

November 8, 2016

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

Re: **EM-VER-047-160919 – Cellco Partnership d/b/a Verizon Wireless
232 South Main Street, East Windsor, Connecticut**

Dear Ms. Bachman:

On October 11, 2016, the Siting Council acknowledged receipt of Cellco's notice of intent to modify its existing telecommunications facility at 232 South Main Street in East Windsor, Connecticut. The modifications involved the replacement of antennas and the installation of remote radio heads at the above-referenced facility.

As a condition of the Council's acknowledgement, Cellco was required to provide a copy of the Structural Analysis Report referencing the Rev. G of the Connecticut State Building Code (Structural Standards). The updated Structural Analysis Report referencing Rev. G is attached.

If you have any questions please do not hesitate to contact me.

Sincerely,



Kenneth C. Baldwin

Attachment
Copy to:
Tim Parks

Structural Analysis Report

188-ft Existing ROHN Lattice Tower

*Proposed Verizon Wireless
Antenna Upgrade*

Verizon Site Ref: East Windsor

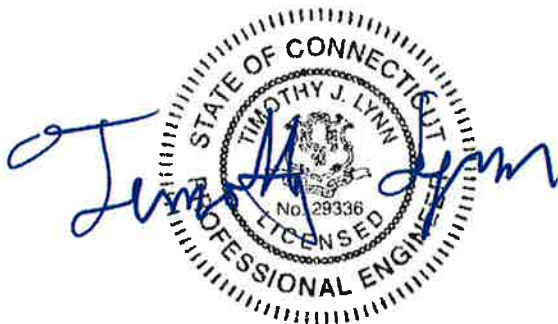
*232 South Main Street
East Windsor, CT*

Centek Project No. 16001.21

~~Date: August 3, 2016~~

~~Rev 1: August 23, 2016~~

Rev 2: November 7, 2016



Prepared for:

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

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Introduction

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

The host tower is a 188-ft, three legged, tapered lattice tower originally designed and manufactured by ROHN dated September 30, 1996. The manufacturer's drawings and calculations were unavailable for use in this report. The tower geometry, structure member sizes and foundation information were all obtained from a structural analysis report prepared by URS Corporation, job no. 36931196.00000 (VZ5-049) dated November 18, 2010.

Antenna and appurtenance information were obtained from a combination of the aforementioned URS structural report, visual verification from grade by Centek personnel on July 25, 2016 and a RF data sheet provided by Verizon Wireless.

The tower is made of ten (10) tapered vertical sections consisting of ASTM A572-50 structural steel pipe legs. Diagonal lateral support bracing consists of ASTM A572-50/A36 structural steel angle shapes. The vertical tower sections are connected by bolted flange plates while the pipe legs and bracing are connected by bolted gusset connections. The width of the tower face is 6.58-ft at the top and 25.04-ft at the base.

Verizon proposes the removal of nine (9) panel antennas and the installation of nine (9) panel antennas, nine (9) remote radio heads and two (2) main distribution boxes on the existing boom gates. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- **AT&T (Existing):**
Antennas: Three (3) Kathrein 800-10121 panel antennas, four (4) Powerwave P65-17-XLH-RR panel antennas, two (2) Andrew SBNH-1D6565C panel antennas, six (6) TMA's, three (3) Ericsson RRUS-11 radio heads and one (1) surge arrestor mounted on three (3) 12-ft boom gates with a RAD center elevation of ± 168 -ft above the existing tower base.
Coax Cables: Twelve (12) 1-5/8" \varnothing coax cables, one (1) fiber trunk and two (2) DC trunks running on a leg/face of the existing tower as specified in Section 3 of this report.
- **T-MOBILE (Existing):**
Antennas: Three (3) RFS APX16DWV-16DWVS panel antennas, six (6) EMS RR90-17-02DP panel antennas and six (6) TMA's mounted on three (3) 13-ft T-Frames with a RAD center elevation of ± 153 -ft above the existing tower base.
Coax Cables: Eighteen (18) 1-5/8" \varnothing coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- **SPRINT (Existing):**
Antennas: Three (3) RFS APXVSPP18 panel antennas and six (6) remote radio heads mounted on three (3) 12-ft boom gates with a RAD center elevation of ±124-ft above the existing tower base.
Coax Cables: Three (3) 1-5/8" Ø fiber cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **VERIZON (Existing to Remain):**
Antennas: Three (3) Antel BXA-70063-6CF panel antennas mounted on three (3) 12-ft boom gates with a RAD center elevation of ±144-ft above the existing tower base.
Coax Cables: Fifteen (15) 1-5/8" Ø coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **VERIZON (Existing to Remove):**
Antennas: Six (6) Antel WPA-80090-4CF panel antennas, three (3) Decibel 948F85T2E-M panel antennas and six (6) RFS FD9R6004-2C/3L diplexers mounted on three (3) 12-ft boom gates with a RAD center elevation of ±144-ft above the existing tower base.
- **VERIZON (PROPOSED):**
Antennas: **Nine (9) Andrew SBNHH-1D65B panel antennas, three (3) Alcatel-Lucent B13 RRH4x30-LTE remote radio heads, three (3) Alcatel-Lucent RRH4x45/2x90-AWS remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads and two (2) RFS DB-T1-6Z-8AB-0Z distribution box mounted on three (3) 12-ft boom gates with a RAD center elevation of ±144-ft above the existing tower base.**
Coax Cables: **Two (2) 1-5/8" Ø fiber cables running on the exterior of the existing tower.**

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- 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 existing coax cables to be installed as indicated in 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, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC¹ and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 1.00" radial ice on the tower structure and its components.

Basic Wind Speed:	Hartford; v = 90-105 mph (3-second gust)	[Annex B of TIA-222-G-2005]
	East Windsor; v = 97 mph (3 second gust)	[Appendix N of the 2016 CT Building Code]
Load Cases:	<u>Load Case 1</u> ; 97 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	[Appendix N of the 2016 CT Building Code]
	<u>Load Case 2</u> ; 50 mph wind speed w/ 1.00" radial ice plus gravity load – used in calculation of tower stresses.	[Annex B of TIA-222-G-2005]

¹ The 2012 International Building Code as amended by the 2016 Connecticut State Building Code (CSBC).

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 4-8 of the TIA 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 **98.7%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T7)	60.00'-80.00'	67.3%	PASS
Diagonal (T10)	0.00'-20.00'	98.7%	PASS

Foundation

The existing foundation consists of three (3) 4.5' square x 12' long reinforced concrete piers on three (3) 11.75' square x 2' thick reinforced concrete pads. Tower legs are connected to the three (3) piers by means of ten (10) 1" diameter ASTM A354 grade BC anchor bolts per leg embedded into the concrete foundation structure.

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	71 kips
	Compression	58 kips
	Moment	7062 kip-ft
Leg	Shear	43 kips
	Uplift	295 kips
	Compression	345 kips

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Compression and Shear	69.9%	PASS

- The foundation was found to be within allowable limits.

Foundation	Design Limit	TIA-222-G Section 9.4 FS ⁽¹⁾	Proposed Loading (FS) ⁽¹⁾	Result
Reinforced Concrete Pad and Pier (3)	Uplift	1.0	1.21	PASS

Note 1: 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 Verizon Wireless. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
 Structural Engineer



Standard Conditions for Furnishing of
Professional Engineering Services on
Existing Structures

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

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an uncorroded 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.

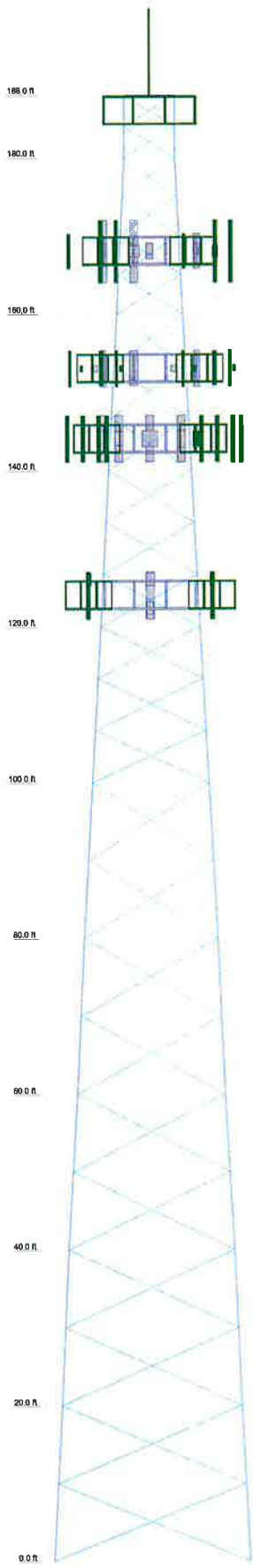
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

TnxTower Features:

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

Section	T0	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14
Legs	ROHN 8 EH	ROHN 8 EH	ROHN 8 EH	ROHN 6 EH	ROHN 6 EH	ROHN 6 EH	ROHN 4 EH	ROHN 3 EH	ROHN 2.5 STD						
Leg Grade															
Diagonals	Lx4x5/16	Lx4x5/16	Lx4x5/16	L3 1/2x2 1/2x1/4	L3 1/2x2 1/2x1/4	L3 1/2x2 1/2x1/4	L3 1/2x2 1/2x1/4	L3 1/2x2 1/2x1/4	L3 1/2x2 1/2x1/4	L3 1/2x2 1/2x1/4	L3 1/2x2 1/2x1/4	L3 1/2x2 1/2x1/4	L3 1/2x2 1/2x1/4	L3 1/2x2 1/2x1/4	L3 1/2x2 1/2x1/4
Diagonal Grade															
Top Chls															
Free Width (ft)	25.04	21.13	18.88	15.92	14.83	13.74	10.91	8.54							
# Parallels @ (ft)		10 @ 10					9 @ 6.86667								
Weight (K)	28.41	5.0	4.3	3.7	3.7	3.4	2.1	1.8	1.5	1.3	1.1	0.9	0.8	0.7	0.6



DESIGNED APPURTENANCE LOADING

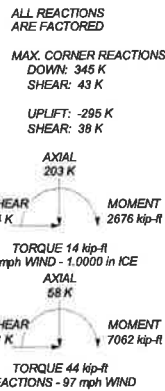
TYPE	ELEVATION	TYPE	ELEVATION
BOD-87010	193.5	13-R T-Frame (T-Mobile - Existing)	153
13' Platform walls	196	13-R T-Frame (T-Mobile - Existing)	153
800-10121 (ATT - Existing)	188	SBNH-1D658 (Verizon - Proposed)	144
PE5-17-XLH-RR (ATT - Existing)	168	SBNH-1D658 (Verizon - Proposed)	144
PE5-17-XLH-RR (ATT - Existing)	168	SBNH-1D658 (Verizon - Proposed)	144
800-10121 (ATT - Existing)	168	BXA-7003MCF (Verizon - Existing)	144
PE5-17-XLH-RR (ATT - Existing)	168	SBNH-1D658 (Verizon - Proposed)	144
PE5-17-XLH-RR (ATT - Existing)	168	SBNH-1D658 (Verizon - Proposed)	144
800-10121 (ATT - Existing)	168	SBNH-1D658 (Verizon - Proposed)	144
SBNH-1D658C (ATT - Existing)	168	SBNH-1D658 (Verizon - Proposed)	144
SBNH-1D658C (ATT - Existing)	168	SBNH-1D658 (Verizon - Proposed)	144
TT19-088P111-001 TMA (ATT - Existing)	168	BXA-7003MCF (Verizon - Existing)	144
RRUS-11 (ATT - Existing)	168	SBNH-1D658 (Verizon - Proposed)	144
DTMABP7819V12A TMA (ATT - Existing)	168	BXA-7003MCF (Verizon - Existing)	144
TT19-088P111-001 TMA (ATT - Existing)	168	RRH260-PCS (Verizon - Proposed)	144
RRUS-11 (ATT - Existing)	168	RRH260-PCS (Verizon - Proposed)	144
DTMABP7819V12A TMA (ATT - Existing)	168	RRH260-PCS (Verizon - Proposed)	144
TT19-088P111-001 TMA (ATT - Existing)	168	RRH4x5/2x90-AWS (Verizon - Proposed)	144
RRUS-11 (ATT - Existing)	168	RRH4x5/2x90-AWS (Verizon - Proposed)	144
DTMABP7819V12A TMA (ATT - Existing)	168	RRH4x5/2x90-AWS (Verizon - Proposed)	144
OC6-48-60-18-8F Surge Arrestor (ATT - Existing)	168	RRH4x5/2x90-AWS (Verizon - Proposed)	144
Rohn 6' x 12' Boom Gate (1) (ATT - Existing)	168	RRH4x5/2x90-AWS (Verizon - Proposed)	144
Rohn 6' x 12' Boom Gate (1) (ATT - Existing)	168	RRH4x5/2x90-AWS (Verizon - Proposed)	144
Rohn 6' x 12' Boom Gate (1) (ATT - Existing)	168	RRH4x5/2x90-AWS (Verizon - Proposed)	144
RR00-17-02DP (T-Mobile - Existing)	153	RRH4x5/2x90-AWS (Verizon - Proposed)	144
APX180WV-180WV-S-E-ACU (T-Mobile - Existing)	153	RRH4x5/2x90-AWS (Verizon - Proposed)	144
RR00-17-02DP (T-Mobile - Existing)	153	RRH4x5/2x90-AWS (Verizon - Proposed)	144
RR00-17-02DP (T-Mobile - Existing)	153	RRH4x5/2x90-AWS (Verizon - Proposed)	144
APX180WV-180WV-S-E-ACU (T-Mobile - Existing)	153	RRH4x5/2x90-AWS (Verizon - Proposed)	144
RR00-17-02DP (T-Mobile - Existing)	153	RRH4x5/2x90-AWS (Verizon - Proposed)	144
RR00-17-02DP (T-Mobile - Existing)	153	RRH4x5/2x90-AWS (Verizon - Proposed)	144
APX180WV-180WV-S-E-ACU (T-Mobile - Existing)	153	RRH4x5/2x90-AWS (Verizon - Proposed)	144
RR00-17-02DP (T-Mobile - Existing)	153	RRH4x5/2x90-AWS (Verizon - Proposed)	144
(2) TMA 10'x6'x4" (T-Mobile - Existing)	153	RRH4x5/2x90-AWS (Verizon - Proposed)	144
(2) TMA 10'x6'x4" (T-Mobile - Existing)	153	RRH4x5/2x90-AWS (Verizon - Proposed)	144
(2) TMA 10'x6'x4" (T-Mobile - Existing)	153	RRH4x5/2x90-AWS (Verizon - Proposed)	144
13-R T-Frame (T-Mobile - Existing)	153	RRH4x5/2x90-AWS (Verizon - Proposed)	144

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 98.7%

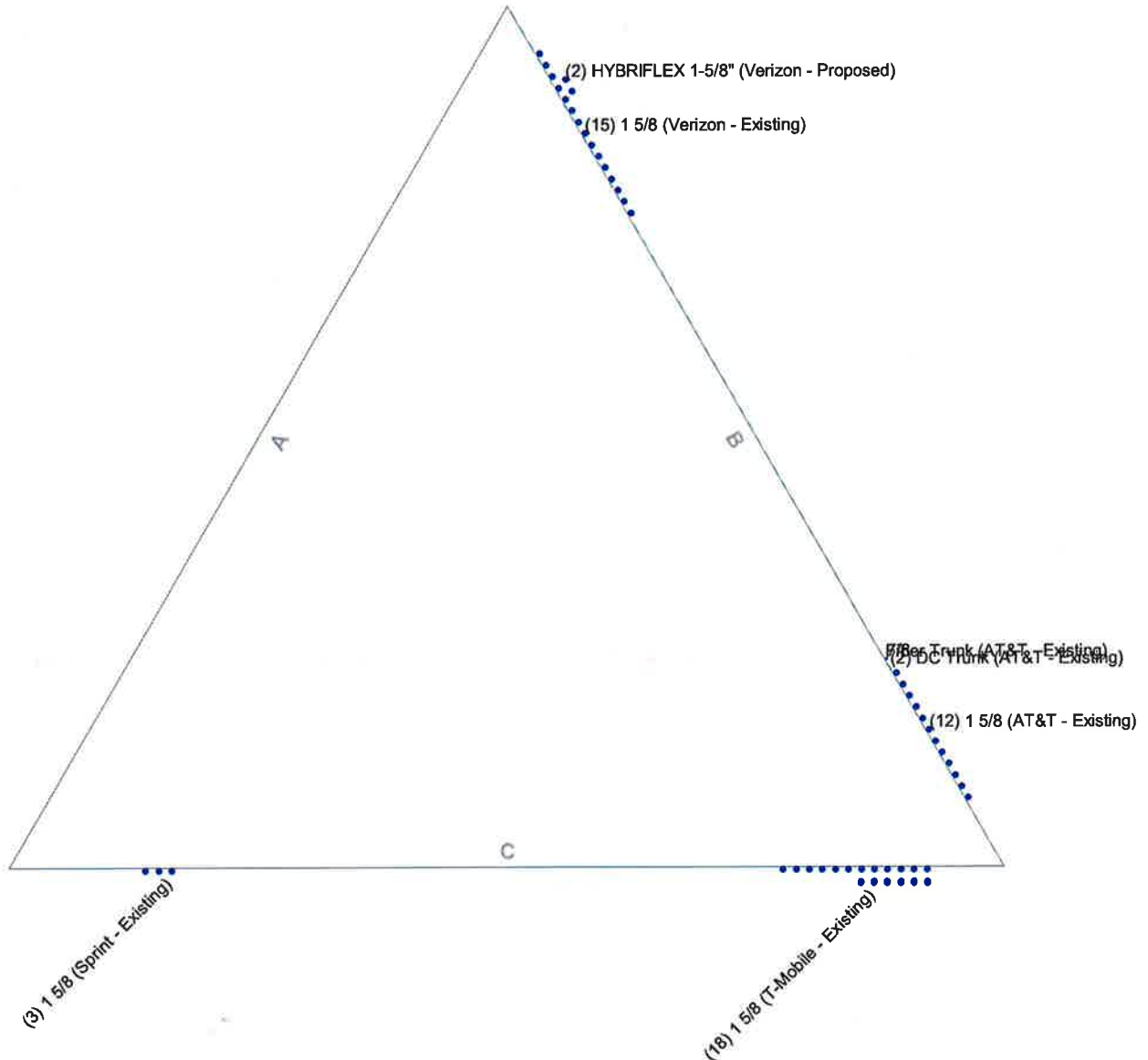


Round

Flat

App In Face

App Out Face



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

Job: 16001.21 - East Windsor		
Project: 188-ft Lattice Tower - 232 South Main St. East Windsor,		
Client: Verizon Wireless	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 11/07/16	Scale: NTS
Path:		Dwg No. E-7

J:\Users\1001001001 - East Windsor CT\Working\Drawings\2016\16001.21 - East Windsor.ctb

0' - 188'

