



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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E-Mail: siting.council@ct.gov

Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

March 25, 2022

Victoria Masse
Northeast Site Solutions
420 Main Street, Unit 1, Box 2
Sturbridge, MA 01566
victoria@northeastsitesolutions.com

RE: **TS-DISH-104-220207** - Dish Wireless LLC request for an order to approve tower sharing at an existing telecommunications facility located at 2 Hinckley Hill Road, Norwich, Connecticut.

Dear Ms. Masse:

The Connecticut Siting Council (Council) is in receipt of your correspondence of March 18, 2022 submitted in response to the Council's March 4, 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,

A handwritten signature in dark ink, appearing to read "Melanie A. Bachman".

Melanie A. Bachman
Executive Director

MAB/IN/emr

c: Deborah Chase; Senior Project Coordinator, Northeast Site Solutions

FW: BOBOS00070B-Fwd: Council Incomplete Letter for TS-DISH-104-220207 (Hinckley Hill Road, Norwich)



This message was sent with High importance.



You forwarded this message on Tue 3/22/2022 6:23 AM

This message was sent with High importance. You forwarded this message on Tue 3/22/2022 6:23 AM

DC

Deborah Chase <deborah@northeastsitesolutions.com>

Fri 3/18/2022 1:53 PM



To:

- **CSC-DL Siting Council;**
- Bachman, Melanie;
- Mathews, Lisa A;
- Fontaine, Lisa;
- Robidoux, Evan

Cc:

- Denise <denise@northeastsitesolutions.com>;
- Chuck Regulbuto <chuck@northeastsitesolutions.com>;
- Paul Sagristano <psagristano@northeastsitesolutions.com>

+4 others

TS-DISH-104-220207_incompletltr_hinckleyrd (2).pdf

144 KB



2 HINCKLEY ROAD NORWICH CT 06360 DISH WIRELESS TOWER SHARE APPLICATION (BOBOS00070B-Dish).pdf

23 MB



BOBOS00070B- Signed and Stamped Structural Analysis.pdf

2 MB



3 attachments (25 MB)Save all to OneDrive - State of ConnecticutDownload all

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Siting Council-

Resending from 3/10.

Please confirm receipt.

Thank you very much

From: Deborah Chase <deborah@northeastsitesolutions.com>
Sent: Thursday, March 10, 2022 7:56 AM
To: 'Victoria Masse' <victoria@northeastsitesolutions.com>; Denise Sabo <denise@northeastsitesolutions.com>
Cc: 'Jason Berry' <jberry@northeastsitesolutions.com>; Chuck Regulbuto <chuck@northeastsitesolutions.com>; 'Paul Sagristano' <psagristano@northeastsitesolutions.com>; 'Jennifer Cannon' <jcannon@northeastsitesolutions.com>; Eric Proulx <eproulx@northeastsitesolutions.com>; Phillip Sipe <phillip@northeastsitesolutions.com>
Subject: RE: BOBOS00070B-Fwd: Council Incomplete Letter for TS-DISH-104-220207 (Hinckley Hill Road, Norwich)

Siting Council-

Please see attached Structural Analysis that is both signed and stamped by the engineer as requested per the incomplete letter.

The document loses the signature when merged with other pdf documents so in the application it is not visible.

Please confirm this is sufficient to render the submission complete for review.

Thank you very much

On Fri, Mar 4, 2022 at 2:43 PM Victoria Masse <victoria@northeastsitesolutions.com> wrote:
Per the incomplete letter from the CSC we need to have the engineer sign the SA, it's stamped but not signed by him.

"Staff has reviewed this tower share request for completeness and has identified a deficiency in the submittal. The Structural Analysis (SA) prepared by Paul J. Ford and Company, and dated February 3, 2022 and provided with the request includes a stamp but is not signed by a Professional Engineer licensed in the State of Connecticut."

Thank you

----- Forwarded message -----

From: Robidoux, Evan <Evan.Robidoux@ct.gov>
Date: Fri, Mar 4, 2022 at 12:34 PM
Subject: Council Incomplete Letter for TS-DISH-104-220207 (Hinckley Hill Road, Norwich)
To: Victoria Masse <victoria@northeastsitesolutions.com>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>

Please see the attached correspondence.

Evan Robidoux
Clerk Typist
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Report Date: February 3, 2022

Client: Everest Infrastructure Partners
Two Allegheny Center
Pittsburgh, PA 15212
Attn: Thomas Rigg
(603) 498-7462
tom.rigg@everestinfrastructure.com

Structure: Existing 150-ft Self Support Tower
Site Name: Norwich CDT
Site Reference #: BOBOS00070B
Site Address: 2 Hinkley Hill Rd
City, County, State: Norwich, New London County, CT
Latitude, Longitude: 41.514847°, -72.061689°

PJF Project: A13321-0008.003.8700

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 135 mph (converted to an equivalent 105 mph nominal 3-second gust wind speed per Section 1609.3.1 for use with TIA-222 G) as required by the 2018 Connecticut State Building Code. 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:

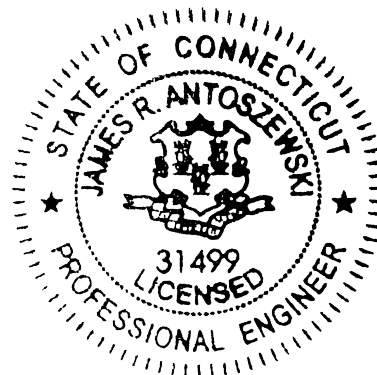
Existing Structure: Pass – 85.3%
Existing Foundation: Pass – 92.8%

We at Paul J. Ford and Company appreciate the opportunity of providing our continuing professional services to you and Everest Infrastructure Partners. 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



Anna Trudo, E.I.
Structural Designer
atrudo@pauljford.com



02/03/2022

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1) INTRODUCTION

This tower is a 150 ft Self Support tower designed by Fred A Nudd Corporation in July of 1999. All tower geometry and foundation information were taken from a previous structural analysis by Fred Nudd Corp dated 6/11/2018.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-G
Risk Category:	II
Wind Speed:	105 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	0.75 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)
105.0	105.0	3	fujitsu	TA08025-B604	1	1-5/8
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-20_V0F w/ Mount Pipe		
		1	mounts	Sabre_C10837002C-32788_Sector_(3)		
		1	raycap	RDIDC-9181-PF-48		

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)
150.0	150.0	3	ericsson	AIR 32 B66AA B2P_T-MOBILE w/ Mount Pipe	6 3	1-5/8 1-1/4
		3	ericsson	AIR 6449 B41 w/ Mount Pipe		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	ericsson	RRUS 4415 B25		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
		3	tower mounts	Site Pro 1 VFA12-HD		
140.0	140.0	6	alcatel lucent	1900 MHz 4x45W RRH	4	1-1/4
		6	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8x20-25		
		3	commscope	DT465B-2XR w/ Mount Pipe		
		3	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe		
		1	tower mounts	Sector Mount [SM 802-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
126.0	127.5	3	commscope	CBC78T-DS-43-2X	12 2	1-5/8 Hybrid
		6	commscope	JAHH-65B-R3B w/ Mount Pipe		
		1	raycap	DB-B1-6C-12AB-0Z		
		1	raycap	RRFDC-3315-PF-48		
		2	rfs celwave	APL866513 w/ Mount Pipe		
		4	rfs celwave	APL868013 w/ Mount Pipe		
		3	samsung telecommunications	64T64R w/ Mount Pipe		
		3	samsung telecommunications	B2/B66A RRH-BR049		
		3	samsung telecommunications	B5/B13 RRH-BR04C		
	126.0	3	commscope	BSAMNT-SBS-2-2 (Mount Bracket)		
		1	tower mounts	Sector Mount [SM 802-3]		
115.0	115.0	2	cci antennas	DMP65R-BU6D w/ Mount Pipe	6 8 2	1-1/4 DC cable fiber
		1	cci antennas	DMP65R-BU8D w/ Mount Pipe		
		2	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe		
		1	cci antennas	OPA-65R-LCUU-H8 w/ Mount Pipe		
		3	ericsson	RRUS 32 B2		
		3	ericsson	RRUS 32 B30		
		3	ericsson	RRUS 32 B66A		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS E2 B29		
		2	kmw communications	EPBQ-654L8H6-L2 w/ Mount Pipe		
		1	kmw communications	EPBQ-654L8H8-L2 w/ Mount Pipe		
		3	powerwave technologies	7770 w/ Mount Pipe		
		6	powerwave technologies	LGP21401		
		4	raycap	DC6-48-60-18-8F		
		3	tower mounts	Site Pro 1 VFA12-HD		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Source
Tower Structural Analysis	Nudd Corp #118-23067 dated 6/11/2018	on file

3.1) Analysis Method

tnxTower (version 8.1.1.0), 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.

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.
 - 3) All tower geometry and foundation information were taken from a previous structural analysis by Fred Nudd Corp dated 6/11/2018.
 - 4) The antenna feedlines are assumed to be placed as indicated in Appendix B.
- 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 (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T1	150 - 140	Leg	Pipe 2.875" x 0.203" (2.5 STD)	2	-11649	82352	14.1	Pass
T2	140 - 120	Leg	Pipe 2.875" x 0.203" (2.5 STD)	21	-51730	62849	82.3	Pass
T3	120 - 100	Leg	Pipe 4.5" x 0.237" (4 STD)	48	-108815	138323	78.7	Pass
T4	100 - 80	Leg	Pipe 5.563" x 0.258" (5 STD)	75	-156683	184163	85.1	Pass
T5	80 - 60	Leg	Pipe 6.625" x 0.280" (6 STD)	94	-200371	248307	80.7	Pass
T6	60 - 40	Leg	Pipe 8.625" x 0.322" (8 STD)	115	-240478	387660	62.0	Pass
T7	40 - 20	Leg	Pipe 8.625" x 0.50" (8 XS)	136	-275341	550137	50.0	Pass
T8	20 - 0	Leg	Pipe 8.625" x 0.50" (8 XS)	151	-310195	550137	56.4	Pass
T1	150 - 140	Diagonal	L 1.5 x 1.5 x 3/16	9	-2659	6096	43.6	Pass
T2	140 - 120	Diagonal	L 2 x 2 x 3/16	24	-7248	12216	59.3 74.7 (b)	Pass
T3	120 - 100	Diagonal	L 2 x 2 x 3/16	54	-7722	9453	81.7	Pass
T4	100 - 80	Diagonal	L 2.5 x 2.5 x 3/16	81	-7950	11411	69.7 85.0 (b)	Pass
T5	80 - 60	Diagonal	L 3 x 3 x 3/16	101	-7983	14952	53.4 82.7 (b)	Pass
T6	60 - 40	Diagonal	L 3 x 3 x 3/16	122	-8500	11937	71.2 85.3 (b)	Pass
T7	40 - 20	Diagonal	L 3.5 x 3.5 x 1/4	143	-9216	16716	55.1 63.2 (b)	Pass
T8	20 - 0	Diagonal	L 3.5 x 3.5 x 1/4	158	-9767	13815	70.7	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T1	150 - 140	Top Girt	L 3 x 3 x 1/4	5	-717	23047	3.1 9.0 (b)	Pass
							Summary	
						Leg (T4)	85.1	Pass
						Diagonal (T6)	85.3	Pass
						Top Girt (T1)	9.0	Pass
						Bolt Checks	85.3	Pass
						Rating =	85.3	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	86.5	Pass
1	Base Foundation (Soil Interaction)	0	92.8	Pass

Structure Rating (max from all components) =	92.8%
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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

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 150.00 ft above the ground line.

