COHEN and WOLF P.C.
ATTORNEYS AT LAW

JULIE D. KOHLER

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

March 13, 2014

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

Re: Notice of Exempt Modification
Jean Szwabowski, J.J. Ochenkowski, Jr. and K.W. Ochenkowski
/T-Mobile co-location
Site ID CT11230A
88 Parsonage Hill Road, North Branford

Dear Attorney Bachman:

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

In this case, Jean Szwabowski, J.J. Ochenkowski, Jr. and K.W. Ochenkowski own the existing three legged lattice telecommunications tower and related facility located at 88 Parsonage Hill Road, North Branford, Connecticut (Latitude: 41.369169 Longitude: -72.810486). T-Mobile intends to replace six antennas and related equipment at this existing telecommunications facility in North Branford ("North Branford Facility"). Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Town Manager Michael T. Paulhus. The structure owners, Jean Szwabowski, J.J. Ochenkowski, Jr. and K.W. Ochenkowski, are also the property owners.

The existing North Branford Facility consists of a 195 foot tall three-legged lattice tower.[1] T-Mobile plans to replace six antennas at a centerline of 180 feet. (See the plans revised to February 12, 2014 attached hereto as Exhibit A). T-Mobile will also install fiber cable and reuse existing coax cable. The existing North Branford Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated February 25, 2014 and attached hereto as Exhibit B.

[1] While the online docket for the Connecticut Siting Council does not provide a docket or petition number for the approval of this structure, it does reference this structure in connection with notices of intent captioned EM-AT&T-099-020619, EM-VER-061-099-080-119-05052, and EM-VER-123-007-010-099-060308.

1115 Broad Street
P.O. Box 1821
Bridgeport, CT 06601-1821
Tel: (203) 368-0211
Fax: (203) 394-9901

158 Deer Hill Avenue
Danbury, CT 06810
Tel: (203) 792-2771
Fax: (203) 791-8149

320 Post Road West
Westport, CT 06880
Tel: (203) 222-1034
Fax: (203) 227-1373

657 Orange Center Road
Orange, CT 06477
Tel: (203) 298-4066
Fax: (203) 298-4068

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

1. The proposed modification will not increase the height of the tower. T-Mobile's replacement antennas will be installed at a centerline of 180 feet, merely replacing existing antennas located at the same 180 foot elevation. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2. The proposed modifications will not require an extension of the site boundaries. T-Mobile's equipment will be located entirely within the existing compound and leased area.

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

4. The operation of the replacement antennas will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI dated March 12, 2014, T-Mobile's operations would add .335% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 39.915% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as Exhibit C.

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

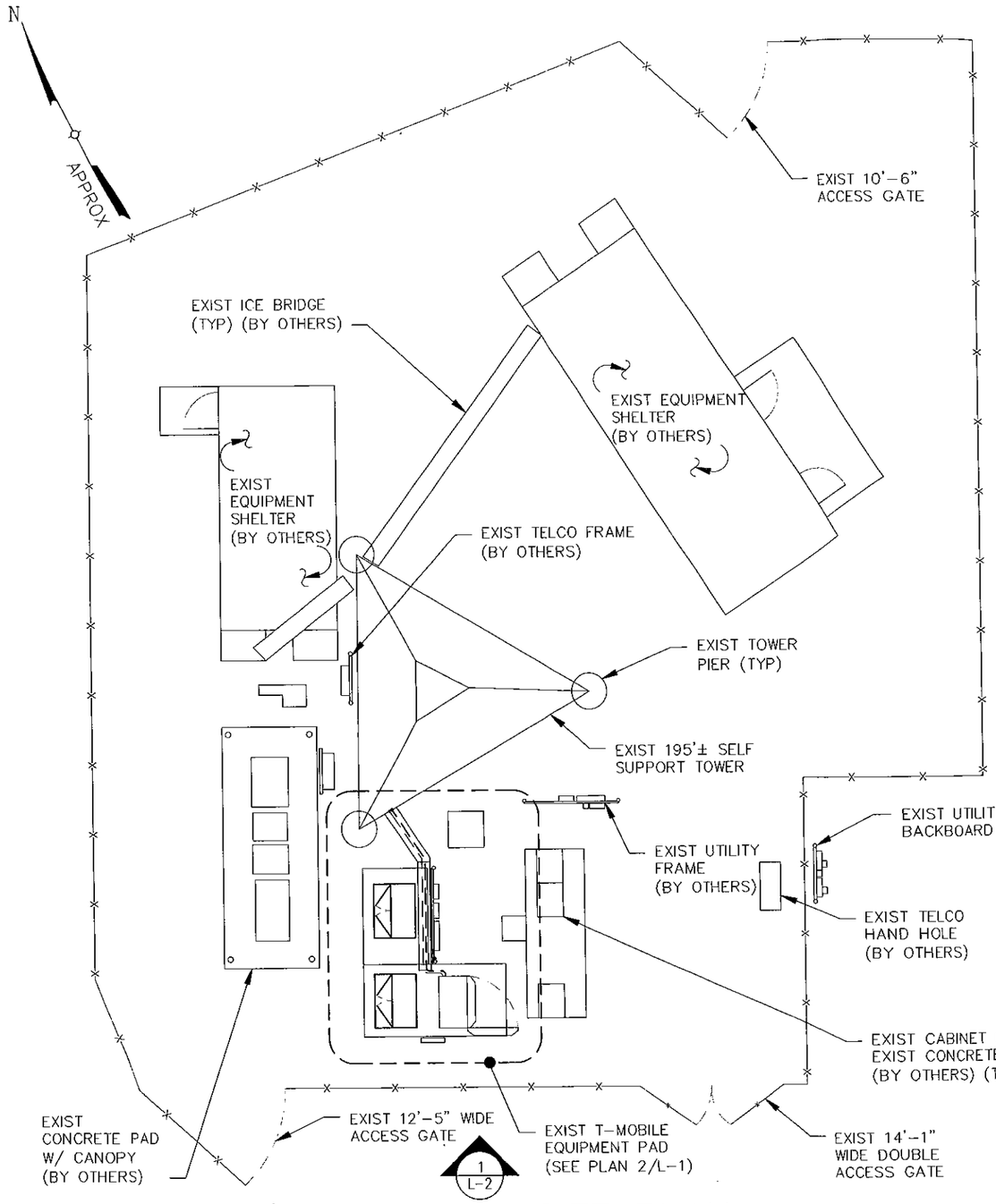
Sincerely,

Julie D. K

Julie D. Kohler, Esq.

cc: Town of North Branford, Town Manager Michael T. Paulhus
Jean Szwabowski, J.J. Ochenkowski, Jr. and K.W. Ochenkowski,
HPC Wireless Solutions, Halene Fujimoto

EXHIBIT A

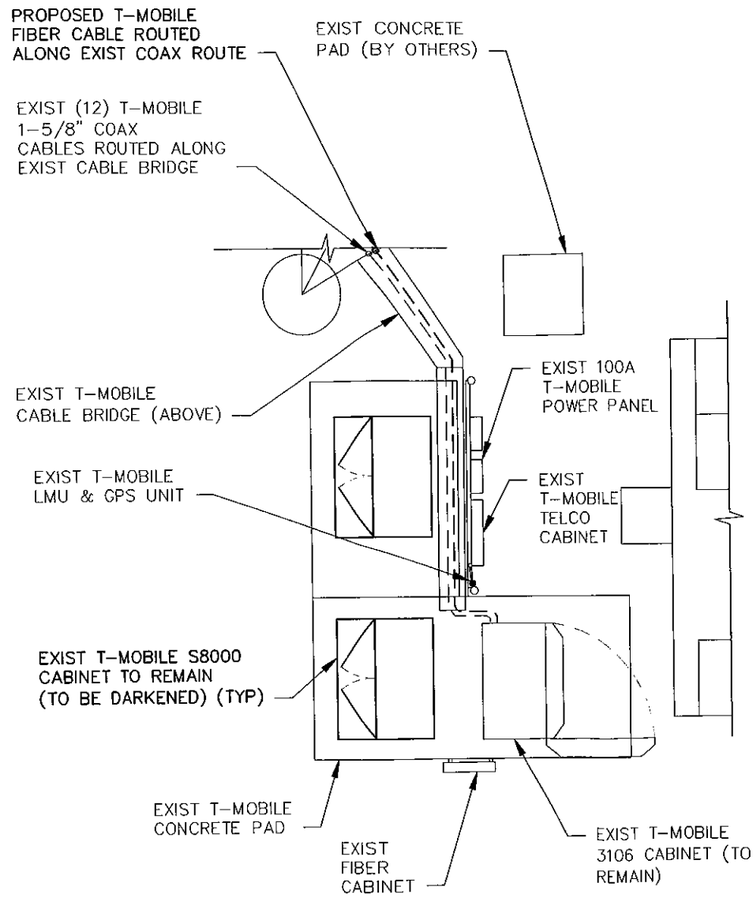


1/L-2

1/L-1 SITE PLAN

SCALE: 3/32" = 1'-0"

STRUCTURAL NOTE:
EXIST MOUNTS AND SELF SUPPORT TOWER TO BE VERIFIED FOR STRUCTURAL SUITABILITY OF THE PROPOSED INSTALLATION BY A STATE LICENSED P.E.



2/L-1

EQUIPMENT PLAN

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

CONFIGURATION
2C

0 1 2 3
ORIGINAL SIZE IN INCHES

TECTONIC
• PLANNING • SURVEYING
• ENGINEERING • CONSTRUCTION MANAGEMENT
TECTONIC Engineering & Surveying Consultants P.C.
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-6656
Fax: (845) 567-8703

T-Mobile
NORTHEAST LLC.

T-MOBILE NORTHEAST, LLC.
4 SYLVAN DRIVE
PARSIPPANY, NJ 07054
PHONE: (973) 686-8500

APPROVALS
T-MOBILE
LANDLORD
RF
CONSTRUCTION

PROJECT NUMBER	DESIGNED BY
6644.CT11230A	JQ

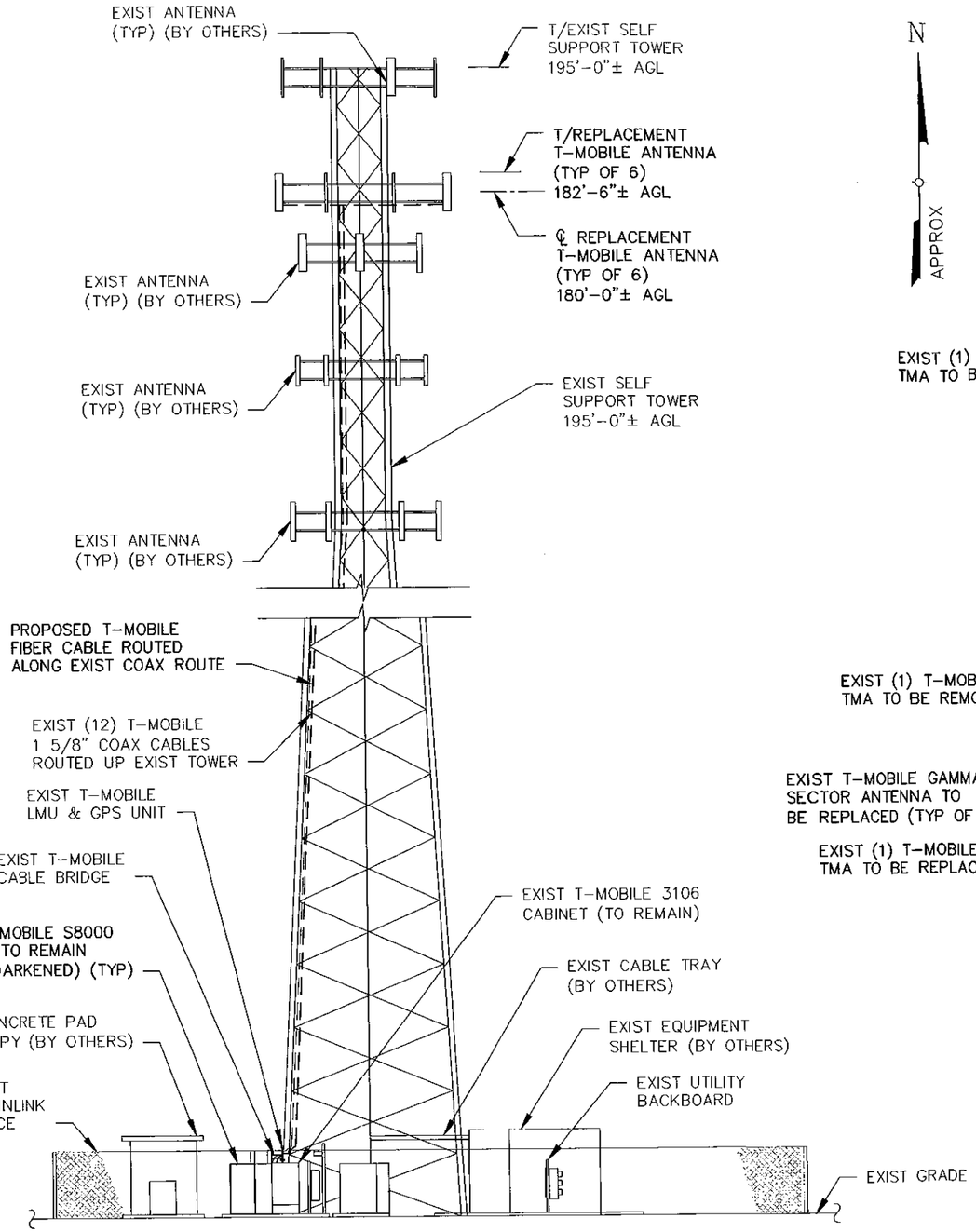
REV	DATE	REVISION	DRAWN BY
0	02/12/14	FOR COMMENT	DS

ISSUED BY | DATE

SITE INFORMATION
CT11230A
NORTH HAVEN/RT 17
88 PARSONAGE HILL RD
NORTH BRANFORD, CT
06472

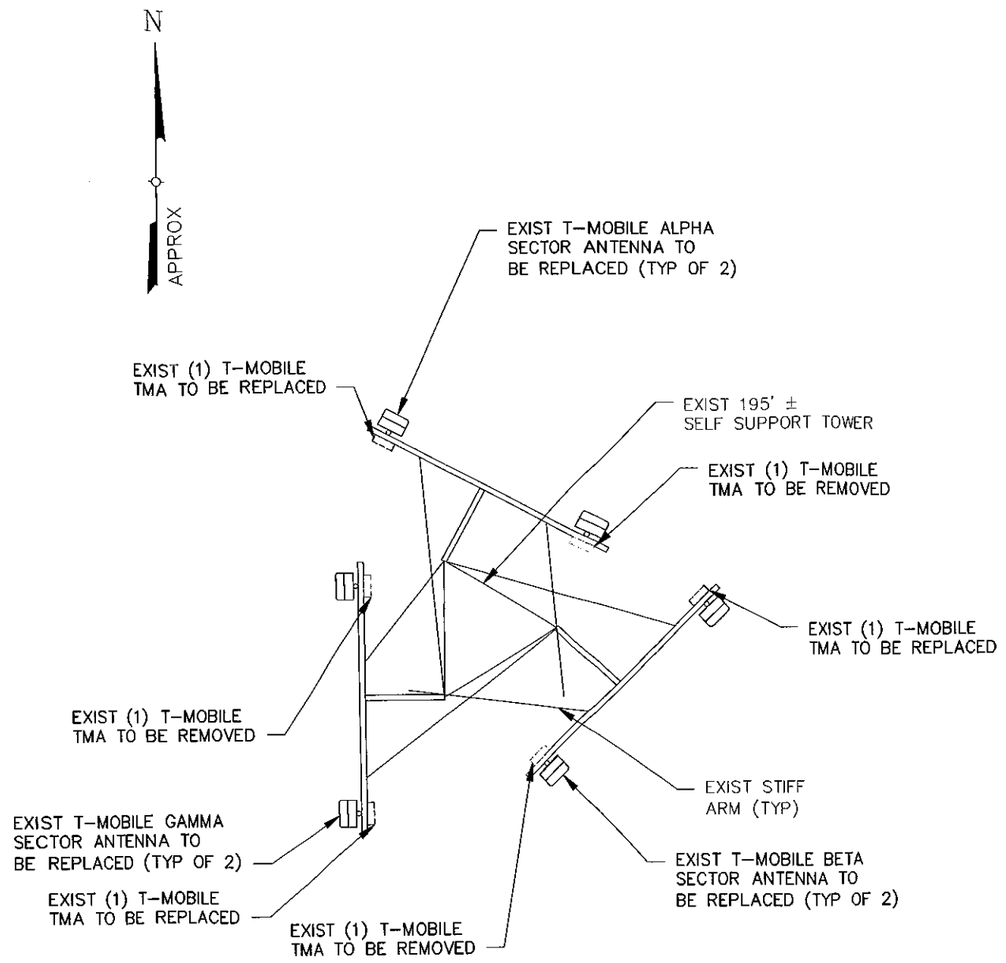
SHEET TITLE
SITE PLAN & EQUIPMENT PLAN

SHEET NUMBER
L-1



1 / L-2 ELEVATION

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



2 / L-2 ANTENNA PLAN

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

STRUCTURAL NOTE:

EXIST MOUNTS AND SELF SUPPORT TOWER TO BE VERIFIED FOR STRUCTURAL SUITABILITY OF THE PROPOSED INSTALLATION BY A STATE LICENSED P.E.

CONFIGURATION

2C

0 1 2 3

ORIGINAL SIZE IN INCHES

TECTONIC
• PLANNING • SURVEYING
• ENGINEERING • CONSTRUCTION MANAGEMENT
TECTONIC Engineering & Surveying Consultants P.C.
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-6656
Fax: (845) 567-8703

T-Mobile
NORTHEAST LLC.

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

APPROVALS

T-MOBILE _____
LANDLORD _____
RF _____
CONSTRUCTION _____

PROJECT NUMBER	DESIGNED BY
6644.CT11230A	JQ

REV	DATE	REVISION	DRAWN BY
0	02/12/14	FOR COMMENT	DS

ISSUED BY _____ DATE _____

SITE INFORMATION

CT11230A
NORTH HAVEN/RT 17
88 PARSONAGE HILL RD
NORTH BRANFORD, CT
06472

SHEET TITLE

ELEVATION &
ANTENNA PLAN

SHEET NUMBER

L-2

EXHIBIT B

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

195' Existing Lattice Tower

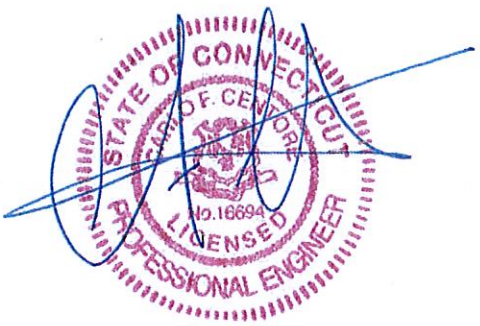
Proposed T-Mobile
Antenna Upgrade

T-Mobile Site Ref: CT11230A

88 Parsonage Hill Road
Northford, CT

CENTEK Project No. 14048.001

Date: February 25, 2014



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

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

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 T-Mobile on the existing lattice tower located in Northford (North Branford), Connecticut.

The host tower is a 195-ft, three legged, lattice tower originally designed and manufactured by Central Tower project no. F-722 dated 4/9/99. The tower geometry, structure member sizes and foundation information were taken from the aforementioned design documents. Antenna and appurtenance inventory were taken from a previous structural report prepared by Centek Engineering project no. 11118.CO60 dated March 29, 2012, a previous structural report prepared by Armor Tower Engineering dated December 17, 2012 and a RF data sheet.

The tower consists of ten (10) vertical sections consisting of solid round pipe legs conforming to ASTM A529 Gr. 50 and steel angle lateral bracing conforming to ASTM A36. The vertical tower sections are connected by bolted flange plates with the diagonal and horizontal bracing to pipe legs consisting of bolted connections. The width of the tower face is 5-ft 0-in at the top and 23-ft 6-in at the bottom.

