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

VIA ELECTRONIC MAIL

November 3, 2022

Evan Renwick
Site Acquisition Specialist
Centerline Communications, LLC
750 West Center Street, Suite 301
West Bridgewater, MA 02379
erenwick@clinellc.com

RE: **EM-AT&T-113-220929** – AT&T notice of intent to modify an existing telecommunications facility located at 97 High Street, Portland, Connecticut.

Dear Evan Renwick:

The Connecticut Siting Council (Council) is in receipt of your correspondence of November 2, 2022 submitted in response to the Council's October 11, 2022 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/RDM/emr

emr

From: Evan Renwick <erenwick@clinellc.com>
Sent: Wednesday, November 2, 2022 10:58 AM
To: Robidoux, Evan <Evan.Robidoux@ct.gov>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: RE: Council Extension Letter for EM-AT&T-113-220929 (97 High Street, Portland)

Good morning,

Attached is a revised Structural Analysis Report along with the incomplete exempt modification letter (EM-AT&T-113-220929), and extension letter for the above referenced address.

One hard copy of these documents will be mailed via UPS to the Connecticut Siting Council office and should arrive shortly. Please let me know if you have any questions or require any additional information. Thank you.

Best Regards,

Evan Renwick
Centerline Communications, LLC
Site Acquisition Specialist
Cell: (774)428-0194
750 W Center St, #301, West Bridgewater, MA 02379
erenwick@clinellc.com

CENTERLINE COMMUNICATIONS

750 West Center Street, Suite 301
West Bridgewater, MA 02379
781.713.4725

November 2, 2022

VIA UPS DELIVERY (1Z9Y4 503 03 2446 0721)

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

Regarding:	Council Incomplete Letter for EM-ATT-113-220929
Site Address:	97 High St, Portland, CT 06480
AT&T Site ID	CT1066 /FA # 10035005
Lessee:	New Cingular Wireless, PCS, LLC ("AT&T")

Dear Mrs. Bachman:

This letter is in response to the Council's Letter for EM-ATT-113-220929 97 High St, Portland, CT 06480) dated October 11, 2022.

The Council reviewed the exempt modification request for completeness and identified a deficiency in the Structural Analysis Report provided with the filing. Per the Council's recommendations, along with this letter is a revised Structural Analysis Report.

Provided to the Council is an electronic version of the revised Structural Analysis Report, and one hard copy of these documents will be mailed to Council's address listed above via UPS and should arrive shortly.

Please do not hesitate to contact me should you have any questions or concerns. Thank you for your attention to this matter.

Sincerely,

Evan Renwick

Evan Renwick
Evan Renwick
Site Acquisition Specialist
Direct Line: (774) 428-0194
Email: erenwick@clinellc.com

Structural Components, LLC
1870 West 64th Lane, Unit A
Denver, CO 80221

Voice: 866-386-7622

October 31, 2022

BST Management, LLC
352 Park Street
Suite 106
North Reading, MA 01864

Re: Rigorous Structural Analysis Report

Structure:	80.4ft Self-Supporting Tower
Site Address:	97 High Street, Portland, Connecticut 06480 (Middlesex County) Latitude: 41.5807˚N, Longitude: 72.6238˚W
Site Name:	BST Management, LLC – Portland AT&T – Portland
Site Number:	BST Management, LLC – CT-1680 AT&T – CT1066
SC Number:	220737
Status:	**Structure Passes (79% Capacity)** **Foundation Passes**

Per your request, Structural Components, LLC has completed a structural analysis for the above referenced project to verify the tower's compliance to the following design criteria:

Standard:	TIA-222-G *Structural Standard for Antenna Supporting Structures and Antennas*
Building Code:	2015 International Building Code 2018 Connecticut State Building Code
Design Basic Wind Speed without Ice:	125 mph 3-second gust V_{ULT}
Design Basic Wind Speed with Ice:	50 mph 3-second gust
Ice Thickness:	3/4" radial
Serviceability Basic Wind Speed:	60 mph 3-second gust
Exposure Category:	C
Topographic Category:	1
Risk Category:	II
Seismic Site Class:	D, S_s=0.180, S_1=0.063
Seismic Design Category:	B

Please refer to the following structural analysis report, which gives complete details of the tower loading, results, information provided, and necessary assumptions.

We trust you find this report satisfactory. Please do not hesitate to contact us if you should have any questions or concerns.

Best Regards,
Structural Components LLC

Wesley Culver
Engineering Manager

Michael Deboer, P.E.
Connecticut P.E. # 0018022

/TR

11/1/2022

1 LOADING CONFIGURATION

The following antennas, mounts, transmission lines, and other appurtenances were considered for the structural analysis.

Elevation (ft)		Equipment	Feedlines	Notes
Mount	Equip			
80.4	80.4	(1) 5/8" x 4' Lightning Rod	---	Existing
77.0	77.0	(1) L6" x 6" x 7/16" Ring Mount	---	Existing
76.7[4]	**78.7**	**(3) Ericsson RRUS 32 B2** **(1) Raycap DC6-48-60-18-8F SSD**	**(6) 7/8" TX** **(3) 0.92" OD DC** **(4) 3/4" OD DC** **(1) 3/8" Fiber** **(1) 1/2" Fiber**	**AT&T Final**
	77.2	**(3) Ericsson RRUS 32 B30[3]** **(3) Ericsson RRUS 32 B66A[3]** **(1) Raycap DC6-48-60-18-8F SSD**		
	76.7	**(3) CCITPA65R-BU6DA-K Panels** **(3) Ericsson AIR6449 B77D Panels** **(3) Ericsson AIR6419 B77G Panels** **(3) CCIDMP65R-BU6DA Panels** **(3) Ericsson RRUS 4478 B14** **(3) Ericsson RRUS 4449 B5/B12** **(1) Raycap DC9-48-60-24-8C-EV SSDs** **(3) 12' Sector Frame Mounts**		
75.0	75.0	(1) L6" x 6" x 7/16" Ring Mount	---	Existing
73.0	73.0	(1) 2-3/8" x 8' Pipe Mount		
67.7	67.7	(1) L6" x 6" x 7/16" Ring Mount		

1) Elevations reference centerline of panel, yagi, mounts, and dish antennas, and base of whip antennas, in relation to the base of the tower.
2) Refer to the feed line diagram and analysis output in Appendix A for the location and orientation of feedlines and equipment.
3) Secondary appurtenances such as TMAs, Diplexers, and RRUs are considered to be installed directly behind panel antennas for frontal area shielding. See analysis output for magnitude of individual shielding.
4) Elevations adjusted from Structural Components Mapping dated 03/15/2022, Job # 220142.

2 RESULTS

The analysis was performed using tnxTower v8.1.1.0, a structural analysis program developed by Tower Numerics, Inc. specifically for the communication tower industry.

2.1 TOWER MEMBER STRESS LEVELS

The tower has the following stress ratios in its structural members.

Elev. (ft)	Member	Stress Ratio*
0 – 80.4	Legs	0.72
0 – 80.4	Bracing	0.79
0 – 80.4	Connections	0.65

Stress ratio (SR) criteria:
SR $\leq$ 1.00 is completely within code limits.
SR $\leq$ 1.05 is considered within acceptable tolerance of code limits.
SR > 1.05 is outside acceptable tolerance of code limits and requires structural modifications.
* Seismic analysis for similar structures under similar loading conditions has been shown to produce significantly lower stress ratios than wind and ice. Therefore, seismic analysis has not been included in the current analysis.

2.2 FOUNDATION REACTIONS

The reactions listed below are for the design wind speed listed. Reactions are factored loads.

Reaction Type	Current Wind Reactions	Current Iced Reactions	Foundation Status
Moment (ft-kips)	955.7	243.5	Passes*
Shear (kips)	19.5	4.8	
Axial (kips)	17.6	45.8	
Leg Compression (kips)	56.4	38.9	
Leg Uplift (kips)	48.4	30.1	
Leg Shear (kips)	10.3	8.9	

* See Appendix A for foundation calculations.

2.3 TOWER DEFLECTION

The tower deflections have been reviewed and are believed to be acceptable for the proposed equipment. The carrier(s) should review the deflections for the service wind condition included in Appendix A for compatibility with their equipment.

3 PROVIDED INFORMATION AND ASSUMPTIONS

The following information was directly used to generate this report, and can be found in Appendix B.

Document	Author	Date	Reference
Client Email	BST Management, LLC	10/18/2022	CT-1680
Structural Analysis Report – AT&T	Structural Components, LLC	09/08/2022	220619

The following assumptions were made in order to complete the analysis. These assumptions must be checked. If they do not accurately represent the existing or proposed tower, foundation, soil, and loading conditions, we must be notified so that we can make the appropriate changes to our analysis, conclusions, and recommendations.

1. The tower and foundation are in good condition with no corrosion, damage or fatiguing issues which could reduce the carrying capacity of the tower.
2. All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report.
3. All prior structural modifications, if any, are assumed to be as per date supplied/ available, to be properly installed and to be fully effective.
4. The following assumptions regarding member minimum material or type apply to this structure, unless otherwise noted in analysis:
   - Angle Legs: A36
   - Angle Bracing: A36
   - Splice Bolts: A307
   - Gusset Plates: A36
   - Brace Bolts: A325N
5. The feedline and appurtenance configuration is as stated in the report. All antennas, coax, cables and waveguide cables are assumed to be properly installed and supported as per manufacturer requirement.
6. The support mounts and/or platforms are not analyzed and are considered adequate to support the loading.
7. All mounting systems connect at tower bracing points. Local stresses are not considered unless noted otherwise in analysis.
8. Some assumptions are made regarding antenna and mount sizes and their projected areas based on a best interpretation of the data supplied and a best knowledge of antenna type and industry practice.
9. The soil parameters are as per data supplied, or as assumed, and stated in the calculations.

4 CONCLUSIONS

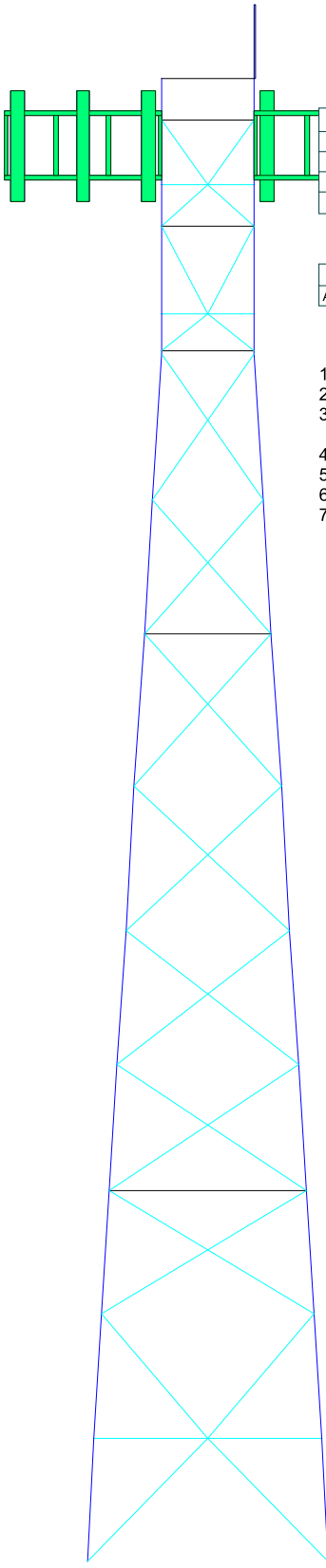
To the best of our knowledge and belief the tower and foundations satisfy the requirements of the applicable codes and standards having jurisdiction over the work for the loadings and conditions as outlined in this report. **Structural modifications are not required at this time.**

APPENDIX A

Tower Profile and Calculations

Section	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1	
Legs	L5x5x5/16					L5x5x3/8			L4x4x3/8						
Leg Grade						A36									
Diagonals	L3x3x5/16		L2 1/2x2 1/2x3/16			L2x2 1/2x3/16				B	L2 1/2x2 1/2x3/16		A	N.A.	
Diagonal Grade						A36								N.A.	
Top Girts	N.A.		L2x2 1/2x3/16		N.A.		L2 1/2x2 1/2x3/16		N.A.		2L4x4x3/8	N.A.	D	C	
Bottom Girts					N.A.					E	N.A.				
Horizontals	L1 3/4x1 3/4x3/16					N.A.				D	N.A.	D	N.A.		
Inner Bracing	N.A.		L2x2x3/16		N.A.		L2 1/2x2x3/16		N.A.	F	N.A.		F	N.A.	
Face Width (ft)	13.083	11.4363	10.6142	9.7793	8.883	7.9252	6.9059	6.0147						5.0416	
# Panels @ (ft)	2 @ 6.7075		1 @ 6.688	1 @ 6.792	1 @ 7.292	1 @ 7.792	1 @ 8.292	1 @ 7.25	1 @ 7.917	1 @ 2	1 @ 4.75	H	1 @ 3.5	G	
Weight (lb)	8093.4	722.7	783.6	605.0	620.6	636.9	792.8	497.4	522.3	446.5	733.1	309.2	448.4	121.6	

80.3 ft
78.1 ft
74.6 ft
72.3 ft
67.6 ft
65.4 ft
57.5 ft
50.3 ft
42.0 ft
34.2 ft
26.9 ft
20.1 ft
13.4 ft
6.7 ft
0.0 ft



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2x2 1/2x3/16	E	L3x3x3/16
B	L2x2x3/16	F	L2 1/2x2x3/16
C	L2x2x1/8	G	1 @ 2.27
D	L4x3 1/2x1/4	H	1 @ 2.25

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi			

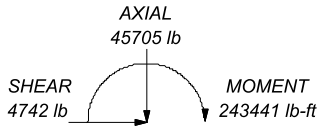
TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 125 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 78.4%

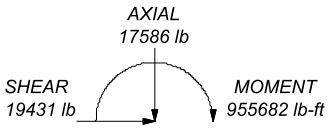
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 56048 lb
SHEAR: 10227 lb

UPLIFT: -48344 lb
SHEAR: 8849 lb



TORQUE 2436 lb-ft
50 mph WIND - 0.7500 in ICE



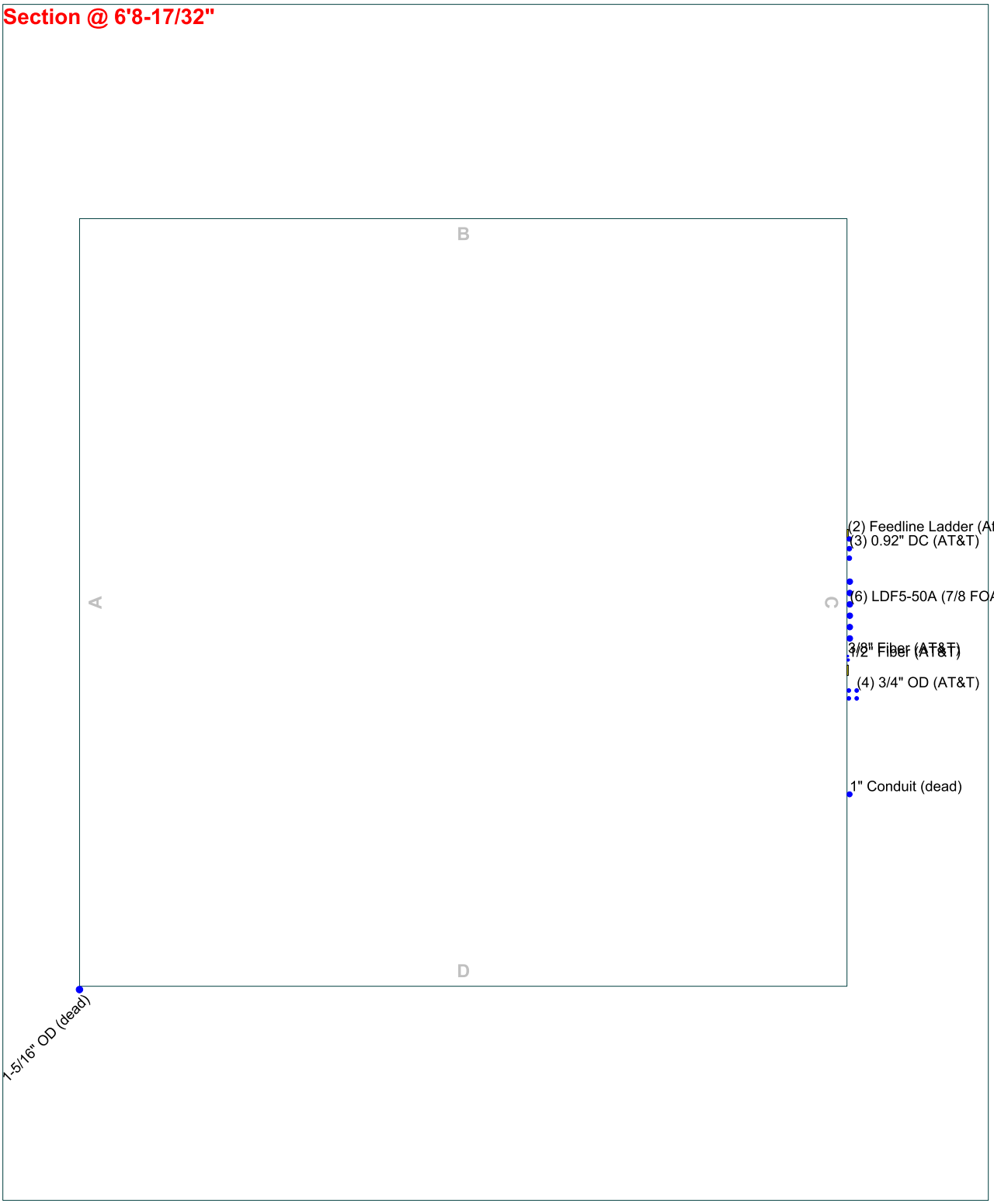
TORQUE 7653 lb-ft
REACTIONS - 125 mph WIND