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

The face width of the tower is 6.00 ft at the top and 18.00 ft at the base.

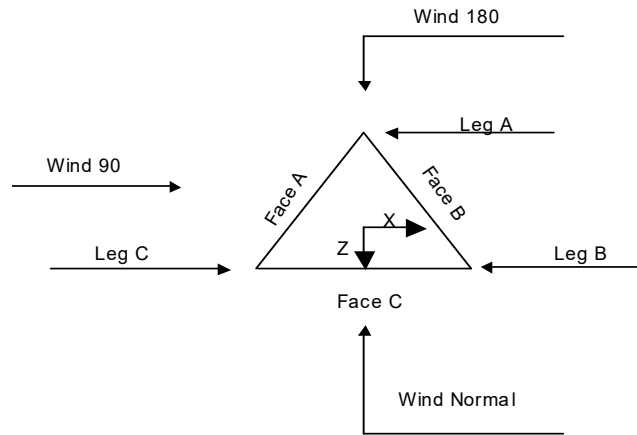
This tower is designed using the TIA-222-G standard.

The following design criteria apply:

- Tower is located in New London County, Connecticut.
- ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
- Basic wind speed of 105 mph.
- Structure Class II.
- Exposure Category B.
- Topographic Category 1.
- Crest Height 0.00 ft.
- Nominal ice thickness of 0.750 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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.
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Use TIA-222-G Tension Splice
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Exemption
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Poles
√ SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Include Shear-Torsion Interaction
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Always Use Sub-Critical Flow
		Use Top Mounted Sockets
		Pole Without Linear Attachments
		Pole With Shroud Or No
		Appurtenances
		Outside and Inside Corner Radii Are
		Known



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	150.00-140.00			6.00	1	10.00
T2	140.00-120.00			6.00	1	20.00
T3	120.00-100.00			6.00	1	20.00
T4	100.00-80.00			8.00	1	20.00
T5	80.00-60.00			10.00	1	20.00
T6	60.00-40.00			12.00	1	20.00
T7	40.00-20.00			14.00	1	20.00
T8	20.00-0.00			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	150.00-140.00	4.33	X Brace	No	No	8.000	8.000
T2	140.00-120.00	4.67	X Brace	No	No	8.000	8.000
T3	120.00-100.00	4.67	X Brace	No	No	8.000	8.000
T4	100.00-80.00	6.25	X Brace	No	No	7.500	7.500
T5	80.00-60.00	6.25	X Brace	No	No	7.500	7.500
T6	60.00-40.00	6.25	X Brace	No	No	7.500	7.500
T7	40.00-20.00	9.33	X Brace	No	No	8.000	8.000
T8	20.00-0.00	9.33	X Brace	No	No	8.000	8.000

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 150.00-140.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A500M-54 (54 ksi)	Single Angle	L 1.5 x 1.5 x 3/16	A36 (36 ksi)
T2 140.00-120.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A500M-54 (54 ksi)	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)
T3 120.00-100.00	Pipe	Pipe 4.5" x 0.237" (4 STD)	A500M-54 (54 ksi)	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)
T4 100.00-80.00	Pipe	Pipe 5.563" x 0.258" (5 STD)	A500M-54 (54 ksi)	Single Angle	L 2.5 x 2.5 x 3/16	A36 (36 ksi)
T5 80.00-60.00	Pipe	Pipe 6.625" x 0.280" (6 STD)	A500M-54 (54 ksi)	Single Angle	L 3 x 3 x 3/16	A36 (36 ksi)
T6 60.00-40.00	Pipe	Pipe 8.625" x 0.322" (8 STD)	A500M-54 (54 ksi)	Single Angle	L 3 x 3 x 3/16	A36 (36 ksi)
T7 40.00-20.00	Pipe	Pipe 8.625" x 0.50" (8 XS)	A500M-54 (54 ksi)	Single Angle	L 3.5 x 3.5 x 1/4	A36 (36 ksi)
T8 20.00-0.00	Pipe	Pipe 8.625" x 0.50" (8 XS)	A500M-54 (54 ksi)	Single Angle	L 3.5 x 3.5 x 1/4	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 150.00-140.00	Single Angle	L 3 x 3 x 1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
T1 150.00-140.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000
T2 140.00-120.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000
T3 120.00-100.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000
T4 100.00-80.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000
T5 80.00-60.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000
T6 60.00-40.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000
T7 40.00-20.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000
T8 20.00-0.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000

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 150.00-140.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 140.00-120.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 120.00-100.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 100.00-80.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 80.00-60.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 60.00-40.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 40.00-20.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 20.00-0.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

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 150.00-140.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 140.00-120.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 120.00-100.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 100.00-80.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 80.00-60.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 60.00-40.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 40.00-20.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 20.00-0.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	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 150.00-140.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 140.00-120.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 120.00-100.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 100.00-80.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	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 80.00-60.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 60.00-40.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 40.00-20.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 20.00-0.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	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 150.00-140.00	Flange	0.750 A325N	4	0.500 A325N	1	0.500 A325N	1	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T2 140.00-120.00	Flange	1.000 A325N	4	0.625 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T3 120.00-100.00	Flange	1.000 A325N	6	0.625 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T4 100.00-80.00	Flange	1.000 A325N	8	0.625 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T5 80.00-60.00	Flange	1.250 A325N	8	0.625 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T6 60.00-40.00	Flange	1.250 A325N	8	0.625 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T7 40.00-20.00	Flange	1.250 A325N	8	0.750 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T8 20.00-0.00	Flange	1.500 A325N	0	0.750 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 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 Spacin g in	Width or Diameter in	Perimeter in	Weight plf
Safety Line 3/8	C	No	No	Ar (CaAa)	150.00 - 0.00	0.000	-0.5	1	1	0.375	0.375		0.22
1.5" flat Cable Ladder Rail	C	No	No	Af (CaAa)	150.00 - 0.00	0.000	-0.25	2	2	30.000 1.500	1.500		1.80
LDF7-50A(1-5/8")	C	No	No	Ar (CaAa)	150.00 - 0.00	0.000	-0.25	6	6	1.980	1.980		0.82
AVA6-50(1-1/4")**	C	No	No	Ar (CaAa)	150.00 - 0.00	0.000	-0.25	3	3	1.560	1.560		0.45
1.5" flat Cable Ladder Rail	A	No	No	Af (CaAa)	140.00 - 0.00	0.000	-0.25	2	2	30.000 1.500	1.500		1.80
AVA6-50(1-1/4")**	A	No	No	Ar (CaAa)	140.00 - 0.00	0.000	-0.25	4	4	1.560	1.560		0.45
1.5" flat Cable Ladder Rail	B	No	No	Af (CaAa)	127.50 - 0.00	0.000	-0.25	2	2	30.000 1.500	1.500		1.80

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") **	B	No	No	Ar (CaAa)	127.50 - 0.00	0.000	-0.25	14	14	1.000 1.980	1.980		0.82
1.5" flat Cable Ladder Rail	C	No	No	Af (CaAa)	115.00 - 0.00	0.000	0.25	2	2	30.000 1.500	1.500		1.80
AVA6-50(1-1/4")	C	No	No	Ar (CaAa)	115.00 - 0.00	0.000	0.25	6	6	1.560	1.560		0.45
DC (3/4")	C	No	No	Ar (CaAa)	115.00 - 0.00	0.000	0.25	2	2	1.090	0.750		0.33
DC (3/4")	C	No	No	Ar (CaAa)	115.00 - 0.00	0.000	0.25	6	6	1.090	0.001		0.33
Fiber (3/8")	C	No	No	Ar (CaAa)	115.00 - 0.00	0.000	0.25	2	1	1.090	0.001		0.33
3" (Nominal) Conduit **	C	No	No	Ar (CaAa)	115.00 - 0.00	0.000	0.25	1	1	3.500	3.500		1.49
HB158-21U6S12-XXXM-01(1-5/8)	A	No	No	Ar (CaAa)	105.00 - 0.00	0.000	-0.2	1	1	1.990	1.990		1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight lb
T1	150.00-140.00	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	21.935	0.000	101
T2	140.00-120.00	A	0.000	0.000	22.480	0.000	108
		B	0.000	0.000	24.540	0.000	113
		C	0.000	0.000	43.870	0.000	202
T3	120.00-100.00	A	0.000	0.000	23.475	0.000	118
		B	0.000	0.000	65.440	0.000	302
		C	0.000	0.000	72.922	0.000	368
T4	100.00-80.00	A	0.000	0.000	26.460	0.000	146
		B	0.000	0.000	65.440	0.000	302
		C	0.000	0.000	82.606	0.000	424
T5	80.00-60.00	A	0.000	0.000	26.460	0.000	146
		B	0.000	0.000	65.440	0.000	302
		C	0.000	0.000	82.606	0.000	424
T6	60.00-40.00	A	0.000	0.000	26.460	0.000	146
		B	0.000	0.000	65.440	0.000	302
		C	0.000	0.000	82.606	0.000	424
T7	40.00-20.00	A	0.000	0.000	26.460	0.000	146
		B	0.000	0.000	65.440	0.000	302
		C	0.000	0.000	82.606	0.000	424
T8	20.00-0.00	A	0.000	0.000	26.460	0.000	146
		B	0.000	0.000	65.440	0.000	302
		C	0.000	0.000	82.606	0.000	424

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight lb
T1	150.00-140.00	A	1.739	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	63.554	0.000	933
T2	140.00-120.00	A	1.720	0.000	0.000	61.780	0.000	900

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight lb
T3	120.00-100.00	B	1.692	0.000	0.000	50.623	0.000	793
		C		0.000	0.000	126.645	0.000	1846
		A		0.000	0.000	64.058	0.000	932
T4	100.00-80.00	B	1.658	0.000	0.000	134.607	0.000	2085
		C		0.000	0.000	235.433	0.000	3266
		A		0.000	0.000	71.501	0.000	1051
T5	80.00-60.00	B	1.617	0.000	0.000	134.151	0.000	2050
		C		0.000	0.000	269.813	0.000	3672
		A		0.000	0.000	70.746	0.000	1023
T6	60.00-40.00	B	1.564	0.000	0.000	133.593	0.000	2008
		C		0.000	0.000	267.224	0.000	3577
		A		0.000	0.000	69.765	0.000	988
T7	40.00-20.00	B	1.486	0.000	0.000	132.868	0.000	1954
		C		0.000	0.000	263.861	0.000	3456
		A		0.000	0.000	68.339	0.000	937
T8	20.00-0.00	B	1.331	0.000	0.000	131.814	0.000	1877
		C		0.000	0.000	258.974	0.000	3284
		A		0.000	0.000	65.513	0.000	839
		B		0.000	0.000	129.725	0.000	1725
		C		0.000	0.000	249.297	0.000	2954
		A		0.000	0.000			

