COHEN and WOLF P.C.
ATTORNEYS AT LAW

JULIE D. KOHLER

PLEASE REPLY TO: Bridgeport
WRITER'S DIRECT DIAL: (203) 337-4157
E-Mail Address: jkohler@cohenandwolf.com

May 7, 2014

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: Notice of Exempt Modification
The Connecticut Light and Power Company/T-Mobile co-location
Site ID CT11029I
135 New Road, Madison, Connecticut

Dear Attorney Bachman:

This office represents T-Mobile Northeast LLC ("T-Mobile") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, the Connecticut Light and Power Company owns the existing guyed lattice tower and related facility located at 135 New Road, Madison, Connecticut (Latitude: 41.293428 Longitude: -72.578375). T-Mobile intends to replace three antennas and related equipment at this existing telecommunications facility in Madison ("Madison Facility"). Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of construction which 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 the First Selectman, Filmore McPherson. The Connecticut Light and Power Company is also the property owner.

The existing Madison Facility consists of a 180 foot tall guyed lattice tower.[1] T-Mobile plans to replace three antennas and three TMAs (tower mounted amplifiers) with six antennas and three TMAs mounted on three proposed mounts at a centerline of 159 feet. (See the plans revised to February 21, 2014 attached hereto as Exhibit A). T-Mobile will also install fiber cable and reuse existing coax cable. The existing Madison Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated March 3, 2014 and attached hereto as Exhibit B.

The planned modifications to the Madison Facility fall squarely within those activities

[1] While the online docket for the Connecticut Siting Council does not provide a docket or petition number for the approval of this structure, it does reference this structure in connection with notices of intent captioned EM-OCI-076-980825, EM-METRICOM-076-001226, and EM-AT&T-076-020927.

explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modification will not increase the height of the tower. T-Mobile's replacement antennas will be installed at a centerline of 159 feet, merely replacing existing antennas located at the same 159 foot elevation. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2. The proposed modifications will not require an extension of the site boundaries. T-Mobile's equipment will be located entirely within the existing compound and equipment pad as shown on Sheet A-1 of Exhibit A.

3. The proposed modification to the Madison Facility will not increase the noise levels at the existing facility by six decibels or more.

4. The operation of the replacement antennas will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI dated April 30, 2014, T-Mobile's operations would add 0.445% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 31.285% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as Exhibit C.

CL&P has authorized the filing of this exempt modification as evidenced by the letter of authorization dated April 30, 2014 attached hereto as Exhibit D.

For the foregoing reasons, T-Mobile respectfully submits that the proposed replacement antennas and equipment at the Madison Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Upon acknowledgement by the Council of this proposed exempt modification, T-Mobile shall commence construction approximately sixty days from the date of the Council's notice of acknowledgement.

Sincerely,

Julie D. Kohler, Esq.

cc: Town of Madison, First Selectman Filmore McPherson
Connecticut Light and Power Company
HPC Wireless Services, Halene Fujimoto

T-MOBILE USA, INC.
12920 SE 38TH STREET
BELLEVUE, WA 98006
(425) 378-4000

2772723
2/12/2014
2000011160

Invoice Number	Inv. Date	Description	Deductions	Voucher	Amount Paid
CT11029I-1	2/11/2014	Exempt Mod Filing Fees	0.00	1100282260	625.00

DO NOT ACCEPT THIS CHECK UNLESS THE FACE FADES FROM BLACK TO RED WITH LOGO IN BACKGROUND. THE BACK OF THIS DOCUMENT HAS HEAT-SENSITIVE INK THAT CHANGES FROM ORANGE TO YELLOW.

DOCUBAN CAPTURE ANTI-FRAUD PROTECTION

T-MOBILE USA, INC.
12920 SE 38th Street
Bellevue, WA 98006
(425) 378-4000

The Bank of New York Mellon
Pittsburgh, PA
60-160/433

2772723
2/12/2014
VID 2000011160

PAY $625.00
SIX TWO FIVE CTS CTS

*$625.00

Six Hundred Twenty Five Dollars Only*******

To The Order Of
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQ
NEW BRITAIN, CT 06051

VOID AFTER 180 DAYS
THIS CHECK CLEARS THROUGH POSITIVE PAY

⑈000277272 3⑈ ⑆043301601⑆ 013⑈8430⑈

THE ORIGINAL DOCUMENT HAS A REFLECTIVE WATERMARK ON THE BACK. HOLD AT AN ANGLE TO VIEW, DO NOT CASH IF MISSING.

EXHIBIT A

N

APPROX.

EXIST T-MOBILE ELEC METER

EXIST T-MOBILE 100A POWER PANEL

EXIST T-MOBILE TELCO CABINET

EXIST TRANSFORMER

EXIST T-MOBILE EQUIPMENT (SEE PLAN 2/L-1)

EXIST DOOR PAD (BY OTHERS)

EXIST EQUIPMENT SHELTER (BY OTHERS)

EXIST EQUIPMENT CABINET (BY OTHERS)

EXIST T-MOBILE CABLE BRIDGE

EXIST 180'± GUYED TOWER

EXIST EQUIPMENT CABINET (BY OTHERS)

EXIST EQUIPMENT CABINET ON CONCRETE PAD (TYP, BY OTHERS)

EXIST EQUIPMENT PAD (BY OTHERS)

EXIST 6' HIGH CHAINLINK FENCE (TYP)

1 / L-2

1 / L-1 SITE PLAN

SCALE: 1/8" = 1'-0"

STRUCTUAL NOTE:
PROPOSED MOUNTS AND GUYED TOWER TO BE VERIFIED FOR STRUCTURAL SUITABILITY OF PROPOSED INSTALLATION BY A STATE LICENSED P.E.

EXIST T-MOBILE GPS UNIT & LMU (ABOVE)

EXIST T-MOBILE S8000 CABINET TO BE DARKENED AND REMAIN

EXIST T-MOBILE EQUIPMENT CANOPY (ABOVE)

EXIST T-MOBILE RBS 3106 CABINET TO REMAIN

EXIST PRESSURE TREATED WOOD CURB

PROPOSED T-MOBILE FIBER CABLE ROUTED ALONG EXIST COAX ROUTE

EXIST T-MOBILE (6) 1-1/4" & (6) 1-5/8" COAX CABLES ROUTED ALONG EXIST CABLE BRIDGE

2 / L-1 EQUIPMENT PLAN

SCALE: 3/16" = 1'-0"

CONFIGURATION
2C

0 1 2 3
ORIGINAL SIZE IN INCHES

TECTONIC
• PLANNING • ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT
TECTONIC Engineering & Surveying Consultants P.C.
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-6556
Fax: (845) 567-8703

T-Mobile NORTHEAST LLC.

T-MOBILE NORTHEAST, LLC.
4 SYLVAN DRIVE
PARSIPPANY, NJ 07054
PHONE: (973) 886-6500

APPROVALS

T-MOBILE _____
LANDLORD _____
RF _____
CONSTRUCTION _____

PROJECT NUMBER	DESIGNED BY
6644.CT110291	TN

REV	DATE	REVISION	DRAWN BY
0	02/21/14	FOR COMMENT	MJR

ISSUED BY | DATE

SITE INFORMATION

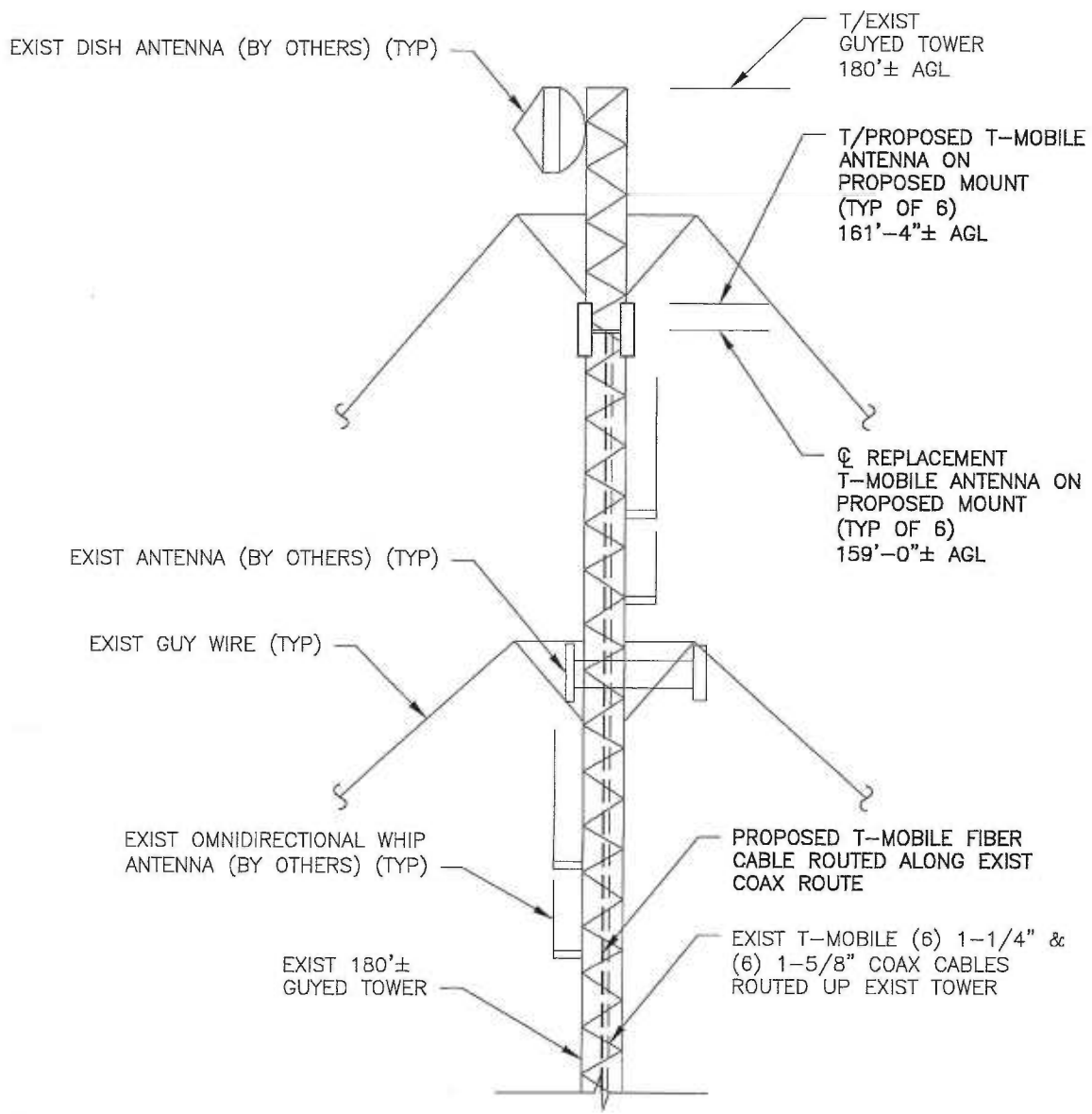
CT110291
MADISON/I-95/X61/JCT_1
135 NEW ROAD
MADISON, CT 06443

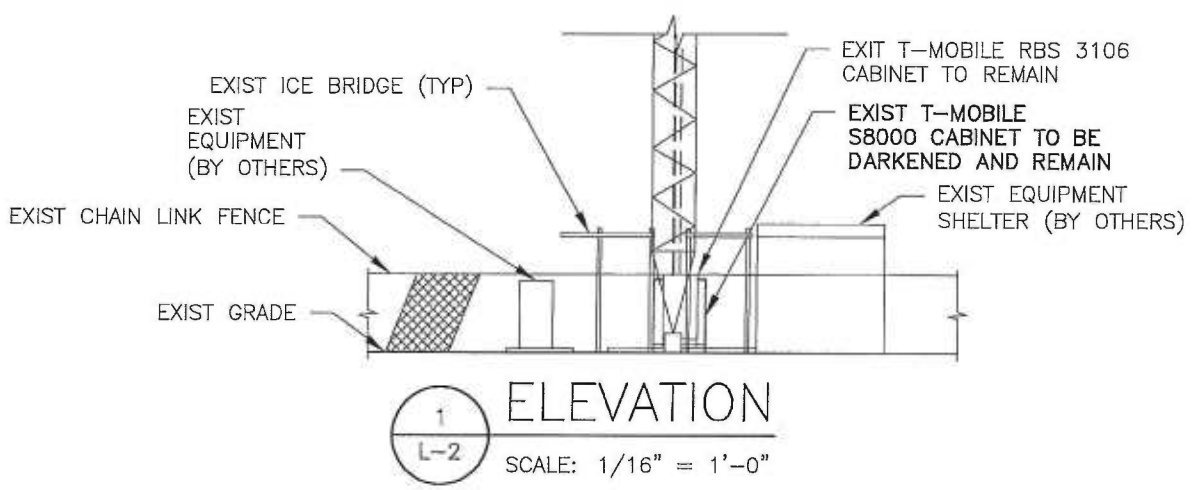
SHEET TITLE

SITE PLAN & EQUIPMENT PLAN

SHEET NUMBER

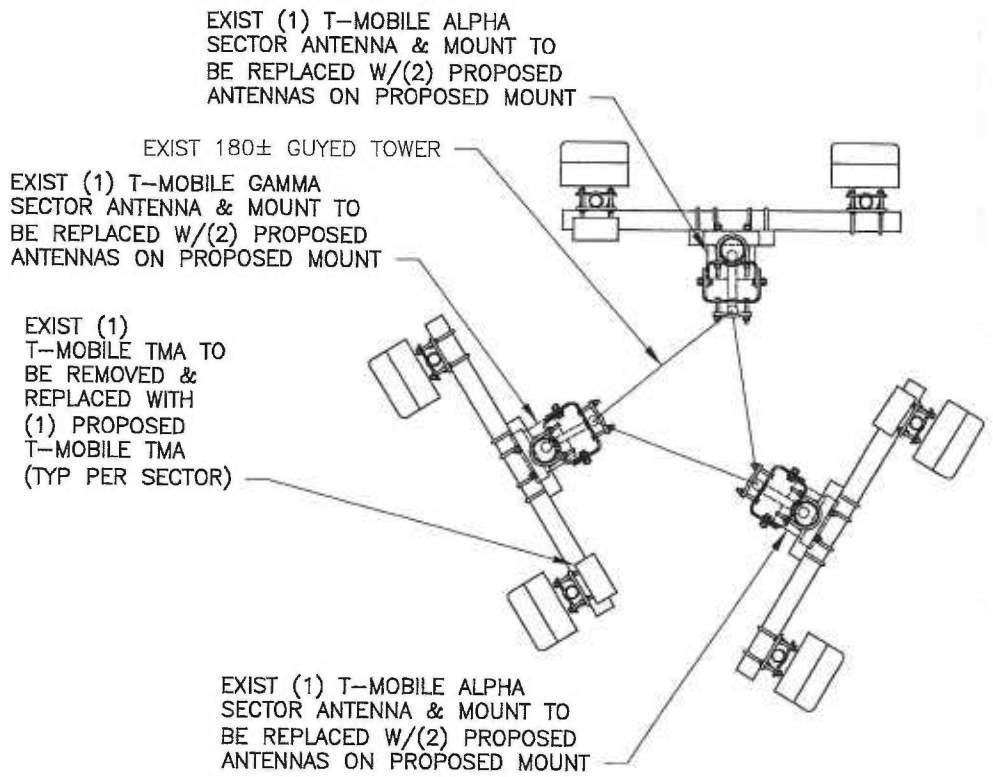
L-1





1 / L-2 ELEVATION

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



2 / L-2 ANTENNA PLAN

SCALE: 3/8" = 1'-0"

STRUCTUAL NOTE:

PROPOSED MOUNTS AND GUYED TOWER TO BE VERIFIED FOR STRUCTURAL SUITABILITY OF PROPOSED INSTALLATION BY A STATE LICENSED P.E.

CONFIGURATION

2C

0 1 2 3

ORIGINAL SIZE IN INCHES

TECTONIC
• PLANNING • SURVEYING
• ENGINEERING • CONSTRUCTION MANAGEMENT
TECTONIC Engineering & Surveying Consultants P.C.
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-8656
Fax: (845) 567-8703

T-Mobile NORTHEAST LLC.

T-MOBILE NORTHEAST, LLC.
4 SYLVAN DRIVE
PARSIPPANY, NJ 07054
PHONE: (973) 686-6500

APPROVALS

T-MOBILE _____

LANDLORD _____

RF _____

CONSTRUCTION _____

PROJECT NUMBER	DESIGNED BY
8544.CT110291	TN

REV	DATE	REVISION	DRAWN BY
0	02/21/14	FOR COMMENT	MJR

ISSUED BY	DATE

SITE INFORMATION

CT110291
MADISON/I-95/X61/JCT_1
135 NEW ROAD
MADISON, CT 06443

SHEET TITLE

SITE PLAN & EQUIPMENT PLAN

SHEET NUMBER

L-2

EXHIBIT B

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

180-ft Existing ROHN Guyed Lattice Tower

Proposed T-Mobile
Antenna Upgrade

T-Mobile Site Ref: CT11029I

135 New Road
Madison, CT 06443

CENTEK Project No. 14025.001

~~Date: February 4, 2014~~
Rev 1: March 3, 2014

Prepared for:
T-Mobile Towers
4 Sylvan Way
Parsippany, NJ 07054

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

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Introduction

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

The host tower is a 180-ft, three legged, Model 80 guyed lattice tower originally designed and manufactured by UNR-ROHN. The tower geometry and structure member size information were obtained from a previous structural analysis report prepared by Centek Engineering, Inc., project no. 12047.CO16 dated April 25, 2013.

Antenna and appurtenance inventory were obtained from the aforementioned structural analysis report prepared by Centek Engineering and a T-Mobile RF data sheet.

The tower consists of nine (9) vertical sections consisting of ROHN steel pipe legs conforming to ASTM A572-50. Diagonal and horizontal lateral support bracing consists of a combination of steel angle and pipe construction conforming to ASTM A36 and A53 Gr. B 35ksi. All connections are bolted. The width of the tower face is 3.41-ft at the top and bottom with a 5-ft tall tapered base section.

T-Mobile proposes the removal of three (3) panel antennas and three (3) TMA's and the installation of six (6) panel antennas and three (3) TMA's mounted on three proposed mounts. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

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

- NEU (Existing):
  Antenna: One (1) Folded Dipole mounted on a 4-ft stand-off with an elevation of ±180-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- NEU (Existing):
  Antenna: One (1) 9-ft and one (1) 7-ft Omni-directional whip antennas mounted to the leg of the existing tower with an elevation of ±180-ft above grade level.
  Coax Cable: One (1) 1-5/8" ∅ and one (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- NEU (Existing):
  Antenna: One (1) 8.5-ft ∅ Microwave dish antenna with radome mounted to the leg of the existing tower with a RAD center elevation of ±175-ft above grade level.
  Coax Cable: One (1) Elliptical coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- NEU (Existing):
  Antenna: One (1) 20-ft Omni-directional whip antenna pipe mounted with RAD center elevation of ±147-ft above grade level.
  Coax Cable: Two (2) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- NEU (Existing):
  Antenna: Two (2) 2-ft Omni-directional whip antennas mounted on a 2-ft stand-off with RAD center elevations of ±143-ft and 141-ft above grade level.
  Coax Cable: Two (2) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- NEU (Existing):
  Antenna: One (1) filter box mounted on a 2-ft stand-off with an elevation of ±142-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- NEU (Existing):
  Antenna: One (1) 12-ft Omni-Directional whip antenna mounted to the leg of the existing tower with a RAD center elevation of ±132-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- SPRINT (Existing/Reserved):
  Antennas: Three (3) RFS APXVSPP18-C-A20 panel antennas, three (3) 1900MHz 4X45 Remote Radio Heads (RRH's) and three (3) 800MHz 2X50W Remote Radio Heads (RRH's) mounted to three (3) existing 6-ft x 12-ft ROHN boom gates with a RAD center elevation of ±126-ft above grade level.
  Coax Cables: Three (3) 1-1/4" ∅ Hybriflex cables running on the face of the existing tower as specified in Section 3 of this report.

- SPRINT (Existing):
  Antenna: One (1) GPS antenna mounted on a 2-ft stand-off with a RAD center elevation of ±88-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- AT&T (Existing):
  Antennas: Three (3) Powerwave 7770 panel antennas, three (3) KMW AM-X-CD-14-65-00T panel antennas and six (6) TMA's mounted to three (3) 10-ft T-Arms with a RAD center elevation of 77-ft above grade level.
  Radios: Six (6) Ericsson Remote Radio Units, P/N: RRUS-11 attached to three (3) unistrut frames independently mounted to three (3) faces of the existing tower at a RAD center elevation of 73-ft above grade level.
  Surge Arrestor: One (1) Raycap DC6-48-60-18-8F Surge Arrestor mounted to the leg of the existing tower with a RAD center elevation of 72-ft above grade level.
  Coax Cables: Six (6) 7/8" ∅ coax cables, one (1) 5/8" ∅ fiber and two (2) #8 DC cables running on a face of the existing tower as specified in Section 3 of this report.

- T-MOBILE (Existing to Remain):
  Coax Cables: Six (6) 1-5/8" ∅ coax cables stacked in a 2x3 configuration running on the face of the existing tower as specified in Section 3 of this report.

- T-MOBILE (Existing to Remove):
  Antennas: Three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas and three (3) TMA's mounted to the legs/4-ft stand-off of the existing tower with a RAD center elevation of 159-ft above grade level.
  Coax Cables: Six (6) 1-1/4" ∅ coaxial cables running on the inside of the existing tower.

- **T-MOBILE (Proposed):**
  Antennas: Six (6) Ericsson AIR 21 panel antennas and three (3) Ericsson KRY 112 144/1 TMA's mounted on three (3) proposed Site Pro Compact Tower Mounts p/n CWT8 with a RAD center elevation of 159-ft above grade level.
  Coax Cables: One (1) 1-5/8" ∅ fiber cable and one (1) 1-1/4" LMU bundle running on the face of the existing tower as specified in Section 3 of this report.

Primary Assumptions Used in the Analysis

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

Analysis

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

The existing tower was analyzed for 85mph basic wind speed (fastest mile) with no ice and 85mph with ½ inch accumulative ice to determine stresses in members as per guidelines of Northeast Utilities Substation Standard (NU SUB-090), TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

Tower Loading

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

Basic Wind Speed:	New Haven; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	NU SUB-090; v = 85 mph (fastest mile)	*[Northeast Utilities Substation Standard 090]*
	Madison; v = 115 mph (3 second gust) equivalent to v = 95 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	NU–SUB-090 wind speed controls	
Load Cases:	Load Case 1; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation. This load case typically controls the design.	*[Northeast Utilities Substation Standard 090]*
	Load Case 2; 85 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. This load case typically controls the design of lattice towers.	*[Northeast Utilities Substation Standard 090]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

Tower Capacity

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

The tower deflection was evaluated with a wind velocity of 85 mph concurrent with 0.5" ice to determine twist (rotation) and sway (deflection) in accordance with NU SUB-90 requirements.

- Calculated stresses were found to be within allowable limits. In Load Case 2, per tnxTower "Section Capacity Table", this tower was found to be at **84.2%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T6)	60'-0"-80'-0"	84.2%	**PASS**
Diagonal (T6) (Bolts)	60'-0"-80'-0"	60.6%	**PASS**
Guy A @ 184-ft radius (T3)	127'-8"	72.3%	**PASS**

- The tower deflection (sway) was found to be within allowable limits as prescribed by Northeast Utilities. The combined tower deflection is **0.4205 degrees.**

Deflection Criteria	Proposed (degrees)	Allowable (degrees)	Result
Sway (Tilt)	0.1883	0.5	**PASS**
Twist	0.3759	0.5	**PASS**
Combined	0.4205	0.5	**PASS**

Foundations and Anchorage

The existing guy anchorage foundation system consists of three (3) inner and three (3) outer reinforced concrete guy anchor foundations and one pad and pier type base foundation, located below existing grade. The properties used in the analysis of the existing anchor foundations were obtained from the aforementioned structural analysis report prepared by Centek Engineering, Inc.

- The worst case tower base and guy anchor reactions developed from the governing Load Case 2 were used in the verification of the anchorage foundations:

Tower Guy Reactions		
Vector	**Proposed Reactions Guy Anchor A at Radius of 150-ft** (2)	**Proposed Reactions Guy Anchor A at Radius of 184-ft** (2)
Horizontal (In Plane of GW)	**15.4 kips**	**39.0 kips**
Horizontal (Out of Plane of GW)	**0.3 kips**	**2.0 kips**
Vertical	**6.1 kips**	**29.7 kips**
Resultant Force at end of Guy Wire	**16.6 kips**	**49.0 kips**
Tower Base Reactions		
Vector	**Proposed Reaction**	
Horizontal Shear	**1.4 kips**	
Axial Compression	**95.7 kips**	

Note 2: Obtained from tnxTower Analysis Load Case No. 2 - Guy Anchor A.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS)(3)	Proposed Loading (FS)(3)	Result
Reinf. Conc. Anchor Block (A) at 150-ft radius.	Uplift	2.0	10.5	**PASS**
	Sliding	2.0	3.9	**PASS**
Reinf. Conc. Anchor Block (A) at 184-ft radius.	Uplift	2.0	2.3	**PASS**
	Sliding	2.0	2.2	**PASS**
		Allowable	**Proposed**	
Base Foundation	Bearing	4.5 ksf	4.28 ksf	**PASS**

Note 3: FS denotes 'Factor of Safety'.

Conclusion

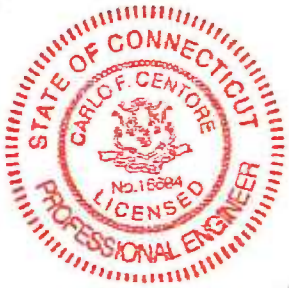
This analysis shows that the subject tower **is adequate** to support the proposed antenna and appurtenance configuration.

The analysis is based, in part on the information provided to this office by T-Mobile. If the existing conditions are different than the information in this report, CENTEK engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer



Prepared by:

Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

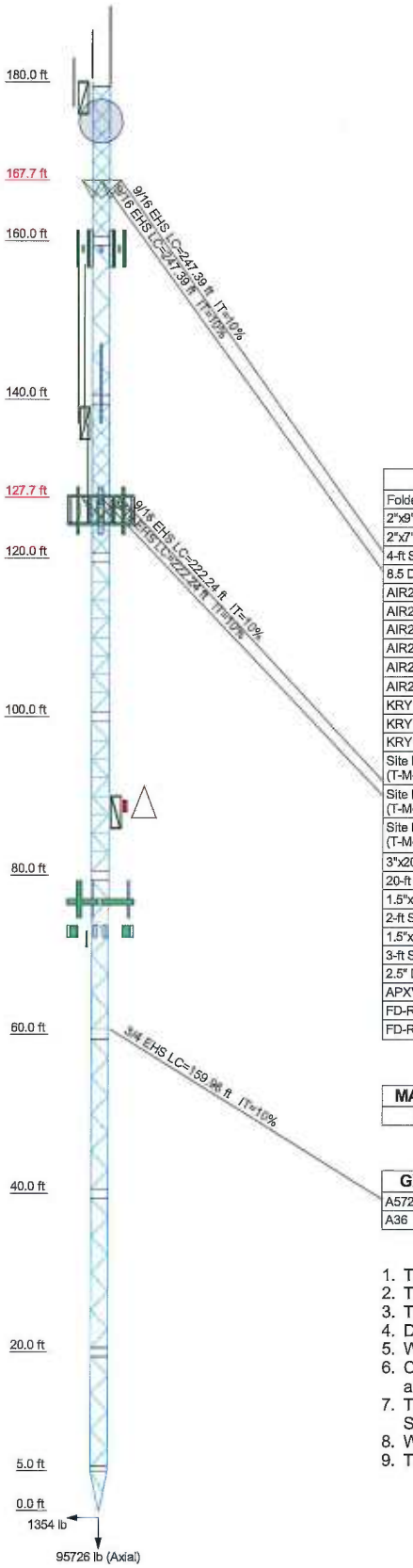
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

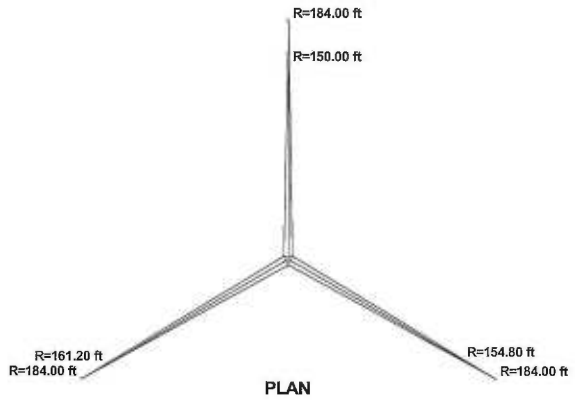
tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, RISATower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

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

Section	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs						P2.5x.203				
Leg Grade						A572-50				
Diagonals		L2 1/2x2 1/2x1/2	ROHN TS1.5x16 ga		L2 1/2x2 1/2x1/2	ROHN TS1.5x11 ga	L2 1/2x2 1/2x1/2	L2x2x3/16	ROHN TS1.5x16 ga	L1 3/4x1 3/4x3/16
Diagonal Grade		A36	A53-B-35		A36	A53-B-35	A36		A53-B-35	A36
Top Girts		L2 1/2x2 1/2x1/2	ROHN TS1.5x16 ga		L2 1/2x2 1/2x1/2	ROHN TS1.5x16 ga	L2 1/2x2 1/2x1/2	L2x2x3/16	ROHN TS1.5x16 ga	L1 3/4x1 3/4x3/16
Bottom Girts	N.A.	L2 1/2x2 1/2x1/2	ROHN TS1.5x16 ga		L2 1/2x2 1/2x1/2	ROHN TS1.5x16 ga	L2 1/2x2 1/2x1/2	L2x2x3/16	ROHN TS1.5x16 ga	L1 3/4x1 3/4x3/16
Horizontals		N.A.			L2 1/2x2 1/2x1/2			N.A.		
Top Guy Pull-Offs		N.A.			4 1/2x3/8			N.A.		
Face Width (ft)						72 @ 2.34635				3.41
# Panels @ (ft)	A	7 @ 2.28514								
Weight (lb)	10311.4	984.1	455.0	1126.8	1323.9	1690.3	1813.4	1438.1	455.0	1389.0





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Folded Dipole (NEU)	180	FD-RRH 2x50 800 (Sprint)	126
2"x9' omni (NEU)	180	FD-RRH 4x45 1900 (Sprint)	126
2"x7' omni (NEU)	180	FD-RRH 4x45 1900 (Sprint)	126
4-ft Side Arm (NEU)	178	FD-RRH 4x45 1900 (Sprint)	126
8.5 Dishw/radome (NU)	175	Rohn 6' x 12' Boom Gate (1) (Sprint - Existing)	126
AIR21 (T-Mobile - Proposed)	159		
AIR21 (T-Mobile - Proposed)	159	Rohn 6' x 12' Boom Gate (1) (Sprint - Existing)	126
AIR21 (T-Mobile - Proposed)	159		
AIR21 (T-Mobile - Proposed)	159	Rohn 6' x 12' Boom Gate (1) (Sprint - Existing)	126
AIR21 (T-Mobile - Proposed)	159		
AIR21 (T-Mobile - Proposed)	159	APXVSPP18-C-A20 w/ Mount (Sprint)	126
KRY 112 TMA (T-Mobile - Proposed)	159	APXVSPP18-C-A20 w/ Mount (Sprint)	126
KRY 112 TMA (T-Mobile - Proposed)	159	3' GPS Stand-off Mount (Sprint)	88
KRY 112 TMA (T-Mobile - Proposed)	159	GPS (Sprint)	88
Site Pro Compact Tower Mount CWT8 (T-Mobile - Proposed)	159	Valmont T-Arm (1) (ATI)	77
		Valmont T-Arm (1) (ATI)	77
Site Pro Compact Tower Mount CWT8 (T-Mobile - Proposed)	159	Valmont T-Arm (1) (ATI)	77
		AM-X-CD-14-65-00TT-RET (ATI)	77
Site Pro Compact Tower Mount CWT8 (T-Mobile - Proposed)	159	AM-X-CD-14-65-00TT-RET (ATI)	77
		AM-X-CD-14-65-00TT-RET (ATI)	77
3"x20-ft Omni (NEU)	147	7770.00 (ATI)	77
20-ft x 1.9in Support Pipe (NEU)	147	7770.00 (ATI)	77
1.5"x2'omni (NEU)	143	7770.00 (ATI)	77
2-ft Stand Off (NEU)	142	(2) LPG21401 TMA (ATI)	77
1.5"x2'omni (NEU)	141	(2) LPG21401 TMA (ATI)	77
3-ft Side Arm (NEU)	137	(2) LPG21401 TMA (ATI)	77
2.5" Dia. x12' Omni (NEU)	132	(2) RRUS-11 (ATI)	73
APXVSPP18-C-A20 w/ Mount (Sprint)	126	(2) RRUS-11 (ATI)	73
FD-RRH 2x50 800 (Sprint)	126	(2) RRUS-11 (ATI)	73
FD-RRH 2x50 800 (Sprint)	126	DC6-48-60-18-8F Surge Arrestor (ATI)	72

