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January 27, 2023

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

Re: **EM-VER-158-221017 – Cellco Partnership d/b/a Verizon Wireless – 880 Post Road East, Westport, Connecticut**

Dear Attorney Bachman:

Pursuant to Condition No. 1 of the Siting Council's December 12, 2022 approval of the above referenced Notice of Exempt Modification, enclosed is a revised Structural Analysis referencing the recently revised Connecticut State Building Code effective October 1, 2022.

Please contact me if you have any questions regarding this proposal.

Sincerely,



Kenneth C. Baldwin

Attachments

Structural Analysis Report

180' Existing Lattice Tower

Verizon Antenna Upgrade

CSP Tower Ref: #32

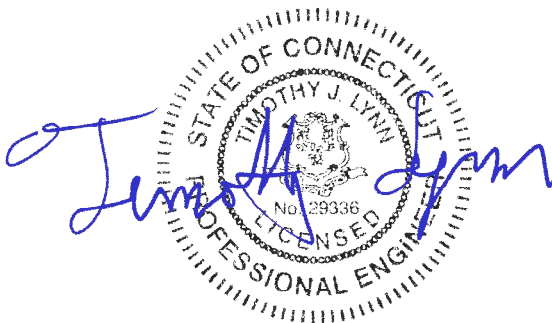
*880 Post Road East
Westport, CT*

CEN TEK Project No. 22027.01

~~Date: April 5, 2022~~

Rev 4: January 27, 2023

Max Stress Ratio = 95%



Prepared for:
Verizon Wireless
20 Alexander Drive
Wallingford, CT 06492

Table of Contents

SECTION 1 - REPORT

- INTRODUCTION
- ANTENNA AND APPURTENANCE SUMMARY
- PRIMARY ASSUMPTIONS USED IN THE ANALYSIS
- ANALYSIS
- TOWER LOADING
- TOWER CAPACITY
- FOUNDATION AND ANCHORS
- CONCLUSION

SECTION 2 – CONDITIONS & SOFTWARE

- STANDARD ENGINEERING CONDITIONS
- GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

SECTION 3 – CALCULATIONS

- tnxTower INPUT/OUTPUT SUMMARY
- tnxTower FEED LINE PLAN
- tnxTower FEED LINE DISTRIBUTION
- tnxTower DETAILED OUTPUT
- tnxTower INPUT/OUTPUT SUMMARY (REV.F FOR TWIST AND SWAY)
- tnxTower DETAILED OUTPUT (REV.F FOR TWIST AND SWAY)
- ANCHOR BOLT ANALYSIS
- FOUNDATION ANALYSIS

Introduction

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

The host tower is a 180-ft, three legged, lattice tower originally designed and manufactured by Rohn Industries. File no. 26263DL dated February 1, 1991. The tower geometry, structure member sizes and foundation information were taken from a previous structural analysis report prepared by Centek job no. 22123.00 dated October 21, 2022. The tower has been previously reinforced. All previous reinforcements are assumed to be installed. See Primary Assumptions Section below for detailed reinforcement reference reports.

Antenna and appurtenance inventory was taken from the aforementioned structural analysis and information provided by Verizon.

The tower consists of nine (9) vertical sections consisting of steel pipe legs conforming to ASTM A572-50 and steel pipe lateral bracing. The vertical tower sections are connected by bolted flange plates with the diagonal and horizontal bracing to pipe legs consisting of bolted connections. The width of the tower face is 8.5-ft at the top and 27.7-ft at the bottom.

Antenna and Appurtenance Summary

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

Antenna Type	Carrier	Mount	Antenna Centerline Elevation	Cable
(1) Telewave ANT490Y10-WR Yagi	D&K-51 CSP-1 (existing)	Leg Mounted	187'	(1) LDF5-50A
(1) Telewave ANT490Y10-WR Yagi	CSP-22 (existing)	Leg Mounted	181'	(1) LDF5-50A
(1) Celwave PA6-65 Dish	D&K-52 CSP-42 (existing)	Pipe Mounted to tower Leg	177'	(1) EW-63
(3) RFI BPA7496-180-14 Panel Antennas (1) Bird TTA unit	CSP-47,80-82 (existing)	(1) USF12-396 Sector Frame	170'	(3) AVA7-50A (1) LDF4-50A
(1) 3-ft Yagi	CSP (existing)	Pipe Mounted to tower Leg	169'	(1) LDF5-50A
(2) BXA-70063-4CF (1) BXA-70080-4CF (2) JAHH-65B-R3B (1) CBC78T-DS-43	VZW (existing to remove)	See Below Mount	160'	NA

CENTEK Engineering, Inc.
 Structural Analysis - 180-ft Lattice Tower #32 Westport
 Antenna Upgrade – Verizon
 Westport, CT
 Rev 4 ~ January 27, 2023

Antenna Type	Carrier	Mount	Antenna Centerline Elevation	Cable
(4) MX06FRO640-02 (3) MT6407-77A (1) 4439d-25A RRH (1) 4440d-13A RRH (1) OVP Unit (6) BSF0020F3V1-1	VZW (Proposed)	See Below Mount	160'	(1) 12x24 Hybrid Cable
(4) JAHH-65B-R3B (3) XXDWMM-12.5-65-8T (3) B2/B66A RRHs (3) B5/B13 RRHs (3) RT4401-48A RRHs (2) CBC78T-DS-43 (1) OVP Units	VZW (existing to remain)	(3) 15-ft Gate Booms	160'	(6) 1 5/8" Coax Cables (1) 12x24 Hybrid Cable
(3) FFVV-65B-R2 (3) TA08025-B605 (3) TA08025-B604 (3) RD1DC-9181-PF-48	Dish (Reserved)	Commscope MTC3975083	144'	(3) 12x24 Hybrid Cable
(3) QD6616-7 (3) DMP65R-BU6DA (3) AIR6419 (3) AIR6449 (3) 4478 B14 RRH Units (3) 4449 B5/12 RRH Units (9) RRUS-32 RRH Units (2) DC6-48-60-18-8F (1) DC9	AT&T (existing)	(3) 14-ft V Frames (p/n VFA14-H10-2120)	133'	(6) 1 1/4" Coax Cables (3) Fiber Cables (7) DC Cables
(6) Ericsson AIR21 (3) Andrew LNX-6515DS (3) RRUS-11 (3) TMAs	T-Mobile (existing)	(3) 12-ft T-Frames	125'	(18) 1 5/8" Coax Cables (1) 6x12 Hybrid Cables
(1) Telewave ANT150D Dipole	CSP (existing)	Pipe Mounted to tower Leg	113'	(1) LDF4-50A
(1) GPS Antenna	D&K-1 CSP-43 (existing)	Leg Mounted	61'	(1) LDF4-50A

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables should be routed as specified in section 3 of this report.
- **All previous reinforcements per the below listed structural analysis and modification reports are assumed to be installed.**
 - **Structural report prepared by AECOM Corp for AT&T project no. SMK-004 / 60581632 dated 7/13/18.**
 - **Structural report prepared by AECOM Corp for Verizon project no. VZ5-224 / 60620140 dated 7/10/20.**
- **The Verizon antenna mount information was taken from the mount analysis report and modification drawings prepared by Maser Consulting job no. 21777772A dated August 22, 2022**

A n a l y s i s

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 with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-H entitled “Structural Standard for Antenna Support Structures, Antennas and Small Wind Turbine Support Structures”, 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 P of the CSBC¹ and the wind speed data available in the TIA-222-H Standard.

T o w e r L o a d i n g

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-H, gravity loads of the tower structure and its components, and the application of 1.0” radial ice on the tower structure and its components.

Load Cases:	<u>Load Case 1</u> ; 130 mph (Risk Cat III) wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	<i>[Appendix P of the 2022 CT Building Code]</i>
	<u>Load Case 2</u> ; 50 mph wind speed w/ 1.00” radial ice plus gravity load – used in calculation of tower stresses.	<i>[Annex B of TIA-222-H]</i>
	<u>Load Case 3</u> ; 90 mph wind speed w/ 0.5” radial ice plus gravity load – used in calculation of tower twist and sway.	<i>[TIA-222-F used for calculation of tower twist and sway per the requirements of the CSP]</i>

¹ The 2021 International Building Code as amended by the 2022 Connecticut State Building Code (CSBC).

Tower Capacity

- Calculated stresses **were found to be within allowable limits.**

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T12)	20.0' - 30.0'	66.9%	PASS
Diagonal (T12)	20.0' - 30.0'	94.5%	PASS
Horizontal (T11)	30.0' - 40.0'	87.7%	PASS

- The tower combined deflection **was found to be within allowable limits.**

Deflection Criteria	Proposed (degrees)	Allowable (degrees)	Result
Sway (Tilt)	0.4654	n/a	n/a
Twist	0.2667	n/a	n/a
Combined	0.7321	0.75	PASS

TIA-222-F standard used for calculation of tower twist and sway per the requirements of the CSP.

Foundation and Anchors

The existing foundation consists of three (3) 4.5-ft diameter x 27-ft long reinforced concrete caissons. The base of the tower is connected to the foundation by means of (10) 1.00"Ø anchor bolts per leg embedded into the concrete foundation structure.

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

Load Effect	Proposed Tower Reactions
Leg Shear	54 kips
Leg Compression	379 kips
Leg Tension	333 kips
Base Moment	8,549 ft-kips
Base Shear	94 kips

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

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Compression and Shear	51.6%	PASS

- The foundation was found to be within allowable limits.

Foundation	Design Limit	(percentage of capacity)	Result
(3) Reinforced Concrete Caisson	Uplift	38%	PASS
	Bearing	49%	PASS

Conclusion

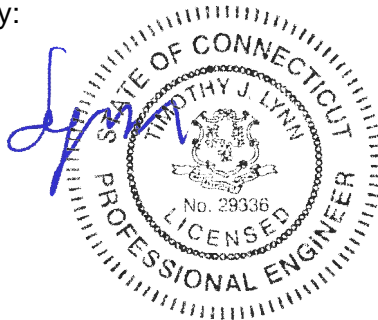
This analysis shows that the subject tower **is adequate** to support the proposed antenna configuration.

The analysis is based, in part, on the information provided to this office by Verizon and the CSP. 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 un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

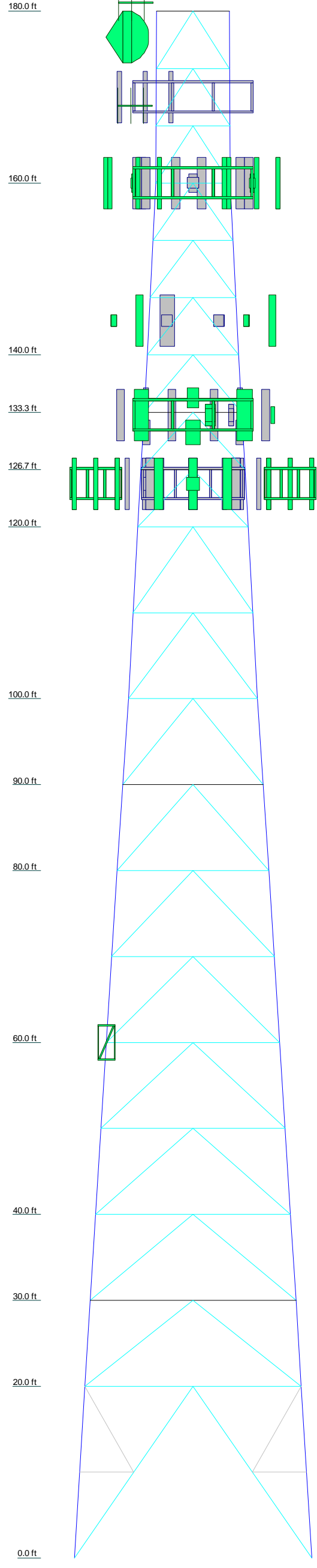
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-H standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 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	T13	T10	T11	T12	T10	T11	T12	T13	T14	T3	T2	T1	
Legs	1/3 9.6250x0.375 on ROHN 8 EH Leg Pipe	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	
Leg Grade	A572-42	A572-50	A572-42	A572-42	A572-50	A572-42	A572-42	A572-50	A572-50	A572-50	A572-50	A572-50	
Diagonals	ROHN 3 EH	ROHN 3 EH	ROHN 3 EH	ROHN 3 EH	ROHN 3 EH	ROHN 3 EH	ROHN 3 EH	ROHN 3 EH	ROHN 3 EH	ROHN 3 EH	ROHN 3 EH	ROHN 3 EH	
Diagonal Grade	A572-42	A572-50	A572-42	A572-42	A572-50	A572-42	A572-42	A572-50	A572-50	A572-50	A572-50	A572-50	
Top Girts	ROHN 2.5 EH	N.A.	ROHN 2.5 EH	N.A.	ROHN 2.5 EH	N.A.	ROHN 2.5 EH	N.A.	ROHN 2.5 EH	N.A.	ROHN 2.5 EH	ROHN 1.5 STD	
Horizontals	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	ROHN 1.5 STD
Red. Horizontals	P3.5x.226	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 1.5 STD
Red. Diagonals	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 1.5 STD
Red. Hips	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 1.5 STD
Inner Bracing	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 1.5 STD
Face Width (ft)	27.877	25.177	23.927	22.877	20.177	17.877	16.3595	12.792	11.4033	10.709	8.625	8.542	8.542
# Panels @ (ft)	1 @ 20	1 @ 20	1 @ 20	1 @ 20	1 @ 20	1 @ 20	1 @ 20	1 @ 20	1 @ 20	1 @ 20	1 @ 20	1 @ 20	1 @ 20
Weight (lb)	35588.4	6187.6	3139.0	2942.5	5700.5	1722.7	3821.3	1080.4	842.2	825.9	1486.6	1250.4	1250.4



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
ANT940Y10-WR (CSP)	187	Commscope MTC3975083 8-ft V-Frame (Dish - Reserved)	144
ANT940Y10-WR (CSP - Yagi Antenna)	181	Commscope MTC3975083 8-ft V-Frame (Dish - Reserved)	144
PA6-65AC (DNK-52 / CSP-42)	177	AIR6449 (ATI)	133
RFI BPS7496-180-14 Panel Antenna (CSP-80)	170	DMP65R-BU6D (ATI)	133
RFI BPS7496-180-14 Panel Antenna (CSP-81)	170	QD6616-7 (ATI)	133
RFI BPS7496-180-14 Panel Antenna (CSP-82)	170	AIR6419 (ATI)	133
SitePro1 USF12-396-U Mount Assembly w/ (3) 96" Mount Pipes (CSP 47, 80, 81, 82)	170	AIR6449 (ATI)	133
432E-831-01T TTA Unit (Re-Located TMA (CSP))	170	DMP65R-BU6D (ATI)	133
3' Yagi (CSP)	169	RRUS-32 B66 (ATI)	133
B2/B66A RRH (Verizon)	160	RRUS-32 (ATI)	133
B5/B13 RRH (Verizon)	160	RRUS-32 (ATI)	133
CBRS RRH-RT4401-48A (Verizon)	160	RRUS-32 (ATI)	133
RF4439d-25A (B2/B66A RRH) (Verizon)	160	RRUS-32 B66 (ATI)	133
RF4440d-13A (B5/B13 RRH) (Verizon)	160	RRUS-32 (ATI)	133
JAHH-65B-R3B Panel Antenna (Verizon)	160	RRUS-32 (ATI)	133
JAHH-65B-R3B Panel Antenna (Verizon)	160	RRUS-32 B66 (ATI)	133
XXDWMM-12.5-65-8T-CBRS Panel (Verizon)	160	RRUS-32 (ATI)	133
MT6407-77A (Verizon)	160	RRUS-32 (ATI)	133
CBC78T-DS-43-2X Diplexer (Verizon)	160	4478 B14 (ATI)	133
B2/B66A RRH (Verizon)	160	4478 B14 (ATI)	133
B5/B13 RRH (Verizon)	160	4478 B14 (ATI)	133
CBRS RRH-RT4401-48A (Verizon)	160	4499 B5/B12 (ATI)	133
JAHH-65B-R3B Panel Antenna (Verizon)	160	4499 B5/B12 (ATI)	133
JAHH-65B-R3B Panel Antenna (Verizon)	160	4499 B5/B12 (ATI)	133
XXDWMM-12.5-65-8T-CBRS Panel (Verizon)	160	DC6-48-60-18-8F (Squid Suppressor (ATI)	133
MT6407-77A (Verizon)	160	DC6-48-60-18-8F (Squid Suppressor (ATI)	133
CBC78T-DS-43-2X Diplexer (Verizon)	160	DC9 (ATI)	133
B2/B66A RRH (Verizon)	160	SitePro VFA14-10 (ATI)	133
B5/B13 RRH (Verizon)	160	SitePro VFA14-10 (ATI)	133
CBRS RRH-RT4401-48A (Verizon)	160	SitePro VFA14-10 (ATI)	133
DB-T1-6Z-8AB-0Z Distribution Box (Verizon)	160	QD6616-7 (ATI)	133
DB-T1-6Z-8AB-0Z Distribution Box (Verizon)	160	AIR6419 (ATI)	133
(2) BSF0020F3V1-1 (Verizon)	160	AIR6449 (ATI)	133
(2) BSF0020F3V1-1 (Verizon)	160	DMP65R-BU6D (ATI)	133
(2) BSF0020F3V1-1 (Verizon)	160	QD6616-7 (ATI)	133
ROHN 6'x15' Boom Gate (1) (Verizon)	160	AIR6419 (ATI)	133
ROHN 6'x15' Boom Gate (1) (Verizon)	160	Generic Twin TMA unit (T-Mobile)	125
MX06FRO640-02 (Verizon)	160	Generic Twin TMA unit (T-Mobile)	125
MX06FRO640-02 (Verizon)	160	AIR21 B2A/B4P (T-Mobile)	125
XXDWMM-12.5-65-8T-CBRS Panel (Verizon)	160	AIR21 B2A/B4P (T-Mobile)	125
MT6407-77A (Verizon)	160	AIR21 B2A/B4P (T-Mobile)	125
MX06FRO640-02 (Verizon)	160	LNX-6515DS (T-Mobile)	125
MX06FRO640-02 (Verizon)	160	LNX-6515DS (T-Mobile)	125
ROHN 6'x15' Boom Gate (1) (Verizon)	160	LNX-6515DS (T-Mobile)	125
FFVV-65B-R2 (Dish - Reserved)	144	RRUS-11 (T-Mobile)	125
FFVV-65B-R2 (Dish - Reserved)	144	RRUS-11 (T-Mobile)	125
FFVV-65B-R2 (Dish - Reserved)	144	RRUS-11 (T-Mobile)	125
TA08025-B604 (Dish - Reserved)	144	LTF12-372 Sector Mount (1) (T-Mobile)	125
TA08025-B604 (Dish - Reserved)	144	LTF12-372 Sector Mount (1) (T-Mobile)	125
TA08025-B605 (Dish - Reserved)	144	LTF12-372 Sector Mount (1) (T-Mobile)	125
TA08025-B605 (Dish - Reserved)	144	AIR21 B4A/B2P (T-Mobile)	125
TA08025-B605 (Dish - Reserved)	144	AIR21 B4A/B2P (T-Mobile)	125
TA08025-B605 (Dish - Reserved)	144	AIR21 B4A/B2P (T-Mobile)	125
RD1DC-9181-PF-48 (Dish - Reserved)	144	Generic Twin TMA unit (T-Mobile)	125
RD1DC-9181-PF-48 (Dish - Reserved)	144	ANT150D (CSP - 1-Bay Dipole)	113
RD1DC-9181-PF-48 (Dish - Reserved)	144	4' Standoff (DNK-1 / GPS)	60
Commscope MTC3975083 8-ft V-Frame (Dish - Reserved)	144	GPS (DNK-1 / GPS)	60

MATERIAL STRENGTH

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

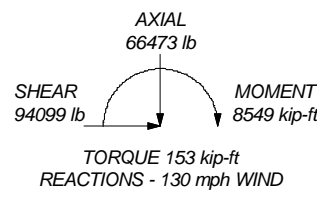
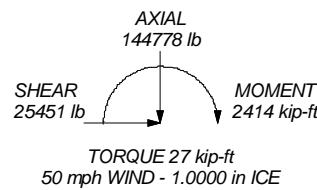
TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-H Standard.
2. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. P-Delta for analysis does not apply for this case - TIA-222-H Section 3.5
8. TOWER RATING: 94.5%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
 DOWN: 378838 lb
 SHEAR: 54309 lb

UPLIFT: -333278 lb
 SHEAR: 49780 lb



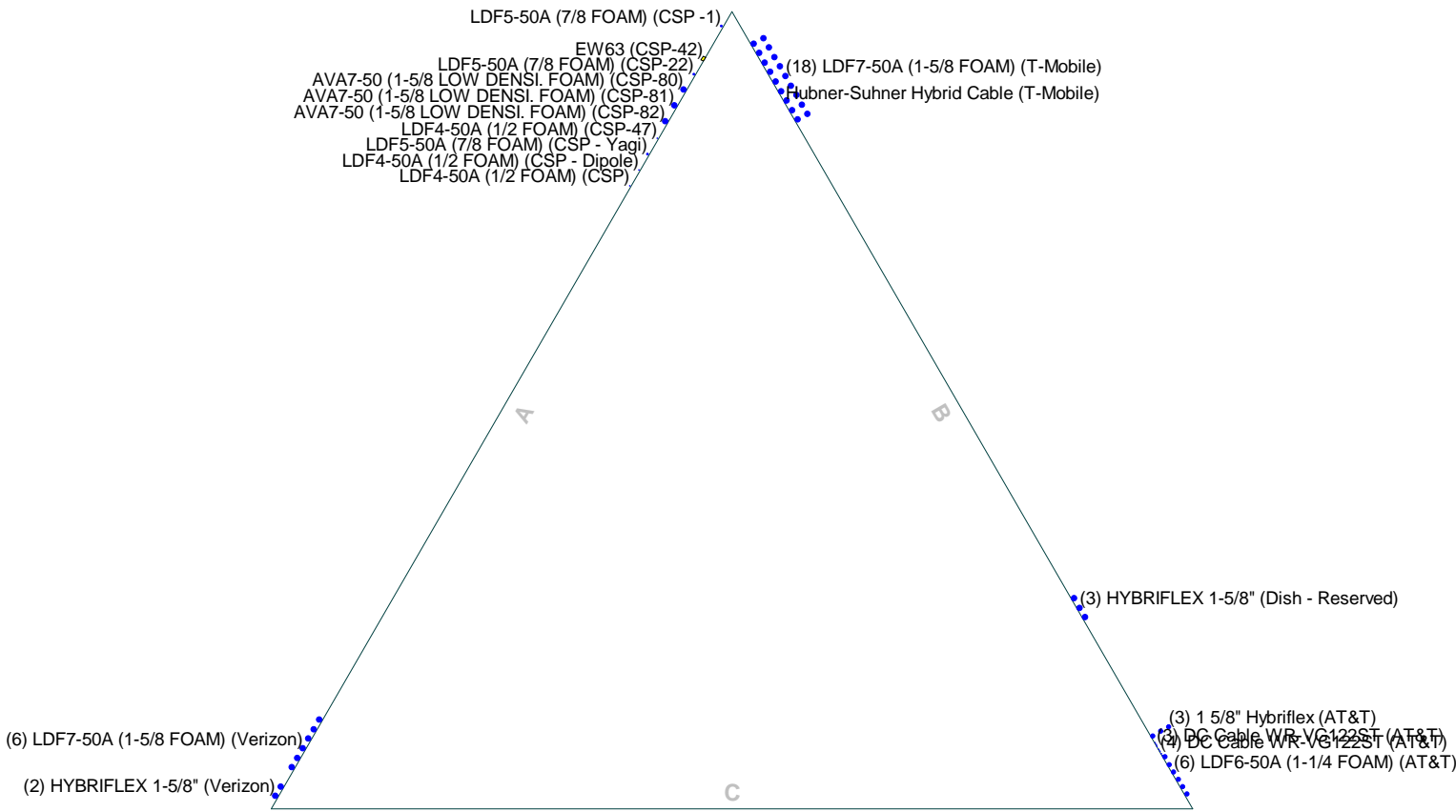
Centek Engineering Inc.
 63-2 North Branford Rd.
 Branford, CT 06405
 Phone: (203) 488-0580
 FAX: (203) 488-8587

Job: **22027.01 - Westport**
 Project: **180-ft Lattice Tower (CSP #32)**
 Client: Verizon
 Code: TIA-222-H
 Path:

Drawn by: T.JL
 Date: 01/27/23
 App'd:
 Scale: NTS
 Dwg No. E-1

Feed Line Plan

— Round
 — Flat
 — App In Face
 — App Out Face

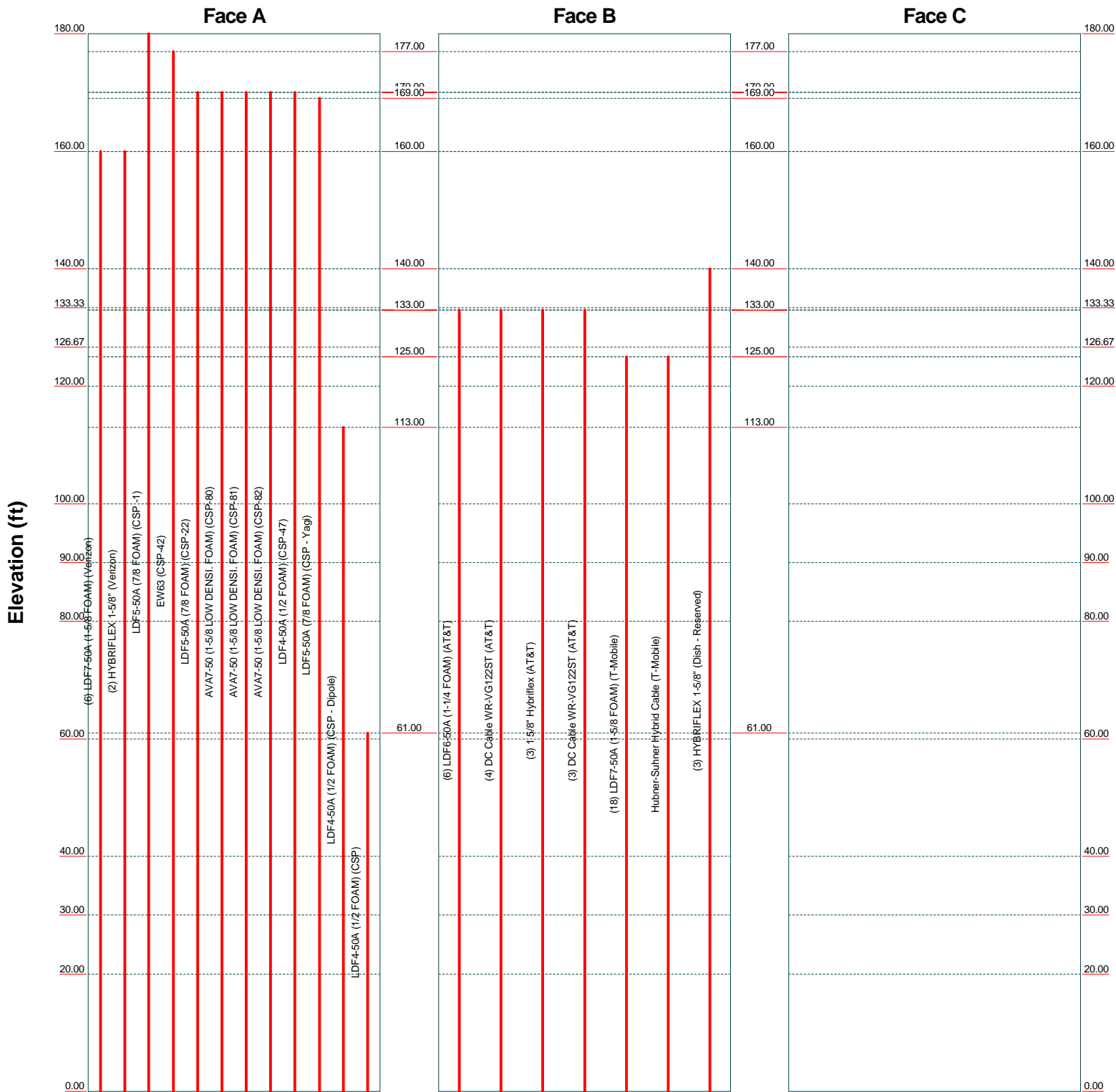


Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587		Job: 22027.01 - Westport	
		Project: 180-ft Lattice Tower (CSP #32)	
Client: Verizon	Drawn by: TJL	App'd:	
Code: TIA-222-H	Date: 01/27/23	Scale: NTS	
Path:		Dwg No. E-7	

Feed Line Distribution Chart

0° - 180°

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



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tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 1 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.

The base of the tower is set at an elevation of 0.00 ft above the ground line.

The face width of the tower is 8.54 ft at the top and 27.68 ft at the base.

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

The following design criteria apply:

Tower base elevation above sea level: 0.00 ft.

Basic wind speed of 130 mph.

Risk Category III.

Exposure Category C.

Simplified Topographic Factor Procedure for wind speed-up calculations is used.

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.

Deflections calculated using a wind speed of 60 mph.

P-Delta for analysis does not apply for this case - TIA-222-H Section 3.5.

Pressures are calculated at each section.

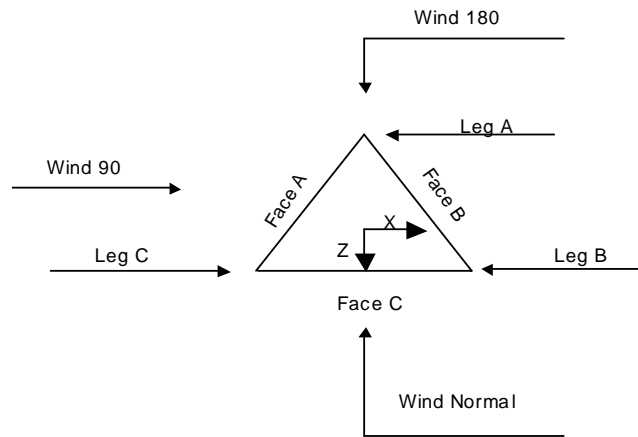
Stress ratio used in tower member design is 1.

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 Ignore KL/ry For 60 Deg. Angle Legs 	<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-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <li style="text-align: center;">Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
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tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 2 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJJ



Triangular Tower

Tower Section Geometry

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

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	<i>ft</i>	<i>ft</i>				<i>in</i>	<i>in</i>
T1	180.00-160.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T2	160.00-140.00	6.67	K Brace Down	No	Yes	0.0000	0.0000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	3 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T3	140.00-133.33	6.67	K Brace Down	No	Yes	0.0000	0.0000
T4	133.33-126.67	6.67	K Brace Down	No	Yes	0.0000	0.0000
T5	126.67-120.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T6	120.00-100.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T7	100.00-90.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T8	90.00-80.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T9	80.00-60.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T10	60.00-40.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T11	40.00-30.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T12	30.00-20.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T13	20.00-0.00	20.00	K1 Down	No	Yes	0.0000	0.0000

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-160.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T2 160.00-140.00	Pipe	ROHN 4 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T3 140.00-133.33	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 2 EH	A572-50 (50 ksi)
T4 133.33-126.67	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 2 EH	A572-50 (50 ksi)
T5 126.67-120.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 2 XXS	A572-50 (50 ksi)
T6 120.00-100.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Pipe	Pipe 2.5 XXS	A572-50 (50 ksi)
T7 100.00-90.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T8 90.00-80.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T9 80.00-60.00	Arbitrary Shape	120deg_9.6250x0.375 BU on ROHN 8 EHS	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T10 60.00-40.00	Arbitrary Shape	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	A572-42 (42 ksi)	Pipe	ROHN 3 EH	A572-50 (50 ksi)
T11 40.00-30.00	Arbitrary Shape	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	A572-42 (42 ksi)	Pipe	ROHN 3 EH	A572-50 (50 ksi)
T12 30.00-20.00	Arbitrary Shape	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	A572-42 (42 ksi)	Pipe	ROHN 3 EH	A572-50 (50 ksi)
T13 20.00-0.00	Arbitrary Shape	1/3 9.6250x0.375 on ROHN 8 EH Leg Pipe	A572-42 (42 ksi)	Pipe	ROHN 3 EH	A572-50 (50 ksi)

Tower Section Geometry (cont'd)

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

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	4 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

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

Tower Section Geometry (cont'd)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180.00-160.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T2 160.00-140.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T3 140.00-133.33	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T4 133.33-126.67	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T5 126.67-120.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T6 120.00-100.00	None	Single Angle		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T7 100.00-90.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T8 90.00-80.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T9 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T10 60.00-40.00	None	Single Angle		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T11 40.00-30.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T12 30.00-20.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T13 20.00-0.00	None	Flat Bar		A36 (36 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)

Tower Section Geometry (cont'd)

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

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 5 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJJ

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

Tower Section Geometry (cont'd)

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

Tower Section Geometry (cont'd)

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
<i>ft</i>	<i>ft²</i>	<i>in</i>					<i>in</i>	<i>in</i>	<i>in</i>
T1 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 140.00-133.33	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 133.33-126.67	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 126.67-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 100.00-90.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	6 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

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
T8 90.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T10 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T11 40.00-30.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T12 30.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T13 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry (cont'd)

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors ¹							
				X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace	
				X Y	X Y	X Y	X Y	X Y	X Y	X Y	
T1 180.00-160.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T2 160.00-140.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T3 140.00-133.33	Yes	Yes	1	1	1	1	1	1	1	1	1
T4 133.33-126.67	Yes	Yes	1	1	1	1	1	1	1	1	1
T5 126.67-120.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T6 120.00-100.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T7 100.00-90.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T8 90.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T9 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T10 60.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T11 40.00-30.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T12 30.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T13 20.00-0.00	Yes	Yes	1	1	0.5	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.