Structural Components, LLC
1870 West 64th Lane, Unit A
Denver, CO 80221
Phone: (866) 386-7622
FAX:

Job: **220737**			
Project: ***Portland (CT-1680)***			
Client: BST Management, LLC	Drawn by: treed	App'd:	
Code: TIA-222-G	Date: 10/31/22	Scale: NTS	
Path:		Dwg No. E-1	

Feed Line Plan
6'8-17/32"

Round Flat App In Face App Out Face



Structural Components, LLC
1870 West 64th Lane, Unit A
Denver, CO 80221
Phone: (866) 386-7622
FAX:

Job: 220737			
Project: Portland (CT-1680)			
Client: BST Management, LLC	Drawn by: treed	App'd:	
Code: TIA-222-G	Date: 10/31/22	Scale: NTS	
Path:		Dwg No. E-7	

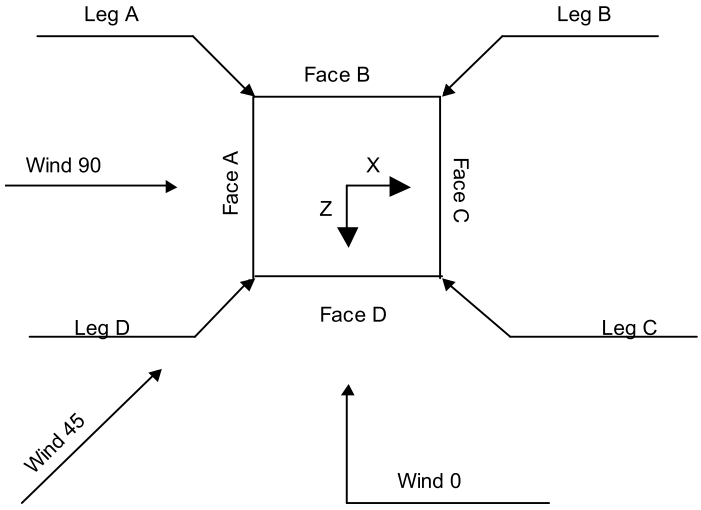
Tower Input Data

The main tower is a 4x free standing tower with an overall height of 80.33 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.04 ft at the top and 13.08 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

ASCE 7-10 Wind Data is used.
Basic wind speed of 125 mph.
Risk Category II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
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

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	√ Calculate Redundant Bracing Forces
Consider Moments - Diagonals	Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	√ SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known



Square Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	80.33-78.06			5.04	1	2.27
T2	78.06-74.56			5.04	1	3.50
T3	74.56-72.31			5.04	1	2.25
T4	72.31-67.56			5.04	1	4.75
T5	67.56-65.44			5.04	1	2.13
T6	65.44-57.52			5.04	1	7.92
T7	57.52-50.27			6.01	1	7.25
T8	50.27-41.98			6.91	1	8.29
T9	41.98-34.19			7.93	1	7.79
T10	34.19-26.90			8.88	1	7.29
T11	26.90-20.10			9.78	1	6.79
T12	20.10-13.42			10.61	1	6.69
T13	13.42-6.71			11.44	1	6.71
T14	6.71-0.00			12.26	1	6.71

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	80.33-78.06	2.27	X Brace	No	Yes	0.0000	0.0000
T2	78.06-74.56	3.50	K Brace Up	No	Yes	0.0000	0.0000
T3	74.56-72.31	2.25	K Brace Down	No	Yes	0.0000	0.0000
T4	72.31-67.56	4.75	K Brace Up	No	Yes	0.0000	0.0000
T5	67.56-65.44	2.00	K Brace Down	No	Yes	0.0000	1.5000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	65.44-57.52	7.92	X Brace	No	No	0.0000	0.0000
T7	57.52-50.27	7.25	X Brace	No	No	0.0000	0.0000
T8	50.27-41.98	8.29	X Brace	No	No	0.0000	0.0000
T9	41.98-34.19	7.79	X Brace	No	No	0.0000	0.0000
T10	34.19-26.90	7.29	X Brace	No	No	0.0000	0.0000
T11	26.90-20.10	6.79	X Brace	No	No	0.0000	0.0000
T12	20.10-13.42	6.69	X Brace	No	No	0.0000	0.0000
T13	13.42-6.71	6.71	K Brace Up	No	Yes	0.0000	0.0000
T14	6.71-0.00	6.71	K Brace 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 80.33-78.06	Equal Angle	L4x4x3/8	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T2 78.06-74.56	Equal Angle	L4x4x3/8	A36 (36 ksi)	Single Angle	L2x2 1/2x3/16	A36 (36 ksi)
T3 74.56-72.31	Equal Angle	L4x4x3/8	A36 (36 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 72.31-67.56	Equal Angle	L4x4x3/8	A36 (36 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 67.56-65.44	Equal Angle	L4x4x3/8	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T6 65.44-57.52	Equal Angle	L4x4x3/8	A36 (36 ksi)	Single Angle	L2x2 1/2x3/16	A36 (36 ksi)
T7 57.52-50.27	Equal Angle	L4x4x3/8	A36 (36 ksi)	Single Angle	L2x2 1/2x3/16	A36 (36 ksi)
T8 50.27-41.98	Equal Angle	L5x5x3/8	A36 (36 ksi)	Single Angle	L2x2 1/2x3/16	A36 (36 ksi)
T9 41.98-34.19	Equal Angle	L5x5x3/8	A36 (36 ksi)	Single Angle	L2x2 1/2x3/16	A36 (36 ksi)
T10 34.19-26.90	Equal Angle	L5x5x3/8	A36 (36 ksi)	Single Angle	L2x2 1/2x3/16	A36 (36 ksi)
T11 26.90-20.10	Equal Angle	L5x5x3/8	A36 (36 ksi)	Single Angle	L2x2 1/2x3/16	A36 (36 ksi)
T12 20.10-13.42	Equal Angle	L5x5x5/16	A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T13 13.42-6.71	Equal Angle	L5x5x5/16	A36 (36 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T14 6.71-0.00	Equal Angle	L5x5x5/16	A36 (36 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 80.33-78.06	Equal Angle	L2x2x1/8	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T2 78.06-74.56	Single Angle	L4x3 1/2x1/4	A36	Solid Round		A36

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T4 72.31-67.56	Double Equal Angle	2L4x4x3/8	(36 ksi) A36 (36 ksi)	Solid Round		(36 ksi) A36 (36 ksi)
T5 67.56-65.44	Single Angle		A36 (36 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T8 50.27-41.98	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T12 20.10-13.42	Single Angle	L2x2 1/2x3/16	A36 (36 ksi)	Solid Round		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
T2 78.06-74.56	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x3 1/2x1/4	A36 (36 ksi)
T3 74.56-72.31	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x3 1/2x1/4	A36 (36 ksi)
T4 72.31-67.56	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x3 1/2x1/4	A36 (36 ksi)
T5 67.56-65.44	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x3 1/2x1/4	A36 (36 ksi)
T13 13.42-6.71	None	Flat Bar		A36 (36 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T14 6.71-0.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 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
T2 78.06-74.56	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T3 74.56-72.31	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T5 67.56-65.44	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T6 65.44-57.52	Solid Round		A36 (36 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T8 50.27-41.98	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T12 20.10-13.42	Solid Round		A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 80.33-78.06	0.00	0.2500	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 78.06-74.56	0.35	0.2500	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 74.56-72.31	0.35	0.2500	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 72.31-67.56	0.58	0.2500	A36 (36 ksi)	1	1	1	36.0000	Third-Pt	36.0000
T5 67.56-65.44	0.58	0.2500	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 65.44-57.52	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 57.52-50.27	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8 50.27-41.98	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 41.98-34.19	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T10 34.19-26.90	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T11 26.90-20.10	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T12 20.10-13.42	0.00	0.3125	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T13 13.42-6.71	0.43	0.2500	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T14 6.71-0.00	0.43	0.2500	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Single Diags X	K Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
80.33-78.06				1	1	1	1	1	1	1	1	1	1	1	1
T2	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
78.06-74.56				1	1	1	1	1	1	1	1	1	1	1	1
T3	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
74.56-72.31				1	1	1	1	1	1	1	1	1	1	1	1
T4	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
72.31-67.56				1	1	1	1	1	1	1	1	1	1	1	1
T5	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
67.56-65.44				1	1	1	1	1	1	1	1	1	1	1	1
T6	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
65.44-57.52				1	1	1	1	1	1	1	1	1	1	1	1
T7	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
57.52-50.27				1	1	1	1	1	1	1	1	1	1	1	1
T8	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
50.27-41.98				1	1	1	1	1	1	1
T9	No	No	1	1	1	1	1	1	1	1
41.98-34.19				1	1	1	1	1	1	1
T10	No	No	1	1	1	1	1	1	1	1
34.19-26.90				1	1	1	1	1	1	1
T11	No	No	1	1	1	1	1	1	1	1
26.90-20.10				1	1	1	1	1	1	1
T12	No	No	1	1	1	1	1	1	1	1
20.10-13.42				1	1	1	1	1	1	1
T13	No	No	1	1	1	1	1	1	1	1
13.42-6.71				1	1	1	1	1	1	1
T14 6.71-0.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	U	Diagonal Net Width Deduct in	U	Top Girt Net Width Deduct in	U	Bottom Girt Net Width Deduct in	U	Mid Girt Net Width Deduct in	U	Long Horizontal Net Width Deduct in	U	Short Horizontal Net Width Deduct in	U
T1 80.33-78.06	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 78.06-74.56	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 74.56-72.31	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 72.31-67.56	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 67.56-65.44	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 65.44-57.52	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 57.52-50.27	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 50.27-41.98	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 41.98-34.19	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 34.19-26.90	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 26.90-20.10	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 20.10-13.42	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T13 13.42-6.71	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T14 6.71-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Redundant Horizontal Net Width Deduct in	U	Redundant Diagonal Net Width Deduct in	U	Redundant Sub-Diagonal Net Width Deduct in	U	Redundant Sub-Horizontal Net Width Deduct in	U	Redundant Vertical Net Width Deduct in	U	Redundant Hip Net Width Deduct in	U	Redundant Hip Diagonal Net Width Deduct in	U
T1 80.33-78.06	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 78.06-74.56	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T3 74.56-72.31	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 72.31-67.56	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 67.56-65.44	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 65.44-57.52	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 57.52-50.27	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 50.27-41.98	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 41.98-34.19	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 34.19-26.90	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 26.90-20.10	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 20.10-13.42	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T13 13.42-6.71	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T14 6.71-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 80.33-78.06	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T2 78.06-74.56	4.2500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T3 74.56-72.31	0.0000	0.0000	3.2500	0.0000	0.0000	0.0000	0.0000	0.0000
T4 72.31-67.56	4.2500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T5 67.56-65.44	0.0000	0.0000	3.2500	0.0000	0.0000	0.0000	0.0000	0.0000
T6 65.44-57.52	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T7 57.52-50.27	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T8 50.27-41.98	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T9 41.98-34.19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T10 34.19-26.90	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T11 26.90-20.10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T12 20.10-13.42	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T13 13.42-6.71	0.0000	0.0000	5.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T14 6.71-0.00	0.0000	0.0000	5.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 80.33-78.06	Sleeve DS	0.6250 A307	0	0.6240 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 78.06-74.56	Flange	0.7500 A307	0	0.5410 A325N	2	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	3	0.6250 A325N	0
T3 74.56-72.31	Flange	0.7500 A307	0	0.5410 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	3	0.6250 A325N	0
T4 72.31-67.56	Flange	0.7500 A307	0	0.5410 A325N	2	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	3	0.6250 A325N	0
T5 67.56-65.44	Flange	0.7500 A307	0	0.5410 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	3	0.6250 A325N	0
T6 65.44-57.52	Flange	0.7500 A307	0	0.5410 A325N	2	0.6250 A325N	0	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	3	0.6250 A325N	0
T7 57.52-50.27	Flange	0.7500 A307	0	0.5410 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 50.27-41.98	Sleeve DS	0.6250 A307	12	0.5410 A325N	2	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 41.98-34.19	Flange	0.7500 A307	0	0.5410 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 34.19-26.90	Flange	0.7500 A307	0	0.5410 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T11 26.90-20.10	Flange	0.7500 A307	0	0.5410 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T12 20.10-13.42	Sleeve DS	0.6250 A307	12	0.5410 A325N	2	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T13 13.42-6.71	Flange	0.7500 A307	0	0.5410 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1	0.6250 A325N	0
T14 6.71-0.00	Flange	0.7500 A307	0	0.5410 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1	0.6250 A325N	0

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 80.33-78.06	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 78.06-74.56	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 74.56-72.31	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 72.31-67.56	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 67.56-65.44	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 65.44-57.52	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 57.52-50.27	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 50.27-41.98	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 41.98-34.19	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	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.
T10	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
34.19-26.90	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T11	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
26.90-20.10	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T12	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
20.10-13.42	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T13 13.42-6.71	0.5000	1	0.5000	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T14 6.71-0.00	0.5000	1	0.5000	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
	A325N		A325N		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
Leg A AZ 0 Deg													
Feedline Ladder (Af)	C	No	No	Af (CaAa)	77.00 - 0.00	0.0000	0	2	2	24.0000	2.0000		4.20
LDF5-50A (7/8 FOAM) (AT&T)	C	No	No	Ar (CaAa)	76.70 - 0.00	0.0000	0.01	6	6	1.0900	1.0900		0.33
0.92" DC (AT&T)	C	No	No	Ar (CaAa)	76.70 - 0.00	0.0000	-0.07	3	3	0.9200	0.9200		0.42
3/8" Fiber (AT&T)	C	No	No	Ar (CaAa)	76.70 - 0.00	0.0000	0.07	1	1	0.3750	0.3750		0.10
1/2" Fiber (AT&T)	C	No	No	Ar (CaAa)	76.70 - 0.00	0.0000	0.075	1	1	0.5000	0.5000		0.10
3/4" OD (AT&T)	C	No	No	Ar (CaAa)	76.70 - 0.00	0.0000	0.12	4	2	0.7500	0.7500		0.40
1" Conduit (dead)	C	No	No	Ar (CaAa)	48.00 - 0.00	0.0000	0.25	1	1	1.0000	1.0000		0.75
5/16" OD (dead)	D	No	No	Ar (CaAa)	48.00 - 50.00	-4.0000	0.25	1	1	0.3125	0.3125		2.00
1-5/16" OD (dead)	D	No	No	Ar (CaAa)	54.00 - 0.00	0.0000	0.5	1	1	1.3125	1.3125		1.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	80.33-78.06	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T2	78.06-74.56	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		C	0.000	0.000	4.440	0.000	31.21
		D	0.000	0.000	0.000	0.000	0.00
T3	74.56-72.31	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	4.464	0.000	30.21
		D	0.000	0.000	0.000	0.000	0.00
T4	72.31-67.56	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	9.425	0.000	63.77
		D	0.000	0.000	0.000	0.000	0.00
T5	67.56-65.44	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	4.216	0.000	28.53
		D	0.000	0.000	0.000	0.000	0.00
T6	65.44-57.52	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	15.709	0.000	106.29
		D	0.000	0.000	0.000	0.000	0.00
T7	57.52-50.27	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	14.385	0.000	97.34
		D	0.000	0.000	0.489	0.000	3.73
T8	50.27-41.98	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	17.055	0.000	115.84
		D	0.000	0.000	1.151	0.000	12.29
T9	41.98-34.19	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	16.240	0.000	110.46
		D	0.000	0.000	1.023	0.000	7.79
T10	34.19-26.90	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	15.198	0.000	103.37
		D	0.000	0.000	0.957	0.000	7.29
T11	26.90-20.10	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	14.156	0.000	96.28
		D	0.000	0.000	0.891	0.000	6.79
T12	20.10-13.42	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	13.939	0.000	94.81
		D	0.000	0.000	0.878	0.000	6.69
T13	13.42-6.71	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	13.980	0.000	95.08
		D	0.000	0.000	0.880	0.000	6.71
T14	6.71-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	13.980	0.000	95.08
		D	0.000	0.000	0.880	0.000	6.71

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	80.33-78.06	A	1.637	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		C		0.000	0.000	0.000	0.000	0.00
		D		0.000	0.000	0.000	0.000	0.00
T2	78.06-74.56	A	1.631	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	13.494	0.000	172.43
		D		0.000	0.000	0.000	0.000	0.00
T3	74.56-72.31	A	1.625	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	13.766	0.000	173.90
		D		0.000	0.000	0.000	0.000	0.00
T4	72.31-67.56	A	1.617	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	28.993	0.000	365.21
		D		0.000	0.000	0.000	0.000	0.00
T5	67.56-65.44	A	1.609	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	12.940	0.000	162.51
		D		0.000	0.000	0.000	0.000	0.00
T6	65.44-57.52	A	1.596	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	48.029	0.000	600.40
		D		0.000	0.000	0.000	0.000	0.00
T7	57.52-50.27	A	1.575	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	43.711	0.000	542.20
		D		0.000	0.000	1.664	0.000	24.46
T8	50.27-41.98	A	1.551	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	52.100	0.000	643.68
		D		0.000	0.000	4.128	0.000	64.35
T9	41.98-34.19	A	1.522	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	49.375	0.000	604.30
		D		0.000	0.000	3.394	0.000	48.85
T10	34.19-26.90	A	1.488	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	45.723	0.000	552.50
		D		0.000	0.000	3.128	0.000	44.43
T11	26.90-20.10	A	1.450	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	42.066	0.000	500.75
		D		0.000	0.000	2.861	0.000	40.03
T12	20.10-13.42	A	1.402	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	40.779	0.000	476.28
		D		0.000	0.000	2.753	0.000	37.78
T13	13.42-6.71	A	1.332	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	39.965	0.000	453.85
		D		0.000	0.000	2.667	0.000	35.57
T14	6.71-0.00	A	1.193	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	38.115	0.000	408.50
		D		0.000	0.000	2.481	0.000	31.21