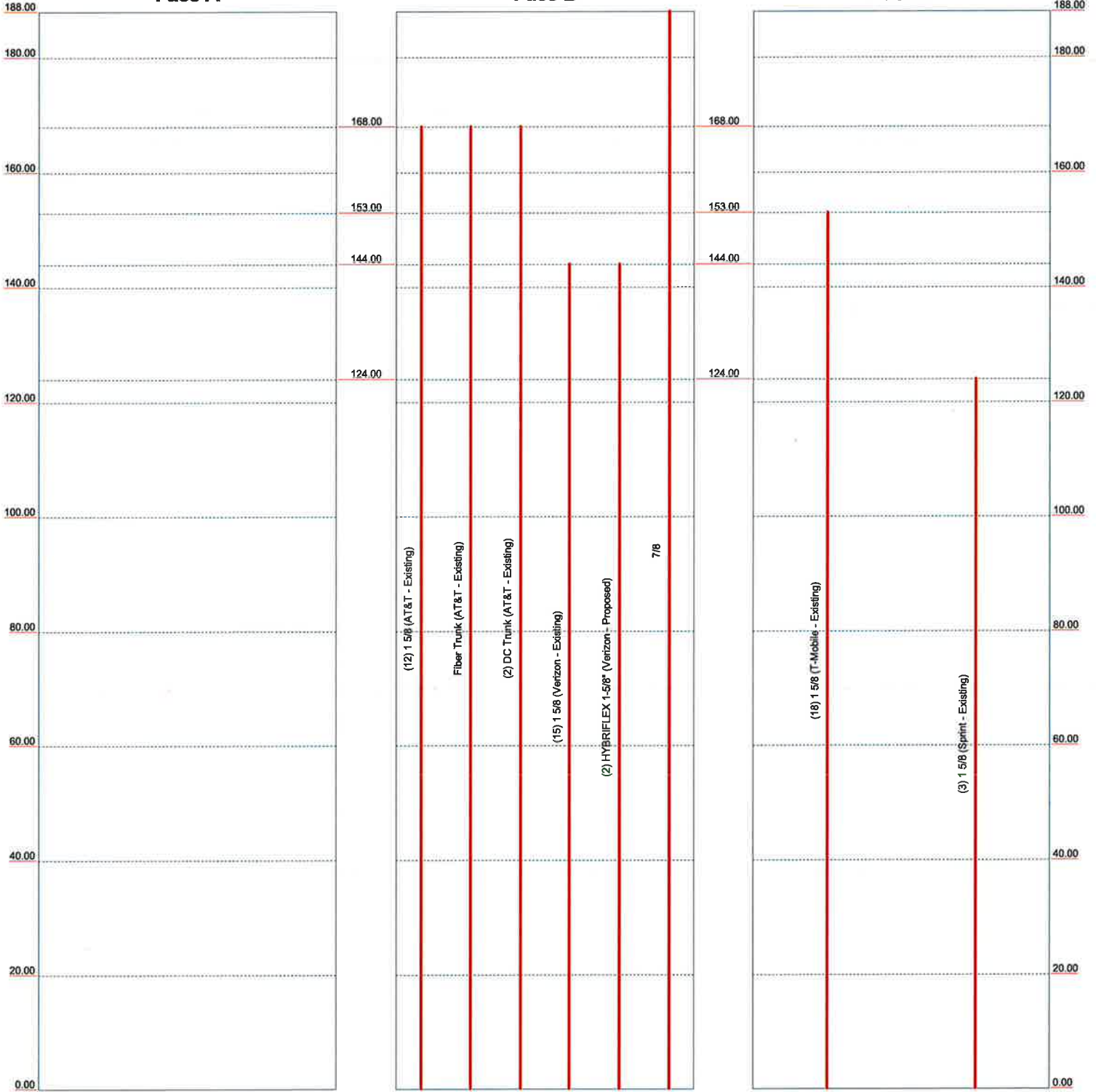
Round Flat App In Face App Out Face Truss Leg

Face A

Face B

Face C

Elevation (ft)



Centek Engineering Inc.		Job: 16001.21 - East Windsor	
63-2 North Branford Rd. Branford, CT 06405		Project: 188-ft Lattice Tower - 232 South Main St. East Windsor,	
Phone: (203) 488-0580		Client: Verizon Wireless	Drawn by: TJL
FAX: (203) 488-8587		Code: TIA-222-G	Date: 11/07/16
		Path:	App'd: _____ Scale: NTS Dwg No. E-7

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 16001.21 - East Windsor	Page 1 of 40
	Project 188-ft Lattice Tower - 232 South Main St. East Windsor, CT	Date 14:08:33 11/07/16
	Client Verizon Wireless	Designed by TJL

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 188.00 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 6.58 ft at the top and 25.04 ft at the base.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

Basic wind speed of 97 mph.

Structure Class II.

Exposure Category C.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 1.0000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

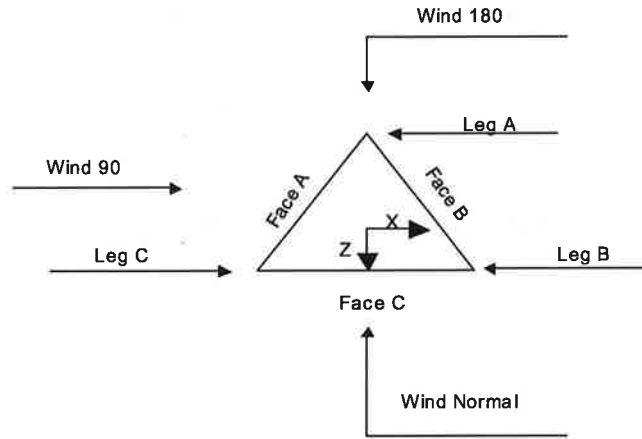
Stress ratio used in tower member design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile √ Include Bolts In Member Capacity √ Leg Bolts Are At Top Of Section √ Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area √ Use Clear Spans For KL/r Retension Guys To Initial Tension Bypass Mast Stability Checks Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination √ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing √ Treat Feed Line Bundles As Cylinder | <ul style="list-style-type: none"> Use ASCE 10 X-Brace Ly Rules √ Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-G Bracing Resist. Exemption Use TIA-222-G Tension Splice Exemption <li style="text-align: center;">Poles Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|---|

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 16001.21 - East Windsor	Page 2 of 40
	Project 188-ft Lattice Tower - 232 South Main St. East Windsor, CT	Date 14:08:33 11/07/16
	Client Verizon Wireless	Designed by TJL



Triangular Tower

Tower Section Geometry

<i>Tower Section</i>	<i>Tower Elevation</i>	<i>Assembly Database</i>	<i>Description</i>	<i>Section Width</i>	<i>Number of Sections</i>	<i>Section Length</i>
	<i>ft</i>			<i>ft</i>		<i>ft</i>
T1	188.00-180.00			6.58	1	8.00
T2	180.00-160.00			6.58	1	20.00
T3	160.00-140.00			8.54	1	20.00
T4	140.00-120.00			10.61	1	20.00
T5	120.00-100.00			12.74	1	20.00
T6	100.00-80.00			14.83	1	20.00
T7	80.00-60.00			16.92	1	20.00
T8	60.00-40.00			18.88	1	20.00
T9	40.00-20.00			21.13	1	20.00
T10	20.00-0.00			23.04	1	20.00

Tower Section Geometry (cont'd)

<i>Tower Section</i>	<i>Tower Elevation</i>	<i>Diagonal Spacing</i>	<i>Bracing Type</i>	<i>Has K Brace End Panels</i>	<i>Has Horizontals</i>	<i>Top Girt Offset</i>	<i>Bottom Girt Offset</i>
	<i>ft</i>	<i>ft</i>				<i>in</i>	<i>in</i>
T1	188.00-180.00	4.00	X Brace	No	No	0.0000	0.0000
T2	180.00-160.00	5.00	X Brace	No	No	0.0000	0.0000
T3	160.00-140.00	6.67	X Brace	No	No	0.0000	0.0000
T4	140.00-120.00	6.67	X Brace	No	No	0.0000	0.0000
T5	120.00-100.00	6.67	X Brace	No	No	0.0000	0.0000

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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	100.00-80.00	10.00	X Brace	No	No	0.0000	0.0000
T7	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T8	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T9	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T10	20.00-0.00	10.00	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 188.00-180.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 180.00-160.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T3 160.00-140.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 140.00-120.00	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T5 120.00-100.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T6 100.00-80.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T7 80.00-60.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T8 60.00-40.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T9 40.00-20.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T10 20.00-0.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Single Angle	L4x4x3/8	A572-50 (50 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 188.00-180.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Single Angle		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 Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
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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	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
T1 188.00-180.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T7 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T8 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T9 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T10 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	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	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace	
											X Y
T1 188.00-180.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T2 180.00-160.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T3 160.00-140.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T4 140.00-120.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T5 120.00-100.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T6 100.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T7 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T8 60.00-40.00	Yes	Yes	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
T10 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1

¹Note: 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.

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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 188.00-180.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 188.00-180.00	Flange	0.6250	4	0.6250	1	0.5000	1	0.5000	1	0.6250	0	0.5000	1	0.6250	0
T2 180.00-160.00	Flange	0.7500	4	0.6250	1	0.5000	1	0.5000	0	0.6250	0	0.5000	1	0.6250	0
T3 160.00-140.00	Flange	0.8750	4	0.6250	1	0.5000	1	0.5000	0	0.6250	0	0.5000	1	0.6250	0
T4 140.00-120.00	Flange	1.0000	4	0.6250	1	0.5000	1	0.5000	0	0.6250	0	0.5000	1	0.6250	0
T5 120.00-100.00	Flange	1.0000	6	0.7500	1	0.5000	1	0.5000	0	0.6250	0	0.5000	1	0.6250	0
T6 100.00-80.00	Flange	1.0000	8	0.7500	1	0.5000	1	0.5000	0	0.6250	0	0.5000	1	0.7500	2
T7 80.00-60.00	Flange	1.0000	8	0.7500	1	0.5000	1	0.5000	0	0.6250	0	0.5000	1	0.7500	2
T8 60.00-40.00	Flange	1.0000	8	0.7500	1	0.5000	1	0.5000	0	0.6250	0	0.5000	1	0.7500	2
T9 40.00-20.00	Flange	1.0000	8	0.7500	1	0.5000	1	0.5000	0	0.6250	0	0.5000	1	0.7500	2
T10 20.00-0.00	Flange	1.0000	10	0.7500	1	0.5000	1	0.5000	0	0.6250	0	0.5000	1	0.7500	2

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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Description	Face or Shield 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 (AT&T - Existing)	B	No	Ar (CaAa)	168.00 - 0.00	0.0000	0.35	12	12	1.9800	1.9800		1.04
Fiber Trunk (AT&T - Existing)	B	No	Ar (CaAa)	168.00 - 0.00	0.0000	0.26	1	1	0.4000	0.4000		1.00
DC Trunk (AT&T - Existing)	B	No	Ar (CaAa)	168.00 - 0.00	0.0000	0.27	2	2	0.4000	0.4000		0.11
1 5/8 (T-Mobile - Existing)	C	No	Ar (CaAa)	153.00 - 0.00	0.0000	-0.35	18	12	1.9800	1.9800		1.04
1 5/8 (Sprint - Existing)	C	No	Ar (CaAa)	124.00 - 0.00	0.0000	0.35	3	3	1.9800	1.9800		1.04
1 5/8 (Verizon - Existing)	B	No	Ar (CaAa)	144.00 - 0.00	0.0000	-0.35	15	15	1.9800	1.9800		1.04
HYBRIFLEX 1-5/8" (Verizon - Proposed)	B	No	Ar (CaAa)	144.00 - 0.00	3.0000	-0.4	2	2	1.9800	1.9800		1.90
7/8	B	No	Ar (CaAa)	188.00 - 0.00	0.0000	0.26	1	1	1.1100	1.1100		0.54

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
T1	188.00-180.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.888	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	22.188	0.000	0.12
		C	0.000	0.000	0.000	0.000	0.00
T3	160.00-140.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	65.604	0.000	0.36
		C	0.000	0.000	46.332	0.000	0.24
T4	140.00-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	119.460	0.000	0.67
		C	0.000	0.000	73.656	0.000	0.39
T5	120.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	119.460	0.000	0.67
		C	0.000	0.000	83.160	0.000	0.44
T6	100.00-80.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	119.460	0.000	0.67
		C	0.000	0.000	83.160	0.000	0.44
T7	80.00-60.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	119.460	0.000	0.67
		C	0.000	0.000	83.160	0.000	0.44
T8	60.00-40.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	119.460	0.000	0.67
		C	0.000	0.000	83.160	0.000	0.44
T9	40.00-20.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	119.460	0.000	0.67
		C	0.000	0.000	83.160	0.000	0.44

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Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
T10	20.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	119.460	0.000	0.67
		C	0.000	0.000	83.160	0.000	0.44

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 _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
T1	188.00-180.00	A	2.375	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	4.688	0.000	0.09
		C		0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	2.356	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	74.248	0.000	1.36
		C		0.000	0.000	0.000	0.000	0.00
T3	160.00-140.00	A	2.327	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	205.009	0.000	3.77
		C		0.000	0.000	83.362	0.000	2.12
T4	140.00-120.00	A	2.294	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	353.771	0.000	6.55
		C		0.000	0.000	136.007	0.000	3.36
T5	120.00-100.00	A	2.256	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	352.515	0.000	6.46
		C		0.000	0.000	167.345	0.000	3.84
T6	100.00-80.00	A	2.211	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	351.035	0.000	6.35
		C		0.000	0.000	166.783	0.000	3.79
T7	80.00-60.00	A	2.156	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	349.224	0.000	6.21
		C		0.000	0.000	166.097	0.000	3.72
T8	60.00-40.00	A	2.085	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	346.871	0.000	6.04
		C		0.000	0.000	165.206	0.000	3.64
T9	40.00-20.00	A	1.981	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	343.450	0.000	5.79
		C		0.000	0.000	163.912	0.000	3.52
T10	20.00-0.00	A	1.775	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	336.673	0.000	5.30
		C		0.000	0.000	161.352	0.000	3.29

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
T1	188.00-180.00	0.5178	0.1037	0.6786	0.1359
T2	180.00-160.00	4.8938	1.6458	4.0392	1.2854
T3	160.00-140.00	8.0347	3.2061	6.6649	2.1394
T4	140.00-120.00	7.6658	-0.0280	6.3724	-0.8272
T5	120.00-100.00	7.8804	0.3919	6.6490	-0.6206
T6	100.00-80.00	8.9476	0.4232	7.7229	-0.7380
T7	80.00-60.00	9.8191	0.4464	8.5894	-0.8368
T8	60.00-40.00	10.5110	0.4620	9.4157	-0.9342
T9	40.00-20.00	11.4650	0.4900	10.3603	-1.0476

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Section	Elevation	CP _x	CP _z	CP _x Ice	CP _z Ice
	ft	in	in	in	in
T10	20.00-0.00	12.3365	0.5155	11.3395	-1.1777

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T1	8	7/8	180.00 - 188.00	0.6000	0.4744
T2	1	1 5/8	160.00 - 168.00	0.6000	0.6000
T2	2	Fiber Trunk	160.00 - 168.00	0.6000	0.6000
T2	3	DC Trunk	160.00 - 168.00	0.6000	0.6000
T2	8	7/8	160.00 - 180.00	0.6000	0.6000
T3	1	1 5/8	140.00 - 160.00	0.6000	0.6000
T3	2	Fiber Trunk	140.00 - 160.00	0.6000	0.6000
T3	3	DC Trunk	140.00 - 160.00	0.6000	0.6000
T3	4	1 5/8	140.00 - 153.00	0.6000	0.6000
T3	6	1 5/8	140.00 - 144.00	0.6000	0.6000
T3	7	HYBRIFLEX 1-5/8"	140.00 - 144.00	0.6000	0.6000
T3	8	7/8	140.00 - 160.00	0.6000	0.6000
T4	1	1 5/8	120.00 - 140.00	0.6000	0.6000
T4	2	Fiber Trunk	120.00 - 140.00	0.6000	0.6000
T4	3	DC Trunk	120.00 - 140.00	0.6000	0.6000
T4	4	1 5/8	120.00 - 140.00	0.6000	0.6000
T4	5	1 5/8	120.00 - 124.00	0.6000	0.6000
T4	6	1 5/8	120.00 - 140.00	0.6000	0.6000
T4	7	HYBRIFLEX 1-5/8"	120.00 - 140.00	0.6000	0.6000
T4	8	7/8	120.00 - 140.00	0.6000	0.6000
T5	1	1 5/8	100.00 - 120.00	0.6000	0.6000
T5	2	Fiber Trunk	100.00 - 120.00	0.6000	0.6000
T5	3	DC Trunk	100.00 - 120.00	0.6000	0.6000
T5	4	1 5/8	100.00 - 120.00	0.6000	0.6000
T5	5	1 5/8	100.00 -	0.6000	0.6000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
			120.00		
T5	6	1 5/8	100.00 - 120.00	0.6000	0.6000
T5	7	HYBRIFLEX 1-5/8"	100.00 - 120.00	0.6000	0.6000
T5	8	7/8	100.00 - 120.00	0.6000	0.6000
T6	1	1 5/8	80.00 - 100.00	0.6000	0.6000
T6	2	Fiber Trunk	80.00 - 100.00	0.6000	0.6000
T6	3	DC Trunk	80.00 - 100.00	0.6000	0.6000
T6	4	1 5/8	80.00 - 100.00	0.6000	0.6000
T6	5	1 5/8	80.00 - 100.00	0.6000	0.6000
T6	6	1 5/8	80.00 - 100.00	0.6000	0.6000
T6	7	HYBRIFLEX 1-5/8"	80.00 - 100.00	0.6000	0.6000
T6	8	7/8	80.00 - 100.00	0.6000	0.6000
T7	1	1 5/8	60.00 - 80.00	0.6000	0.6000
T7	2	Fiber Trunk	60.00 - 80.00	0.6000	0.6000
T7	3	DC Trunk	60.00 - 80.00	0.6000	0.6000
T7	4	1 5/8	60.00 - 80.00	0.6000	0.6000
T7	5	1 5/8	60.00 - 80.00	0.6000	0.6000
T7	6	1 5/8	60.00 - 80.00	0.6000	0.6000
T7	7	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.6000
T7	8	7/8	60.00 - 80.00	0.6000	0.6000
T8	1	1 5/8	40.00 - 60.00	0.6000	0.6000
T8	2	Fiber Trunk	40.00 - 60.00	0.6000	0.6000
T8	3	DC Trunk	40.00 - 60.00	0.6000	0.6000
T8	4	1 5/8	40.00 - 60.00	0.6000	0.6000
T8	5	1 5/8	40.00 - 60.00	0.6000	0.6000
T8	6	1 5/8	40.00 - 60.00	0.6000	0.6000
T8	7	HYBRIFLEX 1-5/8"	40.00 - 60.00	0.6000	0.6000
T8	8	7/8	40.00 - 60.00	0.6000	0.6000
T9	1	1 5/8	20.00 - 40.00	0.6000	0.6000
T9	2	Fiber Trunk	20.00 - 40.00	0.6000	0.6000
T9	3	DC Trunk	20.00 - 40.00	0.6000	0.6000
T9	4	1 5/8	20.00 - 40.00	0.6000	0.6000
T9	5	1 5/8	20.00 - 40.00	0.6000	0.6000
T9	6	1 5/8	20.00 - 40.00	0.6000	0.6000
T9	7	HYBRIFLEX 1-5/8"	20.00 - 40.00	0.6000	0.6000
T9	8	7/8	20.00 - 40.00	0.6000	0.6000
T10	1	1 5/8	0.00 - 20.00	0.6000	0.6000
T10	2	Fiber Trunk	0.00 - 20.00	0.6000	0.6000
T10	3	DC Trunk	0.00 - 20.00	0.6000	0.6000
T10	4	1 5/8	0.00 - 20.00	0.6000	0.6000
T10	5	1 5/8	0.00 - 20.00	0.6000	0.6000
T10	6	1 5/8	0.00 - 20.00	0.6000	0.6000
T10	7	HYBRIFLEX 1-5/8"	0.00 - 20.00	0.6000	0.6000
T10	8	7/8	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