SYMBOL LIST

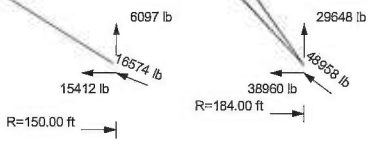
MARK	SIZE	MARK	SIZE
A	2 @ 2.5		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A53-B-35	35 ksi	63 ksi
A36	36 ksi	58 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 85 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 85 mph wind.
5. Weld together tower sections have flange connections.
6. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.
9. TOWER RATING: 84.2%

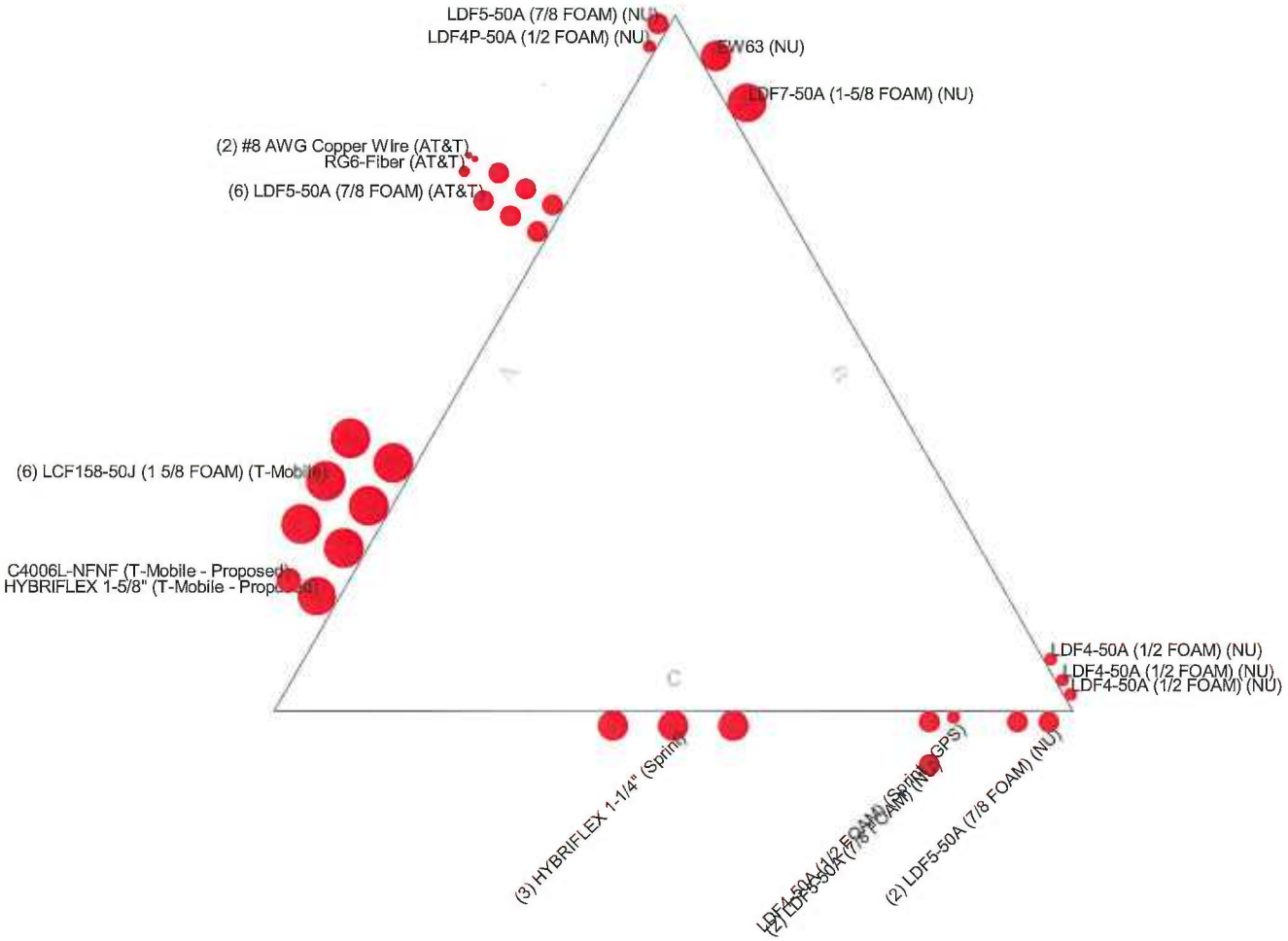


Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: ***14025.001 - CT11029I***			
Project: ***180' Guyed Lattice Tower - 125 New Rd., Madison, CT***			
Client: T-Mobile	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 03/03/14	Scale: NTS	
Path:		Dwg No. E-1	

Feedline Plan

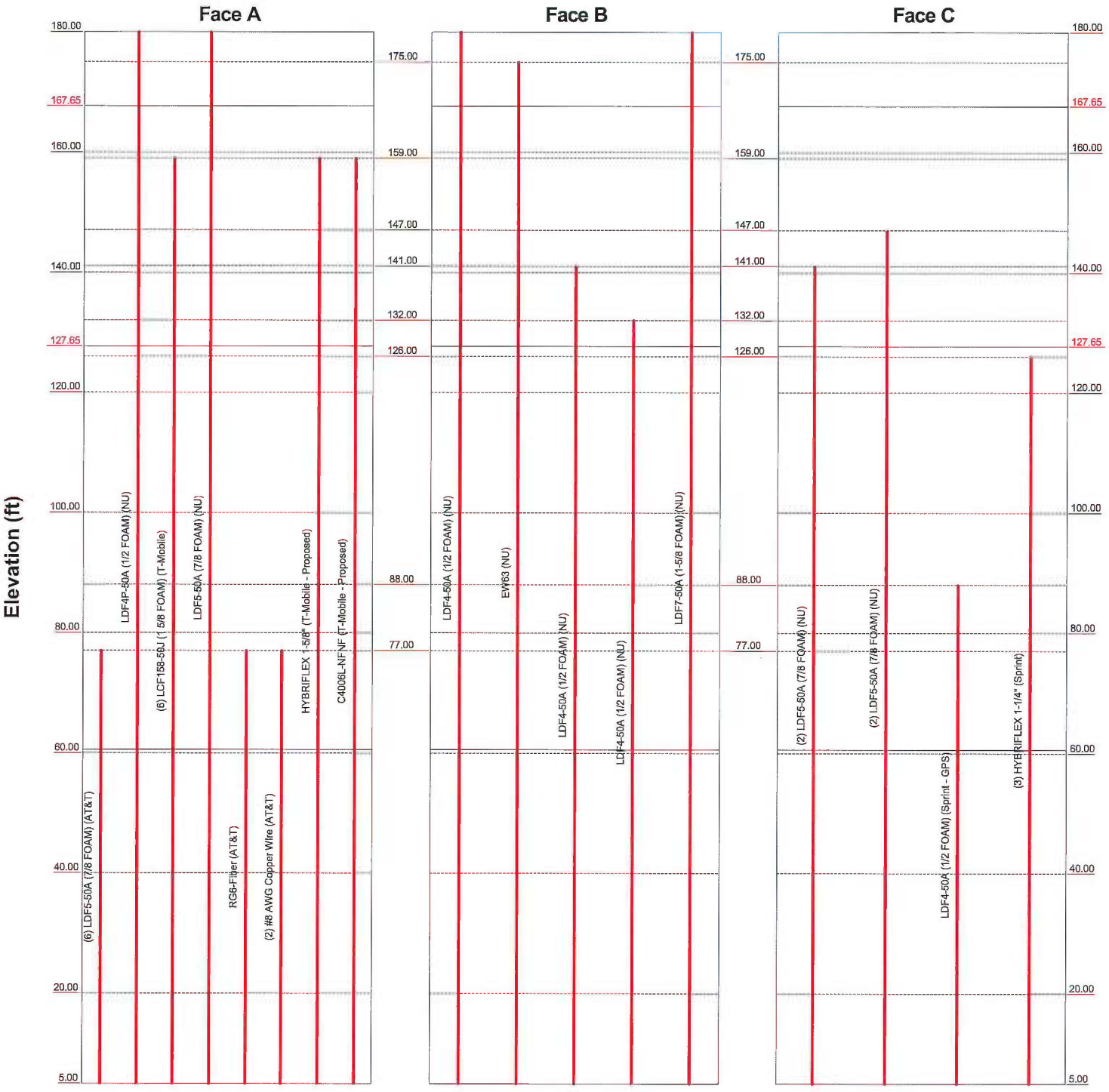
_____ Round _____ Flat _____ App In Face _____ App Out Face



Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: **14025.001 - CT11029I**		
	Project: ***180' Guyed Lattice Tower - 125 New Rd., Madison, CT***		
	Client: T-Mobile	Drawn by: TJL	App'd:
	Code: TIA/EIA-222-F	Date: 03/03/14	Scale: NTS
	Path:		Dwg No. E-7

Feedline Distribution Chart
5' - 180'

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



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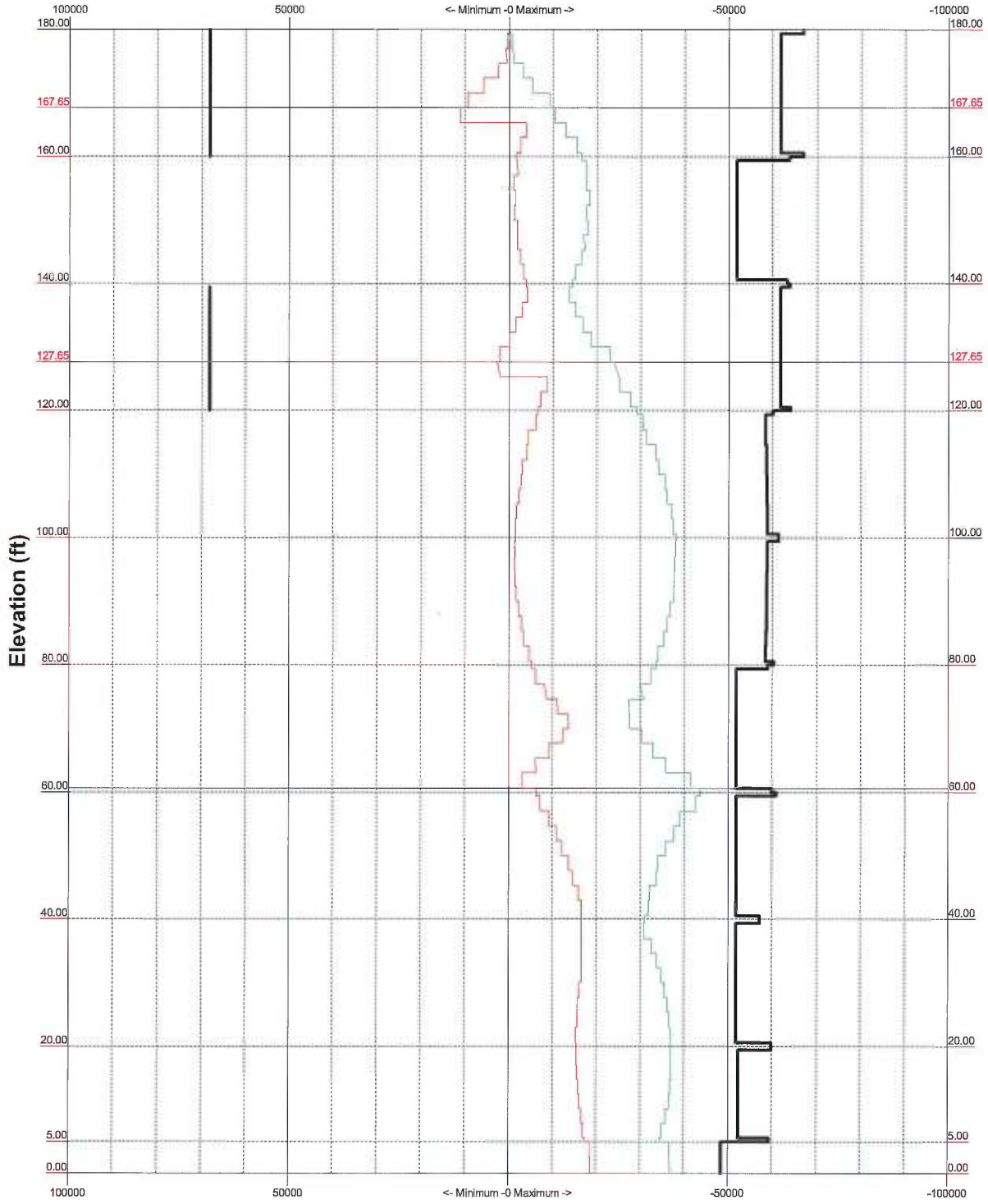
Code: TIA/EIA-222-F	Date: 03/03/14	Scale: NTS
Path:		Dwg No. E-7

TIA/EIA-222-F - 85 mph/85 mph 0.5000 in Ice

Leg Capacity ——— Leg Compression (lb)



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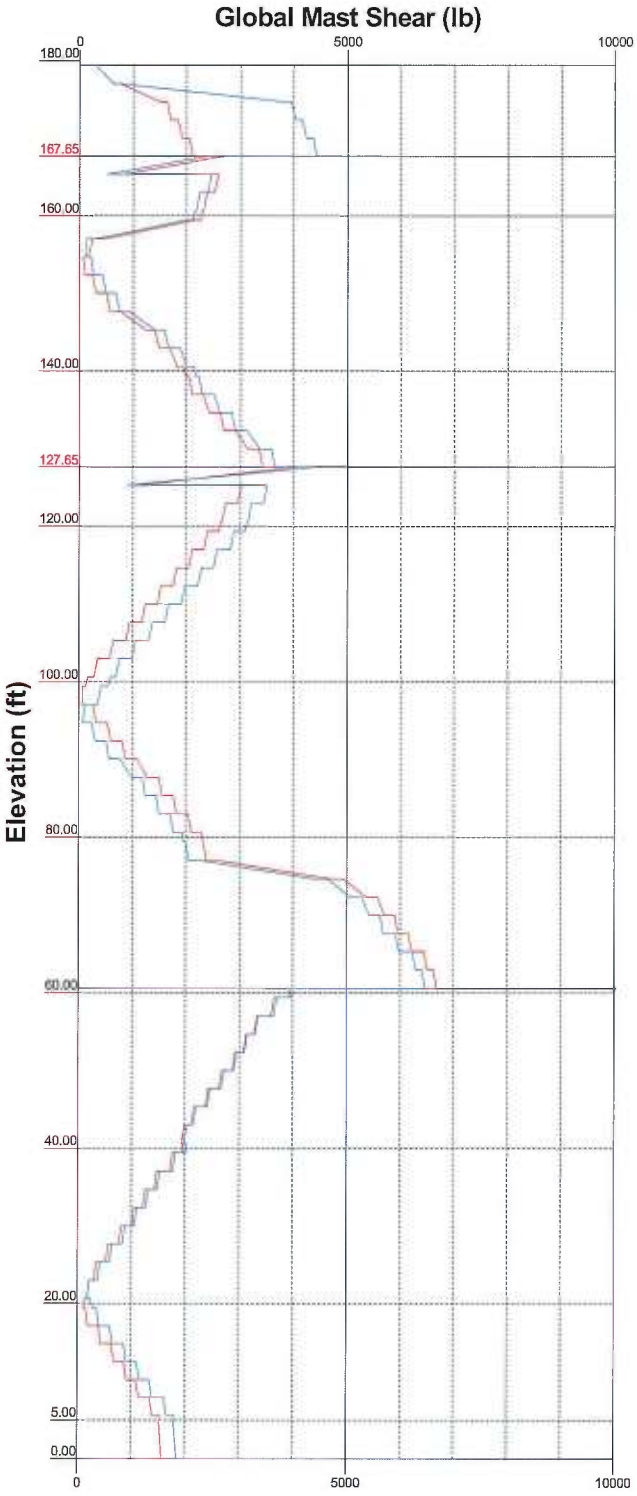
Job: 14025.001 - CT11029I			
Project: 180' Guyed Lattice Tower - 125 New Rd., Madison, CT			
Client: T-Mobile	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 03/03/14	Scale: NTS	
Path:		Dwg No. E-3	

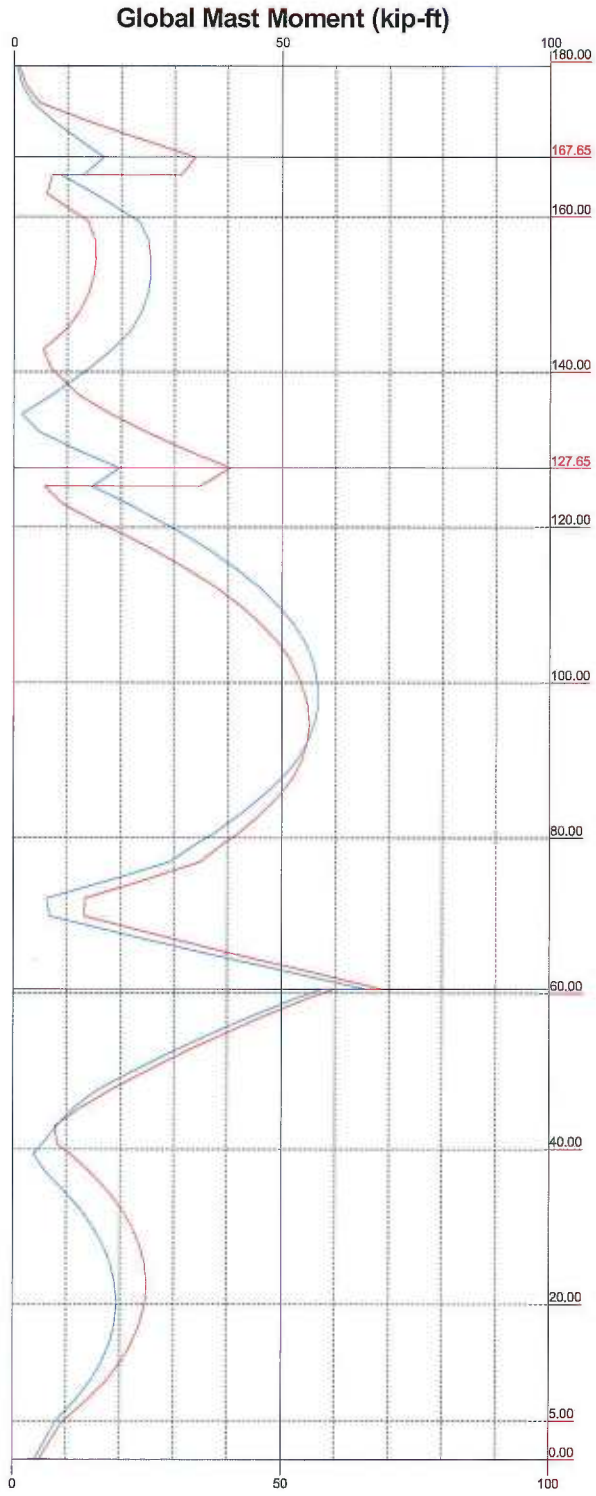
TIA/EIA-222-F - 85 mph/85 mph 0.5000 in Ice

Vx Vz

Maximum Values

Mx Mz





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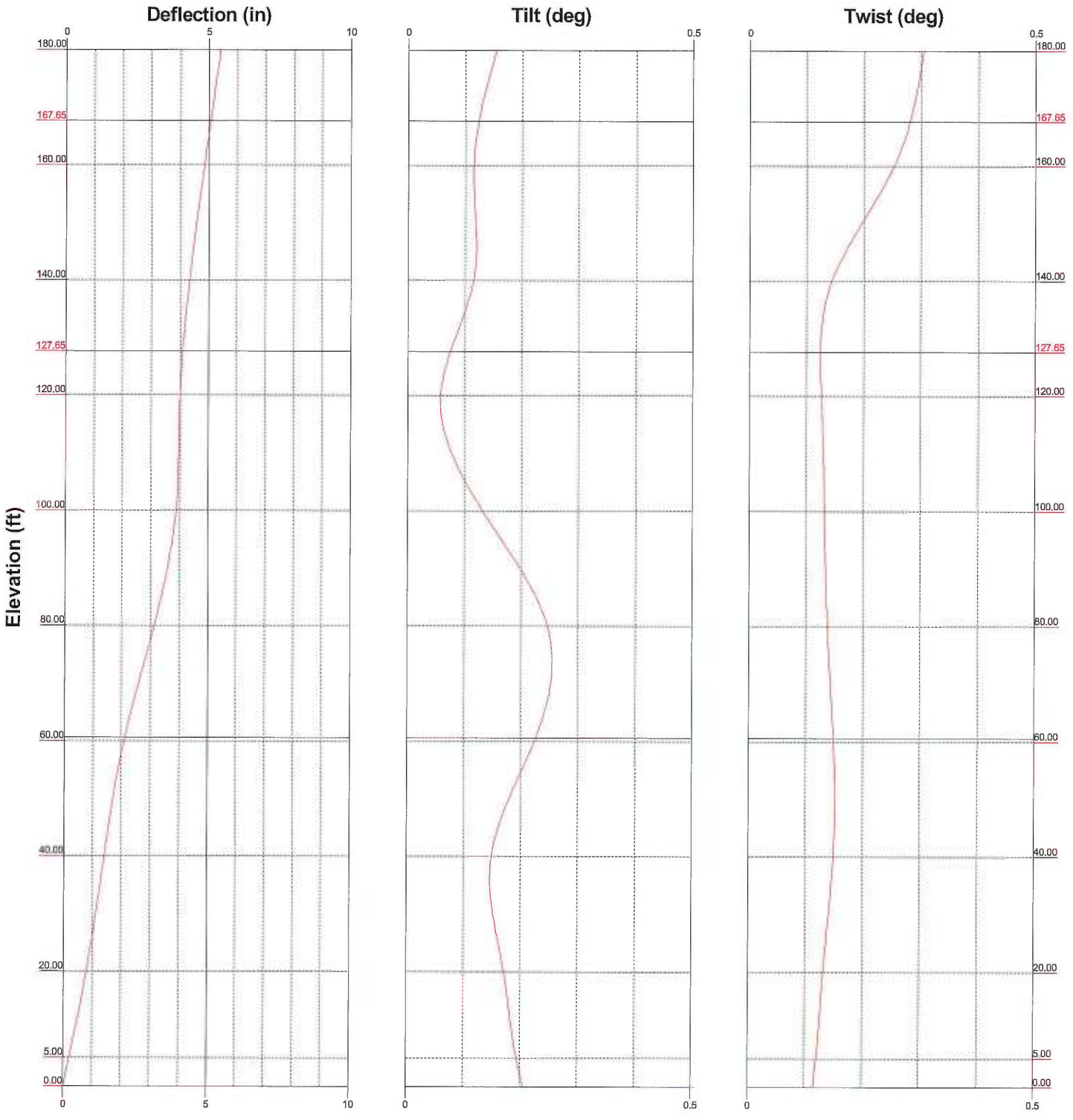
Job: *14025.001 - CT11029I*		
Project: *180' Guyed Lattice Tower - 125 New Rd., Madison, CT*		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 03/03/14	Scale: NTS
Path:		Dwg No. E-4

TIA/EIA-222-F - Service - 85 mph

Maximum Values



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Job: ***14025.001 - CT11029I***			
Project: ***180' Guyed Lattice Tower - 125 New Rd., Madison, CT***			
Client: T-Mobile	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 03/03/14	Scale: NTS	
Path:		Dwg No. E-5	

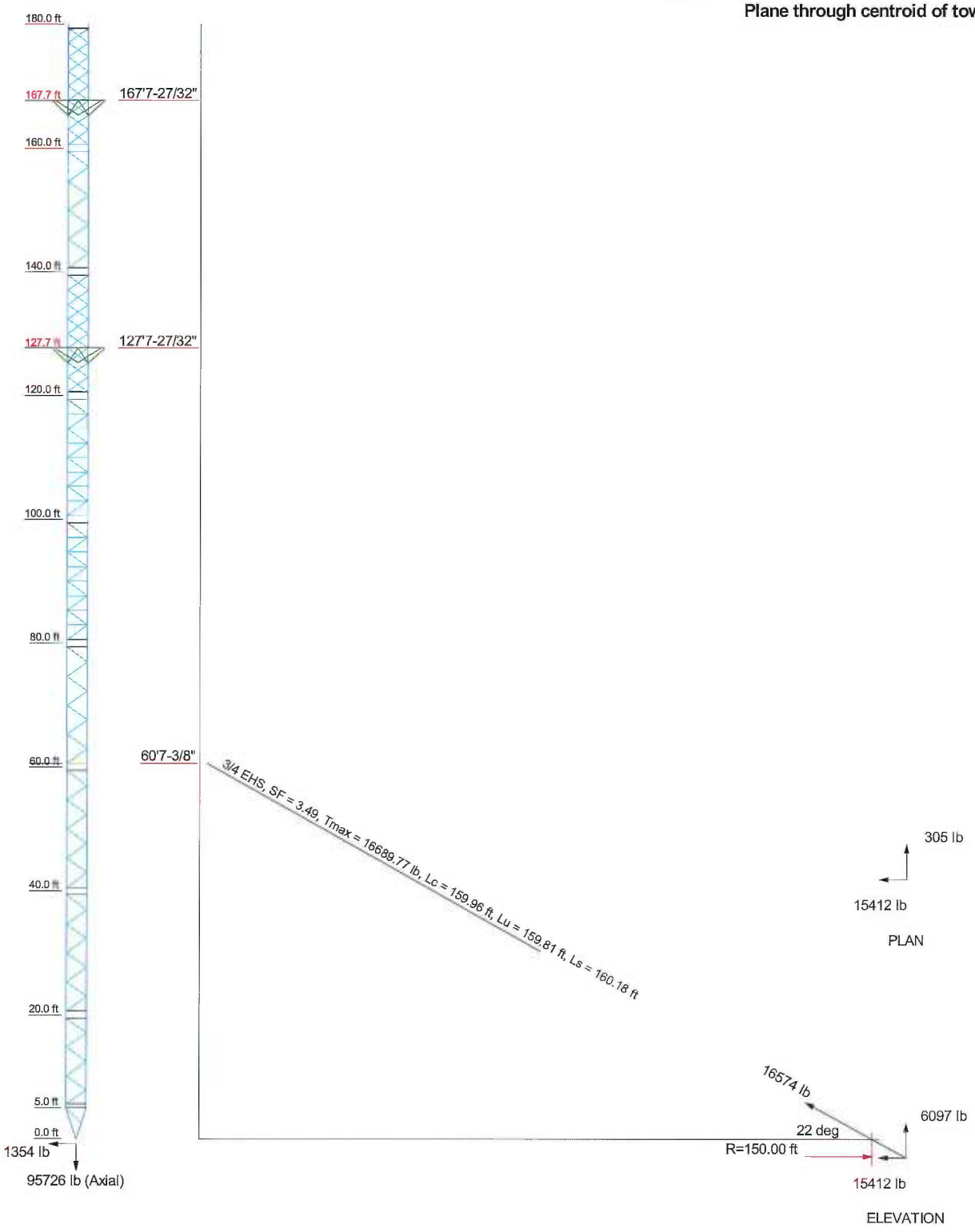
Guy Tensions and Tower Reactions

TIA/EIA-222-F - 85 mph/85 mph 0.5000 in Ice

Maximum Values

Anchor 'A'@150 ft Azimuth 0 deg Elev 0 ft

Plane through centroid of tower



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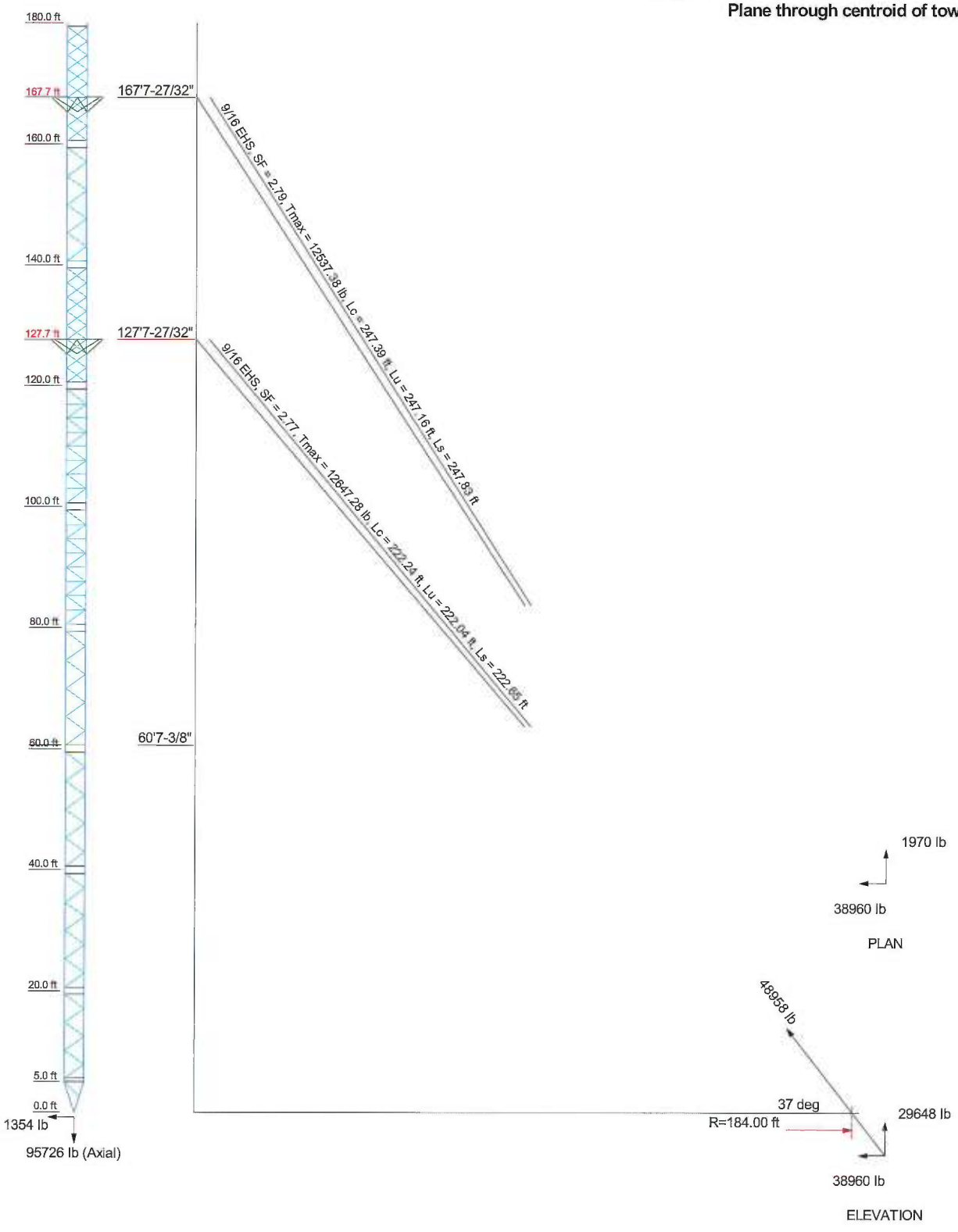
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: ***14025.001 - CT11029I***		
Project: ***180' Guyed Lattice Tower - 125 New Rd., Madison, CT***		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 03/03/14	Scale: NTS
Path:		Dwg No. E-6

Guy Tensions and Tower Reactions

TIA/EIA-222-F - 85 mph/85 mph 0.5000 in Ice

Maximum Values
Anchor 'A'@184 ft Azimuth 0 deg Elev 0 ft
Plane through centroid of tower



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Job: ***14025.001 - CT11029I***		
Project: ***180' Guyed Lattice Tower - 125 New Rd., Madison, CT***		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 03/03/14	Scale: NTS
Path:		Dwg No. E-6

tnxTower	Job	Page
	14025.001 - CT11029I	1 of 53
Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	**Project** 180' Guyed Lattice Tower - 125 New Rd., Madison, CT	**Date** 13:22:04 03/03/14
	Client T-Mobile	**Designed by** TJL

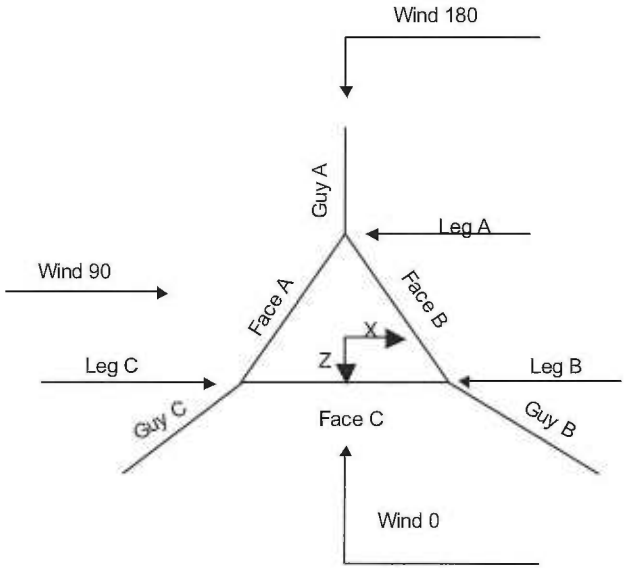
Tower Input Data

The main tower is a 3x guyed 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 3.41 ft at the top and tapered at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

