PAUL J. FORD & COMPANY

Report Date: June 14, 2021

Client: Hirschfeld Communications LLC
1030 New Britain Avenue
West Hartford, CT 06110
Attn: Ian Ormesher
(703) 447-1350
iormesher@hirschfeldcos.com

Structure: Existing 185-ft Self Support Tower
Site Name: West Hartford
Site Reference #: CT001
Site Address: 1030 New Britain Ave
City, County, State: West Hartford, Hartford County, CT
Latitude, Longitude: 41.736092°, -72.720499°

PJF Project: A64120-0001.002.8700

Paul J. Ford and Company is pleased to submit this "**Structural Analysis Report**" to determine the tower stress level.

Analysis Criteria:

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut State Building Code and Appendix N. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Proposed Appurtenance Loads:
The structure was analyzed with the proposed loading configuration shown in Table 1 combined with the other considered equipment shown in Table 2 of this report.

Summary of Analysis Results:
Existing Structure: Pass – 95.8%
Existing Foundation: Pass – 33.0%

We at Paul J. Ford and Company appreciate the opportunity of providing our continuing professional services to you and Hirschfeld Communications LLC. If you have any questions or need further assistance on this or any other projects, please give us a call.

Respectfully Submitted by:
Paul J. Ford and Company

Michael T Bange

Michael Bange, EI
Structural Designer
mbange@pauljford.com

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

2021.06.14
15:06:03-04'00'

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1) INTRODUCTION

This tower is a 180 ft Self Support tower designed by PiRod in June of 1998.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-G
Risk Category:	II
Nominal Wind Speed:	97 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
165.0	165.0	3	ericsson	RRUS 4415 B25	3	1-1/4
		3	ericsson	AIR32 KRD901146-1_B66_B2A w/ Mount Pipe		
		3	ericsson	AIR6449 B41 w/ Mount Pipe		
		3	ericsson	RADIO 4449 B12/B71		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
		3	Sitepro1	SFR-K-L Reinforcement Kit		
		1	tower mounts	Sector Mount		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
180.0	180.0	3	ericsson	RRUS 4478 B14	12 2 4	1-5/8 1/2 3/4
		6	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe		
		3	commscope	CBC23SR-43		
		3	commscope	ION-M23 SDARS		
		3	ericsson	RRUS 11		
		3	ericsson	RRUS 12		
		3	ericsson	RRUS 32		
		3	ericsson	RRUS 32 B66		
		3	ericsson	RRUS A2 MODULE		
		3	kathrein	80010965 w/ Mount Pipe		
		1	miscl	GPS		
		3	powerwave technologies	7770 w/ Mount Pipe		
		6	powerwave technologies	LGP21401		
		3	raycap	DC6-48-60-18-8F		
		1	tower mounts	Platform Mount		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference
Manufacturer Drawings	PiROD Inc., 6/10/1998	203949-B
Geotechnical Report	PiROD Inc., 6/5/1998	A-114804
Pile Driving Report	Simeon Beer, 7/13/1998	-
Site Application	Hirschfeld Communications, 1/26/2021	-

3.1) Analysis Method

tnxTower (version 8.0.9.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

1) Tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J. Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	180 - 170	Leg	1 1/2" solid	2	-18.88	54.43	34.7	Pass
T2	170 - 150	Leg	2" solid	38	73.81	106.69	69.2	Pass
T3	150 - 130	Leg	2 1/4" solid	102	-135.26	148.69	91.0	Pass
T4	130 - 120	Leg	Pirod 105244 (12x1.25)	166	-136.44	142.49	95.8	Pass
T5	120 - 100	Leg	Pirod 105217 (12x1.5)	175	-162.94	214.86	75.8	Pass
T6	100 - 80	Leg	Pirod 105217 (12x1.5)	190	-184.63	214.86	85.9	Pass
T7	80 - 60	Leg	Pirod 105218 (12x1.75)	205	-206.97	300.68	68.8	Pass
T8	60 - 40	Leg	Pirod 105218 (12x1.75)	220	-229.45	300.68	76.3	Pass
T9	40 - 20	Leg	Pirod 105219 (12x2)	235	-252.89	399.87	63.2	Pass
T10	20 - 0	Leg	Pirod 105219 (12x2)	250	-275.18	399.87	68.8	Pass
T1	180 - 170	Diagonal	3/4" solid	12	-3.41	6.09	56.0	Pass
T2	170 - 150	Diagonal	7/8" solid	48	-5.52	9.34	59.2	Pass
T3	150 - 130	Diagonal	1" solid	161	-6.08	15.16	40.1	Pass
T4	130 - 120	Diagonal	L 2.5 x 2.5 x 3/16	173	-7.94	13.56	58.6 69.0 (b)	Pass
T5	120 - 100	Diagonal	L 2.5 x 2.5 x 3/16	186	-5.39	11.92	45.2 52.9 (b)	Pass
T6	100 - 80	Diagonal	L 2.5 x 2.5 x 3/16	194	-5.02	8.66	58.0	Pass
T7	80 - 60	Diagonal	L 3 x 3 x 3/16	209	-5.45	12.12	45.0	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T8	60 - 40	Diagonal	L 3 x 3 x 3/16	224	-5.89	9.79	60.2	Pass
T9	40 - 20	Diagonal	L 3 x 3 x 5/16	239	-6.59	12.87	51.2	Pass
T10	20 - 0	Diagonal	L 3 x 3 x 5/16	254	-8.35	10.64	78.4	Pass
T1	180 - 170	Horizontal	3/4" solid	30	-0.49	3.31	14.9	Pass
T2	170 - 150	Horizontal	3/4" solid	52	-1.38	2.74	50.4	Pass
T3	150 - 130	Horizontal	7/8" solid	116	-2.41	4.10	58.8	Pass
T1	180 - 170	Top Girt	7/8" solid	5	-1.72	6.14	28.1	Pass
T2	170 - 150	Top Girt	7/8" solid	42	-1.96	6.22	31.4	Pass
T3	150 - 130	Top Girt	1" solid	104	-2.41	8.40	28.7	Pass
T1	180 - 170	Bottom Girt	7/8" solid	7	-1.40	6.14	22.9	Pass
T2	170 - 150	Bottom Girt	7/8" solid	45	-2.52	4.94	51.0	Pass
T3	150 - 130	Bottom Girt	1" solid	107	-2.70	6.83	39.5	Pass
							Summary	
						Leg (T4)	95.8	Pass
						Diagonal (T10)	78.4	Pass
						Horizontal (T3)	58.8	Pass
						Top Girt (T2)	31.4	Pass
						Bottom Girt (T2)	51.0	Pass
						Bolt Checks	69.0	Pass
						Rating =	95.8	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	50.2	Pass
1	Base Foundation (Structure)	0	9.1	Pass
1	Base Foundation (Soil Interaction)	0	33.0	Pass