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	80.33-78.06	0.0000	0.0000	0.0000	0.0000
T2	78.06-74.56	1.7091	0.1246	3.8883	0.1975
T3	74.56-72.31	2.3274	0.1658	3.0338	0.1614
T4	72.31-67.56	2.7254	0.1899	6.4075	0.3116
T5	67.56-65.44	1.6881	0.1248	0.1825	0.0105
T6	65.44-57.52	3.6794	0.2481	9.8559	0.4494
T7	57.52-50.27	3.5746	0.6282	9.6930	1.1913
T8	50.27-41.98	3.3172	1.0968	9.3987	2.3457
T9	41.98-34.19	4.0571	1.3100	11.1670	2.6678
T10	34.19-26.90	4.2935	1.3967	11.7251	2.8241
T11	26.90-20.10	4.4733	1.4654	12.1044	2.9381
T12	20.10-13.42	3.9128	1.3157	10.9879	2.7347
T13	13.42-6.71	4.7645	1.5795	13.0683	3.1919
T14	6.71-0.00	4.4143	1.4884	11.5994	2.8968

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T2	2	Feedline Ladder (Af)	74.56 - 77.00	0.6000	0.4134
T2	5	LDF5-50A (7/8 FOAM)	74.56 - 76.70	0.6000	0.4134
T2	6	0.92" DC	74.56 - 76.70	0.6000	0.4134
T2	7	3/8" Fiber	74.56 - 76.70	0.6000	0.4134
T2	8	1/2" Fiber	74.56 - 76.70	0.6000	0.4134
T2	10	3/4" OD	74.56 - 76.70	0.6000	0.4134
T3	2	Feedline Ladder (Af)	72.31 - 74.56	0.5973	0.2515
T3	5	LDF5-50A (7/8 FOAM)	72.31 - 74.56	0.5973	0.2515
T3	6	0.92" DC	72.31 - 74.56	0.5973	0.2515
T3	7	3/8" Fiber	72.31 - 74.56	0.5973	0.2515
T3	8	1/2" Fiber	72.31 - 74.56	0.5973	0.2515
T3	10	3/4" OD	72.31 - 74.56	0.5973	0.2515
T4	2	Feedline Ladder (Af)	67.56 - 72.31	0.6000	0.4506
T4	5	LDF5-50A (7/8 FOAM)	67.56 - 72.31	0.6000	0.4506
T4	6	0.92" DC	67.56 - 72.31	0.6000	0.4506
T4	7	3/8" Fiber	67.56 - 72.31	0.6000	0.4506
T4	8	1/2" Fiber	67.56 - 72.31	0.6000	0.4506
T4	10	3/4" OD	67.56 - 72.31	0.6000	0.4506
T5	2	Feedline Ladder (Af)	65.44 - 67.56	0.4832	0.0219
T5	5	LDF5-50A (7/8 FOAM)	65.44 - 67.56	0.4832	0.0219
T5	6	0.92" DC	65.44 - 67.56	0.4832	0.0219
T5	7	3/8" Fiber	65.44 - 67.56	0.4832	0.0219
T5	8	1/2" Fiber	65.44 - 67.56	0.4832	0.0219
T5	10	3/4" OD	65.44 - 67.56	0.4832	0.0219
T6	2	Feedline Ladder (Af)	57.52 - 65.44	0.6000	0.6000
T6	5	LDF5-50A (7/8 FOAM)	57.52 - 65.44	0.6000	0.6000
T6	6	0.92" DC	57.52 - 65.44	0.6000	0.6000
T6	7	3/8" Fiber	57.52 - 65.44	0.6000	0.6000
T6	8	1/2" Fiber	57.52 - 65.44	0.6000	0.6000
T6	10	3/4" OD	57.52 - 65.44	0.6000	0.6000
T7	2	Feedline Ladder (Af)	50.27 - 57.52	0.6000	0.6000
T7	5	LDF5-50A (7/8 FOAM)	50.27 - 57.52	0.6000	0.6000
T7	6	0.92" DC	50.27 - 57.52	0.6000	0.6000
T7	7	3/8" Fiber	50.27 - 57.52	0.6000	0.6000
T7	8	1/2" Fiber	50.27 - 57.52	0.6000	0.6000
T7	10	3/4" OD	50.27 - 57.52	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	13	1-5/16" OD	50.27 - 54.00	0.6000	0.6000
T8	2	Feedline Ladder (Af)	41.98 - 50.27	0.6000	0.6000
T8	5	LDF5-50A (7/8 FOAM)	41.98 - 50.27	0.6000	0.6000
T8	6	0.92" DC	41.98 - 50.27	0.6000	0.6000
T8	7	3/8" Fiber	41.98 - 50.27	0.6000	0.6000
T8	8	1/2" Fiber	41.98 - 50.27	0.6000	0.6000
T8	10	3/4" OD	41.98 - 50.27	0.6000	0.6000
T8	11	1" Conduit	41.98 - 48.00	0.6000	0.6000
T8	12	5/16" OD	48.00 - 50.00	0.6000	0.6000
T8	13	1-5/16" OD	41.98 - 50.27	0.6000	0.6000
T9	2	Feedline Ladder (Af)	34.19 - 41.98	0.6000	0.6000
T9	5	LDF5-50A (7/8 FOAM)	34.19 - 41.98	0.6000	0.6000
T9	6	0.92" DC	34.19 - 41.98	0.6000	0.6000
T9	7	3/8" Fiber	34.19 - 41.98	0.6000	0.6000
T9	8	1/2" Fiber	34.19 - 41.98	0.6000	0.6000
T9	10	3/4" OD	34.19 - 41.98	0.6000	0.6000
T9	11	1" Conduit	34.19 - 41.98	0.6000	0.6000
T9	13	1-5/16" OD	34.19 - 41.98	0.6000	0.6000
T10	2	Feedline Ladder (Af)	26.89 - 34.19	0.6000	0.6000
T10	5	LDF5-50A (7/8 FOAM)	26.89 - 34.19	0.6000	0.6000
T10	6	0.92" DC	26.89 - 34.19	0.6000	0.6000
T10	7	3/8" Fiber	26.89 - 34.19	0.6000	0.6000
T10	8	1/2" Fiber	26.89 - 34.19	0.6000	0.6000
T10	10	3/4" OD	26.89 - 34.19	0.6000	0.6000
T10	11	1" Conduit	26.89 - 34.19	0.6000	0.6000
T10	13	1-5/16" OD	26.89 - 34.19	0.6000	0.6000
T11	2	Feedline Ladder (Af)	20.10 - 26.89	0.6000	0.6000
T11	5	LDF5-50A (7/8 FOAM)	20.10 - 26.89	0.6000	0.6000
T11	6	0.92" DC	20.10 - 26.89	0.6000	0.6000
T11	7	3/8" Fiber	20.10 - 26.89	0.6000	0.6000
T11	8	1/2" Fiber	20.10 - 26.89	0.6000	0.6000
T11	10	3/4" OD	20.10 - 26.89	0.6000	0.6000
T11	11	1" Conduit	20.10 - 26.89	0.6000	0.6000
T11	13	1-5/16" OD	20.10 - 26.89	0.6000	0.6000
T12	2	Feedline Ladder (Af)	13.41 - 20.10	0.6000	0.6000
T12	5	LDF5-50A (7/8 FOAM)	13.41 - 20.10	0.6000	0.6000
T12	6	0.92" DC	13.41 - 20.10	0.6000	0.6000
T12	7	3/8" Fiber	13.41 - 20.10	0.6000	0.6000
T12	8	1/2" Fiber	13.41 - 20.10	0.6000	0.6000
T12	10	3/4" OD	13.41 - 20.10	0.6000	0.6000
T12	11	1" Conduit	13.41 - 20.10	0.6000	0.6000
T12	13	1-5/16" OD	13.41 - 20.10	0.6000	0.6000
T13	2	Feedline Ladder (Af)	6.71 - 13.41	0.6000	0.6000
T13	5	LDF5-50A (7/8 FOAM)	6.71 - 13.41	0.6000	0.6000
T13	6	0.92" DC	6.71 - 13.41	0.6000	0.6000
T13	7	3/8" Fiber	6.71 - 13.41	0.6000	0.6000
T13	8	1/2" Fiber	6.71 - 13.41	0.6000	0.6000
T13	10	3/4" OD	6.71 - 13.41	0.6000	0.6000
T13	11	1" Conduit	6.71 - 13.41	0.6000	0.6000
T13	13	1-5/16" OD	6.71 - 13.41	0.6000	0.6000
T14	2	Feedline Ladder (Af)	0.00 - 6.71	0.6000	0.6000
T14	5	LDF5-50A (7/8 FOAM)	0.00 - 6.71	0.6000	0.6000
T14	6	0.92" DC	0.00 - 6.71	0.6000	0.6000
T14	7	3/8" Fiber	0.00 - 6.71	0.6000	0.6000
T14	8	1/2" Fiber	0.00 - 6.71	0.6000	0.6000
T14	10	3/4" OD	0.00 - 6.71	0.6000	0.6000
T14	11	1" Conduit	0.00 - 6.71	0.6000	0.6000
T14	13	1-5/16" OD	0.00 - 6.71	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
4' x 5/8" Lightning Rod	B	From Leg	0.00	0.0000	80.33	No Ice	0.25	0.25	5.00
			0.00			1/2" Ice	0.66	0.66	7.82
			2.00			1" Ice	0.97	0.97	13.29
***									
***									
Ring Mount	C	None		0.0000	77.00	No Ice	6.87	6.87	850.00
						1/2" Ice	8.25	8.25	1020.00
						1" Ice	9.62	9.62	1190.00
***									
RRUS-32 (Full Frontal Shielding) (AT&T)	A	From Leg	1.50	30.0000	76.70	No Ice	0.00	2.42	77.00
			-2.00			1/2" Ice	0.00	2.64	104.93
			0.50			1" Ice	0.00	2.86	136.47
RRUS-32 (Full Frontal Shielding) (AT&T)	B	From Leg	1.50	60.0000	76.70	No Ice	0.00	2.42	77.00
			-2.00			1/2" Ice	0.00	2.64	104.93
			0.50			1" Ice	0.00	2.86	136.47
RRUS-32 (Full Frontal Shielding) (AT&T)	D	From Leg	1.50	0.0000	76.70	No Ice	0.00	2.42	77.00
			-2.00			1/2" Ice	0.00	2.64	104.93
			0.50			1" Ice	0.00	2.86	136.47
RRUS-32 (AT&T)	A	From Leg	1.50	30.0000	76.70	No Ice	3.31	2.42	77.00
			2.00			1/2" Ice	3.56	2.64	104.93
			2.00			1" Ice	3.81	2.86	136.47
RRUS-32 (AT&T)	B	From Leg	1.50	60.0000	76.70	No Ice	3.31	2.42	77.00
			2.00			1/2" Ice	3.56	2.64	104.93
			2.00			1" Ice	3.81	2.86	136.47
RRUS-32 (AT&T)	D	From Leg	1.50	0.0000	76.70	No Ice	3.31	2.42	77.00
			2.00			1/2" Ice	3.56	2.64	104.93
			2.00			1" Ice	3.81	2.86	136.47
RRUS-32 (Full Frontal Shielding) (AT&T)	A	From Leg	1.50	30.0000	76.70	No Ice	0.00	2.42	77.00
			5.00			1/2" Ice	0.00	2.64	104.93
			0.50			1" Ice	0.00	2.86	136.47
RRUS-32 (Full Frontal Shielding) (AT&T)	B	From Leg	1.50	60.0000	76.70	No Ice	0.00	2.42	77.00
			5.00			1/2" Ice	0.00	2.64	104.93
			0.50			1" Ice	0.00	2.86	136.47
RRUS-32 (Full Frontal Shielding) (AT&T)	D	From Leg	1.50	0.0000	76.70	No Ice	0.00	2.42	77.00
			5.00			1/2" Ice	0.00	2.64	104.93
			0.50			1" Ice	0.00	2.86	136.47
DC6-48-60-18-8F (AT&T)	B	From Leg	2.00	60.0000	76.70	No Ice	2.20	2.20	20.00
			2.00			1/2" Ice	2.40	2.40	42.56
			2.00			1" Ice	2.60	2.60	68.29
DC6-48-60-18-8F (AT&T)	B	From Leg	2.00	60.0000	76.70	No Ice	2.20	2.20	20.00
			2.00			1/2" Ice	2.40	2.40	42.56
			0.50			1" Ice	2.60	2.60	68.29
TPA65R-BU6DA-K (AT&T)	A	From Leg	2.00	30.0000	76.70	No Ice	12.71	5.62	69.00
			-5.00			1/2" Ice	13.21	6.07	142.96
			0.00			1" Ice	13.71	6.53	223.56
TPA65R-BU6DA-K (AT&T)	B	From Leg	2.00	60.0000	76.70	No Ice	12.71	5.62	69.00
			-5.00			1/2" Ice	13.21	6.07	142.96
			0.00			1" Ice	13.71	6.53	223.56
TPA65R-BU6DA-K (AT&T)	D	From Leg	2.00	0.0000	76.70	No Ice	12.71	5.62	69.00
			-5.00			1/2" Ice	13.21	6.07	142.96
			0.00			1" Ice	13.71	6.53	223.56

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
AIR6449 B77D	A	From Leg	2.00		30.0000	76.70	No Ice	4.05	2.74	95.50
(AT&T)			-2.00				1/2" Ice	4.32	2.97	129.12
			0.00				1" Ice	4.59	3.20	166.64
AIR6449 B77D	B	From Leg	2.00		60.0000	76.70	No Ice	4.05	2.74	95.50
(AT&T)			-2.00				1/2" Ice	4.32	2.97	129.12
			0.00				1" Ice	4.59	3.20	166.64
AIR6449 B77D	D	From Leg	2.00		0.0000	76.70	No Ice	4.05	2.74	95.50
(AT&T)			-2.00				1/2" Ice	4.32	2.97	129.12
			0.00				1" Ice	4.59	3.20	166.64
AIR6419 B77G	A	From Leg	2.00		30.0000	76.70	No Ice	4.17	2.02	55.40
(AT&T)			-2.00				1/2" Ice	4.44	2.23	84.59
			0.00				1" Ice	4.71	2.44	117.51
AIR6419 B77G	B	From Leg	2.00		60.0000	76.70	No Ice	4.17	2.02	55.40
(AT&T)			-2.00				1/2" Ice	4.44	2.23	84.59
			0.00				1" Ice	4.71	2.44	117.51
AIR6419 B77G	D	From Leg	2.00		0.0000	76.70	No Ice	4.17	2.02	55.40
(AT&T)			-2.00				1/2" Ice	4.44	2.23	84.59
			0.00				1" Ice	4.71	2.44	117.51
DMP65R-BU6DA	A	From Leg	2.00		30.0000	76.70	No Ice	12.71	5.62	80.00
(AT&T)			5.00				1/2" Ice	13.21	6.07	153.96
			0.00				1" Ice	13.71	6.53	234.56
DMP65R-BU6DA	B	From Leg	2.00		60.0000	76.70	No Ice	12.71	5.62	80.00
(AT&T)			5.00				1/2" Ice	13.21	6.07	153.96
			0.00				1" Ice	13.71	6.53	234.56
DMP65R-BU6DA	C	From Leg	2.00		0.0000	76.70	No Ice	12.71	5.62	80.00
(AT&T)			5.00				1/2" Ice	13.21	6.07	153.96
			0.00				1" Ice	13.71	6.53	234.56
4478 RRU	A	From Leg	1.50		30.0000	76.70	No Ice	1.64	0.91	60.00
(AT&T)			2.00				1/2" Ice	1.80	1.03	74.20
			0.00				1" Ice	1.97	1.17	90.89
4478 RRU	B	From Leg	1.50		60.0000	76.70	No Ice	1.64	0.91	60.00
(AT&T)			2.00				1/2" Ice	1.80	1.03	74.20
			0.00				1" Ice	1.97	1.17	90.89
4478 RRU	D	From Leg	1.50		0.0000	76.70	No Ice	1.64	0.91	60.00
(AT&T)			2.00				1/2" Ice	1.80	1.03	74.20
			0.00				1" Ice	1.97	1.17	90.89
4449 RRU	A	From Leg	1.50		30.0000	76.70	No Ice	1.64	1.02	74.00
(AT&T)			2.00				1/2" Ice	1.80	1.15	90.04
			0.00				1" Ice	1.97	1.28	108.70
4449 RRU	B	From Leg	1.50		60.0000	76.70	No Ice	1.64	1.02	74.00
(AT&T)			2.00				1/2" Ice	1.80	1.15	90.04
			0.00				1" Ice	1.97	1.28	108.70
4449 RRU	D	From Leg	1.50		0.0000	76.70	No Ice	1.64	1.02	74.00
(AT&T)			2.00				1/2" Ice	1.80	1.15	90.04
			0.00				1" Ice	1.97	1.28	108.70
DC9-48-60-24-8C-EV	A	From Leg	2.00		30.0000	76.70	No Ice	2.74	4.78	16.00
(AT&T)			0.00				1/2" Ice	2.96	5.06	53.06
			0.00				1" Ice	3.20	5.35	94.20
(3) 12' Sector Frames	C	None			0.0000	76.70	No Ice	25.00	25.00	800.00
(AT&T)							1/2" Ice	37.00	37.00	1100.00
							1" Ice	47.00	47.00	1500.00
***										
Ring Mount	C	None			0.0000	75.00	No Ice	6.87	6.87	850.00
							1/2" Ice	8.25	8.25	1020.00
							1" Ice	9.62	9.62	1190.00
***										
2-3/8" x 8' Pipe Mount	A	From Leg	0.00		0.0000	73.00	No Ice	1.90	1.90	30.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1/2" Ice	2.73	2.73	44.37
			0.00			1" Ice	3.40	3.40	64.01
***									
Ring Mount	C	None		0.0000	67.70	No Ice	6.87	6.87	850.00
						1/2" Ice	8.25	8.25	1020.00
						1" Ice	9.62	9.62	1190.00