T-Mobile proposes the removal of six (6) panel antennas and three (3) TMA's and the installation of six (6) panel antennas mounted to the existing three (3) T-Frames. 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:

- Sprint (Existing):
  Antenna: Three (3) RFS APXVSPP18-C-A20 panel antennas, three (3) 1900MHz 4X45W RRH's and three (3) 800MHz 2X50W RRH's mounted on a 15-ft triangular platform with a RAD center elevation of ±190-ft above grade level.
  Coax Cable: Three (3) 1-1/4"∅ Hybriflex cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- AT&T (Existing):
  Antennas: One (1) Raycap DC6-48-60-18-8F surge arrestor leg mounted with an elevation of 175-ft above grade level.
  Coax Cables: One (1) fiber cable and two (2) dc control cables running inside of the existing tower.
- AT&T (Existing):
  Antenna: Three (3) Kathrein 800-10121 panel antennas, three (3) KMW AM-X-CD-16-65-00T panel antennas, six (6) Powerwave LGP21401TMA's and six (6) Ericsson RRUS-11 remote radio heads mounted on three (3) 12-ft T-Frames with a RAD center elevation of ±173-ft above grade level.
  Coax Cable: Six (6) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- Nextel (Existing):
  Antenna: Twelve (12) Andrew DB844H90E-XY panel antennas mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±160-ft above grade level.
  Coax Cable: Twelve (12) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- Verizon (Existing):
  Antennas: Three (3) Antel BXA-171085/8BF panel antennas, six (6) Antel LPA-80080/4CF panel antennas, (3) Antel BXA-70063/6CF panel antennas and six (6) RFS FD9R6004/2C-3L Diplexers mounted on (3) 15-ft T-Frames with a RAD center elevation of ±145-ft above grade level.
  Coax Cable: Twelve (12) 1-5/8" ∅ coax cables coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- Sprint (Existing):
  Antenna: One (1) GPS antenna on a 2-ft standoff with an elevation of ±80-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.
- Verizon (Existing):
  Antenna: One (1) GPS antenna on a 2-ft standoff with an elevation of ±80-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 to Remain):
  Antenna: Three (3) TMA's mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±180-ft above grade level.
  Coax Cable: Twelve (12) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- T-Mobile (Existing to Remove):
  Antenna: Three (3) EMS RR90-17-02DP panel antennas, three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas and three (3) TMA's mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±180-ft above grade level.
- **T-MOBILE (Proposed):**
  Antennas: Six (6) Ericsson AIR 21 panel antennas mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±180-ft above grade level.
  Coax Cables: One (1) 1-5/8" ∅ fiber cable running on a 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 should be routed as specified in section 3 of this report.

Analysis

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

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

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

Tower Loading

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

Basic Wind Speed:	New Haven; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Northford (North Branford); v = 110 mph (3 second gust) equivalent to v = 90 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	Appendix K wind speed controls.	
Load Cases:	Load Case 1; 90 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 78 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 78 mph wind speed velocity represents 75% of the wind pressure generated by the 90 mph wind speed..	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

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

Tower Capacity

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

- Calculated stresses were found to be within allowable limits. In Load Case 1, per tnxTower "Section Capacity Table", this tower was found to be at **71.3%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Diagonal (T10)	0'-0"-20'-0"	71.3%	**PASS**
Leg (T9)	20'-0"-40'-0"	57.2%	**PASS**

Foundation and Anchors

The existing foundation consists of a three (3) 3-ft ∅ x 4-ft long reinforced concrete piers concentrically bearing on a 34-ft square x 2-ft 6-in thick reinforced concrete mat. The sub grade conditions used in the foundation analysis were derived from the aforementioned design documents. The base of the tower is connected to the foundation by means of (8) 1.375"∅, ASTM A449 anchor bolts per leg embedded 5-ft 10-in into the concrete foundation structure.

- The tower reactions developed from the governing Load Case 1 were used in the verification of the foundation and anchor bolts:

Load Effect	Proposed Tower Reactions
Leg Shear	34 kips
Leg Compression	326 kips
Leg Tension	271 kips
Base Moment	6176 ft-kips
Base Shear	55 kips

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

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	48.8%	**PASS**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS)[4]	Proposed Loading (FS)[3]	Result
Reinforced Concrete Pad and Piers	Overturning	2.00	2.64	**PASS**

Note 3: FS denotes Factor of Safety

Conclusion

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer

STATE OF CONNECTICUT
CARLO F. CENTORE
No. 16884
LICENSED
PROFESSIONAL ENGINEER

Prepared by:

Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

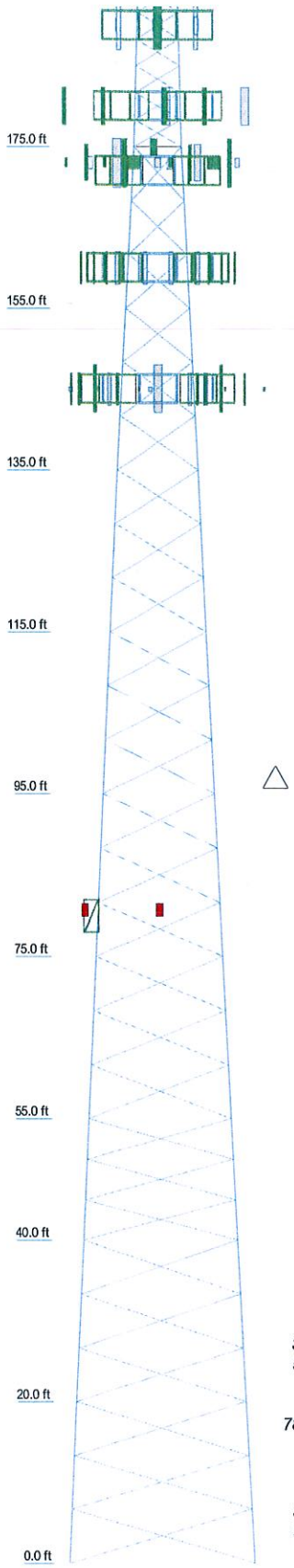
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISA Tower, 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.

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Legs	SR 3	SR 3 3/4	SR 4	SR 4 1/4	SR 4 1/4	SR 4 1/2	SR 4 3/4	SR 4 3/4	SR 5	
Leg Grade	A529-50									
Diagonals	SR 1 1/4	L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x5/16	L3x3x1/4	L3x3x3/8	L3 1/2x3 1/2x5/16	L4x4x1/4	L4x4x5/16	L4x4x3/8	
Diagonal Grade	A36									
Top Girts	SR 1 1/4	N.A.								
Bottom Girts	SR 1 1/4	N.A.								
Face Width (ft)	6	8	10	12	14	16	18	19.5	21.5	23.5
# Panels @ (ft)	6 @ 3.33333			18 @ 6.66667			3 @ 5		6 @ 6.66667	
Weight (K)	2.5	2.8	3.6	4.0	4.8	5.4	5.8	5.0	6.8	8.1



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
15-ft Triangular Mount (Sprint Existing)	190	Pirod 12' T-Frame Sector Mount (1) (ATT Existing)	172
APXVSPP18-C-A20 (Sprint Existing)	190	Pirod 12' T-Frame Sector Mount (1) (ATT Existing)	172
APXVSPP18-C-A20 (Sprint Existing)	190	Pirod 15' T-Frame Sector Mount (1) (Nextel Existing)	160
APXVSPP18-C-A20 (Sprint Existing)	190	Pirod 15' T-Frame Sector Mount (1) (Nextel Existing)	160
FD-RRH 2x50 800 (Sprint Existing)	190	Pirod 15' T-Frame Sector Mount (1) (Nextel Existing)	160
FD-RRH 2x50 800 (Sprint Existing)	190	Pirod 15' T-Frame Sector Mount (1) (Nextel Existing)	160
FD-RRH 2x50 800 (Sprint Existing)	190	(4) DB844H90E-XY (Nextel Existing)	160
FD-RRH 4x45 1900 (Sprint Existing)	190	(4) DB844H90E-XY (Nextel Existing)	160
FD-RRH 4x45 1900 (Sprint Existing)	190	(4) DB844H90E-XY (Nextel Existing)	160
FD-RRH 4x45 1900 (Sprint Existing)	190	Pirod 15' T-Frame Sector Mount (1) (Verizon Existing)	145
Pirod 15' T-Frame Sector Mount (1) (T-Mobile Existing)	180	Pirod 15' T-Frame Sector Mount (1) (Verizon Existing)	145
Pirod 15' T-Frame Sector Mount (1) (T-Mobile Existing)	180	Pirod 15' T-Frame Sector Mount (1) (Verizon Existing)	145
(2) AIR21 (T-Mobile Proposed)	180	LPA-80080-4CF (Verizon Existing)	145
(2) AIR21 (T-Mobile Proposed)	180	BXA-171085-8BF (Verizon Existing)	145
(2) AIR21 (T-Mobile Proposed)	180	BXA-70063/6CF (Verizon Existing)	145
TMA (T-Mobile Existing)	180	LPA-80080-4CF (Verizon Existing)	145
TMA (T-Mobile Existing)	180	LPA-80080-4CF (Verizon Existing)	145
TMA (T-Mobile Existing)	180	BXA-171085-8BF (Verizon Existing)	145
DC6-48-60-18-8F Surge Arrestor (ATT Existing)	175	BXA-70063/6CF (Verizon Existing)	145
800 10121 (ATT Existing)	173	LPA-80080-4CF (Verizon Existing)	145
800 10121 (ATT Existing)	173	LPA-80080-4CF (Verizon Existing)	145
800 10121 (ATT Existing)	173	BXA-171085-8BF (Verizon Existing)	145
(2) LGP21401 TMA (ATT Existing)	173	BXA-70063/6CF (Verizon Existing)	145
(2) LGP21401 TMA (ATT Existing)	173	LPA-80080-4CF (Verizon Existing)	145
(2) LGP21401 TMA (ATT Existing)	173	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	145
(2) RRUS-11 (ATT Existing)	173	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	145
(2) RRUS-11 (ATT Existing)	173	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	145
(2) RRUS-11 (ATT Existing)	173	GPS (Sprint Existing)	80
AM-X-CD-16-65-00T-RET(72") (ATT Existing)	173	2-ft Stand Off (Sprint Existing)	80
AM-X-CD-16-65-00T-RET(72") (ATT Existing)	173	GPS (Verizon Existing)	80
AM-X-CD-16-65-00T-RET(72") (ATT Existing)	173	2-ft Stand Off (Verizon Existing)	80
Pirod 12' T-Frame Sector Mount (1) (ATT Existing)	172		

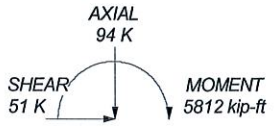
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A529-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

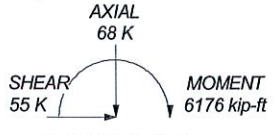
TOWER DESIGN NOTES

1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 78 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 71.3%

MAX. CORNER REACTIONS AT BASE:
DOWN: 326 K
UPLIFT: -271 K
SHEAR: 34 K



TORQUE 52 kip-ft
78 mph WIND - 0.5000 in ICE

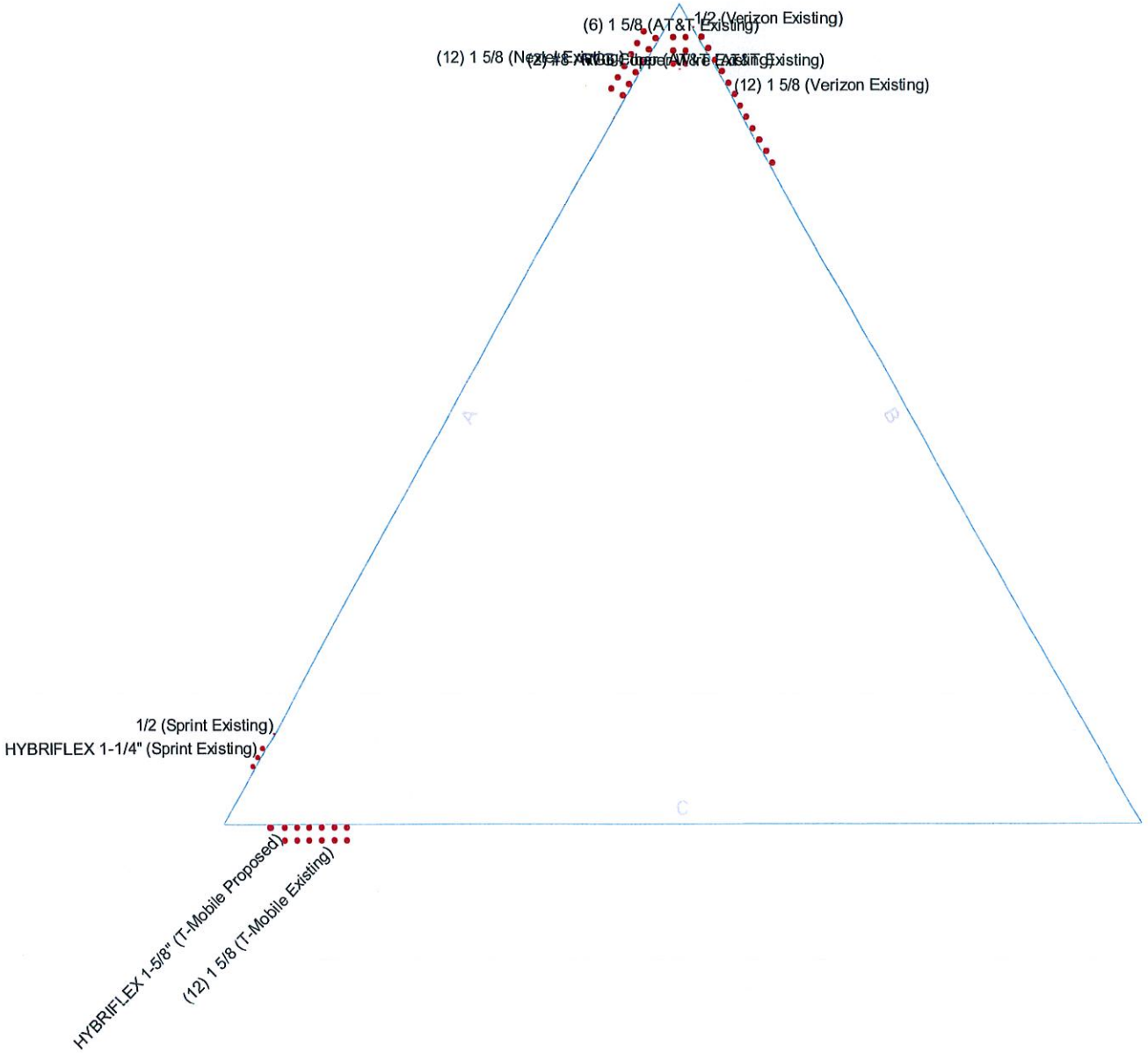


TORQUE 49 kip-ft
REACTIONS - 90 mph WIND

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

Job: *14048.001 - CT11230A*		
Project: *195' Lattice Tower - 88 Parsonage Hill Rd., Northford*		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 02/24/14	Scale: NTS
Path: J:\Job\14040\14040.W001 - CT11230A\04 Structural\Backup Documentation\ER Files\1954 Central Lattice Tower.eri		Dwg No. E-1

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



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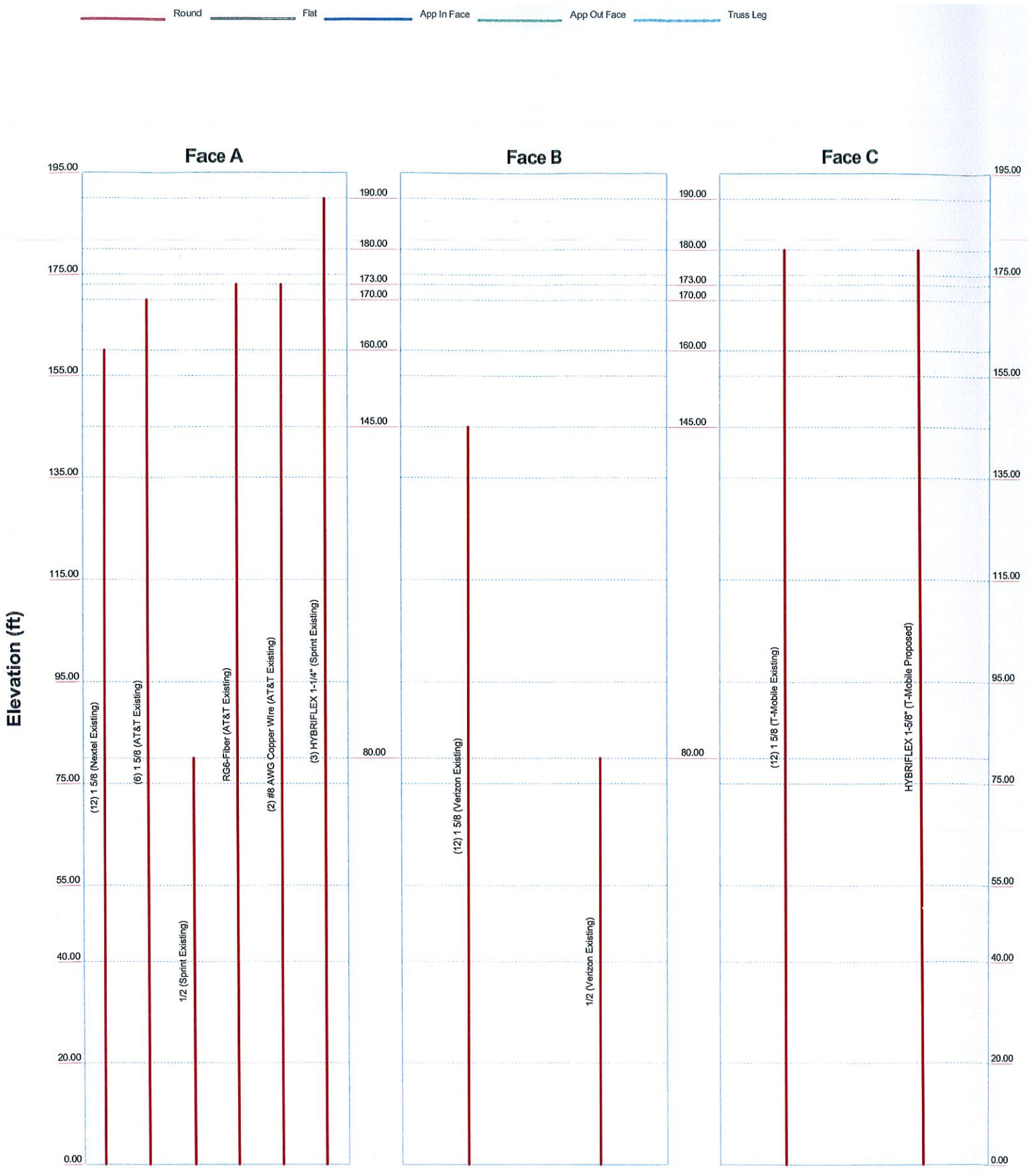
Job: ***14048.001 - CT11230A***		
Project: ***195' Lattice Tower - 88 Parsonage Hill Rd., Northford***		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 02/24/14	Scale: NTS
Path: J:\Jobs\14048\00 WI\001 - CT11230A\04_Structural\Backup Documentation\ER Files\195ft Central Lattice Tower.ep		Dwg No. E-7



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Phone: (203) 488-0580
FAX: (203) 488-8587

Job: **14048.001 - CT11230A**		
Project: ***195' Lattice Tower - 88 Parsonage Hill Rd., Northford***		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 02/24/14	Scale: NTS
Path: J:\Job\14040\00 W\001 - CT11230A\04_Structural\Backup Documentation\ER Files\195-ft Central Lattice Tower.sat		Dwg No. E-7

