STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

September 6, 2013

Melanie Howlett
HPC Wireless Services
22 Shelter Rock Lane, Building C
Danbury, CT 06811

RE: **EM-SPRINT-076-130819** - notice of intent to modify an existing telecommunications facility located at 135 New Road, Madison, Connecticut.

Dear Ms. Howlett:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter;
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;
- Sprint's existing antennas shall be removed prior to the installation of the proposed replacement antennas as stipulated by CL&P's reviewing engineer; and
- Within 45 days following completion of the antenna installation, Sprint shall provide documentation certified by a professional engineer that its installation complied with CL&P's condition.

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated August 16, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base,

consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/CDM/cm

c: The Honorable Fillmore McPherson, First Selectman, Town of Madison
Christine Poutot, Chm., Planning & Zoning Administrator, Town of Madison
CL&P

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
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E-Mail: siting.council@ct.gov
www.ct.gov/csc

July 16, 2014

Jennifer Young Gaudet
HPC Wireless Services
22 Shelter Rock Lane, Building C
Danbury, CT 06811

RE: **EM-SPRINT-076-130819 -** notice of intent to modify an existing telecommunications facility located at 135 New Road, Madison, Connecticut. **Request for Extension of Construction.**

Dear Ms. Gaudet:

The Connecticut Siting Council (Council) is in receipt of the request for an extension of construction time for this exempt modification, dated July 14, 2014. Pursuant to Condition No. 5 of the Council's decision letter dated September 6, 2013, I have considered your request for an extension of construction time for this exempt modification and grant a six-month extension of time until March 6, 2015, to complete the construction of this project.

This extension is granted with the understanding that the Council will be notified should Sprint decide not to proceed with construction.

Sincerely,

Melanie A. Bachman
Acting Executive Director

MAB/RDM/cm

CSC
CONNECTICUT SITING COUNCIL

HPC Wireless Services
22 Shelter Rock Lane.
Building C
Danbury, CT, 06810
P.: 203.797.1112

HPC
WIRELESS SERVICES

July 14, 2014

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051
Attn: Ms. Melanie Bachman, Acting Executive Director

Re: Sprint Spectrum, L.P. – exempt modification – extension of time
135 New Road, Madison, Connecticut

Dear Ms. Bachman:

By letter dated August 16, 2013, Sprint Spectrum, L.P. ("Sprint") provided notice of an exempt modification for the above-noted site. The Council responded by letter dated September 6, 2013. At this time, Sprint anticipates completion of the modifications described in that filing within the one-year time frame for completion. However, to the extent that construction is not complete within that time, Sprint requests that the Council grant an extension of time for completion.

Please contact the undersigned at 860 798-7454 or jgaudet@hpcwireless.com with any questions related to this matter. Thank you for your consideration.

Respectfully yours,

Jennifer Young Gaudet

Jennifer Young Gaudet

Martin, David C.

From: Jennifer Gaudet <jgaudet@hpcwireless.com>
Sent: Tuesday, August 20, 2013 3:38 PM
To: Martin, David C.
Cc: mjhowlett@optonline.net; Daniel Burnett-Pollock
Subject: CL&P approval - Sprint site CT03XC023 - 135 New Road, Madison

David –

Below is Steve Florio's e-mail approval noting the "hot-swap" condition" as discussed in our phone conversation this afternoon. If any further information or clarification is needed, please let us know.

Thanks.
Jennifer

Jennifer Young Gaudet

New England Area Manager

22 Shelter Rock Ln., Building C, Danbury, CT 06810

Office: (203) 797-1112
Fax: (203) 797-1137
Mobile: (860) 798-7454
Email: jgaudet@hpcwireless.com

HPC
WIRELESS SERVICES

Please visit our website: www.hpcwireless.com

From: steven.florio@nu.com [mailto:steven.florio@nu.com]
Sent: Wednesday, July 03, 2013 8:45 AM
To: Jennifer Gaudet
Cc: Daniel Burnett-Pollock
Subject: Re: FW: Structural Analysis - CT03XC023 - Madison

Jennifer,

The structural analysis submitted by Centek Engineering for 135 New Road, Madison is approved with one condition. Sprints existing antennas need to be removed before the proposed antennas can be installed. Under NU standards the combined load of both technologies exceed the towers capacity.

Any questions please let me know.

Steven J. Florio

860-665-5611 (office)
860-655-7943 (cell)
steven.florio@nu.com

Northeast Utilities
Telecommunication Engineering

EM-SPRINT-076-130819

HPC Wireless Services
22 Shelter Rock Lane.
Building C
Danbury, CT, 06810
P.: 203.797.1112

August 16, 2013

ORIGINAL

VIA OVERNIGHT COURIER

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051
Attn: Ms. Melanie Bachman, Acting Executive Director

Re: Sprint Spectrum, L.P. – exempt modification
135 New Road, Madison, Connecticut

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Sprint Spectrum, L.P. ("Sprint"). Sprint is undertaking modifications to certain existing sites in its Connecticut system in order to implement updated technology. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the First Selectman of the Town of Madison.

Sprint plans to modify the existing wireless communications facility owned by the Connecticut Light and Power Company and located at 135 New Road, Madison (coordinates 41°-17'-36.34" N, 72°-34'-42.15" W). Attached are plan and elevation drawings depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration. Also included is a power density report reflecting the modification to Sprint's operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. Sprint will remove the existing six (6) CMDA antennas and add three (3) dual-band panel LTE antennas to the existing T-Arms on existing mounts, at a centerline height of approximately 125.3'. Sprint will also install six (6) RRHs (remote radio heads) on proposed pipe mounts behind the antennas and on the existing platform. Sprint will also place DC power and fiber runs along the existing coaxial cable run. The proposed modifications will not extend the height of the approximately 180' structure.

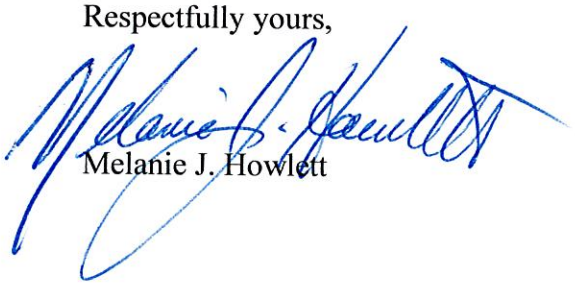
2. Sprint will retrofit or replace the existing cabinet with one cabinet, and add a proposed H-frame and a fiber junction box, all on the existing 8' x 11' concrete equipment pad. The existing GPS antenna will be replaced by another GPS antenna. These changes will have no effect on the site boundaries.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by EBI Consulting, Sprint's operations at the site will result in a power density of approximately 15.722%; the combined site operations will result in a total power density of approximately 49.290%.

Please contact me by phone at (203) 610-1071 or by e-mail at mjhowlett@optonline.net with questions concerning this matter. Thank you for your consideration.

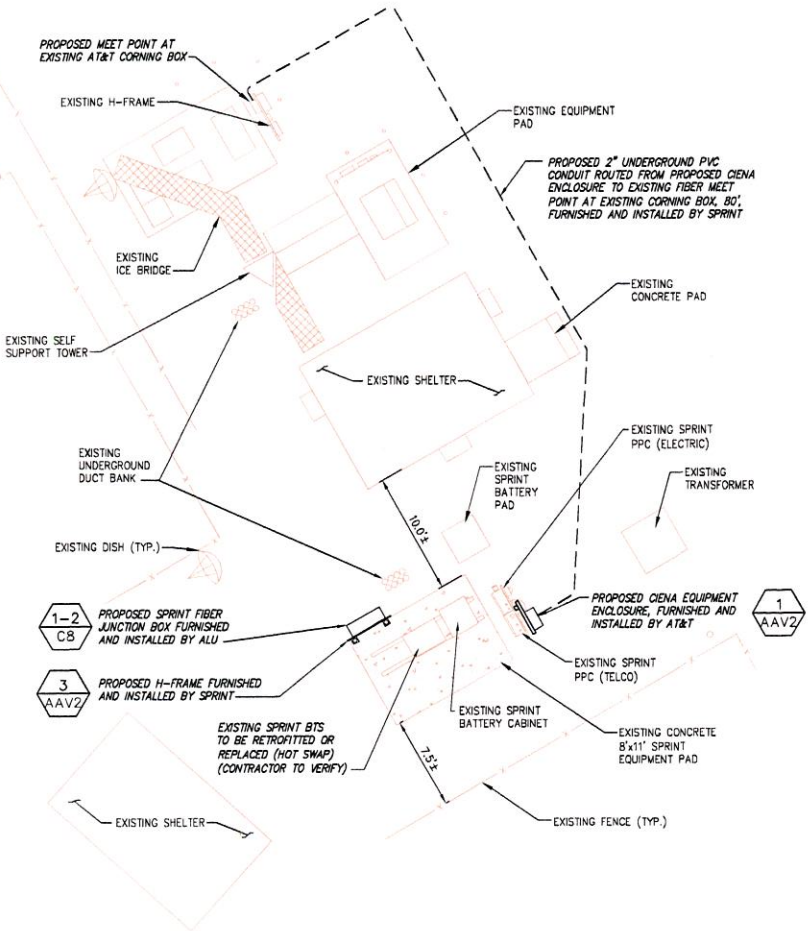
Respectfully yours,



Melanie J. Howlett

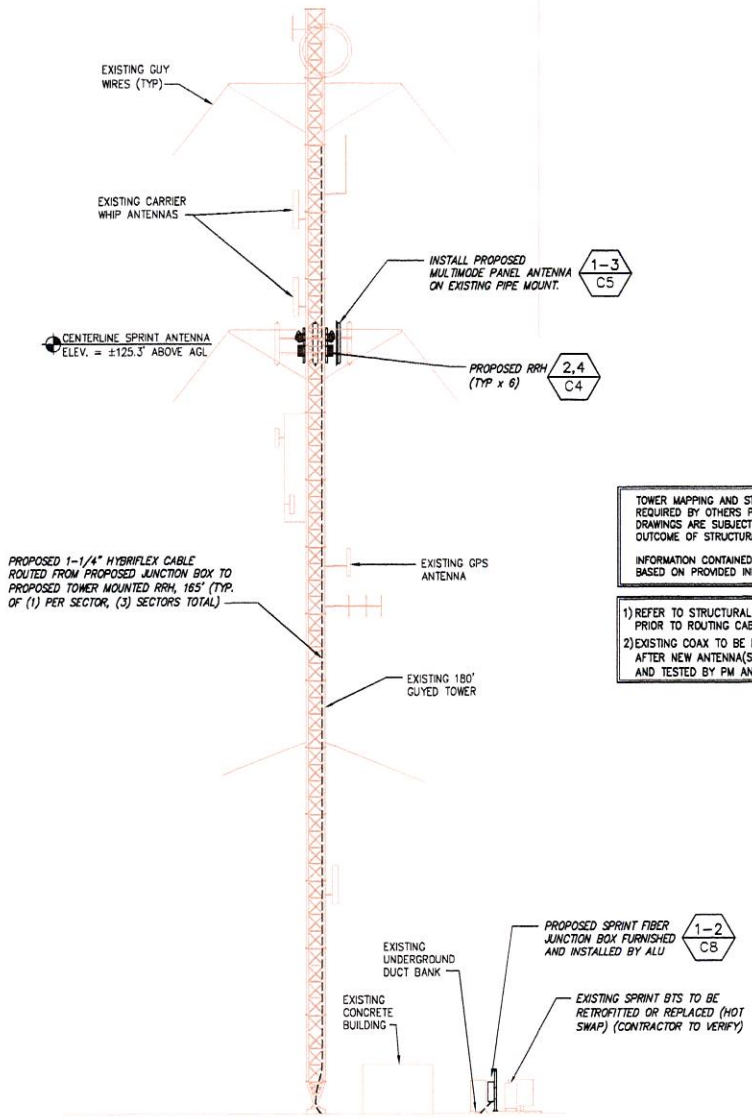
Attachments

cc: Honorable Filmore McPherson, First Selectman, Town of Madison
Connecticut Light and Power Company (underlying property owner)



CALLED NORTH

1 -- COMPOUND SITE PLAN
SCALE:
2.5' 0 2.5' 5' 10'
(IN FEET)
SCALE: 24"X 36" SHEET 1"= 5'
SCALE: 11"X 17" SHEET 1"= 10'



2 -- SITE ELEVATION
SCALE:
5' 0 5' 10' 20'
(IN FEET)
SCALE: 24"X 36" SHEET 1"= 10'
SCALE: 11"X 17" SHEET 1"= 20'

TOWER MAPPING AND STRUCTURAL ANALYSIS ARE REQUIRED BY OTHERS PRIOR TO CONSTRUCTION. DRAWINGS ARE SUBJECT TO CHANGE PENDING OUTCOME OF STRUCTURAL ANALYSIS.

INFORMATION CONTAINED WITHIN DRAWINGS ARE BASED ON PROVIDED INFORMATION.

1) REFER TO STRUCTURAL ANALYSIS BY OTHERS PRIOR TO ROUTING CABLE ON SITE.
2) EXISTING COAX TO BE REMOVED AFTER 6 MONTHS AFTER NEW ANTENNA(S) HAVE BEEN APPROVED AND TESTED BY PM AND/OR SPRINT.

A/E Consultant:
infinigy engineering
11 Herbert Drive
Latham, NY 12110
(518) 690-0790

No.	Submittal / Revision	Appvd	Date
B	ISSUED FOR REVIEW	-	6/29/12
A	ISSUED FOR REVIEW	-	5/22/12

Drawn: SEP Date: 5/22/12
Designed: - Date: -
Checked: - Date: -

Project Number: 286-015

Project Title:
CT03XC023
MADISON
CONNECTICUT
LIGHT & POWER

135 NEW ROAD
MADISON, CT 06443

Clients: Sprint, 300 SPRINGBANK AVENUE DRIVE, CHARLOTTE, NC 28209

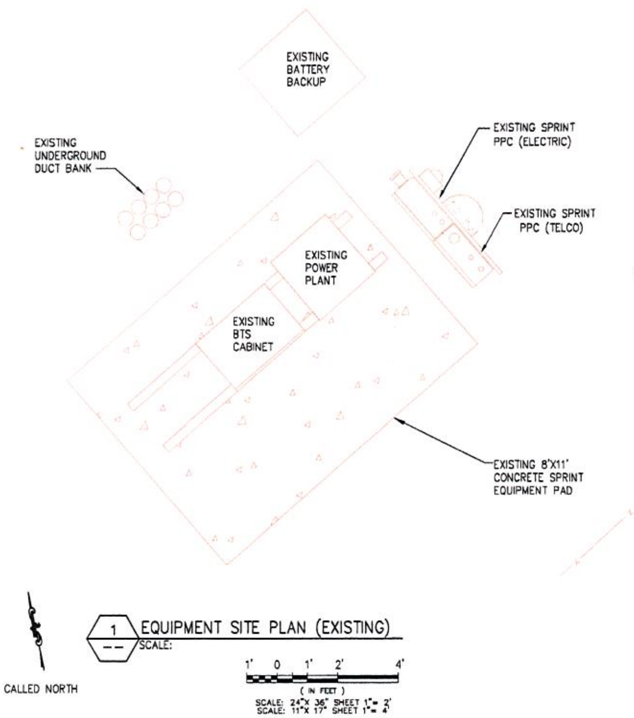
Implementation Team: TELELUCENT, 805 AVIATION PARKWAY, SUITE 700, MORRISVILLE, NC 27560

Drawing Scale: AS NOTED

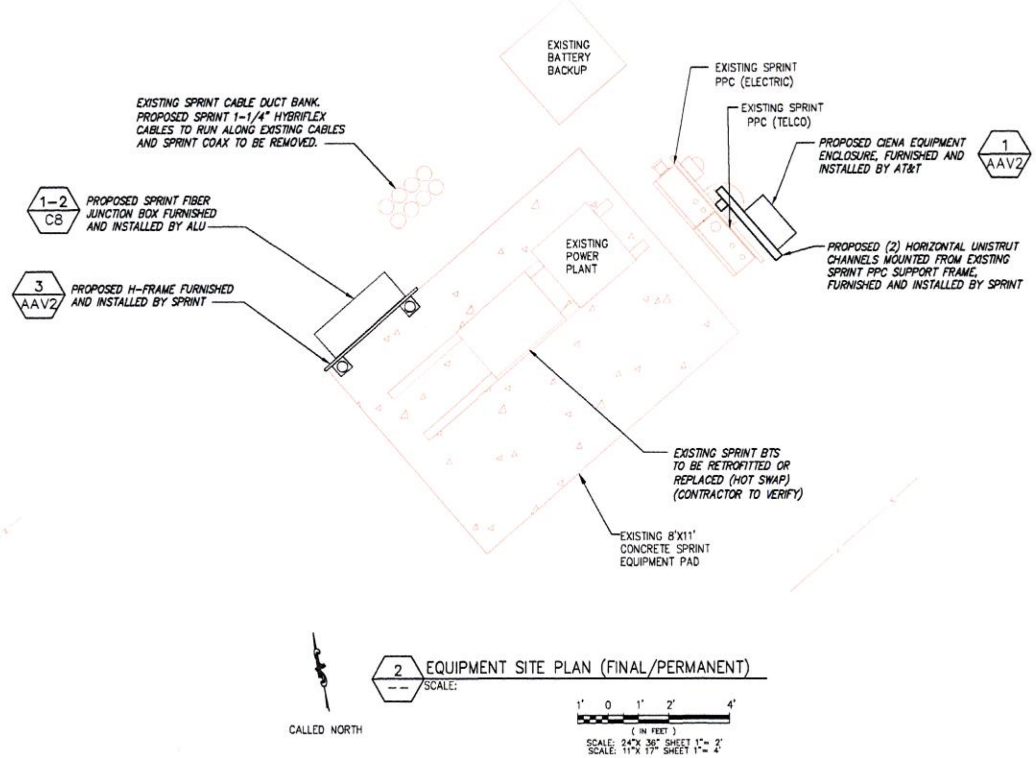
Date: 5/22/12

Drawing Title:
COMPOUND SITE PLAN

Drawing Number:
C2



1 / -- EQUIPMENT SITE PLAN (EXISTING)
SCALE:



2 / -- EQUIPMENT SITE PLAN (FINAL/PERMANENT)
SCALE:

A/E Consultant:

infinigy engineering
11 Herbert Drive
Latham, NY 12110
(518) 690-0790

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No.	Submittal / Revision	App'd	Date
B	ISSUED FOR REVIEW	-	5/25/12
A	ISSUED FOR REVIEW	-	5/23/12

Drawn: SEP Date: 5/23/12
Designed: - Date:
Checked: - Date:

Project Number: 286-015

Project Title:
CT03XC023
MADISON
CONNECTICUT
LIGHT & POWER
135 NEW ROAD
MADISON, CT 06443

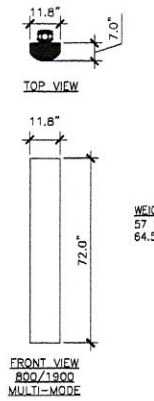
Client: Sprint
3401 INTERNATIONAL AIRPORT DRIVE
CHARLOTTE, NC 28208

Implementation Team: TEL•LUCENT
808 AVIATION PARKWAY
SUITE 700
MORRISVILLE, NC 27560

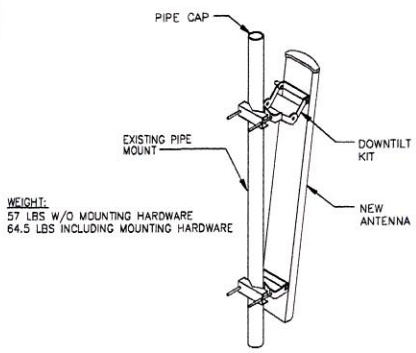
Drawing Scale: AS NOTED
Date: 5/23/12

Drawing Title:
EQUIPMENT SITE PLANS

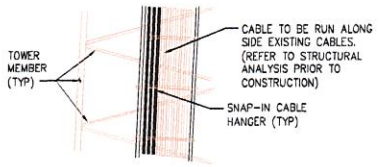
Drawing Number:
C3



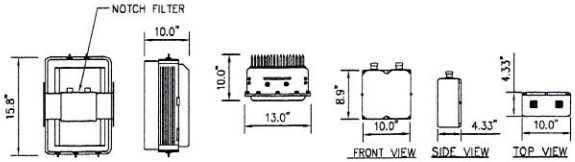
2 ANTENNA DETAILS
NOT TO SCALE



4 PANEL ANTENNA MOUNT DETAIL
NOT TO SCALE

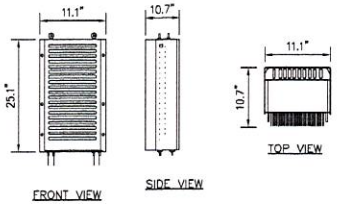


1 CABLE MOUNTING DETAIL
NOT TO SCALE



800 MHz RRH
(ALU)
WEIGHT = 50.6 LBS.

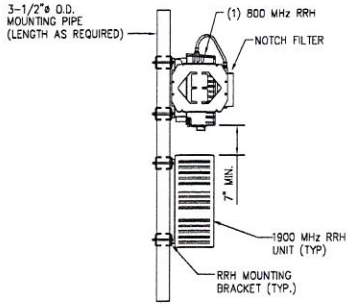
800 MHz NOTCH FILTER
WEIGHT: 9.45 LBS.



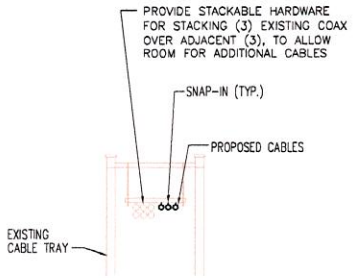
1900 MHZ RRH
(ALU)
WEIGHT = 60 LBS.

NOTE:
REFER TO R.F. SYSTEM SCHEDULE FOR EXACT RRH SPECIFICATIONS AND QUANTITIES.

3 RRH EQUIPMENT DETAILS
NOT TO SCALE



5 RRH MOUNTING DETAIL (TYP.)
NOT TO SCALE



6 EXISTING CABLE TRAY DETAIL
NOT TO SCALE

A/E Consultant:
infinigy
engineering
11 Herbert Drive
Latham, NY 12110
(518) 690-0790

No.	Submittal / Revision	Apv'd	Date
B	ISSUED FOR REVIEW	-	6/28/12
A	ISSUED FOR REVIEW	-	6/22/12

Drawn: MZ Date: 6/22/12
Designed: Date:
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Project Title
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MADISON
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135 NEW ROAD
MADISON, CT 06443

Client:
Sprint
3411 INTERNATIONAL AIRPORT DRIVE
CHARLOTTE, NC 28208

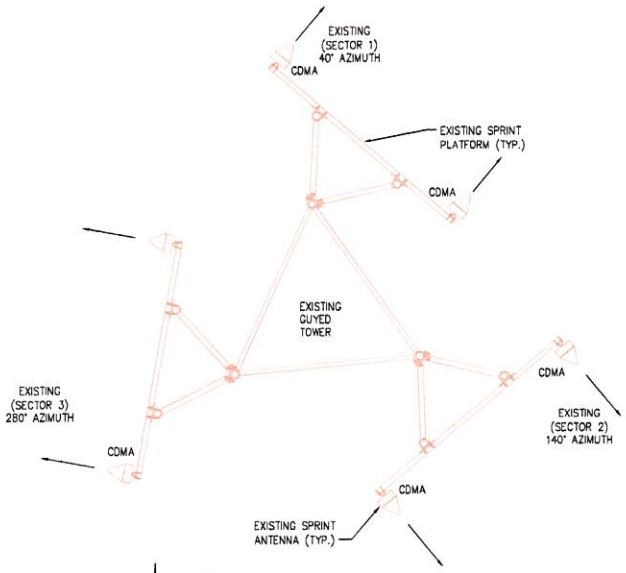
Implementation Team:
TELELUCENT
805 AVIATION PARKWAY
SUITE 700
MORRISVILLE, NC 27560

Drawing Scale:
AS NOTED

Date:
6/22/12

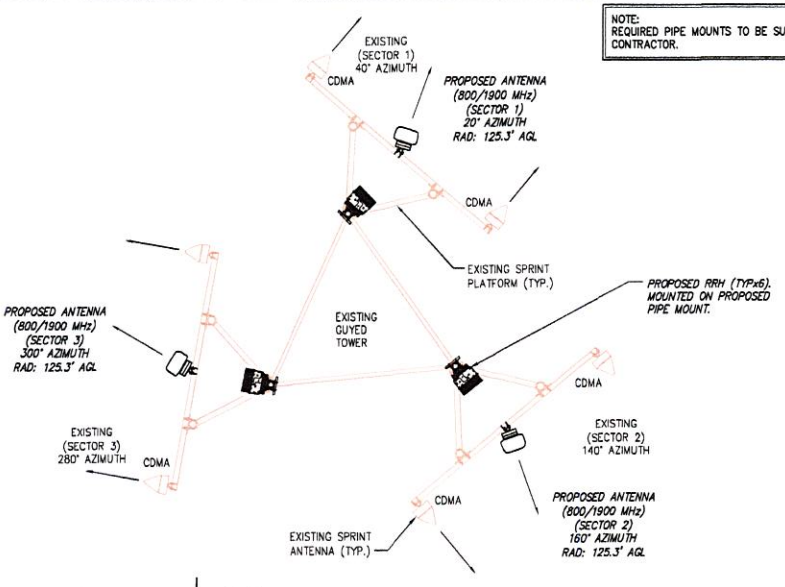
Drawing Title
SITE ELEVATION & ANTENNA/RRH DETAILS

Drawing Number
C4



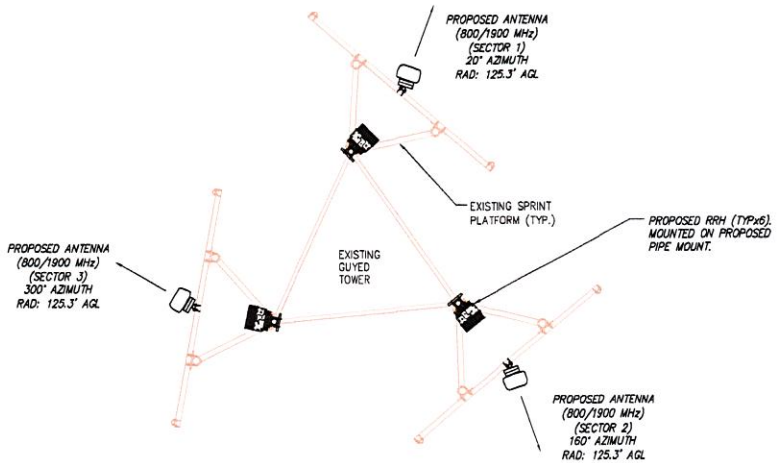
CALLED NORTH

1 / -- ANTENNA CONFIGURATION (EXISTING)
NOT TO SCALE



CALLED NORTH

2 / -- ANTENNA CONFIGURATION (INTERIM/TEMPORARY)
NOT TO SCALE



CALLED NORTH

3 / -- ANTENNA CONFIGURATION (FINAL/PERMANENT)
NOT TO SCALE

NOTE:
REQUIRED PIPE MOUNTS TO BE SUPPLIED BY CONTRACTOR.

NOTES:
EXISTING RF DATA PROVIDED BY SPRINT SITERRA, SPRINT DRAWINGS TITLED, SITE NO: CT03XC023 MADISON, DATED 07/97.

RRH NOTES:
- SEE PAGE C4 FOR RRH MOUNTING INFORMATION (TYP. ALL SECTORS).
- REFER TO RF SCHEDULE ON SHEET C7 FOR RRH UNIT SPECS AND QUANTITIES.

GENERAL NOTES:
1. NEW SPRINT PANEL ANTENNAS TO MEET RF DESIGN REQUIREMENTS PER EBTS, PER APPROVED TOWER STRUCTURAL ANALYSIS.
2. CONTRACTOR TO PROVIDE EXISTING ANTENNA VERIFICATION AND TO INCLUDE MOUNTING HEIGHT, RAD CENTER, TOP AND BOTTOM OF ANTENNA AND AZIMUTHS FOR ALL ANTENNAS.
3. CONTRACTOR SHALL VERIFY NEW PARTS BEFORE ORDERING.
4. REFER TO SHEET C7 FOR ANTENNAS SPECS.
5. CONTRACTOR TO USE PROPER TORQUE WRENCH WHEN INSTALLING AND TIGHTENING CONNECTORS TO INSURE PROPER FIT.
6. ALL HYBRID CABLES SHALL BE MARKED WITHIN 24" OF THE END OF EACH CABLE WITH 2" WIDE VINYL TAPE. THIS INCLUDES ALL JUMPERS AND MAIN LINE HYBRID CABLE.
7. WHERE APPLICABLE, NEW PIPES TO BE 2-1/2" ø SCHEDULE 40, GALVANIZED MOUNTING PIPES (TYP.). COORDINATE PIPE LENGTH IN FIELD AS REQUIRED (MIN. LENGTH: 72")
8. CDMA ANTENNAS SHALL NOT BE REMOVED UNTIL ALL NEW MULTI-MODE ANTENNAS ARE INSTALLED AND ON-AIR.

A/C Consultant:
infinigy engineering
11 Herbert Drive
Latham, NY 12110
(518) 690-0790

No.	Issue/Bid / Revision	Appvl	Date
B	ISSUED FOR REVIEW	-	8/23/12
A	ISSUED FOR REVIEW	-	8/23/12

Drawn: SZP Date: 8/23/12
Designed: ____ Date: ____
Checked: ____ Date: ____

Project Number
286-015

Project Title
CT03XC023
MADISON
CONNECTICUT
LIGHT & POWER

135 NEW ROAD
MADISON, CT 06443

Client: Sprint
2001 EDMUND HALLEY DRIVE RESTON, VA 20191

Implementation Team: TELELUCENT
808 AVIATION PARKWAY SUITE 700 MORRISVILLE, NC 27560

Drawing Scale:
AS NOTED

Date:
8/23/12

Drawing Title
ANTENNA PLANS

Drawing Number
C5

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

180-ft Existing ROHN Guyed Lattice Tower

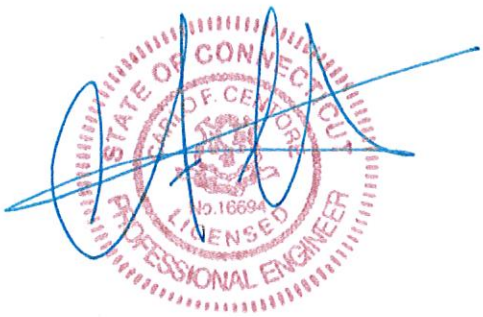
Proposed Sprint
Antenna Upgrade

Sprint Site Ref: CT03XC023

135 New Road
Madison, CT 06443

Centek Project No. 12047.CO16

Date: April 25, 2013



Prepared for:

Sprint

Together with Nextel

Sprint Nextel
8 Airline Drive, Suite 105
Albany, NY 12205

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by Sprint 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. 11009.CO3 (Rev-1), dated March 28, 2011. Antenna and appurtenance inventory were obtained from the aforementioned structural analysis report prepared by Centek Engineering and a Sprint 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.

