	-1.70	-0.07
			Max. My	26	-7.04	-0.03	-1.72
			Max. Vy	18	-1.76	-1.69	0.01
			Max. Vx	10	1.82	-0.05	1.72
		Diagonal	Max Tension	21	16.36	0.00	0.00
			Max. Compression	20	-16.55	0.00	0.00
			Max. Mx	34	-0.30	0.17	0.00
			Max. Vy	34	0.07	0.00	0.00
		Top Girt	Max Tension	7	11.46	-0.01	0.01
			Max. Compression	22	-11.46	0.00	0.00
			Max. Mx	48	-0.49	-0.09	-0.01
			Max. My	12	1.91	-0.00	0.03
			Max. Vy	48	0.06	-0.09	-0.01
			Max. Vx	12	-0.00	-0.00	0.03
		Inner Bracing	Max Tension	22	0.20	0.00	0.00
			Max. Compression	22	-0.20	0.00	0.00
			Max. Mx	34	0.00	-0.07	0.00
			Max. Vy	34	0.05	0.00	0.00
T6	120 - 100	Leg	Max Tension	29	128.67	-0.70	-0.39
			Max. Compression	12	-141.93	0.46	0.29
			Max. Mx	28	98.36	-1.28	-0.26
			Max. My	26	-8.85	-0.02	-1.55
			Max. Vy	18	-0.20	-1.26	0.04
			Max. Vx	10	0.43	-0.03	1.15
		Diagonal	Max Tension	17	21.24	0.00	0.00
			Max. Compression	16	-21.57	0.00	0.00
			Max. Mx	34	-0.45	0.35	0.00
			Max. Vy	34	-0.11	0.00	0.00
		Horizontal	Max Tension	30	12.96	0.00	0.00
			Max. Compression	15	-12.87	-0.03	-0.01
			Max. Mx	48	-0.50	-0.11	-0.01
			Max. My	28	-1.70	-0.05	-0.03
			Max. Vy	48	-0.07	-0.11	-0.01
			Max. Vx	28	-0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Inner Bracing	Max Tension	13	0.01	0.00	0.00
			Max. Compression	28	-0.01	0.00	0.00
			Max. Mx	34	-0.01	-0.11	0.00
			Max. Vy	34	-0.06	0.00	0.00
T7	100 - 90	Leg	Max Tension	29	156.35	-0.48	-0.29
			Max. Compression	12	-171.25	0.81	0.32
			Max. Mx	28	154.02	-0.85	-0.32
			Max. My	26	-11.86	-0.02	-1.15
			Max. Vy	18	0.18	-0.84	0.05
			Max. Vx	10	-0.42	-0.04	1.15
		Diagonal	Max Tension	17	19.91	0.00	0.00
			Max. Compression	16	-20.14	0.00	0.00
			Max. Mx	34	-0.53	0.31	0.00
			Max. Vy	34	0.10	0.00	0.00
		Horizontal	Max Tension	31	12.94	0.00	0.00
			Max. Compression	14	-12.95	-0.04	-0.01
			Max. Mx	48	-0.90	-0.12	-0.01
			Max. My	28	0.22	-0.06	-0.02
			Max. Vy	48	-0.08	-0.12	-0.01
			Max. Vx	28	0.00	-0.06	-0.02
		Inner Bracing	Max Tension	13	0.00	0.00	0.00
			Max. Compression	43	-0.01	0.00	0.00
			Max. Mx	34	-0.01	-0.13	0.00
			Max. Vy	34	0.07	0.00	0.00
T8	90 - 80	Leg	Max Tension	29	180.81	-0.84	-0.32
			Max. Compression	12	-197.09	1.00	0.36
			Max. Mx	28	178.28	-1.04	-0.36
			Max. My	26	-12.95	-0.02	-1.49
			Max. Vy	18	0.16	-1.03	0.05
			Max. Vx	10	-0.40	-0.04	1.49
		Diagonal	Max Tension	15	20.19	0.00	0.00
			Max. Compression	14	-20.44	0.00	0.00
			Max. Mx	34	-0.60	0.34	0.00
			Max. Vy	34	0.10	0.00	0.00
		Top Girt	Max Tension	30	13.63	0.00	0.00
			Max. Compression	15	-13.59	-0.04	-0.01
			Max. Mx	48	-0.72	-0.14	-0.00
			Max. My	28	-2.65	-0.06	-0.02
			Max. Vy	48	-0.08	-0.14	-0.00
			Max. Vx	28	-0.00	-0.06	-0.02
		Inner Bracing	Max Tension	15	0.23	0.00	0.00
			Max. Compression	14	-0.24	0.00	0.00
			Max. Mx	34	-0.00	-0.15	0.00
			Max. Vy	34	0.07	0.00	0.00
T9	80 - 60	Leg	Max Tension	29	227.99	-1.52	-0.23
			Max. Compression	12	-247.41	1.36	0.36
			Max. Mx	28	201.56	-1.52	-0.23
			Max. My	26	-15.28	-0.02	-1.77
			Max. Vy	18	0.22	-1.49	0.05
			Max. Vx	26	0.40	-0.01	-1.67
		Diagonal	Max Tension	15	21.67	0.00	0.00
			Max. Compression	14	-22.01	0.00	0.00
			Max. Mx	34	-0.76	0.41	0.00
			Max. Vy	34	-0.11	0.00	0.00
		Horizontal	Max Tension	30	15.71	0.00	0.00
			Max. Compression	15	-15.62	-0.07	-0.01
			Max. Mx	38	-0.77	-0.24	-0.01
			Max. My	28	1.62	-0.12	-0.03
			Max. Vy	38	0.12	-0.24	-0.01
			Max. Vx	28	-0.00	-0.12	-0.03
		Inner Bracing	Max Tension	13	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	43	-0.02	0.00	0.00
			Max. Mx	34	-0.02	-0.22	0.00
			Max. Vy	34	0.09	0.00	0.00
T10	60 - 40	Leg	Max Tension	29	274.02	-1.72	-0.20
			Max. Compression	12	-297.53	1.30	0.22
			Max. Mx	28	247.79	-1.73	-0.20
			Max. My	26	-15.94	-0.02	-1.77
			Max. Vy	13	0.28	1.72	0.19
			Max. Vx	10	0.50	-0.04	1.77
		Diagonal	Max Tension	15	23.13	0.00	0.00
			Max. Compression	14	-23.59	0.00	0.00
			Max. Mx	34	-0.93	0.54	0.00
			Max. Vy	34	-0.14	0.00	0.00
		Horizontal	Max Tension	30	17.77	0.00	0.00
			Max. Compression	15	-17.61	-0.08	-0.01
			Max. Mx	38	-0.79	-0.28	-0.01
			Max. My	13	4.01	-0.05	0.03
			Max. Vy	38	0.13	-0.28	-0.01
			Max. Vx	28	0.00	-0.12	-0.03
		Inner Bracing	Max Tension	13	0.00	0.00	0.00
			Max. Compression	43	-0.02	0.00	0.00
			Max. Mx	34	-0.02	-0.34	0.00
			Max. Vy	34	0.13	0.00	0.00
T11	40 - 30	Leg	Max Tension	29	296.86	-1.36	-0.22
			Max. Compression	12	-322.79	2.99	0.16
			Max. Mx	12	-322.79	2.99	0.16
			Max. My	26	-18.88	-0.05	-1.65
			Max. Vy	13	-0.39	2.97	0.16
			Max. Vx	26	-0.44	-0.05	-1.65
		Diagonal	Max Tension	15	23.80	0.00	0.00
			Max. Compression	14	-24.30	0.00	0.00
			Max. Mx	34	-1.00	0.57	0.00
			Max. Vy	34	-0.15	0.00	0.00
		Horizontal	Max Tension	30	18.72	0.00	0.00
			Max. Compression	15	-18.55	-0.09	-0.01
			Max. Mx	38	-0.86	-0.30	-0.01
			Max. My	13	4.32	-0.06	0.03
			Max. Vy	38	0.13	-0.30	-0.01
			Max. Vx	13	-0.00	-0.06	0.03
		Inner Bracing	Max Tension	13	0.00	0.00	0.00
			Max. Compression	43	-0.02	0.00	0.00
			Max. Mx	34	-0.02	-0.36	0.00
			Max. Vy	34	0.13	0.00	0.00
T12	30 - 20	Leg	Max Tension	29	319.45	-2.84	-0.17
			Max. Compression	12	-348.02	-2.41	0.91
			Max. Mx	12	-347.51	2.99	0.16
			Max. My	26	-21.04	-0.54	-5.85
			Max. Vy	12	0.74	2.99	0.16
			Max. Vx	26	0.83	-0.54	-5.85
		Diagonal	Max Tension	15	24.48	0.00	0.00
			Max. Compression	14	-25.07	0.00	0.00
			Max. Mx	34	-1.06	0.61	0.00
			Max. Vy	34	-0.15	0.00	0.00
		Top Girt	Max Tension	30	19.55	0.00	0.00
			Max. Compression	15	-19.27	-0.13	-0.01
			Max. Mx	38	1.39	-0.37	-0.01
			Max. My	13	3.80	-0.09	0.03
			Max. Vy	38	-0.15	-0.37	-0.01
			Max. Vx	13	0.00	0.00	0.00
		Inner Bracing	Max Tension	15	0.33	0.00	0.00
			Max. Compression	14	-0.34	0.00	0.00

Section No.	*Elevation ft*	*Component Type*	*Condition*	*Gov. Load Comb.*	*Axial K*	*Major Axis Moment kip-ft*	*Minor Axis Moment kip-ft*
			Max. Mx	34	-0.02	-0.39	0.00
			Max. Vy	34	0.13	0.00	0.00
T13	20 - 0	Leg	Max Tension	29	340.00	1.69	-0.92
			Max. Compression	12	-372.39	0.00	-0.00
			Max. Mx	12	-371.91	8.34	-1.32
			Max. My	26	-22.08	-0.54	-5.85
			Max. Vy	12	-1.25	8.34	-1.32
			Max. Vx	26	-1.43	-0.54	-5.85
		Diagonal	Max Tension	31	36.62	-0.17	0.06
			Max. Compression	14	-37.43	0.00	0.00
			Max. Mx	30	18.04	-0.28	-0.05
			Max. My	12	-34.90	0.01	-0.07
			Max. Vy	37	-0.10	-0.24	-0.00
			Max. Vx	12	-0.01	0.00	0.00
		Horizontal	Max Tension	30	20.92	0.00	0.00
			Max. Compression	15	-20.91	-0.21	-0.02
			Max. Mx	38	-1.35	-0.52	-0.01
			Max. My	13	-1.88	-0.04	0.06
			Max. Vy	38	0.18	-0.52	-0.01
			Max. Vx	13	0.00	0.00	0.00
		Redund Horz 1 Bracing	Max Tension	12	6.46	0.00	0.00
			Max. Compression	12	-6.46	0.00	0.00
			Max. Mx	34	0.92	0.05	0.00
			Max. Vy	34	-0.03	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	12	5.91	0.00	0.00
			Max. Compression	12	-5.91	0.00	0.00
			Max. Mx	34	1.16	0.10	0.00
			Max. Vy	34	-0.04	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	13	0.01	0.00	0.00
			Max. Compression	28	-0.02	0.00	0.00
			Max. Mx	34	-0.02	0.08	0.00
			Max. Vy	34	0.05	0.00	0.00
		Inner Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	43	-0.02	0.00	0.00
			Max. Mx	34	-0.02	0.25	0.00
			Max. Vy	34	-0.08	0.00	0.00

Maximum Reactions

Location	*Condition*	*Gov. Load Comb.*	*Vertical K*	*Horizontal, X K*	*Horizontal, Z K*
Leg C	Max. Vert	24	415.53	48.54	-31.78
	Max. H_x	24	415.53	48.54	-31.78
	Max. H_z	7	-364.49	-42.55	30.55
	Min. Vert	9	-378.42	-45.12	29.76
	Min. H_x	9	-378.42	-45.12	29.76
	Min. H_z	22	399.12	45.08	-32.05
Leg B	Max. Vert	12	420.83	-48.79	-32.34
	Max. H_x	29	-384.20	45.38	30.34
	Max. H_z	31	-370.91	42.79	31.27
	Min. Vert	29	-384.20	45.38	30.34
	Min. H_x	12	420.83	-48.79	-32.34
	Min. H_z	14	405.05	-45.32	-32.77

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg A	Max. Vert	2	417.29	0.36	57.95
	Max. H_x	27	19.38	14.30	1.57
	Max. H_z	2	417.29	0.36	57.95
	Min. Vert	19	-377.10	-0.37	-53.94
	Min. H_x	10	18.33	-14.31	1.42
	Min. H_z	19	-377.10	-0.37	-53.94

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	50.70	0.00	0.00	-25.27	3.16	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	60.85	-0.46	-100.28	-9515.93	80.87	16.77
0.9 Dead+1.6 Wind 0 deg - No Ice	45.63	-0.46	-100.28	-9508.35	79.92	16.77
1.2 Dead+1.6 Wind 30 deg - No Ice	60.85	49.22	-85.25	-8167.90	-4694.45	-80.23
0.9 Dead+1.6 Wind 30 deg - No Ice	45.63	49.22	-85.25	-8160.32	-4695.39	-80.23
1.2 Dead+1.6 Wind 45 deg - No Ice	60.85	69.66	-69.29	-6646.33	-6675.16	-122.15
0.9 Dead+1.6 Wind 45 deg - No Ice	45.63	69.66	-69.29	-6638.75	-6676.10	-122.15
1.2 Dead+1.6 Wind 60 deg - No Ice	60.85	85.26	-48.69	-4676.61	-8197.99	-155.73
0.9 Dead+1.6 Wind 60 deg - No Ice	45.63	85.26	-48.69	-4669.03	-8198.93	-155.73
1.2 Dead+1.6 Wind 90 deg - No Ice	60.85	99.24	0.46	46.76	-9526.19	-189.51
0.9 Dead+1.6 Wind 90 deg - No Ice	45.63	99.24	0.46	54.34	-9527.13	-189.51
1.2 Dead+1.6 Wind 120 deg - No Ice	60.85	87.54	50.54	4779.24	-8326.61	-172.50
0.9 Dead+1.6 Wind 120 deg - No Ice	45.63	87.54	50.54	4786.82	-8327.55	-172.50
1.2 Dead+1.6 Wind 135 deg - No Ice	60.85	70.32	69.94	6694.70	-6784.17	-145.86
0.9 Dead+1.6 Wind 135 deg - No Ice	45.63	70.32	69.94	6702.28	-6785.11	-145.86
1.2 Dead+1.6 Wind 150 deg - No Ice	60.85	50.02	85.72	8184.34	-4827.95	-109.28
0.9 Dead+1.6 Wind 150 deg - No Ice	45.63	50.02	85.72	8191.92	-4828.90	-109.28
1.2 Dead+1.6 Wind 180 deg - No Ice	60.85	0.46	98.19	9395.77	-73.29	-16.77
0.9 Dead+1.6 Wind 180 deg - No Ice	45.63	0.46	98.19	9403.35	-74.24	-16.77
1.2 Dead+1.6 Wind 210 deg - No Ice	60.85	-49.22	85.25	8107.26	4702.02	80.23
0.9 Dead+1.6 Wind 210 deg - No Ice	45.63	-49.22	85.25	8114.84	4701.08	80.23
1.2 Dead+1.6 Wind 225 deg - No Ice	60.85	-69.66	69.29	6585.69	6682.74	122.15
0.9 Dead+1.6 Wind 225 deg - No Ice	45.63	-69.66	69.29	6593.27	6681.79	122.15

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
1.2 Dead+1.6 Wind 240 deg - No Ice	60.85	-87.08	49.74	4645.73	8257.10	155.73
0.9 Dead+1.6 Wind 240 deg - No Ice	45.63	-87.08	49.74	4653.31	8256.16	155.73
1.2 Dead+1.6 Wind 270 deg - No Ice	60.85	-99.24	-0.46	-107.40	9533.77	189.51
0.9 Dead+1.6 Wind 270 deg - No Ice	45.63	-99.24	-0.46	-99.82	9532.82	189.51
1.2 Dead+1.6 Wind 300 deg - No Ice	60.85	-85.72	-49.49	-4810.12	8282.65	172.50
0.9 Dead+1.6 Wind 300 deg - No Ice	45.63	-85.72	-49.49	-4802.54	8281.70	172.50
1.2 Dead+1.6 Wind 315 deg - No Ice	60.85	-70.32	-69.94	-6755.34	6791.74	145.86
0.9 Dead+1.6 Wind 315 deg - No Ice	45.63	-70.32	-69.94	-6747.76	6790.80	145.86
1.2 Dead+1.6 Wind 330 deg - No Ice	60.85	-50.02	-85.72	-8244.98	4835.53	109.28
0.9 Dead+1.6 Wind 330 deg - No Ice	45.63	-50.02	-85.72	-8237.40	4834.58	109.28
1.2 Dead+1.0 Ice	189.96	0.00	-0.00	-303.64	-16.29	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice	189.96	-0.05	-22.62	-2479.62	-7.84	1.81
1.2 Dead+1.0 Wind 30 deg+1.0 Ice	189.96	11.20	-19.39	-2179.04	-1099.06	-17.61
1.2 Dead+1.0 Wind 45 deg+1.0 Ice	189.96	15.83	-15.79	-1831.71	-1551.27	-25.84
1.2 Dead+1.0 Wind 60 deg+1.0 Ice	189.96	19.38	-11.13	-1380.59	-1898.53	-32.30
1.2 Dead+1.0 Wind 90 deg+1.0 Ice	189.96	22.48	0.05	-295.19	-2196.45	-38.34
1.2 Dead+1.0 Wind 120 deg+1.0 Ice	189.96	19.67	11.35	791.68	-1913.43	-34.11
1.2 Dead+1.0 Wind 135 deg+1.0 Ice	189.96	15.91	15.87	1236.39	-1563.22	-28.39
1.2 Dead+1.0 Wind 150 deg+1.0 Ice	189.96	11.28	19.44	1580.22	-1113.69	-20.74
1.2 Dead+1.0 Wind 180 deg+1.0 Ice	189.96	0.05	22.35	1864.91	-24.74	-1.81
1.2 Dead+1.0 Wind 210 deg+1.0 Ice	189.96	-11.20	19.39	1571.77	1066.47	17.61
1.2 Dead+1.0 Wind 225 deg+1.0 Ice	189.96	-15.83	15.79	1224.44	1518.68	25.84
1.2 Dead+1.0 Wind 240 deg+1.0 Ice	189.96	-19.62	11.27	777.04	1872.39	32.30
1.2 Dead+1.0 Wind 270 deg+1.0 Ice	189.96	-22.48	-0.05	-312.08	2163.87	38.34
1.2 Dead+1.0 Wind 300 deg+1.0 Ice	189.96	-19.43	-11.22	-1395.22	1874.40	34.11
1.2 Dead+1.0 Wind 315 deg+1.0 Ice	189.96	-15.91	-15.87	-1843.66	1530.63	28.39
1.2 Dead+1.0 Wind 330 deg+1.0 Ice	189.96	-11.28	-19.44	-2187.49	1081.10	20.74
Dead+Wind 0 deg - Service	50.70	-0.07	-16.22	-1559.05	15.62	2.71
Dead+Wind 30 deg - Service	50.70	7.96	-13.79	-1341.08	-756.53	-12.97
Dead+Wind 45 deg - Service	50.70	11.26	-11.20	-1095.05	-1076.80	-19.75
Dead+Wind 60 deg - Service	50.70	13.79	-7.87	-776.55	-1323.04	-25.18
Dead+Wind 90 deg - Service	50.70	16.05	0.07	-12.80	-1537.80	-30.64
Dead+Wind 120 deg - Service	50.70	14.15	8.17	752.42	-1343.83	-27.89
Dead+Wind 135 deg - Service	50.70	11.37	11.31	1062.14	-1094.43	-23.58
Dead+Wind 150 deg - Service	50.70	8.09	13.86	1303.01	-778.12	-17.67