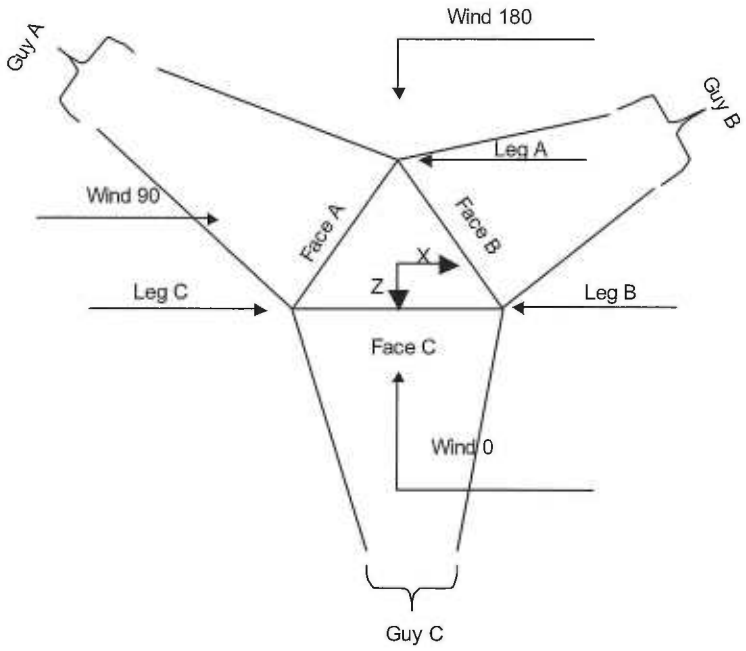
Tower is located in New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 85 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 85 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
Pressures are calculated at each section.
Safety factor used in guy design is 2.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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



Corner & Starmount Guyed Tower



Face Guyed

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.00-160.00			3.41	1	20.00
T2	160.00-140.00			3.41	1	20.00
T3	140.00-120.00			3.41	1	20.00
T4	120.00-100.00			3.41	1	20.00
T5	100.00-80.00			3.41	1	20.00
T6	80.00-60.00			3.41	1	20.00
T7	60.00-40.00			3.41	1	20.00
T8	40.00-20.00			3.41	1	20.00
T9	20.00-5.00			3.41	1	15.00
T10	5.00-0.00			3.41	1	5.00

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	2.35	X Brace	No	Yes	7.3750	7.3750
T2	160.00-140.00	2.35	K Brace Left	No	Yes	7.3750	7.3750
T3	140.00-120.00	2.35	X Brace	No	Yes	7.3750	7.3750
T4	120.00-100.00	2.35	K Brace Left	No	Yes	7.3750	7.3750
T5	100.00-80.00	2.35	K Brace Left	No	Yes	7.3750	7.3750
T6	80.00-60.00	2.35	K Brace Left	No	No	7.3750	7.3750
T7	60.00-40.00	2.35	K Brace Left	No	No	7.3750	7.3750
T8	40.00-20.00	2.35	K Brace Left	No	No	7.3750	7.3750
T9	20.00-5.00	2.30	K Brace Left	No	Yes	7.3750	7.3750
T10	5.00-0.00	2.50	K Brace Left	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	P2.5x.203	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 160.00-140.00	Pipe	P2.5x.203	A572-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-35 (35 ksi)
T3 140.00-120.00	Pipe	P2.5x.203	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 120.00-100.00	Pipe	P2.5x.203	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/2	A36 (36 ksi)
T5 100.00-80.00	Pipe	P2.5x.203	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-35 (35 ksi)
T6 80.00-60.00	Pipe	P2.5x.203	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/2	A36 (36 ksi)
T7 60.00-40.00	Pipe	P2.5x.203	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/2	A36 (36 ksi)
T8 40.00-20.00	Pipe	P2.5x.203	A572-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-35 (35 ksi)
T9 20.00-5.00	Pipe	P2.5x.203	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/2	A36 (36 ksi)
T10 5.00-0.00	Pipe	P2.5x.203	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/2	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180.00-160.00	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 160.00-140.00	Pipe	ROHN TS1.5x16 ga	A36 (36 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-35 (35 ksi)
T3 140.00-120.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 120.00-100.00	Equal Angle	L2 1/2x2 1/2x1/2	A36 (36 ksi)	Equal Angle	L2 1/2x2 1/2x1/2	A36 (36 ksi)
T5 100.00-80.00	Pipe	ROHN TS1.5x16 ga	A36	Pipe	ROHN TS1.5x16 ga	A53-B-35

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T6 80.00-60.00	Equal Angle	L2 1/2x2 1/2x1/2	(36 ksi) A36 (36 ksi)	Equal Angle	L2 1/2x2 1/2x1/2	(35 ksi) A36 (36 ksi)
T7 60.00-40.00	Pipe	ROHN TS1.5x16 ga	(36 ksi) A36 (36 ksi)	Pipe	ROHN TS1.5x16 ga	(35 ksi) A53-B-35 (35 ksi)
T8 40.00-20.00	Pipe	ROHN TS1.5x16 ga	(36 ksi) A36 (36 ksi)	Pipe	ROHN TS1.5x16 ga	(35 ksi) A53-B-35 (35 ksi)
T9 20.00-5.00	Equal Angle	L2 1/2x2 1/2x1/2	(36 ksi) A36 (36 ksi)	Equal Angle	L2 1/2x2 1/2x1/2	(36 ksi) A36 (36 ksi)
T10 5.00-0.00	Equal Angle	L2 1/2x2 1/2x1/2	(36 ksi) A36 (36 ksi)	Flat Bar		(36 ksi) 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
T4 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L2 1/2x2 1/2x1/2	A572-50 (50 ksi)
T5 100.00-80.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L2 1/2x2 1/2x1/2	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T2 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T3 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T4 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T5 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T6 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T7 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T8 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T9 20.00-5.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T10 5.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	No	1	1	1	1	1	1	1	1
180.00-160.00				1	1	1	1	1	1	1
T2	Yes	No	1	1	1	1	1	1	1	1
160.00-140.00				1	1	1	1	1	1	1
T3	Yes	No	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T4	Yes	No	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T5	Yes	No	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T6	Yes	No	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T7	Yes	No	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T8	Yes	No	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T9 20.00-5.00	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T10 5.00-0.00	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
180.00-160.00														
T2	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
160.00-140.00														
T3	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
140.00-120.00														
T4	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
120.00-100.00														
T5	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
100.00-80.00														
T6 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 20.00-5.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 5.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1	Flange	0.7500	4	0.5000	1	0.5000	1	0.5000	0	0.6250	0	0.6250	0	0.6250	0
180.00-160.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T2	Flange	0.7500	4	0.5000	1	0.5000	1	0.5000	0	0.6250	0	0.6250	0	0.6250	0
160.00-140.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T3	Flange	0.7500	4	0.5000	1	0.5000	1	0.5000	0	0.6250	0	0.6250	0	0.6250	0
140.00-120.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T4	Flange	0.7500	4	0.6250	1	0.6250	1	0.6250	0	0.6250	0	0.6250	1	0.6250	0
120.00-100.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T5	Flange	0.7500	4	0.5000	1	0.5000	1	0.5000	0	0.6250	0	0.6250	1	0.6250	0
100.00-80.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T6 80.00-60.00	Flange	0.7500	4	0.6250	1	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T7 60.00-40.00	Flange	0.7500	4	0.6250	1	0.5000	1	0.5000	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T8 40.00-20.00	Flange	0.7500	4	0.5000	1	0.5000	1	0.5000	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T9 20.00-5.00	Flange	0.7500	4	0.6250	1	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T10 5.00-0.00	Flange	0.7500	4	0.0000	0	0.0000	0	0.0000	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension lb	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
167.654	EHS	A	9/16	3500.00	10%	21000	0.671	247.19	184.00	0.0000	0.00	100%
		B	9/16	3500.00	10%	21000	0.671	247.19	184.00	0.0000	0.00	100%
		C	9/16	3500.00	10%	21000	0.671	247.19	184.00	0.0000	0.00	100%
127.654	EHS	A	9/16	3500.00	10%	21000	0.671	222.06	184.00	0.0000	0.00	100%
		B	9/16	3500.00	10%	21000	0.671	222.06	184.00	0.0000	0.00	100%
		C	9/16	3500.00	10%	21000	0.671	222.06	184.00	0.0000	0.00	100%
60.6146	EHS	A	3/4	5830.00	10%	19000	1.155	159.82	150.00	0.0000	0.00	100%
		B	3/4	5830.00	10%	19000	1.155	164.27	154.80	0.0000	0.00	100%
		C	3/4	5830.00	10%	19000	1.155	170.23	161.20	0.0000	0.00	100%

Guy Data *(cont'd)*

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
167.654	Torque Arm	7.33	30.0000	Bat Ear	A53-B-35 (35 ksi)	Pipe	P4x.237 XP34.5x.03325

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
127.654	Torque Arm	7.33	30.0000	Bat Ear	A53-B-35 (35 ksi)	Pipe	P4x.237
60.6146	Corner						XP34.5x.03325

Guy Data *(cont'd)*

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
167.65	A572-50 (50 ksi)	Solid Round				A36 (36 ksi)	Solid Round	
127.65	A572-50 (50 ksi)	Solid Round				A36 (36 ksi)	Solid Round	
60.61	A572-50 (50 ksi)	Solid Round			Yes	A36 (36 ksi)	Flat Bar	4 1/2x3/8

Guy Data *(cont'd)*

Guy Elevation ft	Cable Weight A lb	Cable Weight B lb	Cable Weight C lb	Cable Weight D lb	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
167.654	165.86	165.86	165.86		5.77 4.1 sec/pulse	5.77 4.1 sec/pulse	5.77 4.1 sec/pulse	
127.654	149.00	149.00	149.00		4.67 3.7 sec/pulse	4.67 3.7 sec/pulse	4.67 3.7 sec/pulse	
60.6146	184.59	189.73	196.61		2.52 2.7 sec/pulse	2.66 2.8 sec/pulse	2.86 2.9 sec/pulse	

Guy Data *(cont'd)*

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
167.654	No	No	1	1	1	1	1	1
127.654	No	No	1	1	1	1	1	1
60.6146	No	No			1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
167.654	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
127.654	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
60.6146	0.0000 A325N	0	0.0000	1	0.6250 A325N	4	0.0000	1	0.0000 A325N	0	0.0000	1

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
167.654	A	83.83	24	24	0.5000
	B	83.83	24	24	0.5000
	C	83.83	24	24	0.5000
127.654	A	63.83	22	22	0.5000
	B	63.83	22	22	0.5000
	C	63.83	22	22	0.5000
60.6146	A	30.31	18	18	0.5000
	B	30.31	18	18	0.5000
	C	30.31	18	18	0.5000

Guy-Mast Forces (Excluding Wind) - No Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom lb	F_x lb	F_y lb	F_z lb	M_x kip-ft	M_y kip-ft	M_z kip-ft
167.654	A	42.6630	3612.40 3500.00	-52.70	2492.80	-2613.93	-5.28	9.70	-9.14
	A	42.6630	3612.40 3500.00	52.70	2492.80	-2613.93	-5.28	-9.70	9.14
	B	42.6630	3612.40 3500.00	2290.07	2492.80	1261.33	10.55	9.70	0.00
	B	42.6630	3612.40 3500.00	2237.38	2492.80	1352.60	-5.28	-9.70	-9.14
	C	42.6630	3612.40 3500.00	-2237.38	2492.80	1352.60	-5.28	9.70	9.14
	C	42.6630	3612.40 3500.00	-2290.07	2492.80	1261.33	10.55	-9.70	0.00
			Sum:	0.00	14956.78	0.00	-0.00	0.00	0.00
127.654	A	35.0574	3585.58 3500.00	-58.44	2109.37	-2898.89	-4.47	10.75	-7.73
	A	35.0574	3585.58 3500.00	58.44	2109.37	-2898.89	-4.47	-10.75	7.73
	B	35.0574	3585.58 3500.00	2539.73	2109.37	1398.83	8.93	10.75	0.00
	B	35.0574	3585.58 3500.00	2481.29	2109.37	1500.05	-4.47	-10.75	-7.73
	C	35.0574	3585.58 3500.00	-2481.29	2109.37	1500.05	-4.47	10.75	7.73

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom lb	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		lb	lb	lb	kip-ft	kip-ft	kip-ft
	C	35.0574	3585.58 3500.00	-2539.73	2109.37	1398.83	8.93	-10.75	0.00
			Sum:	0.00	12656.21	0.00	-0.00	0.00	0.00
60.6146	A	22.2677	5899.95 5830.00	0.00	2314.65	-5426.95	-4.56	0.00	0.00
	B	21.6338	5899.95 5830.00	4720.84	2257.04	2725.58	2.22	0.00	-3.85
	C	20.8403	5899.95 5830.00	-4746.27	2184.77	2740.26	2.15	-0.00	3.73
			Sum:	-25.43	6756.46	38.90	-0.18	0.00	-0.12

Guy-Mast Forces (Excluding Wind) - Ice

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom lb	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		lb	lb	lb	kip-ft	kip-ft	kip-ft
167.654	A	42.6630	5176.42 4955.31	-75.05	3595.88	-3722.81	-7.61	13.81	-13.18
	A	42.6630	5176.42 4955.31	75.05	3595.88	-3722.81	-7.61	-13.81	13.18
	B	42.6630	5176.42 4955.31	3261.58	3595.88	1796.41	15.22	13.81	0.00
	B	42.6630	5176.42 4955.31	3186.53	3595.88	1926.40	-7.61	-13.81	-13.18
	C	42.6630	5176.42 4955.31	-3186.53	3595.88	1926.40	-7.61	13.81	13.18
	C	42.6630	5176.42 4955.31	-3261.58	3595.88	1796.41	15.22	-13.81	0.00
			Sum:	0.00	21575.30	0.00	-0.00	0.00	0.00
127.654	A	35.0574	5135.43 4967.08	-83.31	3047.69	-4132.47	-6.45	15.33	-11.17
	A	35.0574	5135.43 4967.08	83.31	3047.69	-4132.47	-6.45	-15.33	11.17
	B	35.0574	5135.43 4967.08	3620.48	3047.69	1994.09	12.90	15.33	0.00
	B	35.0574	5135.43 4967.08	3537.17	3047.69	2138.38	-6.45	-15.33	-11.17
	C	35.0574	5135.43 4967.08	-3537.17	3047.69	2138.38	-6.45	15.33	11.17
	C	35.0574	5135.43 4967.08	-3620.48	3047.69	1994.09	12.90	-15.33	0.00
			Sum:	0.00	18286.13	0.00	-0.00	0.00	0.00
60.6146	A	22.2677	8105.06 7988.88	0.00	3202.43	-7445.57	-6.30	0.00	0.00
	B	21.6338	8111.47 7995.29	6481.96	3126.48	3742.36	3.08	0.00	-5.33
	C	20.8403	8120.24 8004.06	-6523.95	3031.36	3766.60	2.98	-0.00	5.17
			Sum:	-41.98	9360.27	63.40	-0.24	0.00	-0.16

Guy-Mast Forces (Excluding Wind) - Service

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom	F_x	F_y	F_z	M_x	M_y	M_z
ft		°	lb	lb	lb	lb	kip-ft	kip-ft	kip-ft
167.654	A	42.6630	3612.40 3500.00	-52.70	2492.80	-2613.93	-5.28	9.70	-9.14
	A	42.6630	3612.40 3500.00	52.70	2492.80	-2613.93	-5.28	-9.70	9.14
	B	42.6630	3612.40 3500.00	2290.07	2492.80	1261.33	10.55	9.70	0.00
	B	42.6630	3612.40 3500.00	2237.38	2492.80	1352.60	-5.28	-9.70	-9.14
	C	42.6630	3612.40 3500.00	-2237.38	2492.80	1352.60	-5.28	9.70	9.14
	C	42.6630	3612.40 3500.00	-2290.07	2492.80	1261.33	10.55	-9.70	0.00
			Sum:	0.00	14956.78	0.00	-0.00	0.00	0.00
127.654	A	35.0574	3585.58 3500.00	-58.44	2109.37	-2898.89	-4.47	10.75	-7.73
	A	35.0574	3585.58 3500.00	58.44	2109.37	-2898.89	-4.47	-10.75	7.73
	B	35.0574	3585.58 3500.00	2539.73	2109.37	1398.83	8.93	10.75	0.00
	B	35.0574	3585.58 3500.00	2481.29	2109.37	1500.05	-4.47	-10.75	-7.73
	C	35.0574	3585.58 3500.00	-2481.29	2109.37	1500.05	-4.47	10.75	7.73
	C	35.0574	3585.58 3500.00	-2539.73	2109.37	1398.83	8.93	-10.75	0.00
			Sum:	0.00	12656.21	0.00	-0.00	0.00	0.00
60.6146	A	22.2677	5899.95 5830.00	0.00	2314.65	-5426.95	-4.56	0.00	0.00
	B	21.6338	5899.95 5830.00	4720.84	2257.04	2725.58	2.22	0.00	-3.85
	C	20.8403	5899.95 5830.00	-4746.27	2184.77	2740.26	2.15	-0.00	3.73
			Sum:	-25.43	6756.46	38.90	-0.18	0.00	-0.12

Guy-Tensioning Information

Guy Elevation		H	V	Temperature At Time Of Tensioning 0 F Initial Tension	0 F Intercept	20 F Initial Tension	20 F Intercept	40 F Initial Tension	40 F Intercept	60 F Initial Tension	60 F Intercept	80 F Initial Tension	80 F Intercept	100 F Initial Tension	100 F Intercept	120 F Initial Tension	120 F Intercept
ft		ft	ft	lb	ft	lb	ft	lb	ft	lb	ft	lb	ft	lb	ft	lb	ft
167.654	A	181.92	167.65	4295	4.71	4026	5.03	3761	5.38	3500	5.77	3245	6.22	2997	6.72	2759	7.29
	B	181.92	167.65	4295	4.71	4026	5.03	3761	5.38	3500	5.77	3245	6.22	2997	6.72	2759	7.29
	C	181.92	167.65	4295	4.71	4026	5.03	3761	5.38	3500	5.77	3245	6.22	2997	6.72	2759	7.29
127.654	A	181.92	127.65	4489	3.65	4154	3.94	3823	4.28	3500	4.67	3186	5.13	2883	5.66	2595	6.28
	B	181.92	127.65	4489	3.65	4154	3.94	3823	4.28	3500	4.67	3186	5.13	2883	5.66	2595	6.28
	C	181.92	127.65	4489	3.65	4154	3.94	3823	4.28	3500	4.67	3186	5.13	2883	5.66	2595	6.28
60.6146	A	148.03	60.61	7863	1.87	7176	2.05	6497	2.26	5830	2.52	5179	2.83	4551	3.22	3958	3.70
	B	152.83	60.61	7875	1.97	7183	2.16	6501	2.39	5830	2.66	5177	2.99	4548	3.40	3957	3.91
	C	159.23	60.61	7888	2.11	7192	2.32	6504	2.56	5830	2.86	5175	3.22	4546	3.66	3957	4.20

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF5-50A (7/8 FOAM) (NU)	C	Yes	Ar (CfAe)	141.00 - 5.00	0.0000	-0.32	2	1	0.5000 1.0900	1.0900		0.33
LDF5-50A (7/8 FOAM) (NU)	C	Yes	Ar (CfAe)	147.00 - 5.00	0.0000	-0.45	2	2	0.5000 1.0900	1.0900		0.33
LDF5-50A (7/8 FOAM) (AT&T)	A	Yes	Ar (CfAe)	77.00 - 5.00	0.0000	0.2	6	2	0.5000	1.0900		0.33
LDF4-50A (1/2 FOAM) (Sprint - GPS)	C	Yes	Ar (CfAe)	88.00 - 5.00	0.0000	-0.35	1	1	0.6300	0.6300		0.15
LDF4-50A (1/2 FOAM) (NU)	B	Yes	Ar (CfAe)	180.00 - 5.00	0.0000	0.46	1	1	0.6300	0.6300		0.15
EW63 (NU)	B	Yes	Ar (CfAe)	175.00 - 5.00	0.0000	-0.43	1	1	1.5742	1.5742		0.51
LDF4-50A (1/2 FOAM) (NU)	B	Yes	Ar (CfAe)	141.00 - 5.00	0.0000	0.43	1	1	0.6300	0.6300		0.15
LDF4-50A (1/2 FOAM) (NU)	B	Yes	Ar (CfAe)	132.00 - 5.00	0.0000	0.48	1	1	0.6300	0.6300		0.15
LDF7-50A (1-5/8 FOAM) (NU)	B	Yes	Ar (CfAe)	180.00 - 5.00	0.0000	-0.36	1	1	1.9800	1.9800		0.82
LDF4P-50A (1/2 FOAM) (NU)	A	Yes	Ar (CfAe)	180.00 - 5.00	0.0000	0.45	1	1	0.6300	0.6300		0.15
LCF158-50J (1 5/8 FOAM) (T-Mobile)	A	Yes	Ar (CfAe)	159.00 - 5.00	0.0000	-0.22	6	3	0.5000	2.0100		0.92
LDF5-50A (7/8 FOAM) (NU)	A	Yes	Ar (CfAe)	180.00 - 5.00	0.0000	0.48	1	1	0.5000 1.0900	1.0900		0.33
RG6-Fiber (AT&T)	A	Yes	Ar (CfAe)	77.00 - 5.00	5.0000	0.2	1	1	0.0000	0.6250		0.50
#8 AWG Copper WIre (AT&T)	A	Yes	Ar (CfAe)	77.00 - 5.00	5.0000	0.22	2	1	0.0000	0.3400		0.05
HYBRIFLEX 1-1/4" (Sprint)	C	Yes	Ar (CfAe)	126.00 - 5.00	0.0000	0	3	3	1.5400	1.5400		1.30
HYBRIFLEX 1-5/8" (T-Mobile - Proposed)	A	Yes	Ar (CfAe)	159.00 - 5.00	0.0000	-0.35	1	1	1.0000	1.9800		1.90
C4006L-NFN F (T-Mobile - Proposed)	A	Yes	Ar (CfAe)	159.00 - 5.00	2.0000	-0.35	1	1	1.2800	1.2800		0.56

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	180.00-160.00	A	2.867	0.000	0.000	0.000	9.60
		B	6.318	0.000	0.000	0.000	27.05
		C	0.000	0.000	0.000	0.000	0.00
T2	160.00-140.00	A	17.576	0.000	0.000	0.000	161.24
		B	7.026	0.000	0.000	0.000	29.75
		C	1.363	0.000	0.000	0.000	5.28
T3	140.00-120.00	A	18.350	0.000	0.000	0.000	169.22
		B	8.654	0.000	0.000	0.000	34.40
		C	7.760	0.000	0.000	0.000	49.80
T4	120.00-100.00	A	18.350	0.000	0.000	0.000	169.22
		B	9.074	0.000	0.000	0.000	35.60
		C	13.150	0.000	0.000	0.000	104.40
T5	100.00-80.00	A	18.350	0.000	0.000	0.000	169.22
		B	9.074	0.000	0.000	0.000	35.60
		C	13.570	0.000	0.000	0.000	105.60
T6	80.00-60.00	A	22.805	0.000	0.000	0.000	213.08
		B	9.074	0.000	0.000	0.000	35.60
		C	14.200	0.000	0.000	0.000	107.40
T7	60.00-40.00	A	23.592	0.000	0.000	0.000	220.82
		B	9.074	0.000	0.000	0.000	35.60
		C	14.200	0.000	0.000	0.000	107.40
T8	40.00-20.00	A	23.592	0.000	0.000	0.000	220.82
		B	9.074	0.000	0.000	0.000	35.60
		C	14.200	0.000	0.000	0.000	107.40
T9	20.00-5.00	A	17.694	0.000	0.000	0.000	165.62
		B	6.805	0.000	0.000	0.000	26.70
		C	10.650	0.000	0.000	0.000	80.55
T10	5.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	180.00-160.00	A	0.500	6.200	0.000	0.000	0.000	42.83
		B		10.901	0.000	0.000	0.000	90.16
		C		0.000	0.000	0.000	0.000	0.00
T2	160.00-140.00	A	0.500	19.294	7.948	0.000	0.000	416.39
		B		12.110	0.000	0.000	0.000	99.89
		C		1.393	0.927	0.000	0.000	20.53
T3	140.00-120.00	A	0.500	19.983	8.367	0.000	0.000	436.05
		B		16.320	0.000	0.000	0.000	125.93
		C		10.777	2.650	0.000	0.000	149.10
T4	120.00-100.00	A	0.500	19.983	8.367	0.000	0.000	436.05
		B		17.407	0.000	0.000	0.000	132.66
		C		19.667	2.650	0.000	0.000	256.04
T5	100.00-80.00	A	0.500	19.983	8.367	0.000	0.000	436.05
		B		17.407	0.000	0.000	0.000	132.66
		C		20.753	2.650	0.000	0.000	262.76
T6	80.00-60.00	A	0.500	27.145	10.619	0.000	0.000	594.04
		B		17.407	0.000	0.000	0.000	132.66
		C		22.383	2.650	0.000	0.000	272.84
T7	60.00-40.00	A	0.500	28.408	11.017	0.000	0.000	621.92

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		B		17.407	0.000	0.000	0.000	132.66
		C		22.383	2.650	0.000	0.000	272.84
T8	40.00-20.00	A	0.500	28.408	11.017	0.000	0.000	621.92
		B		17.407	0.000	0.000	0.000	132.66
		C		22.383	2.650	0.000	0.000	272.84
T9	20.00-5.00	A	0.500	21.306	8.262	0.000	0.000	466.44
		B		13.055	0.000	0.000	0.000	99.49
		C		16.788	1.987	0.000	0.000	204.63
T10	5.00-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	180.00-160.00	A	0.000	0.553	0.448	0.968
		B	0.000	0.973	0.987	1.703
		C	0.000	0.000	0.000	0.000
T2	160.00-140.00	A	1.286	3.323	0.000	0.000
		B	0.514	1.477	0.000	0.000
		C	0.100	0.283	0.000	0.000
T3	140.00-120.00	A	0.000	2.530	3.276	5.061
		B	0.000	1.457	1.545	2.913
		C	0.000	1.198	1.385	2.397
T4	120.00-100.00	A	0.000	2.210	3.577	5.526
		B	0.000	1.357	1.769	3.393
		C	0.000	1.740	2.563	4.350
T5	100.00-80.00	A	1.343	4.285	1.338	2.067
		B	0.664	2.631	0.662	1.269
		C	0.993	3.538	0.989	1.706
T6	80.00-60.00	A	0.000	2.000	3.210	5.315
		B	0.000	0.922	1.277	2.450
		C	0.000	1.326	1.998	3.523
T7	60.00-40.00	A	0.295	2.417	2.386	3.988
		B	0.113	1.067	0.918	1.761
		C	0.177	1.534	1.436	2.532
T8	40.00-20.00	A	1.727	4.809	0.000	0.000
		B	0.664	2.123	0.000	0.000
		C	1.039	3.054	0.000	0.000
T9	20.00-5.00	A	0.000	1.517	2.269	3.792
		B	0.000	0.670	0.873	1.674
		C	0.000	0.963	1.366	2.407
T10	5.00-0.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	180.00-160.00	0.4383	-2.0402	0.5585	-2.1269
T2	160.00-140.00	-2.7084	-1.6698	-1.6466	-2.0922
T3	140.00-120.00	-0.9935	-0.1873	-0.2372	-0.5057
T4	120.00-100.00	-0.8325	0.4219	-0.1067	0.1659
T5	100.00-80.00	-0.8938	0.5289	-0.0385	0.2828
T6	80.00-60.00	-1.1380	-0.0075	-0.2356	-0.1007
T7	60.00-40.00	-1.2814	-0.1189	-0.3223	-0.2017
T8	40.00-20.00	-1.4302	-0.1327	-0.3660	-0.2191
T9	20.00-5.00	-1.2323	-0.1143	-0.3046	-0.1947
T10	5.00-0.00	0.0000	0.0000	0.0000	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
GPS	B	From Leg	3.50	0.0000	88.00	No Ice	1.00	1.00	10.00
(Sprint)			0.00			1/2" Ice	1.50	1.50	15.00
			0.00						
3' GPS Stand-off Mount	B	From Leg	1.50	0.0000	88.00	No Ice	2.45	2.45	51.00
(Sprint)			0.00			1/2" Ice	3.98	3.98	75.00
			0.00						
APXVSPP18-C-A20 w/	A	From Leg	3.00	0.0000	126.00	No Ice	8.96	8.08	117.64
Mount			0.00			1/2" Ice	9.66	9.14	197.65
(Sprint)			0.00						
APXVSPP18-C-A20 w/	B	From Leg	3.00	0.0000	126.00	No Ice	8.96	8.08	117.64
Mount			0.00			1/2" Ice	9.66	9.14	197.65
(Sprint)			0.00						
APXVSPP18-C-A20 w/	C	From Leg	3.00	0.0000	126.00	No Ice	8.96	8.08	117.64
Mount			0.00			1/2" Ice	9.66	9.14	197.65
(Sprint)			0.00						
FD-RRH 2x50 800	A	From Leg	3.00	0.0000	126.00	No Ice	2.40	2.25	64.00
(Sprint)			0.00			1/2" Ice	2.61	2.46	86.12
			0.00						
FD-RRH 2x50 800	B	From Leg	3.00	0.0000	126.00	No Ice	2.40	2.25	64.00
(Sprint)			0.00			1/2" Ice	2.61	2.46	86.12
			0.00						
FD-RRH 2x50 800	C	From Leg	3.00	0.0000	126.00	No Ice	2.40	2.25	64.00
(Sprint)			0.00			1/2" Ice	2.61	2.46	86.12
			0.00						
FD-RRH 4x45 1900	A	From Leg	3.00	0.0000	126.00	No Ice	2.71	2.78	60.00
(Sprint)			0.00			1/2" Ice	2.94	3.02	83.97
			0.00						
FD-RRH 4x45 1900	B	From Leg	3.00	0.0000	126.00	No Ice	2.71	2.78	60.00
(Sprint)			0.00			1/2" Ice	2.94	3.02	83.97
			0.00						
FD-RRH 4x45 1900	C	From Leg	3.00	0.0000	126.00	No Ice	2.71	2.78	60.00
(Sprint)			0.00			1/2" Ice	2.94	3.02	83.97
			0.00						
Rohn 6' x 12' Boom Gate (1)	A	From Leg	2.00	0.0000	126.00	No Ice	16.60	16.60	560.00
(Sprint - Existing)			0.00			1/2" Ice	19.80	19.80	700.00
			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Rohn 6' x 12' Boom Gate (1)	B	From Leg	2.00	0.0000	126.00	No Ice	16.60	16.60	560.00
(Sprint - Existing)			0.00			1/2" Ice	19.80	19.80	700.00
			0.00						
Rohn 6' x 12' Boom Gate (1)	C	From Leg	2.00	0.0000	126.00	No Ice	16.60	16.60	560.00
(Sprint - Existing)			0.00			1/2" Ice	19.80	19.80	700.00
			0.00						
2.5" Dia. x12' Omni	C	From Leg	1.00	0.0000	132.00	No Ice	4.20	4.20	30.00
(NEU)			0.00			1/2" Ice	5.44	5.44	59.84
			0.00						
1.5"x2'omni	A	From Leg	3.00	0.0000	143.00	No Ice	0.25	0.25	8.00
(NEU)			0.00			1/2" Ice	0.38	0.38	10.60
			1.00						
1.5"x2'omni	A	From Leg	3.00	0.0000	141.00	No Ice	0.25	0.25	8.00
(NEU)			0.00			1/2" Ice	0.38	0.38	10.60
			-1.00						
2-ft Stand Off	A	From Leg	1.00	0.0000	142.00	No Ice	1.07	1.07	20.00
(NEU)			0.00			1/2" Ice	1.62	1.62	28.00
			0.00						
3"x20-ft Omni	C	From Leg	3.00	0.0000	147.00	No Ice	3.56	3.56	23.00
(NEU)			0.00			1/2" Ice	7.13	7.13	46.00
			0.00						
3-ft Side Arm	C	From Leg	1.50	0.0000	137.00	No Ice	0.66	0.66	15.00
(NEU)			0.00			1/2" Ice	1.14	1.14	28.00
			0.00						
20-ft x 1.9in Support Pipe	C	From Leg	1.50	0.0000	147.00	No Ice	3.80	3.80	54.40
(NEU)			0.00			1/2" Ice	5.82	5.82	83.84
			0.00						
Folded Dipole	C	From Leg	4.00	5.0000	180.00	No Ice	0.81	0.81	23.00
(NEU)			0.00			1/2" Ice	1.48	1.48	30.08
			0.00						
4-ft Side Arm	C	From Leg	2.00	0.0000	178.00	No Ice	5.28	5.28	65.00
(NEU)			0.00			1/2" Ice	7.88	7.88	84.50
			0.00						
2"x9' omni	B	From Leg	0.00	0.0000	180.00	No Ice	1.80	1.80	30.00
(NEU)			0.00			1/2" Ice	2.73	2.73	43.97
			4.50						
2"x7' omni	C	From Leg	0.00	0.0000	180.00	No Ice	1.40	1.40	30.00
(NEU)			0.00			1/2" Ice	2.13	2.13	40.92
			3.50						
AM-X-CD-14-65-00TT-RET	A	From Face	3.00	0.0000	77.00	No Ice	5.51	2.83	36.40
(AT&T)			-4.00			1/2" Ice	5.90	3.14	68.35
			0.00						
AM-X-CD-14-65-00TT-RET	B	From Face	3.00	0.0000	77.00	No Ice	5.51	2.83	36.40
(AT&T)			-4.00			1/2" Ice	5.90	3.14	68.35
			0.00						
AM-X-CD-14-65-00TT-RET	C	From Face	3.00	0.0000	77.00	No Ice	5.51	2.83	36.40
(AT&T)			-4.00			1/2" Ice	5.90	3.14	68.35
			0.00						
7770.00	A	From Face	3.00	0.0000	77.00	No Ice	5.88	2.93	35.00
(AT&T)			4.00			1/2" Ice	6.31	3.27	67.63
			0.00						
7770.00	B	From Face	3.00	0.0000	77.00	No Ice	5.88	2.93	35.00
(AT&T)			4.00			1/2" Ice	6.31	3.27	67.63
			0.00						
7770.00	C	From Face	3.00	0.0000	77.00	No Ice	5.88	2.93	35.00
(AT&T)			4.00			1/2" Ice	6.31	3.27	67.63
			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(2) LPG21401 TMA (AT&T)	A	From Face	3.00 4.00 0.00	0.0000	77.00	No Ice 1/2" Ice	0.95 1.09	0.37 0.48	17.50 23.31
(2) LPG21401 TMA (AT&T)	B	From Face	3.00 4.00 0.00	0.0000	77.00	No Ice 1/2" Ice	0.95 1.09	0.37 0.48	17.50 23.31
(2) LPG21401 TMA (AT&T)	C	From Face	3.00 4.00 0.00	0.0000	77.00	No Ice 1/2" Ice	0.95 1.09	0.37 0.48	17.50 23.31
(2) RRUS-11 (AT&T)	A	From Face	3.00 0.00 0.00	0.0000	73.00	No Ice 1/2" Ice	2.99 3.23	1.25 1.41	50.00 69.57
(2) RRUS-11 (AT&T)	B	From Face	3.00 0.00 0.00	0.0000	73.00	No Ice 1/2" Ice	2.99 3.23	1.25 1.41	50.00 69.57
(2) RRUS-11 (AT&T)	C	From Face	3.00 0.00 0.00	0.0000	73.00	No Ice 1/2" Ice	2.99 3.23	1.25 1.41	50.00 69.57
DC6-48-60-18-8F Surge Arrestor (AT&T)	C	From Leg	1.00 0.00 0.00	0.0000	72.00	No Ice 1/2" Ice	2.23 2.45	2.23 2.45	20.00 39.36
Valmont T-Arm (1) (AT&T)	A	From Leg	2.00 0.00 0.00	0.0000	77.00	No Ice 1/2" Ice	10.54 14.45	10.54 14.45	336.00 412.00
Valmont T-Arm (1) (AT&T)	B	From Leg	2.00 0.00 0.00	0.0000	77.00	No Ice 1/2" Ice	10.54 14.45	10.54 14.45	336.00 412.00
Valmont T-Arm (1) (AT&T)	C	From Leg	2.00 0.00 0.00	0.0000	77.00	No Ice 1/2" Ice	10.54 14.45	10.54 14.45	336.00 412.00
AIR21 (T-Mobile - Proposed)	A	From Leg	2.00 -2.00 0.00	0.0000	159.00	No Ice 1/2" Ice	6.53 6.98	4.36 4.77	83.00 124.90
AIR21 (T-Mobile - Proposed)	A	From Leg	2.00 2.00 0.00	0.0000	159.00	No Ice 1/2" Ice	6.53 6.98	4.36 4.77	83.00 124.90
AIR21 (T-Mobile - Proposed)	B	From Leg	2.00 -2.00 0.00	0.0000	159.00	No Ice 1/2" Ice	6.53 6.98	4.36 4.77	83.00 124.90
AIR21 (T-Mobile - Proposed)	B	From Leg	2.00 2.00 0.00	0.0000	159.00	No Ice 1/2" Ice	6.53 6.98	4.36 4.77	83.00 124.90
AIR21 (T-Mobile - Proposed)	C	From Leg	2.00 -2.00 0.00	0.0000	159.00	No Ice 1/2" Ice	6.53 6.98	4.36 4.77	83.00 124.90
AIR21 (T-Mobile - Proposed)	C	From Leg	2.00 2.00 0.00	0.0000	159.00	No Ice 1/2" Ice	6.53 6.98	4.36 4.77	83.00 124.90
KRY 112 TMA (T-Mobile - Proposed)	A	From Leg	2.00 0.00 0.00	0.0000	159.00	No Ice 1/2" Ice	0.78 0.90	0.49 0.59	25.00 31.29
KRY 112 TMA (T-Mobile - Proposed)	B	From Leg	2.00 0.00 0.00	0.0000	159.00	No Ice 1/2" Ice	0.78 0.90	0.49 0.59	25.00 31.29
KRY 112 TMA (T-Mobile - Proposed)	C	From Leg	2.00 0.00 0.00	0.0000	159.00	No Ice 1/2" Ice	0.78 0.90	0.49 0.59	25.00 31.29