Tower Section Geometry (cont'd)

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	9 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

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.
T8 90.00-80.00	Flange	1.0000	0	0.6250	3	0.6250	2	0.6250	0	0.6250	0	0.6250	2	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T9 80.00-60.00	Flange	1.0000	8	0.6250	3	0.6250	2	0.6250	0	0.6250	0	0.6250	2	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T10 60.00-40.00	Flange	1.0000	8	0.6250	3	0.6250	2	0.6250	0	0.6250	0	0.6250	2	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T11 40.00-30.00	Flange	1.0000	8	0.6250	3	0.6250	2	0.6250	0	0.6250	0	0.6250	2	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T12 30.00-20.00	Flange	1.0000	0	0.6250	3	0.6250	2	0.6250	0	0.6250	0	0.6250	2	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T13 20.00-0.00	Flange	1.0000	8	0.6250	3	0.6250	2	0.6250	0	0.6250	0	0.7500	2	0.6250	0
		A325N		A325X		A325N		A325N		A325N		A325N		A325N	

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
* LDF6-50A (1-1/4 FOAM) (AT&T)	B	No	No	Ar (CaAa)	133.00 - 0.00	0.0000	0.46	6	6	1.5500	1.5500		0.66
DC Cable WR-VG122S T (AT&T)	B	No	No	Ar (CaAa)	133.00 - 0.00	0.0000	0.43	4	4	0.4000	0.4000		0.25
1 5/8" Hybriflex (AT&T)	B	No	No	Ar (CaAa)	133.00 - 0.00	0.0000	0.41	3	1	1.6250	1.6250		1.13
DC Cable WR-VG122S T (AT&T)	B	No	No	Ar (CaAa)	133.00 - 0.00	0.0000	0.42	3	3	0.4000	0.4000		0.25
* LDF7-50A (1-5/8 FOAM) (T-Mobile)	B	No	No	Ar (CaAa)	125.00 - 0.00	0.0000	-0.41	18	9	1.9800	1.9800		0.82
Hubner-Suhner Hybrid Cable (T-Mobile)	B	No	No	Ar (CaAa)	125.00 - 0.00	0.0000	-0.385	1	1	0.7087	0.7087		0.48
* LDF7-50A (1-5/8 FOAM) (Verizon)	A	No	No	Ar (CaAa)	160.00 - 0.00	0.0000	-0.42	6	6	1.9800	1.9800		0.82
HYBRIFLEX 1-5/8" (Verizon)	A	No	No	Ar (CaAa)	160.00 - 0.00	0.0000	-0.48	2	2	1.9800	1.9800		1.90
* LDF5-50A (7/8 FOAM) (CSP -1)	A	No	No	Ar (CaAa)	180.00 - 0.00	0.0000	0.48	1	1	1.0900	1.0900		0.33
EW63 (CSP-42)	A	No	No	Af (CaAa)	177.00 - 0.00	0.0000	0.44	1	1	1.5742	1.5742		0.51

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	10 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF5-50A (7/8 FOAM) (CSP-22)	A	No	No	Ar (CaAa)	170.00 - 0.00	0.0000	0.42	1	1	1.0900	1.0900		0.33
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-80)	A	No	No	Ar (CaAa)	170.00 - 0.00	0.0000	0.4	1	1	1.9800	1.9800		0.72
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-81)	A	No	No	Ar (CaAa)	170.00 - 0.00	0.0000	0.38	1	1	1.9800	1.9800		0.72
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-82)	A	No	No	Ar (CaAa)	170.00 - 0.00	0.0000	0.36	1	1	1.9800	1.9800		0.72
LDF4-50A (1/2 FOAM) (CSP-47)	A	No	No	Ar (CaAa)	170.00 - 0.00	0.0000	0.34	1	1	0.6300	0.6300		0.15
LDF5-50A (7/8 FOAM) (CSP - Yagi)	A	No	No	Ar (CaAa)	169.00 - 0.00	0.0000	0.32	1	1	1.0900	1.0900		0.33
LDF4-50A (1/2 FOAM) (CSP - Dipole)	A	No	No	Ar (CaAa)	113.00 - 0.00	0.0000	0.3	1	1	0.6300	0.6300		0.15
LDF4-50A (1/2 FOAM) (CSP)	A	No	No	Ar (CaAa)	61.00 - 0.00	0.0000	0.28	1	1	0.6300	0.6300		0.15
HYBRIFLEX 1-5/8" (Dish - Reserved)	B	No	No	Ar (CaAa)	140.00 - 0.00	0.0000	0.25	3	3	1.9800	1.9800		1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight lb
T1	180.00-160.00	A	0.000	0.000	15.281	0.000	44.64
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	160.00-140.00	A	0.000	0.000	56.607	0.000	250.60
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T3	140.00-133.33	A	0.000	0.000	18.869	0.000	83.53
		B	0.000	0.000	3.960	0.000	38.00
		C	0.000	0.000	0.000	0.000	0.00
T4	133.33-126.67	A	0.000	0.000	18.869	0.000	83.53
		B	0.000	0.000	14.711	0.000	95.63
		C	0.000	0.000	0.000	0.000	0.00
T5	126.67-120.00	A	0.000	0.000	18.869	0.000	83.53
		B	0.000	0.000	33.451	0.000	174.87
		C	0.000	0.000	0.000	0.000	0.00
T6	120.00-100.00	A	0.000	0.000	57.426	0.000	252.55

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	11 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight lb
T7	100.00-90.00	B	0.000	0.000	118.527	0.000	600.82
		C	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	28.934	0.000	126.80
T8	90.00-80.00	B	0.000	0.000	59.264	0.000	300.41
		C	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	28.934	0.000	126.80
T9	80.00-60.00	B	0.000	0.000	59.264	0.000	300.41
		C	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	57.930	0.000	253.75
T10	60.00-40.00	B	0.000	0.000	118.527	0.000	600.82
		C	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	59.127	0.000	256.60
T11	40.00-30.00	B	0.000	0.000	118.527	0.000	600.82
		C	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	29.564	0.000	128.30
T12	30.00-20.00	B	0.000	0.000	59.264	0.000	300.41
		C	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	29.564	0.000	128.30
T13	20.00-0.00	B	0.000	0.000	59.264	0.000	300.41
		C	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	59.127	0.000	256.60

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight lb
T1	180.00-160.00	A	1.355	0.000	0.000	41.294	0.000	492.24
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	160.00-140.00	A	1.338	0.000	0.000	154.465	0.000	1917.64
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T3	140.00-133.33	A	1.326	0.000	0.000	51.304	0.000	633.38
		B		0.000	0.000	11.149	0.000	152.82
		C		0.000	0.000	0.000	0.000	0.00
T4	133.33-126.67	A	1.319	0.000	0.000	51.206	0.000	630.29
		B		0.000	0.000	45.555	0.000	529.46
		C		0.000	0.000	0.000	0.000	0.00
T5	126.67-120.00	A	1.312	0.000	0.000	51.103	0.000	627.05
		B		0.000	0.000	72.258	0.000	1126.78
		C		0.000	0.000	0.000	0.000	0.00
T6	120.00-100.00	A	1.297	0.000	0.000	156.834	0.000	1901.95
		B		0.000	0.000	241.107	0.000	3932.80
		C		0.000	0.000	0.000	0.000	0.00
T7	100.00-90.00	A	1.278	0.000	0.000	79.087	0.000	948.35
		B		0.000	0.000	120.152	0.000	1949.05
		C		0.000	0.000	0.000	0.000	0.00
T8	90.00-80.00	A	1.264	0.000	0.000	78.743	0.000	938.04
		B		0.000	0.000	119.851	0.000	1936.11
		C		0.000	0.000	0.000	0.000	0.00
T9	80.00-60.00	A	1.240	0.000	0.000	156.616	0.000	1843.89
		B		0.000	0.000	238.670	0.000	3827.93
		C		0.000	0.000	0.000	0.000	0.00
T10	60.00-40.00	A	1.199	0.000	0.000	160.368	0.000	1838.84
		B		0.000	0.000	236.929	0.000	3753.77

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 12 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJJ

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight lb
T11	40.00-30.00	C		0.000	0.000	0.000	0.000	0.00
		A	1.157	0.000	0.000	79.080	0.000	888.35
		B		0.000	0.000	117.574	0.000	1839.30
T12	30.00-20.00	C		0.000	0.000	0.000	0.000	0.00
		A	1.119	0.000	0.000	78.075	0.000	860.49
		B		0.000	0.000	116.765	0.000	1805.39
T13	20.00-0.00	C		0.000	0.000	0.000	0.000	0.00
		A	1.021	0.000	0.000	151.008	0.000	1582.42
		B		0.000	0.000	229.396	0.000	3440.18
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
T1	180.00-160.00	-1.5005	-14.6984	-1.9995	-19.2026
T2	160.00-140.00	-19.2261	-5.8802	-22.6760	-6.6175
T3	140.00-133.33	-16.1958	-5.3451	-18.9825	-5.8951
T4	133.33-126.67	1.7675	2.8565	4.6883	4.7018
T5	126.67-120.00	4.4217	-18.0405	6.4306	-8.2316
T6	120.00-100.00	5.1686	-25.3163	7.0343	-13.4695
T7	100.00-90.00	5.5304	-27.8393	7.5951	-15.0957
T8	90.00-80.00	5.8711	-29.8500	8.1090	-16.1573
T9	80.00-60.00	5.0383	-27.1601	8.0266	-16.5556
T10	60.00-40.00	5.3772	-30.3771	8.4466	-19.1519
T11	40.00-30.00	5.7149	-32.5426	9.0039	-20.4232
T12	30.00-20.00	5.9375	-33.9677	9.3574	-21.2129
T13	20.00-0.00	6.3694	-36.6809	9.9551	-22.4925

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T1	17	LDF5-50A (7/8 FOAM)	160.00 - 180.00	1.0000	1.0000
T1	19	EW63	160.00 - 177.00	1.0000	1.0000
T1	20	LDF5-50A (7/8 FOAM)	160.00 - 170.00	1.0000	1.0000
T1	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	160.00 - 170.00	1.0000	1.0000
T1	22	AVA7-50 (1-5/8 LOW DENS. FOAM)	160.00 - 170.00	1.0000	1.0000
T1	23	AVA7-50 (1-5/8 LOW DENS. FOAM)	160.00 - 170.00	1.0000	1.0000
T1	24	LDF4-50A (1/2 FOAM)	160.00 - 170.00	1.0000	1.0000
T1	25	LDF5-50A (7/8 FOAM)	160.00 - 169.00	1.0000	1.0000
T2	14	LDF7-50A (1-5/8 FOAM)	140.00 -	1.0000	1.0000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	13 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
			160.00		
T2	15	HYBRIFLEX 1-5/8"	140.00 -	1.0000	1.0000
			160.00		
T2	17	LDF5-50A (7/8 FOAM)	140.00 -	1.0000	1.0000
			160.00		
T2	19	EW63	140.00 -	1.0000	1.0000
			160.00		
T2	20	LDF5-50A (7/8 FOAM)	140.00 -	1.0000	1.0000
			160.00		
T2	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	140.00 -	1.0000	1.0000
			160.00		
T2	22	AVA7-50 (1-5/8 LOW DENS. FOAM)	140.00 -	1.0000	1.0000
			160.00		
T2	23	AVA7-50 (1-5/8 LOW DENS. FOAM)	140.00 -	1.0000	1.0000
			160.00		
T2	24	LDF4-50A (1/2 FOAM)	140.00 -	1.0000	1.0000
			160.00		
T2	25	LDF5-50A (7/8 FOAM)	140.00 -	1.0000	1.0000
			160.00		
T3	14	LDF7-50A (1-5/8 FOAM)	133.33 -	1.0000	1.0000
			140.00		
T3	15	HYBRIFLEX 1-5/8"	133.33 -	1.0000	1.0000
			140.00		
T3	17	LDF5-50A (7/8 FOAM)	133.33 -	1.0000	1.0000
			140.00		
T3	19	EW63	133.33 -	1.0000	1.0000
			140.00		
T3	20	LDF5-50A (7/8 FOAM)	133.33 -	1.0000	1.0000
			140.00		
T3	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	133.33 -	1.0000	1.0000
			140.00		
T3	22	AVA7-50 (1-5/8 LOW DENS. FOAM)	133.33 -	1.0000	1.0000
			140.00		
T3	23	AVA7-50 (1-5/8 LOW DENS. FOAM)	133.33 -	1.0000	1.0000
			140.00		
T3	24	LDF4-50A (1/2 FOAM)	133.33 -	1.0000	1.0000
			140.00		
T3	25	LDF5-50A (7/8 FOAM)	133.33 -	1.0000	1.0000
			140.00		
T3	28	HYBRIFLEX 1-5/8"	133.33 -	0.6000	0.6000
			140.00		
T4	2	LDF6-50A (1-1/4 FOAM)	126.67 -	1.0000	1.0000
			133.00		
T4	3	DC Cable WR-VG122ST	126.67 -	1.0000	1.0000
			133.00		
T4	4	1 5/8" Hybriflex	126.67 -	1.0000	1.0000
			133.00		
T4	6	DC Cable WR-VG122ST	126.67 -	1.0000	1.0000
			133.00		
T4	14	LDF7-50A (1-5/8 FOAM)	126.67 -	1.0000	1.0000
			133.33		
T4	15	HYBRIFLEX 1-5/8"	126.67 -	1.0000	1.0000
			133.33		
T4	17	LDF5-50A (7/8 FOAM)	126.67 -	1.0000	1.0000
			133.33		
T4	19	EW63	126.67 -	1.0000	1.0000
			133.33		
T4	20	LDF5-50A (7/8 FOAM)	126.67 -	1.0000	1.0000
			133.33		
T4	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	126.67 -	1.0000	1.0000
			133.33		
T4	22	AVA7-50 (1-5/8 LOW	126.67 -	1.0000	1.0000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 14 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
		DENSI. FOAM)	133.33		
T4	23	AVA7-50 (1-5/8 LOW	126.67 -	1.0000	1.0000
		DENSI. FOAM)	133.33		
T4	24	LDF4-50A (1/2 FOAM)	126.67 -	1.0000	1.0000
			133.33		
T4	25	LDF5-50A (7/8 FOAM)	126.67 -	1.0000	1.0000
			133.33		
T4	28	HYBRIFLEX 1-5/8"	126.67 -	0.6000	0.6000
			133.33		
T5	2	LDF6-50A (1-1/4 FOAM)	120.00 -	1.0000	1.0000
			126.67		
T5	3	DC Cable WR-VG122ST	120.00 -	1.0000	1.0000
			126.67		
T5	4	1 5/8" Hybriflex	120.00 -	1.0000	1.0000
			126.67		
T5	6	DC Cable WR-VG122ST	120.00 -	1.0000	1.0000
			126.67		
T5	10	LDF7-50A (1-5/8 FOAM)	120.00 -	1.0000	1.0000
			125.00		
T5	11	Hubner-Suhner Hybrid Cable	120.00 -	1.0000	1.0000
			125.00		
T5	14	LDF7-50A (1-5/8 FOAM)	120.00 -	1.0000	1.0000
			126.67		
T5	15	HYBRIFLEX 1-5/8"	120.00 -	1.0000	1.0000
			126.67		
T5	17	LDF5-50A (7/8 FOAM)	120.00 -	1.0000	1.0000
			126.67		
T5	19	EW63	120.00 -	1.0000	1.0000
			126.67		
T5	20	LDF5-50A (7/8 FOAM)	120.00 -	1.0000	1.0000
			126.67		
T5	21	AVA7-50 (1-5/8 LOW	120.00 -	1.0000	1.0000
		DENSI. FOAM)	126.67		
T5	22	AVA7-50 (1-5/8 LOW	120.00 -	1.0000	1.0000
		DENSI. FOAM)	126.67		
T5	23	AVA7-50 (1-5/8 LOW	120.00 -	1.0000	1.0000
		DENSI. FOAM)	126.67		
T5	24	LDF4-50A (1/2 FOAM)	120.00 -	1.0000	1.0000
			126.67		
T5	25	LDF5-50A (7/8 FOAM)	120.00 -	1.0000	1.0000
			126.67		
T5	28	HYBRIFLEX 1-5/8"	120.00 -	0.6000	0.6000
			126.67		
T6	2	LDF6-50A (1-1/4 FOAM)	100.00 -	1.0000	1.0000
			120.00		
T6	3	DC Cable WR-VG122ST	100.00 -	1.0000	1.0000
			120.00		
T6	4	1 5/8" Hybriflex	100.00 -	1.0000	1.0000
			120.00		
T6	6	DC Cable WR-VG122ST	100.00 -	1.0000	1.0000
			120.00		
T6	10	LDF7-50A (1-5/8 FOAM)	100.00 -	1.0000	1.0000
			120.00		
T6	11	Hubner-Suhner Hybrid Cable	100.00 -	1.0000	1.0000
			120.00		
T6	14	LDF7-50A (1-5/8 FOAM)	100.00 -	1.0000	1.0000
			120.00		
T6	15	HYBRIFLEX 1-5/8"	100.00 -	1.0000	1.0000
			120.00		
T6	17	LDF5-50A (7/8 FOAM)	100.00 -	1.0000	1.0000
			120.00		
T6	19	EW63	100.00 -	1.0000	1.0000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	15 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
			120.00		
T6	20	LDF5-50A (7/8 FOAM)	100.00 - 120.00	1.0000	1.0000
T6	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	100.00 - 120.00	1.0000	1.0000
T6	22	AVA7-50 (1-5/8 LOW DENS. FOAM)	100.00 - 120.00	1.0000	1.0000
T6	23	AVA7-50 (1-5/8 LOW DENS. FOAM)	100.00 - 120.00	1.0000	1.0000
T6	24	LDF4-50A (1/2 FOAM)	100.00 - 120.00	1.0000	1.0000
T6	25	LDF5-50A (7/8 FOAM)	100.00 - 120.00	1.0000	1.0000
T6	26	LDF4-50A (1/2 FOAM)	100.00 - 113.00	1.0000	1.0000
T6	28	HYBRIFLEX 1-5/8"	100.00 - 120.00	0.6000	0.6000
T7	2	LDF6-50A (1-1/4 FOAM)	90.00 - 100.00	1.0000	1.0000
T7	3	DC Cable WR-VG122ST	90.00 - 100.00	1.0000	1.0000
T7	4	1 5/8" Hybriflex	90.00 - 100.00	1.0000	1.0000
T7	6	DC Cable WR-VG122ST	90.00 - 100.00	1.0000	1.0000
T7	10	LDF7-50A (1-5/8 FOAM)	90.00 - 100.00	1.0000	1.0000
T7	11	Hubner-Suhner Hybrid Cable	90.00 - 100.00	1.0000	1.0000
T7	14	LDF7-50A (1-5/8 FOAM)	90.00 - 100.00	1.0000	1.0000
T7	15	HYBRIFLEX 1-5/8"	90.00 - 100.00	1.0000	1.0000
T7	17	LDF5-50A (7/8 FOAM)	90.00 - 100.00	1.0000	1.0000
T7	19	EW63	90.00 - 100.00	1.0000	1.0000
T7	20	LDF5-50A (7/8 FOAM)	90.00 - 100.00	1.0000	1.0000
T7	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	90.00 - 100.00	1.0000	1.0000
T7	22	AVA7-50 (1-5/8 LOW DENS. FOAM)	90.00 - 100.00	1.0000	1.0000
T7	23	AVA7-50 (1-5/8 LOW DENS. FOAM)	90.00 - 100.00	1.0000	1.0000
T7	24	LDF4-50A (1/2 FOAM)	90.00 - 100.00	1.0000	1.0000
T7	25	LDF5-50A (7/8 FOAM)	90.00 - 100.00	1.0000	1.0000
T7	26	LDF4-50A (1/2 FOAM)	90.00 - 100.00	1.0000	1.0000
T7	28	HYBRIFLEX 1-5/8"	90.00 - 100.00	0.6000	0.6000
T8	2	LDF6-50A (1-1/4 FOAM)	80.00 - 90.00	1.0000	1.0000
T8	3	DC Cable WR-VG122ST	80.00 - 90.00	1.0000	1.0000
T8	4	1 5/8" Hybriflex	80.00 - 90.00	1.0000	1.0000
T8	6	DC Cable WR-VG122ST	80.00 - 90.00	1.0000	1.0000
T8	10	LDF7-50A (1-5/8 FOAM)	80.00 - 90.00	1.0000	1.0000
T8	11	Hubner-Suhner Hybrid Cable	80.00 - 90.00	1.0000	1.0000
T8	14	LDF7-50A (1-5/8 FOAM)	80.00 - 90.00	1.0000	1.0000
T8	15	HYBRIFLEX 1-5/8"	80.00 - 90.00	1.0000	1.0000
T8	17	LDF5-50A (7/8 FOAM)	80.00 - 90.00	1.0000	1.0000
T8	19	EW63	80.00 - 90.00	1.0000	1.0000
T8	20	LDF5-50A (7/8 FOAM)	80.00 - 90.00	1.0000	1.0000
T8	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	80.00 - 90.00	1.0000	1.0000
T8	22	AVA7-50 (1-5/8 LOW DENS. FOAM)	80.00 - 90.00	1.0000	1.0000
T8	23	AVA7-50 (1-5/8 LOW DENS. FOAM)	80.00 - 90.00	1.0000	1.0000
T8	24	LDF4-50A (1/2 FOAM)	80.00 - 90.00	1.0000	1.0000
T8	25	LDF5-50A (7/8 FOAM)	80.00 - 90.00	1.0000	1.0000
T8	26	LDF4-50A (1/2 FOAM)	80.00 - 90.00	1.0000	1.0000
T8	28	HYBRIFLEX 1-5/8"	80.00 - 90.00	0.6000	0.6000
T9	2	LDF6-50A (1-1/4 FOAM)	60.00 - 80.00	1.0000	1.0000
T9	3	DC Cable WR-VG122ST	60.00 - 80.00	1.0000	1.0000
T9	4	1 5/8" Hybriflex	60.00 - 80.00	1.0000	1.0000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	16 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T9	6	DC Cable WR-VG122ST	60.00 - 80.00	1.0000	1.0000
T9	10	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	1.0000	1.0000
T9	11	Hubner-Suhner Hybrid Cable	60.00 - 80.00	1.0000	1.0000
T9	14	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	1.0000	1.0000
T9	15	HYBRIFLEX 1-5/8"	60.00 - 80.00	1.0000	1.0000
T9	17	LDF5-50A (7/8 FOAM)	60.00 - 80.00	1.0000	1.0000
T9	19	EW63	60.00 - 80.00	1.0000	1.0000
T9	20	LDF5-50A (7/8 FOAM)	60.00 - 80.00	1.0000	1.0000
T9	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	60.00 - 80.00	1.0000	1.0000
T9	22	AVA7-50 (1-5/8 LOW DENS. FOAM)	60.00 - 80.00	1.0000	1.0000
T9	23	AVA7-50 (1-5/8 LOW DENS. FOAM)	60.00 - 80.00	1.0000	1.0000
T9	24	LDF4-50A (1/2 FOAM)	60.00 - 80.00	1.0000	1.0000
T9	25	LDF5-50A (7/8 FOAM)	60.00 - 80.00	1.0000	1.0000
T9	26	LDF4-50A (1/2 FOAM)	60.00 - 80.00	1.0000	1.0000
T9	27	LDF4-50A (1/2 FOAM)	60.00 - 61.00	1.0000	1.0000
T9	28	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.6000
T10	2	LDF6-50A (1-1/4 FOAM)	40.00 - 60.00	1.0000	1.0000
T10	3	DC Cable WR-VG122ST	40.00 - 60.00	1.0000	1.0000
T10	4	1 5/8" Hybriflex	40.00 - 60.00	1.0000	1.0000
T10	6	DC Cable WR-VG122ST	40.00 - 60.00	1.0000	1.0000
T10	10	LDF7-50A (1-5/8 FOAM)	40.00 - 60.00	1.0000	1.0000
T10	11	Hubner-Suhner Hybrid Cable	40.00 - 60.00	1.0000	1.0000
T10	14	LDF7-50A (1-5/8 FOAM)	40.00 - 60.00	1.0000	1.0000
T10	15	HYBRIFLEX 1-5/8"	40.00 - 60.00	1.0000	1.0000
T10	17	LDF5-50A (7/8 FOAM)	40.00 - 60.00	1.0000	1.0000
T10	19	EW63	40.00 - 60.00	1.0000	1.0000
T10	20	LDF5-50A (7/8 FOAM)	40.00 - 60.00	1.0000	1.0000
T10	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	40.00 - 60.00	1.0000	1.0000
T10	22	AVA7-50 (1-5/8 LOW DENS. FOAM)	40.00 - 60.00	1.0000	1.0000
T10	23	AVA7-50 (1-5/8 LOW DENS. FOAM)	40.00 - 60.00	1.0000	1.0000
T10	24	LDF4-50A (1/2 FOAM)	40.00 - 60.00	1.0000	1.0000
T10	25	LDF5-50A (7/8 FOAM)	40.00 - 60.00	1.0000	1.0000
T10	26	LDF4-50A (1/2 FOAM)	40.00 - 60.00	1.0000	1.0000
T10	27	LDF4-50A (1/2 FOAM)	40.00 - 60.00	1.0000	1.0000
T10	28	HYBRIFLEX 1-5/8"	40.00 - 60.00	0.6000	0.6000
T11	2	LDF6-50A (1-1/4 FOAM)	30.00 - 40.00	1.0000	1.0000
T11	3	DC Cable WR-VG122ST	30.00 - 40.00	1.0000	1.0000
T11	4	1 5/8" Hybriflex	30.00 - 40.00	1.0000	1.0000
T11	6	DC Cable WR-VG122ST	30.00 - 40.00	1.0000	1.0000
T11	10	LDF7-50A (1-5/8 FOAM)	30.00 - 40.00	1.0000	1.0000
T11	11	Hubner-Suhner Hybrid Cable	30.00 - 40.00	1.0000	1.0000
T11	14	LDF7-50A (1-5/8 FOAM)	30.00 - 40.00	1.0000	1.0000
T11	15	HYBRIFLEX 1-5/8"	30.00 - 40.00	1.0000	1.0000
T11	17	LDF5-50A (7/8 FOAM)	30.00 - 40.00	1.0000	1.0000
T11	19	EW63	30.00 - 40.00	1.0000	1.0000
T11	20	LDF5-50A (7/8 FOAM)	30.00 - 40.00	1.0000	1.0000
T11	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	30.00 - 40.00	1.0000	1.0000
T11	22	AVA7-50 (1-5/8 LOW DENS. FOAM)	30.00 - 40.00	1.0000	1.0000
T11	23	AVA7-50 (1-5/8 LOW DENS. FOAM)	30.00 - 40.00	1.0000	1.0000
T11	24	LDF4-50A (1/2 FOAM)	30.00 - 40.00	1.0000	1.0000
T11	25	LDF5-50A (7/8 FOAM)	30.00 - 40.00	1.0000	1.0000
T11	26	LDF4-50A (1/2 FOAM)	30.00 - 40.00	1.0000	1.0000
T11	27	LDF4-50A (1/2 FOAM)	30.00 - 40.00	1.0000	1.0000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	17 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T11	28	HYBRIFLEX 1-5/8"	30.00 - 40.00	0.6000	0.6000
T12	2	LDF6-50A (1-1/4 FOAM)	20.00 - 30.00	1.0000	1.0000
T12	3	DC Cable WR-VG122ST	20.00 - 30.00	1.0000	1.0000
T12	4	1 5/8" Hybriflex	20.00 - 30.00	1.0000	1.0000
T12	6	DC Cable WR-VG122ST	20.00 - 30.00	1.0000	1.0000
T12	10	LDF7-50A (1-5/8 FOAM)	20.00 - 30.00	1.0000	1.0000
T12	11	Hubner-Suhner Hybrid Cable	20.00 - 30.00	1.0000	1.0000
T12	14	LDF7-50A (1-5/8 FOAM)	20.00 - 30.00	1.0000	1.0000
T12	15	HYBRIFLEX 1-5/8"	20.00 - 30.00	1.0000	1.0000
T12	17	LDF5-50A (7/8 FOAM)	20.00 - 30.00	1.0000	1.0000
T12	19	EW63	20.00 - 30.00	1.0000	1.0000
T12	20	LDF5-50A (7/8 FOAM)	20.00 - 30.00	1.0000	1.0000
T12	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	20.00 - 30.00	1.0000	1.0000
T12	22	AVA7-50 (1-5/8 LOW DENS. FOAM)	20.00 - 30.00	1.0000	1.0000
T12	23	AVA7-50 (1-5/8 LOW DENS. FOAM)	20.00 - 30.00	1.0000	1.0000
T12	24	LDF4-50A (1/2 FOAM)	20.00 - 30.00	1.0000	1.0000
T12	25	LDF5-50A (7/8 FOAM)	20.00 - 30.00	1.0000	1.0000
T12	26	LDF4-50A (1/2 FOAM)	20.00 - 30.00	1.0000	1.0000
T12	27	LDF4-50A (1/2 FOAM)	20.00 - 30.00	1.0000	1.0000
T12	28	HYBRIFLEX 1-5/8"	20.00 - 30.00	0.6000	0.6000
T13	2	LDF6-50A (1-1/4 FOAM)	0.00 - 20.00	1.0000	1.0000
T13	3	DC Cable WR-VG122ST	0.00 - 20.00	1.0000	1.0000
T13	4	1 5/8" Hybriflex	0.00 - 20.00	1.0000	1.0000
T13	6	DC Cable WR-VG122ST	0.00 - 20.00	1.0000	1.0000
T13	10	LDF7-50A (1-5/8 FOAM)	0.00 - 20.00	1.0000	1.0000
T13	11	Hubner-Suhner Hybrid Cable	0.00 - 20.00	1.0000	1.0000
T13	14	LDF7-50A (1-5/8 FOAM)	0.00 - 20.00	1.0000	1.0000
T13	15	HYBRIFLEX 1-5/8"	0.00 - 20.00	1.0000	1.0000
T13	17	LDF5-50A (7/8 FOAM)	0.00 - 20.00	1.0000	1.0000
T13	19	EW63	0.00 - 20.00	1.0000	1.0000
T13	20	LDF5-50A (7/8 FOAM)	0.00 - 20.00	1.0000	1.0000
T13	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	0.00 - 20.00	1.0000	1.0000
T13	22	AVA7-50 (1-5/8 LOW DENS. FOAM)	0.00 - 20.00	1.0000	1.0000
T13	23	AVA7-50 (1-5/8 LOW DENS. FOAM)	0.00 - 20.00	1.0000	1.0000
T13	24	LDF4-50A (1/2 FOAM)	0.00 - 20.00	1.0000	1.0000
T13	25	LDF5-50A (7/8 FOAM)	0.00 - 20.00	1.0000	1.0000
T13	26	LDF4-50A (1/2 FOAM)	0.00 - 20.00	1.0000	1.0000
T13	27	LDF4-50A (1/2 FOAM)	0.00 - 20.00	1.0000	1.0000
T13	28	HYBRIFLEX 1-5/8"	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C_{AA} Front	C_{AA} Side	Weight
			ft	°	ft	ft ²	ft ²	lb

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	18 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C _{AA}		Weight lb	
			Horz Lateral ft	Vert ft			Front ft ²	Side ft ²		
*										
ROHN 6'x15' Boom Gate (1) (Verizon)	A	None			0.0000	160.00	No Ice 1/2" Ice 1" Ice	17.75 21.10 24.50	17.75 21.10 24.50	600.00 75.00 890.00
ROHN 6'x15' Boom Gate (1) (Verizon)	B	None			0.0000	160.00	No Ice 1/2" Ice 1" Ice	17.75 21.10 24.50	17.75 21.10 24.50	600.00 75.00 890.00
ROHN 6'x15' Boom Gate (1) (Verizon)	C	None			0.0000	160.00	No Ice 1/2" Ice 1" Ice	17.75 21.10 24.50	17.75 21.10 24.50	600.00 75.00 890.00
MX06FRO640-02 (Verizon)	A	From Leg	3.00 6.50 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	12.38 12.88 13.38	7.43 7.88 8.33	70.00 151.39 239.61
MX06FRO640-02 (Verizon)	A	From Leg	3.00 5.50 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	12.38 12.88 13.38	7.43 7.88 8.33	70.00 151.39 239.61
XXDWMM-12.5-65-8T-CBR S Panel (Verizon)	A	From Leg	3.00 1.00 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.40 2.60 2.81	20.00 59.31 102.70
MT6407-77A (Verizon)	A	From Leg	3.00 -2.00 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	4.71 5.00 5.29	1.84 2.06 2.29	87.00 116.31 149.49
MX06FRO640-02 (Verizon)	A	From Leg	3.00 -6.50 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	12.38 12.88 13.38	7.43 7.88 8.33	70.00 151.39 239.61
MX06FRO640-02 (Verizon)	A	From Leg	3.00 -5.50 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	12.38 12.88 13.38	7.43 7.88 8.33	70.00 151.39 239.61
B2/B66A RRH (Verizon)	A	From Leg	3.00 0.00 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	2.54 2.75 2.97	1.61 1.79 1.98	60.00 80.12 103.35
B5/B13 RRH (Verizon)	A	From Leg	3.00 0.00 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	1.87 2.03 2.21	1.02 1.15 1.29	70.00 86.42 105.50
CBRS RRH-RT4401-48A (Verizon)	A	From Leg	3.00 0.00 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	0.86 0.98 1.10	0.42 0.51 0.61	20.00 26.90 35.60
RF4439d-25A (B2/B66A RRH) (Verizon)	A	From Leg	3.00 0.00 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	75.00 93.34 114.47
RF4440d-13A (B5/B13 RRH) (Verizon)	A	From Leg	3.00 0.00 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.13 1.26 1.41	75.00 92.34 112.40
JAHH-65B-R3B Panel Antenna (Verizon)	B	From Leg	3.00 6.50 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	9.66 10.22 10.79	7.71 8.53 9.37	130.00 204.15 289.72
JAHH-65B-R3B Panel Antenna (Verizon)	B	From Leg	3.00 5.50 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	9.66 10.22 10.79	7.71 8.53 9.37	130.00 204.15 289.72
XXDWMM-12.5-65-8T-CBR S Panel (Verizon)	B	From Leg	3.00 -1.00 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.40 2.60 2.81	20.00 59.31 102.70
MT6407-77A (Verizon)	B	From Leg	3.00 -6.00 0.00		0.0000	160.00	No Ice 1/2" Ice 1" Ice	4.71 5.00 5.29	1.84 2.06 2.29	87.00 116.31 149.49
CBC78T-DS-43-2X Diplexer (Verizon)	B	From Leg	3.00 0.00		0.0000	160.00	No Ice 1/2" Ice	0.37 0.45	0.51 0.60	22.00 28.34

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	19 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft ²	ft ²	lb	
B2/B66A RRH (Verizon)	B	From Leg	0.00		0.0000	160.00	1" Ice	0.53	0.70	36.37
			3.00				No Ice	2.54	1.61	60.00
			0.00				1/2" Ice	2.75	1.79	80.12
B5/B13 RRH (Verizon)	B	From Leg	0.00		0.0000	160.00	1" Ice	2.97	1.98	103.35
			3.00				No Ice	1.87	1.02	70.00
			0.00				1/2" Ice	2.03	1.15	86.42
CBRS RRH-RT4401-48A (Verizon)	B	From Leg	0.00		0.0000	160.00	1" Ice	2.21	1.29	105.50
			3.00				No Ice	0.86	0.42	20.00
			0.00				1/2" Ice	0.98	0.51	26.90
JAHH-65B-R3B Panel Antenna (Verizon)	C	From Leg	0.00		0.0000	160.00	1" Ice	1.10	0.61	35.60
			3.00				No Ice	9.66	7.71	130.00
			6.50				1/2" Ice	10.22	8.53	204.15
JAHH-65B-R3B Panel Antenna (Verizon)	C	From Leg	0.00		0.0000	160.00	1" Ice	10.79	9.37	289.72
			3.00				No Ice	9.66	7.71	130.00
			5.50				1/2" Ice	10.22	8.53	204.15
XXDWMM-12.5-65-8T-CBR S Panel (Verizon)	C	From Leg	0.00		0.0000	160.00	1" Ice	10.79	9.37	289.72
			3.00				No Ice	4.80	2.40	20.00
			-1.00				1/2" Ice	5.07	2.60	59.31
MT6407-77A (Verizon)	C	From Leg	0.00		0.0000	160.00	1" Ice	5.35	2.81	102.70
			3.00				No Ice	4.71	1.84	87.00
			-6.00				1/2" Ice	5.00	2.06	116.31
CBC78T-DS-43-2X Diplexer (Verizon)	C	From Leg	0.00		0.0000	160.00	1" Ice	5.29	2.29	149.49
			3.00				No Ice	0.37	0.51	22.00
			0.00				1/2" Ice	0.45	0.60	28.34
B2/B66A RRH (Verizon)	C	From Leg	0.00		0.0000	160.00	1" Ice	0.53	0.70	36.37
			3.00				No Ice	2.54	1.61	60.00
			0.00				1/2" Ice	2.75	1.79	80.12
B5/B13 RRH (Verizon)	C	From Leg	0.00		0.0000	160.00	1" Ice	2.97	1.98	103.35
			3.00				No Ice	1.87	1.02	70.00
			0.00				1/2" Ice	2.03	1.15	86.42
CBRS RRH-RT4401-48A (Verizon)	C	From Leg	0.00		0.0000	160.00	1" Ice	2.21	1.29	105.50
			3.00				No Ice	0.86	0.42	20.00
			0.00				1/2" Ice	0.98	0.51	26.90
DB-T1-6Z-8AB-0Z Distribution Box (Verizon)	A	From Leg	0.00		0.0000	160.00	1" Ice	1.10	0.61	35.60
			3.00				No Ice	5.60	2.33	50.00
			0.00				1/2" Ice	5.92	2.56	81.13
DB-T1-6Z-8AB-0Z Distribution Box (Verizon)	B	From Leg	0.00		0.0000	160.00	1" Ice	6.24	2.79	121.22
			3.00				No Ice	5.60	2.33	50.00
			0.00				1/2" Ice	5.92	2.56	81.13
(2) BSF0020F3V1-1 (Verizon)	A	From Leg	0.00		0.0000	160.00	1" Ice	6.24	2.79	121.22
			3.00				No Ice	0.96	0.29	20.00
			-6.00				1/2" Ice	1.09	0.36	26.77
(2) BSF0020F3V1-1 (Verizon)	B	From Leg	0.00		0.0000	160.00	1" Ice	1.22	0.45	35.33
			3.00				No Ice	0.96	0.29	20.00
			-6.00				1/2" Ice	1.09	0.36	26.77
(2) BSF0020F3V1-1 (Verizon)	C	From Leg	0.00		0.0000	160.00	1" Ice	1.22	0.45	35.33
			3.00				No Ice	0.96	0.29	20.00
			-6.00				1/2" Ice	1.09	0.36	26.77
LTF12=372 Sector Mount (1) (T-Mobile)	A	None	0.00		0.0000	125.00	1" Ice	1.22	0.45	35.33
							No Ice	13.60	13.60	465.00
							1/2" Ice	18.40	18.40	600.00
LTF12=372 Sector Mount (1) (T-Mobile)	B	None			0.0000	125.00	1" Ice	23.20	23.20	735.00
							No Ice	13.60	13.60	465.00
							1/2" Ice	18.40	18.40	600.00
LTF12=372 Sector Mount (1) (T-Mobile)	C	None			0.0000	125.00	1" Ice	23.20	23.20	735.00
							No Ice	13.60	13.60	465.00
							1/2" Ice	18.40	18.40	600.00