Sprint proposes the removal of six (6) panel antennas and the installation of three (3) panel antennas along with six (6) Remote Radio Units (RRU's) mounted to three (3) 6-ft x 12-ft ROHN boom gates. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

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

- NEU (Existing):
  Antenna: One (1) Folded Dipole mounted on a 4-ft stand-off with a RAD center 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 antenna mounted to the leg of the existing tower with a RAD center 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 mounted on a 3-ft stand-off with a RAD center elevation of ±147-ft above grade level.
  Coax Cable: 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: 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) 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.

- NEU (Existing):
  Antenna: One (1) 9-ft Directional antenna mounted on two (2) 2-ft stand-offs with a RAD center elevation of ±111-ft above grade level.
  Coax Cable: 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) 2-ft Omni-directional antenna mounted on a 2-ft stand-off with a RAD center elevation of ±109-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) 20-ft Omni-Directional whip antenna mounted on a 2-ft stand-off with a RAD center elevation of ±97-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):
  Antenna: One (1) 20-ft 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.

- NEU (Existing):
  Antenna: One (1) 9-ft Yagi antenna mounted to the face of the existing tower with a RAD center elevation of ±81-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 optic cable and two (2) #8 DC control cables running on the face of the existing tower as specified in Section 3 of this report.

- NEU (Existing):
  Antenna: One (1) 13-ft Omni-Directional whip antenna mounted to the leg of the existing tower with a RAD center elevation of ±34.5-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.

- T-MOBILE (Existing):
  Antennas: Three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas, three (3) Twin PCS and three (3) Twin AWS 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 and 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.

- SPRINT (Existing to be Removed):
  Antennas: Six (6) Andrew/decibel DB980H90T2E-M panel antennas 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 Cable: Six (6) 1-5/8" ∅ coax cables running on the face of the existing tower.

- **SPRINT (PROPOSED):**
  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.

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 **86.7%** of its total capacity which conforms with the Northeast Utilities max structure usage criteria of 85%.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T6)	60'-0"-80'-0"	86.7%	**PASS**
Diagonal (T6) (Bolts)	60'-0"-80'-0"	74.0%	**PASS**
Guy A @ 184-ft radius (T3)	127'-8"	75.6%	**PASS**

- The tower deflection (sway) was found to be within allowable limits as prescribed by Northeast Utilities. The tower deflection (sway) is **0.29 degrees**.

Deflection Criteria	Proposed (degrees)	Allowable (degrees)	Result
Sway (Tilt)	0.3096	0.5	**PASS** (1)
Twist	0.2951	0.5	**PASS** (1)

Note 1: Tower deflection limitation of 0.5 degrees per NU-SUB-90.

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.

Review of the anchor and base foundations consisted of verification of applied loads obtained from the tnxTower design calculations and code checks of allowable stresses:

- 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)	**17.4 kips**	**39.5 kips**
Horizontal (Out of Plane of GW)	**0.3 kips**	**2.0 kips**
Vertical	**6.9 kips**	**29.9 kips**
Resultant Force at end of Guy Wire	**18.7 kips**	**49.5 kips**
Tower Base Reactions		
Vector	**Proposed Reaction**	
Horizontal Shear	**1.9 kips**	
Axial Compression	**97.4 kips**	

Note 2: Obtained from Risa Tower 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	9.8	**PASS**
	Sliding	2.0	3.4	**PASS**
Reinf. Conc. Anchor Block (A) at 184-ft radius.	Uplift	2.0	2.3	**PASS**
	Sliding	2.0	2.1	**PASS**
		Allowable	**Proposed**	
Base Foundation	Bearing	4.5 ksf	4.4 ksf	**PASS**

Note 3: FS denotes 'Factor of Safety'.

Conclusion

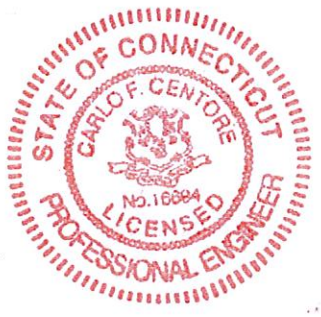
This analysis shows that the subject tower **is adequate** to support the proposed antenna and appurtenance configuration.

The analysis is based, in part, on the information provided to this office Sprint. 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:

Harry M. Rocheville, Jr.
Junior 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.

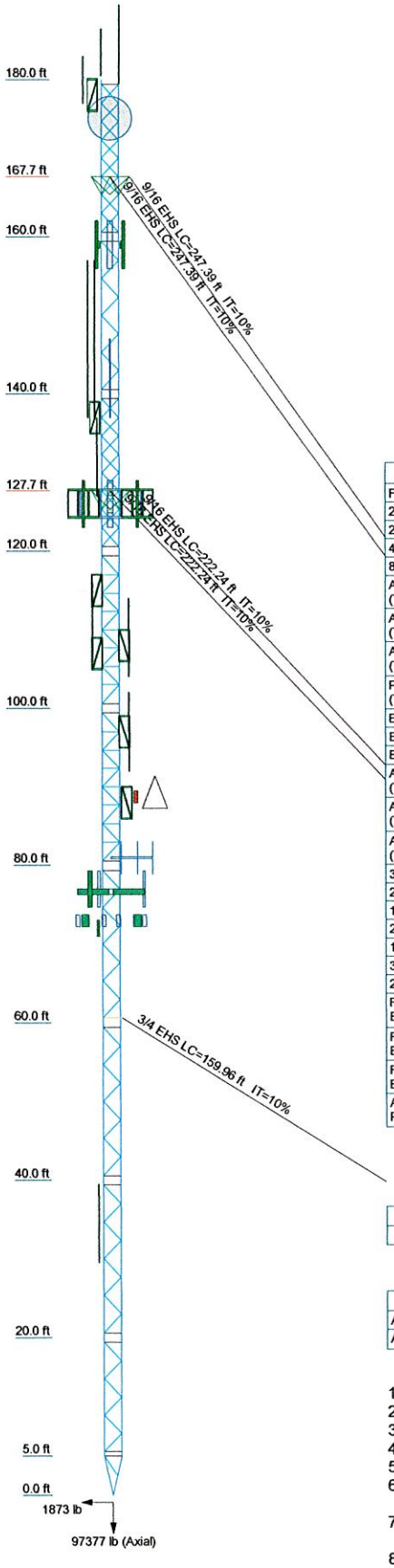
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

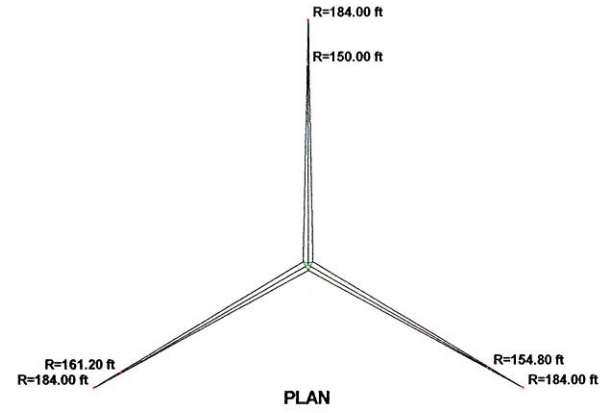
tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, RISATower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

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.		N.A.		L2 1/2x2 1/2x1/2		N.A.		
Top Guy Pull-Offs		N.A.		4 1/2x3/8		N.A.		N.A.		
Face Width (ft)										3.41
# Panels @ (ft)	A	7 @ 2.29514				72 @ 2.34635				
Weight (lb)	254.7	894.1	455.0	1128.8	1323.9	1060.3	1613.4	1439.1	455.0	1368.0
	10311.4									





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Folded Dipole (NEU)	180	APXVSPP18-C-A20 w/ Mount (Sprint - Proposed)	126
2"x9' omni (NEU)	180	APXVSPP18-C-A20 w/ Mount (Sprint - Proposed)	126
2"x7' omni (NEU)	180	FD-RRH 2x50 800 (Sprint - Proposed)	126
4-ft Side Arm (NEU)	178	FD-RRH 2x50 800 (Sprint - Proposed)	126
8.5 Dishw/radome (NU)	175	FD-RRH 2x50 800 (Sprint - Proposed)	126
APX16DWV-16DWVS-E-A20 (T-Mobile)	159	FD-RRH 4x45 1900 (Sprint - Proposed)	126
APX16DWV-16DWVS-E-A20 (T-Mobile)	159	FD-RRH 4x45 1900 (Sprint - Proposed)	126
APX16DWV-16DWVS-E-A20 (T-Mobile)	159	FD-RRH 4x45 1900 (Sprint - Proposed)	126
Pirod 4' Side Mount Standoff (1) (T-Mobile)	159	2-ft Stand Off (NEU)	115
ETW190VS12UB TMA (T-Mobile)	159	110 Directional (NEU)	111
ETW190VS12UB TMA (T-Mobile)	159	1.5"x2'omni (NEU)	109
ETW190VS12UB TMA (T-Mobile)	159	2-ft Stand Off (NEU)	108
ATMAA1412D-1A20 Twin TMA (T-Mobile)	159	2-ft Stand Off (NEU)	107
ATMAA1412D-1A20 Twin TMA (T-Mobile)	159	2-ft Stand Off (NEU)	97
ATMAA1412D-1A20 Twin TMA (T-Mobile)	159	3" Dia 20' Omni (NEU)	97
3"x20-ft Omni (NEU)	147	3' GPS Stand-off Mount (Sprint)	88
20-ft x 1.9in Support Pipe (NEU)	147	GPS (Sprint)	88
1.5"x2'omni (NEU)	143	110" YAGI (NEU)	81
2-ft Stand Off (NEU)	142	Valmont T-Arm (1) (ATI)	77
1.5"x2'omni (NEU)	141	Valmont T-Arm (1) (ATI)	77
3-ft Side Arm (NEU)	137	Valmont T-Arm (1) (ATI)	77
2.5" Dia. x12' Omni (NEU)	132	7770.00 (ATI)	77
Rohn 6' x 12' Boom Gate (1) (Sprint - Existing)	126	AM-X-CD-14-65-00TT-RET (ATI)	77
Rohn 6' x 12' Boom Gate (1) (Sprint - Existing)	126	AM-X-CD-14-65-00TT-RET (ATI)	77
Rohn 6' x 12' Boom Gate (1) (Sprint - Existing)	126	7770.00 (ATI)	77
APXVSPP18-C-A20 w/ Mount (Sprint - Proposed)	126	(2) LPG21401 TMA (ATI)	77
		(2) LPG21401 TMA (ATI)	77
		(2) LPG21401 TMA (ATI)	77
		7770.00 (ATI)	77
		(2) RRUS-11 (ATI)	73
		(2) RRUS-11 (ATI)	73
		(2) RRUS-11 (ATI)	73
		DC6-48-60-18-8F Surge Arrestor (ATI)	72
		3/8"x 13' omni (NEU)	34.5

SYMBOL LIST

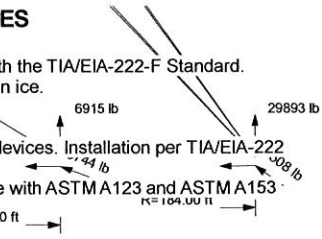
MARK	SIZE	MARK	SIZE
A	2 @ 2.5		

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: 86.7%

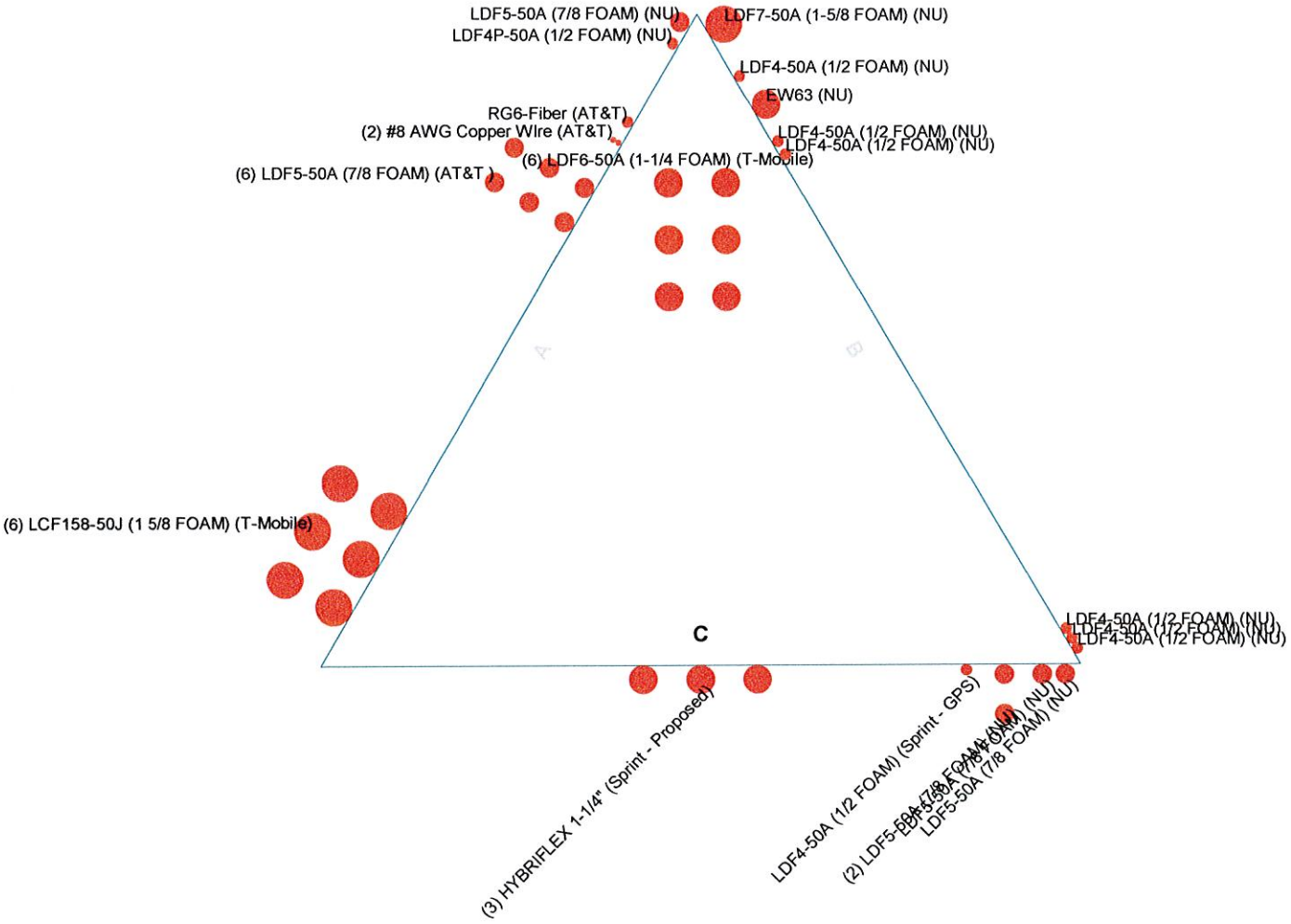


CENTEK Engineering
63-2 N. Branford Road
Branford, CT 06045
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: 12047.CO16		
Project: 180' ROHN NU Guyed Lattice Tower - 125 New Rd., Madison, CT		
Client: Sprint	Drawn by: hmr	App'd:
Code: TIA/EIA-222-F	Date: 04/25/13	Scale: NTS
Path: J:\Jobs\12047\00 WTCO 16 - CT03XC023\Calcs\ER\180-ft Guyed Lattice Tower_Madison_CT.eri		Dwg No. E-1

Feedline Plan

Round Flat App In Face App Out Face



CENTEK Engineering 63-2 N. Branford Road Branford, CT 06045 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: ***12047.CO16***		
	Project: ***180' ROHN NU Guyed Lattice Tower - 125 New Rd., Madison, CT***		
	Client: Sprint	Drawn by: hmr	App'd:
	Code: TIA/EIA-222-F	Date: 04/25/13	Scale: NTS
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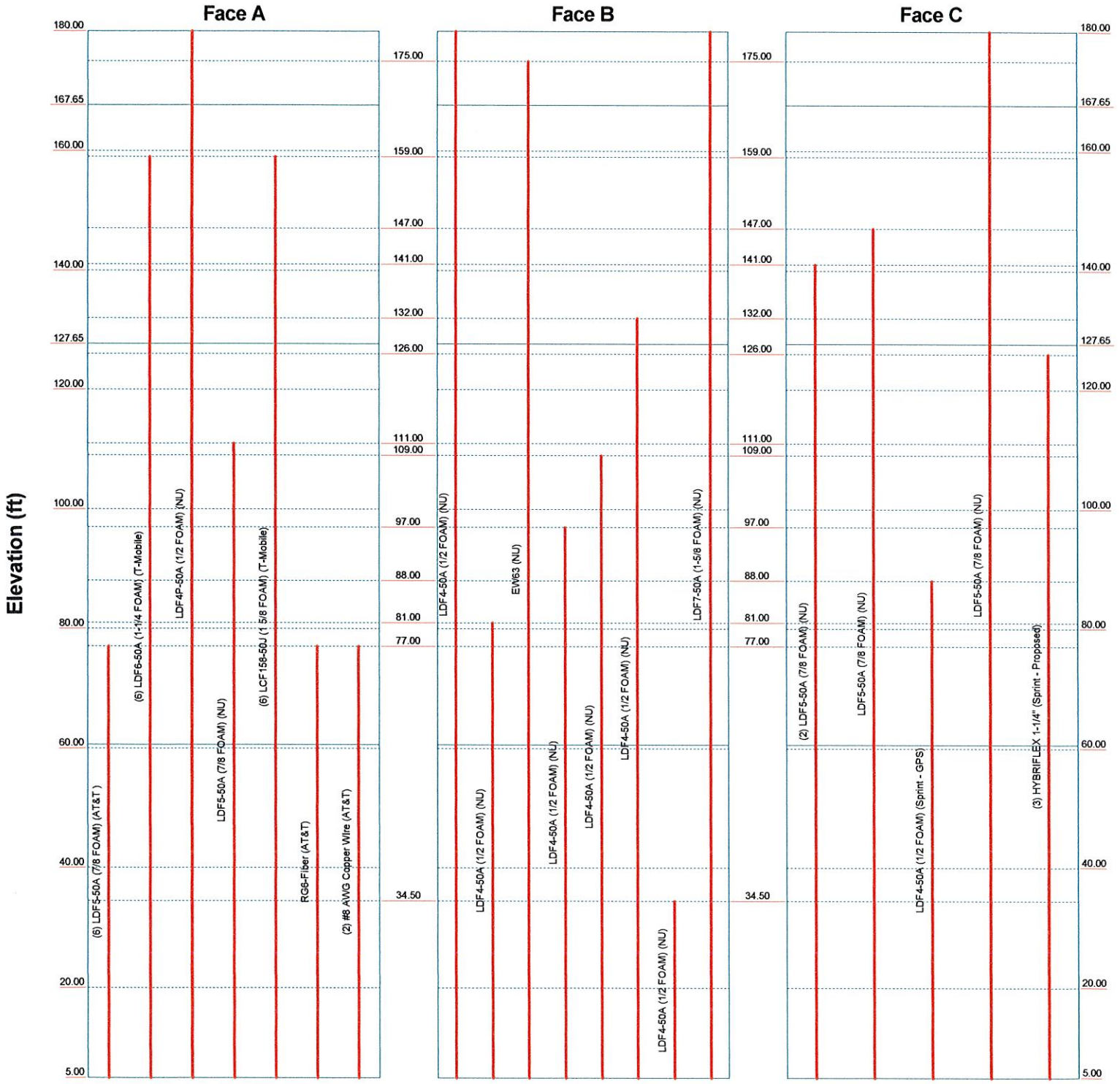
Feedline Distribution Chart
5' - 180'

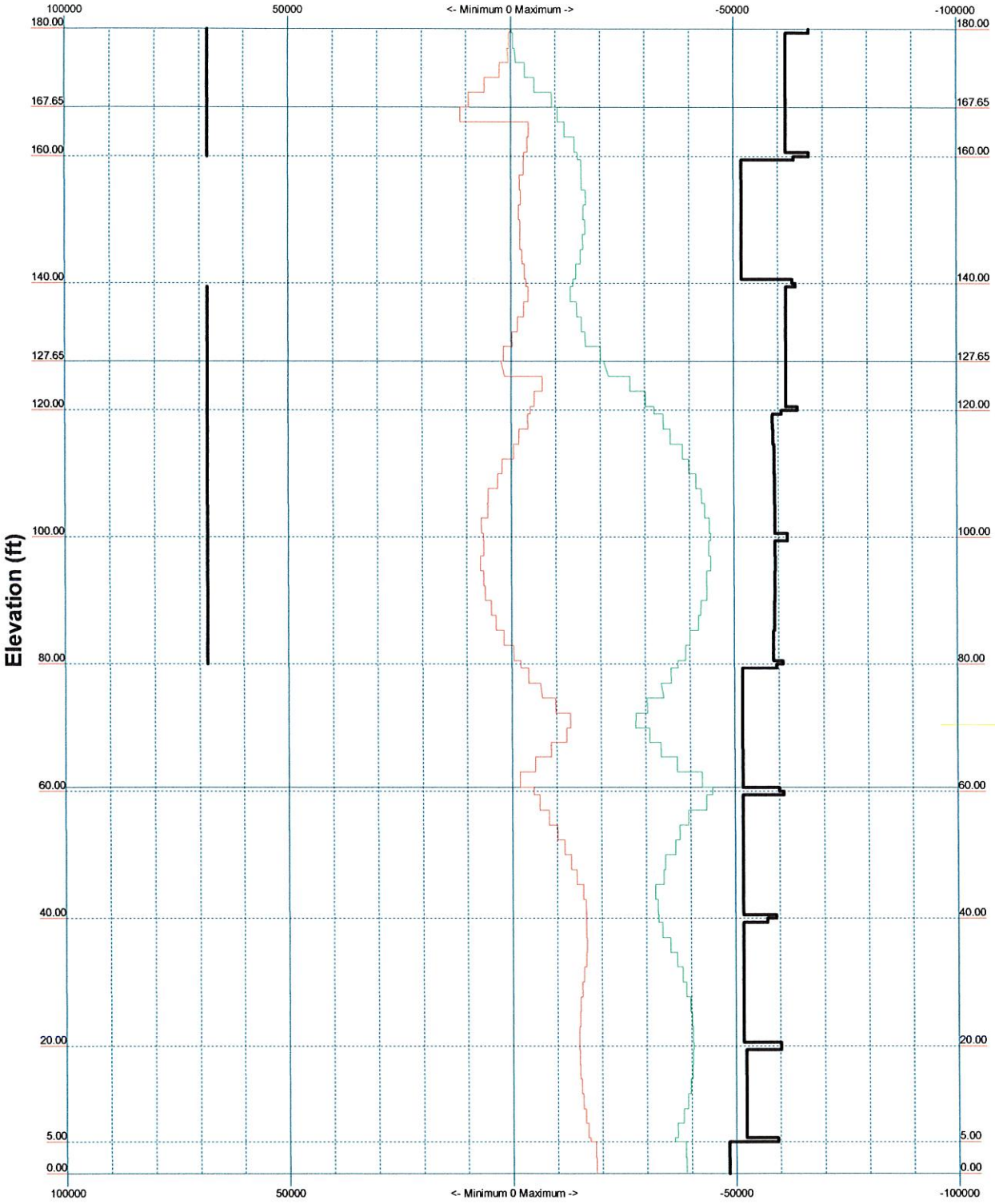
Round | Flat | App In Face | App Out Face | Truss Leg



CENTEK Engineering 63-2 N. Branford Road Branford, CT 06045 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: **12047.CO16**		
	Project: ***180' ROHN NU Guyed Lattice Tower - 125 New Rd., Madison, CT***		
	Client: Sprint	Drawn by: hmr	App'd:
	Code: TIA/EIA-222-F	Date: 04/25/13	Scale: NTS
	Path: J:\Jobs\12047\00 WTCO 16 - CT03XC023\Calcs\ERI\180-ft Guyed Lattice Tower_Madison_CT.er		Dwg No. E-7

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

Leg Capacity ——— Leg Compression (lb)



CENTEK Engineering 63-2 N. Branford Road Branford, CT 06045 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: 12047.CO16		
	Project: 180' ROHN NU Guyed Lattice Tower - 125 New Rd., Madison, CT		
	Client: Sprint	Drawn by: hmr	App'd:
	Code: TIA/EIA-222-F	Date: 04/25/13	Scale: NTS
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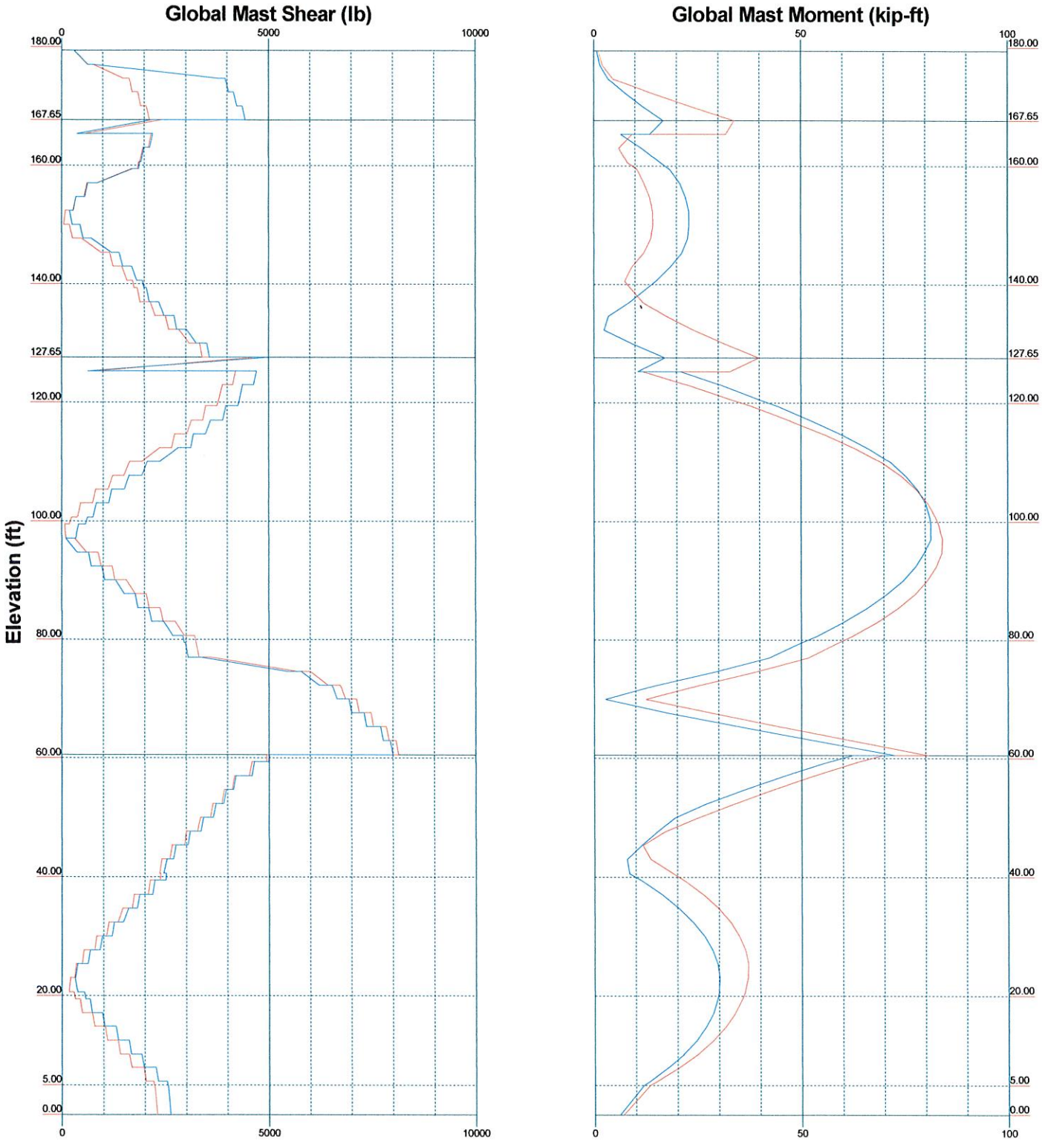
TIA/EIA-222-F - 85 mph/85 mph 0.5000 in Ice