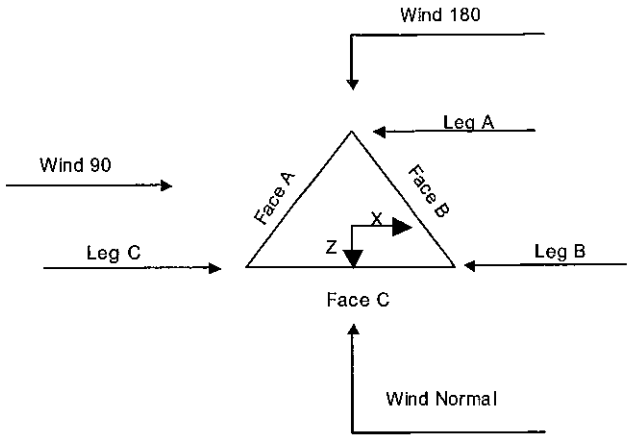
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 195.00 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 5.00 ft at the top and 23.50 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 90 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 78 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, 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		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	195.00-175.00			5.00	1	20.00
T2	175.00-155.00			6.00	1	20.00
T3	155.00-135.00			8.00	1	20.00
T4	135.00-115.00			10.00	1	20.00
T5	115.00-95.00			12.00	1	20.00
T6	95.00-75.00			14.00	1	20.00
T7	75.00-55.00			16.00	1	20.00
T8	55.00-40.00			18.00	1	15.00
T9	40.00-20.00			19.50	1	20.00
T10	20.00-0.00			21.50	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	195.00-175.00	3.33	X Brace	No	Yes	0.0000	0.0000
T2	175.00-155.00	6.67	X Brace	No	No	0.0000	0.0000
T3	155.00-135.00	6.67	X Brace	No	No	0.0000	0.0000
T4	135.00-115.00	6.67	X Brace	No	No	0.0000	0.0000
T5	115.00-95.00	6.67	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	95.00-75.00	6.67	X Brace	No	No	0.0000	0.0000
T7	75.00-55.00	6.67	X Brace	No	No	0.0000	0.0000
T8	55.00-40.00	5.00	X Brace	No	No	0.0000	0.0000
T9	40.00-20.00	6.67	X Brace	No	No	0.0000	0.0000
T10	20.00-0.00	6.67	X Brace	No	No	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 195.00-175.00	Solid Round	3	A529-50 (50 ksi)	Solid Round	1 1/4	A36 (36 ksi)
T2 175.00-155.00	Solid Round	3 3/4	A529-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 155.00-135.00	Solid Round	4	A529-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)
T4 135.00-115.00	Solid Round	4 1/4	A529-50 (50 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T5 115.00-95.00	Solid Round	4 1/4	A529-50 (50 ksi)	Single Angle	L3x3x3/8	A36 (36 ksi)
T6 95.00-75.00	Solid Round	4 1/2	A529-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T7 75.00-55.00	Solid Round	4 3/4	A529-50 (50 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T8 55.00-40.00	Solid Round	4 3/4	A529-50 (50 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T9 40.00-20.00	Solid Round	4 3/4	A529-50 (50 ksi)	Single Angle	L4x4x5/16	A36 (36 ksi)
T10 20.00-0.00	Solid Round	5	A529-50 (50 ksi)	Single Angle	L4x4x3/8	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 195.00-175.00	Solid Round	1 1/4	A36 (36 ksi)	Solid Round	1 1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
T1 195.00-175.00	0.00	0.0000	A36 (36 ksi)	1	1	1	30.0000	30.0000
T2 175.00-155.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 155.00-135.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 135.00-115.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 115.00-95.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 95.00-75.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 75.00-55.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 55.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T10 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
ft																	
T1 195.00-175.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T2 175.00-155.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T3 155.00-135.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T4 135.00-115.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T5 115.00-95.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T6 95.00-75.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T7 75.00-55.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T8 55.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T9 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T10 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 195.00-175.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T2 175.00-155.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 155.00-135.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 135.00-115.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 115.00-95.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 95.00-75.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 75.00-55.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 55.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T10 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

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 195.00-175.00	Flange	1.1250 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 175.00-155.00	Flange	1.1250 A325N	6	0.8750 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 155.00-135.00	Flange	1.1250 A325N	6	0.8750 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 135.00-115.00	Flange	1.1250 A325N	6	0.8750 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 115.00-95.00	Flange	1.1250 A325N	8	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 95.00-75.00	Flange	1.1250 A325N	8	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 75.00-55.00	Flange	1.2500 A325N	8	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 55.00-40.00	Flange	1.2500 A325N	8	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	0
T9 40.00-20.00	Flange	1.2500 A325N	8	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	0
T10 20.00-0.00	Flange	1.3750 A449	8	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (Verizon Existing)	B	Yes	Ar (CfAe)	145.00 - 0.00	0.0000	-0.38	12	12	1.9800	1.9800		1.04
1 5/8 (Nextel Existing)	A	Yes	Ar (CfAe)	160.00 - 0.00	0.0000	0.42	12	6	1.9800	1.9800		1.04
1 5/8 (AT&T Existing)	A	No	Ar (Leg)	170.00 - 0.00	0.0000	0.05	6	3	1.9800	1.9800		1.04
1 5/8 (T-Mobile Existing)	C	Yes	Ar (CfAe)	180.00 - 0.00	0.0000	0.4	12	6	1.9800	1.9800		1.04
1/2 (Sprint Existing)	A	Yes	Ar (CfAe)	80.00 - 0.00	0.0000	-0.39	1	1	0.5800	0.5800		0.25
1/2 (Verizon Existing)	B	Yes	Ar (CfAe)	80.00 - 0.00	0.0000	-0.47	1	1	0.5800	0.5800		0.25
RG6-Fiber (AT&T Existing)	A	No	Ar (Leg)	173.00 - 0.00	0.0000	0.07	1	1	0.5000	0.5000		1.00
#8 AWG Copper Wire (AT&T Existing)	A	No	Ar (Leg)	173.00 - 0.00	0.0000	0.07	2	1	0.2500	0.1285		0.05
HYBRIFLEX 1-5/8" (T-Mobile Proposed)	C	Yes	Ar (CfAe)	180.00 - 0.00	0.0000	0.45	1	1	1.9800	1.9800		1.90
HYBRIFLEX 1-1/4" (Sprint Existing)	A	Yes	Ar (CfAe)	190.00 - 0.00	0.0000	-0.42	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 K
T1	195.00-175.00	A	5.775	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.00
		C	5.775	0.000	0.000	0.000	0.07
T2	175.00-155.00	A	21.018	0.000	0.000	0.000	0.25
		B	8.368	0.000	0.000	0.000	0.00
		C	23.100	0.000	0.000	0.000	0.29
T3	155.00-135.00	A	38.447	0.000	0.000	0.000	0.47
		B	30.747	0.000	0.000	0.000	0.12
		C	23.100	0.000	0.000	0.000	0.29
T4	135.00-115.00	A	38.447	0.000	0.000	0.000	0.47
		B	50.547	0.000	0.000	0.000	0.25
		C	23.100	0.000	0.000	0.000	0.29
T5	115.00-95.00	A	38.447	0.000	0.000	0.000	0.47
		B	50.547	0.000	0.000	0.000	0.25
		C	23.100	0.000	0.000	0.000	0.29
T6	95.00-75.00	A	38.689	0.000	0.000	0.000	0.48
		B	50.789	0.000	0.000	0.000	0.25
		C	23.100	0.000	0.000	0.000	0.29

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T7	75.00-55.00	A	39.414	0.000	0.000	0.000	0.48
		B	51.514	0.000	0.000	0.000	0.25
		C	23.100	0.000	0.000	0.000	0.29
T8	55.00-40.00	A	29.561	0.000	0.000	0.000	0.36
		B	38.636	0.000	0.000	0.000	0.19
		C	17.325	0.000	0.000	0.000	0.22
T9	40.00-20.00	A	39.414	0.000	0.000	0.000	0.48
		B	51.514	0.000	0.000	0.000	0.25
		C	23.100	0.000	0.000	0.000	0.29
T10	20.00-0.00	A	39.414	0.000	0.000	0.000	0.48
		B	51.514	0.000	0.000	0.000	0.25
		C	23.100	0.000	0.000	0.000	0.29

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	195.00-175.00	A	0.500	9.525	0.000	0.000	0.000	0.11
		B		0.000	0.000	0.000	0.000	0.00
		C		8.692	0.000	0.000	0.000	0.17
T2	175.00-155.00	A	0.500	35.268	0.000	0.000	0.000	0.58
		B		15.118	0.000	0.000	0.000	0.00
		C		34.767	0.000	0.000	0.000	0.68
T3	155.00-135.00	A	0.500	61.781	0.000	0.000	0.000	1.12
		B		49.081	0.000	0.000	0.000	0.31
		C		34.767	0.000	0.000	0.000	0.68
T4	135.00-115.00	A	0.500	61.781	0.000	0.000	0.000	1.12
		B		78.881	0.000	0.000	0.000	0.61
		C		34.767	0.000	0.000	0.000	0.68
T5	115.00-95.00	A	0.500	61.781	0.000	0.000	0.000	1.12
		B		78.881	0.000	0.000	0.000	0.61
		C		34.767	0.000	0.000	0.000	0.68
T6	95.00-75.00	A	0.500	62.439	0.000	0.000	0.000	1.13
		B		79.539	0.000	0.000	0.000	0.62
		C		34.767	0.000	0.000	0.000	0.68
T7	75.00-55.00	A	0.500	64.414	0.000	0.000	0.000	1.14
		B		81.514	0.000	0.000	0.000	0.63
		C		34.767	0.000	0.000	0.000	0.68
T8	55.00-40.00	A	0.500	48.311	0.000	0.000	0.000	0.86
		B		61.136	0.000	0.000	0.000	0.47
		C		26.075	0.000	0.000	0.000	0.51
T9	40.00-20.00	A	0.500	64.414	0.000	0.000	0.000	1.14
		B		81.514	0.000	0.000	0.000	0.63
		C		34.767	0.000	0.000	0.000	0.68
T10	20.00-0.00	A	0.500	64.414	0.000	0.000	0.000	1.14
		B		81.514	0.000	0.000	0.000	0.63
		C		34.767	0.000	0.000	0.000	0.68

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

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
T1	195.00-175.00	A	0.483	1.433	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.483	1.307	0.000	0.000
T2	175.00-155.00	A	0.000	0.698	1.096	1.745
		B	0.000	0.000	0.000	0.000
		C	0.000	1.204	2.001	3.011
T3	155.00-135.00	A	0.000	1.324	2.142	3.311
		B	0.000	0.929	1.543	2.322
		C	0.000	1.083	1.800	2.709
T4	135.00-115.00	A	0.000	1.243	2.414	3.730
		B	0.000	1.744	3.476	5.231
		C	0.000	1.017	2.028	3.052
T5	115.00-95.00	A	0.000	1.195	2.319	3.584
		B	0.000	1.675	3.339	5.026
		C	0.000	0.977	1.948	2.932
T6	95.00-75.00	A	0.000	1.181	2.657	4.134
		B	0.000	1.649	3.816	5.772
		C	0.000	0.951	2.213	3.330
T7	75.00-55.00	A	0.000	1.212	3.058	4.849
		B	0.000	1.672	4.358	6.686
		C	0.000	0.934	2.482	3.735
T8	55.00-40.00	A	0.000	1.168	2.946	4.671
		B	0.000	1.610	4.199	6.441
		C	0.000	0.900	2.391	3.598
T9	40.00-20.00	A	0.000	1.187	2.994	4.746
		B	0.000	1.636	4.266	6.545
		C	0.000	0.914	2.429	3.656
T10	20.00-0.00	A	0.000	1.177	2.969	4.708
		B	0.000	1.623	4.231	6.491
		C	0.000	0.907	2.409	3.626

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	195.00-175.00	-4.7794	2.9634	-4.5564	2.7890
T2	175.00-155.00	-8.4368	0.7683	-8.7287	0.1265
T3	155.00-135.00	-7.6444	-10.5028	-7.9360	-11.2927
T4	135.00-115.00	-6.8462	-15.8405	-7.2640	-17.0062
T5	115.00-95.00	-7.7876	-18.0510	-8.2872	-19.4254
T6	95.00-75.00	-8.0987	-18.7513	-8.8471	-20.6261
T7	75.00-55.00	-8.3648	-19.1349	-9.4613	-21.5380
T8	55.00-40.00	-7.6564	-17.6795	-8.7144	-20.1047
T9	40.00-20.00	-9.3719	-21.4658	-10.6690	-24.3089
T10	20.00-0.00	-9.7987	-22.4563	-11.2164	-25.5671

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
15-ft Triangular Mount	C	From Face	2.00	0.0000	190.00	No Ice	75.30	75.30	2.50
(Sprint Existing)			0.00			1/2" Ice	86.60	86.60	2.88
			0.00						
APXVSPP18-C-A20	A	From Face	4.00	0.0000	190.00	No Ice	8.26	5.28	0.06
(Sprint Existing)			0.00			1/2" Ice	8.81	5.74	0.11
			0.00						
APXVSPP18-C-A20	B	From Face	4.00	0.0000	190.00	No Ice	8.26	5.28	0.06
(Sprint Existing)			0.00			1/2" Ice	8.81	5.74	0.11
			0.00						
APXVSPP18-C-A20	C	From Face	4.00	0.0000	190.00	No Ice	8.26	5.28	0.06
(Sprint Existing)			0.00			1/2" Ice	8.81	5.74	0.11
			0.00						
FD-RRH 2x50 800	A	From Face	4.00	0.0000	190.00	No Ice	2.40	2.25	0.06
(Sprint Existing)			0.00			1/2" Ice	2.61	2.46	0.09
			0.00						
FD-RRH 2x50 800	B	From Face	4.00	0.0000	190.00	No Ice	2.40	2.25	0.06
(Sprint Existing)			0.00			1/2" Ice	2.61	2.46	0.09
			0.00						
FD-RRH 2x50 800	C	From Face	4.00	0.0000	190.00	No Ice	2.40	2.25	0.06
(Sprint Existing)			0.00			1/2" Ice	2.61	2.46	0.09
			0.00						
FD-RRH 4x45 1900	A	From Face	4.00	0.0000	190.00	No Ice	2.71	2.78	0.06
(Sprint Existing)			0.00			1/2" Ice	2.94	3.02	0.08
			0.00						
FD-RRH 4x45 1900	B	From Face	4.00	0.0000	190.00	No Ice	2.71	2.78	0.06
(Sprint Existing)			0.00			1/2" Ice	2.94	3.02	0.08
			0.00						
FD-RRH 4x45 1900	C	From Face	4.00	0.0000	190.00	No Ice	2.71	2.78	0.06
(Sprint Existing)			0.00			1/2" Ice	2.94	3.02	0.08
			0.00						
Pirod 15' T-Frame Sector	A	From Leg	2.00	0.0000	180.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(T-Mobile Existing)			0.00						
Pirod 15' T-Frame Sector	B	From Leg	2.00	0.0000	180.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(T-Mobile Existing)			0.00						
Pirod 15' T-Frame Sector	C	From Leg	2.00	0.0000	180.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(T-Mobile Existing)			0.00						
(2) AIR21	A	From Leg	4.00	0.0000	180.00	No Ice	6.53	4.36	0.08
(T-Mobile Proposed)			6.00			1/2" Ice	6.98	4.77	0.12
			0.00						
(2) AIR21	B	From Leg	4.00	0.0000	180.00	No Ice	6.53	4.36	0.08
(T-Mobile Proposed)			6.00			1/2" Ice	6.98	4.77	0.12
			0.00						
(2) AIR21	C	From Leg	4.00	0.0000	180.00	No Ice	6.53	4.36	0.08
(T-Mobile Proposed)			6.00			1/2" Ice	6.98	4.77	0.12
			0.00						
TMA	A	From Leg	4.00	0.0000	180.00	No Ice	1.17	0.39	0.01
(T-Mobile Existing)			0.00			1/2" Ice	1.31	0.48	0.02
			0.00						
TMA	B	From Leg	4.00	0.0000	180.00	No Ice	1.17	0.39	0.01
(T-Mobile Existing)			0.00			1/2" Ice	1.31	0.48	0.02
			0.00						
TMA	C	From Leg	4.00	0.0000	180.00	No Ice	1.17	0.39	0.01
(T-Mobile Existing)			0.00			1/2" Ice	1.31	0.48	0.02
			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pirod 12' T-Frame Sector	A	From Leg	2.00	0.0000	172.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(AT&T Existing)			0.00						
Pirod 12' T-Frame Sector	B	From Leg	2.00	0.0000	172.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(AT&T Existing)			0.00						
Pirod 12' T-Frame Sector	C	From Leg	2.00	0.0000	172.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(AT&T Existing)			0.00						
800 10121	A	From Leg	4.00	0.0000	173.00	No Ice	5.46	3.29	0.05
(AT&T Existing)			5.00			1/2" Ice	5.88	3.64	0.08
			0.00						
800 10121	B	From Leg	4.00	0.0000	173.00	No Ice	5.46	3.29	0.05
(AT&T Existing)			5.00			1/2" Ice	5.88	3.64	0.08
			0.00						
800 10121	C	From Leg	4.00	0.0000	173.00	No Ice	5.46	3.29	0.05
(AT&T Existing)			5.00			1/2" Ice	5.88	3.64	0.08
			0.00						
(2) LGP21401 TMA	A	From Leg	4.00	0.0000	173.00	No Ice	0.95	0.37	0.02
(AT&T Existing)			5.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) LGP21401 TMA	B	From Leg	4.00	0.0000	173.00	No Ice	0.95	0.37	0.02
(AT&T Existing)			5.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) LGP21401 TMA	C	From Leg	4.00	0.0000	173.00	No Ice	0.95	0.37	0.02
(AT&T Existing)			5.00			1/2" Ice	1.09	0.48	0.02
			0.00						
DC6-48-60-18-8F Surge	C	From Face	0.50	0.0000	175.00	No Ice	2.23	2.23	0.02
Arrestor			0.50			1/2" Ice	2.45	2.45	0.04
(AT&T Existing)			0.00						
(2) RRUS-11	A	From Face	4.00	0.0000	173.00	No Ice	2.99	1.25	0.05
(AT&T Existing)			-2.00			1/2" Ice	3.23	1.41	0.07
			0.00						
(2) RRUS-11	B	From Face	4.00	0.0000	173.00	No Ice	2.99	1.25	0.05
(AT&T Existing)			-2.00			1/2" Ice	3.23	1.41	0.07
			0.00						
(2) RRUS-11	C	From Face	4.00	0.0000	173.00	No Ice	2.99	1.25	0.05
(AT&T Existing)			-2.00			1/2" Ice	3.23	1.41	0.07
			0.00						
AM-X-CD-16-65-00T-RET(7	A	From Leg	4.00	0.0000	173.00	No Ice	8.26	4.64	0.05
2")			-5.00			1/2" Ice	8.81	5.09	0.10
(AT&T Existing)			0.00						
AM-X-CD-16-65-00T-RET(7	B	From Leg	4.00	0.0000	173.00	No Ice	8.26	4.64	0.05
2")			-5.00			1/2" Ice	8.81	5.09	0.10
(AT&T Existing)			0.00						
AM-X-CD-16-65-00T-RET(7	C	From Leg	4.00	0.0000	173.00	No Ice	8.26	4.64	0.05
2")			-5.00			1/2" Ice	8.81	5.09	0.10
(AT&T Existing)			0.00						
Pirod 15' T-Frame Sector	A	From Leg	2.00	0.0000	160.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Nextel Existing)			0.00						
Pirod 15' T-Frame Sector	B	From Leg	2.00	0.0000	160.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Nextel Existing)			0.00						
Pirod 15' T-Frame Sector	C	From Leg	2.00	0.0000	160.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Nextel Existing)			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(4) DB844H90E-XY	A	From Leg	4.00	0.0000	160.00	No Ice	2.87	3.73	0.01
(Nextel Existing)			0.00			1/2" Ice	3.18	4.10	0.04
			0.00						
(4) DB844H90E-XY	B	From Leg	4.00	0.0000	160.00	No Ice	2.87	3.73	0.01
(Nextel Existing)			0.00			1/2" Ice	3.18	4.10	0.04
			0.00						
(4) DB844H90E-XY	C	From Leg	4.00	0.0000	160.00	No Ice	2.87	3.73	0.01
(Nextel Existing)			0.00			1/2" Ice	3.18	4.10	0.04
			0.00						
Pirod 15' T-Frame Sector	A	From Leg	2.00	0.0000	145.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Verizon Existing)			0.00						
Pirod 15' T-Frame Sector	B	From Leg	2.00	0.0000	145.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Verizon Existing)			0.00						
Pirod 15' T-Frame Sector	C	From Leg	2.00	0.0000	145.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Verizon Existing)			0.00						
LPA-80080-4CF	A	From Leg	4.00	0.0000	145.00	No Ice	2.62	6.06	0.01
(Verizon Existing)			6.00			1/2" Ice	2.92	6.45	0.05
			0.00						
BXA-171085-8BF	A	From Leg	4.00	0.0000	145.00	No Ice	2.94	2.16	0.01
(Verizon Existing)			4.00			1/2" Ice	3.26	2.46	0.03
			0.00						
BXA-70063/6CF	A	From Leg	4.00	0.0000	145.00	No Ice	7.73	4.16	0.02
(Verizon Existing)			0.00			1/2" Ice	8.27	4.60	0.06
			0.00						
LPA-80080-4CF	A	From Leg	4.00	0.0000	145.00	No Ice	2.62	6.06	0.01
(Verizon Existing)			-6.00			1/2" Ice	2.92	6.45	0.05
			0.00						
LPA-80080-4CF	B	From Leg	4.00	0.0000	145.00	No Ice	2.62	6.06	0.01
(Verizon Existing)			6.00			1/2" Ice	2.92	6.45	0.05
			0.00						
BXA-171085-8BF	B	From Leg	4.00	0.0000	145.00	No Ice	2.94	2.16	0.01
(Verizon Existing)			4.00			1/2" Ice	3.26	2.46	0.03
			0.00						
BXA-70063/6CF	B	From Leg	4.00	0.0000	145.00	No Ice	7.73	4.16	0.02
(Verizon Existing)			0.00			1/2" Ice	8.27	4.60	0.06
			0.00						
LPA-80080-4CF	B	From Leg	4.00	0.0000	145.00	No Ice	2.62	6.06	0.01
(Verizon Existing)			-6.00			1/2" Ice	2.92	6.45	0.05
			0.00						
LPA-80080-4CF	C	From Leg	4.00	0.0000	145.00	No Ice	2.62	6.06	0.01
(Verizon Existing)			6.00			1/2" Ice	2.92	6.45	0.05
			0.00						
BXA-171085-8BF	C	From Leg	4.00	0.0000	145.00	No Ice	2.94	2.16	0.01
(Verizon Existing)			4.00			1/2" Ice	3.26	2.46	0.03
			0.00						
BXA-70063/6CF	C	From Leg	4.00	0.0000	145.00	No Ice	7.73	4.16	0.02
(Verizon Existing)			0.00			1/2" Ice	8.27	4.60	0.06
			0.00						
LPA-80080-4CF	C	From Leg	4.00	0.0000	145.00	No Ice	2.62	6.06	0.01
(Verizon Existing)			-6.00			1/2" Ice	2.92	6.45	0.05
			0.00						
(2) FD9R6004/2C-3L	A	From Leg	4.00	0.0000	145.00	No Ice	0.37	0.08	0.00
Diplexer			-6.00			1/2" Ice	0.45	0.14	0.01
(Verizon Existing)			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) FD9R6004/2C-3L	B	From Leg	4.00	0.0000	145.00	No Ice	0.37	0.08	0.00
Diplexer			-6.00			1/2" Ice	0.45	0.14	0.01
(Verizon Existing)			0.00						
(2) FD9R6004/2C-3L	C	From Leg	4.00	0.0000	145.00	No Ice	0.37	0.08	0.00
Diplexer			-6.00			1/2" Ice	0.45	0.14	0.01
(Verizon Existing)			0.00						
GPS	C	From Leg	2.00	0.0000	80.00	No Ice	1.00	1.00	0.01
(Sprint Existing)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
2-ft Stand Off	C	From Leg	1.00	0.0000	80.00	No Ice	1.07	1.07	0.02
(Sprint Existing)			0.00			1/2" Ice	1.62	1.62	0.03
			0.00						
GPS	A	From Leg	2.00	0.0000	80.00	No Ice	1.00	1.00	0.01
(Verizon Existing)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
2-ft Stand Off	A	From Leg	1.00	0.0000	80.00	No Ice	1.07	1.07	0.02
(Verizon Existing)			0.00			1/2" Ice	1.62	1.62	0.03
			0.00						