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	20 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	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	lb
AIR21 B4A/B2P (T-Mobile)	A	From Face	3.00	0.0000	125.00	1" Ice	23.20	23.20	735.00
			-4.00	0.00		No Ice	6.05	4.36	83.00
			0.00			1/2" Ice	6.42	4.70	124.90
AIR21 B4A/B2P (T-Mobile)	B	From Face	3.00	0.0000	125.00	1" Ice	6.80	5.06	171.93
			-4.00	0.00		No Ice	6.05	4.36	83.00
			0.00			1/2" Ice	6.42	4.70	124.90
AIR21 B4A/B2P (T-Mobile)	C	From Face	3.00	0.0000	125.00	1" Ice	6.80	5.06	171.93
			-4.00	0.00		No Ice	6.05	4.36	83.00
			0.00			1/2" Ice	6.42	4.70	124.90
Generic Twin TMA unit (T-Mobile)	A	From Face	3.00	0.0000	125.00	1" Ice	0.37	0.96	25.00
			0.00	0.00		No Ice	0.46	1.09	32.19
			0.00			1" Ice	0.55	1.22	41.21
Generic Twin TMA unit (T-Mobile)	B	From Face	3.00	0.0000	125.00	1" Ice	0.37	0.96	25.00
			0.00	0.00		No Ice	0.46	1.09	32.19
			0.00			1" Ice	0.55	1.22	41.21
Generic Twin TMA unit (T-Mobile)	C	From Face	3.00	0.0000	125.00	1" Ice	0.37	0.96	25.00
			0.00	0.00		No Ice	0.46	1.09	32.19
			0.00			1" Ice	0.55	1.22	41.21
AIR21 B2A/B4P (T-Mobile)	A	From Face	3.00	0.0000	125.00	1" Ice	6.05	4.36	83.00
			0.00	0.00		No Ice	6.42	4.70	124.90
			0.00			1" Ice	6.80	5.06	171.93
AIR21 B2A/B4P (T-Mobile)	B	From Face	3.00	0.0000	125.00	1" Ice	6.05	4.36	83.00
			0.00	0.00		No Ice	6.42	4.70	124.90
			0.00			1" Ice	6.80	5.06	171.93
AIR21 B2A/B4P (T-Mobile)	C	From Face	3.00	0.0000	125.00	1" Ice	6.05	4.36	83.00
			0.00	0.00		No Ice	6.42	4.70	124.90
			0.00			1" Ice	6.80	5.06	171.93
LNX-6515DS (T-Mobile)	A	From Face	3.00	0.0000	125.00	1" Ice	11.45	7.70	55.00
			4.00	0.00		No Ice	12.06	8.29	120.87
			0.00			1" Ice	12.69	8.89	194.41
LNX-6515DS (T-Mobile)	B	From Face	3.00	0.0000	125.00	1" Ice	11.45	7.70	55.00
			4.00	0.00		No Ice	12.06	8.29	120.87
			0.00			1" Ice	12.69	8.89	194.41
LNX-6515DS (T-Mobile)	C	From Face	3.00	0.0000	125.00	1" Ice	11.45	7.70	55.00
			4.00	0.00		No Ice	12.06	8.29	120.87
			0.00			1" Ice	12.69	8.89	194.41
RRUS-11 (T-Mobile)	A	From Face	3.00	0.0000	125.00	1" Ice	2.57	1.07	50.00
			0.00	0.00		No Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
RRUS-11 (T-Mobile)	B	From Face	3.00	0.0000	125.00	1" Ice	2.57	1.07	50.00
			0.00	0.00		No Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
RRUS-11 (T-Mobile)	C	From Face	3.00	0.0000	125.00	1" Ice	2.57	1.07	50.00
			0.00	0.00		No Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
QD6616-7 (AT&T)	A	From Face	3.00	0.0000	133.00	1" Ice	13.58	6.80	130.00
			-6.00	0.00		No Ice	14.08	7.27	213.97
			0.00			1" Ice	14.60	7.72	304.84
AIR6419 (AT&T)	A	From Face	3.00	0.0000	133.00	1" Ice	3.66	1.66	66.00
			0.00	2.00		No Ice	3.91	1.85	91.40
			2.00			1" Ice	4.16	2.05	120.26
AIR6449 (AT&T)	A	From Face	3.00	0.0000	133.00	1" Ice	5.65	2.42	103.00
			0.00	-2.00		No Ice	5.96	2.64	141.45
			-2.00			1" Ice	6.26	2.87	184.10
DMP65R-BU6D (AT&T)	A	From Face	3.00	0.0000	133.00	1" Ice	12.71	5.62	96.00
			6.00	No Ice		13.21	6.07	169.96	

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	21 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft ²	ft ²	lb
QD6616-7 (AT&T)	B	From Face	0.00		0.0000	133.00	1" Ice	6.53	250.56
			3.00				No Ice	6.80	130.00
			-6.00				1/2" Ice	7.27	213.97
AIR6419 (AT&T)	B	From Face	0.00		0.0000	133.00	1" Ice	7.72	304.84
			3.00				No Ice	1.66	66.00
			0.00				1/2" Ice	1.85	91.40
AIR6449 (AT&T)	B	From Face	2.00		0.0000	133.00	1" Ice	2.05	120.26
			3.00				No Ice	2.42	103.00
			0.00				1/2" Ice	2.64	141.45
DMP65R-BU6D (AT&T)	B	From Face	-2.00		0.0000	133.00	1" Ice	2.87	184.10
			3.00				No Ice	5.62	96.00
			6.00				1/2" Ice	6.07	169.96
QD6616-7 (AT&T)	C	From Face	0.00		0.0000	133.00	1" Ice	6.53	250.56
			3.00				No Ice	6.80	130.00
			-6.00				1/2" Ice	7.27	213.97
AIR6419 (AT&T)	C	From Face	0.00		0.0000	133.00	1" Ice	7.72	304.84
			3.00				No Ice	1.66	66.00
			0.00				1/2" Ice	1.85	91.40
AIR6449 (AT&T)	C	From Face	2.00		0.0000	133.00	1" Ice	2.05	120.26
			3.00				No Ice	2.42	103.00
			0.00				1/2" Ice	2.64	141.45
DMP65R-BU6D (AT&T)	C	From Face	-2.00		0.0000	133.00	1" Ice	2.87	184.10
			3.00				No Ice	5.62	96.00
			6.00				1/2" Ice	6.07	169.96
RRUS-32 B66 (AT&T)	A	From Face	0.00		0.0000	133.00	1" Ice	6.53	250.56
			3.00				No Ice	1.85	60.00
			6.00				1/2" Ice	2.08	81.11
RRUS-32 (AT&T)	A	From Face	0.00		0.0000	133.00	1" Ice	2.31	105.42
			3.00				No Ice	2.42	77.00
			-2.00				1/2" Ice	2.64	104.93
RRUS-32 (AT&T)	A	From Face	0.00		0.0000	133.00	1" Ice	2.86	136.47
			3.00				No Ice	3.31	77.00
			-2.00				1/2" Ice	2.64	104.93
RRUS-32 B66 (AT&T)	B	From Face	0.00		0.0000	133.00	1" Ice	2.86	136.47
			3.00				No Ice	1.85	60.00
			6.00				1/2" Ice	2.08	81.11
RRUS-32 (AT&T)	B	From Face	0.00		0.0000	133.00	1" Ice	2.31	105.42
			3.00				No Ice	2.42	77.00
			-2.00				1/2" Ice	2.64	104.93
RRUS-32 (AT&T)	B	From Face	0.00		0.0000	133.00	1" Ice	2.86	136.47
			3.00				No Ice	3.31	77.00
			-2.00				1/2" Ice	2.64	104.93
RRUS-32 B66 (AT&T)	C	From Face	0.00		0.0000	133.00	1" Ice	2.86	136.47
			3.00				No Ice	3.20	60.00
			6.00				1/2" Ice	3.46	81.11
RRUS-32 (AT&T)	B	From Face	0.00		0.0000	133.00	1" Ice	3.73	105.42
			3.00				No Ice	3.31	77.00
			-2.00				1/2" Ice	3.56	104.93
RRUS-32 (AT&T)	C	From Face	0.00		0.0000	133.00	1" Ice	2.86	136.47
			3.00				No Ice	3.31	77.00
			-2.00				1/2" Ice	2.64	104.93
RRUS-32 (AT&T)	C	From Face	0.00		0.0000	133.00	1" Ice	3.81	136.47
			3.00				No Ice	3.31	77.00
			-2.00				1/2" Ice	2.64	104.93
4478 B14 (AT&T)	A	From Face	0.00		0.0000	133.00	1" Ice	2.86	136.47
			3.00				No Ice	1.84	60.00
			-2.00				1/2" Ice	2.01	75.88
4478 B14 (AT&T)	B	From Face	0.00		0.0000	133.00	1" Ice	1.34	94.39
			3.00				No Ice	1.84	60.00
			-2.00				1/2" Ice	2.01	75.88

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	22 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight	
			Horz Lateral	Vert			Front	Side		
			ft	ft	°	ft	ft ²	ft ²	lb	
4478 B14 (AT&T)	C	From Face	0.00		0.0000	133.00	1" Ice	2.19	1.34	94.39
			3.00				No Ice	1.84	1.06	60.00
			-2.00				1/2" Ice	2.01	1.20	75.88
4449 B5/B12 (AT&T)	A	From Face	0.00		0.0000	133.00	1" Ice	2.19	1.34	94.39
			3.00				No Ice	1.97	1.41	71.00
			-2.00				1/2" Ice	2.14	1.56	89.51
4449 B5/B12 (AT&T)	B	From Face	0.00		0.0000	133.00	1" Ice	2.33	1.73	110.84
			3.00				No Ice	1.97	1.41	71.00
			-2.00				1/2" Ice	2.14	1.56	89.51
4449 B5/B12 (AT&T)	C	From Face	0.00		0.0000	133.00	1" Ice	2.33	1.73	110.84
			3.00				No Ice	1.97	1.41	71.00
			-2.00				1/2" Ice	2.14	1.56	89.51
DC6-48-60-18-8F (Squid) Suppressor (AT&T)	C	From Face	0.00		0.0000	133.00	1" Ice	2.33	1.73	110.84
			3.00				No Ice	1.27	1.27	20.00
			0.00				1/2" Ice	1.46	1.46	35.12
DC6-48-60-18-8F (Squid) Suppressor (AT&T)	A	From Face	0.00		0.0000	133.00	1" Ice	1.66	1.66	52.57
			3.00				No Ice	1.27	1.27	20.00
			0.00				1/2" Ice	1.46	1.46	35.12
DC9 (AT&T)	B	From Leg	0.00		0.0000	133.00	1" Ice	1.66	1.66	52.57
			3.00				No Ice	1.91	1.91	20.00
			-2.00				1/2" Ice	2.10	2.10	39.36
SitePro VFA14-10 (AT&T)	A	None	0.00		0.0000	133.00	1" Ice	2.29	2.29	61.70
							No Ice	30.00	30.00	950.00
							1/2" Ice	35.00	35.00	1400.00
SitePro VFA14-10 (AT&T)	B	None			0.0000	133.00	1" Ice	40.00	40.00	1850.00
							No Ice	30.00	30.00	950.00
							1/2" Ice	35.00	35.00	1400.00
SitePro VFA14-10 (AT&T)	C	None			0.0000	133.00	1" Ice	40.00	40.00	1850.00
							No Ice	30.00	30.00	950.00
							1/2" Ice	35.00	35.00	1400.00
* CSP										
ANT940Y10-WR (CSP)	A	From Leg	0.00		0.0000	187.00	No Ice	0.19	0.19	2.50
			0.00				1/2" Ice	0.34	0.34	3.25
			0.00				1" Ice	0.49	0.49	4.00
ANT940Y10-WR (CSP - Yagi Antenna)	C	From Leg	0.50		0.0000	181.00	No Ice	0.19	0.19	2.50
			0.00				1/2" Ice	0.34	0.34	3.25
			0.00				1" Ice	0.49	0.49	4.00
RFI BPS7496-180-14 Panel Antenna (CSP-80)	A	From Face	4.00		0.0000	170.00	No Ice	5.83	3.75	20.00
			-6.00				1/2" Ice	6.21	4.13	56.42
			0.00				1" Ice	6.60	4.51	97.99
RFI BPS7496-180-14 Panel Antenna (CSP-81)	A	From Face	4.00		0.0000	170.00	No Ice	5.83	3.75	20.00
			0.00				1/2" Ice	6.21	4.13	56.42
			0.00				1" Ice	6.60	4.51	97.99
RFI BPS7496-180-14 Panel Antenna (CSP-82)	A	From Face	4.00		0.0000	170.00	No Ice	5.83	3.75	20.00
			6.00				1/2" Ice	6.21	4.13	56.42
			0.00				1" Ice	6.60	4.51	97.99
SitePro1 USF12-396-U Mount Assembly w/ (3) 96" Mount Pipes (CSP 47, 80, 81, 82)	A	From Leg	0.00		0.0000	170.00	No Ice	16.23	9.80	491.09
			0.00				1/2" Ice	22.18	13.27	630.09
			0.00				1" Ice	28.15	16.68	815.09
432E-83I-01T TTA Unit (Re-Located TMA (CSP))	A	From Leg	4.00		0.0000	170.00	No Ice	2.85	0.97	25.00
			0.00				1/2" Ice	3.06	1.11	44.70
			0.00				1" Ice	3.28	1.26	67.39
3' Yagi (CSP)	C	From Leg	0.50		0.0000	169.00	No Ice	2.08	2.08	30.95
			0.00				1/2" Ice	3.79	3.79	52.87
			0.00				1" Ice	5.52	5.52	85.27

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	23 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft ²	ft ²	lb	
ANT150D (CSP - 1-Bay Dipole)	A	From Leg	0.00	0.00	0.0000	113.00	No Ice	0.80	0.80	5.50
			0.00	0.00			1/2" Ice	1.44	1.44	7.15
			0.00	0.00			1" Ice	2.08	2.08	8.80
GPS (DNK-1 / GPS)	C	From Leg	4.00	0.00	0.0000	60.00	No Ice	1.00	1.00	10.00
			0.00	0.00			1/2" Ice	1.50	1.50	15.00
			2.00	0.00			1" Ice	2.00	2.00	20.00
4' Standoff (DNK-1 / GPS)	C	From Leg	0.00	0.00	0.0000	60.00	No Ice	3.42	3.42	110.00
			0.00	0.00			1/2" Ice	3.67	3.67	147.19
			0.00	0.00			1" Ice	3.92	3.92	187.07
FFVV-65B-R2 (Dish - Reserved)	A	From Leg	3.00	-3.00	0.0000	144.00	No Ice	12.27	5.72	75.00
			0.00	0.00			1/2" Ice	12.76	6.18	147.00
			0.00	0.00			1" Ice	13.26	6.64	225.63
FFVV-65B-R2 (Dish - Reserved)	B	From Leg	3.00	-3.00	0.0000	144.00	No Ice	12.27	5.72	75.00
			0.00	0.00			1/2" Ice	12.76	6.18	147.00
			0.00	0.00			1" Ice	13.26	6.64	225.63
FFVV-65B-R2 (Dish - Reserved)	C	From Leg	3.00	-3.00	0.0000	144.00	No Ice	12.27	5.72	75.00
			0.00	0.00			1/2" Ice	12.76	6.18	147.00
			0.00	0.00			1" Ice	13.26	6.64	225.63
TA08025-B604 (Dish - Reserved)	A	From Leg	3.00	-3.00	0.0000	144.00	No Ice	1.98	1.04	65.00
			0.00	0.00			1/2" Ice	2.15	1.18	81.85
			0.00	0.00			1" Ice	2.33	1.32	101.41
TA08025-B604 (Dish - Reserved)	B	From Leg	3.00	0.00	0.0000	144.00	No Ice	1.98	1.04	65.00
			3.00	0.00			1/2" Ice	2.15	1.18	81.85
			0.00	0.00			1" Ice	2.33	1.32	101.41
TA08025-B604 (Dish - Reserved)	C	From Leg	3.00	0.00	0.0000	144.00	No Ice	1.98	1.04	65.00
			3.00	0.00			1/2" Ice	2.15	1.18	81.85
			0.00	0.00			1" Ice	2.33	1.32	101.41
TA08025-B605 (Dish - Reserved)	A	From Leg	3.00	0.00	0.0000	144.00	No Ice	1.98	1.20	75.00
			3.00	0.00			1/2" Ice	2.15	1.34	93.09
			0.00	0.00			1" Ice	2.33	1.49	113.96
TA08025-B605 (Dish - Reserved)	B	From Leg	3.00	0.00	0.0000	144.00	No Ice	1.98	1.20	75.00
			3.00	0.00			1/2" Ice	2.15	1.34	93.09
			0.00	0.00			1" Ice	2.33	1.49	113.96
TA08025-B605 (Dish - Reserved)	C	From Leg	3.00	0.00	0.0000	144.00	No Ice	1.98	1.20	75.00
			3.00	0.00			1/2" Ice	2.15	1.34	93.09
			0.00	0.00			1" Ice	2.33	1.49	113.96
RD1DC-9181-PF-48 (Dish - Reserved)	A	From Leg	3.00	0.00	0.0000	144.00	No Ice	1.87	1.07	22.00
			3.00	0.00			1/2" Ice	2.04	1.20	38.30
			0.00	0.00			1" Ice	2.21	1.35	57.26
RD1DC-9181-PF-48 (Dish - Reserved)	B	From Leg	3.00	0.00	0.0000	144.00	No Ice	1.87	1.07	22.00
			3.00	0.00			1/2" Ice	2.04	1.20	38.30
			0.00	0.00			1" Ice	2.21	1.35	57.26
RD1DC-9181-PF-48 (Dish - Reserved)	C	From Leg	3.00	0.00	0.0000	144.00	No Ice	1.87	1.07	22.00
			3.00	0.00			1/2" Ice	2.04	1.20	38.30
			0.00	0.00			1" Ice	2.21	1.35	57.26
Commscope MTC3975083 8-ft V-Frame (Dish - Reserved)	A	From Leg	3.00	0.00	0.0000	144.00	No Ice	12.00	12.00	360.00
			0.00	0.00			1/2" Ice	18.00	18.00	500.00
			0.00	0.00			1" Ice	24.00	24.00	640.00
Commscope MTC3975083 8-ft V-Frame (Dish - Reserved)	B	From Leg	3.00	0.00	0.0000	144.00	No Ice	12.00	12.00	360.00
			0.00	0.00			1/2" Ice	18.00	18.00	500.00
			0.00	0.00			1" Ice	24.00	24.00	640.00
Commscope MTC3975083 8-ft V-Frame (Dish - Reserved)	C	From Leg	3.00	0.00	0.0000	144.00	No Ice	12.00	12.00	360.00
			0.00	0.00			1/2" Ice	18.00	18.00	500.00
			0.00	0.00			1" Ice	24.00	24.00	640.00

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 24 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight lb
PA6-65AC (DNK-52 / CSP-42)	C	Paraboloid w/Radome	From	1.00	-55.0000		177.00	6.00	No Ice	90.00
			Leg	0.00					1/2" Ice	240.00
				0.00						1" Ice

222-H Verification Constants

Constant	Value
K _d	0.85
Ice Thickness Importance Factor	1.15
Z _g	900
α	9.5
K _{zmin}	0.85
K _c	n/a
K _t	1
f	1
K _e	1

222-H Section Verification ArRr By Element

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	F a c e	e	e w/Ice	A _r ft ²	A _r w/Ice ft ²	A _r R _r ft ²	A _r R _r w/Ice ft ²
T1 180.00-160.00	1	ROHN 3 STD	45.107	30.78	C	0.139	0.273	5.833	10.350	3.165	6.117
	1	ROHN 3 STD	45.107	30.78	A	0.139	0.273	5.833	10.350	3.165	6.117
	2	ROHN 3 STD	45.107	30.78	C	0.139	0.273	5.833	10.350	3.165	6.117
	2	ROHN 3 STD	45.107	30.78	B	0.139	0.273	5.833	10.350	3.165	6.117
	3	ROHN 3 STD	45.107	30.78	B	0.139	0.273	5.833	10.350	3.165	6.117
	3	ROHN 3 STD	45.107	30.78	A	0.139	0.273	5.833	10.350	3.165	6.117
	4	ROHN 1.5 STD	24.486	22.849	C	0.139	0.273	1.306	3.169	0.740	1.873
	5	ROHN 1.5 STD	24.486	22.849	B	0.139	0.273	1.306	3.169	0.740	1.873
	6	ROHN 1.5 STD	24.486	22.849	A	0.139	0.273	1.306	3.169	0.740	1.873
	7	ROHN 1.5 STD	24.486	22.849	C	0.139	0.273	1.315	3.191	0.745	1.886
	8	ROHN 2 STD	30.608	25.204	C	0.139	0.273	1.518	3.251	0.860	1.921
	9	ROHN 2 STD	30.608	25.204	C	0.139	0.273	1.518	3.251	0.860	1.921
	10	ROHN 1.5 STD	24.486	22.849	B	0.139	0.273	1.315	3.191	0.745	1.886
	11	ROHN 2 STD	30.608	25.204	B	0.139	0.273	1.518	3.251	0.860	1.921
	12	ROHN 2 STD	30.608	25.204	B	0.139	0.273	1.518	3.251	0.860	1.921
	13	ROHN 1.5 STD	24.486	22.849	A	0.139	0.273	1.315	3.191	0.745	1.886
	14	ROHN 2 STD	30.608	25.204	A	0.139	0.273	1.518	3.251	0.860	1.921
	15	ROHN 2 STD	30.608	25.204	A	0.139	0.273	1.518	3.251	0.860	1.921
	19	ROHN 1.5 STD	24.486	22.849	C	0.139	0.273	1.311	3.180	0.743	1.879
	20	ROHN 2 STD	30.608	25.204	C	0.139	0.273	1.517	3.247	0.859	1.919
	21	ROHN 2 STD	30.608	25.204	C	0.139	0.273	1.517	3.247	0.859	1.919
	22	ROHN 1.5 STD	24.486	22.849	B	0.139	0.273	1.311	3.180	0.743	1.879
	23	ROHN 2 STD	30.608	25.204	B	0.139	0.273	1.517	3.247	0.859	1.919

Job	22027.01 - Westport	Page	26 of 72
Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
Client	Verizon	Designed by	TJL

Section Elevation	Elem. Num.	Size	C	C w/Ice	F a c e	e	e w/Ice	A _r	A _r w/Ice	A _r R _r	A _r R _r w/Ice
ft								ft ²	ft ²	ft ²	ft ²
T4 133.33-126.67	85	ROHN 2 STD	29.913	24.348	B	0.151	0.262	2.028	4.291	1.151	2.523
	86	ROHN 2 EH	29.976	24.372	B	0.151	0.262	1.670	3.529	0.948	2.075
	87	ROHN 2 EH	29.976	24.372	B	0.151	0.262	1.670	3.529	0.948	2.075
	88	ROHN 2 STD	29.913	24.348	A	0.151	0.262	2.028	4.291	1.151	2.523
	89	ROHN 2 EH	29.976	24.372	A	0.151	0.262	1.670	3.529	0.948	2.075
	90	ROHN 2 EH	29.976	24.372	A	0.151	0.262	1.670	3.529	0.948	2.075
					A		Sum:	11.559	20.494	5.828	12.050
					B			11.559	20.494	5.828	12.050
					C			11.559	20.494	5.828	12.050
	94	ROHN 5 EH	69.697	39.518	C	0.145	0.253	3.096	4.564	1.388	2.673
	94	ROHN 5 EH	69.697	39.518	A	0.145	0.253	3.096	4.564	1.388	2.673
	95	ROHN 5 EH	69.697	39.518	C	0.145	0.253	3.096	4.564	1.388	2.673
	95	ROHN 5 EH	69.697	39.518	B	0.145	0.253	3.096	4.564	1.388	2.673
	96	ROHN 5 EH	69.697	39.518	B	0.145	0.253	3.096	4.564	1.388	2.673
	96	ROHN 5 EH	69.697	39.518	A	0.145	0.253	3.096	4.564	1.388	2.673
	97	ROHN 2 STD	29.756	24.156	C	0.145	0.253	2.165	4.570	1.228	2.676
	98	ROHN 2 STD	29.756	24.156	B	0.145	0.253	2.165	4.570	1.228	2.676
	99	ROHN 2 STD	29.756	24.156	A	0.145	0.253	2.165	4.570	1.228	2.676
	100	ROHN 2 EH	29.818	24.18	C	0.145	0.253	1.717	3.621	0.974	2.121
101	ROHN 2 EH	29.818	24.18	C	0.145	0.253	1.717	3.621	0.974	2.121	
102	ROHN 2 EH	29.818	24.18	B	0.145	0.253	1.717	3.621	0.974	2.121	
103	ROHN 2 EH	29.818	24.18	B	0.145	0.253	1.717	3.621	0.974	2.121	
104	ROHN 2 EH	29.818	24.18	A	0.145	0.253	1.717	3.621	0.974	2.121	
105	ROHN 2 EH	29.818	24.18	A	0.145	0.253	1.717	3.621	0.974	2.121	
				A		Sum:	11.792	20.941	5.951	12.264	
				B			11.792	20.941	5.951	12.264	
				C			11.792	20.941	5.951	12.264	
T5 126.67-120.00	109	ROHN 5 EH	69.312	39.234	C	0.14	0.244	3.096	4.557	1.386	2.659
109	ROHN 5 EH	69.312	39.234	A	0.14	0.244	3.096	4.557	1.386	2.659	
110	ROHN 5 EH	69.312	39.234	C	0.14	0.244	3.096	4.557	1.386	2.659	
110	ROHN 5 EH	69.312	39.234	B	0.14	0.244	3.096	4.557	1.386	2.659	
111	ROHN 5 EH	69.312	39.234	B	0.14	0.244	3.096	4.557	1.386	2.659	
111	ROHN 5 EH	69.312	39.234	A	0.14	0.244	3.096	4.557	1.386	2.659	
112	ROHN 2 STD	29.591	23.956	C	0.14	0.244	2.303	4.847	1.305	2.829	
113	ROHN 2 STD	29.591	23.956	B	0.14	0.244	2.303	4.847	1.305	2.829	
114	ROHN 2 STD	29.591	23.956	A	0.14	0.244	2.303	4.847	1.305	2.829	
115	ROHN 2 XXS	29.591	23.956	C	0.14	0.244	1.763	3.710	0.999	2.165	
116	ROHN 2 XXS	29.591	23.956	C	0.14	0.244	1.763	3.710	0.999	2.165	
117	ROHN 2 XXS	29.591	23.956	B	0.14	0.244	1.763	3.710	0.999	2.165	
118	ROHN 2 XXS	29.591	23.956	B	0.14	0.244	1.763	3.710	0.999	2.165	
119	ROHN 2 XXS	29.591	23.956	A	0.14	0.244	1.763	3.710	0.999	2.165	
120	ROHN 2 XXS	29.591	23.956	A	0.14	0.244	1.763	3.710	0.999	2.165	
				A		Sum:	12.020	21.380	6.074	12.478	
				B			12.020	21.380	6.074	12.478	
				C			12.020	21.380	6.074	12.478	
T6 120.00-100.00	124	ROHN 6 EHS	81.556	43.651	C	0.133	0.215	11.065	15.398	4.541	8.888
124	ROHN 6 EHS	81.556	43.651	A	0.133	0.215	11.065	15.398	4.541	8.888	
125	ROHN 6 EHS	81.556	43.651	C	0.133	0.215	11.065	15.398	4.541	8.888	
125	ROHN 6 EHS	81.556	43.651	B	0.133	0.215	11.065	15.398	4.541	8.888	
126	ROHN 6 EHS	81.556	43.651	B	0.133	0.215	11.065	15.398	4.541	8.888	
126	ROHN 6 EHS	81.556	43.651	A	0.133	0.215	11.065	15.398	4.541	8.888	
127	ROHN 2 STD	29.237	23.528	C	0.133	0.215	2.645	5.534	1.497	3.195	
128	Pipe 2.5 XXS	35.392	25.896	C	0.133	0.215	2.889	5.496	1.635	3.172	
129	Pipe 2.5 XXS	35.392	25.896	C	0.133	0.215	2.889	5.496	1.635	3.172	
130	ROHN 2 STD	29.237	23.528	B	0.133	0.215	2.645	5.534	1.497	3.195	
131	Pipe 2.5 XXS	35.392	25.896	B	0.133	0.215	2.889	5.496	1.635	3.172	
132	Pipe 2.5 XXS	35.392	25.896	B	0.133	0.215	2.889	5.496	1.635	3.172	

Job	22027.01 - Westport	Page	27 of 72
Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
Client	Verizon	Designed by	TJL

Section Elevation	Elem. Num.	Size	C	C w/Ice	F a c e	e	e w/Ice	A _r	A _r w/Ice	A _r R _r	A _r R _r w/Ice
ft								ft ²	ft ²	ft ²	ft ²
	133	ROHN 2 STD	29.237	23.528	A	0.133	0.215	2.645	5.534	1.497	3.195
	134	Pipe 2.5 XXS	35.392	25.896	A	0.133	0.215	2.889	5.496	1.635	3.172
	135	Pipe 2.5 XXS	35.392	25.896	A	0.133	0.215	2.889	5.496	1.635	3.172
	139	ROHN 2 STD	29.237	23.528	C	0.133	0.215	2.422	5.069	1.371	2.926
	140	Pipe 2.5 XXS	35.392	25.896	C	0.133	0.215	2.804	5.334	1.587	3.079
	141	Pipe 2.5 XXS	35.392	25.896	C	0.133	0.215	2.804	5.334	1.587	3.079
	142	ROHN 2 STD	29.237	23.528	B	0.133	0.215	2.422	5.069	1.371	2.926
	143	Pipe 2.5 XXS	35.392	25.896	B	0.133	0.215	2.804	5.334	1.587	3.079
	144	Pipe 2.5 XXS	35.392	25.896	B	0.133	0.215	2.804	5.334	1.587	3.079
	145	ROHN 2 STD	29.237	23.528	A	0.133	0.215	2.422	5.069	1.371	2.926
	146	Pipe 2.5 XXS	35.392	25.896	A	0.133	0.215	2.804	5.334	1.587	3.079
	147	Pipe 2.5 XXS	35.392	25.896	A	0.133	0.215	2.804	5.334	1.587	3.079
					A		Sum:	38.583	63.059	18.396	36.398
					B			38.583	63.059	18.396	36.398
					C			38.583	63.059	18.396	36.398
T7 100.00-90.00	151	ROHN 6 EH	80.307	42.807	C	0.131	0.206	5.537	7.673	2.265	4.416
	151	ROHN 6 EH	80.307	42.807	A	0.131	0.206	5.537	7.673	2.265	4.416
	152	ROHN 6 EH	80.307	42.807	C	0.131	0.206	5.537	7.673	2.265	4.416
	152	ROHN 6 EH	80.307	42.807	B	0.131	0.206	5.537	7.673	2.265	4.416
	153	ROHN 6 EH	80.307	42.807	B	0.131	0.206	5.537	7.673	2.265	4.416
	153	ROHN 6 EH	80.307	42.807	A	0.131	0.206	5.537	7.673	2.265	4.416
	154	ROHN 2 STD	28.789	22.992	C	0.131	0.206	2.868	5.955	1.623	3.427
	155	ROHN 3 STD	42.426	28.237	C	0.131	0.206	3.643	6.303	2.011	3.628
	156	ROHN 3 STD	42.426	28.237	C	0.131	0.206	3.643	6.303	2.011	3.628
	157	ROHN 2 STD	28.789	22.992	B	0.131	0.206	2.868	5.955	1.623	3.427
	158	ROHN 3 STD	42.426	28.237	B	0.131	0.206	3.643	6.303	2.011	3.628
	159	ROHN 3 STD	42.426	28.237	B	0.131	0.206	3.643	6.303	2.011	3.628
	160	ROHN 2 STD	28.789	22.992	A	0.131	0.206	2.868	5.955	1.623	3.427
	161	ROHN 3 STD	42.426	28.237	A	0.131	0.206	3.643	6.303	2.011	3.628
	162	ROHN 3 STD	42.426	28.237	A	0.131	0.206	3.643	6.303	2.011	3.628
					A		Sum:	21.227	33.908	10.175	19.516
					B			21.227	33.908	10.175	19.516
					C			21.227	33.908	10.175	19.516
T8 90.00-80.00	166	ROHN 6 EH	79.372	42.178	C	0.124	0.195	5.537	7.650	2.247	4.389
	166	ROHN 6 EH	79.372	42.178	A	0.124	0.195	5.537	7.650	2.247	4.389
	167	ROHN 6 EH	79.372	42.178	C	0.124	0.195	5.537	7.650	2.247	4.389
	167	ROHN 6 EH	79.372	42.178	B	0.124	0.195	5.537	7.650	2.247	4.389
	168	ROHN 6 EH	79.372	42.178	B	0.124	0.195	5.537	7.650	2.247	4.389
	168	ROHN 6 EH	79.372	42.178	A	0.124	0.195	5.537	7.650	2.247	4.389
	169	ROHN 2 STD	28.454	22.594	C	0.124	0.195	3.129	6.459	1.769	3.705
	170	ROHN 2 STD	28.454	22.594	B	0.124	0.195	3.129	6.459	1.769	3.705
	171	ROHN 2 STD	28.454	22.594	A	0.124	0.195	3.129	6.459	1.769	3.705
	172	ROHN 3 STD	41.933	27.778	C	0.124	0.195	3.773	6.498	2.088	3.728
	173	ROHN 3 STD	41.933	27.778	C	0.124	0.195	3.773	6.498	2.088	3.728
	174	ROHN 3 STD	41.933	27.778	B	0.124	0.195	3.773	6.498	2.088	3.728
	175	ROHN 3 STD	41.933	27.778	B	0.124	0.195	3.773	6.498	2.088	3.728
	176	ROHN 3 STD	41.933	27.778	A	0.124	0.195	3.773	6.498	2.088	3.728
	177	ROHN 3 STD	41.933	27.778	A	0.124	0.195	3.773	6.498	2.088	3.728
					A		Sum:	21.747	34.754	10.439	19.938
					B			21.747	34.754	10.439	19.938
					C			21.747	34.754	10.439	19.938
T9 80.00-60.00	184	ROHN 2.5 STD	33.748	24.175	C	0.14	0.199	4.360	8.120	2.470	4.663
	185	ROHN 3 STD	41.084	26.997	C	0.14	0.199	3.995	6.825	2.231	3.919
	186	ROHN 3 STD	41.084	26.997	C	0.14	0.199	3.995	6.825	2.231	3.919
	187	ROHN 2.5 STD	33.748	24.175	B	0.14	0.199	4.360	8.120	2.470	4.663
	188	ROHN 3 STD	41.084	26.997	B	0.14	0.199	3.995	6.825	2.231	3.919
	189	ROHN 3 STD	41.084	26.997	B	0.14	0.199	3.995	6.825	2.231	3.919
	190	ROHN 2.5 STD	33.748	24.175	A	0.14	0.199	4.360	8.120	2.470	4.663
	191	ROHN 3 STD	41.084	26.997	A	0.14	0.199	3.995	6.825	2.231	3.919
	192	ROHN 3 STD	41.084	26.997	A	0.14	0.199	3.995	6.825	2.231	3.919