Feed Line Center of Pressure

Section	Elevation ft	CP_x in	CP_z in	CP_x Ice in	CP_z Ice in
T1	150.00-140.00	6.944	3.692	9.464	5.993
T2	140.00-120.00	2.688	-2.033	4.572	0.624
T3	120.00-100.00	0.365	-6.372	-0.457	-1.523
T4	100.00-80.00	-1.000	-6.714	-2.604	-0.691
T5	80.00-60.00	-1.113	-7.373	-2.954	-0.921
T6	60.00-40.00	-1.238	-8.101	-3.253	-1.215
T7	40.00-20.00	-1.437	-9.338	-3.676	-1.740
T8	20.00-0.00	-1.574	-10.193	-3.839	-2.671

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	Safety Line 3/8	140.00 - 150.00	0.6000	0.6000
T1	2	1.5" flat Cable Ladder Rail	140.00 - 150.00	0.6000	0.6000
T1	3	LDF7-50A(1-5/8")	140.00 - 150.00	0.6000	0.6000
T1	4	AVA6-50(1-1/4")	140.00 - 150.00	0.6000	0.6000
T2	1	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T2	2	1.5" flat Cable Ladder Rail	120.00 - 140.00	0.6000	0.6000
T2	3	LDF7-50A(1-5/8")	120.00 - 140.00	0.6000	0.6000
T2	4	AVA6-50(1-1/4")	120.00 - 140.00	0.6000	0.6000
T2	6	1.5" flat Cable Ladder Rail	120.00 - 140.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T2	7	AVA6-50(1-1/4")	120.00 - 140.00	0.6000	0.6000
T2	9	1.5" flat Cable Ladder Rail	120.00 - 127.50	0.6000	0.6000
T2	10	LDF7-50A(1-5/8")	120.00 - 127.50	0.6000	0.6000
T3	1	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T3	2	1.5" flat Cable Ladder Rail	100.00 - 120.00	0.6000	0.6000
T3	3	LDF7-50A(1-5/8")	100.00 - 120.00	0.6000	0.6000
T3	4	AVA6-50(1-1/4")	100.00 - 120.00	0.6000	0.6000
T3	6	1.5" flat Cable Ladder Rail	100.00 - 120.00	0.6000	0.6000
T3	7	AVA6-50(1-1/4")	100.00 - 120.00	0.6000	0.6000
T3	9	1.5" flat Cable Ladder Rail	100.00 - 120.00	0.6000	0.6000
T3	10	LDF7-50A(1-5/8")	100.00 - 120.00	0.6000	0.6000
T3	13	1.5" flat Cable Ladder Rail	100.00 - 115.00	0.6000	0.6000
T3	14	AVA6-50(1-1/4")	100.00 - 115.00	0.6000	0.6000
T3	15	DC (3/4")	100.00 - 115.00	0.6000	0.6000
T3	16	DC (3/4")	100.00 - 115.00	0.6000	0.6000
T3	17	Fiber (3/8")	100.00 - 115.00	0.6000	0.6000
T3	18	3" (Nominal) Conduit	100.00 - 115.00	0.6000	0.6000
T3	20	HB158-21U6S12-XXXM-01(1-5/8)	100.00 - 105.00	0.6000	0.6000
T4	1	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T4	2	1.5" flat Cable Ladder Rail	80.00 - 100.00	0.6000	0.6000
T4	3	LDF7-50A(1-5/8")	80.00 - 100.00	0.6000	0.6000
T4	4	AVA6-50(1-1/4")	80.00 - 100.00	0.6000	0.6000
T4	6	1.5" flat Cable Ladder Rail	80.00 - 100.00	0.6000	0.6000
T4	7	AVA6-50(1-1/4")	80.00 - 100.00	0.6000	0.6000
T4	9	1.5" flat Cable Ladder Rail	80.00 - 100.00	0.6000	0.6000
T4	10	LDF7-50A(1-5/8")	80.00 - 100.00	0.6000	0.6000
T4	13	1.5" flat Cable Ladder Rail	80.00 - 100.00	0.6000	0.6000
T4	14	AVA6-50(1-1/4")	80.00 - 100.00	0.6000	0.6000
T4	15	DC (3/4")	80.00 - 100.00	0.6000	0.6000
T4	16	DC (3/4")	80.00 - 100.00	0.6000	0.6000
T4	17	Fiber (3/8")	80.00 - 100.00	0.6000	0.6000
T4	18	3" (Nominal) Conduit	80.00 - 100.00	0.6000	0.6000
T4	20	HB158-21U6S12-XXXM-01(1-5/8)	80.00 - 100.00	0.6000	0.6000
T5	1	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T5	2	1.5" flat Cable Ladder Rail	60.00 - 80.00	0.6000	0.6000
T5	3	LDF7-50A(1-5/8")	60.00 - 80.00	0.6000	0.6000
T5	4	AVA6-50(1-1/4")	60.00 - 80.00	0.6000	0.6000
T5	6	1.5" flat Cable Ladder Rail	60.00 - 80.00	0.6000	0.6000
T5	7	AVA6-50(1-1/4")	60.00 - 80.00	0.6000	0.6000
T5	9	1.5" flat Cable Ladder Rail	60.00 - 80.00	0.6000	0.6000
T5	10	LDF7-50A(1-5/8")	60.00 - 80.00	0.6000	0.6000
T5	13	1.5" flat Cable Ladder Rail	60.00 - 80.00	0.6000	0.6000
T5	14	AVA6-50(1-1/4")	60.00 - 80.00	0.6000	0.6000
T5	15	DC (3/4")	60.00 - 80.00	0.6000	0.6000
T5	16	DC (3/4")	60.00 - 80.00	0.6000	0.6000
T5	17	Fiber (3/8")	60.00 - 80.00	0.6000	0.6000
T5	18	3" (Nominal) Conduit	60.00 - 80.00	0.6000	0.6000
T5	20	HB158-21U6S12-XXXM-01(1-5/8)	60.00 - 80.00	0.6000	0.6000
T6	1	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T6	2	1.5" flat Cable Ladder Rail	40.00 - 60.00	0.6000	0.6000
T6	3	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.6000
T6	4	AVA6-50(1-1/4")	40.00 - 60.00	0.6000	0.6000
T6	6	1.5" flat Cable Ladder Rail	40.00 - 60.00	0.6000	0.6000
T6	7	AVA6-50(1-1/4")	40.00 - 60.00	0.6000	0.6000
T6	9	1.5" flat Cable Ladder Rail	40.00 - 60.00	0.6000	0.6000
T6	10	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.6000
T6	13	1.5" flat Cable Ladder Rail	40.00 - 60.00	0.6000	0.6000
T6	14	AVA6-50(1-1/4")	40.00 - 60.00	0.6000	0.6000
T6	15	DC (3/4")	40.00 - 60.00	0.6000	0.6000
T6	16	DC (3/4")	40.00 - 60.00	0.6000	0.6000
T6	17	Fiber (3/8")	40.00 - 60.00	0.6000	0.6000
T6	18	3" (Nominal) Conduit	40.00 - 60.00	0.6000	0.6000
T6	20	HB158-21U6S12-XXXM-01(1-5/8)	40.00 - 60.00	0.6000	0.6000
T7	1	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T7	2	1.5" flat Cable Ladder Rail	20.00 - 40.00	0.6000	0.6000
T7	3	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T7	4	AVA6-50(1-1/4")	20.00 - 40.00	0.6000	0.6000
T7	6	1.5" flat Cable Ladder Rail	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T7	7	AVA6-50(1-1/4")	20.00 - 40.00	0.6000	0.6000
T7	9	1.5" flat Cable Ladder Rail	20.00 - 40.00	0.6000	0.6000
T7	10	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T7	13	1.5" flat Cable Ladder Rail	20.00 - 40.00	0.6000	0.6000
T7	14	AVA6-50(1-1/4")	20.00 - 40.00	0.6000	0.6000
T7	15	DC (3/4")	20.00 - 40.00	0.6000	0.6000
T7	16	DC (3/4")	20.00 - 40.00	0.6000	0.6000
T7	17	Fiber (3/8")	20.00 - 40.00	0.6000	0.6000
T7	18	3" (Nominal) Conduit	20.00 - 40.00	0.6000	0.6000
T7	20	HB158-21U6S12-XXXM-01(1-5/8)	20.00 - 40.00	0.6000	0.6000
T8	1	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T8	2	1.5" flat Cable Ladder Rail	0.00 - 20.00	0.6000	0.6000
T8	3	LDF7-50A(1-5/8")	0.00 - 20.00	0.6000	0.6000
T8	4	AVA6-50(1-1/4")	0.00 - 20.00	0.6000	0.6000
T8	6	1.5" flat Cable Ladder Rail	0.00 - 20.00	0.6000	0.6000
T8	7	AVA6-50(1-1/4")	0.00 - 20.00	0.6000	0.6000
T8	9	1.5" flat Cable Ladder Rail	0.00 - 20.00	0.6000	0.6000
T8	10	LDF7-50A(1-5/8")	0.00 - 20.00	0.6000	0.6000
T8	13	1.5" flat Cable Ladder Rail	0.00 - 20.00	0.6000	0.6000
T8	14	AVA6-50(1-1/4")	0.00 - 20.00	0.6000	0.6000
T8	15	DC (3/4")	0.00 - 20.00	0.6000	0.6000
T8	16	DC (3/4")	0.00 - 20.00	0.6000	0.6000
T8	17	Fiber (3/8")	0.00 - 20.00	0.6000	0.6000
T8	18	3" (Nominal) Conduit	0.00 - 20.00	0.6000	0.6000
T8	20	HB158-21U6S12-XXXM-01(1-5/8)	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
Site Pro 1 VFA12-HD	A	From Leg	2.00	0.000	150.00	No Ice	13.20	9.20	658
			0			1/2"	19.50	14.60	804
			0			Ice	25.80	19.50	1015
Site Pro 1 VFA12-HD	B	From Leg	2.00	0.000	150.00	1" Ice	13.20	9.20	658
			0			1/2"	19.50	14.60	804
			0			Ice	25.80	19.50	1015
Site Pro 1 VFA12-HD	C	From Leg	2.00	0.000	150.00	1" Ice	13.20	9.20	658
			0			No Ice	19.50	14.60	804
			0			1/2"	25.80	19.50	1015
8' x 2" Sch 40 Pipe Mount	A	From Leg	4.00	0.000	150.00	1" Ice	1.90	1.90	29
			0			No Ice	2.73	2.73	44
			0			1/2"	3.40	3.40	63
8' x 2" Sch 40 Pipe Mount	B	From Leg	4.00	0.000	150.00	1" Ice	1.90	1.90	29
						No Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
			0			1/2"	2.73	2.73	44
			0			Ice	3.40	3.40	63
8' x 2" Sch 40 Pipe Mount	C	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	1.90	1.90	29
			0			1/2"	2.73	2.73	44
			0			Ice	3.40	3.40	63
AIR 32 B66AA B2P_T- MOBILE_TIA w/ Mount Pipe	A	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	7.09	6.39	158
			0			1/2"	7.56	7.25	222
			0			Ice	8.02	7.99	292
AIR 32 B66AA B2P_T- MOBILE_TIA w/ Mount Pipe	B	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	7.09	6.39	158
			0			1/2"	7.56	7.25	222
			0			Ice	8.02	7.99	292
AIR 32 B66AA B2P_T- MOBILE_TIA w/ Mount Pipe	C	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	7.09	6.39	158
			0			1/2"	7.56	7.25	222
			0			Ice	8.02	7.99	292
APXVAARR24_43-U- NA20_TIA w/ Mount Pipe	A	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	20.48	11.02	186
			0			1/2"	21.23	12.55	322
			0			Ice	21.99	14.10	469
APXVAARR24_43-U- NA20_TIA w/ Mount Pipe	B	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	20.48	11.02	186
			0			1/2"	21.23	12.55	322
			0			Ice	21.99	14.10	469
APXVAARR24_43-U- NA20_TIA w/ Mount Pipe	C	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	20.48	11.02	186
			0			1/2"	21.23	12.55	322
			0			Ice	21.99	14.10	469
AIR 6449 B41_TIA w/ Mount Pipe	A	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	5.87	3.27	128
			0			1/2"	6.23	3.73	177
			0			Ice	6.61	4.20	232
AIR 6449 B41_TIA w/ Mount Pipe	B	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	5.87	3.27	128
			0			1/2"	6.23	3.73	177
			0			Ice	6.61	4.20	232
AIR 6449 B41_TIA w/ Mount Pipe	C	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	5.87	3.27	128
			0			1/2"	6.23	3.73	177
			0			Ice	6.61	4.20	232
RRUS 4415 B25	A	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	1.64	0.68	44
			0			1/2"	1.80	0.79	56
			0			Ice	1.97	0.91	71
RRUS 4415 B25	B	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	1.64	0.68	44
			0			1/2"	1.80	0.79	56
			0			Ice	1.97	0.91	71
RRUS 4415 B25	C	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	1.64	0.68	44
			0			1/2"	1.80	0.79	56
			0			Ice	1.97	0.91	71
RADIO 4449 B71 B85A_T- MOBILE	A	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	1.97	1.59	73
			0			1/2"	2.15	1.75	93
			0			Ice	2.33	1.92	116
RADIO 4449 B71 B85A_T- MOBILE	B	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	1.97	1.59	73
			0			1/2"	2.15	1.75	93
			0			Ice	2.33	1.92	116
RADIO 4449 B71 B85A_T- MOBILE	C	From Leg	4.00	0.000	150.00	1" Ice			
			0			No Ice	1.97	1.59	73
			0			1/2"	2.15	1.75	93