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 lb
Site Pro Compact Tower	A	From Leg	1.00	0.0000	159.00	No Ice	2.85	2.85	150.00
Mount CWT8			0.00			1/2" Ice	4.05	4.05	200.00
(T-Mobile - Proposed)			0.00						
Site Pro Compact Tower	B	From Leg	1.00	0.0000	159.00	No Ice	2.85	2.85	150.00
Mount CWT8			0.00			1/2" Ice	4.05	4.05	200.00
(T-Mobile - Proposed)			0.00						
Site Pro Compact Tower	C	From Leg	1.00	0.0000	159.00	No Ice	2.85	2.85	150.00
Mount CWT8			0.00			1/2" Ice	4.05	4.05	200.00
(T-Mobile - Proposed)			0.00						

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
8.5 Dishw/radome	A	Paraboloid w/o	From	0.00	0.0000		175.00	8.50	No Ice	56.75	75.00
(NU)		Radome	Leg	0.00					1/2" Ice	57.56	297.03
				0.00							

Tower Pressures - No Ice

$G_H = 1.121$

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	170.00	1.597	30	72.992	A	9.457	12.450	9.583	43.75	0.000	0.000
180.00-160.00					B	8.918	15.901		38.61	0.000	0.000
					C	9.904	9.583		49.18	0.000	0.000
T2	150.00	1.541	29	72.992	A	0.000	30.514	9.583	31.41	0.000	0.000
160.00-140.00					B	0.000	20.736		46.22	0.000	0.000
					C	0.000	15.487		61.88	0.000	0.000
T3	130.00	1.48	27	72.992	A	8.044	27.933	9.583	26.64	0.000	0.000
140.00-120.00					B	9.775	18.237		34.21	0.000	0.000
					C	9.934	17.343		35.13	0.000	0.000
T4	110.00	1.411	26	72.992	A	8.782	27.933	9.583	26.10	0.000	0.000
120.00-100.00					B	10.590	18.657		32.77	0.000	0.000
					C	9.796	22.733		29.46	0.000	0.000
T5	90.00	1.332	25	72.992	A	3.286	31.231	9.583	27.76	0.000	0.000
100.00-80.00					B	3.962	22.634		36.03	0.000	0.000
					C	3.634	26.801		31.49	0.000	0.000
T6 80.00-60.00	70.00	1.24	23	72.992	A	5.714	32.389	9.583	25.15	0.000	0.000
					B	7.647	18.657		36.43	0.000	0.000
					C	6.925	23.783		31.21	0.000	0.000

Section Elevation	z	K_Z	q_z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
T7 60.00-40.00	50.00	1.126	21	72.992	A	4.028	33.673	9.583	25.42	0.000	0.000
					B	5.496	19.336		38.59	0.000	0.000
					C	4.978	24.398		32.62	0.000	0.000
T8 40.00-20.00	30.00	1	18	72.992	A	0.000	36.089	9.583	26.55	0.000	0.000
					B	0.000	22.634		42.34	0.000	0.000
					C	0.000	27.385		34.99	0.000	0.000
T9 20.00-5.00	12.50	1	18	54.744	A	3.829	24.881	7.188	25.03	0.000	0.000
					B	5.225	13.993		37.40	0.000	0.000
					C	4.732	17.837		31.85	0.000	0.000
T10 5.00-0.00	2.50	1	18	9.791	A	1.343	2.575	2.575	65.71	0.000	0.000
					B	1.343	2.575		65.71	0.000	0.000
					C	1.343	2.575		65.71	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.121$

Section Elevation	z	K_Z	q_z	t_Z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	in	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
T1	170.00	1.597	30	0.5000	74.658	A	8.936	24.223	12.917	38.95	0.000	0.000
180.00-160.00						B	8.202	28.504		35.19	0.000	0.000
						C	9.904	18.576		45.35	0.000	0.000
T2	150.00	1.541	29	0.5000	74.658	A	7.948	36.623	12.917	28.98	0.000	0.000
160.00-140.00						B	0.000	31.284		41.29	0.000	0.000
						C	0.927	21.762		56.93	0.000	0.000
T3	130.00	1.48	27	0.5000	74.658	A	14.625	36.029	12.917	25.50	0.000	0.000
140.00-120.00						B	8.406	33.440		30.87	0.000	0.000
						C	11.572	28.155		32.51	0.000	0.000
T4	110.00	1.411	26	0.5000	74.658	A	15.200	35.633	12.917	25.41	0.000	0.000
120.00-100.00						B	8.966	33.910		30.13	0.000	0.000
						C	10.659	35.787		27.81	0.000	0.000
T5 100.00-80.00	90.00	1.332	25	0.5000	74.658	A	10.923	38.199	12.917	26.29	0.000	0.000
						B	3.354	37.277		31.79	0.000	0.000
						C	5.567	39.717		28.52	0.000	0.000
T6 80.00-60.00	70.00	1.24	23	0.5000	74.658	A	14.228	41.419	12.917	23.21	0.000	0.000
						B	6.474	32.760		32.92	0.000	0.000
						C	8.051	37.332		28.46	0.000	0.000
T7 60.00-40.00	50.00	1.126	21	0.5000	74.658	A	13.443	42.795	12.917	22.97	0.000	0.000
						B	4.653	33.143		34.17	0.000	0.000
						C	6.532	37.652		29.23	0.000	0.000
T8 40.00-20.00	30.00	1	18	0.5000	74.658	A	11.017	44.251	12.917	23.37	0.000	0.000
						B	0.000	35.935		35.94	0.000	0.000
						C	2.650	39.981		30.30	0.000	0.000
T9 20.00-5.00	12.50	1	18	0.5000	55.994	A	10.569	31.916	9.688	22.80	0.000	0.000
						B	4.424	24.512		33.48	0.000	0.000
						C	5.678	27.951		28.81	0.000	0.000
T10 5.00-0.00	2.50	1	18	0.5000	10.231	A	1.343	4.008	3.470	64.85	0.000	0.000
						B	1.343	4.008		64.85	0.000	0.000
						C	1.343	4.008		64.85	0.000	0.000

Tower Pressure - Service

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	170.00	1.597	30	72.992	A	9.457	12.450	9.583	43.75	0.000	0.000
180.00-160.00					B	8.918	15.901		38.61	0.000	0.000
					C	9.904	9.583		49.18	0.000	0.000
T2	150.00	1.541	29	72.992	A	0.000	30.514	9.583	31.41	0.000	0.000
160.00-140.00					B	0.000	20.736		46.22	0.000	0.000
					C	0.000	15.487		61.88	0.000	0.000
T3	130.00	1.48	27	72.992	A	8.044	27.933	9.583	26.64	0.000	0.000
140.00-120.00					B	9.775	18.237		34.21	0.000	0.000
					C	9.934	17.343		35.13	0.000	0.000
T4	110.00	1.411	26	72.992	A	8.782	27.933	9.583	26.10	0.000	0.000
120.00-100.00					B	10.590	18.657		32.77	0.000	0.000
					C	9.796	22.733		29.46	0.000	0.000
T5	90.00	1.332	25	72.992	A	3.286	31.231	9.583	27.76	0.000	0.000
100.00-80.00					B	3.962	22.634		36.03	0.000	0.000
					C	3.634	26.801		31.49	0.000	0.000
T6 80.00-60.00	70.00	1.24	23	72.992	A	5.714	32.389	9.583	25.15	0.000	0.000
					B	7.647	18.657		36.43	0.000	0.000
					C	6.925	23.783		31.21	0.000	0.000
T7 60.00-40.00	50.00	1.126	21	72.992	A	4.028	33.673	9.583	25.42	0.000	0.000
					B	5.496	19.336		38.59	0.000	0.000
					C	4.978	24.398		32.62	0.000	0.000
T8 40.00-20.00	30.00	1	18	72.992	A	0.000	36.089	9.583	26.55	0.000	0.000
					B	0.000	22.634		42.34	0.000	0.000
					C	0.000	27.385		34.99	0.000	0.000
T9 20.00-5.00	12.50	1	18	54.744	A	3.829	24.881	7.188	25.03	0.000	0.000
					B	5.225	13.993		37.40	0.000	0.000
					C	4.732	17.837		31.85	0.000	0.000
T10 5.00-0.00	2.50	1	18	9.791	A	1.343	2.575	2.575	65.71	0.000	0.000
					B	1.343	2.575		65.71	0.000	0.000
					C	1.343	2.575		65.71	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	36.65	811.06	A	0.3	2.296	0.616	1	1	17.125	1375.21	68.76	B
180.00-160.00		TA 557.98	B	0.34	2.195	0.629	1	1	18.919			
			C	0.267	2.388	0.606	1	1	15.715			
T2	196.27	455.02	A	0.418	2.029	0.659	1	1	20.112	1304.19	65.21	A
160.00-140.00			B	0.284	2.339	0.611	1	1	12.673			
			C	0.212	2.556	0.593	1	1	9.183			
T3	253.42	881.09	A	0.493	1.909	0.694	1	1	27.427	1606.30	80.31	A
140.00-120.00		TA 557.98	B	0.384	2.097	0.645	1	1	21.539			
			C	0.374	2.118	0.641	1	1	21.055			
T4	309.22	1813.41	A	0.503	1.896	0.699	1	1	28.309	1569.68	78.48	A
120.00-100.00			B	0.401	2.063	0.652	1	1	22.752			
			C	0.446	1.981	0.671	1	1	25.056			
T5	310.42	1090.34	A	0.473	1.938	0.684	1	1	24.649	1318.94	65.95	A
100.00-80.00			B	0.364	2.139	0.638	1	1	18.396			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
			C	0.417	2.031	0.659	1	1	21.287			
T6	356.08	1323.89	A	0.522	1.873	0.709	1	1	28.677	1380.46	69.02	A
80.00-60.00			B	0.36	2.148	0.636	1	1	19.517			
			C	0.421	2.024	0.66	1	1	22.629			
T7	363.82	1126.79	A	0.517	1.879	0.706	1	1	27.802	1219.86	60.99	A
60.00-40.00			B	0.34	2.195	0.629	1	1	17.659			
			C	0.402	2.059	0.653	1	1	20.900			
T8	363.82	455.02	A	0.494	1.907	0.695	1	1	25.070	991.34	49.57	A
40.00-20.00			B	0.31	2.27	0.619	1	1	14.011			
			C	0.375	2.115	0.642	1	1	17.575			
T9 20.00-5.00	272.87	984.05	A	0.524	1.87	0.71	1	1	21.502	833.69	55.58	A
			B	0.351	2.169	0.633	1	1	14.081			
			C	0.412	2.04	0.657	1	1	16.446			
T10 5.00-0.00	0.00	254.72	A	0.4	2.064	0.652	1	1	3.021	129.26	25.85	C
			B	0.4	2.064	0.652	1	1	3.021			
			C	0.4	2.064	0.652	1	1	3.021			
Sum Weight:	2462.56	10311.37								11728.93		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	36.65	811.06	A	0.3	2.296	0.616	0.8	1	15.234	1245.56	62.28	B
180.00-160.00		TA 557.98	B	0.34	2.195	0.629	0.8	1	17.135			
			C	0.267	2.388	0.606	0.8	1	13.734			
T2	196.27	455.02	A	0.418	2.029	0.659	0.8	1	20.112	1304.19	65.21	A
160.00-140.00			B	0.284	2.339	0.611	0.8	1	12.673			
			C	0.212	2.556	0.593	0.8	1	9.183			
T3	253.42	881.09	A	0.493	1.909	0.694	0.8	1	25.818	1512.08	75.60	A
140.00-120.00		TA 557.98	B	0.384	2.097	0.645	0.8	1	19.584			
			C	0.374	2.118	0.641	0.8	1	19.068			
T4	309.22	1813.41	A	0.503	1.896	0.699	0.8	1	26.552	1472.29	73.61	A
120.00-100.00			B	0.401	2.063	0.652	0.8	1	20.634			
			C	0.446	1.981	0.671	0.8	1	23.097			
T5	310.42	1090.34	A	0.473	1.938	0.684	0.8	1	23.992	1283.78	64.19	A
100.00-80.00			B	0.364	2.139	0.638	0.8	1	17.603			
			C	0.417	2.031	0.659	0.8	1	20.560			
T6	356.08	1323.89	A	0.522	1.873	0.709	0.8	1	27.534	1325.44	66.27	A
80.00-60.00			B	0.36	2.148	0.636	0.8	1	17.988			
			C	0.421	2.024	0.66	0.8	1	21.244			
T7	363.82	1126.79	A	0.517	1.879	0.706	0.8	1	26.997	1184.52	59.23	A
60.00-40.00			B	0.34	2.195	0.629	0.8	1	16.560			
			C	0.402	2.059	0.653	0.8	1	19.905			
T8	363.82	455.02	A	0.494	1.907	0.695	0.8	1	25.070	991.34	49.57	A
40.00-20.00			B	0.31	2.27	0.619	0.8	1	14.011			
			C	0.375	2.115	0.642	0.8	1	17.575			
T9 20.00-5.00	272.87	984.05	A	0.524	1.87	0.71	0.8	1	20.736	804.00	53.60	A
			B	0.351	2.169	0.633	0.8	1	13.036			
			C	0.412	2.04	0.657	0.8	1	15.500			
T10 5.00-0.00	0.00	254.72	A	0.4	2.064	0.652	0.8	1	2.753	117.77	23.55	C
			B	0.4	2.064	0.652	0.8	1	2.753			
			C	0.4	2.064	0.652	0.8	1	2.753			
Sum Weight:	2462.56	10311.37								11240.97		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	36.65	811.06	A	0.3	2.296	0.616	0.85	1	15.707	1277.97	63.90	B
180.00-160.00		TA 557.98	B	0.34	2.195	0.629	0.85	1	17.581			
			C	0.267	2.388	0.606	0.85	1	14.230			
T2	196.27	455.02	A	0.418	2.029	0.659	0.85	1	20.112	1304.19	65.21	A
160.00-140.00			B	0.284	2.339	0.611	0.85	1	12.673			
			C	0.212	2.556	0.593	0.85	1	9.183			
T3	253.42	881.09	A	0.493	1.909	0.694	0.85	1	26.220	1535.63	76.78	A
140.00-120.00		TA 557.98	B	0.384	2.097	0.645	0.85	1	20.073			
			C	0.374	2.118	0.641	0.85	1	19.565			
T4	309.22	1813.41	A	0.503	1.896	0.699	0.85	1	26.991	1496.63	74.83	A
120.00-100.00			B	0.401	2.063	0.652	0.85	1	21.164			
			C	0.446	1.981	0.671	0.85	1	23.587			
T5	310.42	1090.34	A	0.473	1.938	0.684	0.85	1	24.156	1292.57	64.63	A
100.00-80.00			B	0.364	2.139	0.638	0.85	1	17.801			
			C	0.417	2.031	0.659	0.85	1	20.742			
T6	356.08	1323.89	A	0.522	1.873	0.709	0.85	1	27.820	1339.20	66.96	A
80.00-60.00			B	0.36	2.148	0.636	0.85	1	18.370			
			C	0.421	2.024	0.66	0.85	1	21.590			
T7	363.82	1126.79	A	0.517	1.879	0.706	0.85	1	27.198	1193.35	59.67	A
60.00-40.00			B	0.34	2.195	0.629	0.85	1	16.835			
			C	0.402	2.059	0.653	0.85	1	20.154			
T8	363.82	455.02	A	0.494	1.907	0.695	0.85	1	25.070	991.34	49.57	A
40.00-20.00			B	0.31	2.27	0.619	0.85	1	14.011			
			C	0.375	2.115	0.642	0.85	1	17.575			
T9 20.00-5.00	272.87	984.05	A	0.524	1.87	0.71	0.85	1	20.927	811.42	54.09	A
			B	0.351	2.169	0.633	0.85	1	13.297			
			C	0.412	2.04	0.657	0.85	1	15.736			
T10 5.00-0.00	0.00	254.72	A	0.4	2.064	0.652	0.85	1	2.820	120.64	24.13	C
			B	0.4	2.064	0.652	0.85	1	2.820			
			C	0.4	2.064	0.652	0.85	1	2.820			
Sum Weight:	2462.56	10311.37								11362.96		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	132.99	1316.71	A	0.444	1.983	0.671	1	1	25.180	1769.74	88.49	B
180.00-160.00		TA	B	0.492	1.911	0.693	1	1	27.963			
		1183.98	C	0.381	2.102	0.644	1	1	21.872			
T2	536.80	725.09	A	0.597	1.806	0.752	1	1	35.480	2047.33	102.37	A
160.00-140.00			B	0.419	2.028	0.66	1	1	20.633			
			C	0.304	2.286	0.617	1	1	14.357			
T3	711.08	1429.35	A	0.678	1.776	0.805	1	1	43.620	2376.61	118.83	A
140.00-120.00		TA	B	0.56	1.834	0.73	1	1	32.824			
		1183.98	C	0.532	1.862	0.714	1	1	31.686			
T4	824.74	2382.38	A	0.681	1.776	0.806	1	1	43.935	2281.96	114.10	A
120.00-100.00			B	0.574	1.822	0.738	1	1	33.998			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
			C	0.622	1.792	0.767	1	1	38.121			
T5	831.47	1526.98	A	0.658	1.779	0.791	1	1	41.130	2021.08	101.05	A
100.00-80.00			B	0.544	1.849	0.721	1	1	30.233			
			C	0.607	1.8	0.758	1	1	35.658			
T6	999.54	1748.80	A	0.745	1.786	0.853	1	1	49.573	2275.11	113.76	A
80.00-60.00			B	0.526	1.869	0.711	1	1	29.761			
			C	0.608	1.799	0.758	1	1	36.366			
T7	1027.42	1506.58	A	0.753	1.789	0.859	1	1	50.220	2097.20	104.86	A
60.00-40.00			B	0.506	1.892	0.701	1	1	27.877			
			C	0.592	1.809	0.749	1	1	34.719			
T8	1027.42	725.09	A	0.74	1.784	0.849	1	1	48.607	1797.66	89.88	A
40.00-20.00			B	0.481	1.925	0.688	1	1	24.729			
			C	0.571	1.825	0.736	1	1	32.088			
T9 20.00-5.00	770.57	1296.54	A	0.759	1.791	0.864	1	1	38.132	1416.07	94.40	A
			B	0.517	1.879	0.706	1	1	21.735			
			C	0.601	1.804	0.754	1	1	26.752			
T10 5.00-0.00	0.00	336.95	A	0.523	1.872	0.71	1	1	4.187	162.49	32.50	C
			B	0.523	1.872	0.71	1	1	4.187			
			C	0.523	1.872	0.71	1	1	4.187			
Sum Weight:	6862.03	15362.43								18245.24		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	132.99	1316.71	A	0.444	1.983	0.671	0.8	1	23.393	1665.93	83.30	B
180.00-160.00		TA	B	0.492	1.911	0.693	0.8	1	26.323			
		1183.98	C	0.381	2.102	0.644	0.8	1	19.891			
T2	536.80	725.09	A	0.597	1.806	0.752	0.8	1	33.890	1955.60	97.78	A
160.00-140.00			B	0.419	2.028	0.66	0.8	1	20.633			
			C	0.304	2.286	0.617	0.8	1	14.171			
T3	711.08	1429.35	A	0.678	1.776	0.805	0.8	1	40.695	2217.24	110.86	A
140.00-120.00		TA	B	0.56	1.834	0.73	0.8	1	31.143			
		1183.98	C	0.532	1.862	0.714	0.8	1	29.372			
T4	824.74	2382.38	A	0.681	1.776	0.806	0.8	1	40.895	2124.07	106.20	A
120.00-100.00			B	0.574	1.822	0.738	0.8	1	32.205			
			C	0.622	1.792	0.767	0.8	1	35.989			
T5	831.47	1526.98	A	0.658	1.779	0.791	0.8	1	38.946	1913.74	95.69	A
100.00-80.00			B	0.544	1.849	0.721	0.8	1	29.562			
			C	0.607	1.8	0.758	0.8	1	34.544			
T6	999.54	1748.80	A	0.745	1.786	0.853	0.8	1	46.728	2144.51	107.23	A
80.00-60.00			B	0.526	1.869	0.711	0.8	1	28.467			
			C	0.608	1.799	0.758	0.8	1	34.756			
T7	1027.42	1506.58	A	0.753	1.789	0.859	0.8	1	47.531	1984.93	99.25	A
60.00-40.00			B	0.506	1.892	0.701	0.8	1	26.947			
			C	0.592	1.809	0.749	0.8	1	33.413			
T8	1027.42	725.09	A	0.74	1.784	0.849	0.8	1	46.403	1716.17	85.81	A
40.00-20.00			B	0.481	1.925	0.688	0.8	1	24.729			
			C	0.571	1.825	0.736	0.8	1	31.558			
T9 20.00-5.00	770.57	1296.54	A	0.759	1.791	0.864	0.8	1	36.018	1337.57	89.17	A
			B	0.517	1.879	0.706	0.8	1	20.850			
			C	0.601	1.804	0.754	0.8	1	25.617			
T10 5.00-0.00	0.00	336.95	A	0.523	1.872	0.71	0.8	1	3.918	152.06	30.41	C
			B	0.523	1.872	0.71	0.8	1	3.918			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
			C	0.523	1.872	0.71	0.8	1	3.918			
Sum Weight:	6862.03	15362.43								17211.81		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	132.99	1316.71	A	0.444	1.983	0.671	0.85	1	23.840	1691.88	84.59	B
180.00-160.00		TA	B	0.492	1.911	0.693	0.85	1	26.733			
		1183.98	C	0.381	2.102	0.644	0.85	1	20.386			
T2	536.80	725.09	A	0.597	1.806	0.752	0.85	1	34.288	1978.53	98.93	A
160.00-140.00			B	0.419	2.028	0.66	0.85	1	20.633			
			C	0.304	2.286	0.617	0.85	1	14.218			
T3	711.08	1429.35	A	0.678	1.776	0.805	0.85	1	41.427	2257.08	112.85	A
140.00-120.00		TA	B	0.56	1.834	0.73	0.85	1	31.564			
		1183.98	C	0.532	1.862	0.714	0.85	1	29.950			
T4	824.74	2382.38	A	0.681	1.776	0.806	0.85	1	41.655	2163.54	108.18	A
120.00-100.00			B	0.574	1.822	0.738	0.85	1	32.654			
			C	0.622	1.792	0.767	0.85	1	36.522			
T5	831.47	1526.98	A	0.658	1.779	0.791	0.85	1	39.492	1940.57	97.03	A
100.00-80.00			B	0.544	1.849	0.721	0.85	1	29.730			
			C	0.607	1.8	0.758	0.85	1	34.823			
T6	999.54	1748.80	A	0.745	1.786	0.853	0.85	1	47.439	2177.16	108.86	A
80.00-60.00			B	0.526	1.869	0.711	0.85	1	28.790			
			C	0.608	1.799	0.758	0.85	1	35.158			
T7	1027.42	1506.58	A	0.753	1.789	0.859	0.85	1	48.204	2013.00	100.65	A
60.00-40.00			B	0.506	1.892	0.701	0.85	1	27.179			
			C	0.592	1.809	0.749	0.85	1	33.739			
T8	1027.42	725.09	A	0.74	1.784	0.849	0.85	1	46.954	1736.54	86.83	A
40.00-20.00			B	0.481	1.925	0.688	0.85	1	24.729			
			C	0.571	1.825	0.736	0.85	1	31.690			
T9 20.00-5.00	770.57	1296.54	A	0.759	1.791	0.864	0.85	1	36.547	1357.20	90.48	A
			B	0.517	1.879	0.706	0.85	1	21.071			
			C	0.601	1.804	0.754	0.85	1	25.901			
T10 5.00-0.00	0.00	336.95	A	0.523	1.872	0.71	0.85	1	3.986	154.67	30.93	C
			B	0.523	1.872	0.71	0.85	1	3.986			
			C	0.523	1.872	0.71	0.85	1	3.986			
Sum Weight:	6862.03	15362.43								17470.17		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	36.65	811.06	A	0.3	2.296	0.616	1	1	17.125	1375.21	68.76	B
180.00-160.00		TA 557.98	B	0.34	2.195	0.629	1	1	18.919			
			C	0.267	2.388	0.606	1	1	15.715			
T2	196.27	455.02	A	0.418	2.029	0.659	1	1	20.112	1304.19	65.21	A

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
160.00-140.00			B	0.284	2.339	0.611	1	1	12.673			
			C	0.212	2.556	0.593	1	1	9.183			
T3	253.42	881.09	A	0.493	1.909	0.694	1	1	27.427	1606.30	80.31	A
140.00-120.00		TA 557.98	B	0.384	2.097	0.645	1	1	21.539			
			C	0.374	2.118	0.641	1	1	21.055			
T4	309.22	1813.41	A	0.503	1.896	0.699	1	1	28.309	1569.68	78.48	A
120.00-100.00			B	0.401	2.063	0.652	1	1	22.752			
			C	0.446	1.981	0.671	1	1	25.056			
T5	310.42	1090.34	A	0.473	1.938	0.684	1	1	24.649	1318.94	65.95	A
100.00-80.00			B	0.364	2.139	0.638	1	1	18.396			
			C	0.417	2.031	0.659	1	1	21.287			
T6	356.08	1323.89	A	0.522	1.873	0.709	1	1	28.677	1380.46	69.02	A
80.00-60.00			B	0.36	2.148	0.636	1	1	19.517			
			C	0.421	2.024	0.66	1	1	22.629			
T7	363.82	1126.79	A	0.517	1.879	0.706	1	1	27.802	1219.86	60.99	A
60.00-40.00			B	0.34	2.195	0.629	1	1	17.659			
			C	0.402	2.059	0.653	1	1	20.900			
T8	363.82	455.02	A	0.494	1.907	0.695	1	1	25.070	991.34	49.57	A
40.00-20.00			B	0.31	2.27	0.619	1	1	14.011			
			C	0.375	2.115	0.642	1	1	17.575			
T9 20.00-5.00	272.87	984.05	A	0.524	1.87	0.71	1	1	21.502	833.69	55.58	A
			B	0.351	2.169	0.633	1	1	14.081			
			C	0.412	2.04	0.657	1	1	16.446			
T10 5.00-0.00	0.00	254.72	A	0.4	2.064	0.652	1	1	3.021	129.26	25.85	C
			B	0.4	2.064	0.652	1	1	3.021			
			C	0.4	2.064	0.652	1	1	3.021			
Sum Weight:	2462.56	10311.37								11728.93		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	36.65	811.06	A	0.3	2.296	0.616	0.8	1	15.234	1245.56	62.28	B
180.00-160.00		TA 557.98	B	0.34	2.195	0.629	0.8	1	17.135			
			C	0.267	2.388	0.606	0.8	1	13.734			
T2	196.27	455.02	A	0.418	2.029	0.659	0.8	1	20.112	1304.19	65.21	A
160.00-140.00			B	0.284	2.339	0.611	0.8	1	12.673			
			C	0.212	2.556	0.593	0.8	1	9.183			
T3	253.42	881.09	A	0.493	1.909	0.694	0.8	1	25.818	1512.08	75.60	A
140.00-120.00		TA 557.98	B	0.384	2.097	0.645	0.8	1	19.584			
			C	0.374	2.118	0.641	0.8	1	19.068			
T4	309.22	1813.41	A	0.503	1.896	0.699	0.8	1	26.552	1472.29	73.61	A
120.00-100.00			B	0.401	2.063	0.652	0.8	1	20.634			
			C	0.446	1.981	0.671	0.8	1	23.097			
T5	310.42	1090.34	A	0.473	1.938	0.684	0.8	1	23.992	1283.78	64.19	A
100.00-80.00			B	0.364	2.139	0.638	0.8	1	17.603			
			C	0.417	2.031	0.659	0.8	1	20.560			
T6	356.08	1323.89	A	0.522	1.873	0.709	0.8	1	27.534	1325.44	66.27	A
80.00-60.00			B	0.36	2.148	0.636	0.8	1	17.988			
			C	0.421	2.024	0.66	0.8	1	21.244			
T7	363.82	1126.79	A	0.517	1.879	0.706	0.8	1	26.997	1184.52	59.23	A
60.00-40.00			B	0.34	2.195	0.629	0.8	1	16.560			
			C	0.402	2.059	0.653	0.8	1	19.905			
T8	363.82	455.02	A	0.494	1.907	0.695	0.8	1	25.070	991.34	49.57	A