Job	22027.01 - Westport	Page	28 of 72
Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
Client	Verizon	Designed by	TJL

Section Elevation	Elem. Num.	Size	C	C w/Ice	F a c e	e	e w/Ice	A _r	A _r w/Ice	A _r R _r	A _r R _r w/Ice	
ft								ft ²	ft ²	ft ²	ft ²	
T10 60.00-40.00	196	ROHN 2.5 STD	33.748	24.175	C	0.14	0.199	4.060	7.562	2.301	4.343	
	197	ROHN 3 STD	41.084	26.997	C	0.14	0.199	3.862	6.599	2.157	3.789	
	198	ROHN 3 STD	41.084	26.997	C	0.14	0.199	3.862	6.599	2.157	3.789	
	199	ROHN 2.5 STD	33.748	24.175	B	0.14	0.199	4.060	7.562	2.301	4.343	
	200	ROHN 3 STD	41.084	26.997	B	0.14	0.199	3.862	6.599	2.157	3.789	
	201	ROHN 3 STD	41.084	26.997	B	0.14	0.199	3.862	6.599	2.157	3.789	
	202	ROHN 2.5 STD	33.748	24.175	A	0.14	0.199	4.060	7.562	2.301	4.343	
	203	ROHN 3 STD	41.084	26.997	A	0.14	0.199	3.862	6.599	2.157	3.789	
	204	ROHN 3 STD	41.084	26.997	A	0.14	0.199	3.862	6.599	2.157	3.789	
						A		Sum:	24.135	42.530	13.546	24.424
						B			24.135	42.530	13.546	24.424
						C			24.135	42.530	13.546	24.424
						C			4.959	9.094	2.805	5.200
		211	ROHN 2.5 STD	32.573	22.976	C	0.129	0.184	4.269	7.193	2.404	4.113
		212	ROHN 3 EH	39.655	25.7	C	0.129	0.184	4.269	7.193	2.404	4.113
		213	ROHN 3 EH	39.655	25.7	C	0.129	0.184	4.269	7.193	2.404	4.113
		214	ROHN 2.5 STD	32.573	22.976	B	0.129	0.184	4.959	9.094	2.805	5.200
		215	ROHN 3 EH	39.655	25.7	B	0.129	0.184	4.269	7.193	2.404	4.113
		216	ROHN 3 EH	39.655	25.7	B	0.129	0.184	4.269	7.193	2.404	4.113
		217	ROHN 2.5 STD	32.573	22.976	A	0.129	0.184	4.959	9.094	2.805	5.200
		218	ROHN 3 EH	39.655	25.7	A	0.129	0.184	4.269	7.193	2.404	4.113
		219	ROHN 3 EH	39.655	25.7	A	0.129	0.184	4.269	7.193	2.404	4.113
		223	ROHN 2.5 STD	32.573	22.976	C	0.129	0.184	4.659	8.545	2.636	4.886
		224	ROHN 3 EH	39.655	25.7	C	0.129	0.184	4.130	6.960	2.326	3.980
		225	ROHN 3 EH	39.655	25.7	C	0.129	0.184	4.130	6.960	2.326	3.980
		226	ROHN 2.5 STD	32.573	22.976	B	0.129	0.184	4.659	8.545	2.636	4.886
		227	ROHN 3 EH	39.655	25.7	B	0.129	0.184	4.130	6.960	2.326	3.980
		228	ROHN 3 EH	39.655	25.7	B	0.129	0.184	4.130	6.960	2.326	3.980
		229	ROHN 2.5 STD	32.573	22.976	A	0.129	0.184	4.659	8.545	2.636	4.886
		230	ROHN 3 EH	39.655	25.7	A	0.129	0.184	4.130	6.960	2.326	3.980
		231	ROHN 3 EH	39.655	25.7	A	0.129	0.184	4.130	6.960	2.326	3.980
						A		Sum:	26.417	45.945	14.901	26.273
						B			26.417	45.945	14.901	26.273
						C			26.417	45.945	14.901	26.273
T11 40.00-30.00	238	ROHN 2.5 STD	31.373	21.777	C	0.123	0.174	5.258	9.490	2.973	5.413	
	239	ROHN 3 EH	38.193	24.4	C	0.123	0.174	4.410	7.326	2.493	4.179	
	240	ROHN 3 EH	38.193	24.4	C	0.123	0.174	4.410	7.326	2.493	4.179	
	241	ROHN 2.5 STD	31.373	21.777	B	0.123	0.174	5.258	9.490	2.973	5.413	
	242	ROHN 3 EH	38.193	24.4	B	0.123	0.174	4.410	7.326	2.493	4.179	
	243	ROHN 3 EH	38.193	24.4	B	0.123	0.174	4.410	7.326	2.493	4.179	
	244	ROHN 2.5 STD	31.373	21.777	A	0.123	0.174	5.258	9.490	2.973	5.413	
	245	ROHN 3 EH	38.193	24.4	A	0.123	0.174	4.410	7.326	2.493	4.179	
	246	ROHN 3 EH	38.193	24.4	A	0.123	0.174	4.410	7.326	2.493	4.179	
						A		Sum:	14.079	24.142	7.959	13.771
						B			14.079	24.142	7.959	13.771
					C			14.079	24.142	7.959	13.771	
T12 30.00-20.00	253	ROHN 2.5 EH	30.281	20.709	C	0.119	0.168	5.558	9.882	3.141	5.629	
	254	ROHN 2.5 EH	30.281	20.709	B	0.119	0.168	5.558	9.882	3.141	5.629	
	255	ROHN 2.5 EH	30.281	20.709	A	0.119	0.168	5.558	9.882	3.141	5.629	
	256	ROHN 3 EH	36.864	23.241	C	0.119	0.168	4.555	7.466	2.574	4.252	
	257	ROHN 3 EH	36.864	23.241	C	0.119	0.168	4.555	7.466	2.574	4.252	
	258	ROHN 3 EH	36.864	23.241	B	0.119	0.168	4.555	7.466	2.574	4.252	
	259	ROHN 3 EH	36.864	23.241	B	0.119	0.168	4.555	7.466	2.574	4.252	
	260	ROHN 3 EH	36.864	23.241	A	0.119	0.168	4.555	7.466	2.574	4.252	
	261	ROHN 3 EH	36.864	23.241	A	0.119	0.168	4.555	7.466	2.574	4.252	
						A		Sum:	14.667	24.813	8.288	14.133
						B			14.667	24.813	8.288	14.133
					C			14.667	24.813	8.288	14.133	
T13 20.00-0.00	268	P3.5x.226	39.951	23.207	C	0.108	0.148	8.153	12.313	4.570	6.986	
	269	ROHN 3 EH	34.957	21.286	C	0.108	0.148	6.913	10.944	3.903	6.209	
	270	ROHN 1.5 STD	18.977	15.14	C	0.108	0.148	0.940	1.949	0.531	1.106	

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 29 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

Section Elevation <i>ft</i>	Elem. Num.	Size	C	C w/Ice	F a c e	e	e w/Ice	A _r <i>ft</i> ²	A _r w/Ice <i>ft</i> ²	A _r R _r <i>ft</i> ²	A _r R _r w/Ice <i>ft</i> ²
	271	ROHN 2 STD	23.721	16.965	C	0.108	0.148	2.132	3.965	1.204	2.249
	272	ROHN 3 EH	34.957	21.286	C	0.108	0.148	6.913	10.944	3.903	6.209
	273	ROHN 1.5 STD	18.977	15.14	C	0.108	0.148	0.940	1.949	0.531	1.106
	274	ROHN 2 STD	23.721	16.965	C	0.108	0.148	2.132	3.965	1.204	2.249
	275	P3.5x.226	39.951	23.207	B	0.108	0.148	8.153	12.313	4.570	6.986
	276	ROHN 3 EH	34.957	21.286	B	0.108	0.148	6.913	10.944	3.903	6.209
	277	ROHN 1.5 STD	18.977	15.14	B	0.108	0.148	0.940	1.949	0.531	1.106
	278	ROHN 2 STD	23.721	16.965	B	0.108	0.148	2.132	3.965	1.204	2.249
	279	ROHN 3 EH	34.957	21.286	B	0.108	0.148	6.913	10.944	3.903	6.209
	280	ROHN 1.5 STD	18.977	15.14	B	0.108	0.148	0.940	1.949	0.531	1.106
	281	ROHN 2 STD	23.721	16.965	B	0.108	0.148	2.132	3.965	1.204	2.249
	283	P3.5x.226	39.951	23.207	A	0.108	0.148	8.153	12.313	4.570	6.986
	284	ROHN 3 EH	34.957	21.286	A	0.108	0.148	6.913	10.944	3.903	6.209
	285	ROHN 1.5 STD	18.977	15.14	A	0.108	0.148	0.940	1.949	0.531	1.106
	286	ROHN 2 STD	23.721	16.965	A	0.108	0.148	2.132	3.965	1.204	2.249
	287	ROHN 3 EH	34.957	21.286	A	0.108	0.148	6.913	10.944	3.903	6.209
	288	ROHN 1.5 STD	18.977	15.14	A	0.108	0.148	0.940	1.949	0.531	1.106
	289	ROHN 2 STD	23.721	16.965	A	0.108	0.148	2.132	3.965	1.204	2.249
					A		Sum:	28.122	46.029	15.844	26.114
					B			28.122	46.029	15.844	26.114
					C			28.122	46.029	15.844	26.114

222-H Section Verification Tables - No Ice

Section Elevation <i>ft</i>	z _{wind} <i>ft</i>	z _{ice} <i>ft</i>	K _z	K _h	K _{st}	t _z <i>in</i>	q _z <i>psf</i>	F a c e	e	A _r R _r <i>ft</i> ²
T1 180.00-160.00	170.00		1.415	1	1		52	A	0.139	13.713
								B	0.139	13.713
								C	0.139	13.713
T2 160.00-140.00	150.00		1.378	1	1		51	A	0.143	15.269
								B	0.143	15.269
								C	0.143	15.269
T3 140.00-133.33	136.67		1.352	1	1		50	A	0.151	5.828
								B	0.151	5.828
								C	0.151	5.828
T4 133.33-126.67	130.00		1.337	1	1		49	A	0.145	5.951
								B	0.145	5.951
								C	0.145	5.951
T5 126.67-120.00	123.33		1.323	1	1		49	A	0.14	6.074
								B	0.14	6.074
								C	0.14	6.074
T6 120.00-100.00	110.00		1.291	1	1		47	A	0.133	18.396
								B	0.133	18.396
								C	0.133	18.396
T7 100.00-90.00	95.00		1.252	1	1		46	A	0.131	10.175
								B	0.131	10.175
								C	0.131	10.175
T8 90.00-80.00	85.00		1.223	1	1		45	A	0.124	10.439
								B	0.124	10.439
								C	0.124	10.439
T9 80.00-60.00	70.00		1.174	1	1		43	A	0.14	13.546

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	30 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section Elevation	z_{wind}	z_{ice}	K_z	K_h	K_{st}	t_z	q_z	F_{ac}	e	A,R_r
ft	ft	ft				in	psf	e		ft ²
T10 60.00-40.00	50.00		1.094	1	1		40	B	0.14	13.546
								C	0.14	13.546
								A	0.129	14.901
T11 40.00-30.00	35.00		1.015	1	1		37	B	0.129	14.901
								C	0.129	14.901
								A	0.123	7.959
T12 30.00-20.00	25.00		0.945	1	1		35	B	0.123	7.959
								C	0.123	7.959
								A	0.119	8.288
T13 20.00-0.00	10.00		0.85	1	1		31	B	0.119	8.288
								C	0.119	8.288
								A	0.108	15.844
								B	0.108	15.844
								C	0.108	15.844

222-H Section Verification Tables - Ice

Section Elevation	z_{wind}	z_{ice}	K_z	K_h	K_{st}	t_z	q_z	F_{ac}	e	A,R_r
ft	ft	ft				in	psf	e		ft ²
T1 180.00-160.00	170.00	170.00	1.415	1	1	1.3549	8	A	0.273	29.387
								B	0.273	29.387
								C	0.273	29.387
T2 160.00-140.00	150.00	150.00	1.378	1	1	1.3380	7	A	0.265	32.082
								B	0.265	32.082
								C	0.265	32.082
T3 140.00-133.33	136.67	136.67	1.352	1	1	1.3256	7	A	0.262	12.050
								B	0.262	12.050
								C	0.262	12.050
T4 133.33-126.67	130.00	130.00	1.337	1	1	1.3190	7	A	0.253	12.264
								B	0.253	12.264
								C	0.253	12.264
T5 126.67-120.00	123.33	123.33	1.323	1	1	1.3121	7	A	0.244	12.478
								B	0.244	12.478
								C	0.244	12.478
T6 120.00-100.00	110.00	110.00	1.291	1	1	1.2971	7	A	0.215	36.398
								B	0.215	36.398
								C	0.215	36.398
T7 100.00-90.00	95.00	95.00	1.252	1	1	1.2783	7	A	0.206	19.516
								B	0.206	19.516
								C	0.206	19.516
T8 90.00-80.00	85.00	85.00	1.223	1	1	1.2641	7	A	0.195	19.938
								B	0.195	19.938
								C	0.195	19.938
T9 80.00-60.00	70.00	70.00	1.174	1	1	1.2398	6	A	0.199	24.424
								B	0.199	24.424
								C	0.199	24.424
T10 60.00-40.00	50.00	50.00	1.094	1	1	1.1988	6	A	0.184	26.273
								B	0.184	26.273
								C	0.184	26.273
T11 40.00-30.00	35.00	35.00	1.015	1	1	1.1568	6	A	0.174	13.771
								B	0.174	13.771
								C	0.174	13.771
T12 30.00-20.00	25.00	25.00	0.945	1	1	1.1185	5	A	0.168	14.133
								B	0.168	14.133
								C	0.168	14.133

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	31 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section Elevation	z_{wind}	z_{ice}	K_z	K_h	K_{st}	t_z	q_z	F_{ac}	e	$A_r R_r$
ft	ft	ft				in	psf			ft ²
T13 20.00-0.00	10.00	10.00	0.85	1	1	1.0206	5	A	0.148	26.114
								B	0.148	26.114
								C	0.148	26.114

222-H Section Verification Tables - Service

Section Elevation	z_{wind}	z_{ice}	K_z	K_h	K_{st}	t_z	q_z	F_{ac}	e	$A_r R_r$
ft	ft	ft				in	psf			ft ²
T1 180.00-160.00	170.00		1.415	1	1		11	A	0.139	13.993
								B	0.139	13.993
								C	0.139	13.993
T2 160.00-140.00	150.00		1.378	1	1		11	A	0.143	16.334
								B	0.143	16.334
								C	0.143	16.334
T3 140.00-133.33	136.67		1.352	1	1		11	A	0.151	6.561
								B	0.151	6.561
								C	0.151	6.561
T4 133.33-126.67	130.00		1.337	1	1		10	A	0.145	6.687
								B	0.145	6.687
								C	0.145	6.687
T5 126.67-120.00	123.33		1.323	1	1		10	A	0.14	6.810
								B	0.14	6.810
								C	0.14	6.810
T6 120.00-100.00	110.00		1.291	1	1		10	A	0.133	21.840
								B	0.133	21.840
								C	0.133	21.840
T7 100.00-90.00	95.00		1.252	1	1		10	A	0.131	12.011
								B	0.131	12.011
								C	0.131	12.011
T8 90.00-80.00	85.00		1.223	1	1		10	A	0.124	12.296
								B	0.124	12.296
								C	0.124	12.296
T9 80.00-60.00	70.00		1.174	1	1		9	A	0.14	13.674
								B	0.14	13.674
								C	0.14	13.674
T10 60.00-40.00	50.00		1.094	1	1		9	A	0.129	14.945
								B	0.129	14.945
								C	0.129	14.945
T11 40.00-30.00	35.00		1.015	1	1		8	A	0.123	7.959
								B	0.123	7.959
								C	0.123	7.959
T12 30.00-20.00	25.00		0.945	1	1		7	A	0.119	8.288
								B	0.119	8.288
								C	0.119	8.288
T13 20.00-0.00	10.00		0.85	1	1		7	A	0.108	15.877
								B	0.108	15.877
								C	0.108	15.877

Tower Pressures - No Ice

$G_H = 0.850$

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	32 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

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 180.00-160.00	170.00	1.415	52	177.503	A	0.000	24.699	11.667	47.24	15.281	0.000
					B	0.000	24.699		47.24	0.000	0.000
					C	0.000	24.699		47.24	0.000	0.000
T2 160.00-140.00	150.00	1.378	51	200.850	A	0.000	28.812	15.027	52.16	56.607	0.000
					B	0.000	28.812		52.16	0.000	0.000
					C	0.000	28.812		52.16	0.000	0.000
T3 140.00-133.33	136.67	1.352	50	76.803	A	0.000	11.559	6.192	53.57	18.869	0.000
					B	0.000	11.559		53.57	3.960	0.000
					C	0.000	11.559		53.57	0.000	0.000
T4 133.33-126.67	130.00	1.337	49	81.431	A	0.000	11.792	6.192	52.51	18.869	0.000
					B	0.000	11.792		52.51	14.711	0.000
					C	0.000	11.792		52.51	0.000	0.000
T5 126.67-120.00	123.33	1.323	49	86.060	A	0.000	12.020	6.192	51.52	18.869	0.000
					B	0.000	12.020		51.52	33.451	0.000
					C	0.000	12.020		51.52	0.000	0.000
T6 120.00-100.00	110.00	1.291	47	289.399	A	0.000	38.583	22.130	57.36	57.426	0.000
					B	0.000	38.583		57.36	118.527	0.000
					C	0.000	38.583		57.36	0.000	0.000
T7 100.00-90.00	95.00	1.252	46	162.540	A	0.000	21.227	11.074	52.17	28.934	0.000
					B	0.000	21.227		52.17	59.264	0.000
					C	0.000	21.227		52.17	0.000	0.000
T8 90.00-80.00	85.00	1.223	45	175.715	A	0.000	21.747	11.074	50.92	28.934	0.000
					B	0.000	21.747		50.92	59.264	0.000
					C	0.000	21.747		50.92	0.000	0.000
T9 80.00-60.00	70.00	1.174	43	390.971	A	30.496	24.135	30.496	55.82	57.930	0.000
					B	30.496	24.135		55.82	118.527	0.000
					C	30.496	24.135		55.82	0.000	0.000
T10 60.00-40.00	50.00	1.094	40	440.971	A	30.496	26.417	30.496	53.58	59.127	0.000
					B	30.496	26.417		53.58	118.527	0.000
					C	30.496	26.417		53.58	0.000	0.000
T11 40.00-30.00	35.00	1.015	37	239.236	A	15.248	14.079	15.248	51.99	29.564	0.000
					B	15.248	14.079		51.99	59.264	0.000
					C	15.248	14.079		51.99	0.000	0.000
T12 30.00-20.00	25.00	0.945	35	251.736	A	15.248	14.667	15.248	50.97	29.564	0.000
					B	15.248	14.667		50.97	59.264	0.000
					C	15.248	14.667		50.97	0.000	0.000
T13 20.00-0.00	10.00	0.85	31	541.368	A	30.078	28.122	30.078	51.68	59.127	0.000
					B	30.078	28.122		51.68	118.527	0.000
					C	30.078	28.122		51.68	0.000	0.000

Tower Pressure - With Ice

$G_H = 0.850$

Section Elevation ft	z ft	K _Z	q _z psf	t _z in	A _G 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 180.00-160.00	170.00	1.415	8	1.3549	182.020	A	0.000	49.722	20.699	41.63	41.294	0.000
						B	0.000	49.722		41.63	0.000	0.000
						C	0.000	49.722		41.63	0.000	0.000
T2 160.00-140.00	150.00	1.378	7	1.3380	205.316	A	0.000	54.476	23.963	43.99	154.465	0.000
						B	0.000	54.476		43.99	0.000	0.000
						C	0.000	54.476		43.99	0.000	0.000
T3 140.00-133.33	136.67	1.352	7	1.3256	78.277	A	0.000	20.494	9.143	44.62	51.304	0.000
						B	0.000	20.494		44.62	11.149	0.000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	33 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section Elevation ft	z ft	K _Z	q _z psf	t _z in	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
T4 133.33-126.67	130.00	1.337	7	1.3190	82.899	C	0.000	20.494	9.129	44.62	0.000	0.000
						A	0.000	20.941			51.206	0.000
						B	0.000	20.941			45.555	0.000
T5 126.67-120.00	123.33	1.323	7	1.3121	87.520	C	0.000	20.941	9.113	43.59	0.000	0.000
						A	0.000	21.380			51.103	0.000
						B	0.000	21.380			72.258	0.000
T6 120.00-100.00	110.00	1.291	7	1.2971	293.730	C	0.000	21.380	30.796	42.62	0.000	0.000
						A	0.000	63.059			156.834	0.000
						B	0.000	63.059			241.107	0.000
T7 100.00-90.00	95.00	1.252	7	1.2783	164.675	C	0.000	21.380	15.347	48.84	0.000	0.000
						A	0.000	33.908			79.087	0.000
						B	0.000	33.908			120.152	0.000
T8 90.00-80.00	85.00	1.223	7	1.2641	177.827	C	0.000	33.908	15.299	45.26	0.000	0.000
						A	0.000	34.754			78.743	0.000
						B	0.000	34.754			119.851	0.000
T9 80.00-60.00	70.00	1.174	6	1.2398	395.112	C	0.000	34.754	36.020	44.02	0.000	0.000
						A	36.020	42.530			156.616	0.000
						B	36.020	42.530			238.670	0.000
T10 60.00-40.00	50.00	1.094	6	1.1988	444.975	C	36.020	42.530	35.838	45.86	0.000	0.000
						A	35.838	45.945			160.368	0.000
						B	35.838	45.945			236.929	0.000
T11 40.00-30.00	35.00	1.015	6	1.1568	241.167	C	35.838	45.945	17.825	43.82	0.000	0.000
						A	17.825	24.142			79.080	0.000
						B	17.825	24.142			117.574	0.000
T12 30.00-20.00	25.00	0.945	5	1.1185	253.603	C	17.825	24.142	17.740	42.47	0.000	0.000
						A	17.740	24.813			78.075	0.000
						B	17.740	24.813			116.765	0.000
T13 20.00-0.00	10.00	0.85	5	1.0206	544.777	C	17.740	24.813	34.626	41.69	0.000	0.000
						A	34.626	46.029			151.008	0.000
						B	34.626	46.029			229.396	0.000
						C	34.626	46.029		42.93	0.000	0.000

Tower Pressure - Service

$G_H = 0.850$

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 _A A _A In Face ft ²	C _A A _A Out Face ft ²
T1 180.00-160.00	170.00	1.415	11	177.503	A	0.000	24.699	11.667	47.24	15.281	0.000
					B	0.000	24.699			0.000	0.000
					C	0.000	24.699			0.000	0.000
T2 160.00-140.00	150.00	1.378	11	200.850	A	0.000	28.812	15.027	52.16	56.607	0.000
					B	0.000	28.812			0.000	0.000
					C	0.000	28.812			0.000	0.000
T3 140.00-133.33	136.67	1.352	11	76.803	A	0.000	11.559	6.192	53.57	18.869	0.000
					B	0.000	11.559			3.960	0.000
					C	0.000	11.559			0.000	0.000
T4 133.33-126.67	130.00	1.337	10	81.431	A	0.000	11.792	6.192	52.51	18.869	0.000
					B	0.000	11.792			14.711	0.000
					C	0.000	11.792			0.000	0.000
T5 126.67-120.00	123.33	1.323	10	86.060	A	0.000	12.020	6.192	51.52	18.869	0.000
					B	0.000	12.020			33.451	0.000
					C	0.000	12.020			0.000	0.000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	34 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F _{a c e} ft ²	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
T6 120.00-100.00	110.00	1.291	10	289.399	A B C	0.000 0.000 0.000	38.583 38.583 38.583	22.130	57.36 57.36 57.36	57.426 118.527 0.000	0.000 0.000 0.000
T7 100.00-90.00	95.00	1.252	10	162.540	A B C	0.000 0.000 0.000	21.227 21.227 21.227	11.074	52.17 52.17 52.17	28.934 59.264 0.000	0.000 0.000 0.000
T8 90.00-80.00	85.00	1.223	10	175.715	A B C	0.000 0.000 0.000	21.747 21.747 21.747	11.074	50.92 50.92 50.92	28.934 59.264 0.000	0.000 0.000 0.000
T9 80.00-60.00	70.00	1.174	9	390.971	A B C	30.496 30.496 30.496	24.135 24.135 24.135	30.496	55.82 55.82 55.82	57.930 118.527 0.000	0.000 0.000 0.000
T10 60.00-40.00	50.00	1.094	9	440.971	A B C	30.496 30.496 30.496	26.417 26.417 26.417	30.496	53.58 53.58 53.58	59.127 118.527 0.000	0.000 0.000 0.000
T11 40.00-30.00	35.00	1.015	8	239.236	A B C	15.248 15.248 15.248	14.079 14.079 14.079	15.248	51.99 51.99 51.99	29.564 59.264 0.000	0.000 0.000 0.000
T12 30.00-20.00	25.00	0.945	7	251.736	A B C	15.248 15.248 15.248	14.667 14.667 14.667	15.248	50.97 50.97 50.97	29.564 59.264 0.000	0.000 0.000 0.000
T13 20.00-0.00	10.00	0.85	7	541.368	A B C	30.078 30.078 30.078	28.122 28.122 28.122	30.078	51.68 51.68 51.68	59.127 118.527 0.000	0.000 0.000 0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F _{a c e}	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T1 180.00-160.00	44.64	1250.43	A B C	0.139 0.139 0.139	2.812 2.812 2.812	52	1 1 1	1 1 1	13.713 13.713 13.713	2381.65	119.08	C
T2 160.00-140.00	250.60	1495.62	A B C	0.143 0.143 0.143	2.796 2.796 2.796	51	1 1 1	1 1 1	15.269 15.269 15.269	4278.29	213.91	C
T3 140.00-133.33	121.53	825.91	A B C	0.151 0.151 0.151	2.77 2.77 2.77	50	1 1 1	1 1 1	5.828 5.828 5.828	1579.56	236.93	C
T4 133.33-126.67	179.17	842.18	A B C	0.145 0.145 0.145	2.791 2.791 2.791	49	1 1 1	1 1 1	5.951 5.951 5.951	2031.97	304.80	C
T5 126.67-120.00	258.41	1080.40	A B C	0.14 0.14 0.14	2.81 2.81 2.81	49	1 1 1	1 1 1	6.074 6.074 6.074	2803.41	420.51	C
T6 120.00-100.00	853.37	3821.31	A B C	0.133 0.133 0.133	2.834 2.834 2.834	47	1 1 1	1 1 1	18.396 18.396 18.396	9014.34	450.72	C
T7 100.00-90.00	427.21	1682.80	A B C	0.131 0.131 0.131	2.844 2.844 2.844	46	1 1 1	1 1 1	10.175 10.175 10.175	4491.30	449.13	C
T8 90.00-80.00	427.21	1722.73	A B C	0.124 0.124 0.124	2.87 2.87 2.87	45	1 1 1	1 1 1	10.439 10.439 10.439	4426.46	442.65	C
T9 80.00-60.00	854.57	4897.54	A B	0.14 0.14	2.81 2.81	43	1 1	1 1	44.041 44.041	10842.65	542.13	C

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	35 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T10 60.00-40.00	857.42	5700.46	C	0.14	2.81	40	1	1	44.041	10334.96	516.75	C
			A	0.129	2.85		1	1	45.397			
			B	0.129	2.85		1	1	45.397			
T11 40.00-30.00	428.71	2942.46	C	0.129	2.85	37	1	1	45.397	4857.99	485.80	C
			A	0.123	2.875		1	1	23.207			
			B	0.123	2.875		1	1	23.207			
T12 30.00-20.00	428.71	3139.03	C	0.123	2.875	35	1	1	23.207	4563.85	456.39	C
			A	0.119	2.889		1	1	23.536			
			B	0.119	2.889		1	1	23.536			
T13 20.00-0.00	857.42	6187.56	C	0.119	2.889	31	1	1	23.536	8173.84	408.69	C
			A	0.108	2.934		1	1	45.922			
			B	0.108	2.934		1	1	45.922			
Sum Weight:	5988.97	35588.43	C	0.108	2.934		1	1	45.922			
								OTM	5308.51 kip-ft	69780.28		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T1 180.00-160.00	44.64	1250.43	A	0.139	2.812	52	0.825	1	13.713	2381.65	119.08	C
			B	0.139	2.812		0.825	1	13.713			
			C	0.139	2.812		0.825	1	13.713			
T2 160.00-140.00	250.60	1495.62	A	0.143	2.796	51	0.825	1	15.269	4278.29	213.91	C
			B	0.143	2.796		0.825	1	15.269			
			C	0.143	2.796		0.825	1	15.269			
T3 140.00-133.33	121.53	825.91	A	0.151	2.77	50	0.825	1	5.828	1579.56	236.93	C
			B	0.151	2.77		0.825	1	5.828			
			C	0.151	2.77		0.825	1	5.828			
T4 133.33-126.67	179.17	842.18	A	0.145	2.791	49	0.825	1	5.951	2031.97	304.80	C
			B	0.145	2.791		0.825	1	5.951			
			C	0.145	2.791		0.825	1	5.951			
T5 126.67-120.00	258.41	1080.40	A	0.14	2.81	49	0.825	1	6.074	2803.41	420.51	C
			B	0.14	2.81		0.825	1	6.074			
			C	0.14	2.81		0.825	1	6.074			
T6 120.00-100.00	853.37	3821.31	A	0.133	2.834	47	0.825	1	18.396	9014.34	450.72	C
			B	0.133	2.834		0.825	1	18.396			
			C	0.133	2.834		0.825	1	18.396			
T7 100.00-90.00	427.21	1682.80	A	0.131	2.844	46	0.825	1	10.175	4491.30	449.13	C
			B	0.131	2.844		0.825	1	10.175			
			C	0.131	2.844		0.825	1	10.175			
T8 90.00-80.00	427.21	1722.73	A	0.124	2.87	45	0.825	1	10.439	4426.46	442.65	C
			B	0.124	2.87		0.825	1	10.439			
			C	0.124	2.87		0.825	1	10.439			
T9 80.00-60.00	854.57	4897.54	A	0.14	2.81	43	0.825	1	38.705	10292.36	514.62	C
			B	0.14	2.81		0.825	1	38.705			
			C	0.14	2.81		0.825	1	38.705			
T10 60.00-40.00	857.42	5700.46	A	0.129	2.85	40	0.825	1	40.060	9814.94	490.75	C
			B	0.129	2.85		0.825	1	40.060			
			C	0.129	2.85		0.825	1	40.060			
T11 40.00-30.00	428.71	2942.46	A	0.123	2.875	37	0.825	1	20.539	4614.68	461.47	C
			B	0.123	2.875		0.825	1	20.539			

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 36 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJJ

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T12 30.00-20.00	428.71	3139.03	C	0.123	2.875	35	0.825	1	20.539	4336.03	433.60	C
			A	0.119	2.889		0.825	1	20.868			
			B	0.119	2.889		0.825	1	20.868			
T13 20.00-0.00	857.42	6187.56	C	0.119	2.889	31	0.825	1	20.868	7763.51	388.18	C
			A	0.108	2.934		0.825	1	40.659			
			B	0.108	2.934		0.825	1	40.659			
Sum Weight:	5988.97	35588.43	C	0.108	2.934		0.825	OTM	5225.67 kip-ft	67828.52		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T1 180.00-160.00	44.64	1250.43	A	0.139	2.812	52	0.8	1	13.713	2381.65	119.08	C
			B	0.139	2.812		0.8	1	13.713			
			C	0.139	2.812		0.8	1	13.713			
T2 160.00-140.00	250.60	1495.62	A	0.143	2.796	51	0.8	1	15.269	4278.29	213.91	C
			B	0.143	2.796		0.8	1	15.269			
			C	0.143	2.796		0.8	1	15.269			
T3 140.00-133.33	121.53	825.91	A	0.151	2.77	50	0.8	1	5.828	1579.56	236.93	C
			B	0.151	2.77		0.8	1	5.828			
			C	0.151	2.77		0.8	1	5.828			
T4 133.33-126.67	179.17	842.18	A	0.145	2.791	49	0.8	1	5.951	2031.97	304.80	C
			B	0.145	2.791		0.8	1	5.951			
			C	0.145	2.791		0.8	1	5.951			
T5 126.67-120.00	258.41	1080.40	A	0.14	2.81	49	0.8	1	6.074	2803.41	420.51	C
			B	0.14	2.81		0.8	1	6.074			
			C	0.14	2.81		0.8	1	6.074			
T6 120.00-100.00	853.37	3821.31	A	0.133	2.834	47	0.8	1	18.396	9014.34	450.72	C
			B	0.133	2.834		0.8	1	18.396			
			C	0.133	2.834		0.8	1	18.396			
T7 100.00-90.00	427.21	1682.80	A	0.131	2.844	46	0.8	1	10.175	4491.30	449.13	C
			B	0.131	2.844		0.8	1	10.175			
			C	0.131	2.844		0.8	1	10.175			
T8 90.00-80.00	427.21	1722.73	A	0.124	2.87	45	0.8	1	10.439	4426.46	442.65	C
			B	0.124	2.87		0.8	1	10.439			
			C	0.124	2.87		0.8	1	10.439			
T9 80.00-60.00	854.57	4897.54	A	0.14	2.81	43	0.8	1	37.942	10213.75	510.69	C
			B	0.14	2.81		0.8	1	37.942			
			C	0.14	2.81		0.8	1	37.942			
T10 60.00-40.00	857.42	5700.46	A	0.129	2.85	40	0.8	1	39.297	9740.65	487.03	C
			B	0.129	2.85		0.8	1	39.297			
			C	0.129	2.85		0.8	1	39.297			
T11 40.00-30.00	428.71	2942.46	A	0.123	2.875	37	0.8	1	20.158	4579.92	457.99	C
			B	0.123	2.875		0.8	1	20.158			
			C	0.123	2.875		0.8	1	20.158			
T12 30.00-20.00	428.71	3139.03	A	0.119	2.889	35	0.8	1	20.487	4303.49	430.35	C
			B	0.119	2.889		0.8	1	20.487			
			C	0.119	2.889		0.8	1	20.487			
T13 20.00-0.00	857.42	6187.56	A	0.108	2.934	31	0.8	1	39.907	7704.89	385.24	C
			B	0.108	2.934		0.8	1	39.907			

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	37 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	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	lb	lb				psf			ft ²	lb	plf	
Sum Weight:	5988.97	35588.43	C	0.108	2.934		0.8	1 OTM	39.907 5213.84 kip-ft	67549.69		