Tower Pressures - No Ice

$G_H = 1.116$

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	185.00	1.636	34	115.002	A	0.000	24.066	10.004	41.57	0.000	0.000
195.00-175.00					B	0.000	18.774		53.29	0.000	0.000
					C	0.000	24.066		41.57	0.000	0.000
T2	165.00	1.584	33	146.258	A	10.477	33.539	12.521	28.45	0.000	0.000
175.00-155.00					B	11.572	20.889		38.57	0.000	0.000
					C	9.572	35.621		27.71	0.000	0.000
T3	145.00	1.526	32	186.675	A	11.352	51.803	13.356	21.15	0.000	0.000
155.00-135.00					B	11.952	44.103		23.83	0.000	0.000
					C	11.695	36.456		27.74	0.000	0.000
T4	125.00	1.463	30	227.092	A	16.271	52.638	14.190	20.59	0.000	0.000
135.00-115.00					B	15.209	64.738		17.75	0.000	0.000
					C	16.657	37.290		26.30	0.000	0.000
T5	105.00	1.392	29	267.092	A	19.003	52.638	14.190	19.81	0.000	0.000
115.00-95.00					B	17.983	64.738		17.15	0.000	0.000
					C	19.374	37.290		25.04	0.000	0.000
T6 95.00-75.00	85.00	1.31	27	307.509	A	25.362	53.714	15.025	19.00	0.000	0.000
					B	24.203	65.814		16.69	0.000	0.000
					C	25.806	38.125		23.50	0.000	0.000
T7 75.00-55.00	65.00	1.214	25	347.927	A	32.624	55.274	15.860	18.04	0.000	0.000
					B	31.324	67.374		16.07	0.000	0.000
					C	33.200	38.960		21.98	0.000	0.000
T8 55.00-40.00	47.50	1.11	23	287.195	A	35.046	41.455	11.895	15.55	0.000	0.000
					B	33.794	50.530		14.11	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	35.602	29.220		18.35	0.000	0.000
T9 40.00-20.00	30.00	1	21	417.927	A	39.290	55.274	15.860	16.77	0.000	0.000
					B	38.018	67.374		15.05	0.000	0.000
					C	39.855	38.960		20.12	0.000	0.000
T10 20.00-0.00	10.00	1	21	458.344	A	43.105	56.109	16.694	16.83	0.000	0.000
					B	41.843	68.209		15.17	0.000	0.000
					C	43.665	39.794		20.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.116$

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	185.00	1.636	25	0.5000	116.669	A	0.000	37.216	13.339	35.84	0.000	0.000
195.00-175.00						B	0.000	29.124		45.80	0.000	0.000
						C	0.000	36.508		36.54	0.000	0.000
T2	165.00	1.584	25	0.5000	147.927	A	9.827	55.058	15.860	24.44	0.000	0.000
175.00-155.00						B	11.572	35.606		33.62	0.000	0.000
						C	8.561	54.051		25.33	0.000	0.000
T3	145.00	1.526	24	0.5000	188.344	A	10.183	82.549	16.694	18.00	0.000	0.000
155.00-135.00						B	11.173	70.244		20.50	0.000	0.000
						C	10.786	55.775		25.08	0.000	0.000
T4	125.00	1.463	23	0.5000	228.761	A	14.955	84.295	17.529	17.66	0.000	0.000
135.00-115.00						B	13.454	100.895		15.33	0.000	0.000
						C	15.633	57.507		23.97	0.000	0.000
T5 115.00-95.00	105.00	1.392	22	0.5000	268.761	A	17.738	85.223	17.529	17.02	0.000	0.000
						B	16.296	101.842		14.84	0.000	0.000
						C	18.391	58.426		22.82	0.000	0.000
T6 95.00-75.00	85.00	1.31	20	0.5000	309.178	A	23.885	87.627	18.364	16.47	0.000	0.000
						B	22.247	104.259		14.52	0.000	0.000
						C	24.689	60.184		21.64	0.000	0.000
T7 75.00-55.00	65.00	1.214	19	0.5000	349.595	A	30.833	91.321	19.199	15.72	0.000	0.000
						B	28.996	107.962		14.02	0.000	0.000
						C	31.947	61.952		20.45	0.000	0.000
T8 55.00-40.00	47.50	1.11	17	0.5000	288.446	A	33.321	71.040	14.399	13.80	0.000	0.000
						B	31.552	83.422		12.52	0.000	0.000
						C	34.394	49.073		17.25	0.000	0.000
T9 40.00-20.00	30.00	1	16	0.5000	419.595	A	37.538	92.997	19.199	14.71	0.000	0.000
						B	35.739	109.648		13.21	0.000	0.000
						C	38.628	63.622		18.78	0.000	0.000
T10 20.00-0.00	10.00	1	16	0.5000	460.012	A	41.367	94.789	20.033	14.71	0.000	0.000
						B	39.583	111.443		13.26	0.000	0.000
						C	42.448	65.412		18.57	0.000	0.000