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
40.00-20.00			B	0.31	2.27	0.619	0.8	1	14.011			
			C	0.375	2.115	0.642	0.8	1	17.575			
T9 20.00-5.00	272.87	984.05	A	0.524	1.87	0.71	0.8	1	20.736	804.00	53.60	A
			B	0.351	2.169	0.633	0.8	1	13.036			
			C	0.412	2.04	0.657	0.8	1	15.500			
T10 5.00-0.00	0.00	254.72	A	0.4	2.064	0.652	0.8	1	2.753	117.77	23.55	C
			B	0.4	2.064	0.652	0.8	1	2.753			
			C	0.4	2.064	0.652	0.8	1	2.753			
Sum Weight:	2462.56	10311.37								11240.97		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	36.65	811.06	A	0.3	2.296	0.616	0.85	1	15.707	1277.97	63.90	B
180.00-160.00		TA 557.98	B	0.34	2.195	0.629	0.85	1	17.581			
			C	0.267	2.388	0.606	0.85	1	14.230			
T2	196.27	455.02	A	0.418	2.029	0.659	0.85	1	20.112	1304.19	65.21	A
160.00-140.00			B	0.284	2.339	0.611	0.85	1	12.673			
			C	0.212	2.556	0.593	0.85	1	9.183			
T3	253.42	881.09	A	0.493	1.909	0.694	0.85	1	26.220	1535.63	76.78	A
140.00-120.00		TA 557.98	B	0.384	2.097	0.645	0.85	1	20.073			
			C	0.374	2.118	0.641	0.85	1	19.565			
T4	309.22	1813.41	A	0.503	1.896	0.699	0.85	1	26.991	1496.63	74.83	A
120.00-100.00			B	0.401	2.063	0.652	0.85	1	21.164			
			C	0.446	1.981	0.671	0.85	1	23.587			
T5	310.42	1090.34	A	0.473	1.938	0.684	0.85	1	24.156	1292.57	64.63	A
100.00-80.00			B	0.364	2.139	0.638	0.85	1	17.801			
			C	0.417	2.031	0.659	0.85	1	20.742			
T6	356.08	1323.89	A	0.522	1.873	0.709	0.85	1	27.820	1339.20	66.96	A
80.00-60.00			B	0.36	2.148	0.636	0.85	1	18.370			
			C	0.421	2.024	0.66	0.85	1	21.590			
T7	363.82	1126.79	A	0.517	1.879	0.706	0.85	1	27.198	1193.35	59.67	A
60.00-40.00			B	0.34	2.195	0.629	0.85	1	16.835			
			C	0.402	2.059	0.653	0.85	1	20.154			
T8	363.82	455.02	A	0.494	1.907	0.695	0.85	1	25.070	991.34	49.57	A
40.00-20.00			B	0.31	2.27	0.619	0.85	1	14.011			
			C	0.375	2.115	0.642	0.85	1	17.575			
T9 20.00-5.00	272.87	984.05	A	0.524	1.87	0.71	0.85	1	20.927	811.42	54.09	A
			B	0.351	2.169	0.633	0.85	1	13.297			
			C	0.412	2.04	0.657	0.85	1	15.736			
T10 5.00-0.00	0.00	254.72	A	0.4	2.064	0.652	0.85	1	2.820	120.64	24.13	C
			B	0.4	2.064	0.652	0.85	1	2.820			
			C	0.4	2.064	0.652	0.85	1	2.820			
Sum Weight:	2462.56	10311.37								11362.96		

Discrete Appurtenance Pressures - No Ice $G_H = 1.121$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
Torque Arm Face C	180.0000	0.00	0.00	2.61	166.60	1.588	29	14.36	20.48
Torque Arm Face B	60.0000	0.00	2.26	-1.30	166.60	1.588	29	14.36	20.48
Torque Arm Face A	300.0000	0.00	-2.26	-1.30	166.60	1.588	29	14.36	20.48
Torque Arm Face C	180.0000	0.00	0.00	2.61	126.60	1.468	27	14.36	20.48
Torque Arm Face B	60.0000	0.00	2.26	-1.30	126.60	1.468	27	14.36	20.48
Torque Arm Face A	300.0000	0.00	-2.26	-1.30	126.60	1.468	27	14.36	20.48
GPS	120.0000	10.00	4.74	2.73	88.00	1.323	24	1.00	1.00
3' GPS Stand-off Mount	120.0000	51.00	3.00	1.73	88.00	1.323	24	2.45	2.45
APXVSPP18-C-A20 w/ Mount	0.0000	117.64	0.00	-4.97	126.00	1.466	27	8.96	8.08
APXVSPP18-C-A20 w/ Mount	120.0000	117.64	4.30	2.48	126.00	1.466	27	8.96	8.08
APXVSPP18-C-A20 w/ Mount	240.0000	117.64	-4.30	2.48	126.00	1.466	27	8.96	8.08
FD-RRH 2x50 800	0.0000	64.00	0.00	-4.97	126.00	1.466	27	2.40	2.25
FD-RRH 2x50 800	120.0000	64.00	4.30	2.48	126.00	1.466	27	2.40	2.25
FD-RRH 2x50 800	240.0000	64.00	-4.30	2.48	126.00	1.466	27	2.40	2.25
FD-RRH 4x45 1900	0.0000	60.00	0.00	-4.97	126.00	1.466	27	2.71	2.78
FD-RRH 4x45 1900	120.0000	60.00	4.30	2.48	126.00	1.466	27	2.71	2.78
FD-RRH 4x45 1900	240.0000	60.00	-4.30	2.48	126.00	1.466	27	2.71	2.78
Rohn 6' x 12' Boom Gate (1)	0.0000	560.00	0.00	-3.97	126.00	1.466	27	16.60	16.60
Rohn 6' x 12' Boom Gate (1)	120.0000	560.00	3.44	1.98	126.00	1.466	27	16.60	16.60
Rohn 6' x 12' Boom Gate (1)	240.0000	560.00	-3.44	1.98	126.00	1.466	27	16.60	16.60
2.5" Dia. x12' Omni	240.0000	30.00	-2.57	1.48	132.00	1.486	27	4.20	4.20
1.5"x2'omni	0.0000	8.00	0.00	-4.97	144.00	1.523	28	0.25	0.25
1.5"x2'omni	0.0000	8.00	0.00	-4.97	140.00	1.511	28	0.25	0.25
2-ft Stand Off	0.0000	20.00	0.00	-2.97	142.00	1.517	28	1.07	1.07
3"x20-ft Omni	240.0000	23.00	-4.30	2.48	147.00	1.532	28	3.56	3.56
3-ft Side Arm	240.0000	15.00	-3.00	1.73	137.00	1.502	28	0.66	0.66
20-ft x 1.9in Support Pipe	240.0000	54.40	-3.00	1.73	147.00	1.532	28	3.80	3.80
Folded Dipole	245.0000	23.00	-5.17	2.98	180.00	1.624	30	0.81	0.81
4-ft Side Arm	240.0000	65.00	-3.44	1.98	178.00	1.619	30	5.28	5.28
2"x9' omni	120.0000	30.00	1.71	0.98	184.50	1.635	30	1.80	1.80
2"x7' omni	240.0000	30.00	-1.71	0.98	183.50	1.633	30	1.40	1.40
AM-X-CD-14-65-00TT-RET	300.0000	36.40	-5.45	1.47	77.00	1.274	24	5.51	2.83
AM-X-CD-14-65-00TT-RET	60.0000	36.40	1.45	-5.46	77.00	1.274	24	5.51	2.83
AM-X-CD-14-65-00TT-RET	180.0000	36.40	4.00	3.98	77.00	1.274	24	5.51	2.83
7770.00	300.0000	35.00	-1.45	-5.46	77.00	1.274	24	5.88	2.93
7770.00	60.0000	35.00	5.45	1.47	77.00	1.274	24	5.88	2.93
7770.00	180.0000	35.00	-4.00	3.98	77.00	1.274	24	5.88	2.93
LPG21401 TMA	300.0000	35.00	-1.45	-5.46	77.00	1.274	24	1.91	0.73
LPG21401 TMA	60.0000	35.00	5.45	1.47	77.00	1.274	24	1.91	0.73
LPG21401 TMA	180.0000	35.00	-4.00	3.98	77.00	1.274	24	1.91	0.73
RRUS-11	300.0000	100.00	-3.45	-1.99	73.00	1.255	23	5.99	2.49
RRUS-11	60.0000	100.00	3.45	-1.99	73.00	1.255	23	5.99	2.49
RRUS-11	180.0000	100.00	0.00	3.98	73.00	1.255	23	5.99	2.49
DC6-48-60-18-8F Surge Arrestor	240.0000	20.00	-2.57	1.48	72.00	1.250	23	2.23	2.23
Valmont T-Arm (1)	0.0000	336.00	0.00	-3.97	77.00	1.274	24	10.54	10.54
Valmont T-Arm (1)	120.0000	336.00	3.44	1.98	77.00	1.274	24	10.54	10.54
Valmont T-Arm (1)	240.0000	336.00	-3.44	1.98	77.00	1.274	24	10.54	10.54
AIR21	0.0000	83.00	-2.00	-3.97	159.00	1.567	29	6.53	4.36
AIR21	0.0000	83.00	2.00	-3.97	159.00	1.567	29	6.53	4.36
AIR21	120.0000	83.00	4.44	0.25	159.00	1.567	29	6.53	4.36

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
AIR21	120.0000	83.00	2.44	3.72	159.00	1.567	29	6.53	4.36
AIR21	240.0000	83.00	-2.44	3.72	159.00	1.567	29	6.53	4.36
AIR21	240.0000	83.00	-4.44	0.25	159.00	1.567	29	6.53	4.36
KRY 112 TMA	0.0000	25.00	0.00	-3.97	159.00	1.567	29	0.78	0.49
KRY 112 TMA	120.0000	25.00	3.44	1.98	159.00	1.567	29	0.78	0.49
KRY 112 TMA	240.0000	25.00	-3.44	1.98	159.00	1.567	29	0.78	0.49
Site Pro Compact Tower Mount CWT8	0.0000	150.00	0.00	-2.97	159.00	1.567	29	2.85	2.85
Site Pro Compact Tower Mount CWT8	120.0000	150.00	2.57	1.48	159.00	1.567	29	2.85	2.85
Site Pro Compact Tower Mount CWT8	240.0000	150.00	-2.57	1.48	159.00	1.567	29	2.85	2.85
	Sum Weight:	5442.52							

Discrete Appurtenance Pressures - With Ice $G_H = 1.121$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
Torque Arm Face C	180.0000	0.00	0.00	2.61	166.60	1.588	29	14.98	21.36	0.5000
Torque Arm Face B	60.0000	0.00	2.26	-1.30	166.60	1.588	29	14.98	21.36	0.5000
Torque Arm Face A	300.0000	0.00	-2.26	-1.30	166.60	1.588	29	14.98	21.36	0.5000
Torque Arm Face C	180.0000	0.00	0.00	2.61	126.60	1.468	27	14.98	21.36	0.5000
Torque Arm Face B	60.0000	0.00	2.26	-1.30	126.60	1.468	27	14.98	21.36	0.5000
Torque Arm Face A	300.0000	0.00	-2.26	-1.30	126.60	1.468	27	14.98	21.36	0.5000
GPS	120.0000	15.00	4.74	2.73	88.00	1.323	24	1.50	1.50	0.5000
3' GPS Stand-off Mount	120.0000	75.00	3.00	1.73	88.00	1.323	24	3.98	3.98	0.5000
APXVSPP18-C-A20 w/ Mount	0.0000	197.65	0.00	-4.97	126.00	1.466	27	9.66	9.14	0.5000
APXVSPP18-C-A20 w/ Mount	120.0000	197.65	4.30	2.48	126.00	1.466	27	9.66	9.14	0.5000
APXVSPP18-C-A20 w/ Mount	240.0000	197.65	-4.30	2.48	126.00	1.466	27	9.66	9.14	0.5000
FD-RRH 2x50 800	0.0000	86.12	0.00	-4.97	126.00	1.466	27	2.61	2.46	0.5000
FD-RRH 2x50 800	120.0000	86.12	4.30	2.48	126.00	1.466	27	2.61	2.46	0.5000
FD-RRH 2x50 800	240.0000	86.12	-4.30	2.48	126.00	1.466	27	2.61	2.46	0.5000
FD-RRH 4x45 1900	0.0000	83.97	0.00	-4.97	126.00	1.466	27	2.94	3.02	0.5000
FD-RRH 4x45 1900	120.0000	83.97	4.30	2.48	126.00	1.466	27	2.94	3.02	0.5000
FD-RRH 4x45 1900	240.0000	83.97	-4.30	2.48	126.00	1.466	27	2.94	3.02	0.5000
Rohn 6' x 12' Boom Gate (1)	0.0000	700.00	0.00	-3.97	126.00	1.466	27	19.80	19.80	0.5000
Rohn 6' x 12' Boom Gate (1)	120.0000	700.00	3.44	1.98	126.00	1.466	27	19.80	19.80	0.5000
Rohn 6' x 12' Boom Gate (1)	240.0000	700.00	-3.44	1.98	126.00	1.466	27	19.80	19.80	0.5000
2.5" Dia. x12' Omni	240.0000	59.84	-2.57	1.48	132.00	1.486	27	5.44	5.44	0.5000
1.5"x2'omni	0.0000	10.60	0.00	-4.97	144.00	1.523	28	0.38	0.38	0.5000
1.5"x2'omni	0.0000	10.60	0.00	-4.97	140.00	1.511	28	0.38	0.38	0.5000
2-ft Stand Off	0.0000	28.00	0.00	-2.97	142.00	1.517	28	1.62	1.62	0.5000
3"x20-ft Omni	240.0000	46.00	-4.30	2.48	147.00	1.532	28	7.13	7.13	0.5000
3-ft Side Arm	240.0000	28.00	-3.00	1.73	137.00	1.502	28	1.14	1.14	0.5000
20-ft x 1.9in Support Pipe	240.0000	83.84	-3.00	1.73	147.00	1.532	28	5.82	5.82	0.5000
Folded Dipole	245.0000	30.08	-5.17	2.98	180.00	1.624	30	1.48	1.48	0.5000
4-ft Side Arm	240.0000	84.50	-3.44	1.98	178.00	1.619	30	7.88	7.88	0.5000
2"x9' omni	120.0000	43.97	1.71	0.98	184.50	1.635	30	2.73	2.73	0.5000
2"x7' omni	240.0000	40.92	-1.71	0.98	183.50	1.633	30	2.13	2.13	0.5000

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
AM-X-CD-14-65-00TT-RET	300.0000	68.35	-5.45	1.47	77.00	1.274	24	5.90	3.14	0.5000
AM-X-CD-14-65-00TT-RET	60.0000	68.35	1.45	-5.46	77.00	1.274	24	5.90	3.14	0.5000
AM-X-CD-14-65-00TT-RET	180.0000	68.35	4.00	3.98	77.00	1.274	24	5.90	3.14	0.5000
7770.00	300.0000	67.63	-1.45	-5.46	77.00	1.274	24	6.31	3.27	0.5000
7770.00	60.0000	67.63	5.45	1.47	77.00	1.274	24	6.31	3.27	0.5000
7770.00	180.0000	67.63	-4.00	3.98	77.00	1.274	24	6.31	3.27	0.5000
LPG21401 TMA	300.0000	46.63	-1.45	-5.46	77.00	1.274	24	2.19	0.96	0.5000
LPG21401 TMA	60.0000	46.63	5.45	1.47	77.00	1.274	24	2.19	0.96	0.5000
LPG21401 TMA	180.0000	46.63	-4.00	3.98	77.00	1.274	24	2.19	0.96	0.5000
RRUS-11	300.0000	139.15	-3.45	-1.99	73.00	1.255	23	6.45	2.82	0.5000
RRUS-11	60.0000	139.15	3.45	-1.99	73.00	1.255	23	6.45	2.82	0.5000
RRUS-11	180.0000	139.15	0.00	3.98	73.00	1.255	23	6.45	2.82	0.5000
DC6-48-60-18-8F Surge Arrestor	240.0000	39.36	-2.57	1.48	72.00	1.250	23	2.45	2.45	0.5000
Valmont T-Arm (1)	0.0000	412.00	0.00	-3.97	77.00	1.274	24	14.45	14.45	0.5000
Valmont T-Arm (1)	120.0000	412.00	3.44	1.98	77.00	1.274	24	14.45	14.45	0.5000
Valmont T-Arm (1)	240.0000	412.00	-3.44	1.98	77.00	1.274	24	14.45	14.45	0.5000
AIR21	0.0000	124.90	-2.00	-3.97	159.00	1.567	29	6.98	4.77	0.5000
AIR21	0.0000	124.90	2.00	-3.97	159.00	1.567	29	6.98	4.77	0.5000
AIR21	120.0000	124.90	4.44	0.25	159.00	1.567	29	6.98	4.77	0.5000
AIR21	120.0000	124.90	2.44	3.72	159.00	1.567	29	6.98	4.77	0.5000
AIR21	240.0000	124.90	-2.44	3.72	159.00	1.567	29	6.98	4.77	0.5000
AIR21	240.0000	124.90	-4.44	0.25	159.00	1.567	29	6.98	4.77	0.5000
KRY 112 TMA	0.0000	31.29	0.00	-3.97	159.00	1.567	29	0.90	0.59	0.5000
KRY 112 TMA	120.0000	31.29	3.44	1.98	159.00	1.567	29	0.90	0.59	0.5000
KRY 112 TMA	240.0000	31.29	-3.44	1.98	159.00	1.567	29	0.90	0.59	0.5000
Site Pro Compact Tower Mount CWT8	0.0000	200.00	0.00	-2.97	159.00	1.567	29	4.05	4.05	0.5000
Site Pro Compact Tower Mount CWT8	120.0000	200.00	2.57	1.48	159.00	1.567	29	4.05	4.05	0.5000
Site Pro Compact Tower Mount CWT8	240.0000	200.00	-2.57	1.48	159.00	1.567	29	4.05	4.05	0.5000
	Sum Weight:	7443.47								

Discrete Appurtenance Pressures - Service $G_H = 1.121$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
Torque Arm Face C	180.0000	0.00	0.00	2.61	166.60	1.588	29	14.36	20.48
Torque Arm Face B	60.0000	0.00	2.26	-1.30	166.60	1.588	29	14.36	20.48
Torque Arm Face A	300.0000	0.00	-2.26	-1.30	166.60	1.588	29	14.36	20.48
Torque Arm Face C	180.0000	0.00	0.00	2.61	126.60	1.468	27	14.36	20.48
Torque Arm Face B	60.0000	0.00	2.26	-1.30	126.60	1.468	27	14.36	20.48
Torque Arm Face A	300.0000	0.00	-2.26	-1.30	126.60	1.468	27	14.36	20.48
GPS	120.0000	10.00	4.74	2.73	88.00	1.323	24	1.00	1.00
3' GPS Stand-off Mount	120.0000	51.00	3.00	1.73	88.00	1.323	24	2.45	2.45
APXVSPP18-C-A20 w/ Mount	0.0000	117.64	0.00	-4.97	126.00	1.466	27	8.96	8.08
APXVSPP18-C-A20 w/ Mount	120.0000	117.64	4.30	2.48	126.00	1.466	27	8.96	8.08
APXVSPP18-C-A20 w/ Mount	240.0000	117.64	-4.30	2.48	126.00	1.466	27	8.96	8.08
FD-RRH 2x50 800	0.0000	64.00	0.00	-4.97	126.00	1.466	27	2.40	2.25

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
FD-RRH 2x50 800	120.0000	64.00	4.30	2.48	126.00	1.466	27	2.40	2.25
FD-RRH 2x50 800	240.0000	64.00	-4.30	2.48	126.00	1.466	27	2.40	2.25
FD-RRH 4x45 1900	0.0000	60.00	0.00	-4.97	126.00	1.466	27	2.71	2.78
FD-RRH 4x45 1900	120.0000	60.00	4.30	2.48	126.00	1.466	27	2.71	2.78
FD-RRH 4x45 1900	240.0000	60.00	-4.30	2.48	126.00	1.466	27	2.71	2.78
Rohn 6' x 12' Boom Gate (1)	0.0000	560.00	0.00	-3.97	126.00	1.466	27	16.60	16.60
Rohn 6' x 12' Boom Gate (1)	120.0000	560.00	3.44	1.98	126.00	1.466	27	16.60	16.60
Rohn 6' x 12' Boom Gate (1)	240.0000	560.00	-3.44	1.98	126.00	1.466	27	16.60	16.60
2.5" Dia. x12' Omni	240.0000	30.00	-2.57	1.48	132.00	1.486	27	4.20	4.20
1.5"x2'omni	0.0000	8.00	0.00	-4.97	144.00	1.523	28	0.25	0.25
1.5"x2'omni	0.0000	8.00	0.00	-4.97	140.00	1.511	28	0.25	0.25
2-ft Stand Off	0.0000	20.00	0.00	-2.97	142.00	1.517	28	1.07	1.07
3"x20-ft Omni	240.0000	23.00	-4.30	2.48	147.00	1.532	28	3.56	3.56
3-ft Side Arm	240.0000	15.00	-3.00	1.73	137.00	1.502	28	0.66	0.66
20-ft x 1.9in Support Pipe	240.0000	54.40	-3.00	1.73	147.00	1.532	28	3.80	3.80
Folded Dipole	245.0000	23.00	-5.17	2.98	180.00	1.624	30	0.81	0.81
4-ft Side Arm	240.0000	65.00	-3.44	1.98	178.00	1.619	30	5.28	5.28
2"x9' omni	120.0000	30.00	1.71	0.98	184.50	1.635	30	1.80	1.80
2"x7' omni	240.0000	30.00	-1.71	0.98	183.50	1.633	30	1.40	1.40
AM-X-CD-14-65-00TT-RET	300.0000	36.40	-5.45	1.47	77.00	1.274	24	5.51	2.83
AM-X-CD-14-65-00TT-RET	60.0000	36.40	1.45	-5.46	77.00	1.274	24	5.51	2.83
AM-X-CD-14-65-00TT-RET	180.0000	36.40	4.00	3.98	77.00	1.274	24	5.51	2.83
7770.00	300.0000	35.00	-1.45	-5.46	77.00	1.274	24	5.88	2.93
7770.00	60.0000	35.00	5.45	1.47	77.00	1.274	24	5.88	2.93
7770.00	180.0000	35.00	-4.00	3.98	77.00	1.274	24	5.88	2.93
LPG21401 TMA	300.0000	35.00	-1.45	-5.46	77.00	1.274	24	1.91	0.73
LPG21401 TMA	60.0000	35.00	5.45	1.47	77.00	1.274	24	1.91	0.73
LPG21401 TMA	180.0000	35.00	-4.00	3.98	77.00	1.274	24	1.91	0.73
RRUS-11	300.0000	100.00	-3.45	-1.99	73.00	1.255	23	5.99	2.49
RRUS-11	60.0000	100.00	3.45	-1.99	73.00	1.255	23	5.99	2.49
RRUS-11	180.0000	100.00	0.00	3.98	73.00	1.255	23	5.99	2.49
DC6-48-60-18-8F Surge Arrestor	240.0000	20.00	-2.57	1.48	72.00	1.250	23	2.23	2.23
Valmont T-Arm (1)	0.0000	336.00	0.00	-3.97	77.00	1.274	24	10.54	10.54
Valmont T-Arm (1)	120.0000	336.00	3.44	1.98	77.00	1.274	24	10.54	10.54
Valmont T-Arm (1)	240.0000	336.00	-3.44	1.98	77.00	1.274	24	10.54	10.54
AIR21	0.0000	83.00	-2.00	-3.97	159.00	1.567	29	6.53	4.36
AIR21	0.0000	83.00	2.00	-3.97	159.00	1.567	29	6.53	4.36
AIR21	120.0000	83.00	4.44	0.25	159.00	1.567	29	6.53	4.36
AIR21	120.0000	83.00	2.44	3.72	159.00	1.567	29	6.53	4.36
AIR21	240.0000	83.00	-2.44	3.72	159.00	1.567	29	6.53	4.36
AIR21	240.0000	83.00	-4.44	0.25	159.00	1.567	29	6.53	4.36
KRY 112 TMA	0.0000	25.00	0.00	-3.97	159.00	1.567	29	0.78	0.49
KRY 112 TMA	120.0000	25.00	3.44	1.98	159.00	1.567	29	0.78	0.49
KRY 112 TMA	240.0000	25.00	-3.44	1.98	159.00	1.567	29	0.78	0.49
Site Pro Compact Tower Mount CWT8	0.0000	150.00	0.00	-2.97	159.00	1.567	29	2.85	2.85
Site Pro Compact Tower Mount CWT8	120.0000	150.00	2.57	1.48	159.00	1.567	29	2.85	2.85
Site Pro Compact Tower Mount CWT8	240.0000	150.00	-2.57	1.48	159.00	1.567	29	2.85	2.85
	Sum Weight:	5442.52							

Dish Pressures - No Ice

Elevation ft	Dish Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	K_z	A_A ft^2	q_z psf
175.00	8.5 Dishw/radome	0.0000	75.00	0.00	-1.97	1.611	56.75	30
		Sum Weight:	75.00					

Dish Pressures - With Ice

Elevation ft	Dish Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	K_z	A_A ft^2	q_z psf	t_z in
175.00	8.5 Dishw/radome	0.0000	297.03	0.00	-1.97	1.611	57.56	30	0.5000
		Sum Weight:	297.03						

Dish Pressures - Service

Elevation ft	Dish Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	K_z	A_A ft^2	q_z psf
175.00	8.5 Dishw/radome	0.0000	75.00	0.00	-1.97	1.611	56.75	30
		Sum Weight:	75.00					

Force Totals (Does not include forces on guys)

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Torques kip-ft
Leg Weight	3137.70			
Bracing Weight	7173.66			
Total Member Self-Weight	10311.37			
Guy Weight	2460.12			
Total Weight	20751.57			
Wind 0 deg - No Ice		0.00	-24041.73	-2.84
Wind 90 deg - No Ice		22328.54	-22.21	-2.38
Wind 180 deg - No Ice		0.00	24493.85	2.81
Member Ice	5051.07			
Guy Ice	2204.82			
Total Weight Ice	34629.91			
Wind 0 deg - Ice		0.00	-32256.91	-3.30
Wind 90 deg - Ice		30115.39	-22.52	-2.06
Wind 180 deg - Ice		0.00	32176.99	3.28
Total Weight	20751.57			
Wind 0 deg - Service		0.00	-24041.73	-2.84
Wind 90 deg - Service		22328.54	-22.21	-2.38
Wind 180 deg - Service		0.00	24493.85	2.81

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice+Guy
3	Dead+Wind 90 deg - No Ice+Guy
4	Dead+Wind 180 deg - No Ice+Guy
5	Dead+Ice+Temp+Guy
6	Dead+Wind 0 deg+Ice+Temp+Guy
7	Dead+Wind 90 deg+Ice+Temp+Guy
8	Dead+Wind 180 deg+Ice+Temp+Guy
9	Dead+Wind 0 deg - Service+Guy
10	Dead+Wind 90 deg - Service+Guy
11	Dead+Wind 180 deg - Service+Guy