Tower Forces - No Ice - Wind 90 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	lb	lb				psf			ft ²	lb	plf	
T1 180.00-160.00	44.64	1250.43	A	0.139	2.812	52	0.85	1	13.713	2381.65	119.08	C
			B	0.139	2.812	0.85	1	13.713				
			C	0.139	2.812	0.85	1	13.713				
T2 160.00-140.00	250.60	1495.62	A	0.143	2.796	51	0.85	1	15.269	4278.29	213.91	C
			B	0.143	2.796	0.85	1	15.269				
			C	0.143	2.796	0.85	1	15.269				
T3 140.00-133.33	121.53	825.91	A	0.151	2.77	50	0.85	1	5.828	1579.56	236.93	C
			B	0.151	2.77	0.85	1	5.828				
			C	0.151	2.77	0.85	1	5.828				
T4 133.33-126.67	179.17	842.18	A	0.145	2.791	49	0.85	1	5.951	2031.97	304.80	C
			B	0.145	2.791	0.85	1	5.951				
			C	0.145	2.791	0.85	1	5.951				
T5 126.67-120.00	258.41	1080.40	A	0.14	2.81	49	0.85	1	6.074	2803.41	420.51	C
			B	0.14	2.81	0.85	1	6.074				
			C	0.14	2.81	0.85	1	6.074				
T6 120.00-100.00	853.37	3821.31	A	0.133	2.834	47	0.85	1	18.396	9014.34	450.72	C
			B	0.133	2.834	0.85	1	18.396				
			C	0.133	2.834	0.85	1	18.396				
T7 100.00-90.00	427.21	1682.80	A	0.131	2.844	46	0.85	1	10.175	4491.30	449.13	C
			B	0.131	2.844	0.85	1	10.175				
			C	0.131	2.844	0.85	1	10.175				
T8 90.00-80.00	427.21	1722.73	A	0.124	2.87	45	0.85	1	10.439	4426.46	442.65	C
			B	0.124	2.87	0.85	1	10.439				
			C	0.124	2.87	0.85	1	10.439				
T9 80.00-60.00	854.57	4897.54	A	0.14	2.81	43	0.85	1	39.467	10370.98	518.55	C
			B	0.14	2.81	0.85	1	39.467				
			C	0.14	2.81	0.85	1	39.467				
T10 60.00-40.00	857.42	5700.46	A	0.129	2.85	40	0.85	1	40.822	9889.23	494.46	C
			B	0.129	2.85	0.85	1	40.822				
			C	0.129	2.85	0.85	1	40.822				
T11 40.00-30.00	428.71	2942.46	A	0.123	2.875	37	0.85	1	20.920	4649.44	464.94	C
			B	0.123	2.875	0.85	1	20.920				
			C	0.123	2.875	0.85	1	20.920				
T12 30.00-20.00	428.71	3139.03	A	0.119	2.889	35	0.85	1	21.249	4368.58	436.86	C
			B	0.119	2.889	0.85	1	21.249				
			C	0.119	2.889	0.85	1	21.249				
T13 20.00-0.00	857.42	6187.56	A	0.108	2.934	31	0.85	1	41.411	7822.12	391.11	C
			B	0.108	2.934	0.85	1	41.411				
			C	0.108	2.934	0.85	1	41.411				
Sum Weight:	5988.97	35588.43						OTM	5237.50 kip-ft	68107.34		

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 38 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJJ

Tower Forces - With Ice - 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	lb	lb				psf			ft ²	lb	plf	
T1 180.00-160.00	492.24	3296.69	A	0.273	2.37	8	1	1	29.387	725.96	36.30	C
			B	0.273	2.37							
			C	0.273	2.37							
T2 160.00-140.00	1917.64	3710.35	A	0.265	2.392	7	1	1	32.082	1473.70	73.69	C
			B	0.265	2.392							
			C	0.265	2.392							
T3 140.00-133.33	786.20	1666.01	A	0.262	2.403	7	1	1	12.050	543.40	81.51	C
			B	0.262	2.403							
			C	0.262	2.403							
T4 133.33-126.67	1159.75	1704.37	A	0.253	2.43	7	1	1	12.264	755.16	113.27	C
			B	0.253	2.43							
			C	0.253	2.43							
T5 126.67-120.00	1753.83	1963.86	A	0.244	2.455	7	1	1	12.478	914.67	137.20	C
			B	0.244	2.455							
			C	0.244	2.455							
T6 120.00-100.00	5834.75	6329.32	A	0.215	2.548	7	1	1	36.398	2850.28	142.51	C
			B	0.215	2.548							
			C	0.215	2.548							
T7 100.00-90.00	2897.40	3059.90	A	0.206	2.576	7	1	1	19.516	1406.18	140.62	C
			B	0.206	2.576							
			C	0.206	2.576							
T8 90.00-80.00	2874.15	3136.47	A	0.195	2.611	7	1	1	19.938	1380.19	138.02	C
			B	0.195	2.611							
			C	0.195	2.611							
T9 80.00-60.00	5671.81	8816.59	A	0.199	2.6	6	1	1	60.444	2927.70	146.38	C
			B	0.199	2.6							
			C	0.199	2.6							
T10 60.00-40.00	5592.61	9758.08	A	0.184	2.651	6	1	1	62.111	2776.13	138.81	C
			B	0.184	2.651							
			C	0.184	2.651							
T11 40.00-30.00	2727.65	4973.51	A	0.174	2.685	6	1	1	31.596	1290.32	129.03	C
			B	0.174	2.685							
			C	0.174	2.685							
T12 30.00-20.00	2665.88	5147.00	A	0.168	2.707	5	1	1	31.873	1200.68	120.07	C
			B	0.168	2.707							
			C	0.168	2.707							
T13 20.00-0.00	5022.60	9424.22	A	0.148	2.779	5	1	1	60.740	2108.98	105.45	C
			B	0.148	2.779							
			C	0.148	2.779							
Sum Weight:	39396.51	62986.34						OTM	1634.16 kip-ft	20353.35		

Tower Forces - With 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	lb	lb				psf			ft ²	lb	plf	
T1	492.24	3296.69	A	0.273	2.37	8	0.825	1	29.387	725.96	36.30	C

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 39 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
180.00-160.00			B	0.273	2.37		0.825	1	29.387			
			C	0.273	2.37		0.825	1	29.387			
T2	1917.64	3710.35	A	0.265	2.392	7	0.825	1	32.082	1473.70	73.69	C
160.00-140.00			B	0.265	2.392		0.825	1	32.082			
			C	0.265	2.392		0.825	1	32.082			
T3	786.20	1666.01	A	0.262	2.403	7	0.825	1	12.050	543.40	81.51	C
140.00-133.33			B	0.262	2.403		0.825	1	12.050			
			C	0.262	2.403		0.825	1	12.050			
T4	1159.75	1704.37	A	0.253	2.43	7	0.825	1	12.264	755.16	113.27	C
133.33-126.67			B	0.253	2.43		0.825	1	12.264			
			C	0.253	2.43		0.825	1	12.264			
T5	1753.83	1963.86	A	0.244	2.455	7	0.825	1	12.478	914.67	137.20	C
126.67-120.00			B	0.244	2.455		0.825	1	12.478			
			C	0.244	2.455		0.825	1	12.478			
T6	5834.75	6329.32	A	0.215	2.548	7	0.825	1	36.398	2850.28	142.51	C
120.00-100.00			B	0.215	2.548		0.825	1	36.398			
			C	0.215	2.548		0.825	1	36.398			
T7	2897.40	3059.90	A	0.206	2.576	7	0.825	1	19.516	1406.18	140.62	C
100.00-90.00			B	0.206	2.576		0.825	1	19.516			
			C	0.206	2.576		0.825	1	19.516			
T8	2874.15	3136.47	A	0.195	2.611	7	0.825	1	19.938	1380.19	138.02	C
90.00-80.00			B	0.195	2.611		0.825	1	19.938			
			C	0.195	2.611		0.825	1	19.938			
T9	5671.81	8816.59	A	0.199	2.6	6	0.825	1	54.141	2838.72	141.94	C
80.00-60.00			B	0.199	2.6		0.825	1	54.141			
			C	0.199	2.6		0.825	1	54.141			
T10	5592.61	9758.08	A	0.184	2.651	6	0.825	1	55.839	2692.04	134.60	C
60.00-40.00			B	0.184	2.651		0.825	1	55.839			
			C	0.184	2.651		0.825	1	55.839			
T11	2727.65	4973.51	A	0.174	2.685	6	0.825	1	28.477	1251.03	125.10	C
40.00-30.00			B	0.174	2.685		0.825	1	28.477			
			C	0.174	2.685		0.825	1	28.477			
T12	2665.88	5147.00	A	0.168	2.707	5	0.825	1	28.769	1163.95	116.40	C
30.00-20.00			B	0.168	2.707		0.825	1	28.769			
			C	0.168	2.707		0.825	1	28.769			
T13	5022.60	9424.22	A	0.148	2.779	5	0.825	1	54.680	2042.80	102.14	C
20.00-0.00			B	0.148	2.779		0.825	1	54.680			
			C	0.148	2.779		0.825	1	54.680			
Sum Weight:	39396.51	62986.34						OTM	1620.77 kip-ft	20038.08		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T1	492.24	3296.69	A	0.273	2.37	8	0.8	1	29.387	725.96	36.30	C
180.00-160.00			B	0.273	2.37		0.8	1	29.387			
			C	0.273	2.37		0.8	1	29.387			
T2	1917.64	3710.35	A	0.265	2.392	7	0.8	1	32.082	1473.70	73.69	C
160.00-140.00			B	0.265	2.392		0.8	1	32.082			
			C	0.265	2.392		0.8	1	32.082			
T3	786.20	1666.01	A	0.262	2.403	7	0.8	1	12.050	543.40	81.51	C

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 40 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
140.00-133.33			B	0.262	2.403		0.8	1	12.050			
			C	0.262	2.403		0.8	1	12.050			
T4 133.33-126.67	1159.75	1704.37	A	0.253	2.43	7	0.8	1	12.264	755.16	113.27	C
			B	0.253	2.43		0.8	1	12.264			
			C	0.253	2.43		0.8	1	12.264			
T5 126.67-120.00	1753.83	1963.86	A	0.244	2.455	7	0.8	1	12.478	914.67	137.20	C
			B	0.244	2.455		0.8	1	12.478			
			C	0.244	2.455		0.8	1	12.478			
T6 120.00-100.00	5834.75	6329.32	A	0.215	2.548	7	0.8	1	36.398	2850.28	142.51	C
			B	0.215	2.548		0.8	1	36.398			
			C	0.215	2.548		0.8	1	36.398			
T7 100.00-90.00	2897.40	3059.90	A	0.206	2.576	7	0.8	1	19.516	1406.18	140.62	C
			B	0.206	2.576		0.8	1	19.516			
			C	0.206	2.576		0.8	1	19.516			
T8 90.00-80.00	2874.15	3136.47	A	0.195	2.611	7	0.8	1	19.938	1380.19	138.02	C
			B	0.195	2.611		0.8	1	19.938			
			C	0.195	2.611		0.8	1	19.938			
T9 80.00-60.00	5671.81	8816.59	A	0.199	2.6	6	0.8	1	53.240	2826.01	141.30	C
			B	0.199	2.6		0.8	1	53.240			
			C	0.199	2.6		0.8	1	53.240			
T10 60.00-40.00	5592.61	9758.08	A	0.184	2.651	6	0.8	1	54.943	2680.03	134.00	C
			B	0.184	2.651		0.8	1	54.943			
			C	0.184	2.651		0.8	1	54.943			
T11 40.00-30.00	2727.65	4973.51	A	0.174	2.685	6	0.8	1	28.031	1245.41	124.54	C
			B	0.174	2.685		0.8	1	28.031			
			C	0.174	2.685		0.8	1	28.031			
T12 30.00-20.00	2665.88	5147.00	A	0.168	2.707	5	0.8	1	28.325	1158.70	115.87	C
			B	0.168	2.707		0.8	1	28.325			
			C	0.168	2.707		0.8	1	28.325			
T13 20.00-0.00	5022.60	9424.22	A	0.148	2.779	5	0.8	1	53.815	2033.35	101.67	C
			B	0.148	2.779		0.8	1	53.815			
			C	0.148	2.779		0.8	1	53.815			
Sum Weight:	39396.51	62986.34						OTM	1618.86 kip-ft	19993.04		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T1 180.00-160.00	492.24	3296.69	A	0.273	2.37	8	0.85	1	29.387	725.96	36.30	C
			B	0.273	2.37		0.85	1	29.387			
			C	0.273	2.37		0.85	1	29.387			
T2 160.00-140.00	1917.64	3710.35	A	0.265	2.392	7	0.85	1	32.082	1473.70	73.69	C
			B	0.265	2.392		0.85	1	32.082			
			C	0.265	2.392		0.85	1	32.082			
T3 140.00-133.33	786.20	1666.01	A	0.262	2.403	7	0.85	1	12.050	543.40	81.51	C
			B	0.262	2.403		0.85	1	12.050			
			C	0.262	2.403		0.85	1	12.050			
T4 133.33-126.67	1159.75	1704.37	A	0.253	2.43	7	0.85	1	12.264	755.16	113.27	C
			B	0.253	2.43		0.85	1	12.264			
			C	0.253	2.43		0.85	1	12.264			
T5 126.67-120.00	1753.83	1963.86	A	0.244	2.455	7	0.85	1	12.478	914.67	137.20	C

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 41 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
126.67-120.00			B	0.244	2.455		0.85	1	12.478			
			C	0.244	2.455		0.85	1	12.478			
T6 120.00-100.00	5834.75	6329.32	A	0.215	2.548	7	0.85	1	36.398	2850.28	142.51	C
			B	0.215	2.548		0.85	1	36.398			
			C	0.215	2.548		0.85	1	36.398			
T7 100.00-90.00	2897.40	3059.90	A	0.206	2.576	7	0.85	1	19.516	1406.18	140.62	C
			B	0.206	2.576		0.85	1	19.516			
			C	0.206	2.576		0.85	1	19.516			
T8 90.00-80.00	2874.15	3136.47	A	0.195	2.611	7	0.85	1	19.938	1380.19	138.02	C
			B	0.195	2.611		0.85	1	19.938			
			C	0.195	2.611		0.85	1	19.938			
T9 80.00-60.00	5671.81	8816.59	A	0.199	2.6	6	0.85	1	55.041	2851.43	142.57	C
			B	0.199	2.6		0.85	1	55.041			
			C	0.199	2.6		0.85	1	55.041			
T10 60.00-40.00	5592.61	9758.08	A	0.184	2.651	6	0.85	1	56.735	2704.05	135.20	C
			B	0.184	2.651		0.85	1	56.735			
			C	0.184	2.651		0.85	1	56.735			
T11 40.00-30.00	2727.65	4973.51	A	0.174	2.685	6	0.85	1	28.922	1256.64	125.66	C
			B	0.174	2.685		0.85	1	28.922			
			C	0.174	2.685		0.85	1	28.922			
T12 30.00-20.00	2665.88	5147.00	A	0.168	2.707	5	0.85	1	29.212	1169.20	116.92	C
			B	0.168	2.707		0.85	1	29.212			
			C	0.168	2.707		0.85	1	29.212			
T13 20.00-0.00	5022.60	9424.22	A	0.148	2.779	5	0.85	1	55.546	2052.26	102.61	C
			B	0.148	2.779		0.85	1	55.546			
			C	0.148	2.779		0.85	1	55.546			
Sum Weight:	39396.51	62986.34						OTM	1622.68 kip-ft	20083.12		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T1 180.00-160.00	44.64	1250.43	A	0.139	2.812	11	1	1	13.993	514.75	25.74	C
			B	0.139	2.812		1	1	13.993			
			C	0.139	2.812		1	1	13.993			
T2 160.00-140.00	250.60	1495.62	A	0.143	2.796	11	1	1	16.334	938.67	46.93	C
			B	0.143	2.796		1	1	16.334			
			C	0.143	2.796		1	1	16.334			
T3 140.00-133.33	121.53	825.91	A	0.151	2.77	11	1	1	6.561	354.75	53.21	C
			B	0.151	2.77		1	1	6.561			
			C	0.151	2.77		1	1	6.561			
T4 133.33-126.67	179.17	842.18	A	0.145	2.791	10	1	1	6.687	451.13	67.67	C
			B	0.145	2.791		1	1	6.687			
			C	0.145	2.791		1	1	6.687			
T5 126.67-120.00	258.41	1080.40	A	0.14	2.81	10	1	1	6.810	615.41	92.31	C
			B	0.14	2.81		1	1	6.810			
			C	0.14	2.81		1	1	6.810			
T6 120.00-100.00	853.37	3821.31	A	0.133	2.834	10	1	1	21.840	2004.13	100.21	C
			B	0.133	2.834		1	1	21.840			
			C	0.133	2.834		1	1	21.840			
T7	427.21	1682.80	A	0.131	2.844	10	1	1	12.011	1000.26	100.03	C

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	42 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
100.00-90.00			B	0.131	2.844		1	1	12.011			
			C	0.131	2.844		1	1	12.011			
T8	427.21	1722.73	A	0.124	2.87	10	1	1	12.296	986.33	98.63	C
90.00-80.00			B	0.124	2.87		1	1	12.296			
			C	0.124	2.87		1	1	12.296			
T9	854.57	4897.54	A	0.14	2.81	9	1	1	44.170	2312.50	115.62	C
80.00-60.00			B	0.14	2.81		1	1	44.170			
			C	0.14	2.81		1	1	44.170			
T10	857.42	5700.46	A	0.129	2.85	9	1	1	45.441	2202.45	110.12	C
60.00-40.00			B	0.129	2.85		1	1	45.441			
			C	0.129	2.85		1	1	45.441			
T11	428.71	2942.46	A	0.123	2.875	8	1	1	23.207	1034.84	103.48	C
40.00-30.00			B	0.123	2.875		1	1	23.207			
			C	0.123	2.875		1	1	23.207			
T12	428.71	3139.03	A	0.119	2.889	7	1	1	23.536	972.18	97.22	C
30.00-20.00			B	0.119	2.889		1	1	23.536			
			C	0.119	2.889		1	1	23.536			
T13	857.42	6187.56	A	0.108	2.934	7	1	1	45.955	1741.72	87.09	C
20.00-0.00			B	0.108	2.934		1	1	45.955			
			C	0.108	2.934		1	1	45.955			
Sum Weight:	5988.97	35588.43						OTM	1160.59 kip-ft	15129.13		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T1	44.64	1250.43	A	0.139	2.812	11	0.825	1	13.993	514.75	25.74	C
180.00-160.00			B	0.139	2.812		0.825	1	13.993			
			C	0.139	2.812		0.825	1	13.993			
T2	250.60	1495.62	A	0.143	2.796	11	0.825	1	16.334	938.67	46.93	C
160.00-140.00			B	0.143	2.796		0.825	1	16.334			
			C	0.143	2.796		0.825	1	16.334			
T3	121.53	825.91	A	0.151	2.77	11	0.825	1	6.561	354.75	53.21	C
140.00-133.33			B	0.151	2.77		0.825	1	6.561			
			C	0.151	2.77		0.825	1	6.561			
T4	179.17	842.18	A	0.145	2.791	10	0.825	1	6.687	451.13	67.67	C
133.33-126.67			B	0.145	2.791		0.825	1	6.687			
			C	0.145	2.791		0.825	1	6.687			
T5	258.41	1080.40	A	0.14	2.81	10	0.825	1	6.810	615.41	92.31	C
126.67-120.00			B	0.14	2.81		0.825	1	6.810			
			C	0.14	2.81		0.825	1	6.810			
T6	853.37	3821.31	A	0.133	2.834	10	0.825	1	21.840	2004.13	100.21	C
120.00-100.00			B	0.133	2.834		0.825	1	21.840			
			C	0.133	2.834		0.825	1	21.840			
T7	427.21	1682.80	A	0.131	2.844	10	0.825	1	12.011	1000.26	100.03	C
100.00-90.00			B	0.131	2.844		0.825	1	12.011			
			C	0.131	2.844		0.825	1	12.011			
T8	427.21	1722.73	A	0.124	2.87	10	0.825	1	12.296	986.33	98.63	C
90.00-80.00			B	0.124	2.87		0.825	1	12.296			
			C	0.124	2.87		0.825	1	12.296			
T9	854.57	4897.54	A	0.14	2.81	9	0.825	1	38.833	2195.28	109.76	C

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 43 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
80.00-60.00			B	0.14	2.81		0.825	1	38.833			
			C	0.14	2.81		0.825	1	38.833			
T10	857.42	5700.46	A	0.129	2.85	9	0.825	1	40.104	2091.68	104.58	C
60.00-40.00			B	0.129	2.85		0.825	1	40.104			
			C	0.129	2.85		0.825	1	40.104			
T11	428.71	2942.46	A	0.123	2.875	8	0.825	1	20.539	983.01	98.30	C
40.00-30.00			B	0.123	2.875		0.825	1	20.539			
			C	0.123	2.875		0.825	1	20.539			
T12	428.71	3139.03	A	0.119	2.889	7	0.825	1	20.868	923.65	92.37	C
30.00-20.00			B	0.119	2.889		0.825	1	20.868			
			C	0.119	2.889		0.825	1	20.868			
T13	857.42	6187.56	A	0.108	2.934	7	0.825	1	40.692	1654.31	82.72	C
20.00-0.00			B	0.108	2.934		0.825	1	40.692			
			C	0.108	2.934		0.825	1	40.692			
Sum Weight:	5988.97	35588.43						OTM	1142.95 kip-ft	14713.37		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T1	44.64	1250.43	A	0.139	2.812	11	0.8	1	13.993	514.75	25.74	C
180.00-160.00			B	0.139	2.812		0.8	1	13.993			
			C	0.139	2.812		0.8	1	13.993			
T2	250.60	1495.62	A	0.143	2.796	11	0.8	1	16.334	938.67	46.93	C
160.00-140.00			B	0.143	2.796		0.8	1	16.334			
			C	0.143	2.796		0.8	1	16.334			
T3	121.53	825.91	A	0.151	2.77	11	0.8	1	6.561	354.75	53.21	C
140.00-133.33			B	0.151	2.77		0.8	1	6.561			
			C	0.151	2.77		0.8	1	6.561			
T4	179.17	842.18	A	0.145	2.791	10	0.8	1	6.687	451.13	67.67	C
133.33-126.67			B	0.145	2.791		0.8	1	6.687			
			C	0.145	2.791		0.8	1	6.687			
T5	258.41	1080.40	A	0.14	2.81	10	0.8	1	6.810	615.41	92.31	C
126.67-120.00			B	0.14	2.81		0.8	1	6.810			
			C	0.14	2.81		0.8	1	6.810			
T6	853.37	3821.31	A	0.133	2.834	10	0.8	1	21.840	2004.13	100.21	C
120.00-100.00			B	0.133	2.834		0.8	1	21.840			
			C	0.133	2.834		0.8	1	21.840			
T7	427.21	1682.80	A	0.131	2.844	10	0.8	1	12.011	1000.26	100.03	C
100.00-90.00			B	0.131	2.844		0.8	1	12.011			
			C	0.131	2.844		0.8	1	12.011			
T8	427.21	1722.73	A	0.124	2.87	10	0.8	1	12.296	986.33	98.63	C
90.00-80.00			B	0.124	2.87		0.8	1	12.296			
			C	0.124	2.87		0.8	1	12.296			
T9	854.57	4897.54	A	0.14	2.81	9	0.8	1	38.071	2178.53	108.93	C
80.00-60.00			B	0.14	2.81		0.8	1	38.071			
			C	0.14	2.81		0.8	1	38.071			
T10	857.42	5700.46	A	0.129	2.85	9	0.8	1	39.342	2075.85	103.79	C
60.00-40.00			B	0.129	2.85		0.8	1	39.342			
			C	0.129	2.85		0.8	1	39.342			
T11	428.71	2942.46	A	0.123	2.875	8	0.8	1	20.158	975.61	97.56	C

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	44 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
40.00-30.00			B	0.123	2.875		0.8	1	20.158			
			C	0.123	2.875		0.8	1	20.158			
T12 30.00-20.00	428.71	3139.03	A	0.119	2.889	7	0.8	1	20.487	916.72	91.67	C
			B	0.119	2.889		0.8	1	20.487			
			C	0.119	2.889		0.8	1	20.487			
T13 20.00-0.00	857.42	6187.56	A	0.108	2.934	7	0.8	1	39.940	1641.83	82.09	C
			B	0.108	2.934		0.8	1	39.940			
			C	0.108	2.934		0.8	1	39.940			
Sum Weight:	5988.97	35588.43						OTM	1140.43 kip-ft	14653.97		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T1 180.00-160.00	44.64	1250.43	A	0.139	2.812	11	0.85	1	13.993	514.75	25.74	C
			B	0.139	2.812		0.85	1	13.993			
			C	0.139	2.812		0.85	1	13.993			
T2 160.00-140.00	250.60	1495.62	A	0.143	2.796	11	0.85	1	16.334	938.67	46.93	C
			B	0.143	2.796		0.85	1	16.334			
			C	0.143	2.796		0.85	1	16.334			
T3 140.00-133.33	121.53	825.91	A	0.151	2.77	11	0.85	1	6.561	354.75	53.21	C
			B	0.151	2.77		0.85	1	6.561			
			C	0.151	2.77		0.85	1	6.561			
T4 133.33-126.67	179.17	842.18	A	0.145	2.791	10	0.85	1	6.687	451.13	67.67	C
			B	0.145	2.791		0.85	1	6.687			
			C	0.145	2.791		0.85	1	6.687			
T5 126.67-120.00	258.41	1080.40	A	0.14	2.81	10	0.85	1	6.810	615.41	92.31	C
			B	0.14	2.81		0.85	1	6.810			
			C	0.14	2.81		0.85	1	6.810			
T6 120.00-100.00	853.37	3821.31	A	0.133	2.834	10	0.85	1	21.840	2004.13	100.21	C
			B	0.133	2.834		0.85	1	21.840			
			C	0.133	2.834		0.85	1	21.840			
T7 100.00-90.00	427.21	1682.80	A	0.131	2.844	10	0.85	1	12.011	1000.26	100.03	C
			B	0.131	2.844		0.85	1	12.011			
			C	0.131	2.844		0.85	1	12.011			
T8 90.00-80.00	427.21	1722.73	A	0.124	2.87	10	0.85	1	12.296	986.33	98.63	C
			B	0.124	2.87		0.85	1	12.296			
			C	0.124	2.87		0.85	1	12.296			
T9 80.00-60.00	854.57	4897.54	A	0.14	2.81	9	0.85	1	39.595	2212.02	110.60	C
			B	0.14	2.81		0.85	1	39.595			
			C	0.14	2.81		0.85	1	39.595			
T10 60.00-40.00	857.42	5700.46	A	0.129	2.85	9	0.85	1	40.867	2107.50	105.38	C
			B	0.129	2.85		0.85	1	40.867			
			C	0.129	2.85		0.85	1	40.867			
T11 40.00-30.00	428.71	2942.46	A	0.123	2.875	8	0.85	1	20.920	990.41	99.04	C
			B	0.123	2.875		0.85	1	20.920			
			C	0.123	2.875		0.85	1	20.920			
T12 30.00-20.00	428.71	3139.03	A	0.119	2.889	7	0.85	1	21.249	930.58	93.06	C
			B	0.119	2.889		0.85	1	21.249			
			C	0.119	2.889		0.85	1	21.249			
T13	857.42	6187.56	A	0.108	2.934	7	0.85	1	41.444	1666.80	83.34	C

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 45 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
20.00-0.00			B	0.108	2.934		0.85	1	41.444			
			C	0.108	2.934		0.85	1	41.444			
Sum Weight:	5988.97	35588.43						OTM	1145.47 kip-ft	14772.76		

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M _x kip-ft	Sum of Overturning Moments, M _z kip-ft	Sum of Torques kip-ft
Leg Weight	17198.81					
Bracing Weight	18389.62					
Total Member Self-Weight	35588.43					
Total Weight	55393.93			-15.52	-3.09	
Wind 0 deg - No Ice		-167.50	-94098.64	-8839.07	24.88	5.45
Wind 30 deg - No Ice		45604.68	-79969.26	-7583.24	-4279.63	-72.34
Wind 45 deg - No Ice		64320.41	-65047.91	-6177.89	-6045.84	-104.56
Wind 60 deg - No Ice		78456.56	-45792.00	-4356.27	-7379.24	-129.75
Wind 90 deg - No Ice		90989.52	-10.46	-19.05	-8514.36	-153.28
Wind 120 deg - No Ice		80295.22	46834.72	4356.82	-7443.07	-136.11
Wind 135 deg - No Ice		65031.70	65698.07	6153.44	-6063.25	-112.95
Wind 150 deg - No Ice		45678.24	79799.01	7520.38	-4289.75	-82.16
Wind 180 deg - No Ice		188.11	91632.47	8671.66	-34.71	-6.26
Wind 210 deg - No Ice		-45449.28	79691.07	7502.95	4245.95	70.25
Wind 225 deg - No Ice		-64061.83	64749.07	6093.96	5993.89	102.50
Wind 240 deg - No Ice		-80132.17	46608.24	4319.64	7409.71	127.67
Wind 270 deg - No Ice		-90931.30	-315.80	-69.74	8497.88	151.53
Wind 300 deg - No Ice		-78488.14	-46046.85	-4398.48	7376.97	135.09
Wind 315 deg - No Ice		-64480.19	-65251.64	-6211.58	6065.57	111.88
Wind 330 deg - No Ice		-45852.20	-80128.27	-7609.70	4314.36	81.20
Member Ice	27397.91					
Total Weight Ice	133698.92			-133.83	-16.95	
Wind 0 deg - Ice		-25.40	-25451.38	-2503.16	-12.71	5.69
Wind 30 deg - Ice		12470.99	-21796.39	-2173.95	-1176.15	-8.61
Wind 45 deg - Ice		17607.88	-17757.31	-1796.97	-1655.36	-15.02
Wind 60 deg - Ice		21513.49	-12524.01	-1307.26	-2019.60	-20.43
Wind 90 deg - Ice		24905.62	-2.64	-134.55	-2328.47	-26.93
Wind 120 deg - Ice		21809.87	12691.01	1044.47	-2029.82	-26.26
Wind 135 deg - Ice		17721.68	17861.48	1530.25	-1658.00	-23.17
Wind 150 deg - Ice		12480.86	21768.56	1901.11	-1177.45	-18.51
Wind 180 deg - Ice		28.65	25053.94	2213.63	-21.76	-5.81
Wind 210 deg - Ice		-12446.50	21752.55	1898.53	1137.92	8.28
Wind 225 deg - Ice		-17567.13	17710.22	1520.98	1614.26	14.70
Wind 240 deg - Ice		-21785.17	12657.04	1038.91	1991.81	20.11
Wind 270 deg - Ice		-24896.45	-48.77	-142.20	2292.95	26.65
Wind 300 deg - Ice		-21517.47	-12562.45	-1313.61	1986.15	26.10
Wind 315 deg - Ice		-17631.65	-17788.02	-1802.04	1625.31	23.01
Wind 330 deg - Ice		-12508.28	-21820.45	-2177.95	1148.41	18.36
Total Weight	55393.93			-15.52	-3.09	
Wind 0 deg - Service		-35.68	-20309.37	-1912.45	9.30	1.16
Wind 30 deg - Service		9846.95	-17264.10	-1640.94	-922.53	-15.41
Wind 45 deg - Service		13888.55	-14043.52	-1336.84	-1304.93	-22.27
Wind 60 deg - Service		16941.87	-9886.85	-942.64	-1593.71	-27.64

<p style="text-align: center;">tnxTower</p> <p style="text-align: center;">Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587</p>	<p>Job</p> <p style="text-align: center;">22027.01 - Westport</p>	<p>Page</p> <p style="text-align: center;">46 of 72</p>
	<p>Project</p> <p style="text-align: center;">180-ft Lattice Tower (CSP #32)</p>	<p>Date</p> <p style="text-align: center;">10:19:44 01/27/23</p>
	<p>Client</p> <p style="text-align: center;">Verizon</p>	<p>Designed by</p> <p style="text-align: center;">TJL</p>

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M _x kip-ft	Sum of Overturning Moments, M _z kip-ft	Sum of Torques kip-ft
Wind 90 deg - Service		19647.07	-2.23	-3.84	-1839.50	-32.65
Wind 120 deg - Service		17333.54	10108.97	943.19	-1607.30	-28.99
Wind 135 deg - Service		14040.07	14182.02	1332.08	-1308.64	-24.06
Wind 150 deg - Service		9862.62	17227.83	1627.99	-924.69	-17.50
Wind 180 deg - Service		40.07	19784.03	1877.23	-3.39	-1.33
Wind 210 deg - Service		-9813.85	17204.84	1624.28	923.36	14.96
Wind 225 deg - Service		-13833.47	13979.87	1319.41	1301.87	21.83
Wind 240 deg - Service		-17298.80	10060.73	935.27	1608.20	27.20
Wind 270 deg - Service		-19634.67	-67.27	-14.64	1843.99	32.28
Wind 300 deg - Service		-16948.60	-9941.14	-951.63	1601.22	28.78
Wind 315 deg - Service		-13922.59	-14086.92	-1344.02	1317.14	23.83
Wind 330 deg - Service		-9899.68	-17297.97	-1646.58	937.93	17.30

Load Combinations

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

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	47 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

<i>Comb. No.</i>	<i>Description</i>
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

<i>Section No.</i>	<i>Elevation ft</i>	<i>Component Type</i>	<i>Condition</i>	<i>Gov. Load Comb.</i>	<i>Axial lb</i>	<i>Major Axis Moment kip-ft</i>	<i>Minor Axis Moment kip-ft</i>	
T1	180 - 160	Leg	Max Tension	31	2504.45	-0.26	-0.19	
			Max. Compression	2	-4182.87	-0.06	0.02	
			Max. Mx	12	-395.38	-0.52	-0.04	
			Max. My	33	-144.55	-0.02	-0.92	
			Max. Vy	3	328.03	0.52	0.30	
			Max. Vx	32	-472.59	-0.02	0.75	
		Diagonal	Max Tension	5	3942.47	0.00	0.00	
			Max. Compression	4	-4009.81	0.00	0.00	
			Max. Mx	34	-69.70	0.05	0.00	
			Max. Vy	34	22.77	0.00	0.00	
			Horizontal	Max Tension	4	2149.35	-0.01	-0.00
				Max. Compression	5	-2154.23	-0.01	-0.00
		Max. Mx		49	-147.32	-0.02	-0.00	
		Max. My		3	-308.46	-0.00	0.00	
		Max. Vy		49	23.93	-0.02	-0.00	
		Max. Vx		3	-0.81	-0.00	0.00	
		Top Girt	Max Tension	33	324.38	-0.01	0.00	
			Max. Compression	2	-354.60	-0.01	-0.00	
			Max. Mx	49	14.16	-0.02	-0.00	
			Max. My	3	251.91	-0.00	0.00	
			Max. Vy	49	-23.10	-0.02	-0.00	
			Max. Vx	3	-0.13	0.00	0.00	
		Inner Bracing	Max Tension	3	1.84	0.00	0.00	
			Max. Compression	18	-1.84	0.00	0.00	
Max. Mx	34		-0.10	-0.02	0.00			
Max. Vy	34		19.13	0.00	0.00			

