



STATE OF CONNECTICUT  
*CONNECTICUT SITING COUNCIL*

Ten Franklin Square, New Britain, CT 06051  
Phone: (860) 827-2935 Fax: (860) 827-2950  
E-Mail: [siting.council@ct.gov](mailto:siting.council@ct.gov)  
Web Site: [portal.ct.gov/csc](http://portal.ct.gov/csc)

**VIA ELECTRONIC MAIL**

June 16, 2022

Jonathan McNeal  
Site Acquisitions Manager  
Nexius  
4 MacArthur Avenue  
Devens, MA 01434  
[jonathan.mcneal@nexius.com](mailto:jonathan.mcneal@nexius.com)

**RE: TS-DISH-131-220516** – Dish Wireless, LLC request for an order to approve tower sharing at an existing telecommunications facility located at 435 Mill Street, Southington, Connecticut.

Dear Mr. McNeal:

The Connecticut Siting Council (Council) is in receipt of your correspondence of June 9, 2022 submitted in response to the Council's June 2, 2022 notification of an incomplete request for tower sharing with regard to the above-referenced matter.

The submission renders the request for tower sharing 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 black ink, appearing to read 'Melanie A. Bachman'.

Melanie A. Bachman  
Executive Director

MAB/IN/laf

**From:** Jonathan Mcneal <[jonathan.mcneal@nexius.com](mailto:jonathan.mcneal@nexius.com)>

**Sent:** Thursday, June 9, 2022 1:50 PM

**To:** Robidoux, Evan <[Evan.Robidoux@ct.gov](mailto:Evan.Robidoux@ct.gov)>

**Cc:** Douglas Arndt <[darndt@southingtonwater.org](mailto:darndt@southingtonwater.org)>; [EdwardsM@southington.org](mailto:EdwardsM@southington.org); Southington1 <[sciotam@southington.org](mailto:sciotam@southington.org)>

**Subject:** Council Incomplete Letter for TS-DISH-131-220516 (435 Mill Street, Southington)

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.

Good Afternoon Evan,

Attached please find a revised Structural Analysis for the above-referenced project pursuant to the Incomplete Notice dated 6/2/22. A hard copy of the SA was sent to the CSC yesterday via FedEx. The tracking information is attached. Please let me know if you need additional information.

**JONATHAN MCNEAL**

Site Acquisition Manager

[www.nexius.com](http://www.nexius.com)

603-738-0002

**N E X I U S**

June 7, 2022

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

VIA EMAIL & FEDEX

**TS-DISH-131-220516** – Dish Wireless, LLC request for an order to approve tower sharing at an existing telecommunications facility located at 435 Mill Street, Southington, Connecticut.

Dear Ms. Bachman:

Pursuant the Incomplete Notice from the CSC in a letter dated June 2, 2022, enclosed please find a revised structural analysis for the above-referenced application reflecting the AT&T modifications made/approved by the CSC at EM-AT&T-131-220413. Please let me know if you need additional information.

Respectfully Submitted,



Jonathan McNeal  
4 MacArthur Avenue  
Devens, MA 01434  
[Jonathan.mcneal@nexius.com](mailto:Jonathan.mcneal@nexius.com)  
603-738-0002

Attachment: As Noted.

Cc: Town of Southington- via email only  
Southington Water Department- via email only  
Dish Wireless- via email only

NEXIUS

SELF-SUPPORT TOWER  
STRUCTURAL ANALYSIS REPORT



SITE ID: BOBDL00004B

**Rev.2 - 06/03/2022**

**Tower Components : PASS (72.3%)**

**Tower Foundation: PASS (69.0%)**

## STRUCTURAL ANALYSIS REPORT

Site Information				
<b>Site ID:</b>	BOBDL00004B			
<b>Site Address:</b>	435 Mill St, Southington, CT 06489			
<b>Coordinates</b>	<b>N. Lat.</b>	41.604700	<b>W. Lon.</b>	72.893900

Existing Tower Information	
<b>Type:</b>	Self-Support Tower
<b>Manufacturer:</b>	Valmont
<b>Height:</b>	120 ft
<b>Base Width:</b>	12 ft
<b>Foundation Type:</b>	Combined Foundation (Single Spread Footing w/ 3 Piers)

As requested, we have performed a structural analysis/evaluation of the above-mentioned tower structure subjected to proposed and existing loadings in order to assess the impact of the proposed loading changes. The information provided was evaluated to determine whether the existing tower structure can adequately support the proposed mount and equipment configuration. We have been provided with the documents as outlined below.

The source documents used for the structural analysis are presented in Table 1.

**TABLE 1 - REFERENCED DOCUMENTS**

Type	Preparer	Name	Date
CD	Nexius	BOBDL00004B_CD100_20220425_REV 1	4/25/2022
RF Design Sheet	Dish Wireless	RFDS-BOBDL00004B-Preliminary-20220119-v.2	1/19/2022
Site design Notes	Nexius	BOBDL00004B Site Design Photos and Notes	10/15/2021
Tower Equipment Photos	Nexius	BOBDL00004B Tower Equipment Photos and Notes	1/28/2022
Previous Structural Analysis	Tectonic	em-t-mobile-131-210222_filing_435-MILL-STREET-TANKS-SOUTHINGTON-CT11239A-Anchor	1/26/2021
Previous Structural Analysis	PJF	TS_VER-131-201005_filing_MillSt	9/4/2020

**ANALYSIS CRITERIA:**

This structural analysis has been performed in accordance with the **2018 Connecticut State Building Code/2015 IBC with Connecticut Amendments** as well as the **ANSI/TIA-222-G-05** "Structural Standards for Antenna Supporting Structures and Antennas".

The analysis design parameters considered in this analysis are presented in Table 2.

**TABLE 2 – ANALYSIS / DESIGN PARAMETERS**

Parameter	Value
Ultimate Wind Speed (3-Sec), $V_{ult} =$	<b>135 mph*</b>
Nominal Wind Speed (3-sec), $V =$	<b>104.6 mph</b>
Basic Wind speed with Ice, $V_i =$	<b>50 mph</b>
Design Radial Ice Thickness, $t_i =$	<b>1.00 in</b>
Exposure Category	<b>B</b>
Risk Category (Structure Class)	<b>III</b>
Topographic Category	<b>I</b>
Seismic Parameter, $S_1 =$	<b>0.064</b>
Seismic Parameter, $S_{Ds} =$	<b>0.197</b>

**\*AS REQUIRED BY JURISDICTION.**

**LOADING INFORMATION:**

The proposed and existing appurtenances/equipment loadings are shown below in Table 3.

If the existing/proposed appurtenances/equipment loadings listed below differ from the actual field conditions, we should be contacted immediately to review the discrepancies and evaluate their impact.

# NEXIUS

**TABLE 3 - FINAL ANTENNA AND CABLE INFORMATION**

Center (ft.)	Carrier /Tenant	Number of Antenna	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
120'-0"±	Municipal	1	Tower Mounts	3ft Side Arm Mount	4	7/8 1/2
		2	Andrew	VHLP800-11 MW Dish		
		1	Commscope	DB404-B	4	
		1	MiscI	10' Dipole		
		3	Motorola	PTP 49400	2	
		2	RFI	BA4040-67-DIN		
110'-0"±	T-Mobile	3	Sitepro1	VFA12 Mount	6	6x12 Hybrid
		3	RFS	APXVAARR24_43-U-NA20 Antenna		
		3	Ericsson	AIR 32 B66A/B2A Antenna		
		3	Ericsson	AIR6449 B41 Antenna		
		3	Ericsson	RRUS 4449 B71+B85		
		3	Ericsson	RRUS 4415 B25		
		3	CommScope	SDX1926Q-43/E14F05P86 Diplexer		
99'-8"±	AT&T	<b>3</b>	<b>Ericsson</b>	<b>AIR 6419 B77G Antenna</b>	6 6 2	1-5/8 7/16 DC ½ Fiber
98'-0"±		6	CCI	TPA65R-BU8D Antenna		
		3	Sitepro1	VFA12 Mount		
		1	Raycap	DC6-48-60-0-8C-EV		
		2	Raycap	DC6-48-60-18-8C-EV		
		3	Ericsson	RADIO 4415 B30		
		3	Ericsson	RRUS 4449 B5/B12		
		3	Ericsson	RRUS 4478 B14		
		3	Ericsson	RRUS 8843 B2/B66A		
96'-0"±		<b>3</b>	<b>Ericsson</b>	<b>AIR 6449 B77 Antenna</b>		
88'-0"±	Verizon Wireless	3	Commscope	NHH-65B-R2B Antenna	2	6x12 Hybrid
		3	Commscope	NHHSS-65B-R2B Antenna		
		3	Commscope	BSAMNT-SBS-1-2 Mount		
		3	Samsung	B2/B66A RRH-BR049		
		3	Samsung	B5/B13 RRH-BR04C		
		3	Samsung	CBRS RRH		
		1	Raycap	RVZDC-6627-PF-48		
		3	Sitepro1	VFA12-HD Mount		
74'-0"±	Dish Wireless	<b>3</b>	<b>JMA</b>	<b>MX08FR0665-21 Antenna</b>	1	High-Cap. Hybrid Cable
		<b>3</b>	<b>FUJITSU</b>	<b>TA08025-B605 RRU</b>		
		<b>3</b>	<b>FUJITSU</b>	<b>TA08025-B604 RRU</b>		
		<b>1</b>	<b>RAYCAP</b>	<b>RDIDC-9181-PF-48</b>		
		<b>3</b>	<b>COMMSCOPE</b>	<b>MTC3975083 V-Frame</b>		

\*New proposed appurtenance(s) in bold, all other equipment is existing.

Note: Equipment not listed is assumed to be removed or replaced.

## ANALYSIS AND RESULTS:

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the self-support tower and calculate member stresses for various loading cases. The summary of results from tower structural analysis are shown below in Table 4.

**TABLE 4: TOWER COMPONENTS ANALYSIS RESULTS**

<b>Tower Components</b>	<b>Capacity (%) *</b>	<b>Assessment *</b>
<b>Leg</b>	<b>72.3</b>	<b>Pass</b>
Diagonal	71.1	Pass
Horizontal	62.0	Pass
Top Girt	19.6	Pass
Bottom Girt	19.8	Pass
Mid Girt	8.4	Pass
Bolt Checks	66.5	Pass
Anchor Rod	42.0	Pass

\*\_Capacity percentages  $\leq$  **100%** are considered structurally adequate.

The results from the tower foundation analysis are shown below in Table 5.

**TABLE 5: TOWER FOUNDATION ANALYSIS RESULTS**

<b>Foundation Analysis Checks</b>	<b>Rating (%) *</b>	<b>Assessment *</b>
<b>SOIL RATING</b>		
<b>Uplift</b>	<b>69.0</b>	<b>Pass</b>
Lateral (Sliding)	44.6	Pass
Bearing Pressure	49.9	Pass
<b>STRUCTURAL RATING</b>		
Pier Flexure	27.7	Pass
Pier Compression	4.0	Pass
Pad Flexure	46.5	Pass
<b>Pad Shear</b>	<b>52.1</b>	<b>Pass</b>

\*\_Capacity percentages  $\leq$  **100%** are considered structurally adequate.



## GENERAL ASSUMPTIONS:

- The tower components, plates, bolts and antenna mounting system is assumed to be in good overall condition without structural deficiencies, including but not limited to missing, bent or damaged members or hardware.
- All bolted connections and miscellaneous brackets are assumed to be properly secured and tightened.
- The structural members, sizes, bolts and steel grades are as per data supplied. Where information was missing or insufficient, general assumptions as per industry standards and practice have been made and noted.
- The supporting structure is assumed to adequately support the mounting system and is not within the scope of this analysis.

## CONCLUSIONS AND RECOMMENDATIONS:

Based on the information provided, our assessment concluded that the tower and its foundation have **sufficient capacity** to support the proposed and existing loading as listed in the Table 3 of this report, subject to the attached standard conditions on page 7.

Should you have any questions, comments or require additional information, please do not hesitate to contact us.

Sincerely,

Analysis by:

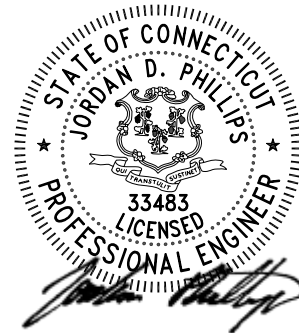
**Binod Paudel, P.E.**

[binod.paudel@nexius.com](mailto:binod.paudel@nexius.com)

Reviewed by:

**Jordan Phillips, P.E.**

[jordan.phillips@nexius.com](mailto:jordan.phillips@nexius.com)



## Standard Conditions for Providing Structural Engineering and Consulting Services on Existing Structures

1. The evaluation assumes that the structure has been properly designed, constructed or structurally modified and maintained in accordance with the TIA-222-G Standard or a previous edition of this standard and that all items related to the integrity of the structure have been corrected and addressed.
2. The assumptions documented in this structural analysis report requiring verification shall be validated prior to implementation of the proposed changed condition or modification.
3. The structural analysis has been performed using information as provided to us and potentially field verified and is assumed to be current and accurate. We have been provided a mounting arrangement for the telecom equipment and appurtenances, including but not limited to: antennas, RRH's, RRU'S, TMA's, OVP's, diplexers, filters, etc. Our analysis has been based upon this specified mounting arrangement and therefore we are not responsible for deviations in the arrangement that may occur over time. If variations in the equipment type, quantity or mounting arrangement are proposed, we should be contacted to revise the structural recommendations of this report.
4. If the existing field conditions are different than those presented in this analysis, we should be contacted to evaluate the significance of the deviation(s) and revise the structural assessment accordingly.
5. When the steel grade or strength is unknown and cannot be field tested, our analysis assumes that the standard structural grades have been used by the manufacturer for all assembled parts of the mounting system. Acceptable steel and connection components are specified by the American Institute of Steel Construction (AISC) and as per typical industry standards. It is assumed all welded connections were performed in a certified shop under the latest American Welding Society (AWS) codes and regulations. No field welds are permitted or assumed for the existing pre-manufactured equipment.
6. The structural analysis has been performed assuming that all structural members and hardware are in "like new" good overall condition and free from structural defects. No allowance has been made for: damaged or missing structural members or hardware, corrosion, loose hardware or connections, misaligned parts etc. or any strength reduction due to excessive corrosion, aging or fatigue of any structural components.
7. We cannot be held liable for any members, hardware or parts manufactured from inferior or defective materials, welds or bolts.
8. The structural analysis provided is an assessment of the primary load carrying capacity of the members and hardware. We provided a limited scope of service; in several instances the capacity of every weld, plate, connection detail, etc. cannot be verified. In cases where the structural fabrication details are unknown and the detailed field measurement of members and connections is not be feasible and therefore, we are unable to perform rigorous connection capacity calculations; in such instances it is assumed that the existing manufactured connections develop the full capacity of the primary members being connected.
9. Mounting hardware is analyzed to the best of our ability using the provided/available information or the limited data obtained during field mapping (if authorized by client), at the time of our analysis.
10. We shall not be held responsible for improperly installed parts or loose hardware or that has a tendency of working loose over its lifetime. The analysis has been performed assuming properly installed, fully tightened, secured connections and symmetry of the mounting hardware per manufacturer instructions.
11. We are not liable for temporary or unbalanced loads on the mounting system or mounting hardware or for the means and methods of how the mounting arrangement is accomplished by the contractor. These means and methods may include but are not limited to: rigging of equipment, hardware to lift and locate, temporary hanging of equipment in locations other than the final arrangement, movement and tie-off of tower riggers/personnel and their equipment, etc.
12. We do not take any responsibility and we are not liable for any damage or injury caused through, be it indirect, special, incidental or consequential damages during the construction or installation process of the proposed scope of work.
13. The loading, analysis, design criteria and rigging related to the installation, alteration, modification or the criteria for safety practices associated with the construction activities are not within the scope of this analysis (refer to the ANSI/TIA-322 and ANSI/ASSE A10.48 Standard - latest versions).