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight	3492.60					
Bracing Weight	4489.54					
Total Member Self-Weight	7982.14			-1999.92	-2828.51	
Gusset Weight	111.27					
Total Weight	14655.39			-1999.92	-2828.51	
Wind 0 deg - No Ice		-182.14	-16067.19	-805835.76	11141.89	1699.54
Wind 45 deg - No Ice		13499.53	-13464.84	-655555.89	-659045.76	5077.90
Wind 90 deg - No Ice		17888.11	182.14	11970.48	-882797.81	-1821.12
Wind 135 deg - No Ice		13757.12	13722.43	671313.18	-678802.90	-7653.36
Wind 180 deg - No Ice		182.14	16067.19	801835.91	-16798.91	-1699.54
Wind 225 deg - No Ice		-13499.53	13464.84	651556.05	653388.75	-5077.90
Wind 270 deg - No Ice		-17888.11	-182.14	-15970.33	877140.79	1821.12
Wind 315 deg - No Ice		-13757.12	-13722.43	-675313.03	673145.88	7653.36
Member Ice	16179.25					
Gusset Ice	182.03					
Total Weight Ice	43046.43			-3673.00	-18746.95	
Wind 0 deg - Ice		-29.58	-3946.43	-201837.21	-16478.16	1901.49
Wind 45 deg - Ice		3314.03	-3308.01	-163563.01	-179099.35	2368.80
Wind 90 deg - Ice		4490.91	29.58	-1404.22	-238256.44	-62.81
Wind 135 deg - Ice		3355.87	3349.84	159425.56	-182307.90	-2435.66
Wind 180 deg - Ice		29.58	3946.43	194491.20	-21015.74	-1901.49
Wind 225 deg - Ice		-3314.03	3308.01	156217.00	141605.44	-2368.80
Wind 270 deg - Ice		-4490.91	-29.58	-5941.79	200762.54	62.81
Wind 315 deg - Ice		-3355.87	-3349.84	-166771.57	144814.00	2435.66
Total Weight	14655.39			-1999.92	-2828.51	
Wind 0 deg - Service		-41.97	-3701.88	-187664.68	4701.31	391.57
Wind 45 deg - Service		3110.29	-3102.30	-153040.20	-149709.93	1169.95
Wind 90 deg - Service		4121.42	41.97	757.88	-201262.40	-419.59
Wind 135 deg - Service		3169.64	3161.65	152670.43	-154261.97	-1763.33
Wind 180 deg - Service		41.97	3701.88	182742.87	-1736.26	-391.57
Wind 225 deg - Service		-3110.29	3102.30	148118.39	152674.98	-1169.95
Wind 270 deg - Service		-4121.42	-41.97	-5679.69	204227.45	419.59
Wind 315 deg - Service		-3169.64	-3161.65	-157592.24	157227.02	1763.33

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 45 deg - No Ice
5	0.9 Dead+1.0 Wind 45 deg - No Ice
6	1.2 Dead+1.0 Wind 90 deg - No Ice
7	0.9 Dead+1.0 Wind 90 deg - No Ice
8	1.2 Dead+1.0 Wind 135 deg - No Ice
9	0.9 Dead+1.0 Wind 135 deg - No Ice
10	1.2 Dead+1.0 Wind 180 deg - No Ice
11	0.9 Dead+1.0 Wind 180 deg - No Ice
12	1.2 Dead+1.0 Wind 225 deg - No Ice
13	0.9 Dead+1.0 Wind 225 deg - No Ice
14	1.2 Dead+1.0 Wind 270 deg - No Ice
15	0.9 Dead+1.0 Wind 270 deg - No Ice
16	1.2 Dead+1.0 Wind 315 deg - No Ice
17	0.9 Dead+1.0 Wind 315 deg - No Ice
18	1.2 Dead+1.0 Ice+1.0 Temp
19	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
20	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
21	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
22	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
23	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
24	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
25	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
26	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 45 deg - Service
29	Dead+Wind 90 deg - Service
30	Dead+Wind 135 deg - Service
31	Dead+Wind 180 deg - Service
32	Dead+Wind 225 deg - Service
33	Dead+Wind 270 deg - Service
34	Dead+Wind 315 deg - Service

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg D	Max. Vert	12	54278.49	7150.77	-6956.69
	Max. H_x	12	54278.49	7150.77	-6956.69
	Max. H_z	5	-46971.93	-6198.02	6011.34
	Min. Vert	5	-46971.93	-6198.02	6011.34
	Min. H_x	5	-46971.93	-6198.02	6011.34
	Min. H_z	12	54278.49	7150.77	-6956.69
Leg C	Max. Vert	8	56048.07	-7067.55	-7392.11
	Max. H_x	17	-48287.49	6114.79	6390.56
	Max. H_z	17	-48287.49	6114.79	6390.56
	Min. Vert	17	-48287.49	6114.79	6390.56
	Min. H_x	8	56048.07	-7067.55	-7392.11
	Min. H_z	8	56048.07	-7067.55	-7392.11
Leg B	Max. Vert	4	54721.37	-6980.36	7182.86
	Max. H_x	13	-46639.77	5986.22	-6181.31
	Max. H_z	4	54721.37	-6980.36	7182.86
	Min. Vert	13	-46639.77	5986.22	-6181.31

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg A	Min. H_x	4	54721.37	-6980.36	7182.86
	Min. H_z	13	-46639.77	5986.22	-6181.31
	Max. Vert	16	55972.07	7383.67	7067.52
	Max. H_x	16	55972.07	7383.67	7067.52
	Max. H_z	16	55972.07	7383.67	7067.52
	Min. Vert	9	-48344.49	-6389.53	-6122.17
	Min. H_x	9	-48344.49	-6389.53	-6122.17
	Min. H_z	9	-48344.49	-6389.53	-6122.17

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	14655.39	0.00	-0.00	-1999.92	-2828.51	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	17586.47	-182.14	-16067.19	-806707.30	10576.20	1699.54
0.9 Dead+1.0 Wind 0 deg - No Ice	13189.85	-182.14	-16067.19	-806107.32	11424.75	1699.54
1.2 Dead+1.0 Wind 45 deg - No Ice	17586.47	13499.54	-13464.84	-656570.91	-660226.50	5077.90
0.9 Dead+1.0 Wind 45 deg - No Ice	13189.85	13499.54	-13464.84	-655970.94	-659377.95	5077.90
1.2 Dead+1.0 Wind 90 deg - No Ice	17586.47	17888.11	182.14	11570.50	-884135.09	-1821.12
0.9 Dead+1.0 Wind 90 deg - No Ice	13189.85	17888.11	182.14	12170.47	-883286.53	-1821.12
1.2 Dead+1.0 Wind 135 deg - No Ice	17586.47	13757.13	13722.43	671528.23	-679983.64	-7653.36
0.9 Dead+1.0 Wind 135 deg - No Ice	13189.85	13757.13	13722.43	672128.21	-679135.08	-7653.36
1.2 Dead+1.0 Wind 180 deg - No Ice	17586.47	182.14	16067.19	801907.48	-17364.62	-1699.54
0.9 Dead+1.0 Wind 180 deg - No Ice	13189.85	182.14	16067.19	802507.46	-16516.06	-1699.54
1.2 Dead+1.0 Wind 225 deg - No Ice	17586.47	-13499.54	13464.84	651771.10	653438.08	-5077.90
0.9 Dead+1.0 Wind 225 deg - No Ice	13189.85	-13499.54	13464.84	652371.07	654286.63	-5077.90
1.2 Dead+1.0 Wind 270 deg - No Ice	17586.47	-17888.11	-182.14	-16370.31	877346.67	1821.12
0.9 Dead+1.0 Wind 270 deg - No Ice	13189.85	-17888.11	-182.14	-15770.34	878195.22	1821.12
1.2 Dead+1.0 Wind 315 deg - No Ice	17586.47	-13757.13	-13722.43	-676328.05	673195.22	7653.36
0.9 Dead+1.0 Wind 315 deg - No Ice	13189.85	-13757.13	-13722.43	-675728.07	674043.77	7653.36
1.2 Dead+1.0 Ice+1.0 Temp	45705.34	0.00	-0.00	-4072.99	-19312.65	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	45705.34	-29.58	-3946.43	-202371.11	-17043.87	1901.49
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	45705.34	3314.03	-3308.01	-164108.90	-179810.95	2368.80
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	45705.34	4490.91	29.58	-1804.20	-239045.76	-62.81
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	45705.34	3355.87	3349.84	159171.47	-183019.50	-2435.66
1.2 Dead+1.0 Wind 180	45705.34	29.58	3946.43	194225.13	-21581.44	-1901.49

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 225	45705.34	-3314.03	3308.01	155962.92	141185.64	-2368.80
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 270	45705.34	-4490.91	-29.58	-6341.78	200420.45	62.81
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 315	45705.34	-3355.87	-3349.84	-167317.45	144394.19	2435.67
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	14655.39	-41.97	-3701.88	-187312.35	390.27	391.57
Dead+Wind 45 deg - Service	14655.39	3110.29	-3102.30	-152720.92	-154162.67	1169.95
Dead+Wind 90 deg - Service	14655.39	4121.42	41.97	1218.86	-205751.21	-419.59
Dead+Wind 135 deg - Service	14655.39	3169.64	3161.65	153273.12	-158714.71	-1763.33
Dead+Wind 180 deg - Service	14655.39	41.97	3701.88	183312.50	-6047.29	-391.57
Dead+Wind 225 deg - Service	14655.39	-3110.29	3102.30	148721.08	148505.65	-1169.95
Dead+Wind 270 deg - Service	14655.39	-4121.42	-41.97	-5218.71	200094.19	419.59
Dead+Wind 315 deg - Service	14655.39	-3169.64	-3161.65	-157272.97	153057.70	1763.33

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-14655.39	0.00	-0.00	14655.39	0.00	0.000%
2	-182.14	-17586.47	-16067.19	182.14	17586.47	16067.19	0.000%
3	-182.14	-13189.85	-16067.19	182.14	13189.85	16067.19	0.000%
4	13499.53	-17586.47	-13464.84	-13499.54	17586.47	13464.84	0.000%
5	13499.53	-13189.85	-13464.84	-13499.54	13189.85	13464.84	0.000%
6	17888.11	-17586.47	182.14	-17888.11	17586.47	-182.14	0.000%
7	17888.11	-13189.85	182.14	-17888.11	13189.85	-182.14	0.000%
8	13757.12	-17586.47	13722.43	-13757.13	17586.47	-13722.43	0.000%
9	13757.12	-13189.85	13722.43	-13757.13	13189.85	-13722.43	0.000%
10	182.14	-17586.47	16067.19	-182.14	17586.47	-16067.19	0.000%
11	182.14	-13189.85	16067.19	-182.14	13189.85	-16067.19	0.000%
12	-13499.53	-17586.47	13464.84	13499.54	17586.47	-13464.84	0.000%
13	-13499.53	-13189.85	13464.84	13499.54	13189.85	-13464.84	0.000%
14	-17888.11	-17586.47	-182.14	17888.11	17586.47	182.14	0.000%
15	-17888.11	-13189.85	-182.14	17888.11	13189.85	182.14	0.000%
16	-13757.12	-17586.47	-13722.43	13757.13	17586.47	13722.43	0.000%
17	-13757.12	-13189.85	-13722.43	13757.13	13189.85	13722.43	0.000%
18	0.00	-45705.34	0.00	-0.00	45705.34	0.00	0.000%
19	-29.58	-45705.34	-3946.43	29.58	45705.34	3946.43	0.000%
20	3314.03	-45705.34	-3308.01	-3314.03	45705.34	3308.01	0.000%
21	4490.91	-45705.34	29.58	-4490.91	45705.34	-29.58	0.000%
22	3355.87	-45705.34	3349.84	-3355.87	45705.34	-3349.84	0.000%
23	29.58	-45705.34	3946.43	-29.58	45705.34	-3946.43	0.000%
24	-3314.03	-45705.34	3308.01	3314.03	45705.34	-3308.01	0.000%
25	-4490.91	-45705.34	-29.58	4490.91	45705.34	29.58	0.000%
26	-3355.87	-45705.34	-3349.84	3355.87	45705.34	3349.84	0.000%
27	-41.97	-14655.39	-3701.88	41.97	14655.39	3701.88	0.000%
28	3110.29	-14655.39	-3102.30	-3110.29	14655.39	3102.30	0.000%
29	4121.42	-14655.39	41.97	-4121.42	14655.39	-41.97	0.000%
30	3169.64	-14655.39	3161.65	-3169.64	14655.39	-3161.65	0.000%
31	41.97	-14655.39	3701.88	-41.97	14655.39	-3701.88	0.000%
32	-3110.29	-14655.39	3102.30	3110.29	14655.39	-3102.30	0.000%
33	-4121.42	-14655.39	-41.97	4121.42	14655.39	41.97	0.000%
34	-3169.64	-14655.39	-3161.65	3169.64	14655.39	3161.65	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	80.333 - 78.063	0.496	34	0.0462	0.0030
T2	78.063 - 74.563	0.476	34	0.0462	0.0035
T3	74.563 - 72.313	0.442	34	0.0458	0.0033
T4	72.313 - 67.563	0.419	34	0.0455	0.0031
T5	67.563 - 65.438	0.369	34	0.0437	0.0027
T6	65.438 - 57.521	0.349	34	0.0429	0.0026
T7	57.521 - 50.271	0.276	34	0.0383	0.0021
T8	50.271 - 41.979	0.218	34	0.0339	0.0017
T9	41.979 - 34.187	0.158	34	0.0290	0.0013
T10	34.187 - 26.895	0.110	34	0.0246	0.0010
T11	26.895 - 20.103	0.071	34	0.0198	0.0007
T12	20.103 - 13.415	0.042	30	0.0157	0.0005
T13	13.415 - 6.7075	0.020	30	0.0097	0.0002
T14	6.7075 - 0	0.003	32	0.0051	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
80.33	4' x 5/8" Lightning Rod	34	0.496	0.0462	0.0030	55388
77.00	Ring Mount	34	0.466	0.0461	0.0035	55388
76.70	RRUS-32 (Full Frontal Shielding)	34	0.463	0.0461	0.0035	55388
75.00	Ring Mount	34	0.446	0.0459	0.0034	62288
73.00	2-3/8" x 8' Pipe Mount	34	0.426	0.0457	0.0032	126217
67.70	Ring Mount	34	0.371	0.0438	0.0027	71061

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	80.333 - 78.063	2.128	16	0.1948	0.0131
T2	78.063 - 74.563	2.047	16	0.1948	0.0151
T3	74.563 - 72.313	1.900	16	0.1936	0.0144
T4	72.313 - 67.563	1.804	16	0.1928	0.0134
T5	67.563 - 65.438	1.594	16	0.1857	0.0117
T6	65.438 - 57.521	1.506	16	0.1825	0.0111
T7	57.521 - 50.271	1.196	16	0.1642	0.0090
T8	50.271 - 41.979	0.942	16	0.1458	0.0074
T9	41.979 - 34.187	0.685	16	0.1253	0.0057
T10	34.187 - 26.895	0.476	16	0.1063	0.0042
T11	26.895 - 20.103	0.310	16	0.0858	0.0030
T12	20.103 - 13.415	0.181	8	0.0683	0.0020
T13	13.415 - 6.7075	0.085	8	0.0420	0.0010
T14	6.7075 - 0	0.012	16	0.0220	0.0006

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
80.33	4' x 5/8" Lightning Rod	16	2.128	0.1948	0.0131	13253
77.00	Ring Mount	16	2.004	0.1945	0.0153	13253
76.70	RRUS-32 (Full Frontal Shielding)	16	1.992	0.1944	0.0153	13253
75.00	Ring Mount	16	1.918	0.1938	0.0146	14972
73.00	2-3/8" x 8' Pipe Mount	16	1.833	0.1932	0.0137	30870
67.70	Ring Mount	16	1.600	0.1860	0.0117	18155