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
			0			1/2" Ice 1" Ice	2.33	1.92	116
** Sector Mount [SM 802-3]	C	None		0.000	140.00	No Ice 1/2" Ice 1" Ice	25.34 33.44 41.56	25.34 33.44 41.56	930 1388 1977
DT465B-2XR_TIA w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	9.34 9.91 10.44	7.63 8.82 9.72	84 160 245
DT465B-2XR_TIA w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	9.34 9.91 10.44	7.63 8.82 9.72	84 160 245
DT465B-2XR_TIA w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	9.34 9.91 10.44	7.63 8.82 9.72	84 160 245
TD-RRH8x20-25	A	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	70 97 128
TD-RRH8x20-25	B	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	70 97 128
TD-RRH8x20-25	C	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	70 97 128
(2) 1900 MHz 4x45W RRH	A	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	60 83 110
(2) 1900 MHz 4x45W RRH	B	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	60 83 110
(2) 1900 MHz 4x45W RRH	C	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	60 83 110
APXV9ERR18-C-A20_TIA w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	7.47 8.66 9.56	95 166 244
APXV9ERR18-C-A20_TIA w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	7.47 8.66 9.56	95 166 244
APXV9ERR18-C-A20_TIA w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	7.47 8.66 9.56	95 166 244
(2) RRH2X50-800	A	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	53 70 90
(2) RRH2X50-800	B	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	53 70 90
(2) RRH2X50-800	C	From Leg	4.00	0.000	140.00	No Ice	1.70	1.28	53

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
			0			1/2"	1.86	1.43	70
			0			Ice	2.03	1.58	90
						1" Ice			
** Sector Mount [SM 802-3]	C	None		0.000	126.00	No Ice	25.34	25.34	930
						1/2"	33.44	33.44	1388
						Ice	41.56	41.56	1977
						1" Ice			
BSAMNT-SBS-2-2 (Mount Bracket)	A	From Leg	4.00	0.000	126.00	No Ice	0.00	0.00	67
			0			1/2"	0.00	0.00	88
			0			Ice	0.00	0.00	108
						1" Ice			
BSAMNT-SBS-2-2 (Mount Bracket)	B	From Leg	4.00	0.000	126.00	No Ice	0.00	0.00	67
			0			1/2"	0.00	0.00	88
			0			Ice	0.00	0.00	108
						1" Ice			
BSAMNT-SBS-2-2 (Mount Bracket)	C	From Leg	4.00	0.000	126.00	No Ice	0.00	0.00	67
			0			1/2"	0.00	0.00	88
			0			Ice	0.00	0.00	108
						1" Ice			
Miscellaneous [NA 509-1]	A	From Leg	2.00	0.000	126.00	No Ice	6.32	4.85	275
			0			1/2"	7.79	6.36	417
			0			Ice	9.36	7.94	598
						1" Ice			
Miscellaneous [NA 509-1]	B	From Leg	2.00	0.000	126.00	No Ice	6.32	4.85	275
			0			1/2"	7.79	6.36	417
			0			Ice	9.36	7.94	598
						1" Ice			
Miscellaneous [NA 509-1]	C	From Leg	2.00	0.000	126.00	No Ice	6.32	4.85	275
			0			1/2"	7.79	6.36	417
			0			Ice	9.36	7.94	598
						1" Ice			
12.5' x 2.375" Pipe (Hoirz)	A	From Leg	4.00	0.000	126.00	No Ice	2.97	1.07	30
			0			1/2"	4.25	1.54	52
			0			Ice	5.54	2.01	83
						1" Ice			
12.5' x 2.375" Pipe (Hoirz)	B	From Leg	4.00	0.000	126.00	No Ice	2.97	1.07	30
			0			1/2"	4.25	1.54	52
			0			Ice	5.54	2.01	83
						1" Ice			
12.5' x 2.375" Pipe (Hoirz)	C	From Leg	4.00	0.000	126.00	No Ice	2.97	1.07	30
			0			1/2"	4.25	1.54	52
			0			Ice	5.54	2.01	83
						1" Ice			
64T64R w/ Mount Pipe	A	From Leg	4.00	0.000	126.00	No Ice	4.70	1.99	87
			0			1/2"	5.03	2.39	123
			2			Ice	5.37	2.80	164
						1" Ice			
64T64R w/ Mount Pipe	B	From Leg	4.00	0.000	126.00	No Ice	4.70	1.99	87
			0			1/2"	5.03	2.39	123
			2			Ice	5.37	2.80	164
						1" Ice			
64T64R w/ Mount Pipe	C	From Leg	4.00	0.000	126.00	No Ice	4.70	1.99	87
			0			1/2"	5.03	2.39	123
			2			Ice	5.37	2.80	164
						1" Ice			
(2) JAHH-65B-R3B_TIA w/ Mount Pipe	A	From Leg	4.00	0.000	126.00	No Ice	9.35	7.65	89
			0			1/2"	9.92	8.83	165
			2			Ice	10.46	9.73	250
						1" Ice			
(2) JAHH-65B-R3B_TIA w/ Mount Pipe	B	From Leg	4.00	0.000	126.00	No Ice	9.35	7.65	89
			0			1/2"	9.92	8.83	165
			2			Ice	10.46	9.73	250
						1" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
(2) JAHB-65B-R3B_TIA w/ Mount Pipe	C	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	9.35 9.92 10.46	7.65 8.83 9.73	89 165 250
APL866513_TIA w/ Mount Pipe	A	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	4.29 4.66 5.04	4.80 5.42 6.04	34 79 129
APL866513_TIA w/ Mount Pipe	B	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	4.29 4.66 5.04	4.80 5.42 6.04	34 79 129
APL868013_TIA w/ Mount Pipe	A	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	3.10 3.48 3.85	4.80 5.42 6.04	30 69 113
APL868013_TIA w/ Mount Pipe	B	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	3.10 3.48 3.85	4.80 5.42 6.04	30 69 113
(2) APL868013_TIA w/ Mount Pipe	C	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	3.10 3.48 3.85	4.80 5.42 6.04	30 69 113
B2/B66A RRH-BR049	A	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	70 87 106
B2/B66A RRH-BR049	B	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	70 87 106
B2/B66A RRH-BR049	C	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	70 87 106
B5/B13 RRH-BR04C	A	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	70 87 106
B5/B13 RRH-BR04C	B	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	70 87 106
B5/B13 RRH-BR04C	C	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	70 87 106
CBC78T-DS-43-2X	A	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	0.37 0.45 0.53	0.51 0.60 0.70	21 27 35
CBC78T-DS-43-2X	B	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	0.37 0.45 0.53	0.51 0.60 0.70	21 27 35
CBC78T-DS-43-2X	C	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	0.37 0.45 0.53	0.51 0.60 0.70	21 27 35
RRFDC-3315-PF-48	A	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	3.36 3.60 3.84	2.19 2.39 2.61	32 61 93
DB-B1-6C-12AB-0Z	B	From Leg	4.00	0.000	126.00	No Ice	2.60	2.08	55