Structure Rating (max from all components) =	**95.8%**

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

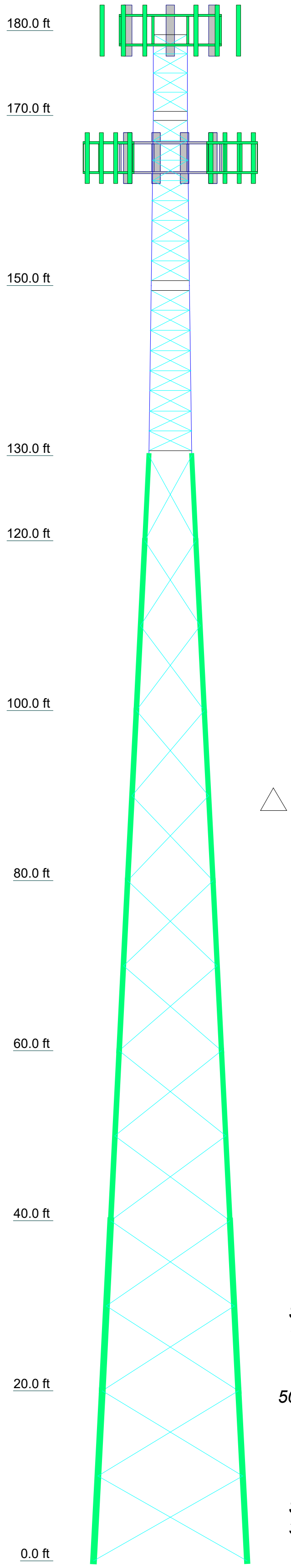
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Bottom Girts	Horizontals	Face Width (ft)	# Panels @ (ft)	Weight (K)
T1	A	A572-50	SR 3/4" solid	A572-50				4	4 @ 2.25	0.4
T2	SR 2" solid	A572-50	SR 7/8" solid	A572-50	SR 7/8" solid	SR 7/8" solid	SR 3/4" solid		16 @ 2.35833	1.3
T3	SR 2 1/4" solid	A572-50	SR 1" solid	A572-50	SR 1" solid	SR 1" solid	SR 7/8" solid	4.5	16 @ 2.35833	1.7
T4	B	A572-50	L 2.5 x 2.5 x 3/16	A36	N.A.	N.A.	N.A.	5	13 @ 10	1.1
T5	Pirod 105217 (12x1.5)	A572-50	L 2.5 x 2.5 x 3/16	A36	N.A.	N.A.	N.A.	6	13 @ 10	2.6
T6	Pirod 105217 (12x1.5)	A572-50	L 2.5 x 2.5 x 3/16	A36	N.A.	N.A.	N.A.	8	13 @ 10	2.7
T7	Pirod 105218 (12x1.75)	A572-50	L 3 x 3 x 3/16	A36	N.A.	N.A.	N.A.	10	13 @ 10	3.2
T8	Pirod 105218 (12x1.75)	A572-50	L 3 x 3 x 3/16	A36	N.A.	N.A.	N.A.	12	13 @ 10	3.3
T9	Pirod 105219 (12x2)	A572-50	L 3 x 3 x 5/16	A36	N.A.	N.A.	N.A.	14	13 @ 10	5.0
T10	Pirod 105219 (12x2)	A572-50	L 3 x 3 x 5/16	A36	N.A.	N.A.	N.A.	16	13 @ 10	5.2
								18		26.4



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	SR 1 1/2" solid	B	Pirod 105244 (12x1.25)

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97.0 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.0 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.0 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 95.8%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 282 K
SHEAR: 26 K

UPLIFT: -250 K
SHEAR: 23 K

AXIAL 148 K
SHEAR 12 K
MOMENT 1424 kip-ft
TORQUE 9 kip-ft
50.0 mph WIND - 1.00 in ICE

AXIAL 46 K
SHEAR 39 K
MOMENT 4153 kip-ft
TORQUE 34 kip-ft
REACTIONS - 97.0 mph WIND

Paul J. Ford and Company
250 E. Broad St., Ste 600
Columbus, OH 43215
Phone: 614-221-6679
FAX:

Job:	*180-ft Self-Support Tower / WESTHARTFORD_DEXTERS*
Project:	*PJF# 64120-0001 / CT0001*
Client:	Hirschfeld Communications, LLC
Drawn by:	Michael Bange
App'd:	
Code:	TIA-222-G
Date:	06/10/21
Scale:	NTS
Path:	G:\TOWER\641_Hirschfeld Communications\2020\64120-0001 CT001\64120-0001.002.8700_SA\TNX\64120-0001.002.8700.eri
Dwg No.	E-1

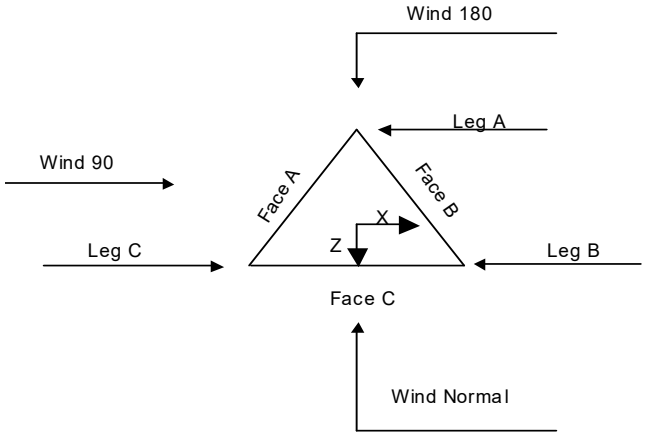
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 4.00 ft at the top and 18.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

- Tower is located in Hartford County, Connecticut.
- ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
- Basic wind speed of 97.0 mph.
- Structure Class II.
- Exposure Category C.
- Topographic Category 1.
- Crest Height 0.00 ft.
- Nominal ice thickness of 1.00 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50.0 mph is used in combination with ice.
- Deflections calculated using a wind speed of 60.0 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



Triangular Tower

Tower Section Geometry

Tower Section	*Tower Elevation*	*Assembly Database*	*Description*	*Section Width*	*Number of Sections*	*Section Length*
	ft			*ft*		*ft*
T1	180.00-170.00		106778 (48)	4.00	1	10.00
T2	170.00-150.00		100246 (48/54)	4.00	1	20.00
T3	150.00-130.00		119703 (54/60)	4.50	1	20.00
T4	130.00-120.00		U06 105218 [L2.5 x 3/16]	5.00	1	10.00
T5	120.00-100.00		U08 105217 [L2.5 x 3/16]	6.00	1	20.00
T6	100.00-80.00		U10 105217 [L2.5 x 3/16]	8.00	1	20.00
T7	80.00-60.00		U12 105218 [L3 x 3/16]	10.00	1	20.00
T8	60.00-40.00		U14 105218 [L3 x 3/16]	12.00	1	20.00
T9	40.00-20.00		U16 105219 [L3 x 5/16]	14.00	1	20.00
T10	20.00-0.00		U18 105219 [L3 x 5/16]	16.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	*Tower Elevation*	*Diagonal Spacing*	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*	*Top Girt Offset*	*Bottom Girt Offset*
	ft	*ft*				*in*	*in*
T1	180.00-170.00	2.25	X Brace	No	Steps	6.00	6.00
T2	170.00-150.00	2.36	X Brace	No	Steps	6.80	6.80
T3	150.00-130.00	2.36	X Brace	No	Steps	6.80	6.80
T4	130.00-120.00	10.00	X Brace	No	No	0.00	0.00
T5	120.00-100.00	10.00	X Brace	No	No	0.00	0.00
T6	100.00-80.00	10.00	X Brace	No	No	0.00	0.00
T7	80.00-60.00	10.00	X Brace	No	No	0.00	0.00
T8	60.00-40.00	10.00	X Brace	No	No	0.00	0.00
T9	40.00-20.00	10.00	X Brace	No	No	0.00	0.00
T10	20.00-0.00	10.00	X Brace	No	No	0.00	0.00