Vx Vz

Maximum Values

Mx Mz



CENTEK Engineering 63-2 N. Branford Road Branford, CT 06045 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: 12047.CO16		
	Project: 180' ROHN NU Guyed Lattice Tower - 125 New Rd., Madison, CT		
	Client: Sprint	Drawn by: hmr	App'd:
	Code: TIA/EIA-222-F	Date: 04/25/13	Scale: NTS
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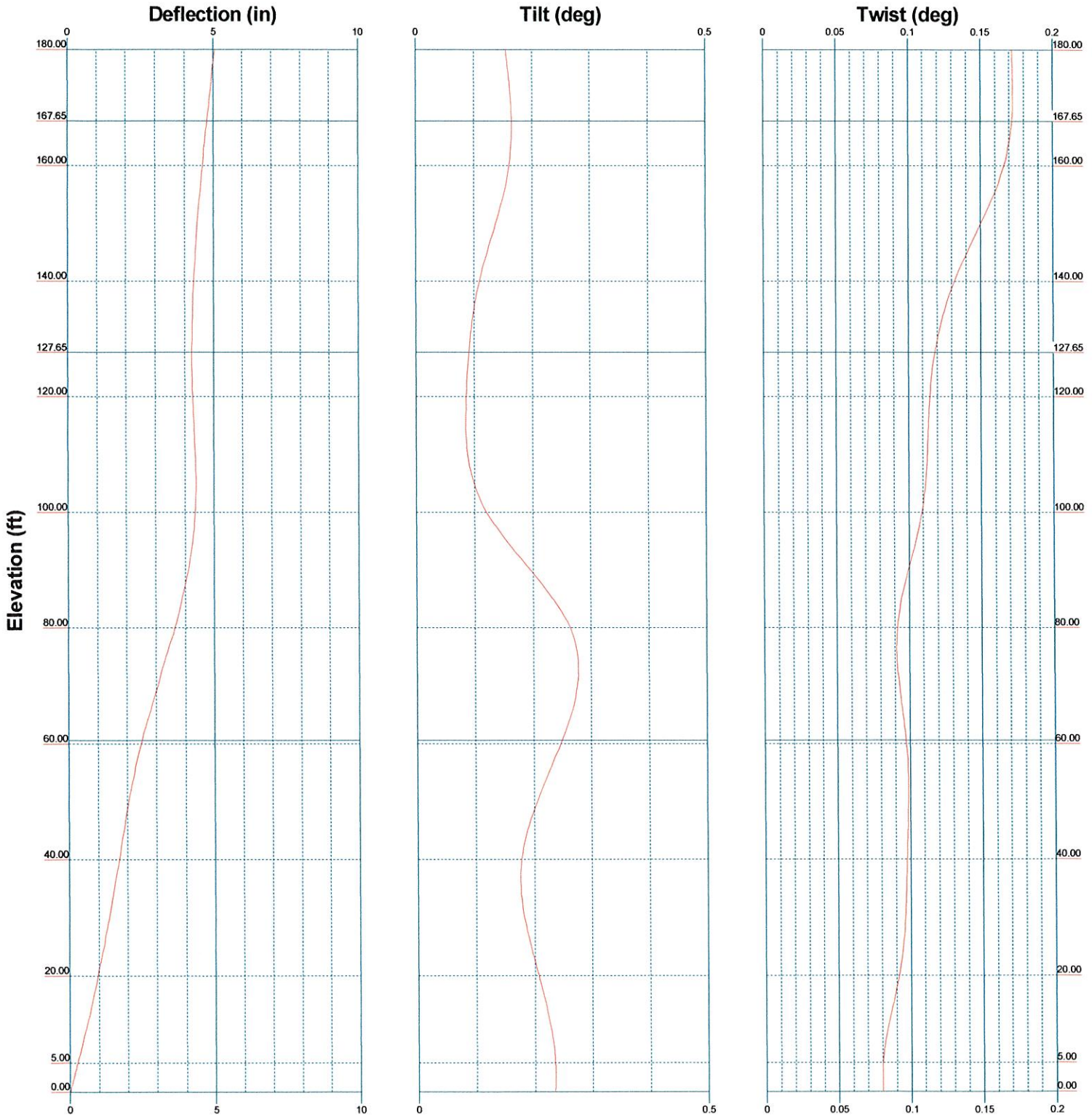
TIA/EIA-222-F - Service - 85 mph

Maximum Values



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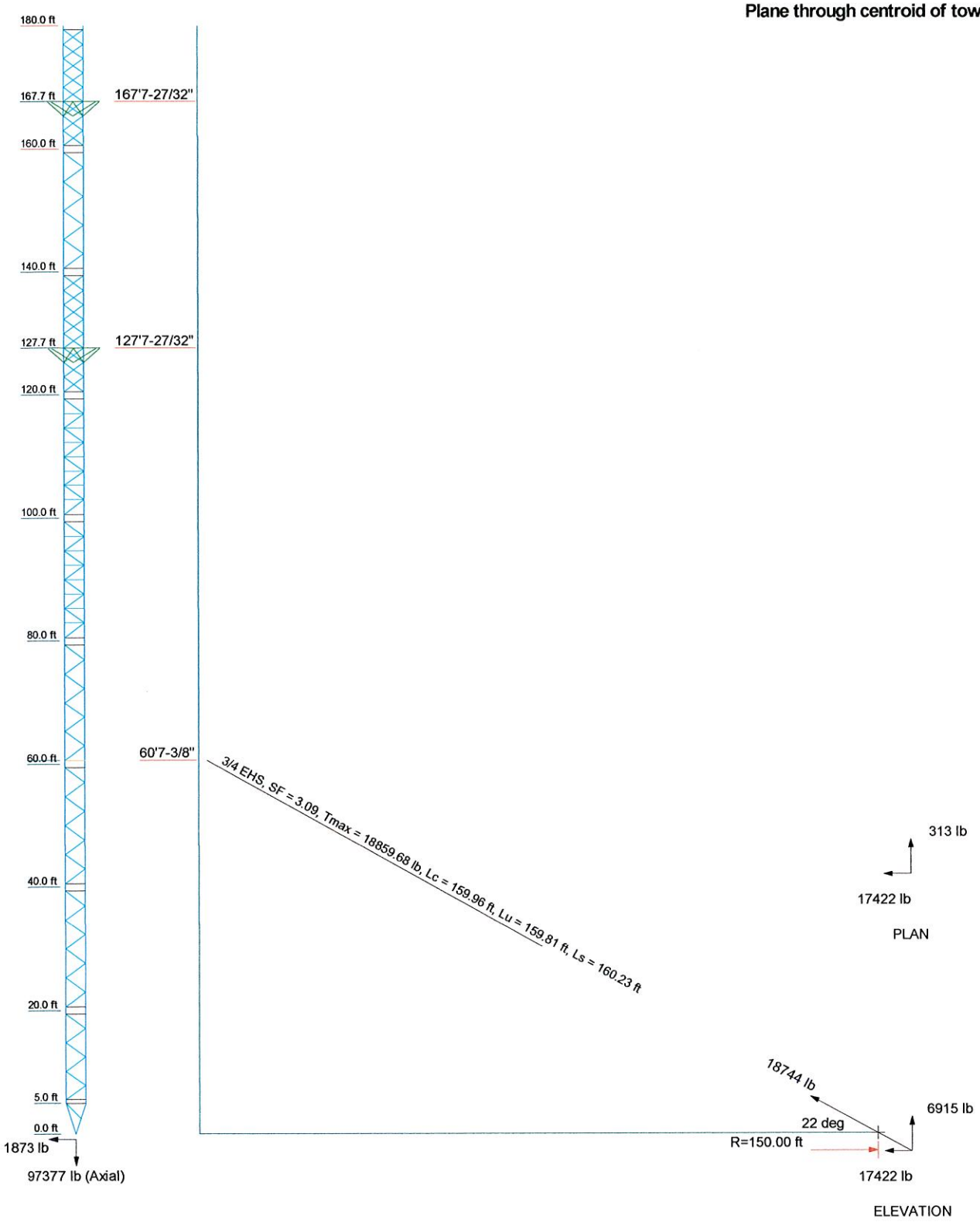
Branford, CT 06045
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: ***12047.CO16***			
Project: ***180' ROHN NU Guyed Lattice Tower - 125 New Rd., Madison, CT***			
Client: Sprint	Drawn by: hmr	App'd:	
Code: TIA/EIA-222-F	Date: 04/25/13	Scale: NTS	
Path: J:\Jobs\1204700.WI\CO16 - CT03XC023\Calcs\ER\180-ft Guyed Lattice Tower_Madison_CT.er		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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Phone: (203) 488-0580
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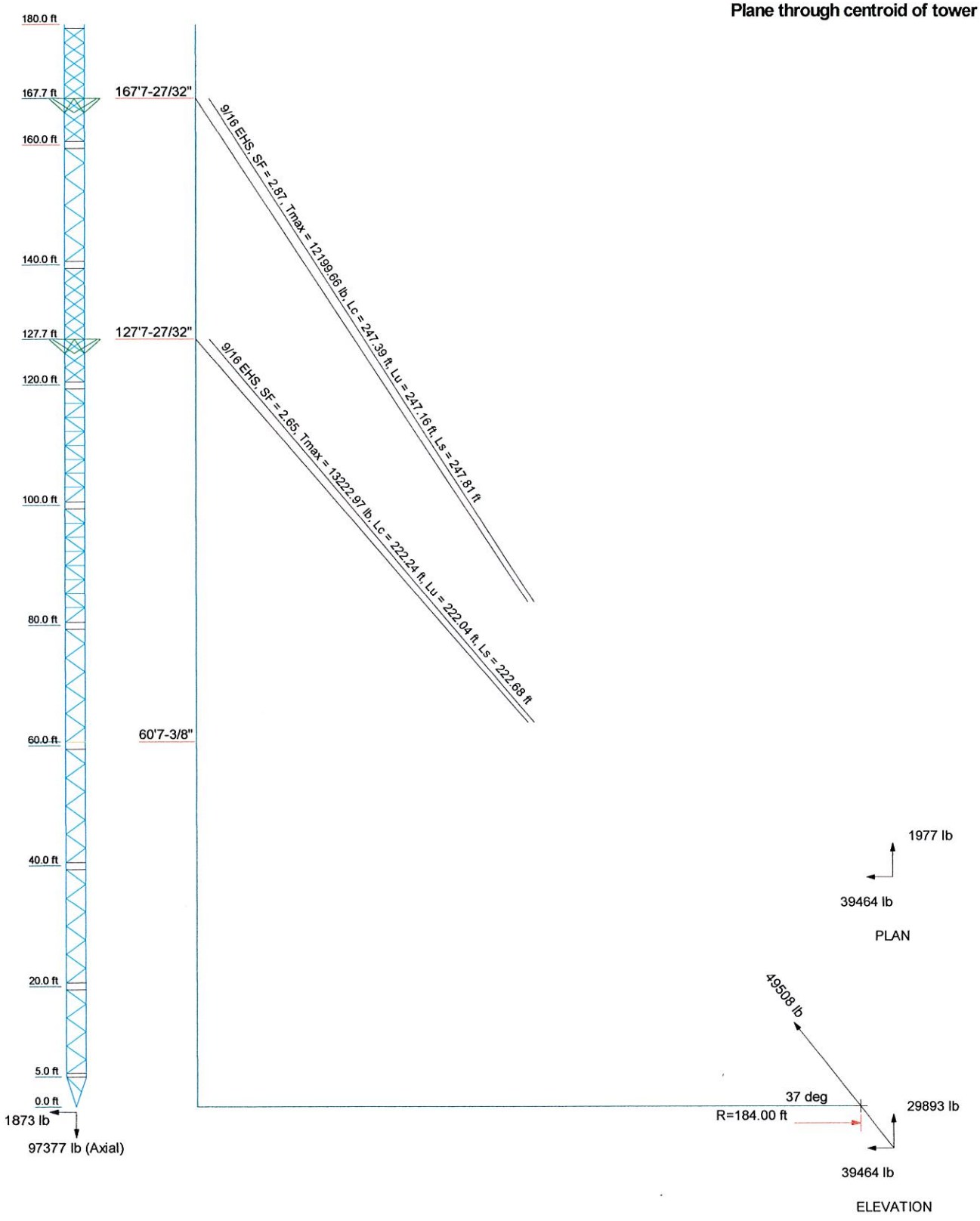
Job: ***12047.CO16***			
Project: ***180' ROHN NU Guyed Lattice Tower - 125 New Rd., Madison, CT***			
Client: Sprint	Drawn by: hmr	App'd:	
Code: TIA/EIA-222-F	Date: 04/25/13	Scale: NTS	
Path: J:\Jobs\1204700 WI\CO16 - CT03XC023\Calcs\ER\180-ft Guyed Lattice Tower_Madison, CT.eri		Dwg No. E-6	

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



CENTEK Engineering 63-2 N. Branford Road Branford, CT 06045 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: ***12047.CO16***		
	Project: ***180' ROHN NU Guyed Lattice Tower - 125 New Rd., Madison, CT***		
	Client: Sprint	Drawn by: hmr	App'd:
	Code: TIA/EIA-222-F	Date: 04/25/13	Scale: NTS
	Path: J:\Jobs\1204700.WI\CO16 - CT033XC023\Calcs\ER\180-ft Guyed Lattice Tower_Madison_CT.er		Dwg No. E-6

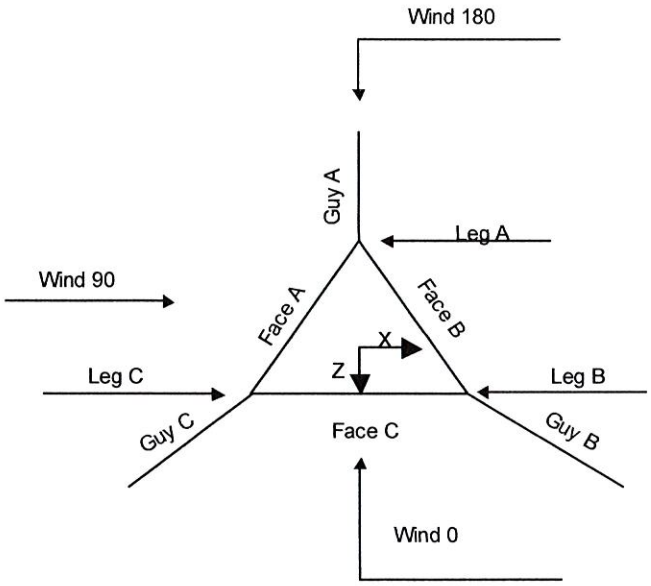
Tower Input Data

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:

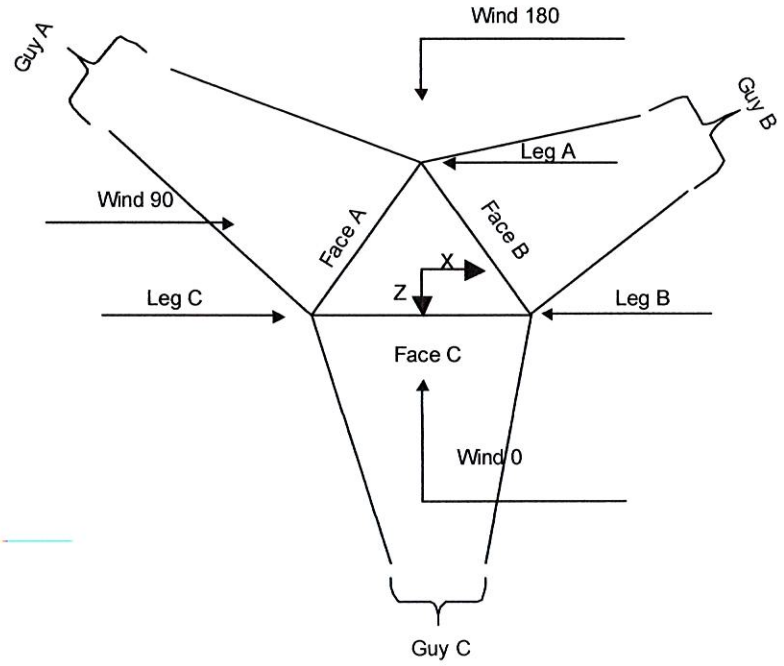
Tower is located in New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 85 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 85 mph.
Weld together tower sections 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	A36 (36 ksi)	Equal Angle	L2 1/2x2 1/2x1/2	A36 (36 ksi)
T7 60.00-40.00	Pipe	ROHN TS1.5x16 ga	A36 (36 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-35 (35 ksi)
T8 40.00-20.00	Pipe	ROHN TS1.5x16 ga	A36 (36 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-35 (35 ksi)
T9 20.00-5.00	Equal Angle	L2 1/2x2 1/2x1/2	A36 (36 ksi)	Equal Angle	L2 1/2x2 1/2x1/2	A36 (36 ksi)
T10 5.00-0.00	Equal Angle	L2 1/2x2 1/2x1/2	A36 (36 ksi)	Flat Bar		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 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 20.00-5.00	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		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180.00-160.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 160.00-140.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 140.00-120.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 120.00-100.00	Flange	0.7500 A325N	4	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1	0.6250 A325N	0
T5 100.00-80.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	0	0.6250 A325N	0	0.6250 A325N	1	0.6250 A325N	0
T6 80.00-60.00	Flange	0.7500 A325N	4	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 60.00-40.00	Flange	0.7500 A325N	4	0.6250 A325N	1	0.5000 A325N	1	0.5000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 40.00-20.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 20.00-5.00	Flange	0.7500 A325N	4	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 5.00-0.00	Flange	0.7500 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

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	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**

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	-0.4	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	-0.48	1	1	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	1.0900	1.0900		0.33
LDF6-50A (1-1/4 FOAM)	A	No	Ar (Leg)	159.00 - 5.00	0.0000	0.3	6	3	1.5500	1.5500		0.66

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
(T-Mobile) 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	-0.3	1	1	0.6300	0.6300		0.15
LDF4-50A (1/2 FOAM) (NU)	B	Yes	Ar (CfAe)	81.00 - 5.00	0.0000	-0.28	1	1	0.6300	0.6300		0.15
EW63 (NU)	B	Yes	Ar (CfAe)	175.00 - 5.00	0.0000	-0.35	1	1	1.5742	1.5742		0.51
LDF4-50A (1/2 FOAM) (NU)	B	Yes	Ar (CfAe)	97.00 - 5.00	0.0000	0.45	1	1	0.6300	0.6300		0.15
LDF4-50A (1/2 FOAM) (NU)	B	Yes	Ar (CfAe)	109.00 - 5.00	0.0000	0.465	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
LDF4-50A (1/2 FOAM) (NU)	B	Yes	Ar (CfAe)	34.50 - 5.00	0.0000	-0.4	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	-0.47	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
LDF5-50A (7/8 FOAM) (NU)	A	Yes	Ar (CfAe)	111.00 - 5.00	0.0000	0.48	1	1	1.0900	1.0900		0.33
LCF158-50J (1 5/8 FOAM) (T-Mobile)	A	Yes	Ar (CfAe)	159.00 - 5.00	0.0000	-0.35	6	3	1.0000	2.0100		0.92
LDF5-50A (7/8 FOAM) (NU)	C	Yes	Ar (CfAe)	180.00 - 5.00	0.0000	-0.45	1	1	0.5000 1.0900	1.0900		0.33
RG6-Fiber (AT&T)	A	Yes	Ar (CfAe)	77.00 - 5.00	0.0000	0.33	1	1	0.0000	0.6250		0.50
#8 AWG Copper Wire (AT&T)	A	Yes	Ar (CfAe)	77.00 - 5.00	0.0000	0.3	2	1	0.0000	0.3400		0.05
HYBRIFLEX 1-1/4" (Sprint - Proposed)	C	No	Ar (CfAe)	126.00 - 0.00	0.0000	0	3	3	1.5400	1.5400		1.30

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	1.050	0.000	0.000	0.000	3.00
		B	6.318	0.000	0.000	0.000	27.05
		C	1.817	0.000	0.000	0.000	6.60

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
T2	160.00-140.00	A	17.960	0.000	0.000	0.000	183.12
		B	14.336	0.000	0.000	0.000	29.60
		C	2.543	0.000	0.000	0.000	9.57
T3	140.00-120.00	A	18.850	0.000	0.000	0.000	192.60
		B	15.354	0.000	0.000	0.000	31.40
		C	7.760	0.000	0.000	0.000	49.80
T4	120.00-100.00	A	19.849	0.000	0.000	0.000	196.23
		B	16.246	0.000	0.000	0.000	33.95
		C	13.150	0.000	0.000	0.000	104.40
T5	100.00-80.00	A	20.667	0.000	0.000	0.000	199.20
		B	17.769	0.000	0.000	0.000	38.30
		C	13.570	0.000	0.000	0.000	105.60
T6	80.00-60.00	A	25.122	0.000	0.000	0.000	243.06
		B	18.924	0.000	0.000	0.000	41.60
		C	14.200	0.000	0.000	0.000	107.40
T7	60.00-40.00	A	25.908	0.000	0.000	0.000	250.80
		B	18.924	0.000	0.000	0.000	41.60
		C	14.200	0.000	0.000	0.000	107.40
T8	40.00-20.00	A	25.908	0.000	0.000	0.000	250.80
		B	19.685	0.000	0.000	0.000	43.77
		C	14.200	0.000	0.000	0.000	107.40
T9	20.00-5.00	A	19.431	0.000	0.000	0.000	188.10
		B	14.980	0.000	0.000	0.000	33.45
		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	1.925	0.000	0.000	0.000	19.50

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	2.717	0.000	0.000	0.000	16.81
		B		10.901	0.000	0.000	0.000	90.16
		C		3.483	0.000	0.000	0.000	26.03
T2	160.00-140.00	A	0.500	19.595	9.532	0.000	0.000	571.94
		B		24.086	0.000	0.000	0.000	99.05
		C		4.877	0.000	0.000	0.000	37.74
T3	140.00-120.00	A	0.500	20.483	10.033	0.000	0.000	601.16
		B		26.354	0.000	0.000	0.000	109.13
		C		14.260	0.000	0.000	0.000	149.93
T4	120.00-100.00	A	0.500	22.399	10.033	0.000	0.000	615.47
		B		28.663	0.000	0.000	0.000	123.41
		C		23.150	0.000	0.000	0.000	256.87
T5	100.00-80.00	A	0.500	23.967	10.033	0.000	0.000	627.19
		B		32.602	0.000	0.000	0.000	147.78
		C		24.237	0.000	0.000	0.000	263.59
T6	80.00-60.00	A	0.500	34.089	10.033	0.000	0.000	799.25
		B		35.590	0.000	0.000	0.000	166.27
		C		25.867	0.000	0.000	0.000	273.68
T7	60.00-40.00	A	0.500	35.875	10.033	0.000	0.000	829.61
		B		35.590	0.000	0.000	0.000	166.27
		C		25.867	0.000	0.000	0.000	273.68
T8	40.00-20.00	A	0.500	35.875	10.033	0.000	0.000	829.61
		B		37.560	0.000	0.000	0.000	178.45
		C		25.867	0.000	0.000	0.000	273.68
T9	20.00-5.00	A	0.500	26.906	7.525	0.000	0.000	622.21

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		28.730	0.000	0.000	0.000	137.31
		C		19.400	0.000	0.000	0.000	205.26
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		3.175	0.000	0.000	0.000	38.19

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	0.242	0.164	0.424
		B	0.000	0.973	0.987	1.703
		C	0.000	0.311	0.284	0.544
T2	160.00-140.00	A	0.776	2.076	0.000	0.000
		B	0.510	1.461	0.000	0.000
		C	0.186	0.595	0.000	0.000
T3	140.00-120.00	A	0.000	1.586	1.982	3.172
		B	0.000	1.214	1.357	2.428
		C	0.000	0.933	0.973	1.865
T4	120.00-100.00	A	0.000	1.534	2.358	3.836
		B	0.000	1.241	1.656	3.101
		C	0.000	0.815	1.062	2.037
T5	100.00-80.00	A	0.945	3.212	0.942	1.549
		B	0.733	3.001	0.731	1.448
		C	0.430	1.744	0.428	0.841
T6	80.00-60.00	A	0.000	1.662	2.445	4.415
		B	0.000	1.210	1.573	3.215
		C	0.000	0.697	0.915	1.853
T7	60.00-40.00	A	0.227	2.032	1.837	3.354
		B	0.140	1.400	1.130	2.310
		C	0.081	0.807	0.658	1.332
T8	40.00-20.00	A	1.329	4.045	0.000	0.000
		B	0.874	3.027	0.000	0.000
		C	0.476	1.606	0.000	0.000
T9	20.00-5.00	A	0.000	1.276	1.746	3.189
		B	0.000	0.983	1.176	2.458
		C	0.000	0.507	0.625	1.266
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 ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180.00-160.00	0.6233	-1.6705	0.7047	-1.8168
T2	160.00-140.00	-1.4803	-2.1254	-0.3852	-2.6476
T3	140.00-120.00	-0.5487	-0.8888	0.4602	-1.1663
T4	120.00-100.00	-0.3654	-0.2888	0.6264	-0.4723
T5	100.00-80.00	-0.1246	-0.3270	1.0719	-0.4423

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T6	80.00-60.00	-0.2369	-0.9070	0.9268	-1.2755
T7	60.00-40.00	-0.2996	-1.0705	0.8934	-1.4816
T8	40.00-20.00	-0.3143	-1.3287	0.9503	-1.7953
T9	20.00-5.00	-0.2665	-1.1916	0.8953	-1.6813
T10	5.00-0.00	0.0000	1.7722	0.0000	2.0795

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
3/8"x 13' omni	C	From Leg	1.00	0.00	0.0000	34.50	No Ice	1.68	1.68	33.25
(NEU)			0.00				1/2" Ice	3.29	3.29	51.50
110" YAGI	A	From Leg	5.00	0.00	0.0000	81.00	No Ice	2.70	2.70	11.00
(NEU)			0.00				1/2" Ice	5.50	5.50	36.00
GPS	B	From Leg	3.50	0.00	0.0000	88.00	No Ice	1.00	1.00	10.00
(Sprint)			0.00				1/2" Ice	1.50	1.50	15.00
3' GPS Stand-off Mount	B	From Leg	1.50	0.00	0.0000	88.00	No Ice	2.45	2.45	51.00
(Sprint)			0.00				1/2" Ice	3.98	3.98	75.00
3" Dia 20' Omni	B	From Leg	2.00	0.00	0.0000	97.00	No Ice	4.00	4.00	55.00
(NEU)			0.00				1/2" Ice	6.00	6.00	100.00
2-ft Stand Off	B	From Leg	1.00	0.00	0.0000	97.00	No Ice	1.07	1.07	20.00
(NEU)			0.00				1/2" Ice	1.62	1.62	28.00
1.5"x2'omni	B	From Leg	2.00	0.00	0.0000	109.00	No Ice	0.25	0.25	8.00
(NEU)			0.00				1/2" Ice	0.38	0.38	10.60
2-ft Stand Off	B	From Leg	1.00	0.00	0.0000	108.00	No Ice	1.07	1.07	20.00
(NEU)			0.00				1/2" Ice	1.62	1.62	28.00
2-ft Stand Off	C	From Leg	1.00	0.00	0.0000	107.00	No Ice	1.07	1.07	20.00
(NEU)			0.00				1/2" Ice	1.62	1.62	28.00
110 Directional	C	From Leg	2.00	0.00	0.0000	111.00	No Ice	7.00	7.00	66.00
(NEU)			0.00				1/2" Ice	12.60	12.60	85.80
2-ft Stand Off	C	From Leg	1.00	0.00	0.0000	115.00	No Ice	1.07	1.07	20.00
(NEU)			0.00				1/2" Ice	1.62	1.62	28.00
Rohn 6' x 12' Boom Gate (1)	A	From Leg	4.00	0.00	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
Rohn 6' x 12' Boom Gate (1)	B	From Leg	4.00	0.00	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
Rohn 6' x 12' Boom Gate (1)	C	From Leg	4.00	0.00	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

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
2.5" Dia. x12' Omni (NEU)	C	From Leg	0.00 1.00 0.00	0.0000	132.00	No Ice 1/2" Ice	4.20 5.44	4.20 5.44	30.00 59.84
1.5"x2'omni (NEU)	A	From Leg	0.00 3.00 0.00	0.0000	143.00	No Ice 1/2" Ice	0.25 0.38	0.25 0.38	8.00 10.60
1.5"x2'omni (NEU)	A	From Leg	1.00 3.00 0.00	0.0000	141.00	No Ice 1/2" Ice	0.25 0.38	0.25 0.38	8.00 10.60
2-ft Stand Off (NEU)	A	From Leg	-1.00 1.00 0.00	0.0000	142.00	No Ice 1/2" Ice	1.07 1.62	1.07 1.62	20.00 28.00
3"x20-ft Omni (NEU)	C	From Leg	0.00 3.00 0.00	0.0000	147.00	No Ice 1/2" Ice	3.56 7.13	3.56 7.13	23.00 46.00
3-ft Side Arm (NEU)	C	From Leg	0.00 1.50 0.00	0.0000	137.00	No Ice 1/2" Ice	0.66 1.14	0.66 1.14	15.00 28.00
20-ft x 1.9in Support Pipe (NEU)	C	From Leg	0.00 1.50 0.00	0.0000	147.00	No Ice 1/2" Ice	3.80 5.82	3.80 5.82	54.40 83.84
Folded Dipole (NEU)	C	From Leg	0.00 4.00 0.00	5.0000	180.00	No Ice 1/2" Ice	0.81 1.48	0.81 1.48	23.00 30.08
4-ft Side Arm (NEU)	C	From Leg	0.00 2.00 0.00	0.0000	178.00	No Ice 1/2" Ice	5.28 7.88	5.28 7.88	65.00 84.50
2"x9' omni (NEU)	B	From Leg	0.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	1.80 2.73	1.80 2.73	30.00 43.97
2"x7' omni (NEU)	C	From Leg	4.50 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	1.40 2.13	1.40 2.13	30.00 40.92
APX16DWV-16DWVS-E-A20 (T-Mobile)	A	From Leg	3.50 4.00 0.00	0.0000	159.00	No Ice 1/2" Ice	7.07 7.52	2.15 2.49	41.00 73.95
APX16DWV-16DWVS-E-A20 (T-Mobile)	B	From Leg	0.00 1.00 0.00	0.0000	159.00	No Ice 1/2" Ice	7.07 7.52	2.15 2.49	41.00 73.95
APX16DWV-16DWVS-E-A20 (T-Mobile)	C	From Leg	0.00 1.00 0.00	0.0000	159.00	No Ice 1/2" Ice	7.07 7.52	2.15 2.49	41.00 73.95
Pirod 4' Side Mount Standoff (1) (T-Mobile)	A	From Leg	0.00 2.00 0.00	0.0000	159.00	No Ice 1/2" Ice	2.72 4.91	2.72 4.91	50.00 89.00
ETW190VS12UB TMA (T-Mobile)	A	From Leg	0.00 3.50 0.00	0.0000	159.00	No Ice 1/2" Ice	0.66 0.78	0.37 0.46	15.00 19.94
ETW190VS12UB TMA (T-Mobile)	B	From Leg	0.00 0.50 0.00	0.0000	159.00	No Ice 1/2" Ice	0.66 0.78	0.37 0.46	15.00 19.94
ETW190VS12UB TMA (T-Mobile)	C	From Leg	0.00 0.50 0.00	0.0000	159.00	No Ice 1/2" Ice	0.66 0.78	0.37 0.46	15.00 19.94
ATMAA1412D-1A20 Twin TMA	A	From Leg	0.00 3.50 0.00	0.0000	159.00	No Ice 1/2" Ice	1.17 1.31	0.39 0.48	13.00 20.62