Tower Pressure - Service

$G_H = 1.116$

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	185.00	1.636	10	115.002	A	0.000	24.066	10.004	41.57	0.000	0.000
195.00-175.00					B	0.000	18.774		53.29	0.000	0.000
					C	0.000	24.066		41.57	0.000	0.000
T2	165.00	1.584	10	146.258	A	10.477	33.539	12.521	28.45	0.000	0.000
175.00-155.00					B	11.572	20.889		38.57	0.000	0.000
					C	9.572	35.621		27.71	0.000	0.000
T3	145.00	1.526	10	186.675	A	11.352	51.803	13.356	21.15	0.000	0.000
155.00-135.00					B	11.952	44.103		23.83	0.000	0.000
					C	11.695	36.456		27.74	0.000	0.000
T4	125.00	1.463	9	227.092	A	16.271	52.638	14.190	20.59	0.000	0.000
135.00-115.00					B	15.209	64.738		17.75	0.000	0.000
					C	16.657	37.290		26.30	0.000	0.000
T5	105.00	1.392	9	267.092	A	19.003	52.638	14.190	19.81	0.000	0.000
115.00-95.00					B	17.983	64.738		17.15	0.000	0.000
					C	19.374	37.290		25.04	0.000	0.000
T6 95.00-75.00	85.00	1.31	8	307.509	A	25.362	53.714	15.025	19.00	0.000	0.000
					B	24.203	65.814		16.69	0.000	0.000
					C	25.806	38.125		23.50	0.000	0.000
T7 75.00-55.00	65.00	1.214	8	347.927	A	32.624	55.274	15.860	18.04	0.000	0.000
					B	31.324	67.374		16.07	0.000	0.000
					C	33.200	38.960		21.98	0.000	0.000
T8 55.00-40.00	47.50	1.11	7	287.195	A	35.046	41.455	11.895	15.55	0.000	0.000
					B	33.794	50.530		14.11	0.000	0.000
					C	35.602	29.220		18.35	0.000	0.000
T9 40.00-20.00	30.00	1	6	417.927	A	39.290	55.274	15.860	16.77	0.000	0.000
					B	38.018	67.374		15.05	0.000	0.000
					C	39.855	38.960		20.12	0.000	0.000
T10 20.00-0.00	10.00	1	6	458.344	A	43.105	56.109	16.694	16.83	0.000	0.000
					B	41.843	68.209		15.17	0.000	0.000
					C	43.665	39.794		20.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.13	2.55	A	0.209	2.565	0.592	1	1	14.255	1.38	69.21	C
195.00-175.00			B	0.163	2.723	0.584	1	1	10.956			
			C	0.209	2.565	0.592	1	1	14.255			
T2	0.54	2.79	A	0.301	2.293	0.616	1	1	31.143	2.63	131.58	C
175.00-155.00			B	0.222	2.524	0.595	1	1	24.004			
			C	0.309	2.272	0.619	1	1	31.610			
T3	0.89	3.57	A	0.338	2.199	0.628	1	1	43.904	3.41	170.44	A
155.00-135.00			B	0.3	2.295	0.616	1	1	39.119			
			C	0.258	2.414	0.604	1	1	33.711			
T4	1.01	4.04	A	0.303	2.287	0.617	1	1	48.747	4.12	206.06	B
135.00-115.00			B	0.352	2.167	0.633	1	1	56.202			
			C	0.238	2.475	0.599	1	1	38.986			
T5	1.01	4.79	A	0.268	2.384	0.607	1	1	50.938	4.24	212.19	B
115.00-95.00			B	0.31	2.27	0.619	1	1	58.050			
			C	0.212	2.556	0.593	1	1	41.486			
T6	1.01	5.35	A	0.257	2.416	0.604	1	1	57.790	4.53	226.68	B
95.00-75.00			B	0.293	2.316	0.614	1	1	64.593			
			C	0.208	2.57	0.592	1	1	48.378			
T7	1.02	5.79	A	0.253	2.43	0.603	1	1	65.929	4.76	238.15	B
75.00-55.00			B	0.284	2.34	0.611	1	1	72.492			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.207	2.571	0.592	1	1	56.262			
T8	0.77	5.02	A	0.266	2.389	0.606	1	1	60.176	3.85	256.57	B
55.00-40.00			B	0.294	2.313	0.614	1	1	64.818			
			C	0.226	2.512	0.596	1	1	53.016			
T9	1.02	6.79	A	0.226	2.511	0.596	1	1	72.240	4.42	221.01	B
40.00-20.00			B	0.252	2.431	0.602	1	1	78.606			
			C	0.189	2.635	0.588	1	1	62.768			
T10	1.02	8.13	A	0.216	2.542	0.594	1	1	76.428	4.72	236.09	B
20.00-0.00			B	0.24	2.468	0.599	1	1	82.728			
			C	0.182	2.657	0.587	1	1	67.021			
Sum Weight:	8.43	48.83						OTM	3202.89 kip-ft	38.08		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.13	2.55	A	0.209	2.565	0.592	0.825	1	14.255	1.38	69.21	C
195.00-175.00			B	0.163	2.723	0.584	0.825	1	10.956			
			C	0.209	2.565	0.592	0.825	1	14.255			
T2	0.54	2.79	A	0.301	2.293	0.616	0.825	1	29.309	2.49	124.60	C
175.00-155.00			B	0.222	2.524	0.595	0.825	1	21.979			
			C	0.309	2.272	0.619	0.825	1	29.935			
T3	0.89	3.57	A	0.338	2.199	0.628	0.825	1	41.917	3.25	162.73	A
155.00-135.00			B	0.3	2.295	0.616	0.825	1	37.027			
			C	0.258	2.414	0.604	0.825	1	31.665			
T4	1.01	4.04	A	0.303	2.287	0.617	0.825	1	45.899	3.93	196.30	B
135.00-115.00			B	0.352	2.167	0.633	0.825	1	53.540			
			C	0.238	2.475	0.599	0.825	1	36.071			
T5	1.01	4.79	A	0.268	2.384	0.607	0.825	1	47.613	4.01	200.68	B
115.00-95.00			B	0.31	2.27	0.619	0.825	1	54.903			
			C	0.212	2.556	0.593	0.825	1	38.095			
T6	1.01	5.35	A	0.257	2.416	0.604	0.825	1	53.352	4.24	211.81	B
95.00-75.00			B	0.293	2.316	0.614	0.825	1	60.357			
			C	0.208	2.57	0.592	0.825	1	43.862			
T7	1.02	5.79	A	0.253	2.43	0.603	0.825	1	60.220	4.40	220.14	B
75.00-55.00			B	0.284	2.34	0.611	0.825	1	67.010			
			C	0.207	2.571	0.592	0.825	1	50.452			
T8	0.77	5.02	A	0.266	2.389	0.606	0.825	1	54.043	3.50	233.16	B
55.00-40.00			B	0.294	2.313	0.614	0.825	1	58.904			
			C	0.226	2.512	0.596	0.825	1	46.786			
T9	1.02	6.79	A	0.226	2.511	0.596	0.825	1	65.364	4.05	202.30	B
40.00-20.00			B	0.252	2.431	0.602	0.825	1	71.953			
			C	0.189	2.635	0.588	0.825	1	55.794			
T10	1.02	8.13	A	0.216	2.542	0.594	0.825	1	68.884	4.30	215.19	B
20.00-0.00			B	0.24	2.468	0.599	0.825	1	75.405			
			C	0.182	2.657	0.587	0.825	1	59.379			
Sum Weight:	8.43	48.83						OTM	3028.20 kip-ft	35.56		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.13	2.55	A	0.209	2.565	0.592	0.8	1	14.255	1.38	69.21	C
195.00-175.00			B	0.163	2.723	0.584	0.8	1	10.956			
			C	0.209	2.565	0.592	0.8	1	14.255			
T2	0.54	2.79	A	0.301	2.293	0.616	0.8	1	29.048	2.47	123.61	C
175.00-155.00			B	0.222	2.524	0.595	0.8	1	21.689			
			C	0.309	2.272	0.619	0.8	1	29.696			
T3	0.89	3.57	A	0.338	2.199	0.628	0.8	1	41.633	3.23	161.63	A
155.00-135.00			B	0.3	2.295	0.616	0.8	1	36.728			
			C	0.258	2.414	0.604	0.8	1	31.372			
T4	1.01	4.04	A	0.303	2.287	0.617	0.8	1	45.492	3.90	194.90	B
135.00-115.00			B	0.352	2.167	0.633	0.8	1	53.160			
			C	0.238	2.475	0.599	0.8	1	35.655			
T5	1.01	4.79	A	0.268	2.384	0.607	0.8	1	47.138	3.98	199.04	B
115.00-95.00			B	0.31	2.27	0.619	0.8	1	54.454			
			C	0.212	2.556	0.593	0.8	1	37.611			
T6	1.01	5.35	A	0.257	2.416	0.604	0.8	1	52.718	4.19	209.69	B
95.00-75.00			B	0.293	2.316	0.614	0.8	1	59.752			
			C	0.208	2.57	0.592	0.8	1	43.217			
T7	1.02	5.79	A	0.253	2.43	0.603	0.8	1	59.404	4.35	217.57	B
75.00-55.00			B	0.284	2.34	0.611	0.8	1	66.227			
			C	0.207	2.571	0.592	0.8	1	49.622			
T8	0.77	5.02	A	0.266	2.389	0.606	0.8	1	53.167	3.45	229.81	B
55.00-40.00			B	0.294	2.313	0.614	0.8	1	58.059			
			C	0.226	2.512	0.596	0.8	1	45.896			
T9	1.02	6.79	A	0.226	2.511	0.596	0.8	1	64.382	3.99	199.63	B
40.00-20.00			B	0.252	2.431	0.602	0.8	1	71.002			
			C	0.189	2.635	0.588	0.8	1	54.797			
T10	1.02	8.13	A	0.216	2.542	0.594	0.8	1	67.807	4.24	212.21	B
20.00-0.00			B	0.24	2.468	0.599	0.8	1	74.359			
			C	0.182	2.657	0.587	0.8	1	58.288			
Sum Weight:	8.43	48.83						OTM	3003.24 kip-ft	35.20		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.13	2.55	A	0.209	2.565	0.592	0.85	1	14.255	1.38	69.21	C
195.00-175.00			B	0.163	2.723	0.584	0.85	1	10.956			
			C	0.209	2.565	0.592	0.85	1	14.255			
T2	0.54	2.79	A	0.301	2.293	0.616	0.85	1	29.571	2.51	125.60	C
175.00-155.00			B	0.222	2.524	0.595	0.85	1	22.268			
			C	0.309	2.272	0.619	0.85	1	30.174			
T3	0.89	3.57	A	0.338	2.199	0.628	0.85	1	42.201	3.28	163.83	A
155.00-135.00			B	0.3	2.295	0.616	0.85	1	37.326			
			C	0.258	2.414	0.604	0.85	1	31.957			
T4	1.01	4.04	A	0.303	2.287	0.617	0.85	1	46.306	3.95	197.69	B
135.00-115.00			B	0.352	2.167	0.633	0.85	1	53.920			
			C	0.238	2.475	0.599	0.85	1	36.488			
T5	1.01	4.79	A	0.268	2.384	0.607	0.85	1	48.088	4.05	202.33	B
115.00-95.00			B	0.31	2.27	0.619	0.85	1	55.353			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.212	2.556	0.593	0.85	1	38.580			
T6	1.01	5.35	A	0.257	2.416	0.604	0.85	1	53.986	4.28	213.94	B
95.00-75.00			B	0.293	2.316	0.614	0.85	1	60.963			
			C	0.208	2.57	0.592	0.85	1	44.507			
T7	1.02	5.79	A	0.253	2.43	0.603	0.85	1	61.035	4.45	222.72	B
75.00-55.00			B	0.284	2.34	0.611	0.85	1	67.793			
			C	0.207	2.571	0.592	0.85	1	51.282			
T8	0.77	5.02	A	0.266	2.389	0.606	0.85	1	54.919	3.55	236.50	B
55.00-40.00			B	0.294	2.313	0.614	0.85	1	59.749			
			C	0.226	2.512	0.596	0.85	1	47.676			
T9	1.02	6.79	A	0.226	2.511	0.596	0.85	1	66.346	4.10	204.97	B
40.00-20.00			B	0.252	2.431	0.602	0.85	1	72.903			
			C	0.189	2.635	0.588	0.85	1	56.790			
T10	1.02	8.13	A	0.216	2.542	0.594	0.85	1	69.962	4.36	218.18	B
20.00-0.00			B	0.24	2.468	0.599	0.85	1	76.451			
			C	0.182	2.657	0.587	0.85	1	60.471			
Sum Weight:	8.43	48.83						OTM	3053.15 kip-ft	35.92		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.28	2.96	A	0.319	2.247	0.622	1	1	23.144	1.48	73.81	A
195.00-175.00			B	0.25	2.439	0.602	1	1	17.526			
			C	0.313	2.262	0.62	1	1	22.633			
T2	1.26	3.35	A	0.439	1.993	0.668	1	1	46.613	2.55	127.60	A
175.00-155.00			B	0.319	2.247	0.622	1	1	33.715			
			C	0.423	2.02	0.661	1	1	44.309			
T3	2.11	4.21	A	0.492	1.91	0.694	1	1	67.442	3.41	170.57	A
155.00-135.00			B	0.432	2.004	0.665	1	1	57.906			
			C	0.353	2.164	0.634	1	1	46.130			
T4	2.42	4.84	A	0.434	2.001	0.666	1	1	71.095	4.04	202.13	B
135.00-115.00			B	0.5	1.9	0.697	1	1	83.820			
			C	0.32	2.245	0.622	1	1	51.410			
T5	2.42	5.68	A	0.383	2.098	0.645	1	1	72.694	4.06	202.85	B
115.00-95.00			B	0.44	1.991	0.669	1	1	84.382			
			C	0.286	2.334	0.612	1	1	54.128			
T6	2.43	6.46	A	0.361	2.147	0.636	1	1	79.646	4.21	210.66	B
95.00-75.00			B	0.409	2.046	0.655	1	1	90.577			
			C	0.275	2.366	0.608	1	1	61.307			
T7	2.45	7.13	A	0.349	2.173	0.632	1	1	88.572	4.34	216.82	B
75.00-55.00			B	0.392	2.081	0.648	1	1	98.985			
			C	0.269	2.383	0.607	1	1	69.539			
T8	1.84	6.39	A	0.362	2.145	0.637	1	1	78.557	3.42	227.75	B
55.00-40.00			B	0.399	2.067	0.651	1	1	85.862			
			C	0.289	2.325	0.613	1	1	64.461			
T9	2.45	8.34	A	0.311	2.267	0.619	1	1	95.136	3.97	198.43	B
40.00-20.00			B	0.346	2.18	0.631	1	1	104.952			
			C	0.244	2.457	0.6	1	1	76.819			
T10	2.45	9.80	A	0.296	2.307	0.615	1	1	99.632	4.21	210.67	B
20.00-0.00			B	0.328	2.223	0.625	1	1	109.232			
			C	0.234	2.485	0.598	1	1	81.567			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	20.12	59.16						OTM	3083.60 kip-ft	35.69		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.28	2.96	A	0.319	2.247	0.622	0.825	1	23.144	1.48	73.81	A
195.00-175.00			B	0.25	2.439	0.602	0.825	1	17.526			
			C	0.313	2.262	0.62	0.825	1	22.633			
T2	1.26	3.35	A	0.439	1.993	0.668	0.825	1	44.893	2.46	122.90	A
175.00-155.00			B	0.319	2.247	0.622	0.825	1	31.690			
			C	0.423	2.02	0.661	0.825	1	42.811			
T3	2.11	4.21	A	0.492	1.91	0.694	0.825	1	65.659	3.32	166.06	A
155.00-135.00			B	0.432	2.004	0.665	0.825	1	55.951			
			C	0.353	2.164	0.634	0.825	1	44.243			
T4	2.42	4.84	A	0.434	2.001	0.666	0.825	1	68.478	3.93	196.45	B
135.00-115.00			B	0.5	1.9	0.697	0.825	1	81.466			
			C	0.32	2.245	0.622	0.825	1	48.675			
T5	2.42	5.68	A	0.383	2.098	0.645	0.825	1	69.590	3.92	195.99	B
115.00-95.00			B	0.44	1.991	0.669	0.825	1	81.530			
			C	0.286	2.334	0.612	0.825	1	50.909			
T6	2.43	6.46	A	0.361	2.147	0.636	0.825	1	75.466	4.03	201.61	B
95.00-75.00			B	0.409	2.046	0.655	0.825	1	86.684			
			C	0.275	2.366	0.608	0.825	1	56.986			
T7	2.45	7.13	A	0.349	2.173	0.632	0.825	1	83.177	4.11	205.70	B
75.00-55.00			B	0.392	2.081	0.648	0.825	1	93.910			
			C	0.269	2.383	0.607	0.825	1	63.948			
T8	1.84	6.39	A	0.362	2.145	0.637	0.825	1	72.726	3.20	213.11	B
55.00-40.00			B	0.399	2.067	0.651	0.825	1	80.341			
			C	0.289	2.325	0.613	0.825	1	58.442			
T9	2.45	8.34	A	0.311	2.267	0.619	0.825	1	88.567	3.73	186.61	B
40.00-20.00			B	0.346	2.18	0.631	0.825	1	98.698			
			C	0.244	2.457	0.6	0.825	1	70.059			
T10	2.45	9.80	A	0.296	2.307	0.615	0.825	1	92.393	3.95	197.31	B
20.00-0.00			B	0.328	2.223	0.625	0.825	1	102.305			
			C	0.234	2.485	0.598	0.825	1	74.139			
Sum Weight:	20.12	59.16						OTM	2976.36 kip-ft	34.13		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.28	2.96	A	0.319	2.247	0.622	0.8	1	23.144	1.48	73.81	A
195.00-175.00			B	0.25	2.439	0.602	0.8	1	17.526			
			C	0.313	2.262	0.62	0.8	1	22.633			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T2	1.26	3.35	A	0.439	1.993	0.668	0.8	1	44.648	2.44	122.22	A
175.00-155.00			B	0.319	2.247	0.622	0.8	1	31.401			
			C	0.423	2.02	0.661	0.8	1	42.597			
T3	2.11	4.21	A	0.492	1.91	0.694	0.8	1	65.405	3.31	165.42	A
155.00-135.00			B	0.432	2.004	0.665	0.8	1	55.672			
			C	0.353	2.164	0.634	0.8	1	43.973			
T4	2.42	4.84	A	0.434	2.001	0.666	0.8	1	68.104	3.91	195.64	B
135.00-115.00			B	0.5	1.9	0.697	0.8	1	81.130			
			C	0.32	2.245	0.622	0.8	1	48.284			
T5	2.42	5.68	A	0.383	2.098	0.645	0.8	1	69.147	3.90	195.01	B
115.00-95.00			B	0.44	1.991	0.669	0.8	1	81.123			
			C	0.286	2.334	0.612	0.8	1	50.449			
T6	2.43	6.46	A	0.361	2.147	0.636	0.8	1	74.869	4.01	200.31	B
95.00-75.00			B	0.409	2.046	0.655	0.8	1	86.128			
			C	0.275	2.366	0.608	0.8	1	56.369			
T7	2.45	7.13	A	0.349	2.173	0.632	0.8	1	82.406	4.08	204.11	B
75.00-55.00			B	0.392	2.081	0.648	0.8	1	93.186			
			C	0.269	2.383	0.607	0.8	1	63.150			
T8	1.84	6.39	A	0.362	2.145	0.637	0.8	1	71.893	3.17	211.01	B
55.00-40.00			B	0.399	2.067	0.651	0.8	1	79.552			
			C	0.289	2.325	0.613	0.8	1	57.582			
T9	2.45	8.34	A	0.311	2.267	0.619	0.8	1	87.629	3.70	184.92	B
40.00-20.00			B	0.346	2.18	0.631	0.8	1	97.804			
			C	0.244	2.457	0.6	0.8	1	69.094			
T10	2.45	9.80	A	0.296	2.307	0.615	0.8	1	91.358	3.91	195.40	B
20.00-0.00			B	0.328	2.223	0.625	0.8	1	101.315			
			C	0.234	2.485	0.598	0.8	1	73.077			
Sum Weight:	20.12	59.16						OTM	2961.04 kip-ft	33.90		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.28	2.96	A	0.319	2.247	0.622	0.85	1	23.144	1.48	73.81	A
195.00-175.00			B	0.25	2.439	0.602	0.85	1	17.526			
			C	0.313	2.262	0.62	0.85	1	22.633			
T2	1.26	3.35	A	0.439	1.993	0.668	0.85	1	45.139	2.47	123.57	A
175.00-155.00			B	0.319	2.247	0.622	0.85	1	31.979			
			C	0.423	2.02	0.661	0.85	1	43.025			
T3	2.11	4.21	A	0.492	1.91	0.694	0.85	1	65.914	3.33	166.70	A
155.00-135.00			B	0.432	2.004	0.665	0.85	1	56.230			
			C	0.353	2.164	0.634	0.85	1	44.513			
T4	2.42	4.84	A	0.434	2.001	0.666	0.85	1	68.852	3.95	197.26	B
135.00-115.00			B	0.5	1.9	0.697	0.85	1	81.802			
			C	0.32	2.245	0.622	0.85	1	49.065			
T5	2.42	5.68	A	0.383	2.098	0.645	0.85	1	70.033	3.94	196.97	B
115.00-95.00			B	0.44	1.991	0.669	0.85	1	81.938			
			C	0.286	2.334	0.612	0.85	1	51.369			
T6	2.43	6.46	A	0.361	2.147	0.636	0.85	1	76.063	4.06	202.90	B
95.00-75.00			B	0.409	2.046	0.655	0.85	1	87.240			
			C	0.275	2.366	0.608	0.85	1	57.604			
T7	2.45	7.13	A	0.349	2.173	0.632	0.85	1	83.947	4.15	207.29	B
75.00-55.00			B	0.392	2.081	0.648	0.85	1	94.635			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.269	2.383	0.607	0.85	1	64.747			
T8	1.84	6.39	A	0.362	2.145	0.637	0.85	1	73.559	3.23	215.20	B
55.00-40.00			B	0.399	2.067	0.651	0.85	1	81.129			
			C	0.289	2.325	0.613	0.85	1	59.302			
T9	2.45	8.34	A	0.311	2.267	0.619	0.85	1	89.506	3.77	188.30	B
40.00-20.00			B	0.346	2.18	0.631	0.85	1	99.591			
			C	0.244	2.457	0.6	0.85	1	71.025			
T10	2.45	9.80	A	0.296	2.307	0.615	0.85	1	93.427	3.98	199.22	B
20.00-0.00			B	0.328	2.223	0.625	0.85	1	103.295			
			C	0.234	2.485	0.598	0.85	1	75.200			
Sum Weight:	20.12	59.16						OTM	2991.68 kip-ft	34.35		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.13	2.55	A	0.209	2.565	0.592	1	1	14.255	0.43	21.36	C
195.00-175.00			B	0.163	2.723	0.584	1	1	10.956			
			C	0.209	2.565	0.592	1	1	14.255			
T2	0.54	2.79	A	0.301	2.293	0.616	1	1	31.143	0.81	40.61	C
175.00-155.00			B	0.222	2.524	0.595	1	1	24.004			
			C	0.309	2.272	0.619	1	1	31.610			
T3	0.89	3.57	A	0.338	2.199	0.628	1	1	43.904	1.05	52.61	A
155.00-135.00			B	0.3	2.295	0.616	1	1	39.119			
			C	0.258	2.414	0.604	1	1	33.711			
T4	1.01	4.04	A	0.303	2.287	0.617	1	1	48.747	1.27	63.60	B
135.00-115.00			B	0.352	2.167	0.633	1	1	56.202			
			C	0.238	2.475	0.599	1	1	38.986			
T5	1.01	4.79	A	0.268	2.384	0.607	1	1	50.938	1.31	65.49	B
115.00-95.00			B	0.31	2.27	0.619	1	1	58.050			
			C	0.212	2.556	0.593	1	1	41.486			
T6	1.01	5.35	A	0.257	2.416	0.604	1	1	57.790	1.40	69.96	B
95.00-75.00			B	0.293	2.316	0.614	1	1	64.593			
			C	0.208	2.57	0.592	1	1	48.378			
T7	1.02	5.79	A	0.253	2.43	0.603	1	1	65.929	1.47	73.50	B
75.00-55.00			B	0.284	2.34	0.611	1	1	72.492			
			C	0.207	2.571	0.592	1	1	56.262			
T8	0.77	5.02	A	0.266	2.389	0.606	1	1	60.176	1.19	79.19	B
55.00-40.00			B	0.294	2.313	0.614	1	1	64.818			
			C	0.226	2.512	0.596	1	1	53.016			
T9	1.02	6.79	A	0.226	2.511	0.596	1	1	72.240	1.36	68.21	B
40.00-20.00			B	0.252	2.431	0.602	1	1	78.606			
			C	0.189	2.635	0.588	1	1	62.768			
T10	1.02	8.13	A	0.216	2.542	0.594	1	1	76.428	1.46	72.87	B
20.00-0.00			B	0.24	2.468	0.599	1	1	82.728			
			C	0.182	2.657	0.587	1	1	67.021			
Sum Weight:	8.43	48.83						OTM	988.55 kip-ft	11.75		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.13	2.55	A	0.209	2.565	0.592	0.825	1	14.255	0.43	21.36	C
195.00-175.00			B	0.163	2.723	0.584	0.825	1	10.956			
			C	0.209	2.565	0.592	0.825	1	14.255			
T2	0.54	2.79	A	0.301	2.293	0.616	0.825	1	29.309	0.77	38.46	C
175.00-155.00			B	0.222	2.524	0.595	0.825	1	21.979			
			C	0.309	2.272	0.619	0.825	1	29.935			
T3	0.89	3.57	A	0.338	2.199	0.628	0.825	1	41.917	1.00	50.23	A
155.00-135.00			B	0.3	2.295	0.616	0.825	1	37.027			
			C	0.258	2.414	0.604	0.825	1	31.665			
T4	1.01	4.04	A	0.303	2.287	0.617	0.825	1	45.899	1.21	60.59	B
135.00-115.00			B	0.352	2.167	0.633	0.825	1	53.540			
			C	0.238	2.475	0.599	0.825	1	36.071			
T5	1.01	4.79	A	0.268	2.384	0.607	0.825	1	47.613	1.24	61.94	B
115.00-95.00			B	0.31	2.27	0.619	0.825	1	54.903			
			C	0.212	2.556	0.593	0.825	1	38.095			
T6	1.01	5.35	A	0.257	2.416	0.604	0.825	1	53.352	1.31	65.37	B
95.00-75.00			B	0.293	2.316	0.614	0.825	1	60.357			
			C	0.208	2.57	0.592	0.825	1	43.862			
T7	1.02	5.79	A	0.253	2.43	0.603	0.825	1	60.220	1.36	67.95	B
75.00-55.00			B	0.284	2.34	0.611	0.825	1	67.010			
			C	0.207	2.571	0.592	0.825	1	50.452			
T8	0.77	5.02	A	0.266	2.389	0.606	0.825	1	54.043	1.08	71.96	B
55.00-40.00			B	0.294	2.313	0.614	0.825	1	58.904			
			C	0.226	2.512	0.596	0.825	1	46.786			
T9	1.02	6.79	A	0.226	2.511	0.596	0.825	1	65.364	1.25	62.44	B
40.00-20.00			B	0.252	2.431	0.602	0.825	1	71.953			
			C	0.189	2.635	0.588	0.825	1	55.794			
T10	1.02	8.13	A	0.216	2.542	0.594	0.825	1	68.884	1.33	66.42	B
20.00-0.00			B	0.24	2.468	0.599	0.825	1	75.405			
			C	0.182	2.657	0.587	0.825	1	59.379			
Sum Weight:	8.43	48.83						OTM	934.63 kip-ft	10.97		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.13	2.55	A	0.209	2.565	0.592	0.8	1	14.255	0.43	21.36	C
195.00-175.00			B	0.163	2.723	0.584	0.8	1	10.956			
			C	0.209	2.565	0.592	0.8	1	14.255			
T2	0.54	2.79	A	0.301	2.293	0.616	0.8	1	29.048	0.76	38.15	C
175.00-155.00			B	0.222	2.524	0.595	0.8	1	21.689			
			C	0.309	2.272	0.619	0.8	1	29.696			
T3	0.89	3.57	A	0.338	2.199	0.628	0.8	1	41.633	1.00	49.89	A
155.00-135.00			B	0.3	2.295	0.616	0.8	1	36.728			
			C	0.258	2.414	0.604	0.8	1	31.372			
T4	1.01	4.04	A	0.303	2.287	0.617	0.8	1	45.492	1.20	60.16	B
135.00-115.00			B	0.352	2.167	0.633	0.8	1	53.160			
			C	0.238	2.475	0.599	0.8	1	35.655			
T5	1.01	4.79	A	0.268	2.384	0.607	0.8	1	47.138	1.23	61.43	B
115.00-95.00			B	0.31	2.27	0.619	0.8	1	54.454			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.212	2.556	0.593	0.8	1	37.611			
T6	1.01	5.35	A	0.257	2.416	0.604	0.8	1	52.718	1.29	64.72	B
95.00-75.00			B	0.293	2.316	0.614	0.8	1	59.752			
			C	0.208	2.57	0.592	0.8	1	43.217			
T7	1.02	5.79	A	0.253	2.43	0.603	0.8	1	59.404	1.34	67.15	B
75.00-55.00			B	0.284	2.34	0.611	0.8	1	66.227			
			C	0.207	2.571	0.592	0.8	1	49.622			
T8	0.77	5.02	A	0.266	2.389	0.606	0.8	1	53.167	1.06	70.93	B
55.00-40.00			B	0.294	2.313	0.614	0.8	1	58.059			
			C	0.226	2.512	0.596	0.8	1	45.896			
T9	1.02	6.79	A	0.226	2.511	0.596	0.8	1	64.382	1.23	61.61	B
40.00-20.00			B	0.252	2.431	0.602	0.8	1	71.002			
			C	0.189	2.635	0.588	0.8	1	54.797			
T10	1.02	8.13	A	0.216	2.542	0.594	0.8	1	67.807	1.31	65.50	B
20.00-0.00			B	0.24	2.468	0.599	0.8	1	74.359			
			C	0.182	2.657	0.587	0.8	1	58.288			
Sum Weight:	8.43	48.83						OTM	926.93 kip-ft	10.86		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.13	2.55	A	0.209	2.565	0.592	0.85	1	14.255	0.43	21.36	C
195.00-175.00			B	0.163	2.723	0.584	0.85	1	10.956			
			C	0.209	2.565	0.592	0.85	1	14.255			
T2	0.54	2.79	A	0.301	2.293	0.616	0.85	1	29.571	0.78	38.77	C
175.00-155.00			B	0.222	2.524	0.595	0.85	1	22.268			
			C	0.309	2.272	0.619	0.85	1	30.174			
T3	0.89	3.57	A	0.338	2.199	0.628	0.85	1	42.201	1.01	50.57	A
155.00-135.00			B	0.3	2.295	0.616	0.85	1	37.326			
			C	0.258	2.414	0.604	0.85	1	31.957			
T4	1.01	4.04	A	0.303	2.287	0.617	0.85	1	46.306	1.22	61.02	B
135.00-115.00			B	0.352	2.167	0.633	0.85	1	53.920			
			C	0.238	2.475	0.599	0.85	1	36.488			
T5	1.01	4.79	A	0.268	2.384	0.607	0.85	1	48.088	1.25	62.45	B
115.00-95.00			B	0.31	2.27	0.619	0.85	1	55.353			
			C	0.212	2.556	0.593	0.85	1	38.580			
T6	1.01	5.35	A	0.257	2.416	0.604	0.85	1	53.986	1.32	66.03	B
95.00-75.00			B	0.293	2.316	0.614	0.85	1	60.963			
			C	0.208	2.57	0.592	0.85	1	44.507			
T7	1.02	5.79	A	0.253	2.43	0.603	0.85	1	61.035	1.37	68.74	B
75.00-55.00			B	0.284	2.34	0.611	0.85	1	67.793			
			C	0.207	2.571	0.592	0.85	1	51.282			
T8	0.77	5.02	A	0.266	2.389	0.606	0.85	1	54.919	1.09	72.99	B
55.00-40.00			B	0.294	2.313	0.614	0.85	1	59.749			
			C	0.226	2.512	0.596	0.85	1	47.676			
T9	1.02	6.79	A	0.226	2.511	0.596	0.85	1	66.346	1.27	63.26	B
40.00-20.00			B	0.252	2.431	0.602	0.85	1	72.903			
			C	0.189	2.635	0.588	0.85	1	56.790			
T10	1.02	8.13	A	0.216	2.542	0.594	0.85	1	69.962	1.35	67.34	B
20.00-0.00			B	0.24	2.468	0.599	0.85	1	76.451			
			C	0.182	2.657	0.587	0.85	1	60.471			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
Sum Weight:	8.43	48.83						OTM	942.33 kip-ft	11.09		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	29.31					
Bracing Weight	19.52					
Total Member Self-Weight	48.83			-17.58	20.30	
Total Weight	67.79			-17.58	20.30	
Wind 0 deg - No Ice		0.00	-55.38	-6157.42	20.30	-26.42
Wind 30 deg - No Ice		26.61	-46.09	-5205.17	-2974.75	-40.68
Wind 45 deg - No Ice		37.38	-37.38	-4235.58	-4197.70	-44.08
Wind 60 deg - No Ice		45.47	-26.25	-2987.68	-5124.06	-44.38
Wind 90 deg - No Ice		53.22	0.00	-17.58	-5969.81	-38.22
Wind 120 deg - No Ice		47.96	27.69	3052.35	-5296.96	-22.67
Wind 135 deg - No Ice		37.38	37.38	4200.43	-4197.70	-9.22
Wind 150 deg - No Ice		26.61	46.09	5170.01	-2974.75	2.46
Wind 180 deg - No Ice		0.00	52.50	5922.63	20.30	24.40
Wind 210 deg - No Ice		-26.61	46.09	5170.01	3015.36	40.68
Wind 225 deg - No Ice		-37.38	37.38	4200.43	4238.31	44.08
Wind 240 deg - No Ice		-47.96	27.69	3052.35	5337.57	49.09
Wind 270 deg - No Ice		-53.22	0.00	-17.58	6010.42	38.22
Wind 300 deg - No Ice		-45.47	-26.25	-2987.68	5164.67	19.98
Wind 315 deg - No Ice		-37.38	-37.38	-4235.58	4238.31	9.22
Wind 330 deg - No Ice		-26.61	-46.09	-5205.17	3015.36	-2.46
Member Ice	10.33					
Total Weight Ice	93.65			-56.49	45.93	
Wind 0 deg - Ice		0.00	-51.35	-5789.94	45.93	-27.06
Wind 30 deg - Ice		25.01	-43.31	-4942.20	-2774.84	-43.62
Wind 45 deg - Ice		35.21	-35.21	-4034.82	-3932.40	-47.83
Wind 60 deg - Ice		42.93	-24.78	-2861.93	-4813.25	-48.72
Wind 90 deg - Ice		50.01	0.00	-56.49	-5595.60	-42.18
Wind 120 deg - Ice		44.47	25.68	2810.24	-4919.39	-24.93
Wind 135 deg - Ice		35.21	35.21	3921.85	-3932.40	-11.29
Wind 150 deg - Ice		25.01	43.31	4829.22	-2774.84	1.44
Wind 180 deg - Ice		0.00	49.57	5554.41	45.93	25.66
Wind 210 deg - Ice		-25.01	43.31	4829.22	2866.70	43.62
Wind 225 deg - Ice		-35.21	35.21	3921.85	4024.26	47.83
Wind 240 deg - Ice		-44.47	25.68	2810.24	5011.25	51.98
Wind 270 deg - Ice		-50.01	0.00	-56.49	5687.46	42.18
Wind 300 deg - Ice		-42.93	-24.78	-2861.93	4905.10	23.06
Wind 315 deg - Ice		-35.21	-35.21	-4034.82	4024.26	11.29
Wind 330 deg - Ice		-25.01	-43.31	-4942.20	2866.70	-1.44
Total Weight	67.79			-17.58	20.30	
Wind 0 deg - Service		0.00	-17.09	-1886.33	0.28	-8.15
Wind 30 deg - Service		8.21	-14.23	-1592.43	-924.12	-12.56
Wind 45 deg - Service		11.54	-11.54	-1293.17	-1301.58	-13.61
Wind 60 deg - Service		14.03	-8.10	-908.02	-1587.49	-13.70
Wind 90 deg - Service		16.43	0.00	8.68	-1848.52	-11.80
Wind 120 deg - Service		14.80	8.55	956.19	-1640.85	-7.00
Wind 135 deg - Service		11.54	11.54	1310.53	-1301.58	-2.85
Wind 150 deg - Service		8.21	14.23	1609.79	-924.12	0.76