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Leg Type*	*Leg Size*	*Leg Grade*	*Diagonal Type*	*Diagonal Size*	*Diagonal Grade*
T1 180.00-170.00	Solid Round	1 1/2" solid	A572-50 (50 ksi)	Solid Round	3/4" solid	A572-50 (50 ksi)
T2 170.00-150.00	Solid Round	2" solid	A572-50 (50 ksi)	Solid Round	7/8" solid	A572-50 (50 ksi)
T3 150.00-130.00	Solid Round	2 1/4" solid	A572-50 (50 ksi)	Solid Round	1" solid	A572-50 (50 ksi)
T4 130.00-120.00	Truss Leg	Pirod 105244 (12x1.25)	A572-50 (50 ksi)	Single Angle	L 2.5 x 2.5 x 3/16	A36 (36 ksi)
T5 120.00-100.00	Truss Leg	Pirod 105217 (12x1.5)	A572-50 (50 ksi)	Single Angle	L 2.5 x 2.5 x 3/16	A36 (36 ksi)
T6 100.00-80.00	Truss Leg	Pirod 105217 (12x1.5)	A572-50 (50 ksi)	Single Angle	L 2.5 x 2.5 x 3/16	A36 (36 ksi)
T7 80.00-60.00	Truss Leg	Pirod 105218 (12x1.75)	A572-50 (50 ksi)	Single Angle	L 3 x 3 x 3/16	A36 (36 ksi)
T8 60.00-40.00	Truss Leg	Pirod 105218 (12x1.75)	A572-50 (50 ksi)	Single Angle	L 3 x 3 x 3/16	A36 (36 ksi)
T9 40.00-20.00	Truss Leg	Pirod 105219 (12x2)	A572-50 (50 ksi)	Single Angle	L 3 x 3 x 5/16	A36 (36 ksi)
T10 20.00-0.00	Truss Leg	Pirod 105219 (12x2)	A572-50 (50 ksi)	Single Angle	L 3 x 3 x 5/16	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 180.00-170.00	Solid Round	7/8" solid	A572-50 (50 ksi)	Solid Round	7/8" solid	A572-50 (50 ksi)
T2 170.00-150.00	Solid Round	7/8" solid	A572-50 (50 ksi)	Solid Round	7/8" solid	A572-50 (50 ksi)
T3 150.00-130.00	Solid Round	1" solid	A572-50 (50 ksi)	Solid Round	1" solid	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*No. of Mid Girts*	*Mid Girt Type*	*Mid Girt Size*	*Mid Girt Grade*	*Horizontal Type*	*Horizontal Size*	*Horizontal Grade*
T1 180.00-170.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	3/4" solid	A572-50 (50 ksi)
T2 170.00-150.00	None	Solid Round		A36 (36 ksi)	Solid Round	3/4" solid	A572-50 (50 ksi)
T3 150.00-130.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/8" solid	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 180.00-170.00	0.00	0.00	A36 (36 ksi)	1	1	1.02	Mid-Pt	Mid-Pt	Mid-Pt
T2 170.00-150.00	0.00	0.00	A36 (36 ksi)	1	1	1.03	Mid-Pt	Mid-Pt	Mid-Pt
T3 150.00-130.00	0.00	0.00	A36 (36 ksi)	1	1	1.03	Mid-Pt	Mid-Pt	Mid-Pt
T4 130.00-120.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T5 120.00-100.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T6 100.00-80.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T7 80.00-60.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T8 60.00-40.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T9 40.00-20.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T10 20.00-0.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180.00-170.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 170.00-150.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 150.00-130.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 130.00-120.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 120.00-100.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 100.00-80.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 80.00-60.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 60.00-40.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 40.00-20.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 20.00-0.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Truss-Leg K Factors					
	Truss-Legs Used As Leg Members			Truss-Legs Used As Inner Members		
	Leg Panels	X Brace Diagonals	Z Brace Diagonals	Leg Panels	X Brace Diagonals	Z Brace Diagonals
T4 130.00-120.00	1	0.5	0.85	1	0.5	0.85
T5 120.00-100.00	1	0.5	0.85	1	0.5	0.85
T6 100.00-80.00	1	0.5	0.85	1	0.5	0.85
T7 80.00-60.00	1	0.5	0.85	1	0.5	0.85
T8 60.00-40.00	1	0.5	0.85	1	0.5	0.85
T9 40.00-20.00	1	0.5	0.85	1	0.5	0.85
T10 20.00-0.00	1	0.5	0.85	1	0.5	0.85

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 180.00-170.00	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1
T2 170.00-150.00	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1
T3 150.00-130.00	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1
T4 130.00-120.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T5 120.00-100.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T6 100.00-80.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T7 80.00-60.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T8 60.00-40.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T9 40.00-20.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T10 20.00-0.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	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
T1 180.00-170.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T2 170.00-150.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T3 150.00-130.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T4 130.00-120.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	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
T5 120.00-100.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T6 100.00-80.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T7 80.00-60.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T8 60.00-40.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T9 40.00-20.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T10 20.00-0.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180.00-170.00	Sleeve DS	0.63 A325N	5	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.63 A325N	0	0.00 A325N	0	0.63 A325N	0
T2 170.00-150.00	Sleeve DS	0.75 A325N	5	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T3 150.00-130.00	Flange	1.00 A325N	6	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.50 A325N	0	0.00 A325N	0	0.50 A325N	0
T4 130.00-120.00	Flange	1.00 A325N	6	1.00 A325N	1	0.00 A325N	0	0.00 A325N	0	1.00 A325N	0	1.00 A325N	0	1.00 A325N	0
T5 120.00-100.00	Flange	1.00 A325N	6	1.00 A325N	1	0.00 A325N	0	0.00 A325N	0	1.00 A325N	0	1.00 A325N	0	1.00 A325N	0
T6 100.00-80.00	Flange	1.00 A325N	6	1.00 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T7 80.00-60.00	Flange	1.00 A325N	6	1.00 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T8 60.00-40.00	Flange	1.00 A325N	6	1.00 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T9 40.00-20.00	Flange	1.25 A325N	6	1.25 A325N	1	0.00 A325N	0	0.00 A325N	0	1.25 A325N	0	1.25 A325N	0	1.25 A325N	0
T10 20.00-0.00	Flange	1.25 F1554-105	0	1.25 A325N	1	0.00 A325N	0	0.00 A325N	0	1.00 A325N	0	1.00 A325N	0	1.00 A325N	0

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
LDF7-50A (1 5/8" foam)	A	No	No	Ar (CaAa)	180.00 - 8.00	-6.00	0.45	12	6	1.00 0.50	1.98		0.92
FSJ4-50B(1/2")	A	No	No	Ar (CaAa)	180.00 - 8.00	-6.00	0.45	2	2	1.00 0.50	0.52		0.14
9776(3/4")	A	No	No	Ar (CaAa)	180.00 - 8.00	-6.00	0.45	4	4	1.00 0.50	0.73		0.31
T-Brackets (Af) ***	A	No	No	Af (CaAa)	180.00 - 8.00	-6.00	0.45	1	1	1.00	1.00		8.40

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
T-Brackets (Af)	C	No	No	Af (CaAa)	165.00 - 8.00	-6.00	-0.45	1	1	1.00	1.00		8.40
LDF6-50 (1 1/4" foam) ***	C	No	No	Ar (CaAa)	165.00 - 8.00	-6.00	-0.45	3	3	1.00	1.55		0.66

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 K
Platform Mount [LP 405-1]	C	None		0.000	180.00	No Ice	20.88	20.88	1.80
						1/2" Ice	28.89	28.89	2.28
						1" Ice	37.04	37.04	2.87
7770_TIA w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						1" Ice	6.61	5.71	0.16
7770_TIA w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						1" Ice	6.61	5.71	0.16
7770_TIA w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						1" Ice	6.61	5.71	0.16
(2) OPA-65R-LCUU-H6_TIA w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice	9.68	7.12	0.11
						1/2" Ice	10.25	8.30	0.18
						1" Ice	10.79	9.20	0.26
(2) OPA-65R-LCUU-H6_TIA w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice	9.68	7.12	0.11
						1/2" Ice	10.25	8.30	0.18
						1" Ice	10.79	9.20	0.26
(2) OPA-65R-LCUU-H6_TIA w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice	9.68	7.12	0.11
						1/2" Ice	10.25	8.30	0.18
						1" Ice	10.79	9.20	0.26
80010965_TIA w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice	14.05	7.63	0.14
						1/2" Ice	14.69	8.90	0.23
						1" Ice	15.30	9.96	0.34
80010965_TIA w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice	14.05	7.63	0.14
						1/2" Ice	14.69	8.90	0.23
						1" Ice	15.30	9.96	0.34
80010965_TIA w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice	14.05	7.63	0.14
						1/2" Ice	14.69	8.90	0.23
						1" Ice	15.30	9.96	0.34
ION-M23 SDARS	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice	1.84	1.76	0.05
						1/2" Ice	2.05	1.98	0.06
						1" Ice	2.27	2.19	0.08
ION-M23 SDARS	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice	1.84	1.76	0.05
						1/2" Ice	2.05	1.98	0.06
						1" Ice	2.27	2.19	0.08
ION-M23 SDARS	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice	1.84	1.76	0.05
						1/2" Ice	2.05	1.98	0.06
						1" Ice	2.27	2.19	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
CBC23SR-43	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	0.42 0.50 0.59	0.14 0.20 0.27	0.01 0.01 0.01
CBC23SR-43	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	0.42 0.50 0.59	0.14 0.20 0.27	0.01 0.01 0.01
CBC23SR-43	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	0.42 0.50 0.59	0.14 0.20 0.27	0.01 0.01 0.01
DC6-48-60-18-8F	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	1.21 1.89 2.11	1.21 1.89 2.11	0.03 0.05 0.08
DC6-48-60-18-8F	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	1.21 1.89 2.11	1.21 1.89 2.11	0.03 0.05 0.08
DC6-48-60-18-8F	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	1.21 1.89 2.11	1.21 1.89 2.11	0.03 0.05 0.08
(2) LGP21401	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.35 0.44 0.54	0.01 0.02 0.03
(2) LGP21401	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.35 0.44 0.54	0.01 0.02 0.03
(2) LGP21401	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.35 0.44 0.54	0.01 0.02 0.03
RRUS 11	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	0.05 0.07 0.10
RRUS 11	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	0.05 0.07 0.10
RRUS 11	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	0.05 0.07 0.10
RRUS 12	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	0.06 0.08 0.11
RRUS 12	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	0.06 0.08 0.11
RRUS 12	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	0.06 0.08 0.11
RRUS A2 MODULE	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	1.60 1.76 1.92	0.38 0.47 0.57	0.02 0.03 0.04
RRUS A2 MODULE	B	From Leg	4.00	0.000	180.00	No Ice	1.60	0.38	0.02