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)
(T-Mobile)			0.00						
ATMAA1412D-1A20 Twin	B	From Leg	0.50	0.0000	159.00	No Ice	1.17	0.39	13.00
TMA			0.00			1/2" Ice	1.31	0.48	20.62
(T-Mobile)			0.00						
ATMAA1412D-1A20 Twin	C	From Leg	0.50	0.0000	159.00	No Ice	1.17	0.39	13.00
TMA			0.00			1/2" Ice	1.31	0.48	20.62
(T-Mobile)			0.00						
AM-X-CD-14-65-00TT-RET	A	From Face	4.00	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	4.00	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	4.00	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	4.00	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	4.00	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	4.00	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						
(2) LPG21401 TMA	A	From Face	3.50	0.0000	77.00	No Ice	0.95	0.37	17.50
(AT&T)			4.00			1/2" Ice	1.09	0.48	23.31
			0.00						
(2) LPG21401 TMA	B	From Face	3.50	0.0000	77.00	No Ice	0.95	0.37	17.50
(AT&T)			4.00			1/2" Ice	1.09	0.48	23.31
			0.00						
(2) LPG21401 TMA	C	From Face	3.50	0.0000	77.00	No Ice	0.95	0.37	17.50
(AT&T)			4.00			1/2" Ice	1.09	0.48	23.31
			0.00						
(2) RRUS-11	A	From Face	3.50	0.0000	73.00	No Ice	2.99	1.25	50.00
(AT&T)			0.00			1/2" Ice	3.23	1.41	69.57
			0.00						
(2) RRUS-11	B	From Face	3.50	0.0000	73.00	No Ice	2.99	1.25	50.00
(AT&T)			0.00			1/2" Ice	3.23	1.41	69.57
			0.00						
(2) RRUS-11	C	From Face	3.50	0.0000	73.00	No Ice	2.99	1.25	50.00
(AT&T)			0.00			1/2" Ice	3.23	1.41	69.57
			0.00						
DC6-48-60-18-8F Surge	C	From Leg	1.00	0.0000	72.00	No Ice	2.23	2.23	20.00
Arrestor			0.00			1/2" Ice	2.45	2.45	39.36
(AT&T)			0.00						
Valmont T-Arm (1)	A	From Leg	2.00	0.0000	77.00	No Ice	10.54	10.54	336.00
(AT&T)			0.00			1/2" Ice	14.45	14.45	412.00
			0.00						
Valmont T-Arm (1)	B	From Leg	2.00	0.0000	77.00	No Ice	10.54	10.54	336.00
(AT&T)			0.00			1/2" Ice	14.45	14.45	412.00
			0.00						
Valmont T-Arm (1)	C	From Leg	2.00	0.0000	77.00	No Ice	10.54	10.54	336.00
(AT&T)			0.00			1/2" Ice	14.45	14.45	412.00
			0.00						
APXVSPP18-C-A20 w/	A	From Leg	4.00	0.0000	126.00	No Ice	8.96	8.08	117.64
Mount			0.00			1/2" Ice	9.66	9.14	197.65

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
(Sprint - Proposed)			0.00						
APXVSPP18-C-A20 w/ Mount	B	From Leg	4.00 0.00	0.0000	126.00	No Ice 1/2" Ice	8.96 9.66	8.08 9.14	117.64 197.65
(Sprint - Proposed)			0.00						
APXVSPP18-C-A20 w/ Mount	C	From Leg	4.00 0.00	0.0000	126.00	No Ice 1/2" Ice	8.96 9.66	8.08 9.14	117.64 197.65
(Sprint - Proposed)			0.00						
FD-RRH 2x50 800	A	From Leg	4.00	0.0000	126.00	No Ice	2.40	2.25	64.00
(Sprint - Proposed)			0.00 0.00			1/2" Ice	2.61	2.46	86.12
FD-RRH 2x50 800	B	From Leg	4.00	0.0000	126.00	No Ice	2.40	2.25	64.00
(Sprint - Proposed)			0.00 0.00			1/2" Ice	2.61	2.46	86.12
FD-RRH 2x50 800	C	From Leg	4.00	0.0000	126.00	No Ice	2.40	2.25	64.00
(Sprint - Proposed)			0.00 0.00			1/2" Ice	2.61	2.46	86.12
FD-RRH 4x45 1900	A	From Leg	4.00	0.0000	126.00	No Ice	2.71	2.78	60.00
(Sprint - Proposed)			0.00 0.00			1/2" Ice	2.94	3.02	83.97
FD-RRH 4x45 1900	B	From Leg	4.00	0.0000	126.00	No Ice	2.71	2.78	60.00
(Sprint - Proposed)			0.00 0.00			1/2" Ice	2.94	3.02	83.97
FD-RRH 4x45 1900	C	From Leg	4.00	0.0000	126.00	No Ice	2.71	2.78	60.00
(Sprint - Proposed)			0.00 0.00			1/2" Ice	2.94	3.02	83.97

Dishes

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

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	9.740	10.633	9.583	47.04	0.000	0.000
180.00-160.00					B	8.918	15.901		38.61	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	9.621	11.400		45.59	0.000	0.000
T2 160.00-140.00	150.00	1.541	29	72.992	A	0.000	31.409	9.583	30.51	0.000	0.000
					B	0.000	28.050		34.17	0.000	0.000
					C	0.000	16.582		57.80	0.000	0.000
T3 140.00-120.00	130.00	1.48	27	72.992	A	9.338	28.433	9.583	25.37	0.000	0.000
					B	9.962	24.937		27.46	0.000	0.000
					C	10.346	17.343		34.61	0.000	0.000
T4 120.00-100.00	110.00	1.411	26	72.992	A	10.000	29.432	9.583	24.30	0.000	0.000
					B	10.703	25.830		26.23	0.000	0.000
					C	11.296	22.733		28.16	0.000	0.000
T5 100.00-80.00	90.00	1.332	25	72.992	A	3.682	33.946	9.583	25.47	0.000	0.000
					B	3.893	31.260		27.26	0.000	0.000
					C	4.196	27.365		30.37	0.000	0.000
T6 80.00-60.00	70.00	1.24	23	72.992	A	6.479	34.705	9.583	23.27	0.000	0.000
					B	7.351	28.507		26.73	0.000	0.000
					C	8.009	23.783		30.14	0.000	0.000
T7 60.00-40.00	50.00	1.126	21	72.992	A	4.577	36.057	9.583	23.58	0.000	0.000
					B	5.284	29.160		27.82	0.000	0.000
					C	5.757	24.495		31.68	0.000	0.000
T8 40.00-20.00	30.00	1	18	72.992	A	0.000	38.804	9.583	24.70	0.000	0.000
					B	0.000	33.036		29.01	0.000	0.000
					C	0.000	27.949		34.29	0.000	0.000
T9 20.00-5.00	12.50	1	18	54.744	A	4.352	26.619	7.188	23.21	0.000	0.000
					B	4.922	22.168		26.53	0.000	0.000
					C	5.473	17.837		30.83	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	4.500		44.07	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 180.00-160.00	170.00	1.597	30	0.5000	74.658	A	9.480	21.051	12.917	42.31	0.000	0.000
						B	8.202	28.504		35.19	0.000	0.000
						C	9.360	21.749		41.52	0.000	0.000
T2 160.00-140.00	150.00	1.541	29	0.5000	74.658	A	9.532	38.171	12.917	27.08	0.000	0.000
						B	0.000	43.277		29.85	0.000	0.000
						C	0.000	24.934		51.80	0.000	0.000
T3 140.00-120.00	130.00	1.48	27	0.5000	74.658	A	18.181	37.474	12.917	23.21	0.000	0.000
						B	8.891	43.716		24.55	0.000	0.000
						C	9.454	31.904		31.23	0.000	0.000
T4 120.00-100.00	110.00	1.411	26	0.5000	74.658	A	18.556	38.725	12.917	22.55	0.000	0.000
						B	9.257	45.282		23.68	0.000	0.000
						C	10.322	40.195		25.57	0.000	0.000
T5 100.00-80.00	90.00	1.332	25	0.5000	74.658	A	13.107	43.256	12.917	22.92	0.000	0.000
						B	3.176	52.102		23.37	0.000	0.000
						C	3.782	44.994		26.48	0.000	0.000
T6 80.00-60.00	70.00	1.24	23	0.5000	74.658	A	14.542	48.702	12.917	20.42	0.000	0.000
						B	5.709	50.656		22.92	0.000	0.000
						C	7.071	41.444		26.62	0.000	0.000
T7 60.00-40.00	50.00	1.126	21	0.5000	74.658	A	13.093	50.646	12.917	20.26	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						B	4.104	50.994		23.44	0.000	0.000
						C	5.082	41.863		27.51	0.000	0.000
T8 40.00-20.00	30.00	1	18	0.5000	74.658	A	10.033	52.482	12.917	20.66	0.000	0.000
						B	0.000	55.185		23.41	0.000	0.000
						C	0.000	44.912		28.76	0.000	0.000
T9 20.00-5.00	12.50	1	18	0.5000	55.994	A	10.434	37.757	9.688	20.10	0.000	0.000
						B	3.640	39.874		22.26	0.000	0.000
						C	4.832	31.020		27.02	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	7.183		40.70	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	9.740	10.633	9.583	47.04	0.000	0.000
180.00-160.00					B	8.918	15.901		38.61	0.000	0.000
					C	9.621	11.400		45.59	0.000	0.000
T2	150.00	1.541	29	72.992	A	0.000	31.409	9.583	30.51	0.000	0.000
160.00-140.00					B	0.000	28.050		34.17	0.000	0.000
					C	0.000	16.582		57.80	0.000	0.000
T3	130.00	1.48	27	72.992	A	9.338	28.433	9.583	25.37	0.000	0.000
140.00-120.00					B	9.962	24.937		27.46	0.000	0.000
					C	10.346	17.343		34.61	0.000	0.000
T4	110.00	1.411	26	72.992	A	10.000	29.432	9.583	24.30	0.000	0.000
120.00-100.00					B	10.703	25.830		26.23	0.000	0.000
					C	11.296	22.733		28.16	0.000	0.000
T5	90.00	1.332	25	72.992	A	3.682	33.946	9.583	25.47	0.000	0.000
100.00-80.00					B	3.893	31.260		27.26	0.000	0.000
					C	4.196	27.365		30.37	0.000	0.000
T6 80.00-60.00	70.00	1.24	23	72.992	A	6.479	34.705	9.583	23.27	0.000	0.000
					B	7.351	28.507		26.73	0.000	0.000
					C	8.009	23.783		30.14	0.000	0.000
T7 60.00-40.00	50.00	1.126	21	72.992	A	4.577	36.057	9.583	23.58	0.000	0.000
					B	5.284	29.160		27.82	0.000	0.000
					C	5.757	24.495		31.68	0.000	0.000
T8 40.00-20.00	30.00	1	18	72.992	A	0.000	38.804	9.583	24.70	0.000	0.000
					B	0.000	33.036		29.01	0.000	0.000
					C	0.000	27.949		34.29	0.000	0.000
T9 20.00-5.00	12.50	1	18	54.744	A	4.352	26.619	7.188	23.21	0.000	0.000
					B	4.922	22.168		26.53	0.000	0.000
					C	5.473	17.837		30.83	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	4.500		44.07	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	0.279	2.353	0.61	1	1	16.224	1375.21	68.76	B
180.00-160.00		TA 557.98	B	0.34	2.195	0.629	1	1	18.919			
			C	0.288	2.328	0.612	1	1	16.601			
T2	222.29	455.02	A	0.43	2.007	0.664	1	1	20.869	1338.40	66.92	A
160.00-140.00			B	0.384	2.096	0.645	1	1	18.101			
			C	0.227	2.508	0.596	1	1	9.888			
T3	273.80	881.09	A	0.517	1.878	0.707	1	1	29.428	1695.45	84.77	A
140.00-120.00		TA 557.98	B	0.478	1.93	0.687	1	1	27.083			
			C	0.379	2.106	0.643	1	1	21.505			
T4	334.58	1813.41	A	0.54	1.853	0.719	1	1	31.158	1688.56	84.43	A
120.00-100.00			B	0.5	1.899	0.698	1	1	28.725			
			C	0.466	1.948	0.681	1	1	26.774			
T5	343.10	1090.34	A	0.516	1.881	0.706	1	1	27.631	1434.96	71.75	A
100.00-80.00			B	0.482	1.925	0.688	1	1	25.409			
			C	0.432	2.003	0.665	1	1	22.403			
T6	392.06	1323.89	A	0.564	1.831	0.732	1	1	31.896	1500.57	75.03	A
80.00-60.00			B	0.491	1.912	0.693	1	1	27.109			
			C	0.436	1.998	0.667	1	1	23.867			
T7	399.80	1126.79	A	0.557	1.837	0.728	1	1	30.829	1322.25	66.11	A
60.00-40.00			B	0.472	1.939	0.684	1	1	25.217			
			C	0.414	2.036	0.658	1	1	21.864			
T8	401.98	455.02	A	0.532	1.862	0.714	1	1	27.711	1069.88	53.49	A
40.00-20.00			B	0.453	1.969	0.674	1	1	22.282			
			C	0.383	2.099	0.645	1	1	18.021			
T9 20.00-5.00	302.10	984.05	A	0.566	1.829	0.733	1	1	23.869	905.20	60.35	A
			B	0.495	1.907	0.695	1	1	20.327			
			C	0.426	2.015	0.662	1	1	17.290			
T10 5.00-0.00	19.50	254.72	A	0.4	2.064	0.652	1	1	3.021	176.94	35.39	C
			B	0.4	2.064	0.652	1	1	3.021			
			C	0.597	1.806	0.752	1	1	4.726			
Sum Weight:	2725.86	10311.37								12507.40		

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 ft²	F lb	w plf	Ctrl. Face
T1	36.65	811.06	A	0.279	2.353	0.61	0.8	1	14.276	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	0.288	2.328	0.612	0.8	1	14.677			
T2	222.29	455.02	A	0.43	2.007	0.664	0.8	1	20.869	1338.40	66.92	A
160.00-140.00			B	0.384	2.096	0.645	0.8	1	18.101			
			C	0.227	2.508	0.596	0.8	1	9.888			
T3	273.80	881.09	A	0.517	1.878	0.707	0.8	1	27.560	1587.85	79.39	A
140.00-120.00		TA 557.98	B	0.478	1.93	0.687	0.8	1	25.091			
			C	0.379	2.106	0.643	0.8	1	19.436			
T4	334.58	1813.41	A	0.54	1.853	0.719	0.8	1	29.158	1580.17	79.01	A
120.00-100.00			B	0.5	1.899	0.698	0.8	1	26.585			
			C	0.466	1.948	0.681	0.8	1	24.515			
T5	343.10	1090.34	A	0.516	1.881	0.706	0.8	1	26.895	1396.72	69.84	A
100.00-80.00			B	0.482	1.925	0.688	0.8	1	24.630			
			C	0.432	2.003	0.665	0.8	1	21.563			
T6	392.06	1323.89	A	0.564	1.831	0.732	0.8	1	30.600	1439.60	71.98	A
80.00-60.00			B	0.491	1.912	0.693	0.8	1	25.639			

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	0.436	1.998	0.667	0.8	1	22.265			
T7	399.80	1126.79	A	0.557	1.837	0.728	0.8	1	29.914	1282.98	64.15	A
60.00-40.00			B	0.472	1.939	0.684	0.8	1	24.160			
			C	0.414	2.036	0.658	0.8	1	20.713			
T8	401.98	455.02	A	0.532	1.862	0.714	0.8	1	27.711	1069.88	53.49	A
40.00-20.00			B	0.453	1.969	0.674	0.8	1	22.282			
			C	0.383	2.099	0.645	0.8	1	18.021			
T9 20.00-5.00	302.10	984.05	A	0.566	1.829	0.733	0.8	1	22.999	872.19	58.15	A
			B	0.495	1.907	0.695	0.8	1	19.342			
			C	0.426	2.015	0.662	0.8	1	16.195			
T10 5.00-0.00	19.50	254.72	A	0.4	2.064	0.652	0.8	1	2.753	166.88	33.38	C
			B	0.4	2.064	0.652	0.8	1	2.753			
			C	0.597	1.806	0.752	0.8	1	4.457			
Sum Weight:	2725.86	10311.37								11980.23		

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 ft²	F lb	w plf	Ctrl. Face
T1	36.65	811.06	A	0.279	2.353	0.61	0.85	1	14.763	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	0.288	2.328	0.612	0.85	1	15.158			
T2	222.29	455.02	A	0.43	2.007	0.664	0.85	1	20.869	1338.40	66.92	A
160.00-140.00			B	0.384	2.096	0.645	0.85	1	18.101			
			C	0.227	2.508	0.596	0.85	1	9.888			
T3	273.80	881.09	A	0.517	1.878	0.707	0.85	1	28.027	1614.75	80.74	A
140.00-120.00		TA 557.98	B	0.478	1.93	0.687	0.85	1	25.589			
			C	0.379	2.106	0.643	0.85	1	19.953			
T4	334.58	1813.41	A	0.54	1.853	0.719	0.85	1	29.658	1607.26	80.36	A
120.00-100.00			B	0.5	1.899	0.698	0.85	1	27.120			
			C	0.466	1.948	0.681	0.85	1	25.080			
T5	343.10	1090.34	A	0.516	1.881	0.706	0.85	1	27.079	1406.28	70.31	A
100.00-80.00			B	0.482	1.925	0.688	0.85	1	24.825			
			C	0.432	2.003	0.665	0.85	1	21.773			
T6	392.06	1323.89	A	0.564	1.831	0.732	0.85	1	30.924	1454.84	72.74	A
80.00-60.00			B	0.491	1.912	0.693	0.85	1	26.006			
			C	0.436	1.998	0.667	0.85	1	22.665			
T7	399.80	1126.79	A	0.557	1.837	0.728	0.85	1	30.142	1292.80	64.64	A
60.00-40.00			B	0.472	1.939	0.684	0.85	1	24.424			
			C	0.414	2.036	0.658	0.85	1	21.001			
T8	401.98	455.02	A	0.532	1.862	0.714	0.85	1	27.711	1069.88	53.49	A
40.00-20.00			B	0.453	1.969	0.674	0.85	1	22.282			
			C	0.383	2.099	0.645	0.85	1	18.021			
T9 20.00-5.00	302.10	984.05	A	0.566	1.829	0.733	0.85	1	23.217	880.44	58.70	A
			B	0.495	1.907	0.695	0.85	1	19.588			
			C	0.426	2.015	0.662	0.85	1	16.469			
T10 5.00-0.00	19.50	254.72	A	0.4	2.064	0.652	0.85	1	2.820	169.40	33.88	C
			B	0.4	2.064	0.652	0.85	1	2.820			
			C	0.597	1.806	0.752	0.85	1	4.524			
Sum Weight:	2725.86	10311.37								12112.03		

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 ft²	F lb	w plf	Ctrl. Face
T1	132.99	1316.71	A	0.409	2.047	0.655	1	1	23.274	1769.74	88.49	B
180.00-160.00		TA	B	0.492	1.911	0.693	1	1	27.963			
		1183.98	C	0.417	2.032	0.659	1	1	23.683			
T2	708.73	725.09	A	0.639	1.785	0.778	1	1	39.237	2237.93	111.90	A
160.00-140.00			B	0.58	1.818	0.741	1	1	32.084			
			C	0.334	2.21	0.627	1	1	15.630			
T3	860.22	1429.35	A	0.745	1.786	0.853	1	1	50.162	2747.57	137.38	A
140.00-120.00		TA	B	0.705	1.776	0.823	1	1	44.878			
		1183.98	C	0.554	1.84	0.727	1	1	32.632			
T4	995.76	2382.38	A	0.767	1.795	0.87	1	1	52.254	2743.55	137.18	A
120.00-100.00			B	0.731	1.781	0.842	1	1	47.392			
			C	0.677	1.776	0.804	1	1	42.619			
T5	1038.56	1526.98	A	0.755	1.79	0.861	1	1	50.336	2487.46	124.37	A
100.00-80.00			B	0.74	1.784	0.85	1	1	47.442			
			C	0.653	1.781	0.788	1	1	39.223			
T6	1239.19	1748.80	A	0.847	1.858	0.936	1	1	60.126	2871.76	143.59	A
80.00-60.00			B	0.755	1.79	0.861	1	1	49.308			
			C	0.65	1.782	0.785	1	1	39.620			
T7	1269.55	1506.58	A	0.854	1.866	0.942	1	1	60.788	2647.43	132.37	A
60.00-40.00			B	0.738	1.783	0.848	1	1	47.334			
			C	0.629	1.789	0.772	1	1	37.386			
T8	1281.74	725.09	A	0.837	1.848	0.928	1	1	58.715	2249.95	112.50	A
40.00-20.00			B	0.739	1.784	0.849	1	1	46.833			
			C	0.602	1.803	0.755	1	1	33.889			
T9 20.00-5.00	964.77	1296.54	A	0.861	1.873	0.948	1	1	46.220	1795.11	119.67	A
			B	0.777	1.801	0.878	1	1	38.649			
			C	0.64	1.785	0.779	1	1	28.999			
T10 5.00-0.00	38.19	336.95	A	0.523	1.872	0.71	1	1	4.187	305.22	61.04	C
			B	0.523	1.872	0.71	1	1	4.187			
			C	0.833	1.844	0.924	1	1	7.982			
Sum Weight:	8529.71	15362.43								21855.72		

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 ft²	F lb	w plf	Ctrl. Face
T1	132.99	1316.71	A	0.409	2.047	0.655	0.8	1	21.378	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	0.417	2.032	0.659	0.8	1	21.811			
T2	708.73	725.09	A	0.639	1.785	0.778	0.8	1	37.331	2129.20	106.46	A
160.00-140.00			B	0.58	1.818	0.741	0.8	1	32.084			
			C	0.334	2.21	0.627	0.8	1	15.630			
T3	860.22	1429.35	A	0.745	1.786	0.853	0.8	1	46.526	2548.40	127.42	A
140.00-120.00		TA	B	0.705	1.776	0.823	0.8	1	43.100			
		1183.98	C	0.554	1.84	0.727	0.8	1	30.741			
T4	995.76	2382.38	A	0.767	1.795	0.87	0.8	1	48.543	2548.70	127.43	A
120.00-100.00			B	0.731	1.781	0.842	0.8	1	45.541			
			C	0.677	1.776	0.804	0.8	1	40.555			
T5	1038.56	1526.98	A	0.755	1.79	0.861	0.8	1	47.715	2357.91	117.90	A
100.00-80.00			B	0.74	1.784	0.85	0.8	1	46.807			
			C	0.653	1.781	0.788	0.8	1	38.467			

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
T6	1239.19	1748.80	A	0.847	1.858	0.936	0.8	1	57.218	2732.85	136.64	A
80.00-60.00			B	0.755	1.79	0.861	0.8	1	48.166			
			C	0.65	1.782	0.785	0.8	1	38.205			
T7	1269.55	1506.58	A	0.854	1.866	0.942	0.8	1	58.169	2533.39	126.67	A
60.00-40.00			B	0.738	1.783	0.848	0.8	1	46.513			
			C	0.629	1.789	0.772	0.8	1	36.369			
T8	1281.74	725.09	A	0.837	1.848	0.928	0.8	1	56.708	2173.05	108.65	A
40.00-20.00			B	0.739	1.784	0.849	0.8	1	46.833			
			C	0.602	1.803	0.755	0.8	1	33.889			
T9 20.00-5.00	964.77	1296.54	A	0.861	1.873	0.948	0.8	1	44.133	1714.06	114.27	A
			B	0.777	1.801	0.878	0.8	1	37.921			
			C	0.64	1.785	0.779	0.8	1	28.033			
T10 5.00-0.00	38.19	336.95	A	0.523	1.872	0.71	0.8	1	3.918	294.95	58.99	C
			B	0.523	1.872	0.71	0.8	1	3.918			
			C	0.833	1.844	0.924	0.8	1	7.713			
Sum Weight:	8529.71	15362.43								20698.44		

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	0.409	2.047	0.655	0.85	1	21.852	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	0.417	2.032	0.659	0.85	1	22.279			
T2	708.73	725.09	A	0.639	1.785	0.778	0.85	1	37.807	2156.39	107.82	A
160.00-140.00			B	0.58	1.818	0.741	0.85	1	32.084			
			C	0.334	2.21	0.627	0.85	1	15.630			
T3	860.22	1429.35	A	0.745	1.786	0.853	0.85	1	47.435	2598.20	129.91	A
140.00-120.00		TA	B	0.705	1.776	0.823	0.85	1	43.545			
		1183.98	C	0.554	1.84	0.727	0.85	1	31.214			
T4	995.76	2382.38	A	0.767	1.795	0.87	0.85	1	49.471	2597.41	129.87	A
120.00-100.00			B	0.731	1.781	0.842	0.85	1	46.004			
			C	0.677	1.776	0.804	0.85	1	41.071			
T5	1038.56	1526.98	A	0.755	1.79	0.861	0.85	1	48.370	2390.30	119.52	A
100.00-80.00			B	0.74	1.784	0.85	0.85	1	46.965			
			C	0.653	1.781	0.788	0.85	1	38.656			
T6	1239.19	1748.80	A	0.847	1.858	0.936	0.85	1	57.945	2767.57	138.38	A
80.00-60.00			B	0.755	1.79	0.861	0.85	1	48.452			
			C	0.65	1.782	0.785	0.85	1	38.559			
T7	1269.55	1506.58	A	0.854	1.866	0.942	0.85	1	58.824	2561.90	128.09	A
60.00-40.00			B	0.738	1.783	0.848	0.85	1	46.719			
			C	0.629	1.789	0.772	0.85	1	36.623			
T8	1281.74	725.09	A	0.837	1.848	0.928	0.85	1	57.210	2192.28	109.61	A
40.00-20.00			B	0.739	1.784	0.849	0.85	1	46.833			
			C	0.602	1.803	0.755	0.85	1	33.889			
T9 20.00-5.00	964.77	1296.54	A	0.861	1.873	0.948	0.85	1	44.655	1734.32	115.62	A
			B	0.777	1.801	0.878	0.85	1	38.103			
			C	0.64	1.785	0.779	0.85	1	28.274			
T10 5.00-0.00	38.19	336.95	A	0.523	1.872	0.71	0.85	1	3.986	297.52	59.50	C
			B	0.523	1.872	0.71	0.85	1	3.986			
			C	0.833	1.844	0.924	0.85	1	7.780			
Sum Weight:	8529.71	15362.43								20987.76		

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	0.279	2.353	0.61	1	1	16.224	1375.21	68.76	B
180.00-160.00		TA 557.98	B	0.34	2.195	0.629	1	1	18.919			
			C	0.288	2.328	0.612	1	1	16.601			
T2	222.29	455.02	A	0.43	2.007	0.664	1	1	20.869	1338.40	66.92	A
160.00-140.00			B	0.384	2.096	0.645	1	1	18.101			
			C	0.227	2.508	0.596	1	1	9.888			
T3	273.80	881.09	A	0.517	1.878	0.707	1	1	29.428	1695.45	84.77	A
140.00-120.00		TA 557.98	B	0.478	1.93	0.687	1	1	27.083			
			C	0.379	2.106	0.643	1	1	21.505			
T4	334.58	1813.41	A	0.54	1.853	0.719	1	1	31.158	1688.56	84.43	A
120.00-100.00			B	0.5	1.899	0.698	1	1	28.725			
			C	0.466	1.948	0.681	1	1	26.774			
T5	343.10	1090.34	A	0.516	1.881	0.706	1	1	27.631	1434.96	71.75	A
100.00-80.00			B	0.482	1.925	0.688	1	1	25.409			
			C	0.432	2.003	0.665	1	1	22.403			
T6	392.06	1323.89	A	0.564	1.831	0.732	1	1	31.896	1500.57	75.03	A
80.00-60.00			B	0.491	1.912	0.693	1	1	27.109			
			C	0.436	1.998	0.667	1	1	23.867			
T7	399.80	1126.79	A	0.557	1.837	0.728	1	1	30.829	1322.25	66.11	A
60.00-40.00			B	0.472	1.939	0.684	1	1	25.217			
			C	0.414	2.036	0.658	1	1	21.864			
T8	401.98	455.02	A	0.532	1.862	0.714	1	1	27.711	1069.88	53.49	A
40.00-20.00			B	0.453	1.969	0.674	1	1	22.282			
			C	0.383	2.099	0.645	1	1	18.021			
T9 20.00-5.00	302.10	984.05	A	0.566	1.829	0.733	1	1	23.869	905.20	60.35	A
			B	0.495	1.907	0.695	1	1	20.327			
			C	0.426	2.015	0.662	1	1	17.290			
T10 5.00-0.00	19.50	254.72	A	0.4	2.064	0.652	1	1	3.021	176.94	35.39	C
			B	0.4	2.064	0.652	1	1	3.021			
			C	0.597	1.806	0.752	1	1	4.726			
Sum Weight:	2725.86	10311.37								12507.40		

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	0.279	2.353	0.61	0.8	1	14.276	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	0.288	2.328	0.612	0.8	1	14.677			
T2	222.29	455.02	A	0.43	2.007	0.664	0.8	1	20.869	1338.40	66.92	A
160.00-140.00			B	0.384	2.096	0.645	0.8	1	18.101			
			C	0.227	2.508	0.596	0.8	1	9.888			
T3	273.80	881.09	A	0.517	1.878	0.707	0.8	1	27.560	1587.85	79.39	A
140.00-120.00		TA 557.98	B	0.478	1.93	0.687	0.8	1	25.091			
			C	0.379	2.106	0.643	0.8	1	19.436			
T4	334.58	1813.41	A	0.54	1.853	0.719	0.8	1	29.158	1580.17	79.01	A
120.00-100.00			B	0.5	1.899	0.698	0.8	1	26.585			
			C	0.466	1.948	0.681	0.8	1	24.515			

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
T5	343.10	1090.34	A	0.516	1.881	0.706	0.8	1	26.895	1396.72	69.84	A
100.00-80.00			B	0.482	1.925	0.688	0.8	1	24.630			
			C	0.432	2.003	0.665	0.8	1	21.563			
T6	392.06	1323.89	A	0.564	1.831	0.732	0.8	1	30.600	1439.60	71.98	A
80.00-60.00			B	0.491	1.912	0.693	0.8	1	25.639			
			C	0.436	1.998	0.667	0.8	1	22.265			
T7	399.80	1126.79	A	0.557	1.837	0.728	0.8	1	29.914	1282.98	64.15	A
60.00-40.00			B	0.472	1.939	0.684	0.8	1	24.160			
			C	0.414	2.036	0.658	0.8	1	20.713			
T8	401.98	455.02	A	0.532	1.862	0.714	0.8	1	27.711	1069.88	53.49	A
40.00-20.00			B	0.453	1.969	0.674	0.8	1	22.282			
			C	0.383	2.099	0.645	0.8	1	18.021			
T9 20.00-5.00	302.10	984.05	A	0.566	1.829	0.733	0.8	1	22.999	872.19	58.15	A
			B	0.495	1.907	0.695	0.8	1	19.342			
			C	0.426	2.015	0.662	0.8	1	16.195			
T10 5.00-0.00	19.50	254.72	A	0.4	2.064	0.652	0.8	1	2.753	166.88	33.38	C
			B	0.4	2.064	0.652	0.8	1	2.753			
			C	0.597	1.806	0.752	0.8	1	4.457			
Sum Weight:	2725.86	10311.37								11980.23		