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 180 deg - Service		0.00	16.20	1842.07	0.28	7.53
Wind 210 deg - Service		-8.21	14.23	1609.79	924.68	12.56
Wind 225 deg - Service		-11.54	11.54	1310.53	1302.13	13.61
Wind 240 deg - Service		-14.80	8.55	956.19	1641.41	15.15
Wind 270 deg - Service		-16.43	0.00	8.68	1849.08	11.80
Wind 300 deg - Service		-14.03	-8.10	-908.02	1588.04	6.17
Wind 315 deg - Service		-11.54	-11.54	-1293.17	1302.13	2.85
Wind 330 deg - Service		-8.21	-14.23	-1592.43	924.68	-0.76

Load Combinations

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

Comb. No.	Description
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	195 - 175	Leg	Max Tension	10	14.41	-0.11	0.00
			Max. Compression	13	-18.49	0.51	-0.03
			Max. Mx	5	-1.77	0.86	-0.23
			Max. My	15	-0.39	0.15	-1.34
			Max. Vy	5	0.78	-0.43	-0.23
			Max. Vx	15	1.13	0.15	0.53
		Diagonal	Max Tension	6	4.11	0.00	0.00
			Max. Compression	6	-4.14	0.00	0.00
			Max. Mx	29	2.50	-0.01	0.00
			Max. My	14	-3.38	-0.00	-0.00
			Max. Vy	30	-0.01	-0.01	-0.00
			Max. Vx	14	0.00	-0.00	-0.00
		Top Girt	Max Tension	10	0.10	0.00	0.00
			Max. Compression	7	-0.12	0.00	0.00
			Max. Mx	18	-0.02	0.02	0.00
			Max. My	8	0.01	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	8	0.00	0.00	0.00
		Bottom Girt	Max Tension	2	0.36	0.00	0.00
			Max. Compression	15	-0.39	0.00	0.00
			Max. Mx	18	-0.02	0.02	0.00
			Max. My	34	-0.02	0.00	-0.00
			Max. Vy	18	-0.02	0.00	0.00
			Max. Vx	34	0.00	0.00	0.00
T2	175 - 155	Leg	Max Tension	10	43.65	-0.50	-0.02
			Max. Compression	13	-52.21	0.39	0.00
			Max. Mx	5	19.60	1.15	0.03
			Max. My	17	-4.46	-0.04	-1.14
			Max. Vy	5	-0.85	-0.49	0.01
			Max. Vx	17	0.81	-0.01	0.38
		Diagonal	Max Tension	6	6.57	0.00	0.00
			Max. Compression	6	-6.66	0.00	0.00
			Max. Mx	27	4.31	0.02	-0.00
			Max. My	14	-5.94	0.00	0.02
			Max. Vy	27	0.01	0.02	-0.00
			Max. Vx	14	-0.00	0.00	0.00
T3	155 - 135	Leg	Max Tension	10	78.69	-0.80	-0.02
			Max. Compression	13	-92.47	-0.07	-0.05
			Max. Mx	5	63.90	1.35	0.03
			Max. My	6	-5.28	-0.03	-1.37
			Max. Vy	10	0.67	-0.80	-0.02
			Max. Vx	14	0.67	-0.03	-0.74
		Diagonal	Max Tension	6	7.51	0.00	0.00
			Max. Compression	6	-7.56	0.00	0.00
			Max. Mx	27	5.31	0.04	-0.00
			Max. My	32	-6.09	0.02	0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	27	0.02	0.04	-0.00
			Max. Vx	32	-0.00	0.00	0.00
T4	135 - 115	Leg	Max Tension	10	113.36	-0.13	-0.02
			Max. Compression	13	-131.41	0.29	-0.05
			Max. Mx	7	-130.62	0.30	0.02
			Max. My	14	-8.05	-0.00	-0.28
			Max. Vy	10	0.10	-0.26	-0.02
			Max. Vx	13	0.10	-0.13	-0.16
		Diagonal	Max Tension	6	7.10	0.00	0.00
			Max. Compression	6	-7.15	0.00	0.00
			Max. Mx	30	5.35	0.05	-0.01
			Max. My	33	-4.72	0.03	0.01
			Max. Vy	32	0.03	0.05	0.01
			Max. Vx	33	-0.00	0.00	0.00
T5	115 - 95	Leg	Max Tension	10	143.57	-0.20	-0.02
			Max. Compression	13	-166.53	0.17	-0.05
			Max. Mx	7	-142.26	0.30	0.02
			Max. My	14	-8.35	-0.00	-0.28
			Max. Vy	10	-0.07	-0.29	-0.03
			Max. Vx	13	-0.09	-0.15	-0.26
		Diagonal	Max Tension	3	7.33	0.00	0.00
			Max. Compression	3	-7.43	0.00	0.00
			Max. Mx	32	5.62	0.09	-0.01
			Max. My	21	-6.91	0.05	0.01
			Max. Vy	32	0.05	0.09	-0.01
			Max. Vx	27	0.00	0.00	0.00
T6	95 - 75	Leg	Max Tension	15	171.87	-0.23	-0.03
			Max. Compression	13	-199.93	0.17	-0.05
			Max. Mx	10	171.38	-0.24	-0.03
			Max. My	14	-11.87	-0.01	-0.29
			Max. Vy	27	-0.09	-0.22	-0.03
			Max. Vx	13	-0.13	-0.13	-0.27
		Diagonal	Max Tension	3	8.01	0.00	0.00
			Max. Compression	3	-8.07	0.00	0.00
			Max. Mx	32	5.77	0.11	-0.01
			Max. My	21	-7.56	0.07	0.02
			Max. Vy	32	0.05	0.11	-0.01
			Max. Vx	21	-0.00	0.00	0.00
T7	75 - 55	Leg	Max Tension	15	198.87	-0.27	-0.03
			Max. Compression	13	-232.49	0.06	0.00
			Max. Mx	27	179.25	-0.30	-0.02
			Max. My	14	-14.39	-0.04	-0.35
			Max. Vy	27	-0.10	-0.30	-0.02
			Max. Vx	13	-0.12	-0.16	-0.32
		Diagonal	Max Tension	3	8.74	0.00	0.00
			Max. Compression	3	-8.84	0.00	0.00
			Max. Mx	19	5.99	0.13	0.02
			Max. My	21	-7.98	0.08	0.02
			Max. Vy	32	0.06	0.13	-0.02
			Max. Vx	21	-0.00	0.00	0.00
T8	55 - 40	Leg	Max Tension	15	219.48	-0.09	-0.00
			Max. Compression	2	-258.19	0.55	0.05
			Max. Mx	27	196.83	-1.00	-0.05
			Max. My	31	-25.40	-0.51	-0.52
			Max. Vy	27	0.28	-1.00	-0.05
			Max. Vx	23	-0.13	-0.51	0.52
		Diagonal	Max Tension	28	9.10	0.00	0.00
			Max. Compression	3	-9.14	0.00	0.00
			Max. Mx	32	5.85	0.14	-0.02
			Max. My	21	-8.29	0.09	0.02
			Max. Vy	32	0.06	0.14	-0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	21	-0.00	0.00	0.00
T9	40 - 20	Leg	Max Tension	15	243.80	-0.25	-0.02
			Max. Compression	2	-289.21	0.28	0.03
			Max. Mx	24	-275.06	2.26	0.03
			Max. My	31	-25.56	-0.51	-0.52
			Max. Vy	24	-0.51	2.26	0.03
			Max. Vx	14	0.12	-0.03	-0.49
		Diagonal	Max Tension	28	10.21	0.00	0.00
			Max. Compression	28	-11.02	0.00	0.00
			Max. Mx	32	5.23	0.25	-0.02
			Max. My	21	-10.62	0.20	0.03
			Max. Vy	32	0.08	0.25	-0.02
			Max. Vx	21	-0.00	0.00	0.00
T10	20 - 0	Leg	Max Tension	15	268.02	-0.27	-0.03
			Max. Compression	2	-321.30	-0.00	-0.00
			Max. Mx	24	-294.57	3.53	0.03
			Max. My	14	-22.16	-0.05	-0.59
			Max. Vy	27	-0.98	-3.20	-0.01
			Max. Vx	14	-0.16	-0.05	-0.59
		Diagonal	Max Tension	28	13.89	0.00	0.00
			Max. Compression	28	-13.22	0.00	0.00
			Max. Mx	32	3.61	0.39	-0.03
			Max. My	21	-12.16	0.32	0.04
			Max. Vy	32	0.11	0.39	-0.03
			Max. Vx	21	-0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	13	325.64	28.93	-18.09
	Max. H_x	13	325.64	28.93	-18.09
	Max. H_z	21	-236.28	-27.27	18.22
	Min. Vert	5	-269.74	-24.63	15.48
	Min. H_x	22	-244.98	-28.52	17.81
	Min. H_z	13	325.64	28.93	-18.09
Leg B	Max. Vert	7	323.91	-29.24	-17.51
	Max. H_x	32	-248.89	28.87	17.32
	Max. H_z	33	-240.20	27.76	17.49
	Min. Vert	15	-271.48	24.95	14.98
	Min. H_x	7	323.91	-29.24	-17.51
	Min. H_z	7	323.91	-29.24	-17.51
Leg A	Max. Vert	2	326.07	-0.65	34.11
	Max. H_x	14	23.46	5.21	1.80
	Max. H_z	2	326.07	-0.65	34.11
	Min. Vert	10	-269.31	0.60	-29.07
	Min. H_x	6	23.46	-5.24	1.80
	Min. H_z	27	-242.76	0.61	-33.56

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	67.79	0.00	0.00	-17.58	20.30	0.00
Dead+Wind 0 deg - No Ice	67.79	-0.00	-55.38	-6176.14	20.40	-26.48
Dead+Wind 30 deg - No Ice	67.79	26.61	-46.09	-5221.10	-2983.84	-40.74
Dead+Wind 45 deg - No Ice	67.79	37.38	-37.38	-4248.56	-4210.56	-44.13
Dead+Wind 60 deg - No Ice	67.79	45.47	-26.25	-2996.84	-5139.79	-44.41
Dead+Wind 90 deg - No Ice	67.79	53.22	-0.00	-17.62	-5988.13	-38.23
Dead+Wind 120 deg - No Ice	67.79	47.96	27.69	3061.68	-5313.12	-22.65
Dead+Wind 135 deg - No Ice	67.79	37.38	37.38	4213.36	-4210.59	-9.20
Dead+Wind 150 deg - No Ice	67.79	26.61	46.09	5185.91	-2983.86	2.50
Dead+Wind 180 deg - No Ice	67.79	-0.00	52.50	5940.86	20.40	24.46
Dead+Wind 210 deg - No Ice	67.79	-26.61	46.09	5185.88	3024.64	40.74
Dead+Wind 225 deg - No Ice	67.79	-37.38	37.38	4213.33	4251.34	44.14
Dead+Wind 240 deg - No Ice	67.79	-47.96	27.69	3061.66	5353.86	49.13
Dead+Wind 270 deg - No Ice	67.79	-53.22	-0.00	-17.60	6028.84	38.23
Dead+Wind 300 deg - No Ice	67.79	-45.47	-26.25	-2996.80	5180.53	19.95
Dead+Wind 315 deg - No Ice	67.79	-37.38	-37.38	-4248.52	4251.32	9.18
Dead+Wind 330 deg - No Ice	67.79	-26.61	-46.09	-5221.06	3024.62	-2.50
Dead+Ice+Temp	93.65	0.00	0.00	-56.49	45.92	-0.00
Dead+Wind 0 deg+Ice+Temp	93.65	0.00	-51.35	-5812.06	46.10	-27.17
Dead+Wind 30 deg+Ice+Temp	93.65	25.01	-43.31	-4961.17	-2785.54	-43.75
Dead+Wind 45 deg+Ice+Temp	93.65	35.21	-35.21	-4050.32	-3947.59	-47.97
Dead+Wind 60 deg+Ice+Temp	93.65	42.93	-24.78	-2872.93	-4831.85	-48.84
Dead+Wind 90 deg+Ice+Temp	93.65	50.01	0.00	-56.65	-5617.21	-42.26
Dead+Wind 120 deg+Ice+Temp	93.65	44.47	25.68	2821.11	-4938.31	-24.93
Dead+Wind 135 deg+Ice+Temp	93.65	35.21	35.21	3937.07	-3947.60	-11.27
Dead+Wind 150 deg+Ice+Temp	93.65	25.01	43.31	4847.94	-2785.54	1.50
Dead+Wind 180 deg+Ice+Temp	93.65	0.00	49.57	5575.89	46.22	25.77
Dead+Wind 210 deg+Ice+Temp	93.65	-25.01	43.31	4847.93	2877.78	43.75
Dead+Wind 225 deg+Ice+Temp	93.65	-35.21	35.21	3937.05	4039.81	47.97
Dead+Wind 240 deg+Ice+Temp	93.65	-44.47	25.68	2821.11	5030.50	52.10
Dead+Wind 270 deg+Ice+Temp	93.65	-50.01	0.00	-56.62	5709.37	42.26
Dead+Wind 300 deg+Ice+Temp	93.65	-42.93	-24.78	-2872.90	4923.92	23.06
Dead+Wind 315 deg+Ice+Temp	93.65	-35.21	-35.21	-4050.26	4039.76	11.27
Dead+Wind 330 deg+Ice+Temp	93.65	-25.01	-43.31	-4961.12	2877.73	-1.50
Dead+Wind 0 deg - Service	67.79	0.00	-17.09	-1918.38	20.36	-8.17
Dead+Wind 30 deg - Service	67.79	8.21	-14.23	-1623.61	-906.88	-12.57
Dead+Wind 45 deg - Service	67.79	11.54	-11.54	-1323.44	-1285.50	-13.62
Dead+Wind 60 deg - Service	67.79	14.03	-8.10	-937.11	-1572.30	-13.71
Dead+Wind 90 deg - Service	67.79	16.43	0.00	-17.59	-1834.12	-11.80
Dead+Wind 120 deg - Service	67.79	14.80	8.55	932.81	-1625.79	-6.99
Dead+Wind 135 deg - Service	67.79	11.54	11.54	1288.27	-1285.49	-2.83
Dead+Wind 150 deg - Service	67.79	8.21	14.23	1588.44	-906.88	0.77
Dead+Wind 180 deg - Service	67.79	-0.00	16.20	1821.45	20.36	7.55
Dead+Wind 210 deg - Service	67.79	-8.21	14.23	1588.44	947.60	12.57
Dead+Wind 225 deg - Service	67.79	-11.54	11.54	1288.27	1326.22	13.62
Dead+Wind 240 deg - Service	67.79	-14.80	8.55	932.82	1666.51	15.16
Dead+Wind 270 deg - Service	67.79	-16.43	0.00	-17.59	1874.84	11.80
Dead+Wind 300 deg - Service	67.79	-14.03	-8.10	-937.10	1613.01	6.16
Dead+Wind 315 deg - Service	67.79	-11.54	-11.54	-1323.44	1326.22	2.83
Dead+Wind 330 deg - Service	67.79	-8.21	-14.23	-1623.60	947.60	-0.77

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-67.79	0.00	0.00	67.79	0.00	0.000%
2	0.00	-67.79	-55.38	0.00	67.79	55.38	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
3	26.61	-67.79	-46.09	-26.61	67.79	46.09	0.000%
4	37.38	-67.79	-37.38	-37.38	67.79	37.38	0.000%
5	45.47	-67.79	-26.25	-45.47	67.79	26.25	0.000%
6	53.22	-67.79	0.00	-53.22	67.79	0.00	0.001%
7	47.96	-67.79	27.69	-47.96	67.79	-27.69	0.000%
8	37.38	-67.79	37.38	-37.38	67.79	-37.38	0.000%
9	26.61	-67.79	46.09	-26.61	67.79	-46.09	0.000%
10	0.00	-67.79	52.50	0.00	67.79	-52.50	0.000%
11	-26.61	-67.79	46.09	26.61	67.79	-46.09	0.000%
12	-37.38	-67.79	37.38	37.38	67.79	-37.38	0.001%
13	-47.96	-67.79	27.69	47.96	67.79	-27.69	0.000%
14	-53.22	-67.79	0.00	53.22	67.79	0.00	0.001%
15	-45.47	-67.79	-26.25	45.47	67.79	26.25	0.000%
16	-37.38	-67.79	-37.38	37.38	67.79	37.38	0.000%
17	-26.61	-67.79	-46.09	26.61	67.79	46.09	0.000%
18	0.00	-93.65	0.00	-0.00	93.65	-0.00	0.000%
19	0.00	-93.65	-51.35	-0.00	93.65	51.35	0.000%
20	25.01	-93.65	-43.31	-25.01	93.65	43.31	0.000%
21	35.21	-93.65	-35.21	-35.21	93.65	35.21	0.000%
22	42.93	-93.65	-24.78	-42.93	93.65	24.78	0.000%
23	50.01	-93.65	0.00	-50.01	93.65	-0.00	0.000%
24	44.47	-93.65	25.68	-44.47	93.65	-25.68	0.000%
25	35.21	-93.65	35.21	-35.21	93.65	-35.21	0.000%
26	25.01	-93.65	43.31	-25.01	93.65	-43.31	0.000%
27	0.00	-93.65	49.57	-0.00	93.65	-49.57	0.000%
28	-25.01	-93.65	43.31	25.01	93.65	-43.31	0.000%
29	-35.21	-93.65	35.21	35.21	93.65	-35.21	0.000%
30	-44.47	-93.65	25.68	44.47	93.65	-25.68	0.000%
31	-50.01	-93.65	0.00	50.01	93.65	-0.00	0.000%
32	-42.93	-93.65	-24.78	42.93	93.65	24.78	0.000%
33	-35.21	-93.65	-35.21	35.21	93.65	35.21	0.000%
34	-25.01	-93.65	-43.31	25.01	93.65	43.31	0.000%
35	0.00	-67.79	-17.09	0.00	67.79	17.09	0.000%
36	8.21	-67.79	-14.23	-8.21	67.79	14.23	0.000%
37	11.54	-67.79	-11.54	-11.54	67.79	11.54	0.000%
38	14.03	-67.79	-8.10	-14.03	67.79	8.10	0.000%
39	16.43	-67.79	0.00	-16.43	67.79	0.00	0.000%
40	14.80	-67.79	8.55	-14.80	67.79	-8.55	0.000%
41	11.54	-67.79	11.54	-11.54	67.79	-11.54	0.000%
42	8.21	-67.79	14.23	-8.21	67.79	-14.23	0.000%
43	-0.00	-67.79	16.20	0.00	67.79	-16.20	0.000%
44	-8.21	-67.79	14.23	8.21	67.79	-14.23	0.000%
45	-11.54	-67.79	11.54	11.54	67.79	-11.54	0.000%
46	-14.80	-67.79	8.55	14.80	67.79	-8.55	0.000%
47	-16.43	-67.79	0.00	16.43	67.79	0.00	0.000%
48	-14.03	-67.79	-8.10	14.03	67.79	8.10	0.000%
49	-11.54	-67.79	-11.54	11.54	67.79	11.54	0.000%
50	-8.21	-67.79	-14.23	8.21	67.79	14.23	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001