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 180 deg - Service	50.70	0.07	15.88	1498.90	-9.31	-2.71
Dead+Wind 210 deg - Service	50.70	-7.96	13.79	1290.55	762.84	12.97
Dead+Wind 225 deg - Service	50.70	-11.26	11.20	1044.52	1083.12	19.75
Dead+Wind 240 deg - Service	50.70	-14.08	8.04	730.83	1337.69	25.18
Dead+Wind 270 deg - Service	50.70	-16.05	-0.07	-37.73	1544.12	30.64
Dead+Wind 300 deg - Service	50.70	-13.86	-8.00	-798.14	1341.82	27.89
Dead+Wind 315 deg - Service	50.70	-11.37	-11.31	-1112.68	1100.74	23.58
Dead+Wind 330 deg - Service	50.70	-8.09	-13.86	-1353.54	784.43	17.67

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-50.70	0.00	0.00	50.70	0.00	0.000%
2	-0.46	-60.85	-100.28	0.46	60.85	100.28	0.000%
3	-0.46	-45.63	-100.28	0.46	45.63	100.28	0.000%
4	49.22	-60.85	-85.25	-49.22	60.85	85.25	0.000%
5	49.22	-45.63	-85.25	-49.22	45.63	85.25	0.000%
6	69.66	-60.85	-69.29	-69.66	60.85	69.29	0.000%
7	69.66	-45.63	-69.29	-69.66	45.63	69.29	0.000%
8	85.26	-60.85	-48.69	-85.26	60.85	48.69	0.000%
9	85.26	-45.63	-48.69	-85.26	45.63	48.69	0.000%
10	99.24	-60.85	0.46	-99.24	60.85	-0.46	0.000%
11	99.24	-45.63	0.46	-99.24	45.63	-0.46	0.000%
12	87.54	-60.85	50.54	-87.54	60.85	-50.54	0.000%
13	87.54	-45.63	50.54	-87.54	45.63	-50.54	0.000%
14	70.32	-60.85	69.94	-70.32	60.85	-69.94	0.000%
15	70.32	-45.63	69.94	-70.32	45.63	-69.94	0.000%
16	50.02	-60.85	85.72	-50.02	60.85	-85.72	0.000%
17	50.02	-45.63	85.72	-50.02	45.63	-85.72	0.000%
18	0.46	-60.85	98.19	-0.46	60.85	-98.19	0.000%
19	0.46	-45.63	98.19	-0.46	45.63	-98.19	0.000%
20	-49.22	-60.85	85.25	49.22	60.85	-85.25	0.000%
21	-49.22	-45.63	85.25	49.22	45.63	-85.25	0.000%
22	-69.66	-60.85	69.29	69.66	60.85	-69.29	0.000%
23	-69.66	-45.63	69.29	69.66	45.63	-69.29	0.000%
24	-87.08	-60.85	49.74	87.08	60.85	-49.74	0.000%
25	-87.08	-45.63	49.74	87.08	45.63	-49.74	0.000%
26	-99.24	-60.85	-0.46	99.24	60.85	0.46	0.000%
27	-99.24	-45.63	-0.46	99.24	45.63	0.46	0.000%
28	-85.72	-60.85	-49.49	85.72	60.85	49.49	0.000%
29	-85.72	-45.63	-49.49	85.72	45.63	49.49	0.000%
30	-70.32	-60.85	-69.94	70.32	60.85	69.94	0.000%
31	-70.32	-45.63	-69.94	70.32	45.63	69.94	0.000%
32	-50.02	-60.85	-85.72	50.02	60.85	85.72	0.000%
33	-50.02	-45.63	-85.72	50.02	45.63	85.72	0.000%
34	0.00	-189.96	0.00	0.00	189.96	0.00	0.000%
35	-0.05	-189.96	-22.62	0.05	189.96	22.62	0.000%
36	11.20	-189.96	-19.39	-11.20	189.96	19.39	0.000%
37	15.83	-189.96	-15.79	-15.83	189.96	15.79	0.000%
38	19.38	-189.96	-11.13	-19.38	189.96	11.13	0.000%
39	22.48	-189.96	0.05	-22.48	189.96	-0.05	0.000%
40	19.67	-189.96	11.35	-19.67	189.96	-11.35	0.000%
41	15.91	-189.96	15.87	-15.91	189.96	-15.87	0.000%
42	11.28	-189.96	19.44	-11.28	189.96	-19.44	0.000%
43	0.05	-189.96	22.35	-0.05	189.96	-22.35	0.000%
44	-11.20	-189.96	19.39	11.20	189.96	-19.39	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
45	-15.83	-189.96	15.79	15.83	189.96	-15.79	0.000%
46	-19.62	-189.96	11.27	19.62	189.96	-11.27	0.000%
47	-22.48	-189.96	-0.05	22.48	189.96	0.05	0.000%
48	-19.43	-189.96	-11.22	19.43	189.96	11.22	0.000%
49	-15.91	-189.96	-15.87	15.91	189.96	15.87	0.000%
50	-11.28	-189.96	-19.44	11.28	189.96	19.44	0.000%
51	-0.07	-50.70	-16.22	0.07	50.70	16.22	0.000%
52	7.96	-50.70	-13.79	-7.96	50.70	13.79	0.000%
53	11.26	-50.70	-11.20	-11.26	50.70	11.20	0.000%
54	13.79	-50.70	-7.87	-13.79	50.70	7.87	0.000%
55	16.05	-50.70	0.07	-16.05	50.70	-0.07	0.000%
56	14.15	-50.70	8.17	-14.15	50.70	-8.17	0.000%
57	11.37	-50.70	11.31	-11.37	50.70	-11.31	0.000%
58	8.09	-50.70	13.86	-8.09	50.70	-13.86	0.000%
59	0.07	-50.70	15.88	-0.07	50.70	-15.88	0.000%
60	-7.96	-50.70	13.79	7.96	50.70	-13.79	0.000%
61	-11.26	-50.70	11.20	11.26	50.70	-11.20	0.000%
62	-14.08	-50.70	8.04	14.08	50.70	-8.04	0.000%
63	-16.05	-50.70	-0.07	16.05	50.70	0.07	0.000%
64	-13.86	-50.70	-8.00	13.86	50.70	8.00	0.000%
65	-11.37	-50.70	-11.31	11.37	50.70	11.31	0.000%
66	-8.09	-50.70	-13.86	8.09	50.70	13.86	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	2.004	65	0.0883	0.0310
T2	160 - 140	1.626	65	0.0873	0.0329
T3	140 - 133.333	1.245	65	0.0792	0.0327
T4	133.333 - 126.667	1.130	65	0.0765	0.0321
T5	126.667 - 120	1.017	65	0.0734	0.0313
T6	120 - 100	0.910	65	0.0695	0.0307
T7	100 - 90	0.638	65	0.0556	0.0278
T8	90 - 80	0.518	65	0.0490	0.0251
T9	80 - 60	0.412	65	0.0420	0.0221
T10	60 - 40	0.244	65	0.0289	0.0165
T11	40 - 30	0.123	56	0.0190	0.0111
T12	30 - 20	0.076	56	0.0139	0.0083
T13	20 - 0	0.041	56	0.0086	0.0058

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178.00	AP11-850/090/ADT w/Mount Pipe	65	1.967	0.0884	0.0312	636040
177.00	PA6-65AC	65	1.948	0.0884	0.0314	636040
175.00	SE419-SWBPALDF Panel Antenna	65	1.911	0.0885	0.0316	636040
171.00	2" Dia 10' Omni	65	1.836	0.0886	0.0320	353355
170.00	WPA-700102-4CF-EDIN-X w/	65	1.817	0.0886	0.0321	318020

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	Mount Kit					
169.00	3' Yagi	65	1.798	0.0885	0.0322	289109
162.00	AP11-850/090/ADT w/Mount Pipe	65	1.665	0.0878	0.0328	186586
160.00	Pirod 15' T-Frame Sector Mount (1)	65	1.626	0.0873	0.0329	204187
159.00	2" Dia 10' Omni	65	1.607	0.0871	0.0329	236899
133.00	Pirod 15' T-Frame Sector Mount (1)	65	1.125	0.0764	0.0321	Inf
125.00	AIR21 B2A/B4P	65	0.989	0.0725	0.0312	61725
60.00	GPS	65	0.244	0.0289	0.0165	107501

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	12.300	28	0.5426	0.1918
T2	160 - 140	9.978	28	0.5359	0.2034
T3	140 - 133.333	7.638	28	0.4852	0.2024
T4	133.333 - 126.667	6.936	28	0.4684	0.1984
T5	126.667 - 120	6.239	28	0.4491	0.1939
T6	120 - 100	5.586	28	0.4252	0.1899
T7	100 - 90	3.919	13	0.3397	0.1722
T8	90 - 80	3.188	13	0.2997	0.1551
T9	80 - 60	2.544	13	0.2568	0.1365
T10	60 - 40	1.516	13	0.1768	0.1018
T11	40 - 30	0.763	13	0.1163	0.0685
T12	30 - 20	0.472	12	0.0848	0.0513
T13	20 - 0	0.255	12	0.0524	0.0358

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178.00	AP11-850/090/ADT w/Mount Pipe	28	12.071	0.5431	0.1932	107037
177.00	PA6-65AC	28	11.956	0.5434	0.1939	107037
175.00	SE419-SWBPALDF Panel Antenna	28	11.726	0.5438	0.1953	107037
171.00	2" Dia 10' Omni	28	11.266	0.5440	0.1979	59465
170.00	WPA-700102-4CF-EDIN-X w/ Mount Kit	28	11.150	0.5438	0.1985	53519
169.00	3' Yagi	28	11.034	0.5436	0.1991	48653
162.00	AP11-850/090/ADT w/Mount Pipe	28	10.215	0.5386	0.2027	31437
160.00	Pirod 15' T-Frame Sector Mount (1)	28	9.978	0.5359	0.2034	34566
159.00	2" Dia 10' Omni	28	9.858	0.5342	0.2037	40340
133.00	Pirod 15' T-Frame Sector Mount (1)	28	6.901	0.4675	0.1982	214374
125.00	AIR21 B2A/B4P	28	6.071	0.4436	0.1928	10033
60.00	GPS	13	1.516	0.1768	0.1018	17571

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.8750	4	1.22	40.59	0.030 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	1.79	12.43	0.144 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	1.48	12.43	0.119 ✔	1	Bolt Shear
		Top Girt	A325N	0.6250	2	0.32	12.43	0.026 ✔	1	Bolt Shear
T2	160	Leg	A325N	0.8750	4	9.81	40.59	0.242 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	3.48	12.43	0.280 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	3.18	12.43	0.256 ✔	1	Bolt Shear
T3	140	Leg	A325N	0.7500	6	8.73	29.82	0.293 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	3.35	12.43	0.270 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	3.25	12.43	0.261 ✔	1	Bolt Shear
T4	133.333	Leg	A325N	0.7500	6	10.83	29.82	0.363 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	4.55	12.43	0.366 ✔	1	Bolt Shear
		Top Girt	A325N	0.6250	2	4.65	12.43	0.374 ✔	1	Bolt Shear
T5	126.667	Leg	A325N	0.7500	6	13.49	29.82	0.452 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	5.52	12.43	0.444 ✔	1	Bolt Shear
		Top Girt	A325N	0.6250	2	5.73	12.43	0.461 ✔	1	Bolt Shear
T6	120	Leg	A325N	0.7500	6	21.45	29.82	0.719 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	7.19	12.43	0.579 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	6.48	12.43	0.521 ✔	1	Bolt Shear
T7	100	Leg	A325N	0.7500	6	26.06	29.82	0.874 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	6.71	12.43	0.540 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	6.47	12.43	0.521 ✔	1	Bolt Shear
T8	90	Leg	A325N	1.0000	6	30.14	53.01	0.568 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	6.81	12.43	0.548 ✔	1	Bolt Shear
		Top Girt	A325N	0.6250	2	6.81	12.43	0.548 ✔	1	Bolt Shear
T9	80	Leg	A325N	1.0000	6	38.00	53.01	0.717 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	7.34	12.43	0.590 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	7.85	12.43	0.632 ✔	1	Bolt Shear
T10	60	Leg	A325N	1.0000	8	34.25	53.01	0.646 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	7.86	12.43	0.633 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	8.88	12.43	0.715 ✔	1	Bolt Shear
T11	40	Leg	A325N	1.0000	8	37.11	53.01	0.700 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	8.10	12.43	0.652 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	9.36	12.43	0.753 ✔	1	Bolt Shear
T12	30	Leg	A325N	1.0000	8	39.93	53.01	0.753 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	8.36	12.43	0.673 ✔	1	Bolt Shear
		Top Girt	A325N	0.6250	2	9.78	12.43	0.787 ✔	1	Bolt Shear
T13	20	Leg	A325N	1.0000	8	42.43	53.01	0.800 ✔	1	Bolt Tension
		Diagonal	A325X	0.6250	3	12.48	15.19	0.821 ✔	1	Bolt Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Horizontal	A325N	0.7500	2	10.46	17.89	0.585 ✔	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 3 STD	20.00	6.67	68.8 K=1.00	2.2285	-6.24	70.98	0.088 [1] ✔
T2	160 - 140	ROHN 4 STD	20.04	6.68	53.1 K=1.00	3.1741	-44.43	116.23	0.382 [1] ✔
T3	140 - 133.333	ROHN 5 EH	6.68	6.68	43.6 K=1.00	6.1120	-58.05	239.38	0.243 [1] ✔
T4	133.333 - 126.667	ROHN 5 EH	6.68	6.68	43.6 K=1.00	6.1120	-72.59	239.38	0.303 [1] ✔
T5	126.667 - 120	ROHN 5 EH	6.68	6.68	43.6 K=1.00	6.1120	-91.06	239.38	0.380 [1] ✔
T6	120 - 100	ROHN 6 EHS	20.04	10.02	54.0 K=1.00	6.7133	-141.93	244.02	0.582 [1] ✔
T7	100 - 90	ROHN 6 EH	10.03	10.03	54.8 K=1.00	8.4049	-171.25	303.58	0.564 [1] ✔
T8	90 - 80	ROHN 6 EH	10.03	10.03	54.8 K=1.00	8.4049	-197.09	303.58	0.649 [1] ✔
T9	80 - 60	ROHN 8 EHS	20.05	10.03	41.2 K=1.00	9.7193	-247.41	386.31	0.640 [1] ✔
T10	60 - 40	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	20.05	10.03	42.2 K=1.00	13.6005	-297.53	460.81	0.646 [1] ✔
T11	40 - 30	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	10.03	10.03	42.2 K=1.00	13.6005	-322.79	460.81	0.700 [1] ✔
T12	30 - 20	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	10.03	10.03	42.2 K=1.00	13.6005	-348.02	460.81	0.755 [1] ✔
T13	20 - 0	1/3 9.6250x0.375 on ROHN 8 EH Leg Pipe	20.05	10.03	42.9 K=1.00	16.6002	-372.39	560.41	0.665 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 2 STD	7.94	7.67	117.0 K=1.00	1.0745	-5.38	17.75	0.303 [1]
T2	160 - 140	ROHN 2 STD	8.55	8.25	125.8 K=1.00	1.0745	-9.80	15.33	0.639 [1]
T3	140 - 133.333	ROHN 2 EH	8.77	8.42	131.5 K=1.00	1.4807	-10.06	19.35	0.520 [1]
T4	133.333 - 126.667	ROHN 2 EH	9.00	8.66	135.3 K=1.00	1.4807	-13.65	18.29	0.747 [1]
T5	126.667 - 120	ROHN 2 XXS	9.24	8.91	152.1 K=1.00	2.6559	-16.55	25.94	0.638 [1]
T6	120 - 100	Pipe 2.5 XXS	12.52	12.06	171.4 K=1.00	4.0285	-21.57	30.98	0.696 [1]
T7	100 - 90	ROHN 3 STD	12.92	12.49	128.8 K=1.00	2.2285	-20.14	30.35	0.664 [1]
T8	90 - 80	ROHN 3 STD	13.35	12.93	133.4 K=1.00	2.2285	-20.44	28.29	0.722 [1]
T9	80 - 60	ROHN 3 STD	14.21	13.70	141.3 K=1.00	2.2285	-22.01	25.21	0.873 [1]
T10	60 - 40	P3.5x.226	15.12	14.64	131.4 K=1.00	2.6795	-23.59	35.06	0.673 [1]
T11	40 - 30	P3.5x.226	15.60	15.12	135.8 K=1.00	2.6795	-24.30	32.85	0.740 [1]
T12	30 - 20	P3.5x.226	16.08	15.62	140.2 K=1.00	2.6795	-25.07	30.80	0.814 [1]
T13	20 - 0	P3.5x.226	24.33	23.70	106.4 K=0.50	2.6795	-37.43	52.71	0.710 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 1.5 STD	8.60	4.15	80.0 K=1.00	0.7995	-2.93	22.52	0.130 [1]
T2	160 - 140	ROHN 1.5 STD	10.01	4.82	92.9 K=1.00	0.7995	-6.09	19.14	0.318 [1]
T3	140 - 133.333	ROHN 2 STD	10.71	5.17	78.8 K=1.00	1.0745	-6.47	30.72	0.211 [1]
T6	120 - 100	ROHN 2 STD	13.92	6.68	101.9 K=1.00	1.0745	-12.87	22.64	0.569 [1]
T7	100 - 90	ROHN 2 STD	15.04	7.24	110.5 K=1.00	1.0745	-12.95	19.82	0.653 [1]
T9	80 - 60	ROHN 2.5 STD	18.93	9.10	115.3 K=1.00	1.7040	-15.62	28.95	0.540 [1]
T10	60 - 40	ROHN 2.5 STD	21.43	10.35	131.1 K=1.00	1.7040	-17.61	22.41	0.786 [1]
T11	40 - 30	ROHN 2.5 STD	22.68	10.97	139.0 K=1.00	1.7040	-18.55	19.93	0.931 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in²	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	P3.5x.226	25.18	12.22	109.7 K=1.00	2.6795	-20.91	49.99	0.418 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in²	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 1.5 STD	8.54	4.13	79.5 K=1.00	0.7995	-0.65	22.66	0.029 [1] ✔
T4	133.333 - 126.667	ROHN 2 STD	11.40	5.47	83.4 K=1.00	1.0745	-9.30	29.08	0.320 [1] ✔
T5	126.667 - 120	ROHN 2 STD	12.10	5.82	88.7 K=1.00	1.0745	-11.46	27.21	0.421 [1] ✔
T8	90 - 80	ROHN 2 STD	16.36	7.90	120.5 K=1.00	1.0745	-13.59	16.72	0.813 [1] ✔
T12	30 - 20	ROHN 2.5 EH	23.93	11.60	150.6 K=1.00	2.2535	-19.27	22.44	0.859 [1] ✔