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 160	Leg	Max Tension	8	11334.19	0.01	-0.22
			Max. Compression	7	-16560.26	-0.15	-0.15
			Max. Mx	7	-3568.08	-0.76	0.06
			Max. My	6	-5635.44	-0.06	0.69
			Max. Vy	7	-1029.30	-0.76	0.06
			Max. Vx	8	902.17	-0.01	-0.11
		Diagonal	Max Tension	8	2366.00	0.00	0.00
			Max. Compression	6	-1882.31	0.00	0.00
			Max. Mx	8	1726.80	-0.03	-0.00
			Max. My	8	-1855.67	0.00	-0.01
			Max. Vy	8	-19.95	0.00	0.00
			Max. Vx	8	-6.01	0.00	-0.01
		Top Girt	Max Tension	6	66.98	0.00	0.00
			Max. Compression	8	-145.00	0.00	0.00
			Max. Mx	5	-22.20	-0.01	0.00
			Max. My	7	-90.26	0.00	0.00
			Max. Vy	5	-6.58	0.00	0.00
			Max. Vx	7	0.00	0.00	0.00
		Bottom Girt	Max Tension	6	394.33	0.00	0.00
			Max. Compression	7	-456.95	0.00	0.00
			Max. Mx	5	2.12	-0.01	0.00
			Max. My	7	-456.95	0.00	0.00
			Max. Vy	5	-6.58	0.00	0.00
			Max. Vx	7	0.00	0.00	0.00
		Guy A	Bottom Tension	8	12317.92		
			Top Tension	8	12537.38		
			Top Cable Vert	8	8738.44		
			Top Cable Norm	8	8990.30		
			Top Cable Tan	8	7.00		
			Bot Cable Vert	8	-8059.26		
			Bot Cable Norm	8	9315.54		
			Bot Cable Tan	8	7.28		
		Guy B	Bottom Tension	6	8571.36		
			Top Tension	6	8790.52		
			Top Cable Vert	6	6147.74		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Top Cable Norm	6	6269.34		
			Top Cable Tan	6	417.05		
			Bot Cable Vert	6	-5586.59		
			Bot Cable Norm	6	6485.81		
			Bot Cable Tan	6	438.73		
		Guy C	Bottom Tension	7	10108.65		
			Top Tension	7	10328.28		
			Top Cable Vert	7	7243.74		
			Top Cable Norm	7	7359.30		
			Top Cable Tan	7	205.63		
			Bot Cable Vert	7	-6571.14		
			Bot Cable Norm	7	7678.48		
			Bot Cable Tan	7	214.53		
		Torque Arm Top	Max Tension	8	13879.45	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	6	7261.81	0.02	0.00
			Max. My	7	12499.88	0.00	-0.00
			Max. Vy	6	25.42	0.00	0.00
			Max. Vx	7	0.00	0.00	0.00
		Torque Arm Bottom	Max Tension	2	725.57	0.00	0.00
			Max. Compression	8	-18289.83	0.00	0.00
			Max. Mx	7	-14032.26	0.07	0.00
			Max. My	7	-2215.52	0.00	0.00
			Max. Vy	7	61.85	0.00	0.00
			Max. Vx	7	-0.28	0.00	0.00
T2	160 - 140	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	7	-18425.17	0.03	-0.07
			Max. Mx	7	-3589.25	0.58	-0.02
			Max. My	6	-12163.60	0.11	-0.51
			Max. Vy	7	-1024.94	-0.13	0.02
			Max. Vx	6	-878.54	-0.07	0.15
		Diagonal	Max Tension	8	2236.31	0.00	0.00
			Max. Compression	6	-2334.56	0.00	0.00
			Max. Mx	8	2236.31	0.00	0.00
			Max. My	8	-69.13	0.00	-0.00
			Max. Vy	8	-3.61	0.00	0.00
			Max. Vx	8	-0.01	0.00	0.00
		Top Girt	Max Tension	6	512.96	0.00	0.00
			Max. Compression	7	-805.55	0.00	0.00
			Max. Mx	5	-21.71	0.00	0.00
			Max. My	7	98.98	0.00	-0.00
			Max. Vy	5	-3.61	0.00	0.00
			Max. Vx	7	0.00	0.00	0.00
		Bottom Girt	Max Tension	6	1153.25	0.00	0.00
			Max. Compression	8	-1119.54	0.00	0.00
			Max. Mx	5	19.33	0.00	0.00
			Max. My	8	-1119.54	0.00	0.00
			Max. Vy	5	-3.61	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
T3	140 - 120	Leg	Max Tension	4	2803.71	0.01	-0.29
			Max. Compression	7	-29063.55	0.03	-0.15
			Max. Mx	7	-12854.23	-0.71	0.03
			Max. My	6	-14362.31	0.13	0.79
			Max. Vy	7	1140.24	-0.49	-0.15
			Max. Vx	6	-1224.38	0.02	0.58
		Diagonal	Max Tension	8	2804.02	0.00	0.00
			Max. Compression	6	-2839.64	0.00	0.00
			Max. Mx	8	2112.58	-0.07	-0.00
			Max. My	6	-427.49	-0.02	0.02
			Max. Vy	8	-36.82	0.00	0.00
			Max. Vx	6	-9.59	-0.02	0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Top Girt	Max Tension	6	652.73	0.00	0.00
			Max. Compression	8	-203.07	0.00	0.00
			Max. Mx	5	145.33	-0.01	0.00
			Max. My	8	386.36	0.00	-0.00
			Max. Vy	5	7.45	0.00	0.00
			Max. Vx	8	0.00	0.00	0.00
		Bottom Girt	Max Tension	6	892.19	0.00	0.00
			Max. Compression	8	-246.66	0.00	0.00
			Max. Mx	5	219.01	-0.01	0.00
			Max. My	8	533.69	0.00	-0.00
			Max. Vy	5	7.45	0.00	0.00
			Max. Vx	8	0.00	0.00	0.00
		Guy A	Bottom Tension	8	12479.91		
			Top Tension	8	12647.28		
			Top Cable Vert	8	7460.28		
			Top Cable Norm	8	10212.64		
			Top Cable Tan	8	4.71		
			Bot Cable Vert	8	-6932.60		
			Bot Cable Norm	8	10377.25		
			Bot Cable Tan	8	5.35		
		Guy B	Bottom Tension	6	8745.95		
			Top Tension	6	8912.65		
			Top Cable Vert	6	5301.92		
			Top Cable Norm	6	7156.87		
			Top Cable Tan	6	322.64		
			Bot Cable Vert	6	-4817.46		
			Bot Cable Norm	6	7291.15		
			Bot Cable Tan	6	350.60		
		Guy C	Bottom Tension	7	11161.83		
			Top Tension	7	11328.96		
			Top Cable Vert	7	6713.67		
			Top Cable Norm	7	9124.13		
			Top Cable Tan	7	149.57		
			Bot Cable Vert	7	-6171.21		
			Bot Cable Norm	7	9299.11		
			Bot Cable Tan	7	171.05		
		Torque Arm Top	Max Tension	7	12137.08	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	5	6506.77	0.02	0.00
			Max. My	6	12133.00	0.00	-0.00
			Max. Vy	5	25.42	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Torque Arm Bottom	Max Tension	6	2775.17	0.00	0.00
			Max. Compression	8	-17158.49	0.00	0.00
			Max. Mx	7	-14285.03	0.07	0.00
			Max. My	6	2775.17	0.00	0.00
			Max. Vy	7	61.80	0.00	0.00
			Max. Vx	6	0.13	0.00	0.00
T4	120 - 100	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	7	-38086.02	-0.04	-0.23
			Max. Mx	7	-22589.22	0.60	-0.04
			Max. My	8	-20586.83	-0.03	0.71
			Max. Vy	7	-1020.70	-0.08	0.06
			Max. Vx	6	1204.13	0.10	0.05
		Diagonal	Max Tension	6	2533.57	0.00	0.00
			Max. Compression	8	-3061.47	0.00	0.00
			Max. Mx	8	-888.45	-0.02	0.00
			Max. My	8	-884.98	0.00	0.00
			Max. Vy	8	-17.06	0.00	0.00
			Max. Vx	8	-0.05	0.00	0.00
		Horizontal	Max Tension	8	1064.93	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	7	-659.67	0.00	0.00
			Max. Mx	5	408.23	-0.01	0.00
			Max. My	8	652.41	0.00	0.00
			Max. Vy	5	17.02	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
		Top Girt	Max Tension	6	1413.48	0.00	0.00
			Max. Compression	8	-1077.84	0.00	0.00
			Max. Mx	5	70.86	-0.01	0.00
			Max. My	8	839.02	0.00	0.00
			Max. Vy	5	-17.02	0.00	0.00
			Max. Vx	8	0.00	0.00	0.00
		Bottom Girt	Max Tension	6	514.06	0.00	0.00
			Max. Compression	2	-13.18	0.00	0.00
			Max. Mx	5	192.72	-0.01	0.00
			Max. My	8	101.03	0.00	0.00
			Max. Vy	5	-17.02	0.00	0.00
			Max. Vx	8	0.00	0.00	0.00
T5	100 - 80	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	7	-38094.57	-0.00	-0.19
			Max. Mx	7	-24962.79	0.49	-0.10
			Max. My	8	-20254.36	0.03	0.52
			Max. Vy	7	879.11	-0.09	-0.19
			Max. Vx	8	912.52	-0.09	-0.04
		Diagonal	Max Tension	7	1759.95	0.00	0.00
			Max. Compression	8	-2046.73	0.00	0.00
			Max. Mx	7	1759.95	0.01	0.00
			Max. My	8	-567.12	0.00	-0.00
			Max. Vy	7	-5.12	0.00	0.00
			Max. Vx	8	0.02	0.00	0.00
		Horizontal	Max Tension	8	815.39	0.00	0.00
			Max. Compression	7	-659.82	0.00	0.00
			Max. Mx	5	360.94	-0.01	0.00
			Max. My	8	815.39	0.00	0.00
			Max. Vy	5	17.02	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
		Top Girt	Max Tension	8	333.55	0.00	0.00
			Max. Compression	6	-26.95	0.00	0.00
			Max. Mx	5	138.96	0.00	0.00
			Max. My	8	333.55	0.00	-0.00
			Max. Vy	5	-3.61	0.00	0.00
			Max. Vx	8	0.00	0.00	0.00
		Bottom Girt	Max Tension	7	801.29	0.00	0.00
			Max. Compression	7	-485.21	0.00	0.00
			Max. Mx	5	79.38	0.00	0.00
			Max. My	8	301.94	0.00	-0.00
			Max. Vy	5	-3.61	0.00	0.00
			Max. Vx	8	0.00	0.00	0.00
T6	80 - 60	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	7	-43655.00	-0.23	0.05
			Max. Mx	7	-41326.70	-1.16	0.00
			Max. My	6	-39707.56	0.20	1.11
			Max. Vy	7	-1519.41	-1.16	0.00
			Max. Vx	8	-1606.53	-0.08	-1.06
		Diagonal	Max Tension	7	5202.09	0.00	0.00
			Max. Compression	7	-5109.41	0.00	0.00
			Max. Mx	7	4563.43	-0.02	0.00
			Max. My	8	-64.63	0.00	0.00
			Max. Vy	7	-17.10	0.00	0.00
			Max. Vx	8	-0.07	0.00	0.00
		Top Girt	Max Tension	8	927.96	0.00	0.00
			Max. Compression	7	-779.72	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	5	121.39	-0.01	0.00
			Max. My	7	858.60	0.00	0.00
			Max. Vy	5	-17.02	0.00	0.00
			Max. Vx	7	-0.00	0.00	0.00
		Bottom Girt	Max Tension	7	4580.79	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	5	2376.22	-0.01	0.00
			Max. My	7	1818.19	0.00	0.00
			Max. Vy	5	-17.02	0.00	0.00
			Max. Vx	7	-0.00	0.00	0.00
		Guy A	Bottom Tension	8	16573.91		
			Top Tension	8	16689.77		
			Top Cable Vert	8	6480.70		
			Top Cable Norm	8	15380.15		
			Top Cable Tan	8	0.83		
			Bot Cable Vert	8	-6097.04		
			Bot Cable Norm	8	15411.70		
			Bot Cable Tan	8	0.83		
		Guy B	Bottom Tension	6	12976.27		
			Top Tension	6	13091.53		
			Top Cable Vert	6	4999.61		
			Top Cable Norm	6	12097.45		
			Top Cable Tan	6	209.41		
			Bot Cable Vert	6	-4594.05		
			Bot Cable Norm	6	12133.31		
			Bot Cable Tan	6	247.56		
		Guy C	Bottom Tension	7	15545.65		
			Top Tension	7	15661.37		
			Top Cable Vert	7	5755.56		
			Top Cable Norm	7	14565.23		
			Top Cable Tan	7	77.94		
			Bot Cable Vert	7	-5324.54		
			Bot Cable Norm	7	14604.99		
			Bot Cable Tan	7	103.41		
		Top Guy Pull-Off	Max Tension	7	3435.60	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	5	1782.17	0.01	0.00
			Max. My	7	1363.64	0.00	-0.00
			Max. Vy	5	-13.54	0.00	0.00
			Max. Vx	7	0.00	0.00	0.00
T7	60 - 40	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	7	-43654.91	0.71	0.10
			Max. Mx	7	-42652.89	0.71	0.10
			Max. My	8	-12113.35	0.16	0.91
			Max. Vy	7	-1533.88	-0.23	0.05
			Max. Vx	8	-1602.88	0.04	-0.07
		Diagonal	Max Tension	7	3511.97	0.00	0.00
			Max. Compression	6	-3245.98	0.00	0.00
			Max. Mx	7	-2902.57	-0.02	0.00
			Max. My	8	-104.79	0.00	0.00
			Max. Vy	7	17.08	0.00	0.00
			Max. Vx	8	-0.05	0.00	0.00
		Top Girt	Max Tension	6	1993.63	0.00	0.00
			Max. Compression	8	-1705.47	0.00	0.00
			Max. Mx	5	73.40	0.00	0.00
			Max. My	7	-1697.04	0.00	-0.00
			Max. Vy	5	-3.61	0.00	0.00
			Max. Vx	7	0.00	0.00	0.00
		Bottom Girt	Max Tension	7	964.37	0.00	0.00
			Max. Compression	6	-753.36	0.00	0.00
			Max. Mx	5	62.01	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	6	-753.33	0.00	0.00
			Max. Vy	5	-3.61	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
T8	40 - 20	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-37112.52	0.11	0.11
			Max. Mx	7	-29908.21	0.40	-0.18
			Max. My	8	-30854.25	0.10	0.52
			Max. Vy	7	-729.32	-0.14	0.04
			Max. Vx	8	-803.64	0.09	0.02
		Diagonal	Max Tension	7	1617.84	0.00	0.00
			Max. Compression	8	-1639.71	0.00	0.00
			Max. Mx	7	-233.14	0.00	0.00
			Max. My	6	80.17	0.00	0.00
			Max. Vy	7	3.62	0.00	0.00
			Max. Vx	6	0.01	0.00	0.00
		Top Girt	Max Tension	6	771.32	0.00	0.00
			Max. Compression	7	-730.64	0.00	0.00
			Max. Mx	5	54.46	0.00	0.00
			Max. My	6	-488.00	0.00	-0.00
			Max. Vy	5	-3.61	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	6	163.03	0.00	0.00
			Max. Compression	4	-46.31	0.00	0.00
			Max. Mx	5	52.31	0.00	0.00
			Max. My	6	163.03	0.00	0.00
			Max. Vy	5	-3.61	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
T9	20 - 5	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-37127.62	0.00	0.02
			Max. Mx	6	-31192.88	-0.28	-0.08
			Max. My	6	-31230.58	0.20	-0.47
			Max. Vy	7	802.71	-0.24	-0.06
			Max. Vx	8	900.99	0.05	-0.16
		Diagonal	Max Tension	6	1015.95	0.00	0.00
			Max. Compression	6	-1569.82	0.00	0.00
			Max. Mx	7	1009.97	-0.02	0.00
			Max. My	6	-26.35	0.00	-0.00
			Max. Vy	7	17.09	0.00	0.00
			Max. Vx	6	0.05	0.00	0.00
		Top Girt	Max Tension	8	169.11	0.00	0.00
			Max. Compression	6	-128.35	0.00	0.00
			Max. Mx	5	71.79	-0.01	0.00
			Max. My	6	-128.19	0.00	-0.00
			Max. Vy	5	-17.02	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Bottom Girt	Max Tension	6	1202.16	0.00	0.00
			Max. Compression	8	-429.47	0.00	0.00
			Max. Mx	5	255.09	-0.01	0.00
			Max. My	6	1202.16	0.00	-0.00
			Max. Vy	5	-17.02	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
T10	5 - 0	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-36915.87	-0.42	0.20
			Max. Mx	8	-32814.37	-0.44	0.27
			Max. My	4	-21030.07	-0.30	0.27
			Max. Vy	8	295.49	-0.44	0.27
			Max. Vx	8	-176.54	-0.44	0.27
		Diagonal	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-550.21	0.00	0.00
			Max. Mx	6	-115.19	-0.01	0.00
			Max. My	8	-418.95	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	6	12.60	0.00	0.00
			Max. Vx	8	-3.54	0.00	0.00
		Top Girt	Max Tension	8	7653.47	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	8	6866.55	-0.01	0.00
			Max. My	6	6142.57	0.00	-0.00
			Max. Vy	8	16.70	0.00	0.00
			Max. Vx	6	3.29	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Mast	Max. Vert	8	95725.74	-5.84	-1054.54
	Max. H_x	11	60961.83	0.29	-655.08
	Max. H_z	6	88979.96	-17.21	1353.80
	Max. M_x	1	0.00	-5.88	-2.15
	Max. M_z	1	0.00	-5.88	-2.15
	Max. Torsion	2	0.25	-8.30	726.74
	Min. Vert	1	52642.72	-5.88	-2.15
	Min. H_x	7	91816.37	-1129.28	-60.76
	Min. H_z	8	95725.74	-5.84	-1054.54
	Min. M_x	1	0.00	-5.88	-2.15
	Min. M_z	1	0.00	-5.88	-2.15
	Min. Torsion	4	-0.28	0.29	-655.08
Guy C @ 184 ft Elev 0 ft Azimuth 240 deg	Max. Vert	4	-6407.89	-7174.73	3487.71
	Max. H_x	11	-6407.89	-7174.73	3487.71
	Max. H_z	7	-25325.85	-29615.21	16250.71
	Min. Vert	7	-25325.85	-29615.21	16250.71
	Min. H_x	7	-25325.85	-29615.21	16250.71
	Min. H_z	4	-6407.89	-7174.73	3487.71
Guy B @ 184 ft Elev 0 ft Azimuth 120 deg	Max. Vert	3	-3520.51	3464.96	2296.56
	Max. H_x	6	-20759.63	23025.76	15114.15
	Max. H_z	6	-20759.63	23025.76	15114.15
	Min. Vert	6	-20759.63	23025.76	15114.15
	Min. H_x	3	-3520.51	3464.96	2296.56
	Min. H_z	3	-3520.51	3464.96	2296.56
Guy A @ 184 ft Elev 0 ft Azimuth 0 deg	Max. Vert	2	-967.66	-0.92	-1059.12
	Max. H_x	8	-29647.84	10.13	-38959.75
	Max. H_z	2	-967.66	-0.92	-1059.12
	Min. Vert	8	-29647.84	10.13	-38959.75
	Min. H_x	7	-15960.33	-1970.49	-20542.34
	Min. H_z	8	-29647.84	10.13	-38959.75
Guy C @ 161.2 ft Elev 0 ft Azimuth 240 deg	Max. Vert	4	-1303.68	-3190.34	1721.76
	Max. H_x	11	-1303.68	-3190.34	1721.76
	Max. H_z	7	-5324.54	-12700.00	7212.94
	Min. Vert	7	-5324.54	-12700.00	7212.94
	Min. H_x	7	-5324.54	-12700.00	7212.94

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
	Min. H_z	4	-1303.68	-3190.34	1721.76
Guy B @ 154.8 ft Elev 0 ft Azimuth 120 deg	Max. Vert	3	-611.41	1464.47	889.98
	Max. H_x	6	-4594.05	10383.97	6281.05
	Max. H_z	6	-4594.05	10383.97	6281.05
	Min. Vert	6	-4594.05	10383.97	6281.05
	Min. H_x	3	-611.41	1464.47	889.98
	Min. H_z	3	-611.41	1464.47	889.98
Guy A @ 150 ft Elev 0 ft Azimuth 0 deg	Max. Vert	6	-439.63	-0.04	-1333.55
	Max. H_x	8	-6097.04	0.83	-15411.70
	Max. H_z	2	-463.51	-0.05	-1307.94
	Min. Vert	8	-6097.04	0.83	-15411.70
	Min. H_x	7	-3235.02	-304.60	-8282.56
	Min. H_z	8	-6097.04	0.83	-15411.70

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	52642.72	5.88	2.15	0.00	0.00	0.02
Dead+Wind 0 deg - No Ice+Guy	58003.24	8.30	-726.74	0.00	0.00	-0.25
Dead+Wind 90 deg - No Ice+Guy	58907.62	655.32	3.52	0.00	0.00	-0.04
Dead+Wind 180 deg - No Ice+Guy	60961.83	-0.29	655.08	0.00	0.00	0.28
Dead+Ice+Temp+Guy	74366.19	14.32	7.04	0.00	0.00	0.02
Dead+Wind 0 deg+Ice+Temp+Guy	88979.96	17.21	-1353.80	0.00	0.00	-0.15
Dead+Wind 90 deg+Ice+Temp+Guy	91816.37	1129.28	60.76	0.00	0.00	-0.13
Dead+Wind 180 deg+Ice+Temp+Guy	95725.74	5.84	1054.54	0.00	0.00	0.20
Dead+Wind 0 deg - Service+Guy	58003.24	8.30	-726.74	0.00	0.00	-0.25
Dead+Wind 90 deg - Service+Guy	58907.62	655.32	3.52	0.00	0.00	-0.04
Dead+Wind 180 deg - Service+Guy	60961.83	-0.29	655.08	0.00	0.00	0.28

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-20751.33	-0.00	0.20	20751.31	-0.38	0.002%
2	-3.89	-20989.56	-26928.11	3.89	20989.51	26926.29	0.005%
3	25190.04	-20751.12	-20.11	-25189.57	20751.11	20.52	0.002%
4	3.89	-20513.10	27380.24	-4.34	20513.08	-27379.19	0.003%
5	0.00	-34629.45	0.00	-0.75	34629.39	0.60	0.003%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
6	-9.07	-35271.37	-40108.56	9.07	35271.34	40107.53	0.002%
7	37906.04	-34628.96	-17.63	-37905.22	34628.94	18.45	0.002%
8	9.07	-33987.54	40028.63	-9.74	33987.53	-40028.26	0.001%
9	-3.89	-20989.56	-26928.11	3.89	20989.51	26926.29	0.005%
10	25190.04	-20751.12	-20.11	-25189.57	20751.11	20.52	0.002%
11	3.89	-20513.10	27380.24	-4.34	20513.08	-27379.19	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	8	0.00000001	0.00004150
2	Yes	14	0.00000001	0.00009876
3	Yes	14	0.00000001	0.00003886
4	Yes	10	0.00000001	0.00008585
5	Yes	6	0.00000001	0.00005254
6	Yes	16	0.00000001	0.00003748
7	Yes	15	0.00000001	0.00003829
8	Yes	11	0.00000001	0.00003963
9	Yes	14	0.00000001	0.00009876
10	Yes	14	0.00000001	0.00003886
11	Yes	10	0.00000001	0.00008585

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	5.422	11	0.1553	0.3013
T2	160 - 140	4.848	11	0.1131	0.2543
T3	140 - 120	4.328	11	0.1155	0.1409
T4	120 - 100	3.999	10	0.0555	0.1243
T5	100 - 80	3.877	10	0.1328	0.1298
T6	80 - 60	3.134	9	0.2459	0.1402
T7	60 - 40	2.087	9	0.2235	0.1475
T8	40 - 20	1.410	9	0.1491	0.1490
T9	20 - 5	0.798	9	0.1718	0.1323
T10	5 - 0	0.211	9	0.1965	0.1199

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Folded Dipole	11	5.422	0.1553	0.3013	87659
178.00	4-ft Side Arm	11	5.364	0.1492	0.3006	87659
175.00	8.5 Dishw/radome	11	5.277	0.1404	0.2991	87659
167.65	Guy	11	5.066	0.1221	0.2880	35500

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
159.00	AIR21	11	4.820	0.1130	0.2476	23600
147.00	3"x20-ft Omni	11	4.495	0.1203	0.1432	30903
143.00	1.5"x2'omni	11	4.396	0.1196	0.1424	24627
142.00	2-ft Stand Off	11	4.373	0.1186	0.1420	23649
141.00	1.5"x2'omni	11	4.350	0.1173	0.1415	22958
137.00	3-ft Side Arm	11	4.264	0.1077	0.1385	23200
132.00	2.5" Dia. x12' Omni	11	4.168	0.0896	0.1331	27092
127.65	Guy	11	4.094	0.0729	0.1287	31876
126.00	APXVSPP18-C-A20 w/ Mount	11	4.068	0.0674	0.1274	32996
88.00	GPS	9	3.492	0.2077	0.1325	7898
77.00	AM-X-CD-14-65-00TT-RET	9	2.980	0.2545	0.1422	15553
73.00	(2) RRUS-11	9	2.763	0.2578	0.1442	61414
72.00	DC6-48-60-18-8F Surge Arrestor	9	2.708	0.2573	0.1446	78552
60.61	Guy	9	2.115	0.2261	0.1474	7452

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	8.409	8	0.1883	0.3759
T2	160 - 140	7.710	8	0.1697	0.3307
T3	140 - 120	6.991	8	0.1705	0.1835
T4	120 - 100	6.428	8	0.1022	0.1411
T5	100 - 80	5.922	7	0.2204	0.1318
T6	80 - 60	4.794	7	0.3706	0.1402
T7	60 - 40	3.434	6	0.3166	0.1475
T8	40 - 20	2.510	6	0.2262	0.1490
T9	20 - 5	1.470	6	0.3073	0.1323
T10	5 - 0	0.393	6	0.3637	0.1199

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Folded Dipole	8	8.409	0.1883	0.3759	71117
178.00	4-ft Side Arm	8	8.341	0.1812	0.3758	71117
175.00	8.5 Dishw/radome	8	8.238	0.1718	0.3752	71117
167.65	Guy	8	7.983	0.1763	0.3652	28801
159.00	AIR21	8	7.673	0.1676	0.3236	19225
147.00	3"x20-ft Omni	8	7.233	0.1698	0.2115	30903
143.00	1.5"x2'omni	8	7.092	0.1731	0.1901	24627
142.00	2-ft Stand Off	8	7.058	0.1728	0.1880	23649
141.00	1.5"x2'omni	8	7.024	0.1720	0.1858	22958
137.00	3-ft Side Arm	8	6.895	0.1625	0.1764	22962
132.00	2.5" Dia. x12' Omni	8	6.745	0.1414	0.1639	26557
127.65	Guy	8	6.624	0.1215	0.1532	30939
126.00	APXVSPP18-C-A20 w/ Mount	8	6.580	0.1148	0.1493	30705
88.00	GPS	7	5.352	0.3283	0.1325	5371
77.00	AM-X-CD-14-65-00TT-RET	6	4.593	0.3750	0.1422	9950
73.00	(2) RRUS-11	6	4.315	0.3713	0.1442	29842

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
72.00	DC6-48-60-18-8F Surge Arrestor	6	4.244	0.3689	0.1446	31329
60.61	Guy	6	3.471	0.3202	0.1474	4931

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.7500	4	60.08	19438.60	0.003 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	2366.00	4123.34	0.574 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	145.00	4123.34	0.035 ✓	1.333	Bolt Shear
T2	160	Leg	A325N	0.7500	4	0.00	19431.20	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	2236.31	3197.25	0.699 ✓	1.333	Member Bearing
		Top Girt	A325N	0.5000	1	805.55	4036.80	0.200 ✓	1.333	Member Bearing
T3	140	Leg	A325N	0.7500	4	0.00	19432.70	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	2839.64	4123.34	0.689 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	652.73	4123.34	0.158 ✓	1.333	Bolt Shear
T4	120	Leg	A325N	0.7500	4	0.00	19428.30	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	3061.47	6442.72	0.475 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	1	1064.93	6442.72	0.165 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	1	1413.48	6442.72	0.219 ✓	1.333	Bolt Shear
T5	100	Leg	A325N	0.7500	4	0.00	19438.10	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	2046.73	4123.34	0.496 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	1	815.39	6442.72	0.127 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	333.55	2943.50	0.113 ✓	1.333	Member Bearing
T6	80	Leg	A325N	0.7500	4	0.00	19432.40	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	5202.09	6442.72	0.807 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	1	927.96	6442.72	0.144 ✓	1.333	Bolt Shear
		Top Guy Pull-Off@60.6146	A325N	0.6250	4	858.90	6442.72	0.133 ✓	1.333	Bolt Shear
T7	60	Leg	A325N	0.7500	4	0.00	19420.20	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	3511.97	6442.72	0.545 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	1993.63	2943.50	0.677 ✓	1.333	Member Bearing
T8	40	Leg	A325N	0.7500	4	0.00	19434.00	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	1617.84	3197.25	0.506 ✓	1.333	Member Bearing
		Top Girt	A325N	0.5000	1	771.32	2943.50	0.262 ✓	1.333	Member Bearing
T9	20	Leg	A325N	0.7500	4	0.00	19438.50	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	1569.82	6442.72	0.244 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	1	169.11	6442.72	0.026 ✓	1.333	Bolt Shear
T10	5	Leg	A325N	0.7500	4	0.00	19438.20	0.000 ✓	1.333	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T lb	Allowable T_a lb	Required S.F.	Actual S.F.
T1	167.65 (A) (403)	9/16 EHS	3500.00	35000.04	12256.60	17500.00	2.000	2.856 ✓
	167.65 (A) (404)	9/16 EHS	3500.00	35000.04	12537.40	17500.00	2.000	2.792 ✓
	167.65 (B) (397)	9/16 EHS	3500.00	35000.04	8790.52	17500.00	2.000	3.982 ✓
	167.65 (B) (398)	9/16 EHS	3500.00	35000.04	8734.75	17500.00	2.000	4.007 ✓
	167.65 (C) (391)	9/16 EHS	3500.00	35000.04	10328.30	17500.00	2.000	3.389 ✓
	167.65 (C) (392)	9/16 EHS	3500.00	35000.04	10100.30	17500.00	2.000	3.465 ✓
T3	127.65 (A) (421)	9/16 EHS	3500.00	35000.04	12390.50	17500.00	2.000	2.825 ✓
	127.65 (A) (422)	9/16 EHS	3500.00	35000.04	12647.30	17500.00	2.000	2.767 ✓
	127.65 (B) (415)	9/16 EHS	3500.00	35000.04	8897.28	17500.00	2.000	3.934 ✓
	127.65 (B) (416)	9/16 EHS	3500.00	35000.04	8912.65	17500.00	2.000	3.927 ✓
	127.65 (C) (409)	9/16 EHS	3500.00	35000.04	11329.00	17500.00	2.000	3.089 ✓
	127.65 (C) (410)	9/16 EHS	3500.00	35000.04	11319.40	17500.00	2.000	3.092 ✓
T6	60.61 (A) (432)	3/4 EHS	5830.00	58299.91	16689.80	29150.00	2.000	3.493 ✓
	60.61 (B) (431)	3/4 EHS	5830.00	58299.91	13091.50	29150.00	2.000	4.453 ✓
	60.61 (C) (427)	3/4 EHS	5830.00	58299.91	15661.40	29150.00	2.000	3.723 ✓

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	Mast Stability Index	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	180 - 160	P2.5x.203	20.00	2.35	29.7 K=1.00	1.00	27.188	1.7040	-16560.30	46328.80	0.357 ✓
T2	160 - 140	P2.5x.203	20.00	2.35	59.4 K=2.00	1.00	22.813	1.7040	-18425.20	38874.80	0.474

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	Mast Stability Index	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T3	140 - 120	P2.5x.203	20.00	2.35	29.7 K=1.00	1.00	27.188	1.7040	-29063.50	46328.80	0.627 ✓
T4	120 - 100	P2.5x.203	20.00	2.35	29.7 K=1.00	0.95	25.885	1.7040	-38086.00	44109.50	0.863 ✓
T5	100 - 80	P2.5x.203	20.00	2.35	29.7 K=1.00	0.95	25.885	1.7040	-38086.00	44109.50	0.863 ✓
T6	80 - 60	P2.5x.203	20.00	2.35	59.4 K=2.00	1.00	22.813	1.7040	-43655.00	38874.80	1.123 ✓
T7	60 - 40	P2.5x.203	20.00	2.35	59.4 K=2.00	1.00	22.813	1.7040	-43654.30	38874.80	1.123 ✓
T8	40 - 20	P2.5x.203	20.00	2.35	59.4 K=2.00	1.00	22.813	1.7040	-37112.50	38874.80	0.955 ✓
T9	20 - 5	P2.5x.203	15.00	2.30	58.1 K=2.00	1.00	23.032	1.7040	-37127.60	39248.30	0.946 ✓
T10	5 - 0	P2.5x.203	5.37	2.69	68.1 K=2.00	1.00	21.294	1.7040	-36915.90	36285.90	1.017 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	L1 3/4x1 3/4x3/16	4.14	1.81	77.4 K=1.22	15.640	0.6211	-1882.31	9713.78	0.194 ✓
T2	160 - 140	ROHN TS1.5x16 ga	4.14	3.85	90.5 K=1.00	13.897	0.2627	-2334.56	3651.52	0.639 ✓
T3	140 - 120	L2x2x3/16	4.14	1.81	71.3 K=1.29	16.291	0.7150	-2839.64	11648.20	0.244 ✓
T4	120 - 100	L2 1/2x2 1/2x1/2	4.14	3.58	104.1 K=1.18	12.455	2.2500	-3061.47	28023.90	0.109 ✓
T5	100 - 80	ROHN TS1.5x11 ga	4.14	3.85	94.3 K=1.00	13.463	0.5202	-2046.73	7003.98	0.292 ✓
T6	80 - 60	L2 1/2x2 1/2x1/2	4.14	3.58	104.1 K=1.18	12.455	2.2500	-5109.41	28023.90	0.182 ✓
T7	60 - 40	L2 1/2x2 1/2x1/2	4.14	3.58	104.1 K=1.18	12.455	2.2500	-3245.98	28023.90	0.116 ✓
T8	40 - 20	ROHN TS1.5x16 ga	4.14	3.85	90.5 K=1.00	13.897	0.2627	-1639.71	3651.52	0.449 ✓
T9	20 - 5	L2 1/2x2 1/2x1/2	4.11	3.55	103.7 K=1.19	12.498	2.2500	-1569.82	28120.20	0.056 ✓
T10	5 - 0	L2 1/2x2 1/2x1/2	3.61	3.28	100.4 K=1.24	12.929	2.2500	-550.21	29089.80	0.019 ✓

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T4	120 - 100	L2 1/2x2 1/2x1/2	3.41	2.90	95.7 K=1.34	15.680	2.2500	-659.67	35280.90	0.019 ✔
T5	100 - 80	L2 1/2x2 1/2x1/2	3.41	2.90	95.7 K=1.34	15.680	2.2500	-659.82	35280.90	0.019 ✔

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	L1 3/4x1 3/4x3/16	3.41	2.94	111.4 K=1.08	11.485	0.6211	-145.00	7133.13	0.020 ✔
T2	160 - 140	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.949	0.2627	-805.55	4190.65	0.192 ✔
T3	140 - 120	L2x2x3/16	3.41	2.94	104.8 K=1.17	12.362	0.7150	-203.07	8839.01	0.023 ✔
T4	120 - 100	L2 1/2x2 1/2x1/2	3.41	2.90	95.7 K=1.34	13.512	2.2500	-1077.84	30401.80	0.035 ✔
T5	100 - 80	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.949	0.2627	-26.95	4190.65	0.006 ✔
T6	80 - 60	L2 1/2x2 1/2x1/2	3.41	2.90	95.7 K=1.34	13.512	2.2500	-779.72	30401.80	0.026 ✔
T7	60 - 40	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.949	0.2627	-1705.47	4190.65	0.407 ✔
T8	40 - 20	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.949	0.2627	-730.64	4190.65	0.174 ✔
T9	20 - 5	L2 1/2x2 1/2x1/2	3.41	2.90	95.7 K=1.34	13.512	2.2500	-128.35	30401.80	0.004 ✔

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	L1 3/4x1 3/4x3/16	3.41	3.17	115.4 K=1.04	10.934	0.6211	-456.95	6791.15	0.067 ✔
T2	160 - 140	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.615	0.2627	-1119.54	4102.70	0.273 ✔
T3	140 - 120	L2x2x3/16	3.41	3.17	108.3 K=1.12	11.902	0.7150	-246.66	8510.09	0.029 ✔
T4	120 - 100	L2 1/2x2 1/2x1/2	3.41	3.17	99.1 K=1.27	13.096	2.2500	-13.18	29466.80	0.000 ✔
T5	100 - 80	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.615	0.2627	-485.21	4102.70	0.118 ✔
T7	60 - 40	ROHN TS1.5x16 ga	3.41	3.17	74.6	15.615	0.2627	-753.36	4102.70	0.184

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
					K=1.00					✔
T8	40 - 20	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.615	0.2627	-46.31	4102.70	0.011 ✔
T9	20 - 5	L2 1/2x2 1/2x1/2	3.41	3.17	99.1 K=1.27	13.096	2.2500	-429.48	29466.80	0.015 ✔

Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160 (395)	XP34.5x.03325	4.36	4.21	4.1 K=1.00	14.638	3.6003	-14110.70	52701.60	0.268 ✔
T1	180 - 160 (396)	d/t > 13000/Fy - 395 XP34.5x.03325	4.36	4.21	4.1 K=1.00	14.638	3.6003	-18289.80	52701.60	0.347 ✔
T1	180 - 160 (401)	d/t > 13000/Fy - 396 XP34.5x.03325	4.36	4.21	4.1 K=1.00	14.638	3.6003	-11493.60	52701.60	0.218 ✔
T1	180 - 160 (402)	d/t > 13000/Fy - 401 XP34.5x.03325	4.36	4.21	4.1 K=1.00	14.638	3.6003	-15368.60	52701.60	0.292 ✔
T1	180 - 160 (407)	d/t > 13000/Fy - 402 XP34.5x.03325	4.36	4.21	4.1 K=1.00	14.638	3.6003	-13362.50	52701.60	0.254 ✔
T1	180 - 160 (408)	d/t > 13000/Fy - 407 XP34.5x.03325	4.36	4.21	4.1 K=1.00	14.638	3.6003	-18152.30	52701.60	0.344 ✔
T3	140 - 120 (413)	d/t > 13000/Fy - 408 XP34.5x.03325	4.36	4.21	4.1 K=1.00	14.638	3.6003	-14363.70	52701.60	0.273 ✔
T3	140 - 120 (414)	d/t > 13000/Fy - 413 XP34.5x.03325	4.36	4.21	4.1 K=1.00	14.638	3.6003	-17124.00	52701.60	0.325 ✔
T3	140 - 120 (419)	d/t > 13000/Fy - 414 XP34.5x.03325	4.36	4.21	4.1 K=1.00	14.638	3.6003	-9791.25	52701.60	0.186 ✔
T3	140 - 120 (420)	d/t > 13000/Fy - 419 XP34.5x.03325	4.36	4.21	4.1 K=1.00	14.638	3.6003	-16422.80	52701.60	0.312 ✔
T3	140 - 120 (425)	d/t > 13000/Fy - 420 XP34.5x.03325	4.36	4.21	4.1 K=1.00	14.638	3.6003	-13422.30	52701.60	0.255 ✔
T3	140 - 120 (426)	d/t > 13000/Fy - 425 XP34.5x.03325 d/t > 13000/Fy - 426	4.36	4.21	4.1 K=1.00	14.638	3.6003	-17158.50	52701.60	0.326 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	P2.5x.203	20.00	2.35	29.7	30.000	1.7040	11334.20	51121.50	0.222 ✔
T3	140 - 120	P2.5x.203	20.00	2.35	29.7	30.000	1.7040	2803.71	51121.50	0.055 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	L1 3/4x1 3/4x3/16	4.14	1.81	43.0	29.000	0.3779	2366.00	10960.00	0.216 ✔
T2	160 - 140	ROHN TS1.5x16 ga	4.14	3.85	90.5	21.000	0.2627	2236.31	5517.75	0.405 ✔
T3	140 - 120	L2x2x3/16	4.14	1.81	37.4	29.000	0.4484	2804.02	13002.40	0.216 ✔
T4	120 - 100	L2 1/2x2 1/2x1/2	4.14	3.58	62.5	29.000	1.4063	2533.57	40781.30	0.062 ✔
T5	100 - 80	ROHN TS1.5x11 ga	4.14	3.85	94.3	21.000	0.5202	1759.95	10925.20	0.161 ✔
T6	80 - 60	L2 1/2x2 1/2x1/2	4.14	3.58	62.5	29.000	1.4063	5202.09	40781.30	0.128 ✔
T7	60 - 40	L2 1/2x2 1/2x1/2	4.14	3.58	62.5	29.000	1.4063	3511.97	40781.30	0.086 ✔
T8	40 - 20	ROHN TS1.5x16 ga	4.14	3.85	90.5	21.000	0.2627	1617.84	5517.75	0.293 ✔
T9	20 - 5	L2 1/2x2 1/2x1/2	4.11	3.55	62.1	29.000	1.4063	1015.95	40781.30	0.025 ✔

