EVERSOURCE ENERGY

56 Prospect Street,
P.O. Box 270
Hartford, CT 06103

Kathleen M. Shanley
Manager – Transmission Siting
Tel: (860) 728-4527

September 10, 2021

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

RE: **Notice of Exempt Modification**
Eversource Site # ES-051 Thompson
97 Mountain Hill Road, Thompson, CT 06255
Latitude: 41-59-11.76 N / Longitude: 71-54-49.11 W

Dear Ms. Bachman:

The Connecticut Light and Power Company doing business as Eversource Energy ("Eversource") currently maintains multiple antennas mounted at various heights on an existing 180-foot self-support tower located at 97 Mountain Hill Road in Thompson. See Attachment A, Parcel Map and Property Card. The tower and property are owned by the State of Connecticut Department of Emergency Services and Public Protection ("DESPP"). Eversource and DESPP have entered into an agreement allowing the modification of Eversource's equipment on the DESPP tower. See Attachment B, Letter of Authorization. Eversource is seeking the Connecticut Siting Council's authorization for the installation of one 5-foot 4-inch dipole antenna mounted at 134 feet above ground level ("AGL") with a four feet stand-off mount and the removal of one existing omni-directional antenna. See Attachment C, Mount Analysis, dated August 16, 2021. There will be no other changes to the area of the fenced compound, the tower or the existing antennas and other equipment currently mounted on the tower. The tower and existing and proposed equipment are depicted on Attachment D, Construction Drawings, dated August 17, 2021 and Attachment E, Structural Analysis, dated August 18, 2021. The Connecticut Siting Council approved this tower under Docket No. 157 in March 1993.

The modification is required to eliminate transmitter induced noise issues from an antenna previously installed as part of Eversource's program to update its obsolete analog voice radio communications system to a modern digital voice communications system (refer to EM-EVER-141-210128, dated March 9, 2021).. The transmitter issue manifests as passive intermodulation, or PIM, noise located on the receive frequencies, which limits the system level coverage capability of the site.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies ("R.C.S.A.") §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this notice is being delivered to Amy St. Onge, First Selectman for the Town of Thompson and Tyra Penn-Gesek, Director of Planning and

Development for the Town of Thompson via private carrier. Proof of delivery is attached. See Attachment F, Proof of Delivery of Notice.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2):

1. There will be no change to the height of the existing tower.
2. The modifications will not require an extension of the site boundary.
3. The modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the new antenna will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard as shown in the attached Radio Frequency Emissions Report, dated August 18, 2021 (Attachment G – Power Density Report)[1].
5. The modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, Eversource respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2). One original and two copies of this notice and a check in the amount of $625 are enclosed.

Communications regarding this Notice of Exempt Modification should be directed to Kathleen Shanley at (860) 728-4527.

By: _____
Kathleen M. Shanley
Manager – Transmission Siting

cc: Honorable Amy St. Onge, First Selectman, Town of Thompson
Tyra Penn-Gesek, Director of Planning and Development, Town of Thompson
DESPP