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	Project		188-ft Lattice Tower - 232 South Main St. East Windsor, CT		Date		14:08:33 11/07/16	
	Client		Verizon Wireless		Designed by		TJL	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz Lateral	Vert					
BCD-87010	C	None			0.0000	193.50	No Ice 2.90	2.90	0.03
							1/2" Ice 4.05	4.05	0.05
							1" Ice 5.21	5.21	0.08
13' Platform w/rails	C	None			0.0000	186.00	No Ice 31.30	31.30	1.82
							1/2" Ice 40.20	40.20	2.45
							1" Ice 49.10	49.10	3.08
800-10121 (AT&T - Existing)	A	From Leg	4.00		0.0000	168.00	No Ice 5.16	3.29	0.05
			6.00				1/2" Ice 5.51	3.64	0.08
			0.00				1" Ice 5.87	3.99	0.12
P65-17-XLH-RR (AT&T - Existing)	A	From Leg	4.00		0.0000	168.00	No Ice 11.47	6.80	0.06
			-2.00				1/2" Ice 12.08	7.38	0.12
			0.00				1" Ice 12.71	7.98	0.19
P65-17-XLH-RR (AT&T - Existing)	A	From Leg	4.00		0.0000	168.00	No Ice 11.47	6.80	0.06
			-6.00				1/2" Ice 12.08	7.38	0.12
			0.00				1" Ice 12.71	7.98	0.19
800-10121 (AT&T - Existing)	B	From Leg	4.00		0.0000	168.00	No Ice 5.16	3.29	0.05
			6.00				1/2" Ice 5.51	3.64	0.08
			0.00				1" Ice 5.87	3.99	0.12
P65-17-XLH-RR (AT&T - Existing)	B	From Leg	4.00		0.0000	168.00	No Ice 11.47	6.80	0.06
			-2.00				1/2" Ice 12.08	7.38	0.12
			0.00				1" Ice 12.71	7.98	0.19
P65-17-XLH-RR (AT&T - Existing)	B	From Leg	4.00		0.0000	168.00	No Ice 11.47	6.80	0.06
			-6.00				1/2" Ice 12.08	7.38	0.12
			0.00				1" Ice 12.71	7.98	0.19
800-10121 (AT&T - Existing)	C	From Leg	4.00		0.0000	168.00	No Ice 5.16	3.29	0.05
			6.00				1/2" Ice 5.51	3.64	0.08
			0.00				1" Ice 5.87	3.99	0.12
SBNH-1D6565C (AT&T - Existing)	C	From Leg	4.00		0.0000	168.00	No Ice 11.41	7.70	0.06
			-2.00				1/2" Ice 12.03	8.29	0.13
			0.00				1" Ice 12.65	8.89	0.20
SBNH-1D6565C (AT&T - Existing)	C	From Leg	4.00		0.0000	168.00	No Ice 11.41	7.70	0.06
			-6.00				1/2" Ice 12.03	8.29	0.13
			0.00				1" Ice 12.65	8.89	0.20
TT19-08BP111-001 TMA (AT&T - Existing)	A	From Leg	4.00		0.0000	168.00	No Ice 0.55	0.45	0.02
			6.00				1/2" Ice 0.65	0.53	0.02
			0.00				1" Ice 0.75	0.63	0.03
RRUS-11 (AT&T - Existing)	A	From Leg	4.00		0.0000	168.00	No Ice 2.57	1.07	0.05
			-2.00				1/2" Ice 2.76	1.21	0.07
			0.00				1" Ice 2.97	1.36	0.09
DTMABP7819VG12A TMA (AT&T - Existing)	A	From Leg	4.00		0.0000	168.00	No Ice 1.36	0.51	0.02
			-6.00				1/2" Ice 1.51	0.61	0.03
			0.00				1" Ice 1.66	0.72	0.04
TT19-08BP111-001 TMA (AT&T - Existing)	B	From Leg	4.00		0.0000	168.00	No Ice 0.55	0.45	0.02
			6.00				1/2" Ice 0.65	0.53	0.02
			0.00				1" Ice 0.75	0.63	0.03
RRUS-11 (AT&T - Existing)	B	From Leg	4.00		0.0000	168.00	No Ice 2.57	1.07	0.05
			-2.00				1/2" Ice 2.76	1.21	0.07
			0.00				1" Ice 2.97	1.36	0.09
DTMABP7819VG12A TMA (AT&T - Existing)	B	From Leg	4.00		0.0000	168.00	No Ice 1.36	0.51	0.02
			-6.00				1/2" Ice 1.51	0.61	0.03
			0.00				1" Ice 1.66	0.72	0.04
TT19-08BP111-001 TMA (AT&T - Existing)	C	From Leg	4.00		0.0000	168.00	No Ice 0.55	0.45	0.02
			6.00				1/2" Ice 0.65	0.53	0.02
			0.00				1" Ice 0.75	0.63	0.03
RRUS-11 (AT&T - Existing)	C	From Leg	4.00		0.0000	168.00	No Ice 2.57	1.07	0.05
			-2.00				1/2" Ice 2.76	1.21	0.07
			0.00				1" Ice 2.97	1.36	0.09

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	Project 188-ft Lattice Tower - 232 South Main St. East Windsor, CT	Date 14:08:33 11/07/16
	Client Verizon Wireless	Designed by TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			Horz ft	Lateral Vert ft					
DTMABP7819VG12A TMA (AT&T - Existing)	C	From Leg	4.00	0.0000	168.00	No Ice	1.36	0.51	0.02
			-6.00			1/2" Ice	1.51	0.61	0.03
			0.00			1" Ice	1.66	0.72	0.04
DC6-48-60-18-8F Surge Arrestor (AT&T - Existing)	A	From Leg	1.00	0.0000	168.00	No Ice	1.91	1.91	0.02
			0.00			1/2" Ice	2.10	2.10	0.04
			0.00			1" Ice	2.29	2.29	0.06
Rohn 6' x 12' Boom Gate (1) (AT&T - Existing)	A	From Leg	2.00	0.0000	168.00	No Ice	16.60	16.60	0.56
			0.00			1/2" Ice	19.80	19.80	0.70
			0.00			1" Ice	23.00	23.00	0.84
Rohn 6' x 12' Boom Gate (1) (AT&T - Existing)	B	From Leg	2.00	0.0000	168.00	No Ice	16.60	16.60	0.56
			0.00			1/2" Ice	19.80	19.80	0.70
			0.00			1" Ice	23.00	23.00	0.84
Rohn 6' x 12' Boom Gate (1) (AT&T - Existing)	C	From Leg	2.00	0.0000	168.00	No Ice	16.60	16.60	0.56
			0.00			1/2" Ice	19.80	19.80	0.70
			0.00			1" Ice	23.00	23.00	0.84
RR90-17-02DP (T-Mobile - Existing)	A	From Leg	3.00	0.0000	153.00	No Ice	4.36	1.97	0.02
			6.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
APX16DWV-16DWV-S-E-A CU (T-Mobile - Existing)	A	From Leg	3.00	0.0000	153.00	No Ice	6.08	2.00	0.04
			-2.00			1/2" Ice	6.44	2.33	0.07
			0.00			1" Ice	6.80	2.66	0.11
RR90-17-02DP (T-Mobile - Existing)	A	From Leg	3.00	0.0000	153.00	No Ice	4.36	1.97	0.02
			-6.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
RR90-17-02DP (T-Mobile - Existing)	B	From Leg	3.00	0.0000	153.00	No Ice	4.36	1.97	0.02
			6.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
APX16DWV-16DWV-S-E-A CU (T-Mobile - Existing)	B	From Leg	3.00	0.0000	153.00	No Ice	6.08	2.00	0.04
			-2.00			1/2" Ice	6.44	2.33	0.07
			0.00			1" Ice	6.80	2.66	0.11
RR90-17-02DP (T-Mobile - Existing)	B	From Leg	3.00	0.0000	153.00	No Ice	4.36	1.97	0.02
			-6.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
RR90-17-02DP (T-Mobile - Existing)	C	From Leg	3.00	0.0000	153.00	No Ice	4.36	1.97	0.02
			6.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
APX16DWV-16DWV-S-E-A CU (T-Mobile - Existing)	C	From Leg	3.00	0.0000	153.00	No Ice	6.08	2.00	0.04
			-2.00			1/2" Ice	6.44	2.33	0.07
			0.00			1" Ice	6.80	2.66	0.11
RR90-17-02DP (T-Mobile - Existing)	C	From Leg	3.00	0.0000	153.00	No Ice	4.36	1.97	0.02
			-6.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
(2) TMA 10"x8"x3" (T-Mobile - Existing)	A	From Leg	3.00	0.0000	153.00	No Ice	0.67	0.26	0.02
			-2.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
(2) TMA 10"x8"x3" (T-Mobile - Existing)	B	From Leg	3.00	0.0000	153.00	No Ice	0.67	0.26	0.02
			-2.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
(2) TMA 10"x8"x3" (T-Mobile - Existing)	C	From Leg	3.00	0.0000	153.00	No Ice	0.67	0.26	0.02
			-2.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
13-ft T-Frame (T-Mobile - Existing)	A	From Leg	2.00	0.0000	153.00	No Ice	11.70	11.70	0.53
			0.00			1/2" Ice	16.40	16.40	0.74
			0.00			1" Ice	21.10	21.10	0.96
13-ft T-Frame (T-Mobile - Existing)	B	From Leg	2.00	0.0000	153.00	No Ice	11.70	11.70	0.53
			0.00			1/2" Ice	16.40	16.40	0.74
			0.00			1" Ice	21.10	21.10	0.96

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	Project	188-ft Lattice Tower - 232 South Main St. East Windsor, CT	Date	14:08:33 11/07/16
	Client	Verizon Wireless	Designed by	TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight
			Horz	Vert			Front	Side	
			ft	ft	°	ft	ft ²	ft ²	K
13-ft T-Frame (T-Mobile - Existing)	C	From Leg	2.00	0.0000	153.00	No Ice	11.70	11.70	0.53
			0.00			1/2" Ice	16.40	16.40	0.74
			0.00			1" Ice	21.10	21.10	0.96
APXVSP18-C-A20 (Sprint - Existing)	A	From Leg	2.00	0.0000	124.00	No Ice	8.02	5.28	0.06
			0.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
APXVSP18-C-A20 (Sprint - Existing)	B	From Leg	2.00	0.0000	124.00	No Ice	8.02	5.28	0.06
			0.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
APXVSP18-C-A20 (Sprint - Existing)	C	From Leg	2.00	0.0000	124.00	No Ice	8.02	5.28	0.06
			0.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
FD-RRH 4x40 1900 (Sprint - Existing)	A	From Leg	2.00	0.0000	124.00	No Ice	2.24	2.32	0.06
			0.00			1/2" Ice	2.44	2.53	0.08
			-2.00			1" Ice	2.65	2.74	0.11
FD-RRH 4x40 1900 (Sprint - Existing)	B	From Leg	2.00	0.0000	124.00	No Ice	2.24	2.32	0.06
			0.00			1/2" Ice	2.44	2.53	0.08
			-2.00			1" Ice	2.65	2.74	0.11
FD-RRH 4x40 1900 (Sprint - Existing)	C	From Leg	2.00	0.0000	124.00	No Ice	2.24	2.32	0.06
			0.00			1/2" Ice	2.44	2.53	0.08
			-2.00			1" Ice	2.65	2.74	0.11
FD-RRH 2x50 800 (Sprint - Existing)	A	From Leg	2.00	0.0000	124.00	No Ice	2.06	1.93	0.06
			0.00			1/2" Ice	2.24	2.11	0.09
			2.00			1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800 (Sprint - Existing)	B	From Leg	2.00	0.0000	124.00	No Ice	2.06	1.93	0.06
			0.00			1/2" Ice	2.24	2.11	0.09
			2.00			1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800 (Sprint - Existing)	C	From Leg	2.00	0.0000	124.00	No Ice	2.06	1.93	0.06
			0.00			1/2" Ice	2.24	2.11	0.09
			2.00			1" Ice	2.43	2.29	0.11
Rohn 6' x 12' Boom Gate (1) (Sprint - Existing)	A	From Leg	2.00	0.0000	124.00	No Ice	16.60	16.60	0.56
			0.00			1/2" Ice	19.80	19.80	0.70
			0.00			1" Ice	23.00	23.00	0.84
Rohn 6' x 12' Boom Gate (1) (Sprint - Existing)	B	From Leg	2.00	0.0000	124.00	No Ice	16.60	16.60	0.56
			0.00			1/2" Ice	19.80	19.80	0.70
			0.00			1" Ice	23.00	23.00	0.84
Rohn 6' x 12' Boom Gate (1) (Sprint - Existing)	C	From Leg	2.00	0.0000	124.00	No Ice	16.60	16.60	0.56
			0.00			1/2" Ice	19.80	19.80	0.70
			0.00			1" Ice	23.00	23.00	0.84
SBNHH-1D65B (Verizon - Proposed)	A	From Leg	4.00	0.0000	144.00	No Ice	8.08	5.34	0.04
			-6.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B (Verizon - Proposed)	A	From Leg	4.00	0.0000	144.00	No Ice	8.08	5.34	0.04
			-4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
BXA-70063/6CF (Verizon - Existing)	A	From Leg	4.00	0.0000	144.00	No Ice	7.57	4.16	0.01
			0.00			1/2" Ice	8.02	4.60	0.05
			0.00			1" Ice	8.47	5.04	0.10
SBNHH-1D65B (Verizon - Proposed)	A	From Leg	4.00	0.0000	144.00	No Ice	8.08	5.34	0.04
			4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B (Verizon - Proposed)	B	From Leg	4.00	0.0000	144.00	No Ice	8.08	5.34	0.04
			-6.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B (Verizon - Proposed)	B	From Leg	4.00	0.0000	144.00	No Ice	8.08	5.34	0.04
			-4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15

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	Project	188-ft Lattice Tower - 232 South Main St. East Windsor, CT	Date	14:08:33 11/07/16
	Client	Verizon Wireless	Designed by	TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight
			Horz	Vert			Front	Side	
			Lateral	ft	°	ft	ft ²	ft ²	K
BXA-70063/6CF (Verizon - Existing)	B	From Leg	4.00	0.0000	144.00	No Ice	7.57	4.16	0.01
			0.00			1/2" Ice	8.02	4.60	0.05
			0.00			1" Ice	8.47	5.04	0.10
SBNHH-1D65B (Verizon - Proposed)	B	From Leg	4.00	0.0000	144.00	No Ice	8.08	5.34	0.04
			4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B (Verizon - Proposed)	C	From Leg	4.00	0.0000	144.00	No Ice	8.08	5.34	0.04
			-6.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B (Verizon - Proposed)	C	From Leg	4.00	0.0000	144.00	No Ice	8.08	5.34	0.04
			-4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
BXA-70063/6CF (Verizon - Existing)	C	From Leg	4.00	0.0000	144.00	No Ice	7.57	4.16	0.01
			0.00			1/2" Ice	8.02	4.60	0.05
			0.00			1" Ice	8.47	5.04	0.10
SBNHH-1D65B (Verizon - Proposed)	C	From Leg	4.00	0.0000	144.00	No Ice	8.08	5.34	0.04
			4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
RRH2x60-PCS (Verizon - Proposed)	A	From Leg	4.00	0.0000	144.00	No Ice	2.15	1.35	0.06
			-4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH2x60-PCS (Verizon - Proposed)	B	From Leg	4.00	0.0000	144.00	No Ice	2.15	1.35	0.06
			-4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH2x60-PCS (Verizon - Proposed)	C	From Leg	4.00	0.0000	144.00	No Ice	2.15	1.35	0.06
			-4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH4x45/2x90-AWS (Verizon - Proposed)	A	From Leg	4.00	0.0000	144.00	No Ice	2.58	1.69	0.08
			4.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS (Verizon - Proposed)	B	From Leg	4.00	0.0000	144.00	No Ice	2.58	1.69	0.08
			4.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS (Verizon - Proposed)	C	From Leg	4.00	0.0000	144.00	No Ice	2.58	1.69	0.08
			4.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH4x30-B13 (Verizon - Proposed)	A	From Leg	4.00	0.0000	144.00	No Ice	2.16	1.62	0.06
			0.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.10
RRH4x30-B13 (Verizon - Proposed)	B	From Leg	4.00	0.0000	144.00	No Ice	2.16	1.62	0.06
			0.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.10
RRH4x30-B13 (Verizon - Proposed)	C	From Leg	4.00	0.0000	144.00	No Ice	2.16	1.62	0.06
			0.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.10
DB-T1-6Z-8AB-0Z (Verizon - Proposed)	A	From Leg	1.00	0.0000	144.00	No Ice	4.80	2.00	0.04
			0.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
DB-T1-6Z-8AB-0Z (Verizon - Proposed)	B	From Leg	1.00	0.0000	144.00	No Ice	4.80	2.00	0.04
			0.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
Rohn 6' x 12' Boom Gate (1) (Verizon - Existing)	A	From Leg	2.00	0.0000	144.00	No Ice	16.60	16.60	0.56
			0.00			1/2" Ice	19.80	19.80	0.70
			0.00			1" Ice	23.00	23.00	0.84
Rohn 6' x 12' Boom Gate (1) (Verizon - Existing)	B	From Leg	2.00	0.0000	144.00	No Ice	16.60	16.60	0.56
			0.00			1/2" Ice	19.80	19.80	0.70
			0.00			1" Ice	23.00	23.00	0.84

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	Client Verizon Wireless	Designed by TJL

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
Rohn 6' x 12' Boom Gate (1) (Verizon - Existing)	C	From Leg	2.00	0.0000	144.00	No Ice	16.60	16.60	0.56
			0.00			1/2" Ice	19.80	19.80	0.70
			0.00			1" Ice	23.00	23.00	0.84

Tower Pressures - No Ice

$$G_H = 0.850$$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _{AA} In Face ft ²	C _{AA} Out Face ft ²
T1 188.00-180.00	184.00	1.439	29	54.557	A	5.913	3.833	3.833	39.33	0.000	0.000
					B	5.913	3.833	39.33	0.888	0.000	
					C	5.913	3.833	39.33	0.000	0.000	
T2 180.00-160.00	170.00	1.415	29	155.997	A	10.246	9.599	9.599	48.37	0.000	0.000
					B	10.246	9.599	48.37	22.188	0.000	
					C	10.246	9.599	48.37	0.000	0.000	
T3 160.00-140.00	150.00	1.378	28	197.341	A	14.160	11.687	11.687	45.22	0.000	0.000
					B	14.160	11.687	45.22	65.604	0.000	
					C	14.160	11.687	45.22	46.332	0.000	
T4 140.00-120.00	130.00	1.337	27	241.011	A	19.550	15.028	15.028	43.46	0.000	0.000
					B	19.550	15.028	43.46	119.460	0.000	
					C	19.550	15.028	43.46	73.656	0.000	
T5 120.00-100.00	110.00	1.291	26	284.984	A	22.226	18.577	18.577	45.53	0.000	0.000
					B	22.226	18.577	45.53	119.460	0.000	
					C	22.226	18.577	45.53	83.160	0.000	
T6 100.00-80.00	90.00	1.238	25	328.557	A	21.164	22.123	22.123	51.11	0.000	0.000
					B	21.164	22.123	51.11	119.460	0.000	
					C	21.164	22.123	51.11	83.160	0.000	
T7 80.00-60.00	70.00	1.174	24	369.055	A	26.500	22.119	22.119	45.49	0.000	0.000
					B	26.500	22.119	45.49	119.460	0.000	
					C	26.500	22.119	45.49	83.160	0.000	
T8 60.00-40.00	50.00	1.094	22	414.498	A	28.816	28.811	28.811	50.00	0.000	0.000
					B	28.816	28.811	50.00	119.460	0.000	
					C	28.816	28.811	50.00	83.160	0.000	
T9 40.00-20.00	30.00	0.982	20	456.091	A	31.276	28.794	28.794	47.93	0.000	0.000
					B	31.276	28.794	47.93	119.460	0.000	
					C	31.276	28.794	47.93	83.160	0.000	
T10 20.00-0.00	10.00	0.85	17	495.193	A	33.681	28.798	28.798	46.09	0.000	0.000
					B	33.681	28.798	46.09	119.460	0.000	
					C	33.681	28.798	46.09	83.160	0.000	