[1] P_u / ϕP_n controls

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in²	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	ROHN 1.5 STD	6.29	5.93	91.5 K=0.80	0.7995	-6.46	19.50	0.331 [1] ✔

[1] P_u / ϕP_n controls

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in²	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	ROHN 2 STD	11.50	10.76	131.3 K=0.80	1.0745	-5.91	14.09	0.419 [1] ✔

[1] P_u / ϕP_n controls

Redundant Hip (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $P_u / \phi P_n$
T13	20 - 0	ROHN 2.5 STD	6.29	6.29	63.8 K=0.80	1.7040	-0.02	56.95	0.000 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $P_u / \phi P_n$
T1	180 - 160	L2x2x1/8	4.27	4.27	128.9 K=1.00	0.4844	-0.01	6.51	0.002 [1] ✔
T2	160 - 140	L2x2x1/8	4.31	4.31	130.2 K=1.00	0.4844	-0.01	6.40	0.001 [1] ✔
T3	140 - 133.333	L2x2x1/8	5.35	5.35	161.6 K=1.00	0.4844	-0.01	4.19	0.002 [1] ✔
T4	133.333 - 126.667	L2x2x1/8	5.70	5.70	172.1 K=1.00	0.4844	-0.16	3.69	0.044 [1] ✔
T5	126.667 - 120	L2x2x1/8	6.05	6.05	182.6 K=1.00	0.4844	-0.20	3.28	0.061 [1] ✔
T6	120 - 100	L2 1/2x2 1/2x3/16	6.96	6.96	168.7 K=1.00	0.9020	-0.01	7.16	0.002 [1] ✔
T7	100 - 90	L2 1/2x2 1/2x3/16	7.52	7.52	182.3 K=1.00	0.9020	-0.01	6.13	0.002 [1] ✔
T8	90 - 80	L2 1/2x2 1/2x3/16	8.18	8.18	198.3 K=1.00	0.9020	-0.24	5.18	0.046 [1] ✔
T9	80 - 60	L3x3x3/16	9.46	9.46	190.5 K=1.00	1.0900	-0.02	6.78	0.003 [1] ✔
T10	60 - 40	L3 1/2x3 1/2x1/4	10.71	10.71	185.2 K=1.00	1.6900	-0.02	11.13	0.002 [1] ✔
T11	40 - 30	L3 1/2x3 1/2x1/4	11.34	11.34	196.1 K=1.00	1.6900	-0.02	9.93	0.002 [1] ✔
T12	30 - 20	L3 1/2x3 1/2x1/4	11.96	11.96	206.9 K=1.00	1.6900	-0.34	8.92	0.039 [1] ✔
T13	20 - 0	ROHN 2 STD	12.59	12.59	191.9 K=1.00	1.0745	-0.02	6.59	0.003 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 3 STD	20.00	6.67	68.8	2.2285	4.86	100.28	0.048 [1] ✔
T2	160 - 140	ROHN 4 STD	20.04	6.68	53.1	3.1741	39.23	142.83	0.275 [1] ✔
T3	140 - 133.333	ROHN 5 EH	6.68	6.68	43.6	6.1120	52.40	275.04	0.191 [1] ✔
T4	133.333 - 126.667	ROHN 5 EH	6.68	6.68	43.6	6.1120	64.97	275.04	0.236 [1] ✔
T5	126.667 - 120	ROHN 5 EH	6.68	6.68	43.6	6.1120	80.91	275.04	0.294 [1] ✔
T6	120 - 100	ROHN 6 EHS	20.04	10.02	54.0	6.7133	128.67	302.10	0.426 [1] ✔
T7	100 - 90	ROHN 6 EH	10.03	10.03	54.8	8.4049	156.35	378.22	0.413 [1] ✔
T8	90 - 80	ROHN 6 EH	10.03	10.03	54.8	8.4049	180.81	378.22	0.478 [1] ✔
T9	80 - 60	ROHN 8 EHS	20.05	10.03	41.2	9.7193	227.99	437.37	0.521 [1] ✔
T10	60 - 40	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	20.05	10.03	42.2	13.6005	274.02	514.10	0.533 [1] ✔
T11	40 - 30	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	10.03	10.03	42.2	13.6005	296.86	514.10	0.577 [1] ✔
T12	30 - 20	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	10.03	10.03	42.2	13.6005	319.45	514.10	0.621 [1] ✔
T13	20 - 0	1/3 9.6250x0.375 on ROHN 8 EH Leg Pipe	20.05	10.03	42.9	16.6002	340.00	627.49	0.542 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 2 STD	7.94	7.67	117.0	1.0745	5.31	48.35	0.110 [1] ✔
T2	160 - 140	ROHN 2 STD	8.14	7.84	119.5	1.0745	10.38	48.35	0.215 [1] ✔
T3	140 - 133.333	ROHN 2 EH	8.77	8.42	131.5	1.4807	9.94	66.63	0.149 [1] ✔
T4	133.333 - 126.667	ROHN 2 EH	9.00	8.66	135.3	1.4807	13.53	66.63	0.203 [1] ✔
T5	126.667 - 120	ROHN 2 XXS	9.24	8.91	152.1	2.6559	16.36	119.52	0.137 [1] ✔
T6	120 - 100	Pipe 2.5 XXS	12.52	12.06	171.4	4.0285	21.24	181.28	0.117 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T7	100 - 90	ROHN 3 STD	12.92	12.49	128.8	2.2285	19.91	100.28	0.199 [1] ✔
T8	90 - 80	ROHN 3 STD	13.35	12.93	133.4	2.2285	20.19	100.28	0.201 [1] ✔
T9	80 - 60	ROHN 3 STD	14.21	13.70	141.3	2.2285	21.67	100.28	0.216 [1] ✔
T10	60 - 40	P3.5x.226	15.12	14.64	131.4	2.6795	23.13	120.58	0.192 [1] ✔
T11	40 - 30	P3.5x.226	15.60	15.12	135.8	2.6795	23.80	120.58	0.197 [1] ✔
T12	30 - 20	P3.5x.226	16.08	15.62	140.2	2.6795	24.48	120.58	0.203 [1] ✔
T13	20 - 0	P3.5x.226	24.33	23.70	212.8	2.6795	36.63	120.58	0.304 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 1.5 STD	8.60	4.15	80.0	0.7995	2.96	35.98	0.082 [1] ✔
T2	160 - 140	ROHN 1.5 STD	8.63	4.13	79.5	0.7995	6.25	35.98	0.174 [1] ✔
T3	140 - 133.333	ROHN 2 STD	10.71	5.17	78.8	1.0745	6.50	48.35	0.134 [1] ✔
T6	120 - 100	ROHN 2 STD	13.92	6.68	101.9	1.0745	12.96	48.35	0.268 [1] ✔
T7	100 - 90	ROHN 2 STD	15.04	7.24	110.5	1.0745	12.94	48.35	0.268 [1] ✔
T9	80 - 60	ROHN 2.5 STD	18.93	9.10	115.3	1.7040	15.71	76.68	0.205 [1] ✔
T10	60 - 40	ROHN 2.5 STD	21.43	10.35	131.1	1.7040	17.77	76.68	0.232 [1] ✔
T11	40 - 30	ROHN 2.5 STD	22.68	10.97	139.0	1.7040	18.72	76.68	0.244 [1] ✔
T13	20 - 0	P3.5x.226	25.18	12.22	109.7	2.6795	20.92	120.58	0.174 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 1.5 STD	8.54	4.13	79.5	0.7995	0.65	35.98	0.018 [1] ✔
T4	133.333 - 126.667	ROHN 2 STD	11.40	5.47	83.4	1.0745	9.28	48.35	0.192 [1] ✔
T5	126.667 - 120	ROHN 2 STD	12.10	5.82	88.7	1.0745	11.46	48.35	0.237 [1] ✔
T8	90 - 80	ROHN 2 STD	16.36	7.90	120.5	1.0745	13.63	48.35	0.282 [1] ✔
T12	30 - 20	ROHN 2.5 EH	23.93	11.60	150.6	2.2535	19.55	101.41	0.193 [1] ✔

[1] P_u / ϕP_n controls

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	ROHN 1.5 STD	6.29	5.93	114.4	0.7995	6.46	35.98	0.180 [1] ✔

[1] P_u / ϕP_n controls

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	ROHN 2 STD	11.50	10.76	164.1	1.0745	5.91	48.35	0.122 [1] ✔