# NEXIUS

14. It is assumed that all welded connections are performed in the shop under the latest American Welding Society Code. No field welds are permitted or assumed for the existing pre-manufactured equipment.
15. Steel grade and strength are unknown and cannot be field tested. We cannot be held responsible for equipment manufactured from inferior steel or bolts. Our analysis assumes that standard structural grade steel has been used by the equipment manufacturer for all assembled parts of the mounting apparatus. Acceptable steels and connection components are specified by the American Institute of Steel Construction. In case no accurate info available, following material assumptions were used:

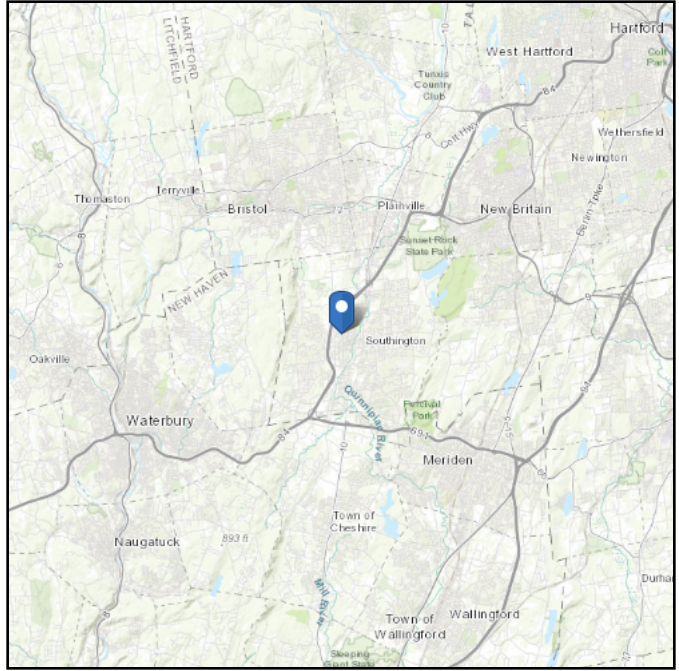
Pipe	ASTM A53 B-42
Connection Bolts	ASTM A325

# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

**Standard:** ASCE/SEI 7-10  
**Risk Category:** III  
**Soil Class:** D - Stiff Soil

**Elevation:** 312.85 ft (NAVD 88)  
**Latitude:** 41.6047  
**Longitude:** -72.8939



## Wind

### Results:

Wind Speed	131 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	92 Vmph
100-year MRI	99 Vmph

135 Vmph REQUIRED BY JURISDICTION

**Data Source:** ASCE/SEI 7-10, Fig. 26.5-1B and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (annual exceedance probability = 0.000588, MRI = 1,700 years).

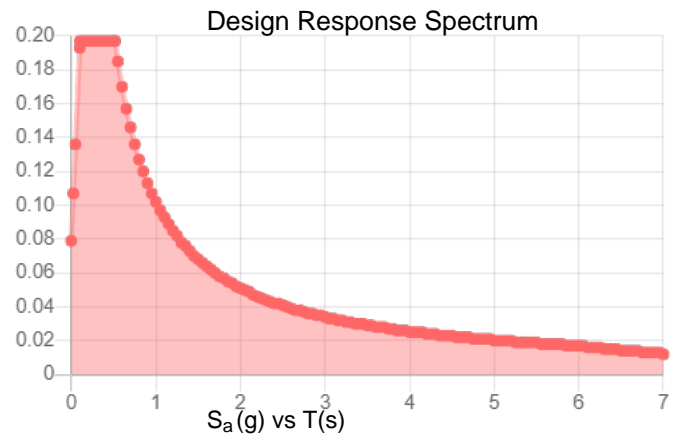
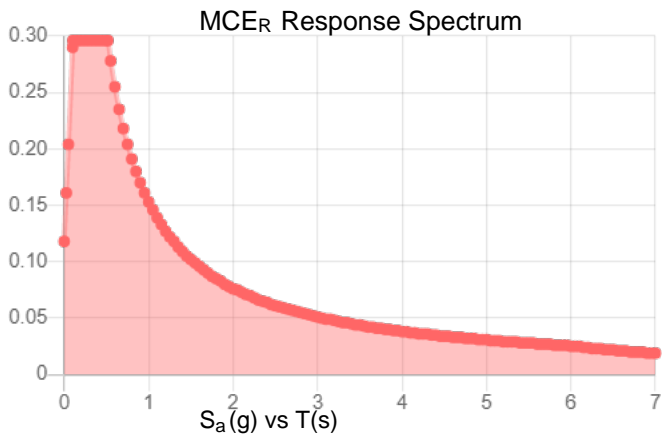
Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

**Site Soil Class:** D - Stiff Soil

**Results:**

$S_s$ :	0.185	$S_{DS}$ :	0.197
$S_1$ :	0.064	$S_{D1}$ :	0.102
$F_a$ :	1.6	$T_L$ :	6
$F_v$ :	2.4	PGA :	0.095
$S_{MS}$ :	0.296	$PGA_M$ :	0.152
$S_{M1}$ :	0.153	$F_{PGA}$ :	1.6
		$I_e$ :	1.25

**Seismic Design Category** B



**Data Accessed:** Tue Feb 08 2022

**Date Source:**

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

## Ice

---

**Results:**

Ice Thickness: 1.00 in.  
Concurrent Temperature: 15 F  
Gust Speed 50 mph

**Data Source:** Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

**Date Accessed:** Tue Feb 08 2022

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

## Snow

---

**Results:**

Ground Snow Load,  $p_g$  : 30 lb/ft<sup>2</sup>  
Elevation: 312.9 ft

**Data Source:** ASCE/SEI 7-10, Fig. 7-1.

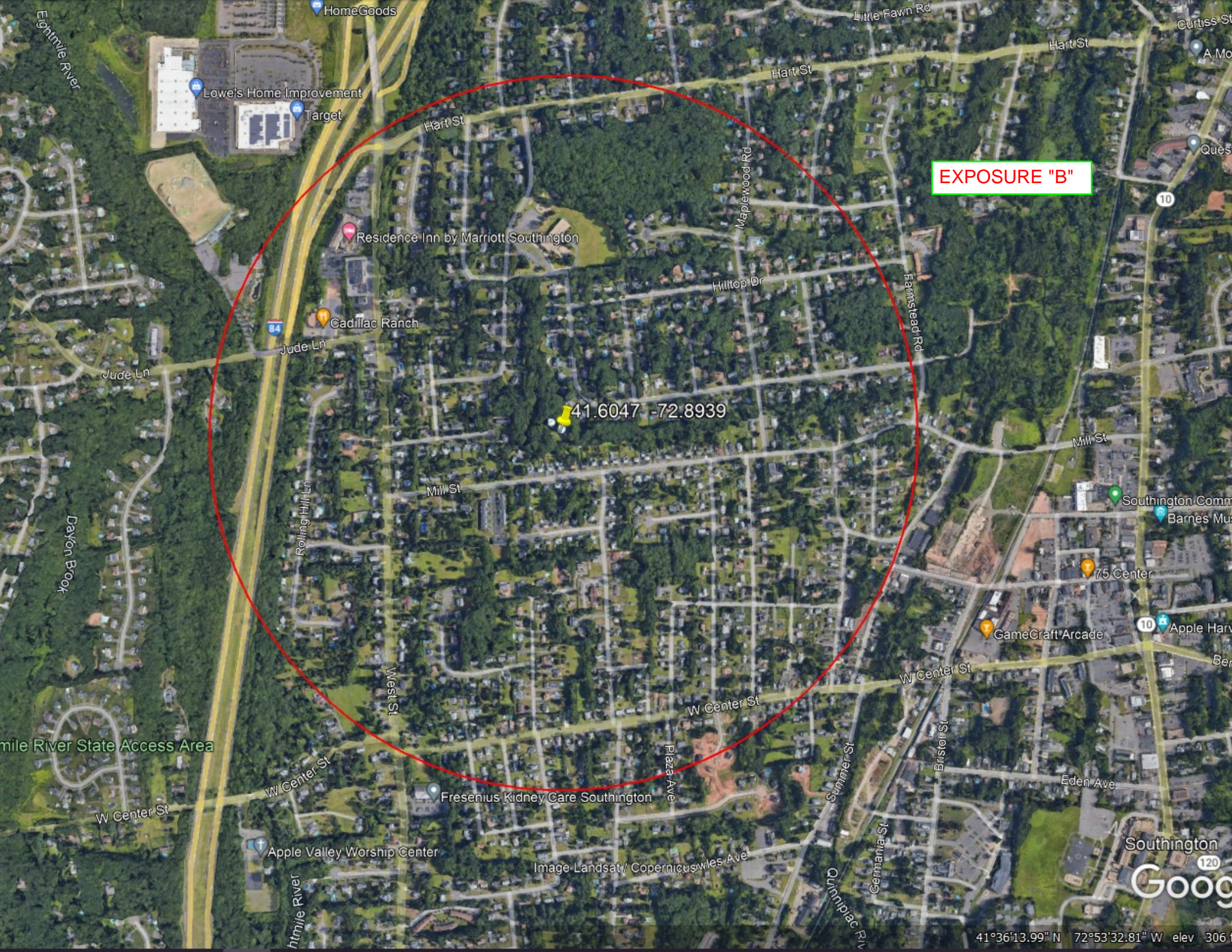
**Date Accessed:** Tue Feb 08 2022

Values provided are ground snow loads. In areas designated "case study required," extreme local variations in ground snow loads preclude mapping at this scale. Site-specific case studies are required to establish ground snow loads at elevations not covered.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.



**EXPOSURE "B"**

41.6047 -72.8939

Eightmile River

HomeGoods

Lowe's Home Improvement

Target

Hart St

Hart St

Hart St

Little Fawn Rd

Curtiss St

A Mo

Ques

Residence Inn by Marriott Southington

Cadillac Ranch

84

Jude Ln

Jude Ln

Hilltop Dr

Maplewood Rd

Farmstead Rd

10

Dakota Brook

Rolling Hill Ln

Mill St

Mill St

Southington Comm

Barnes Mus

75 Center

GameCraft Arcade

10

Apple Harv

Eightmile River State Access Area

West St

W Center St

W Center St

Apple Harv

W Center St

W Center St

Fresenius Kidney Care Southington

Plaza Ave

Summer St

Bristol St

Eden Ave

Apple Valley Worship Center

Image Landsat/ Copernicus wiles Ave

Quinnipiac Riv

Germania St

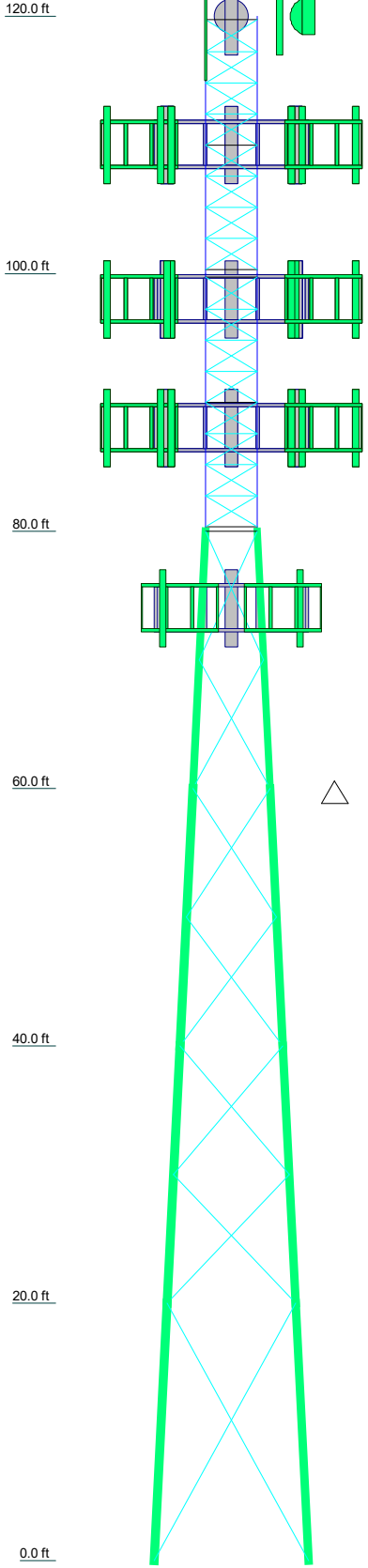
Southington

Goog 120

41°36'13.99" N 72°53'32.81" W elev 306 ft



Section	T1	T2	T3	T4	T5	T6
Legs	SR 1 3/4	SR 2 1/4	Pirod 194651 (Gr.58)	Pirod 195213 (Gr.58)	Pirod 195217 (Gr.58)	Pirod 196915 (Gr.58)
Leg Grade	SR 3/4	SR 7/8	A572-55	A572-50	L2 1/2x2 1/2x1/4	2L3 1/2x3 1/2x1/4
Diagonals			L2 1/2x2 1/2x1/4	L3x3x3/16	N.A.	N.A.
Diagonal Grade						
Top Girts	SR 7/8	SR 1				
Mid Girts	SR 7/8	SR 1				
Bottom Girts	SR 7/8	SR 1				
Horizontals		SR 3/4				
Face Width (ft)	4	6	6	6 @ 10	8	10
# Panels @ (ft)		16 @ 2.42708		2.7	3.1	1 @ 20
Weight (K)	1.1	1.5	2.5	2.7	3.1	4.4