Tower Pressure - With Ice

$$G_H = 0.850$$

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Section Elevation	z	K _Z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	in	ft ²	e	ft ²	ft ²	ft ²		ft ²	ft ²
T1 188.00-180.00	184.00	1.439	8	2.3750	57.723	A	5.913	24.425	10.167	33.51	0.000	0.000
						B	5.913	24.425		33.51	4.688	0.000
						C	5.913	24.425		33.51	0.000	0.000
T2 180.00-160.00	170.00	1.415	8	2.3563	163.861	A	10.246	52.923	25.332	40.10	0.000	0.000
						B	10.246	52.923		40.10	74.248	0.000
						C	10.246	52.923		40.10	0.000	0.000
T3 160.00-140.00	150.00	1.378	7	2.3270	205.108	A	14.160	53.589	27.228	40.19	0.000	0.000
						B	14.160	53.589		40.19	205.009	0.000
						C	14.160	53.589		40.19	83.362	0.000
T4 140.00-120.00	130.00	1.337	7	2.2939	248.668	A	19.550	60.246	30.350	38.03	0.000	0.000
						B	19.550	60.246		38.03	353.771	0.000
						C	19.550	60.246		38.03	136.007	0.000
T5 120.00-100.00	110.00	1.291	7	2.2559	292.514	A	22.226	67.070	33.644	37.68	0.000	0.000
						B	22.226	67.070		37.68	352.515	0.000
						C	22.226	67.070		37.68	167.345	0.000
T6 100.00-80.00	90.00	1.238	7	2.2111	335.937	A	21.164	63.630	36.891	43.51	0.000	0.000
						B	21.164	63.630		43.51	351.035	0.000
						C	21.164	63.630		43.51	166.783	0.000
T7 80.00-60.00	70.00	1.174	6	2.1562	376.251	A	26.500	65.085	36.516	39.87	0.000	0.000
						B	26.500	65.085		39.87	349.224	0.000
						C	26.500	65.085		39.87	166.097	0.000
T8 60.00-40.00	50.00	1.094	6	2.0849	421.458	A	28.816	72.778	42.739	42.07	0.000	0.000
						B	28.816	72.778		42.07	346.871	0.000
						C	28.816	72.778		42.07	165.206	0.000
T9 40.00-20.00	30.00	0.982	5	1.9810	462.702	A	31.276	73.000	42.021	40.30	0.000	0.000
						B	31.276	73.000		40.30	343.450	0.000
						C	31.276	73.000		40.30	163.912	0.000
T10 20.00-0.00	10.00	0.85	5	1.7749	501.117	A	33.681	70.541	40.650	39.00	0.000	0.000
						B	33.681	70.541		39.00	336.673	0.000
						C	33.681	70.541		39.00	161.352	0.000

Tower Pressure - Service

$G_H = 0.850$

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	ft ²	e	ft ²	ft ²	ft ²		ft ²	ft ²
T1 188.00-180.00	184.00	1.439	11	54.557	A	5.913	3.833	3.833	39.33	0.000	0.000
					B	5.913	3.833		39.33	0.888	0.000
					C	5.913	3.833		39.33	0.000	0.000
T2 180.00-160.00	170.00	1.415	11	155.997	A	10.246	9.599	9.599	48.37	0.000	0.000
					B	10.246	9.599		48.37	22.188	0.000
					C	10.246	9.599		48.37	0.000	0.000
T3 160.00-140.00	150.00	1.378	11	197.341	A	14.160	11.687	11.687	45.22	0.000	0.000
					B	14.160	11.687		45.22	65.604	0.000
					C	14.160	11.687		45.22	46.332	0.000
T4 140.00-120.00	130.00	1.337	10	241.011	A	19.550	15.028	15.028	43.46	0.000	0.000
					B	19.550	15.028		43.46	119.460	0.000
					C	19.550	15.028		43.46	73.656	0.000
T5 120.00-100.00	110.00	1.291	10	284.984	A	22.226	18.577	18.577	45.53	0.000	0.000
					B	22.226	18.577		45.53	119.460	0.000
					C	22.226	18.577		45.53	83.160	0.000
T6	90.00	1.238	10	328.557	A	21.164	22.123	22.123	51.11	0.000	0.000

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Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F _a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
100.00-80.00					B	21.164	22.123		51.11	119.460	0.000
T7 80.00-60.00	70.00	1.174	9	369.055	A	21.164	22.123		51.11	83.160	0.000
					B	26.500	22.119	22.119	45.49	0.000	0.000
					C	26.500	22.119		45.49	119.460	0.000
T8 60.00-40.00	50.00	1.094	9	414.498	A	26.500	22.119		45.49	83.160	0.000
					B	28.816	28.811	28.811	50.00	0.000	0.000
					C	28.816	28.811		50.00	119.460	0.000
T9 40.00-20.00	30.00	0.982	8	456.091	A	28.816	28.811		50.00	83.160	0.000
					B	31.276	28.794	28.794	47.93	0.000	0.000
					C	31.276	28.794		47.93	119.460	0.000
T10 20.00-0.00	10.00	0.85	7	495.193	A	31.276	28.794		47.93	83.160	0.000
					B	33.681	28.798	28.798	46.09	0.000	0.000
					C	33.681	28.798		46.09	119.460	0.000
					C	33.681	28.798		46.09	83.160	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	F _a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.00	0.43	A	0.179	2.669	29	1	1	8.103	0.55	69.36	C
			B	0.179	2.669		1	1	8.103			
			C	0.179	2.669		1	1	8.103			
T2 180.00-160.00	0.12	0.81	A	0.127	2.857	29	1	1	15.675	1.43	71.54	C
			B	0.127	2.857		1	1	15.675			
			C	0.127	2.857		1	1	15.675			
T3 160.00-140.00	0.61	1.47	A	0.131	2.843	28	1	1	20.705	3.02	151.15	C
			B	0.131	2.843		1	1	20.705			
			C	0.131	2.843		1	1	20.705			
T4 140.00-120.00	1.06	2.09	A	0.143	2.796	27	1	1	27.353	4.48	223.85	C
			B	0.143	2.796		1	1	27.353			
			C	0.143	2.796		1	1	27.353			
T5 120.00-100.00	1.11	2.60	A	0.143	2.797	26	1	1	31.076	4.69	234.25	C
			B	0.143	2.797		1	1	31.076			
			C	0.143	2.797		1	1	31.076			
T6 100.00-80.00	1.11	2.67	A	0.132	2.84	25	1	1	30.704	4.50	224.86	C
			B	0.132	2.84		1	1	30.704			
			C	0.132	2.84		1	1	30.704			
T7 80.00-60.00	1.11	3.73	A	0.132	2.84	24	1	1	36.206	4.58	229.24	C
			B	0.132	2.84		1	1	36.206			
			C	0.132	2.84		1	1	36.206			
T8 60.00-40.00	1.11	4.18	A	0.139	2.812	22	1	1	40.721	4.49	224.70	C
			B	0.139	2.812		1	1	40.721			
			C	0.139	2.812		1	1	40.721			
T9 40.00-20.00	1.11	4.99	A	0.132	2.84	20	1	1	43.070	4.17	208.45	C
			B	0.132	2.84		1	1	43.070			
			C	0.132	2.84		1	1	43.070			
T10 20.00-0.00	1.11	5.65	A	0.126	2.861	17	1	1	45.401	3.72	185.99	C
			B	0.126	2.861		1	1	45.401			
			C	0.126	2.861		1	1	45.401			
Sum Weight:	8.45	28.61						OTM	3008.80 kip-ft	35.64		

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	Client Verizon Wireless	Designed by TJL

Tower Forces - No Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K	e			psf			ft ²	K	plf	
T1 188.00-180.00	0.00	0.43	A	0.179	2.669	29	0.825	1	7.068	0.49	60.71	C
			B	0.179	2.669		0.825		7.068			
			C	0.179	2.669		0.825		7.068			
T2 180.00-160.00	0.12	0.81	A	0.127	2.857	29	0.825	1	13.882	1.30	65.24	C
			B	0.127	2.857		0.825		13.882			
			C	0.127	2.857		0.825		13.882			
T3 160.00-140.00	0.61	1.47	A	0.131	2.843	28	0.825	1	18.227	2.85	142.70	C
			B	0.131	2.843		0.825		18.227			
			C	0.131	2.843		0.825		18.227			
T4 140.00-120.00	1.06	2.09	A	0.143	2.796	27	0.825	1	23.932	4.25	212.72	C
			B	0.143	2.796		0.825		23.932			
			C	0.143	2.796		0.825		23.932			
T5 120.00-100.00	1.11	2.60	A	0.143	2.797	26	0.825	1	27.186	4.44	222.03	C
			B	0.143	2.797		0.825		27.186			
			C	0.143	2.797		0.825		27.186			
T6 100.00-80.00	1.11	2.67	A	0.132	2.84	25	0.825	1	27.000	4.27	213.53	C
			B	0.132	2.84		0.825		27.000			
			C	0.132	2.84		0.825		27.000			
T7 80.00-60.00	1.11	3.73	A	0.132	2.84	24	0.825	1	31.568	4.32	215.78	C
			B	0.132	2.84		0.825		31.568			
			C	0.132	2.84		0.825		31.568			
T8 60.00-40.00	1.11	4.18	A	0.139	2.812	22	0.825	1	35.678	4.22	211.20	C
			B	0.139	2.812		0.825		35.678			
			C	0.139	2.812		0.825		35.678			
T9 40.00-20.00	1.11	4.99	A	0.132	2.84	20	0.825	1	37.597	3.90	195.17	C
			B	0.132	2.84		0.825		37.597			
			C	0.132	2.84		0.825		37.597			
T10 20.00-0.00	1.11	5.65	A	0.126	2.861	17	0.825	1	39.507	3.47	173.52	C
			B	0.126	2.861		0.825		39.507			
			C	0.126	2.861		0.825		39.507			
Sum Weight:	8.45	28.61						OTM	2830.25 kip-ft	33.52		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K	e			psf			ft ²	K	plf	
T1 188.00-180.00	0.00	0.43	A	0.179	2.669	29	0.8	1	6.920	0.48	59.48	C
			B	0.179	2.669		0.8		6.920			
			C	0.179	2.669		0.8		6.920			
T2 180.00-160.00	0.12	0.81	A	0.127	2.857	29	0.8	1	13.626	1.29	64.33	C
			B	0.127	2.857		0.8		13.626			
			C	0.127	2.857		0.8		13.626			
T3 160.00-140.00	0.61	1.47	A	0.131	2.843	28	0.8	1	17.872	2.83	141.49	C
			B	0.131	2.843		0.8		17.872			
			C	0.131	2.843		0.8		17.872			
T4 140.00-120.00	1.06	2.09	A	0.143	2.796	27	0.8	1	23.443	4.22	211.13	C
			B	0.143	2.796		0.8		23.443			

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	Client Verizon Wireless	Designed by T.J.L.

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T5 120.00-100.00	1.11	2.60	C	0.143	2.796	26	0.8	1	23.443	4.41	220.28	C
			A	0.143	2.797		0.8	1	26.631			
			B	0.143	2.797		0.8	1	26.631			
T6 100.00-80.00	1.11	2.67	C	0.143	2.797	25	0.8	1	26.631	4.24	211.92	C
			A	0.132	2.84		0.8	1	26.471			
			B	0.132	2.84		0.8	1	26.471			
T7 80.00-60.00	1.11	3.73	C	0.132	2.84	24	0.8	1	26.471	4.28	213.86	C
			A	0.132	2.84		0.8	1	30.906			
			B	0.132	2.84		0.8	1	30.906			
T8 60.00-40.00	1.11	4.18	C	0.132	2.84	22	0.8	1	30.906	4.19	209.27	C
			A	0.139	2.812		0.8	1	34.958			
			B	0.139	2.812		0.8	1	34.958			
T9 40.00-20.00	1.11	4.99	C	0.139	2.812	20	0.8	1	34.958	3.87	193.27	C
			A	0.132	2.84		0.8	1	36.815			
			B	0.132	2.84		0.8	1	36.815			
T10 20.00-0.00	1.11	5.65	C	0.132	2.84	17	0.8	1	36.815	3.43	171.74	C
			A	0.126	2.861		0.8	1	38.665			
			B	0.126	2.861		0.8	1	38.665			
Sum Weight:	8.45	28.61						OTM	2804.75 kip-ft	33.22		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.00	0.43	A	0.179	2.669	29	0.85	1	7.216	0.50	61.95	C
			B	0.179	2.669		0.85	1	7.216			
			C	0.179	2.669		0.85	1	7.216			
T2 180.00-160.00	0.12	0.81	A	0.127	2.857	29	0.85	1	14.138	1.32	66.14	C
			B	0.127	2.857		0.85	1	14.138			
			C	0.127	2.857		0.85	1	14.138			
T3 160.00-140.00	0.61	1.47	A	0.131	2.843	28	0.85	1	18.581	2.88	143.91	C
			B	0.131	2.843		0.85	1	18.581			
			C	0.131	2.843		0.85	1	18.581			
T4 140.00-120.00	1.06	2.09	A	0.143	2.796	27	0.85	1	24.421	4.29	214.31	C
			B	0.143	2.796		0.85	1	24.421			
			C	0.143	2.796		0.85	1	24.421			
T5 120.00-100.00	1.11	2.60	A	0.143	2.797	26	0.85	1	27.742	4.48	223.77	C
			B	0.143	2.797		0.85	1	27.742			
			C	0.143	2.797		0.85	1	27.742			
T6 100.00-80.00	1.11	2.67	A	0.132	2.84	25	0.85	1	27.529	4.30	215.15	C
			B	0.132	2.84		0.85	1	27.529			
			C	0.132	2.84		0.85	1	27.529			
T7 80.00-60.00	1.11	3.73	A	0.132	2.84	24	0.85	1	32.231	4.35	217.71	C
			B	0.132	2.84		0.85	1	32.231			
			C	0.132	2.84		0.85	1	32.231			
T8 60.00-40.00	1.11	4.18	A	0.139	2.812	22	0.85	1	36.398	4.26	213.13	C
			B	0.139	2.812		0.85	1	36.398			
			C	0.139	2.812		0.85	1	36.398			
T9 40.00-20.00	1.11	4.99	A	0.132	2.84	20	0.85	1	38.379	3.94	197.07	C
			B	0.132	2.84		0.85	1	38.379			
			C	0.132	2.84		0.85	1	38.379			

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	Project 188-ft Lattice Tower - 232 South Main St. East Windsor, CT	Date 14:08:33 11/07/16
	Client Verizon Wireless	Designed by TJL

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T10 20.00-0.00	1.11	5.65	C	0.132	2.84	17	0.85	1	38.379	3.51	175.30	C
			A	0.126	2.861		0.85	1	40.349			
			B	0.126	2.861		0.85	1	40.349			
			C	0.126	2.861		0.85	1	40.349			
Sum Weight:	8.45	28.61						OTM	2855.76 kip-ft	33.83		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.09	2.48	A	0.526	1.869	8	1	1	22.990	0.30	37.59	C
			B	0.526	1.869		1	1	22.990			
			C	0.526	1.869		1	1	22.990			
T2 180.00-160.00	1.36	4.74	A	0.386	2.093	8	1	1	43.592	0.89	44.43	C
			B	0.386	2.093		1	1	43.592			
			C	0.386	2.093		1	1	43.592			
T3 160.00-140.00	5.88	5.97	A	0.33	2.218	7	1	1	46.793	1.76	88.22	C
			B	0.33	2.218		1	1	46.793			
			C	0.33	2.218		1	1	46.793			
T4 140.00-120.00	9.91	7.67	A	0.321	2.242	7	1	1	56.041	2.59	129.72	C
			B	0.321	2.242		1	1	56.041			
			C	0.321	2.242		1	1	56.041			
T5 120.00-100.00	10.30	8.83	A	0.305	2.282	7	1	1	62.506	2.71	135.71	C
			B	0.305	2.282		1	1	62.506			
			C	0.305	2.282		1	1	62.506			
T6 100.00-80.00	10.13	8.46	A	0.252	2.43	7	1	1	58.425	2.59	129.55	C
			B	0.252	2.43		1	1	58.425			
			C	0.252	2.43		1	1	58.425			
T7 80.00-60.00	9.94	10.18	A	0.243	2.457	6	1	1	64.472	2.54	126.93	C
			B	0.243	2.457		1	1	64.472			
			C	0.243	2.457		1	1	64.472			
T8 60.00-40.00	9.68	11.11	A	0.241	2.465	6	1	1	71.235	2.44	122.09	C
			B	0.241	2.465		1	1	71.235			
			C	0.241	2.465		1	1	71.235			
T9 40.00-20.00	9.31	11.91	A	0.225	2.513	5	1	1	73.570	2.22	111.13	C
			B	0.225	2.513		1	1	73.570			
			C	0.225	2.513		1	1	73.570			
T10 20.00-0.00	8.59	12.04	A	0.208	2.57	5	1	1	74.307	1.92	96.25	C
			B	0.208	2.57		1	1	74.307			
			C	0.208	2.57		1	1	74.307			
Sum Weight:	75.19	83.39							OTM			

Tower Forces - With Ice - Wind 45 To Face

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	Project 188-ft Lattice Tower - 232 South Main St. East Windsor, CT	Date 14:08:33 11/07/16
	Client Verizon Wireless	Designed by TJL

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
188.00-180.00	0.09	2.48	A	0.526	1.869	8	0.825	1	21.955	0.29	35.98	C
			B	0.526	1.869		0.825	1	21.955			
			C	0.526	1.869		0.825	1	21.955			
180.00-160.00	1.36	4.74	A	0.386	2.093	8	0.825	1	41.799	0.86	43.21	C
			B	0.386	2.093		0.825	1	41.799			
			C	0.386	2.093		0.825	1	41.799			
160.00-140.00	5.88	5.97	A	0.33	2.218	7	0.825	1	44.315	1.73	86.47	C
			B	0.33	2.218		0.825	1	44.315			
			C	0.33	2.218		0.825	1	44.315			
140.00-120.00	9.91	7.67	A	0.321	2.242	7	0.825	1	52.620	2.55	127.35	C
			B	0.321	2.242		0.825	1	52.620			
			C	0.321	2.242		0.825	1	52.620			
120.00-100.00	10.30	8.83	A	0.305	2.282	7	0.825	1	58.617	2.66	133.06	C
			B	0.305	2.282		0.825	1	58.617			
			C	0.305	2.282		0.825	1	58.617			
100.00-80.00	10.13	8.46	A	0.252	2.43	7	0.825	1	54.722	2.54	126.98	C
			B	0.252	2.43		0.825	1	54.722			
			C	0.252	2.43		0.825	1	54.722			
80.00-60.00	9.94	10.18	A	0.243	2.457	6	0.825	1	59.834	2.48	123.84	C
			B	0.243	2.457		0.825	1	59.834			
			C	0.243	2.457		0.825	1	59.834			
60.00-40.00	9.68	11.11	A	0.241	2.465	6	0.825	1	66.193	2.38	118.95	C
			B	0.241	2.465		0.825	1	66.193			
			C	0.241	2.465		0.825	1	66.193			
40.00-20.00	9.31	11.91	A	0.225	2.513	5	0.825	1	68.097	2.16	108.00	C
			B	0.225	2.513		0.825	1	68.097			
			C	0.225	2.513		0.825	1	68.097			
20.00-0.00	8.59	12.04	A	0.208	2.57	5	0.825	1	68.413	1.87	93.27	C
			B	0.208	2.57		0.825	1	68.413			
			C	0.208	2.57		0.825	1	68.413			
Sum Weight:	75.19	83.39						OTM	1687.45 kip-ft	19.51		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
188.00-180.00	0.09	2.48	A	0.526	1.869	8	0.8	1	21.807	0.29	35.75	C
			B	0.526	1.869		0.8	1	21.807			
			C	0.526	1.869		0.8	1	21.807			
180.00-160.00	1.36	4.74	A	0.386	2.093	8	0.8	1	41.543	0.86	43.03	C
			B	0.386	2.093		0.8	1	41.543			
			C	0.386	2.093		0.8	1	41.543			
160.00-140.00	5.88	5.97	A	0.33	2.218	7	0.8	1	43.961	1.72	86.22	C
			B	0.33	2.218		0.8	1	43.961			
			C	0.33	2.218		0.8	1	43.961			
140.00-120.00	9.91	7.67	A	0.321	2.242	7	0.8	1	52.131	2.54	127.01	C
			B	0.321	2.242		0.8	1	52.131			
			C	0.321	2.242		0.8	1	52.131			
120.00-100.00	10.30	8.83	A	0.305	2.282	7	0.8	1	58.061	2.65	132.68	C
			B	0.305	2.282		0.8	1	58.061			
			C	0.305	2.282		0.8	1	58.061			