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* *K*
			0.00			1/2"	1.76	0.47	0.03
			0.00			Ice	1.92	0.57	0.04
						1" Ice			
RRUS A2 MODULE	C	From Leg	4.00	0.000	180.00	No Ice	1.60	0.38	0.02
			0.00			1/2"	1.76	0.47	0.03
			0.00			Ice	1.92	0.57	0.04
						1" Ice			
RRUS 32	A	From Leg	4.00	0.000	180.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			0.00			Ice	3.32	2.17	0.10
						1" Ice			
RRUS 32	B	From Leg	4.00	0.000	180.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			0.00			Ice	3.32	2.17	0.10
						1" Ice			
RRUS 32	C	From Leg	4.00	0.000	180.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			0.00			Ice	3.32	2.17	0.10
						1" Ice			
RRUS 32 B66	A	From Leg	4.00	0.000	180.00	No Ice	2.74	1.67	0.05
			0.00			1/2"	2.96	1.86	0.07
			0.00			Ice	3.19	2.05	0.10
						1" Ice			
RRUS 32 B66	B	From Leg	4.00	0.000	180.00	No Ice	2.74	1.67	0.05
			0.00			1/2"	2.96	1.86	0.07
			0.00			Ice	3.19	2.05	0.10
						1" Ice			
RRUS 32 B66	C	From Leg	4.00	0.000	180.00	No Ice	2.74	1.67	0.05
			0.00			1/2"	2.96	1.86	0.07
			0.00			Ice	3.19	2.05	0.10
						1" Ice			
RRUS 4478 B14	A	From Leg	4.00	0.000	180.00	No Ice	0.00	1.25	0.06
			0.00			1/2"	0.00	1.40	0.08
			0.00			Ice	0.00	1.55	0.10
						1" Ice			
RRUS 4478 B14	B	From Leg	4.00	0.000	180.00	No Ice	0.00	1.25	0.06
			0.00			1/2"	0.00	1.40	0.08
			0.00			Ice	0.00	1.55	0.10
						1" Ice			
RRUS 4478 B14	C	From Leg	4.00	0.000	180.00	No Ice	0.00	1.25	0.06
			0.00			1/2"	0.00	1.40	0.08
			0.00			Ice	0.00	1.55	0.10
						1" Ice			
GPS	C	From Leg	4.00	0.000	180.00	No Ice	0.13	0.13	0.02
			0.00			1/2"	0.24	0.24	0.02
			0.00			Ice	0.31	0.31	0.02
						1" Ice			
***									
AIR32 KRD901146-1_B66_B2A w/ Mount Pipe	A	From Leg	4.00	0.000	165.00	No Ice	11.39	5.90	0.11
			0.00			1/2"	11.86	6.56	0.19
			0.00			Ice	12.33	7.24	0.28
						1" Ice			
AIR32 KRD901146-1_B66_B2A w/ Mount Pipe	B	From Leg	4.00	0.000	165.00	No Ice	11.39	5.90	0.11
			0.00			1/2"	11.86	6.56	0.19
			0.00			Ice	12.33	7.24	0.28
						1" Ice			
AIR32 KRD901146-1_B66_B2A w/ Mount Pipe	C	From Leg	4.00	0.000	165.00	No Ice	11.39	5.90	0.11
			0.00			1/2"	11.86	6.56	0.19
			0.00			Ice	12.33	7.24	0.28
						1" Ice			
APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	A	From Leg	4.00	0.000	165.00	No Ice	20.48	11.02	0.19
			0.00			1/2"	21.23	12.55	0.32
			0.00			Ice	21.99	14.10	0.47
						1" Ice			

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	0.19 0.32 0.47
APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	0.19 0.32 0.47
AIR6449 B41_TIA w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	5.89 6.26 6.63	3.28 3.74 4.22	0.12 0.17 0.22
AIR6449 B41_TIA w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	5.89 6.26 6.63	3.28 3.74 4.22	0.12 0.17 0.22
AIR6449 B41_TIA w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	5.89 6.26 6.63	3.28 3.74 4.22	0.12 0.17 0.22
RADIO 4449 B12/B71	A	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	0.07 0.09 0.11
RADIO 4449 B12/B71	B	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	0.07 0.09 0.11
RADIO 4449 B12/B71	C	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	0.07 0.09 0.11
RRUS 4415 B25	A	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.68 0.79 0.91	0.04 0.06 0.07
RRUS 4415 B25	B	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.68 0.79 0.91	0.04 0.06 0.07
RRUS 4415 B25	C	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.68 0.79 0.91	0.04 0.06 0.07
Sector Mount [SM 402-3]	C	From Leg	0.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	18.87 26.47 33.99	18.87 26.47 33.99	0.85 1.21 1.70
(2) L 2 x 2 x 3/16 x 6.5' Mount Angle	A	From Leg	2.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	1.30 1.75 2.20	0.03 0.06 0.09	0.02 0.03 0.05
(2) L 2 x 2 x 3/16 x 6.5' Mount Angle	B	From Leg	2.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	1.30 1.75 2.20	0.03 0.06 0.09	0.02 0.03 0.05
(2) L 2 x 2 x 3/16 x 6.5' Mount Angle	C	From Leg	2.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	1.30 1.75 2.20	0.03 0.06 0.09	0.02 0.03 0.05
***									

Truss-Leg Properties

Section Designation	Area	Area Ice	Self Weight	Ice Weight	Equiv. Diameter	Equiv. Diameter Ice	Leg Area
	in^2	in^2	K	K	in	in	in^2
Pirod 105244 (12x1.25)	1026.86	3397.26	0.56	0.95	7.13	23.59	3.68
Pirod 105217 (12x1.5)	2303.92	6585.93	0.71	1.94	8.00	22.87	5.30
Pirod 105217 (12x1.5)	2303.92	6554.05	0.71	1.88	8.00	22.76	5.30
Pirod 105218 (12x1.75)	2432.86	6587.02	0.85	1.83	8.45	22.87	7.22
Pirod 105218 (12x1.75)	2432.86	6536.27	0.85	1.74	8.45	22.70	7.22
Pirod 105219 (12x2)	2608.79	6534.42	1.22	1.70	9.06	22.69	9.42
Pirod 105219 (12x2)	2608.79	6387.80	1.22	1.38	9.06	22.18	9.42

Load Combinations

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

Comb. No.	Description
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 170	7.64	49	0.466	0.076
T2	170 - 150	6.62	43	0.454	0.072
T3	150 - 130	4.76	43	0.398	0.062
T4	130 - 120	3.22	43	0.307	0.050
T5	120 - 100	2.63	43	0.253	0.041
T6	100 - 80	1.70	43	0.187	0.028
T7	80 - 60	1.02	43	0.128	0.019
T8	60 - 40	0.56	43	0.089	0.012
T9	40 - 20	0.24	43	0.053	0.007
T10	20 - 0	0.07	43	0.026	0.003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Platform Mount [LP 405-1]	49	7.64	0.466	0.076	37524
165.00	AIR32 KRD901146-1_B66_B2A w/ Mount Pipe	43	6.13	0.444	0.070	17908