**DESIGNED APPURTENANCE LOADING**

TYPE	ELEVATION	TYPE	ELEVATION
10' Lightning Rod (Municipal)	120	RRUS 4478 B14 (ATI)	98
PTP 49400 (Municipal)	120	RRUS 4478 B14 (ATI)	98
PTP 49400 (Municipal)	120	RRUS 8843 B2/B66A (ATI)	98
PTP 49400 (Municipal)	120	RRUS 8843 B2/B66A (ATI)	98
10' Dipole (Municipal)	120	RRUS 8843 B2/B66A (ATI)	98
DB404-B (Municipal)	120	AIR 6449 B77 (ATI)	98
BA4040-67-DIN (Municipal)	120	AIR 6449 B77 (ATI)	98
BA4040-67-DIN (Municipal)	120	AIR 6449 B77 (ATI)	98
Pipe Mount (Municipal)	120	AIR 6419 B77G (ATI)	98
3ft Side Arm Mount (Municipal)	120	AIR 6419 B77G (ATI)	98
VHLP800-11 (Municipal)	120	NHH-65B-R2B_TIA w/Mount Pipe (Verizon)	88
VHLP800-11 (Municipal)	120	NHHSS-65B-R2BT4 w/Mount Pipe (Verizon)	88
APXVAARR24_43-U-NA20_TIA w/Mount Pipe (T-Mobile)	110	NHHSS-65B-R2BT4 w/Mount Pipe (Verizon)	88
AIR-32 B2A/B66AA w/Mount Pipe (T-Mobile)	110	NHHSS-65B-R2BT4 w/Mount Pipe (Verizon)	88
AIR-32 B2A/B66AA w/Mount Pipe (T-Mobile)	110	NHHSS-65B-R2BT4 w/Mount Pipe (Verizon)	88
AIR-32 B2A/B66AA w/Mount Pipe (T-Mobile)	110	BSAMNT-SBS-1-2 (Verizon)	88
AIR-32 B2A/B66AA w/Mount Pipe (T-Mobile)	110	BSAMNT-SBS-1-2 (Verizon)	88
AIR 6449 B41 w/ Mount Pipe (T-Mobile)	110	BSAMNT-SBS-1-2 (Verizon)	88
AIR 6449 B41 w/ Mount Pipe (T-Mobile)	110	B2/B66 RRH-BR049 (Verizon)	88
AIR 6449 B41 w/ Mount Pipe (T-Mobile)	110	B2/B66 RRH-BR049 (Verizon)	88
AIR 6449 B41 w/ Mount Pipe (T-Mobile)	110	B2/B66 RRH-BR049 (Verizon)	88
AIR 6449 B41 w/ Mount Pipe (T-Mobile)	110	B5/B13 RRH-BR04C (Verizon)	88
AIR 6449 B41 w/ Mount Pipe (T-Mobile)	110	B5/B13 RRH-BR04C (Verizon)	88
RADIO 4449 B71/B85 (T-Mobile)	110	B5/B13 RRH-BR04C (Verizon)	88
RADIO 4449 B71/B85 (T-Mobile)	110	CBRS RRH-RT4401-48A (Verizon)	88
RADIO 4449 B71/B85 (T-Mobile)	110	CBRS RRH-RT4401-48A (Verizon)	88
RRUS 4415 B25 (T-Mobile)	110	CBRS RRH-RT4401-48A (Verizon)	88
RRUS 4415 B25 (T-Mobile)	110	CBRS RRH-RT4401-48A (Verizon)	88
RRUS 4415 B25 (T-Mobile)	110	RVZDC-6627-PF-48 (Verizon)	88
SDX1926Q-43 (T-Mobile)	110	RVZDC-6627-PF-48 (Verizon)	88
SDX1926Q-43 (T-Mobile)	110	Sitepro VFA12-HD (Verizon)	88
SDX1926Q-43 (T-Mobile)	110	Sitepro VFA12-HD (Verizon)	88
SDX1926Q-43 (T-Mobile)	110	Sitepro VFA12-HD (Verizon)	88
4415 B66A (T-Mobile)	110	Sitepro VFA12-HD (Verizon)	88
4415 B66A (T-Mobile)	110	NHH-65B-R2B_TIA w/Mount Pipe (Verizon)	88
4415 B66A (T-Mobile)	110	NHH-65B-R2B_TIA w/Mount Pipe (Verizon)	88
Sitepro VFA12-RRU (T-Mobile)	110	NHH-65B-R2B_TIA w/Mount Pipe (Verizon)	88
Sitepro VFA12-RRU (T-Mobile)	110	JMA MX08FR0665-21 (Dish Wireless)	74
Sitepro VFA12-RRU (T-Mobile)	110	JMA MX08FR0665-21 (Dish Wireless)	74
APXVAARR24_43-U-NA20_TIA w/Mount Pipe (T-Mobile)	110	FUJITSU TA08025-B605 (Dish Wireless)	74
APXVAARR24_43-U-NA20_TIA w/Mount Pipe (T-Mobile)	110	FUJITSU TA08025-B605 (Dish Wireless)	74
APXVAARR24_43-U-NA20_TIA w/Mount Pipe (T-Mobile)	110	FUJITSU TA08025-B605 (Dish Wireless)	74
AIR 6419 B77G (ATI)	98	FUJITSU TA08025-B605 (Dish Wireless)	74
(2) TPA65R-BU8D w/Mount Pipe (ATI)	98	FUJITSU TA08025-B604 (Dish Wireless)	74
(2) TPA65R-BU8D w/Mount Pipe (ATI)	98	FUJITSU TA08025-B604 (Dish Wireless)	74
(2) TPA65R-BU8D w/Mount Pipe (ATI)	98	FUJITSU TA08025-B604 (Dish Wireless)	74
Sitepro1 VFA12-HD (ATI)	98	FUJITSU TA08025-B604 (Dish Wireless)	74
Sitepro1 VFA12-HD (ATI)	98	FUJITSU TA08025-B604 (Dish Wireless)	74
Sitepro1 VFA12-HD (ATI)	98	FUJITSU TA08025-B604 (Dish Wireless)	74
DC6-48-60-0-8C-EV (ATI)	98	RAYCAP RDIDC-9181-PF-48 OVP (Dish Wireless)	74
DC6-48-60-18-8C-EV (ATI)	98	RAYCAP RDIDC-9181-PF-48 OVP (Dish Wireless)	74
DC6-48-60-18-8C-EV (ATI)	98	Commscope MTC3975083 V-Frame (Dish Wireless)	74
RADIO 4415 B30 (ATI)	98	Commscope MTC3975083 V-Frame (Dish Wireless)	74
RADIO 4415 B30 (ATI)	98	Commscope MTC3975083 V-Frame (Dish Wireless)	74
RADIO 4415 B30 (ATI)	98	Commscope MTC3975083 V-Frame (Dish Wireless)	74
RRUS 4449 B5/B12 (ATI)	98	JMA MX08FR0665-21 (Dish Wireless)	74
RRUS 4449 B5/B12 (ATI)	98	JMA MX08FR0665-21 (Dish Wireless)	74
RRUS 4449 B5/B12 (ATI)	98	JMA MX08FR0665-21 (Dish Wireless)	74
RRUS 4478 B14 (ATI)	98		

**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-55	55 ksi	70 ksi	A572-50	50 ksi	65 ksi

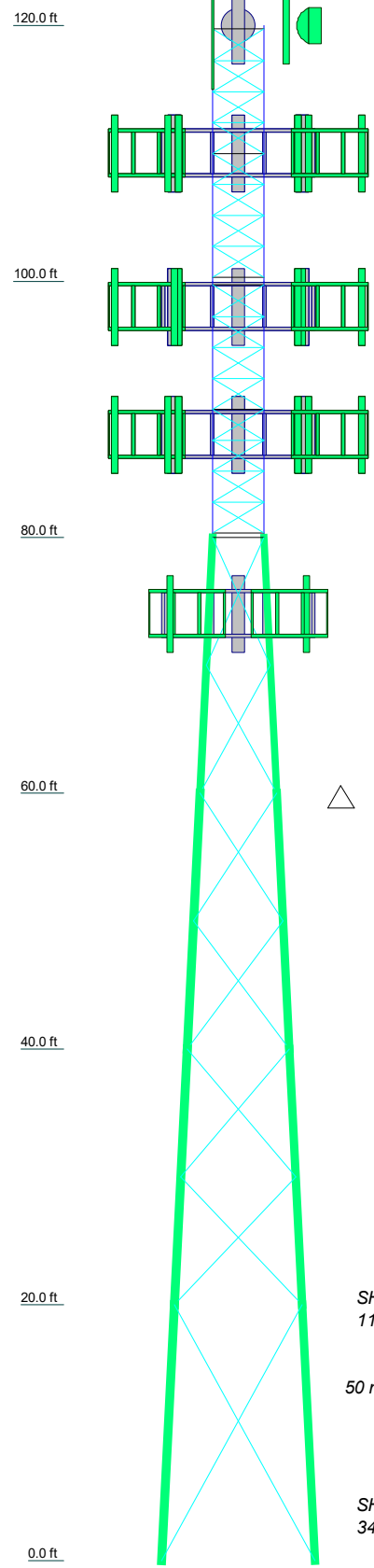
**TOWER DESIGN NOTES**

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class III.
7. Topographic Category 1 with Crest Height of 0.00 ft

**Nexius**  
2595 NORTH DALLAS PARKWAY, SUITE 300  
FRISCO, TX 75034  
Phone: (978) 581-9888  
FAX:

Job: <b>BOBDL00004B</b>		
Project: <b>BOBDL00004B</b>		
Client: Dish Wireless	Drawn by: Binod Paudel	App'd:
Code: TIA-222-G	Date: 06/03/22	Scale: NTS
Path:		Dwg No. E-1

Section	T1	T2	T3	T4	T5	T6
Legs	SR 1 3/4	SR 2 1/4	Pirod 194651 (Gr.58)	Pirod 195213 (Gr.58)	Pirod 195217 (Gr.58)	Pirod 196915 (Gr.58)
Leg Grade	SR 3/4	SR 7/8	A572-55	A572-55	A572-50	A572-50
Diagonals	SR 7/8	SR 7/8	L2 1/2x2 1/2x1/4	L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x5/16	2L3 1/2x3 1/2x1/4
Diagonal Grade	SR 3/4	SR 7/8	L3x3x3/16	N.A.	N.A.	N.A.
Top Girts	SR 7/8	SR 1	SR 1	SR 1	SR 1	SR 1
Mid Girts	SR 7/8	SR 1	SR 1	SR 1	SR 1	SR 1
Bottom Girts	SR 7/8	SR 1	SR 1	SR 1	SR 1	SR 1
Horizontals	SR 3/4	SR 3/4	SR 3/4	SR 3/4	SR 3/4	SR 3/4
Face Width (ft)	12	10	8	6 @ 10	6 @ 10	6 @ 10
# Panels @ (ft)	4	4.4	3.1	2.7	2.5	1.5
Weight (K)	15.3	4.4	3.1	2.7	2.5	1.5



**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-55	55 ksi	70 ksi	A572-50	50 ksi	65 ksi

**TOWER DESIGN NOTES**

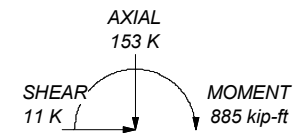
1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class III.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 72.3%

ALL REACTIONS ARE FACTORED

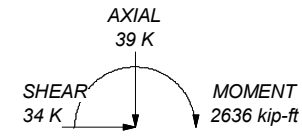
MAX. CORNER REACTIONS AT BASE:

DOWN: 267 K  
SHEAR: 28 K

UPLIFT: -241 K  
SHEAR: 25 K



TORQUE 2 kip-ft  
50 mph WIND - 1.0000 in ICE



TORQUE 6 kip-ft  
REACTIONS - 105 mph WIND

**Nexius**  
2595 NORTH DALLAS PARKWAY, SUITE 300  
FRISCO, TX 75034  
Phone: (978) 581-9888  
FAX:

Job: <b>BOBDL00004B</b>		
Project: <b>BOBDL00004B</b>		
Client: Dish Wireless	Drawn by: Binod Paudel	App'd:
Code: TIA-222-G	Date: 06/03/22	Scale: NTS
Path:		Dwg No. E-1

X:\Projects\0619\NET\CTB\BOBDL00004B\STRUCTURAL\ANALYSIS\SA\Rev. IT\Tower\BOBDL00004B\_120 SST Structural Analysis.dwg

<p><b>tnxTower</b></p> <p><b>Nexus</b>  2595 NORTH DALLAS PARKWAY,  SUITE 300  FRISCO, TX 75034  Phone: (978) 581-9888  FAX:</p>	<b>Job</b>	BOBDL00004B	<b>Page</b>	1 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

## Tower Input Data

The main tower is a 3x free standing tower with an overall height of 120.00 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 12.00 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 105 mph.