[1] P_u / ϕP_n controls

Redundant Hip (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	ROHN 2.5 STD	6.29	6.29	79.7	1.7040	0.01	76.68	0.000 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	4.27	4.27	81.8	0.4844	0.01	15.69	0.001 [1] ✔
T2	160 - 140	L2x2x1/8	4.31	4.31	82.6	0.4844	0.01	15.69	0.000 [1] ✔
T3	140 - 133.333	L2x2x1/8	5.35	5.35	102.6	0.4844	0.01	15.69	0.000 [1] ✔
T4	133.333 - 126.667	L2x2x1/8	5.70	5.70	109.3	0.4844	0.16	15.69	0.010 [1] ✔
T5	126.667 - 120	L2x2x1/8	6.05	6.05	115.9	0.4844	0.20	15.69	0.013 [1] ✔
T6	120 - 100	L2 1/2x2 1/2x3/16	6.40	6.40	98.7	0.9020	0.01	29.22	0.000 [1] ✔
T7	100 - 90	L2 1/2x2 1/2x3/16	7.52	7.52	116.0	0.9020	0.00	29.22	0.000 [1] ✔
T8	90 - 80	L2 1/2x2 1/2x3/16	8.18	8.18	126.2	0.9020	0.23	29.22	0.008 [1] ✔
T9	80 - 60	L3x3x3/16	8.84	8.84	113.0	1.0900	0.00	35.32	0.000 [1] ✔
T10	60 - 40	L3 1/2x3 1/2x1/4	10.09	10.09	111.1	1.6900	0.00	76.05	0.000 [1] ✔
T11	40 - 30	L3 1/2x3 1/2x1/4	11.34	11.34	124.8	1.6900	0.00	76.05	0.000 [1] ✔
T12	30 - 20	L3 1/2x3 1/2x1/4	11.96	11.96	131.7	1.6900	0.33	76.05	0.004 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 3 STD	1	-5.95	70.98	8.4	Pass
		Leg	ROHN 3 STD	2	-6.24	70.98	8.8	Pass
		Leg	ROHN 3 STD	3	-5.99	70.98	8.4	Pass
T2	160 - 140	Leg	ROHN 4 STD	40	-42.61	116.23	36.7	Pass
		Leg	ROHN 4 STD	41	-44.43	116.23	38.2	Pass
		Leg	ROHN 4 STD	42	-42.65	116.23	36.7	Pass
T3	140 - 133.333	Leg	ROHN 5 EH	79	-55.86	239.38	23.3 28.0 (b)	Pass
		Leg	ROHN 5 EH	80	-58.05	239.38	24.3 29.3 (b)	Pass
		Leg	ROHN 5 EH	81	-55.90	239.38	23.4 28.0 (b)	Pass
T4	133.333 - 126.667	Leg	ROHN 5 EH	94	-70.04	239.38	29.3 34.7 (b)	Pass
		Leg	ROHN 5 EH	95	-72.59	239.38	30.3 36.3 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Leg	ROHN 5 EH	96	-70.07	239.38	29.3 34.7 (b)	Pass
T5	126.667 - 120	Leg	ROHN 5 EH	109	-88.17	239.38	36.8 43.4 (b)	Pass
		Leg	ROHN 5 EH	110	-91.06	239.38	38.0 45.2 (b)	Pass
		Leg	ROHN 5 EH	111	-88.30	239.38	36.9 43.4 (b)	Pass
T6	120 - 100	Leg	ROHN 6 EHS	124	-138.35	244.02	56.7 69.7 (b)	Pass
		Leg	ROHN 6 EHS	125	-141.93	244.02	58.2 71.9 (b)	Pass
		Leg	ROHN 6 EHS	126	-138.85	244.02	56.9 69.6 (b)	Pass
T7	100 - 90	Leg	ROHN 6 EH	151	-167.34	303.58	55.1 85.0 (b)	Pass
		Leg	ROHN 6 EH	152	-171.25	303.58	56.4 87.4 (b)	Pass
		Leg	ROHN 6 EH	153	-168.00	303.58	55.3 84.8 (b)	Pass
T8	90 - 80	Leg	ROHN 6 EH	166	-192.96	303.58	63.6	Pass
		Leg	ROHN 6 EH	167	-197.09	303.58	64.9	Pass
		Leg	ROHN 6 EH	168	-193.77	303.58	63.8	Pass
T9	80 - 60	Leg	ROHN 8 EHS	181	-242.91	386.31	62.9 70.1 (b)	Pass
		Leg	ROHN 8 EHS	182	-247.41	386.31	64.0 71.7 (b)	Pass
		Leg	ROHN 8 EHS	183	-244.00	386.31	63.2 69.9 (b)	Pass
T10	60 - 40	Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	208	-292.73	460.81	63.5	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	209	-297.53	460.81	64.6 64.6 (b)	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	210	-294.09	460.81	63.8	Pass
T11	40 - 30	Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	235	-317.87	460.81	69.0	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	236	-322.79	460.81	70.0	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	237	-319.36	460.81	69.3	Pass
T12	30 - 20	Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	250	-343.00	460.81	74.4	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	251	-348.02	460.81	75.5	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	252	-344.60	460.81	74.8	Pass
T13	20 - 0	Leg	1/3 9.6250x0.375 on ROHN 8 EH Leg Pipe	265	-367.33	560.41	65.5 78.7 (b)	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EH Leg Pipe	266	-372.39	560.41	66.5 80.0 (b)	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EH Leg Pipe	267	-369.24	560.41	65.9 78.4 (b)	Pass
T1	180 - 160	Diagonal	ROHN 2 STD	8	-5.38	17.75	30.3	Pass
		Diagonal	ROHN 2 STD	9	-5.38	17.75	30.3	Pass
		Diagonal	ROHN 2 STD	11	-5.03	17.75	28.4	Pass
		Diagonal	ROHN 2 STD	12	-5.03	17.75	28.4	Pass
		Diagonal	ROHN 2 STD	14	-4.05	17.75	22.8	Pass
		Diagonal	ROHN 2 STD	15	-4.05	17.75	22.8	Pass
		Diagonal	ROHN 2 STD	20	-3.75	17.78	21.1	Pass
		Diagonal	ROHN 2 STD	21	-3.75	17.78	21.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	øP_allow K	% Capacity	Pass Fail
		Diagonal	ROHN 2 STD	23	-2.71	17.78	15.3	Pass
		Diagonal	ROHN 2 STD	24	-2.71	17.78	15.3	Pass
		Diagonal	ROHN 2 STD	26	-3.48	17.78	19.6	Pass
		Diagonal	ROHN 2 STD	27	-3.48	17.78	19.6	Pass
		Diagonal	ROHN 2 STD	31	-0.91	17.82	5.1	Pass
		Diagonal	ROHN 2 STD	32	-0.91	17.82	5.1	Pass
		Diagonal	ROHN 2 STD	33	-0.26	17.82	1.4	Pass
		Diagonal	ROHN 2 STD	34	-0.25	17.82	1.4	Pass
		Diagonal	ROHN 2 STD	35	-1.08	17.82	6.1	Pass
		Diagonal	ROHN 2 STD	36	-1.08	17.82	6.1	Pass
T2	160 - 140	Diagonal	ROHN 2 STD	44	-9.52	15.33	62.1	Pass
		Diagonal	ROHN 2 STD	45	-9.52	15.33	62.1	Pass
		Diagonal	ROHN 2 STD	47	-9.77	15.33	63.7	Pass
		Diagonal	ROHN 2 STD	48	-9.76	15.33	63.7	Pass
		Diagonal	ROHN 2 STD	50	-9.80	15.33	63.9	Pass
		Diagonal	ROHN 2 STD	51	-9.80	15.33	63.9	Pass
		Diagonal	ROHN 2 STD	56	-10.00	16.15	61.9	Pass
		Diagonal	ROHN 2 STD	57	-10.00	16.15	61.9	Pass
		Diagonal	ROHN 2 STD	59	-10.00	16.15	61.9	Pass
		Diagonal	ROHN 2 STD	60	-10.00	16.15	61.9	Pass
		Diagonal	ROHN 2 STD	62	-9.76	16.15	60.4	Pass
		Diagonal	ROHN 2 STD	63	-9.77	16.15	60.5	Pass
		Diagonal	ROHN 2 STD	68	-10.45	17.01	61.5	Pass
		Diagonal	ROHN 2 STD	69	-10.44	17.01	61.4	Pass
		Diagonal	ROHN 2 STD	71	-10.19	17.01	59.9	Pass
		Diagonal	ROHN 2 STD	72	-10.20	17.01	60.0	Pass
		Diagonal	ROHN 2 STD	74	-9.62	17.01	56.5	Pass
		Diagonal	ROHN 2 STD	75	-9.62	17.01	56.6	Pass
T3	140 - 133.333	Diagonal	ROHN 2 EH	83	-9.31	19.35	48.1	Pass
		Diagonal	ROHN 2 EH	84	-9.31	19.35	48.1	Pass
		Diagonal	ROHN 2 EH	86	-9.77	19.35	50.5	Pass
		Diagonal	ROHN 2 EH	87	-9.76	19.35	50.4	Pass
		Diagonal	ROHN 2 EH	89	-10.06	19.35	52.0	Pass
		Diagonal	ROHN 2 EH	90	-10.06	19.35	52.0	Pass
T4	133.333 - 126.667	Diagonal	ROHN 2 EH	100	-12.68	18.29	69.4	Pass
		Diagonal	ROHN 2 EH	101	-12.69	18.29	69.4	Pass
		Diagonal	ROHN 2 EH	102	-13.27	18.29	72.5	Pass
		Diagonal	ROHN 2 EH	103	-13.26	18.29	72.5	Pass
		Diagonal	ROHN 2 EH	104	-13.65	18.29	74.7	Pass
		Diagonal	ROHN 2 EH	105	-13.65	18.29	74.7	Pass
T5	126.667 - 120	Diagonal	ROHN 2 XXS	115	-15.33	25.94	59.1	Pass
		Diagonal	ROHN 2 XXS	116	-15.34	25.94	59.1	Pass
		Diagonal	ROHN 2 XXS	117	-16.25	25.94	62.6	Pass
		Diagonal	ROHN 2 XXS	118	-16.23	25.94	62.6	Pass
		Diagonal	ROHN 2 XXS	119	-16.54	25.94	63.8	Pass
		Diagonal	ROHN 2 XXS	120	-16.55	25.94	63.8	Pass
T6	120 - 100	Diagonal	Pipe 2.5 XXS	128	-18.23	30.98	58.9	Pass
		Diagonal	Pipe 2.5 XXS	129	-18.25	30.98	58.9	Pass
		Diagonal	Pipe 2.5 XXS	131	-21.57	30.98	69.6	Pass
		Diagonal	Pipe 2.5 XXS	132	-21.53	30.98	69.5	Pass
		Diagonal	Pipe 2.5 XXS	134	-21.53	30.98	69.5	Pass
		Diagonal	Pipe 2.5 XXS	135	-21.55	30.98	69.6	Pass
		Diagonal	Pipe 2.5 XXS	140	-19.11	32.74	58.4	Pass
		Diagonal	Pipe 2.5 XXS	141	-19.12	32.74	58.4	Pass
		Diagonal	Pipe 2.5 XXS	143	-21.31	32.74	65.1	Pass
		Diagonal	Pipe 2.5 XXS	144	-21.28	32.74	65.0	Pass
		Diagonal	Pipe 2.5 XXS	146	-21.49	32.74	65.6	Pass
		Diagonal	Pipe 2.5 XXS	147	-21.50	32.74	65.7	Pass
T7	100 - 90	Diagonal	ROHN 3 STD	155	-15.98	30.35	52.7	Pass
		Diagonal	ROHN 3 STD	156	-16.00	30.35	52.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Diagonal	ROHN 3 STD	158	-20.14	30.35	66.4	Pass
		Diagonal	ROHN 3 STD	159	-20.09	30.35	66.2	Pass
		Diagonal	ROHN 3 STD	161	-19.96	30.35	65.8	Pass
		Diagonal	ROHN 3 STD	162	-19.99	30.35	65.9	Pass
T8	90 - 80	Diagonal	ROHN 3 STD	172	-15.58	28.29	55.1	Pass
		Diagonal	ROHN 3 STD	173	-15.59	28.29	55.1	Pass
		Diagonal	ROHN 3 STD	174	-20.44	28.29	72.2	Pass
		Diagonal	ROHN 3 STD	175	-20.38	28.29	72.0	Pass
		Diagonal	ROHN 3 STD	176	-20.12	28.29	71.1	Pass
		Diagonal	ROHN 3 STD	177	-20.16	28.29	71.3	Pass
T9	80 - 60	Diagonal	ROHN 3 STD	185	-16.01	25.21	63.5	Pass
		Diagonal	ROHN 3 STD	186	-16.02	25.21	63.6	Pass
		Diagonal	ROHN 3 STD	188	-22.01	25.21	87.3	Pass
		Diagonal	ROHN 3 STD	189	-21.93	25.21	87.0	Pass
		Diagonal	ROHN 3 STD	191	-21.50	25.21	85.3	Pass
		Diagonal	ROHN 3 STD	192	-21.56	25.21	85.5	Pass
		Diagonal	ROHN 3 STD	197	-15.95	26.89	59.3	Pass
		Diagonal	ROHN 3 STD	198	-15.96	26.89	59.4	Pass
		Diagonal	ROHN 3 STD	200	-21.47	26.89	79.8	Pass
		Diagonal	ROHN 3 STD	201	-21.40	26.89	79.6	Pass
		Diagonal	ROHN 3 STD	203	-21.04	26.89	78.2	Pass
		Diagonal	ROHN 3 STD	204	-21.09	26.89	78.4	Pass
T10	60 - 40	Diagonal	P3.5x.226	212	-16.71	35.06	47.7	Pass
		Diagonal	P3.5x.226	213	-16.72	35.06	47.7	Pass
		Diagonal	P3.5x.226	215	-23.59	35.06	67.3	Pass
		Diagonal	P3.5x.226	216	-23.51	35.06	67.1	Pass
		Diagonal	P3.5x.226	218	-22.96	35.06	65.5	Pass
		Diagonal	P3.5x.226	219	-23.03	35.06	65.7	Pass
		Diagonal	P3.5x.226	224	-16.18	37.39	43.3 43.4 (b)	Pass
		Diagonal	P3.5x.226	225	-16.19	37.39	43.3 43.4 (b)	Pass
		Diagonal	P3.5x.226	227	-22.73	37.39	60.8 61.0 (b)	Pass
		Diagonal	P3.5x.226	228	-22.65	37.39	60.6 60.8 (b)	Pass
		Diagonal	P3.5x.226	230	-22.15	37.39	59.3 59.4 (b)	Pass
		Diagonal	P3.5x.226	231	-22.22	37.39	59.4 59.6 (b)	Pass
T11	40 - 30	Diagonal	P3.5x.226	239	-17.05	32.85	51.9	Pass
		Diagonal	P3.5x.226	240	-17.06	32.85	51.9	Pass
		Diagonal	P3.5x.226	242	-24.30	32.85	74.0	Pass
		Diagonal	P3.5x.226	243	-24.21	32.85	73.7	Pass
		Diagonal	P3.5x.226	245	-23.61	32.85	71.9	Pass
		Diagonal	P3.5x.226	246	-23.69	32.85	72.1	Pass
T12	30 - 20	Diagonal	P3.5x.226	256	-17.76	30.80	57.6	Pass
		Diagonal	P3.5x.226	257	-17.77	30.80	57.7	Pass
		Diagonal	P3.5x.226	258	-25.07	30.80	81.4	Pass
		Diagonal	P3.5x.226	259	-24.98	30.80	81.1	Pass
		Diagonal	P3.5x.226	260	-24.35	30.80	79.0	Pass
		Diagonal	P3.5x.226	261	-24.43	30.80	79.3	Pass
T13	20 - 0	Diagonal	P3.5x.226	269	-25.73	52.71	48.8 56.5 (b)	Pass
		Diagonal	P3.5x.226	272	-25.77	52.71	48.9 56.6 (b)	Pass
		Diagonal	P3.5x.226	276	-37.43	52.71	71.0 82.1 (b)	Pass
		Diagonal	P3.5x.226	279	-36.75	52.71	69.7 80.7 (b)	Pass
		Diagonal	P3.5x.226	284	-35.57	52.71	67.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
							78.1 (b)	
		Diagonal	P3.5x.226	287	-36.38	52.71	69.0 79.9 (b)	Pass
T1	180 - 160	Horizontal	ROHN 1.5 STD	7	-2.93	22.52	13.0	Pass
		Horizontal	ROHN 1.5 STD	10	-2.74	22.52	12.2	Pass
		Horizontal	ROHN 1.5 STD	13	-2.20	22.52	9.8	Pass
		Horizontal	ROHN 1.5 STD	19	-2.35	22.59	10.4	Pass
		Horizontal	ROHN 1.5 STD	22	-1.70	22.59	7.5	Pass
		Horizontal	ROHN 1.5 STD	25	-2.20	22.59	9.7	Pass
T2	160 - 140	Horizontal	ROHN 1.5 STD	43	-5.91	19.14	30.9	Pass
		Horizontal	ROHN 1.5 STD	46	-6.06	19.14	31.7	Pass
		Horizontal	ROHN 1.5 STD	49	-6.09	19.14	31.8	Pass
		Horizontal	ROHN 1.5 STD	55	-5.96	20.90	28.5	Pass
		Horizontal	ROHN 1.5 STD	58	-5.96	20.90	28.5	Pass
		Horizontal	ROHN 1.5 STD	61	-5.82	20.90	27.8	Pass
		Horizontal	ROHN 1.5 STD	67	-6.36	22.66	28.1	Pass
		Horizontal	ROHN 1.5 STD	70	-6.25	22.66	27.6	Pass
		Horizontal	ROHN 1.5 STD	73	-5.95	22.66	26.3	Pass
T3	140 - 133.333	Horizontal	ROHN 2 STD	82	-5.98	30.72	19.5 24.2 (b)	Pass
		Horizontal	ROHN 2 STD	85	-6.29	30.72	20.5 25.4 (b)	Pass
		Horizontal	ROHN 2 STD	88	-6.47	30.72	21.1 26.1 (b)	Pass
T6	120 - 100	Horizontal	ROHN 2 STD	127	-10.76	22.64	47.5	Pass
		Horizontal	ROHN 2 STD	130	-12.87	22.64	56.9	Pass
		Horizontal	ROHN 2 STD	133	-12.83	22.64	56.7	Pass
		Horizontal	ROHN 2 STD	139	-10.76	25.59	42.1 43.5 (b)	Pass
		Horizontal	ROHN 2 STD	142	-12.11	25.59	47.3 48.8 (b)	Pass
		Horizontal	ROHN 2 STD	145	-12.15	25.59	47.5 49.0 (b)	Pass
T7	100 - 90	Horizontal	ROHN 2 STD	154	-10.01	19.82	50.5	Pass
		Horizontal	ROHN 2 STD	157	-12.95	19.82	65.3	Pass
		Horizontal	ROHN 2 STD	160	-12.84	19.82	64.8	Pass
T9	80 - 60	Horizontal	ROHN 2.5 STD	184	-11.15	28.95	38.5 45.4 (b)	Pass
		Horizontal	ROHN 2.5 STD	187	-15.62	28.95	54.0 63.2 (b)	Pass
		Horizontal	ROHN 2.5 STD	190	-15.30	28.95	52.9 62.0 (b)	Pass
		Horizontal	ROHN 2.5 STD	196	-10.76	32.99	32.6 43.9 (b)	Pass
		Horizontal	ROHN 2.5 STD	199	-14.70	32.99	44.5 59.5 (b)	Pass
		Horizontal	ROHN 2.5 STD	202	-14.44	32.99	43.8 58.5 (b)	Pass
T10	60 - 40	Horizontal	ROHN 2.5 STD	211	-12.21	22.41	54.5	Pass
		Horizontal	ROHN 2.5 STD	214	-17.61	22.41	78.6	Pass
		Horizontal	ROHN 2.5 STD	217	-17.19	22.41	76.7	Pass
		Horizontal	ROHN 2.5 STD	223	-11.55	25.38	45.5 47.1 (b)	Pass
		Horizontal	ROHN 2.5 STD	226	-16.57	25.38	65.3 67.1 (b)	Pass
		Horizontal	ROHN 2.5 STD	229	-16.20	25.38	63.8 65.6 (b)	Pass
T11	40 - 30	Horizontal	ROHN 2.5 STD	238	-12.74	19.93	63.9	Pass
		Horizontal	ROHN 2.5 STD	241	-18.55	19.93	93.1	Pass
		Horizontal	ROHN 2.5 STD	244	-18.09	19.93	90.8	Pass
T13	20 - 0	Horizontal	P3.5x.226	268	-13.98	49.99	28.0	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	øP_allow K	% Capacity	Pass Fail
							39.3 (b)	
		Horizontal	P3.5x.226	275	-20.91	49.99	41.8 58.5 (b)	Pass
		Horizontal	P3.5x.226	283	-20.33	49.99	40.7 56.9 (b)	Pass
T1	180 - 160	Top Girt	ROHN 1.5 STD	4	-0.59	22.66	2.6	Pass
		Top Girt	ROHN 1.5 STD	5	-0.25	22.66	1.1	Pass
		Top Girt	ROHN 1.5 STD	6	-0.65	22.66	2.9	Pass
T4	133.333 - 126.667	Top Girt	ROHN 2 STD	97	-8.47	29.08	29.1 34.1 (b)	Pass
		Top Girt	ROHN 2 STD	98	-9.14	29.08	31.4 36.8 (b)	Pass
		Top Girt	ROHN 2 STD	99	-9.30	29.08	32.0 37.4 (b)	Pass
T5	126.667 - 120	Top Girt	ROHN 2 STD	112	-10.52	27.21	38.7 42.3 (b)	Pass
		Top Girt	ROHN 2 STD	113	-11.35	27.21	41.7 45.7 (b)	Pass
		Top Girt	ROHN 2 STD	114	-11.46	27.21	42.1 46.1 (b)	Pass
T8	90 - 80	Top Girt	ROHN 2 STD	169	-10.17	16.72	60.8	Pass
		Top Girt	ROHN 2 STD	170	-13.59	16.72	81.3	Pass
		Top Girt	ROHN 2 STD	171	-13.41	16.72	80.2	Pass
T12	30 - 20	Top Girt	ROHN 2.5 EH	253	-13.46	22.44	60.0	Pass
		Top Girt	ROHN 2.5 EH	254	-19.27	22.44	85.9	Pass
		Top Girt	ROHN 2.5 EH	255	-18.77	22.44	83.7	Pass
T13	20 - 0	Redund Horz 1 Bracing	ROHN 1.5 STD	270	-6.38	19.50	32.7	Pass
		Redund Horz 1 Bracing	ROHN 1.5 STD	273	-6.46	19.50	33.1	Pass
		Redund Horz 1 Bracing	ROHN 1.5 STD	277	-6.46	19.50	33.1	Pass
		Redund Horz 1 Bracing	ROHN 1.5 STD	280	-6.41	19.50	32.9	Pass
		Redund Horz 1 Bracing	ROHN 1.5 STD	285	-6.41	19.50	32.9	Pass
		Redund Horz 1 Bracing	ROHN 1.5 STD	288	-6.38	19.50	32.7	Pass
T13	20 - 0	Redund Diag 1 Bracing	ROHN 2 STD	271	-5.83	14.09	41.4	Pass
		Redund Diag 1 Bracing	ROHN 2 STD	274	-5.91	14.09	41.9	Pass
		Redund Diag 1 Bracing	ROHN 2 STD	278	-5.91	14.09	41.9	Pass
		Redund Diag 1 Bracing	ROHN 2 STD	281	-5.86	14.09	41.6	Pass
		Redund Diag 1 Bracing	ROHN 2 STD	286	-5.86	14.09	41.6	Pass
		Redund Diag 1 Bracing	ROHN 2 STD	289	-5.83	14.09	41.4	Pass
T13	20 - 0	Redund Hip 1 Bracing	ROHN 2.5 STD	282	-0.02	56.95	0.1	Pass
		Redund Hip 1 Bracing	ROHN 2.5 STD	290	-0.02	56.95	0.1	Pass
		Redund Hip 1 Bracing	ROHN 2.5 STD	291	-0.02	56.95	0.1	Pass
T1	180 - 160	Inner Bracing	L2x2x1/8	16	-0.00	6.44	0.7	Pass
		Inner Bracing	L2x2x1/8	17	-0.00	6.44	0.7	Pass
		Inner Bracing	L2x2x1/8	18	-0.00	6.44	0.7	Pass
		Inner Bracing	L2x2x1/8	28	-0.00	6.48	0.7	Pass
		Inner Bracing	L2x2x1/8	29	-0.00	6.48	0.7	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	øP_allow K	% Capacity	Pass Fail
		Inner Bracing	L2x2x1/8	30	-0.00	6.48	0.7	Pass
		Inner Bracing	L2x2x1/8	37	-0.01	6.51	0.7	Pass
		Inner Bracing	L2x2x1/8	38	-0.01	6.51	0.7	Pass
		Inner Bracing	L2x2x1/8	39	-0.01	6.51	0.7	Pass
T2	160 - 140	Inner Bracing	L2x2x1/8	52	-0.01	4.79	0.8	Pass
		Inner Bracing	L2x2x1/8	53	-0.01	4.79	0.8	Pass
		Inner Bracing	L2x2x1/8	54	-0.01	4.79	0.8	Pass
		Inner Bracing	L2x2x1/8	64	-0.01	5.53	0.7	Pass
		Inner Bracing	L2x2x1/8	65	-0.01	5.53	0.7	Pass
		Inner Bracing	L2x2x1/8	66	-0.01	5.53	0.7	Pass
		Inner Bracing	L2x2x1/8	76	-0.01	6.40	0.7	Pass
		Inner Bracing	L2x2x1/8	77	-0.01	6.40	0.7	Pass
		Inner Bracing	L2x2x1/8	78	-0.01	6.40	0.7	Pass
T3	140 - 133.333	Inner Bracing	L2x2x1/8	91	-0.01	4.19	0.8	Pass
		Inner Bracing	L2x2x1/8	92	-0.01	4.19	0.8	Pass
		Inner Bracing	L2x2x1/8	93	-0.01	4.19	0.8	Pass
T4	133.333 - 126.667	Inner Bracing	L2x2x1/8	106	-0.16	3.69	4.3	Pass
		Inner Bracing	L2x2x1/8	107	-0.16	3.69	4.4	Pass
		Inner Bracing	L2x2x1/8	108	-0.16	3.69	4.4	Pass
T5	126.667 - 120	Inner Bracing	L2x2x1/8	121	-0.20	3.28	6.1	Pass
		Inner Bracing	L2x2x1/8	122	-0.20	3.28	6.1	Pass
		Inner Bracing	L2x2x1/8	123	-0.20	3.28	6.1	Pass
T6	120 - 100	Inner Bracing	L2 1/2x2 1/2x3/16	136	-0.01	7.16	0.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	137	-0.01	7.16	0.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	138	-0.01	7.16	0.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	148	-0.01	8.48	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	149	-0.01	8.48	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	150	-0.01	8.48	0.6	Pass
T7	100 - 90	Inner Bracing	L2 1/2x2 1/2x3/16	163	-0.01	6.13	0.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	164	-0.01	6.13	0.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	165	-0.01	6.13	0.7	Pass
T8	90 - 80	Inner Bracing	L2 1/2x2 1/2x3/16	178	-0.24	5.18	4.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	179	-0.24	5.18	4.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	180	-0.24	5.18	4.6	Pass
T9	80 - 60	Inner Bracing	L3x3x3/16	193	-0.02	6.78	0.9	Pass
		Inner Bracing	L3x3x3/16	194	-0.02	6.78	0.9	Pass
		Inner Bracing	L3x3x3/16	195	-0.02	6.78	0.9	Pass
		Inner Bracing	L3x3x3/16	205	-0.02	7.78	0.8	Pass
		Inner Bracing	L3x3x3/16	206	-0.02	7.78	0.8	Pass
		Inner Bracing	L3x3x3/16	207	-0.02	7.78	0.8	Pass
T10	60 - 40	Inner Bracing	L3 1/2x3 1/2x1/4	220	-0.02	11.13	0.5	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	221	-0.02	11.13	0.5	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	222	-0.02	11.13	0.5	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	232	-0.02	12.55	0.5	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	233	-0.02	12.55	0.5	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	234	-0.02	12.55	0.5	Pass
T11	40 - 30	Inner Bracing	L3 1/2x3 1/2x1/4	247	-0.02	9.93	0.5	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	248	-0.02	9.93	0.5	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	249	-0.02	9.93	0.5	Pass
T12	30 - 20	Inner Bracing	L3 1/2x3 1/2x1/4	262	-0.34	8.92	3.9	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	263	-0.34	8.92	3.9	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	264	-0.34	8.92	3.8	Pass
T13	20 - 0	Inner Bracing	ROHN 2 STD	292	-0.02	6.59	0.3	Pass
		Inner Bracing	ROHN 2 STD	293	-0.02	6.59	0.3	Pass
		Inner Bracing	ROHN 2 STD	294	-0.02	6.59	0.3	Pass
							Summary	
						Leg (T7)	87.4	Pass
						Diagonal (T9)	87.3	Pass
						Horizontal	93.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
						(T11)		
						Top Girt (T12)	85.9	Pass
						Redund Horz 1 Bracing (T13)	33.1	Pass
						Redund Diag 1 Bracing (T13)	41.9	Pass
						Redund Hip 1 Bracing (T13)	0.1	Pass
						Inner Bracing (T5)	6.1	Pass
						Bolt Checks	87.4	Pass
						RATING =	**93.1**	**Pass**