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	48 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft	
T2	160 - 140	Leg	Max Tension	19	22242.69	-0.58	-0.07	
			Max. Compression	2	-29799.04	0.79	0.12	
			Max. Mx	8	19661.75	1.03	0.11	
			Max. My	16	-4321.73	-0.03	1.03	
			Max. Vy	18	-2463.12	0.07	-0.02	
			Max. Vx	10	2467.95	0.02	-0.09	
		Diagonal	Max Tension	5	9338.52	0.00	0.00	
			Max. Compression	4	-9415.80	0.00	0.00	
			Max. Mx	34	-195.70	0.06	0.00	
			Max. Vy	34	-28.02	0.00	0.00	
			Horizontal	Max Tension	5	5859.04	-0.01	-0.00
				Max. Compression	5	-5857.67	-0.01	-0.00
		Max. Mx		48	-198.29	-0.03	-0.00	
		Max. My		2	2363.52	-0.01	0.01	
		Max. Vy		48	-27.96	-0.03	-0.00	
		Max. Vx		2	-2.44	-0.01	0.01	
		Inner Bracing	Max Tension	3	4.72	0.00	0.00	
			Max. Compression	18	-6.60	0.00	0.00	
			Max. Mx	34	-3.22	-0.03	0.00	
			Max. Vy	34	22.00	0.00	0.00	
T3	140 - 133.333		Leg	Max Tension	19	31737.30	-0.85	-0.12
				Max. Compression	2	-40327.33	0.01	-0.01
		Max. Mx		18	30668.56	-0.85	-0.12	
		Max. My		32	-2929.82	-0.04	0.97	
		Diagonal	Max. Vy	8	-192.68	-0.85	0.11	
			Max. Vx	16	-256.14	-0.03	-0.96	
			Max Tension	5	10279.25	0.00	0.00	
			Max. Compression	4	-10389.57	0.00	0.00	
			Max. Mx	34	-216.97	0.08	0.00	
			Max. Vy	34	-34.37	0.00	0.00	
Horizontal	Max Tension	5	6700.23	-0.01	-0.00			
	Max. Compression	5	-6693.76	-0.01	-0.00			
	Max. Mx	48	-167.85	-0.04	-0.00			
	Max. My	3	-482.14	-0.00	0.01			
	Max. Vy	48	-36.14	-0.04	-0.00			
	Max. Vx	3	2.79	0.00	0.00			
Inner Bracing	Max Tension	3	5.06	0.00	0.00			
	Max. Compression	18	-7.89	0.00	0.00			
	Max. Mx	34	-3.79	-0.03	0.00			
	Max. Vy	34	-23.31	0.00	0.00			
	T4	133.333 - 126.667	Leg	Max Tension	19	42408.60	-0.01	0.00
				Max. Compression	2	-53852.79	1.19	0.04
Max. Mx				18	39210.62	-1.26	-0.04	
Max. My				11	-5316.06	-0.03	1.25	
Diagonal			Max. Vy	28	-2435.58	-0.01	0.00	
			Max. Vx	4	-2349.67	-0.01	0.07	
			Max Tension	5	13255.29	0.00	0.00	
			Max. Compression	4	-13373.95	0.00	0.00	
			Max. Mx	34	-211.44	0.08	0.00	
			Max. Vy	34	-36.33	0.00	0.00	
Top Girt			Max Tension	7	8932.06	-0.01	0.01	
			Max. Compression	4	-8956.65	-0.02	-0.00	
			Max. Mx	48	-398.13	-0.05	-0.00	
			Max. My	2	416.38	-0.01	0.02	
	Max. Vy	48	-38.49	-0.05	-0.00			
	Max. Vx	2	3.78	0.00	0.00			
Inner Bracing	Max Tension	3	7.28	0.00	0.00			
	Max. Compression	18	-10.25	0.00	0.00			
	Max. Mx	34	-4.00	-0.04	0.00			
	Max. Vy	34	-24.69	0.00	0.00			

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	49 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft	
T5	126.667 - 120	Leg	Max Tension	19	55505.20	-1.25	-0.04	
			Max. Compression	2	-70118.21	0.82	-0.04	
			Max. Mx	18	53749.86	-1.26	-0.04	
			Max. My	11	-5476.56	-0.03	1.25	
			Max. Vy	18	-1147.64	-1.26	-0.04	
			Max. Vx	10	1170.19	-0.04	1.25	
		Diagonal	Max Tension	5	15077.22	0.00	0.00	
			Max. Compression	4	-15261.64	0.00	0.00	
			Max. Mx	34	-232.06	0.12	0.00	
			Max. Vy	34	53.61	0.00	0.00	
			Top Girt	Max Tension	5	10465.45	-0.02	-0.00
				Max. Compression	5	-10466.26	-0.02	-0.00
		Max. Mx		48	-313.25	-0.06	-0.01	
		Max. My		3	2150.01	-0.00	0.02	
		Inner Bracing	Max. Vy	48	40.60	-0.06	-0.01	
			Max. Vx	3	-3.78	-0.00	0.02	
			Max Tension	3	6.67	0.00	0.00	
			Max. Compression	18	-11.10	0.00	0.00	
			Max. Mx	34	-4.92	-0.04	0.00	
			Max. Vy	34	26.06	0.00	0.00	
T6	120 - 100	Leg	Max Tension	19	95456.17	-0.58	0.06	
			Max. Compression	2	-113661.65	0.28	-0.09	
			Max. Mx	18	69287.57	-0.86	0.04	
			Max. My	26	-9954.21	-0.02	-1.05	
			Max. Vy	18	-142.46	-0.86	0.04	
			Max. Vx	11	340.70	-0.01	0.90	
		Diagonal	Max Tension	5	19638.18	0.00	0.00	
			Max. Compression	4	-19951.06	0.00	0.00	
			Max. Mx	34	-307.36	0.27	0.00	
			Max. Vy	34	-86.80	0.00	0.00	
			Horizontal	Max Tension	4	11892.04	-0.03	-0.00
				Max. Compression	5	-11792.71	-0.02	-0.00
		Max. Mx		48	-385.50	-0.08	-0.01	
		Max. My		18	-1645.41	-0.05	-0.02	
		Inner Bracing	Max. Vy	48	-46.48	-0.08	-0.01	
			Max. Vx	18	-3.45	-0.05	-0.02	
			Max Tension	3	4.06	0.00	0.00	
			Max. Compression	18	-12.58	0.00	0.00	
			Max. Mx	34	-8.55	-0.07	0.00	
			Max. Vy	34	39.46	0.00	0.00	
T7	100 - 90	Leg	Max Tension	19	119379.26	-0.30	0.09	
			Max. Compression	2	-139472.36	0.67	-0.05	
			Max. Mx	18	116370.87	-0.71	0.05	
			Max. My	11	-8330.79	-0.02	0.90	
			Max. Vy	18	154.28	-0.71	0.05	
			Max. Vx	10	-332.83	-0.02	0.90	
		Diagonal	Max Tension	5	18575.57	0.00	0.00	
			Max. Compression	4	-18793.13	0.00	0.00	
			Max. Mx	34	-336.71	0.22	0.00	
			Max. Vy	34	-67.81	0.00	0.00	
			Horizontal	Max Tension	7	11937.89	-0.02	0.01
				Max. Compression	22	-11837.92	0.00	0.00
		Max. Mx		48	-693.80	-0.08	-0.01	
		Max. My		18	-1757.42	-0.05	-0.02	
		Inner Bracing	Max. Vy	48	-48.93	-0.08	-0.01	
			Max. Vx	18	2.74	-0.05	-0.02	
			Max Tension	3	3.01	0.00	0.00	
			Max. Compression	43	-10.41	0.00	0.00	
			Max. Mx	34	-8.64	-0.08	0.00	
			Max. Vy	34	-42.12	0.00	0.00	
T8	90 - 80	Leg	Max Tension	19	141170.80	-0.71	0.05	

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	50 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T9	80 - 60	Diagonal	Max. Compression	2	-162852.22	0.62	-0.04
			Max. Mx	18	138341.77	-0.71	0.05
			Max. My	10	-11912.30	-0.03	1.03
			Max. Vy	18	-117.48	-0.71	0.05
			Max. Vx	10	-297.44	-0.03	1.03
			Max Tension	5	18818.26	0.00	0.00
			Max. Compression	4	-19053.79	0.00	0.00
			Max. Mx	34	-362.56	0.24	0.00
			Max. Vy	34	-72.80	0.00	0.00
			Max Tension	6	12650.03	-0.03	0.00
			Max. Compression	23	-12495.01	0.00	0.00
			Max. Mx	48	-550.30	-0.09	-0.01
		Max. My	18	-408.15	-0.06	-0.02	
		Max. Vy	48	-52.44	-0.09	-0.01	
		Max. Vx	18	-2.37	-0.06	-0.02	
		Max Tension	3	2.02	0.00	0.00	
		Max. Compression	43	-10.62	0.00	0.00	
		Max. Mx	34	-9.05	-0.09	0.00	
		Max. Vy	34	45.38	0.00	0.00	
		Max Tension	19	184193.92	-1.20	0.04	
		Max. Compression	2	-209887.06	1.87	-0.05	
		Max. Mx	18	180244.66	-1.88	0.05	
		Max. My	11	-10690.59	-0.02	1.97	
		Max. Vy	18	270.78	-1.88	0.05	
		Max. Vx	11	-453.12	-0.02	1.97	
		Max Tension	5	20275.35	0.00	0.00	
		Max. Compression	4	-20596.37	0.00	0.00	
		Max. Mx	34	-449.66	0.29	0.00	
		Max. Vy	34	82.17	0.00	0.00	
		Max Tension	6	14707.83	-0.07	0.01	
		Max. Compression	23	-14520.31	0.00	0.00	
		Max. Mx	48	-600.55	-0.16	-0.01	
		Max. My	3	1317.98	-0.03	0.03	
		Max. Vy	48	-79.44	-0.16	-0.01	
		Max. Vx	18	-3.14	-0.10	-0.03	
		Max Tension	3	3.22	0.00	0.00	
Max. Compression	43	-12.52	0.00	0.00			
Max. Mx	34	-10.56	-0.14	0.00			
Max. Vy	34	60.35	0.00	0.00			
Max Tension	19	227910.02	-1.24	0.04			
Max. Compression	2	-258713.90	1.10	-0.04			
Max. Mx	18	202251.91	-1.88	0.05			
Max. My	11	-11116.27	-0.02	1.97			
Max. Vy	8	-312.82	-1.84	0.34			
Max. Vx	11	444.59	-0.02	1.97			
Max Tension	5	21729.91	0.00	0.00			
Max. Compression	4	-22206.99	0.00	0.00			
Max. Mx	34	-565.92	0.41	0.00			
Max. Vy	34	-108.89	0.00	0.00			
Max Tension	6	16716.52	-0.10	0.01			
Max. Compression	15	-16511.62	-0.08	-0.01			
Max. Mx	38	-554.21	-0.20	-0.01			
Max. My	3	962.28	-0.04	0.03			
Max. Vy	38	87.73	-0.20	-0.01			
Max. Vx	3	-2.88	0.00	0.00			
Max Tension	3	1.17	0.00	0.00			
Max. Compression	43	-14.88	0.00	0.00			
Max. Mx	34	-13.17	-0.23	0.00			
Max. Vy	34	85.20	0.00	0.00			
Max Tension	19	249761.82	-1.17	0.04			
Max. Compression	2	-283465.99	2.62	-0.03			
T10	60 - 40	Leg					
T11	40 - 30	Leg					

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	51 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft	
T12	30 - 20	Diagonal	Max. Mx	2	-283465.99	2.62	-0.03	
			Max. My	10	-17465.71	-0.06	1.34	
			Max. Vy	3	-313.45	2.60	-0.03	
			Max. Vx	11	345.83	-0.05	1.34	
			Max Tension	15	22392.96	0.00	0.00	
			Max. Compression	14	-22920.69	0.00	0.00	
			Max. Mx	34	-603.10	0.44	0.00	
			Max. Vy	34	-113.09	0.00	0.00	
			Horizontal	Max Tension	6	17546.82	-0.11	0.01
				Max. Compression	15	-17466.65	-0.09	-0.01
				Max. Mx	38	-596.98	-0.22	-0.01
			Inner Bracing	Max. My	3	1077.26	-0.06	0.03
				Max. Vy	38	90.73	-0.22	-0.01
				Max. Vx	3	-2.50	-0.06	0.03
				Max Tension	1	0.00	0.00	0.00
		Max. Compression		43	-15.13	0.00	0.00	
		Max. Mx		34	-13.52	-0.25	0.00	
		Leg	Max. Vy	34	88.05	0.00	0.00	
			Max Tension	19	271399.17	-2.42	0.03	
			Max. Compression	2	-308155.79	-2.26	-0.07	
			Max. Mx	2	-307505.85	2.62	-0.03	
			Max. My	10	-19492.54	-0.55	4.94	
			Max. Vy	2	634.28	2.62	-0.03	
			Diagonal	Max. Vx	10	-683.11	-0.55	4.94
				Max Tension	15	23071.03	0.00	0.00
				Max. Compression	14	-23684.05	0.00	0.00
			Top Girt	Max. Mx	34	-658.29	0.47	0.00
				Max. Vy	34	-117.29	0.00	0.00
				Max Tension	14	18316.55	-0.18	-0.01
				Max. Compression	15	-18182.38	-0.13	-0.01
				Max. Mx	38	798.10	-0.28	-0.01
				Max. My	3	635.25	-0.09	0.03
			Inner Bracing	Max. Vy	38	-110.90	-0.28	-0.01
Max. Vx	3			2.16	0.00	0.00		
Max Tension	1			0.00	0.00	0.00		
Max. Compression	43	-15.94		0.00	0.00			
Max. Mx	34	-14.56		-0.27	0.00			
Max. Vy	34	90.88		0.00	0.00			
Leg	Max Tension	19	291233.67	1.35	0.08			
	Max. Compression	2	-332328.20	0.00	-0.00			
	Max. Mx	2	-331558.28	7.59	0.03			
	Max. My	10	-20551.41	-0.55	4.94			
	Max. Vy	2	-1109.61	7.59	0.03			
	Diagonal	Max. Vx	10	1171.24	-0.55	4.94		
		Max Tension	31	33994.84	-0.16	0.04		
		Max. Compression	14	-35237.89	0.00	0.00		
	Horizontal	Max. Mx	30	18100.17	-0.24	-0.03		
		Max. My	2	-28612.60	-0.02	0.05		
		Max. Vy	50	-78.16	-0.19	0.00		
		Max. Vx	2	3.89	0.00	0.00		
		Max Tension	30	19454.14	0.00	0.00		
		Max. Compression	15	-19674.12	-0.20	-0.01		
		Max. Mx	38	-946.59	-0.40	-0.02		
		Max. My	3	1545.86	-0.06	0.06		
		Max. Vy	38	140.22	-0.40	-0.02		
	Redund Horz 1 Bracing	Max. Vx	3	4.59	0.00	0.00		
Max Tension		4	1415.70	0.00	0.00			
Max. Compression		5	-1263.88	0.00	0.00			
Max. Mx		34	197.45	0.03	0.00			
Max. Vy		34	-21.73	0.00	0.00			

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	52 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Redund Diag 1 Bracing	Max Tension	4	1339.19	0.00	0.00
			Max. Compression	5	-1198.69	0.00	0.00
			Max. Mx	34	87.40	0.07	0.00
			Max. Vy	34	-24.49	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	3	2.38	0.00	0.00
			Max. Compression	18	-18.12	0.00	0.00
			Max. Mx	34	-13.54	0.06	0.00
			Max. Vy	34	-37.18	0.00	0.00
		Inner Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	43	-14.43	0.00	0.00
			Max. Mx	34	-12.53	0.17	0.00
			Max. Vy	34	54.27	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	24	367680.42	44907.51	-29028.85
	Max. H _x	24	367680.42	44907.51	-29028.85
	Max. H _z	7	-319073.86	-39051.66	28049.26
	Min. Vert	9	-328876.03	-41338.62	27001.89
	Min. H _x	9	-328876.03	-41338.62	27001.89
	Min. H _z	22	354178.22	41643.29	-29512.35
Leg B	Max. Vert	12	369706.10	-44957.71	-29269.06
	Max. H _x	29	-329696.88	41360.97	27150.20
	Max. H _z	31	-320511.86	39102.22	28257.11
	Min. Vert	29	-329696.88	41360.97	27150.20
	Min. H _x	12	369706.10	-44957.71	-29269.06
	Min. H _z	14	357841.98	-42112.08	-30093.62
Leg A	Max. Vert	2	378838.42	122.09	54308.94
	Max. H _x	26	25196.64	13120.14	2057.89
	Max. H _z	2	378838.42	122.09	54308.94
	Min. Vert	19	-333278.08	-135.91	-49780.25
	Min. H _x	11	17348.16	-13154.55	1401.57
	Min. H _z	19	-333278.08	-135.91	-49780.25

Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	55393.93	-0.00	-0.00	-15.52	-3.09	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	66472.72	-167.50	-94098.64	-8549.28	24.26	5.45
0.9 Dead+1.0 Wind 0 deg - No Ice	49854.54	-167.50	-94098.64	-8544.62	25.19	5.45
1.2 Dead+1.0 Wind 30 deg - No Ice	66472.72	45604.68	-79969.26	-7336.80	-4136.18	-72.34
0.9 Dead+1.0 Wind 30 deg - No Ice	49854.54	45604.68	-79969.26	-7332.14	-4135.26	-72.34

<p style="text-align: center;">tnxTower</p> <p style="text-align: center;">Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587</p>	Job	22027.01 - Westport	Page	53 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

<i>Load Combination</i>	<i>Vertical</i>	<i>Shear_x</i>	<i>Shear_z</i>	<i>Overturning Moment, M_x</i>	<i>Overturning Moment, M_z</i>	<i>Torque</i>
	<i>lb</i>	<i>lb</i>	<i>lb</i>	<i>kip-ft</i>	<i>kip-ft</i>	<i>kip-ft</i>
1.2 Dead+1.0 Wind 45 deg - No Ice	66472.72	64320.41	-65047.91	-5977.81	-5843.27	-104.56
0.9 Dead+1.0 Wind 45 deg - No Ice	49854.54	64320.41	-65047.91	-5973.16	-5842.35	-104.56
1.2 Dead+1.0 Wind 60 deg - No Ice	66472.72	78456.56	-45792.00	-4216.10	-7131.69	-129.74
0.9 Dead+1.0 Wind 60 deg - No Ice	49854.54	78456.56	-45792.00	-4211.44	-7130.76	-129.74
1.2 Dead+1.0 Wind 90 deg - No Ice	66472.72	90989.52	-10.46	-22.15	-8226.84	-153.28
0.9 Dead+1.0 Wind 90 deg - No Ice	49854.54	90989.52	-10.46	-17.50	-8225.91	-153.28
1.2 Dead+1.0 Wind 120 deg - No Ice	66472.72	80295.22	46834.72	4207.27	-7190.03	-136.11
0.9 Dead+1.0 Wind 120 deg - No Ice	49854.54	80295.22	46834.72	4211.92	-7189.11	-136.11
1.2 Dead+1.0 Wind 135 deg - No Ice	66472.72	65031.70	65698.07	5944.91	-5858.44	-112.95
0.9 Dead+1.0 Wind 135 deg - No Ice	49854.54	65031.70	65698.07	5949.57	-5857.51	-112.95
1.2 Dead+1.0 Wind 150 deg - No Ice	66472.72	45678.24	79799.01	7267.74	-4146.30	-82.16
0.9 Dead+1.0 Wind 150 deg - No Ice	49854.54	45678.24	79799.01	7272.40	-4145.37	-82.16
1.2 Dead+1.0 Wind 180 deg - No Ice	66472.72	188.11	91632.47	8382.00	-35.33	-6.27
0.9 Dead+1.0 Wind 180 deg - No Ice	49854.54	188.11	91632.47	8386.66	-34.40	-6.27
1.2 Dead+1.0 Wind 210 deg - No Ice	66472.72	-45449.28	79691.07	7250.31	4101.26	70.25
0.9 Dead+1.0 Wind 210 deg - No Ice	49854.54	-45449.28	79691.07	7254.97	4102.19	70.25
1.2 Dead+1.0 Wind 225 deg - No Ice	66472.72	-64061.83	64749.07	5887.67	5790.09	102.50
0.9 Dead+1.0 Wind 225 deg - No Ice	49854.54	-64061.83	64749.07	5892.33	5791.01	102.50
1.2 Dead+1.0 Wind 240 deg - No Ice	66472.72	-80132.18	46608.24	4170.08	7155.44	127.67
0.9 Dead+1.0 Wind 240 deg - No Ice	49854.54	-80132.18	46608.24	4174.74	7156.36	127.67
1.2 Dead+1.0 Wind 270 deg - No Ice	66472.72	-90931.30	-315.80	-72.84	8209.12	151.53
0.9 Dead+1.0 Wind 270 deg - No Ice	49854.54	-90931.30	-315.80	-68.19	8210.05	151.53
1.2 Dead+1.0 Wind 300 deg - No Ice	66472.72	-78488.14	-46046.85	-4258.30	7128.19	135.08
0.9 Dead+1.0 Wind 300 deg - No Ice	49854.54	-78488.14	-46046.85	-4253.65	7129.12	135.08
1.2 Dead+1.0 Wind 315 deg - No Ice	66472.72	-64480.19	-65251.64	-6011.50	5861.77	111.88
0.9 Dead+1.0 Wind 315 deg - No Ice	49854.54	-64480.19	-65251.64	-6006.85	5862.69	111.88
1.2 Dead+1.0 Wind 330 deg - No Ice	66472.72	-45852.20	-80128.27	-7363.27	4169.67	81.20
0.9 Dead+1.0 Wind 330 deg - No Ice	49854.54	-45852.20	-80128.27	-7358.61	4170.60	81.20
1.2 Dead+1.0 Ice	144777.71	-0.00	-0.00	-136.93	-17.57	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice	144777.71	-25.40	-25451.38	-2414.37	-13.33	5.69
1.2 Dead+1.0 Wind 30 deg+1.0 Ice	144777.71	12470.99	-21796.39	-2098.27	-1131.29	-8.61

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 54 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 45 deg+1.0 Ice	144777.71	17607.88	-17757.31	-1735.86	-1591.77	-15.02
1.2 Dead+1.0 Wind 60 deg+1.0 Ice	144777.71	21513.49	-12524.01	-1265.03	-1941.71	-20.43
1.2 Dead+1.0 Wind 90 deg+1.0 Ice	144777.71	24905.62	-2.64	-137.66	-2238.12	-26.93
1.2 Dead+1.0 Wind 120 deg+1.0 Ice	144777.71	21809.87	12691.01	995.43	-1950.86	-26.26
1.2 Dead+1.0 Wind 135 deg+1.0 Ice	144777.71	17721.68	17861.48	1462.50	-1593.98	-23.17
1.2 Dead+1.0 Wind 150 deg+1.0 Ice	144777.71	12480.86	21768.56	1819.23	-1132.59	-18.51
1.2 Dead+1.0 Wind 180 deg+1.0 Ice	144777.71	28.65	25053.94	2119.87	-22.38	-5.81
1.2 Dead+1.0 Wind 210 deg+1.0 Ice	144777.71	-12446.50	21752.55	1816.65	1091.82	8.28
1.2 Dead+1.0 Wind 225 deg+1.0 Ice	144777.71	-17567.13	17710.22	1453.67	1549.43	14.70
1.2 Dead+1.0 Wind 240 deg+1.0 Ice	144777.71	-21785.17	12657.04	989.86	1911.62	20.11
1.2 Dead+1.0 Wind 270 deg+1.0 Ice	144777.71	-24896.45	-48.77	-145.31	2201.36	26.65
1.2 Dead+1.0 Wind 300 deg+1.0 Ice	144777.71	-21517.47	-12562.45	-1271.39	1907.02	26.10
1.2 Dead+1.0 Wind 315 deg+1.0 Ice	144777.71	-17631.65	-17788.02	-1740.93	1560.48	23.01
1.2 Dead+1.0 Wind 330 deg+1.0 Ice	144777.71	-12508.28	-21820.45	-2102.27	1102.31	18.36
Dead+Wind 0 deg - Service	55393.93	-35.68	-20309.37	-1861.95	2.87	1.16
Dead+Wind 30 deg - Service	55393.93	9846.95	-17264.10	-1599.75	-898.00	-15.41
Dead+Wind 45 deg - Service	55393.93	13888.55	-14043.52	-1305.61	-1267.70	-22.27
Dead+Wind 60 deg - Service	55393.93	16941.87	-9886.85	-924.28	-1546.80	-27.64
Dead+Wind 90 deg - Service	55393.93	19647.07	-2.23	-16.27	-1784.01	-32.65
Dead+Wind 120 deg - Service	55393.93	17333.54	10108.97	899.29	-1559.23	-28.99
Dead+Wind 135 deg - Service	55393.93	14040.07	14182.02	1275.50	-1270.93	-24.06
Dead+Wind 150 deg - Service	55393.93	9862.62	17227.83	1561.93	-900.16	-17.50
Dead+Wind 180 deg - Service	55393.93	40.07	19784.03	1803.21	-9.82	-1.33
Dead+Wind 210 deg - Service	55393.93	-9813.85	17204.84	1558.22	885.96	14.96
Dead+Wind 225 deg - Service	55393.93	-13833.47	13979.87	1263.30	1251.77	21.83
Dead+Wind 240 deg - Service	55393.93	-17298.80	10060.73	891.37	1547.26	27.20
Dead+Wind 270 deg - Service	55393.93	-19634.67	-67.27	-27.07	1775.63	32.28
Dead+Wind 300 deg - Service	55393.93	-16948.60	-9941.14	-933.27	1541.46	28.78
Dead+Wind 315 deg - Service	55393.93	-13922.59	-14086.92	-1312.79	1267.04	23.83
Dead+Wind 330 deg - Service	55393.93	-9899.68	-17297.97	-1605.39	900.54	17.30

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	0.00	-55393.93	0.00	0.00	55393.93	0.00	0.000%
2	-167.50	-66472.72	-94098.64	167.50	66472.72	94098.64	0.000%
3	-167.50	-49854.54	-94098.64	167.50	49854.54	94098.64	0.000%
4	45604.68	-66472.72	-79969.26	-45604.68	66472.72	79969.26	0.000%
5	45604.68	-49854.54	-79969.26	-45604.68	49854.54	79969.26	0.000%
6	64320.41	-66472.72	-65047.91	-64320.41	66472.72	65047.91	0.000%
7	64320.41	-49854.54	-65047.91	-64320.41	49854.54	65047.91	0.000%
8	78456.56	-66472.72	-45792.00	-78456.56	66472.72	45792.00	0.000%

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	55 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
9	78456.56	-49854.54	-45792.00	-78456.56	49854.54	45792.00	0.000%
10	90989.52	-66472.72	-10.46	-90989.52	66472.72	10.46	0.000%
11	90989.52	-49854.54	-10.46	-90989.52	49854.54	10.46	0.000%
12	80295.22	-66472.72	46834.72	-80295.22	66472.72	-46834.72	0.000%
13	80295.22	-49854.54	46834.72	-80295.22	49854.54	-46834.72	0.000%
14	65031.70	-66472.72	65698.07	-65031.70	66472.72	-65698.07	0.000%
15	65031.70	-49854.54	65698.07	-65031.70	49854.54	-65698.07	0.000%
16	45678.24	-66472.72	79799.01	-45678.24	66472.72	-79799.01	0.000%
17	45678.24	-49854.54	79799.01	-45678.24	49854.54	-79799.01	0.000%
18	188.11	-66472.72	91632.47	-188.11	66472.72	-91632.47	0.000%
19	188.11	-49854.54	91632.47	-188.11	49854.54	-91632.47	0.000%
20	-45449.28	-66472.72	79691.07	45449.28	66472.72	-79691.07	0.000%
21	-45449.28	-49854.54	79691.07	45449.28	49854.54	-79691.07	0.000%
22	-64061.83	-66472.72	64749.07	64061.83	66472.72	-64749.07	0.000%
23	-64061.83	-49854.54	64749.07	64061.83	49854.54	-64749.07	0.000%
24	-80132.17	-66472.72	46608.24	80132.18	66472.72	-46608.24	0.000%
25	-80132.17	-49854.54	46608.24	80132.18	49854.54	-46608.24	0.000%
26	-90931.30	-66472.72	-315.80	90931.30	66472.72	315.80	0.000%
27	-90931.30	-49854.54	-315.80	90931.30	49854.54	315.80	0.000%
28	-78488.14	-66472.72	-46046.85	78488.14	66472.72	46046.85	0.000%
29	-78488.14	-49854.54	-46046.85	78488.14	49854.54	46046.85	0.000%
30	-64480.19	-66472.72	-65251.64	64480.19	66472.72	65251.64	0.000%
31	-64480.19	-49854.54	-65251.64	64480.19	49854.54	65251.64	0.000%
32	-45852.20	-66472.72	-80128.27	45852.20	66472.72	80128.27	0.000%
33	-45852.20	-49854.54	-80128.27	45852.20	49854.54	80128.27	0.000%
34	0.00	-144777.71	0.00	0.00	144777.71	0.00	0.000%
35	-25.40	-144777.71	-25451.38	25.40	144777.71	25451.38	0.000%
36	12470.99	-144777.71	-21796.39	-12470.99	144777.71	21796.39	0.000%
37	17607.88	-144777.71	-17757.31	-17607.88	144777.71	17757.31	0.000%
38	21513.49	-144777.71	-12524.01	-21513.49	144777.71	12524.01	0.000%
39	24905.62	-144777.71	-2.64	-24905.62	144777.71	2.64	0.000%
40	21809.87	-144777.71	12691.01	-21809.87	144777.71	-12691.01	0.000%
41	17721.68	-144777.71	17861.48	-17721.68	144777.71	-17861.48	0.000%
42	12480.86	-144777.71	21768.56	-12480.86	144777.71	-21768.56	0.000%
43	28.65	-144777.71	25053.94	-28.65	144777.71	-25053.94	0.000%
44	-12446.50	-144777.71	21752.55	12446.50	144777.71	-21752.55	0.000%
45	-17567.13	-144777.71	17710.22	17567.13	144777.71	-17710.22	0.000%
46	-21785.17	-144777.71	12657.04	21785.17	144777.71	-12657.04	0.000%
47	-24896.45	-144777.71	-48.77	24896.45	144777.71	48.77	0.000%
48	-21517.47	-144777.71	-12562.45	21517.47	144777.71	12562.45	0.000%
49	-17631.65	-144777.71	-17788.02	17631.65	144777.71	17788.02	0.000%
50	-12508.28	-144777.71	-21820.45	12508.28	144777.71	21820.45	0.000%
51	-35.68	-55393.93	-20309.37	35.68	55393.93	20309.37	0.000%
52	9846.95	-55393.93	-17264.10	-9846.95	55393.93	17264.10	0.000%
53	13888.55	-55393.93	-14043.52	-13888.55	55393.93	14043.52	0.000%
54	16941.87	-55393.93	-9886.85	-16941.87	55393.93	9886.85	0.000%
55	19647.07	-55393.93	-2.23	-19647.07	55393.93	2.23	0.000%
56	17333.54	-55393.93	10108.97	-17333.54	55393.93	-10108.97	0.000%
57	14040.07	-55393.93	14182.02	-14040.07	55393.93	-14182.02	0.000%
58	9862.62	-55393.93	17227.83	-9862.62	55393.93	-17227.83	0.000%
59	40.07	-55393.93	19784.03	-40.07	55393.93	-19784.03	0.000%
60	-9813.85	-55393.93	17204.84	9813.85	55393.93	-17204.84	0.000%
61	-13833.47	-55393.93	13979.87	13833.47	55393.93	-13979.87	0.000%
62	-17298.80	-55393.93	10060.73	17298.80	55393.93	-10060.73	0.000%
63	-19634.67	-55393.93	-67.27	19634.67	55393.93	67.27	0.000%
64	-16948.60	-55393.93	-9941.14	16948.60	55393.93	9941.14	0.000%
65	-13922.59	-55393.93	-14086.92	13922.59	55393.93	14086.92	0.000%
66	-9899.68	-55393.93	-17297.97	9899.68	55393.93	17297.97	0.000%

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	56 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	2.111	51	0.0896	0.0559
T2	160 - 140	1.732	51	0.0881	0.0511
T3	140 - 133.333	1.350	51	0.0806	0.0379
T4	133.333 - 126.667	1.232	51	0.0781	0.0352
T5	126.667 - 120	1.114	51	0.0753	0.0338
T6	120 - 100	1.003	51	0.0715	0.0328
T7	100 - 90	0.719	51	0.0573	0.0292
T8	90 - 80	0.593	51	0.0505	0.0259
T9	80 - 60	0.482	51	0.0430	0.0225
T10	60 - 40	0.290	51	0.0332	0.0163
T11	40 - 30	0.146	51	0.0221	0.0109
T12	30 - 20	0.089	51	0.0162	0.0081
T13	20 - 0	0.048	62	0.0101	0.0056

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
187.00	ANT940Y10-WR	51	2.111	0.0896	0.0559	474166
181.00	ANT940Y10-WR	51	2.111	0.0896	0.0559	474166
177.00	PA6-65AC	51	2.055	0.0896	0.0556	474166
170.00	RFI BPS7496-180-14 Panel Antenna	51	1.923	0.0895	0.0546	237083
169.00	3' Yagi	51	1.904	0.0895	0.0543	215530
160.00	ROHN 6'x15' Boom Gate (1)	51	1.732	0.0881	0.0511	140197
144.00	FFVV-65B-R2	51	1.423	0.0821	0.0403	85748
133.00	QD6616-7	51	1.226	0.0780	0.0352	283073
125.00	LTF12=372 Sector Mount (1)	51	1.085	0.0744	0.0335	56712
113.00	ANT150D	51	0.897	0.0667	0.0318	73831
60.00	GPS	51	0.290	0.0332	0.0163	93379

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	9.659	2	0.4042	0.2626
T2	160 - 140	7.942	2	0.3994	0.2399
T3	140 - 133.333	6.197	2	0.3682	0.1779
T4	133.333 - 126.667	5.656	2	0.3575	0.1654
T5	126.667 - 120	5.114	2	0.3446	0.1585
T6	120 - 100	4.607	2	0.3273	0.1538
T7	100 - 90	3.305	2	0.2623	0.1369
T8	90 - 80	2.727	2	0.2311	0.1217
T9	80 - 60	2.214	2	0.1969	0.1057
T10	60 - 40	1.337	2	0.1521	0.0764
T11	40 - 30	0.673	2	0.1012	0.0511

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	57 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T12	30 - 20	0.414	3	0.0742	0.0379
T13	20 - 0	0.221	3	0.0461	0.0263

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
187.00	ANT940Y10-WR	2	9.659	0.4042	0.2626	120588
181.00	ANT940Y10-WR	2	9.659	0.4042	0.2626	120588
177.00	PA6-65AC	2	9.405	0.4046	0.2611	120588
170.00	RFI BPS7496-180-14 Panel Antenna	2	8.809	0.4045	0.2561	60294
169.00	3' Yagi	2	8.723	0.4044	0.2551	54813
160.00	ROHN 6x15' Boom Gate (1)	2	7.942	0.3994	0.2399	36193
144.00	FFVV-65B-R2	2	6.534	0.3750	0.1890	19043
133.00	QD6616-7	2	5.629	0.3570	0.1650	64465
125.00	LTF12=372 Sector Mount (1)	2	4.983	0.3406	0.1571	12306
113.00	ANT150D	2	4.121	0.3054	0.1493	16071
60.00	GPS	2	1.337	0.1521	0.0764	20470

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load Allowable	Allowable Ratio	Criteria	
T1	180	Diagonal	A325N	0.6250	3	1336.60	13805.80	0.097	✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	1077.12	13805.80	0.078	✓	1	Bolt Shear
		Top Girt	A325N	0.6250	2	177.30	13805.80	0.013	✓	1	Bolt Shear
T2	160	Leg	A325N	0.8750	4	1490.49	41556.00	0.036	✓	1	Bolt Tension
		Diagonal	A325N	0.6250	3	3138.60	13805.80	0.227	✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	2929.52	13805.80	0.212	✓	1	Bolt Shear
T3	140	Leg	A325N	1.0000	4	7934.32	54517.00	0.146	✓	1	Bolt Tension
		Diagonal	A325N	0.6250	3	3463.19	13805.80	0.251	✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	3350.11	13805.80	0.243	✓	1	Bolt Shear
T4	133.333	Diagonal	A325N	0.6250	3	4457.98	13805.80	0.323	✓	1	Bolt Shear
		Top Girt	A325N	0.6250	2	4478.32	13805.80	0.324	✓	1	Bolt Shear
T5	126.667	Diagonal	A325N	0.6250	3	5087.21	13805.80	0.368	✓	1	Bolt Shear
		Top Girt	A325N	0.6250	2	5233.13	13805.80	0.379	✓	1	Bolt Shear
T6	120	Leg	A325N	1.0000	6	11901.30	54517.00	0.218	✓	1	Bolt Tension
		Diagonal	A325N	0.6250	3	6650.35	13805.80	0.482	✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	5946.02	13805.80	0.431	✓	1	Bolt Shear
T7	100	Leg	A325N	1.0000	6	19896.50	54517.00	0.365	✓	1	Bolt Tension