Structure Class III.

Exposure Category B.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 1.0000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

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

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

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

Pressures are calculated at each section.

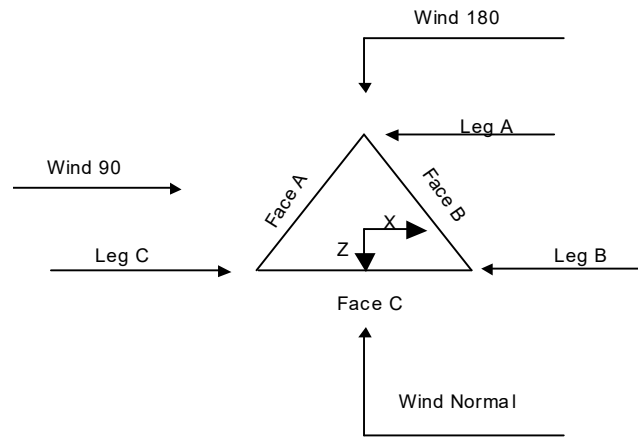
Stress ratio used in tower member design is 1.

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

## Options

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>√ Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>SR Members Have Cut Ends</li> <li>SR Members Are Concentric</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>√ Use Clear Spans For KL/r</li> <li>Retension Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>Add IBC .6D+W Combination</li> <li>Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> <li>Treat Feed Line Bundles As Cylinder</li> <li>Ignore KL/ry For 60 Deg. Angle Legs</li> </ul> | <ul style="list-style-type: none"> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>√ Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feed Line Torque</li> <li>√ Include Angle Block Shear Check</li> <li>Use TIA-222-G Bracing Resist. Exemption</li> <li>Use TIA-222-G Tension Splice Exemption</li> </ul> <div style="background-color: #e0e0e0; text-align: center; padding: 2px;"><b>Poles</b></div> <ul style="list-style-type: none"> <li>Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> <li>Pole Without Linear Attachments</li> <li>Pole With Shroud Or No Appurtenances</li> <li>Outside and Inside Corner Radii Are Known</li> </ul> |
|--|---|--|

<b>tnxTower</b>  <b>Nexius</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b> BOBDL00004B	<b>Page</b> 2 of 24
	<b>Project</b> BOBDL00004B	<b>Date</b> 17:13:09 06/03/22
	<b>Client</b> Dish Wireless	<b>Designed by</b> Binod Paudel



**Triangular Tower**

**Tower Section Geometry**

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	<i>ft</i>			<i>ft</i>		<i>ft</i>
T1	120.00-100.00			4.00	1	20.00
T2	100.00-80.00			4.00	1	20.00
T3	80.00-60.00			4.00	1	20.00
T4	60.00-40.00			6.00	1	20.00
T5	40.00-20.00			8.00	1	20.00
T6	20.00-0.00			10.00	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
	<i>ft</i>	<i>ft</i>				<i>in</i>	<i>in</i>
T1	120.00-100.00	2.43	X Brace	No	Yes	3.5000	3.5000
T2	100.00-80.00	2.43	X Brace	No	Yes	3.5000	3.5000
T3	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T4	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T5	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T6	20.00-0.00	20.00	X Brace	No	No	0.0000	0.0000

<b>tnxTower</b>  <b>Nexius</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	3 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

### Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 120.00-100.00	Solid Round	1 3/4	A572-55 (55 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 100.00-80.00	Solid Round	2 1/4	A572-55 (55 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T3 80.00-60.00	Truss Leg	Pirod 194651 (Gr.58)	A572-55 (55 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A572-50 (50 ksi)
T4 60.00-40.00	Truss Leg	Pirod 195213 (Gr.58)	A572-55 (55 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A572-50 (50 ksi)
T5 40.00-20.00	Truss Leg	Pirod 195217 (Gr.58)	A572-55 (55 ksi)	Equal Angle	L2 1/2x2 1/2x5/16	A572-50 (50 ksi)
T6 20.00-0.00	Truss Leg	Pirod 196915 (Gr.58)	A572-55 (55 ksi)	Double Equal Angle	2L3 1/2x3 1/2x1/4	A572-50 (50 ksi)

### Tower Section Geometry (cont'd)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 120.00-100.00	Solid Round	7/8	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 100.00-80.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T3 80.00-60.00	Equal Angle	L3x3x3/16	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)

### Tower Section Geometry (cont'd)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 120.00-100.00	1	Solid Round	7/8	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 100.00-80.00	1	Solid Round	1	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)

### Tower Section Geometry (cont'd)

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1	0.00	0.0000	A36	1.03	1	1.05	36.0000	36.0000	36.0000

<b>tnxTower</b>  <b>Nexius</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	4 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor $A_f$	Adjust. Factor $A_r$	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
ft	ft <sup>2</sup>	in							
120.00-100.00			(36 ksi)						
T2	0.00	0.0000	A36	1.03	1	1.05	36.0000	36.0000	36.0000
100.00-80.00			(36 ksi)						
T3 80.00-60.00	0.00	0.0000	A36	1.03	1	1.05	36.0000	36.0000	36.0000
80.00-60.00			(36 ksi)						
T4 60.00-40.00	0.00	0.0000	A36	1.03	1	1.05	36.0000	36.0000	36.0000
60.00-40.00			(36 ksi)						
T5 40.00-20.00	0.00	0.0000	A36	1.03	1	1.05	36.0000	36.0000	36.0000
40.00-20.00			(36 ksi)						
T6 20.00-0.00	0.00	0.0000	A36	1.03	1	1.05	36.0000	36.0000	36.0000
20.00-0.00			(36 ksi)						

### Tower Section Geometry (cont'd)

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors <sup>1</sup>							
				X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace	
											X
ft				Y	Y	Y	Y	Y	Y	Y	
T1	Yes	Yes	1	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1	1
T6 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1
20.00-0.00				1	1	1	1	1	1	1	1

<sup>1</sup>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	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
ft						
T3 80.00-60.00	1	0.5	0.85	1	0.5	0.85
T4 60.00-40.00	1	0.5	0.85	1	0.5	0.85
T5 40.00-20.00	1	0.5	0.85	1	0.5	0.85
T6 20.00-0.00	1	0.5	0.85	1	0.5	0.85

<b>tnxTower</b>  <b>Nexus</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	5 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

**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 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower 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 120.00-100.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 100.00-80.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 80.00-60.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 60.00-40.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 40.00-20.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 20.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

**Tower Section Geometry (cont'd)**

Tower Elevation 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 120.00-100.00	Flange	1.2500	2	0.0000	0	0.0000	0	0.0000	0	0.6250	0	0.6250	0	0.6250	0
T2 100.00-80.00	Flange	1.0000	4	0.0000	0	0.0000	0	0.0000	0	0.6250	0	0.6250	0	0.6250	0
T3 80.00-60.00	Flange	1.0000	6	1.0000	1	1.0000	0	0.0000	0	0.6250	0	0.6250	0	0.6250	0
T4 60.00-40.00	Flange	1.2500	6	1.0000	1	0.0000	0	0.0000	0	0.6250	0	0.6250	0	0.6250	0
T5 40.00-20.00	Flange	1.2500	6	1.0000	1	0.0000	0	0.0000	0	0.6250	0	0.6250	0	0.6250	0
T6 20.00-0.00	Flange	0.0000	0	0.8750	2	0.0000	0	0.0000	0	0.6250	0	0.6250	0	0.6250	0

<b>tnxTower</b>  <b>Nexius</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	6 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

### 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
LDF5-50A (7/8) (Municipal)	A	No	No	Ar (CaAa)	120.00 - 3.00	0.0000	-0.47	4	4	1.0300	1.0300		0.33
LDF4P-50A (1/2") (Municipal) ****	A	No	No	Ar (CaAa)	120.00 - 3.00	0.0000	-0.48	4	4	0.6300	0.6300		0.28
HCS 6X12 4AWG (1-5/8) (T-Mobile) ****	B	No	No	Ar (CaAa)	110.00 - 8.00	0.0000	-0.4	6	6	1.6600	1.9900		0.92
1-5/8 Coax (AT&T)	A	No	No	Ar (CaAa)	98.00 - 6.00	0.0000	-0.42	6	6	1.9800	1.9800		0.92
WR-VG122S T-BRDA (7/16") (AT&T)	A	No	No	Ar (CaAa)	98.00 - 6.00	0.0000	-0.45	6	6	0.4000	0.4000		0.27
FB-L98B-002-100000 (3/8") (AT&T) ****	A	No	No	Ar (CaAa)	98.00 - 6.00	0.0000	-0.4	2	2	0.4000	0.4000		0.22
HCS 6X12 4AWG (1-5/8) (Verizon) ****	C	No	No	Ar (CaAa)	88.00 - 6.00	0.0000	-0.4	2	2	1.6600 1.9900	1.9900		0.92
Feedline Ladder (Af) (Municipal)	A	No	No	Af (CaAa)	120.00 - 10.00	0.0000	-0.45	1	1	3.0000	3.0000		8.40
Feedline Ladder (Af) (T-Mobile)	B	No	No	Af (CaAa)	120.00 - 10.00	0.0000	-0.45	1	1	3.0000	3.0000		8.40
Feedline Ladder (Af) (Verizon) ****	C	No	No	Af (CaAa)	88.00 - 6.00	0.0000	-0.45	1	1	3.0000	3.0000		8.40
High Cap Hybrid Cable (Dish Wireless)	B	No	No	Ar (CaAa)	74.00 - 6.00	0.0000	0.4	1	1	1.6600	1.9900		0.92
Feedline Ladder (Af) (Dish Wireless)	B	No	No	Af (CaAa)	74.00 - 6.00	0.0000	0.4	1	1	3.0000	3.0000		8.40

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
---------------	--------------------	------	--------------------------------	--------------------------------	---	--	----------



<b>tnxTower</b>  <b>Nexus</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	7 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

Tower Section	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
T1	120.00-100.00	A	0.000	0.000	23.280	0.000	0.22
		B	0.000	0.000	21.940	0.000	0.22
		C	0.000	0.000	0.000	0.000	0.00
T2	100.00-80.00	A	0.000	0.000	50.424	0.000	0.35
		B	0.000	0.000	33.880	0.000	0.28
		C	0.000	0.000	7.184	0.000	0.08
T3	80.00-60.00	A	0.000	0.000	53.440	0.000	0.37
		B	0.000	0.000	43.666	0.000	0.41
		C	0.000	0.000	17.960	0.000	0.20
T4	60.00-40.00	A	0.000	0.000	53.440	0.000	0.37
		B	0.000	0.000	47.860	0.000	0.46
		C	0.000	0.000	17.960	0.000	0.20
T5	40.00-20.00	A	0.000	0.000	53.440	0.000	0.37
		B	0.000	0.000	47.860	0.000	0.46
		C	0.000	0.000	17.960	0.000	0.20
T6	20.00-0.00	A	0.000	0.000	37.400	0.000	0.23
		B	0.000	0.000	29.114	0.000	0.28
		C	0.000	0.000	12.572	0.000	0.14

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
T1	120.00-100.00	A	2.820	0.000	0.000	87.086	0.000	1.70
		B		0.000	0.000	55.006	0.000	1.37
		C		0.000	0.000	0.000	0.000	0.00
T2	100.00-80.00	A	2.764	0.000	0.000	196.012	0.000	3.59
		B		0.000	0.000	88.160	0.000	2.03
		C		0.000	0.000	21.884	0.000	0.48
T3	80.00-60.00	A	2.695	0.000	0.000	205.641	0.000	3.70
		B		0.000	0.000	112.340	0.000	2.65
		C		0.000	0.000	53.961	0.000	1.16
T4	60.00-40.00	A	2.606	0.000	0.000	202.286	0.000	3.56
		B		0.000	0.000	121.382	0.000	2.84
		C		0.000	0.000	52.986	0.000	1.12
T5	40.00-20.00	A	2.476	0.000	0.000	197.412	0.000	3.36
		B		0.000	0.000	119.025	0.000	2.69
		C		0.000	0.000	51.568	0.000	1.06
T6	20.00-0.00	A	2.219	0.000	0.000	136.309	0.000	2.10
		B		0.000	0.000	69.899	0.000	1.47
		C		0.000	0.000	34.129	0.000	0.66

### Feed Line Center of Pressure

Section	Elevation ft	$CP_x$ in	$CP_z$ in	$CP_x$ Ice in	$CP_z$ Ice in
T1	120.00-100.00	-5.7323	-3.2186	-0.9648	-0.2329
T2	100.00-80.00	-6.4771	-1.3744	-1.4707	0.1031
T3	80.00-60.00	-2.4990	0.3881	-0.8826	0.6754
T4	60.00-40.00	-2.6453	0.7968	-2.0809	2.0998
T5	40.00-20.00	-3.2465	1.0224	-3.1766	3.1702
T6	20.00-0.00	-3.0593	2.5022	-3.6219	4.9180

<b>tnxTower</b>  <b>Nexus</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	8 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

## Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
T1	1	LDF5-50A (7/8)	100.00 - 120.00	0.6000	0.1157
T1	2	LDF4P-50A (1/2")	100.00 - 120.00	0.6000	0.1157
T1	4	HCS 6X12 4AWG (1-5/8)	100.00 - 110.00	0.6000	0.1157
T1	12	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.1157
T1	13	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.1157
T2	1	LDF5-50A (7/8)	80.00 - 100.00	0.6000	0.1159
T2	2	LDF4P-50A (1/2")	80.00 - 100.00	0.6000	0.1159
T2	4	HCS 6X12 4AWG (1-5/8)	80.00 - 100.00	0.6000	0.1159
T2	6	1-5/8 Coax	80.00 - 98.00	0.6000	0.1159
T2	7	WR-VG122ST-BRDA (7/16")	80.00 - 98.00	0.6000	0.1159
T2	8	FB-L98B-002-100000 (3/8")	80.00 - 98.00	0.6000	0.1159
T2	10	HCS 6X12 4AWG (1-5/8)	80.00 - 88.00	0.6000	0.1159
T2	12	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.1159
T2	13	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.1159
T2	14	Feedline Ladder (Af)	80.00 - 88.00	0.6000	0.1159
T3	1	LDF5-50A (7/8)	60.00 - 80.00	0.6000	0.1497
T3	2	LDF4P-50A (1/2")	60.00 - 80.00	0.6000	0.1497
T3	4	HCS 6X12 4AWG (1-5/8)	60.00 - 80.00	0.6000	0.1497
T3	6	1-5/8 Coax	60.00 - 80.00	0.6000	0.1497
T3	7	WR-VG122ST-BRDA (7/16")	60.00 - 80.00	0.6000	0.1497
T3	8	FB-L98B-002-100000 (3/8")	60.00 - 80.00	0.6000	0.1497
T3	10	HCS 6X12 4AWG (1-5/8)	60.00 - 80.00	0.6000	0.1497
T3	12	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.1497
T3	13	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.1497
T3	14	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.1497
T3	16	High Cap Hybrid Cable	60.00 - 74.00	0.6000	0.1497
T3	17	Feedline Ladder (Af)	60.00 - 74.00	0.6000	0.1497
T4	1	LDF5-50A (7/8)	40.00 - 60.00	0.6000	0.3413
T4	2	LDF4P-50A (1/2")	40.00 - 60.00	0.6000	0.3413
T4	4	HCS 6X12 4AWG (1-5/8)	40.00 - 60.00	0.6000	0.3413
T4	6	1-5/8 Coax	40.00 - 60.00	0.6000	0.3413
T4	7	WR-VG122ST-BRDA (7/16")	40.00 - 60.00	0.6000	0.3413
T4	8	FB-L98B-002-100000 (3/8")	40.00 - 60.00	0.6000	0.3413
T4	10	HCS 6X12 4AWG (1-5/8)	40.00 - 60.00	0.6000	0.3413
T4	12	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.3413
T4	13	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.3413
T4	14	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.3413
T4	16	High Cap Hybrid Cable	40.00 - 60.00	0.6000	0.3413
T4	17	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.3413
T5	1	LDF5-50A (7/8)	20.00 - 40.00	0.6000	0.4575
T5	2	LDF4P-50A (1/2")	20.00 - 40.00	0.6000	0.4575
T5	4	HCS 6X12 4AWG (1-5/8)	20.00 - 40.00	0.6000	0.4575
T5	6	1-5/8 Coax	20.00 - 40.00	0.6000	0.4575
T5	7	WR-VG122ST-BRDA (7/16")	20.00 - 40.00	0.6000	0.4575

<b>tnxTower</b>  <b>Nexus</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	9 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
T5	8	FB-L98B-002-100000 (3/8")	20.00 - 40.00	0.6000	0.4575
T5	10	HCS 6X12 4AWG (1-5/8)	20.00 - 40.00	0.6000	0.4575
T5	12	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.4575
T5	13	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.4575
T5	14	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.4575
T5	16	High Cap Hybrid Cable	20.00 - 40.00	0.6000	0.4575
T5	17	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.4575
T6	1	LDF5-50A (7/8)	3.00 - 20.00	0.6000	0.5590
T6	2	LDF4P-50A (1/2")	3.00 - 20.00	0.6000	0.5590
T6	4	HCS 6X12 4AWG (1-5/8)	8.00 - 20.00	0.6000	0.5590
T6	6	1-5/8 Coax	6.00 - 20.00	0.6000	0.5590
T6	7	WR-VG122ST-BRDA (7/16")	6.00 - 20.00	0.6000	0.5590
T6	8	FB-L98B-002-100000 (3/8")	6.00 - 20.00	0.6000	0.5590
T6	10	HCS 6X12 4AWG (1-5/8)	6.00 - 20.00	0.6000	0.5590
T6	12	Feedline Ladder (Af)	10.00 - 20.00	0.6000	0.5590
T6	13	Feedline Ladder (Af)	10.00 - 20.00	0.6000	0.5590
T6	14	Feedline Ladder (Af)	6.00 - 20.00	0.6000	0.5590
T6	16	High Cap Hybrid Cable	6.00 - 20.00	0.6000	0.5590
T6	17	Feedline Ladder (Af)	6.00 - 20.00	0.6000	0.5590

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz Lateral	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
10' Lightning Rod (Municipal)	C	From Leg	0.00	0.00	0.0000	120.00	No Ice	0.63	0.63	0.02
			0.00	0.00			1/2" Ice	1.64	1.64	0.03
			0.00	0.00			1" Ice	2.65	2.65	0.04
PTP 49400 (Municipal)	A	From Leg	3.00	0.00	0.0000	120.00	No Ice	1.75	0.48	0.01
			0.00	0.00			1/2" Ice	1.92	0.58	0.02
			0.00	0.00			1" Ice	2.09	0.68	0.03
PTP 49400 (Municipal)	B	From Leg	1.00	0.00	0.0000	120.00	No Ice	1.75	0.48	0.01
			0.00	0.00			1/2" Ice	1.92	0.58	0.02
			0.00	0.00			1" Ice	2.09	0.68	0.03
PTP 49400 (Municipal)	C	From Leg	1.00	0.00	0.0000	120.00	No Ice	1.75	0.48	0.01
			0.00	0.00			1/2" Ice	1.92	0.58	0.02
			0.00	0.00			1" Ice	2.09	0.68	0.03
10' Dipole (Municipal)	A	From Leg	2.00	0.00	0.0000	120.00	No Ice	3.69	3.69	0.03
			0.00	0.00			1/2" Ice	4.73	4.73	0.05
			0.00	0.00			1" Ice	5.77	5.77	0.07
DB404-B (Municipal)	A	From Leg	3.00	0.00	0.0000	120.00	No Ice	1.14	1.14	0.01
			0.00	0.00			1/2" Ice	2.29	2.29	0.03
			0.00	0.00			1" Ice	3.44	3.44	0.05
BA4040-67-DIN (Municipal)	A	From Leg	3.00	0.00	0.0000	120.00	No Ice	12.76	4.92	0.18
			0.00	0.00			1/2" Ice	13.51	6.06	0.23
			0.00	0.00			1" Ice	14.26	7.20	0.28
BA4040-67-DIN (Municipal)	B	From Leg	2.00	0.00	0.0000	120.00	No Ice	12.76	4.92	0.18
			0.00	0.00			1/2" Ice	13.51	6.06	0.23
			0.00	0.00			1" Ice	14.26	7.20	0.28
Pipe Mount	B	From Leg	1.50	0.00	0.0000	120.00	No Ice	1.32	1.32	0.07

<b>tnxTower</b>  <b>Nexius</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	10 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz Lateral	Vert					
(Municipal)				0.00		1/2" Ice	1.58	1.58	0.08
				0.00		1" Ice	1.84	1.84	0.09
3ft Side Arm Mount (Municipal)	A	From Leg	1.50	0.0000	120.00	No Ice	1.78	3.79	0.13
			0.00			1/2" Ice	2.24	4.47	0.15
			0.00			1" Ice	2.70	5.15	0.17
****									
APXVAARR24_43-U-NA20 _TIA w/Mount Pipe (T-Mobile)	A	From Leg	4.00	0.0000	110.00	No Ice	20.48	11.02	0.19
			0.00			1/2" Ice	21.23	12.55	0.32
			0.00			1" Ice	21.98	14.08	0.45
APXVAARR24_43-U-NA20 _TIA w/Mount Pipe (T-Mobile)	B	From Leg	4.00	0.0000	110.00	No Ice	20.48	11.02	0.19
			0.00			1/2" Ice	21.23	12.55	0.32
			0.00			1" Ice	21.98	14.08	0.45
APXVAARR24_43-U-NA20 _TIA w/Mount Pipe (T-Mobile)	C	From Leg	4.00	0.0000	110.00	No Ice	20.48	11.02	0.19
			0.00			1/2" Ice	21.23	12.55	0.32
			0.00			1" Ice	21.98	14.08	0.45
AIR-32 B2A/B66AA w/Mount Pipe (T-Mobile)	A	From Leg	4.00	0.0000	110.00	No Ice	6.75	6.07	0.15
			0.00			1/2" Ice	7.20	6.87	0.21
			0.00			1" Ice	7.65	7.67	0.27
AIR-32 B2A/B66AA w/Mount Pipe (T-Mobile)	B	From Leg	4.00	0.0000	110.00	No Ice	6.75	6.07	0.15
			0.00			1/2" Ice	7.20	6.87	0.21
			0.00			1" Ice	7.65	7.67	0.27
AIR-32 B2A/B66AA w/Mount Pipe (T-Mobile)	C	From Leg	4.00	0.0000	110.00	No Ice	6.75	6.07	0.15
			0.00			1/2" Ice	7.20	6.87	0.21
			0.00			1" Ice	7.65	7.67	0.27
AIR 6449 B41 w/ Mount Pipe (T-Mobile)	A	From Leg	4.00	0.0000	110.00	No Ice	6.90	4.32	0.13
			0.00			1/2" Ice	7.74	5.37	0.19
			0.00			1" Ice	8.58	6.42	0.25
AIR 6449 B41 w/ Mount Pipe (T-Mobile)	B	From Leg	4.00	0.0000	110.00	No Ice	6.90	4.32	0.13
			0.00			1/2" Ice	7.74	5.37	0.19
			0.00			1" Ice	8.58	6.42	0.25
AIR 6449 B41 w/ Mount Pipe (T-Mobile)	C	From Leg	4.00	0.0000	110.00	No Ice	6.90	4.32	0.13
			0.00			1/2" Ice	7.74	5.37	0.19
			0.00			1" Ice	8.58	6.42	0.25
RADIO 4449 B71/B85 (T-Mobile)	A	From Leg	4.00	0.0000	110.00	No Ice	1.64	1.31	0.07
			0.00			1/2" Ice	1.80	1.46	0.09
			0.00			1" Ice	1.96	1.61	0.11
RADIO 4449 B71/B85 (T-Mobile)	B	From Leg	4.00	0.0000	110.00	No Ice	1.64	1.31	0.07
			0.00			1/2" Ice	1.80	1.46	0.09
			0.00			1" Ice	1.96	1.61	0.11
RADIO 4449 B71/B85 (T-Mobile)	C	From Leg	4.00	0.0000	110.00	No Ice	1.64	1.31	0.07
			0.00			1/2" Ice	1.80	1.46	0.09
			0.00			1" Ice	1.96	1.61	0.11
RRUS 4415 B25 (T-Mobile)	A	From Leg	4.00	0.0000	110.00	No Ice	1.64	0.68	0.04
			0.00			1/2" Ice	1.80	0.79	0.06
			0.00			1" Ice	1.96	0.90	0.08
RRUS 4415 B25 (T-Mobile)	B	From Leg	4.00	0.0000	110.00	No Ice	1.64	0.68	0.04
			0.00			1/2" Ice	1.80	0.79	0.06
			0.00			1" Ice	1.96	0.90	0.08
RRUS 4415 B25 (T-Mobile)	C	From Leg	4.00	0.0000	110.00	No Ice	1.64	0.68	0.04
			0.00			1/2" Ice	1.80	0.79	0.06
			0.00			1" Ice	1.96	0.90	0.08
SDX1926Q-43 (T-Mobile)	A	From Leg	4.00	0.0000	110.00	No Ice	0.24	0.10	0.01
			0.00			1/2" Ice	0.31	0.14	0.01
			0.00			1" Ice	0.38	0.18	0.01
SDX1926Q-43 (T-Mobile)	B	From Leg	4.00	0.0000	110.00	No Ice	0.24	0.10	0.01
			0.00			1/2" Ice	0.31	0.14	0.01
			0.00			1" Ice	0.38	0.18	0.01

<b>tnxTower</b>  <b>Nexius</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	11 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C <sub>AA</sub>		Weight K	
			Horz Lateral ft	Vert ft			Front ft <sup>2</sup>	Side ft <sup>2</sup>		
SDX1926Q-43 (T-Mobile)	C	From Leg	4.00	0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	0.24 0.31 0.38	0.10 0.14 0.18	0.01 0.01 0.01
4415 B66A (T-Mobile)	A	From Leg	2.50	0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	1.86 2.03 2.20	0.82 0.94 1.06	0.04 0.06 0.08
4415 B66A (T-Mobile)	B	From Leg	2.50	0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	1.86 2.03 2.20	0.82 0.94 1.06	0.04 0.06 0.08
4415 B66A (T-Mobile)	C	From Leg	2.50	0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	1.86 2.03 2.20	0.82 0.94 1.06	0.04 0.06 0.08
Sitepro VFA12-RRU (T-Mobile)	A	From Leg	2.00	0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	15.40 21.30 27.20	14.00 20.81 27.62	0.56 0.74 0.92
Sitepro VFA12-RRU (T-Mobile)	B	From Leg	2.00	0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	15.40 21.30 27.20	14.00 20.81 27.62	0.56 0.74 0.92
Sitepro VFA12-RRU (T-Mobile)	C	From Leg	2.00	0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	15.40 21.30 27.20	14.00 20.81 27.62	0.56 0.74 0.92
****										
AIR 6419 B77G (AT&T)	A	From Leg	3.00	0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	7.59 8.41 9.14	5.06 6.15 7.10	0.07 0.14 0.21
AIR 6419 B77G (AT&T)	B	From Leg	3.00	0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	7.59 8.41 9.14	5.06 6.15 7.10	0.07 0.14 0.21
AIR 6419 B77G (AT&T)	C	From Leg	3.00	0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	7.59 8.41 9.14	5.06 6.15 7.10	0.07 0.14 0.21
(2) TPA65R-BU8D w/Mount Pipe (AT&T)	A	From Leg	3.50	0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	18.33 19.06 19.79	10.34 11.86 13.38	0.12 0.24 0.36
(2) TPA65R-BU8D w/Mount Pipe (AT&T)	B	From Leg	3.50	0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	18.33 19.06 19.79	10.34 11.86 13.38	0.12 0.24 0.36
(2) TPA65R-BU8D w/Mount Pipe (AT&T)	C	From Leg	3.50	0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	18.33 19.06 19.79	10.34 11.86 13.38	0.12 0.24 0.36
Sitepro1 VFA12-HD (AT&T)	A	From Leg	2.00	0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	15.40 21.30 27.20	14.00 20.81 27.62	0.56 0.74 0.92
Sitepro1 VFA12-HD (AT&T)	B	From Leg	2.00	0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	15.40 21.30 27.20	14.00 20.81 27.62	0.56 0.74 0.92
Sitepro1 VFA12-HD (AT&T)	C	From Leg	2.00	0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	15.40 21.30 27.20	14.00 20.81 27.62	0.56 0.74 0.92
DC6-48-60-0-8C-EV (AT&T)	C	From Leg	1.00	0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	1.09 1.70 2.31	1.09 1.70 2.31	0.03 0.05 0.07
DC6-48-60-18-8C-EV (AT&T)	A	From Leg	1.00	0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	1.09 1.70 2.31	1.09 1.70 2.31	0.03 0.05 0.07
DC6-48-60-18-8C-EV (AT&T)	B	From Leg	1.00	0.00	0.0000	98.00	No Ice 1/2" Ice	1.09 1.70	1.09 1.70	0.03 0.05