ANCHOR BOLT EVALUATION

ANCHOR BOLT ANALYSIS

Input Data

Tower Reactions:

Uplift:	$Uplift := 384 \cdot kips$	*user input*
Shear:	$Shear := 59 \cdot kips$	*user input*
Compression:	$Compression := 421 \cdot kips$	*user input*

Anchor Bolt Data:

Use ASTM A354 Gr. BC

Number of Anchor Bolts = N	$N := 10$	*user input*	
Bolt Ultimate Strength:	$F_u := 125 \cdot ksi$	*user input*	
Bolt Yield Strength:	$Fy := 109 \cdot ksi$	*user input*	
Bolt Modulus:	$E := 29000 ksi$	*user input*	
Thickness of Anchor Bolts	$D := 1.0 in$	*user input*	
Threads per Inch:	$n := 8$	*user input*	
Coefficient of Friction:	$\mu := 0.55$	*user input*	(for baseplate with grout ASCE 10-15)
Length from top of pier to bottom of leveling nut:	$L_{ar} := 0 in$	*user input*	
Bolt Modulus:	$E := 29000 \cdot ksi$	*user input*	

Anchor Bolt Section Properties:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \qquad A_g = 0.79 \cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 \qquad A_n = 0.61 \cdot in^2$$

Net Diameter:

$$D_n := D - \frac{0.9743in}{n} \qquad D_n = 0.88 \cdot in$$

Radius of Gyration of Bolt:

$$r := \frac{D_n}{4} \qquad r = 0.22 \cdot in$$

Plastic Section Modulus of Bolt:

$$Z_x := \frac{D_n^{\ 3}}{6} \qquad Z_x = 0.11 \cdot in^3$$

Forces:

Tension Force:

$$T_u := \frac{Uplift}{N}$$

$$T_u = 38.4 \cdot kip \qquad T_{ub} := T_u$$

Shear Force:

$$V_u := \frac{Shear}{N}$$

$$V_u = 5.9 \cdot kip \qquad V_{ub} := V_u$$

Resistance Factor for Flexure (ANSI/TIA-222-G 4.7):

$$\phi_f := 0.9$$

Resistance Factor for Anchor Bolt (ANSI/TIA-222-G 4.5.4.2):

$$\phi_b := 0.80$$

Resistance Factor for Tension (ANSI/TIA-222-G 4.9.6.1):

$$\phi_t := 0.75$$

Resistance Factor for Shear (ANSI/TIA-222-G 4.9.6.3):

$$\phi_v := 0.75$$

ANSI/TIA-222-G 4.7.1 Flexural Members:

Nominal Flexure Strength, Mn:

$M_n := Fy \cdot Z_x$

$M_n = 1.03 \cdot ft \cdot kip$

$\phi_f \cdot M_n = 0.92 \cdot ft \cdot kip$

Applied Moment due to Shear (worst case lever arm), Mu:

$M_u := L_{ar} \cdot V_u$

$M_u = 0 \cdot ft \cdot kip$

Flexure Check:

$FlexureCheck := if(M_u \le \phi_f \cdot M_n, \text{"OK"}, \text{"NO GOOD"})$

$FlexureCheck = \text{"OK"}$

$\frac{M_u}{\phi_f \cdot M_n} = 0 \cdot \%$

ANSI/TIA-222-G 4.9.6.1 Tensile Strength:

Design Tensile Strength, Rnt:

$R_{nt} := F_u \cdot A_n$

$R_{nt} = 75.72 \cdot ft \cdot kip$

$\phi_t \cdot R_{nt} = 56.79 \cdot ft \cdot kip$

Tension Check:

$TensionCheck := if(T_u \le \phi_t \cdot R_{nt}, \text{"OK"}, \text{"NO GOOD"})$

$TensionCheck = \text{"OK"}$

$\frac{T_u}{\phi_t \cdot R_{nt}} = 67.62 \cdot \%$

ANSI/TIA-222-G 4.9.6.3 Design Shear Strength:

Design Shear Strength, Rnv:

$R_{nv} := 0.45 \cdot F_u \cdot A_g$

$R_{nv} = 44.18 \cdot ft \cdot kip$

$\phi_v \cdot R_{nv} = 33.13 \cdot ft \cdot kip$

Shear Check:

$ShearCheck := if(V_u \le \phi_v \cdot R_{nv}, \text{"OK"}, \text{"NO GOOD"})$

$ShearCheck = \text{"OK"}$

$\frac{V_u}{\phi_v \cdot R_{nv}} = 17.81 \cdot \%$

ANSI/TIA-222-G 4.9.6.4 Combined Shear and Tension:

$$\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt})}\right]^2 \le 1$$

$$\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt})}\right]^2 = 0.49$$

Combined Shear and Tension Check:

$$\text{ShearAndTensionCheck} := \text{if}\left[\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt})}\right]^2 \le 1, \text{"OK"}, \text{"NO GOOD"}\right]$$

$$\text{ShearAndTensionCheck} = \text{"OK"}$$

ANSI/TIA-222-G 4.9.9 Anchor Rods (Capacity):

$$\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{\phi_b \cdot P_n} \le 1$$

$$\eta := 0.55$$

user input from ANSI/TIA-222-G 4.9.9

$$\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{\phi_b \cdot F_u \cdot A_n} = 0.811$$

Capacity Check:

$$\text{CapacityCheck} := \text{if}\left[\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{\phi_b \cdot F_u \cdot A_n} \le 1, \text{"OK"}, \text{"NO GOOD"}\right]$$

$$\text{CapacityCheck} = \text{"OK"}$$

FOUNDATION ANALYSIS
(PERFORMED BY DR. CLARENCE WELTI, P.E., P.C.)

DR. CLARENCE WELTI, P.E., P.C.
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STATE OF CONNECTICUT DR. CLARENCE WELTI, P.E., P.C. NO. EL 0037 CORPORATE PRACTICE OF ENGINEERING

October 10, 2002

Mr. Mohsen Sahirad
URS Corporation
500 Enterprise Drive; Suite 3B
Rocky Hill, CT 06067

Re: Telecommunications Tower; 880 Post Road; Westport, CT ; Evaluation of Existing Foundation for Increased Design Loads

Dear Mohsen:

1.0 Herewith are boring data pertaining to the above. Two borings were drilled to a maximum depth of 12 feet. One boring was drilled 10 feet into bedrock and the second boring was drilled to the top of bedrock. The two borings are shown on the attached photo. Boring B-1 was about 11 feet from the tower leg and boring B-2 was about 15 feet from the tower leg. Considering that the rock outcrops at the third leg, the two borings define rock sufficiently to permit a reasonable interpolation of rock at the actual leg foundations. The former police station site is undergoing environmental remediation. *The borings were drilled by Clarence Welti Associates, Inc. and sampling was conducted by this firm solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.*

2.0 The purpose of this study is to assess the capability of tower legs to receive the proposed revised loadings. The load summary, including initial and revised design loadings is as follows:

Loading Type	Original Reaction	Revised Reactions
Uplift	276.7 kips	324 kips
Download	319.9 kips	374 kips
Shear	41.0 kips	48 kips

3.0 The initial boring data (1990 data from Test Craig Laboratories) indicated bedrock over the entire site. It is understood that there is information indicating that two of the legs were placed in earth instead of rock. The recent boring tends to belie this. The analyses for uplift (which is the only critical item on the above reaction schedule) have been done for both earth and rock. The reference for both analyses is FHWA-1F-025 Publication "Drilled Shafts: Construction Procedures and Design Methods".

3.0.1 The tower legs were each placed on 4.5 feet diameter shafts installed 27 feet deep into either earth or rock. The design uplift was and is based on an effective length of 21 feet.

3.1 Regarding the shaft in earth analysis there were no deep blow counts in the borings, since rock was encountered within 2 feet of grade. It is however reasonable to assume the N value (blows per 12" on split spoon) will be about 60 in the till overlying rock. Using the procedure indicated on the attached calculations the ultimate uplift capacity would be 831 kips. Design capacity would be ½ of this value or 415 kips. In reviewing the reference you cited (Foundation Engineering by Das, 4th edition) a similar ultimate load capacity can also be found if one assumes an angle of internal friction of about 40° (which would be typical for N = 60) and a δ/ϕ ratio of 1.0 (relative density of soil ≥ 85+%).

3.2 Regarding the shaft in rock the friction is defined in the attached calculations. The ultimate uplift of the shaft placed the Straits Schist rock formation would be about 10 kips/sf. With a factor of safety of 3 (using 3 kips/sf) the allowable loading would be 888 kips.

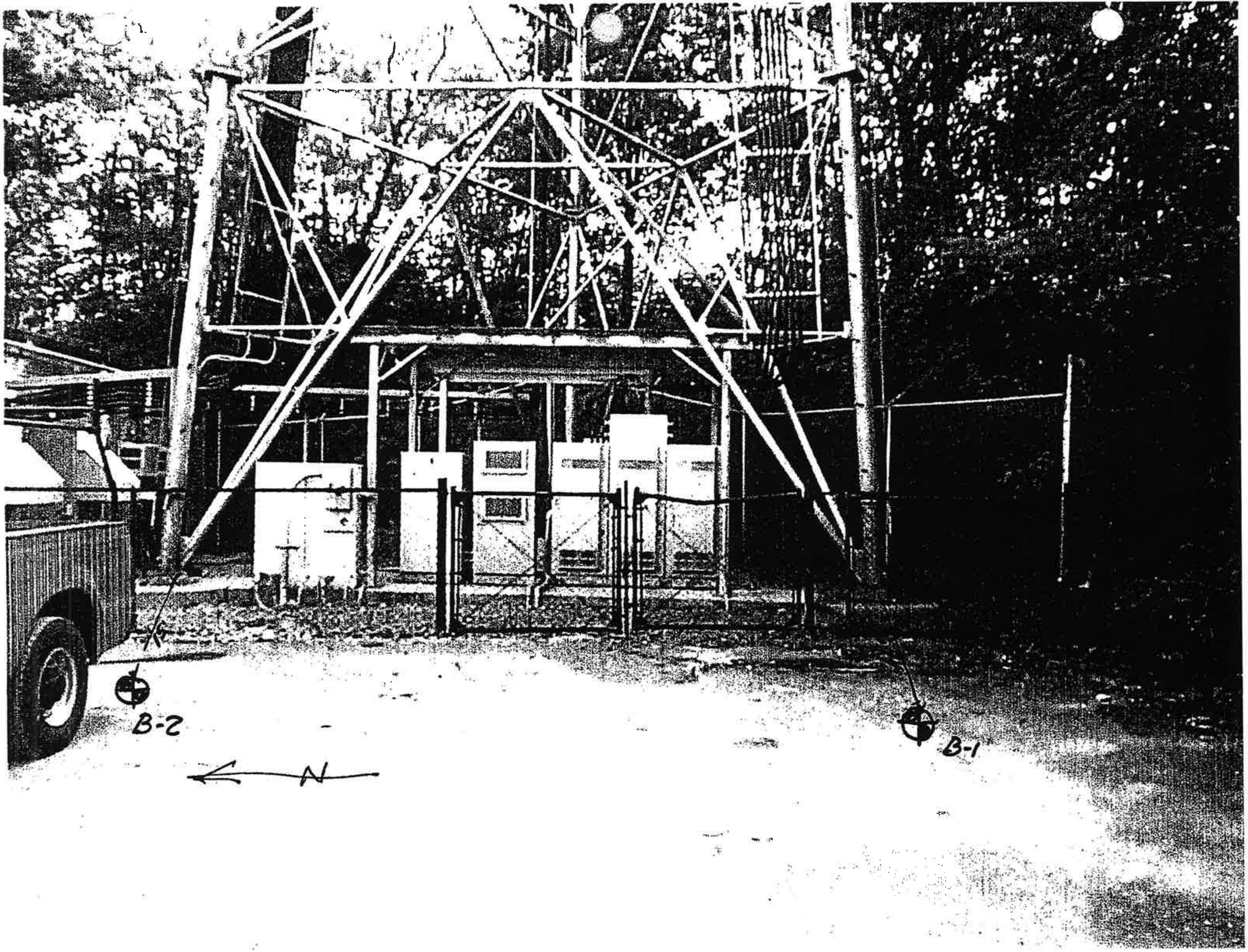
4.0 In summary it is believed that the shafts are in rock. The rock is a Schist with steep foliation and may have been drilled with only moderate effort. If the actual shaft are in earth there would have to have been a deep depression between the rock outcrop (which was cut down about 5 feet at the east leg) and the boring locations west of the two west legs, which indicated rock at 2 feet below grade similar to the original borings on the site. If there was a depression in the rock, the soil would be glacial till similar to what is being excavated to the northwest of the site at the old State Police Station. The analyses included herewith indicate that with either rock or till overburden the shafts have adequate capacity for the revised loading.

If you have any questions, please call me.

Very truly yours.

Clarence Welti, PhD, P. E.
Pres. Dr. Clarence Welti, P. E., P.C.

A:\urstoweranalysis9/04/02


B-2
N
B-1

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT URS CORPORATION	PROJECT NAME CELL TOWER SITE LOCATION 880 POST ROAD WESTPORT, CT

	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.	HOLE NO. B-1
TYPE	HSA		SS	NX	LINE & STA.	GROUND WATER OBSERVATIONS	START DATE 10/7/02
SIZE I.D.	3.75"		1.5"	2.0"	N. COORDINATE	AT 2.0 FT. AFTER 0 HOURS	
HAMMER WT.			140lbs		E. COORDINATE	AT FT. AFTER HOURS	FINISH DATE 10/7/02
HAMMER FALL			30"				

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	4-13-20-60	0.00'-1.50'		ASPHALT	.10
					BR. FINE-CRS. SAND AND FINE GRAVEL - FILL	.80
					GRAY ROCK FRAGMENTS, LITTLE SILT AND FINE SAND	1.5
					GRAY ROCK FRAGMENTS	2.0
					CORED ROCK -	
					RUN #1 2.0' - 7.0' RECOVERED 50"	
5					RUN #2 7.0' - 12.0' RECOVERED 60"	
10						12.0
					BOTTOM OF BORING @ 12.0'	
					NOTE: BORING WAS DRILLED 11.0' WEST OF TOWER LEG	
15						
20						
25						
30						
35						

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: BROMLEY

INSPECTOR:

SHEET 1 OF 1 | HOLE NO. B-1

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT	PROJECT NAME	LOCATION
URS CORPORATION	CELL TOWER SITE	880 POST ROAD WESTPORT, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.5"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.
HOLE NO. B-2

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 10/7/02
FINISH DATE 10/7/02

DEPTH	SAMPLE NO.	BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	1-8-12-60	0.00'-1.50'		DARK BR. FINE-CRS. SAND, SOME FINE-MED. GRAVEL, TRACE SILT - FILL	
					1.0	
					BR./GRAY ROCK FRAGMENTS, SILT AND FINE SAND	
					1.5	
					GRAY ROCK FRAGMENTS	
					2.0	
					AUGER REFUSAL @ 2.0'	
					NOTE: BORING WAS DRILLED 15'WEST OF TOWER LEG	
5						
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: BROMLEY
INSPECTOR:

SHEET 1 OF 1 HOLE NO. B-2

DR. CLARENCE WELTI, PE, PC
P.O. BOX 397
GLASTONBURY, CONNECTICUT 06033 • (860) 633-4623

CLIENT: URS
PROJECT: Communication Tower (illegible)
SUBJECT: Assessment of Capacity
BY: CW DATE: 10/ /02 SHEET NO.

Reference: Drilled Shafts Construction Procedures & Design Methods PUBLICATION NO FHWA-IF 99-025

Material: "Intermediate Geo-material" N > 50B/12"
(IGM)

(1) $f_{max} = \sigma_{vi}\ K_{oi}\ \tan\phi_i'$

σ_{vi}: vertical effective stress at middle of layer i ≈ 1.8 ksf

K_{oi}: design value of earth pressure coefficient at rest

ϕ_i: design value of angle of internal friction layer i

(2) $\phi_i' = \tan^{-1}\left\{\left[\dfrac{N_{60}\ (\text{LAYER } i)}{12.3 + 20.3\left(\frac{\sigma_{vi}}{p_a}\right)}\right]^{0.34}\right\}$

$p_a = 2$ ksf ≈ 14.7 psi

N_{60} (LAYER i) = 60

$= \tan^{-1}\left\{\left[\dfrac{60}{12.3 + 20.3 \times 0.9}\right]^{.34}\right\} = \tan^{-1}(1.96)^{.34} = 51.5°$

(3) $K_{oi} = (1 - \sin\phi_i')\left[\dfrac{0.2\ p_a\ N_{60}\ (\text{layer})}{\sigma_{vi}}\right]^{\sin\phi}$

$= (1 - .78)\left[\dfrac{.2 \times 2 \times 60}{1.8}\right]^{.78} = 1.65$

f_a = (from (1)) = 3.73 ksf × 0.75 (uplift) = 2.8 ksf

21' × 4.5 × π × 2.8 = 831 KIPS ULTIMATE UPLIFT CAPACITY

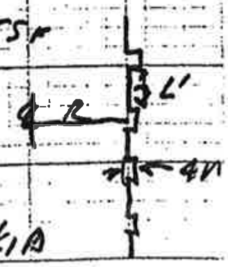
FOR SHAFT IN ROCK

q_u ≈ 5200 psi ≈ 333 TSF

L = 21'

ΔR = 0.5' L' = 0.2'

$f_{max} = 0.8\left[\dfrac{\Delta R}{R}\left(\dfrac{L'}{L}\right)\right]^{0.45} q_u$



f_{max}: 5.37 TSF = 10.78 ksf

21' × π × 4.5 = 296 SF

Assume 1/3 for f_{all} ≈ 3 ksf. Q = 888 KIP

AECOM

Job Westport, CT (CSP tower) Project No. ______ Page 1 of 3
Sheet ____ of ____

Description Evaluating Foundation Capacity from 2002 assessment Computed by McD Date

Checked by ______ Date ______

Reference

from Dr. Clarence Welti, P.E., P.C.