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 170	32.01	11	1.937	0.320
T2	170 - 150	27.74	11	1.889	0.303
T3	150 - 130	19.92	11	1.663	0.261
T4	130 - 120	13.48	11	1.285	0.210
T5	120 - 100	10.99	11	1.057	0.171
T6	100 - 80	7.10	11	0.781	0.118
T7	80 - 60	4.29	11	0.537	0.080
T8	60 - 40	2.32	11	0.373	0.052
T9	40 - 20	1.01	11	0.220	0.028
T10	20 - 0	0.28	11	0.108	0.013

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Platform Mount [LP 405-1]	11	32.01	1.937	0.320	9071
165.00	AIR32 KRD901146-1_B66_B2A w/ Mount Pipe	11	25.68	1.850	0.293	4340

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.63	5	4.36	24.85	0.175	1	Bolt DS
T2	170	Leg	A325N	0.75	5	15.94	35.78	0.445	1	Bolt DS
T3	150	Leg	A325N	1.00	6	21.94	53.01	0.414	1	Bolt Tension
T4	130	Leg	A325N	1.00	6	21.52	53.01	0.406	1	Bolt Tension
		Diagonal	A325N	1.00	1	7.36	10.66	0.690	1	Member Block Shear
T5	120	Leg	A325N	1.00	6	25.37	53.01	0.478	1	Bolt Tension
		Diagonal	A325N	1.00	1	5.64	10.66	0.529	1	Member Block Shear
T6	100	Leg	A325N	1.00	6	28.47	53.01	0.537	1	Bolt Tension
		Diagonal	A325N	1.00	1	4.77	10.66	0.448	1	Member Block Shear
T7	80	Leg	A325N	1.00	6	31.62	53.01	0.596	1	Bolt Tension
		Diagonal	A325N	1.00	1	5.16	11.68	0.442	1	Member Block Shear
T8	60	Leg	A325N	1.00	6	34.74	53.01	0.655	1	Bolt Tension
		Diagonal	A325N	1.00	1	5.53	11.68	0.473	1	Member Block Shear
T9	40	Leg	A325N	1.25	6	37.86	82.83	0.457	1	Bolt Tension
		Diagonal	A325N	1.25	1	6.13	20.30	0.302	1	Member Block Shear
T10	20	Diagonal	A325N	1.25	1	7.62	20.30	0.375	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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	1 1/2" solid	10.00	2.25	72.0 K=1.00	1.77	-18.88	54.43	0.347 [1]
T2	170 - 150	2" solid	20.00	2.36	56.6 K=1.00	3.14	-74.89	111.84	0.670 [1]
T3	150 - 130	2 1/4" solid	20.00	2.36	50.3 K=1.00	3.98	-135.26	148.69	0.910 [1]
T4	130 - 120	Pirod 105244 (12x1.25)	10.02	10.02	45.4 K=1.00	3.68	-136.44	142.49	0.958 [1]
T5	120 - 100	Pirod 105217 (12x1.5)	20.03	10.02	37.8 K=1.00	5.30	-162.94	214.86	0.758 [1]
T6	100 - 80	Pirod 105217 (12x1.5)	20.03	10.02	37.8 K=1.00	5.30	-184.63	214.86	0.859 [1]
T7	80 - 60	Pirod 105218 (12x1.75)	20.03	10.02	32.4 K=1.00	7.22	-206.97	300.68	0.688 [1]
T8	60 - 40	Pirod 105218 (12x1.75)	20.03	10.02	32.4 K=1.00	7.22	-229.45	300.68	0.763 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T9	40 - 20	Pirod 105219 (12x2)	20.03	10.02	28.4 K=1.00	9.42	-252.89	399.87	0.632 [1]
T10	20 - 0	Pirod 105219 (12x2)	20.03	10.02	28.4 K=1.00	9.42	-275.18	399.87	0.688 [1]

[1] P_u / ϕP_n controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T4	130 - 120	0.5	1.48	121.0	165.67	0.20	1.15	3.39	0.340
T5	120 - 100	0.5	1.47	120.0	238.57	0.20	0.95	3.34	0.286
T6	100 - 80	0.5	1.47	120.0	238.57	0.20	0.30	3.34	0.091
T7	80 - 60	0.5	1.46	119.0	324.71	0.20	0.28	3.38	0.083
T8	60 - 40	0.5	1.46	119.0	324.71	0.20	0.27	3.38	0.080
T9	40 - 20	0.625	1.45	94.4	424.12	0.31	0.31	6.96	0.046
T10	20 - 0	0.625	1.45	94.4	424.12	0.31	0.92	6.96	0.133

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	3/4" solid	4.59	2.22	128.0 K=0.90	0.44	-3.41	6.09	0.560 [1]
T2	170 - 150	7/8" solid	5.04	2.44	120.6 K=0.90	0.60	-5.52	9.34	0.592 [1]
T3	150 - 130	1" solid	5.12	2.47	107.6 K=0.91	0.79	-6.08	15.16	0.401 [1]
T4	130 - 120	L 2.5 x 2.5 x 3/16	11.42	4.98	120.8 K=1.00	0.90	-7.94	13.56	0.586 [1]
T5	120 - 100	L 2.5 x 2.5 x 3/16	11.93	5.38	130.5 K=1.00	0.90	-5.39	11.92	0.452 [1]
T6	100 - 80	L 2.5 x 2.5 x 3/16	13.80	6.33	153.4 K=1.00	0.90	-5.02	8.66	0.580 [1]
T7	80 - 60	L 3 x 3 x 3/16	15.24	7.08	142.5 K=1.00	1.09	-5.45	12.12	0.450 [1]
T8	60 - 40	L 3 x 3 x 3/16	16.80	7.88	158.6 K=1.00	1.09	-5.89	9.79	0.602 [1]
T9	40 - 20	L 3 x 3 x 5/16	18.45	8.68	176.8 K=1.00	1.78	-6.59	12.87	0.512 [1]
T10	20 - 0	L 3 x 3 x 5/16	20.16	9.54	194.4 K=1.00	1.78	-8.35	10.64	0.784 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	3/4" solid	4.00	3.88	173.6 K=0.70	0.44	-0.49	3.31	0.149 [1]
T2	170 - 150	3/4" solid	4.43	4.26	190.9 K=0.70	0.44	-1.38	2.74	0.504 [1]

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T3	150 - 130	7/8" solid	4.93	4.74	182.0 K=0.70	0.60	-2.41	4.10	0.588 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	180 - 170	7/8" solid	4.00	3.88	148.8 K=0.70	0.60	-1.72	6.14	0.281 [1]
T2	170 - 150	7/8" solid	4.01	3.85	147.7 K=0.70	0.60	-1.96	6.22	0.314 [1]
T3	150 - 130	1" solid	4.51	4.33	145.4 K=0.70	0.79	-2.41	8.40	0.287 [1]

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	180 - 170	7/8" solid	4.00	3.88	148.8 K=0.70	0.60	-1.40	6.14	0.229 [1]
T2	170 - 150	7/8" solid	4.49	4.32	165.9 K=0.70	0.60	-2.52	4.94	0.510 [1]
T3	150 - 130	1" solid	4.99	4.80	161.2 K=0.70	0.79	-2.70	6.83	0.395 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	180 - 170	1 1/2" solid	10.00	0.50	16.0	1.77	18.46	79.52	0.232 [1]
T2	170 - 150	2" solid	20.00	0.57	13.6	2.19	73.81	106.69	0.692 [1] [#]
T3	150 - 130	2 1/4" solid	20.00	0.57	12.1	3.98	131.62	178.92	0.736 [1]
T4	130 - 120	Pirod 105244 (12x1.25)	10.02	10.02	45.4	3.68	129.11	165.67	0.779 [1]
T5	120 - 100	Pirod 105217 (12x1.5)	20.03	10.02	37.8	5.30	152.20	238.57	0.638 [1]
T6	100 - 80	Pirod 105217 (12x1.5)	20.03	10.02	37.8	5.30	170.83	238.57	0.716 [1]
T7	80 - 60	Pirod 105218 (12x1.75)	20.03	10.02	32.4	7.22	189.70	324.71	0.584 [1]
T8	60 - 40	Pirod 105218 (12x1.75)	20.03	10.02	32.4	7.22	208.47	324.71	0.642 [1]
T9	40 - 20	Pirod 105219 (12x2)	20.03	10.02	28.4	9.42	227.13	424.12	0.536 [1]
T10	20 - 0	Pirod 105219 (12x2)	20.03	10.02	28.4	9.42	244.49	424.12	0.576 [1]