<b>Job</b>	BOBDL00004B	<b>Page</b>	12 of 24
<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
RADIO 4415 B30 (AT&T)	A	From Leg	2.00		0.0000	98.00	1" Ice	2.31	2.31	0.07
			2.50				No Ice	1.64	0.64	0.04
			0.00				1/2" Ice	1.80	0.75	0.05
			0.00				1" Ice	1.96	0.86	0.06
RADIO 4415 B30 (AT&T)	B	From Leg	2.50		0.0000	98.00	No Ice	1.64	0.64	0.04
			0.00				1/2" Ice	1.80	0.75	0.05
			0.00				1" Ice	1.96	0.86	0.06
			0.00				No Ice	1.64	0.64	0.04
RADIO 4415 B30 (AT&T)	C	From Leg	2.50		0.0000	98.00	1/2" Ice	1.80	0.75	0.05
			0.00				1" Ice	1.96	0.86	0.06
			0.00				No Ice	1.64	0.64	0.04
			0.00				1/2" Ice	1.80	0.75	0.05
RRUS 4449 B5/B12 (AT&T)	A	From Leg	2.50		0.0000	98.00	1" Ice	1.96	0.86	0.06
			0.00				No Ice	1.97	1.41	0.07
			0.00				1/2" Ice	2.14	1.56	0.09
			0.00				1" Ice	2.31	1.71	0.11
RRUS 4449 B5/B12 (AT&T)	B	From Leg	2.50		0.0000	98.00	No Ice	1.97	1.41	0.07
			0.00				1/2" Ice	2.14	1.56	0.09
			0.00				1" Ice	2.31	1.71	0.11
			0.00				No Ice	1.97	1.41	0.07
RRUS 4449 B5/B12 (AT&T)	C	From Leg	2.50		0.0000	98.00	1/2" Ice	2.14	1.56	0.09
			0.00				1" Ice	2.31	1.71	0.11
			0.00				No Ice	1.97	1.41	0.07
			0.00				1/2" Ice	2.14	1.56	0.09
RRUS 4478 B14 (AT&T)	A	From Leg	2.50		0.0000	98.00	1" Ice	2.31	1.71	0.11
			0.00				No Ice	1.84	1.06	0.06
			0.00				1/2" Ice	2.01	1.20	0.08
			0.00				1" Ice	2.18	1.34	0.10
RRUS 4478 B14 (AT&T)	B	From Leg	2.50		0.0000	98.00	No Ice	1.84	1.06	0.06
			0.00				1/2" Ice	2.01	1.20	0.08
			0.00				1" Ice	2.18	1.34	0.10
			0.00				No Ice	1.84	1.06	0.06
RRUS 4478 B14 (AT&T)	C	From Leg	2.50		0.0000	98.00	1/2" Ice	2.01	1.20	0.08
			0.00				1" Ice	2.18	1.34	0.10
			0.00				No Ice	1.84	1.06	0.06
			0.00				1/2" Ice	2.01	1.20	0.08
RRUS 8843 B2/B66A (AT&T)	A	From Leg	2.50		0.0000	98.00	1" Ice	2.18	1.34	0.10
			0.00				No Ice	1.64	1.35	0.07
			0.00				1/2" Ice	1.80	1.50	0.09
			0.00				1" Ice	1.96	1.65	0.11
RRUS 8843 B2/B66A (AT&T)	B	From Leg	2.50		0.0000	98.00	No Ice	1.64	1.35	0.07
			0.00				1/2" Ice	1.80	1.50	0.09
			0.00				1" Ice	1.96	1.65	0.11
			0.00				No Ice	1.64	1.35	0.07
RRUS 8843 B2/B66A (AT&T)	C	From Leg	2.50		0.0000	98.00	1/2" Ice	1.80	1.50	0.09
			0.00				1" Ice	1.96	1.65	0.11
			0.00				No Ice	1.64	1.35	0.07
			0.00				1/2" Ice	1.80	1.50	0.09
AIR 6449 B77 (AT&T)	A	From Leg	3.00		0.0000	98.00	1" Ice	1.96	1.65	0.11
			0.00				No Ice	7.59	5.06	0.07
			-2.00				1/2" Ice	8.41	6.15	0.14
			0.00				1" Ice	9.14	7.10	0.21
AIR 6449 B77 (AT&T)	B	From Leg	3.00		0.0000	98.00	No Ice	7.59	5.06	0.07
			0.00				1/2" Ice	8.41	6.15	0.14
			-2.00				1" Ice	9.14	7.10	0.21
			0.00				No Ice	7.59	5.06	0.07
AIR 6449 B77 (AT&T)	C	From Leg	3.00		0.0000	98.00	1/2" Ice	8.41	6.15	0.14
			0.00				1" Ice	9.14	7.10	0.21
			-2.00				No Ice	7.59	5.06	0.07
			0.00				1/2" Ice	8.41	6.15	0.14
****										
NHH-65B-R2B_TIA w/Mount Pipe (Verizon)	A	From Leg	4.00		0.0000	88.00	No Ice	8.32	7.00	0.07
			0.00				1/2" Ice	8.88	8.19	0.14
			0.00				1" Ice	9.44	9.38	0.21
NHH-65B-R2B_TIA w/Mount Pipe (Verizon)	B	From Leg	4.00		0.0000	88.00	No Ice	8.32	7.00	0.07
			0.00				1/2" Ice	8.88	8.19	0.14
			0.00				1" Ice	9.44	9.38	0.21
NHH-65B-R2B_TIA w/Mount Pipe (Verizon)	C	From Leg	4.00		0.0000	88.00	No Ice	8.32	7.00	0.07
			0.00				1/2" Ice	8.88	8.19	0.14
			0.00				1" Ice	9.44	9.38	0.21
NHHSS-65B-R2BT4	A	From Leg	4.00		0.0000	88.00	No Ice	8.52	7.25	0.11

<b>tnxTower</b>  <b>Nexius</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>		BOBDL00004B					<b>Page</b>	
	<b>Project</b>		BOBDL00004B					<b>Date</b>	
	<b>Client</b>		Dish Wireless					<b>Designed by</b>	
							13 of 24		
							17:13:09 06/03/22		
							Binod Paudel		

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz Lateral	Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
w/Mount Pipe (Verizon)			0.00	0.00		1/2" Ice	9.19	8.54	0.18
NHHSS-65B-R2BT4	B	From Leg	4.00	0.0000	88.00	No Ice	8.52	7.25	0.11
w/Mount Pipe (Verizon)			0.00	0.00		1/2" Ice	9.19	8.54	0.18
NHHSS-65B-R2BT4	C	From Leg	4.00	0.0000	88.00	No Ice	8.52	7.25	0.11
w/Mount Pipe (Verizon)			0.00	0.00		1/2" Ice	9.19	8.54	0.18
BSAMNT-SBS-1-2 (Verizon)	A	From Leg	4.00	0.0000	88.00	No Ice	0.15	0.05	0.01
			0.00	0.00		1/2" Ice	0.21	0.10	0.01
			0.00	0.00		1" Ice	0.27	0.15	0.01
BSAMNT-SBS-1-2 (Verizon)	B	From Leg	4.00	0.0000	88.00	No Ice	0.15	0.05	0.01
			0.00	0.00		1/2" Ice	0.21	0.10	0.01
			0.00	0.00		1" Ice	0.27	0.15	0.01
BSAMNT-SBS-1-2 (Verizon)	C	From Leg	4.00	0.0000	88.00	No Ice	0.15	0.05	0.01
			0.00	0.00		1/2" Ice	0.21	0.10	0.01
			0.00	0.00		1" Ice	0.27	0.15	0.01
B2/B66 RRH-BR049 (Verizon)	A	From Leg	4.00	0.0000	88.00	No Ice	1.88	1.25	0.08
			0.00	0.00		1/2" Ice	2.05	1.39	0.10
			0.00	0.00		1" Ice	2.22	1.53	0.12
B2/B66 RRH-BR049 (Verizon)	B	From Leg	4.00	0.0000	88.00	No Ice	1.88	1.25	0.08
			0.00	0.00		1/2" Ice	2.05	1.39	0.10
			0.00	0.00		1" Ice	2.22	1.53	0.12
B2/B66 RRH-BR049 (Verizon)	C	From Leg	4.00	0.0000	88.00	No Ice	1.88	1.25	0.08
			0.00	0.00		1/2" Ice	2.05	1.39	0.10
			0.00	0.00		1" Ice	2.22	1.53	0.12
B5/B13 RRH-BR04C (Verizon)	A	From Leg	4.00	0.0000	88.00	No Ice	1.88	1.01	0.07
			0.00	0.00		1/2" Ice	2.05	1.14	0.09
			0.00	0.00		1" Ice	2.22	1.27	0.11
B5/B13 RRH-BR04C (Verizon)	B	From Leg	4.00	0.0000	88.00	No Ice	1.88	1.01	0.07
			0.00	0.00		1/2" Ice	2.05	1.14	0.09
			0.00	0.00		1" Ice	2.22	1.27	0.11
B5/B13 RRH-BR04C (Verizon)	C	From Leg	4.00	0.0000	88.00	No Ice	1.88	1.01	0.07
			0.00	0.00		1/2" Ice	2.05	1.14	0.09
			0.00	0.00		1" Ice	2.22	1.27	0.11
CBRS RRH-RT4401-48A (Verizon)	A	From Leg	4.00	0.0000	88.00	No Ice	1.54	0.75	0.02
			0.00	0.00		1/2" Ice	1.70	0.87	0.04
			0.00	0.00		1" Ice	1.86	0.99	0.06
CBRS RRH-RT4401-48A (Verizon)	B	From Leg	4.00	0.0000	88.00	No Ice	1.54	0.75	0.02
			0.00	0.00		1/2" Ice	1.70	0.87	0.04
			0.00	0.00		1" Ice	1.86	0.99	0.06
CBRS RRH-RT4401-48A (Verizon)	C	From Leg	4.00	0.0000	88.00	No Ice	1.54	0.75	0.02
			0.00	0.00		1/2" Ice	1.70	0.87	0.04
			0.00	0.00		1" Ice	1.86	0.99	0.06
RVZDC-6627-PF-48 (Verizon)	A	From Leg	4.00	0.0000	88.00	No Ice	3.79	2.51	0.03
			0.00	0.00		1/2" Ice	4.04	2.73	0.06
			0.00	0.00		1" Ice	4.29	2.95	0.09
RVZDC-6627-PF-48 (Verizon)	A	From Leg	4.00	0.0000	88.00	No Ice	3.79	2.51	0.03
			0.00	0.00		1/2" Ice	4.04	2.73	0.06
			0.00	0.00		1" Ice	4.29	2.95	0.09
Sitepro VFA12-HD (Verizon)	A	From Leg	2.00	0.0000	88.00	No Ice	15.40	14.00	0.56
			0.00	0.00		1/2" Ice	21.30	20.81	0.74
			0.00	0.00		1" Ice	27.20	27.62	0.92
Sitepro VFA12-HD (Verizon)	B	From Leg	2.00	0.0000	88.00	No Ice	15.40	14.00	0.56
			0.00	0.00		1/2" Ice	21.30	20.81	0.74
			0.00	0.00		1" Ice	27.20	27.62	0.92
Sitepro VFA12-HD	C	From Leg	2.00	0.0000	88.00	No Ice	15.40	14.00	0.56

<b>tnxTower</b>  <b>Nexius</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	14 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			ft ft ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
(Verizon)			0.00		1/2" Ice	21.30	20.81	0.74	
****			0.00		1" Ice	27.20	27.62	0.92	
JMA MX08FR0665-21 (Dish Wireless)	A	From Leg	3.50 0.00 0.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	12.96 13.67 14.34	7.77 9.05 10.19	0.11 0.21 0.31
JMA MX08FR0665-21 (Dish Wireless)	B	From Leg	3.50 0.00 0.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	12.96 13.67 14.34	7.77 9.05 10.19	0.11 0.21 0.31
JMA MX08FR0665-21 (Dish Wireless)	C	From Leg	3.50 0.00 0.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	12.96 13.67 14.34	7.77 9.05 10.19	0.11 0.21 0.31
FUJITSU TA08025-B605 (Dish Wireless)	A	From Leg	2.50 0.00 0.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	1.95 2.12 2.30	1.12 1.25 1.40	0.08 0.09 0.11
FUJITSU TA08025-B605 (Dish Wireless)	B	From Leg	2.50 0.00 0.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	1.95 2.12 2.30	1.12 1.25 1.40	0.08 0.09 0.11
FUJITSU TA08025-B605 (Dish Wireless)	C	From Leg	2.50 0.00 0.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	1.95 2.12 2.30	1.12 1.25 1.40	0.08 0.09 0.11
FUJITSU TA08025-B604 (Dish Wireless)	A	From Leg	2.50 0.00 0.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	1.95 2.12 2.30	0.97 1.10 1.24	0.06 0.08 0.10
FUJITSU TA08025-B604 (Dish Wireless)	B	From Leg	2.50 0.00 0.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	1.95 2.12 2.30	0.97 1.10 1.24	0.06 0.08 0.10
FUJITSU TA08025-B604 (Dish Wireless)	C	From Leg	2.50 0.00 0.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	1.95 2.12 2.30	0.97 1.10 1.24	0.06 0.08 0.10
RAYCAP RDIDC-9181-PF-48 OVP (Dish Wireless)	B	From Leg	2.50 0.00 0.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	2.28 2.47 2.66	1.29 1.44 1.61	0.02 0.04 0.06
Commscope MTC3975083 V-Frame (Dish Wireless)	A	From Leg	2.00 0.00 0.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	10.30 14.20 18.10	9.33 13.87 18.41	0.36 0.49 0.62
Commscope MTC3975083 V-Frame (Dish Wireless)	B	From Leg	2.00 0.00 0.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	10.30 14.20 18.10	9.33 13.87 18.41	0.36 0.49 0.62
Commscope MTC3975083 V-Frame (Dish Wireless)	C	From Leg	2.00 0.00 0.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	10.30 14.20 18.10	9.33 13.87 18.41	0.36 0.49 0.62
****									

## Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight
				ft ft ft	°	°	ft	ft	ft <sup>2</sup>	K



<b>tnxTower</b>  <b>Nexus</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	15 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft <sup>2</sup>	Weight K	
VHLP800-11 (Municipal)	A	Paraboloid w/Shroud (HP)	From Leg	3.00 0.00	Worst		120.00	2.80	No Ice 1/2" Ice 1" Ice	6.16 6.53 6.90	0.05 0.08 0.11
VHLP800-11 (Municipal)	B	Paraboloid w/Shroud (HP)	From Leg	3.00 0.00	Worst		120.00	2.80	No Ice 1/2" Ice 1" Ice	6.16 6.53 6.90	0.05 0.08 0.11

### Truss-Leg Properties

Section Designation	Area in <sup>2</sup>	Area Ice in <sup>2</sup>	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in <sup>2</sup>
Pirod 194651 (Gr.58)	2147.4000	7415.6426	0.61	2.62	7.4562	25.7488	5.3014
Pirod 195213 (Gr.58)	2279.8092	7408.8085	0.75	2.50	7.9160	25.7250	7.2158
Pirod 195217 (Gr.58)	2279.8092	7294.0816	0.75	2.29	7.9160	25.3267	7.2158
Pirod 196915 (Gr.58)	2413.7763	7138.3308	0.91	1.93	8.3812	24.7859	9.4248

### Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M <sub>x</sub> kip-ft	Sum of Overturning Moments, M <sub>z</sub> kip-ft	Sum of Torques kip-ft
Leg Weight	10.43					
Bracing Weight	4.83					
Total Member Self-Weight	15.26					
Total Weight	32.73					
Wind 0 deg - No Ice		-0.08	-20.46	-1601.60	8.56	-1.46
Wind 30 deg - No Ice		9.65	-16.87	-1340.79	-764.73	-0.19
Wind 60 deg - No Ice		17.65	-10.18	-798.79	-1384.73	-2.75
Wind 90 deg - No Ice		20.95	0.08	8.48	-1634.12	-1.76
Wind 120 deg - No Ice		18.13	10.56	822.70	-1410.28	1.31
Wind 150 deg - No Ice		10.11	17.50	1376.89	-797.11	3.70
Wind 180 deg - No Ice		0.08	20.14	1587.91	-9.91	1.46
Wind 210 deg - No Ice		-9.65	16.87	1339.28	763.38	0.19
Wind 240 deg - No Ice		-17.93	10.34	803.38	1393.93	2.75
Wind 270 deg - No Ice		-20.95	-0.08	-9.99	1632.77	1.76
Wind 300 deg - No Ice		-17.85	-10.39	-818.11	1398.37	-1.31
Wind 330 deg - No Ice		-10.11	-17.50	-1378.40	795.76	-3.70
Member Ice	50.49					
Total Weight Ice	146.94			3.46	24.63	
Wind 0 deg - Ice		-0.01	-10.38	-817.53	26.20	-0.40
Wind 30 deg - Ice		5.15	-8.94	-705.57	-383.48	-0.31
Wind 60 deg - Ice		9.06	-5.22	-408.12	-689.22	-0.89
Wind 90 deg - Ice		10.64	0.01	5.02	-807.66	-0.16
Wind 120 deg - Ice		9.26	5.36	421.98	-698.12	1.37
Wind 150 deg - Ice		5.26	9.10	719.62	-389.41	1.45
Wind 180 deg - Ice		0.01	10.33	822.41	23.07	0.40

<b>tnxTower</b>  <b>Nexius</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	16 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, $M_x$ kip-ft	Sum of Overturning Moments, $M_z$ kip-ft	Sum of Torques kip-ft
Wind 210 deg - Ice		-5.15	8.94	712.49	432.75	0.31
Wind 240 deg - Ice		-9.10	5.25	416.06	740.25	0.89
Wind 270 deg - Ice		-10.64	-0.01	1.90	856.92	0.16
Wind 300 deg - Ice		-9.21	-5.33	-414.04	745.62	-1.37
Wind 330 deg - Ice		-5.26	-9.10	-712.70	438.68	-1.45
Total Weight	32.73			-0.75	-0.68	
Wind 0 deg - Service		-0.03	-6.68	-524.30	1.83	-0.48
Wind 30 deg - Service		3.15	-5.51	-439.13	-250.67	-0.06
Wind 60 deg - Service		5.76	-3.33	-262.15	-453.12	-0.90
Wind 90 deg - Service		6.84	0.03	1.45	-534.55	-0.57
Wind 120 deg - Service		5.92	3.45	267.31	-461.46	0.43
Wind 150 deg - Service		3.30	5.71	448.28	-261.24	1.21
Wind 180 deg - Service		0.03	6.58	517.18	-4.20	0.48
Wind 210 deg - Service		-3.15	5.51	435.99	248.31	0.06
Wind 240 deg - Service		-5.85	3.38	261.00	454.20	0.90
Wind 270 deg - Service		-6.84	-0.03	-4.58	532.19	0.57
Wind 300 deg - Service		-5.83	-3.39	-268.46	455.65	-0.43
Wind 330 deg - Service		-3.30	-5.71	-451.41	258.88	-1.21

## 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

<b>tnxTower</b>  <b>Nexius</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	17 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

<i>Comb. No.</i>	<i>Description</i>
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
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

<i>Section No.</i>	<i>Elevation ft</i>	<i>Horz. Deflection in</i>	<i>Gov. Load Comb.</i>	<i>Tilt °</i>	<i>Twist °</i>
T1	120 - 100	3.575	42	0.2705	0.0551
T2	100 - 80	2.445	42	0.2549	0.0368
T3	80 - 60	1.435	42	0.1951	0.0208
T4	60 - 40	0.739	42	0.1249	0.0080
T5	40 - 20	0.299	42	0.0761	0.0027
T6	20 - 0	0.058	42	0.0300	0.0010

### Critical Deflections and Radius of Curvature - Service Wind

<i>Elevation ft</i>	<i>Appurtenance</i>	<i>Gov. Load Comb.</i>	<i>Deflection in</i>	<i>Tilt °</i>	<i>Twist °</i>	<i>Radius of Curvature ft</i>
120.00	VHLP800-11	42	3.575	0.2705	0.0551	216664
110.00	APXVAARR24_43-U-NA20_TIA w/Mount Pipe	42	3.005	0.2664	0.0457	108332
98.00	AIR 6419 B77G	42	2.335	0.2510	0.0351	39506
88.00	NHH-65B-R2B TIA w/Mount Pipe	42	1.809	0.2233	0.0270	17517
74.00	JMA MX08FR0665-21	42	1.192	0.1728	0.0162	13718

### Maximum Tower Deflections - Design Wind

<i>Section No.</i>	<i>Elevation ft</i>	<i>Horz. Deflection in</i>	<i>Gov. Load Comb.</i>	<i>Tilt °</i>	<i>Twist °</i>
T1	120 - 100	17.522	22	1.3173	0.2711
T2	100 - 80	11.989	8	1.2496	0.1813
T3	80 - 60	7.037	8	0.9578	0.1027
T4	60 - 40	3.626	8	0.6124	0.0392

<b>tnxTower</b>  <b>Nexius</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	18 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T5	40 - 20	1.464	8	0.3734	0.0131
T6	20 - 0	0.286	10	0.1471	0.0050

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.00	VHLP800-11	22	17.522	1.3173	0.2711	49309
110.00	APXVAARR24_43-U-NA20_TIA w/Mount Pipe	22	14.728	1.3037	0.2251	24654
98.00	AIR 6419 B77G	8	11.451	1.2305	0.1729	8676
88.00	NHH-65B-R2B TIA w/Mount Pipe	8	8.873	1.0958	0.1332	3651
74.00	JMA MX08FR0665-21	8	5.846	0.8482	0.0801	2808

### 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	120	Leg	A325N	1.2500	2	12.64	82.83	0.153 ✓	1	Bolt Tension
T2	100	Leg	A325N	1.0000	4	28.13	53.01	0.531 ✓	1	Bolt Tension
T3	80	Leg	A325N	1.0000	6	24.04	53.01	0.453 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	9.12	13.71	0.665 ✓	1	Member Block Shear
T4	60	Leg	A325N	1.2500	6	30.41	82.83	0.367 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	6.41	10.28	0.623 ✓	1	Member Block Shear
T5	40	Leg	A325N	1.2500	6	35.98	82.83	0.434 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	8.69	17.14	0.507 ✓	1	Member Block Shear
T6	20	Diagonal	A325N	0.8750	2	8.28	30.01	0.276 ✓	1	Member Block Shear

### Compression Checks

### Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
-------------	-----------------	------	---------	----------------------	------	----------------------	---------------------	----------------------	---------------------------------

<b>tnxTower</b>  <b>Nexius</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	19 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	1 3/4	20.00	2.43	66.6 K=1.00	2.4053	-26.34	83.36	0.316 <sup>1</sup>
T2	100 - 80	2 1/4	20.00	2.43	51.8 K=1.00	3.9761	-114.75	158.64	0.723 <sup>1</sup>
T3	80 - 60	Pirod 194651 (Gr.58)	20.03	10.02	34.4 K=1.00	5.3014	-156.46	238.57	0.656 <sup>1</sup>
T4	60 - 40	Pirod 195213 (Gr.58)	20.03	10.02	29.5 K=1.00	7.2158	-198.44	333.04	0.596 <sup>1</sup>
T5	40 - 20	Pirod 195217 (Gr.58)	20.03	10.02	29.5 K=1.00	7.2158	-236.16	333.04	0.709 <sup>1</sup>
T6	20 - 0	Pirod 196915 (Gr.58)	20.03	20.03	48.8 K=1.00	9.4248	-237.68	385.15	0.617 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L <sub>d</sub> ft	Kl/r	φP <sub>n</sub> K	A in <sup>2</sup>	V <sub>u</sub> K	φV <sub>n</sub> K	Stress Ratio
T3	80 - 60	0.5	1.39	113.1	262.42	0.1963	1.85	3.83	0.483
T4	60 - 40	0.5	1.37	112.1	357.18	0.1963	0.64	3.88	0.166
T5	40 - 20	0.5	1.37	112.1	357.18	0.1963	2.22	3.88	0.574
T6	20 - 0	0.5	1.36	111.2	466.53	0.1963	1.13	3.91	0.291

### Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	3/4	4.68	2.25	129.8 K=0.90	0.4418	-3.69	5.92	0.622 <sup>1</sup>
T2	100 - 80	7/8	4.68	2.23	110.1 K=0.90	0.6013	-7.94	11.16	0.711 <sup>1</sup>
T3	80 - 60	L2 1/2x2 1/2x1/4	10.97	4.89	119.7 K=1.00	1.1900	-9.91	18.78	0.528 <sup>1</sup>
T4	60 - 40	L2 1/2x2 1/2x3/16	11.93	5.42	131.5 K=1.00	0.9020	-6.73	11.78	0.571 <sup>1</sup>
T5	40 - 20	L2 1/2x2 1/2x5/16	13.80	6.37	156.3 K=1.00	1.4600	-7.91	13.50	0.586 <sup>1</sup>
T6	20 - 0	2L3 1/2x3 1/2x1/4	22.83	11.16	122.2 K=0.99	3.3800	-18.37	51.14	0.359 <sup>1</sup>

<b>tnxTower</b>  <b>Nexus</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	20 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

<sup>1</sup>  $P_u / \phi P_n$  controls

### Horizontal Design Data (Compression)

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L<sub>u</sub></i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in<sup>2</sup></i>	<i>P<sub>u</sub></i> <i>K</i>	$\phi P_n$ <i>K</i>	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	3/4	4.00	3.85	172.7 K=0.70	0.4418	-0.51	3.35	0.152 <sup>1</sup> ✓
T2	100 - 80	3/4	4.00	3.81	170.8 K=0.70	0.4418	-2.12	3.42	0.620 <sup>1</sup> ✓

<sup>1</sup>  $P_u / \phi P_n$  controls

### Top Girt Design Data (Compression)

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L<sub>u</sub></i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in<sup>2</sup></i>	<i>P<sub>u</sub></i> <i>K</i>	$\phi P_n$ <i>K</i>	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	7/8	4.00	3.85	148.0 K=0.70	0.6013	-0.32	6.20	0.052 <sup>1</sup> ✓
T2	100 - 80	1	4.00	3.81	128.1 K=0.70	0.7854	-2.12	10.81	0.196 <sup>1</sup> ✓
T3	80 - 60	L3x3x3/16	4.00	3.00	90.2 K=1.49	1.0900	-2.71	24.99	0.109 <sup>1</sup> ✓