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	80.333	Top Girt	A325N	0.6250	1	65.23	4743.75	0.014 ✔	1	Member Block Shear
T2	78.063	Diagonal	A325N	0.5410	2	644.37	5577.24	0.116 ✔	1	Member Block Shear
		Top Girt	A325N	0.6250	2	126.62	11010.90	0.011 ✔	1	Member Block Shear
T3	74.563	Diagonal	A325N	0.5410	2	1054.06	7208.49	0.146 ✔	1	Member Block Shear
		Horizontal	A325N	0.6250	3	293.14	10059.40	0.029 ✔	1	Member Block Shear
T4	72.313	Diagonal	A325N	0.5410	2	1708.69	7208.49	0.237 ✔	1	Member Block Shear
		Top Girt	A325N	0.6250	3	243.05	15080.00	0.016 ✔	1	Gusset Bearing
T5	67.563	Diagonal	A325N	0.5410	2	1167.22	5577.24	0.209 ✔	1	Member Block Shear
		Horizontal	A325N	0.6250	3	117.26	10059.40	0.012 ✔	1	Member Block Shear
T6	65.438	Diagonal	A325N	0.5410	2	1305.63	6188.96	0.211 ✔	1	Member Block Shear
T7	57.521	Diagonal	A325N	0.5410	2	1222.65	6188.96	0.198 ✔	1	Member Block Shear
T8	50.271	Leg	A307	0.6250	12	4483.39	12425.20	0.361 ✔	1	Bolt DS
		Diagonal	A325N	0.5410	2	1210.11	6188.96	0.196 ✔	1	Member Block Shear
		Top Girt	A325N	0.6250	3	134.75	6728.91	0.020 ✔	1	Member Block Shear
T9	41.979	Diagonal	A325N	0.5410	2	1261.33	6188.96	0.204 ✔	1	Member Block Shear
T10	34.187	Diagonal	A325N	0.5410	2	1176.10	6188.96	0.190 ✔	1	Member Block Shear
T11	26.895	Diagonal	A325N	0.5410	2	1247.88	6188.96	0.202 ✔	1	Member Block Shear
T12	20.103	Leg	A307	0.6250	12	8029.80	12425.20	0.646 ✔	1	Bolt DS
		Diagonal	A325N	0.5410	2	2036.03	7208.49	0.282 ✔	1	Member Block Shear
		Top Girt	A325N	0.6250	1	1487.46	7115.63	0.209 ✔	1	Member Block Shear

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
T13	13.415	Diagonal	A325N	0.5410	2	2815.93	9309.78	0.302 ✔	1	Bolt Shear
T14	6.7075	Diagonal	A325N	0.5410	2	2922.22	9309.78	0.314 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	1	723.47	6096.09	0.119 ✔	1	Member Block 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 $\frac{P_u}{\phi P_n}$
T1	80.333 - 78.063	L4x4x3/8	2.27	2.27	34.6 K=1.00	2.8600	-34.75	87014.20	0.000
T2	78.063 - 74.563	L4x4x3/8	3.50	3.50	53.3 K=1.00	2.8600	-4307.28	79792.20	0.054 [1]
T3	74.563 - 72.313	L4x4x3/8	2.25	2.25	34.3 K=1.00	2.8600	-4440.39	87110.20	0.051 [1]
T4	72.313 - 67.563	L4x4x3/8	4.75	4.75	72.3 K=1.00	2.8600	-9447.62	70353.00	0.134 [1]
T5	67.563 - 65.438	L4x4x3/8	2.13	0.13	1.9 K=1.00	2.8600	-13012.60	92646.30	0.140 [1]
T6	65.438 - 57.521	L4x4x3/8	7.95	7.95	121.0 K=1.00	2.8600	-15841.90	42861.90	0.370 [1]
T7	57.521 - 50.271	L4x4x3/8	7.28	7.28	110.8 K=1.00	2.8600	-22015.90	48541.60	0.454 [1]
T8	50.271 - 41.979	L5x5x3/8	8.32	8.32	100.9 K=1.00	3.6100	-26900.30	68445.00	0.393 [1]
T9	41.979 - 34.187	L5x5x3/8	7.82	7.82	94.8 K=1.00	3.6100	-32790.70	72871.90	0.450 [1]
T10	34.187 - 26.895	L5x5x3/8	7.32	7.32	88.7 K=1.00	3.6100	-37500.80	77283.40	0.485 [1]
T11	26.895 - 20.103	L5x5x3/8	6.82	6.82	82.6 K=1.00	3.6100	-41631.10	81643.20	0.510 [1]
T12	20.103 - 13.415	L5x5x5/16	6.71	6.71	81.0 K=1.00	3.0300	-48178.80	67911.60	0.709 [1]
T13	13.415 - 6.7075	L5x5x5/16	6.73	6.73	81.3 K=1.00	3.0300	-48027.80	67779.70	0.709 [1]
T14	6.7075 - 0	L5x5x5/16	6.73	6.73	81.3 K=1.00	3.0300	-48141.40	67779.70	0.710 [1]

[1] $P_u / \phi P_n$ controls

Leg Bending Design Data (Compression)

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	80.333 - 78.063	L4x4x3/8	6.31	10432.17	0.001	-249.37	5285.74	0.047
T2	78.063 - 74.563	L4x4x3/8	0.00	10432.17	0.000	0.00	5285.74	0.000
T3	74.563 - 72.313	L4x4x3/8	0.00	10432.17	0.000	0.00	5285.74	0.000
T4	72.313 - 67.563	L4x4x3/8	0.00	10432.17	0.000	0.00	5285.74	0.000
T5	67.563 - 65.438	L4x4x3/8	0.00	10432.17	0.000	0.00	5285.74	0.000
T6	65.438 - 57.521	L4x4x3/8	0.00	10432.17	0.000	0.00	5285.74	0.000
T7	57.521 - 50.271	L4x4x3/8	0.00	10432.17	0.000	0.00	5285.74	0.000
T8	50.271 - 41.979	L5x5x3/8	0.00	16592.75	0.000	0.00	8406.50	0.000
T9	41.979 - 34.187	L5x5x3/8	0.00	16592.75	0.000	0.00	8406.50	0.000
T10	34.187 - 26.895	L5x5x3/8	0.00	16592.75	0.000	0.00	8406.50	0.000
T11	26.895 - 20.103	L5x5x3/8	0.00	16592.75	0.000	0.00	8406.50	0.000
T12	20.103 - 13.415	L5x5x5/16	0.00	13533.58	0.000	0.00	6815.35	0.000
T13	13.415 - 6.7075	L5x5x5/16	0.00	13533.58	0.000	0.00	6815.35	0.000
T14	6.7075 - 0	L5x5x5/16	0.00	13533.58	0.000	0.00	6815.35	0.000

Leg Interaction Design Data (Compression)

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	80.333 - 78.063	L4x4x3/8	0.000	0.001	0.047	0.048 ✔	1.000	4.8.1 ✔
T2	78.063 - 74.563	L4x4x3/8	0.054	0.000	0.000	0.054 [1] ✔	1.000	4.8.1 ✔
T3	74.563 - 72.313	L4x4x3/8	0.051	0.000	0.000	0.051 [1] ✔	1.000	4.8.1 ✔
T4	72.313 - 67.563	L4x4x3/8	0.134	0.000	0.000	0.134 [1] ✔	1.000	4.8.1 ✔
T5	67.563 - 65.438	L4x4x3/8	0.140	0.000	0.000	0.140 [1] ✔	1.000	4.8.1 ✔
T6	65.438 - 57.521	L4x4x3/8	0.370	0.000	0.000	0.370 [1] ✔	1.000	4.8.1 ✔
T7	57.521 - 50.271	L4x4x3/8	0.454	0.000	0.000	0.454 [1] ✔	1.000	4.8.1 ✔
T8	50.271 - 41.979	L5x5x3/8	0.393	0.000	0.000	0.393 [1] ✔	1.000	4.8.1 ✔
T9	41.979 - 34.187	L5x5x3/8	0.450	0.000	0.000	0.450 [1] ✔	1.000	4.8.1 ✔
T10	34.187 - 26.895	L5x5x3/8	0.485	0.000	0.000	0.485 [1] ✔	1.000	4.8.1 ✔

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T11	26.895 - 20.103	L5x5x3/8	0.510	0.000	0.000	0.510 [1] ✔	1.000	4.8.1 ✔
T12	20.103 - 13.415	L5x5x5/16	0.709	0.000	0.000	0.709 [1] ✔	1.000	4.8.1 ✔
T13	13.415 - 6.7075	L5x5x5/16	0.709	0.000	0.000	0.709 [1] ✔	1.000	4.8.1 ✔
T14	6.7075 - 0	L5x5x5/16	0.710	0.000	0.000	0.710 [1] ✔	1.000	4.8.1 ✔

[1] $P_u / \phi P_n$ 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 $\frac{P_u}{\phi P_n}$
T2	78.063 - 74.563	L2x2 1/2x3/16	4.31	4.03	113.2 K=1.00	0.8090	-1530.79	13350.80	0.115 [1] ✔
T3	74.563 - 72.313	L2 1/2x2 1/2x3/16	3.38	3.16	76.5 K=1.00	0.9020	-2486.36	21476.40	0.116 [1] ✔
T4	72.313 - 67.563	L2 1/2x2 1/2x3/16	5.38	5.02	121.7 K=1.00	0.9020	-3800.49	13393.30	0.284 [1] ✔
T5	67.563 - 65.438	L2x2x3/16	3.22	3.01	91.5 K=1.00	0.7150	-2954.12	14904.90	0.198 [1] ✔
T6	65.438 - 57.521	L2x2 1/2x3/16	9.67	4.97	139.7 K=1.00	0.8090	-2783.35	9371.28	0.297 [1] ✔
T7	57.521 - 50.271	L2x2 1/2x3/16	9.72	4.95	139.0 K=1.00	0.8090	-2371.07	9461.43	0.251 [1] ✔
T8	50.271 - 41.979	L2x2 1/2x3/16	11.14	5.64	158.5 K=1.00	0.8090	-2542.51	7278.76	0.349 [1] ✔
T9	41.979 - 34.187	L2x2 1/2x3/16	11.47	5.78	162.4 K=1.00	0.8090	-2479.30	6931.00	0.358 [1] ✔
T10	34.187 - 26.895	L2x2 1/2x3/16	11.85	5.95	167.1 K=1.00	0.8090	-2407.69	6545.86	0.368 [1] ✔
T11	26.895 - 20.103	L2x2 1/2x3/16	12.26	6.13	172.3 K=1.00	0.8090	-2525.20	6158.09	0.410 [1] ✔
T12	20.103 - 13.415	L2 1/2x2 1/2x3/16	12.90	6.45	156.3 K=1.00	0.9020	-3572.48	8340.24	0.428 [1] ✔
T13	13.415 - 6.7075	L3x3x5/16	8.82	8.50	173.2 K=1.00	1.7800	-5631.86	13399.30	0.420 [1] ✔
T14	6.7075 - 0	L3x3x5/16	9.38	9.08	185.0 K=1.00	1.7800	-5844.43	11750.10	0.497 [1] ✔

[1] $P_u / \phi P_n$ controls

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 $\frac{P_u}{\phi P_n}$
T3	74.563 - 72.313	L4x3 1/2x1/4	5.04	3.53	39.4 K=1.00	1.8100	-881.88	52350.20	0.017 [1] ✔
T5	67.563 - 65.438	L4x3 1/2x1/4	5.04	3.53	39.4 K=1.00	1.8100	-346.51	52350.20	0.007 [1] ✔
T14	6.7075 - 0	L1 3/4x1 3/4x3/16	12.26	5.92	206.9 K=1.00	0.6211	-723.47	3277.90	0.221 [1] ✔
		KL/R > 200 (C) - 189							

[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	80.333 - 78.063	L2x2x1/8	5.04	4.71	142.1 K=1.00	0.4844	-10.69	5417.56	0.002
T2	78.063 - 74.563	L4x3 1/2x1/4	5.04	3.53	57.7 K=1.00	1.8100	-160.19	47824.20	0.003 [1]
T4	72.313 - 67.563	2L4x4x3/8	5.04	4.71	45.9 K=1.00	5.7200	-302.72	165844.00	0.002 [1]
T8	50.271 - 41.979	L2 1/2x2 1/2x3/16	6.91	6.49	157.3 K=1.00	0.9020	-404.26	8233.94	0.049 [1]
T12	20.103 - 13.415	L2x2 1/2x3/16	10.61	10.20	286.6 K=1.00	0.8090	-1745.57	2225.31	0.784 [1]
		KL/R > 200 (C) - 174							

[1] P_u / ϕP_n controls

Top Girt Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	80.333 - 78.063	L2x2x1/8	17.67	866.44	0.020	17.73	436.82	0.041
T2	78.063 - 74.563	L4x3 1/2x1/4	0.00	5775.02	0.000	0.00	2676.33	0.000
T4	72.313 - 67.563	2L4x4x3/8	0.00	12352.50	0.000	0.00	16327.42	0.000
T8	50.271 - 41.979	L2 1/2x2 1/2x3/16	0.00	2077.96	0.000	0.00	1051.11	0.000
T12	20.103 - 13.415	L2x2 1/2x3/16	0.00	1559.86	0.000	0.00	664.81	0.000

Top Girt Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	80.333 - 78.063	L2x2x1/8	0.002	0.020	0.041	0.062 ✔	1.000	4.8.1 ✔
T2	78.063 - 74.563	L4x3 1/2x1/4	0.003	0.000	0.000	0.003 [1] ✔	1.000	4.8.1 ✔
T4	72.313 - 67.563	2L4x4x3/8	0.002	0.000	0.000	0.002 [1] ✔	1.000	4.8.1 ✔
T8	50.271 - 41.979	L2 1/2x2 1/2x3/16	0.049	0.000	0.000	0.049 [1] ✔	1.000	4.8.1 ✔
T12	20.103 - 13.415	L2x2 1/2x3/16	0.784	0.000	0.000	0.784 [1] ✔	1.000	4.8.1 ✔

[1] $P_u / \phi P_n$ controls

Bottom 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 $\frac{P_u}{\phi P_n}$
T5	67.563 - 65.438	L3x3x3/16	5.04	3.53	71.1 K=1.00	1.0900	-357.48	26385.00	0.014 [1] ✔

[1] $P_u / \phi P_n$ 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 $\frac{P_u}{\phi P_n}$
T2	78.063 - 74.563	L2 1/2x2x3/16	3.56	3.23	90.8 K=1.00	0.8090	-6.07	16979.30	0.000 [1] ✔
T5	67.563 - 65.438	L2 1/2x2x3/16	3.56	3.23	90.8 K=1.00	0.8090	-2.60	16979.30	0.000 [1] ✔
T12	20.103 - 13.415	L2x2x3/16	15.01	14.59	444.5 K=1.00	0.7150	-129.63	817.57	0.159 [1] ✔
		KL/R > 250 (C) - 171							

[1] $P_u / \phi P_n$ 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 $\frac{P_u}{\phi P_n}$
T2	78.063 - 74.563	L4x4x3/8	3.50	3.50	34.1	2.8600	1502.56	92664.00	0.016 [1]
T3	74.563 - 72.313	L4x4x3/8	2.25	2.25	22.0	2.8600	794.84	92664.00	0.009 [1]
T4	72.313 - 67.563	L4x4x3/8	4.75	4.75	46.3	2.8600	6444.09	92664.00	0.070 [1]
T5	67.563 - 65.438	L4x4x3/8	2.13	0.13	1.2	2.8600	8893.54	92664.00	0.096 [1]
T6	65.438 - 57.521	L4x4x3/8	7.95	7.95	77.5	2.8600	11812.40	92664.00	0.127 [1]
T7	57.521 - 50.271	L4x4x3/8	7.28	7.28	71.0	2.8600	17333.40	92664.00	0.187 [1]
T8	50.271 - 41.979	L5x5x3/8	8.32	8.32	64.0	3.6100	22055.20	116964.00	0.189 [1]
T9	41.979 - 34.187	L5x5x3/8	7.82	7.82	60.2	3.6100	27347.30	116964.00	0.234 [1]
T10	34.187 - 26.895	L5x5x3/8	7.32	7.32	56.3	3.6100	31777.90	116964.00	0.272 [1]
T11	26.895 - 20.103	L5x5x3/8	6.82	6.82	52.4	3.6100	35503.60	116964.00	0.304 [1]
T12	20.103 - 13.415	L5x5x5/16	6.71	6.71	51.3	3.0300	41082.80	98172.00	0.418 [1]
T13	13.415 - 6.7075	L5x5x5/16	6.73	6.73	51.5	3.0300	41857.80	98172.00	0.426 [1]
T14	6.7075 - 0	L5x5x5/16	6.73	6.73	51.5	3.0300	41763.40	98172.00	0.425 [1]

[1] $P_u / \phi P_n$ controls

Leg Bending Design Data (Tension)

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T2	78.063 - 74.563	L4x4x3/8	0.00	10432.17	0.000	0.00	5285.74	0.000
T3	74.563 - 72.313	L4x4x3/8	0.00	10432.17	0.000	0.00	5285.74	0.000
T4	72.313 - 67.563	L4x4x3/8	0.00	10432.17	0.000	0.00	5285.74	0.000
T5	67.563 - 65.438	L4x4x3/8	0.00	10432.17	0.000	0.00	5285.74	0.000
T6	65.438 - 57.521	L4x4x3/8	0.00	10432.17	0.000	0.00	5285.74	0.000
T7	57.521 - 50.271	L4x4x3/8	0.00	10432.17	0.000	0.00	5285.74	0.000
T8	50.271 - 41.979	L5x5x3/8	0.00	16592.75	0.000	0.00	8406.50	0.000
T9	41.979 - 34.187	L5x5x3/8	0.00	16592.75	0.000	0.00	8406.50	0.000
T10	34.187 - 26.895	L5x5x3/8	0.00	16592.75	0.000	0.00	8406.50	0.000
T11	26.895 - 20.103	L5x5x3/8	0.00	16592.75	0.000	0.00	8406.50	0.000
T12	20.103 - 13.415	L5x5x5/16	0.00	13533.58	0.000	0.00	6815.35	0.000