[1] P_u / ϕP_n controls
[#] Based on net area of leg in section below

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T4	130 - 120	0.5	1.48	121.0	165.67	0.20	1.15	3.39	0.340
T5	120 - 100	0.5	1.47	120.0	238.57	0.20	0.95	3.34	0.286
T6	100 - 80	0.5	1.47	120.0	238.57	0.20	0.30	3.34	0.091
T7	80 - 60	0.5	1.46	119.0	324.71	0.20	0.28	3.38	0.083
T8	60 - 40	0.5	1.46	119.0	324.71	0.20	0.27	3.38	0.080
T9	40 - 20	0.625	1.45	94.4	424.12	0.31	0.31	6.96	0.046
T10	20 - 0	0.625	1.45	94.4	424.12	0.31	0.92	6.96	0.133

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	3/4" solid	4.59	2.22	142.3	0.44	3.40	19.88	0.171 [1]
T2	170 - 150	7/8" solid	5.04	2.44	134.0	0.60	5.49	27.06	0.203 [1]
T3	150 - 130	1" solid	5.12	2.47	118.7	0.79	6.02	35.34	0.170 [1]
T4	130 - 120	L 2.5 x 2.5 x 3/16	11.42	4.98	80.0	0.52	7.36	22.55	0.326 [1]
T5	120 - 100	L 2.5 x 2.5 x 3/16	11.93	5.38	86.2	0.52	5.64	22.55	0.250 [1]
T6	100 - 80	L 2.5 x 2.5 x 3/16	13.80	6.33	100.7	0.52	4.77	22.55	0.212 [1]
T7	80 - 60	L 3 x 3 x 3/16	15.24	7.08	93.1	0.66	5.16	28.67	0.180 [1]
T8	60 - 40	L 3 x 3 x 3/16	16.80	7.88	103.4	0.66	5.53	28.67	0.193 [1]
T9	40 - 20	L 3 x 3 x 5/16	17.62	8.27	111.0	1.01	6.13	44.05	0.139 [1]
T10	20 - 0	L 3 x 3 x 5/16	20.16	9.54	127.6	1.01	7.62	44.05	0.173 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	3/4" solid	4.00	3.88	248.0	0.44	0.65	19.88	0.033 [1]
T2	170 - 150	3/4" solid	4.37	4.20	268.9	0.44	1.38	19.88	0.069 [1]
T3	150 - 130	7/8" solid	4.87	4.68	256.8	0.60	2.41	27.06	0.089 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	7/8" solid	4.00	3.88	212.6	0.60	1.72	27.06	0.064 [1]
T2	170 - 150	7/8" solid	4.01	3.85	211.1	0.60	1.95	27.06	0.072 [1]
T3	150 - 130	1" solid	4.51	4.33	207.7	0.79	2.41	35.34	0.068 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	7/8" solid	4.00	3.88	212.6	0.60	1.48	27.06	0.055 [1]
T2	170 - 150	7/8" solid	4.49	4.32	236.9	0.60	2.57	27.06	0.095 [1]
T3	150 - 130	1" solid	4.99	4.80	230.3	0.79	2.87	35.34	0.081 [1]

[1] P_u / ϕP_n controls

Section Capacity Table

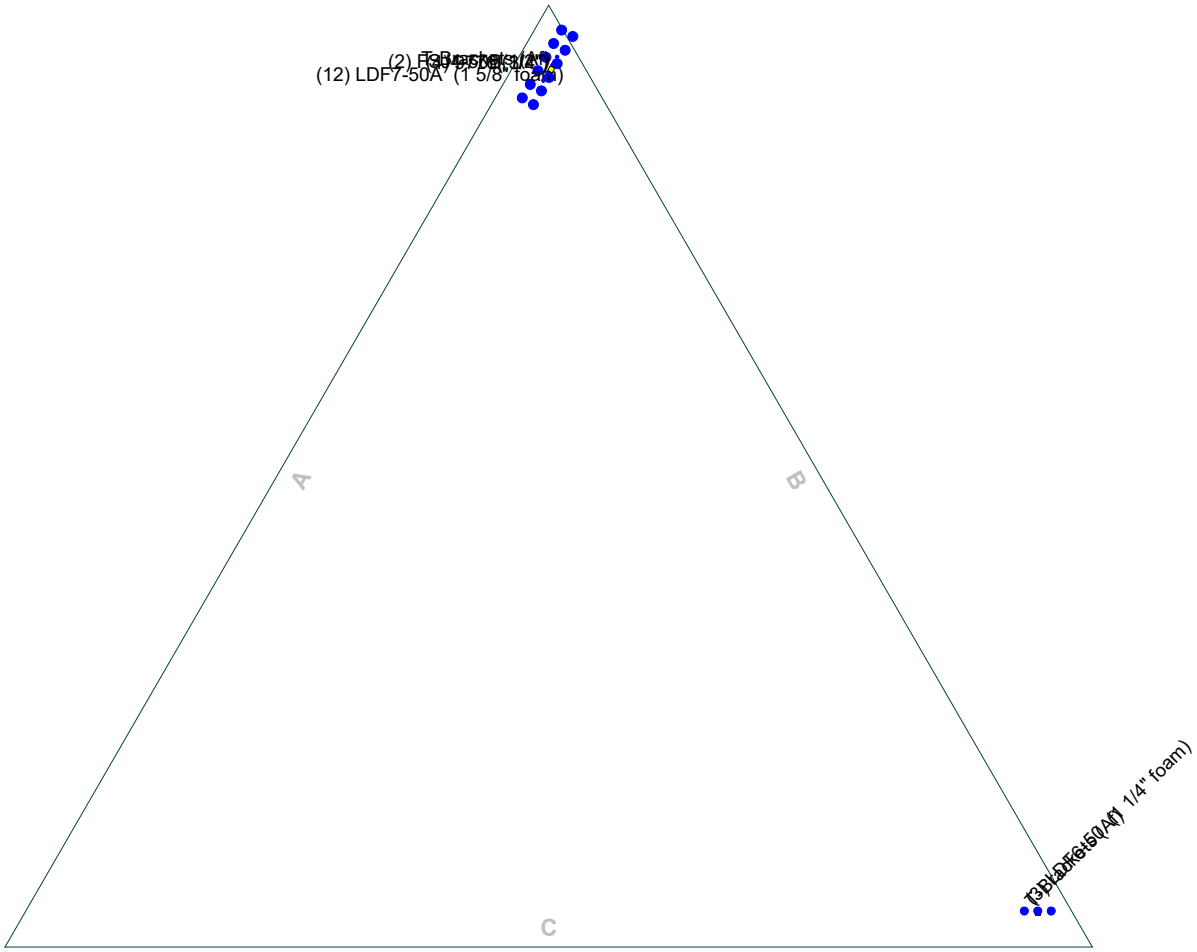
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 170	Leg	1 1/2" solid	2	-18.88	54.43	34.7	Pass
T2	170 - 150	Leg	2" solid	38	73.81	106.69	69.2	Pass
T3	150 - 130	Leg	2 1/4" solid	102	-135.26	148.69	91.0	Pass
T4	130 - 120	Leg	Pirod 105244 (12x1.25)	166	-136.44	142.49	95.8	Pass
T5	120 - 100	Leg	Pirod 105217 (12x1.5)	175	-162.94	214.86	75.8	Pass
T6	100 - 80	Leg	Pirod 105217 (12x1.5)	190	-184.63	214.86	85.9	Pass
T7	80 - 60	Leg	Pirod 105218 (12x1.75)	205	-206.97	300.68	68.8	Pass
T8	60 - 40	Leg	Pirod 105218 (12x1.75)	220	-229.45	300.68	76.3	Pass
T9	40 - 20	Leg	Pirod 105219 (12x2)	235	-252.89	399.87	63.2	Pass
T10	20 - 0	Leg	Pirod 105219 (12x2)	250	-275.18	399.87	68.8	Pass
T1	180 - 170	Diagonal	3/4" solid	12	-3.41	6.09	56.0	Pass
T2	170 - 150	Diagonal	7/8" solid	48	-5.52	9.34	59.2	Pass
T3	150 - 130	Diagonal	1" solid	161	-6.08	15.16	40.1	Pass
T4	130 - 120	Diagonal	L 2.5 x 2.5 x 3/16	173	-7.94	13.56	58.6 69.0 (b)	Pass
T5	120 - 100	Diagonal	L 2.5 x 2.5 x 3/16	186	-5.39	11.92	45.2 52.9 (b)	Pass
T6	100 - 80	Diagonal	L 2.5 x 2.5 x 3/16	194	-5.02	8.66	58.0	Pass
T7	80 - 60	Diagonal	L 3 x 3 x 3/16	209	-5.45	12.12	45.0	Pass
T8	60 - 40	Diagonal	L 3 x 3 x 3/16	224	-5.89	9.79	60.2	Pass
T9	40 - 20	Diagonal	L 3 x 3 x 5/16	239	-6.59	12.87	51.2	Pass
T10	20 - 0	Diagonal	L 3 x 3 x 5/16	254	-8.35	10.64	78.4	Pass
T1	180 - 170	Horizontal	3/4" solid	30	-0.49	3.31	14.9	Pass
T2	170 - 150	Horizontal	3/4" solid	52	-1.38	2.74	50.4	Pass
T3	150 - 130	Horizontal	7/8" solid	116	-2.41	4.10	58.8	Pass
T1	180 - 170	Top Girt	7/8" solid	5	-1.72	6.14	28.1	Pass
T2	170 - 150	Top Girt	7/8" solid	42	-1.96	6.22	31.4	Pass
T3	150 - 130	Top Girt	1" solid	104	-2.41	8.40	28.7	Pass
T1	180 - 170	Bottom Girt	7/8" solid	7	-1.40	6.14	22.9	Pass
T2	170 - 150	Bottom Girt	7/8" solid	45	-2.52	4.94	51.0	Pass
T3	150 - 130	Bottom Girt	1" solid	107	-2.70	6.83	39.5	Pass
							Summary	
						Leg (T4)	95.8	Pass
						Diagonal (T10)	78.4	Pass
						Horizontal (T3)	58.8	Pass
						Top Girt (T2)	31.4	Pass
						Bottom Girt (T2)	51.0	Pass
						Bolt Checks	69.0	Pass
						RATING =	**95.8**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