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	0.279	2.353	0.61	0.85	1	14.763	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	0.288	2.328	0.612	0.85	1	15.158			
T2	222.29	455.02	A	0.43	2.007	0.664	0.85	1	20.869	1338.40	66.92	A
160.00-140.00			B	0.384	2.096	0.645	0.85	1	18.101			
			C	0.227	2.508	0.596	0.85	1	9.888			
T3	273.80	881.09	A	0.517	1.878	0.707	0.85	1	28.027	1614.75	80.74	A
140.00-120.00		TA 557.98	B	0.478	1.93	0.687	0.85	1	25.589			
			C	0.379	2.106	0.643	0.85	1	19.953			
T4	334.58	1813.41	A	0.54	1.853	0.719	0.85	1	29.658	1607.26	80.36	A
120.00-100.00			B	0.5	1.899	0.698	0.85	1	27.120			
			C	0.466	1.948	0.681	0.85	1	25.080			
T5	343.10	1090.34	A	0.516	1.881	0.706	0.85	1	27.079	1406.28	70.31	A
100.00-80.00			B	0.482	1.925	0.688	0.85	1	24.825			
			C	0.432	2.003	0.665	0.85	1	21.773			
T6	392.06	1323.89	A	0.564	1.831	0.732	0.85	1	30.924	1454.84	72.74	A
80.00-60.00			B	0.491	1.912	0.693	0.85	1	26.006			
			C	0.436	1.998	0.667	0.85	1	22.665			
T7	399.80	1126.79	A	0.557	1.837	0.728	0.85	1	30.142	1292.80	64.64	A
60.00-40.00			B	0.472	1.939	0.684	0.85	1	24.424			
			C	0.414	2.036	0.658	0.85	1	21.001			
T8	401.98	455.02	A	0.532	1.862	0.714	0.85	1	27.711	1069.88	53.49	A
40.00-20.00			B	0.453	1.969	0.674	0.85	1	22.282			
			C	0.383	2.099	0.645	0.85	1	18.021			
T9 20.00-5.00	302.10	984.05	A	0.566	1.829	0.733	0.85	1	23.217	880.44	58.70	A
			B	0.495	1.907	0.695	0.85	1	19.588			
			C	0.426	2.015	0.662	0.85	1	16.469			
T10 5.00-0.00	19.50	254.72	A	0.4	2.064	0.652	0.85	1	2.820	169.40	33.88	C
			B	0.4	2.064	0.652	0.85	1	2.820			
			C	0.597	1.806	0.752	0.85	1	4.524			

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
Sum Weight:	2725.86	10311.37								12112.03		

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
3/8"x 13' omni	240.0000	33.25	-2.57	1.48	34.50	1.013	19	1.68	1.68
110" YAGI	0.0000	11.00	0.00	-6.97	81.00	1.292	24	2.70	2.70
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
3" Dia 20' Omni	120.0000	55.00	3.44	1.98	97.00	1.361	25	4.00	4.00
2-ft Stand Off	120.0000	20.00	2.57	1.48	97.00	1.361	25	1.07	1.07
1.5"x2'omni	120.0000	8.00	3.44	1.98	109.00	1.407	26	0.25	0.25
2-ft Stand Off	120.0000	20.00	2.57	1.48	108.00	1.403	26	1.07	1.07
2-ft Stand Off	240.0000	20.00	-2.57	1.48	107.00	1.399	26	1.07	1.07
110 Directional	240.0000	66.00	-3.44	1.98	111.00	1.414	26	7.00	7.00
2-ft Stand Off	240.0000	20.00	-2.57	1.48	115.00	1.429	26	1.07	1.07
Rohn 6' x 12' Boom Gate (1)	0.0000	560.00	0.00	-5.97	126.00	1.466	27	16.60	16.60
Rohn 6' x 12' Boom Gate (1)	120.0000	560.00	5.17	2.98	126.00	1.466	27	16.60	16.60
Rohn 6' x 12' Boom Gate (1)	240.0000	560.00	-5.17	2.98	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
APX16DWV-16DWVS-E-A20	0.0000	41.00	0.00	-5.97	159.00	1.567	29	7.07	2.15
APX16DWV-16DWVS-E-A20	120.0000	41.00	2.57	1.48	159.00	1.567	29	7.07	2.15
APX16DWV-16DWVS-E-A20	240.0000	41.00	-2.57	1.48	159.00	1.567	29	7.07	2.15
Pirod 4' Side Mount Standoff (1)	0.0000	50.00	0.00	-3.97	159.00	1.567	29	2.72	2.72
ETW190VS12UB TMA	0.0000	15.00	0.00	-5.47	159.00	1.567	29	0.66	0.37
ETW190VS12UB TMA	120.0000	15.00	2.14	1.23	159.00	1.567	29	0.66	0.37
ETW190VS12UB TMA	240.0000	15.00	-2.14	1.23	159.00	1.567	29	0.66	0.37
ATMAA1412D-1A20 Twin TMA	0.0000	13.00	0.00	-5.47	159.00	1.567	29	1.17	0.39
ATMAA1412D-1A20	120.0000	13.00	2.14	1.23	159.00	1.567	29	1.17	0.39

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
Twin TMA ATMAA1412D-1A20	240.0000	13.00	-2.14	1.23	159.00	1.567	29	1.17	0.39
Twin TMA AM-X-CD-14-65-00TT-RET	300.0000	36.40	-6.32	0.97	77.00	1.274	24	5.51	2.83
AM-X-CD-14-65-00TT-RET	60.0000	36.40	2.32	-5.96	77.00	1.274	24	5.51	2.83
AM-X-CD-14-65-00TT-RET	180.0000	36.40	4.00	4.98	77.00	1.274	24	5.51	2.83
7770.00	300.0000	35.00	-2.32	-5.96	77.00	1.274	24	5.88	2.93
7770.00	60.0000	35.00	6.32	0.97	77.00	1.274	24	5.88	2.93
7770.00	180.0000	35.00	-4.00	4.98	77.00	1.274	24	5.88	2.93
LPG21401 TMA	300.0000	35.00	-1.88	-5.71	77.00	1.274	24	1.91	0.73
LPG21401 TMA	60.0000	35.00	5.88	1.22	77.00	1.274	24	1.91	0.73
LPG21401 TMA	180.0000	35.00	-4.00	4.48	77.00	1.274	24	1.91	0.73
RRUS-11	300.0000	100.00	-3.88	-2.24	73.00	1.255	23	5.99	2.49
RRUS-11	60.0000	100.00	3.88	-2.24	73.00	1.255	23	5.99	2.49
RRUS-11	180.0000	100.00	0.00	4.48	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
APXVSPP18-C-A20 w/ Mount	0.0000	117.64	0.00	-5.97	126.00	1.466	27	8.96	8.08
APXVSPP18-C-A20 w/ Mount	120.0000	117.64	5.17	2.98	126.00	1.466	27	8.96	8.08
APXVSPP18-C-A20 w/ Mount	240.0000	117.64	-5.17	2.98	126.00	1.466	27	8.96	8.08
FD-RRH 2x50 800	0.0000	64.00	0.00	-5.97	126.00	1.466	27	2.40	2.25
FD-RRH 2x50 800	120.0000	64.00	5.17	2.98	126.00	1.466	27	2.40	2.25
FD-RRH 2x50 800	240.0000	64.00	-5.17	2.98	126.00	1.466	27	2.40	2.25
FD-RRH 4x45 1900	0.0000	60.00	0.00	-5.97	126.00	1.466	27	2.71	2.78
FD-RRH 4x45 1900	120.0000	60.00	5.17	2.98	126.00	1.466	27	2.71	2.78
FD-RRH 4x45 1900	240.0000	60.00	-5.17	2.98	126.00	1.466	27	2.71	2.78
	Sum Weight:	4929.77							

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
3/8"x 13' omni	240.0000	51.50	-2.57	1.48	34.50	1.013	19	3.29	3.29	0.5000
110" YAGI	0.0000	36.00	0.00	-6.97	81.00	1.292	24	5.50	5.50	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
3" Dia 20' Omni	120.0000	100.00	3.44	1.98	97.00	1.361	25	6.00	6.00	0.5000
2-ft Stand Off	120.0000	28.00	2.57	1.48	97.00	1.361	25	1.62	1.62	0.5000
1.5"x2'omni	120.0000	10.60	3.44	1.98	109.00	1.407	26	0.38	0.38	0.5000
2-ft Stand Off	120.0000	28.00	2.57	1.48	108.00	1.403	26	1.62	1.62	0.5000
2-ft Stand Off	240.0000	28.00	-2.57	1.48	107.00	1.399	26	1.62	1.62	0.5000

Description	Aiming Azimuth	Weight	$Offset_x$	$Offset_z$	z	K_z	q_z	C_AA_C Front	C_AA_C Side	t_z
	°	lb	ft	ft	ft		psf	ft^2	ft^2	in
110 Directional	240.0000	85.80	-3.44	1.98	111.00	1.414	26	12.60	12.60	0.5000
2-ft Stand Off	240.0000	28.00	-2.57	1.48	115.00	1.429	26	1.62	1.62	0.5000
Rohn 6' x 12' Boom Gate (1)	0.0000	700.00	0.00	-5.97	126.00	1.466	27	19.80	19.80	0.5000
Rohn 6' x 12' Boom Gate (1)	120.0000	700.00	5.17	2.98	126.00	1.466	27	19.80	19.80	0.5000
Rohn 6' x 12' Boom Gate (1)	240.0000	700.00	-5.17	2.98	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
APX16DWV-16DWVS-E-A20	0.0000	73.95	0.00	-5.97	159.00	1.567	29	7.52	2.49	0.5000
APX16DWV-16DWVS-E-A20	120.0000	73.95	2.57	1.48	159.00	1.567	29	7.52	2.49	0.5000
APX16DWV-16DWVS-E-A20	240.0000	73.95	-2.57	1.48	159.00	1.567	29	7.52	2.49	0.5000
Pirod 4' Side Mount Standoff (1)	0.0000	89.00	0.00	-3.97	159.00	1.567	29	4.91	4.91	0.5000
ETW190VS12UB TMA	0.0000	19.94	0.00	-5.47	159.00	1.567	29	0.78	0.46	0.5000
ETW190VS12UB TMA	120.0000	19.94	2.14	1.23	159.00	1.567	29	0.78	0.46	0.5000
ETW190VS12UB TMA	240.0000	19.94	-2.14	1.23	159.00	1.567	29	0.78	0.46	0.5000
ATMAA1412D-1A20 Twin TMA	0.0000	20.62	0.00	-5.47	159.00	1.567	29	1.31	0.48	0.5000
ATMAA1412D-1A20 Twin TMA	120.0000	20.62	2.14	1.23	159.00	1.567	29	1.31	0.48	0.5000
ATMAA1412D-1A20 Twin TMA	240.0000	20.62	-2.14	1.23	159.00	1.567	29	1.31	0.48	0.5000
AM-X-CD-14-65-00TT-RET	300.0000	68.35	-6.32	0.97	77.00	1.274	24	5.90	3.14	0.5000
AM-X-CD-14-65-00TT-RET	60.0000	68.35	2.32	-5.96	77.00	1.274	24	5.90	3.14	0.5000
AM-X-CD-14-65-00TT-RET	180.0000	68.35	4.00	4.98	77.00	1.274	24	5.90	3.14	0.5000
7770.00	300.0000	67.63	-2.32	-5.96	77.00	1.274	24	6.31	3.27	0.5000
7770.00	60.0000	67.63	6.32	0.97	77.00	1.274	24	6.31	3.27	0.5000
7770.00	180.0000	67.63	-4.00	4.98	77.00	1.274	24	6.31	3.27	0.5000
LPG21401 TMA	300.0000	46.63	-1.88	-5.71	77.00	1.274	24	2.19	0.96	0.5000
LPG21401 TMA	60.0000	46.63	5.88	1.22	77.00	1.274	24	2.19	0.96	0.5000
LPG21401 TMA	180.0000	46.63	-4.00	4.48	77.00	1.274	24	2.19	0.96	0.5000
RRUS-11	300.0000	139.15	-3.88	-2.24	73.00	1.255	23	6.45	2.82	0.5000
RRUS-11	60.0000	139.15	3.88	-2.24	73.00	1.255	23	6.45	2.82	0.5000
RRUS-11	180.0000	139.15	0.00	4.48	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
APXVSPP18-C-A20 w/ Mount	0.0000	197.65	0.00	-5.97	126.00	1.466	27	9.66	9.14	0.5000
APXVSPP18-C-A20 w/ Mount	120.0000	197.65	5.17	2.98	126.00	1.466	27	9.66	9.14	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
APXVSPP18-C-A20 w/ Mount	240.0000	197.65	-5.17	2.98	126.00	1.466	27	9.66	9.14	0.5000
FD-RRH 2x50 800	0.0000	86.12	0.00	-5.97	126.00	1.466	27	2.61	2.46	0.5000
FD-RRH 2x50 800	120.0000	86.12	5.17	2.98	126.00	1.466	27	2.61	2.46	0.5000
FD-RRH 2x50 800	240.0000	86.12	-5.17	2.98	126.00	1.466	27	2.61	2.46	0.5000
FD-RRH 4x45 1900	0.0000	83.97	0.00	-5.97	126.00	1.466	27	2.94	3.02	0.5000
FD-RRH 4x45 1900	120.0000	83.97	5.17	2.98	126.00	1.466	27	2.94	3.02	0.5000
FD-RRH 4x45 1900	240.0000	83.97	-5.17	2.98	126.00	1.466	27	2.94	3.02	0.5000
	Sum Weight:	6828.62								

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
3/8"x 13' omni	240.0000	33.25	-2.57	1.48	34.50	1.013	19	1.68	1.68
110" YAGI	0.0000	11.00	0.00	-6.97	81.00	1.292	24	2.70	2.70
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
3" Dia 20' Omni	120.0000	55.00	3.44	1.98	97.00	1.361	25	4.00	4.00
2-ft Stand Off	120.0000	20.00	2.57	1.48	97.00	1.361	25	1.07	1.07
1.5"x2'omni	120.0000	8.00	3.44	1.98	109.00	1.407	26	0.25	0.25
2-ft Stand Off	120.0000	20.00	2.57	1.48	108.00	1.403	26	1.07	1.07
2-ft Stand Off	240.0000	20.00	-2.57	1.48	107.00	1.399	26	1.07	1.07
110 Directional	240.0000	66.00	-3.44	1.98	111.00	1.414	26	7.00	7.00
2-ft Stand Off	240.0000	20.00	-2.57	1.48	115.00	1.429	26	1.07	1.07
Rohn 6' x 12' Boom Gate (1)	0.0000	560.00	0.00	-5.97	126.00	1.466	27	16.60	16.60
Rohn 6' x 12' Boom Gate (1)	120.0000	560.00	5.17	2.98	126.00	1.466	27	16.60	16.60
Rohn 6' x 12' Boom Gate (1)	240.0000	560.00	-5.17	2.98	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
APX16DWV-16DWVS-E-A20	0.0000	41.00	0.00	-5.97	159.00	1.567	29	7.07	2.15
APX16DWV-16DWVS-E-A20	120.0000	41.00	2.57	1.48	159.00	1.567	29	7.07	2.15
APX16DWV-16DWVS-E-A20	240.0000	41.00	-2.57	1.48	159.00	1.567	29	7.07	2.15
Pirod 4' Side Mount	0.0000	50.00	0.00	-3.97	159.00	1.567	29	2.72	2.72

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
Standoff (1)									
ETW190VS12UB TMA	0.0000	15.00	0.00	-5.47	159.00	1.567	29	0.66	0.37
ETW190VS12UB TMA	120.0000	15.00	2.14	1.23	159.00	1.567	29	0.66	0.37
ETW190VS12UB TMA	240.0000	15.00	-2.14	1.23	159.00	1.567	29	0.66	0.37
ATMAA1412D-1A20 Twin TMA	0.0000	13.00	0.00	-5.47	159.00	1.567	29	1.17	0.39
ATMAA1412D-1A20 Twin TMA	120.0000	13.00	2.14	1.23	159.00	1.567	29	1.17	0.39
ATMAA1412D-1A20 Twin TMA	240.0000	13.00	-2.14	1.23	159.00	1.567	29	1.17	0.39
AM-X-CD-14-65-00TT-RET	300.0000	36.40	-6.32	0.97	77.00	1.274	24	5.51	2.83
AM-X-CD-14-65-00TT-RET	60.0000	36.40	2.32	-5.96	77.00	1.274	24	5.51	2.83
AM-X-CD-14-65-00TT-RET	180.0000	36.40	4.00	4.98	77.00	1.274	24	5.51	2.83
7770.00	300.0000	35.00	-2.32	-5.96	77.00	1.274	24	5.88	2.93
7770.00	60.0000	35.00	6.32	0.97	77.00	1.274	24	5.88	2.93
7770.00	180.0000	35.00	-4.00	4.98	77.00	1.274	24	5.88	2.93
LPG21401 TMA	300.0000	35.00	-1.88	-5.71	77.00	1.274	24	1.91	0.73
LPG21401 TMA	60.0000	35.00	5.88	1.22	77.00	1.274	24	1.91	0.73
LPG21401 TMA	180.0000	35.00	-4.00	4.48	77.00	1.274	24	1.91	0.73
RRUS-11	300.0000	100.00	-3.88	-2.24	73.00	1.255	23	5.99	2.49
RRUS-11	60.0000	100.00	3.88	-2.24	73.00	1.255	23	5.99	2.49
RRUS-11	180.0000	100.00	0.00	4.48	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
APXVSPP18-C-A20 w/ Mount	0.0000	117.64	0.00	-5.97	126.00	1.466	27	8.96	8.08
APXVSPP18-C-A20 w/ Mount	120.0000	117.64	5.17	2.98	126.00	1.466	27	8.96	8.08
APXVSPP18-C-A20 w/ Mount	240.0000	117.64	-5.17	2.98	126.00	1.466	27	8.96	8.08
FD-RRH 2x50 800	0.0000	64.00	0.00	-5.97	126.00	1.466	27	2.40	2.25
FD-RRH 2x50 800	120.0000	64.00	5.17	2.98	126.00	1.466	27	2.40	2.25
FD-RRH 2x50 800	240.0000	64.00	-5.17	2.98	126.00	1.466	27	2.40	2.25
FD-RRH 4x45 1900	0.0000	60.00	0.00	-5.97	126.00	1.466	27	2.71	2.78
FD-RRH 4x45 1900	120.0000	60.00	5.17	2.98	126.00	1.466	27	2.71	2.78
FD-RRH 4x45 1900	240.0000	60.00	-5.17	2.98	126.00	1.466	27	2.71	2.78
	Sum Weight:	4929.77							

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	20502.11			
Wind 0 deg - No Ice		0.00	-24640.06	-2.52
Wind 90 deg - No Ice		22897.48	-22.21	-1.38
Wind 180 deg - No Ice		0.00	25052.99	2.52
Member Ice	5051.07			
Guy Ice	2204.82			
Total Weight Ice	35682.73			
Wind 0 deg - Ice		0.00	-36003.85	-2.44
Wind 90 deg - Ice		33769.44	-22.52	-2.15
Wind 180 deg - Ice		0.00	35800.07	2.50
Total Weight	20502.11			
Wind 0 deg - Service		0.00	-24640.06	-2.52
Wind 90 deg - Service		22897.48	-22.21	-1.38
Wind 180 deg - Service		0.00	25052.99	2.52

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

Comb. No.	Description
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	11394.84	0.01	-0.22
			Max. Compression	7	-15035.81	-0.07	-0.10
			Max. Mx	7	-4790.44	-0.55	-0.13
			Max. My	6	-6640.74	-0.05	0.61
			Max. Vy	7	-722.48	-0.55	-0.13
			Max. Vx	8	901.35	-0.01	-0.11
		Diagonal	Max Tension	8	2238.88	0.00	0.00
			Max. Compression	6	-1848.13	0.00	0.00
			Max. Mx	8	2234.36	0.03	0.00
			Max. My	8	-1834.35	0.00	-0.01
			Max. Vy	8	-19.59	0.03	0.00
			Max. Vx	8	-5.79	0.00	-0.01
		Top Girt	Max Tension	6	67.20	0.00	0.00
			Max. Compression	8	-144.14	0.00	0.00
			Max. Mx	5	-21.06	-0.01	0.00
			Max. My	7	-90.14	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	320.07	0.00	0.00
			Max. Compression	7	-338.50	0.00	0.00
			Max. Mx	5	0.89	-0.01	0.00
			Max. My	7	-46.99	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	11980.16		
			Top Tension	8	12199.66		
			Top Cable Vert	8	8510.59		
			Top Cable Norm	8	8740.80		
			Top Cable Tan	8	6.99		
			Bot Cable Vert	8	-7831.41		
			Bot Cable Norm	8	9066.04		
			Bot Cable Tan	8	7.29		
		Guy B	Bottom Tension	6	8445.07		
			Top Tension	6	8664.43		
			Top Cable Vert	6	6070.31		
			Top Cable Norm	6	6169.32		
			Top Cable Tan	6	403.94		
			Bot Cable Vert	6	-5494.89		
			Bot Cable Norm	6	6398.93		
			Bot Cable Tan	6	423.08		
		Guy C	Bottom Tension	7	9738.24		
			Top Tension	7	9957.91		
			Top Cable Vert	7	6993.27		
			Top Cable Norm	7	7086.00		
			Top Cable Tan	7	206.47		
			Bot Cable Vert	7	-6320.67		
			Bot Cable Norm	7	7405.18		
			Bot Cable Tan	7	213.68		
		Torque Arm Top	Max Tension	8	13516.48	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	1	0.00	0.00	0.00
			Max. Mx	6	7449.99	0.02	0.00
			Max. My	7	11701.98	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	380.65	0.00	0.00
			Max. Compression	8	-17634.40	0.00	0.00
			Max. Mx	7	-7924.35	0.07	0.00
			Max. My	7	-2799.46	0.00	0.00
			Max. Vy	7	-61.93	0.00	0.00
			Max. Vx	7	0.29	0.00	0.00
T2	160 - 140	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	7	-16839.45	0.04	-0.05
			Max. Mx	7	-11129.88	0.36	0.15
			Max. My	8	-11118.30	-0.03	0.40
			Max. Vy	7	-718.09	-0.11	-0.03
			Max. Vx	8	794.09	-0.03	-0.15
		Diagonal	Max Tension	8	2069.78	0.00	0.00
			Max. Compression	6	-1991.24	0.00	0.00
			Max. Mx	7	1275.55	0.00	0.00
			Max. My	7	-155.88	0.00	0.00
			Max. Vy	7	-3.62	0.00	0.00
			Max. Vx	7	-0.02	0.00	0.00
		Top Girt	Max Tension	6	584.78	0.00	0.00
			Max. Compression	7	-639.82	0.00	0.00
			Max. Mx	5	-27.01	0.00	0.00
			Max. My	7	-639.79	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	978.16	0.00	0.00
			Max. Compression	8	-1036.90	0.00	0.00
			Max. Mx	5	23.44	0.00	0.00
			Max. My	7	564.88	0.00	-0.00
			Max. Vy	5	-3.61	0.00	0.00
			Max. Vx	7	0.00	0.00	0.00
T3	140 - 120	Leg	Max Tension	4	2323.98	0.01	-0.28
			Max. Compression	7	-32095.01	0.04	-0.15
			Max. Mx	7	-7413.44	-0.91	-0.01
			Max. My	6	-8426.87	0.13	1.01
			Max. Vy	7	-1379.73	-0.91	-0.01
			Max. Vx	6	1605.77	0.13	1.01
		Diagonal	Max Tension	7	3216.86	0.00	0.00
			Max. Compression	6	-3129.45	0.00	0.00
			Max. Mx	8	2179.18	-0.07	-0.00
			Max. My	8	-1755.84	0.01	-0.02
			Max. Vy	8	-37.90	0.00	0.00
			Max. Vx	8	9.87	0.01	-0.02
		Top Girt	Max Tension	6	588.58	0.00	0.00
			Max. Compression	8	-177.83	0.00	0.00
			Max. Mx	5	142.32	-0.01	0.00
			Max. My	7	-167.57	0.00	0.00
			Max. Vy	5	7.45	0.00	0.00
			Max. Vx	7	-0.00	0.00	0.00
		Bottom Girt	Max Tension	6	1177.77	0.00	0.00
			Max. Compression	8	-505.18	0.00	0.00
			Max. Mx	5	213.47	-0.01	0.00
			Max. My	7	-431.67	0.00	0.00
			Max. Vy	5	7.45	0.00	0.00
			Max. Vx	7	-0.00	0.00	0.00
		Guy A	Bottom Tension	8	13055.67		
			Top Tension	8	13222.97		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Top Cable Vert	8	7788.76		
			Top Cable Norm	8	10685.61		
			Top Cable Tan	8	4.60		
			Bot Cable Vert	8	-7261.07		
			Bot Cable Norm	8	10850.22		
			Bot Cable Tan	8	5.46		
		Guy B	Bottom Tension	6	9435.11		
			Top Tension	6	9601.46		
			Top Cable Vert	6	5696.43		
			Top Cable Norm	6	7722.56		
			Top Cable Tan	6	317.43		
			Bot Cable Vert	6	-5211.97		
			Bot Cable Norm	6	7856.85		
			Bot Cable Tan	6	355.81		
		Guy C	Bottom Tension	7	11827.30		
			Top Tension	7	11994.39		
			Top Cable Vert	7	7094.70		
			Top Cable Norm	7	9670.21		
			Top Cable Tan	7	132.72		
			Bot Cable Vert	7	-6552.29		
			Bot Cable Norm	7	9845.15		
			Bot Cable Tan	7	159.32		
		Torque Arm Top	Max Tension	6	12725.44	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	5	6500.68	0.02	0.00
			Max. My	7	12256.86	0.00	-0.00
			Max. Vy	5	25.42	0.00	0.00
			Max. Vx	7	0.00	0.00	0.00
		Torque Arm Bottom	Max Tension	6	3125.09	0.00	0.00
			Max. Compression	8	-18156.94	0.00	0.00
			Max. Mx	6	-10168.93	0.07	0.00
			Max. My	7	2070.33	0.00	0.00
			Max. Vy	6	-61.89	0.00	0.00
			Max. Vx	7	0.19	0.00	0.00
T4	120 - 100	Leg	Max Tension	6	6859.57	-0.27	-0.11
			Max. Compression	7	-44714.63	-0.01	-0.23
			Max. Mx	7	-24514.13	0.87	-0.04
			Max. My	6	-8437.43	0.04	-0.96
			Max. Vy	7	-1375.16	-0.06	0.06
			Max. Vx	6	1599.68	0.09	0.02
		Diagonal	Max Tension	6	3611.30	0.00	0.00
			Max. Compression	8	-4035.57	0.00	0.00
			Max. Mx	6	3611.30	-0.02	0.00
			Max. My	8	-1318.77	0.00	0.00
			Max. Vy	6	17.06	0.00	0.00
			Max. Vx	8	-0.04	0.00	0.00
		Horizontal	Max Tension	8	1257.44	0.00	0.00
			Max. Compression	6	-383.96	0.00	0.00
			Max. Mx	5	500.20	-0.01	0.00
			Max. My	8	481.32	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	1930.21	0.00	0.00
			Max. Compression	8	-1574.79	0.00	0.00
			Max. Mx	5	72.91	-0.01	0.00
			Max. My	7	1534.11	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	6	845.25	0.00	0.00
			Max. Compression	8	-310.54	0.00	0.00
			Max. Mx	5	193.15	-0.01	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	8	-166.09	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	6	7049.56	0.20	-0.09
			Max. Compression	7	-44722.40	-0.04	-0.28
			Max. Mx	7	-37287.53	0.73	-0.03
			Max. My	8	-18461.38	0.08	0.70
			Max. Vy	7	1254.95	-0.04	-0.18
			Max. Vx	8	1165.94	-0.08	-0.01
		Diagonal	Max Tension	7	3117.54	0.00	0.00
			Max. Compression	7	-3036.52	0.00	0.00
			Max. Mx	7	3117.54	0.01	0.00
			Max. My	7	-1295.70	0.00	0.00
			Max. Vy	7	-5.13	0.00	0.00
			Max. Vx	7	-0.02	0.00	0.00
		Horizontal	Max Tension	8	984.80	0.00	0.00
			Max. Compression	6	-146.01	0.00	0.00
			Max. Mx	5	332.74	-0.01	0.00
			Max. My	7	-123.66	0.00	0.00
			Max. Vy	5	17.02	0.00	0.00
			Max. Vx	7	-0.00	0.00	0.00
		Top Girt	Max Tension	8	567.46	0.00	0.00
			Max. Compression	6	-279.81	0.00	0.00
			Max. Mx	5	136.13	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	1076.25	0.00	0.00
			Max. Compression	7	-1012.09	0.00	0.00
			Max. Mx	5	81.44	0.00	0.00
			Max. My	7	-1012.09	0.00	-0.00
			Max. Vy	5	-3.61	0.00	0.00
			Max. Vx	7	0.00	0.00	0.00
T6	80 - 60	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	7	-44904.88	-0.25	0.06
			Max. Mx	7	-42558.43	-1.40	-0.03
			Max. My	6	-40915.89	0.26	1.37
			Max. Vy	7	-1882.07	-1.40	-0.03
			Max. Vx	8	-2041.20	-0.14	-1.35
		Diagonal	Max Tension	7	6355.29	0.00	0.00
			Max. Compression	7	-6252.71	0.00	0.00
			Max. Mx	7	5568.88	-0.02	0.00
			Max. My	7	2904.04	0.00	-0.00
			Max. Vy	7	-17.12	0.00	0.00
			Max. Vx	7	0.10	0.00	0.00
		Top Girt	Max Tension	8	1452.41	0.00	0.00
			Max. Compression	6	-1124.22	0.00	0.00
			Max. Mx	5	118.74	-0.01	0.00
			Max. My	7	1330.13	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	6	5279.01	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	5	2376.56	-0.01	0.00
			Max. My	7	1883.06	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	18743.86		
			Top Tension	8	18859.68		
			Top Cable Vert	8	7298.88		
			Top Cable Norm	8	17390.05		
			Top Cable Tan	8	0.57		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Bot Cable Vert	8	-6915.22		
			Bot Cable Norm	8	17421.60		
			Bot Cable Tan	8	0.57		
		Guy B	Bottom Tension	6	15262.18		
			Top Tension	6	15377.03		
			Top Cable Vert	6	5838.91		
			Top Cable Norm	6	14224.01		
			Top Cable Tan	6	194.44		
			Bot Cable Vert	6	-5433.35		
			Bot Cable Norm	6	14259.87		
			Bot Cable Tan	6	262.53		
		Guy C	Bottom Tension	7	17974.20		
			Top Tension	7	18089.79		
			Top Cable Vert	7	6615.42		
			Top Cable Norm	7	16836.63		
			Top Cable Tan	7	68.37		
			Bot Cable Vert	7	-6184.40		
			Bot Cable Norm	7	16876.39		
			Bot Cable Tan	7	112.98		
		Top Guy Pull-Off	Max Tension	6	3959.25	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	5	1782.42	0.01	0.00
			Max. My	7	1412.29	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	-44903.97	-0.25	0.06
			Max. Mx	7	-43593.77	0.92	0.14
			Max. My	8	-9773.29	0.20	1.15
			Max. Vy	7	-1899.04	-0.25	0.06
			Max. Vx	8	-2036.95	0.03	-0.10
		Diagonal	Max Tension	7	4299.85	0.00	0.00
			Max. Compression	8	-4143.58	0.00	0.00
			Max. Mx	7	-3529.53	-0.02	0.00
			Max. My	7	1691.81	0.00	-0.00
			Max. Vy	7	-17.09	0.00	0.00
			Max. Vx	7	0.09	0.00	0.00
		Top Girt	Max Tension	6	2436.83	0.00	0.00
			Max. Compression	8	-2141.28	0.00	0.00
			Max. Mx	5	70.44	0.00	0.00
			Max. My	7	-2094.40	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	8	1192.59	0.00	0.00
			Max. Compression	6	-935.83	0.00	0.00
			Max. Mx	5	65.30	0.00	0.00
			Max. My	7	1169.98	0.00	-0.00
			Max. Vy	5	-3.61	0.00	0.00
			Max. Vx	7	0.00	0.00	0.00
T8	40 - 20	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-40471.17	0.11	0.12
			Max. Mx	7	-33029.29	0.49	-0.21
			Max. My	8	-33366.35	0.10	0.63
			Max. Vy	7	-885.06	-0.14	0.04
			Max. Vx	8	-994.85	0.09	0.02
		Diagonal	Max Tension	7	1982.77	0.00	0.00
			Max. Compression	8	-1958.43	0.00	0.00
			Max. Mx	6	139.54	0.00	0.00
			Max. My	7	-435.40	0.00	0.00
			Max. Vy	6	-3.63	0.00	0.00
			Max. Vx	7	-0.02	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
		Top Girt	Max Tension	6	941.50	0.00	0.00
			Max. Compression	8	-926.01	0.00	0.00
			Max. Mx	5	52.08	0.00	0.00
			Max. My	7	-921.32	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	259.97	0.00	0.00
			Max. Compression	6	-94.95	0.00	0.00
			Max. Mx	5	55.83	0.00	0.00
			Max. My	7	42.79	0.00	-0.00
			Max. Vy	5	-3.61	0.00	0.00
			Max. Vx	7	0.00	0.00	0.00
T9	20 - 5	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-40478.91	0.11	0.10
			Max. Mx	7	-31591.12	0.46	0.38
			Max. My	8	-36201.10	0.21	0.50
			Max. Vy	7	1143.13	-0.41	-0.08
			Max. Vx	8	1282.91	0.10	-0.28
		Diagonal	Max Tension	6	1709.49	0.00	0.00
			Max. Compression	6	-1903.94	0.00	0.00
			Max. Mx	6	1709.49	-0.02	0.00
			Max. My	7	-1573.11	0.00	-0.00
			Max. Vy	6	17.12	0.00	0.00
			Max. Vx	7	0.09	0.00	0.00
		Top Girt	Max Tension	6	284.24	0.00	0.00
			Max. Compression	6	-249.82	0.00	0.00
			Max. Mx	5	69.10	-0.01	0.00
			Max. My	7	171.99	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	6	1353.61	0.00	0.00
			Max. Compression	6	-710.69	0.00	0.00
			Max. Mx	5	260.10	-0.01	0.00
			Max. My	7	-369.45	0.00	0.00
			Max. Vy	5	-17.02	0.00	0.00
			Max. Vx	7	-0.00	0.00	0.00
T10	5 - 0	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-38750.62	-0.38	0.01
			Max. Mx	6	-35386.00	-0.46	0.14
			Max. My	7	-37298.54	-0.30	-0.30
			Max. Vy	6	-280.22	-0.37	0.11
			Max. Vx	7	214.75	-0.20	0.28
		Diagonal	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-598.19	0.00	0.00
			Max. Mx	6	-181.73	-0.01	0.00
			Max. My	6	-181.73	0.00	0.00
			Max. Vy	6	12.63	0.00	0.00
			Max. Vx	6	-3.54	0.00	0.00
		Top Girt	Max Tension	8	7806.52	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	5	5667.50	-0.01	0.00
			Max. My	7	6150.41	0.00	-0.00
			Max. Vy	5	16.70	0.00	0.00
			Max. Vx	7	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	97377.23	-5.12	-1593.19
	Max. H_x	11	60671.44	2.58	-757.48
	Max. H_z	6	92440.95	-19.76	1872.61
	Max. M_x	1	0.00	-4.05	-4.37
	Max. M_z	1	0.00	-4.05	-4.37
	Max. Torsion	7	0.49	-1676.58	-73.63
	Min. Vert	1	52393.33	-4.05	-4.37
	Min. H_x	7	94307.35	-1676.58	-73.63
	Min. H_z	8	97377.23	-5.12	-1593.19
	Min. M_x	1	0.00	-4.05	-4.37
	Min. M_z	1	0.00	-4.05	-4.37
	Min. Torsion	4	-0.18	2.58	-757.48
Guy C @ 184 ft Elev 0 ft Azimuth 240 deg	Max. Vert	4	-6461.25	-7216.30	3511.39
	Max. H_x	11	-6461.25	-7216.30	3511.39
	Max. H_z	7	-25672.85	-30162.43	16554.87
	Min. Vert	7	-25672.85	-30162.43	16554.87
	Min. H_x	7	-25672.85	-30162.43	16554.87
	Min. H_z	4	-6461.25	-7216.30	3511.39
Guy B @ 184 ft Elev 0 ft Azimuth 120 deg	Max. Vert	3	-3665.93	3588.54	2369.45
	Max. H_x	6	-21196.77	23623.94	15476.27
	Max. H_z	6	-21196.77	23623.94	15476.27
	Min. Vert	6	-21196.77	23623.94	15476.27
	Min. H_x	3	-3665.93	3588.54	2369.45
	Min. H_z	3	-3665.93	3588.54	2369.45
Guy A @ 184 ft Elev 0 ft Azimuth 0 deg	Max. Vert	2	-1109.41	-1.08	-1207.90
	Max. H_x	8	-29893.46	8.85	-39463.69
	Max. H_z	2	-1109.41	-1.08	-1207.90
	Min. Vert	8	-29893.46	8.85	-39463.69
	Min. H_x	7	-16103.47	-1976.92	-20767.29
	Min. H_z	8	-29893.46	8.85	-39463.69
Guy C @ 161.2 ft Elev 0 ft Azimuth 240 deg	Max. Vert	4	-1239.32	-3043.79	1637.04
	Max. H_x	11	-1239.32	-3043.79	1637.04
	Max. H_z	7	-6184.40	-14671.87	8340.35
	Min. Vert	7	-6184.40	-14671.87	8340.35
	Min. H_x	7	-6184.40	-14671.87	8340.35
	Min. H_z	4	-1239.32	-3043.79	1637.04
Guy B @ 154.8 ft Elev 0 ft Azimuth 120 deg	Max. Vert	7	-473.55	1197.25	793.56
	Max. H_x	6	-5433.35	12218.15	7357.29
	Max. H_z	6	-5433.35	12218.15	7357.29
	Min. Vert	6	-5433.35	12218.15	7357.29
	Min. H_x	7	-473.55	1197.25	793.56
	Min. H_z	3	-517.10	1258.37	770.86
Guy A @ 150 ft Elev 0 ft Azimuth 0 deg	Max. Vert	6	-283.77	-0.01	-951.03
	Max. H_x	8	-6915.22	0.57	-17421.60
	Max. H_z	6	-283.77	-0.01	-951.03
	Min. Vert	8	-6915.22	0.57	-17421.60
	Min. H_x	7	-3586.85	-312.84	-9144.87
	Min. H_z	8	-6915.22	0.57	-17421.60