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T13	13.415 - 6.7075	L5x5x5/16	0.00	13533.58	0.000	0.00	6815.35	0.000
T14	6.7075 - 0	L5x5x5/16	0.00	13533.58	0.000	0.00	6815.35	0.000

Leg Interaction Design Data (Tension)

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	78.063 - 74.563	L4x4x3/8	0.016	0.000	0.000	0.016 [1] ✔	1.000	4.8.1 ✔
T3	74.563 - 72.313	L4x4x3/8	0.009	0.000	0.000	0.009 [1] ✔	1.000	4.8.1 ✔
T4	72.313 - 67.563	L4x4x3/8	0.070	0.000	0.000	0.070 [1] ✔	1.000	4.8.1 ✔
T5	67.563 - 65.438	L4x4x3/8	0.096	0.000	0.000	0.096 [1] ✔	1.000	4.8.1 ✔
T6	65.438 - 57.521	L4x4x3/8	0.127	0.000	0.000	0.127 [1] ✔	1.000	4.8.1 ✔
T7	57.521 - 50.271	L4x4x3/8	0.187	0.000	0.000	0.187 [1] ✔	1.000	4.8.1 ✔
T8	50.271 - 41.979	L5x5x3/8	0.189	0.000	0.000	0.189 [1] ✔	1.000	4.8.1 ✔
T9	41.979 - 34.187	L5x5x3/8	0.234	0.000	0.000	0.234 [1] ✔	1.000	4.8.1 ✔
T10	34.187 - 26.895	L5x5x3/8	0.272	0.000	0.000	0.272 [1] ✔	1.000	4.8.1 ✔
T11	26.895 - 20.103	L5x5x3/8	0.304	0.000	0.000	0.304 [1] ✔	1.000	4.8.1 ✔
T12	20.103 - 13.415	L5x5x5/16	0.418	0.000	0.000	0.418 [1] ✔	1.000	4.8.1 ✔
T13	13.415 - 6.7075	L5x5x5/16	0.426	0.000	0.000	0.426 [1] ✔	1.000	4.8.1 ✔
T14	6.7075 - 0	L5x5x5/16	0.425	0.000	0.000	0.425 [1] ✔	1.000	4.8.1 ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	78.063 - 74.563	L2x2 1/2x3/16	4.31	4.03	80.6	0.5131	1288.74	22319.60	0.058 [1] ✔
T3	74.563 - 72.313	L2 1/2x2 1/2x3/16	3.38	3.16	48.7	0.5828	2108.12	25353.70	0.083 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T4	72.313 - 67.563	L2 1/2x2 1/2x3/16	5.38	5.02	77.5	0.5828	3417.37	25353.70	0.135 [1] ✔
T5	67.563 - 65.438	L2x2x3/16	3.22	3.01	58.4	0.4426	2334.44	19252.80	0.121 [1] ✔
T6	65.438 - 57.521	L2x2 1/2x3/16	9.67	4.97	99.4	0.5131	2611.27	22319.60	0.117 [1] ✔
T7	57.521 - 50.271	L2x2 1/2x3/16	9.72	4.95	99.0	0.5131	2445.29	22319.60	0.110 [1] ✔
T8	50.271 - 41.979	L2x2 1/2x3/16	11.14	5.64	112.8	0.5131	2420.23	22319.60	0.108 [1] ✔
T9	41.979 - 34.187	L2x2 1/2x3/16	11.47	5.78	115.6	0.5131	2522.65	22319.60	0.113 [1] ✔
T10	34.187 - 26.895	L2x2 1/2x3/16	11.85	5.95	119.0	0.5131	2352.20	22319.60	0.105 [1] ✔
T11	26.895 - 20.103	L2x2 1/2x3/16	12.26	6.13	122.7	0.5131	2495.75	22319.60	0.112 [1] ✔
T12	20.103 - 13.415	L2 1/2x2 1/2x3/16	12.90	6.45	99.5	0.5828	4072.05	25353.70	0.161 [1] ✔
T13	13.415 - 6.7075	L3x3x5/16	8.82	8.50	110.7	1.1789	5012.89	51282.40	0.098 [1] ✔
T14	6.7075 - 0	L3x3x5/16	9.38	9.08	118.2	1.1789	5004.48	51282.40	0.098 [1] ✔

[1] $P_u / \phi P_n$ 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 $\frac{P_u}{\phi P_n}$
T3	74.563 - 72.313	L4x3 1/2x1/4	5.04	3.53	39.4	1.2169	879.43	52934.10	0.017 [1] ✔
T5	67.563 - 65.438	L4x3 1/2x1/4	5.04	3.53	39.4	1.2169	351.79	52934.10	0.007 [1] ✔
T14	6.7075 - 0	L1 3/4x1 3/4x3/16	12.26	5.92	198.5	0.3604	723.47	15675.30	0.046 [1] ✔

[1] $P_u / \phi P_n$ 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	80.333 - 78.063	L2x2x1/8	5.04	4.71	90.2	0.2930	3.73	12744.10	0.000
T2	78.063 -	L4x3 1/2x1/4	5.04	3.53	44.6	1.2169	253.24	52934.10	0.005 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T4	74.563 72.313 - 67.563	2L4x4x3/8	5.04	4.71	45.9	3.8681	729.16	168263.00	0.004 [1]
T8	50.271 - 41.979	L2 1/2x2 1/2x3/16	6.91	6.49	100.1	0.5710	404.26	24839.90	0.016 [1]
T12	20.103 - 13.415	L2x2 1/2x3/16	10.61	10.20	204.0	0.5013	1487.46	21805.70	0.068 [1]

[1] P_u / ϕP_n controls

Top Girt Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	80.333 - 78.063	L2x2x1/8	15.95	866.44	0.018	16.05	436.82	0.037
T2	78.063 - 74.563	L4x3 1/2x1/4	0.00	5775.02	0.000	0.00	2676.33	0.000
T4	72.313 - 67.563	2L4x4x3/8	0.00	12352.50	0.000	0.00	16327.42	0.000
T8	50.271 - 41.979	L2 1/2x2 1/2x3/16	0.00	2077.96	0.000	0.00	1051.11	0.000
T12	20.103 - 13.415	L2x2 1/2x3/16	0.00	1559.86	0.000	0.00	664.81	0.000

Top Girt Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	80.333 - 78.063	L2x2x1/8	0.000	0.018	0.037	0.055 ✔	1.000	4.8.1 ✔
T2	78.063 - 74.563	L4x3 1/2x1/4	0.005	0.000	0.000	0.005 [1] ✔	1.000	4.8.1 ✔
T4	72.313 - 67.563	2L4x4x3/8	0.004	0.000	0.000	0.004 [1] ✔	1.000	4.8.1 ✔
T8	50.271 - 41.979	L2 1/2x2 1/2x3/16	0.016	0.000	0.000	0.016 [1] ✔	1.000	4.8.1 ✔
T12	20.103 - 13.415	L2x2 1/2x3/16	0.068	0.000	0.000	0.068 [1] ✔	1.000	4.8.1 ✔

[1] P_u / ϕP_n controls

Bottom 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 $\frac{P_u}{\phi P_n}$
T5	67.563 - 65.438	L3x3x3/16	5.04	3.53	60.2	1.0900	523.18	35316.00	0.015 [1] ✔

[1] $P_u / \phi P_n$ controls

Inner Bracing 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 $\frac{P_u}{\phi P_n}$
T2	78.063 - 74.563	L2 1/2x2x3/16	7.13	6.80	136.0	0.8090	52.05	26211.60	0.002*[1] ✔
T5	67.563 - 65.438	L2 1/2x2x3/16	7.13	6.80	136.0	0.8090	163.47	26211.60	0.006 [1] ✔
T8	50.271 - 41.979	L2 1/2x2x3/16	9.77	9.35	187.1	0.8090	29.52	26211.60	0.001 [1] ✔
T12	20.103 - 13.415	L2x2x3/16	15.01	14.59	283.8	0.7150	204.60	23166.00	0.009*[1] ✔

* DL controls
[1] $P_u / \phi P_n$ controls

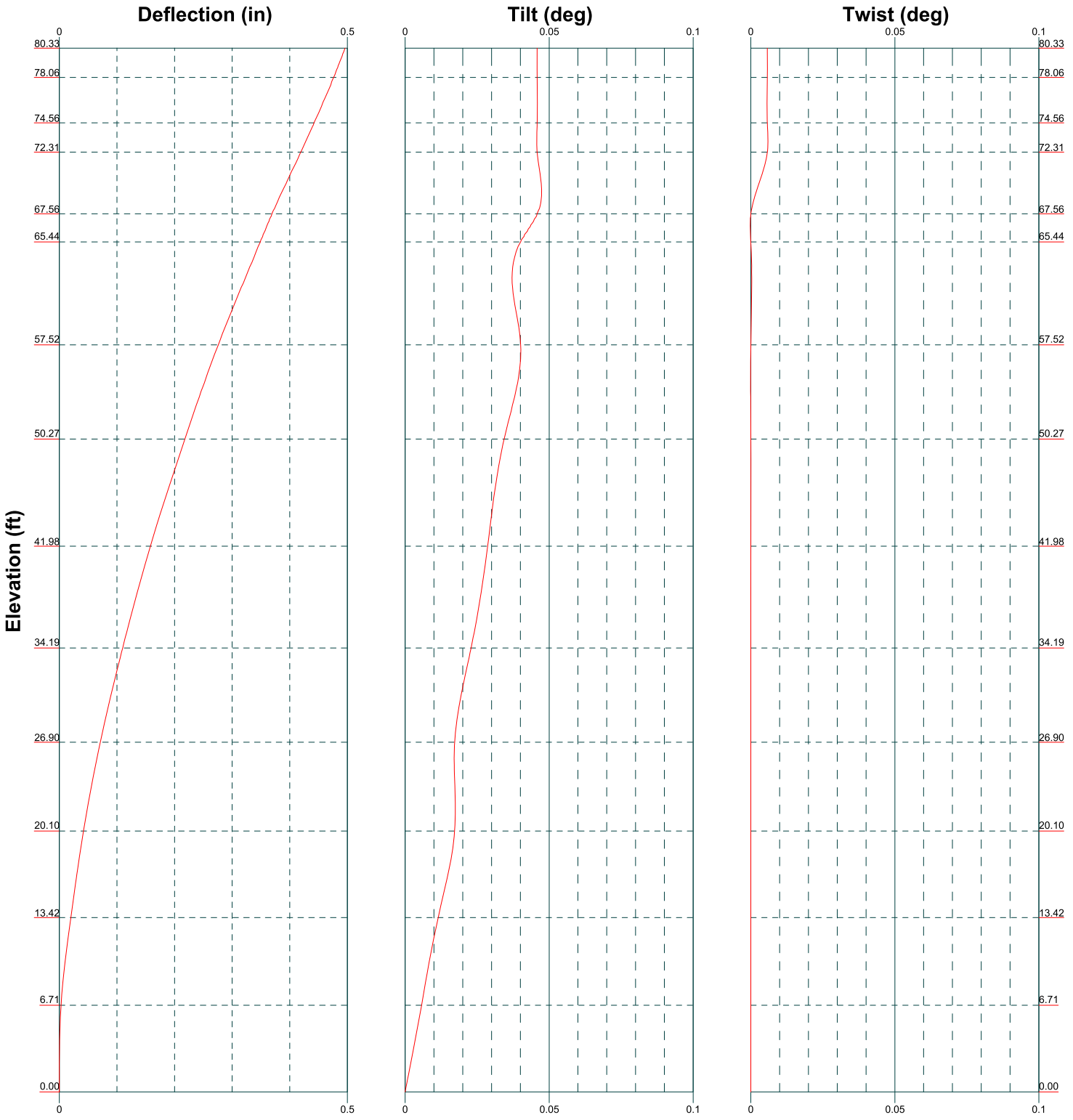
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	80.333 - 78.063	Leg	L4x4x3/8	2	-34.75	87014.20	4.8	Pass
T2	78.063 - 74.563	Leg	L4x4x3/8	12	-4307.28	79792.20	5.4	Pass
T3	74.563 - 72.313	Leg	L4x4x3/8	38	-4440.39	87110.20	5.1	Pass
T4	72.313 - 67.563	Leg	L4x4x3/8	50	-9447.62	70353.00	13.4	Pass
T5	67.563 - 65.438	Leg	L4x4x3/8	70	-13012.60	92646.30	14.0	Pass
T6	65.438 - 57.521	Leg	L4x4x3/8	92	-15841.90	42861.90	37.0	Pass
T7	57.521 - 50.271	Leg	L4x4x3/8	104	-22015.90	48541.60	45.4	Pass
T8	50.271 - 41.979	Leg	L5x5x3/8	116	-26900.30	68445.00	39.3	Pass
T9	41.979 - 34.187	Leg	L5x5x3/8	134	-32790.70	72871.90	45.0	Pass
T10	34.187 - 26.895	Leg	L5x5x3/8	146	-37500.80	77283.40	48.5	Pass
T11	26.895 - 20.103	Leg	L5x5x3/8	158	-41631.10	81643.20	51.0	Pass
T12	20.103 - 13.415	Leg	L5x5x5/16	170	-48178.80	67911.60	70.9	Pass
T13	13.415 - 6.7075	Leg	L5x5x5/16	186	-48027.80	67779.70	70.9	Pass
T14	6.7075 - 0	Leg	L5x5x5/16	202	-48141.40	67779.70	71.0	Pass
T2	78.063 - 74.563	Diagonal	L2x2 1/2x3/16	26	-1530.79	13350.80	11.5	Pass
T3	74.563 - 72.313	Diagonal	L2 1/2x2 1/2x3/16	44	-2486.36	21476.40	11.6	Pass
T4	72.313 - 67.563	Diagonal	L2 1/2x2 1/2x3/16	62	-3800.49	13393.30	28.4	Pass
T5	67.563 - 65.438	Diagonal	L2x2x3/16	82	-2954.12	14904.90	19.8	Pass
T6	65.438 - 57.521	Diagonal	L2x2 1/2x3/16	97	-2783.35	9371.28	29.7	Pass
T7	57.521 - 50.271	Diagonal	L2x2 1/2x3/16	109	-2371.07	9461.43	25.1	Pass
T8	50.271 - 41.979	Diagonal	L2x2 1/2x3/16	128	-2542.51	7278.76	34.9	Pass
T9	41.979 - 34.187	Diagonal	L2x2 1/2x3/16	139	-2479.30	6931.00	35.8	Pass
T10	34.187 - 26.895	Diagonal	L2x2 1/2x3/16	152	-2407.69	6545.86	36.8	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T11	26.895 - 20.103	Diagonal	L2x2 1/2x3/16	164	-2525.20	6158.09	41.0	Pass
T12	20.103 - 13.415	Diagonal	L2 1/2x2 1/2x3/16	180	-3572.48	8340.24	42.8	Pass
T13	13.415 - 6.7075	Diagonal	L3x3x5/16	194	-5631.86	13399.30	42.0	Pass
T14	6.7075 - 0	Diagonal	L3x3x5/16	207	-5844.43	11750.10	49.7	Pass
T3	74.563 - 72.313	Horizontal	L4x3 1/2x1/4	25	-881.88	52350.20	1.7	Pass
T5	67.563 - 65.438	Horizontal	L4x3 1/2x1/4	61	351.79	52934.10	0.7	Pass
T14	6.7075 - 0	Horizontal	L1 3/4x1 3/4x3/16	189	-723.47	3277.90	22.1	Pass
T1	80.333 - 78.063	Top Girt	L2x2x1/8	8	-10.69	5417.56	6.2	Pass
T2	78.063 - 74.563	Top Girt	L4x3 1/2x1/4	17	253.24	52934.10	0.5	Pass
T4	72.313 - 67.563	Top Girt	2L4x4x3/8	53	729.16	168263.00	0.4	Pass
T8	50.271 - 41.979	Top Girt	L2 1/2x2 1/2x3/16	121	-404.26	8233.94	4.9	Pass
T12	20.103 - 13.415	Top Girt	L2x2 1/2x3/16	174	-1745.57	2225.31	78.4	Pass
T5	67.563 - 65.438	Bottom Girt	L3x3x3/16	76	523.18	35316.00	1.5	Pass
T2	78.063 - 74.563	Inner Bracing	L2 1/2x2x3/16	32	-5.59	16979.30	0.3	Pass
T5	67.563 - 65.438	Inner Bracing	L2 1/2x2x3/16	72	163.47	26211.60	0.6	Pass
T8	50.271 - 41.979	Inner Bracing	L2 1/2x2x3/16	117	29.52	26211.60	0.7	Pass
T12	20.103 - 13.415	Inner Bracing	L2x2x3/16	172	-129.63	817.57	15.9	Pass
							Summary	
						Leg (T14)	71.0	Pass
						Diagonal (T14)	49.7	Pass
						Horizontal (T14)	22.1	Pass
						Top Girt (T12)	78.4	Pass
						Bottom Girt (T5)	1.5	Pass
						Inner Bracing (T12)	15.9	Pass
						Bolt Checks	64.6	Pass
						RATING =	**78.4**	**Pass**