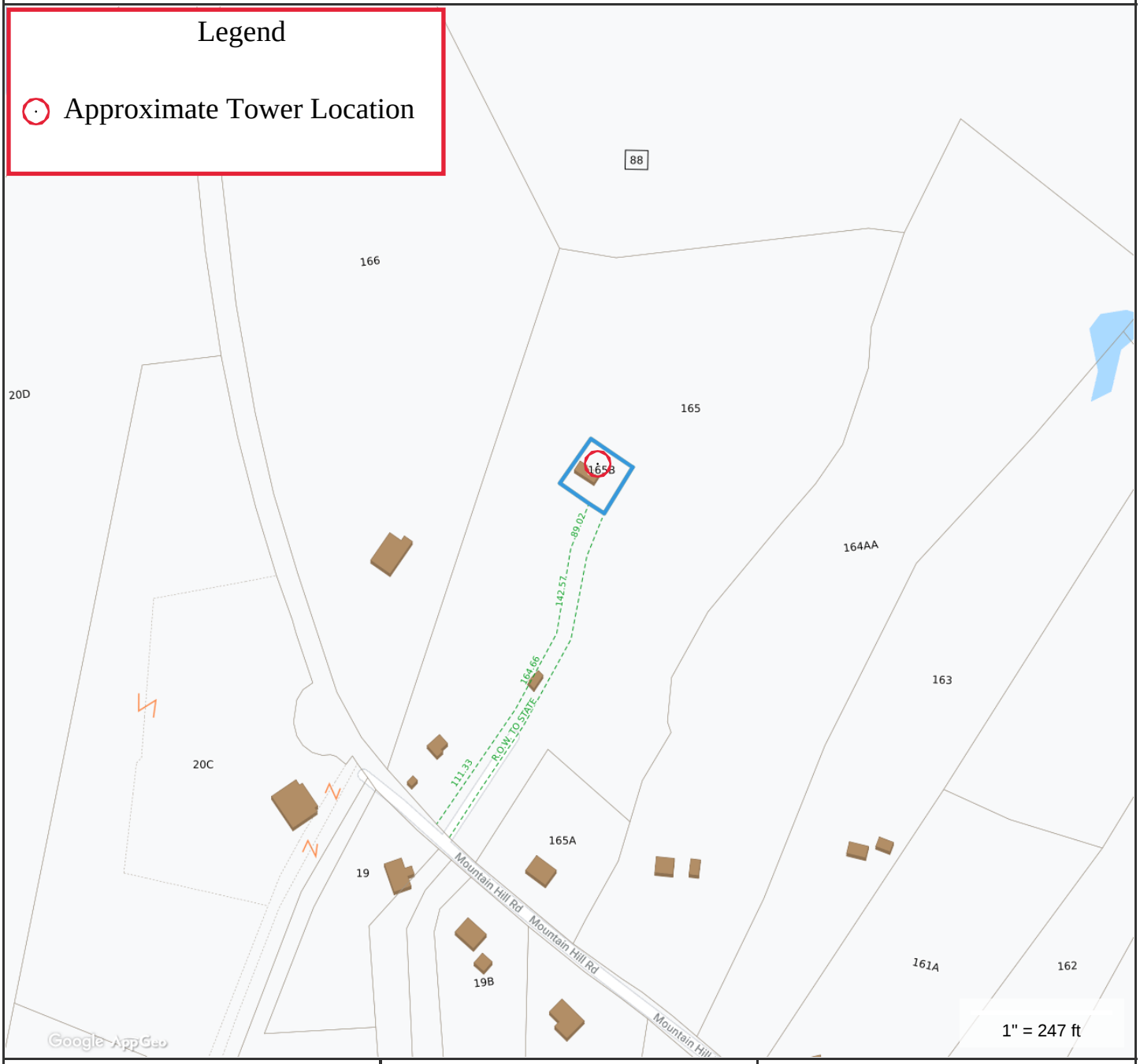
Attachments

A. Parcel Map and Property Card
B. Letter of Authorization
C. Mount Analysis
D. Construction Drawings
E. Structural Analysis
F. Proof of Delivery of Notice
G. Power Density Report

[1] Any receive-only antennas are not included in the Power Density Report, as they are irrelevant in terms of the % MPE calculations.

ATTACHMENT A – PARCEL MAP AND PROPERTY CARD

ES-051 Thompson



Property Information

Property ID	104520
Location	97 MOUNTAIN HILL RD
Owner	CONNECTICUT STATE OF DPS

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Thompson, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated April 1, 2018
Data updated April 1, 2018

97 MOUNTAIN HILL RD

Location	97 MOUNTAIN HILL RD	**Mblu**	42/ 88/ 165/B /
Acct#	001730	**Owner**	CONNECTICUT STATE OF
Assessment	$307,500	**Appraisal**	$439,200
PID	848	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$239,200	$200,000	$439,200
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$167,500	$140,000	$307,500

Owner of Record

Owner	CONNECTICUT STATE OF	**Sale Price**	$0
Co-Owner	DEPT PUBLIC SAFETY	**Certificate**	
Address	165 CAPITOL AVE HARTFORD, CT 06106	**Book & Page**	0248/0073
		Sale Date	11/27/1989

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
CONNECTICUT STATE OF	$0		0248/0073	11/27/1989

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Attributes

Field	Description
Style	Outbuildings
Model	
Grade:	
Stories:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	

Building Photo

(http://images.vgsi.com/photos/ThompsonCTPhotos//default.jpg)

Building Layout

Building Layout

(http://images.vgsi.com/photos/ThompsonCTPhotos//Sketches/848_848.jp

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	9010
Description	STATE
Zone	RA80
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0.23
Frontage	0
Depth	0
Assessed Value	$140,000
Appraised Value	$200,000

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
CB1	PRECAST CONC CELL			756 S.F.	$85,100	1
FN9	W/O TOP RL-8'			370 L.F.	$8,300	1
TWR2	MONOPOLE			180 HEIGHT	$145,800	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$239,700	$200,000	$439,700
2017	$239,700	$200,000	$439,700
2016	$239,700	$200,000	$439,700