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	kip-ft	kip-ft	kip-ft
Dead Only	52393.33	4.05	4.37	0.00	0.00	0.02
Dead+Wind 0 deg - No Ice+Guy	57964.43	7.28	-841.32	0.00	0.00	-0.14
Dead+Wind 90 deg - No Ice+Guy	58806.43	762.90	11.07	0.00	0.00	-0.15
Dead+Wind 180 deg - No Ice+Guy	60671.44	-2.58	757.48	0.00	0.00	0.18
Dead+Ice+Temp+Guy	75379.03	14.66	15.65	0.00	0.00	0.02
Dead+Wind 0 deg+Ice+Temp+Guy	92440.95	19.76	-1872.61	0.00	0.00	0.12
Dead+Wind 90 deg+Ice+Temp+Guy	94307.35	1676.58	73.63	0.00	0.00	-0.49
Dead+Wind 180 deg+Ice+Temp+Guy	97377.23	5.12	1593.19	0.00	0.00	-0.05
Dead+Wind 0 deg - Service+Guy	57964.43	7.28	-841.32	0.00	0.00	-0.14
Dead+Wind 90 deg - Service+Guy	58806.43	762.90	11.07	0.00	0.00	-0.15
Dead+Wind 180 deg - Service+Guy	60671.44	-2.58	757.48	0.00	0.00	0.18

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	-20501.88	0.00	0.19	20501.85	-0.41	0.002%
2	-3.89	-20740.11	-27526.45	3.89	20740.09	27525.77	0.002%
3	25758.98	-20501.67	-20.11	-25758.39	20501.65	20.59	0.002%
4	3.89	-20263.65	27939.38	-4.06	20263.64	-27939.07	0.001%
5	0.00	-35682.28	0.00	-0.72	35682.22	0.43	0.002%
6	-9.07	-36324.20	-43855.50	9.08	36324.15	43853.78	0.003%
7	41560.09	-35681.79	-17.63	-41558.52	35681.75	19.03	0.004%
8	9.07	-35040.37	43651.72	-9.90	35040.35	-43651.10	0.002%
9	-3.89	-20740.11	-27526.45	3.89	20740.09	27525.77	0.002%
10	25758.98	-20501.67	-20.11	-25758.39	20501.65	20.59	0.002%
11	3.89	-20263.65	27939.38	-4.06	20263.64	-27939.07	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	8	0.00000001	0.00004232
2	Yes	15	0.00000001	0.00004500
3	Yes	14	0.00000001	0.00005079
4	Yes	11	0.00000001	0.00003082
5	Yes	6	0.00000001	0.00006339
6	Yes	16	0.00000001	0.00006502

7	Yes	15	0.00000001	0.00007668
8	Yes	11	0.00000001	0.00005784
9	Yes	15	0.00000001	0.00004500
10	Yes	14	0.00000001	0.00005079
11	Yes	11	0.00000001	0.00003082

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	5.048	11	0.1523	0.1727
T2	160 - 140	4.625	11	0.1614	0.1634
T3	140 - 120	4.312	11	0.1087	0.1290
T4	120 - 100	4.268	9	0.0831	0.1171
T5	100 - 80	4.347	9	0.1226	0.1099
T6	80 - 60	3.630	9	0.2632	0.0917
T7	60 - 40	2.473	9	0.2459	0.0954
T8	40 - 20	1.691	9	0.1760	0.0966
T9	20 - 5	0.953	9	0.2058	0.0896
T10	5 - 0	0.252	9	0.2344	0.0818

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	5.048	0.1523	0.1727	170602
178.00	4-ft Side Arm	11	5.004	0.1551	0.1747	170602
175.00	8.5 Dishw/radome	11	4.938	0.1590	0.1772	170602
167.65	Guy	11	4.780	0.1652	0.1781	69090
159.00	APX16DWV-16DWVS-E-A20	11	4.605	0.1598	0.1598	41922
147.00	3"x20-ft Omni	11	4.401	0.1277	0.1309	25331
143.00	1.5"x2'omni	11	4.347	0.1161	0.1300	22463
142.00	2-ft Stand Off	11	4.335	0.1135	0.1297	22042
141.00	1.5"x2'omni	11	4.323	0.1110	0.1294	21843
137.00	3-ft Side Arm	11	4.282	0.1030	0.1274	24105
132.00	2.5" Dia. x12' Omni	11	4.242	0.0964	0.1243	32187
127.65	Guy	11	4.214	0.0921	0.1213	24407
126.00	Rohn 6' x 12' Boom Gate (1)	11	4.205	0.0905	0.1203	22352
115.00	2-ft Stand Off	9	4.337	0.0745	0.1156	10249
111.00	110 Directional	9	4.376	0.0693	0.1148	7758
109.00	1.5"x2'omni	9	4.387	0.0684	0.1143	6918
108.00	2-ft Stand Off	9	4.390	0.0686	0.1141	6562
107.00	2-ft Stand Off	9	4.392	0.0692	0.1137	6241
97.00	3" Dia 20' Omni	9	4.294	0.1475	0.1069	5025
88.00	GPS	9	4.010	0.2169	0.0957	6369
81.00	110" YAGI	9	3.683	0.2573	0.0918	8150
77.00	AM-X-CD-14-65-00TT-RET	9	3.462	0.2760	0.0917	12341
73.00	(2) RRUS-11	9	3.225	0.2823	0.0945	36840
72.00	DC6-48-60-18-8F Surge Arrestor	9	3.164	0.2822	0.0949	73806
60.61	Guy	9	2.504	0.2487	0.0953	6868
34.50	3/8"x 13' omni	9	1.503	0.1756	0.0960	43603

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	7.871	8	0.3008	0.2873
T2	160 - 140	7.548	8	0.3087	0.2859
T3	140 - 120	7.262	8	0.2285	0.1772
T4	120 - 100	7.186	7	0.2261	0.1534
T5	100 - 80	7.625	6	0.1944	0.1628
T6	80 - 60	6.761	6	0.4113	0.2751
T7	60 - 40	5.075	6	0.3768	0.2918
T8	40 - 20	3.784	6	0.3328	0.2977
T9	20 - 5	2.200	6	0.4622	0.2694
T10	5 - 0	0.586	6	0.5431	0.2430

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	7.871	0.3008	0.2873	170602
178.00	4-ft Side Arm	8	7.839	0.3044	0.2906	170602
175.00	8.5 Dishw/radome	8	7.791	0.3096	0.2951	170602
167.65	Guy	8	7.672	0.3168	0.2998	69090
159.00	APX16DWV-16DWVS-E-A20	8	7.532	0.3060	0.2821	41922
147.00	3"x20-ft Omni	8	7.346	0.2549	0.2138	25331
143.00	1.5"x2'omni	8	7.295	0.2381	0.1910	22118
142.00	2-ft Stand Off	8	7.284	0.2346	0.1860	21166
141.00	1.5"x2'omni	8	7.273	0.2313	0.1814	20587
137.00	3-ft Side Arm	8	7.235	0.2222	0.1673	22593
132.00	2.5" Dia. x12' Omni	8	7.200	0.2361	0.1583	27102
127.65	Guy	8	7.176	0.2467	0.1554	19217
126.00	Rohn 6' x 12' Boom Gate (1)	8	7.168	0.2477	0.1549	17302
115.00	2-ft Stand Off	6	7.328	0.1714	0.1500	6778
111.00	110 Directional	6	7.467	0.1318	0.1477	4935
109.00	1.5"x2'omni	6	7.524	0.1211	0.1475	4345
108.00	2-ft Stand Off	6	7.548	0.1168	0.1478	4099
107.00	2-ft Stand Off	6	7.570	0.1132	0.1483	3880
97.00	3" Dia 20' Omni	6	7.589	0.2356	0.1763	2965
88.00	GPS	6	7.270	0.3492	0.2318	3645
81.00	110" YAGI	6	6.834	0.4067	0.2710	4574
77.00	AM-X-CD-14-65-00TT-RET	6	6.525	0.4192	0.2842	6509
73.00	(2) RRUS-11	6	6.186	0.4242	0.2903	14225
72.00	DC6-48-60-18-8F Surge Arrestor	6	6.099	0.4241	0.2910	20292
60.61	Guy	6	5.123	0.3801	0.2915	4220
34.50	3/8"x 13' omni	6	3.409	0.3302	0.2809	8463

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	60.13	19438.60	0.003 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	2238.88	4123.34	0.543 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	144.14	4123.34	0.035 ✓	1.333	Bolt Shear
T2	160	Leg	A325N	0.7500	4	0.00	19434.40	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	2069.78	3197.25	0.647 ✓	1.333	Member Bearing
		Top Girt	A325N	0.5000	1	584.78	2943.50	0.199 ✓	1.333	Member Bearing
T3	140	Leg	A325N	0.7500	4	0.00	19434.10	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	3216.86	4123.34	0.780 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	588.58	4123.34	0.143 ✓	1.333	Bolt Shear
T4	120	Leg	A325N	0.7500	4	0.00	19420.50	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	4035.57	6442.72	0.626 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	1	1257.44	6442.72	0.195 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	1	1930.21	6442.72	0.300 ✓	1.333	Bolt Shear
T5	100	Leg	A325N	0.7500	4	1586.77	19437.90	0.082 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	3117.54	4123.34	0.756 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	1	984.80	6442.72	0.153 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	567.47	2943.50	0.193 ✓	1.333	Member Bearing
T6	80	Leg	A325N	0.7500	4	0.00	19427.10	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	6355.29	6442.72	0.986 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	1	1452.41	6442.72	0.225 ✓	1.333	Bolt Shear
		Top Guy Pull-Off@60.6146	A325N	0.6250	4	989.81	6442.72	0.154 ✓	1.333	Bolt Shear
T7	60	Leg	A325N	0.7500	4	0.00	19408.70	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	4299.85	6442.72	0.667 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	2436.83	2943.50	0.828 ✓	1.333	Member Bearing
T8	40	Leg	A325N	0.7500	4	0.00	19431.60	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	1982.77	3197.25	0.620 ✓	1.333	Member Bearing
		Top Girt	A325N	0.5000	1	941.49	2943.50	0.320 ✓	1.333	Member Bearing
T9	20	Leg	A325N	0.7500	4	0.00	19438.20	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	1903.94	6442.72	0.296 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	1	284.24	6442.72	0.044 ✓	1.333	Bolt Shear
T10	5	Leg	A325N	0.7500	4	0.00	19437.90	0.000 ✓	1.333	Bolt Tension

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.

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	11948.10	17500.00	2.000	2.929 ✓
	167.65 (A) (404)	9/16 EHS	3500.00	35000.04	12199.70	17500.00	2.000	2.869 ✓
	167.65 (B) (397)	9/16 EHS	3500.00	35000.04	8557.12	17500.00	2.000	4.090 ✓
	167.65 (B) (398)	9/16 EHS	3500.00	35000.04	8664.42	17500.00	2.000	4.040 ✓
	167.65 (C) (391)	9/16 EHS	3500.00	35000.04	9957.91	17500.00	2.000	3.515 ✓
	167.65 (C) (392)	9/16 EHS	3500.00	35000.04	9928.25	17500.00	2.000	3.525 ✓
T3	127.65 (A) (421)	9/16 EHS	3500.00	35000.04	13009.40	17500.00	2.000	2.690 ✓
	127.65 (A) (422)	9/16 EHS	3500.00	35000.04	13223.00	17500.00	2.000	2.647 ✓
	127.65 (B) (415)	9/16 EHS	3500.00	35000.04	9332.20	17500.00	2.000	3.750 ✓
	127.65 (B) (416)	9/16 EHS	3500.00	35000.04	9601.46	17500.00	2.000	3.645 ✓
	127.65 (C) (409)	9/16 EHS	3500.00	35000.04	11903.60	17500.00	2.000	2.940 ✓
	127.65 (C) (410)	9/16 EHS	3500.00	35000.04	11994.40	17500.00	2.000	2.918 ✓
T6	60.61 (A) (432)	3/4 EHS	5830.00	58299.92	18859.70	29150.00	2.000	3.091 ✓
	60.61 (B) (431)	3/4 EHS	5830.00	58299.92	15377.00	29150.00	2.000	3.791 ✓
	60.61 (C) (427)	3/4 EHS	5830.00	58299.92	18089.80	29150.00	2.000	3.223 ✓

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 $\frac{P}{P_a}$
T1	180 - 160	P2.5x.203	20.00	2.35	29.7 K=1.00	1.00	27.188	1.7040	-15035.80	46328.80	0.325 ✓
T2	160 - 140	P2.5x.203	20.00	2.35	59.4 K=2.00	1.00	22.813	1.7040	-16839.40	38874.80	0.433 ✓
T3	140 - 120	P2.5x.203	20.00	2.35	29.7 K=1.00	1.00	27.188	1.7040	-32095.00	46328.80	0.693 ✓
T4	120 - 100	P2.5x.203	20.00	2.35	29.7 K=1.00	0.96	26.071	1.7040	-44714.60	44425.70	1.007 ✓
T5	100 - 80	P2.5x.203	20.00	2.35	29.7 K=1.00	0.96	26.071	1.7040	-44714.70	44425.70	1.007 ✓
T6	80 - 60	P2.5x.203	20.00	2.35	59.4 K=2.00	1.00	22.813	1.7040	-44904.90	38874.80	1.155 ✓
T7	60 - 40	P2.5x.203	20.00	2.35	59.4 K=2.00	1.00	22.813	1.7040	-44904.00	38874.80	1.155 ✓

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 $\frac{P}{P_a}$
T8	40 - 20	P2.5x.203	20.00	2.35	59.4 K=2.00	1.00	22.813	1.7040	-40471.20	38874.80	1.041 ✓
T9	20 - 5	P2.5x.203	15.00	2.30	58.1 K=2.00	1.00	23.032	1.7040	-40471.20	39248.30	1.031 ✓
T10	5 - 0	P2.5x.203	5.37	2.69	68.1 K=2.00	1.00	21.294	1.7040	-38750.60	36285.90	1.068 ✓

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	-1848.13	9713.78	0.190 ✓
T2	160 - 140	ROHN TS1.5x16 ga	4.14	3.85	90.5 K=1.00	13.897	0.2627	-1991.24	3651.52	0.545 ✓
T3	140 - 120	L2x2x3/16	4.14	1.81	71.3 K=1.29	16.291	0.7150	-3129.45	11648.20	0.269 ✓
T4	120 - 100	L2 1/2x2 1/2x1/2	4.14	3.58	104.1 K=1.18	12.455	2.2500	-4035.57	28023.90	0.144 ✓
T5	100 - 80	ROHN TS1.5x11 ga	4.14	3.85	94.3 K=1.00	13.463	0.5202	-3036.52	7003.98	0.434 ✓
T6	80 - 60	L2 1/2x2 1/2x1/2	4.14	3.58	104.1 K=1.18	12.455	2.2500	-6252.71	28023.90	0.223 ✓
T7	60 - 40	L2 1/2x2 1/2x1/2	4.14	3.58	104.1 K=1.18	12.455	2.2500	-4143.58	28023.90	0.148 ✓
T8	40 - 20	ROHN TS1.5x16 ga	4.14	3.85	90.5 K=1.00	13.897	0.2627	-1958.43	3651.52	0.536 ✓
T9	20 - 5	L2 1/2x2 1/2x1/2	4.11	3.55	103.7 K=1.19	12.498	2.2500	-1903.94	28120.20	0.068 ✓
T10	5 - 0	L2 1/2x2 1/2x1/2	3.61	3.28	100.4 K=1.24	12.929	2.2500	-598.19	29089.80	0.021 ✓

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	-383.96	35280.90	0.011 ✓
T5	100 - 80	L2 1/2x2 1/2x1/2	3.41	2.90	95.7 K=1.34	15.680	2.2500	-146.01	35280.90	0.004 ✓

Top Girt Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio P / P_a
	ft		ft	ft		ksi	in^2	lb	lb	
T1	180 - 160	L1 3/4x1 3/4x3/16	3.41	2.94	111.4 K=1.08	11.485	0.6211	-144.14	7133.13	0.020 ✓
T2	160 - 140	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.949	0.2627	-639.82	4190.65	0.153 ✓
T3	140 - 120	L2x2x3/16	3.41	2.94	104.8 K=1.17	12.362	0.7150	-177.83	8839.01	0.020 ✓
T4	120 - 100	L2 1/2x2 1/2x1/2	3.41	2.90	95.7 K=1.34	13.512	2.2500	-1574.79	30401.80	0.052 ✓
T5	100 - 80	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.949	0.2627	-279.81	4190.65	0.067 ✓
T6	80 - 60	L2 1/2x2 1/2x1/2	3.41	2.90	95.7 K=1.34	13.512	2.2500	-1124.22	30401.80	0.037 ✓
T7	60 - 40	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.949	0.2627	-2141.28	4190.65	0.511 ✓
T8	40 - 20	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.949	0.2627	-926.01	4190.65	0.221 ✓
T9	20 - 5	L2 1/2x2 1/2x1/2	3.41	2.90	95.7 K=1.34	13.512	2.2500	-249.82	30401.80	0.008 ✓

Bottom Girt Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio P / P_a
	ft		ft	ft		ksi	in^2	lb	lb	
T1	180 - 160	L1 3/4x1 3/4x3/16	3.41	3.17	115.4 K=1.04	10.934	0.6211	-338.50	6791.15	0.050 ✓
T2	160 - 140	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.615	0.2627	-1036.90	4102.70	0.253 ✓
T3	140 - 120	L2x2x3/16	3.41	3.17	108.3 K=1.12	11.902	0.7150	-505.18	8510.09	0.059 ✓
T4	120 - 100	L2 1/2x2 1/2x1/2	3.41	3.17	99.1 K=1.27	13.096	2.2500	-310.54	29466.80	0.011 ✓
T5	100 - 80	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.615	0.2627	-1012.09	4102.70	0.247 ✓
T7	60 - 40	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.615	0.2627	-935.83	4102.70	0.228 ✓
T8	40 - 20	ROHN TS1.5x16 ga	3.41	3.17	74.6 K=1.00	15.615	0.2627	-94.95	4102.70	0.023 ✓
T9	20 - 5	L2 1/2x2 1/2x1/2	3.41	3.17	99.1 K=1.27	13.096	2.2500	-710.69	29466.80	0.024 ✓

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 d/t > 13000/Fy - 395	4.36	4.21	4.1 K=1.00	14.638	3.6003	-13722.00	52701.60	0.260 ✓
T1	180 - 160 (396)	XP34.5x.03325 d/t > 13000/Fy - 396	4.36	4.21	4.1 K=1.00	14.638	3.6003	-17634.40	52701.60	0.335 ✓
T1	180 - 160 (401)	XP34.5x.03325 d/t > 13000/Fy - 401	4.36	4.21	4.1 K=1.00	14.638	3.6003	-11194.10	52701.60	0.212 ✓
T1	180 - 160 (402)	XP34.5x.03325 d/t > 13000/Fy - 402	4.36	4.21	4.1 K=1.00	14.638	3.6003	-14680.20	52701.60	0.279 ✓
T1	180 - 160 (407)	XP34.5x.03325 d/t > 13000/Fy - 407	4.36	4.21	4.1 K=1.00	14.638	3.6003	-13037.20	52701.60	0.247 ✓
T1	180 - 160 (408)	XP34.5x.03325 d/t > 13000/Fy - 408	4.36	4.21	4.1 K=1.00	14.638	3.6003	-17527.10	52701.60	0.333 ✓
T3	140 - 120 (413)	XP34.5x.03325 d/t > 13000/Fy - 413	4.36	4.21	4.1 K=1.00	14.638	3.6003	-15196.30	52701.60	0.288 ✓
T3	140 - 120 (414)	XP34.5x.03325 d/t > 13000/Fy - 414	4.36	4.21	4.1 K=1.00	14.638	3.6003	-18100.10	52701.60	0.343 ✓
T3	140 - 120 (419)	XP34.5x.03325 d/t > 13000/Fy - 419	4.36	4.21	4.1 K=1.00	14.638	3.6003	-10247.30	52701.60	0.194 ✓
T3	140 - 120 (420)	XP34.5x.03325 d/t > 13000/Fy - 420	4.36	4.21	4.1 K=1.00	14.638	3.6003	-17477.50	52701.60	0.332 ✓
T3	140 - 120 (425)	XP34.5x.03325 d/t > 13000/Fy - 425	4.36	4.21	4.1 K=1.00	14.638	3.6003	-14415.10	52701.60	0.274 ✓
T3	140 - 120 (426)	XP34.5x.03325 d/t > 13000/Fy - 426	4.36	4.21	4.1 K=1.00	14.638	3.6003	-18156.90	52701.60	0.345 ✓

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	11394.80	51121.50	0.223 ✓
T3	140 - 120	P2.5x.203	20.00	2.35	29.7	30.000	1.7040	2323.98	51121.50	0.045 ✓
T4	120 - 100	P2.5x.203	20.00	2.35	29.7	30.000	1.7040	6859.57	51121.50	0.134 ✓

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 $\frac{P}{P_a}$
T5	100 - 80	P2.5x.203	20.00	2.35	29.7	30.000	1.7040	7049.56	51121.50	0.138 ✓

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	2238.88	10960.00	0.204 ✓
T2	160 - 140	ROHN TS1.5x16 ga	4.14	3.85	90.5	21.000	0.2627	2069.78	5517.75	0.375 ✓
T3	140 - 120	L2x2x3/16	4.14	1.81	37.4	29.000	0.4484	3216.86	13002.40	0.247 ✓
T4	120 - 100	L2 1/2x2 1/2x1/2	4.14	3.58	62.5	29.000	1.4063	3611.30	40781.30	0.089 ✓
T5	100 - 80	ROHN TS1.5x11 ga	4.14	3.85	94.3	21.000	0.5202	3117.54	10925.20	0.285 ✓
T6	80 - 60	L2 1/2x2 1/2x1/2	4.14	3.58	62.5	29.000	1.4063	6355.29	40781.30	0.156 ✓
T7	60 - 40	L2 1/2x2 1/2x1/2	4.14	3.58	62.5	29.000	1.4063	4299.85	40781.30	0.105 ✓
T8	40 - 20	ROHN TS1.5x16 ga	4.14	3.85	90.5	21.000	0.2627	1982.77	5517.75	0.359 ✓
T9	20 - 5	L2 1/2x2 1/2x1/2	4.11	3.55	62.1	29.000	1.4063	1709.49	40781.30	0.042 ✓