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
			0			1/2"	2.81	2.27	78
			2			Ice	3.04	2.47	105
						1" Ice			
** Site Pro 1 VFA12-HD	A	From Leg	2.00	0.000	115.00	No Ice	13.20	9.20	658
			0			1/2"	19.50	14.60	804
			0			Ice	25.80	19.50	1015
						1" Ice			
Site Pro 1 VFA12-HD	B	From Leg	2.00	0.000	115.00	No Ice	13.20	9.20	658
			0			1/2"	19.50	14.60	804
			0			Ice	25.80	19.50	1015
						1" Ice			
Site Pro 1 VFA12-HD	C	From Leg	2.00	0.000	115.00	No Ice	13.20	9.20	658
			0			1/2"	19.50	14.60	804
			0			Ice	25.80	19.50	1015
						1" Ice			
7770_TIA w/ Mount Pipe	A	From Leg	4.00	0.000	115.00	No Ice	5.75	4.25	55
			0			1/2"	6.18	5.01	103
			0			Ice	6.61	5.71	157
						1" Ice			
7770_TIA w/ Mount Pipe	B	From Leg	4.00	0.000	115.00	No Ice	5.75	4.25	55
			0			1/2"	6.18	5.01	103
			0			Ice	6.61	5.71	157
						1" Ice			
7770_TIA w/ Mount Pipe	C	From Leg	4.00	0.000	115.00	No Ice	5.75	4.25	55
			0			1/2"	6.18	5.01	103
			0			Ice	6.61	5.71	157
						1" Ice			
OPA-65R-LCUU-H8_TIA w/ Mount Pipe	A	From Leg	4.00	0.000	115.00	No Ice	13.00	9.56	103
			0			1/2"	13.69	11.03	198
			0			Ice	14.38	12.49	303
						1" Ice			
OPA-65R-LCUU-H6_TIA w/ Mount Pipe	B	From Leg	4.00	0.000	115.00	No Ice	9.68	7.12	106
			0			1/2"	10.25	8.30	181
			0			Ice	10.79	9.20	265
						1" Ice			
OPA-65R-LCUU-H6_TIA w/ Mount Pipe	C	From Leg	4.00	0.000	115.00	No Ice	9.68	7.12	106
			0			1/2"	10.25	8.30	181
			0			Ice	10.79	9.20	265
						1" Ice			
EPBQ-654L8H8-L2_TIA w/ Mount Pipe	A	From Leg	4.00	0.000	115.00	No Ice	18.33	9.17	119
			0			1/2"	19.06	10.68	236
			0			Ice	19.81	12.22	363
						1" Ice			
EPBQ-654L8H6-L2_TIA w/ Mount Pipe	B	From Leg	4.00	0.000	115.00	No Ice	13.47	6.64	110
			0			1/2"	14.09	7.83	201
			0			Ice	14.66	8.75	300
						1" Ice			
EPBQ-654L8H6-L2_TIA w/ Mount Pipe	C	From Leg	4.00	0.000	115.00	No Ice	13.47	6.64	110
			0			1/2"	14.09	7.83	201
			0			Ice	14.66	8.75	300
						1" Ice			
DMP65R-BU8D_TIA w/ Mount Pipe	A	From Leg	4.00	0.000	115.00	No Ice	18.11	10.26	138
			0			1/2"	18.84	11.78	260
			0			Ice	19.59	13.33	392
						1" Ice			
DMP65R-BU6D_TIA w/ Mount Pipe	B	From Leg	4.00	0.000	115.00	No Ice	12.95	7.26	115
			0			1/2"	13.55	8.43	207
			0			Ice	14.11	9.31	308
						1" Ice			
DMP65R-BU6D_TIA w/ Mount Pipe	C	From Leg	4.00	0.000	115.00	No Ice	12.95	7.26	115
			0			1/2"	13.55	8.43	207
			0			Ice	14.11	9.31	308
						1" Ice			
RRUS E2 B29	A	From Leg	4.00	0.000	115.00	No Ice	3.15	1.29	60

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb
			0			1/2"	3.36	1.44	83
			0			Ice	3.59	1.60	110
RRUS E2 B29	B	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	3.15	1.29	60
			0			1/2"	3.36	1.44	83
			0			Ice	3.59	1.60	110
RRUS E2 B29	C	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	3.15	1.29	60
			0			1/2"	3.36	1.44	83
			0			Ice	3.59	1.60	110
RRUS 4449 B5/B12	A	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	1.97	1.41	71
			0			1/2"	2.14	1.56	90
			0			Ice	2.33	1.73	111
RRUS 4449 B5/B12	B	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	1.97	1.41	71
			0			1/2"	2.14	1.56	90
			0			Ice	2.33	1.73	111
RRUS 4449 B5/B12	C	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	1.97	1.41	71
			0			1/2"	2.14	1.56	90
			0			Ice	2.33	1.73	111
RRUS 4478 B14	A	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.02	1.25	59
			0			1/2"	2.20	1.40	77
			0			Ice	2.39	1.55	97
RRUS 4478 B14	B	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.02	1.25	59
			0			1/2"	2.20	1.40	77
			0			Ice	2.39	1.55	97
RRUS 4478 B14	C	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.02	1.25	59
			0			1/2"	2.20	1.40	77
			0			Ice	2.39	1.55	97
RRUS 32 B66A	A	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.86	1.78	55
			0			1/2"	3.09	1.97	77
			0			Ice	3.32	2.17	103
RRUS 32 B66A	B	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.86	1.78	55
			0			1/2"	3.09	1.97	77
			0			Ice	3.32	2.17	103
RRUS 32 B66A	C	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.86	1.78	55
			0			1/2"	3.09	1.97	77
			0			Ice	3.32	2.17	103
RRUS 32 B30	A	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.74	1.67	53
			0			1/2"	2.96	1.86	74
			0			Ice	3.19	2.05	98
RRUS 32 B30	B	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.74	1.67	53
			0			1/2"	2.96	1.86	74
			0			Ice	3.19	2.05	98
RRUS 32 B30	C	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.74	1.67	53
			0			1/2"	2.96	1.86	74
			0			Ice	3.19	2.05	98
RRUS 32 B2	A	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.74	1.67	53
			0			1/2"	2.96	1.86	74
			0			Ice	3.19	2.05	98
RRUS 32 B2	B	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.74	1.67	53
			0			1/2"	2.96	1.86	74

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb
			0			1/2" Ice	3.19	2.05	98
RRUS 32 B2	C	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.74	1.67	53
			0			1/2"	2.96	1.86	74
			0			Ice	3.19	2.05	98
(2) DC6-48-60-18-8F	A	From Leg	0.00	0.000	115.00	1" Ice			
			0			No Ice	1.21	1.21	33
			0			1/2"	1.89	1.89	55
			0			Ice	2.11	2.11	80
DC6-48-60-18-8F	B	From Leg	0.00	0.000	115.00	1" Ice			
			0			No Ice	1.21	1.21	33
			0			1/2"	1.89	1.89	55
			0			Ice	2.11	2.11	80
DC6-48-60-18-8F	C	From Leg	0.00	0.000	115.00	1" Ice			
			0			No Ice	1.21	1.21	33
			0			1/2"	1.89	1.89	55
			0			Ice	2.11	2.11	80
(2) LGP21401	A	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	1.10	0.35	14
			0			1/2"	1.24	0.44	21
			0			Ice	1.38	0.54	30
(2) LGP21401	B	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	1.10	0.35	14
			0			1/2"	1.24	0.44	21
			0			Ice	1.38	0.54	30
(2) LGP21401	C	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	1.10	0.35	14
			0			1/2"	1.24	0.44	21
			0			Ice	1.38	0.54	30
**						1" Ice			
TA08025-B604	A	From Leg	4.00	0.000	105.00	No Ice	1.96	0.98	0
			0			1/2"	2.14	1.11	0
			0			Ice	2.32	1.25	0
TA08025-B605	A	From Leg	4.00	0.000	105.00	1" Ice			
			0			No Ice	1.96	1.13	0
			0			1/2"	2.14	1.27	0
			0			Ice	2.32	1.41	0
RDIDC-9181-PF-48	A	From Leg	4.00	0.000	105.00	1" Ice			
			0			No Ice	2.01	1.17	0
			0			1/2"	2.19	1.31	0
			0			Ice	2.37	1.46	0
TA08025-B604	B	From Leg	4.00	0.000	105.00	1" Ice			
			0			No Ice	1.96	0.98	0
			0			1/2"	2.14	1.11	0
			0			Ice	2.32	1.25	0
TA08025-B605	B	From Leg	4.00	0.000	105.00	1" Ice			
			0			No Ice	1.96	1.13	0
			0			1/2"	2.14	1.27	0
			0			Ice	2.32	1.41	0
TA08025-B604	C	From Leg	4.00	0.000	105.00	1" Ice			
			0			No Ice	1.96	0.98	0
			0			1/2"	2.14	1.11	0
			0			Ice	2.32	1.25	0
TA08025-B605	C	From Leg	4.00	0.000	105.00	1" Ice			
			0			No Ice	1.96	1.13	0
			0			1/2"	2.14	1.27	0
			0			Ice	2.32	1.41	0
MX08FRO665-20_TIA w/ Mount Pipe	A	From Leg	4.00	0.000	105.00	1" Ice			
			0			No Ice	12.73	7.53	98
			0			1/2"	13.33	8.72	190
			0			Ice	13.89	9.62	291
						1" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
MX08FRO665-20_TIA w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	105.00	No Ice 1/2" Ice 1" Ice	12.73 13.33 13.89	7.53 8.72 9.62	98 190 291
MX08FRO665-20_TIA w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	105.00	No Ice 1/2" Ice 1" Ice	12.73 13.33 13.89	7.53 8.72 9.62	98 190 291
Sabre_C10837002C- 32788_Sector_(3)	A	None		0.000	105.00	No Ice 1/2" Ice 1" Ice	18.52 28.00 37.48	18.52 28.00 37.48	2028 3067 4106
**									

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+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
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 Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	18	318745	26967	-15641
	Max. H _x	18	318745	26967	-15641
	Max. H _z	7	-281892	-24719	14350
	Min. Vert	7	-281892	-24719	14350
	Min. H _x	7	-281892	-24719	14350
	Min. H _z	18	318745	26967	-15641
Leg B	Max. Vert	10	307953	-25944	-14676
	Max. H _x	23	-271232	23669	13351
	Max. H _z	23	-271232	23669	13351
	Min. Vert	23	-271232	23669	13351
	Min. H _x	10	307953	-25944	-14676
	Min. H _z	10	307953	-25944	-14676
Leg A	Max. Vert	2	314674	-14	30567
	Max. H _x	21	12118	3679	796
	Max. H _z	2	314674	-14	30567
	Min. Vert	15	-278190	13	-27962
	Min. H _x	9	11782	-3680	770
	Min. H _z	15	-278190	13	-27962

Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overturing Moment, M _x lb-ft	Overturing Moment, M _z lb-ft	Torque lb-ft
Dead Only	40114	0	0	1510	525	0
1.2 Dead+1.6 Wind 0 deg - No Ice	48137	-20	-49729	-4655151	3235	-420
0.9 Dead+1.6 Wind 0 deg - No Ice	36103	-20	-49729	-4648648	3077	-423
1.2 Dead+1.6 Wind 30 deg - No Ice	48137	24735	-43043	-4021271	-2308464	8344
0.9 Dead+1.6 Wind 30 deg - No Ice	36103	24735	-43043	-4015721	-2305170	8341
1.2 Dead+1.6 Wind 60 deg - No Ice	48137	42403	-24574	-2301082	-3969648	-1909
0.9 Dead+1.6 Wind 60 deg - No Ice	36103	42403	-24574	-2298095	-3963866	-1912
1.2 Dead+1.6 Wind 90 deg - No Ice	48137	45193	20	4386	-4298392	-17890
0.9 Dead+1.6 Wind 90 deg - No Ice	36103	45193	20	3926	-4292043	-17892
1.2 Dead+1.6 Wind 120 deg - No Ice	48137	41859	24283	2287104	-3933870	8467
0.9 Dead+1.6 Wind 120 deg - No Ice	36103	41859	24283	2283220	-3928124	8466
1.2 Dead+1.6 Wind 150 deg - No Ice	48137	22620	39339	3777637	-2168642	18689