4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000075
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000099
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000074
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000065
20	Yes	4	0.00000001	0.00000093
21	Yes	4	0.00000001	0.00000100
22	Yes	4	0.00000001	0.00000102
23	Yes	4	0.00000001	0.00000102
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000074
26	Yes	4	0.00000001	0.00000096
27	Yes	4	0.00000001	0.00000101
28	Yes	4	0.00000001	0.00000091
29	Yes	4	0.00000001	0.00000071
30	Yes	4	0.00000001	0.00000063
31	Yes	4	0.00000001	0.00000104
32	Yes	4	0.00000001	0.00000104
33	Yes	4	0.00000001	0.00000105
34	Yes	4	0.00000001	0.00000100
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	195 - 175	3.025	46	0.1223	0.0324
T2	175 - 155	2.511	46	0.1182	0.0218
T3	155 - 135	2.003	46	0.1099	0.0148
T4	135 - 115	1.546	46	0.0972	0.0145
T5	115 - 95	1.141	46	0.0831	0.0146
T6	95 - 75	0.807	35	0.0670	0.0137
T7	75 - 55	0.534	35	0.0519	0.0118

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T8	55 - 40	0.315	35	0.0382	0.0090
T9	40 - 20	0.178	35	0.0278	0.0059
T10	20 - 0	0.059	35	0.0133	0.0029

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.00	15-ft Triangular Mount	46	2.897	0.1214	0.0300	675033
180.00	Pirod 15' T-Frame Sector Mount (1)	46	2.640	0.1195	0.0248	225010
175.00	DC6-48-60-18-8F Surge Arrestor	46	2.511	0.1182	0.0218	204788
173.00	800 10121	46	2.459	0.1176	0.0205	263789
172.00	Pirod 12' T-Frame Sector Mount (1)	46	2.433	0.1173	0.0198	333934
160.00	Pirod 15' T-Frame Sector Mount (1)	46	2.127	0.1124	0.0154	96601
145.00	Pirod 15' T-Frame Sector Mount (1)	46	1.767	0.1038	0.0145	87347
80.00	GPS	35	0.597	0.0555	0.0124	81637

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	195 - 175	9.722	13	0.3878	0.1051
T2	175 - 155	8.084	13	0.3775	0.0708
T3	155 - 135	6.456	13	0.3524	0.0515
T4	135 - 115	4.986	13	0.3124	0.0534
T5	115 - 95	3.683	13	0.2675	0.0532
T6	95 - 75	2.604	2	0.2159	0.0490
T7	75 - 55	1.723	2	0.1674	0.0419
T8	55 - 40	1.016	2	0.1229	0.0316
T9	40 - 20	0.576	2	0.0894	0.0206
T10	20 - 0	0.191	2	0.0427	0.0099

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.00	15-ft Triangular Mount	13	9.314	0.3859	0.0971	312212
180.00	Pirod 15' T-Frame Sector Mount (1)	13	8.495	0.3810	0.0802	104071
175.00	DC6-48-60-18-8F Surge Arrestor	13	8.084	0.3775	0.0708	98932
173.00	800 10121	13	7.919	0.3758	0.0665	142455
172.00	Pirod 12' T-Frame Sector Mount (1)	13	7.836	0.3749	0.0643	207179
160.00	Pirod 15' T-Frame Sector Mount (1)	13	6.853	0.3604	0.0512	31893
145.00	Pirod 15' T-Frame Sector Mount (1)	13	5.699	0.3335	0.0541	27645
80.00	GPS	2	1.926	0.1790	0.0439	25394

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	195	Leg	A325N	1.1250	4	3.60	43.74	0.082 ✔	1.333	Bolt Tension
T2	175	Leg	A325N	1.1250	6	7.28	43.74	0.166 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.8750	1	6.57	8.16	0.806 ✔	1.333	Member Bearing
T3	155	Leg	A325N	1.1250	6	13.11	43.74	0.300 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.8750	1	7.56	12.63	0.599 ✔	1.333	Bolt Shear
T4	135	Leg	A325N	1.1250	6	18.89	43.74	0.432 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.8750	1	7.10	10.88	0.653 ✔	1.333	Member Bearing
T5	115	Leg	A325N	1.1250	8	17.95	43.74	0.410 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	7.43	16.49	0.450 ✔	1.333	Bolt Shear
T6	95	Leg	A325N	1.1250	8	21.48	43.74	0.491 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	8.01	15.86	0.505 ✔	1.333	Member Bearing
T7	75	Leg	A325N	1.2500	8	24.86	54.00	0.460 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	8.74	12.69	0.689 ✔	1.333	Member Bearing
T8	55	Leg	A325N	1.2500	8	27.44	54.00	0.508 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	9.10	12.69	0.717 ✔	1.333	Member Bearing
T9	40	Leg	A325N	1.2500	8	30.48	54.00	0.564 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	11.02	16.49	0.668 ✔	1.333	Bolt Shear
T10	20	Leg	A449	1.3750	8	33.50	51.45	0.651 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	13.89	16.49	0.842 ✔	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	195 - 175	3	20.01	3.33	53.4 K=1.00	23.819	7.0686	-18.49	168.37	0.110 ✔
T2	175 - 155	3 3/4	20.03	6.68	85.5 K=1.00	17.895	11.0447	-52.20	197.65	0.264 ✔
T3	155 - 135	4	20.03	6.68	80.1 K=1.00	18.986	12.5664	-92.47	238.58	0.388 ✔
T4	135 - 115	4 1/4	20.03	6.68	75.4 K=1.00	19.913	14.1863	-131.41	282.48	0.465 ✔
T5	115 - 95	4 1/4	20.03	6.68	75.4	19.913	14.1863	-166.53	282.48	0.590

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
					K=1.00					✔
T6	95 - 75	4 1/2	20.03	6.68	71.2 K=1.00	20.709	15.9043	-199.93	329.36	0.607 ✔
T7	75 - 55	4 3/4	20.03	6.68	67.5 K=1.00	21.400	17.7205	-232.49	379.22	0.613 ✔
T8	55 - 40	4 3/4	15.03	5.01	50.6 K=1.00	24.255	17.7205	-258.19	429.82	0.601 ✔
T9	40 - 20	4 3/4	20.03	6.68	67.5 K=1.00	21.400	17.7205	-289.21	379.22	0.763 ✔
T10	20 - 0	5	20.03	6.68	64.1 K=1.00	22.004	19.6350	-321.30	432.05	0.744 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	195 - 175	1 1/4	6.79	3.30	95.0 K=0.75	13.596	1.2272	-4.14	16.68	0.248 ✔
T2	175 - 155	L2 1/2x2 1/2x3/16	10.16	4.93	119.6 K=1.00	10.340	0.9020	-6.66	9.33	0.714 ✔
T3	155 - 135	L2 1/2x2 1/2x5/16	11.74	5.71	140.0 K=1.00	7.618	1.4600	-7.56	11.12	0.680 ✔
T4	135 - 115	L3x3x1/4	13.44	6.54	132.6 K=1.00	8.496	1.4400	-6.93	12.23	0.567 ✔
T5	115 - 95	L3x3x3/8	15.21	7.40	151.4 K=1.00	6.517	2.1100	-7.43	13.75	0.540 ✔
T6	95 - 75	L3 1/2x3 1/2x5/16	17.03	8.30	144.4 K=1.00	7.161	2.0900	-8.07	14.97	0.539 ✔
T7	75 - 55	L4x4x1/4	18.88	9.22	139.2 K=1.00	7.709	1.9400	-8.84	14.95	0.591 ✔
T8	55 - 40	L4x4x1/4	19.89	9.68	146.1 K=1.00	6.992	1.9400	-9.14	13.56	0.674 ✔
T9	40 - 20	L4x4x5/16	22.19	10.88	165.0 K=1.00	5.485	2.4000	-11.02	13.16	0.837 ✔
T10	20 - 0	L4x4x3/8	23.47	11.50	175.2 K=1.00	4.866	2.8600	-13.22	13.92	0.950 ✔

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	195 - 175	1 1/4	5.00	4.75	127.7 K=0.70	9.160	1.2272	-0.12	11.24	0.011 ✔

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	195 - 175	1 1/4	6.00	5.75	154.6 K=0.70	6.251	1.2272	-0.39	7.67	0.050 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	195 - 175	3	20.01	3.33	53.4	30.000	7.0686	14.41	212.06	0.068 ✔
T2	175 - 155	3 3/4	20.03	6.68	85.5	30.000	11.0447	43.65	331.34	0.132 ✔
T3	155 - 135	4	20.03	6.68	80.1	30.000	12.5664	78.69	376.99	0.209 ✔
T4	135 - 115	4 1/4	20.03	6.68	75.4	30.000	14.1863	113.36	425.59	0.266 ✔
T5	115 - 95	4 1/4	20.03	6.68	75.4	30.000	14.1863	143.57	425.59	0.337 ✔
T6	95 - 75	4 1/2	20.03	6.68	71.2	30.000	15.9043	171.87	477.13	0.360 ✔
T7	75 - 55	4 3/4	20.03	6.68	67.5	30.000	17.7205	198.87	531.62	0.374 ✔
T8	55 - 40	4 3/4	15.03	5.01	50.6	30.000	17.7205	219.48	531.62	0.413 ✔
T9	40 - 20	4 3/4	20.03	6.68	67.5	30.000	17.7205	243.80	531.62	0.459 ✔
T10	20 - 0	5	20.03	6.68	64.1	30.000	19.6350	268.02	589.05	0.455 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	195 - 175	1 1/4	6.79	3.30	126.7	21.600	1.2272	4.11	26.51	0.155 ✔
T2	175 - 155	L2 1/2x2 1/2x3/16	10.16	4.93	78.6	21.600	0.9020	6.57	19.48	0.337 ✔
T3	155 - 135	L2 1/2x2 1/2x5/16	11.74	5.71	92.6	21.600	1.4600	7.51	31.54	0.238 ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T4	135 - 115	L3x3x1/4	12.30	5.98	79.3	21.600	1.4400	7.10	31.10	0.228 ✔
T5	115 - 95	L3x3x3/8	15.21	7.40	99.8	21.600	2.1100	7.33	45.58	0.161 ✔
T6	95 - 75	L3 1/2x3 1/2x5/16	17.03	8.30	94.3	21.600	2.0900	8.01	45.14	0.178 ✔
T7	75 - 55	L4x4x1/4	18.88	9.22	90.3	21.600	1.9400	8.74	41.90	0.209 ✔
T8	55 - 40	L4x4x1/4	19.89	9.68	94.7	21.600	1.9400	9.10	41.90	0.217 ✔
T9	40 - 20	L4x4x5/16	21.56	10.56	104.0	21.600	2.4000	10.21	51.84	0.197 ✔
T10	20 - 0	L4x4x3/8	24.11	11.82	117.2	21.600	2.8600	13.89	61.78	0.225 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	195 - 175	1 1/4	5.00	4.75	182.4	21.600	1.2272	0.10	26.51	0.004 ✔

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 K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	195 - 175	1 1/4	6.00	5.75	220.8	21.600	1.2272	0.36	26.51	0.013 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	195 - 175	Leg	3	1	-18.49	224.43	8.2	Pass
T2	175 - 155	Leg	3 3/4	46	-52.20	263.47	19.8	Pass
T3	155 - 135	Leg	4	67	-92.47	318.03	29.1	Pass
T4	135 - 115	Leg	4 1/4	88	-131.41	376.55	34.9	Pass
T5	115 - 95	Leg	4 1/4	109	-166.53	376.55	44.2	Pass
T6	95 - 75	Leg	4 1/2	130	-199.93	439.04	45.5	Pass
T7	75 - 55	Leg	4 3/4	151	-232.49	505.50	46.0	Pass
T8	55 - 40	Leg	4 3/4	174	-258.19	572.94	45.1	Pass
T9	40 - 20	Leg	4 3/4	195	-289.21	505.50	57.2	Pass
T10	20 - 0	Leg	5	216	-321.30	575.93	55.8	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	195 - 175	Diagonal	1 1/4	11	-4.14	22.24	18.6	Pass
T2	175 - 155	Diagonal	L2 1/2x2 1/2x3/16	50	-6.66	12.43	53.5	Pass
							60.5 (b)	
T3	155 - 135	Diagonal	L2 1/2x2 1/2x5/16	71	-7.56	14.83	51.0	Pass
T4	135 - 115	Diagonal	L3x3x1/4	95	-6.93	16.31	42.5	Pass
							49.0 (b)	
T5	115 - 95	Diagonal	L3x3x3/8	116	-7.43	18.33	40.5	Pass
T6	95 - 75	Diagonal	L3 1/2x3 1/2x5/16	137	-8.07	19.95	40.5	Pass
T7	75 - 55	Diagonal	L4x4x1/4	158	-8.84	19.93	44.4	Pass
							51.7 (b)	
T8	55 - 40	Diagonal	L4x4x1/4	179	-9.14	18.08	50.6	Pass
							53.8 (b)	
T9	40 - 20	Diagonal	L4x4x5/16	201	-11.02	17.55	62.8	Pass
T10	20 - 0	Diagonal	L4x4x3/8	228	-13.22	18.55	71.3	Pass
T1	195 - 175	Top Girt	1 1/4	6	-0.12	14.98	0.8	Pass
T1	195 - 175	Bottom Girt	1 1/4	9	-0.39	10.23	3.8	Pass
							Summary	
						Leg (T9)	57.2	Pass
						Diagonal (T10)	71.3	Pass
						Top Girt (T1)	0.8	Pass
						Bottom Girt (T1)	3.8	Pass
						Bolt Checks	63.2	Pass
						RATING =	**71.3**	**Pass**

CENTEK engineering
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Subject: FOUNDATION ANALYSIS

Location: Northford, CT

Rev. 0: 2/24/14

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 14048.001

Mat Foundation Analysis:

Input Data:

Tower Data

Overturning Moment =	$OM := 6176 \cdot ft \cdot kips$	(User Input from tnxTower)	
Shear Force =	$S_t := 55 \cdot kip$	(User Input from tnxTower)	
Axial Force =	$WT_t := 68 \cdot kip$	(User Input from tnxTower)	
Max Compression Force =	$C_t := 326 \cdot kip$	(User Input from tnxTower)	
Max Uplift Force =	$U_t := 271 \cdot kip$	(User Input from tnxTower)	
Tower Height =	$H_t := 195 \cdot ft$	(User Input)	
Tower Width =	$W_t := 23.5 \cdot ft$	(User Input)	
Tower Position on Foundation (1=offset, 2=centered) =	$Pos_t := 2$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 6.0 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 2.5 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 34.0 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 4.0 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)	
Diameter of Pier =	$d_p := 3 \cdot ft$	(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 =	$\Phi_s := 30 \cdot deg$	(User Input)	
Allowable Soil Bearing Capacity =	$q_s := 6000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 120 \cdot pcf$	(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)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Pier Reinforcement:

Bar Size =	$BS_{pier} := 8$	(User Input)	
Bar Diameter =	$d_{bpier} := 1.0 \cdot in$	(User Input)	
Number of Bars =	$NB_{pier} := 20$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{pier} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{Tie} := 3 \cdot in$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 8$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 1.0 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 34$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 8$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 1.0 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 34$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area =

$$A_{bpier} := \frac{\pi \cdot d_{bpier}^2}{4} = 0.785 \cdot in^2$$

Pad Top Reinforcement Bar Area =

$$A_{btop} := \frac{\pi \cdot d_{btop}^2}{4} = 0.785 \cdot in^2$$

Pad Bottom Reinforcement Bar Area =

$$A_{bbot} := \frac{\pi \cdot d_{bbot}^2}{4} = 0.785 \cdot in^2$$

Coefficient of Lateral Soil Pressure =

$$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$$

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 = $\gamma_s := if(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}) = 120 \cdot pcf$

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

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 1.26 \cdot ksf$

$P_{top} := if[n < (D_f - T_f), P_{pt}, P_{pn}] = 1.26 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 2.16 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 1.71 \cdot ksf$

$T_p := if[n < (D_f - T_f), T_f, (D_f - n)] = 2.5$

$A_p := W_f \cdot T_p = 85$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 145.35 \cdot kip$

Weight of Concrete Pad = $WT_{pad} := \left(W_f^2 \cdot T_f\right) \cdot \gamma_c = 433.5 \cdot kip$

Weight of Concrete Piers = $WT_{pier} := 3 \cdot \left[\left(L_p \cdot \frac{d_p^2 \cdot \pi}{4}\right) \cdot \gamma_c\right] = 12.723 \cdot kip$

Total Weight of Concrete = $WT_c := WT_{pad} + WT_{pier} = 446 \cdot kip$

Weight of Soil Above Footing = $WT_{s1} := \left(W_f^2 - 3 \cdot \frac{d_p^2 \cdot \pi}{4}\right) \cdot (L_p - L_{pag}) \cdot \gamma_s = 477 \cdot kip$

Weight of Soil Back Face = $WT_{s2} := \left[\frac{\tan(\Phi_s) \cdot (D_f)^2}{2} \cdot W_f\right] \cdot \gamma_s = 42 \cdot kip$

Tower Offset = $X_{t1} := \left[\frac{W_f}{2} - \frac{(W_t \cdot \cos(30 \cdot deg))}{2}\right]$ $X_{t2} := \frac{W_f}{2} - \frac{(W_t \cdot \cos(30 \cdot deg))}{3}$

$X_t := if(Pos_t, X_{t1}, X_{t2}) = 6.824$

$X_{off} := \frac{W_f}{2} - \left[\frac{(W_t \cdot \cos(30 \cdot deg))}{3} + X_t\right] = 3.392$

Resisting Moment = $M_r := (WT_c + WT_{s1}) \cdot \frac{W_f}{2} + S_u \cdot \frac{T_f}{3} + WT_{s2} \cdot \left[W_f + \frac{\tan(\Phi_s) \cdot (L_p - L_{pag})}{3}\right] = 17280 \cdot ki$

Overturning Moment = $M_{ot} := OM + S_t \cdot (L_p + T_f) = 6533.5 \cdot kip \cdot ft$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 2.64$

Factor of Safety Required = $FS_{req} := 2$

$OverTurning\_Moment\_Check := if(FS \geq FS_{req}, "Okay", "No Good")$

$OverTurning\_Moment\_Check = "Okay"$

Bearing Pressure Caused by Footing:

Total Load = $Load_{tot} := WT_c + WT_{s1} + WT_t = 991 \cdot kip$

Area of the Mat = $A_{mat} := W_f^{\,2} = 1.156 \times 10^{3}$

Section Modulus of Mat = $S := \frac{W_f^{\,3}}{6} = 6550.67 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{Load_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 1.855 \cdot ksf$

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

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat = $P_{min} := \frac{Load_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.14 \cdot ksf$

$Min\_Pressure\_Check := if\left[\left(P_{min} \geq 0\right) \cdot \left(P_{min} < q_s\right), "Okay", "No Good"\right]$

Min_Pressure_Check = "No Good"

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 10.536$

Distance to Kern = $X_k := \frac{W_f}{6} = 5.667$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity = $e := \frac{M_{ot}}{Load_{tot}} = 6.594$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot Load_{tot}}{3 \cdot W_f \left(\frac{W_f}{2} - e\right)} = 1.867 \cdot ksf$

$q_{adj} := if\left(P_{min} < 0, P_a, P_{max}\right) = 1.867 \cdot ksf$

$Pressure\_Check := if\left(q_{adj} < q_s, "Okay", "No Good"\right)$

Pressure_Check = "Okay"

Network Modernization RFDS v3.0

T-Mobile

Site ID	CT11230A	Latitude	41.36944
		Longitude	-72.81028
Site Name	North Haven/ Rt 17	Site Type	Structure (Non-Building)
Address	88 Parsonage Hill Rd., North Branford, CONNECTICUT, 06472	Site Class	Self Support Tower
Market	CONNECTICUT	Landlord	Ochenkowski Tower LLC

Configuration
2C

Approvals	
Market RF	
Market Development	

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

Site Information

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

- [ ] Relocate cabinet
- [ ] Add cabinet
- [ ] Swap cabinet
- [ ] Remove cabinet
- [X] Make cabinet dark

Scope of Work

Keep existing 3106 UMTS cabinet, replace CBU and RAX/TX boards with DUW30. Turn off and keep in place existing S8000 GSM cabinets. Add another DUW30, DUL20 and DUG20 and keep 6 RU22 B4 radios in the existing 3106 cabinet. Install 3 E/// TMAs and remove 6 TMAs. Install 1 power upgrade kit 6131.