Feed Line Plan

Round Flat App In Face App Out Face Truss-Leg



Paul J. Ford and Company
250 E. Broad St., Ste 600
Columbus, OH 43215
Phone: 614-221-6679
FAX:

Job: ***180-ft Self-Support Tower / WESTHARTFORD_DEXTERS***			
Project: ***PJF# 64120-0001 / CT0001***			
Client: Hirschfeld Communications, LLC	Drawn by: Michael Bange	App'd:	
Code: TIA-222-G	Date: 06/10/21	Scale: NTS	
Path: G:\TOWER\641 Hirschfeld Communications\2020\64120-0001 CT001\64120-0001.002.8700 SA\TNX\64120-0001.002.8700.eri		Dwg No. E-7	

APPENDIX C

ADDITIONAL CALCULATIONS

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Page	1	of	1
By	MTB	Date	6/10/2021
Project #	64120-0001		

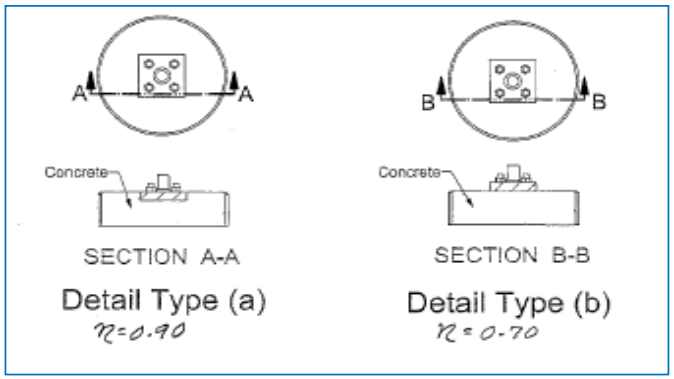
Self-Support Tower Anchor Rod Capacity - TIA-G

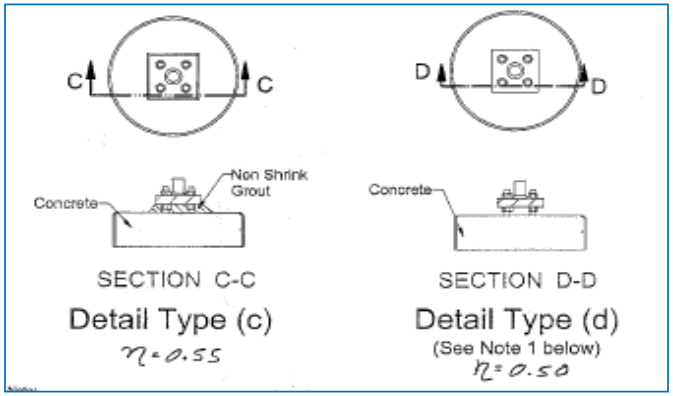
Loads

Compression :	282	kips	Tension :	250	kips	Code:	TIA-G
Comp. Shear :	26	kips	Ten.Shear :	23	kips	Maximum Ratio:	1.00

Existing Anchor Rods

Anchor Rod Condition (n) :	0.55	
Anchor Rod ø :	1 1/4	in
Anchor Rod Quantity :	6	
Anchor Rod Grade :	F1554 Gr. 105	
F_y :	105	ksi
F_u :	125	ksi
Threads per Inch	7	
Net Tensile Area	0.97	in^2
ϕ_t :	0.80	
$\phi_t R_{nt}$:	581.47	kip
Anchor Rod Ratio :	0.502	





PJF Job No. **64118-0001** Project Name: **West Hartford** Engineer: MTB

Factored Foundation Loads:

	Comp	Uplift	
Factored Axial Load (+Comp, -Ten) =	**282**	**-250**	kips
Factored Horiz. Load at Top of Pier =	**26**	**23**	kips
Factored OTM at Top of Pier =	**0**	**0**	k-ft