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T4	120 - 100	L2 1/2x2 1/2x1/2	3.41	2.90	51.5	32.500	1.4063	1064.93	45703.10	0.023 ✔
T5	100 - 80	L2 1/2x2 1/2x1/2	3.41	2.90	51.5	32.500	1.4063	815.39	45703.10	0.018 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	L1 3/4x1 3/4x3/16	3.41	2.94	70.9	29.000	0.3779	66.98	10960.00	0.006 ✔
T2	160 - 140	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.600	0.2627	512.96	5675.41	0.090 ✔
T3	140 - 120	L2x2x3/16	3.41	2.94	61.7	29.000	0.4484	652.73	13002.40	0.050 ✔
T4	120 - 100	L2 1/2x2 1/2x1/2	3.41	2.90	51.5	29.000	1.4063	1413.48	40781.30	0.035 ✔
T5	100 - 80	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.600	0.2627	333.55	5675.41	0.059 ✔
T6	80 - 60	L2 1/2x2 1/2x1/2	3.41	2.90	51.5	29.000	1.4063	927.96	40781.30	0.023 ✔
T7	60 - 40	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.600	0.2627	1993.63	5675.41	0.351 ✔
T8	40 - 20	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.600	0.2627	771.32	5675.41	0.136 ✔
T9	20 - 5	L2 1/2x2 1/2x1/2	3.41	2.90	51.5	29.000	1.4063	169.11	40781.30	0.004 ✔
T10	5 - 0	L2 1/2x2 1/2x1/2	3.41	3.17	51.5	21.600	2.2500	7653.47	48600.00	0.157 ✔

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	L1 3/4x1 3/4x3/16	3.41	3.17	70.9	21.600	0.6211	394.33	13415.60	0.029 ✔
T2	160 - 140	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.000	0.2627	1153.25	5517.75	0.209 ✔
T3	140 - 120	L2x2x3/16	3.41	3.17	61.7	21.600	0.7150	892.19	15444.00	0.058 ✔
T4	120 - 100	L2 1/2x2 1/2x1/2	3.41	3.17	51.5	21.600	2.2500	514.06	48600.00	0.011 ✔
T5	100 - 80	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.000	0.2627	801.29	5517.75	0.145 ✔
T6	80 - 60	L2 1/2x2 1/2x1/2	3.41	3.17	51.5	21.600	2.2500	4580.79	48600.00	0.094 ✔
T7	60 - 40	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.000	0.2627	964.37	5517.75	0.175 ✔
T8	40 - 20	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.000	0.2627	163.03	5517.75	0.030 ✔
T9	20 - 5	L2 1/2x2 1/2x1/2	3.41	3.17	51.5	21.600	2.2500	1202.16	48600.00	0.025 ✔

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T6	80 - 60	4 1/2x3/8	3.41	3.17	351.4	21.600	1.6875	3435.60	36450.00	0.094 ✔

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160 (393)	P4x.237	3.67	3.55	28.2	21.000	3.1741	12500.10	66655.00	0.188 ✔
T1	180 - 160 (394)	P4x.237	3.67	3.55	28.2	21.000	3.1741	13686.90	66655.00	0.205 ✔
T1	180 - 160 (399)	P4x.237	3.67	3.55	28.2	21.000	3.1741	12430.00	66655.00	0.186 ✔
T1	180 - 160 (400)	P4x.237	3.67	3.55	28.2	21.000	3.1741	12765.70	66655.00	0.192 ✔
T1	180 - 160 (405)	P4x.237	3.67	3.55	28.2	21.000	3.1741	11366.30	66655.00	0.171 ✔
T1	180 - 160 (406)	P4x.237	3.67	3.55	28.2	21.000	3.1741	13879.50	66655.00	0.208 ✔
T3	140 - 120 (411)	P4x.237	3.67	3.55	28.2	21.000	3.1741	12137.10	66655.00	0.182 ✔
T3	140 - 120 (412)	P4x.237	3.67	3.55	28.2	21.000	3.1741	11841.00	66655.00	0.178 ✔
T3	140 - 120 (417)	P4x.237	3.67	3.55	28.2	21.000	3.1741	11575.40	66655.00	0.174 ✔
T3	140 - 120 (418)	P4x.237	3.67	3.55	28.2	21.000	3.1741	12133.10	66655.00	0.182 ✔
T3	140 - 120 (423)	P4x.237	3.67	3.55	28.2	21.000	3.1741	10631.20	66655.00	0.159 ✔
T3	140 - 120 (424)	P4x.237	3.67	3.55	28.2	21.000	3.1741	12015.30	66655.00	0.180 ✔

Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160 (396)	XP34.5x.03325	4.36	4.21	4.1	21.000	3.6003	725.57	75606.90	0.010 ✔
T1	180 - 160 (408)	d/t > 13000/Fy - 396 XP34.5x.03325	4.36	4.21	4.1	21.000	3.6003	665.88	75606.90	0.009 ✔
T3	140 - 120 (414)	d/t > 13000/Fy - 408 XP34.5x.03325	4.36	4.21	4.1	21.000	3.6003	2680.64	75606.90	0.035

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
										✔
T3	140 - 120 (419)	d/t > 13000/Fy - 414 XP34.5x.03325	4.36	4.21	4.1	21.000	3.6003	1724.47	75606.90	0.023
										✔
T3	140 - 120 (425)	d/t > 13000/Fy - 419 XP34.5x.03325	4.36	4.21	4.1	21.000	3.6003	98.70	75606.90	0.001
										✔
T3	140 - 120 (426)	d/t > 13000/Fy - 425 XP34.5x.03325	4.36	4.21	4.1	21.000	3.6003	2775.17	75606.90	0.037
										✔
		d/t > 13000/Fy - 426								

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	180 - 160	Leg	P2.5x.203	1	-16560.30	61756.29	26.8	Pass
T2	160 - 140	Leg	P2.5x.203	58	-18425.20	51820.11	35.6	Pass
T3	140 - 120	Leg	P2.5x.203	91	-29063.50	61756.29	47.1	Pass
T4	120 - 100	Leg	P2.5x.203	148	-38086.00	58797.96	64.8	Pass
T5	100 - 80	Leg	P2.5x.203	202	-38086.00	58797.96	64.8	Pass
T6	80 - 60	Leg	P2.5x.203	257	-43655.00	51820.11	84.2	Pass
T7	60 - 40	Leg	P2.5x.203	290	-43654.30	51820.11	84.2	Pass
T8	40 - 20	Leg	P2.5x.203	324	-37112.50	51820.11	71.6	Pass
T9	20 - 5	Leg	P2.5x.203	357	-37127.60	52317.98	71.0	Pass
T10	5 - 0	Leg	P2.5x.203	384	-36915.90	48369.10	76.3	Pass
T1	180 - 160	Diagonal	L1 3/4x1 3/4x3/16	23	2366.00	14609.68	16.2 43.0 (b)	Pass
T2	160 - 140	Diagonal	ROHN TS1.5x16 ga	69	-2334.56	4867.48	48.0 52.5 (b)	Pass
T3	140 - 120	Diagonal	L2x2x3/16	112	-2839.64	15527.05	18.3 51.7 (b)	Pass
T4	120 - 100	Diagonal	L2 1/2x2 1/2x1/2	200	-3061.47	37355.86	8.2 35.6 (b)	Pass
T5	100 - 80	Diagonal	ROHN TS1.5x11 ga	212	-2046.73	9336.30	21.9 37.2 (b)	Pass
T6	80 - 60	Diagonal	L2 1/2x2 1/2x1/2	268	-5109.41	37355.86	13.7 60.6 (b)	Pass
T7	60 - 40	Diagonal	L2 1/2x2 1/2x1/2	321	-3245.98	37355.86	8.7 40.9 (b)	Pass
T8	40 - 20	Diagonal	ROHN TS1.5x16 ga	353	-1639.71	4867.48	33.7 38.0 (b)	Pass
T9	20 - 5	Diagonal	L2 1/2x2 1/2x1/2	366	-1569.82	37484.22	4.2 18.3 (b)	Pass
T10	5 - 0	Diagonal	L2 1/2x2 1/2x1/2	390	-550.21	38776.70	1.4	Pass
T4	120 - 100	Horizontal	L2 1/2x2 1/2x1/2	197	1064.93	60922.23	1.7 12.4 (b)	Pass
T5	100 - 80	Horizontal	L2 1/2x2 1/2x1/2	216	-659.82	47029.44	1.4 9.5 (b)	Pass
T1	180 - 160	Top Girt	L1 3/4x1 3/4x3/16	4	-145.00	9508.46	1.5 2.6 (b)	Pass
T2	160 - 140	Top Girt	ROHN TS1.5x16 ga	61	-805.55	5586.14	14.4 15.0 (b)	Pass
T3	140 - 120	Top Girt	L2x2x3/16	94	652.73	17332.20	3.8 11.9 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T4	120 - 100	Top Girt	L2 1/2x2 1/2x1/2	153	-1077.84	40525.60	2.7 16.5 (b)	Pass
T5	100 - 80	Top Girt	ROHN TS1.5x16 ga	206	333.55	7565.32	4.4 8.5 (b)	Pass
T6	80 - 60	Top Girt	L2 1/2x2 1/2x1/2	260	-779.72	40525.60	1.9 10.8 (b)	Pass
T7	60 - 40	Top Girt	ROHN TS1.5x16 ga	294	-1705.47	5586.14	30.5 50.8 (b)	Pass
T8	40 - 20	Top Girt	ROHN TS1.5x16 ga	325	-730.64	5586.14	13.1 19.7 (b)	Pass
T9	20 - 5	Top Girt	L2 1/2x2 1/2x1/2	360	-128.35	40525.60	0.3 2.0 (b)	Pass
T10	5 - 0	Top Girt	L2 1/2x2 1/2x1/2	387	7653.47	64783.80	11.8	Pass
T1	180 - 160	Bottom Girt	L1 3/4x1 3/4x3/16	8	-456.95	9052.60	5.0	Pass
T2	160 - 140	Bottom Girt	ROHN TS1.5x16 ga	66	-1119.54	5468.90	20.5	Pass
T3	140 - 120	Bottom Girt	L2x2x3/16	97	892.19	20586.85	4.3	Pass
T4	120 - 100	Bottom Girt	L2 1/2x2 1/2x1/2	154	514.06	64783.80	0.8	Pass
T5	100 - 80	Bottom Girt	ROHN TS1.5x16 ga	209	801.29	7355.16	10.9	Pass
T6	80 - 60	Bottom Girt	L2 1/2x2 1/2x1/2	264	4580.79	64783.80	7.1	Pass
T7	60 - 40	Bottom Girt	ROHN TS1.5x16 ga	297	-753.36	5468.90	13.8	Pass
T8	40 - 20	Bottom Girt	ROHN TS1.5x16 ga	330	163.03	7355.16	2.2	Pass
T9	20 - 5	Bottom Girt	L2 1/2x2 1/2x1/2	363	1202.16	64783.80	1.9	Pass
T1	180 - 160	Guy A@167.654	9/16	404	12537.40	17500.00	71.6	Pass
T3	140 - 120	Guy A@127.654	9/16	422	12647.30	17500.00	72.3	Pass
T6	80 - 60	Guy A@60.6146	3/4	432	16689.80	29150.00	57.3	Pass
T1	180 - 160	Guy B@167.654	9/16	397	8790.52	17500.00	50.2	Pass
T3	140 - 120	Guy B@127.654	9/16	416	8912.65	17500.00	50.9	Pass
T6	80 - 60	Guy B@60.6146	3/4	431	13091.50	29150.00	44.9	Pass
T1	180 - 160	Guy C@167.654	9/16	391	10328.30	17500.00	59.0	Pass
T3	140 - 120	Guy C@127.654	9/16	409	11329.00	17500.00	64.7	Pass
T6	80 - 60	Guy C@60.6146	3/4	427	15661.40	29150.00	53.7	Pass
T6	80 - 60	Top Guy Pull-Off@60.6146	4 1/2x3/8	430	3435.60	48587.85	7.1 10.0 (b)	Pass
T1	180 - 160	Torque Arm Top@167.654	P4x.237	406	13879.50	88851.11	15.6	Pass
T3	140 - 120	Torque Arm Top@127.654	P4x.237	411	12137.10	88851.11	13.7	Pass
T1	180 - 160	Torque Arm Bottom@167.654	XP34.5x.03325	396	-18289.80	70251.23	26.0	Pass
T3	140 - 120	Torque Arm Bottom@127.654	XP34.5x.03325	426	-17158.50	70251.23	24.4	Pass

	Summary	
Leg (T6)	84.2	Pass
Diagonal (T6)	60.6	Pass
Horizontal (T4)	12.4	Pass
Top Girt (T7)	50.8	Pass
Bottom Girt (T2)	20.5	Pass
Guy A (T3)	72.3	Pass
Guy B (T3)	50.9	Pass
Guy C (T3)	64.7	Pass
Top Guy Pull-Off (T6)	10.0	Pass
Torque Arm Top (T1)	15.6	Pass
Torque Arm Bottom (T1)	26.0	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
						Bolt Checks	60.6	Pass
						RATING =	**84.2**	**Pass**

Element Map

Section No.	Section Elevation ft	Component Type	Element List
T1	180.00-160.00	Leg	1-3
		Diagonal	10-57
		Top Girt	4-6
		Bottom Girt	7-9
		Guy A	403-404
		Guy B	397-398
		Guy C	391-392
		Torque Arm Top	393-394,399-400,405-406
		Torque Arm Bottom	395-396,401-402,407-408
T2	160.00-140.00	Leg	58-60
		Diagonal	67-90
		Top Girt	61-63
		Bottom Girt	64-66
T3	140.00-120.00	Leg	91-93
		Diagonal	100-147
		Top Girt	94-96
		Bottom Girt	97-99
		Guy A	421-422
		Guy B	415-416
		Guy C	409-410
		Torque Arm Top	411-412,417-418,423-424
		Torque Arm Bottom	413-414,419-420,425-426
T4	120.00-100.00	Leg	148-150
		Diagonal	157-159,163-165,169-171,175-177,181-183,187-189,193-195,199-201
		Horizontal	160-162,166-168,172-174,178-180,184-186,190-192,196-198
		Top Girt	151-153
		Bottom Girt	154-156
T5	100.00-80.00	Leg	202-204
		Diagonal	211-213,217-219,223-225,229-231,235-237,241-243,247-249,253-255
		Horizontal	214-216,220-222,226-228,232-234,238-240,244-246,250-252
		Top Girt	205-207
		Bottom Girt	208-210
T6	80.00-60.00	Leg	256-258
		Diagonal	265-288
		Top Girt	259-261
		Bottom Girt	262-264
		Guy A	432
		Guy B	431
		Guy C	427
		Top Guy Pull-Off	428-430
T7	60.00-40.00	Leg	289-291
		Diagonal	298-321
		Top Girt	292-294
		Bottom Girt	295-297
T8	40.00-20.00	Leg	322-324
		Diagonal	331-354
		Top Girt	325-327

Section No.	Section Elevation ft	Component Type	Element List
T9	20.00-5.00	Bottom Girt	328-330
		Leg	355-357
		Diagonal	364-381
		Top Girt	358-360
T10	5.00-0.00	Bottom Girt	361-363
		Leg	382-384
		Diagonal	388-390
		Top Girt	385-387
			Total number of elements: 432

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				Page	of
Job :	T-Mobile/NU - 180-ft ROHN Guyed Lattice Tower	Project No.	14025.001	Sheet	1 of 2
Address:	135 New Rd., Madison, CT	Computed by	TJL	Date	3/3/14
Description:	Guy Anchor Evaluation - 2005 CSBC 3108.4.2/TIA Req	Checked by	CFC	Date	

CHECK UPLIFT RESISTANCE

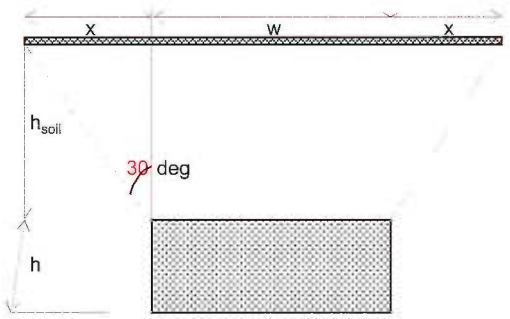
ANCHOR (A) AT 150.0ft RADIUS

RESULTS FROM COMPUTER ANALYSIS:

Uplift =	6.1	kips
Sliding =	15.4	kips

CONCRETE PARAMETERS:

γ_{conc} =	150	pcf
w =	4.6	ft
h =	2.3	ft
d =	6.3	ft
Vol. =	*66.65*	ft^3
Wc =	*10.00*	kips



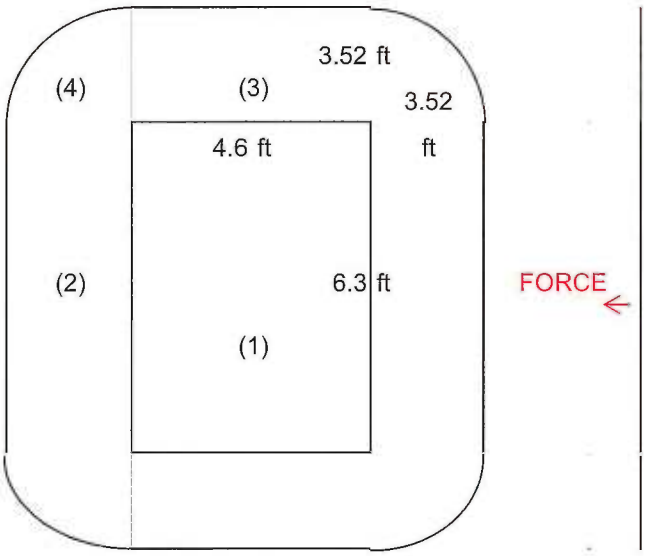
Foundation Section

SOIL PARAMETERS:

γ_{soil} =	110	pcf
h_{soil} =	6.1	ft
x =	*3.52*	ft

Soil Weight (Wr):

(1) =	19.45	kips
(2) =	14.89	kips
(3) =	10.87	kips
(4) =	8.72	kips
*(5) Anchor Reinf. =	0	kips
Total =	53.92	kips



Foundation Plan View

CHECK UPLIFT (PER EIA/TIA-222-F STANDARD AND 2005 CT BUILDING CODE):

Wr / 2.0 + Wc /1.5 > UPLIFT				(Wr + Wc) / 2.0 > UPLIFT			
33.63	>	*6.1*	***OK***	*31.96*	>	*6.1*	***OK***

→ ***GUY ANCHORS AGAINST UPLIFT ARE ADEQUATE***

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Job :	T-MobileNU - 180-ft ROHN Guyed Lattice Tower	**Project No.**	14025.001	**Date**	3/3/14
Address:	135 New Rd., Madison, CT	**Computed by**	TJL		
Description:	Guy Anchor Evaluation - TIA Req	**Checked by**	CFC	**Date**	

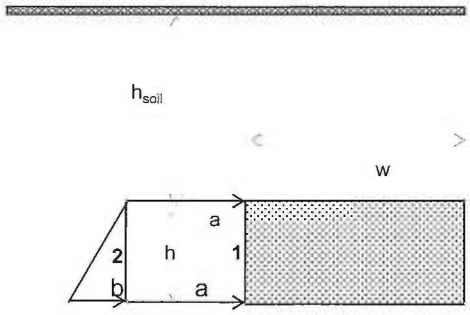
CHECK SLIDING RESISTANCE

SOIL PARAMETERS

γ soil =	110	pcf
h_{soil} =	5	ft
h =	2.3	ft
ϕ =	32	degrees

ANCHOR PARAMETERS

w =	4.6	ft
h =	2.3	ft
d =	6.3	ft



Foundation Elevation View

K_a = 0.31

K_p = 3.25

Δ = 2.95

HORIZONTAL FORCES

1 =	28.89	k
2 =	5.15	k
RESIST TO SLIDING =	34.04	k

SOIL & CONCRETE WEIGHT =	Wr + Wc =	63.92	k
UPLIFT REACTIONS =		-6.1	k
SUM =		57.82	k

COEF. OF FRICTION, (0.45) =	26.02	k
RESIST TO SLIDING =	34.04	k
SUM =	60.05	k

SF AGAINST SLIDING

SF = 3.9 > 2 OK

→ ***GUY ANCHORS AGAINST SLIDING ARE ADEQUATE***

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P: (203) 488-0580
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Job :	T-Mobile/NU - 180-ft ROHN Guyed Lattice Tower	**Project No.**	14025.001	**Date**	3/3/14
Address:	135 New Rd., Madison, CT	**Computed by**	TJL		
Description:	Guy Anchor Evaluation - 2005 CSBC 3108.4.2/TIA Req	**Checked by**	CFC	**Date**	

CHECK UPLIFT RESISTANCE

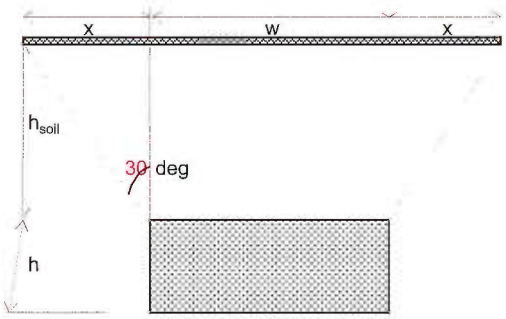
ANCHOR (A) AT 184.0ft RADIUS

RESULTS FROM COMPUTER ANALYSIS:

Uplift =	29.7	kips
Sliding =	39	kips

CONCRETE PARAMETERS:

γ_{conc} =	150	pcf
w =	3	ft
h =	3	ft
d =	9.5	ft
Vol. =	*85.50*	ft^3
Wc =	*12.83*	kips



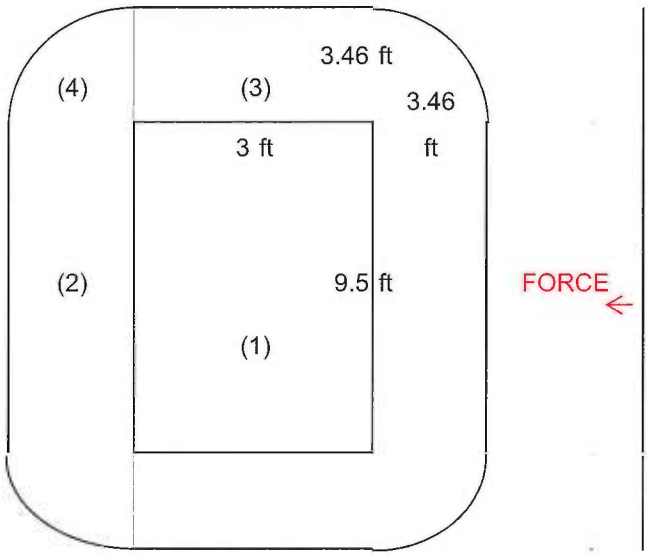
Foundation Section

SOIL PARAMETERS:

γ_{soil} =	110	pcf
h_{soil} =	6	ft
x =	*3.46*	ft

Soil Weight (Wr):

(1) =	18.81	kips
(2) =	21.72	kips
(3) =	6.86	kips
(4) =	8.29	kips
*(5) Anchor Reinf. =	0	kips
Total =	55.68	kips



Foundation Plan View

CHECK UPLIFT (PER EIA/TIA-222-F STANDARD AND 2005 CT BUILDING CODE):

Wr / 2.0 + Wc / 1.5 > UPLIFT				(Wr + Wc) / 2.0 > UPLIFT			
36.39	>	*29.7*	***OK***	*34.25*	>	*29.7*	***OK***

→ ***GUY ANCHORS AGAINST UPLIFT ARE ADEQUATE***

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				Page	of
Job :	T-Mobile/NU - 180-ft ROHN Guyed Lattice Tower	Project No.	14025.001	Sheet	2 of 2
Address:	135 New Rd., Madison, CT	Computed by	TJL	Date	3/3/14
Description:	Guy Anchor Evaluation - TIA Req	Checked by	CFC	Date	

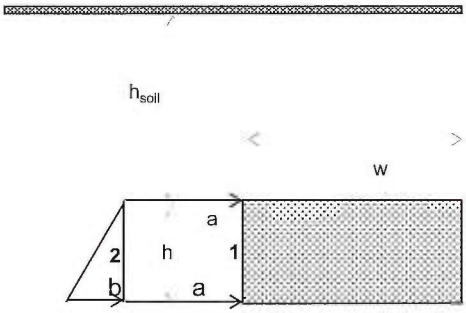
CHECK SLIDING RESISTANCE

SOIL PARAMETERS

γ soil =	110	pcf
h_{soil} =	5	ft
h =	3	ft
ϕ =	32	degrees

ANCHOR PARAMETERS

w =	3.0	ft
h =	3.0	ft
d =	9.5	ft



Foundation Elevation View

K_a = 0.31

K_p = 3.25

Δ = 2.95

HORIZONTAL FORCES

1 =		60.06	k
2 =		8.75	k
RESIST TO SLIDING =		68.81	k
SOIL & CONCRETE WEIGHT =	Wr + Wc =	68.51	k
UPLIFT REACTIONS =		-29.7	k
SUM =		38.81	k
COEF. OF FRICTION, (0.45) =		17.46	k
RESIST TO SLIDING =		68.81	k
SUM =		86.28	k

SF AGAINST SLIDING

SF = 2.2 > 2 OK

→ *GUY ANCHORS AGAINST SLIDING ARE ADEQUATE*

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Subject:	Base Foundation Analysis
Location:	180-ft Guyed Lattice Tower Madison, CT.
Rev. 1: 03/03/14	Prepared by: T.J.L. Checked by: C.F.C. Job No. 14025.001

Guyed Tower Base Foundation:

Input Data:

Tower Data

Shear Force =	Shear := 1.4·kip	(User Input from RISATower)	
Axial Force =	Axial := 95.7·kip	(User Input from RISATower)	
Tower Height =	$H_t := 180.0 \cdot ft$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 7.70 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 5.70 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 1.50 \cdot ft$	(User Input)	
Width of Pier =	$W_p := 2.0 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 2.0 \cdot ft$	(User Input)	
Width of Footing =	$W_{f1} := 4.7 \cdot ft$	(User Input)	
Length of Footing =	$W_{f2} := 5.3 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 3000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 32 \cdot deg$	(User Input)	
Allowable Soil Bearing Capacity =	$q_s := 4500 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 110 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	Bouyancy := 0	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	Z := 2	(User Input)	
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Calculated Factors:

Coefficient of Lateral Soil Pressure =

$$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3.255$$

Load Factor =

$$LF := \begin{cases} 1.333 & \text{if } H_t \le 700 \cdot ft \\ 1.7 & \text{if } H_t \ge 1200 \cdot ft \\ 1.333 + \left(\frac{H_t - 700ft}{1200ft - 700ft} \right) \cdot 0.4 & \text{otherwise} \end{cases} = 1.333$$

Stability of Footing:

Adjusted Concrete Unit Weight =

$\gamma_c := if\left(Bouyancy = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc}\right) = 150 \cdot pcf$

Adjusted Soil Unit Weight =

$\gamma_s := if\left(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}\right) = 110 \cdot pcf$

Passive Pressure =

$P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot ksf$

$P_{pt} := K_p \cdot \gamma_s \cdot \left(D_f - T_f\right) + c \cdot 2 \cdot \sqrt{K_p} = 2.041 \cdot ksf$

$P_{top} := if\left[n < \left(D_f - T_f\right), P_{pt}, P_{pn}\right] = 2.041 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 2.757 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 2.399 \cdot ksf$

$T_p := if\left[n < \left(D_f - T_f\right), T_f, \left(D_f - n\right)\right] = 2$

$A_p := W_{f1} \cdot T_p = 9.4$

Soil Shear Resistance =

$Sl_1 := P_{ave} \cdot A_p = 22.55 \cdot kip$

Weight of Concrete =

$WT_c := \left[\left(W_{f1} \cdot W_{f2} \cdot T_f\right) + W_p{}^2 L_p\right] \cdot \gamma_c = 10.89 \cdot kip$

Total Weight =

$WT_{tot} := WT_c + Axial = 106.59 \cdot kip$

Soil/Concrete Friction Resistance =

$Sl_2 := \mu \cdot WT_{tot} = 47.97 \cdot kips$

Total Sliding Resistance =

$Sl_{tot} := Sl_1 + Sl_2 = 70.51 \cdot kips$

Sliding Resistance Ratio =

$Sliding\_Resistance_{ratio} := \frac{Shear \cdot 2.0}{Sl_{tot}} = 0.04$

$Sliding\_Resistance\_Check := if\left[\left(\frac{Shear \cdot 2.0}{Sl_{tot}} < 1.0\right), "Okay", "No\ Good"\right]$

Sliding_Resistance_Check = "Okay"

Bearing Pressure Caused by Footing:

Area of the Mat =

$A_{mat} := W_{f1} \cdot W_{f2} = 24.91$

Maximum Pressure in Mat =

$P_{max} := \frac{WT_{tot}}{A_{mat}} = 4.28 \cdot ksf$

$Max\_Pressure\_Check := if\left(P_{max} < q_s, "Okay", "No\ Good"\right)$

Max_Pressure_Check = "Okay"

Network Modernization RFDS v3.0

T-Mobile

Site ID	**CT11029I**	**Latitude**	41.29344
		Longitude	-72.57841
Site Name	Madison/ I-95/ X61/ Jct_1	**Site Type**	Structure (Non-Building)
Address	135 New Road, Madison, CONNECTICUT, 06443	**Site Class**	Guyed Tower
Market	CONNECTICUT	**Landlord**	CL&P

Configuration
2C

Approvals	
Market RF	
Market Development	

RFDS Revision		Date	01/13/2014
RFDS Final			
Work Order #		NOC#	(888) 218-6664

Site Information

Existing Configuration					Proposed Configuration			
1	2	3	4	Cabinet #	1	2	3	4
UMTS	GSM			Technology	GSM/UMTS/LTE	GSM		
3106	S8000			Cabinet type	3106	S8000		
1				CBU				
				DUW30	2			
				DUL20	1			
				DUG20	1			
				DUS41				
				RBS6601				
	6			dTRU/TRX				
9				RU22 B4	6			
				RUS01 B2				
				RUS01 B4				

	Relocate cabinet
	Add cabinet
	Swap cabinet
	Remove cabinet
X	Make cabinet dark

Scope of Work

Keep existing 3106 UMTS cabinet, replace CBU and RAX/TX boards with DUW30. Turn off and keep in place existing S8000 GSM cabinet. Add another DUW30, DUL20 and DUG20 and keep 6 RU22 B4 radios in the existing 3106 cabinet. Install 3 E/// TMA and remove 3 TMAs. Install power upgrade kit 6131. Install 3 mounts.

ALPHA - Scope of Work

X	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
X	Add antenna		Remove RRU
X	Swap antenna	X	Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA	X	Add fiber cables
X	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Swap existing passive antenna at position 1 with AIR21 B2A|B4P. Keep existing UMTS dd B4 TMA at position 1/right. Keep existing coax lines at position 1/left for LMU. Keep existing coax lines at position 1/right for AWS UMTS. Connect DATA (CPRI) active ports of AIR21 B2A/B4P antenna to DUG20 and PCS UMTS DUW30 via fiber lines. Connect RF passive port of AIR21 B2A/B4P antenna to in cabinet radio/filter units via coax lines. Add new mount and AIR21 B4A|B2P antenna at position 2. Connect DATA 1 (CPRI) active port of AIR21 B4A/B2P antenna to DUL20 via fiber line. Connect spare (yellow) fiber jumper to DATA 2 (CPRI) active port of AIR B4A/B2P antenna to allow future implementation of AWS UMTS over fiber. Install 1 E/// TMA and remove 1 TMAs, install 1 mount. .