ALPHA - Scope of Work

- [ ] Add new mount
- [ ] Relocate antenna
- [ ] Add antenna
- [X] Swap antenna
- [ ] Remove antenna
- [ ] Add TMA
- [X] Swap TMA
- [X] Remove TMA

- [ ] Add RRU
- [ ] Swap existing RRU
- [ ] Remove RRU
- [X] Consolidate coax cables
- [ ] Add coax cables
- [X] Add fiber cables
- [ ] Add hybrid combiner
- [ ] Add filter combiner

Swap existing passive antenna at position 1 with AIR21 B2A|B4P. Relocate existing UMTS dd B4 TMA at position 1/right and remove/disconnect obsolete GSM TMAs. Consolidate 2 existing coax lines at position 1/left for LMU. Consolidate 2 existing coax lines at position 1/right for AWS UMTS. Connect DATA (CPRI) active ports of AIR21 B2A/B4P antenna to DUG20 and PCS UMTS DUW30 via fiber lines. Connect RF passive port of AIR21 B2A/B4P antenna to in cabinet radio/filter units via coax lines. Swap existing passive antenna at position 4 with AIR21 B4A|B2P. Connect DATA 1 (CPRI) active port of AIR21 B4A/B2P antenna to DUL20 via fiber line. Connect spare (yellow) fiber jumper to DATA 2 (CPRI) active port of AIR B4A/B2P antenna to allow future implementation of AWS UMTS over fiber. Install 1 E/// TMA and remove 2 TMAs. .

BETA - Scope of Work

- [ ] Add new mount
- [ ] Relocate antenna
- [ ] Add antenna
- [X] Swap antenna
- [ ] Remove antenna
- [ ] Add TMA
- [X] Swap TMA
- [X] Remove TMA

- [ ] Add RRU
- [ ] Swap existing RRU
- [ ] Remove RRU
- [X] Consolidate coax cables
- [ ] Add coax cables
- [X] Add fiber cables
- [ ] Add hybrid combiner
- [ ] Add filter combiner

Swap existing passive antenna at position 1 with AIR21 B2A|B4P. Relocate existing UMTS dd B4 TMA at position 1/right and remove/disconnect obsolete GSM TMAs. Consolidate 2 existing coax lines at position 1/left for LMU. Consolidate 2 existing coax lines at position 1/right for AWS UMTS. Connect DATA (CPRI) active ports of AIR21 B2A/B4P antenna to DUG20 and PCS UMTS DUW30 via fiber lines. Connect RF passive port of AIR21 B2A/B4P antenna to in cabinet radio/filter units via coax lines. Swap existing passive antenna at position 4 with AIR21 B4A|B2P. Connect DATA 1 (CPRI) active port of AIR21 B4A/B2P antenna to DUL20 via fiber line. Connect spare (yellow) fiber jumper to DATA 2 (CPRI) active port of AIR B4A/B2P antenna to allow future implementation of AWS UMTS over fiber. Install 1 E/// TMA and remove 2 TMAs. .

GAMMA - Scope of Work

- [ ] Add new mount
- [ ] Relocate antenna
- [ ] Add antenna
- [X] Swap antenna
- [ ] Remove antenna
- [ ] Add TMA
- [X] Swap TMA
- [X] Remove TMA

- [ ] Add RRU
- [ ] Swap existing RRU
- [ ] Remove RRU
- [X] Consolidate coax cables
- [ ] Add coax cables
- [X] Add fiber cables
- [ ] Add hybrid combiner
- [ ] Add filter combiner

Swap existing passive antenna at position 1 with AIR21 B2A|B4P. Relocate existing UMTS dd B4 TMA at position 1/right and remove/disconnect obsolete GSM TMAs. Consolidate 2 existing coax lines at position 1/left for LMU. Consolidate 2 existing coax lines at position 1/right for AWS UMTS. Connect DATA (CPRI) active ports of AIR21 B2A/B4P antenna to DUG20 and PCS UMTS DUW30 via fiber lines. Connect RF passive port of AIR21 B2A/B4P antenna to in cabinet radio/filter units via coax lines. Swap existing passive antenna at position 4 with AIR21 B4A|B2P. Connect DATA 1 (CPRI) active port of AIR21 B4A/B2P antenna to DUL20 via fiber line. Connect spare (yellow) fiber jumper to DATA 2 (CPRI) active port of AIR B4A/B2P antenna to allow future implementation of AWS UMTS over fiber. Install 1 E/// TMA and remove 2 TMAs. .

DELTA - Scope of Work

- [ ] Add new mount
- [ ] Relocate antenna
- [ ] Add antenna
- [ ] Swap antenna
- [ ] Remove antenna
- [ ] Add TMA
- [ ] Swap TMA
- [ ] Remove TMA

- [ ] Add RRU
- [ ] Swap existing RRU
- [ ] Remove RRU
- [ ] Consolidate coax cables
- [ ] Add coax cables
- [ ] Add fiber cables
- [ ] Add hybrid combiner
- [ ] Add filter combiner

Network Modernization RFDS v3.0

T-Mobile

Site ID	CT11230A	Latitude	41.36944
		Longitude	-72.81028
Site Name	North Haven/ Rt 17	Site Type	Structure (Non-Building)
Address	88 Parsonage Hill Rd., North Branford, CONNECTICUT, 06472	Site Class	Self Support Tower
Market	CONNECTICUT	Landlord	Ochenkowski Tower LLC

Configuration
2C

Approvals	
Market RF	
Market Development	

RFDS Revision	
RFDS Final	

Date: 01/13/2014

ALPHA (view from behind)

Existing Configuration					Proposed Configuration			
X	X	X	X	Mount	X	X	X	X
GSM B2 P Dual pole RR90-17-02DP EMS 180 30 No 2			UMTS B4 P Dual pole APX16DWV-16DWV-S RFS 180 30 Yes 2	Technology Band Active/Passive Ant. Type Ant. Model Ant. Vendor Ant. Height Azimuth RET deployed E-Tilt M-Tilt	GSM/UMTS B2 / UMTS B4 A / P Quad pole AIR21 B2A/B4P Ericsson 180 30 Yes 2 / Yes 2			LTE B4 A Quad pole AIR21 B4A/B2P Ericsson 180 30 Yes 2
1 dd B2			1 dd B4	TMA # TMA Type	1 dd B4			
				RRU # RRU Type				
2 1 5/8" 200			2 1 5/8" 200	Used Coax # Coax Type Coax Length (ft)	2 (LMU) / 2 1 5/8" / 1 5/8" 200			2
				Fiber (CPRI) #	2			
				Splitter #				
				Combiner # Combiner Type				

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

Scope of work

Swap existing passive antenna at position 1 with AIR21 B2A|B4P. Relocate existing UMTS dd B4 TMA at position 1/right and remove/disconnect obsolete GSM TMAs. Consolidate 2 existing coax lines at position 1/left for LMU. Consolidate 2 existing coax lines at position 1/right for AWS UMTS. Connect DATA (CPRI) active ports of AIR21 B2A/B4P antenna to DUG20 and PCS UMTS DUW30 via fiber lines. Connect RF passive port of AIR21 B2A/B4P antenna to in cabinet radio/filter units via coax lines. Swap existing passive antenna at position 4 with AIR21 B4A|B2P. Connect DATA 1 (CPRI) active port of AIR21 B4A/B2P antenna to DUL20 via fiber line. Connect spare (yellow) fiber jumper to DATA 2 (CPRI) active port of AIR B4A/B2P antenna to allow future implementation of AWS UMTS over fiber. Install 1 E/// TMA and remove 2 TMAs. .

BETA (view from behind)

Existing Configuration					Proposed Configuration			
X	X	X	X	Mount	X	X	X	X
GSM B2 P Dual pole RR90-17-02DP EMS 180 150 No 2			UMTS B4 P Dual pole APX16DWV-16DWV-S RFS 180 150 Yes 2	Technology Band Active/Passive Ant. Type Ant. Model Ant. Vendor Ant. Height Azimuth RET deployed E-Tilt M-Tilt	GSM/UMTS B2 / UMTS B4 A / P Quad pole AIR21 B2A/B4P Ericsson 180 150 Yes 2 / Yes 2			LTE B4 A Quad pole AIR21 B4A/B2P Ericsson 180 150 Yes 2
1 dd B2			1 dd B4	TMA # TMA Type	1 dd B4			
				RRU # RRU Type				
2 1 5/8" 200			2 1 5/8" 200	Used Coax # Coax Type Coax Length (ft)	2 (LMU) / 2 1 5/8" / 1 5/8" 200			2
				Fiber (CPRI) #	2			
				Splitter #				
				Combiner # Combiner Type				

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

Scope of work

Swap existing passive antenna at position 1 with AIR21 B2A|B4P. Relocate existing UMTS dd B4 TMA at position 1/right and remove/disconnect obsolete GSM TMAs. Consolidate 2 existing coax lines at position 1/left for LMU. Consolidate 2 existing coax lines at position 1/right for AWS UMTS. Connect DATA (CPRI) active ports of AIR21 B2A/B4P antenna to DUG20 and PCS UMTS DUW30 via fiber lines. Connect RF passive port of AIR21 B2A/B4P antenna to in cabinet radio/filter units via coax lines. Swap existing passive antenna at position 4 with AIR21 B4A|B2P. Connect DATA 1 (CPRI) active port of AIR21 B4A/B2P antenna to DUL20 via fiber line. Connect spare (yellow) fiber jumper to DATA 2 (CPRI) active port of AIR B4A/B2P antenna to allow future implementation of AWS UMTS over fiber. Install 1 E/// TMA and remove 2 TMAs. .

Network Modernization RFDS v3.0

T-Mobile

Site ID	CT11230A	Latitude	41.36944
		Longitude	-72.81028
Site Name	North Haven/ Rt 17	Site Type	Structure (Non-Building)
Address	88 Parsonage Hill Rd., North Branford, CONNECTICUT, 06472	Site Class	Self Support Tower
Market	CONNECTICUT	Landlord	Ochenkowski Tower LLC

Configuration
2C

Approvals	
Market RF	
Market Development	

RFDS Revision	
RFDS Final	

Date: 01/13/2014

GAMMA (view from behind)

Existing Configuration					Proposed Configuration			
X	X	X	X		X	X	X	X
GSM			UMTS	Technology	GSM/UMTS / UMTS			LTE
B2			B4	Band	B2 / B4			B4
P			P	Active/Passive	A / P			A
Dual pole			Dual pole	Ant. Type	Quad pole			Quad pole
RR90-17-02DP			APX16DWV-16DWV-S	Ant. Model	AIR21 B2A/B4P			AIR21 B4A/B2P
EMS			RFS	Ant. Vendor	Ericsson			Ericsson
180			180	Ant. Height	180			180
270			270	Azimuth	270			270
No			Yes	RET deployed	Yes / Yes			Yes
2			2	E-Tilt	2 / 2			2
			4	M-Tilt	4 / 4			4
1			1	TMA #	/ 1			
dd B2			dd B4	TMA Type	/ dd B4			
				RRU #				
				RRU Type				
2			2	Used Coax #	2 (LMU) / 2			
1 5/8"			1 5/8"	Coax Type	1 5/8" / 1 5/8"			
200			200	Coax Length (ft)	200			
				Fiber (CPRI) #	2			2
				Splitter #				
				Combiner #				
				Combiner Type				

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

Scope of work

Swap existing passive antenna at position 1 with AIR21 B2A|B4P. Relocate existing UMTS dd B4 TMA at position 1/right and remove/disconnect obsolete GSM TMAs. Consolidate 2 existing coax lines at position 1/left for LMU. Consolidate 2 existing coax lines at position 1/right for AWS UMTS. Connect DATA (CPRI) active ports of AIR21 B2A/B4P antenna to DUG20 and PCS UMTS DUW30 via fiber lines. Connect RF passive port of AIR21 B2A/B4P antenna to in cabinet radio/filter units via coax lines. Swap existing passive antenna at position 4 with AIR21 B4A|B2P. Connect DATA 1 (CPRI) active port of AIR21 B4A/B2P antenna to DUL20 via fiber line. Connect spare (yellow) fiber jumper to DATA 2 (CPRI) active port of AIR B4A/B2P antenna to allow future implementation of AWS UMTS over fiber. Install 1 E/// TMA and remove 2 TMAs. .

DELTA (view from behind)

Existing Configuration					Proposed Configuration			
				Technology				
				Band				
				Active/Passive				
				Ant. Type				
				Ant. Model				
				Ant. Vendor				
				Ant. Height				
				Azimuth				
				RET deployed				
				E-Tilt				
				M-Tilt				
				TMA #				
				TMA Type				
				RRU #				
				RRU Type				
				Used Coax #				
				Coax Type				
				Coax Length (ft)				
				Fiber (CPRI) #				
				Splitter #				
				Combiner #				
				Combiner Type				

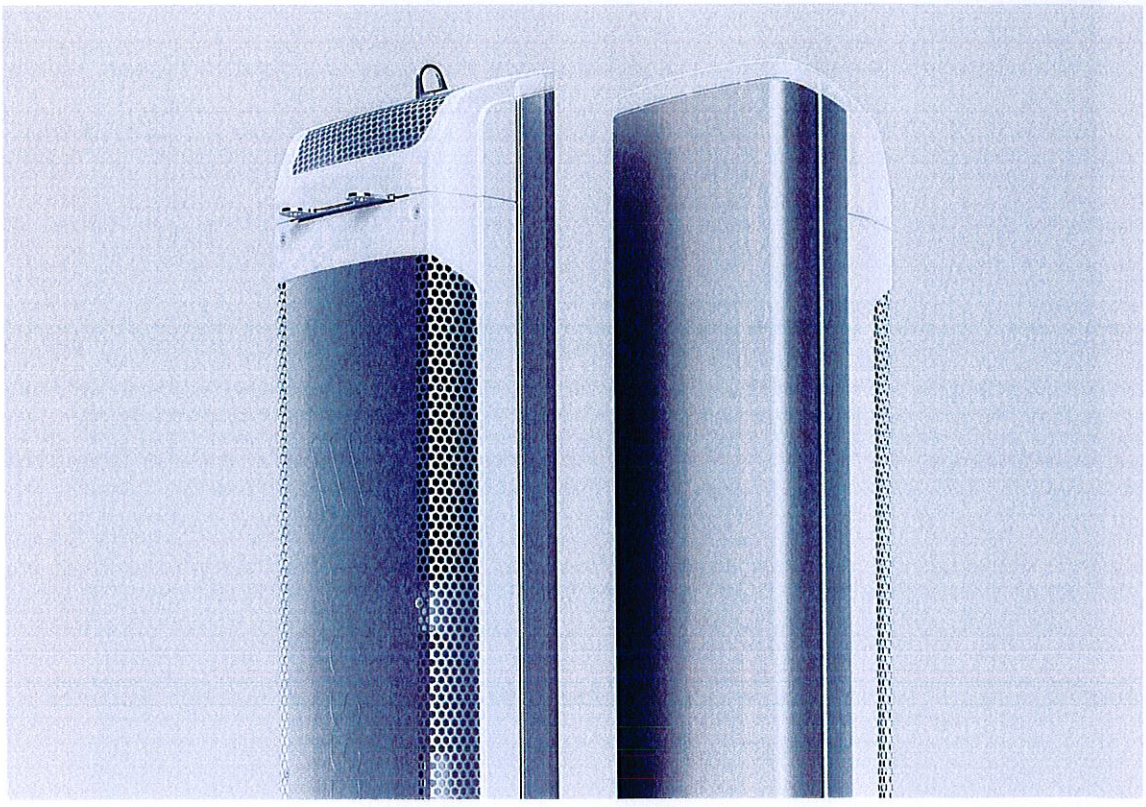
	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

ERICSSON

DATA-SHEET FOR

AIR 21, 1.3 M, B2A B4P



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

ANTENNA-INTEGRATED RADIO

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

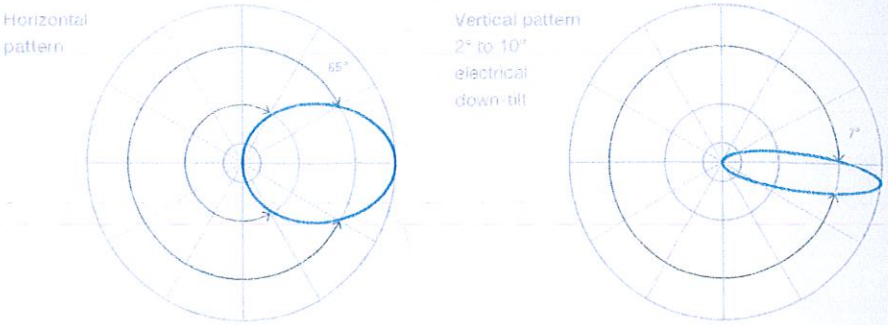
The Antenna-Integrated Radio (AIR) is a single tower-mounted unit that can replace the antenna/s and radio for one sector. Additional electronics such as ASC? and a RET Actuator and control are also included. A passive antenna function for an extra band is optional. (The option has to be specified when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

Digital Units (DUs) from Ericsson's RBS 6000 family provide the baseband function and support GSM, WCDMA and LTE.

One or two DUs, depending on capacity and the standards to be supported, are needed for a three-sector site with AIR units.

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

Figure 4
Antenna
Characteristics



Technical Specification

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

EXHIBIT C

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

T-Mobile Existing Facility

Site ID: CT11230A

North Haven / Route 17

88 Parsonage Hill Road
North Branford, CT 06472

March 12, 2014

EBI PROJECT NUMBER: 62141310

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

EBI Consulting
environmental | engineering | due diligence

March 12, 2014

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

Re: Emissions Values for Site: **CT11230A - North Haven Route 17**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at 88 Parsonage Hill Road, North Branford, CT, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 88 Parsonage Hill Road, North Branford, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, the actual antenna pattern gain value in the direction of the sample area was used. For this report the sample point is a 6 foot person standing at the base of the tower

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

1) 2 GSM channels (1935.000 MHz—to 1945.000 MHz / 1980.000 MHz—to 1985.000 MHz) were considered for each sector of the proposed installation.
2) 2 UMTS channels (2110.000 to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation.
3) 2 LTE channels (2110.000 to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation.
4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
5) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
6) The antenna used in this modeling is the Ericsson AIR21 for LTE, UMTS and GSM. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.6 dBd gain value at its main lobe. Actual antenna gain values were used for all calculations as per the manufacturers specifications

7) The antenna mounting height centerline of the proposed antennas is **182.5 feet** above ground level (AGL)
8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

Site ID	CT11230A - North Haven Route 17
Site Address	88 Parsonage Hill Road, North Branford, CT 06472
Site Type	Self Support Tower

Sector 1

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	182.5	176.5	None	0	0	48.326044	0.557696	0.05577%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	182.5	176.5	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	182.5	176.5	1-5/8"	0	0	24.163022	0.278848	0.02788%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	182.5	176.5	1-5/8"	0	0	24.163022	0.278848	0.02788%
														Sector total Power Density Value:		0.112%	

Sector 2

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	182.5	176.5	None	0	0	48.326044	0.557696	0.05577%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	182.5	176.5	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	182.5	176.5	1-5/8"	0	0	24.163022	0.278848	0.02788%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	182.5	176.5	1-5/8"	0	0	24.163022	0.278848	0.02788%
														Sector total Power Density Value:		0.112%	

Sector 3

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	182.5	176.5	None	0	0	48.326044	0.557696	0.05577%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	182.5	176.5	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	182.5	176.5	1-5/8"	0	0	24.163022	0.278848	0.02788%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	182.5	176.5	1-5/8"	0	0	24.163022	0.278848	0.02788%
														Sector total Power Density Value:		0.112%	

Site Composite MPE %

Carrier	MPE %
T-Mobile	0.335%
Nextel	2.230%
Motient	4.900%
Sprint	3.430%
AT&T	11.810%
Verizon Wireless	11.370%
MetroPCS	2.110%
Clearwire	1.070%
UI	0.220%
Field Measurements (Clearwire Filing)	2.440%
Total Site MPE %	**39.915%**

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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 T-Mobile facility are **0.335% (0.112% 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 **39.915%** 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 within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803