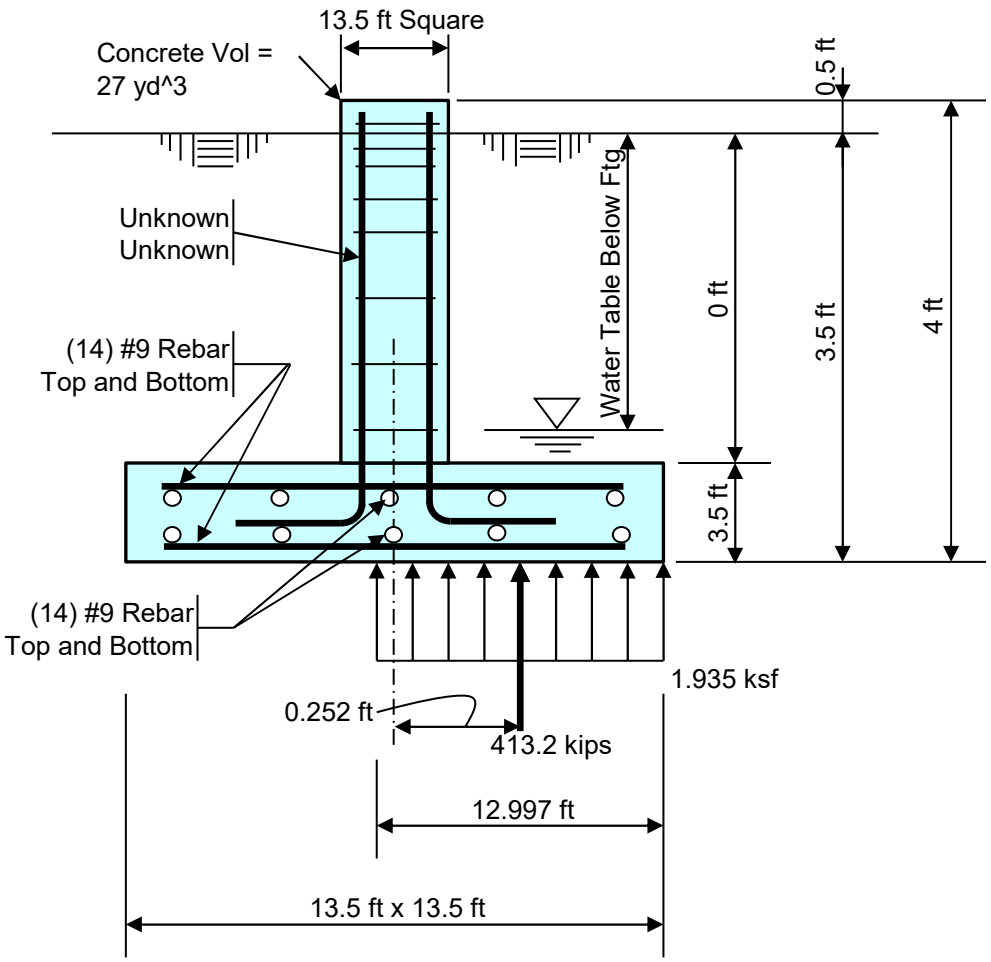
LRFD Resistance and Load Factors:

	Φ	Dead Load Factors	
Soil Bearing =	**0.75**		
Soil Weight =	**0.75**	1.2	0.9
Concrete Weight =	**0.75**	1.2	0.9

Soil Properties:

Depth to Water Table =	**99**	ft
Uplift Cone from	**Top**	of footing
Depth to Ignore for Uplift and PP =	**3.33**	ft

Layer Thk ft	Soil Density pcf	Cohesion ksf	Friction Angle degrees	Ult Bearing ksf	Depth ft
3.5	**100**	**0**	**28**	**12**	**3.50**



Dimensions:

Pier Shape =	**Square**	
Pier Width =	**13.5**	ft Square
Pier Height above Grade =	**0.5**	ft
Depth to Bottom of Footing =	**3.5**	ft
Footing Thickness =	**3.5**	ft
Footing Width, B =	**13.5**	ft
Footing Length, L =	**13.5**	ft

Concrete:

Concrete Strength =	**3**	ksi
Rebar Strength =	**60**	ksi

Total Pad Reinf Stl = **28.00** in^2 >= 12.25 in^2 = Min Stl, OK

Total Pier Reinf Stl =

Footing Thickness = **3.50** ft >= 0.75 ft = Min Ftg Thk, OK

Summary Results:

	Required		Available		
Maximum Net Soil Bearing =	**1.935**	ksf	**9.000**	ksf	
Uplift =	**250.0**	kips	**96.4**	kips	
Punching Shear Stress =	**0.000**	ksi	**0.159**	ksi	Stress Ratio = **0.0%** in Punching Shear
Bending Shear Stress =	**-4.7**	kips	**496.6**	kips	Stress Ratio = **0.9%** in Bending Shear
Bending Moment =	**0.004**	in / in	**0.0**	in / in	Stress Ratio = **9.1%** in Bending Moment
Conc Pier Reinforcing Steel =					Rebar Unknown

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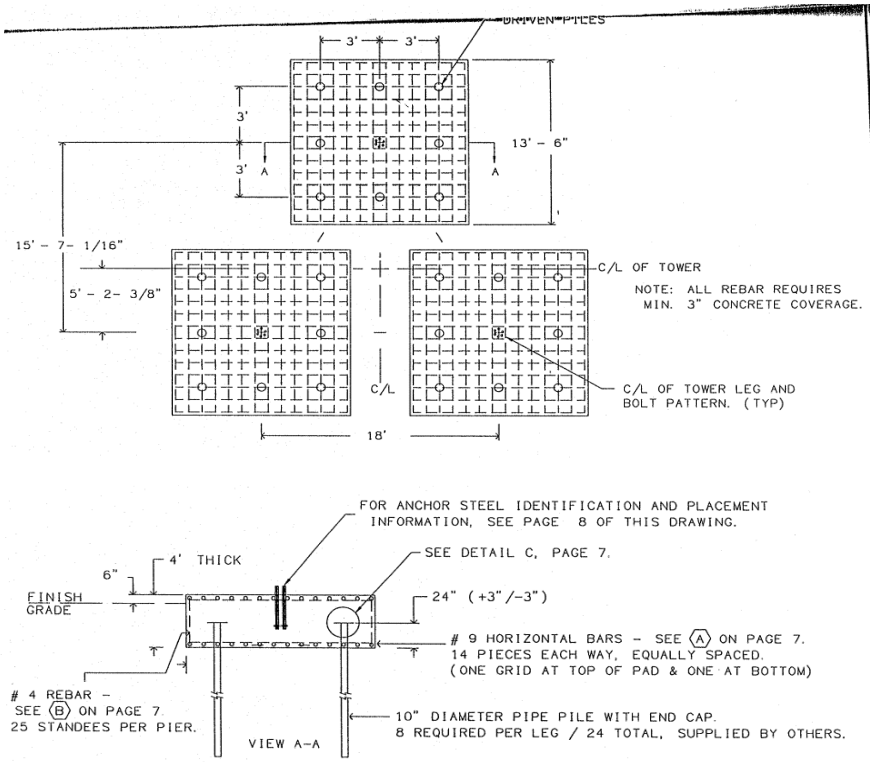
West Hartford Foundation Analysis

Uplift (kips):	250
Compression (kips):	282
Concrete Weight (kcf):	0.15
Mat Length/Width (ft):	13.5
Mat Depth (ft):	4
Mat Weight (kips):	109.4
Mat Bearing Area (ft^2):	182.3
Pile Quantity	8
Pile Diameter (in):	10
Pile Length (ft):	50
Depth to Ignore (ft):	8
Total Pile Surface Area (ft^2):	879.6
Ultimate Bearing Pressure (ksf):	12
Ultimate Skin Friction (ksf):	1
$Ø_{soil}$:	0.75
Mat Bearing Capacity (kips):	1640.3
Skin Friction Capcity (kips):	659.7
Total Uplift Load (kips):	250.0
Total Compression Load (kips):	413.2



Uplift Capacity (kips):	758.1
Compression Capacity (kips):	2300.0
Uplift Usage Capacity:	**33.0%**
Compression Usage Capacity:	**18.0%**

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES BY PAUL J. FORD AND COMPANY

1) Paul J. Ford and Company has not made a field inspection to verify the tower member sizes or the antenna/coax loading. If the existing conditions are not as represented on these drawings, we should be contacted immediately to evaluate the significance of the deviation.

2) No allowance was made for any damaged, missing, or rusted members. The analysis of this tower assumes that no physical deterioration has occurred in any of the structural components of the tower and that all the tower members have the same load carrying capacity as the day the tower was erected.

3) It is not possible to have all the detailed information to perform a thorough analysis of every structural sub-component of an existing tower. The structural analysis by Paul J. Ford and Company verifies the adequacy of the main structural members of the tower. Paul J. Ford and Company provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc.

4) This tower has been analyzed according to the minimum design wind loads recommended by the Telecommunications Industry Association Standard ANSI/TIA-222-G. If the owner or local or state agencies require a higher design wind load, Paul J. Ford and Company should be made aware of this requirement.

5) The enclosed sketches are a schematic representation of the tower that we have analyzed. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions and for the proper fit and clearance in the field.

6) Miscellaneous items such as antenna mounts etc. have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.