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	58 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load Allowable	Allowable Ratio	Criteria	
T8	90	Diagonal	A325N	0.6250	3	6264.38	13805.80	0.454	✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	5968.94	13805.80	0.432	✓	1	Bolt Shear
T9	80	Diagonal	A325N	0.6250	3	6351.26	13805.80	0.460	✓	1	Bolt Shear
		Top Girt	A325N	0.6250	2	6325.02	13805.80	0.458	✓	1	Bolt Shear
T10	60	Leg	A325N	1.0000	8	20319.90	54517.00	0.373	✓	1	Bolt Tension
		Diagonal	A325N	0.6250	3	6865.46	13805.80	0.497	✓	1	Bolt Shear
T11	40	Horizontal	A325N	0.6250	2	7353.91	13805.80	0.533	✓	1	Bolt Shear
		Leg	A325N	1.0000	8	25737.70	54517.00	0.472	✓	1	Bolt Tension
T12	30	Diagonal	A325N	0.6250	3	7402.33	13805.80	0.536	✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	8358.26	13805.80	0.605	✓	1	Bolt Shear
T13	20	Leg	A325N	1.0000	8	31220.20	54517.00	0.573	✓	1	Bolt Tension
		Diagonal	A325N	0.6250	3	7640.23	13805.80	0.553	✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	8773.41	13805.80	0.635	✓	1	Bolt Shear
		Diagonal	A325N	0.6250	3	7894.68	13805.80	0.572	✓	1	Bolt Shear
		Top Girt	A325N	0.6250	2	9158.28	13805.80	0.663	✓	1	Bolt Shear
		Leg	A325N	1.0000	8	36404.20	54517.00	0.668	✓	1	Bolt Tension
		Diagonal	A325X	0.6250	3	11746.00	17257.30	0.681	✓	1	Bolt Shear
		Horizontal	A325N	0.7500	2	9837.06	19880.40	0.495	✓	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio P _u / φP _n
T1	180 - 160	ROHN 3 STD	20.00	6.67	68.8 K=1.00	2.2285	-4182.87	70976.40	0.059 ¹
T2	160 - 140	ROHN 4 STD	20.04	6.68	53.1 K=1.00	3.1741	-29799.00	116229.00	0.256 ¹
T3	140 - 133.333	ROHN 5 EH	6.68	6.68	43.6 K=1.00	6.1120	-40327.30	239378.00	0.168 ¹
T4	133.333 - 126.667	ROHN 5 EH	6.68	6.68	43.6 K=1.00	6.1120	-53852.80	239378.00	0.225 ¹
T5	126.667 - 120	ROHN 5 EH	6.68	6.68	43.6 K=1.00	6.1120	-70118.20	239378.00	0.293 ¹
T6	120 - 100	ROHN 6 EHS	20.04	10.02	54.0 K=1.00	6.7133	-113662.00	244017.00	0.466 ¹
T7	100 - 90	ROHN 6 EH	10.03	10.03	54.8 K=1.00	8.4049	-139472.00	303585.00	0.459 ¹
T8	90 - 80	ROHN 6 EH	10.03	10.03	54.8	8.4049	-162852.00	303585.00	0.536 ¹

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 59 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
					K=1.00				✓
T9	80 - 60	120deg_9.6250x0.375 BU on ROHN 8 EHS	20.05	10.03	42.2	13.6005	-209887.00	537270.00	0.391 ¹
T10	60 - 40	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	20.05	10.03	42.2	13.6005	-258714.00	460811.00	0.561 ¹
T11	40 - 30	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	10.03	10.03	42.2	13.6005	-283466.00	460811.00	0.615 ¹
T12	30 - 20	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	10.03	10.03	42.2	13.6005	-308156.00	460811.00	0.669 ¹
T13	20 - 0	1/3 9.6250x0.375 on ROHN 8 EH Leg Pipe	20.05	10.03	42.9	16.6002	-332328.00	560408.00	0.593 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 lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 2 STD	7.94	7.67	117.0	1.0745	-4009.81	17747.50	0.226 ¹
T2	160 - 140	ROHN 2 STD	8.55	8.25	125.8	1.0745	-9415.80	15331.30	0.614 ¹
T3	140 - 133.333	ROHN 2 EH	8.77	8.42	131.5	1.4807	-10389.60	19347.50	0.537 ¹
T4	133.333 - 126.667	ROHN 2 EH	9.00	8.66	135.3	1.4807	-13373.90	18285.10	0.731 ¹
T5	126.667 - 120	ROHN 2 XXS	9.24	8.91	152.1	2.6559	-15261.60	25935.80	0.588 ¹
T6	120 - 100	Pipe 2.5 XXS	12.52	12.06	171.4	4.0285	-19951.10	30977.00	0.644 ¹
T7	100 - 90	ROHN 3 STD	12.92	12.49	128.8	2.2285	-18793.10	30346.40	0.619 ¹
T8	90 - 80	ROHN 3 STD	13.35	12.93	133.4	2.2285	-19053.80	28290.90	0.673 ¹
T9	80 - 60	ROHN 3 STD	14.21	13.70	141.3	2.2285	-20596.40	25233.20	0.816 ¹
T10	60 - 40	ROHN 3 EH	15.12	14.64	154.6	3.0159	-22207.00	28518.80	0.779 ¹
T11	40 - 30	ROHN 3 EH	15.60	15.12	159.7	3.0159	-22920.70	26718.70	0.858 ¹
T12	30 - 20	ROHN 3 EH	16.08	15.62	164.9	3.0159	-23684.00	25055.10	0.945 ¹
T13	20 - 0	ROHN 3 EH	24.33	23.70	125.1	3.0159	-35237.90	43506.30	0.810 ¹

¹ P_u / φP_n controls

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 60 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 1.5 STD	8.60	4.15	80.0 K=1.00	0.7995	-2154.23	22519.90	0.096 ¹ ✓
T2	160 - 140	ROHN 1.5 STD	10.01	4.82	92.9 K=1.00	0.7995	-5857.67	19142.00	0.306 ¹ ✓
T3	140 - 133.333	ROHN 2 STD	10.71	5.12	78.1 K=1.00	1.0745	-6693.76	30956.80	0.216 ¹ ✓
T6	120 - 100	ROHN 2 STD	13.92	6.68	101.9 K=1.00	1.0745	-11792.70	22639.20	0.521 ¹ ✓
T7	100 - 90	ROHN 2 STD	15.04	7.24	110.5 K=1.00	1.0745	-11837.90	19817.20	0.597 ¹ ✓
T9	80 - 60	ROHN 2.5 STD	18.93	9.10	115.2 K=1.00	1.7040	-14520.30	28984.30	0.501 ¹ ✓
T10	60 - 40	ROHN 2.5 STD	21.43	10.35	131.1 K=1.00	1.7040	-16511.60	22405.40	0.737 ¹ ✓
T11	40 - 30	ROHN 2.5 STD	22.68	10.97	139.0 K=1.00	1.7040	-17466.60	19925.90	0.877 ¹ ✓
T13	20 - 0	P3.5x.226	25.18	12.23	109.8 K=1.00	2.6795	-19674.10	49951.20	0.394 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 lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 1.5 STD	8.54	4.13	79.5 K=1.00	0.7995	-354.60	22660.50	0.016 ¹ ✓
T4	133.333 - 126.667	ROHN 2 STD	11.40	5.47	83.4 K=1.00	1.0745	-8956.65	29081.40	0.308 ¹ ✓
T5	126.667 - 120	ROHN 2 STD	12.10	5.82	88.7 K=1.00	1.0745	-10466.30	27207.90	0.385 ¹ ✓
T8	90 - 80	ROHN 2 STD	16.36	7.90	120.5 K=1.00	1.0745	-12495.00	16719.60	0.747 ¹ ✓
T12	30 - 20	ROHN 2.5 EH	23.93	11.60	150.6 K=1.00	2.2535	-18182.40	22438.80	0.810 ¹ ✓

¹ P_u / φP_n controls

Redundant Horizontal (1) Design Data (Compression)

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	61 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	ROHN 1.5 STD	6.29	5.93	114.4 K=1.00	0.7995	-5767.31	13802.80	0.418 ¹ ✓

¹ P_u / φP_n controls

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	ROHN 2 STD	11.50	10.77	164.2 K=1.00	1.0745	-5269.03	8998.85	0.586 ¹ ✓

¹ P_u / φP_n controls

Redundant Hip (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	ROHN 2.5 STD	6.29	6.29	79.7 K=1.00	1.7040	-18.12	48180.50	0.000 ¹ ✓

¹ P_u / φP_n controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	4.30	4.30	129.8 K=1.00	0.4844	-1.84	8234.10	0.000 ¹ ✓
T2	160 - 140	L2x2x1/8	5.01	5.01	151.1 K=1.00	0.4844	-5.12	6068.75	0.001 ¹ ✓
T3	140 - 133.333	L2x2x1/8	5.35	5.35	161.6 K=1.00	0.4844	-7.89	5306.96	0.001 ¹ ✓
T4	133.333 - 126.667	L2x2x1/8	5.70	5.70	172.1 K=1.00	0.4844	-10.25	4680.37	0.002 ¹ ✓
T5	126.667 - 120	L2x2x1/8	6.05	6.05	182.6 K=1.00	0.4844	-11.10	4158.54	0.003 ¹ ✓
T6	120 - 100	L2 1/2x2 1/2x3/16	6.96	6.96	168.7 K=1.00	0.9020	-11.99	9072.37	0.001 ¹ ✓
T7	100 - 90	L2 1/2x2 1/2x3/16	7.52	7.52	182.3 K=1.00	0.9020	-10.41	7766.06	0.001 ¹ ✓

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	62 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T8	90 - 80	L2 1/2x2 1/2x3/16	8.18	8.18	198.3 K=1.00	0.9020	-10.62	6565.57	0.002 ¹ ✓
T9	80 - 60	L3x3x3/16	9.46	9.46	190.5 K=1.00	1.0900	-12.52	8593.12	0.001 ¹ ✓
T10	60 - 40	L3 1/2x3 1/2x1/4	10.71	10.71	185.2 K=1.00	1.6900	-14.88	14095.40	0.001 ¹ ✓
T11	40 - 30	L3 1/2x3 1/2x1/4	11.34	11.34	196.1 K=1.00	1.6900	-15.13	12584.30	0.001 ¹ ✓
T12	30 - 20	L3 1/2x3 1/2x1/4	11.96	11.96	206.9 K=1.00	1.6900	-15.94	11303.80	0.001 ¹ ✓
T13	20 - 0	ROHN 2 STD	12.59	12.59	191.9 K=1.00	1.0745	-14.43	6590.81	0.002 ¹ ✓

¹ P_u / φP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 3 STD	20.00	6.67	68.8	2.2285	2504.45	100281.00	0.025 ¹ ✓
T2	160 - 140	ROHN 4 STD	20.04	6.68	53.1	3.1741	22242.70	142832.00	0.156 ¹ ✓
T3	140 - 133.333	ROHN 5 EH	6.68	6.68	43.6	6.1120	31737.30	275039.00	0.115 ¹ ✓
T4	133.333 - 126.667	ROHN 5 EH	6.68	6.68	43.6	6.1120	42408.60	275039.00	0.154 ¹ ✓
T5	126.667 - 120	ROHN 5 EH	6.68	6.68	43.6	6.1120	55505.20	275039.00	0.202 ¹ ✓
T6	120 - 100	ROHN 6 EHS	20.04	10.02	54.0	6.7133	95456.20	302097.00	0.316 ¹ ✓
T7	100 - 90	ROHN 6 EH	10.03	10.03	54.8	8.4049	119379.00	378222.00	0.316 ¹ ✓
T8	90 - 80	ROHN 6 EH	10.03	10.03	54.8	8.4049	141171.00	378222.00	0.373 ¹ ✓
T9	80 - 60	120deg_9.6250x0.375 BU on ROHN 8 EHS	20.05	10.03	42.2	13.6005	184194.00	612023.00	0.301 ¹ ✓
T10	60 - 40	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	20.05	10.03	42.2	13.6005	227910.00	514099.00	0.443 ¹ ✓
T11	40 - 30	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	10.03	10.03	42.2	13.6005	249762.00	514099.00	0.486 ¹ ✓
T12	30 - 20	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	10.03	10.03	42.2	13.6005	271399.00	514099.00	0.528 ¹ ✓
T13	20 - 0	1/3 9.6250x0.375 on ROHN	20.05	10.03	42.9	16.6002	291234.00	627488.00	0.464 ¹ ✓

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	63 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
		8 EH Leg Pipe							✓

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 lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 2 STD	7.94	7.67	117.0	1.0745	3942.47	48353.90	0.082 ¹ ✓
T2	160 - 140	ROHN 2 STD	8.55	8.25	125.8	1.0745	9338.52	48353.90	0.193 ¹ ✓
T3	140 - 133.333	ROHN 2 EH	8.77	8.42	131.5	1.4807	10279.20	66630.70	0.154 ¹ ✓
T4	133.333 - 126.667	ROHN 2 EH	9.00	8.66	135.3	1.4807	13255.30	66630.70	0.199 ¹ ✓
T5	126.667 - 120	ROHN 2 XXS	9.24	8.91	152.1	2.6559	15077.20	119516.00	0.126 ¹ ✓
T6	120 - 100	Pipe 2.5 XXS	12.52	12.06	171.4	4.0285	19638.20	181280.00	0.108 ¹ ✓
T7	100 - 90	ROHN 3 STD	12.92	12.49	128.8	2.2285	18575.60	100281.00	0.185 ¹ ✓
T8	90 - 80	ROHN 3 STD	13.35	12.93	133.4	2.2285	18818.30	100281.00	0.188 ¹ ✓
T9	80 - 60	ROHN 3 STD	14.21	13.70	141.3	2.2285	20275.30	100281.00	0.202 ¹ ✓
T10	60 - 40	ROHN 3 EH	15.12	14.64	154.6	3.0159	21729.90	135717.00	0.160 ¹ ✓
T11	40 - 30	ROHN 3 EH	15.60	15.12	159.7	3.0159	22393.00	135717.00	0.165 ¹ ✓
T12	30 - 20	ROHN 3 EH	16.08	15.62	164.9	3.0159	23071.00	135717.00	0.170 ¹ ✓
T13	20 - 0	ROHN 3 EH	24.33	23.70	250.3	3.0159	33994.80	135717.00	0.250 ¹ ✓

¹ P_u / φP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 1.5 STD	8.60	4.15	80.0	0.7995	2149.35	35975.60	0.060 ¹ ✓
T2	160 - 140	ROHN 1.5 STD	10.01	4.82	92.9	0.7995	5859.04	35975.60	0.163 ¹ ✓

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	64 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T3	140 - 133.333	ROHN 2 STD	10.71	5.12	78.1	1.0745	6700.23	48353.90	0.139 ¹ ✓
T6	120 - 100	ROHN 2 STD	13.92	6.68	101.9	1.0745	11892.00	48353.90	0.246 ¹ ✓
T7	100 - 90	ROHN 2 STD	15.04	7.24	110.5	1.0745	11937.90	48353.90	0.247 ¹ ✓
T9	80 - 60	ROHN 2.5 STD	18.93	9.10	115.2	1.7040	14707.80	76682.30	0.192 ¹ ✓
T10	60 - 40	ROHN 2.5 STD	21.43	10.35	131.1	1.7040	16716.50	76682.30	0.218 ¹ ✓
T11	40 - 30	ROHN 2.5 STD	22.68	10.97	139.0	1.7040	17546.80	76682.30	0.229 ¹ ✓
T13	20 - 0	P3.5x.226	25.18	12.23	109.8	2.6795	19454.10	120579.00	0.161 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 lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 1.5 STD	8.54	4.13	79.5	0.7995	324.38	35975.60	0.009 ¹ ✓
T4	133.333 - 126.667	ROHN 2 STD	11.40	5.47	83.4	1.0745	8932.06	48353.90	0.185 ¹ ✓
T5	126.667 - 120	ROHN 2 STD	12.10	5.82	88.7	1.0745	10465.50	48353.90	0.216 ¹ ✓
T8	90 - 80	ROHN 2 STD	16.36	7.90	120.5	1.0745	12650.00	48353.90	0.262 ¹ ✓
T12	30 - 20	ROHN 2.5 EH	23.93	11.60	150.6	2.2535	18316.60	101409.00	0.181 ¹ ✓

¹ P_u / φP_n controls

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	ROHN 1.5 STD	6.29	5.93	114.4	0.7995	5767.31	35975.60	0.160 ¹ ✓

¹ P_u / φP_n controls

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	65 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L_u</i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in²</i>	<i>P_u</i> <i>lb</i>	ϕP_n <i>lb</i>	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	ROHN 2 STD	11.50	10.77	164.2	1.0745	5269.03	48353.90	0.109 ¹

¹ $P_u / \phi P_n$ controls

Redundant Hip (1) Design Data (Tension)

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L_u</i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in²</i>	<i>P_u</i> <i>lb</i>	ϕP_n <i>lb</i>	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	ROHN 2.5 STD	6.29	6.29	79.7	1.7040	2.38	76682.30	0.000 ¹

¹ $P_u / \phi P_n$ controls

Inner Bracing Design Data (Tension)

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L_u</i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in²</i>	<i>P_u</i> <i>lb</i>	ϕP_n <i>lb</i>	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	4.30	4.30	82.4	0.4844	1.84	15693.80	0.000 ¹
T2	160 - 140	L2x2x1/8	4.31	4.31	82.6	0.4844	4.72	15693.80	0.000 ¹
T3	140 - 133.333	L2x2x1/8	5.35	5.35	102.6	0.4844	5.06	15693.80	0.000 ¹
T4	133.333 - 126.667	L2x2x1/8	5.70	5.70	109.3	0.4844	7.28	15693.80	0.000 ¹
T5	126.667 - 120	L2x2x1/8	6.05	6.05	115.9	0.4844	6.67	15693.80	0.000 ¹
T6	120 - 100	L2 1/2x2 1/2x3/16	6.40	6.40	98.7	0.9020	4.06	29224.80	0.000 ¹
T7	100 - 90	L2 1/2x2 1/2x3/16	7.52	7.52	116.0	0.9020	3.01	29224.80	0.000 ¹
T8	90 - 80	L2 1/2x2 1/2x3/16	8.18	8.18	126.2	0.9020	2.02	29224.80	0.000 ¹
T9	80 - 60	L3x3x3/16	8.84	8.84	113.0	1.0900	3.22	35316.00	0.000 ¹
T10	60 - 40	L3 1/2x3 1/2x1/4	10.09	10.09	111.1	1.6900	1.17	76050.00	0.000 ¹

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 66 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

¹ $P_u / \phi P_n$ controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 3 STD	1	-2846.05	70976.40	4.0	Pass
		Leg	ROHN 3 STD	2	-2533.92	70976.40	3.6	Pass
		Leg	ROHN 3 STD	3	-4182.87	70976.40	5.9	Pass
T2	160 - 140	Leg	ROHN 4 STD	40	-25716.80	116229.00	22.1	Pass
		Leg	ROHN 4 STD	41	-25546.10	116229.00	22.0	Pass
		Leg	ROHN 4 STD	42	-29799.00	116229.00	25.6	Pass
T3	140 - 133.333	Leg	ROHN 5 EH	79	-35533.30	239378.00	14.8	Pass
		Leg	ROHN 5 EH	80	-35514.80	239378.00	14.8	Pass
		Leg	ROHN 5 EH	81	-40327.30	239378.00	16.8	Pass
T4	133.333 - 126.667	Leg	ROHN 5 EH	94	-48442.10	239378.00	20.2	Pass
		Leg	ROHN 5 EH	95	-48644.40	239378.00	20.3	Pass
		Leg	ROHN 5 EH	96	-53852.80	239378.00	22.5	Pass
T5	126.667 - 120	Leg	ROHN 5 EH	109	-64062.50	239378.00	26.8	Pass
		Leg	ROHN 5 EH	110	-64460.80	239378.00	26.9	Pass
		Leg	ROHN 5 EH	111	-70118.20	239378.00	29.3	Pass
T6	120 - 100	Leg	ROHN 6 EHS	124	-106173.00	244017.00	43.5	Pass
		Leg	ROHN 6 EHS	125	-107016.00	244017.00	43.9	Pass
		Leg	ROHN 6 EHS	126	-113662.00	244017.00	46.6	Pass
T7	100 - 90	Leg	ROHN 6 EH	151	-131312.00	303585.00	43.3	Pass
		Leg	ROHN 6 EH	152	-132364.00	303585.00	43.6	Pass
		Leg	ROHN 6 EH	153	-139472.00	303585.00	45.9	Pass
T8	90 - 80	Leg	ROHN 6 EH	166	-154215.00	303585.00	50.8	Pass
		Leg	ROHN 6 EH	167	-155436.00	303585.00	51.2	Pass
		Leg	ROHN 6 EH	168	-162852.00	303585.00	53.6	Pass
T9	80 - 60	Leg	120deg_9.6250x0.375 BU on ROHN 8 EHS	181	-200436.00	537270.00	37.3	Pass
		Leg	120deg_9.6250x0.375 BU on ROHN 8 EHS	182	-201944.00	537270.00	37.6	Pass
		Leg	120deg_9.6250x0.375 BU on ROHN 8 EHS	183	-209887.00	537270.00	39.1	Pass
T10	60 - 40	Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	208	-248711.00	460811.00	54.0	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	209	-250318.00	460811.00	54.3	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	210	-258714.00	460811.00	56.1	Pass
T11	40 - 30	Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	235	-273155.00	460811.00	59.3	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	236	-274875.00	460811.00	59.7	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	237	-283466.00	460811.00	61.5	Pass
T12	30 - 20	Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	250	-297568.00	460811.00	64.6	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	251	-299392.00	460811.00	65.0	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EHS Leg Pipe	252	-308156.00	460811.00	66.9	Pass
T13	20 - 0	Leg	1/3 9.6250x0.375 on ROHN 8 EH Leg Pipe	265	-321399.00	560408.00	57.4	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EH Leg Pipe	266	-323382.00	560408.00	57.7	Pass
		Leg	1/3 9.6250x0.375 on ROHN 8 EH Leg Pipe	267	-332328.00	560408.00	59.3	Pass

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	67 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	180 - 160	Diagonal	ROHN 2 STD	8	-2221.63	17747.50	12.5	Pass
		Diagonal	ROHN 2 STD	9	-1970.64	17747.50	11.1	Pass
		Diagonal	ROHN 2 STD	11	-2184.55	17747.50	12.3	Pass
		Diagonal	ROHN 2 STD	12	-2290.85	17747.50	12.9	Pass
		Diagonal	ROHN 2 STD	14	-4009.81	17747.50	22.6	Pass
		Diagonal	ROHN 2 STD	15	-3574.97	17747.50	20.1	Pass
		Diagonal	ROHN 2 STD	20	-1749.17	17782.20	9.8	Pass
		Diagonal	ROHN 2 STD	21	-1438.32	17782.20	8.1	Pass
		Diagonal	ROHN 2 STD	23	-987.11	17782.20	5.6	Pass
		Diagonal	ROHN 2 STD	24	-1116.99	17782.20	6.3	Pass
		Diagonal	ROHN 2 STD	26	-2752.61	17782.20	15.5	Pass
		Diagonal	ROHN 2 STD	27	-2255.78	17782.20	12.7	Pass
		Diagonal	ROHN 2 STD	31	-513.50	17817.00	2.9	Pass
		Diagonal	ROHN 2 STD	32	-387.49	17817.00	2.2	Pass
		Diagonal	ROHN 2 STD	33	-151.12	17817.00	0.8	Pass
		Diagonal	ROHN 2 STD	34	-143.88	17817.00	0.8	Pass
		T2	160 - 140	Diagonal	ROHN 2 STD	35	-616.46	17817.00
Diagonal	ROHN 2 STD			36	-509.18	17817.00	2.9	Pass
Diagonal	ROHN 2 STD			44	-6117.79	15331.30	39.9	Pass
Diagonal	ROHN 2 STD			45	-6014.74	15331.30	39.2	Pass
Diagonal	ROHN 2 STD			47	-6880.05	15331.30	44.9	Pass
Diagonal	ROHN 2 STD			48	-6868.92	15331.30	44.8	Pass
Diagonal	ROHN 2 STD			50	-9415.80	15331.30	61.4	Pass
Diagonal	ROHN 2 STD			51	-9136.52	15331.30	59.6	Pass
Diagonal	ROHN 2 STD			56	-5030.95	16154.50	31.1	Pass
Diagonal	ROHN 2 STD			57	-4909.06	16154.50	30.4	Pass
Diagonal	ROHN 2 STD			59	-5946.61	16154.50	36.8	Pass
Diagonal	ROHN 2 STD			60	-5935.91	16154.50	36.7	Pass
Diagonal	ROHN 2 STD			62	-8339.14	16154.50	51.6	Pass
Diagonal	ROHN 2 STD			63	-8030.47	16154.50	49.7	Pass
Diagonal	ROHN 2 STD			68	-4953.58	17005.60	29.1	Pass
Diagonal	ROHN 2 STD			69	-4807.29	17005.60	28.3	Pass
T3	140 - 133.333			Diagonal	ROHN 2 STD	71	-6093.29	17005.60
		Diagonal	ROHN 2 STD	72	-6084.75	17005.60	35.8	Pass
		Diagonal	ROHN 2 STD	74	-8362.07	17005.60	49.2	Pass
		Diagonal	ROHN 2 STD	75	-8008.83	17005.60	47.1	Pass
		Diagonal	ROHN 2 EH	83	-7076.18	19347.50	36.6	Pass
T4	133.333 - 126.667	Diagonal	ROHN 2 EH	84	-6987.84	19347.50	36.1	Pass
		Diagonal	ROHN 2 EH	86	-7681.47	19347.50	39.7	Pass
		Diagonal	ROHN 2 EH	87	-7664.14	19347.50	39.6	Pass
		Diagonal	ROHN 2 EH	89	-10389.60	19347.50	53.7	Pass
		Diagonal	ROHN 2 EH	90	-10133.50	19347.50	52.4	Pass
T5	126.667 - 120	Diagonal	ROHN 2 EH	100	-10416.60	18285.10	57.0	Pass
		Diagonal	ROHN 2 EH	101	-10336.50	18285.10	56.5	Pass
		Diagonal	ROHN 2 EH	102	-10789.80	18285.10	59.0	Pass
		Diagonal	ROHN 2 EH	103	-10778.00	18285.10	58.9	Pass
		Diagonal	ROHN 2 EH	104	-13373.90	18285.10	73.1	Pass
		Diagonal	ROHN 2 EH	105	-13142.00	18285.10	71.9	Pass
T6	120 - 100	Diagonal	ROHN 2 XXS	115	-12435.00	25935.80	47.9	Pass
		Diagonal	ROHN 2 XXS	116	-12358.40	25935.80	47.7	Pass
		Diagonal	ROHN 2 XXS	117	-12936.20	25935.80	49.9	Pass
		Diagonal	ROHN 2 XXS	118	-12923.60	25935.80	49.8	Pass
		Diagonal	ROHN 2 XXS	119	-15261.60	25935.80	58.8	Pass
T6	120 - 100	Diagonal	Pipe 2.5 XXS	120	-15047.90	25935.80	58.0	Pass
		Diagonal	Pipe 2.5 XXS	128	-15578.20	30977.00	50.3	Pass
		Diagonal	Pipe 2.5 XXS	129	-15494.50	30977.00	50.0	Pass
		Diagonal	Pipe 2.5 XXS	131	-18063.80	30977.00	58.3	Pass
		Diagonal	Pipe 2.5 XXS	132	-18034.50	30977.00	58.2	Pass
		Diagonal	Pipe 2.5 XXS	134	-19951.10	30977.00	64.4	Pass
Diagonal	Pipe 2.5 XXS	135	-19759.60	30977.00	63.8	Pass		

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	68 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Diagonal	Pipe 2.5 XXS	140	-15713.50	32743.10	48.0	Pass
		Diagonal	Pipe 2.5 XXS	141	-15623.70	32743.10	47.7	Pass
		Diagonal	Pipe 2.5 XXS	143	-17210.50	32743.10	52.6	Pass
		Diagonal	Pipe 2.5 XXS	144	-17182.40	32743.10	52.5	Pass
		Diagonal	Pipe 2.5 XXS	146	-19646.20	32743.10	60.0	Pass
		Diagonal	Pipe 2.5 XXS	147	-19417.80	32743.10	59.3	Pass
T7	100 - 90	Diagonal	ROHN 3 STD	155	-14245.80	30346.40	46.9	Pass
		Diagonal	ROHN 3 STD	156	-14168.90	30346.40	46.7	Pass
		Diagonal	ROHN 3 STD	158	-17418.30	30346.40	57.4	Pass
		Diagonal	ROHN 3 STD	159	-17358.20	30346.40	57.2	Pass
		Diagonal	ROHN 3 STD	161	-18793.10	30346.40	61.9	Pass
		Diagonal	ROHN 3 STD	162	-18659.00	30346.40	61.5	Pass
T8	90 - 80	Diagonal	ROHN 3 STD	172	-14298.20	28290.90	50.5	Pass
		Diagonal	ROHN 3 STD	173	-14225.60	28290.90	50.3	Pass
		Diagonal	ROHN 3 STD	174	-18061.20	28290.90	63.8	Pass
		Diagonal	ROHN 3 STD	175	-18006.10	28290.90	63.6	Pass
		Diagonal	ROHN 3 STD	176	-19053.80	28290.90	67.3	Pass
		Diagonal	ROHN 3 STD	177	-18943.80	28290.90	67.0	Pass
T9	80 - 60	Diagonal	ROHN 3 STD	185	-15491.80	25233.20	61.4	Pass
		Diagonal	ROHN 3 STD	186	-15426.60	25233.20	61.1	Pass
		Diagonal	ROHN 3 STD	188	-20198.90	25233.20	80.0	Pass
		Diagonal	ROHN 3 STD	189	-20064.90	25233.20	79.5	Pass
		Diagonal	ROHN 3 STD	191	-20596.40	25233.20	81.6	Pass
		Diagonal	ROHN 3 STD	192	-20516.50	25233.20	81.3	Pass
		Diagonal	ROHN 3 STD	197	-14937.10	26922.60	55.5	Pass
		Diagonal	ROHN 3 STD	198	-14867.60	26922.60	55.2	Pass
		Diagonal	ROHN 3 STD	200	-19257.00	26922.60	71.5	Pass
		Diagonal	ROHN 3 STD	201	-19189.30	26922.60	71.3	Pass
		Diagonal	ROHN 3 STD	203	-19940.60	26922.60	74.1	Pass
		Diagonal	ROHN 3 STD	204	-19845.00	26922.60	73.7	Pass
T10	60 - 40	Diagonal	ROHN 3 EH	212	-16719.10	28518.80	58.6	Pass
		Diagonal	ROHN 3 EH	213	-16664.00	28518.80	58.4	Pass
		Diagonal	ROHN 3 EH	215	-22170.40	28518.80	77.7	Pass
		Diagonal	ROHN 3 EH	216	-21932.50	28518.80	76.9	Pass
		Diagonal	ROHN 3 EH	218	-22207.00	28518.80	77.9	Pass
		Diagonal	ROHN 3 EH	219	-22147.50	28518.80	77.7	Pass
		Diagonal	ROHN 3 EH	224	-16301.40	30411.50	53.6	Pass
		Diagonal	ROHN 3 EH	225	-16244.50	30411.50	53.4	Pass
		Diagonal	ROHN 3 EH	227	-21436.70	30411.50	70.5	Pass
		Diagonal	ROHN 3 EH	228	-21240.60	30411.50	69.8	Pass
		Diagonal	ROHN 3 EH	230	-21689.70	30411.50	71.3	Pass
		Diagonal	ROHN 3 EH	231	-21616.20	30411.50	71.1	Pass
T11	40 - 30	Diagonal	ROHN 3 EH	239	-17113.40	26718.70	64.1	Pass
		Diagonal	ROHN 3 EH	240	-17058.40	26718.70	63.8	Pass
		Diagonal	ROHN 3 EH	242	-22920.70	26718.70	85.8	Pass
		Diagonal	ROHN 3 EH	243	-22642.20	26718.70	84.7	Pass
		Diagonal	ROHN 3 EH	245	-22756.60	26718.70	85.2	Pass
		Diagonal	ROHN 3 EH	246	-22710.60	26718.70	85.0	Pass
T12	30 - 20	Diagonal	ROHN 3 EH	256	-17760.60	25055.10	70.9	Pass
		Diagonal	ROHN 3 EH	257	-17707.50	25055.10	70.7	Pass
		Diagonal	ROHN 3 EH	258	-23684.00	25055.10	94.5	Pass
		Diagonal	ROHN 3 EH	259	-23408.90	25055.10	93.4	Pass
		Diagonal	ROHN 3 EH	260	-23398.50	25055.10	93.4	Pass
		Diagonal	ROHN 3 EH	261	-23359.10	25055.10	93.2	Pass
T13	20 - 0	Diagonal	ROHN 3 EH	269	-25616.90	43506.30	58.9	Pass
		Diagonal	ROHN 3 EH	272	-25546.60	43506.30	58.7	Pass
		Diagonal	ROHN 3 EH	276	-35237.90	43506.30	81.0	Pass
		Diagonal	ROHN 3 EH	279	-34480.80	43506.30	79.3	Pass
		Diagonal	ROHN 3 EH	284	-34158.10	43506.30	78.5	Pass
		Diagonal	ROHN 3 EH	287	-34381.20	43506.30	79.0	Pass
T1	180 - 160	Horizontal	ROHN 1.5 STD	7	-1264.98	22519.90	5.6	Pass