From original Welti Calculation;

HAND CALCULATIONS INITIALLY DERIVED FROM PROJECT (VZ5-202 / SAI-097 DATED DECEMBER 2016)

Given values:

$N_{60} = 60$

$\sigma'_v = 1.8\,ksf$

$P_a = 2000\,psf$ (Atmospheric pressure)

$D_{pier} = 4.5\,ft$

$H_{T\,Pier} = 21\,ft$

FHWA-IF-99-025 (Reference for Design for cohesionless IGM - compression)

EQ (B.61) $\phi' = \tan^{-1}\left[\left[\frac{N_{60}}{12.2 + 20.3\left(\frac{\sigma'_v}{P_a}\right)}\right]^{0.34}\right] = \tan^{-1}\left[\left[\frac{60}{12.2 + 20.3\left(\frac{1.8}{2}\right)}\right]^{0.34}\right]$

EQ $\underline{\phi' = 51.5°}$

(B.60) $"OCR" = \frac{\sigma'_p}{\sigma'_v} = \frac{(0.2)(N_{60})(P_a)}{\sigma'_v} = \frac{(0.2)(60)(2\,ksf)}{1.8\,ksf} = \underline{13.3}$

EQ. (B.59) ↑

EQ (B.51) $K_o = (1 - \sin\phi')(OCR)^{\sin\phi'} = (1 - \sin 51.5°)(13.3)^{\sin 51.5°}$

$\underline{K_o = 1.65}$

EQ. (B.62) $f_{max} = \sigma'_v \times K_o \times \tan\phi' = 1.8\,ksf \times 1.65 \times \tan 51.5° = 3.734\,ksf$

$3.734\,ksf \times 21\,ft \times 4.5\,ft \times \pi = R_n = 1109\,kip \times 0.60$ (cons.) ϕ_{LRFD} (FHWA factor)

$= 665\,kip$ ↓ (Comp Capacity LRFD)

. Pg 50 table L/B → ψ factor EQ (B.46)

L = 21 ft
B = 4.5 ft $\frac{L}{B} \approx 5 \rightarrow \psi = 0.74$

Uplift = (ψ)(comp) = 492 k uplift cap LRFD

FHWA-NHI-10-016 – Drilled Shafts: Construction Procedures & LRFD Design Methods (follows up to AASHTO LRFD 2009)

13.3.5.1 – Cohesionless Soil – Side Resistance

EQ (13-5) $R_n = \pi B \Delta z (\sigma'_v K \tan\delta)$ $\beta = K \cdot \tan\delta$

$= \pi B \Delta z (\sigma'_v \beta)$

[EQ 13-12] (Gravely Soils)

$\frac{\sigma'_p}{P_a} = 0.15 \times N_{60}$

Given by Welti calculation:

$N_{60} = 60$ $z = 27 ft$
$P_a = 2.116$ ksf $B = 4.5 ft$
$\sigma'_v = 1.8$ ksf

$\sigma'_p = 0.15 \times N_{60} \times P_a = (0.15)(60)(2.116 \text{ ksf})$
$= 19.044$ ksf

[EQ 13-13] $\beta \approx (1-\sin\phi')\left(\frac{\sigma'_p}{\sigma'_v}\right)^{\sin\phi'} \times \tan\phi' \leq K_p \times \tan\phi$

$\phi' = 27.5 + 9.2[\log(N_1)_{60}] \rightarrow 27.5 + 9.2[\log(60)] = 43.85° = \phi'$

[EQ 3-8] (cons.)

[EQ 13-13] $\beta \approx (1-\sin(43.85°))\left(\frac{19.044}{1.8}\right)^{\sin 43.85°} \times \tan 43.85° = 1.513$

$K_p \times \tan\phi' = \tan^2\left(45 + \frac{\phi}{2}\right) \times \tan\phi = \tan^2\left(45 + \frac{43.85°}{2}\right) \times \tan 43.85°$
$= 5.29$

$1.513 \leq 5.29$ (OK) $\rightarrow$ use $\beta = 1.513$

$\delta = \phi = 43.85°$

[Eq 13-7] $f_{SN} = \sigma'_v \beta = 1.8\,ksf \times 1.513 = 2.7234\,ksf$

[Eq 13-5] $R_{SN} = (\pi)(B)(\Delta z)(f_{SN}) = \pi \times 4.5\,ft \times 27\,ft \times 2.7434\,ksf$

$= 1039.5$ kips Slide/Uplift Resistance (Nominal)

TIA-222-G Reduction Factor 0.75 – Uplift Rock/Soil

FHWA pg. 13-13 "Casing reduction factors of 0.6–0.75 are commonly used" (for "Permanent Casing").

Check ($0.75 = \phi_{red}$)

∴ 1039.5 kips × 0.75 = 779.625 kip Uplift (Ult. Capacity)

Check ($0.60 = \phi_{red}$)

1039.5 kips × 0.6 = 623.7 kip Uplift (Ult. Capacity)

∴ Based off of given Soil/Geotechnical Parameters provided in "Evaluation of Existing Foundation for Increased Design Loads" Provided by Dr. Clarence Welti, P.E., P.C., the following shall be used for uplift & compression capacities.

* Uplift (LRFD) = 492 kips (614.94 kip) *

Compression (LRFD) = 665 kips
Bearing on Rock

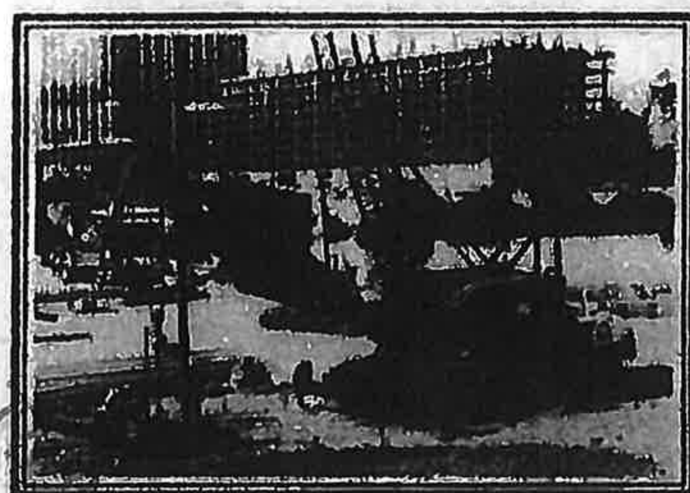
*Dr Welti's 2002 Assessment (Attached)

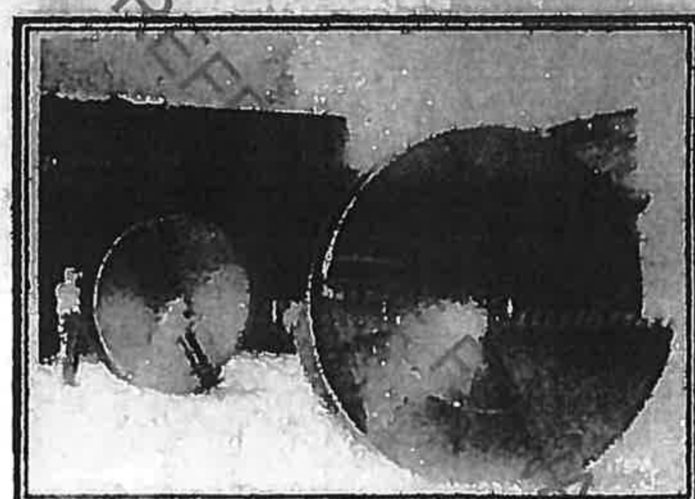
U.S Department
of Transportation
Federal Highway
Administration

PUBLICATION No. FHWA-IF-99-025

DRILLED SHAFTS:

CONSTRUCTION PROCEDURES AND DESIGN METHODS





Office Of Infrastructure

Printed August 1999

Little specific experimental information is available on side resistance in uplift for drilled shafts in gravel. Until such information becomes available, f_{max} can be estimated in a gravel layer in the same manner as it is estimated in a sand layer.

While the above method is theoretically correct and is accurate for simulated deep foundations in a geotechnical centrifuge, it has not been tested against full-scale drilled shaft foundations. Therefore, site-specific loading tests should be conducted where they are warranted economically.

Cohesionless Intermediate Geomaterials - Compression

N > 75c/ft

A cohesionless intermediate geomaterial is a sand-like or gravel-like material (transported or residual) that exhibits $N > 50$ blows/0.3 m. f_{max} can be estimated in such soils using Equation (B.50). O'Neill et al. (1996) recommend the following procedure using the SPT N value, based on the original work of Mayne and Harris (1993). This method has been used and verified by load testing of full-scale drilled shafts in residual micaceous sands in the Piedmont province of the United States and has been verified for granular glacial till in the northeastern United States (O'Neill et al., 1996).

Within any one layer, the preconsolidation pressure of the IGM, σ'_p, is estimated from the correlation given in Equation (B.59). Then, after estimating the vertical effective stress at the middle of the layer, σ'_v (Figure 2.4), the overconsolidation ratio, OCR, is then estimated from Equation (B.60).

$$\sigma'_p = 0.2\, N_{60}\, p_a \qquad \text{(B.59)}$$

$$OCR = \sigma'_p / \sigma'_v \qquad \text{(B.60)}$$

(0.2)(N60)(Pa) / σ'V = 1.8ksi?

N_{60} is the uncorrected SPT blow count in blows/0.3 m for the condition in which 60 per cent of the potential energy of the SPT hammer is transferred into the drive string, and p_a is atmospheric pressure in the units being used in the calculations. ϕ' is then computed from:

N60 = 60

$$\phi' = \tan^{-1}\left\{\left[\frac{N_{60}}{12.2 + 20.3\left(\frac{\sigma'_v}{p_a}\right)}\right]^{0.34}\right\} \qquad \text{(B.61)}$$

Then,

$$K_o = (1-\sin\phi')OCR^{\sin\phi'} \quad \text{and} \qquad \text{(B.51)}$$

$$f_{max} = \sigma'_v K_o \tan\phi' \qquad \text{(B.62)}$$

The method assumes that $K = K_o$ and that $\delta = \phi'$ in granular IGM's. Obviously, if the contractor were to leave the borehole open for an extended period of time or otherwise deviate from good practice, f_{max} would be overestimated with this procedure.

It is recommended by O'Neill et al. (1996) that N_{60} not be taken to be > 100 with this method, regardless of the actual value of N_{60} measured. Otherwise, the method will overpredict f_{max}. While the method is sound, the various coefficients and exponents are based empirically on residual soils in the Piedmont province. Local correlations are therefore recommended.

Cohesionless Intermediate Geomaterials - Uplift Loading

It can reasonably be assumed that Equations (B.46), (B.57) and (B.58) apply both to granular soils and cohesionless IGM's.

Intermediate Geomaterials -- Considerations for Desert Regions

Some "cohesionless" IGM's exhibit cementation due to the presence of carbonates and other weak cementing agents. Such geomaterials are often found in desert regions. While more research is needed in this subject area, various empirical means have been suggested to estimate unit side resistance values. For example, Ismael et al. (1994) found from uplift loading tests on 0.3-m-diameter drilled shafts in dry cemented sand with N from 60 to 90 that β was 1.47 in the depth range of 3 to 5 m (10 to 16 ft). From uplift tests on 0.5-m-diameter drilled shafts in calcareous sands below the water table in the depth range of 5 to 15 m (16 to 49 ft), Ismael and Al-Sanad (1986) proposed f_{max} (kPa) = 0.96 N (blows/0.3 m), or f_{max} (tsf) = 0.01 N (blows/ft). These relations correspond to $\beta \approx 1$ in that depth range, suggesting relatively high values of f_{max}. The authors caution, however, that they were careful to prevent the intrusion of groundwater into the boreholes by casing off sources of water at shallow depths.

On the other hand, Walsh et al. (1995) reported uplift tests on three small-scale drilled shafts (102 mm ≤ B ≤ 254 mm; 0.915 m ≤ L ≤ 1.53 m) in cemented, fine-grained geomaterials above the water table having carbonate contents ranging from 4 per cent to 50 per cent. These geomaterials exhibited s_u between 250 and 670 kPa (2.6 and 7.0 tsf) based on UU triaxial compression tests with cell pressures equal to the total overburden pressures at the depths from which the samples were recovered. From these tests, and treating the geomaterial as if it were a cohesive soil [Equation (B.32)], it was found that $\alpha = 0.45$ (average over the entire length of the small test shaft). This value is higher than would be expected if the geomaterial is classified as a

Let w (corresponding to failure) = 25 mm = 0.025 m.

H_f = [(50) (1.937) (0.025)]/[π (5) (0.442)(0.688)] = 0.507

(Note that pressure units are all in expressed in MPa, and all length units are expressed in m, so the units are consistent, leading to a value for H_f that is nondimensional.)

K_f = 0.04 + [(0.507 - 0.04) (1 - 0.04)] / [0.507 - 2 (0.04) +1] = 0.354.

<u>d. Compute f_{max}</u> from Equation (B.40):

f_{max} = 0.354 (0.688) = 0.243 MPa = 2.53 tons/ft^2.

Note that this value is about twice the value for the smooth interface. A cost analysis should be performed, perhaps by discussing the issue with drilled shaft contractors, relating to the increased costs incurred in cutting off infiltration of the perched water and roughening and cleaning the sides of the borehole before concreting plus careful inspection versus the benefit achieved in increasing the side resistance (reduced size of the drilled shaft).

Cohesive Intermediate Geomaterials - Uplift Loading

Cohesive IGM's that are loaded in uplift will develop values of f_{max} that are essentially identical to those developed in compression, provided the shaft borehole is classified as "rough." When the borehole is "smooth" the Poisson's effect influences shaft resistance. The shaft expands laterally when it is loaded in compression, increasing the lateral effective stresses against the interface and consequently the shearing resistance of the IGM at the interface, since the interface is drained and frictional. However, when the drilled shaft is loaded in uplift, the shaft contracts laterally, reducing the lateral effective stresses against the interface and the shearing resistance of the IGM at the interface. This effect is illustrated in exaggerated form in Figure B.14. For this reason values of f_{max} for uplift loading should be reduced slightly below the values shown above for compression loading if the shaft is long and flexible. It is recommended that

$$f_{max}\,(uplift) = \Psi f_{max}\,(compression) \qquad \text{(B.46)}$$

in which Ψ is taken to be 1.0 if $(E_c/E_m)\,(B/D)^2 \geq 4$, or 0.7 if $(E_c/E_m)\,(B/D)^2 < 4$, unless loading tests in uplift are performed. E_c and E_m are the composite Young's modulus of the shaft's cross section and IGM mass, respectively, B is the socket diameter and D is the socket length. This recommendation is based upon a study by Carter and Kulhawy (1988) for sockets in rock.

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Drilled Shafts: Construction Procedures and LRFD Design Methods

Developed following:

AASHTO LRFD Bridge Design Specifications, 4th Edition, 2007, with 2008 and 2009 Interims.

NATIONAL HIGHWAY INSTITUTE

TABLE 3-3 RELATIONSHIP BETWEEN RELATIVE DENSITY, SPT N-VALUE, AND DRAINED FRICTION ANGLE OF COHESIONLESS SOILS (SABATINI ET AL., 2002, AFTER MEYERHOF, 1956)

State of Packing	Relative Density (%)	Standard Penetration Resistance, N (blows per ft)	Friction Angle, ϕ' (degrees)
Very Loose	< 20	< 4	< 30
Loose	20 – 40	4 – 10	30 – 35
Compact	40 – 60	10 – 30	35 – 40
Dense	60 – 80	30 – 50	40 – 45
Very Dense	> 80	> 50	> 45

Note: N = 15 + (N' – 15)/2 for N' > 15 in saturated or very fine silty sand, where N' = measured blow count and N = blow count corrected for dynamic pore pressure effects during the SPT

$$\phi' = \tan^{-1}\left[\frac{N_{60}}{12.2 + 20.3\left(\frac{\sigma'_{vo}}{p_a}\right)}\right]^{0.34} \quad \text{3-7}$$

In which: ϕ' = effective stress friction angle, σ'_{vo} = vertical effective stress at the depth of N-value measurement, and p_a = atmospheric pressure in the same units as σ'_{vo} (*e.g.*, 2,116 psf). Equation 3-6 is a derived correlation between ϕ' and normalized SPT resistance, $(N_1)_{60}$, where high quality undisturbed frozen samples of natural sands were obtained that permitted direct measurements of ϕ' in triaxial cells (Hatanaka and Uchida, 1996). Equation 3-7 is a well-known correlation between N_{60} and ϕ' developed by Schmertmann (1975). Results from Equation 3-7 tend to be somewhat conservative, especially for shallow depths (*i.e.*, less than 6 ft).

Kulhawy and Chen (2007) evaluated data compiled from the literature on the strength properties of very coarse-grained soils, including both sands and gravels. The database was used to develop the following correlation, based on regression analysis, between ϕ' and N-value. This equation provides a first-order estimate of ϕ' for a wide range of cohesionless soils and over a wide range of N-values, including values up to 100. Equation 3-8 is the recommended correlation for estimating ϕ' for the purpose of evaluating unit side resistance of drilled shafts in cohesionless soils by the methods described in Chapter 13.

$$\phi' = 27.5 + 9.2\log\left[(N_1)_{60}\right] \qquad \left(r^2 = 0.356, n = 57\right) \quad \text{3-8}$$

Where r^2 = coefficient of determination and n = number of data pairs used in the regression analysis. AASHTO (2007) states that other in-situ tests, including CPT, may be used to determine ϕ' and refers to GEC No. 5 (Sabatini et al., 2002) for details. The correlation given in GEC No. 5, based on CPT cone resistance, q_c, is given by:

$$\phi' = \tan^{-1}\left[0.1 + 0.38\log\left(\frac{q_c}{\sigma'_{vo}}\right)\right] \quad \text{3-9}$$

In which σ'_{vo} = vertical effective stress at the depth of the q_c measurement.