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
0.9 Dead+1.6 Wind 150 deg	36103	22620	39339	3771428	-2165490	18690
- No Ice						
1.2 Dead+1.6 Wind 180 deg	48137	20	47891	4531419	-2012	419
- No Ice						
0.9 Dead+1.6 Wind 180 deg	36103	20	47891	4524141	-2161	422
- No Ice						
1.2 Dead+1.6 Wind 210 deg	48137	-24735	43043	4024945	2309644	-8346
- No Ice						
0.9 Dead+1.6 Wind 210 deg	36103	-24735	43043	4018481	2306044	-8343
- No Ice						
1.2 Dead+1.6 Wind 240 deg	48137	-43995	25492	2368395	4081200	1909
- No Ice						
0.9 Dead+1.6 Wind 240 deg	36103	-43995	25492	2364429	4074993	1912
- No Ice						
1.2 Dead+1.6 Wind 270 deg	48137	-45193	-20	-863	4299634	17891
- No Ice						
0.9 Dead+1.6 Wind 270 deg	36103	-45193	-20	-1313	4292978	17893
- No Ice						
1.2 Dead+1.6 Wind 300 deg	48137	-40268	-23364	-2219755	3824819	-8465
- No Ice						
0.9 Dead+1.6 Wind 300 deg	36103	-40268	-23364	-2216853	3818885	-8465
- No Ice						
1.2 Dead+1.6 Wind 330 deg	48137	-22620	-39339	-3773957	2169957	-18689
- No Ice						
0.9 Dead+1.6 Wind 330 deg	36103	-22620	-39339	-3768661	2166497	-18690
- No Ice						
1.2 Dead+1.0 Ice+1.0 Temp	139632	0	-1	25105	2953	0
1.2 Dead+1.0 Wind 0	139632	-3	-13151	-1195475	3257	-1008
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 30	139632	6461	-11212	-1015694	-596764	3034
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 60	139632	10874	-6287	-561144	-1011359	-47
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 90	139632	11609	3	25828	-1098340	-1023
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 120	139632	10373	6001	592866	-977410	5514
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 150	139632	6074	10536	1022034	-571513	7370
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 180	139632	3	12929	1231331	2462	1008
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 210	139632	-6461	11212	1066559	602478	-3034
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 240	139632	-11067	6398	619509	1030073	46
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 270	139632	-11609	-3	25031	1104060	1023
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	139632	-10181	-5890	-534496	970137	-5513
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	139632	-6074	-10536	-971168	577240	-7370
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	40114	-4	-10354	-957684	1053	-86
Dead+Wind 30 deg - Service	40114	5151	-8962	-827148	-475121	1697
Dead+Wind 60 deg - Service	40114	8832	-5118	-472866	-817370	-392
Dead+Wind 90 deg - Service	40114	9429	4	2048	-885684	-3649
Dead+Wind 120 deg - Service	40114	8721	5059	472302	-810074	1726
Dead+Wind 150 deg - Service	40114	4719	8206	779739	-446614	3809
Dead+Wind 180 deg - Service	40114	4	9979	934736	-17	86
Dead+Wind 210 deg - Service	40114	-5151	8962	830179	476155	-1697
Dead+Wind 240 deg - Service	40114	-9157	5305	488885	840904	391
Dead+Wind 270 deg - Service	40114	-9429	-4	978	886721	3649
Dead+Wind 300 deg - Service	40114	-8396	-4871	-456282	788614	-1726

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+Wind 330 deg - Service	40114	-4719	-8206	-776708	447654	-3809

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	0	-40114	0	0	40114	0	0.000%
2	-20	-48137	-49729	20	48137	49729	0.001%
3	-20	-36103	-49729	20	36103	49729	0.001%
4	24735	-48137	-43043	-24735	48137	43043	0.001%
5	24735	-36103	-43043	-24735	36103	43043	0.001%
6	42404	-48137	-24574	-42403	48137	24574	0.001%
7	42404	-36103	-24574	-42403	36103	24574	0.001%
8	45194	-48137	20	-45193	48137	-20	0.001%
9	45194	-36103	20	-45193	36103	-20	0.001%
10	41860	-48137	24283	-41859	48137	-24283	0.001%
11	41860	-36103	24283	-41859	36103	-24283	0.001%
12	22620	-48137	39339	-22620	48137	-39339	0.001%
13	22620	-36103	39339	-22620	36103	-39339	0.001%
14	20	-48137	47892	-20	48137	-47891	0.001%
15	20	-36103	47892	-20	36103	-47891	0.001%
16	-24735	-48137	43043	24735	48137	-43043	0.001%
17	-24735	-36103	43043	24735	36103	-43043	0.001%
18	-43995	-48137	25493	43995	48137	-25492	0.001%
19	-43995	-36103	25493	43995	36103	-25492	0.001%
20	-45194	-48137	-20	45193	48137	20	0.001%
21	-45194	-36103	-20	45193	36103	20	0.001%
22	-40268	-48137	-23365	40268	48137	23364	0.001%
23	-40268	-36103	-23365	40268	36103	23364	0.001%
24	-22620	-48137	-39339	22620	48137	39339	0.001%
25	-22620	-36103	-39339	22620	36103	39339	0.001%
26	0	-139632	0	0	139632	1	0.001%
27	-3	-139632	-13152	3	139632	13151	0.000%
28	6461	-139632	-11212	-6461	139632	11212	0.000%
29	10875	-139632	-6287	-10874	139632	6287	0.000%
30	11609	-139632	3	-11609	139632	-3	0.000%
31	10373	-139632	6001	-10373	139632	-6001	0.000%
32	6075	-139632	10536	-6074	139632	-10536	0.000%
33	3	-139632	12930	-3	139632	-12929	0.000%
34	-6461	-139632	11212	6461	139632	-11212	0.000%
35	-11067	-139632	6398	11067	139632	-6398	0.000%
36	-11609	-139632	-3	11609	139632	3	0.000%
37	-10181	-139632	-5890	10181	139632	5890	0.000%
38	-6075	-139632	-10536	6074	139632	10536	0.000%
39	-4	-40114	-10354	4	40114	10354	0.000%
40	5151	-40114	-8962	-5151	40114	8962	0.000%
41	8832	-40114	-5118	-8832	40114	5118	0.000%
42	9429	-40114	4	-9429	40114	-4	0.000%
43	8721	-40114	5059	-8721	40114	-5059	0.000%
44	4719	-40114	8206	-4719	40114	-8206	0.000%
45	4	-40114	9979	-4	40114	-9979	0.000%
46	-5151	-40114	8962	5151	40114	-8962	0.000%
47	-9157	-40114	5305	9157	40114	-5305	0.000%
48	-9429	-40114	-4	9429	40114	4	0.000%
49	-8396	-40114	-4871	8396	40114	4871	0.000%
50	-4719	-40114	-8206	4719	40114	8206	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	10	0.00000001	0.00007081
3	Yes	10	0.00000001	0.00005187
4	Yes	10	0.00000001	0.00007221
5	Yes	10	0.00000001	0.00005324
6	Yes	10	0.00000001	0.00007377
7	Yes	10	0.00000001	0.00005472
8	Yes	10	0.00000001	0.00007276
9	Yes	10	0.00000001	0.00005366
10	Yes	10	0.00000001	0.00007101
11	Yes	10	0.00000001	0.00005202
12	Yes	10	0.00000001	0.00007311
13	Yes	10	0.00000001	0.00005392
14	Yes	10	0.00000001	0.00007407
15	Yes	10	0.00000001	0.00005495
16	Yes	10	0.00000001	0.00007222
17	Yes	10	0.00000001	0.00005325
18	Yes	10	0.00000001	0.00007047
19	Yes	10	0.00000001	0.00005161
20	Yes	10	0.00000001	0.00007272
21	Yes	10	0.00000001	0.00005364
22	Yes	10	0.00000001	0.00007417
23	Yes	10	0.00000001	0.00005502
24	Yes	10	0.00000001	0.00007307
25	Yes	10	0.00000001	0.00005388
26	Yes	6	0.00000001	0.00008419
27	Yes	11	0.00000001	0.00004705
28	Yes	11	0.00000001	0.00004702
29	Yes	11	0.00000001	0.00004696
30	Yes	11	0.00000001	0.00004630
31	Yes	11	0.00000001	0.00004694
32	Yes	11	0.00000001	0.00004743
33	Yes	11	0.00000001	0.00004794
34	Yes	11	0.00000001	0.00004736
35	Yes	11	0.00000001	0.00004665
36	Yes	11	0.00000001	0.00004549
37	Yes	11	0.00000001	0.00004583
38	Yes	11	0.00000001	0.00004628
39	Yes	10	0.00000001	0.00005656
40	Yes	10	0.00000001	0.00005674
41	Yes	10	0.00000001	0.00005704
42	Yes	10	0.00000001	0.00005684
43	Yes	10	0.00000001	0.00005665
44	Yes	10	0.00000001	0.00005719
45	Yes	10	0.00000001	0.00005718
46	Yes	10	0.00000001	0.00005667
47	Yes	10	0.00000001	0.00005628
48	Yes	10	0.00000001	0.00005667
49	Yes	10	0.00000001	0.00005711
50	Yes	10	0.00000001	0.00005709

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	3.64	47	0.236	0.018
T2	140 - 120	3.12	47	0.233	0.017
T3	120 - 100	2.15	47	0.193	0.017
T4	100 - 80	1.38	47	0.147	0.013
T5	80 - 60	0.82	47	0.101	0.009
T6	60 - 40	0.44	47	0.062	0.006
T7	40 - 20	0.20	47	0.036	0.003
T8	20 - 0	0.06	47	0.018	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	Site Pro 1 VFA12-HD	47	3.64	0.236	0.018	104208
140.00	Sector Mount [SM 802-3]	47	3.12	0.233	0.017	53347
126.00	Sector Mount [SM 802-3]	47	2.43	0.208	0.017	25863
115.00	Site Pro 1 VFA12-HD	47	1.94	0.181	0.016	21714
105.00	TA08025-B604	47	1.56	0.158	0.014	22573

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	17.83	18	1.160	0.087
T2	140 - 120	15.26	18	1.144	0.081
T3	120 - 100	10.51	18	0.945	0.083
T4	100 - 80	6.74	18	0.717	0.065
T5	80 - 60	3.98	18	0.494	0.046
T6	60 - 40	2.15	18	0.303	0.031
T7	40 - 20	0.97	18	0.174	0.017
T8	20 - 0	0.31	18	0.087	0.008

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	Site Pro 1 VFA12-HD	18	17.83	1.160	0.087	21458
140.00	Sector Mount [SM 802-3]	18	15.26	1.144	0.081	10981
126.00	Sector Mount [SM 802-3]	18	11.85	1.018	0.084	5291
115.00	Site Pro 1 VFA12-HD	18	9.47	0.886	0.080	4422
105.00	TA08025-B604	18	7.58	0.773	0.070	4594