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	69 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T2	160 - 140	Horizontal	ROHN 1.5 STD	10	-1288.38	22519.90	5.7	Pass
		Horizontal	ROHN 1.5 STD	13	-2154.23	22519.90	9.6	Pass
		Horizontal	ROHN 1.5 STD	19	-1062.92	22590.20	4.7	Pass
		Horizontal	ROHN 1.5 STD	22	-726.24	22590.20	3.2	Pass
		Horizontal	ROHN 1.5 STD	25	-1556.76	22590.20	6.9	Pass
		Horizontal	ROHN 1.5 STD	43	-4001.22	19142.00	20.9	Pass
		Horizontal	ROHN 1.5 STD	46	-4425.23	19142.00	23.1	Pass
		Horizontal	ROHN 1.5 STD	49	-5857.67	19142.00	30.6	Pass
		Horizontal	ROHN 1.5 STD	55	-3026.71	20895.80	14.5	Pass
		Horizontal	ROHN 1.5 STD	58	-3582.37	20895.80	17.1	Pass
		Horizontal	ROHN 1.5 STD	61	-4964.70	20895.80	23.8	Pass
		Horizontal	ROHN 1.5 STD	67	-3613.50	22661.30	15.9	Pass
		Horizontal	ROHN 1.5 STD	70	-4052.56	22661.30	17.9	Pass
T3	140 - 133.333	Horizontal	ROHN 1.5 STD	73	-4932.25	22661.30	21.8	Pass
		Horizontal	ROHN 2 STD	82	-4711.53	30956.80	15.2	Pass
		Horizontal	ROHN 2 STD	85	-5090.60	30956.80	17.3 (b)	Pass
T6	120 - 100	Horizontal	ROHN 2 STD	88	-6693.76	30956.80	16.4	Pass
		Horizontal	ROHN 2 STD	88	-6693.76	30956.80	18.5 (b)	Pass
		Horizontal	ROHN 2 STD	127	-9162.88	22639.20	21.6	Pass
		Horizontal	ROHN 2 STD	130	-10847.70	22639.20	24.3 (b)	Pass
		Horizontal	ROHN 2 STD	133	-11792.70	22639.20	40.5	Pass
		Horizontal	ROHN 2 STD	139	-8814.05	25586.40	47.9	Pass
T7	100 - 90	Horizontal	ROHN 2 STD	142	-9821.64	25586.40	52.1	Pass
		Horizontal	ROHN 2 STD	145	-11065.70	25586.40	34.4	Pass
		Horizontal	ROHN 2 STD	142	-9821.64	25586.40	38.4	Pass
		Horizontal	ROHN 2 STD	145	-11065.70	25586.40	43.2	Pass
		Horizontal	ROHN 2 STD	154	-8899.31	19817.20	44.9	Pass
T9	80 - 60	Horizontal	ROHN 2 STD	157	-11221.40	19817.20	56.6	Pass
		Horizontal	ROHN 2 STD	160	-11837.90	19817.20	59.7	Pass
		Horizontal	ROHN 2.5 STD	184	-10782.70	28984.30	37.2	Pass
T10	60 - 40	Horizontal	ROHN 2.5 STD	187	-14377.70	28984.30	39.5 (b)	Pass
		Horizontal	ROHN 2.5 STD	187	-14377.70	28984.30	49.6	Pass
		Horizontal	ROHN 2.5 STD	190	-14520.30	28984.30	52.1 (b)	Pass
		Horizontal	ROHN 2.5 STD	190	-14520.30	28984.30	50.1	Pass
		Horizontal	ROHN 2.5 STD	196	-10062.50	33028.40	53.3 (b)	Pass
		Horizontal	ROHN 2.5 STD	196	-10062.50	33028.40	30.5	Pass
		Horizontal	ROHN 2.5 STD	199	-13212.90	33028.40	36.9 (b)	Pass
		Horizontal	ROHN 2.5 STD	199	-13212.90	33028.40	40.0	Pass
		Horizontal	ROHN 2.5 STD	202	-13529.70	33028.40	48.2 (b)	Pass
		Horizontal	ROHN 2.5 STD	202	-13529.70	33028.40	41.0	Pass
T11	40 - 30	Horizontal	ROHN 2.5 STD	211	-12186.40	22405.40	49.7 (b)	Pass
		Horizontal	ROHN 2.5 STD	211	-12186.40	22405.40	54.4	Pass
		Horizontal	ROHN 2.5 STD	214	-16511.60	22405.40	73.7	Pass
		Horizontal	ROHN 2.5 STD	217	-16430.70	22405.40	73.3	Pass
		Horizontal	ROHN 2.5 STD	223	-11623.70	25378.10	45.8	Pass
		Horizontal	ROHN 2.5 STD	226	-15654.00	25378.10	61.7	Pass
T13	20 - 0	Horizontal	ROHN 2.5 STD	229	-15711.50	25378.10	61.9	Pass
		Horizontal	ROHN 2.5 STD	238	-12750.00	19925.90	64.0	Pass
		Horizontal	ROHN 2.5 STD	241	-17466.60	19925.90	87.7	Pass
		Horizontal	ROHN 2.5 STD	244	-17257.90	19925.90	86.6	Pass
T1	180 - 160	Horizontal	P3.5x.226	268	-13969.50	49951.20	28.0	Pass
		Horizontal	P3.5x.226	268	-13969.50	49951.20	35.4 (b)	Pass
		Horizontal	P3.5x.226	275	-19674.10	49951.20	39.4	Pass
T4	133.333 -	Horizontal	P3.5x.226	283	-19208.10	49951.20	49.5 (b)	Pass
		Horizontal	P3.5x.226	283	-19208.10	49951.20	38.5	Pass
T4	133.333 -	Top Girt	ROHN 1.5 STD	4	-239.65	22660.50	1.1	Pass
		Top Girt	ROHN 1.5 STD	5	-126.86	22660.50	1.2 (b)	Pass
		Top Girt	ROHN 1.5 STD	6	-354.60	22660.50	0.6	Pass
		Top Girt	ROHN 2 STD	97	-7235.45	29081.40	1.6	Pass

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	22027.01 - Westport	Page	70 of 72
	Project	180-ft Lattice Tower (CSP #32)	Date	10:19:44 01/27/23
	Client	Verizon	Designed by	TJL

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
	126.667						26.2 (b)	
		Top Girt	ROHN 2 STD	98	-7585.18	29081.40	26.1	Pass
		Top Girt	ROHN 2 STD	99	-8956.65	29081.40	30.8	Pass
							32.4 (b)	
T5	126.667 - 120	Top Girt	ROHN 2 STD	112	-8511.58	27207.90	31.3	Pass
		Top Girt	ROHN 2 STD	113	-9079.31	27207.90	33.4	Pass
		Top Girt	ROHN 2 STD	114	-10466.30	27207.90	38.5	Pass
T8	90 - 80	Top Girt	ROHN 2 STD	169	-9314.29	16719.60	55.7	Pass
		Top Girt	ROHN 2 STD	170	-12026.90	16719.60	71.9	Pass
		Top Girt	ROHN 2 STD	171	-12495.00	16719.60	74.7	Pass
T12	30 - 20	Top Girt	ROHN 2.5 EH	253	-13433.50	22438.80	59.9	Pass
		Top Girt	ROHN 2.5 EH	254	-18182.40	22438.80	81.0	Pass
		Top Girt	ROHN 2.5 EH	255	-17873.50	22438.80	79.7	Pass
T13	20 - 0	Redund Horiz 1 Bracing	ROHN 1.5 STD	270	-5577.65	13802.80	40.4	Pass
		Redund Horiz 1 Bracing	ROHN 1.5 STD	273	-5612.05	13802.80	40.7	Pass
		Redund Horiz 1 Bracing	ROHN 1.5 STD	277	-5612.05	13802.80	40.7	Pass
		Redund Horiz 1 Bracing	ROHN 1.5 STD	280	-5767.31	13802.80	41.8	Pass
		Redund Horiz 1 Bracing	ROHN 1.5 STD	285	-5767.31	13802.80	41.8	Pass
		Redund Horiz 1 Bracing	ROHN 1.5 STD	288	-5577.65	13802.80	40.4	Pass
T13	20 - 0	Redund Diag 1 Bracing	ROHN 2 STD	271	-5095.76	8998.85	56.6	Pass
		Redund Diag 1 Bracing	ROHN 2 STD	274	-5127.19	8998.85	57.0	Pass
		Redund Diag 1 Bracing	ROHN 2 STD	278	-5127.19	8998.85	57.0	Pass
		Redund Diag 1 Bracing	ROHN 2 STD	281	-5269.03	8998.85	58.6	Pass
		Redund Diag 1 Bracing	ROHN 2 STD	286	-5269.03	8998.85	58.6	Pass
		Redund Diag 1 Bracing	ROHN 2 STD	289	-5095.76	8998.85	56.6	Pass
T13	20 - 0	Redund Hip 1 Bracing	ROHN 2.5 STD	282	-18.00	48180.50	0.2	Pass
		Redund Hip 1 Bracing	ROHN 2.5 STD	290	-18.12	48180.50	0.2	Pass
		Redund Hip 1 Bracing	ROHN 2.5 STD	291	-17.97	48180.50	0.2	Pass
T1	180 - 160	Inner Bracing	L2x2x1/8	16	-1.79	8234.10	0.4	Pass
		Inner Bracing	L2x2x1/8	17	-1.84	8234.10	0.4	Pass
		Inner Bracing	L2x2x1/8	18	-1.71	8234.10	0.4	Pass
		Inner Bracing	L2x2x1/8	28	-1.40	8287.35	0.4	Pass
		Inner Bracing	L2x2x1/8	29	-1.41	8287.35	0.4	Pass
		Inner Bracing	L2x2x1/8	30	-1.37	8287.35	0.4	Pass
		Inner Bracing	L2x2x1/8	37	-0.29	8341.12	0.4	Pass
		Inner Bracing	L2x2x1/8	38	-0.28	8341.12	0.4	Pass
		Inner Bracing	L2x2x1/8	39	-0.32	8341.12	0.4	Pass
T2	160 - 140	Inner Bracing	L2x2x1/8	52	-4.97	6068.75	0.5	Pass
		Inner Bracing	L2x2x1/8	53	-5.12	6068.75	0.5	Pass
		Inner Bracing	L2x2x1/8	54	-4.95	6068.75	0.5	Pass
		Inner Bracing	L2x2x1/8	64	-4.46	7007.17	0.4	Pass
		Inner Bracing	L2x2x1/8	65	-4.65	7007.17	0.4	Pass
		Inner Bracing	L2x2x1/8	66	-4.43	7007.17	0.4	Pass
		Inner Bracing	L2x2x1/8	76	-6.28	8181.36	0.4	Pass
		Inner Bracing	L2x2x1/8	77	-6.60	8181.36	0.4	Pass

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 71 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

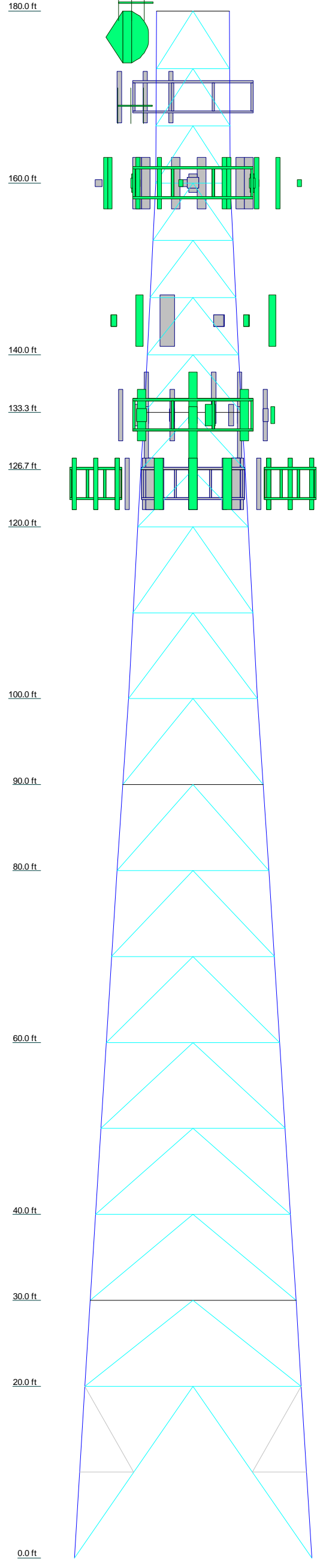
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T3	140 - 133.333	Inner Bracing	L2x2x1/8	78	-6.23	8181.36	0.4	Pass
		Inner Bracing	L2x2x1/8	91	-7.68	5306.96	0.5	Pass
		Inner Bracing	L2x2x1/8	92	-7.89	5306.96	0.5	Pass
T4	133.333 - 126.667	Inner Bracing	L2x2x1/8	93	-7.66	5306.96	0.5	Pass
		Inner Bracing	L2x2x1/8	106	-10.09	4680.37	0.5	Pass
		Inner Bracing	L2x2x1/8	107	-10.25	4680.37	0.5	Pass
T5	126.667 - 120	Inner Bracing	L2x2x1/8	108	-10.07	4680.37	0.5	Pass
		Inner Bracing	L2x2x1/8	121	-10.96	4158.54	0.5	Pass
		Inner Bracing	L2x2x1/8	122	-11.10	4158.54	0.5	Pass
T6	120 - 100	Inner Bracing	L2x2x1/8	123	-10.95	4158.54	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	136	-11.90	9072.37	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	137	-11.99	9072.37	0.4	Pass
T7	100 - 90	Inner Bracing	L2 1/2x2 1/2x3/16	138	-11.89	9072.37	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	148	-12.47	10738.30	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	149	-12.58	10738.30	0.4	Pass
T8	90 - 80	Inner Bracing	L2 1/2x2 1/2x3/16	150	-12.46	10738.30	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	163	-10.32	7766.06	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	164	-10.41	7766.06	0.5	Pass
T9	80 - 60	Inner Bracing	L2 1/2x2 1/2x3/16	165	-10.34	7766.06	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	178	-10.53	6565.57	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	179	-10.62	6565.57	0.5	Pass
T10	60 - 40	Inner Bracing	L2 1/2x2 1/2x3/16	180	-10.55	6565.57	0.5	Pass
		Inner Bracing	L3x3x3/16	193	-12.41	8593.12	0.6	Pass
		Inner Bracing	L3x3x3/16	194	-12.52	8593.12	0.6	Pass
T11	40 - 30	Inner Bracing	L3x3x3/16	195	-12.41	8593.12	0.6	Pass
		Inner Bracing	L3x3x3/16	205	-11.99	9851.38	0.5	Pass
		Inner Bracing	L3x3x3/16	206	-12.12	9851.38	0.5	Pass
T12	30 - 20	Inner Bracing	L3x3x3/16	207	-12.00	9851.38	0.5	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	220	-14.79	14095.40	0.4	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	221	-14.88	14095.40	0.4	Pass
T13	20 - 0	Inner Bracing	L3 1/2x3 1/2x1/4	222	-14.79	14095.40	0.4	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	232	-14.34	15896.00	0.3	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	233	-14.44	15896.00	0.3	Pass
T12	30 - 20	Inner Bracing	L3 1/2x3 1/2x1/4	234	-14.34	15896.00	0.3	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	247	-15.04	12584.30	0.4	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	248	-15.13	12584.30	0.4	Pass
T13	20 - 0	Inner Bracing	L3 1/2x3 1/2x1/4	249	-15.03	12584.30	0.4	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	262	-15.86	11303.80	0.4	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	263	-15.94	11303.80	0.4	Pass
T13	20 - 0	Inner Bracing	L3 1/2x3 1/2x1/4	264	-15.85	11303.80	0.4	Pass
		Inner Bracing	ROHN 2 STD	292	-13.98	6590.81	0.4	Pass
		Inner Bracing	ROHN 2 STD	293	-14.43	6590.81	0.4	Pass
		Inner Bracing	ROHN 2 STD	294	-13.92	6590.81	0.4	Pass
Summary								
						Leg (T12)	66.9	Pass
						Diagonal (T12)	94.5	Pass
						Horizontal (T11)	87.7	Pass
						Top Girt (T12)	81.0	Pass
						Redund Horz 1 Bracing (T13)	41.8	Pass
						Redund Diag 1 Bracing (T13)	58.6	Pass
						Redund Hip	0.2	Pass

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 72 of 72
	Project 180-ft Lattice Tower (CSP #32)	Date 10:19:44 01/27/23
	Client Verizon	Designed by TJL

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
						1 Bracing (T13) Inner	0.6	Pass
						Bracing (T9)	68.1	Pass
						Bolt Checks	68.1	Pass
						RATING =	94.5	Pass

Program Version 8.1.1.0 - 6/3/2021 File:J:/Jobs/2202700.WI/01_Westport CT/05_Structural/Backup Documentation/Rev (4)/Tnxtower/20200708_VZW_MODification_H_180' SST (1).eri

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13
Legs	ROHN 3 STD	ROHN 4 STD	ROHN 5 EH	ROHN 6 EHS	ROHN 8 EHS	ROHN 8 EHS	ROHN 6 EH	ROHN 8 EHS	ROHN 8 EHS	ROHN 8 EHS	ROHN 8 EHS	ROHN 8 EHS	ROHN 8 EHS
Leg Grade													
Diagonals	ROHN 2 STD	ROHN 2 STD	ROHN 2 EH	ROHN 2 XXS	ROHN 2 XXS	ROHN 2 XXS	ROHN 2 STD	ROHN 2 STD	ROHN 2 STD	ROHN 2 STD	ROHN 2.5 EH	ROHN 2.5 EH	ROHN 2.5 EH
Diagonal Grade													
Top Girts	ROHN 1.5 STD	N.A.	ROHN 2 STD	N.A.	ROHN 2 STD	N.A.	ROHN 2 STD	N.A.	ROHN 2.5 STD	N.A.	ROHN 2.5 STD	N.A.	N.A.
Horizontals													
Red. Horizontals													
Red. Diagonals													
Red. Hips													
Inner Bracing													
Face Width (ft)	8.542	8.625	10.709	11.4033	12.0977	12.792	15.042	16.3595	17.877	20.177	22.877	23.927	25.177
# Panels @ (ft)		9 @ 6.66667											1 @ 20
Weight (lb)	1250.4	1486.6	825.9	842.2	1080.4	3821.3	1662.8	1722.7	2942.5	5700.5	2942.5	3139.0	6187.6



DESIGNED APPURTENANCE LOADING

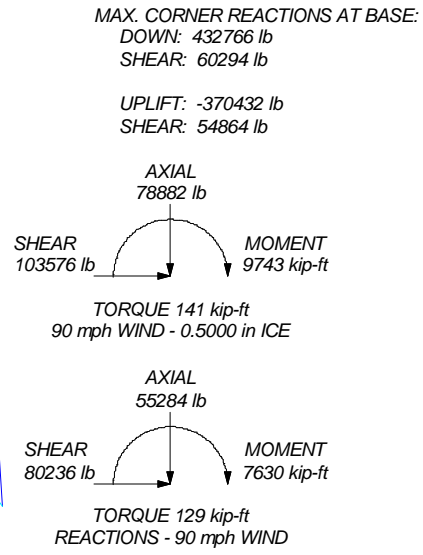
TYPE	ELEVATION	TYPE	ELEVATION
ANT940Y10-WR (CSP)	187	Commscope MTC3975083 8-ft V-Frame (Dish - Reserved)	144
ANT940Y10-WR (CSP - Yagi Antenna)	181		
PA6-65AC (DNK-52 / CSP-42)	177	Commscope MTC3975083 8-ft V-Frame (Dish - Reserved)	144
RFI BPS7496-180-14 Panel Antenna (CSP-80)	170	AIR6449 (ATI)	133
RFI BPS7496-180-14 Panel Antenna (CSP-81)	170	DMP65R-BU6D (ATI)	133
RFI BPS7496-180-14 Panel Antenna (CSP-82)	170	QD6616-7 (ATI)	133
SitePro1 USF12-396-U Mount Assembly w/ (3) 96" Mount Pipes (CSP 47, 80, 81, 82)	170	AIR6419 (ATI)	133
432E-831-01T TTA Unit (Re-Located TMA (CSP))	170	AIR6449 (ATI)	133
3' Yagi (CSP)	169	DMP65R-BU6D (ATI)	133
B2/B66A RRH (Verizon)	160	RRUS-32 B66 (ATI)	133
B5/B13 RRH (Verizon)	160	RRUS-32 (ATI)	133
CBRS RRH-RT4401-48A (Verizon)	160	RRUS-32 (ATI)	133
RF4439d-25A (B2/B66A RRH) (Verizon)	160	RRUS-32 B66 (ATI)	133
RF4440d-13A (B5/B13 RRH) (Verizon)	160	RRUS-32 (ATI)	133
JAHH-65B-R3B Panel Antenna (Verizon)	160	RRUS-32 (ATI)	133
JAHH-65B-R3B Panel Antenna (Verizon)	160	RRUS-32 B66 (ATI)	133
XXDWMM-12.5-65-8T-CBRS Panel (Verizon)	160	RRUS-32 (ATI)	133
MT6407-77A (Verizon)	160	RRUS-32 (ATI)	133
CBC78T-DS-43-2X Diplexer (Verizon)	160	4478 B14 (ATI)	133
B2/B66A RRH (Verizon)	160	4478 B14 (ATI)	133
B5/B13 RRH (Verizon)	160	4478 B14 (ATI)	133
CBRS RRH-RT4401-48A (Verizon)	160	4449 B5/B12 (ATI)	133
JAHH-65B-R3B Panel Antenna (Verizon)	160	4449 B5/B12 (ATI)	133
JAHH-65B-R3B Panel Antenna (Verizon)	160	4449 B5/B12 (ATI)	133
XXDWMM-12.5-65-8T-CBRS Panel (Verizon)	160	DC6-48-60-18-8F (Squid) Suppressor (ATI)	133
MT6407-77A (Verizon)	160	DC6-48-60-18-8F (Squid) Suppressor (ATI)	133
CBC78T-DS-43-2X Diplexer (Verizon)	160	DC9 (ATI)	133
B2/B66A RRH (Verizon)	160	SitePro VFA14-10 (ATI)	133
B5/B13 RRH (Verizon)	160	SitePro VFA14-10 (ATI)	133
CBRS RRH-RT4401-48A (Verizon)	160	SitePro VFA14-10 (ATI)	133
DB-T1-6Z-8AB-0Z Distribution Box (Verizon)	160	QD6616-7 (ATI)	133
DB-T1-6Z-8AB-0Z Distribution Box (Verizon)	160	AIR6419 (ATI)	133
(2) BSF0020F3V1-1 (Verizon)	160	AIR6449 (ATI)	133
(2) BSF0020F3V1-1 (Verizon)	160	DMP65R-BU6D (ATI)	133
(2) BSF0020F3V1-1 (Verizon)	160	QD6616-7 (ATI)	133
ROHN 6'x15' Boom Gate (1) (Verizon)	160	AIR6419 (ATI)	133
ROHN 6'x15' Boom Gate (1) (Verizon)	160	Generic Twin TMA unit (T-Mobile)	125
MX06FRO640-02 (Verizon)	160	Generic Twin TMA unit (T-Mobile)	125
MX06FRO640-02 (Verizon)	160	AIR21 B4A/B2P (T-Mobile)	125
XXDWMM-12.5-65-8T-CBRS Panel (Verizon)	160	AIR21 B4A/B2P (T-Mobile)	125
MT6407-77A (Verizon)	160	AIR21 B4A/B2P (T-Mobile)	125
MX06FRO640-02 (Verizon)	160	LNX-6515DS (T-Mobile)	125
MX06FRO640-02 (Verizon)	160	LNX-6515DS (T-Mobile)	125
ROHN 6'x15' Boom Gate (1) (Verizon)	160	LNX-6515DS (T-Mobile)	125
FFVV-65B-R2 (Dish - Reserved)	144	RRUS-11 (T-Mobile)	125
FFVV-65B-R2 (Dish - Reserved)	144	RRUS-11 (T-Mobile)	125
FFVV-65B-R2 (Dish - Reserved)	144	RRUS-11 (T-Mobile)	125
TA08025-B604 (Dish - Reserved)	144	LTF12=372 Sector Mount (1) (T-Mobile)	125
TA08025-B604 (Dish - Reserved)	144	LTF12=372 Sector Mount (1) (T-Mobile)	125
TA08025-B605 (Dish - Reserved)	144	LTF12=372 Sector Mount (1) (T-Mobile)	125
TA08025-B605 (Dish - Reserved)	144	AIR21 B2A/B4P (T-Mobile)	125
TA08025-B605 (Dish - Reserved)	144	AIR21 B2A/B4P (T-Mobile)	125
TA08025-B605 (Dish - Reserved)	144	AIR21 B2A/B4P (T-Mobile)	125
RD1DC-9181-PF-48 (Dish - Reserved)	144	Generic Twin TMA unit (T-Mobile)	125
RD1DC-9181-PF-48 (Dish - Reserved)	144	ANT150D (CSP - 1-Bay Dipole)	113
RD1DC-9181-PF-48 (Dish - Reserved)	144	GPS (DNK-1 / GPS)	60
Commscope MTC3975083 8-ft V-Frame (Dish - Reserved)	144		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 90 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 90 mph wind.



Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: 22027.01 - Westport
	Project: 180-ft Lattice Tower (CSP #32)
	Client: Verizon
	Code: TIA/EIA-222-F
	Path:
Drawn by: TJL	App'd:
Date: 01/27/23	Scale: NTS
Dwg No. E-1	

<p style="text-align: center;"><i>tnxTower</i></p> <p style="text-align: center;">Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587</p>	Job	22027.01 - Westport	Page	1 of 3
	Project	180-ft Lattice Tower (CSP #32)	Date	10:24:29 01/27/23
	Client	Verizon	Designed by	TJL

Load Combinations

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

Maximum Tower Deflections - Service Wind

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 2 of 3
	Project 180-ft Lattice Tower (CSP #32)	Date 10:24:29 01/27/23
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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	8.869	35	0.3739	0.2263
T2	160 - 140	7.283	35	0.3697	0.2082
T3	140 - 133.333	5.661	35	0.3416	0.1542
T4	133.333 - 126.667	5.158	35	0.3317	0.1427
T5	126.667 - 120	4.655	35	0.3196	0.1357
T6	120 - 100	4.184	35	0.3034	0.1313
T7	100 - 90	2.978	35	0.2424	0.1162
T8	90 - 80	2.445	35	0.2130	0.1029
T9	80 - 60	1.976	35	0.1810	0.0891
T10	60 - 40	1.178	35	0.1391	0.0641
T11	40 - 30	0.583	35	0.0921	0.0427
T12	30 - 20	0.355	35	0.0673	0.0317
T13	20 - 0	0.187	35	0.0417	0.0220

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
187.00	ANT940Y10-WR	35	8.869	0.3739	0.2263	119243
181.00	ANT940Y10-WR	35	8.869	0.3739	0.2263	119243
177.00	PA6-65AC	35	8.634	0.3742	0.2254	119243
170.00	RFI BPS7496-180-14 Panel Antenna	35	8.084	0.3742	0.2218	59622
169.00	3' Yagi	35	8.005	0.3741	0.2210	54201
160.00	ROHN 6'x15' Boom Gate (1)	35	7.283	0.3697	0.2082	35718
144.00	FFVV-65B-R2	35	5.973	0.3478	0.1638	20070
133.00	QD6616-7	35	5.133	0.3312	0.1422	65391
125.00	LTF12=372 Sector Mount (1)	35	4.533	0.3159	0.1344	13005
113.00	ANT150D	35	3.733	0.2829	0.1271	17131
60.00	GPS	35	1.178	0.1391	0.0641	21611

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	11.135	19	0.4654	0.2667
T2	160 - 140	9.161	19	0.4604	0.2434
T3	140 - 133.333	7.147	19	0.4260	0.1765
T4	133.333 - 126.667	6.519	19	0.4140	0.1627
T5	126.667 - 120	5.892	19	0.3992	0.1541
T6	120 - 100	5.305	19	0.3794	0.1482
T7	100 - 90	3.791	19	0.3046	0.1298
T8	90 - 80	3.119	19	0.2684	0.1144
T9	80 - 60	2.524	19	0.2286	0.0986
T10	60 - 40	1.509	19	0.1763	0.0707
T11	40 - 30	0.749	19	0.1170	0.0469
T12	30 - 20	0.457	19	0.0856	0.0348
T13	20 - 0	0.242	24	0.0530	0.0242

<i>tnxTower</i> Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 22027.01 - Westport	Page 3 of 3
	Project 180-ft Lattice Tower (CSP #32)	Date 10:24:29 01/27/23
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Critical Deflections and Radius of Curvature - Design Wind

<i>Elevation</i>	<i>Appurtenance</i>	<i>Gov. Load Comb.</i>	<i>Deflection</i>	<i>Tilt</i>	<i>Twist</i>	<i>Radius of Curvature</i>
<i>ft</i>			<i>in</i>	<i>°</i>	<i>°</i>	<i>ft</i>
187.00	ANT940Y10-WR	19	11.135	0.4654	0.2667	101190
181.00	ANT940Y10-WR	19	11.135	0.4654	0.2667	101190
177.00	PA6-65AC	19	10.843	0.4659	0.2653	101190
170.00	RFI BPS7496-180-14 Panel Antenna	19	10.158	0.4659	0.2604	50595
169.00	3' Yagi	19	10.059	0.4658	0.2594	45995
160.00	ROHN 6'x15' Boom Gate (1)	19	9.161	0.4604	0.2434	30190
144.00	FFVV-65B-R2	19	7.536	0.4336	0.1886	17590
133.00	QD6616-7	19	6.488	0.4134	0.1623	65391
125.00	LTF12=372 Sector Mount (1)	19	5.741	0.3947	0.1523	10913
113.00	ANT150D	19	4.740	0.3543	0.1429	14106
60.00	GPS	19	1.509	0.1763	0.0707	17140

Anchor Bolt Analysis:

Input Data:

Tower Reactions:

Tension Force =	Tension := 333-kips	(Input From trnTower)
Compression Force =	Compression := 379-kips	(Input From trnTower)
Shear Force =	Shear := 54-kips	(Input From trnTower)

Anchor Bolt Data:

ASTMA354 Grade BC		
Number of Anchor Bolts =	N := 10	(User Input)
Bolt Ultimate Strength =	$F_u := 125$ -ksi	(User Input)
Bolt Yield Strength =	$F_y := 109$ -ksi	(User Input)
Bolt Modulus =	E := 29000-ksi	(User Input)
Diameter of Anchor Bolts =	D := 1.00-in	(User Input)
Threads per Inch =	n := 8	(User Input)
Length from Top of Pier to Bottom of Leveling Nut =	$L_{ar} := 0$ -in	(User Input)

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

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

Plastic Section Modulus of Bolt = $Z_x := \frac{D_n^3}{6} = 0.113 \cdot \text{in}^3$

Anchor Bolt Design Strength:

Resistance Factor for Flexure = $\phi_f := 0.9$

Resistance Factor for Compression = $\phi_c := 0.9$

Resistance Factor for Tension = $\phi_t := 0.75$

Resistance Factor for Shear = $\phi_v := 0.75$

Design Tensile Strength = $\Phi R_{nt} := \phi_t \cdot F_u \cdot A_n = 56.8 \cdot \text{k}$

Design Compression Strength = $\Phi R_{nc} := \phi_c \cdot F_y \cdot A_g = 77 \cdot \text{k}$

Design Shear Strength (Tension) = $\Phi R_{nv} := \phi_v \cdot 0.5 F_u \cdot A_g = 36.8 \cdot \text{k}$

Design Shear Strength (Compression) = $\Phi R_{nvc} := \phi_c \cdot 0.6 F_y \cdot A_g \cdot 0.75 = 34.7 \cdot \text{k}$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $P_{ut} := \frac{\text{Tension}}{N} = 33.3\text{-kips}$

Maximum Compressive Force = $P_{uc} := \frac{\text{Compression}}{N} = 37.9\text{-kips}$

Maximum Shear Force = $V_u := \frac{\text{Shear}}{N} = 5.4\text{-kips}$

Condition1 = $\left[\text{if} \left[\left(\frac{P_{ut}}{\Phi R_{nt}} \right)^2 + \left(\frac{V_u}{\Phi R_{nv}} \right)^2 \right] \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right]$

Condition1 = "OK"

Condition2 = $\left[\text{if} \left[\left(\frac{P_{uc}}{\Phi R_{nc}} \right) + \left(\frac{V_u}{\Phi R_{nvc}} \right)^2 \right] \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right]$

Condition2 = "OK"

Bolt % of Capacity = $\max \left[\left(\frac{P_{ut}}{\Phi R_{nt}} \right)^2 + \left(\frac{V_u}{\Phi R_{nv}} \right)^2, \left(\frac{P_{uc}}{\Phi R_{nc}} \right) + \left(\frac{V_u}{\Phi R_{nvc}} \right)^2 \right] = 51.6\text{-}\%$

Caisson Foundation:

Input Data:

Tower Data

Uplift =	Uplift := 333-kips	(User Input)
Compression =	Comp := 379-kips	(User Input)
Shear Force =	Shear := 54-kips	(User Input)
Tower Height =	H _t := 180-ft	(User Input)

Footing Data:

Length of Caisson =	L _c := 27-ft	(User Input)
Extension of Caisson Above Grade =	L _{cag} := 1-ft	(User Input)
Diameter of Caisson =	d _c := 4.5-ft	(User Input)
Length of Caisson Above Water Table =	L _{c.AWT} := 27-ft	(User Input)
Length of Caisson Below Water Table =	L _{c.BWT} := 0-ft	(User Input)

Material Properties:

Concrete Compressive Strength =	f _c := 4000-psi	(User Input)
Steel Reinforcement Yield Strength =	f _y := 60000-psi	(User Input)
Ultimate Skin Friction (Above Water Table) =	μ ₁ := 3.73-ksf	(User Input)
Ultimate Skin Friction (Below Water Table) =	μ ₂ := 3.73-ksf	(User Input)
Ultimate Soil Bearing Capacity =	q _u := 6000-psf	(Assumed Conservative User Input)
Unit Weight of Soil =	γ _{soil} := 120-pcf	(User Input)
Unit Weight of Concrete =	γ _{conc} := 150-pcf	(User Input)
Depth to Neglect =	n := 5-ft	(User Input)
Resistance Factor for Bearing =	Φ _{sBearing} := 0.75	(TIA-222-H 9.7)
Resistance Factor for Friction =	Φ _{sFriction} := 0.75	(TIA-222-H 9.7)

Calculated Properties:

Adjusted Concrete Unit Weight = $\gamma_c := \gamma_{\text{conc}} - 62.4 \text{pcf} = 87.6 \text{pcf}$

Weight of Concrete Caisson (no water) = $WT_{c,\text{comp}} := \frac{\pi}{4} \cdot (d_c^2 \cdot L_c) \cdot \gamma_{\text{conc}} = 64.412 \text{kip}$

Weight of Concrete Caisson (water) = $WT_{c,\text{uplift}} := \frac{\pi}{4} \cdot \left[(d_c^2 \cdot L_{c,\text{AWT}}) \cdot \gamma_{\text{conc}} + (d_c^2 \cdot L_{c,\text{BWT}}) \cdot \gamma_c \right] = 64.412 \text{kip}$

Check Uplift:

Uplift Resistance from Concrete Weight = $Uplift_{\text{conc}} := (WT_{c,\text{uplift}}) \cdot 0.9 = 57.971 \text{kips}$

Uplift Resistance from Skin Friction = $Uplift_{\text{SF}} := \Phi_{\text{SF}} \cdot \pi \cdot d_c \cdot \left[(L_{c,\text{AWT}} - L_{\text{cag}} - n) \cdot \mu_1 + L_{c,\text{BWT}} \cdot \mu_2 \right] = 831 \text{kips}$

Total Uplift Resistance = $Uplift_R := Uplift_{\text{conc}} + Uplift_{\text{SF}} = 888.494 \text{kips}$

Uplift Check = $\frac{Uplift}{Uplift_R} = 37.48\%$

$Uplift_Check := \text{if} \left(\frac{Uplift_R}{Uplift} \geq 1.0, \text{"Okay"}, \text{"No Good"} \right)$

Uplift_Check = "Okay"

Check Compression:

Total Compression Force = $Comp_{\text{tot}} := WT_{c,\text{comp}} + Comp = 443 \text{kips}$

Compression Resistance from Bearing = $Comp_{\text{bearing}} := \Phi_{\text{sBearing}} \cdot \left(\frac{\pi}{4} \cdot d_c^2 \cdot q_u \right) = 72 \text{kips}$

Compression Resistance from Skin Friction = $Comp_{\text{SF}} := \Phi_{\text{SF}} \cdot \pi \cdot d_c \cdot \left[(L_{c,\text{AWT}} - L_{\text{cag}} - n) \cdot \mu_1 + L_{c,\text{BWT}} \cdot \mu_2 \right] = 831 \text{kips}$

Total Compression Resistance = $Comp_R := Comp_{\text{bearing}} + Comp_{\text{SF}} = 902 \text{kips}$

Compression Check = $\frac{Comp_{\text{tot}}}{Comp_R} = 49.15\%$

$Compression_Check := \text{if} \left(\frac{Comp_R}{Comp_{\text{tot}}} \geq 1.0, \text{"Okay"}, \text{"No Good"} \right)$

Compression_Check = "Okay"