13.3.5.1 Cohesionless Soils

Side Resistance

The nominal side resistance of a drilled shaft in cohesionless soil can be expressed as the frictional resistance that develops over a cylindrical shear surface defined by the soil-shaft interface. As illustrated in Figure 13-4, the unit side resistance is directly proportional to the normal stress acting on the interface. By Equation 13-3, nominal side resistance is then given by:

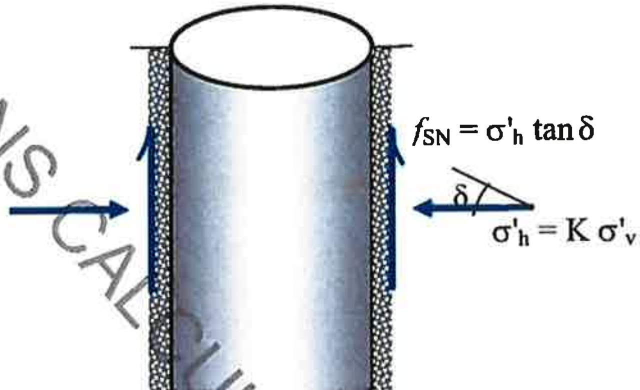


Figure 13-4 Frictional Model of Unit Side Resistance, Drilled Shaft in Cohesionless Soil

$$R_{SN} = \pi B \Delta z f_{SN} = \pi B \Delta z (\sigma'_v K \tan\delta) \quad \text{13-5}$$

where:

- R_{SN} = nominal side resistance
- B = shaft diameter
- Δz = thickness of the soil layer over which resistance is calculated
- σ'_v = average vertical effective stress over the depth interval Δz
- K = coefficient of horizontal soil stress ($K = \sigma'_h / \sigma'_v$)
- σ'_h = horizontal effective stress
- δ = effective stress angle of friction for the soil-shaft interface

For convenience, the following terms may be combined:

$$\beta = K \tan\delta \quad \text{13-6}$$

and

$$f_{SN} = \sigma'_v \beta \quad \text{13-7}$$

in which β = side resistance coefficient (hence the term "beta method") and f_{SN} = nominal unit side resistance. Several design models have been proposed for evaluating the β term in Equation 13-7. The approach currently recommended in AASHTO (2007) is the "O'Neill and Reese (1999)" method, in reference to equations presented in the previous version of this manual. In this approach, β is calculated solely as a function of depth below the ground surface, without explicit consideration of soil strength or the in-situ state of stress. This approach is based on fitting a design curve to values of β back-calculated from field load tests. A more rational approach, as presented for example by Chen and Kulhawy (2002), is to evaluate separately values of K and δ which are then combined to determine β. Results of research published over the past 15 years demonstrate that this approach can provide reliable estimates of side resistance and represents a rational method to incorporate soil strength and state of stress into design equations. It is recommended that designers employ this model, which is presented below. Additional commentary, including a comparison between the Reese and O'Neill method and the procedure presented herein, is given in Appendix C. It is noted further that this approach is applicable to all cohesionless soils, including those identified previously as cohesionless intermediate geomaterials.

The operative value of K, coefficient of horizontal soil stress, is a function of the in-situ (at-rest) value, K_o, and changes in horizontal stress that occur in response to drilled shaft construction, given by the ratio K/K_o. A rational first-order approximation is that $K/K_o = 1$, assuming there is no stress change induced by construction. For simple virgin loading-unloading of "normal soils" that are not cemented, the K_o value increases with overconsolidation ratio (OCR) and can be approximated according to (Mayne and Kulhawy, 1982):

$$K_o = (1 - \sin\phi')\,OCR^{\sin\phi'} \leq K_p \qquad 13\text{-}8$$

$$OCR = \frac{\sigma'_p}{\sigma'_v} \qquad 13\text{-}9$$

where σ'_p = effective vertical preconsolidation stress. Note that the value of K_o as given by Equation 13-8 is limited to an upper-bound value corresponding to the coefficient of passive earth pressure, which, for a cohesionless soil, is given by:

$$K_p = \tan^2\left(45^\circ + \frac{\phi'}{2}\right) \qquad 13\text{-}10$$

A variety of methods have been proposed for evaluation of either K_o or σ'_p by correlations with in-situ test results. For a practical estimate based on the most commonly used in-situ test (SPT) the following correlation is suggested by Mayne (2007):

$$\frac{\sigma'_p}{p_a} \approx 0.47(N_{60})^m \qquad 13\text{-}11$$

where m = 0.6 for clean quartzitic sands and m = 0.8 for silty sands to sandy silts (*e.g.*, Piedmont residual soils), and p_a = atmospheric pressure in the same units as σ'_p (for example, 2,116 psf). Kulhawy and Chen (2007) suggest the following correlation provides a good fit for gravelly soils:

$$\frac{\sigma'_p}{p_a} = 0.15N_{60} \qquad 13\text{-}12$$

Substituting Equations 13-9 through 13-12 into Equation 13-6 leads to the following approximation of β for cohesionless soils:

$$\beta \approx (1-\sin\phi')\left(\frac{\sigma'_p}{\sigma'_v}\right)^{\sin\phi'}\tan\phi' \qquad \le K_p \tan\phi' \qquad 13\text{-}13$$

where σ'_p is estimated by Equation 13-11 for sandy soils and Equation 13-12 for gravelly soils. The value of β at shallow depths should be limited to the value corresponding to a depth of 7.5 ft, which corresponds to a vertical effective stress of approximately 900 psf. At lower confining stress, the correlations for effective stress friction angle and preconsolidation stress have not been validated and it would be prudent to limit β to the values corresponding to this depth. The value of β evaluated by Equation 13-13 is substituted into Equation 13-7 for determination of unit side resistance and this value is substituted into Equation 13-5 for determination of nominal side resistance R_{SN} for each layer of cohesionless soil. This model accounts for site-specific variations in horizontal stress and soil strength in a rational manner. The approach is also adaptable to other in-situ methods that allow measurement of horizontal soil stress and its variation with depth, such as pressuremeter test (PMT) and flat plate dilatometer test (DMT). The principal limitation of this approach relates to its reliance on N-values and the correlations employed between N-values, friction angle, and preconsolidation stress. Furthermore, resistance factors have not been established for this method through a probability-based calibration study with AASHTO LRFD load factors. Calibration to allowable stress design (ASD) using a factor of safety of FS = 2.5 yields a resistance factor for side resistance in cohesionless soils of $\varphi_S = 0.55$ as discussed in Chapter 10. Until the proper reliability-based calibration study is conducted, this value is recommended. Agencies are also encouraged to establish resistance factors based on local calibrations.

In the approach described above, it is assumed that no change in horizontal stress, and therefore no change in K, occurs as a result of construction. Experience demonstrates this assumption is valid for dry, slurry (wet-hole), and casing methods of construction with minimal sidewall disturbance, proper handling of slurry and casing, and prompt placement of concrete (Chen and Kulhawy, 2002). However, when these aspects of construction quality are not controlled properly, the coefficient K can be reduced to 2/3 of its initial in-situ value (K_o), or lower in extreme cases of soil caving. Judgment and accurate knowledge of field realities are therefore needed to assess the applicability of the design equations to individual projects. The recommended approach is to take the necessary measures that will assure quality of construction, thereby justifying the use of the design equations presented above.

When permanent casing is used and extends through layers of cohesionless soil, the basic concepts presented above are valid, with proper consideration of differences in the interface shear strength. AASHTO (2007) states that no specific data are available, but that casing reduction factors of 0.60 to 0.75 are commonly used. A common practice is to specify permanent casing in subsurface zones where scour is expected, in which case side resistance may be neglected over this depth.

For each strength or service limit state considered, side resistance in cohesionless soils must account for scour resulting from the design flood. The most significant effect is that all material above the total scour line is assumed to be removed and unavailable for axial support. Changes in subsurface stress also occur in response to removal of soil, and these changes will affect side resistance calculated by the β-method. This issue is considered in Section 13.5.

Illustrative Example 13-1 on the following page demonstrates evaluation of unit side resistance by the β-method as presented above.

GENERAL CONSTRUCTION NOTES

1. ALL WORK SHALL COMPLY WITH THE CONNECTICUT STATE BUILDING AND LIFE SAFETY CODES, SUPPLEMENTS AND AMENDMENTS.

2. CONTRACTOR IS TO REVIEW ALL DRAWINGS AND NOTES IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUB-CONTRACTORS AND ALL RELATED PARTIES. THE SUB-CONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.

3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON DRAWINGS OR WRITTEN IN SPECIFICATIONS.

4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.

5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION AND ELECTRICAL SUB-CONTRACTORS SHALL PAY FOR THEIR PERMITS.

6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS ON SITE AT ALL TIMES AND ENSURE THE DISTRIBUTION OF NEW DRAWINGS TO SUB-CONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. CONTRACTOR SHALL FURNISH 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.

7. INSTALLATION OF THIS WIRELESS COMMUNICATIONS EQUIPMENT SITE REQUIRES WORK IN THE IMMEDIATE VICINITY OF EXISTING OPERATING TELECOMMUNICATION SYSTEMS. THE CONTRACTOR SHALL PROVIDE AND COORDINATE THE METHODS OF PROTECTION WITH THE VARIOUS TELECOMMUNICATION CARRIERS AND THE TOWER OWNER. THERE SHALL BE NO INTERRUPTION OF OPERATION WITHOUT TIMELY COORDINATION WITH AND APPROVAL BY THE VARIOUS COMMUNICATIONS OPERATORS INCLUDING THE CONNECTICUT STATE POLICE.

8. THE REINFORCEMENT OF PORTIONS OF THIS TOWER STRUCTURE WILL AFFECT CRITICAL CONNECTICUT STATE POLICE ANTENNAS. NO MOVEMENT, ALTERATION, OR DISCONNECTION OF CONNECTICUT STATE POLICE ANTENNAS MAY OCCUR WITHOUT THE NOTIFICATION AND APPROVAL OF THE CONNECTICUT STATE POLICE CONTACT THE NETWORK CONTROL CENTER AT 860-865-8008

9. TOWER REINFORCING WORK AFFECTING CRITICAL CONNECTICUT STATE POLICE ANTENNAS MAY BE REQUIRED TO BE CONDUCTED AT TIMES AS DETERMINED BY THE REQUIREMENTS OF THE CONNECTICUT STATE POLICE.

10. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER MFR'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR ARCHITECT.

11. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.

12. SHOP DRAWINGS ARE REQUIRED. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS ON THE TOWER AND INCLUDE THE GATHERED INFORMATION ON THE SHOP DRAWINGS. NOTE ANY DISCREPANCIES ENCOUNTERED ON THE SHOP DRAWINGS. NO FABRICATION OR INSTALLATION OF STEEL SHALL OCCUR PRIOR TO THE RECEIPT AND APPROVAL OF SHOP DRAWINGS.

13. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ARCHITECT FOR REVIEW. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTAL TO THE ARCHITECT FOR REVIEW.

14. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURE AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.

15. CONTRACTOR TO CONTACT "CALL BEFORE YOU DIG" AT 1-800-922-4455 TO VERIFY AND IDENTIFY THE EXACT LOCATIONS OF ALL UNDERGROUND UTILITIES AND OBSTRUCTIONS IDENTIFIED PRIOR TO COMMENCING WORK IN THE CONTRACT AREA.

16. CONTRACTOR SHALL COMPLY WITH OWNER ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

17. DIMENSIONS OF EXISTING TOWER ARE BASED ON MANUFACTURER'S DRAWINGS PREPARED BY ROHN INDUSTRIES. DATED FEBRUARY 1, 1991, AND ARE NOT GUARANTEED. CONTRACTOR SHALL TAKE FIELD DIMENSIONS AS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY. WHEN SHOP DRAWINGS BASED ON FIELD MEASUREMENT ARE SUBMITTED FOR REVIEW, DIMENSIONS ARE PROVIDED FOR THE ENGINEER'S REFERENCE ONLY.

18. TOWER INVENTORY IS BASED ON INFORMATION OBTAINED FROM MOTOROLA/CONNECTICUT STATE POLICE DATED JUNE 22, 2016 AND AT&T DATED APRIL 6, 2018. TOWER MAPPING AND EXISTING INVENTORY OBTAINED FROM D&K NATIONWIDE COMMUNICATIONS, INC. DATED MARCH 18, 2016

19. CONTRACTOR TO VERIFY REQUIRED CLEARANCES INCLUDING BUT NOT LIMITED TO EXISTING BUILDINGS, EQUIPMENT PADS AND SHELTERS PRIOR TO COMMENCING WORK

20. THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION. NO MEMBER OF THE TOWER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY. THE CONTRACTOR SHALL BE AWARE OF WEATHER AND WIND CONDITIONS AND NOT PERFORM MEMBER REPLACEMENT IN A WIND GUSTING MORE THAN 10 MPH

STRUCTURAL NOTES

STRUCTURAL STEEL MATERIAL:

EXISTING PIPE/TUBE LEG .... ASTM A572-50
1/3 HSS REINFORCING .... ASTM 501-Gr. B (50 ksi)
EXISTING PLATES & ANGLES .... ASTM A36
BOLTS .... ASTM A325N, 325X

STRUCTURAL STEEL SHALL CONFORM TO ALL THE REQUIREMENTS OF THE ASTM SPECIFICATION, AS REFERENCED IN THE CODE.

UNLESS OTHERWISE NOTED, ALL STEEL WILL BE GALVANIZED IN ACCORDANCE WITH ASTM 123 AFTER FABRICATION. TOUCH UP ALL DAMAGED GALVANIZED STEEL WITH APPROVED COLD ZINC, "GALVANOX", "DRY GALV", "ZINC-IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURERS GUIDELINES. TOUCH-UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT APPLIED IN SHOP OR FIELD.

SHOP AND ERECTION DRAWINGS SHALL BE SUBMITTED FOR ALL STRUCTURAL STEEL WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. SUBMIT 2 SETS OF PRINTS FOR THE ENGINEER REVIEW. REFER TO NOTE 12 ABOVE.

MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.

THE OMISSION OF ANY MATERIAL THAT WAS SHOWN ON THE CONTRACT DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR OF PROVIDING THE SAME.

CONNECTIONS / FIELD ASSEMBLY:

BOLTED CONNECTIONS UNLESS OTHERWISE NOTED, ALL JOINTS ARE SLIP CRITICAL TYPE, REQUIRING 5/8", 3/4", 7/8" & 1" DIA. A325N BOLTS, A563 NUTS AND F436 WASHERS, ALL GALVANIZED. BEVELED WASHERS SHALL BE USED ON BEAM FLANGES HAVING A SLOPE GREATER THAN 1:20.

STRUCTURE IS DESIGNED TO BE LEVEL AND PLUMB, SELF-SUPPORTING AND STABLE AFTER WORK IS COMPLETED.

COMMENCEMENT OF WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

INSPECTIONS:

SPECIAL INSPECTIONS ARE REQUIRED PER THE CODE FOR STRUCTURAL STEEL WORK.

OWNER WILL SUPPLY THE SERVICES OF A SPECIAL INSPECTOR AND TESTING AGENTS AS REQUIRED. CONTRACTOR SHALL COORDINATE INSPECTIONS OF FABRICATOR'S AND ERECTOR'S WORK AND MATERIALS TO MEET THE REQUIREMENTS OF THE STATEMENT OF SPECIAL INSPECTIONS FOR THIS PROJECT.

COPIES OF TESTING AND INSPECTION REPORTS WILL BE PROVIDED TO THE OWNER, BUILDING OFFICIAL, ENGINEER OF RECORD AND CONTRACTOR.

STATE OF CONNECTICUT
RICHARD A. SAMBOR
No. 9057
LICENSED
PROFESSIONAL ENGINEER

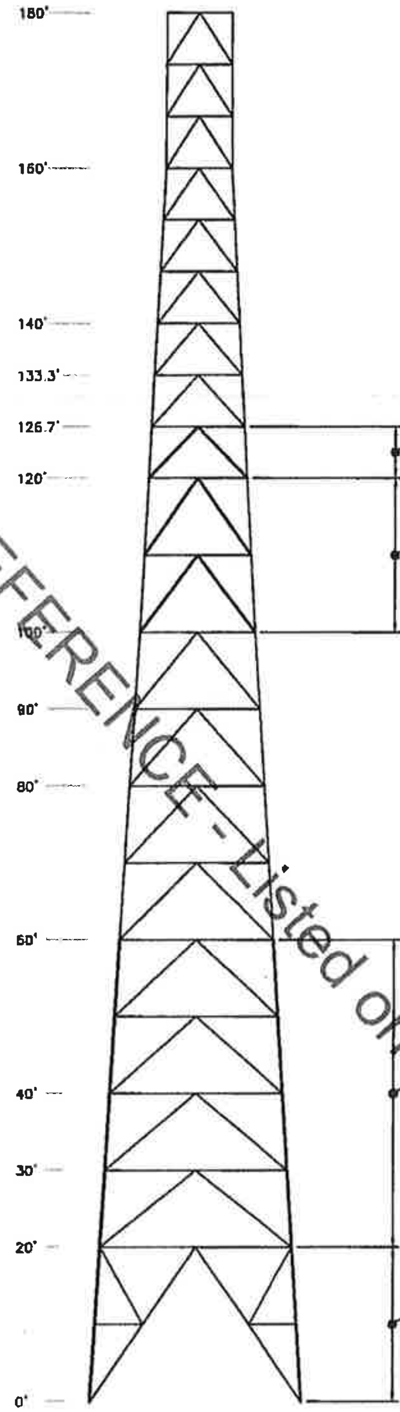
PROJECT NO. 60581632	AECOM	at&t	REV. / DATE: / DESCRIPTION	Dwg. No. SK-1
Designed by: MCD	500 ENTERPRISE DRIVE	WESTPORT, AT&T SITE CTLO2147	Scale: AS NOTED	Date: 7/13/2018
Drawn by: GAT	ROCKY HILL, CONNECTICUT	SITE ADDRESS: 880 POST ROAD EAST	Job No. SMK-004	File No.
Checked by: ICA	(860)-529-8882	WESTPORT, CONNECTICUT		Dwg. 1 of 4
Approved by: RAS				

STRUCTURAL NOTES

SEE SHEET SK-1 FOR STRUCTURAL NOTES

NOTES

1. REFER TO STRUCTURAL NOTES ON SK-1 FOR STEEL GRADE REQUIREMENTS FOR REPLACEMENT AND REINFORCEMENT MEMBERS
2. CONTRACTOR SHALL COORDINATE WITH ROHN INDUSTRIES INC. FOR DIAGONAL AND HORIZONTAL PIPE ASSEMBLY REPLACEMENT INDICATED ON SHEET.
3. REINFORCEMENT OF TOWER IS REQUIRED FOR ALL 3 SIDES OF EXISTING TOWER STRUCTURE.
4. 1/3 HSS TUBES SHALL BE ATTACHED TO TOWER STRUCTURE WITH U-BOLTS. SEE SK-3 AND SK-4 FOR DETAILS.
5. CONNECTION BOLTS FOR REPLACEMENT MEMBERS SHALL BE REPLACED IN KIND. EXISTING BOLTS SHALL NOT BE RE-USED FOR CONNECTION OF REPLACEMENT MEMBERS.