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	150	Leg	A325N	0.750	4	2154	29821	0.072	✓	Bolt Tension
		Diagonal	A325N	0.500	1	2775	6986	0.397	✓	Member Block Shear
		Top Girt	A325N	0.500	1	717	7952	0.090	✓	Bolt Shear
T2	140	Leg	A325N	1.000	4	12646	53014	0.239	✓	Bolt Tension
		Diagonal	A325N	0.625	1	7310	9788	0.747	✓	Member Bearing
T3	120	Leg	A325N	1.000	6	16721	53014	0.315	✓	Bolt Tension
		Diagonal	A325N	0.625	1	7773	9788	0.794	✓	Member Bearing
T4	100	Leg	A325N	1.000	8	18286	53014	0.345	✓	Bolt Tension

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
T5	80	Diagonal	A325N	0.625	1	8317	9788	0.850 ✓	1	Member Bearing
		Leg	A325N	1.250	8	23195	82835	0.280 ✓	1	Bolt Tension
T6	60	Diagonal	A325N	0.625	1	8092	9788	0.827 ✓	1	Member Bearing
		Leg	A325N	1.250	8	27631	82835	0.334 ✓	1	Bolt Tension
T7	40	Diagonal	A325N	0.625	1	8347	9788	0.853 ✓	1	Member Bearing
		Leg	A325N	1.250	8	31655	82835	0.382 ✓	1	Bolt Tension
T8	20	Diagonal	A325N	0.750	1	9071	14355	0.632 ✓	1	Member Bearing
		Diagonal	A325N	0.750	1	9542	14355	0.665 ✓	1	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio P _u / φP _n
T1	150 - 140	Pipe 2.875" x 0.203" (2.5 STD)	10.00	0.67	8.4 K=1.00	1.704	-11649	82352	0.141 ¹ ✓
T2	140 - 120	Pipe 2.875" x 0.203" (2.5 STD)	20.00	4.67	59.1 K=1.00	1.704	-51730	62849	0.823 ¹ ✓
T3	120 - 100	Pipe 4.5" x 0.237" (4 STD)	20.03	4.67	37.2 K=1.00	3.174	-108815	138323	0.787 ¹ ✓
T4	100 - 80	Pipe 5.563" x 0.258" (5 STD)	20.03	6.26	40.0 K=1.00	4.300	-156683	184163	0.851 ¹ ✓
T5	80 - 60	Pipe 6.625" x 0.280" (6 STD)	20.03	6.26	33.5 K=1.00	5.581	-200371	248307	0.807 ¹ ✓
T6	60 - 40	Pipe 8.625" x 0.322" (8 STD)	20.03	6.26	25.6 K=1.00	8.399	-240478	387660	0.620 ¹ ✓
T7	40 - 20	Pipe 8.625" x 0.50" (8 XS)	20.03	9.35	39.0 K=1.00	12.763	-275341	550137	0.500 ¹ ✓
T8	20 - 0	Pipe 8.625" x 0.50" (8 XS)	20.03	9.35	39.0 K=1.00	12.763	-310195	550137	0.564 ¹ ✓

¹ P_u / φP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio P _u / φP _n
T1	150 - 140	L 1.5 x 1.5 x 3/16	7.40	3.42	139.8 K=1.00	0.527	-2659	6096	0.436 ¹ ✓
T2	140 - 120	L 2 x 2 x 3/16	7.60	3.51	110.3 K=1.03	0.715	-7248	12216	0.593 ¹ ✓
T3	120 - 100	L 2 x 2 x 3/16	9.00	4.28	130.5 K=1.00	0.715	-7722	9453	0.817 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	100 - 80	L 2.5 x 2.5 x 3/16	11.48	5.51	133.7 K=1.00	0.902	-7950	11411	0.697 ¹ ✓
T5	80 - 60	L 3 x 3 x 3/16	13.20	6.33	127.4 K=1.00	1.090	-7983	14952	0.534 ¹ ✓
T6	60 - 40	L 3 x 3 x 3/16	14.99	7.14	143.6 K=1.00	1.090	-8500	11937	0.712 ¹ ✓
T7	40 - 20	L 3.5 x 3.5 x 1/4	18.07	8.74	151.1 K=1.00	1.690	-9216	16716	0.551 ¹ ✓
T8	20 - 0	L 3.5 x 3.5 x 1/4	19.81	9.61	166.2 K=1.00	1.690	-9767	13815	0.707 ¹ ✓

¹ P_u / φP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	L 3 x 3 x 1/4	6.00	5.49	115.6 K=1.04	1.438	-717	23047	0.031 ¹ ✓

¹ P_u / φP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	Pipe 2.875" x 0.203" (2.5 STD)	10.00	0.67	8.4	1.704	8615	82817	0.104 ¹ ✓
T2	140 - 120	Pipe 2.875" x 0.203" (2.5 STD)	20.00	0.67	8.4	1.704	50583	82817	0.611 ¹ ✓
T3	120 - 100	Pipe 4.5" x 0.237" (4 STD)	20.03	0.67	5.3	3.174	100327	154259	0.650 ¹ ✓
T4	100 - 80	Pipe 5.563" x 0.258" (5 STD)	20.03	0.63	4.0	4.300	146290	208974	0.700 ¹ ✓
T5	80 - 60	Pipe 6.625" x 0.280" (6 STD)	20.03	0.63	3.3	5.581	185557	271254	0.684 ¹ ✓
T6	60 - 40	Pipe 8.625" x 0.322" (8 STD)	20.03	0.63	2.6	8.399	221045	408204	0.542 ¹ ✓
T7	40 - 20	Pipe 8.625" x 0.50" (8 XS)	20.03	0.67	2.8	12.763	253242	620268	0.408 ¹ ✓
T8	20 - 0	Pipe 8.625" x 0.50" (8 XS)	20.03	0.67	2.8	12.763	283123	620268	0.456 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 $\frac{P_u}{\phi P_n}$
T1	150 - 140	L 1.5 x 1.5 x 3/16	7.40	3.42	93.4	0.308	2775	13381	0.207 ¹ ✓
T2	140 - 120	L 2 x 2 x 3/16	7.60	3.51	71.0	0.431	7310	18739	0.390 ¹ ✓
T3	120 - 100	L 2 x 2 x 3/16	9.00	4.28	86.0	0.431	7773	18739	0.415 ¹ ✓
T4	100 - 80	L 2.5 x 2.5 x 3/16	10.45	5.01	79.3	0.571	8317	24840	0.335 ¹ ✓
T5	80 - 60	L 3 x 3 x 3/16	12.11	5.79	75.7	0.712	8092	30968	0.261 ¹ ✓
T6	60 - 40	L 3 x 3 x 3/16	14.99	7.14	92.9	0.712	8347	30968	0.270 ¹ ✓
T7	40 - 20	L 3.5 x 3.5 x 1/4	18.07	8.74	97.8	1.103	9071	48000	0.189 ¹ ✓
T8	20 - 0	L 3.5 x 3.5 x 1/4	19.81	9.61	107.4	1.103	9542	48000	0.199 ¹ ✓

¹ P_u / φP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	L 3 x 3 x 1/4	6.00	5.49	74.3	0.961	691	41801	0.017 ¹ ✓

¹ P_u / φP_n controls

Section Capacity Table

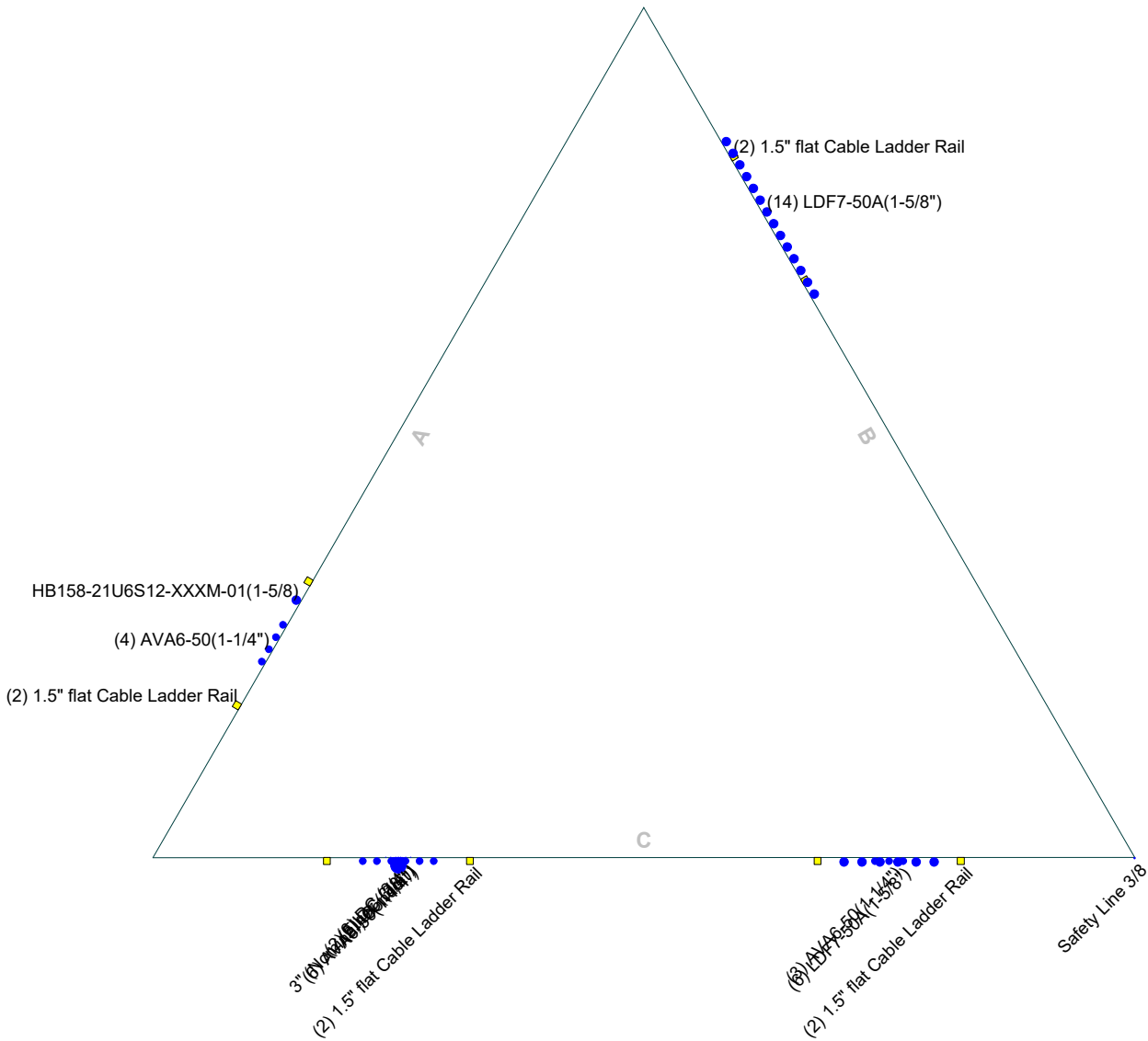
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	φP _{allow} lb	% Capacity	Pass Fail
T1	150 - 140	Leg	Pipe 2.875" x 0.203" (2.5 STD)	2	-11649	82352	14.1	Pass
T2	140 - 120	Leg	Pipe 2.875" x 0.203" (2.5 STD)	21	-51730	62849	82.3	Pass
T3	120 - 100	Leg	Pipe 4.5" x 0.237" (4 STD)	48	-108815	138323	78.7	Pass
T4	100 - 80	Leg	Pipe 5.563" x 0.258" (5 STD)	75	-156683	184163	85.1	Pass
T5	80 - 60	Leg	Pipe 6.625" x 0.280" (6 STD)	94	-200371	248307	80.7	Pass
T6	60 - 40	Leg	Pipe 8.625" x 0.322" (8 STD)	115	-240478	387660	62.0	Pass
T7	40 - 20	Leg	Pipe 8.625" x 0.50" (8 XS)	136	-275341	550137	50.0	Pass
T8	20 - 0	Leg	Pipe 8.625" x 0.50" (8 XS)	151	-310195	550137	56.4	Pass
T1	150 - 140	Diagonal	L 1.5 x 1.5 x 3/16	9	-2659	6096	43.6	Pass
T2	140 - 120	Diagonal	L 2 x 2 x 3/16	24	-7248	12216	59.3	Pass
							74.7 (b)	
T3	120 - 100	Diagonal	L 2 x 2 x 3/16	54	-7722	9453	81.7	Pass
T4	100 - 80	Diagonal	L 2.5 x 2.5 x 3/16	81	-7950	11411	69.7	Pass
							85.0 (b)	
T5	80 - 60	Diagonal	L 3 x 3 x 3/16	101	-7983	14952	53.4	Pass
							82.7 (b)	
T6	60 - 40	Diagonal	L 3 x 3 x 3/16	122	-8500	11937	71.2	Pass
							85.3 (b)	
T7	40 - 20	Diagonal	L 3.5 x 3.5 x 1/4	143	-9216	16716	55.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T8	20 - 0	Diagonal	L 3.5 x 3.5 x 1/4	158	-9767	13815	63.2 (b)	
T1	150 - 140	Top Girt	L 3 x 3 x 1/4	5	-717	23047	70.7	Pass
							3.1	Pass
							9.0 (b)	
							Summary	
						Leg (T4)	85.1	Pass
						Diagonal (T6)	85.3	Pass
						Top Girt (T1)	9.0	Pass
						Bolt	85.3	Pass
						Checks		
						RATING =	85.3	Pass