TIA-222-G - Service - 60 mph

Maximum Values

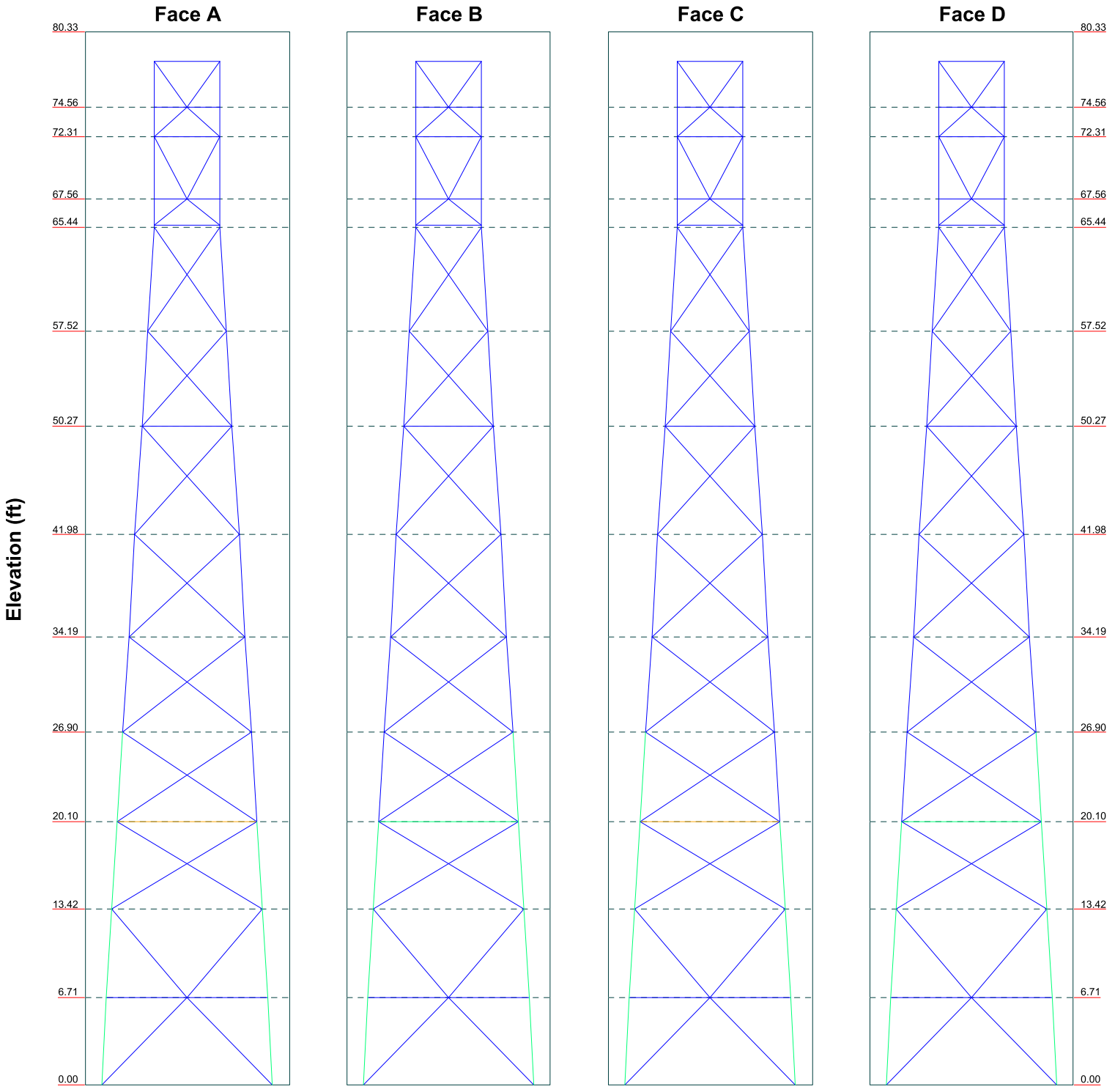


Structural Components, LLC
1870 West 64th Lane, Unit A
Denver, CO 80221
Phone: (866) 386-7622
FAX:

Job: ***220737***			
Project: ***Portland (CT-1680)***			
Client: BST Management, LLC	Drawn by: treed	App'd:	
Code: TIA-222-G	Date: 10/31/22	Scale: NTS	
Path:		Dwg No. E-5	

Stress Distribution Chart
0' - 80'3-31/32"

> 100% | 90%-100% | 75%-90% | 50%-75% | < 50% Overstress



Structural Components, LLC
1870 West 64th Lane, Unit A
Denver, CO 80221
Phone: (866) 386-7622
FAX:

Job: ***220737***			
Project: ***Portland (CT-1680)***			
Client: BST Management, LLC	Drawn by: treed	App'd:	
Code: TIA-222-G	Date: 10/31/22	Scale: NTS	
Path:		Dwg No. E-8	

PIER/PAD & MAT FOUNDATION

Template = "SquareCombPierPadMat.xmcd"
Version = 4.02

Structural Components
Bringing It All Together.

1870 West 64th Lane, UnitA
Denver, CO 80221
866-386-7622

PROJECT DATA

Job = 220737
Client = "BST Management, LLC"
Site = "Portland (CT-1680)"
Model = "80ft SST"

DESIGN CODES AND STANDARDS

Code = ("TIA-222-G, "Structural Standard for Antenna Supporting Structures and Antennas" 2005."
"ACI 318-08, "Building Code Requirements for Structural Concrete and Commentary," 2008.")

FACTORED FOUNDATION DESIGN LOADS

Overdesign Factor: $\alpha = 1.00$
Percentage for Passing: $PP = 100 \cdot \%$
Calculation Mode: calc = "Analysis (no seismic provision check)" reinf' = "Reinforcing Details Available"

	Load Comb. #1	Load Comb. #2	Load Comb. #3
Load Combination:	$Comb_1$ = "1.2D + 1.0W"	$Comb'_2$ = "0.9D + 1.6W"	$Comb_3$ = "1.2D + 1.0Di + 1.0W"
Overall Moment:	$M_{u_1} = 955.7 \cdot kip \cdot ft$	$M_{u_2} = 955.6 \cdot kip \cdot ft$	$M_{u_3} = 243.5 \cdot kip \cdot ft$
Overall Shear:	$V_{u_1} = 19.5 \cdot kip$	$V_{u_2} = 19.5 \cdot kip$	$V_{u_3} = 4.8 \cdot kip$
Overall Axial:	$P_{u_1} = 17.6 \cdot kip$	$P_{u_2} = 13.6 \cdot kip$	$P_{u_3} = 45.8 \cdot kip$
Leg Moment:	$LM_{u_1} = 0.0 \cdot kip \cdot ft$	$LM_{u_2} = 0.0 \cdot kip \cdot ft$	$LM_{u_3} = 0.0 \cdot kip \cdot ft$
Leg Shear:	$S_{u_1} = 10.3 \cdot kip$	$S_{u_2} = 10.3 \cdot kip$	$S_{u_3} = 8.9 \cdot kip$
Leg Axial:	$Pmax_{u_1} = 56.4 \cdot kip$	$Pmax_{u_2} = 55.3 \cdot kip$	$Pmax_{u_3} = 38.9 \cdot kip$
	$Pmin_{u_1} = -48.4 \cdot kip$	$Pmin_{u_2} = -47.6 \cdot kip$	$Pmin_{u_3} = -30.1 \cdot kip$

DIMENSIONS

Depth:	$D = 6.5 \cdot ft$	(from grade to bottom of pad)
Pad Width:	$W = 18.0 \cdot ft$	(each way)
Pad Thickness:	$T = 2.0 \cdot ft$	
Pier Separation:	$Wt = 13.0 \cdot ft$	
Pier (or mat) Extension:	$E = 0.5 \cdot ft$	(above-grade portion)
Pier: Pier = "Square"	$D_p = 2.0 \cdot ft$	
Base Plate Geometry:	BPG = "None"	$BP = 0.0 \cdot in$
Tower Offset:	$ecc1 = 0.0 \cdot ft$	(center of tower to center of pad)
Tower Leg Offset:	$ecc2 = 0.0 \cdot ft$	(center of tower leg to center of pier)
Concrete Volume:	$V_{pad} = 24.0 \cdot yd^3$	
	$V_{pier} = 0.7 \cdot yd^3$	
	$V_{conc} = 27.0 \cdot yd^3$	

SITE & GEOTECHNICAL DATA

Soil Parameters: Geo = "GDP, 03/06/2017, Job # 2017702.58"

Soil Unit Weight: $\gamma_{soil} = 136.5385 \cdot pcf$

Soil Cone Override: soilcone = "N" $\phi_{cone} = 0.0 \cdot deg$

Constant Lateral Pressure: costpres = "N" $CP_p = 0 \cdot psf$ (for pier) $CP_P = 0 \cdot psf$ (for pad)

Equivalent Fluid Pressure: EFpres = "N" $EFP = 0.0 \cdot pcf$

Angle of Internal Friction: $\phi_1 = 15.0 \cdot deg$ (above water table)

$\phi_2 = "N/A" \cdot deg$ (below water table)

Ultimate Bearing Pressure: $B'_c = 30.0 \cdot ksf$ Bearing = "Capacity at Depth"

Cohesion: $c = 10000 \cdot psf$

Adhesion: $c_A = 0 \cdot psf$

Passive Pressure Coefficient (Rankine): $K_{p1} = 1.70$ (above water table) $K_{p2} = "N/A"$ (below water table)

Active Pressure Coefficient: $K_{a1} = 0.59$ (above water table) $K_{a2} = "N/A"$ (below water table)

Ultimate Friction Coefficient: $\mu = 0.60$ (base) $\mu_s = 0.60$ (sides)

Ultimate Sliding Friction: $f_s = 0 \cdot psf$ (base) $f_{s.s} = 0.0000 \cdot psf$ (sides)

Depth Neglected: $D_n = 2.5\,ft$

Depth of Water Table: $D_w = "Below\ Footing"$

Seismic Design Category: SDCT = "Seismic Design Category B" $Note_{SDC} = "N/A"$

MATERIAL SPECIFICATIONS

Concrete:	Compressive Strength:	$f'_c = 3000 \cdot psi$
	Clear Cover:	$cc = 3.0 \cdot in$
	Lightweight Aggregate Factor:	$\lambda = 1.00$
	Unit Weight:	$\gamma_{conc} = 150 \cdot pcf$
Rebar:	Yield Strength:	$F_y = 60 \cdot ksi$

LATERAL CAPACITY

Design Resist.	Lat. Load	Check	Ratio
$\min(\phi V_n) = 1111 \cdot kip$	$\max(V_u) = 20 \cdot kip$	$Check'_{lateral} = "OK"$	$Ratio'_{lateral} = 0.02$

OVERTURNING

Design Resist.	O.T. Moment	Check	Ratio
$\min(MR1, MR2) = 6743\,ft \cdot kip$	$\max(M_{u.ot}) = 1092 \cdot ft \cdot kip$	$Check'_{over} = "OK"$	$Ratio'_{over} = 0.16$

SOIL BEARING

Design Bearing Capacity	Max. Bearing	Check	Ratio
$\phi B_c = 22500 \cdot psf$	$P_{pos} = 2283 \cdot psf$	$Check'_{comp} = "OK"$	$Ratio'_{comp} = 0.10$

PAD REINFORCEMENT/STRENGTH

*Pad reinforcement is assumed

Number of Reinforcing Layers:	$Mats = "Top \& Bottom Mats"$
Pad has Hoops or Ties?	$Tie_P = "No"$
Bar Quantity:	$n_p = 21$ (per layer per direction)
Bar Size:	$s_p = 6$
Bar Spacing (center to center):	$sp_{p.ctr} = 10.5 \cdot in$
Bar Spacing (clear):	$sp_{p.cl} = 9.7 \cdot in$
Total Weight (per mat):	$Wt_{tp} = 1104\,lbf$
Check of Reinforcing Spacing and Minimum Reinforcing:	$Check_{spp.cl} = "OK"$ $Check_{spp.cl2} = "OK"$ $Check_{minp} = "N/A"$

REINFORCING FLEXURAL STRENGTH

Case	Design Strength	Calculated Max Moment	Check	Ratio
A	$\phi M_{nA} = 805 \cdot ft \cdot kip$	$\max(M_{u.TA}) = 84\,ft \cdot kip$	$Check'_{flex} = "OK"$	$Ratio_{flex} = 0.45$
B	$\phi M_{nB} = 805 \cdot ft \cdot kip$	$\max(M_{u.TB}) = 365\,ft \cdot kip$		

(Case A = Bottom of Pad in Tension at Toe, Case B = Top of Pad in Tension at Heel)

PAD ONE-WAY SHEAR

Case	Design Strength	Calculated Max Shear	Check	Ratio
1	$\phi V_{n1} = 353 \cdot kip$	$\lvert\max(V_{umax.C1T}, V_{umin.C1T})\rvert = 160 \cdot kip$	$Check'_{shear.1} = "OK"$	$Ratio'_{shear.1} = 0.45$
2		$\lvert\max(V_{umax.C2T}, V_{umin.C2T})\rvert = 126 \cdot kip$		

(Case 1 = Hinging about Pad Edge Adjacent to Pier 1, Case 2 = Hinging about Pad Edge Adjacent to Piers 2/3.)

Shear Reinforcing Check: $Check'_{shrrnf} = "OK"$

TWO-WAY PAD SHEAR

Design Strength	Calculated Max Shear	Check	Ratio
$\phi V_{n2} = 573 \cdot kip$	$\max(V_{u2}) = 104 \cdot kip$	$Check'_{shear.2} = "OK"$	$Ratio'_{shear.2} = 0.18$

PIER REINFORCEMENT

Gross Area: $A_{pier} = 4.0 \cdot ft^2$

Design Pier Area Factor: $P_{Ag} = 50 \cdot \%$

Effective Gross Area: $A'_{pier} = 2.0 \cdot ft^2$

Check of Area Factor: $Check_{PAg} = "OK"$

LONGITUDINAL PIER REINFORCING

Bar Quantity: $n_c = 12$

Bar Size: $s_c = 6$

Hook Length: $hook_{ca} = 0.0 \cdot in$ (actual/0 for none)

Bend Dia: $bend_c = 4.5 \cdot in$ (inside)

Hook Length: $hook_c = 9.0 \cdot in$ (required per ACI 7.1.2)

Bar Weight: $Wt_{tc} = 133\ lbf$ (per pier)

Check of Hook Length: $Check_{hookc} = "N/A"$

TIES

Tie Size: $s_t = 4.0000$

Tie Weight: $Wt_{tc} = 133 \cdot lbf$ (per pier)

Check of Tie Size: $Check_{st} = "OK"$

Maximum Crosstie Spacing (hx): (0 for none) $h_x = 0.0 \cdot in$

$Note_{SDCt1} = "N/A"$

Tie Levels: (0 if none)	Qty. Spaces	Spacing	
	$qsp_{t1} = 7.0000$	$sp_{t1} = 8.0 \cdot in$	(top)
	$qsp_{t2} = 0.0000$	$sp_{t2} = 0.0 \cdot in$	(mid.)
	$qsp_{t3} = 0.0000$	$sp_{t3} = 0.0 \cdot in$	(bot.)

Tie Quantity: $n_t = 8$

Maximum Required Tie Spacing (top, mid., bot.): $sp_{t.max} = 12.0 \cdot in$

$Check_{tie} = "OK"$

$Note_{SDCt3} = "N/A"$

$Check_{sp.cl} = "OK"$

TIE SPLICE

Required Lap Splice Length: $Lap = 24.0000 \cdot in$

$Note_{SDCt2} = "N/A"$

MINIMUM LONGITUDINAL REINFORCEMENT

Pier Area of Steel: $A_{tc} = 5.3 \cdot in^2$ $Ratio_{min.c} = 1.8 \cdot \%$ (based on effective pier gross area)

Minimum Steel Area Required: $A_{min.c} = 2.9 \cdot in^2$

Maximum Steel Area Allowed: $A_{max.c} = 23.0 \cdot in^2$

Check of Steel Area: $Check_{min.c} = "OK"$

BASE PLATE BEARING ON CONCRETE

Design Strength	Calculated Max Compression	Check	Ratio
$\phi B_n = 0 \cdot kip$	$\max(Pmax_u) = 56 \cdot kip$	$Check'_{bear} = "N/A"$	$Ratio'_{bear} = 0.00$

COMPRESSIVE STRENGTH OF PIER CONCRETE

Design Strength	Calculated Max Compression	Check	Ratio
$\phi P_n = 382 \cdot kip$	$\max(P_{upier}) = 60 \cdot kip$	$Check'_{comp2} = "OK"$	$Ratio'_{comp2} = 0.16$

SHEAR STRENGTH OF PIER CONCRETE

Design Strength	Calculated Max Shear	Check	Ratio
$\phi V_{npM} = 75 \cdot kip$	$\max(S_u) = 10 \cdot kip$	$Check'_{shear.p} = "OK"$	$Ratio'_{shear.p} = 0.15$

Shear Reinforcing Check: $Check'_{shrrnfp} = "OK"$

PIER MOMENT CAPACITY

Design Strength	Calculated Max Moment	Check	Ratio
$\phi Mn_{cm} = 109\ ft \cdot kip$	$\max(M_{u1.c}, M_{u2.c}) = 52\ ft \cdot kip$	$Check'_{pier} = "OK"$	$Ratio'_{pier} = 0.47$

DEVELOPMENT LENGTH IN TENSION

Case	Required Length	Length Available	Check	Ratio
w/o Hook	$l_{dc} = 12.0 \cdot in$	$l_{ac} = 21.0 \cdot in$	$Check_{dev.ch} = "Hook\ not\ Required"$	$Ratio_{dev} = 0.57$
w/ Hook	$l_{dch} = 6.0 \cdot in$	$hook_{ca} = 0.0 \cdot in$		

Controlling Foundation: $CFP = 47.2 \cdot \%$

APPENDIX B

Data Provided for Analysis

---------- Forwarded message ---------
From: **Chuck Laurette** <chuck.laurette@blueskytower.com>
Date: Tue, Oct 18, 2022 at 5:26 PM
Subject: CT-1680_ RE run w/o extension
To: Wes Culver <wculver@structuralcomponents.net>
Cc: James Burgess <james.burgess@blueskytower.com>

Wes,

AT&T has issues with the SA, and the state has asked them to remove VZE from the loading.