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	Project 188-ft Lattice Tower - 232 South Main St. East Windsor, CT	Date 14:08:33 11/07/16
	Client Verizon Wireless	Designed by TJL

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T6 100.00-80.00	10.13	8.46	A	0.252	2.43	7	0.8	1	54.192	2.53	126.61	C
			B	0.252	2.43		0.8	1	54.192			
			C	0.252	2.43		0.8	1	54.192			
T7 80.00-60.00	9.94	10.18	A	0.243	2.457	6	0.8	1	59.172	2.47	123.40	C
			B	0.243	2.457		0.8	1	59.172			
			C	0.243	2.457		0.8	1	59.172			
T8 60.00-40.00	9.68	11.11	A	0.241	2.465	6	0.8	1	65.472	2.37	118.50	C
			B	0.241	2.465		0.8	1	65.472			
			C	0.241	2.465		0.8	1	65.472			
T9 40.00-20.00	9.31	11.91	A	0.225	2.513	5	0.8	1	67.315	2.15	107.56	C
			B	0.225	2.513		0.8	1	67.315			
			C	0.225	2.513		0.8	1	67.315			
T10 20.00-0.00	8.59	12.04	A	0.208	2.57	5	0.8	1	67.571	1.86	92.84	C
			B	0.208	2.57		0.8	1	67.571			
			C	0.208	2.57		0.8	1	67.571			
Sum Weight:	75.19	83.39						OTM	1681.97 kip-ft	19.44		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.09	2.48	A	0.526	1.869	8	0.85	1	22.103	0.29	36.21	C
			B	0.526	1.869		0.85	1	22.103			
			C	0.526	1.869		0.85	1	22.103			
T2 180.00-160.00	1.36	4.74	A	0.386	2.093	8	0.85	1	42.055	0.87	43.38	C
			B	0.386	2.093		0.85	1	42.055			
			C	0.386	2.093		0.85	1	42.055			
T3 160.00-140.00	5.88	5.97	A	0.33	2.218	7	0.85	1	44.669	1.73	86.72	C
			B	0.33	2.218		0.85	1	44.669			
			C	0.33	2.218		0.85	1	44.669			
T4 140.00-120.00	9.91	7.67	A	0.321	2.242	7	0.85	1	53.108	2.55	127.69	C
			B	0.321	2.242		0.85	1	53.108			
			C	0.321	2.242		0.85	1	53.108			
T5 120.00-100.00	10.30	8.83	A	0.305	2.282	7	0.85	1	59.172	2.67	133.43	C
			B	0.305	2.282		0.85	1	59.172			
			C	0.305	2.282		0.85	1	59.172			
T6 100.00-80.00	10.13	8.46	A	0.252	2.43	7	0.85	1	55.251	2.55	127.35	C
			B	0.252	2.43		0.85	1	55.251			
			C	0.252	2.43		0.85	1	55.251			
T7 80.00-60.00	9.94	10.18	A	0.243	2.457	6	0.85	1	60.497	2.49	124.28	C
			B	0.243	2.457		0.85	1	60.497			
			C	0.243	2.457		0.85	1	60.497			
T8 60.00-40.00	9.68	11.11	A	0.241	2.465	6	0.85	1	66.913	2.39	119.40	C
			B	0.241	2.465		0.85	1	66.913			
			C	0.241	2.465		0.85	1	66.913			
T9 40.00-20.00	9.31	11.91	A	0.225	2.513	5	0.85	1	68.879	2.17	108.45	C
			B	0.225	2.513		0.85	1	68.879			
			C	0.225	2.513		0.85	1	68.879			
T10 20.00-0.00	8.59	12.04	A	0.208	2.57	5	0.85	1	69.255	1.87	93.69	C
			B	0.208	2.57		0.85	1	69.255			
			C	0.208	2.57		0.85	1	69.255			

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	Project	188-ft Lattice Tower - 232 South Main St. East Windsor, CT	Date	14:08:33 11/07/16
	Client	Verizon Wireless	Designed by	TJL

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K				psf			ft ²	K	plf	
Sum Weight:	75.19	83.39						OTM	1692.93 kip-ft	19.58		

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K				psf			ft ²	K	plf	
T1 188.00-180.00	0.00	0.43	A	0.179	2.669	11	1	1	8.103	0.21	26.54	C
			B	0.179	2.669		1	1	8.103			
			C	0.179	2.669		1	1	8.103			
T2 180.00-160.00	0.12	0.81	A	0.127	2.857	11	1	1	15.675	0.55	27.37	C
			B	0.127	2.857		1	1	15.675			
			C	0.127	2.857		1	1	15.675			
T3 160.00-140.00	0.61	1.47	A	0.131	2.843	11	1	1	20.705	1.16	57.83	C
			B	0.131	2.843		1	1	20.705			
			C	0.131	2.843		1	1	20.705			
T4 140.00-120.00	1.06	2.09	A	0.143	2.796	10	1	1	27.353	1.71	85.65	C
			B	0.143	2.796		1	1	27.353			
			C	0.143	2.796		1	1	27.353			
T5 120.00-100.00	1.11	2.60	A	0.143	2.797	10	1	1	31.076	1.79	89.63	C
			B	0.143	2.797		1	1	31.076			
			C	0.143	2.797		1	1	31.076			
T6 100.00-80.00	1.11	2.67	A	0.132	2.84	10	1	1	30.704	1.72	86.04	C
			B	0.132	2.84		1	1	30.704			
			C	0.132	2.84		1	1	30.704			
T7 80.00-60.00	1.11	3.73	A	0.132	2.84	9	1	1	36.206	1.75	87.71	C
			B	0.132	2.84		1	1	36.206			
			C	0.132	2.84		1	1	36.206			
T8 60.00-40.00	1.11	4.18	A	0.139	2.812	9	1	1	40.721	1.72	85.97	C
			B	0.139	2.812		1	1	40.721			
			C	0.139	2.812		1	1	40.721			
T9 40.00-20.00	1.11	4.99	A	0.132	2.84	8	1	1	43.070	1.60	79.76	C
			B	0.132	2.84		1	1	43.070			
			C	0.132	2.84		1	1	43.070			
T10 20.00-0.00	1.11	5.65	A	0.126	2.861	7	1	1	45.401	1.42	71.16	C
			B	0.126	2.861		1	1	45.401			
			C	0.126	2.861		1	1	45.401			
Sum Weight:	8.45	28.61						OTM	1151.20 kip-ft	13.63		

Tower Forces - Service - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K				psf			ft ²	K	plf	
T1	0.00	0.43	A	0.179	2.669	11	0.825	1	7.068	0.19	23.23	C

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	Project 188-ft Lattice Tower - 232 South Main St. East Windsor, CT	Date 14:08:33 11/07/16
	Client Verizon Wireless	Designed by TJL

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
188.00-180.00			B	0.179	2.669		0.825	1	7.068			
			C	0.179	2.669		0.825	1	7.068			
T2	0.12	0.81	A	0.127	2.857	11	0.825	1	13.882	0.50	24.96	C
180.00-160.00			B	0.127	2.857		0.825	1	13.882			
			C	0.127	2.857		0.825	1	13.882			
T3	0.61	1.47	A	0.131	2.843	11	0.825	1	18.227	1.09	54.60	C
160.00-140.00			B	0.131	2.843		0.825	1	18.227			
			C	0.131	2.843		0.825	1	18.227			
T4	1.06	2.09	A	0.143	2.796	10	0.825	1	23.932	1.63	81.39	C
140.00-120.00			B	0.143	2.796		0.825	1	23.932			
			C	0.143	2.796		0.825	1	23.932			
T5	1.11	2.60	A	0.143	2.797	10	0.825	1	27.186	1.70	84.95	C
120.00-100.00			B	0.143	2.797		0.825	1	27.186			
			C	0.143	2.797		0.825	1	27.186			
T6	1.11	2.67	A	0.132	2.84	10	0.825	1	27.000	1.63	81.70	C
100.00-80.00			B	0.132	2.84		0.825	1	27.000			
			C	0.132	2.84		0.825	1	27.000			
T7	1.11	3.73	A	0.132	2.84	9	0.825	1	31.568	1.65	82.56	C
80.00-60.00			B	0.132	2.84		0.825	1	31.568			
			C	0.132	2.84		0.825	1	31.568			
T8	1.11	4.18	A	0.139	2.812	9	0.825	1	35.678	1.62	80.81	C
60.00-40.00			B	0.139	2.812		0.825	1	35.678			
			C	0.139	2.812		0.825	1	35.678			
T9	1.11	4.99	A	0.132	2.84	8	0.825	1	37.597	1.49	74.67	C
40.00-20.00			B	0.132	2.84		0.825	1	37.597			
			C	0.132	2.84		0.825	1	37.597			
T10	1.11	5.65	A	0.126	2.861	7	0.825	1	39.507	1.33	66.39	C
20.00-0.00			B	0.126	2.861		0.825	1	39.507			
			C	0.126	2.861		0.825	1	39.507			
Sum Weight:	8.45	28.61						OTM	1082.89 kip-ft	12.83		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T1	0.00	0.43	A	0.179	2.669	11	0.8	1	6.920	0.18	22.76	C
188.00-180.00			B	0.179	2.669		0.8	1	6.920			
			C	0.179	2.669		0.8	1	6.920			
T2	0.12	0.81	A	0.127	2.857	11	0.8	1	13.626	0.49	24.62	C
180.00-160.00			B	0.127	2.857		0.8	1	13.626			
			C	0.127	2.857		0.8	1	13.626			
T3	0.61	1.47	A	0.131	2.843	11	0.8	1	17.872	1.08	54.14	C
160.00-140.00			B	0.131	2.843		0.8	1	17.872			
			C	0.131	2.843		0.8	1	17.872			
T4	1.06	2.09	A	0.143	2.796	10	0.8	1	23.443	1.62	80.78	C
140.00-120.00			B	0.143	2.796		0.8	1	23.443			
			C	0.143	2.796		0.8	1	23.443			
T5	1.11	2.60	A	0.143	2.797	10	0.8	1	26.631	1.69	84.28	C
120.00-100.00			B	0.143	2.797		0.8	1	26.631			
			C	0.143	2.797		0.8	1	26.631			
T6	1.11	2.67	A	0.132	2.84	10	0.8	1	26.471	1.62	81.08	C

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Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
100.00-80.00			B	0.132	2.84		0.8	1	26.471			
			C	0.132	2.84		0.8	1	26.471			
T7	1.11	3.73	A	0.132	2.84	9	0.8	1	30.906	1.64	81.83	C
80.00-60.00			B	0.132	2.84		0.8	1	30.906			
			C	0.132	2.84		0.8	1	30.906			
T8	1.11	4.18	A	0.139	2.812	9	0.8	1	34.958	1.60	80.07	C
60.00-40.00			B	0.139	2.812		0.8	1	34.958			
			C	0.139	2.812		0.8	1	34.958			
T9	1.11	4.99	A	0.132	2.84	8	0.8	1	36.815	1.48	73.95	C
40.00-20.00			B	0.132	2.84		0.8	1	36.815			
			C	0.132	2.84		0.8	1	36.815			
T10	1.11	5.65	A	0.126	2.861	7	0.8	1	38.665	1.31	65.71	C
20.00-0.00			B	0.126	2.861		0.8	1	38.665			
			C	0.126	2.861		0.8	1	38.665			
Sum Weight:	8.45	28.61						OTM	1073.13 kip-ft	12.71		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T1	0.00	0.43	A	0.179	2.669	11	0.85	1	7.216	0.19	23.70	C
188.00-180.00			B	0.179	2.669		0.85	1	7.216			
			C	0.179	2.669		0.85	1	7.216			
T2	0.12	0.81	A	0.127	2.857	11	0.85	1	14.138	0.51	25.30	C
180.00-160.00			B	0.127	2.857		0.85	1	14.138			
			C	0.127	2.857		0.85	1	14.138			
T3	0.61	1.47	A	0.131	2.843	11	0.85	1	18.581	1.10	55.06	C
160.00-140.00			B	0.131	2.843		0.85	1	18.581			
			C	0.131	2.843		0.85	1	18.581			
T4	1.06	2.09	A	0.143	2.796	10	0.85	1	24.421	1.64	82.00	C
140.00-120.00			B	0.143	2.796		0.85	1	24.421			
			C	0.143	2.796		0.85	1	24.421			
T5	1.11	2.60	A	0.143	2.797	10	0.85	1	27.742	1.71	85.62	C
120.00-100.00			B	0.143	2.797		0.85	1	27.742			
			C	0.143	2.797		0.85	1	27.742			
T6	1.11	2.67	A	0.132	2.84	10	0.85	1	27.529	1.65	82.32	C
100.00-80.00			B	0.132	2.84		0.85	1	27.529			
			C	0.132	2.84		0.85	1	27.529			
T7	1.11	3.73	A	0.132	2.84	9	0.85	1	32.231	1.67	83.30	C
80.00-60.00			B	0.132	2.84		0.85	1	32.231			
			C	0.132	2.84		0.85	1	32.231			
T8	1.11	4.18	A	0.139	2.812	9	0.85	1	36.398	1.63	81.55	C
60.00-40.00			B	0.139	2.812		0.85	1	36.398			
			C	0.139	2.812		0.85	1	36.398			
T9	1.11	4.99	A	0.132	2.84	8	0.85	1	38.379	1.51	75.40	C
40.00-20.00			B	0.132	2.84		0.85	1	38.379			
			C	0.132	2.84		0.85	1	38.379			
T10	1.11	5.65	A	0.126	2.861	7	0.85	1	40.349	1.34	67.07	C
20.00-0.00			B	0.126	2.861		0.85	1	40.349			
			C	0.126	2.861		0.85	1	40.349			
Sum Weight:	8.45	28.61						OTM	1092.65	12.94		

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K				psf			ft ²	K	plf	
									kip-ft			

Force Totals

Load Case	Vertical Forces	Sum of Forces X	Sum of Forces Z	Sum of Overturning Moments, M _x	Sum of Overturning Moments, M _z	Sum of Torques
	K	K	K	kip-ft	kip-ft	kip-ft
Leg Weight	13.56					
Bracing Weight	15.05					
Total Member Self-Weight	28.61			-0.10	-35.46	
Total Weight	48.31			-0.10	-35.46	
Wind 0 deg - No Ice		-0.04	-44.59	-4377.21	-29.40	27.38
Wind 30 deg - No Ice		21.33	-37.03	-3655.23	-2138.75	23.36
Wind 45 deg - No Ice		29.98	-30.01	-2964.65	-2995.06	19.40
Wind 60 deg - No Ice		36.47	-21.05	-2081.39	-3640.35	14.20
Wind 90 deg - No Ice		42.73	0.04	5.95	-4252.53	1.69
Wind 120 deg - No Ice		38.60	22.33	2193.69	-3823.11	-12.14
Wind 135 deg - No Ice		31.27	31.30	3077.62	-3108.23	-17.92
Wind 150 deg - No Ice		21.40	37.07	3661.07	-2149.24	-21.68
Wind 180 deg - No Ice		0.04	42.18	4172.95	-41.51	-25.54
Wind 210 deg - No Ice		-21.33	37.03	3655.02	2067.84	-23.36
Wind 225 deg - No Ice		-29.98	30.01	2964.45	2924.15	-19.40
Wind 240 deg - No Ice		-38.56	22.26	2183.20	3746.14	-15.24
Wind 270 deg - No Ice		-42.73	-0.04	-6.16	4181.62	-1.69
Wind 300 deg - No Ice		-36.51	-21.12	-2091.88	3575.49	11.34
Wind 315 deg - No Ice		-31.27	-31.30	-3077.82	3077.32	17.92
Wind 330 deg - No Ice		-21.40	-37.07	-3661.28	2078.33	21.68
Member Ice	54.78					
Total Weight Ice	193.76			4.81	-311.79	
Wind 0 deg - Ice		-0.01	-24.11	-2357.83	-310.06	13.33
Wind 30 deg - Ice		11.84	-20.53	-2011.94	-1474.16	10.86
Wind 45 deg - Ice		16.70	-16.71	-1637.46	-1952.65	8.57
Wind 60 deg - Ice		20.40	-11.78	-1153.07	-2317.31	5.72
Wind 90 deg - Ice		23.70	0.01	6.55	-2639.53	-0.89
Wind 120 deg - Ice		20.88	12.07	1187.64	-2357.03	-7.45
Wind 135 deg - Ice		16.99	17.00	1672.03	-1977.59	-10.03
Wind 150 deg - Ice		11.86	20.54	2023.30	-1477.17	-11.75
Wind 180 deg - Ice		0.01	23.57	2323.60	-313.53	-12.97
Wind 210 deg - Ice		-11.84	20.53	2021.56	850.57	-10.86
Wind 225 deg - Ice		-16.70	16.71	1647.09	1329.06	-8.57
Wind 240 deg - Ice		-20.87	12.05	1184.63	1731.71	-5.88
Wind 270 deg - Ice		-23.70	-0.01	3.07	2015.95	0.89
Wind 300 deg - Ice		-20.41	-11.80	-1156.08	1695.46	7.25
Wind 315 deg - Ice		-16.99	-17.00	-1662.40	1354.00	10.03
Wind 330 deg - Ice		-11.86	-20.54	-2013.68	853.58	11.75
Total Weight	48.31			-0.10	-35.46	
Wind 0 deg - Service		-0.02	-17.06	-1674.98	2.08	10.48
Wind 30 deg - Service		8.16	-14.17	-1398.74	-804.98	8.94
Wind 45 deg - Service		11.47	-11.48	-1134.52	-1132.62	7.42
Wind 60 deg - Service		13.95	-8.06	-796.57	-1379.51	5.43
Wind 90 deg - Service		16.35	0.02	2.07	-1613.74	0.64
Wind 120 deg - Service		14.77	8.54	839.13	-1449.44	-4.65
Wind 135 deg - Service		11.96	11.98	1177.33	-1175.92	-6.85

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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 150 deg - Service		8.19	14.18	1400.56	-809.00	-8.29
Wind 180 deg - Service		0.02	16.14	1596.42	-2.56	-9.77
Wind 210 deg - Service		-8.16	14.17	1398.25	804.51	-8.94
Wind 225 deg - Service		-11.47	11.48	1134.03	1132.14	-7.42
Wind 240 deg - Service		-14.75	8.52	835.11	1446.65	-5.83
Wind 270 deg - Service		-16.35	-0.02	-2.56	1613.27	-0.64
Wind 300 deg - Service		-13.97	-8.08	-800.59	1381.35	4.34
Wind 315 deg - Service		-11.96	-11.98	-1177.82	1175.44	6.85
Wind 330 deg - Service		-8.19	-14.18	-1401.06	808.52	8.29