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	1257.44	45703.10	0.028 ✓
T5	100 - 80	L2 1/2x2 1/2x1/2	3.41	2.90	51.5	32.500	1.4063	984.80	45703.10	0.022 ✓

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	67.20	10960.00	0.006 ✓

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 $\frac{P}{P_a}$
T2	160 - 140	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.600	0.2627	584.78	5675.41	0.103 ✔
T3	140 - 120	L2x2x3/16	3.41	2.94	61.7	29.000	0.4484	588.58	13002.40	0.045 ✔
T4	120 - 100	L2 1/2x2 1/2x1/2	3.41	2.90	51.5	29.000	1.4063	1930.21	40781.30	0.047 ✔
T5	100 - 80	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.600	0.2627	567.47	5675.41	0.100 ✔
T6	80 - 60	L2 1/2x2 1/2x1/2	3.41	2.90	51.5	29.000	1.4063	1452.41	40781.30	0.036 ✔
T7	60 - 40	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.600	0.2627	2436.83	5675.41	0.429 ✔
T8	40 - 20	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.600	0.2627	941.49	5675.41	0.166 ✔
T9	20 - 5	L2 1/2x2 1/2x1/2	3.41	2.90	51.5	29.000	1.4063	284.24	40781.30	0.007 ✔
T10	5 - 0	L2 1/2x2 1/2x1/2	3.41	3.17	51.5	21.600	2.2500	7806.52	48600.00	0.161 ✔

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	320.07	13415.60	0.024 ✔
T2	160 - 140	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.000	0.2627	978.16	5517.75	0.177 ✔
T3	140 - 120	L2x2x3/16	3.41	3.17	61.7	21.600	0.7150	1177.77	15444.00	0.076 ✔
T4	120 - 100	L2 1/2x2 1/2x1/2	3.41	3.17	51.5	21.600	2.2500	845.25	48600.00	0.017 ✔
T5	100 - 80	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.000	0.2627	1076.25	5517.75	0.195 ✔
T6	80 - 60	L2 1/2x2 1/2x1/2	3.41	3.17	51.5	21.600	2.2500	5279.01	48600.00	0.109 ✔
T7	60 - 40	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.000	0.2627	1192.59	5517.75	0.216 ✔
T8	40 - 20	ROHN TS1.5x16 ga	3.41	3.17	74.6	21.000	0.2627	259.97	5517.75	0.047 ✔
T9	20 - 5	L2 1/2x2 1/2x1/2	3.41	3.17	51.5	21.600	2.2500	1353.61	48600.00	0.028 ✔

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	3959.25	36450.00	0.109 ✓

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	12325.40	66655.00	0.185 ✓
T1	180 - 160 (394)	P4x.237	3.67	3.55	28.2	21.000	3.1741	13327.70	66655.00	0.200 ✓
T1	180 - 160 (399)	P4x.237	3.67	3.55	28.2	21.000	3.1741	12131.50	66655.00	0.182 ✓
T1	180 - 160 (400)	P4x.237	3.67	3.55	28.2	21.000	3.1741	12436.60	66655.00	0.187 ✓
T1	180 - 160 (405)	P4x.237	3.67	3.55	28.2	21.000	3.1741	11315.50	66655.00	0.170 ✓
T1	180 - 160 (406)	P4x.237	3.67	3.55	28.2	21.000	3.1741	13516.50	66655.00	0.203 ✓
T3	140 - 120 (411)	P4x.237	3.67	3.55	28.2	21.000	3.1741	12619.70	66655.00	0.189 ✓
T3	140 - 120 (412)	P4x.237	3.67	3.55	28.2	21.000	3.1741	12257.10	66655.00	0.184 ✓
T3	140 - 120 (417)	P4x.237	3.67	3.55	28.2	21.000	3.1741	12227.60	66655.00	0.183 ✓
T3	140 - 120 (418)	P4x.237	3.67	3.55	28.2	21.000	3.1741	12725.40	66655.00	0.191 ✓
T3	140 - 120 (423)	P4x.237	3.67	3.55	28.2	21.000	3.1741	10914.90	66655.00	0.164 ✓
T3	140 - 120 (424)	P4x.237	3.67	3.55	28.2	21.000	3.1741	12368.60	66655.00	0.186 ✓

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	380.65	75606.90	0.005 ✓
T1	180 - 160 (408)	d/t > 13000/Fy - 396 XP34.5x.03325	4.36	4.21	4.1	21.000	3.6003	324.86	75606.90	0.004 ✓
T3	140 - 120 (414)	d/t > 13000/Fy - 408 XP34.5x.03325	4.36	4.21	4.1	21.000	3.6003	3013.03	75606.90	0.040 ✓
		d/t > 13000/Fy - 414								

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 $\frac{P}{P_a}$
T3	140 - 120 (419)	XP34.5x.03325	4.36	4.21	4.1	21.000	3.6003	2070.33	75606.90	0.027 ✔
		d/t > 13000/Fy - 419								
T3	140 - 120 (425)	XP34.5x.03325	4.36	4.21	4.1	21.000	3.6003	169.17	75606.90	0.002 ✔
		d/t > 13000/Fy - 425								
T3	140 - 120 (426)	XP34.5x.03325	4.36	4.21	4.1	21.000	3.6003	3125.09	75606.90	0.041 ✔
		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	-15035.80	61756.29	24.3	Pass
T2	160 - 140	Leg	P2.5x.203	58	-16839.40	51820.11	32.5	Pass
T3	140 - 120	Leg	P2.5x.203	91	-32095.00	61756.29	52.0	Pass
T4	120 - 100	Leg	P2.5x.203	148	-44714.60	59219.45	75.5	Pass
T5	100 - 80	Leg	P2.5x.203	202	-44714.70	59219.45	75.5	Pass
T6	80 - 60	Leg	P2.5x.203	257	-44904.90	51820.11	86.7	Pass
T7	60 - 40	Leg	P2.5x.203	290	-44904.00	51820.11	86.7	Pass
T8	40 - 20	Leg	P2.5x.203	324	-40471.20	51820.11	78.1	Pass
T9	20 - 5	Leg	P2.5x.203	357	-40471.20	52317.98	77.4	Pass
T10	5 - 0	Leg	P2.5x.203	384	-38750.60	48369.10	80.1	Pass
T1	180 - 160	Diagonal	L1 3/4x1 3/4x3/16	23	2238.88	14609.68	15.3	Pass
							40.7 (b)	
T2	160 - 140	Diagonal	ROHN TS1.5x16 ga	69	-1991.24	4867.48	40.9	Pass
							48.6 (b)	
T3	140 - 120	Diagonal	L2x2x3/16	112	-3129.45	15527.05	20.2	Pass
							58.5 (b)	
T4	120 - 100	Diagonal	L2 1/2x2 1/2x1/2	200	-4035.57	37355.86	10.8	Pass
							47.0 (b)	
T5	100 - 80	Diagonal	ROHN TS1.5x11 ga	217	-3036.52	9336.30	32.5	Pass
							56.7 (b)	
T6	80 - 60	Diagonal	L2 1/2x2 1/2x1/2	268	-6252.71	37355.86	16.7	Pass
							74.0 (b)	
T7	60 - 40	Diagonal	L2 1/2x2 1/2x1/2	320	-4143.58	37355.86	11.1	Pass
							50.1 (b)	
T8	40 - 20	Diagonal	ROHN TS1.5x16 ga	353	-1958.43	4867.48	40.2	Pass
							46.5 (b)	
T9	20 - 5	Diagonal	L2 1/2x2 1/2x1/2	366	-1903.94	37484.22	5.1	Pass
							22.2 (b)	
T10	5 - 0	Diagonal	L2 1/2x2 1/2x1/2	389	-598.19	38776.70	1.5	Pass
T4	120 - 100	Horizontal	L2 1/2x2 1/2x1/2	197	1257.44	60922.23	2.1	Pass
							14.6 (b)	
T5	100 - 80	Horizontal	L2 1/2x2 1/2x1/2	215	984.80	60922.23	1.6	Pass
							11.5 (b)	
T1	180 - 160	Top Girt	L1 3/4x1 3/4x3/16	4	-144.14	9508.46	1.5	Pass
							2.6 (b)	
T2	160 - 140	Top Girt	ROHN TS1.5x16 ga	61	-639.82	5586.14	11.5	Pass
							14.9 (b)	
T3	140 - 120	Top Girt	L2x2x3/16	94	588.58	17332.20	3.4	Pass
							10.7 (b)	
T4	120 - 100	Top Girt	L2 1/2x2 1/2x1/2	153	-1574.79	40525.60	3.9	Pass
							22.5 (b)	

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T5	100 - 80	Top Girt	ROHN TS1.5x16 ga	206	567.47	7565.32	7.5	Pass
T6	80 - 60	Top Girt	L2 1/2x2 1/2x1/2	261	-1124.22	40525.60	14.5 (b) 2.8	Pass
T7	60 - 40	Top Girt	ROHN TS1.5x16 ga	294	-2141.28	5586.14	16.9 (b) 38.3	Pass
T8	40 - 20	Top Girt	ROHN TS1.5x16 ga	327	-926.01	5586.14	62.1 (b) 16.6	Pass
T9	20 - 5	Top Girt	L2 1/2x2 1/2x1/2	360	-249.82	40525.60	24.0 (b) 0.6	Pass
T10	5 - 0	Top Girt	L2 1/2x2 1/2x1/2	387	7806.52	64783.80	3.3 (b) 12.1	Pass
T1	180 - 160	Bottom Girt	L1 3/4x1 3/4x3/16	8	-338.50	9052.60	3.7	Pass
T2	160 - 140	Bottom Girt	ROHN TS1.5x16 ga	66	-1036.90	5468.90	19.0	Pass
T3	140 - 120	Bottom Girt	L2x2x3/16	97	1177.77	20586.85	5.7	Pass
T4	120 - 100	Bottom Girt	L2 1/2x2 1/2x1/2	154	845.25	64783.80	1.3	Pass
T5	100 - 80	Bottom Girt	ROHN TS1.5x16 ga	208	-1012.09	5468.90	18.5	Pass
T6	80 - 60	Bottom Girt	L2 1/2x2 1/2x1/2	262	5279.01	64783.80	8.1	Pass
T7	60 - 40	Bottom Girt	ROHN TS1.5x16 ga	297	-935.83	5468.90	17.1	Pass
T8	40 - 20	Bottom Girt	ROHN TS1.5x16 ga	330	259.97	7355.16	3.5	Pass
T9	20 - 5	Bottom Girt	L2 1/2x2 1/2x1/2	363	1353.61	64783.80	2.1	Pass
T1	180 - 160	Guy A@167.654	9/16	404	12199.70	17500.00	69.7	Pass
T3	140 - 120	Guy A@127.654	9/16	422	13223.00	17500.00	75.6	Pass
T6	80 - 60	Guy A@60.6146	3/4	432	18859.70	29150.00	64.7	Pass
T1	180 - 160	Guy B@167.654	9/16	398	8664.42	17500.00	49.5	Pass
T3	140 - 120	Guy B@127.654	9/16	416	9601.46	17500.00	54.9	Pass
T6	80 - 60	Guy B@60.6146	3/4	431	15377.00	29150.00	52.8	Pass
T1	180 - 160	Guy C@167.654	9/16	391	9957.91	17500.00	56.9	Pass
T3	140 - 120	Guy C@127.654	9/16	410	11994.40	17500.00	68.5	Pass
T6	80 - 60	Guy C@60.6146	3/4	427	18089.80	29150.00	62.1	Pass
T6	80 - 60	Top Guy Pull-Off@60.6146	4 1/2x3/8	428	3959.25	48587.85	8.1	Pass
T1	180 - 160	Torque Arm Top@167.654	P4x.237	406	13516.50	88851.11	11.5 (b) 15.2	Pass
T3	140 - 120	Torque Arm Top@127.654	P4x.237	418	12725.40	88851.11	14.3	Pass
T1	180 - 160	Torque Arm Bottom@167.654	XP34.5x.03325	396	-17634.40	70251.23	25.1	Pass
T3	140 - 120	Torque Arm Bottom@127.654	XP34.5x.03325	426	-18156.90	70251.23	25.8	Pass

	Summary	
Leg (T6)	86.7	Pass
Diagonal (T6)	74.0	Pass
Horizontal (T4)	14.6	Pass
Top Girt (T7)	62.1	Pass
Bottom Girt (T2)	19.0	Pass
Guy A (T3)	75.6	Pass
Guy B (T3)	54.9	Pass
Guy C (T3)	68.5	Pass
Top Guy Pull-Off (T6)	11.5	Pass
Torque Arm Top (T1)	15.2	Pass
Torque Arm Bottom (T3)	25.8	Pass
Bolt Checks	74.0	Pass
RATING =	**86.7**	**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
		Bottom Girt	328-330
T9	20.00-5.00	Leg	355-357
		Diagonal	364-381
		Top Girt	358-360
		Bottom Girt	361-363

Section No.	Section Elevation ft	Component Type	Element List
T10	5.00-0.00	Leg Diagonal Top Girt	382-384 388-390 385-387 Total number of elements: 432

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Job :	AT&T/NU - 180-ft ROHN Guyed Lattice Tower	Project No.	12047.CO16	Page	of
Address:	135 New Rd., Madison, CT	Computed by	HMR	Sheet	1 of 2
Description:	Guy Anchor Evaluation - 2005 CSBC 3108.4.2/TIA Req	Checked by	CFC	Date	4/25/13
				Date	

CHECK UPLIFT RESISTANCE

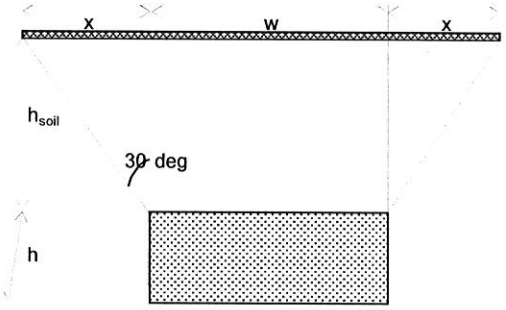
ANCHOR (A) AT 150.0ft RADIUS

RESULTS FROM COMPUTER ANALYSIS:

Uplift =	6.9	kips
Sliding =	17.4	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



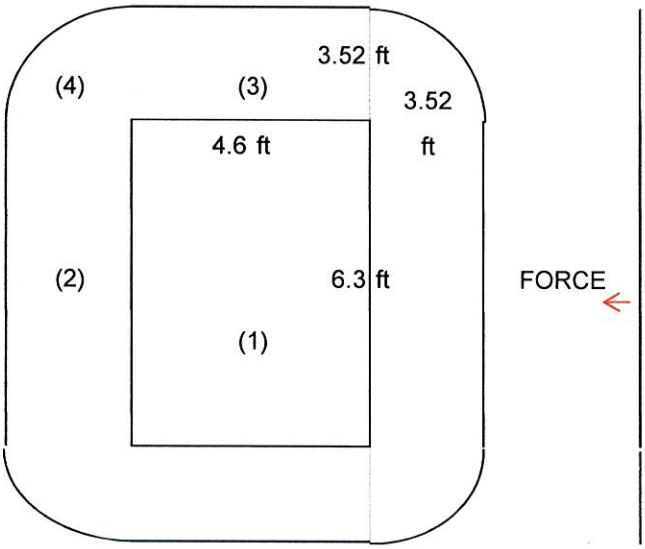
Foundation Section

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	>	*6.9*	***OK***	*31.96*	>	*6.9*	***OK***

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

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Job :	NU - 180-ft ROHN Guyed Lattice Tower	Project No.	12047.CO16	Page	of
Address:	135 New Rd., Madison, CT	Computed by	HMR	Sheet	2 of 2
Description:	Guy Anchor Evaluation - TIA Req	Checked by	CFC	Date	4/25/13
				Date	

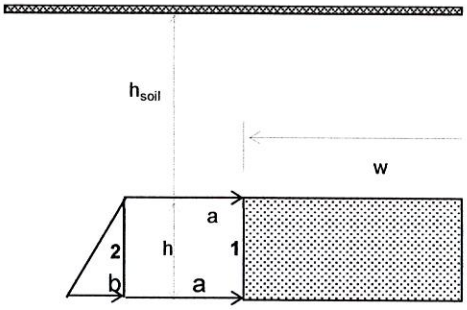
CHECK SLIDING RESISTANCE

SOIL PARAMETERS

$\gamma soil$ =	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 =		-6.9	k
SUM =		57.02	k

COEF. OF FRICTION, (0.45) =	25.66	k
RESIST TO SLIDING =	34.04	k
SUM =	59.69	k

SF AGAINST SLIDING

SF = 3.4 > 2 OK

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

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F: (203) 488-8587

				Page	of
Job :	AT&T/NU - 180-ft ROHN Guyed Lattice Tower	Project No.	12047.CO16	Sheet 1	of 2
Address:	135 New Rd., Madison, CT	Computed by	HMR	Date	4/25/13
Description:	Guy Anchor Evaluation - 2005 CSBC 3108.4.2/TIA Req	Checked by	CFC	Date	

CHECK UPLIFT RESISTANCE

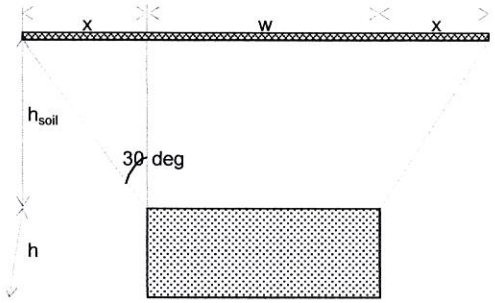
ANCHOR (A) AT 184.0ft RADIUS

RESULTS FROM COMPUTER ANALYSIS:

Uplift =	29.9	kips
Sliding =	39.5	kips

CONCRETE PARAMETERS:

γ_{conc} =	150	pcf
w =	3	ft
h =	3	ft
d =	9.3	ft
Vol. =	*83.70*	ft^3
Wc =	*12.56*	kips



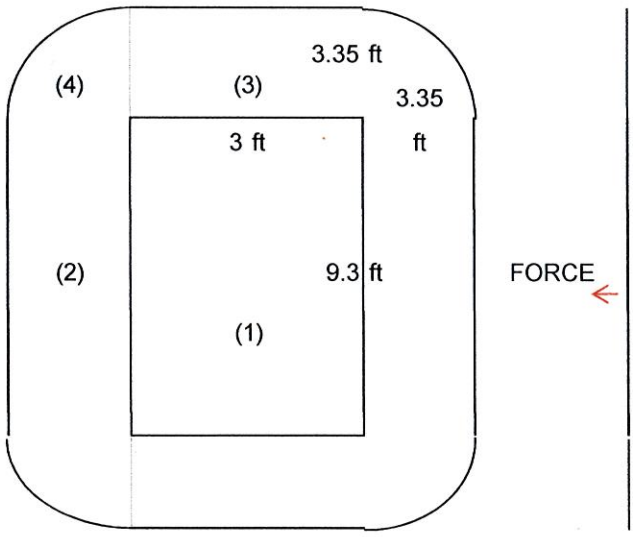
Foundation Section

SOIL PARAMETERS:

γ_{soil} =	110	pcf
h_{soil} =	5.8	ft
x =	*3.35*	ft

Soil Weight (Wr):

(1) =	17.80	kips
(2) =	19.87	kips
(3) =	6.41	kips
(4) =	7.49	kips
*(5) Anchor Reinf. =	0	kips
Total =	51.57	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			
34.16	>	*29.9*	***OK***	*32.06*	>	*29.9*	***OK***

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

CENTEK engineering
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Job :	NU - 180-ft ROHN Guyed Lattice Tower	Project No.	12047.CO16	Page	of
Address:	135 New Rd., Madison, CT	Computed by	HMR	Sheet	2 of 2
Description:	Guy Anchor Evaluation - TIA Req	Checked by	CFC	Date	4/25/13
				Date	

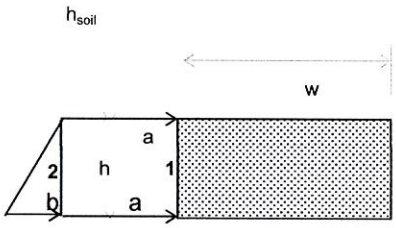
CHECK SLIDING RESISTANCE

SOIL PARAMETERS

$\gamma soil$ =	110	pcf
h_{soil} =	5	ft
h =	3	ft
ϕ =	32	degrees

ANCHOR PARAMETERS

w =	3.0	ft
h =	3.0	ft
d =	9.3	ft



Foundation Elevation View

K_a = 0.31

K_p = 3.25

Δ = 2.95

HORIZONTAL FORCES

1 =	58.79	k
2 =	8.75	k
RESIST TO SLIDING =	67.55	k

SOIL & CONCRETE WEIGHT =	Wr + Wc =	64.13	k
UPLIFT REACTIONS =		-29.9	k
SUM =		34.23	k

COEF. OF FRICTION, (0.45) =	15.40	k
RESIST TO SLIDING =	67.55	k
SUM =	82.95	k

SF AGAINST SLIDING

SF = 2.1 > 2 OK

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

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Branford, CT 06405
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P: (203) 488-0580
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Subject:	Base Foundation Analysis
	Sprint CT03XC023
Location:	180-ft Guyed Lattice Tower Madison, CT.
Rev. 0: 04/25/13	

Guyed Tower Base Foundation:

Input Data:

Tower Data

Shear Force =	Shear := 1.9·kip	(User Input from RISATower)	
Axial Force =	Axial := 97.4·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 = $\gamma_c := if(Bouyancy = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc}) = 150 \cdot pcf$

Adjusted Soil Unit Weight = $\gamma_s := if(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}) = 110 \cdot pcf$

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

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

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

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

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

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

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

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

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

Total Weight = $WT_{tot} := WT_c + Axial = 108.29 \cdot kip$

Soil/Concrete Friction Resistance = $Sl_2 := \mu \cdot WT_{tot} = 48.73 \cdot kips$

Total Sliding Resistance = $Sl_{tot} := Sl_1 + Sl_2 = 71.28 \cdot kips$

Sliding Resistance Ratio = $Sliding\_Resistance_{ratio} := \frac{Shear \cdot 2.0}{Sl_{tot}} = 0.05$

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

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 = $P_{max} := \frac{WT_{tot}}{A_{mat}} = 4.35 \cdot ksf$

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

Max_Pressure_Check = "Okay"

	Market	Southern Connecticut		
	Cascade ID	CT03XC023		
		SECTOR 1	SECTOR 2	SECTOR 3
	Split sector present	No	No	No
1900	1900MHz_Azimuth	20	160	300
1900	1900MHz_No_of_Antennas	1	1	1
1900	1900MHz_RADCenter(ft)	125.3	125.3	125.3
1900	1900MHz_Antenna Make	RFS	RFS	RFS
1900	1900MHz_Antenna Model	APXVSPP18-C-A20	APXVSPP18-C-A20	APXVSPP18-C-A20
1900	1900MHz_Horizontal_Beamwidth	65	65	65
1900	1900MHz_Vertical_Beamwidth	5.5	5.5	5.5
1900	1900MHz_AntennaHeight (ft)	6	6	6
1900	1900MHz_AntennaGain(dBd)	15.9	15.9	15.9
1900	1900MHz_E_Tilt	0	-1	0
1900	1900MHz _M_Tilt	0	0	0
1900	1900MHz_Carrier_Forecast_Year_2013	2	2	2
1900	1900MHz_RRH Manufacturer	ALU	ALU	ALU
1900	1900MHz_RRH Model	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz
1900	1900MHz_RRH Count	1	1	1
1900	1900MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
1900	1900MHz Combiner Model	No Combiner Required	No Combiner Required	No Combiner Required
1900	1900MHz_Top_Jumper #1_Length (RRH or Combiner-to-Antenna for TT or Main Coax to	10	10	10
1900	1900MHz_Top_Jumper #1_Cable_Model (RRH or Combiner-to-Antenna for TT or Main	LCF12-50J	LCF12-50J	LCF12-50J
1900	1900MHz_Top_Jumper #2_Length (RRH to Combiner for TT if applicable, ft)	N/A	N/A	N/A
1900	1900MHz_Top_Jumper #2_Cable_Model (RRH to Combiner for TT if applicable)	N/A	N/A	N/A
1900	1900MHz_Main_Coax_Cable_Length (ft)	N/A	N/A	N/A
1900	1900MHz_Main_Coax_Cable_Model	N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #1_Length (Ground based RRH to Combiner-OR-Main Coax, ft)	N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #1_Cable_Model (Ground based RRH to Combiner-OR-Main	N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #2_Length (Ground based-Combiner to Main Coax, ft)	N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #2_Cable_Model (Ground based-Combiner to Main Coax)	N/A	N/A	N/A
800	800MHz_Azimuth	20	160	300
800	800MHz_No_of_Antennas	0	0	0
800	800MHz_RADCenter(ft)	125.3	125.3	125.3
800	800MHz_AntennaMake	RFS	RFS	RFS
800	800MHz_AntennaModel	APXVSPP18-C-A20 (Shared w/1900)	APXVSPP18-C-A20 (Shared w/1900)	APXVSPP18-C-A20 (Shared w/1900)
800	800MHz_Horizontal_Beamwidth	65	65	65
800	800MHz_Vertical_Beamwidth	11.5	11.5	11.5
800	800MHz_AntennaHeight (ft)	6	6	6
800	800MHz_AntennaGain (dBd)	13.4	13.4	13.4
800	800MHz_E_Tilt	0	-6	-2
800	800MHz_M_Tilt	0	0	0
800	800MHz_RRH Manufacturer	ALU	ALU	ALU
800	800MHz_RRH Model	RRH 800 MHz 2x50W	RRH 800 MHz 2x50W	RRH 800 MHz 2x50W
800	800MHz_RRH Count	1	1	1
800	800MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
800	800_Top_Jumper #1_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)	10	10	10
800	800_Top_Jumper_Cable_Model (RRH to Antenna for TT or Main Coax to Antenna for GM)	LCF12-50J	LCF12-50J	LCF12-50J
800	800MHz_Main_Coax_Cable_Length (ft)	N/A	N/A	N/A
800	800MHz_Main_Coax_Cable_Model	N/A	N/A	N/A
800	800_Bottom_Jumper #1_Length (Ground based RRH to Main Coax)	N/A	N/A	N/A
800	800_Bottom_Jumper #1_Cable_Model (Ground based RRH to Main Coax)	N/A	N/A	N/A
	Plumbing Scenario *	124	124	124
Comments	* If plumbing scenario does not match the material received, please contact your Construction Manager			
Comments	11/9/2012			
Comments				
Comments				

Product Data Sheet APXVSPP18-C

Triple Band Dual Polarized Antenna, 806-1995, 65deg, 16-18dBi, 1.8m, VET, 0-10deg, 0.5m AISG Cable

Product Description

This antenna is an ideal choice for dual band site upgrade for high traffic areas. It features 4 ports in 1900 MHz and 2 ports in 800 MHz.

Features/Benefits

- **Variable electrical downtilt – provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.**
- **High suppression of all upper sidelobes (Typically < 18 dB)**
- **Independent control of electrical downtilt for 800 and PCS bands**
- **Remote tilt – AISG compatible**
- **Low profile for low visual impact**
- **Quick and easy to adjust**
- **High front-to-back ratio**

Technical Specifications

Electrical Specifications

Frequency Range, MHz	806-869	1850-1995	1850-1995
Horizontal Beamwidth, deg	65	65	65
Vertical Beamwidth, deg	11.5	5.5	5.5
Electrical Downtilt, deg		0-10	
Gain, dBi (dBd)	15.5 (13.4)	18.0 (15.9)	18.0 (15.9)
1st Upper Sidelobe Suppression, dB, typ. @ T0° & T8°		>18	
Front-To-Back Ratio, dB, @ 180° ± 15°	>30	>27	>27
Polarization		Dual pol +/-45°	
Return Loss, dB		> 14	
Isolation between Ports, dB		>28	
3rd Order IMP @ 2 x 43 dBm, @ 2 min. duration		>110	
Cross Polar Discrimination (XPD) 0°, dB	>15	>20	>20
Cross Polar Discrimination (XPD) ± 60°, dB	>9.5	>11	>11
HBW Squint accross same band ports, °		±5	
Impedance, Ohms		50	
Maximum Power Input, W		250	
Lightning Protection		Direct Ground	
Connector Type		(6) 7-16 DIN Female	

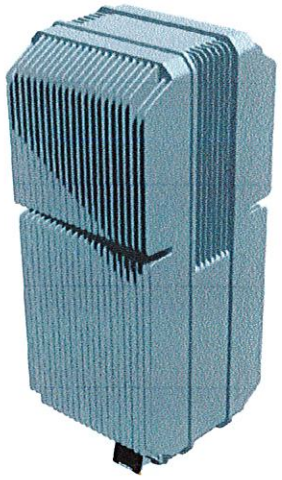
Mechanical Specifications

Dimensions - HxWxD, mm (in)	1829 x 302 x 178 (72.0 x 11.8 x 7)
Weight w/o Mtg Hardware, kg (lb)	25.8 (57)
Radome Material	ASA
Radome Color	Light Grey RAL7035
Mounting Hardware Material	Diecasted Aluminum and Galvanized Steel

Ordering Information

Mounting Hardware	APM40-2 Downtilt Kit
AISG System Cable	0.5 m, included
Mounting Pipe Diameter, mm (in)	60-120 (2.4-4.7)
Mounting Hardware Weight, kg (lb)	3.4 (7.5)

Product: 1900MHz RRH (65MHz)



Product Description:
This Remote Radio Head (RRH) supports the 1900MHz spectrum with a Quad Transmit and Quad Receiver configuration supporting 4x45W of output power in a dual head configuration

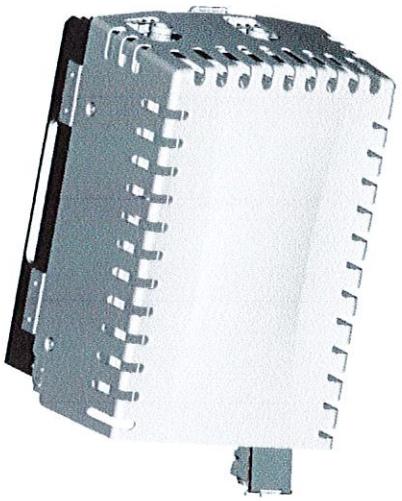
Features / Benefits:

- Supports up to 6 carriers of CDMA in the 1900MHz spectrum and is hardware ready for 4x4 LTE MIMO (dual technology)
- Supports up to 8 carriers of CDMA (single technology)
- Supports AISG
- -48V DC may be powered from Alcatel-Lucent cabinet
- Supports Hybriflex fiber / power cable bundle

Technical Specifications:

Physical Dimensions (HxWxD):	25" x 11.1" x 11.4"
Weight:	60 pounds
Output Power:	4x45W (180W Total)
Frequency Range:	1930-1995MHz Tx / 1850 - 1915 Rx
Consumed Power (Typ):	680W
Instantaneous Bandwidth:	65 MHz
Rx Noise Figure:	3.0dB
Antenna Interface :	7/16 DIN Female
Operating Temperature Range:	-40C to +55C
Supports AISG 2.0	

Product: 800MHz RRH



Product Description:
This Remote Radio Head (RRH) supports the 800MHz spectrum with a Dual Transmit and Dual Receiver configuration supporting 2x50W of output power

Features / Benefits:

- Supports up to 4 carriers of CDMA in the 800MHz spectrum and is hardware ready for LTE MIMO.