BETA - Scope of Work

X	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
X	Add antenna		Remove RRU
X	Swap antenna	X	Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA	X	Add fiber cables
X	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Swap existing passive antenna at position 1 with AIR21 B2A|B4P. Keep existing UMTS dd B4 TMA at position 1/right. Keep existing coax lines at position 1/left for LMU. Keep existing coax lines at position 1/right for AWS UMTS. Connect DATA (CPRI) active ports of AIR21 B2A/B4P antenna to DUG20 and PCS UMTS DUW30 via fiber lines. Connect RF passive port of AIR21 B2A/B4P antenna to in cabinet radio/filter units via coax lines. Add new mount and AIR21 B4A|B2P antenna at position 2. Connect DATA 1 (CPRI) active port of AIR21 B4A/B2P antenna to DUL20 via fiber line. Connect spare (yellow) fiber jumper to DATA 2 (CPRI) active port of AIR B4A/B2P antenna to allow future implementation of AWS UMTS over fiber. Install 1 E/// TMA and remove 1 TMAs, install 1 mount. .

GAMMA - Scope of Work

X	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
X	Add antenna		Remove RRU
X	Swap antenna	X	Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA	X	Add fiber cables
X	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Swap existing passive antenna at position 1 with AIR21 B2A|B4P. Keep existing UMTS dd B4 TMA at position 1/right. Keep existing coax lines at position 1/left for LMU. Keep existing coax lines at position 1/right for AWS UMTS. Connect DATA (CPRI) active ports of AIR21 B2A/B4P antenna to DUG20 and PCS UMTS DUW30 via fiber lines. Connect RF passive port of AIR21 B2A/B4P antenna to in cabinet radio/filter units via coax lines. Add new mount and AIR21 B4A|B2P antenna at position 2. Connect DATA 1 (CPRI) active port of AIR21 B4A/B2P antenna to DUL20 via fiber line. Connect spare (yellow) fiber jumper to DATA 2 (CPRI) active port of AIR B4A/B2P antenna to allow future implementation of AWS UMTS over fiber. Install 1 E/// TMA and remove 1 TMAs, install 1 mount. .

DELTA - Scope of Work

	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Network Modernization RFDS v3.0

Site ID	**CT11029I**	**Latitude**	41.29344
		Longitude	-72.57841
Site Name	Madison/ I-95/ X61/ Jct_1	**Site Type**	Structure (Non-Building)
Address	135 New Road, Madison, CONNECTICUT, 06443	**Site Class**	Guyed Tower
Market	CONNECTICUT	**Landlord**	CL&P

Configuration

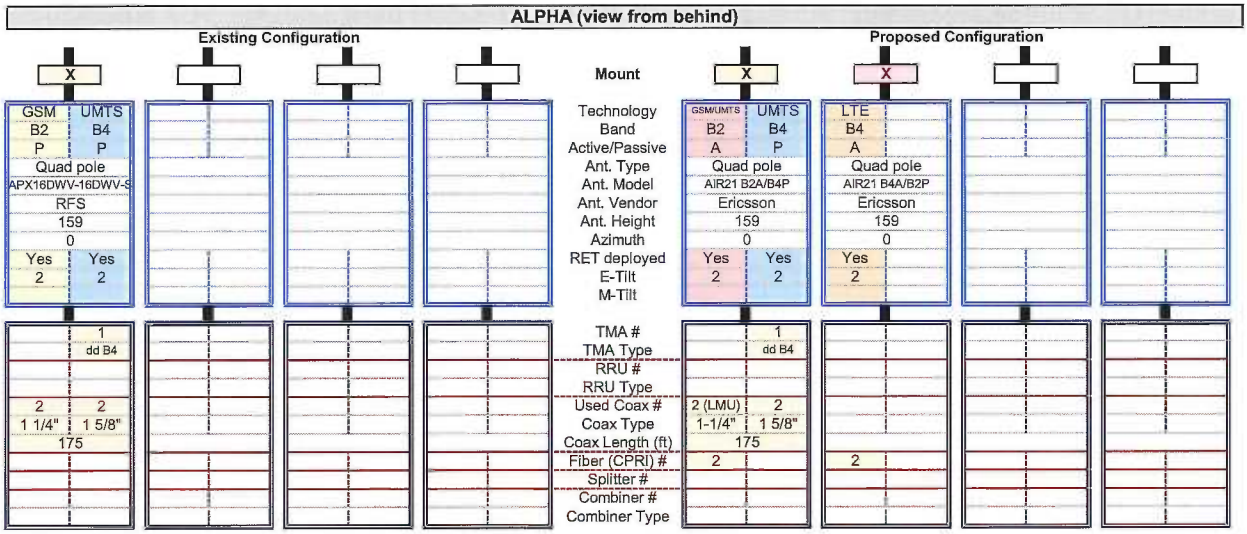
2C

Approvals	
Market RF	
Market Development	

RFDS Revision	
RFDS Final	

Date 01/13/2014

ALPHA (view from behind)

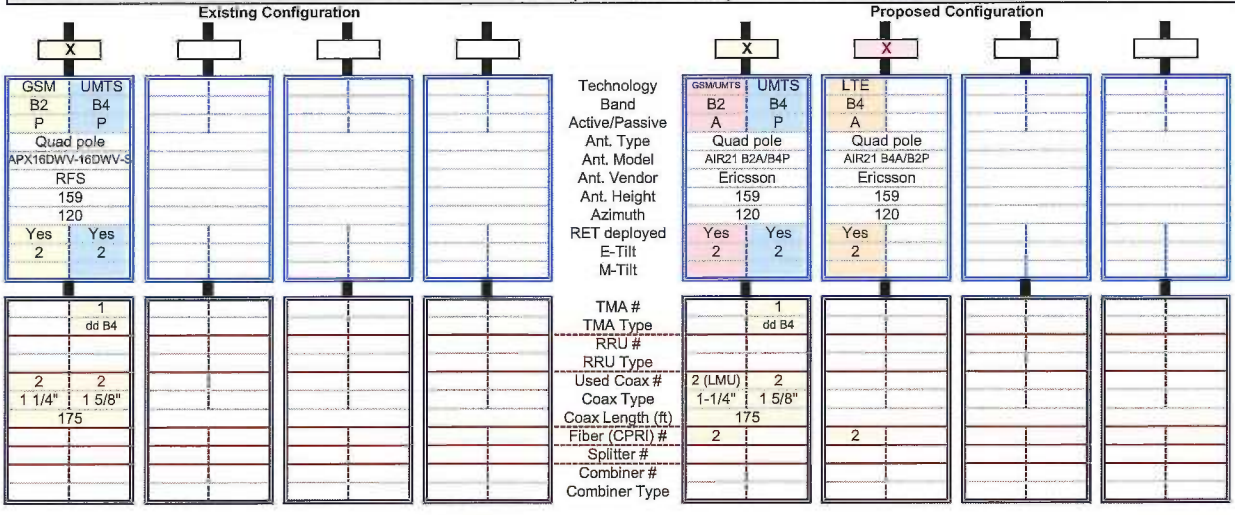


X	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
X	Add antenna		Remove RRU
X	Swap antenna	X	Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA	X	Add fiber cables
X	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Swap existing passive antenna at position 1 with AIR21 B2A|B4P. Keep existing UMTS dd B4 TMA at position 1/right. Keep existing coax lines at position 1/left for LMU. Keep existing coax lines at position 1/right for AWS UMTS. Connect DATA (CPRI) active ports of AIR21 B2A/B4P antenna to DUG20 and PCS UMTS DUW30 via fiber lines. Connect RF passive port of AIR21 B2A/B4P antenna to in cabinet radio/filter units via coax lines. Add new mount and AIR21 B4A|B2P antenna at position 2. Connect DATA 1 (CPRI) active port of AIR21 B4A/B2P antenna to DUL20 via fiber line. Connect spare (yellow) fiber jumper to DATA 2 (CPRI) active port of AIR B4A/B2P antenna to allow future implementation of AWS UMTS over fiber. Install 1 E/// TMA and remove 1 TMAs, install 1 mount. .

BETA (view from behind)



X	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
X	Add antenna		Remove RRU
X	Swap antenna	X	Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA	X	Add fiber cables
X	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Swap existing passive antenna at position 1 with AIR21 B2A|B4P. Keep existing UMTS dd B4 TMA at position 1/right. Keep existing coax lines at position 1/left for LMU. Keep existing coax lines at position 1/right for AWS UMTS. Connect DATA (CPRI) active ports of AIR21 B2A/B4P antenna to DUG20 and PCS UMTS DUW30 via fiber lines. Connect RF passive port of AIR21 B2A/B4P antenna to in cabinet radio/filter units via coax lines. Add new mount and AIR21 B4A|B2P antenna at position 2. Connect DATA 1 (CPRI) active port of AIR21 B4A/B2P antenna to DUL20 via fiber line. Connect spare (yellow) fiber jumper to DATA 2 (CPRI) active port of AIR B4A/B2P antenna to allow future implementation of AWS UMTS over fiber. Install 1 E/// TMA and remove 1 TMAs, install 1 mount. .

Network Modernization RFDS v3.0

Site ID	**CT11029I**	**Latitude**	41.29344
		Longitude	-72.57841
Site Name	Madison/ I-95/ X61/ Jct_1	**Site Type**	Structure (Non-Building)
Address	135 New Road, Madison, CONNECTICUT, 06443	**Site Class**	Guyed Tower
Market	CONNECTICUT	**Landlord**	CL&P

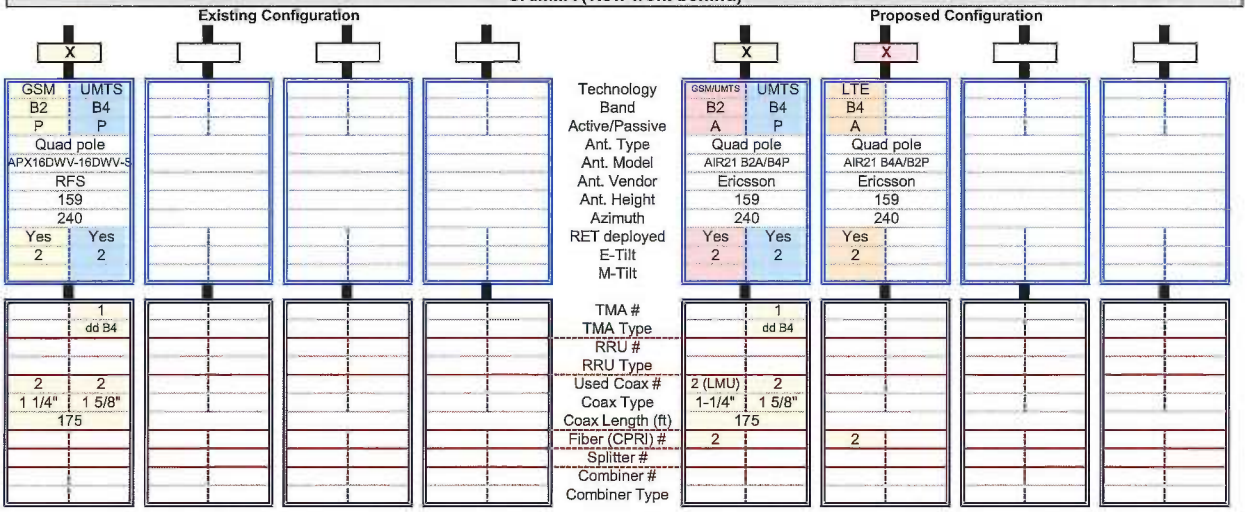
Configuration

2C

Approvals	
Market RF	
Market Development	

RFDS Revision		Date 01/13/2014
RFDS Final		

GAMMA (view from behind)

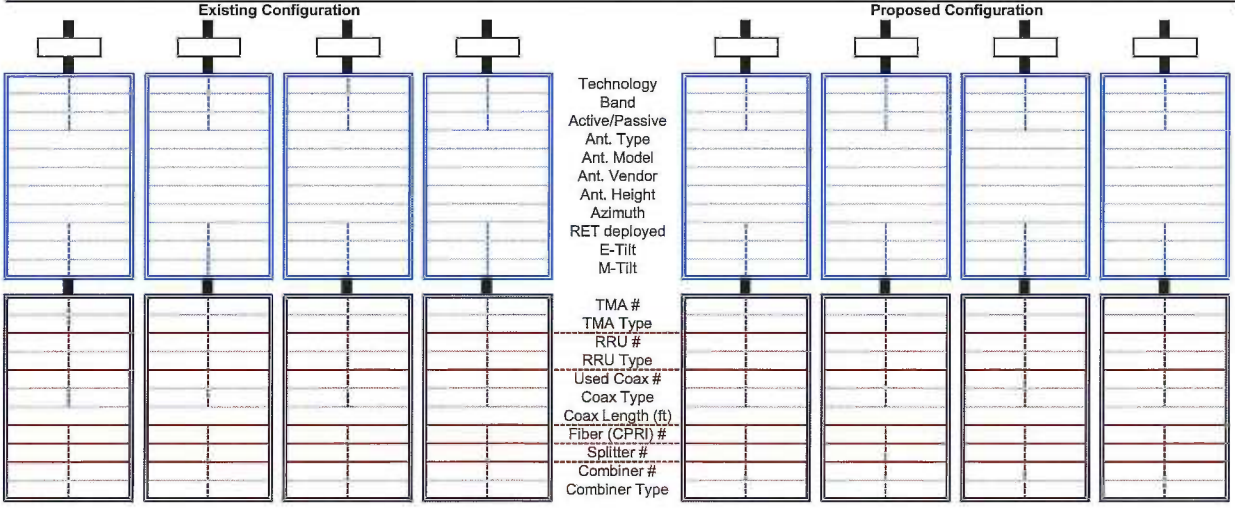


X	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
X	Add antenna		Remove RRU
X	Swap antenna	X	Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA	X	Add fiber cables
X	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Swap existing passive antenna at position 1 with AIR21 B2A|B4P. Keep existing UMTS dd B4 TMA at position 1/right. Keep existing coax lines at position 1/left for LMU. Keep existing coax lines at position 1/right for AWS UMTS. Connect DATA (CPRI) active ports of AIR21 B2A/B4P antenna to DUG20 and PCS UMTS DUW30 via fiber lines. Connect RF passive port of AIR21 B2A/B4P antenna to in cabinet radio/filter units via coax lines. Add new mount and AIR21 B4A|B2P antenna at position 2. Connect DATA 1 (CPRI) active port of AIR21 B4A/B2P antenna to DUL20 via fiber line. Connect spare (yellow) fiber jumper to DATA 2 (CPRI) active port of AIR B4A/B2P antenna to allow future implementation of AWS UMTS over fiber. Install 1 E/// TMA and remove 1 TMAs, install 1 mount. .

DELTA (view from behind)



	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

ERICSSON

DATA-SHEET FOR

AIR 21, 1.3 M, B2A B4P

The Antenna-Integrated Radio (AIR) is a single tower-mounted unit that can replace the antenna/s and radio for one sector. Additional electronics such as ASC? and a RET Actuator and control are also included. A passive antenna function for an extra band is optional.

ericsson.com

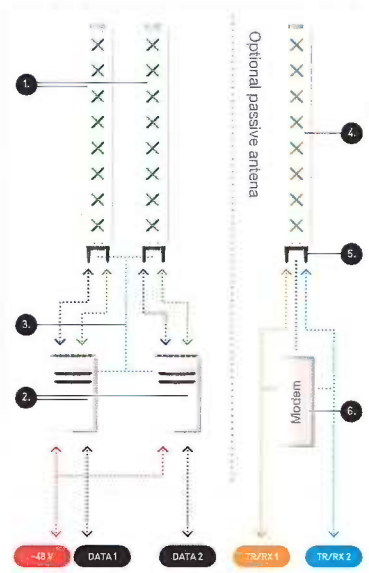
ANTENNA-INTEGRATED RADIO

Figure 2 →
Three-sector tower site with three AIR units e

The Antenna-Integrated Radio (AIR) is a single tower-mounted unit that can replace the antenna/s and radio for one sector. Additional electronics such as ASC? and a RET Actuator and control are also included. A passive antenna function for an extra band is optional. (The option has to be specified when ordering, retrofit is not possible).
The height and width are the same as for a passive antenna with similar characteristics. The depth is increased to house the radios' electronics. Digital Units (DUs) from Ericsson's RBS 6000 family provide the baseband function and support GSM, WCDMA and LTE.

Digital Units (DUs) from Ericsson's RBS 6000 family provide the baseband function and support GSM, WCDMA and LTE. One or two DUs, depending on capacity and the standards to be supported, are needed for a three-sector site with AIR units.

The AIR is especially suited for state of the art mobile broadband basestations utilizing advanced MIMO techniques. Less tower-mounted equipment is required and the unit's attractive appearance enables it to blend in well with other existing equipment. The same applies to sites with multiple access technologies on different frequency bands. With Air, it is only necessary to swap antennas in order to add new 3G/4G technology on-site or at a new site. The AIR also saves power compared to traditional macro RBSs that use long feeders for antenna connections.



← Figure 2
Example of hardware that a single AIR unit can replace

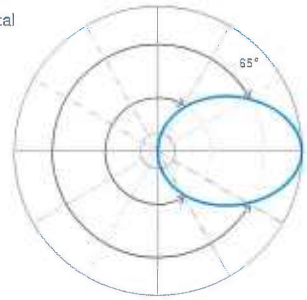
Functionality for the AIR unit
Figure 2 shows an example of the hardware that a single AIR unit can replace. The function of the AIR unit is the same, but the implementation is different.
The AIR unit's active band has two radios (2) connected to a pair of cross-polarized antenna arrays (1). Remote electrical tilt (3) is included. Air supports 2 TX for the down-link and 4 RX for the up-link.
The passive antenna function on the frequency band not used by the AIR unit's active part is optional. The passive function includes an antenna array (4) and a RET motor (5) with a modem to control it (6).
The tilts for the active part and the passive part are controlled independently, but each band has the same tilt for both arrays and for both polarizations.

Configuration Example
Figure 3 shows a typical configuration with WCDMA with 2 x 2 MIMO for Band 1.
One AIR unit is deployed in each sector.
A common base band unit with a DUW inside provides base band processing and back-haul.
The AIR units can be specified with passive antennas for Band 4.

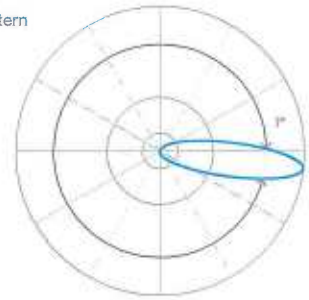
Figure 3 →
Three sector configuration example: RBS 6601 with three AIR units.

Figure 4
Antenna
Characteristics

Horizontal
pattern



Vertical pattern
2° to 10°
electrical
down-tilt



Technical Specification

RADIO	
Active frequency band	Band 2 (1850-1910 / 1930-1990 MHz)
Passive frequency band (optional)	Band 4 (1710-1755 / 2110-2155 MHz)
Downlink EIRP in bore-sight direction for the active band	2 x 63 dBm
Uplink sensitivity	TBD*
Remote electrical tilt	-2° to -12°, independently controlled per frequency band
MIMO	2 x 2 for DL 4 RX branches to be used for diversity/beam-steering
Instantaneous bandwidth	20 MHz
Capacity (single standard per sector)	Up to 8 carriers GSM Up to 4 carriers WCDMA with 2 x 2 DL MIMO Up to 20 MHz LTE with 2 x 2 DL MIMO
Multi-RAT capability	Single standard or two simultaneous standards (Capacity above is reduced for multi-RAT)
Bore-sight antenna gain for passive antenna option	17.5 dBi
Nominal beam-width, azimuth	65°
Nominal beam-width, elevation	7°
Additional antenna parameters	See Figure 3
MECHANICAL	
Weight	32 kg (70 lb) for active only 38 kg (83 lb) for active and passive
Size (H x W x D)	56" x 12" x 8" (1422 mm x 300 mm x 200 mm)
Wind load (frontal/lateral/rear-side) @ 150 km/h wind speed	580 N / 300 N / 720 N
INTERFACES	
AIR – DU	DATA 1, Data 2: CPRI links (SFP modules with LC socket + flanges that match protective cover TYCO C20611458)
Power	- 48 V DC (TYCO/Ericsson RPT 447 04)
Passive antenna (option)	TX/RX 1, TX/RX 2: RF connectors (7/16 female)
SUPPORTING BASE-BAND	
RBS 6601	One or two units depending on configuration.

* Target: 1 dB better than best-in-class RRU connected to same size best-in-class antenna
** Other base-band configurations are available

DOUBLE TMA 17/21, PREMIUM

3GPP/AISG compatible with RET interface

Improving a radio uplink by using tower mounted amplifiers is perceived as a key method of optimizing radio networks. By ensuring maximum coverage including in-door penetration, a TMA supports the design of cost-efficient networks and extended talk-time handsets, low dropped call rates and high traffic billing.

TMA design
This Double Premium TMA for 17/2100 MHz has 12dB gain and is 3GPP/AISG 2.0 compatible, with a RET interface. It has superior RF performance, small size and low weight. There is a corresponding TMA version called ASC that has a higher gain and a VSWR measuring coupler.

System integration
The Double TMA 17/2100 is a part of Ericsson's TMA family. Power, control and supervision are provided by the RBS 3000. If sold to other RBS brand installations, it can be controlled and supervised from the "Antenna System & TMA Control Module", AST-CM, via the RF feeder.

3GPP/AISG
TMA communication is based on the 3GPP/AISG protocol standard and has a RET port for controlling antenna RET units. The communication port allows multiple RETs or Antenna Line Devices to be supervised and controlled via the TMA.

Future-proof
The Double TMA 17/21 Premium is designed for co-existence with future complementary, mast-mounted devices.

Excellent reliability
As the world's largest supplier of TMAs, Ericsson has a well-proven track record of reliable TMA designs. Reliability enhancing features include dual LNAs, weatherproof design, integrated alarm and lightning protection.

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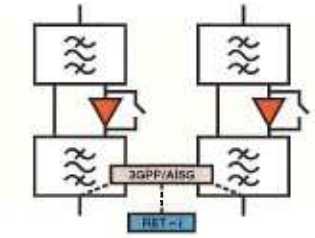
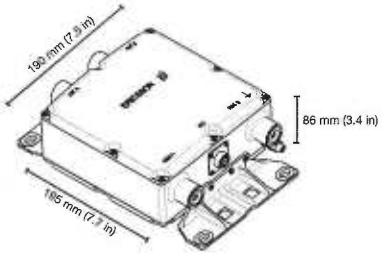
Features

- Specified and verified as an integrated system solution for Ericsson RBSs
- Possible to power both TMAs from one feeder, or from both feeders
- High power capacity
- Automatic LNA by-pass function
- Built in lightning protection
- Excellent RF performance
- Connectors "in line"
- Distance between connectors simplifies sealing work
- A range of accessories for flexible site configurations

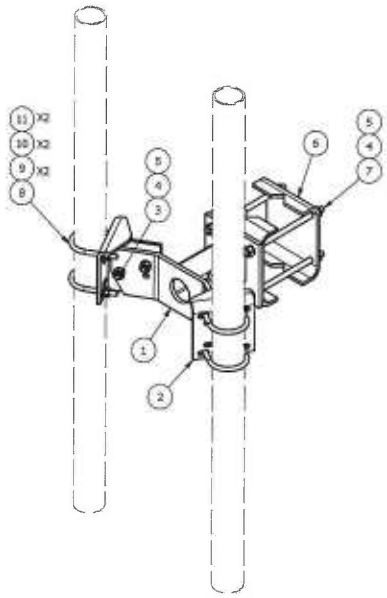


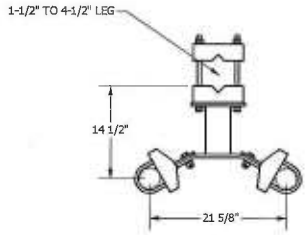


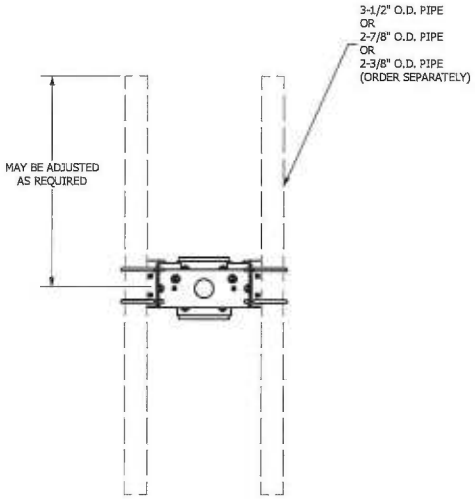
Technical Specifications for Double TMA 1700/2100, MHz Premium

Product name Double TMA 17/21, Premium 3GPP/ASIG compatible with RET interface	**Product number** KRY 112 144/1
Radio performance	
Bandwidth:	45 MHz
Receiving pass band:	1710 - 1755 MHz
Transmitting pass band:	2110 - 2155 MHz
RX Gain:	12± 1 dB
Input IP3:	16 dBm*
IM3 at antenna port (2x43dBM):	-128 dBm
Noise figure midband:	1.0 dB*
TX max input power (Max Peak):	57 dBm
TX insertion loss:	0.25 dB*
RX return loss:	22 dB*
TX return loss:	22 dB*
Electrical specifications	
Input power:	+12 - 32 VDC
Power consumption:	< 4.5 W
Mechanical specifications	
Dimensions (W x H x D):	155 x 176 x 71 mm
Weight:	5 kg
RF connectors:	7-16 DIN female
Ground connectors:	M8
DC/Alarm:	Superimposed on the RF signal
Mounting:	Pole or wall mounting
RET connectors:	Din con. IEC 60130-9 - Ed. 3.0 female
Environmental specifications	
Temperature range, full performance:	-40°C - +55°C
MTBF:	80 years
Sealing:	IP67
Lightning protection:	IEC 62305-1, IEC 61000-6
Safety approval:	International: CB certified, IEC 60 529 Europe: EN 60 529 North America: NRTL, NEMA 3R
Safety standard:	UL 60950-1, IEC 60950-1

* Typical values







PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	X-210717	STANDOFF BRACKET WELDMENT		28.58	28.58
2	2	X-ATB	PIPE ATTACHMENT BRACKET		10.68	21.37
3	4	A5802	5/8" x 2" HDG A325 HEX BOLT		0.27	1.09
4	12	G58LW	5/8" HDG LOCKWASHER		0.03	0.31
5	12	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	1.56
6	2	X-214130	BENT PLATE V-CLAMP	12 5/8 in	11.43	22.86
7	4	G58R-12	5/8" x 12" THREADED ROD (HDG.)		1.05	4.18
8	4	X-UB1358	1/2" X 3-5/8" X 5-1/2" X 3" U-BOLT (HDG.)		0.77	3.09
8	4	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.70	2.80
8	4	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.63	2.52
9	8	G12FW	1/2" HDG USS FLATWASHER		0.03	0.27
10	8	G12LW	1/2" HDG LOCKWASHER		0.01	0.11
11	8	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	0.57
					TOTAL WT. #	88.22

NOTE:
REFERENCE VMI P/N 217928

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	REPLACED X-210746 WITH X-ATB	4779	CEK	1/5/2012

REVISION HISTORY

TOLERANCE NOTE

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE - ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (± 0.060")

DESCRIPTION
DUAL ANTENNA MOUNT ASSEMBLY
(14" STAND-OFF)
1-1/2" TO 4-1/2" LEG

DRAWN BY	CPD NO.	DRAWING USAGE
CEK 1/5/2012	4779	CUSTOMER

ENG. APPROVAL
CHECKED BY BMC 1/6/2012

SITE PRO 1 — A valmont COMPANY

Engineering Support Team: 1-888-753-7446

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

PART NO. CWT8

DWG. NO. CWT8

EXHIBIT C

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11029I
Madison I-95 X61 Jct_1

135 New Road
Madison, CT 06443

April 30, 2014

EBI Project Number: 62142697

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

April 30, 2014

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Re: Emissions Values for Site: **CT11029I-Madison I-95 X61 Jct_1**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at 135 New Road, Madison, CT, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter (μW/cm2). The general population exposure limit for the cellular band is 567 μW/cm2, and the general population exposure limit for the PCS and AWS bands is 1000 μW/cm2. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 135 New Road, Madison, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, the actual antenna pattern gain value in the direction of the sample area was used. For this report the sample point is a 6 foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 GSM channels (1935.000 MHz—to 1945.000 MHz) were considered for each sector of the proposed installation.
2) 2 UMTS channels (2110.000 MHz to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation.
3) 2 LTE channels (2110.000 MHz to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation.
4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
5) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
6) The antenna used in this modeling is the Ericsson AIR21 for LTE, UMTS and GSM. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.6 dBd gain value at its main lobe. Actual antenna gain values were used for all calculations as per the manufacturers specifications.

7) The antenna mounting height centerline of the proposed antennas is **159 feet** above ground level (AGL).
8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.

Site ID	CT11029I-Madison I-95 X61 Jct_1
Site Addresss	135 New Road, Madison, CT 06443
Site Type	Guyed Tower

Sector 1

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	159	153	None	0	0	48.326044	0.742172	0.07422%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	159	153	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	159	153	1-5/8"	0	0	24.163022	0.371086	0.03711%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	159	153	1-5/8"	0	0	24.163022	0.371086	0.03711%
														Sector total Power Density Value:		0.148%	

Sector 2

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	159	153	None	0	0	48.326044	0.742172	0.07422%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	159	153	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	159	153	1-5/8"	0	0	24.163022	0.371086	0.03711%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	159	153	1-5/8"	0	0	24.163022	0.371086	0.03711%
														Sector total Power Density Value:		0.148%	

Sector 3

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	159	153	None	0	0	48.326044	0.742172	0.07422%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	159	153	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	159	153	1-5/8"	0	0	24.163022	0.371086	0.03711%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	159	153	1-5/8"	0	0	24.163022	0.371086	0.03711%
														Sector total Power Density Value:		0.148%	

Site Composite MPE %

Carrier	MPE %
T-Mobile	[illegible]
AT&T	26.090%
Sprint	4.750%
Total Site MPE %	**31.285%**

EBI Consulting
environmental | engineering | due diligence

Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public exposure to RF Emissions.

The anticipated Maximum Composite contributions from the T-Mobile facility are **0.445% (0.148% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **31.285%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

EXHIBIT D

Northeast
Utilities System

107 Selden Street, Berlin, CT 06037

Northeast Utilities Service Company
P.O. Box 270
Hartford, CT 06141-0270
(860) 665-5000

April 30, 2014

T-Mobile
4 Sylvan Way
Parsippany, NJ 07054

Re: Site Permitting Authorization
New Road, Madison, CT

Dear T-Mobile,

Authorization is hereby given to T-Mobile employees and its duly authorized agents and independent contractors (hereinafter collectively referred to as " T-Mobile"), to apply for any and all local municipal, state and federal licenses, permits and approvals, including but not limited to Connecticut Siting Council, building permits, zoning variances, zoning special exceptions, site plan and subdivision approvals, driveway, wetlands and terrain alteration permits, which are or may be necessary or required for T-Mobile to construct, operate and maintain a wireless communications system (PCS System), and/or antenna site on the following property over which The Connecticut Light & Power Company (CL&P) has property rights:

CT 11029 (site location)
Madison, Connecticut

The foregoing authorization is given subject to the following conditions:

1. This authorization shall be nonexclusive. Nothing herein shall prevent or restrict CL&P from authorizing any other person or entity to apply for any similar licenses, permits or approvals to construct, operate and maintain any other communication system or facility of any type on the property at any time.

2. This authorization shall not obligate CL&P to pay for or reimburse any costs or expenses or to provide any assistance of any kind in connection with any applications, or bind or obligate CL&P to agree or be responsible for any on-site or off-site improvements, development restrictions, impact fees or assessments, capital improvement charges, bonds or other security, or any other fee, assessment, charge or expense imposed or required as a condition of any license, permit or approval. T-Mobile shall be solely and fully responsible for all fees, charges costs and expenses of any kind in connection with any applications. CL&P agrees to reasonably cooperate with T-Mobile in signing such applications or other similar documents as may be required in order for T-Mobile to apply for any license, permit or approval.

3. This authorization shall not be deemed or construed to grant or transfer to T-Mobile any interest in the property, whatsoever, and shall not in any respect obligate or require CL&P to sell, lease or license the Property to T-Mobile or otherwise allow T-Mobile to use or occupy the property for any purpose, regardless of whether any licenses, permits and approvals applied for by T-Mobile for the property are granted. T-Mobile understands and acknowledges T-Mobile's sole risk and without any enforceable expectation that the property will be made available for T-Mobile's use.

4. T-Mobile shall be required to supply to CL&P, free of charge and contemporaneous with T-Mobile 's filing of same, a complete copy of any and all applications, plans, reports and other public filings made by T-Mobile with any local, municipal, state or federal governmental or regulatory officer, agency board, bureau, commission or other person or body for any licenses, permits or approvals for the property, and to keep CL&P fully informed on a regular basis of the status of T-Mobile 's applications.

5. This authorization shall automatically expire six (6) months after the date of this letter, unless extended in writing by mutual agreement of CL&P and T-Mobile.

Very truly yours,

Salvatore Giuliano, Manager
R E & Property Management

AGREED TO on behalf of
T-Mobile

By: _____
Duly Authorized

Date: 5-7-2014

Site Location: New Road, Madison, CT