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp

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Comb. No.	Description
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	188 - 180	Leg	Max Tension	9	0.68	-0.15	0.09
			Max. Compression	40	-3.08	-0.01	-0.01
			Max. Mx	10	-1.16	0.37	0.01
			Max. My	2	-1.21	-0.00	-0.37
			Max. Vy	10	0.28	-0.18	-0.00
			Max. Vx	2	-0.29	-0.00	0.18
		Diagonal	Max Tension	30	0.84	0.00	0.00
			Max. Compression	2	-0.89	0.00	0.00
			Max. Mx	43	0.32	0.03	-0.00
			Max. My	40	0.07	0.03	-0.00
			Max. Vy	39	-0.03	0.03	-0.00
			Max. Vx	40	0.00	0.00	0.00
		Top Girt	Max Tension	13	0.08	0.00	0.00
			Max. Compression	38	-0.13	0.00	0.00
			Max. Mx	40	-0.08	-0.14	0.00
			Max. My	2	-0.07	0.00	-0.00
			Max. Vy	40	-0.08	0.00	0.00
T2	180 - 160	Leg	Max Tension	9	10.52	-0.49	0.00
			Max. Compression	12	-15.12	-0.06	0.00
			Max. Mx	18	6.24	1.15	-0.00
			Max. My	16	-1.04	-0.02	1.15
			Max. Vy	18	-0.89	-0.61	-0.00
			Max. Vx	16	-0.87	-0.02	-0.56
		Diagonal	Max Tension	32	2.91	0.00	0.00
			Max. Compression	32	-2.89	0.00	0.00
			Max. Mx	39	0.41	0.04	-0.01
			Max. My	39	-0.37	0.04	0.01
			Max. Vy	37	0.04	0.04	0.01

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft		
T3	160 - 140	Leg	Max. Vx	41	-0.00	0.00	0.00		
			Max Tension	19	31.08	-0.89	0.05		
			Max. Compression	12	-40.58	1.10	0.03		
			Max. Mx	28	28.75	1.63	-0.03		
			Max. My	20	-5.27	-0.03	-1.57		
			Max. Vy	28	-0.97	-0.90	-0.02		
			Max. Vx	20	0.99	-0.04	0.99		
		Diagonal	Max Tension	32	5.67	0.00	0.00		
			Max. Compression	32	-5.77	0.00	0.00		
			Max. Mx	41	1.05	0.10	0.01		
			Max. My	42	1.04	0.09	0.01		
			Max. Vy	39	0.07	0.09	0.01		
			Max. Vx	42	-0.00	0.00	0.00		
			T4	140 - 120	Leg	Max Tension	19	64.16	-0.70
Max. Compression	12	-78.90				0.62	0.02		
Max. Mx	28	39.78				-1.18	-0.03		
Max. My	5	-3.96				-0.04	-1.05		
Max. Vy	28	-0.58				-0.71	-0.02		
Max. Vx	4	-0.55				-0.04	-0.60		
Diagonal	Max Tension	32				8.04	0.00	0.00	
	Max. Compression	32			-8.17	0.00	0.00		
	Max. Mx	40			2.11	0.15	-0.02		
	Max. My	35			0.26	0.13	-0.02		
	Max. Vy	38			0.10	0.14	0.02		
	Max. Vx	35			0.01	0.00	0.00		
	T5	120 - 100			Leg	Max Tension	9	101.98	-0.30
Max. Compression						12	-121.75	0.73	0.03
Max. Mx			24	-119.71		0.74	0.04		
Max. My			4	-7.68		-0.04	-0.74		
Max. Vy			28	-0.15		-0.68	-0.02		
Max. Vx			20	0.17		-0.04	0.74		
Diagonal			Max Tension	32		9.62	0.00	0.00	
			Max. Compression	32	-9.66	0.00	0.00		
			Max. Mx	38	2.38	0.18	-0.02		
			Max. My	36	-1.17	0.16	-0.03		
			Max. Vy	38	0.11	0.18	-0.02		
			Max. Vx	36	-0.01	0.00	0.00		
			T6	100 - 80	Leg	Max Tension	9	136.82	-0.54
Max. Compression						12	-160.72	1.04	0.04
Max. Mx	24	-158.18				1.04	0.05		
Max. My	4	-9.77				-0.07	-0.96		
Max. Vy	24	-0.18				1.04	0.05		
Max. Vx	4	0.19				-0.07	-0.96		
Diagonal	Max Tension	32				11.55	0.00	0.00	
	Max. Compression	32			-11.72	0.00	0.00		
	Max. Mx	38			2.95	0.28	0.04		
	Max. My	42			2.17	0.25	0.04		
	Max. Vy	38			0.14	0.28	0.04		
	Max. Vx	41			0.01	0.00	0.00		
	T7	80 - 60			Leg	Max Tension	9	175.23	-0.58
Max. Compression						12	-204.43	1.12	0.03
Max. Mx			2	-203.20		1.12	-0.07		
Max. My			4	-11.57		-0.07	-0.91		
Max. Vy			24	-0.18		1.12	0.04		
Max. Vx			2	0.18		-0.36	-0.84		
Diagonal			Max Tension	32		13.00	0.00	0.00	
			Max. Compression	32	-13.21	0.00	0.00		
			Max. Mx	40	3.92	0.40	-0.05		
			Max. My	35	0.58	0.34	-0.05		
			Max. Vy	38	0.18	0.39	0.05		
			Max. Vx	35	-0.01	0.00	0.00		

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft			
T8	60 - 40	Leg	Max Tension	9	211.70	-1.35	-0.03			
			Max. Compression	12	-246.80	1.03	0.02			
			Max. Mx	48	14.46	-2.07	-0.04			
			Max. My	4	-13.70	-0.07	-1.43			
			Max. Vy	48	0.34	-2.07	-0.04			
		Diagonal	Max. Vx	4	0.23	-0.07	-1.43			
			Max Tension	32	13.20	0.00	0.00			
			Max. Compression	32	-13.34	0.00	0.00			
			Max. Mx	38	3.57	0.45	0.06			
			Max. My	36	-1.82	0.42	-0.06			
			Max. Vy	38	0.19	0.45	0.06			
			Max. Vx	35	-0.01	0.00	0.00			
			T9	40 - 20	Leg	Max Tension	9	248.99	-1.22	-0.02
						Max. Compression	12	-290.42	1.99	0.04
Max. Mx	38	42.97				-5.01	-0.03			
Max. My	4	-16.68				-0.09	-1.27			
Max. Vy	48	0.84				-5.00	-0.03			
Diagonal	Max. Vx	4			-0.19	-0.09	-1.27			
	Max Tension	32			15.28	0.00	0.00			
	Max. Compression	32			-15.63	0.00	0.00			
	Max. Mx	38			2.77	0.51	0.06			
	Max. My	35			-0.35	0.46	-0.06			
	Max. Vy	38			0.20	0.47	0.05			
	Max. Vx	35			-0.01	0.00	0.00			
	T10	20 - 0			Leg	Max Tension	9	285.74	-1.22	-0.03
						Max. Compression	12	-334.29	-0.00	-0.00
Max. Mx			46	-162.62		5.22	-0.06			
Max. My			4	-19.51		-0.17	-2.77			
Max. Vy			48	-1.02		-5.00	-0.03			
Diagonal			Max. Vx	4	-0.41	-0.17	-2.77			
			Max Tension	32	15.92	0.00	0.00			
			Max. Compression	32	-16.28	0.00	0.00			
			Max. Mx	38	0.86	0.64	-0.08			
			Max. My	43	-7.49	0.60	0.09			
			Max. Vy	38	0.22	0.64	-0.08			
			Max. Vx	43	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	24	340.80	37.31	-20.88
	Max. H _x	24	340.80	37.31	-20.88
	Max. H _z	7	-285.96	-31.56	19.18
	Min. Vert	9	-294.63	-33.16	18.55
	Min. H _x	9	-294.63	-33.16	18.55
	Min. H _z	24	340.80	37.31	-20.88
Leg B	Max. Vert	12	344.99	-36.90	-21.84
	Max. H _x	29	-292.85	32.72	19.37
	Max. H _z	31	-284.27	30.90	20.39
	Min. Vert	29	-292.85	32.72	19.37
	Min. H _x	12	344.99	-36.90	-21.84
	Min. H _z	12	344.99	-36.90	-21.84
Leg A	Max. Vert	2	343.29	1.03	42.85
	Max. H _x	26	19.78	5.90	1.66
	Max. H _z	2	343.29	1.03	42.85

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. Vert	19	-294.12	-0.94	-38.04
	Min. H _x	13	-147.74	-5.86	-19.54
	Min. H _z	19	-294.12	-0.94	-38.04

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	48.31	0.00	0.00	-0.10	-35.46	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	57.98	-0.06	-71.34	-7025.27	-33.06	43.99
0.9 Dead+1.6 Wind 0 deg - No Ice	43.48	-0.06	-71.34	-7019.75	-22.37	43.96
1.2 Dead+1.6 Wind 30 deg - No Ice	57.98	34.13	-59.25	-5866.52	-3418.50	37.54
0.9 Dead+1.6 Wind 30 deg - No Ice	43.48	34.13	-59.25	-5861.89	-3405.15	37.48
1.2 Dead+1.6 Wind 45 deg - No Ice	57.98	47.96	-48.01	-4758.15	-4792.85	31.17
0.9 Dead+1.6 Wind 45 deg - No Ice	43.48	47.96	-48.01	-4754.39	-4778.44	31.14
1.2 Dead+1.6 Wind 60 deg - No Ice	57.98	58.35	-33.69	-3340.52	-5828.51	22.81
0.9 Dead+1.6 Wind 60 deg - No Ice	43.48	58.35	-33.69	-3337.88	-5813.29	22.79
1.2 Dead+1.6 Wind 90 deg - No Ice	57.98	68.37	0.06	9.60	-6811.03	2.70
0.9 Dead+1.6 Wind 90 deg - No Ice	43.48	68.37	0.06	9.62	-6795.04	2.69
1.2 Dead+1.6 Wind 120 deg - No Ice	57.98	61.75	35.73	3520.83	-6121.79	-19.51
0.9 Dead+1.6 Wind 120 deg - No Ice	43.48	61.75	35.73	3518.13	-6106.35	-19.50
1.2 Dead+1.6 Wind 135 deg - No Ice	57.98	48.05	48.10	4771.66	-4806.61	-28.78
0.9 Dead+1.6 Wind 135 deg - No Ice	43.48	48.05	48.10	4767.95	-4792.18	-28.77
1.2 Dead+1.6 Wind 150 deg - No Ice	57.98	34.24	59.31	5876.00	-3435.34	-34.83
0.9 Dead+1.6 Wind 150 deg - No Ice	43.48	34.24	59.31	5871.44	-3421.98	-34.79
1.2 Dead+1.6 Wind 180 deg - No Ice	57.98	0.06	67.48	6697.62	-52.50	-41.04
0.9 Dead+1.6 Wind 180 deg - No Ice	43.48	0.06	67.48	6692.40	-41.79	-41.00
1.2 Dead+1.6 Wind 210 deg - No Ice	57.98	-34.13	59.25	5866.36	3333.00	-37.54
0.9 Dead+1.6 Wind 210 deg - No Ice	43.48	-34.13	59.25	5861.78	3341.06	-37.48
1.2 Dead+1.6 Wind 225 deg - No Ice	57.98	-47.96	48.01	4757.99	4707.40	-31.18
0.9 Dead+1.6 Wind 225 deg - No Ice	43.48	-47.96	48.01	4754.31	4714.38	-31.13
1.2 Dead+1.6 Wind 240 deg - No Ice	57.98	-61.69	35.62	3504.09	6026.64	-24.48
0.9 Dead+1.6 Wind 240 deg - No Ice	43.48	-61.69	35.62	3501.38	6032.62	-24.46

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Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
No Ice						
1.2 Dead+1.6 Wind 270 deg - No Ice	57.98	-68.37	-0.06	-9.84	6725.67	-2.70
0.9 Dead+1.6 Wind 270 deg - No Ice	43.48	-68.37	-0.06	-9.80	6731.06	-2.70
1.2 Dead+1.6 Wind 300 deg - No Ice	57.98	-58.41	-33.80	-3357.45	5752.84	18.23
0.9 Dead+1.6 Wind 300 deg - No Ice	43.48	-58.41	-33.80	-3354.79	5759.00	18.21
1.2 Dead+1.6 Wind 315 deg - No Ice	57.98	-48.05	-48.10	-4772.00	4721.16	28.78
0.9 Dead+1.6 Wind 315 deg - No Ice	43.48	-48.05	-48.10	-4768.23	4728.13	28.75
1.2 Dead+1.6 Wind 330 deg - No Ice	57.98	-34.24	-59.31	-5876.32	3349.86	34.83
0.9 Dead+1.6 Wind 330 deg - No Ice	43.48	-34.24	-59.31	-5871.69	3357.90	34.79
1.2 Dead+1.0 Ice+1.0 Temp	203.42	-0.00	-0.00	4.97	-322.59	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	203.42	-0.01	-24.11	-2384.15	-320.84	13.81
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	203.42	11.84	-20.53	-2034.40	-1497.97	11.28
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	203.42	16.70	-16.71	-1655.76	-1981.78	8.92
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	203.42	20.40	-11.78	-1165.90	-2350.56	5.96
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	203.42	23.70	0.01	6.71	-2676.38	-0.87
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	203.42	20.88	12.07	1201.01	-2390.70	-7.68
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	203.42	16.72	16.73	1668.12	-1984.31	-10.35
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	203.42	11.86	20.54	2046.06	-1501.03	-12.15
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	203.42	0.01	23.57	2349.72	-324.40	-13.43
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	203.42	-11.84	20.53	2044.30	852.75	-11.28
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	203.42	-16.70	16.71	1665.62	1336.61	-8.92
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	203.42	-20.87	12.05	1197.95	1743.73	-6.13
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	203.42	-23.70	-0.01	3.17	2031.19	0.87
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	203.42	-20.41	-11.80	-1168.99	1707.12	7.47
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	203.42	-16.72	-16.73	-1658.25	1339.11	10.35
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	203.42	-11.86	-20.54	-2036.18	855.82	12.15
Dead+Wind 0 deg - Service	48.31	-0.02	-17.06	-1679.19	-33.23	10.51
Dead+Wind 30 deg - Service	48.31	8.16	-14.17	-1402.24	-842.39	8.97
Dead+Wind 45 deg - Service	48.31	11.47	-11.48	-1137.33	-1170.88	7.45
Dead+Wind 60 deg - Service	48.31	13.95	-8.06	-798.50	-1418.42	5.45
Dead+Wind 90 deg - Service	48.31	16.35	0.02	2.22	-1653.26	0.64
Dead+Wind 120 deg - Service	48.31	14.77	8.54	841.45	-1488.52	-4.66
Dead+Wind 135 deg - Service	48.31	11.49	11.50	1140.42	-1174.17	-6.88
Dead+Wind 150 deg - Service	48.31	8.19	14.18	1404.36	-846.42	-8.32
Dead+Wind 180 deg - Service	48.31	0.02	16.14	1600.73	-37.88	-9.81
Dead+Wind 210 deg - Service	48.31	-8.16	14.17	1402.04	771.29	-8.97
Dead+Wind 225 deg - Service	48.31	-11.47	11.48	1137.13	1099.78	-7.45

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Load Combination	Vertical K	Shear _x K	Shear _y K	Overtuning Moment, M _x kip-ft	Overtuning Moment, M _y kip-ft	Torque kip-ft
Dead+ Wind 240 deg - Service	48.31	-14.75	8.52	837.43	1415.09	-5.85
Dead+ Wind 270 deg - Service	48.31	-16.35	-0.02	-2.43	1582.16	-0.64
Dead+ Wind 300 deg - Service	48.31	-13.97	-8.08	-802.53	1349.65	4.36
Dead+ Wind 315 deg - Service	48.31	-11.49	-11.50	-1140.62	1103.07	6.88
Dead+ Wind 330 deg - Service	48.31	-8.19	-14.18	-1404.57	775.32	8.32

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-48.31	0.00	0.00	48.31	0.00	0.000%
2	-0.06	-57.98	-71.34	0.06	57.98	71.34	0.000%
3	-0.06	-43.48	-71.34	0.06	43.48	71.34	0.000%
4	34.13	-57.98	-59.25	-34.13	57.98	59.25	0.000%
5	34.13	-43.48	-59.25	-34.13	43.48	59.25	0.001%
6	47.96	-57.98	-48.01	-47.96	57.98	48.01	0.000%
7	47.96	-43.48	-48.01	-47.96	43.48	48.01	0.000%
8	58.35	-57.98	-33.69	-58.35	57.98	33.69	0.000%
9	58.35	-43.48	-33.69	-58.35	43.48	33.69	0.000%
10	68.37	-57.98	0.06	-68.37	57.98	-0.06	0.000%
11	68.37	-43.48	0.06	-68.37	43.48	-0.06	0.000%
12	61.75	-57.98	35.73	-61.75	57.98	-35.73	0.000%
13	61.75	-43.48	35.73	-61.75	43.48	-35.73	0.000%
14	48.05	-57.98	48.10	-48.05	57.98	-48.10	0.000%
15	48.05	-43.48	48.10	-48.05	43.48	-48.10	0.000%
16	34.24	-57.98	59.31	-34.24	57.98	-59.31	0.000%
17	34.24	-43.48	59.31	-34.24	43.48	-59.31	0.000%
18	0.06	-57.98	67.48	-0.06	57.98	-67.48	0.000%
19	0.06	-43.48	67.48	-0.06	43.48	-67.48	0.000%
20	-34.13	-57.98	59.25	34.13	57.98	-59.25	0.000%
21	-34.13	-43.48	59.25	34.13	43.48	-59.25	0.001%
22	-47.96	-57.98	48.01	47.96	57.98	-48.01	0.000%
23	-47.96	-43.48	48.01	47.96	43.48	-48.01	0.000%
24	-61.69	-57.98	35.62	61.69	57.98	-35.62	0.000%
25	-61.69	-43.48	35.62	61.69	43.48	-35.62	0.000%
26	-68.37	-57.98	-0.06	68.37	57.98	0.06	0.000%
27	-68.37	-43.48	-0.06	68.37	43.48	0.06	0.000%
28	-58.41	-57.98	-33.80	58.41	57.98	33.80	0.000%
29	-58.41	-43.48	-33.80	58.41	43.48	33.80	0.000%
30	-48.05	-57.98	-48.10	48.05	57.98	48.10	0.000%
31	-48.05	-43.48	-48.10	48.05	43.48	48.10	0.000%
32	-34.24	-57.98	-59.31	34.24	57.98	59.31	0.000%
33	-34.24	-43.48	-59.31	34.24	43.48	59.31	0.000%
34	0.00	-203.42	0.00	0.00	203.42	0.00	0.000%
35	-0.01	-203.42	-24.11	0.01	203.42	24.11	0.000%
36	11.84	-203.42	-20.53	-11.84	203.42	20.53	0.000%
37	16.70	-203.42	-16.71	-16.70	203.42	16.71	0.000%
38	20.40	-203.42	-11.78	-20.40	203.42	11.78	0.000%
39	23.70	-203.42	0.01	-23.70	203.42	-0.01	0.000%
40	20.88	-203.42	12.07	-20.88	203.42	-12.07	0.000%
41	16.72	-203.42	16.73	-16.72	203.42	-16.73	0.000%
42	11.86	-203.42	20.54	-11.86	203.42	-20.54	0.000%
43	0.01	-203.42	23.57	-0.01	203.42	-23.57	0.000%
44	-11.84	-203.42	20.53	11.84	203.42	-20.53	0.000%
45	-16.70	-203.42	16.71	16.70	203.42	-16.71	0.000%
46	-20.87	-203.42	12.05	20.87	203.42	-12.05	0.000%
47	-23.70	-203.42	-0.01	23.70	203.42	0.01	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
48	-20.41	-203.42	-11.80	20.41	203.42	11.80	0.000%
49	-16.72	-203.42	-16.73	16.72	203.42	16.73	0.000%
50	-11.86	-203.42	-20.54	11.86	203.42	20.54	0.000%
51	-0.02	-48.31	-17.06	0.02	48.31	17.06	0.000%
52	8.16	-48.31	-14.17	-8.16	48.31	14.17	0.000%
53	11.47	-48.31	-11.48	-11.47	48.31	11.48	0.000%
54	13.95	-48.31	-8.06	-13.95	48.31	8.06	0.000%
55	16.35	-48.31	0.02	-16.35	48.31	-0.02	0.000%
56	14.77	-48.31	8.54	-14.77	48.31	-8.54	0.000%
57	11.49	-48.31	11.50	-11.49	48.31	-11.50	0.000%
58	8.19	-48.31	14.18	-8.19	48.31	-14.18	0.000%
59	0.02	-48.31	16.14	-0.02	48.31	-16.14	0.000%
60	-8.16	-48.31	14.17	8.16	48.31	-14.17	0.000%
61	-11.47	-48.31	11.48	11.47	48.31	-11.48	0.000%
62	-14.75	-48.31	8.52	14.75	48.31	-8.52	0.000%
63	-16.35	-48.31	-0.02	16.35	48.31	0.02	0.000%
64	-13.97	-48.31	-8.08	13.97	48.31	8.08	0.000%
65	-11.49	-48.31	-11.50	11.49	48.31	11.50	0.000%
66	-8.19	-48.31	-14.18	8.19	48.31	14.18	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	0.00000216
6	Yes	4	0.00000001	0.00000001
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	0.00000186
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
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	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000218
22	Yes	4	0.00000001	0.00000085
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001