- Supports AISG
- External Notch Filter available to meet temporary in-band emissions requirements..
- -48V DC may be powered from Alcatel-Lucent cabinet
- Supports Hybriflex fiber / power cable bundle
- Includes Smart Bias-T

Technical Specifications:

Physical Dimensions (HxWxD):	19.7" x 13" x 10.8"
Weight:	53 pounds
Output Power:	2x50W (100W Total)
Frequency Range:	862.275 – 869MHz Tx / 817.275 – 824 Rx
Consumed Power (Typ):	425W
Instantaneous Bandwidth:	7 MHz
Antenna Interface :	7/16 DIN Female
Operating Temperature Range:	-40C to +50C (with solar loading), +55C (without solar loading)
Supports AISG 2.0	

Dispersive Wave Propagation Testing of an Existing Tower Foundation

Report Prepared for
Centek Engineering, Inc.

Site Name: 135 New Road
Site ID: CTO3XC-023
135 New Road - Madison, CT
Lat: 41.293408°
Lon: -72.578397°

FDH Project Number 10-12250E N1

Prepared By:

Jason E. Tucker, PE
Project Engineer
Engineering Investigative Services

Reviewed By:

Jeremy D. Piner, PE
Director
Engineering Investigative Services

FDH Engineering, Inc.
2730 Rowland Road
Raleigh, NC 27615
(919)-755-1012
info@fdh-inc.com

1/5/2011

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Dispersive Wave Signal Analysis:

Prepared By:

Brian Peele, BSMSE
Signal Analyst
Nondestructive Testing Services

Reviewed By:

Corbin Hardy, MSEE
Director
Nondestructive Testing Services

FDH Engineering, Inc.
2730 Rowland Road, Suite 100 – Raleigh, NC 27615
Tel: (919) 755-1012 Fax: (919) 755-1031

Client: Centek Engineering, Inc.
Attn: Mr. Dan Bolan
63-2 North Branford Road - Branford, CT 06405-
Tel: (203) 488-0580 Fax: (203) 488-8587

Project Location: 135 New Road - Madison, CT

Foundation Type: Concrete Pad/Pier and Concrete Deadman Anchor

No. of Foundations Investigated: Seven (7)

Scope of Work

Field crews from FDH Engineering, Inc. performed a nondestructive *Dispersive Wave* investigation of the as-built tower foundations in CT. These tests were conducted to collect data used for determining the foundations' overall, in-situ sizes. The data acquired was transmitted to FDH's offices in Raleigh, NC where it was post-processed and analyzed. Contained herein are the results from this analysis.

The FDH Testing Methodology

FDH's method of dispersive wave testing is conducted by temporarily mounting accelerometers (gages) on the foundation's top, and then striking the foundation with a hand-held hammer. The waves created by the blow propagate up and down the foundation's length with the reflections being recorded and stored on a digital storage oscilloscope each time they pass the gages. The data then is analyzed by digital signal processing techniques using special software designed by

FDH. This analysis permits computation of the time needed for a select group of frequencies to travel from the gages to the bottom of the concrete and back. The foundation's vertical dimension is then computed from the product of frequency velocity and the corresponding time required for travel. FDH's method of rebar determinations is conducted using FDH's proprietary software and field capabilities to obtain a three-dimensional view of the reinforcing steel within the concrete.

DISCUSSION

The concrete lengths shown in *Appendix – Drawing No. S-2 and S-3* are considered to be from the foundation's top surface to its bottom surface. If there is a break or other significant fracture in the concrete, or a major void, a strong return would be found on the record at the approximate location of the apparent damage. The computed length then would be the distance from the foundation's top to the location of such a material anomaly.

GENERAL COMMENTS/LIMITATIONS

Professional judgments are incorporated into this report. These are based on our evaluations of field information gathered, on our understanding of the characteristics of the project, and on our experience and capabilities using dispersive wave propagation methods. We do not guarantee performance of this project in any respect, only that our work and judgments rendered meet the standard of care of our profession.

Several factors are mentioned below that could potentially affect the results of our investigation, either the wave propagation testing or the manual probing/digging operations that may have been used.

If any portion of the foundations have been modified in the past by pouring additional concrete above the original (old) concrete, then there exists the possibility of not being able to identify the dimensions of the original foundation located beneath the new pour. Such modifications could create cold joints through which wave energy may not pass, and the dimensions of any original block may be obscured by the new pour, or completely encompassed by it. The presence of "toes" at the bottom of anchor blocks, if applicable for this project, might not be detected.

If foundations are embedded into rock the computed concrete thicknesses (depths) could be affected by the underlying rock. Multiple wave reflections could be present in the data due to uneven concrete surfaces that may exist between concrete and rock. Some wave energy could extend into the rock that could induce a slight error in the thickness (depth) calculations.

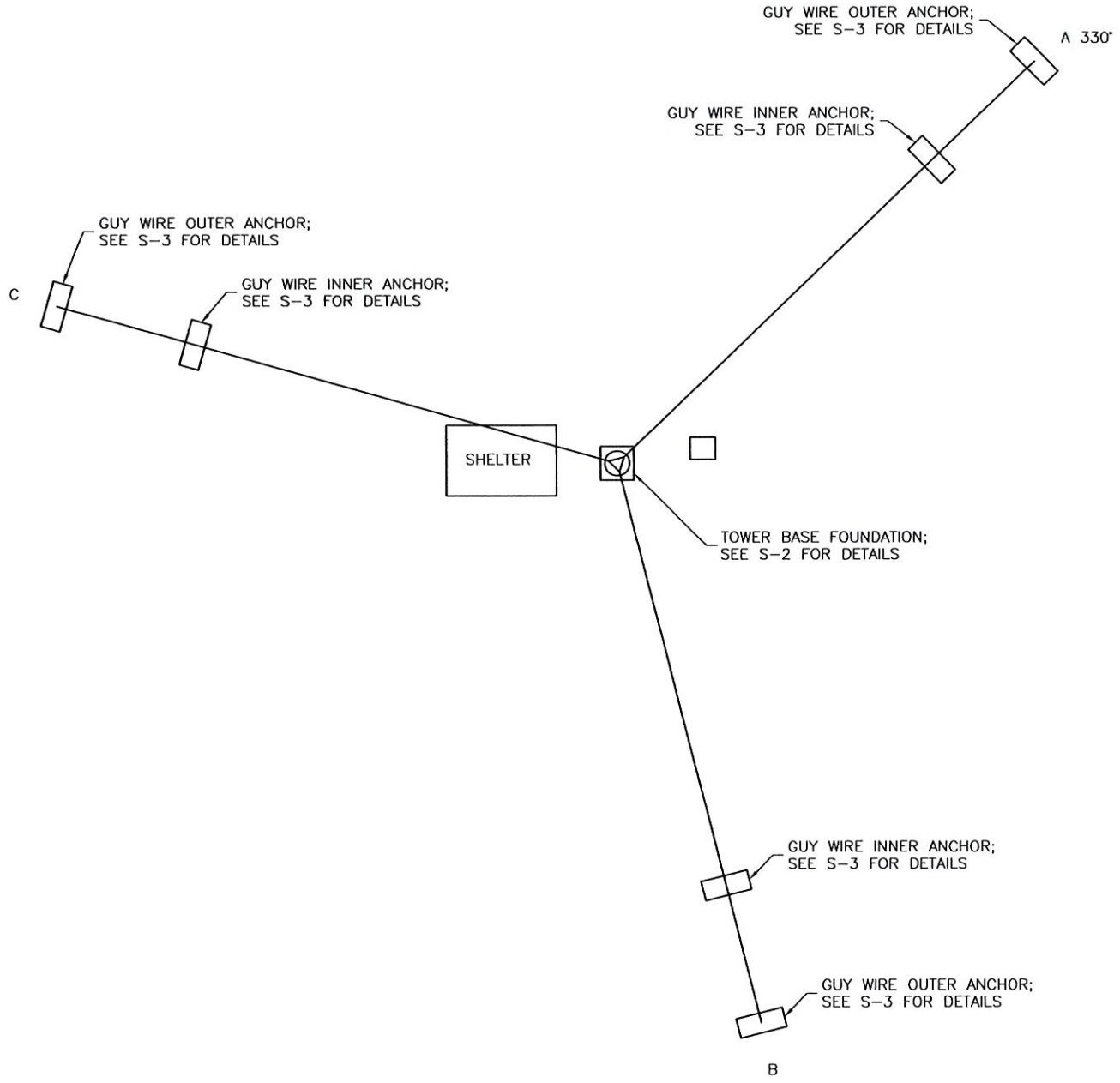
The presence of overspill concrete near the top of foundations can cause an error in the lateral dimensions determined for a foundations. Overspill concrete can encompass a larger area above the actual installed foundation size. Also, uneven concrete surfaces below grade, if they exist,

make determination of foundation concrete sizes difficult. In these cases, average concrete dimensions are reported.

Every attempt is made to identify whether driven or cast-in-place piles exist beneath a foundation. Where piles are identified they are reported. If not reported, we do not guarantee they do not exist, only that they were not located. The client should be aware of this possibility and know that FDH has made every attempt to locate any suspected piles. Locating piles is a difficult operation without excavations, shoring, and dewatering operations where water table is high.

Wave propagation testing uses the fact that wave energy is mechanically generated and allowed to travel up and down a foundation's vertical length. Wave reflections, used for thickness or depth computations, are caused by energy encountering either the bottom of the concrete, voids, fractures, breaks, cold joints, soil intrusion, or varying material properties. If such areas are present, a strong return would be found on the record at the approximate location of the apparent interface. The computed length (thickness) then would be the distance from the foundation's top to the location of such a material anomaly.

Appendix



PLAN VIEW

SCALE: NTS

PREPARED BY:
FDH ENGINEERING
2730 ROWLAND ROAD
RALEIGH, NC 27615
PHONE: (919) 755-1012
FAX: (919) 755-1031

PREPARED FOR:
CENTEK engineering

DRAWING TITLE:
EXISTING SITE PLAN

PROJECT NO:	DRAWN:	PC:	APPV'D:	DATE:
10-12250E N1	DBM	JET	JDP	01/05/11

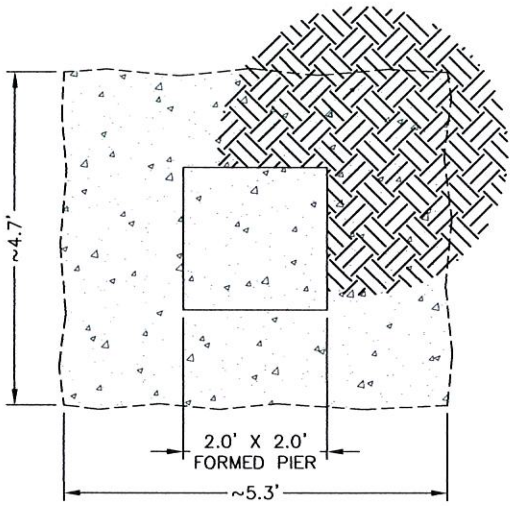
PROJECT NAME:
135 NEW ROAD

ADDRESS:
135 NEW ROAD
MADISON, CT 06443

LAT: 41° 17' 36.27"
LONG: -72° 34' 42.23"

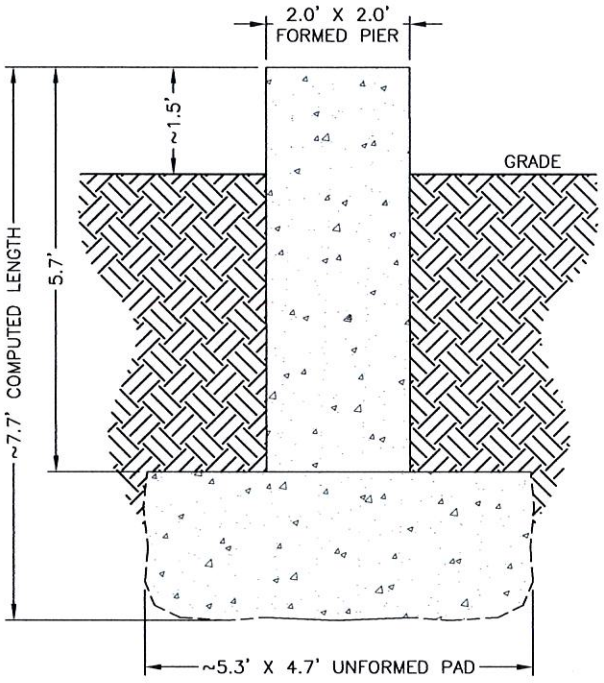
REV. NO:	DATE:
A	01/05/11

DRAWING NO:
S-1



PLAN VIEW

SCALE: NTS



VERIFIED GEOMETRY
PROJECTED GEOMETRY

ELEVATION VIEW

SCALE: NTS

PREPARED BY:
FDH ENGINEERING
2730 ROWLAND ROAD
RALEIGH, NC 27615
PHONE: (919) 755-1012
FAX: (919) 755-1031

PREPARED FOR:
CENTEK engineering

DRAWING TITLE:
DISPERSIVE WAVE FOUNDATION RESULTS @ BASE

PROJECT NO:	DRAWN:	PC:	APPV'D:	DATE:
10-12250E N1	DBM	JET	JDP	01/05/11

PROJECT NAME:
135 NEW ROAD

ADDRESS:
135 NEW ROAD
MADISON, CT 06443

LAT: 41° 17' 36.27"
LONG: -72° 34' 42.23"

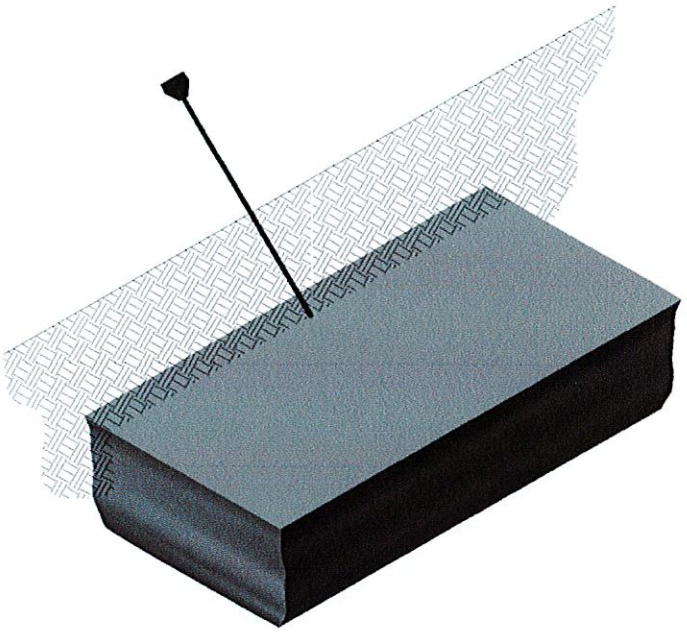
REV. NO:	DATE:
A	01/05/11

DRAWING NO:
S-2

ANCHOR BLOCK DIMENSIONS

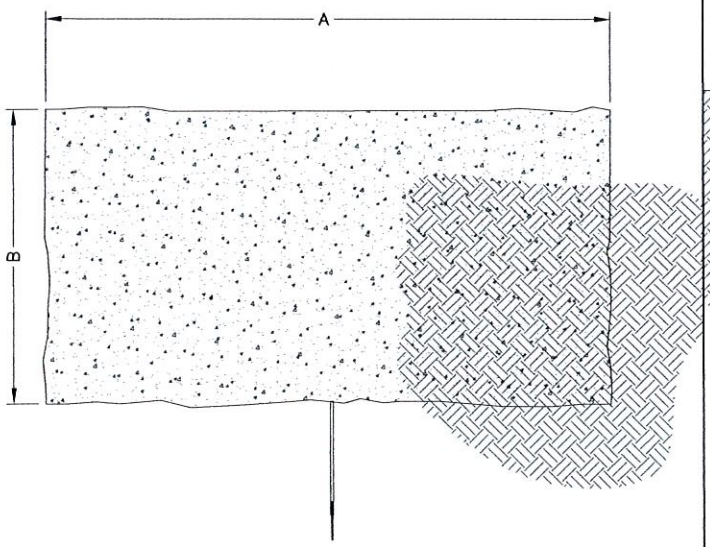
ANCHOR LOCATION	AZIMUTH	A	B	C	D
A - OUTER	330°	9.3'	3.0'	5.8'	**
B - OUTER	-	8.9'	4.1'	5.0'	2.5'
C - OUTER	-	9.2'	3.7'	5.2'	3.1'
A - INNER	330°	6.3'	4.6'	6.1'	2.3'
B - INNER	-	7.3'	4.1'	4.4'	2.3'
C - INNER	-	7.2'	5.0'	5.4'	2.1'

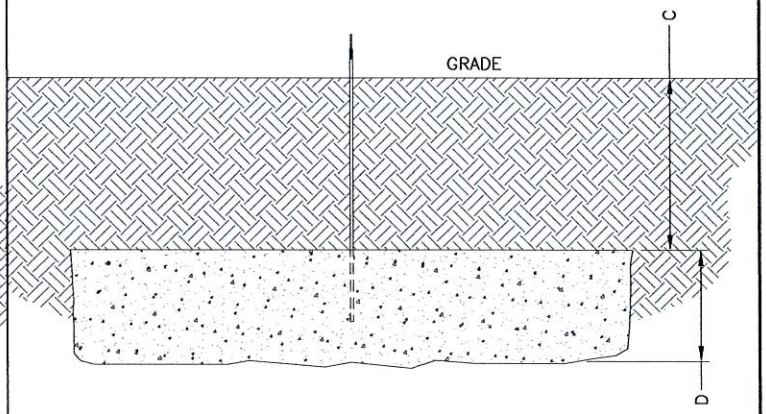
SITE NOTES:
A=LATERAL DIMENSION
B=FRONT TO BACK
C=BELOW GRADE
D=BLOCK THICKNESS
*ANCHOR BLOCK NOT DRAWN TO SCALE
**INCONCLUSIVE DATA



ANCHOR INFORMATION

ISOMETRIC VIEW SCALE: NTS





PLAN VIEW SCALE: NTS

ELEVATION VIEW SCALE: NTS

PREPARED BY:
FDH ENGINEERING
2736 ROWLAND ROAD
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PHONE: (919) 755-1012
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PREPARED FOR:
CENTEK engineering

DRAWING TITLE:
DISPERSIVE WAVE FOUNDATION RESULTS @ ANCHORS

PROJECT NO:	DRAWN:	PC:	APPV'D:	DATE:
10-12250E N1	DBM	JET	JDP	01/05/11

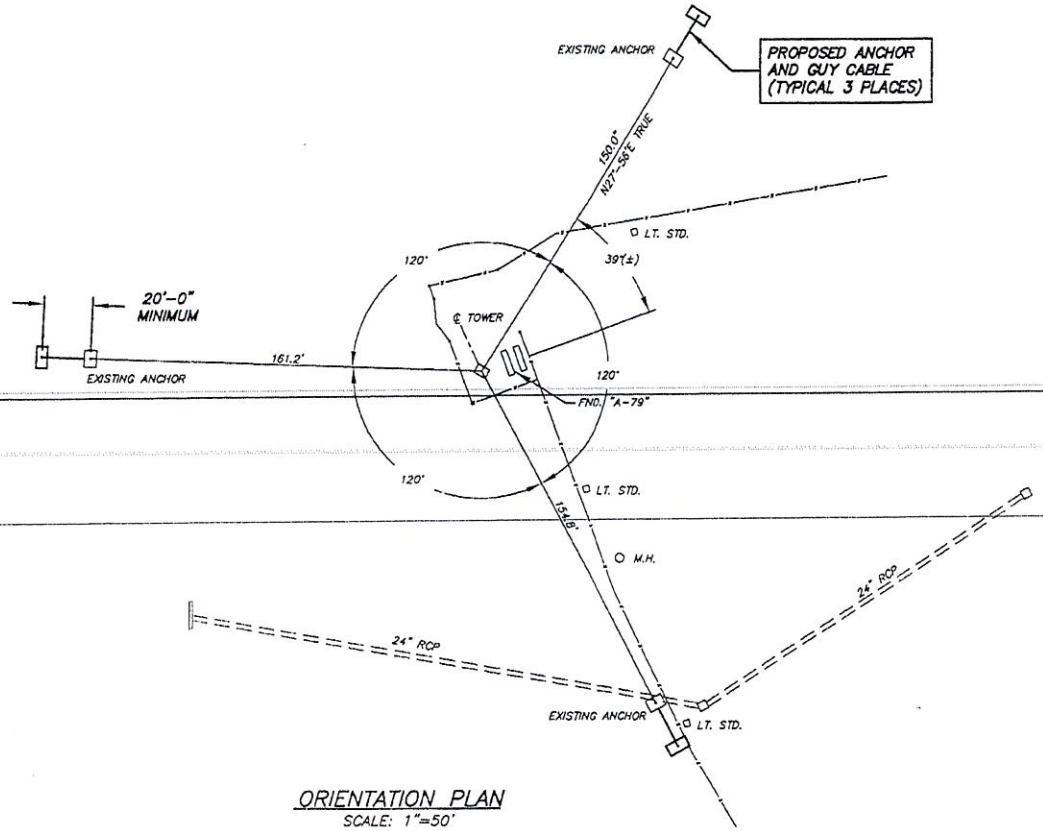
PROJECT NAME:
135 NEW ROAD

ADDRESS:
135 NEW ROAD
MADISON, CT 06443

LAT: 41° 17' 36.27"
LONG: -72° 34' 42.23"

REV. NO:	DATE:
A	01/05/11

DRAWING NO:
S-3

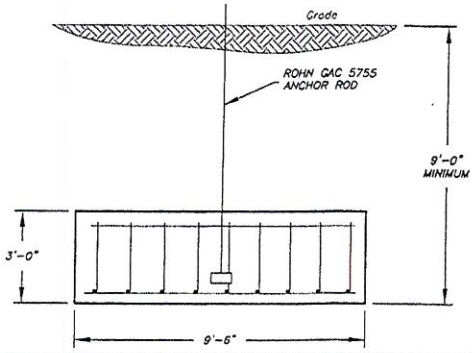


ORIENTATION PLAN
SCALE: 1"=50'

STATE OF CONNECTICUT
H. EDMUND BERGERON
No. 20022
LICENSED PROFESSIONAL ENGINEER

Plotted 09/23/2003, 13:40

HEB	H.E. BERGERON ENGINEERS, P.A. NORTH CONWAY, N.H. (603) 356-6936	180' GUYED TOWER MADISON, CT prepared for URS CORP	ORIENTATION PLAN DRWN: BCL SCALE: 1"=50' DESIGN: JCK PROJ. # 97058-007 DATE: 9/23/03 SHEET 1 OF 4



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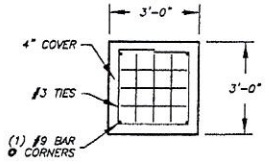

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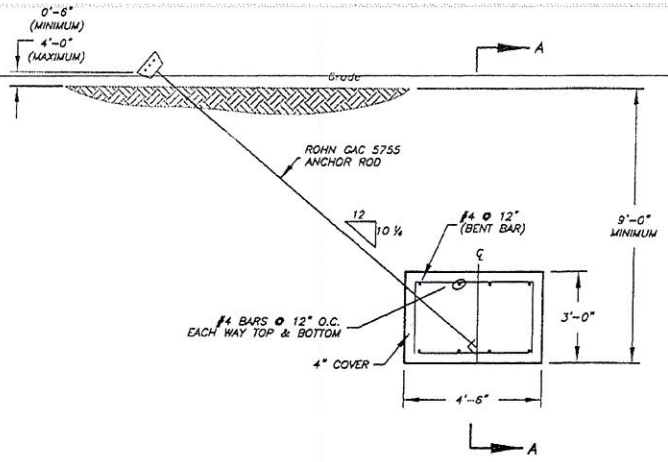
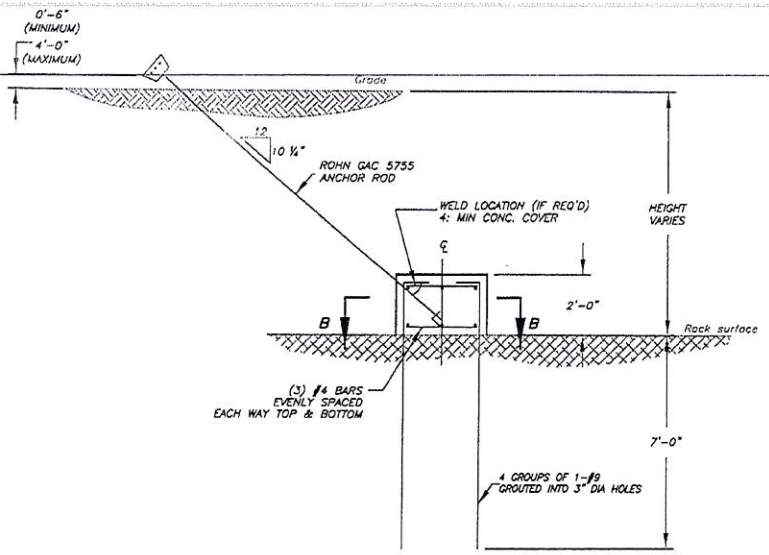


SOIL ANCHOR OPTION DETAIL
SCALE: 1/4" = 1'-0"



ROCK ANCHOR OPTION DETAIL
SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. CONCRETE AND REINFORCING SHALL BE PLACED IN ACCORDANCE WITH ACI BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318-71). PROVIDE 3" MINIMUM COVER FOR ALL REINFORCING UNLESS OTHERWISE NOTED.
2. CONCRETE SHALL DEVELOP MINIMUM COMPRESSIVE STRENGTH OF 3500 PSI IN 28 DAYS AND SHALL HAVE 5% - 7% AIR ENTRAINMENT.
3. REINFORCING STEEL SHALL BE DEFORMED BARS GRADE 60.
4. PROVIDE 1½" CHAMFER AT EXPOSED EDGES OF TOWER PIER.
5. REMOVE ALL FORM MATERIAL BEFORE BACKFILLING.
6. BACKFILL CONCRETE ANCHORS IN 8" LAYERS AND MECHANICALLY COMPACT EACH LAYER TO 95%
7. CONTRACTOR IS RESPONSIBLE FOR DETERMINING WHICH ANCHOR WAS INSTALLED AND USE THE APPROPRIATE OPTION.
8. TEMPORARY BRACING SHALL BE LEFT IN PLACE UNTIL CONCRETE HAS DEVELOPED A STRENGTH OF 3500 PSI.
9. EPOXY SHALL BE EOPXY SYSTEMS INC PRODUCT #6 OR EQUAL, (BOND STRENGTH = 3500 PSI, TENSILE = 4000 PSI) INSTALLATION SHALL COMPLY WITH ALL MANUFACTURERS SPECIFICATIONS
10. APPLY BITUMASTIC PAINT TO ANCHOR RODS BEFORE BACKFILLING.

HEB H.E. BERGERON ENGINEERS, P.A. NORTH CONWAY, N.H. (603) 356-6936	180' GUYED TOWER MADISON, CT prepared for URS CORP	ANCHOR DETAILS	
		DRWN: BCL	SCALE: AS NOTED
		DESIGN: JCK	PROJ. # 97058-007
		DATE: 9/23/03	SHEET 2 OF 4

Plotted 09/23/2003, 13:40

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

Sprint Existing Facility

Site ID: CT03XC023

Madison CL&P
135 New Road
Madison, CT 06443

August 14, 2012

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

EBI Consulting

environmental | engineering | due diligence

August 14, 2012

Sprint
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Re: Emissions Values for Site **CT03XC023 – Madison CL&P**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 135 New Road, Madison, CT, for the purpose of determining whether the emissions from the proposed Sprint equipment upgrades 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 ($\mu W/cm^2$). The general population exposure limit for the cellular band is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the PCS band is 1000 $\mu W/cm^2$. 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 upgrades to the existing Sprint 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. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

1) 2 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
3) 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.
4) 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.
5) The antenna used in this modeling is the RFS APXVSPP18-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.

6) The antenna mounting height centerline of the proposed antennas is **125.3 feet** above ground level (AGL)
7) 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 calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT03XC023 - Madison CL&P
Site Addresss	135 New Road, Madison, CT 06443
Site Type	Guyed Tower

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	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	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	125.3	119.3	1/2 "	0.5	0	1386.9474	35.03363	3.50336%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	125.3	119.3	1/2 "	0.5	0	389.96892	9.850428	1.73729%
														Sector total Power Density Value:		5.241%	

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	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
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	125.3	119.3	1/2 "	0.5	0	1386.9474	35.03363	3.50336%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	125.3	119.3	1/2 "	0.5	0	389.96892	9.850428	1.73729%
														Sector total Power Density Value:		5.241%	

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	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
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	125.3	119.3	1/2 "	0.5	0	1386.9474	35.03363	3.50336%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	125.3	119.3	1/2 "	0.5	0	389.96892	9.850428	1.73729%
														Sector total Power Density Value:		5.241%	

Site Composite MPE %	
Carrier	MPE %
Sprint	15.722%
T-Mobile	2.920%
AT&T	26.090%
Unidentified	4.558%
Total Site MPE %	**49.290%**

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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 Sprint facility are **15.722% (5.241% 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 **49.290%** 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

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

August 19, 2013

The Honorable Fillmore McPherson
First Selectman
Town of Madison
8 Campus Drive
Madison, CT 06443-2563

RE: **EM-SPRINT-076-130819** - notice of intent to modify an existing telecommunications facility located at 135 New Road, Madison, Connecticut.

Dear First Selectman McPherson:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72, a copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by September 2, 2013.

Thank you for your cooperation and consideration.

Very truly yours,

Melanie Bachman
Acting Executive Director

MB/cm

c: Christine Poutot, Chm., Planning & Zoning Administrator, Town of Madison