APPENDIX B
BASE LEVEL DRAWING

Feed Line Plan

Round Flat App In Face App Out Face



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

Job: **150-ft Norwich, CT S/S Tower**

Project: **PJF 13321-0008**

Client: **Everest Infrastructure Partners** Drawn by: **Anna Trudo** App'd:

Code: **TIA-222-G**

Date: **08/25/21**

Scale: **NTS**

Path:

Dwg No. **E-7**

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APPENDIX C

ADDITIONAL CALCULATIONS

Self-Support Tower Anchor Rod Capacity - TIA-G

Loads

Compression :	<u>318.7</u>	kips	Tension :	<u>281.9</u>	kips
Comp. Shear :	<u>31.2</u>	kips	Ten. Shear :	<u>28.6</u>	kips

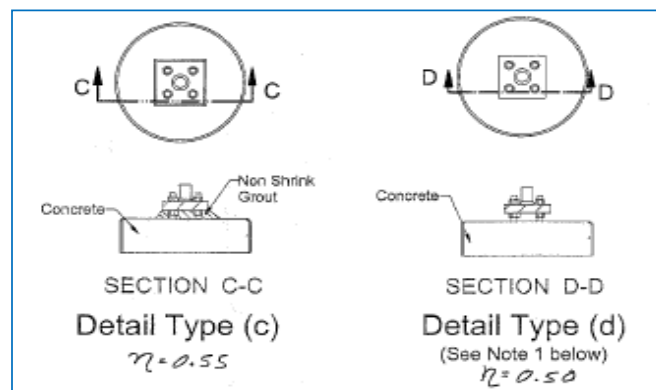
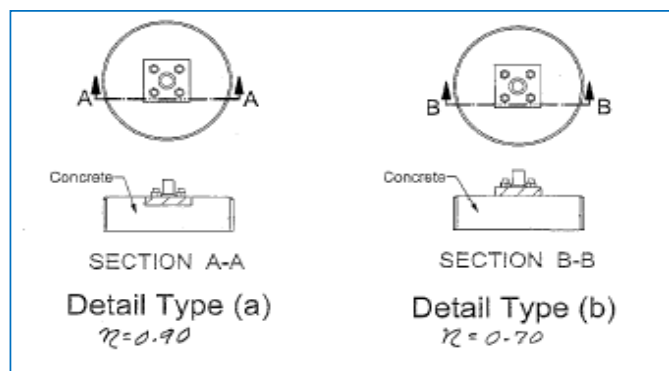
Code:	<u>TIA-G</u>
Maximum Ratio:	<u>1.00</u>

Existing Anchor Rods

Anchor Rod Condition (n) :	<u>0.5</u>
Anchor Rod ϕ :	<u>1 1/2</u> in
Anchor Rod Quantity :	<u>8</u>
Anchor Rod Grade :	<u>F1554 Gr. 36</u>
F_y :	36 ksi
F_u :	58 ksi
Threads per Inch	6
Net Tensile Area	1.41 in ²
ϕ_t :	0.80
$\phi_t R_{nt}$:	521.63 kip
Anchor Rod Ratio :	<u>0.865</u>

l_{ar} :	<u>1.5</u> inches
Comp. M_u :	30.42 k-in

ϕ_v :	0.75
ϕ_f :	0.90
$\phi_v R_{nv}$:	276.74 kips
$\phi_f R_{nm}$:	97.44 k-in



DRILLED PIER STEEL ANALYSIS - STEEL CALCULATIONS - TIA-222-G

BASED ON ACI 318-05, SECTIONS 9 & 10 (ASSUMING TIE REINFORCEMENT)

Factored Internal Loads from Analysis

Reference Standard =	TIA-222-G
ACI Code =	ACI 318-05
Maximum Ratio =	100.0%
Axial Load, Pu =	318.7 kips, (+Comp, -Tension)
Moment, Mu =	134.2 k-ft (Must be Positive)
Depth to Analysis Section =	3.80 ft, from Grade

Factored Internal Loads

Load Factor =	1.0
Axial Load, Pu = ΦP_n =	318.7 kips
Moment, Mu =	134.2 k-ft

Drilled Pier Geometry and Concrete Specifications

Diameter =	42 in
f'_c =	0.416 ksi
ϵ_c =	0.003 in/in
β_1 =	0.85
Ag =	1385.4 in ²
Height Above Grade =	0.5 ft
Depth Below Grade =	3.8 ft

Nominal Axial Load and Moment

$\Phi P_n(\max)$ =	488.4 kips
$\Phi P_n(\min)$ =	-406.4 kips
ΦP_n =	318.7 kips
Φ =	0.650
ΦM_n (Resultant) =	190.5 k-ft
at θ =	180.00 degrees
NA Depth =	30.59 in

Rebar Size and Specifications

	Existing	Bar Circle 2
Bar Size =	#10	
Override Bar Diameter =		
Bar Diameter =	1.2700	0.0000 in
Bar Area =	1.2700	0.0000 in ²
Effective Bar Area =	1.2700	0.0000 in ²
Number Bars =	5	
Spacing =	Symmetric	
f_y =	71.111111	ksi
E_s =	29000	ksi
ϵ_y =	0.00245	in/in
Tie Size =	#4	
Clear Cover to Ties =	6.865	in
Bar Circle =	26	in
Adjust =	18.0000	
% of Area Effective =	100.0%	100.0%
Include in Calcs =	Yes	Yes
Bar Circle Valid =	Yes	No

ROCK ANCHOR CHECK -
TOWER COMPRESSION LEG

AXIAL RATIO = 65.3% OK

MOMENT RATIO = 70.4% OK

Minimum Required Steel

Seismic Design Category =	D
As(min) =	3.90 sq in
As =	6.35 sq in
Stl Area Reduction Factor =	1.00

ACI Section 10.5.1 & 10.5.3

DRILLED PIER STEEL ANALYSIS - STEEL CALCULATIONS - TIA-222-G

BASED ON ACI 318-05, SECTIONS 9 & 10 (ASSUMING TIE REINFORCEMENT)

Factored Internal Loads from Analysis

Reference Standard =	TIA-222-G
ACI Code =	ACI 318-05
Maximum Ratio =	100.0%
Axial Load, Pu =	-281.9 kips, (+Comp, -Tension)
Moment, Mu =	123.0 k-ft (Must be Positive)
Depth to Analysis Section =	3.80 ft, from Grade

Factored Internal Loads

Load Factor =	1.0
Axial Load, Pu = ΦP_n =	-281.9 kips
Moment, Mu =	123.0 k-ft

Drilled Pier Geometry and Concrete Specifications

Diameter =	42 in
f_c' =	0.416 ksi
ϵ_c =	0.003 in/in
β_1 =	0.85
Ag =	1385.4 in ²
Height Above Grade =	0.5 ft
Depth Below Grade =	3.8 ft

Nominal Axial Load and Moment

$\Phi P_n(\max)$ =	488.4 kips
$\Phi P_n(\min)$ =	-406.4 kips
ΦP_n =	-281.9 kips
Φ =	0.900
ΦM_n (Resultant) =	132.6 k-ft
at θ =	0.00 degrees
NA Depth =	7.47 in

Rebar Size and Specifications

	Existing	Bar Circle 2
Bar Size =	#10	
Override Bar Diameter =		
Bar Diameter =	1.2700	0.0000 in
Bar Area =	1.2700	0.0000 in ²
Effective Bar Area =	1.2700	0.0000 in ²
Number Bars =	5	
Spacing =	Symmetric	
f_y =	71.111111	ksi
E_s =	29000	ksi
ϵ_y =	0.00245	in/in
Tie Size =	#4	
Clear Cover to Ties =	6.865	in
Bar Circle =	26	in
Adjust =	18.0000	
% of Area Effective =	100.0%	100.0%
Include in Calcs =	Yes	Yes
Bar Circle Valid =	Yes	No

ROCK ANCHOR CHECK -
TOWER UPLIFT LEG

AXIAL RATIO = 69.4% OK

MOMENT RATIO = 92.8% OK

Minimum Required Steel

Seismic Design Category =	D
As(min) =	3.90 sq in
As =	6.35 sq in
Stl Area Reduction Factor =	1.00

ACI Section 10.5.1 & 10.5.3

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) The structural integrity of the existing tower foundation can only be verified if exact foundation sizes and soil conditions are known. Paul J. Ford and Company will not accept any responsibility for the adequacy of the existing foundations unless the foundation sizes and a soils report are provided.
- 5) 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.
- 6) 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.
- 7) 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.