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33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000398
36	Yes	4	0.00000001	0.00000415
37	Yes	4	0.00000001	0.00000421
38	Yes	4	0.00000001	0.00000424
39	Yes	4	0.00000001	0.00000421
40	Yes	4	0.00000001	0.00000415
41	Yes	4	0.00000001	0.00000413
42	Yes	4	0.00000001	0.00000414
43	Yes	4	0.00000001	0.00000409
44	Yes	4	0.00000001	0.00000391
45	Yes	4	0.00000001	0.00000376
46	Yes	4	0.00000001	0.00000369
47	Yes	4	0.00000001	0.00000362
48	Yes	4	0.00000001	0.00000372
49	Yes	4	0.00000001	0.00000378
50	Yes	4	0.00000001	0.00000383
51	Yes	4	0.00000001	0.00000001
52	Yes	4	0.00000001	0.00000001
53	Yes	4	0.00000001	0.00000001
54	Yes	4	0.00000001	0.00000001
55	Yes	4	0.00000001	0.00000001
56	Yes	4	0.00000001	0.00000001
57	Yes	4	0.00000001	0.00000001
58	Yes	4	0.00000001	0.00000001
59	Yes	4	0.00000001	0.00000001
60	Yes	4	0.00000001	0.00000001
61	Yes	4	0.00000001	0.00000001
62	Yes	4	0.00000001	0.00000001
63	Yes	4	0.00000001	0.00000001
64	Yes	4	0.00000001	0.00000001
65	Yes	4	0.00000001	0.00000001
66	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	188 - 180	3.445	56	0.1503	0.0132
T2	180 - 160	3.191	56	0.1498	0.0132
T3	160 - 140	2.565	56	0.1414	0.0127
T4	140 - 120	1.985	56	0.1268	0.0118
T5	120 - 100	1.467	56	0.1084	0.0102
T6	100 - 80	1.018	56	0.0899	0.0080
T7	80 - 60	0.656	56	0.0688	0.0061
T8	60 - 40	0.385	56	0.0493	0.0046
T9	40 - 20	0.191	56	0.0308	0.0031
T10	20 - 0	0.062	56	0.0160	0.0014

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
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Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
193.50	BCD-87010	56	3.445	0.1503	0.0132	Inf
186.00	13' Platform w/rails	56	3.381	0.1503	0.0132	Inf
168.00	800-10121	56	2.812	0.1458	0.0130	153502
153.00	RR90-17-02DP	56	2.355	0.1368	0.0125	81787
144.00	SBNHH-1D65B	56	2.096	0.1301	0.0120	79248
124.00	APXVSPP18-C-A20	56	1.565	0.1122	0.0106	73428

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	188 - 180	14.206	12	0.6186	0.0551
T2	180 - 160	13.164	12	0.6165	0.0551
T3	160 - 140	10.584	12	0.5817	0.0534
T4	140 - 120	8.197	12	0.5219	0.0494
T5	120 - 100	6.061	12	0.4466	0.0426
T6	100 - 80	4.210	12	0.3705	0.0335
T7	80 - 60	2.717	12	0.2837	0.0255
T8	60 - 40	1.596	12	0.2032	0.0194
T9	40 - 20	0.795	12	0.1272	0.0128
T10	20 - 0	0.258	12	0.0658	0.0060

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
193.50	BCD-87010	12	14.206	0.6186	0.0551	244741
186.00	13' Platform w/rails	12	13.946	0.6185	0.0552	244741
168.00	800-10121	12	11.603	0.6000	0.0543	37280
153.00	RR90-17-02DP	12	9.721	0.5630	0.0523	19915
144.00	SBNHH-1D65B	12	8.655	0.5354	0.0504	19420
124.00	APXVSPP18-C-A20	12	6.467	0.4619	0.0442	17992

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	188	Leg	A325N	0.6250	4	0.20	20.71	0.010 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	1	0.84	7.83	0.107 ✓	1	Member Bearing
		Top Girt	A325N	0.5000	1	0.13	7.95	0.016 ✓	1	Bolt Shear
T2	180	Leg	A325N	0.7500	4	0.62	29.82	0.021 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	1	2.91	7.83	0.372 ✓	1	Member Bearing

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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
T3	160	Leg	A325N	0.8750	4	4.00	40.59	0.099 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	1	5.67	10.44	0.543 ✓	1	Member Bearing
T4	140	Leg	A325N	1.0000	4	10.34	53.01	0.195 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	1	8.04	11.70	0.687 ✓	1	Member Bearing
T5	120	Leg	A325N	1.0000	6	12.73	53.01	0.240 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	9.62	14.14	0.680 ✓	1	Member Bearing
T6	100	Leg	A325N	1.0000	8	14.71	53.01	0.277 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	11.55	14.14	0.817 ✓	1	Member Bearing
T7	80	Leg	A325N	1.0000	8	19.51	53.01	0.368 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	13.21	17.89	0.738 ✓	1	Bolt Shear
T8	60	Leg	A325N	1.0000	8	24.24	53.01	0.457 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	13.20	17.67	0.747 ✓	1	Member Bearing
T9	40	Leg	A325N	1.0000	8	28.78	53.01	0.543 ✓	1	Bolt Tension
		Diagonal	A325X	0.7500	1	15.28	17.67	0.864 ✓	1	Member Bearing
T10	20	Leg	A325N	1.0000	10	26.81	53.01	0.506 ✓	1	Bolt Tension
		Diagonal	A325X	0.7500	1	15.92	21.21	0.751 ✓	1	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio P _u /φP _n
T1	188 - 180	ROHN 2.5 STD	8.00	4.00	50.7 K=1.00	1.7040	-3.08	63.56	0.048 ¹ ✓
T2	180 - 160	ROHN 2.5 STD	20.03	5.01	63.4 K=1.00	1.7040	-15.12	57.14	0.265 ¹ ✓
T3	160 - 140	ROHN 3 EH	20.04	6.68	70.5 K=1.00	3.0159	-40.58	94.34	0.430 ¹ ✓
T4	140 - 120	ROHN 4 EH	20.04	6.68	54.3 K=1.00	4.4074	-78.90	159.90	0.493 ¹ ✓
T5	120 - 100	ROHN 5 EH	20.04	6.68	43.6 K=1.00	6.1120	-121.75	239.38	0.509 ¹ ✓
T6	100 - 80	ROHN 6 EHS	20.04	10.02	54.0 K=1.00	6.7133	-160.72	244.05	0.659 ¹ ✓
T7	80 - 60	ROHN 6 EH	20.03	10.02	54.8 K=1.00	8.4049	-204.44	303.76	0.673 ¹ ✓
T8	60 - 40	ROHN 8 EHS	20.04	10.02	41.2 K=1.00	9.7193	-246.80	386.35	0.639 ¹ ✓
T9	40 - 20	ROHN 8 EH	20.03	10.02	41.8 K=1.00	12.7627	-290.42	505.57	0.574 ¹ ✓

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T10	20 - 0	ROHN 8 EH	20.03	10.02	41.8 K=1.00	12.7627	-334.29	505.56	0.661 ¹ ✓

¹ P_u / φP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	188 - 180	L1 3/4x1 3/4x3/16	7.70	3.59	125.4 K=1.00	0.6211	-0.89	8.79	0.101 ¹ ✓
T2	180 - 160	L1 3/4x1 3/4x3/16	9.69	4.73	165.1 K=1.00	0.6211	-2.89	5.14	0.562 ¹ ✓
T3	160 - 140	L2 1/2x2 1/2x1/4	12.24	6.03	147.4 K=1.00	1.1900	-5.77	12.37	0.466 ¹ ✓
T4	140 - 120	L3x3x1/4	14.07	6.90	139.9 K=1.00	1.4400	-8.17	16.62	0.491 ¹ ✓
T5	120 - 100	L3x3x1/4	15.94	7.77	157.6 K=1.00	1.4400	-9.66	13.10	0.737 ¹ ✓
T6	100 - 80	L3 1/2x3 1/2x1/4	19.21	9.45	163.4 K=1.00	1.6900	-11.72	14.29	0.820 ¹ ✓
T7	80 - 60	L4x4x5/16	20.93	10.30	156.2 K=1.00	2.4000	-13.21	22.22	0.595 ¹ ✓
T8	60 - 40	L4x4x5/16	22.87	11.21	170.1 K=1.00	2.4000	-13.34	18.73	0.712 ¹ ✓
T9	40 - 20	L4x4x5/16	24.68	12.07	183.2 K=1.00	2.4000	-15.63	16.16	0.967 ¹ ✓
T10	20 - 0	L4x4x3/8	26.50	13.00	197.9 K=1.00	2.8600	-16.28	16.49	0.987 ¹ ✓

¹ P_u / φP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	188 - 180	L3x3x1/4	6.58	6.11	123.9 K=1.00	1.4400	-0.13	20.80	0.006 ¹ ✓

¹ P_u / φP_n controls

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Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	188 - 180	ROHN 2.5 STD	8.00	4.00	50.7	1.7040	0.68	76.68	0.009 ¹
T2	180 - 160	ROHN 2.5 STD	20.03	5.01	63.4	1.7040	10.52	76.68	0.137 ¹
T3	160 - 140	ROHN 3 EH	20.04	6.68	70.5	3.0159	31.08	135.72	0.229 ¹
T4	140 - 120	ROHN 4 EH	20.04	6.68	54.3	4.4074	64.16	198.34	0.323 ¹
T5	120 - 100	ROHN 5 EH	20.04	6.68	43.6	6.1120	101.98	275.04	0.371 ¹
T6	100 - 80	ROHN 6 EHS	20.04	10.02	54.0	6.7133	136.82	302.10	0.453 ¹
T7	80 - 60	ROHN 6 EH	20.03	10.02	54.8	8.4049	175.23	378.22	0.463 ¹
T8	60 - 40	ROHN 8 EHS	20.04	10.02	41.2	9.7193	211.70	437.37	0.484 ¹
T9	40 - 20	ROHN 8 EH	20.03	10.02	41.8	12.7627	248.99	574.32	0.434 ¹
T10	20 - 0	ROHN 8 EH	20.03	10.02	41.8	12.7627	285.74	574.32	0.498 ¹

¹ P_u / φP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	188 - 180	L1 3/4x1 3/4x3/16	7.70	3.59	82.9	0.3604	0.84	15.68	0.054 ¹
T2	180 - 160	L1 3/4x1 3/4x3/16	9.69	4.73	108.3	0.3604	2.91	15.68	0.186 ¹
T3	160 - 140	L2 1/2x2 1/2x1/4	12.24	6.03	96.0	0.7519	5.67	32.71	0.173 ¹
T4	140 - 120	L3x3x1/4	14.07	6.90	90.6	0.9394	8.04	45.79	0.176 ¹
T5	120 - 100	L3x3x1/4	15.94	7.77	102.0	0.9159	9.62	44.65	0.215 ¹
T6	100 - 80	L3 1/2x3 1/2x1/4	19.21	9.45	105.5	1.1034	11.55	53.79	0.215 ¹
T7	80 - 60	L4x4x5/16	20.93	10.30	101.0	1.5949	13.00	77.75	0.167 ¹
T8	60 - 40	L4x4x5/16	22.87	11.21	109.8	1.5949	13.20	77.75	0.170 ¹

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T9	40 - 20	L4x4x5/16	24.68	12.07	118.1	1.5949	15.28	77.75	0.196 ¹ ✓
T10	20 - 0	L4x4x3/8	26.50	13.00	128.1	1.8989	15.92	92.57	0.172 ¹ ✓

¹ P_u / φP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	188 - 180	L3x3x1/4	6.58	6.11	81.8	0.9628	0.08	41.88	0.002 ¹ ✓

¹ P_u / φP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	φP _{allow} K	% Capacity	Pass Fail
T1	188 - 180	Leg	ROHN 2.5 STD	2	-3.08	63.56	4.8	Pass
T2	180 - 160	Leg	ROHN 2.5 STD	20	-15.12	57.14	26.5	Pass
T3	160 - 140	Leg	ROHN 3 EH	47	-40.58	94.34	43.0	Pass
T4	140 - 120	Leg	ROHN 4 EH	68	-78.90	159.90	49.3	Pass
T5	120 - 100	Leg	ROHN 5 EH	89	-121.75	239.38	50.9	Pass
T6	100 - 80	Leg	ROHN 6 EHS	110	-160.72	244.05	65.9	Pass
T7	80 - 60	Leg	ROHN 6 EH	125	-204.44	303.76	67.3	Pass
T8	60 - 40	Leg	ROHN 8 EHS	140	-246.80	386.35	63.9	Pass
T9	40 - 20	Leg	ROHN 8 EH	155	-290.42	505.57	57.4	Pass
T10	20 - 0	Leg	ROHN 8 EH	170	-334.29	505.56	66.1	Pass
T1	188 - 180	Diagonal	L1 3/4x1 3/4x3/16	11	-0.89	8.79	10.1	Pass
T2	180 - 160	Diagonal	L1 3/4x1 3/4x3/16	25	-2.89	5.14	56.2	Pass
T3	160 - 140	Diagonal	L2 1/2x2 1/2x1/4	52	-5.77	12.37	46.6	Pass
T4	140 - 120	Diagonal	L3x3x1/4	73	-8.17	16.62	54.3 (b)	Pass
T5	120 - 100	Diagonal	L3x3x1/4	94	-9.66	13.10	49.1	Pass
T6	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	115	-11.72	14.29	68.7 (b)	Pass
T7	80 - 60	Diagonal	L4x4x5/16	130	-13.21	22.22	73.7	Pass
T8	60 - 40	Diagonal	L4x4x5/16	145	-13.34	18.73	59.5	Pass
T9	40 - 20	Diagonal	L4x4x5/16	160	-15.63	16.16	73.8 (b)	Pass
T10	20 - 0	Diagonal	L4x4x3/8	175	-16.28	16.49	71.2	Pass
T1	188 - 180	Top Girt	L3x3x1/4	5	-0.13	20.80	74.7 (b)	Pass
							96.7	Pass
							98.7	Pass
							0.6	Pass
							1.6 (b)	
							Summary	

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
						Leg (T7)	67.3	Pass
						Diagonal (T10)	98.7	Pass
						Top Girt (T1)	1.6	Pass
						Bolt Checks	86.4	Pass
						RATING =	98.7	Pass

Element Map

Section No.	Section Elevation ft	Component Type	Element List
T1	188.00-180.00	Leg Diagonal Top Girt	1-3 7-18 4-6
T2	180.00-160.00	Leg Diagonal	19-21 22-45
T3	160.00-140.00	Leg Diagonal	46-48 49-66
T4	140.00-120.00	Leg Diagonal	67-69 70-87
T5	120.00-100.00	Leg Diagonal	88-90 91-108
T6	100.00-80.00	Leg Diagonal	109-111 112-123
T7	80.00-60.00	Leg Diagonal	124-126 127-138
T8	60.00-40.00	Leg Diagonal	139-141 142-153
T9	40.00-20.00	Leg Diagonal	154-156 157-168
T10	20.00-0.00	Leg Diagonal	169-171 172-183
			Total number of elements: 183

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Tension Force =	Tension := 295 kips	(Input From <i>tnxTower</i>)
Compression Force =	Compression := 345 kips	(Input From <i>tnxTower</i>)
Shear Force =	Shear := 43 kips	(Input From <i>tnxTower</i>)

Anchor Bolt Data:

ASTMA354-BC

Number of Anchor Bolts =	N := 10	(User Input)
Bolt Ultimate Strength =	$F_u := 125 \text{ ksi}$	(User Input)
Bolt Yield Strength =	$F_y := 93.75 \text{ ksi}$	(User Input)
Bolt Modulus =	E := 29000 ksi	(User Input)
Diameter of Anchor Bolts =	D := 1-in	(User Input)
Threads per Inch =	n := 8	(User Input)
	$\eta := 0.55$	For grouted Base Plate per TIA-222-G Section 4.9.9

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot \text{in}^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot \text{in}}{n} \right)^2 = 0.606 \cdot \text{in}^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.878 \cdot \text{in}$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.22 \cdot \text{in}$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.066 \cdot \text{in}^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{\text{Max}} := \frac{\text{Tension}}{N} = 29.5 \cdot \text{kips}$

Maximum Compressive Force = $C_{\text{Max}} := \frac{\text{Compression}}{N} = 34.5 \cdot \text{kips}$

Maximum Shear Force = $V_{\text{Max}} := \frac{\text{Shear}}{N} = 4.3 \cdot \text{kips}$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_n = 60.574 \cdot \text{k}$

Bolt % of Capacity = $\frac{\left(C_{\text{Max}} + \frac{V_{\text{Max}}}{\eta} \right)}{\Phi R_{nt}} \cdot 100 = 69.9$

Condition1 = $\left[\frac{\left(C_{\text{Max}} + \frac{V_{\text{Max}}}{\eta} \right)}{\Phi R_{nt}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right]$

Condition1 = "OK"

Foundation Analysis**Input Data:**Max. Reactions at Tower Leg:

Shear = Shear := 43-kips (User Input)

Compression = Comp := 345-kips (User Input)

Uplift = Uplift := 295-kips (User Input)