<sup>1</sup>  $P_u / \phi P_n$  controls

### Bottom Girt Design Data (Compression)

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L<sub>u</sub></i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in<sup>2</sup></i>	<i>P<sub>u</sub></i> <i>K</i>	$\phi P_n$ <i>K</i>	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	7/8	4.00	3.85	148.0 K=0.70	0.6013	-1.23	6.20	0.198 <sup>1</sup> ✓
T2	100 - 80	1	4.00	3.81	128.1 K=0.70	0.7854	-2.12	10.81	0.196 <sup>1</sup> ✓

<sup>1</sup>  $P_u / \phi P_n$  controls

### Mid Girt Design Data (Compression)

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L<sub>u</sub></i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in<sup>2</sup></i>	<i>P<sub>u</sub></i> <i>K</i>	$\phi P_n$ <i>K</i>	Ratio $\frac{P_u}{\phi P_n}$
-------------	------------------------	------	-----------------------	-----------------------------------	-------------	-----------------------------------	----------------------------------	------------------------	---------------------------------

<b>tnxTower</b>  <b>Nexius</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	21 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	7/8	4.00	3.85	148.0 K=0.70	0.6013	-0.50	6.20	0.080 <sup>1</sup>
T2	100 - 80	1	4.00	3.81	128.1 K=0.70	0.7854	-0.91	10.81	0.084 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Tension Checks

### Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	1 3/4	20.00	0.29	8.0	2.4053	25.27	119.06	0.212 <sup>1</sup>
T2	100 - 80	2 1/4	20.00	0.29	6.2	3.9761	112.51	196.82	0.572 <sup>1</sup>
T3	80 - 60	Pirol 194651 (Gr.58)	20.03	10.02	34.4	5.3014	144.22	262.42	0.550 <sup>1</sup>
T4	60 - 40	Pirol 195213 (Gr.58)	20.03	10.02	29.5	7.2158	182.43	357.18	0.511 <sup>1</sup>
T5	40 - 20	Pirol 195217 (Gr.58)	20.03	10.02	29.5	7.2158	215.88	357.18	0.604 <sup>1</sup>
T6	20 - 0	Pirol 196915 (Gr.58)	20.03	20.03	48.8	9.4248	218.51	466.53	0.468 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L <sub>d</sub> ft	Kl/r	φP <sub>n</sub> K	A in <sup>2</sup>	V <sub>u</sub> K	φV <sub>n</sub> K	Stress Ratio
T3	80 - 60	0.5	1.39	113.1	262.42	0.1963	1.85	3.83	0.483
T4	60 - 40	0.5	1.37	112.1	357.18	0.1963	0.64	3.88	0.166
T5	40 - 20	0.5	1.37	112.1	357.18	0.1963	2.22	3.88	0.574
T6	20 - 0	0.5	1.36	111.2	466.53	0.1963	1.13	3.91	0.291

<b>tnxTower</b>  <b>Nexus</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b> BOBDL00004B	<b>Page</b> 22 of 24
	<b>Project</b> BOBDL00004B	<b>Date</b> 17:13:09 06/03/22
	<b>Client</b> Dish Wireless	<b>Designed by</b> Binod Paudel

### Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	3/4	4.68	2.25	144.3	0.4418	3.57	19.88	0.180 <sup>1</sup>
T2	100 - 80	7/8	4.68	2.23	122.3	0.6013	7.61	27.06	0.281 <sup>1</sup>
T3	80 - 60	L2 1/2x2 1/2x1/4	10.97	4.89	78.9	0.6816	9.12	33.23	0.274 <sup>1</sup>
T4	60 - 40	L2 1/2x2 1/2x3/16	11.93	5.42	86.2	0.5183	6.41	25.27	0.254 <sup>1</sup>
T5	40 - 20	L2 1/2x2 1/2x5/16	13.80	6.37	103.1	0.8313	8.69	40.53	0.214 <sup>1</sup>
T6	20 - 0	2L3 1/2x3 1/2x1/4	22.83	11.16	125.7	2.1600	16.57	105.30	0.157 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	3/4	4.00	3.85	246.7	0.4418	0.51	19.88	0.026 <sup>1</sup>
T2	100 - 80	3/4	4.00	3.81	244.0	0.4418	2.12	19.88	0.107 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	7/8	4.00	3.85	211.4	0.6013	0.33	27.06	0.012 <sup>1</sup>
T2	100 - 80	1	4.00	3.81	183.0	0.7854	2.12	35.34	0.060 <sup>1</sup>
T3	80 - 60	L3x3x3/16	4.00	3.00	38.3	0.8175	2.71	39.85	0.068 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls



<b>tnxTower</b>  <b>Nexius</b> 2595 NORTH DALLAS PARKWAY, SUITE 300 FRISCO, TX 75034 Phone: (978) 581-9888 FAX:	<b>Job</b>	BOBDL00004B	<b>Page</b>	23 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

### Bottom Girt Design Data (Tension)

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L<sub>u</sub></i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in<sup>2</sup></i>	<i>P<sub>u</sub></i> <i>K</i>	$\phi P_n$ <i>K</i>	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	7/8	4.00	3.85	211.4	0.6013	1.31	27.06	0.049 <sup>1</sup>
T2	100 - 80	1	4.00	3.81	183.0	0.7854	2.12	35.34	0.060 <sup>1</sup>

<sup>1</sup>  $P_u / \phi P_n$  controls

### Mid Girt Design Data (Tension)

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L<sub>u</sub></i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in<sup>2</sup></i>	<i>P<sub>u</sub></i> <i>K</i>	$\phi P_n$ <i>K</i>	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	7/8	4.00	3.85	211.4	0.6013	0.60	27.06	0.022 <sup>1</sup>
T2	100 - 80	1	4.00	3.81	183.0	0.7854	1.15	35.34	0.033 <sup>1</sup>

<sup>1</sup>  $P_u / \phi P_n$  controls

### Section Capacity Table

Section No.	Elevation <i>ft</i>	Component Type	Size	Critical Element	<i>P</i> <i>K</i>	$\phi P_{allow}$ <i>K</i>	% Capacity	Pass Fail
T1	120 - 100	Leg	1 3/4	3	-26.34	83.36	31.6	Pass
		Diagonal	3/4	15	-3.69	5.92	62.2	Pass
		Horizontal	3/4	20	-0.51	3.35	15.2	Pass
		Top Girt	7/8	6	-0.32	6.20	5.2	Pass
		Bottom Girt	7/8	9	-1.23	6.20	19.8	Pass
		Mid Girt	7/8	10	-0.50	6.20	8.0	Pass
T2	100 - 80	Leg	2 1/4	80	-114.75	158.64	72.3	Pass
		Diagonal	7/8	93	-7.94	11.16	71.1	Pass
		Horizontal	3/4	97	-2.12	3.42	62.0	Pass
		Top Girt	1	82	-2.12	10.81	19.6	Pass
		Bottom Girt	1	85	-2.12	10.81	19.6	Pass
		Mid Girt	1	90	-0.91	10.81	8.4	Pass
T3	80 - 60	Leg	Pirod 194651 (Gr.58)	158	-156.46	238.57	65.6	Pass
		Diagonal	L2 1/2x2 1/2x1/4	174	-9.91	18.78	52.8	Pass
T4	60 - 40	Top Girt	L3x3x3/16	160	-2.71	24.99	10.9	Pass
		Leg	Pirod 195213 (Gr.58)	176	-198.44	333.04	59.6	Pass
		Diagonal	L2 1/2x2 1/2x3/16	188	-6.73	11.78	57.1	Pass
T5	40 - 20	Leg	Pirod 195217 (Gr.58)	191	-236.16	333.04	70.9	Pass
		Diagonal	L2 1/2x2 1/2x5/16	197	-7.91	13.50	58.6	Pass
T6	20 - 0	Leg	Pirod 196915 (Gr.58)	206	-237.68	385.15	61.7	Pass
		Diagonal	2L3 1/2x3 1/2x1/4	213	-18.37	51.14	35.9	Pass

Summary

<p><b>tnxTower</b></p> <p><b>Nexius</b>  2595 NORTH DALLAS PARKWAY,  SUITE 300  FRISCO, TX 75034  Phone: (978) 581-9888  FAX:</p>	<b>Job</b>	BOBDL00004B	<b>Page</b>	24 of 24
	<b>Project</b>	BOBDL00004B	<b>Date</b>	17:13:09 06/03/22
	<b>Client</b>	Dish Wireless	<b>Designed by</b>	Binod Paudel

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
						Leg (T2)	72.3	Pass
						Diagonal (T2)	71.1	Pass
						Horizontal (T2)	62.0	Pass
						Top Girt (T2)	19.6	Pass
						Bottom Girt (T1)	19.8	Pass
						Mid Girt (T2)	8.4	Pass
						Bolt Checks	66.5	Pass
						<b>RATING =</b>	<b>72.3</b>	<b>Pass</b>

## ANCHOR ROD CAPACITY CHECK

### Project Information

Site ID:	BOBDL00004B
Site Name:	BOBDL00004B

### Tower Information

Tower Type:	Self Support
TIA-222 Rev.	G

### Applied Load

	Comp.	Uplift
Axial (k)	267	241
Shear (k)	28	25

### Anchor Rod Data

Quantity (N_anchors):	12	
Diameter of anchor rod (d_anchor):	1	in
Net tensile area of anchor rod (A <sub>n</sub> ):	0.606	sq. in
Material Grade:	F1554	
Minimum yield stress (F <sub>y</sub> )	105	ksi
Ultimate Tensile Stress (F <sub>ub</sub> )	125	ksi
Safety Factor for Anchor (Φ)	0.75	
Design Tensile Strength of anchor rod (R <sub>nt</sub> )=F <sub>ub</sub> xAn	75.75	kips
T <sub>cap</sub> = ΦxR <sub>nt</sub> =	56.8125	kips
Eta Factor, η	0.55	

(AISC, Table 7-17)

(AISC, Table 2-6)

(Section 4.9.9, TIA-222-G, Addendum 2)

For Detail Type C (with grout considered)

### Anchor Rod Results

Axial, P <sub>u</sub>	241	kips
Shear, V <sub>u</sub>	25	kips
Max Load per anchor [T <sub>max</sub> =(P <sub>u</sub> +V <sub>u</sub> /η)/Nanchors]	23.87	kips
Anchor Rod Capacity = T <sub>max</sub> /T <sub>cap</sub> =	42.0%	OK!

Tension (uplift) force for anchor detail type A, B and C

Direct shear force corresponding to P<sub>u</sub>

(Section 4.9.9, TIA-222-G, Addendum 2)

# Pier and Pad Foundation

SITE ID	BOBDL00004B
Site Name:	BOBDL00004B

TIA-222 Revision:	G
Tower Type:	Self Support

Block Foundation?:	<input type="checkbox"/>
--------------------	--------------------------

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	267	kips
Compression Shear, $V_{u\_comp}$ :	28	kips
Uplift, $P_{uplift}$ :	241	kips
Uplift Shear, $V_{u\_uplift}$ :	25	kips
Tower Height, $H$ :	120	ft
Base Face Width, $BW$ :	12	ft
BP Dist. Above Fdn, $bp_{dist}$ :		in

Foundation Analysis Checks				
	Capacity	Demand	Rating	Check
<i>Uplift (kips)</i>	349.19	241.00	69.0%	Pass
<i>Lateral (Sliding) (kips)</i>	62.85	28.00	44.6%	Pass
<i>Bearing Pressure (ksf)</i>	2.61	1.30	49.9%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	1022.23	140.00	13.7%	Pass
<i>Pier Flexure (Tension) (kip*ft)</i>	452.07	125.00	27.7%	Pass
<i>Pier Compression (kip)</i>	6889.11	275.66	4.0%	Pass
<i>Pad Flexure (kip*ft)</i>	1238.27	575.45	46.5%	Pass
<i>Pad Shear - 1-way (kips)</i>	388.39	101.96	26.3%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.201	0.105	52.1%	Pass

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, $dpier$ :	3.5	ft
Ext. Above Grade, $E$ :	0.5	ft
Pier Rebar Size, $Sc$ :	7	
Pier Rebar Quantity, $mc$ :	16	
Pier Tie/Spiral Size, $St$ :	4	
Pier Tie/Spiral Quantity, $mt$ :		
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	3	in

Soil Rating:	69.0%
Structural Rating:	52.1%

Pad Properties		
Depth, $D$ :	6	ft
Pad Width, $W$ :	23.5	ft
Pad Thickness, $T$ :	1.5	ft
Pad Rebar Size, $Sp$ :	7	
Pad Rebar Quantity, $mp$ :	35	
Pad Clear Cover, $cc_{pad}$ :	3	in

Material Properties		
Rebar Grade, $Fy$ :	60000	psi
Concrete Compressive Strength, $F'c$ :	4500	psi
Dry Concrete Density, $\delta c$ :	150	pcf

Soil Properties		
Total Soil Unit Weight, $\gamma$ :	100	pcf
Ultimate Net Bearing, $Q_{net}$ :	2.876	ksf
Cohesion, $Cu$ :	0.100	ksf
Friction Angle, $\phi$ :	0	degrees
SPT Blow Count, $N_{blows}$ :		
Base Friction, $\mu$ :		
Neglected Depth, $N$ :	3.00	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, $gw$ :	10.5	ft

<--Toggle between Gross and Net



FedEx® Tracking



777076235678



[ADD NICKNAME](#)

**ON TIME**

Scheduled delivery date  
Monday, 6/13/2022 before 4:30 pm



**IN TRANSIT**

Arrived at FedEx location  
MEMPHIS, TN

[GET STATUS UPDATES](#)

**FROM**

Devens, MA US

**TO**

NEW BRITAIN, CT US

[MANAGE DELIVERY](#)

### Travel History

**TIME ZONE**

Local Scan Time



Thursday, June 9, 2022

11:06 AM	MEMPHIS, TN	Shipment arriving On-Time
10:53 AM	MEMPHIS, TN	Arrived at FedEx hub

Wednesday, June 8, 2022

10:21 PM	LONDONDERRY, NH	At local FedEx facility
7:54 PM	LONDONDERRY, NH	Left FedEx origin facility
6:04 PM	LONDONDERRY, NH	Picked up
1:51 PM		Shipment information sent to FedEx