1 / SK-2 **TOWER ELEVATION**

SCALE: 1" = 25'-0"

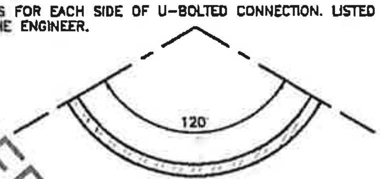
STATE OF CONNECTICUT ★ RICHARD A. SAMBOR ★ No. 5057 LICENSED PROFESSIONAL ENGINEER

PROJECT NO. 60581632	AECOM	at&t	Dwg. No. SK-2
Designed by: MCD	500 ENTERPRISE DRIVE	WESTPORT, AT&T SITE CTLO2147	REV. / DATE: / DESCRIPTION
Drawn by: GAT	ROCKY HILL, CONNECTICUT	SITE ADDRESS: 880 POST ROAD EAST	Scale: AS NOTED / Date: 7/13/2018
Checked by: ICA	(860)-529-8882	WESTPORT, CONNECTICUT	Job No. SMK-004 / File No.
Approved by: RAS			Dwg. 2 of 4

ELEVATION	TOWER LEG DIAMETER 1/3 HSS TUBE EXISTING LEG SIZE (IN)	1/3 HSS TUBE REINFORCING DIMENSIONS (IN)	MINIMUM # U-BOLTS AT EACH END OF 20' SECTION SPACED AS INDICATED C-TO-C (# PER TOWER LEG)	MINIMUM U-BOLTS REMAINING PER LEG (QTY)	TOTAL U-BOLTS PER LEG PER 20' SECTION (MIN.)(QTY)	DIAMETER U-BOLTS (IN)	MINIMUM SPACING REMAINING U-BOLTS C-TO-C (IN)	MAXIMUM SPACING REMAINING U-BOLTS C-TO-C (IN)	INSTALLING PRETENSION FORCE ON U-BOLT CONNECTION (KIPS) (LRFD)
0'-20'	8.6250x0.500	9.6250x0.375	15	10	40	5/8	8	12	10
20'-40'	8.750x0.375	9.6250x0.375	23	12	58	5/8	6.5	7	6.85
40'-60'	8.750x0.375	9.6250x0.375	23	12	58	5/8	6.5	7	6.85

NOTES:

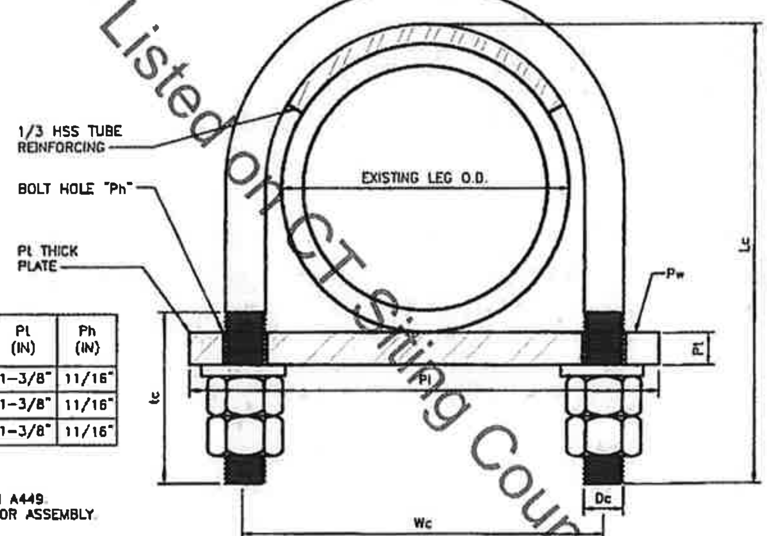
- U-BOLTS SHALL MEET THE STRENGTH REQUIREMENTS OF ASTM A449. BASIS OF DESIGN IS PORTLAND BOLT OF PORTLAND, OREGON, USA. ALTERNATIVE SUPPLIER SHALL MATCH OR EXCEED QUALITY OF PORTLAND BOLT
- CONTRACTOR SHALL TAKE SPECIFIC CARE WHEN INSTALLING U-BOLTS AND NOT ALLOW ANY VISIBLE DEFORMATION OF THE EXISTING TOWER LEG MEMBERS.
- THE 1/3 (ONE-THIRD) HSS TUBE REFERS TO THE REQUIRED PORTION OF HSS TUBING TO BE INSTALLED FOR REINFORCING.
- EXISTING TOWER LEGS HAVE STEP BOLTS. PLACEMENT OF THE 1/3 HSS TUBING SHALL NOT CONFLICT WITH EXISTING TOWER STEP BOLTS.
- SPACING DIMENSIONS FOR U-BOLTS ARE MAXIMUM ALLOWABLE DISTANCES (CENTER-TO-CENTER). ADDITIONAL U-BOLTS MAY BE REQUIRED DUE TO INTERRUPTION CAUSED BY EXISTING TOWER CONDITIONS. SHOP DRAWINGS SHALL ILLUSTRATE ACTUAL BOLT SPACING REQUIRED BASED ON VERIFIED FIELD CONDITIONS.
- 1/3 HSS TUBES SHALL BE CONTINUOUS, SINGLE PIECE MEMBERS APPROXIMATELY 20' LENGTH (TO BE FIELD VERIFIED BEFORE ORDERING)
- INSTALLING PRETENSION FORCE IS FOR EACH SIDE OF U-BOLTED CONNECTION. LISTED PRETENSION SHALL NOT BE EXCEEDED WITHOUT NOTIFYING THE ENGINEER.



PLAN VIEW OF 1/3 HSS TUBE

2 (SK-3) 1/3 HSS TUBE REINFORCEMENT

SCALE: N.T.S.



ELEVATION	TOWER LEG DIAMETER (IN)	HSS REINFORCING O.D. (IN)	Dc (IN)	Lc (IN)	Wc (IN)	tc (IN)	Pl (IN)	Pw (IN)	Pt (IN)	Ph (IN)
0-20'	8.625	9.625	5/8"	12"	9-5/8"	3"	12-1/4"	2-1/2"	1-3/8"	11/16"
20'-40'	8.75	9.625	5/8"	12-1/8"	9-5/8"	3"	12-1/4"	2"	1-3/8"	11/16"
40'-60'	8.75	9.625	5/8"	12-1/8"	9-5/8"	3"	12-1/4"	2"	1-3/8"	11/16"

NOTES:

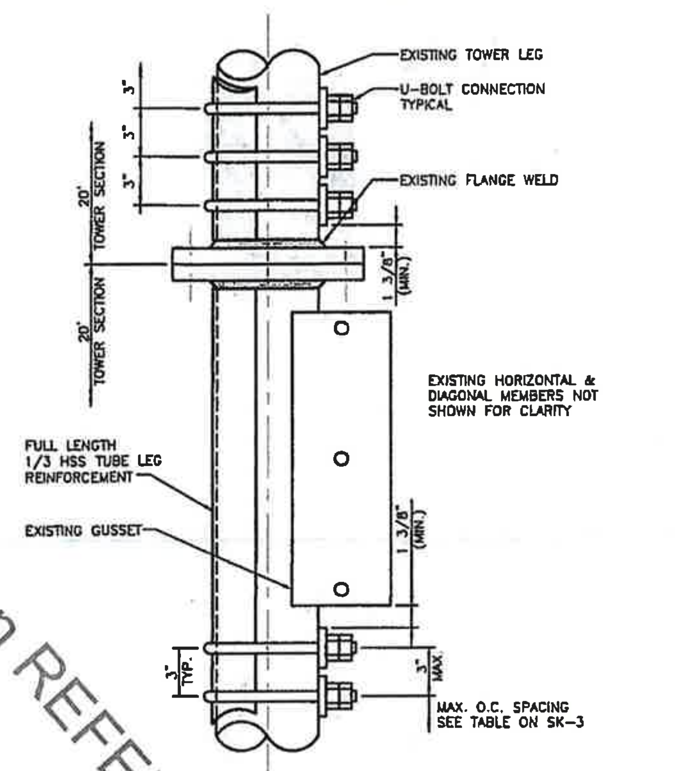
1. U-BOLT ATTACHMENT PLATE MATERIAL SHALL MEET STRENGTH REQUIREMENTS OF ASTM A449. COORDINATE WITH ABOVE U-BOLT TABLE FOR QUANTITIES AND SPACING OF U-BOLT FOR ASSEMBLY.
2. "Pw" REFERS TO PLATE WIDTH MEASUREMENT IN THE ABOVE TABLE.

1 (SK-3) U-BOLT FOR LEG REINFORCEMENT

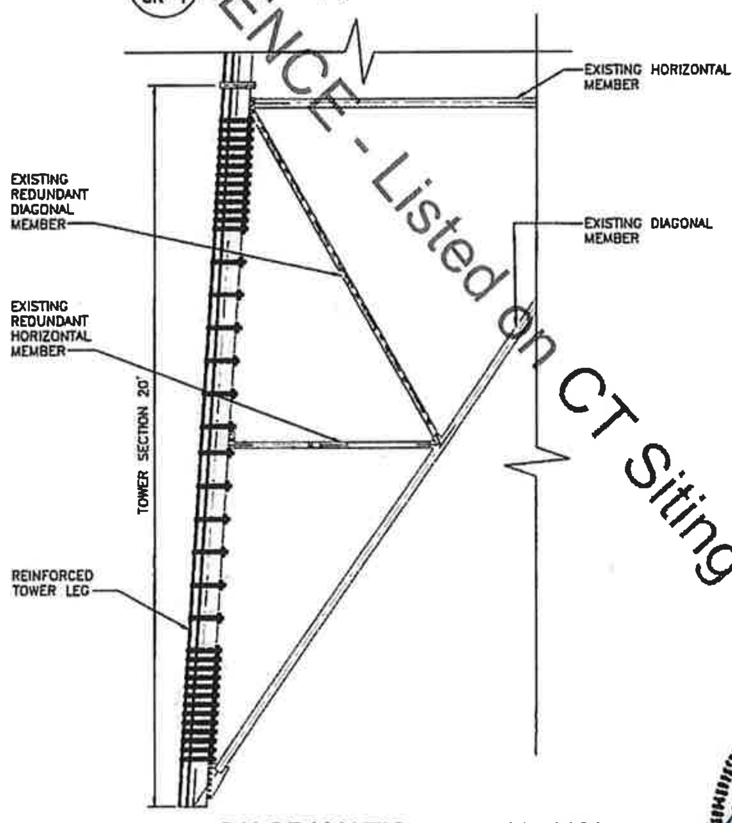
SCALE: N.T.S.

STATE OF CONNECTICUT · RICHARD A. SAMBOR · No. 9057 · LICENSED PROFESSIONAL ENGINEER

PROJECT NO. 60581632	AECOM 500 ENTERPRISE DRIVE ROCKY HILL, CONNECTICUT (860)-529-8882	at&t
Designed by: MCD		WESTPORT, AT&T SITE CTL02147
Drawn by: GAT		SITE ADDRESS: 880 POST ROAD EAST, WESTPORT, CONNECTICUT
Checked by: ICA		REV. / DATE / DESCRIPTION
Approved by: RAS		Scale: AS NOTED / Date: 7/13/2018
Job No. SMK-004	File No.	Dwg. No. SK-3 / Dwg. 3 of 4



1 / SK-4 **LEG REINFORCEMENT**
SCALE: 1" = 1'-0"



2 / SK-4 **DIAGRAMATIC U-BOLT LAYOUT AT TOWER BASE SECTION**
SCALE: 3/16" = 1'-0"

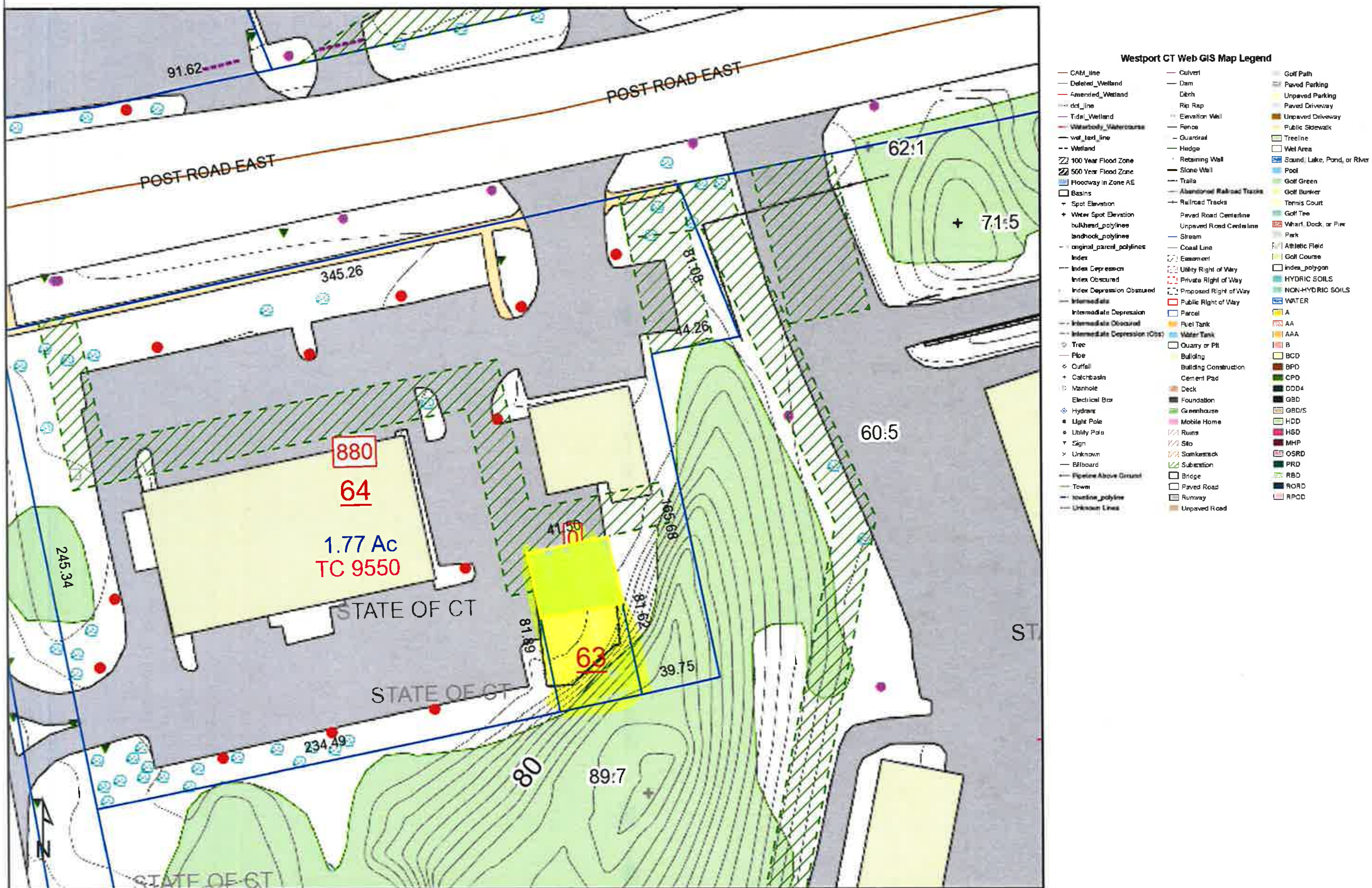
STATE OF CONNECTICUT · RICHARD A. SAMBOR · No. 9057 · LICENSED · PROFESSIONAL ENGINEER

PROJECT NO. 60581632	AECOM	at&t
Designed by: MCD	500 ENTERPRISE DRIVE	WESTPORT, AT&T SITE CTLO2147
Drawn by: GAT	ROCKY HILL, CONNECTICUT	SITE ADDRESS: 880 POST ROAD EAST
Checked by: ICA	(860)-529-8882	WESTPORT, CONNECTICUT
Approved by: RAS		

REV.	DATE:	DESCRIPTION

Scale: AS NOTED | Date: 7/13/2018 | Job No. SMK-004 | File No. | Dwg. No. SK-4 | Dwg. 4 of 4

ATTACHMENT 4



1 inch = 71 feet

Westport and its mapping contractors assume no legal responsibility for the information contained herein.

POST RD E

Location POST RD E

Mblu F09/ / 063/000 /

Acct# 53184

Owner CONNECTICUT STATE OF

Assessment $689,500

Appraisal $985,000

PID 100302

Building Count 1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$985,000	$0	$985,000
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$689,500	$0	$689,500

Owner of Record

Owner CONNECTICUT STATE OF
Co-Owner CELL TOWER/WALGREENS
Address 30 TRINITY ST
HARTFORD, CT 06106

Sale Price $0
Certificate
Book & Page 0/ 0
Sale Date 10/01/2005

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
CONNECTICUT STATE OF	$0		0/ 0	10/01/2005

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Attributes	
Field	**Description**

Building Layout

(http://images.vgsi.com/photos2/WestportCTPhotos//Sketches/

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Style	Vacant Land
Model	
Grade:	
Stories:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Kitchens	
Whirlpool Tubs	
Hot Tubs	
Sauna (SF Area)	
Fin Basement	
Fin Bsmt Qual	
Bsmt. Garages	
Interior Cond	
Fireplaces	
Ceiling Height	
Sprinklers	
Acc Apts	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 435
Description Cell Site Vac Lnd
Zone GBD
Neighborhood
Alt Land Appr No
Category

Land Line Valuation

Size (Acres) 0
Frontage
Depth
Assessed Value $0
Appraised Value $0

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
CELL	Cell on TWR	TW		3 Sites	$984,000	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$985,000	$0	$985,000
2016	$985,000	$0	$985,000
2014	$490,800	$0	$490,800

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$689,500	$0	$689,500
2016	$689,500	$0	$689,500
2014	$343,600	$0	$343,600

ATTACHMENT 5

UNITED STATES POSTAL SERVICE ®

Certificate of Mailing — Firm

Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Kenneth C. Baldwin, Esq. Robinson & Cole LLP 280 Trumbull Street Hartford, CT 06103		3	neopost 12/13/2018 US POSTAGE $002.38⁰ ZIP 06103 041L12203360
	Postmaster, per *(name of receiving employee)*	OLD STATE HOUSE STATION 06103 DEC 13 2018 USPS	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.	James Marpe, First Selectman Town of Westport 110 Myrtle Avenue Westport, CT 06880				
2.	Mary Young, Planning & Zoning Director Town of Westport 110 Myrtle Avenue Westport, CT 06880				
3.	Gareth D. Bye, Director of Legal Affairs Office of the Secretary State of Connecticut Office of Policy and Management 450 Capitol Avenue Hartford CT 06106-1379				
4.					
5.					
6.					

PS Form **3665**, January 2017 (Page ___ of ___) PSN 7530-17-000-5549

See Reverse for Instructions