Foundation Properties:Pier Height = P_H := 12-ft (User Input)Pier Width Top = P_{W1} := 4.5-ft (User Input)Pier Width Bottom = P_{W2} := 4.5-ft (User Input)Pier Projection Above Grade = P_P := 0.5-ft (User Input)Pad Width = Pd_W := 11.75-ft (User Input)Pad Thickness = Pd_t := 2.0-ft (User Input)Depth Below Grade = H := 13.5-ft (User Input)Subgrade Properties:Concrete Unit Weight = γ_c := 150-pcf (User Input)Water Unit Weight = γ_w := 62.4-pcf (User Input)Soil Unit Weight = γ_s := 100-pcf (User Input)Uplift Angle = ψ := 30.0-deg (User Input)Ultimate Soil Bearing Capacity = BC_{soil} := 8000-psf (User Input)Coefficient of Friction = μ := 0.45 (User Input)

Calculated Data:

Volume of the Concrete Pad = $V_{pad} := Pd_w^2 \cdot Pd_t = 276.125 \cdot ft^3$

Volume of the Concrete Pier = $V_{pier} := \frac{P_H}{3} \cdot \left(P_{w1}^2 + P_{w2}^2 + \sqrt{P_{w1}^2 \cdot P_{w2}^2} \right) = 243 \cdot ft^3$

Total Volume of Concrete = $V_{Conc} := V_{pad} + V_{pier} = 519 \cdot ft^3$

Resisting Pyramid Base 1 = $B_1 := Pd_w^2 = 138.063 \cdot ft^2$

Resisting Pyramid Base 2 = $B_2 := \left[2 \cdot \tan(\psi) \cdot (H - Pd_t) + Pd_w \right]^2 = 626.454 \cdot ft^2$

Volume of Soil = $V_{Soil} := \left[\frac{(H - Pd_t)}{3} \cdot (B_1 + B_2 + \sqrt{B_1 \cdot B_2}) \right] - V_{pier} = 3815 \cdot ft^3$

Mass of Concrete = $Mass_{Conc} := V_{Conc} \cdot \gamma_c = 77.9 \cdot kips$

Mass of Soil = $Mass_{Soil} := V_{Soil} \cdot \gamma_s = 381.5 \cdot kips$

Total Mass = $Total_{mass} := 0.9 \cdot Mass_{Conc} + 0.75 \cdot Mass_{Soil} = 356.207 \cdot kips$

Check Uplift:

Required Factor of Safety = $F_S := 1$

ActualFS = $ActualFS := \frac{Total_{mass}}{Uplift} = 1.21$

Uplift_Check = $Uplift_Check := \text{if} \left(\frac{Total_{mass}}{Uplift} \geq F_S, "OK", "Overstressed" \right)$

Uplift_Check = "OK"

Check Bearing:

Cross Sectional Area of Pad = $A_{pad} := Pd_w^2 = 138 \cdot ft^2$

Section Modulus of Pad = $S_{pad} := \frac{(Pd_w)^3}{6} = 270 \cdot ft^3$

Bearing = $Bearing := \frac{Comp + Mass_{Conc}}{A_{pad}} + \frac{Shear \cdot (H + P_P)}{S_{pad}} = 5.29 \cdot ksf$

Bearing_Check = $Bearing_Check := \text{if} (Bearing \leq 0.75 \cdot BC_{soil}, "OK", "No Good")$

Bearing_Check = "OK"

SITE NAME	E WINDSOR CT		ECP - CELL #	8	31
LATITUDE	41-87-70.42 N		LONGITUDE	72-61-09.23 W	
AWS carrier add, TRDU to RRH upgrade, RET antenna upgrade. 700 60W RRH will use both low band ports on the AWS and PCS SBNHH antenna. Tilts must be set to the same for both low band ports.			SAVE BUTTON		
			STRUCTURE TYPE		LATTICE
700 Mhz - LTE Current Config	ALPHA		BETA		GAMMA
EQUIPMENT TYPE	eNodeB		eNodeB		eNodeB
ANTENNA TYPE	BXA-70063-6CF-2-750MHZ		BXA-70063-6CF-2-750MHZ		BXA-70063-6CF-5-750MHZ
QTY OF ANTENNAS PER FACE	skeep as placeholder		skeep as placeholder		skeep as placeholder
ORIENTATION (DEG)	40		170		290
DOWN TILT (MECH/DEG)	0		0		0
RAD CTR (FT AGL)	140		140		140
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL					
700 Mhz - LTE Future Config	ALPHA		BETA		GAMMA
EQUIPMENT TYPE	eNodeB		eNodeB		eNodeB
ANTENNA TYPE	SBNHH-1D65B-A1M		SBNHH-1D65B-A1M		SBNHH-1D65B-A1M
QTY OF ANTENNAS PER FACE	same as AWS/PCS		same as AWS/PCS		same as AWS/PCS
ORIENTATION (DEG)	40		170		290
DOWN TILT (MECH/DEG)	4 electrical		5 electrical		6 electrical
RAD CTR (FT AGL)	140		140		140
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL					
RRH - QTY/MODEL	1	ALU RH_2X60-700U	1	ALU RH_2X60-700U	1 ALU RH_2X60-700U
SECTOR DISTRIBUTION BOX					
MAIN DISTRIBUTION BOX					
850 Cellular - Current Config	ALPHA		BETA		GAMMA
EQUIPMENT TYPE	4.0B		4.0B		4.0B
ANTENNA TYPE	WPA-80090/4CF		WPA-80090/4CF		WPA-80090/4CF
QTY OF ANTENNAS PER FACE	2		2		2
ORIENTATION (DEG)	30		150		270
DOWN TILT (MECH/DEG)	0		0		0
RAD CTR (FT AGL)	140		140		140
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL	1	FD9R6004-2C_3L	1	FD9R6004-2C_3L	1 FD9R6004-2C_3L
850 Cellular - Future Config	ALPHA		BETA		GAMMA
EQUIPMENT TYPE	4.0B		4.0B		4.0B
ANTENNA TYPE	SBNHH-1D65B-A1M		SBNHH-1D65B-A1M		SBNHH-1D65B-A1M
QTY OF ANTENNAS PER FACE	1		1		1
ORIENTATION (DEG)	30		150		270
DOWN TILT (MECH/DEG)	0 electrical		0 electrical		0 electrical
RAD CTR (FT AGL)	140		140		140
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL	0	FD9R6004-2C_3L	0	FD9R6004-2C_3L	0 FD9R6004-2C_3L
DIPLEX WITH LTE CABLE					
1900 PCS - Current Config	ALPHA		BETA		GAMMA
EQUIPMENT TYPE	PCS Modcell 4.0		PCS Modcell 4.0		PCS Modcell 4.0
ANTENNA TYPE	948F85T2E-M_2		948F85T2E-M_2		948F85T2E-M_2
QTY OF ANTENNAS PER FACE	1		1		1
ORIENTATION (DEG)	30		150		270
DOWN TILT (MECH/DEG)	0		0		0
RAD CTR (FT AGL)	144		144		144
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL	1	FD9R6004-2C_3L	1	FD9R6004-2C_3L	1 FD9R6004-2C_3L
1900 PCS - Future Config	ALPHA		BETA		GAMMA
EQUIPMENT TYPE	1900 MHz BBU		1900 MHz BBU		1900 MHz BBU
ANTENNA TYPE	SBNHH-1D65B-A1M		SBNHH-1D65B-A1M		SBNHH-1D65B-A1M
QTY OF ANTENNAS PER FACE	1		1		1
ORIENTATION (DEG)	30		150		270
DOWN TILT (MECH/DEG)	2 electrical		4 electrical		3 electrical
RAD CTR (FT AGL)	144		144		144
TMA - QTY / MODEL					
DIPLEX WITH CELLULAR CABLE	NO		NO		NO
RRH - QTY/MODEL	1	ALU RH_2X90-PCS	1	ALU RH_2X90-PCS	1 ALU RH_2X90-PCS
SECTOR DISTRIBUTION BOX					
MAIN DISTRIBUTION BOX					

AWS - LTE ANTENNA ADD		ALPHA		BETA		GAMMA					
EQUIPMENT TYPE		2100 MHz BBU		2100 MHz BBU		2100 MHz BBU					
ANTENNA TYPE		SBNHH-1D65B-A1M		SBNHH-1D65B-A1M		SBNHH-1D65B-A1M					
QTY OF ANTENNAS PER FACE		1		1		1					
ORIENTATION (DEG)		30		150		290					
DOWN TILT (MECH/ELEC)		2 electrical		4 electrical		3 electrical					
RAD CTR (FT AGL)		140		140		140					
TMA - QTY / MODEL											
DIPLEXER - QTY / MODEL											
RRH - QTY/MODEL		1	ALU RH_2X90-AWS	1	ALU RH_2X90-AWS	1	ALU RH_2X90-AWS				
SECTOR DISTRIBUTION BOX											
MAIN DISTRIBUTION BOX		2				DB-T1-6Z-8AB-0Z					
NUMBER OF CABLE'S NEEDED				ESTIMATED CABLE LENGTH							
MAINLINE SIZE		TOTAL # OF MAINLINES		15	MAINLINE (FT)						
JUMPER SIZE		TOTAL # OF TOP JUMPERS		48	TOP JUMPER (FT)		12				
Equipment Cable Ordering		MAIN CABLE #	15	+	0	TOP JUMPER #	24				
FIBER LINE SIZE		TOTAL # OF FIBER LINES		2	FIBER LINE MODEL #		B158-1-08U8-S8J1				
JUMPER SIZE		TOTAL # OF TOP JUMPERS		9	TOP JUMPER MODEL #		B058-1-08U1-S1J1				
Fiber Cable Ordering		FIBER CABLE #	0	+	2	TOP JUMPER #	0				
TX / RX FREQUENCIES				TX POWER OUTPUT							
Cellular A-Band		PCS F / AWS-Band		700 Mhz C - Bloc	Cellular (Watts)		20				
TX - 869-880,890-891.5 MHz		TX - 1970-1975 / 2145-2155		TX - 746-757	PCS (Watts)		16				
RX - 824-835,845-846.5 MHz		RX - 1890-1895 / 1745-1755		RX - 776-787	LTE (Watts)		40				
ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1	800	Tx1/Rx0	RED	A7	800	Tx2/Rx0	BLUE	A13	800	Tx3/Rx0	GREEN
A2	1900	Tx1/Rx0	RED/WHITE	A8	1900	Tx2/Rx0	BLUE/WHITE	A14	1900	Tx3/Rx0	GREEN/WHITE
A3	700	Tx1/Rx0	RED/ORANGE	A9	700	Tx2/Rx0	BLUE/ORANGE	A15	700	Tx3/Rx0	GREEN/ORANGE
A4	700	Tx4/Rx1	RED/RED/ORANGE	A10	700	Tx5/Rx1	BLUE/BLUE/ORANGE	A16	700	Tx6/Rx1	GREEN/GREEN/ORANGE
A5	1900	Tx4/Rx1	RED/RED/WHITE	A11	1900	Tx5/Rx1	BLUE/BLUE/WHITE	A17	1900	Tx6/Rx1	GREEN/GREEN/WHITE
A6	800	Tx4/Rx1	RED/RED	A12	800	Tx5/Rx1	BLUE/BLUE	A18	800	Tx6/Rx1	GREEN/GREEN
RF ENGINEER				RF MANAGER				INITIALS		DATE	
Prepared By: Mark Brauer				Alex Restrepo				MB		10/16/2015	



SBNHH-1D65B

Andrew® Tri-band Antenna, 698–896 and 2 x 1710–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.

- Interleaved dipole technology providing for attractive, low wind load mechanical package

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1710–1880	1850–1990	1920–2180	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS, dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
CPR at Boresight, dB	20	23	20	20	17	21
CPR at Sector, dB	14	10	12	10	9	1
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR Return Loss, dB	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1710–1880	1850–1990	1920–2180	2300–2360
Gain by all Beam Tilts, average, dBi	14.5	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0° 14.6	0° 14.5	0° 17.4	0° 17.8	0° 18.1	0° 18.2
	7° 14.6	7° 14.4	3° 17.5	3° 17.9	3° 18.3	3° 18.4
	14° 14.2	14° 13.6	7° 17.4	7° 17.9	7° 18.2	7° 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	4

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, [download the whitepaper Time to Raise the Bar on BSAs.](#)

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® multiband with internal RET
Band	Multiband
Brand	DualPol® Teletilt®
Operating Frequency Band	1710 – 2360 MHz 698 – 896 MHz

Mechanical Specifications

Product Specifications

COMMScope®

SBNHH-1D65B



Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h 150.0 mph

Dimensions

Depth	181.0 mm 7.1 in
Length	1828.0 mm 72.0 in
Width	301.0 mm 11.9 in
Net Weight	18.4 kg 40.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10-30 Vdc
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female 8-pin DIN Male
RET Interface, quantity	1 female 1 male
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system



Included Products

BSAMNT-1 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

ALCATEL-LUCENT B13 RRH4X30-4R

Alcatel-Lucent B13 Remote Radio Head 4x30-4R is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

Supporting 2Tx/4Tx MIMO and 4-way Rx diversity, Alcatel-Lucent B13 RRH4x30-4R allows operators to have a compact radio solution to deploy LTE in the 700U band (700 MHz, 3GPP band 13), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B13 RRH4x30-4R product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity and up to 10MHz instantaneous bandwidth.

The Alcatel-Lucent B13 RRH4x30-4R is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

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

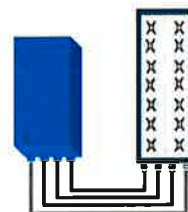


FEATURES

- Supporting LTE in 700 MHz band (700U, 3GPP band 13)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- 10MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in 700U band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through MIMO4
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



4x30W with 4T4R
or
2x60W with 2T4R

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

TECHNICAL SPECIFICATIONS

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz
Instantaneous bandwidth - #carriers	10MHz – 1 LTE carrier (in 10MHz occupied bandwidth)
LTE carrier bandwidth	10 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure – RX Diversity scheme	2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity
Sizes (HxWxD) in mm (in.)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield)
Volume in L	38 (with solar shield)
Weight in kg (lb) (w/o mounting HW)	26 (57.2) (with solar shield)
DC voltage range	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption
DC power consumption	550W typical @100% RF load (in 2Tx or 4TX mode)
Environmental conditions	-40°C (-40°F) /+55°C (+131°F)
Wind load (@150km/h or 93mph)	IP65 Frontal:<200N / Lateral :<150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate7, 9.8 Gbps) SFP single mode dual fiber
AISG interfaces	1 AISG2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) – 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

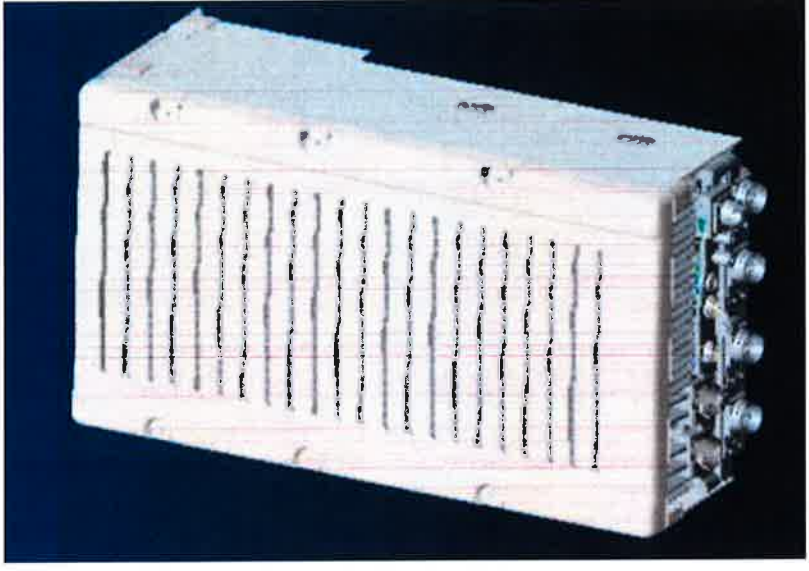
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NEW PCS RF MODULES FOR VZW

RRH2X60 - HW CHARACTERISTICS

LR14.3

RRH2X60	
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC
	Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (downward facing)
Dimensions	22"(h) x 12"(w) x 9.4" (d)**
Weight	55lb**



** - Includes solar shield but not mounting brackets (8 lbs.)

VZW Network Equipment Reporting Form (NERF)

Vendor	Alcatel-Lucent		Model	B66a RRH 4Tx/4Rx 4x45W or 2x 90W (SW selectable)		Function	RRH for distributed architecture with a CPRI interface between digital and RF processing components. The RRH has 4 Tx ports and 4 Rx ports. Can be SW configured for 2 Tx with 90W rf per port or 4 Tx with 45W rf per port. The RRH has passive cooling only.		
*1)Equipment Configuration	*2)Heat Release @50°F Intake Temp [W]		*3)Airflow Rate @ 100% Activity Rate [cfm]		*4)Dimensions [in]		Non-Thermal Data		
	100% Activity	50% Activity	Nominal (70°F)	Max (95°F)	External (WxDxH)	Clear (F/R/S)	Installed Weight [lb]	*5)Sound @ Nominal [LwAd]	*6)Name Plate [W]
Minimum			N/A Convection cooled	N/A Convection cooled	w/o Solar Shield W = 11.4in D = 6.7in H = 25.2in (W=290mm) (D=170mm) (H=640mm)	Front: 12" Rear: 7.5" Right: 12" Left: 12" Top: 12" Bottom: 24"			
Typical			N/A Convection cooled	N/A Convection cooled	with Solar Shield W = 12in D = 7.6in H = 25.8in (W=304mm) (D=193mm) (H=655mm)		62lb 72 lb(w mounting brackets)	N/A Convection cooled	
Full	825W (add 60W for AISG)	TBD	N/A Convection cooled	N/A Convection cooled	N/A			N/A Convection cooled	
*7)Equipment EC-Class	N/A Convection cooled	*10)Fan Speed	N/A Convection cooled	*13)Fan Hot-Swap	N/A Convection cooled	*16)Environ. Tests	N/A Convection cooled	*18)Temp. Rise [°F]	N/A Convection cooled
*8)Non-Optimal EC-Class	N/A Convection cooled	*11)Fan Logic	N/A Convection cooled	*14)Shut-Down	N/A Convection cooled	*17)Allow. Max [°F]	N/A Convection cooled	*19)Rec. Max [°F]	N/A Convection cooled
*9)Exhaust Openings	N/A Convection cooled	*12)Fan Alarm	N/A Convection cooled	*15)Temp. Access	N/A Convection cooled	*17)Allow. Min [°F]	N/A Convection cooled	*19)Rec. Min [°F]	N/A Convection cooled
Power Reporting									
Power Input	-48V		No. Power Supplies		N/A (Customer provided power plant)	Number of Inputs per Power Supply		1	
*24)Maximum Demand (total system in Watts)	825W (add 60W for AISG)		Maximum Input (each power supply in Watts)		N/A (Customer provided power plant)	Maximum Output (each power supply in Watts)		58W (to AISG port, 29V/2A)	
Power Supply Connection Type	DC entry via Conduit Box		Power Supply Make & Model		N/A (Customer provided power plant)				
Input Protection	no input fuse		Input Protection Make & Model		N/A (Customer provided power plant)				
Redundancy Scheme	N/A								
Nominal Voltage	-48VDC		Maximum Voltage		-57V	Minimum Voltage		-38V	
*25)Max Current at Nominal Voltage	17.2A (add 1.2A if AISG port loaded 2A*29V)		*25)Max Current at Maximum Voltage		14.5A (add 1A if AISG port loaded 2A*29V)	*25)Max Current at Minimum Voltage		21.7A (add 1.5A if AISG port loaded 2A*29V)	

Return completed forms to Engineering and Operations Support (EOS)

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DC and Fiber Management Distribution Boxes for HYBRIFLEX™ Cable

Product Description

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

Features/Benefits

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



Technical Specifications

Mechanical Specifications

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

Electrical Specifications

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

* This data is provisional and subject to change.

All information contained in the present datasheet is subject to confirmation at time of ordering.