Please let me know how much for a rerun.

Chuck Laurette

Director of Operations

Park Place West

352 Park Street, Suite 106

North Reading, MA 01864

978.852.0774 – M

888-960-7958 - O

chuck.laurette@blueskytower.com

www.blueskytower.com

Attachments:

CT-1680_BSTManagementLLC.FullPassingSAReport - Sealed_CLA.pdf	10.9 MB
CT-1680 Structural Components BST Management PO $1000.pdf	66.5 KB

Structural Components, LLC
1870 West 64th Lane, Unit A
Denver, CO 80221

Voice: 866-386-7622

September 8, 2022

BST Management, LLC
352 Park Street
Suite 106
North Reading, MA 01864

Re: Rigorous Structural Analysis Report

Structure:	80.4ft Self-Supporting Tower with 10ft Extension
Site Address:	97 High Street, Portland, Connecticut 06480 (Middlesex County) Latitude: 41.5807˚N, Longitude: 72.6238˚W
Site Name:	BST Management, LLC – Portland AT&T – Portland
Site Number:	BST Management, LLC – CT-1680 AT&T – CT1066
SC Number:	220619
Status:	**Structure Passes (98% Capacity)** **Foundation Passes**

Per your request, Structural Components, LLC has completed a structural analysis for the above referenced project to verify the tower's compliance to the following design criteria:

Standard:	TIA-222-G *Structural Standard for Antenna Supporting Structures and Antennas*
Building Code:	2015 International Building Code 2018 Connecticut State Building Code
Design Basic Wind Speed without Ice:	125 mph 3-second gust V_{ULT}
Design Basic Wind Speed with Ice:	50 mph 3-second gust
Ice Thickness:	3/4" radial
Serviceability Basic Wind Speed:	60 mph 3-second gust
Exposure Category:	C
Topographic Category:	1
Risk Category:	II
Seismic Site Class:	D, S_s=0.180, S_1=0.063
Seismic Design Category:	B

Please refer to the following structural analysis report, which gives complete details of the tower loading, results, information provided, and necessary assumptions.

We trust you find this report satisfactory. Please do not hesitate to contact us if you should have any questions or concerns.

Best Regards,
Structural Components LLC

Wesley Culver
Engineering Manager

Michael Deboer, P.E.
Connecticut P.E. # 0018022

09/09/2022

/TR

1 LOADING CONFIGURATION

The following antennas, mounts, transmission lines, and other appurtenances were considered for the structural analysis.

Elevation (ft)		Equipment	Feedlines	Notes
Mount	Equip			
90.5	90.5	(1) 5/8" x 6' Lightning Rod	---	Existing
90.0	90.0	(3) CommScope NNH4-65B-R6 Panels (3) Samsung XXDWMM-12.5-65-8TCBRS Panels (3) Samsung MT6407-77A Panels (3) Samsung CBRS RRH - RT4401-48A RRUs (3) Samsung RF4439d-25A RRUs (3) Samsung RF4440d-13A RRUs (1) CommScope FE-16148-OVP-B12 TMA (3) T-Arms	(2) 6x12 Hybrid	Verizon Existing
77.0	77.0	(1) L6" x 6" x 7/16" Ring Mount	---	Existing
76.7[4]	**78.7**	**(3) Ericsson RRUS 32 B2** **(1) Raycap DC6-48-60-18-8F SSD**	**(6) 7/8" TX** **(3) 0.92" OD DC** **(4) 3/4" OD DC** **(1) 3/8" Fiber** **(1) 1/2" Fiber**	**AT&T** **Final**
	77.2	**(3) Ericsson RRUS 32 B30[3]** **(3) Ericsson RRUS 32 B66A[3]** **(1) Raycap DC6-48-60-18-8F SSD**		
	76.7	**(3) CCITPA65R-BU6DA-K Panels** **(3) Ericsson AIR6449 B77D Panels** **(3) Ericsson AIR6419 B77G Panels** **(3) CCIDMP65R-BU6DA Panels** **(3) Ericsson RRUS 4478 B14** **(3) Ericsson RRUS 4449 B5/B12** **(1) Raycap DC9-48-60-24-8C-EV SSDs** **(3) 12' Sector Frame Mounts**		
75.0	75.0	(1) L6" x 6" x 7/16" Ring Mount	---	Existing
73.0	73.0	(1) 2-3/8" x 8' Pipe Mount		
67.7	67.7	(1) L6" x 6" x 7/16" Ring Mount		

1) Elevations reference centerline of panel, yagi, mounts, and dish antennas, and base of whip antennas, in relation to the base of the tower.
2) Refer to the feed line diagram and analysis output in Appendix A for the location and orientation of feedlines and equipment.
3) Secondary appurtenances such as TMAs, Diplexers, and RRUs are considered to be installed directly behind panel antennas for frontal area shielding. See analysis output for magnitude of individual shielding.
4) Elevations adjusted from Structural Components Mapping dated 03/15/2022, Job # 220142.

2 RESULTS

The analysis was performed using tnxTower v8.1.1.0, a structural analysis program developed by Tower Numerics, Inc. specifically for the communication tower industry.

2.1 TOWER MEMBER STRESS LEVELS

The tower has the following stress ratios in its structural members.

Elev. (ft)	Member	Stress Ratio*
0 – 90.4	Legs	0.98
0 – 90.4	Bracing	0.80
0 – 90.4	Connections	0.89

Stress ratio (SR) criteria:
SR ≤ 1.00 is completely within code limits.
SR ≤ 1.05 is considered within acceptable tolerance of code limits.
SR > 1.05 is outside acceptable tolerance of code limits and requires structural modifications.
* Seismic analysis for similar structures under similar loading conditions has been shown to produce significantly lower stress ratios than wind and ice. Therefore, seismic analysis has not been included in the current analysis.

2.2 FOUNDATION REACTIONS

The reactions listed below are for the design wind speed listed. Reactions are factored loads.

Reaction Type	Current Wind Reactions	Current Iced Reactions	Foundation Status
Moment (ft-kips)	1,271.3	314.6	Passes*
Shear (kips)	23.4	5.7	
Axial (kips)	21.2	54.2	
Leg Compression (kips)	74.0	51.2	
Leg Uplift (kips)	64.8	40.7	
Leg Shear (kips)	13.0	11.4	

* See Appendix A for foundation calculations.

2.3 TOWER DEFLECTION

The tower deflections have been reviewed and are believed to be acceptable for the proposed equipment. The carrier(s) should review the deflections for the service wind condition included in Appendix A for compatibility with their equipment.

3 PROVIDED INFORMATION AND ASSUMPTIONS

The following information was directly used to generate this report, and can be found in Appendix B.

Document	Author	Date	Reference
Collocation Application	AT&T	08/16/2022	CT-1680
Collocation Application EPA	AT&T	08/17/2022	CT-1680
Mount Analysis	Hudson Design Group, LLC	01/21/2022	MRCTB055774
Structural Analysis Report – Verizon	Structural Components, LLC	05/02/2022	220142
Modification Drawings	Structural Components, LLC	04/29/2022	220142

The following assumptions were made in order to complete the analysis. These assumptions must be checked. If they do not accurately represent the existing or proposed tower, foundation, soil, and loading conditions, we must be notified so that we can make the appropriate changes to our analysis, conclusions, and recommendations.

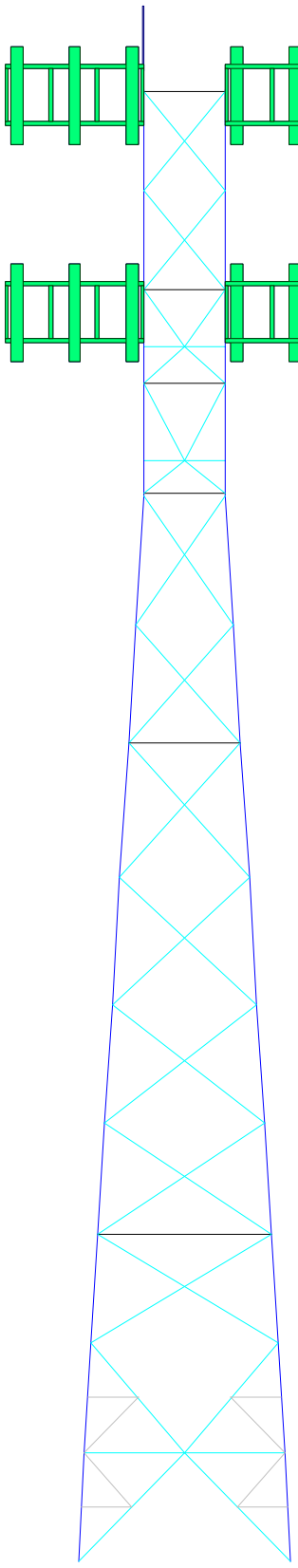
1. The tower and foundation are in good condition with no corrosion, damage or fatiguing issues which could reduce the carrying capacity of the tower.
2. All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report.
3. All prior structural modifications, if any, are assumed to be as per date supplied/ available, to be properly installed and to be fully effective.
4. The following assumptions regarding member minimum material or type apply to this structure, unless otherwise noted in analysis:
   - Angle Legs: A36
   - Angle Bracing: A36
   - Splice Bolts: A307
   - Gusset Plates: A36
   - Brace Bolts: A325N
5. The feedline and appurtenance configuration is as stated in the report. All antennas, coax, cables and waveguide cables are assumed to be properly installed and supported as per manufacturer requirement.
6. The support mounts and/or platforms are not analyzed and are considered adequate to support the loading.
7. All mounting systems connect at tower bracing points. Local stresses are not considered unless noted otherwise in analysis.
8. Some assumptions are made regarding antenna and mount sizes and their projected areas based on a best interpretation of the data supplied and a best knowledge of antenna type and industry practice.
9. The soil parameters are as per data supplied, or as assumed, and stated in the calculations.
10. **The modifications shown in the previous Modification Drawings, SC #220142, dated 04/28/2022 have been considered to be installed for this analysis.**

4 CONCLUSIONS

To the best of our knowledge and belief the tower and foundations satisfy the requirements of the applicable codes and standards having jurisdiction over the work for the loadings and conditions as outlined in this report. **Structural modifications are not required at this time.**

Section	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs		L5x5x5/16				L5x5x3/8			L4x4x3/8					L4x4x1/4
Leg Grade							A36							
Diagonals		L3x3x5/16	C				L2x2 1/2x3/16			B	L2 1/2x2 1/2x3/16	A		L2x2x1/4
Diagonal Grade							A36							
Top Girts	N.A.		L2x2 1/2x1/4		N.A.		L2 1/2x2 1/2x3/16		N.A.		2L4x4x3/8	N.A.	D	L2 1/2x2 1/2x3/16
Bottom Girts					N.A.					E		N.A.		
Horizontals	F					N.A.				D	N.A.	D		N.A.
Red. Horizontals	L1 3/4x1 3/4x3/16						N.A.							
Red. Diagonals	L1 3/4x1 3/4x3/16						N.A.							
Inner Bracing	N.A.		L2x2x3/16		N.A.		L2 1/2x2x3/16		N.A.	G	N.A.	G		N.A.
Face Width (ft)	13.083	12.2597	11.4363	10.6142	9.7793	8.883	7.9252	6.9059	6.0147					5.0416
# Panels @ (ft)		2 @ 6.7075	1 @ 6.688	1 @ 6.792	1 @ 7.292	1 @ 7.792	1 @ 8.292	1 @ 7.25	1 @ 7.917	1 @ 2	1 @ 4.75	H	1 @ 3.5	2 @ 6.08292
Weight (lb)	9055.0	979.7	853.8	819.8	805.0	620.6	636.9	792.8	497.4	522.3	446.5	733.1	309.2	448.4	789.4

90.3 ft
78.1 ft
74.6 ft
72.3 ft
67.6 ft
65.4 ft
57.5 ft
50.3 ft
42.0 ft
34.2 ft
26.9 ft
20.1 ft
13.4 ft
6.7 ft
0.0 ft



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2x2 1/2x3/16	E	L3x3x3/16
B	L2x2x3/16	F	L1 3/4x1 3/4x3/16
C	L2 1/2x2 1/2x3/16	G	L2 1/2x2x3/16
D	L4x3 1/2x1/4	H	1 @ 2.25

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 125 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 97.1%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 73986 lb
SHEAR: 12961 lb

UPLIFT: -64739 lb
SHEAR: 11301 lb

AXIAL 54143 lb
SHEAR 5646 lb
MOMENT 314524 lb-ft
TORQUE 2842 lb-ft
50 mph WIND - 0.7500 in ICE

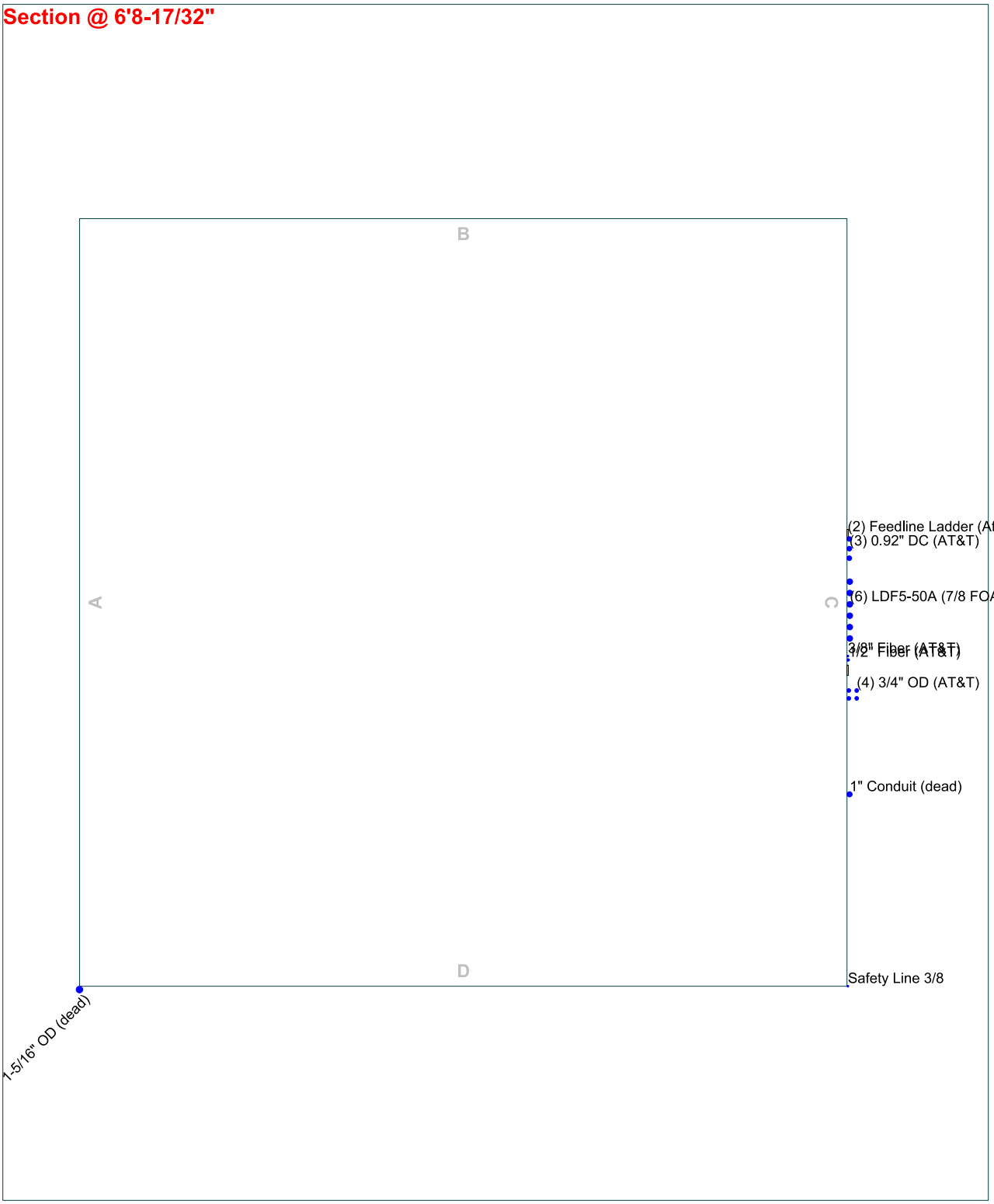
AXIAL 21114 lb
SHEAR 23336 lb
MOMENT 1271270 lb-ft
TORQUE 9597 lb-ft
REACTIONS - 125 mph WIND

Structural Components, LLC
1870 West 64th Lane, Unit A
Denver, CO 80221
Phone: (866) 386-7622
FAX:

Job: 220619			
Project: Portland (CT-1680)			
Client: BST Management, LLC	Drawn by: treed	App'd:	
Code: TIA-222-G	Date: 09/08/22	Scale: NTS	
Path:		Dwg No. E-1	

Feed Line Plan
6'8-17/32"

Round Flat App In Face App Out Face



Structural Components, LLC
1870 West 64th Lane, Unit A
Denver, CO 80221
Phone: (866) 386-7622
FAX:

Job: 220619			
Project: Portland (CT-1680)			
Client: BST Management, LLC	Drawn by: treed	App'd:	
Code: TIA-222-G	Date: 09/07/22	Scale: NTS	
Path:		Dwg No. E-7	