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$167,900	$140,000	$307,900
2017	$167,900	$140,000	$307,900
2016	$167,900	$140,000	$307,900

ATTACHMENT B – LETTER OF AUTHORIZATION

STATE OF CONNECTICUT

DEPARTMENT OF EMERGENCY SERVICES AND PUBLIC PROTECTION

April 7, 2020

Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Letter of Authorization** – Co-location on Connecticut State Police tower
Property address: 97 Mt. Hill Road, Thompson, CT
Latitude: 41 98'-65" Longitude: 71 54' 49.16"

To Whom It May Concern:

Eversource Energy (Eversource) has an Agreement with the Connecticut Department of Emergency Services and Public Protection (DESPP) to co-locate its communications equipment on the DESPP tower located at 97 Mt. Hill Road, Thompson, Connecticut.

Eversource shall be required by the terms of the agreement to seek and obtain all necessary permits and approvals. As a duly authorized representative of the DESPP, permission is hereby granted to Eversource and agents thereof, for the purpose of consummating any applications necessary to gain the required approvals from the State of Connecticut.

Any fees or charges associated with all applications or permits and any conditions placed on the applicant shall be the sole responsibility of Eversource.

Yours truly,

Brian Benito
Planning Specialist
State Of Connecticut
Department of Emergency Services and Public Protection
CTS Unit
860-685-8297
brian.benito@ct.gov

ATTACHMENT C – MOUNT ANALYSIS

BLACK & VEATCH
Building a world of difference.
BLACK & VEATCH CORPORATION
6800 W 115TH ST, SUITE 2292, OVERLAND PARK, KS 66211
+1 913-458-2522 | RILEYJJ@BV.COM

August 16, 2021

MOUNT EVALUATION LETTER

Site Number: 848
Site Name: THOMPSON CSP
Site Data: 97 Mountain Hill Road
Thompson, CT 06255
Latitude: 41° 59' 11.76"
Longitude: -71° 54' 49.11"

Black & Veatch Corporation is pleased to submit this "Mount Evaluation Letter" to determine the structural integrity of antenna mounting system on the above-mentioned site. The purpose of this evaluation is to determine the capacity of the system in supporting the final loading in the attached "Loading Summary".

Based on our evaluation we have determined the proposed antenna mounting system to be: **SUFFICIENT**

Structure Rating (max from all components) =	17.2%

Proposed Mounting System
SitePro 1 (USF-4U) 48" Ultimate Universal Stand-off Frame

This analysis analyzes the worst-case scenario for the proposed USF-4U Stand-off Frame. All levels are deemed sufficient. The proposed mounting system will be capable of supporting the proposed equipment, under the following conditions:

- Contractor shall be responsible for the means and methods of construction.
- Contractor shall inspect the condition of all existing and proposed structural members, all relevant members and connections and report any deficiencies to the engineer prior to installation of any new antennas and other equipment.

The scope of this evaluation pertains only to the proposed antenna mounting system and does not include examination of the loads imparted by the antenna mounting system to the existing tower and its structural components. This document was prepared based on information provided to Black & Veatch. If existing conditions do not reflect those represented, this analysis is no longer valid.

Please contact Josh Riley in our Overland Park Office
at 913-458-2522 if you have any questions or comments.

Sincerely,
Black & Veatch Corporation

Prepared By: Shaun Donley
Submitted By: Josh Riley, P.E.

08/18/2021

TABLE OF CONTENTS

1. LOADING SUMMARY

Appurtenance								
Carrier	Position	Sector	Antenna RAD Center (ft)	Mount Centerline (ft)	Qty	Type	Manufacturer	Model
Eversource	1	-	157	154	1	Omni	Telewave	ANT220F2
Eversource	1	-	134	131	1	Dipole	COMPROD	871F-70-2

This analysis analyzes the worst-case scenario for the proposed USF-4U Stand-off Frame. All levels are deemed sufficient

2. ANALYSIS CRITERIA SUMMARY

ANALYSIS CRITERIA	
STANDARD	TIA-222-H
WIND SPEED	Ultimate of 140 mph
WIND SPEED WITH ICE	50 mph with 2" radial ice thickness
EXPOSURE CATEGORY	B
RISK CATEGORY	III
TOPO CATEGORY	Hill
CREST HEIGHT	110 ft

3. REFERENCES

- American Institute of Steel Construction, AISC 15th Edition
- Telecommunications Industry Association Standard, TIA-222-H & 2018 Connecticut State Building Code
- Antenna Mount Assembly Drawing (Model: USF-4U) by SitePro 1, dated 02/16/2011

4. ASSUMPTIONS

This analysis may be affected if any assumptions are not valid or have been made in error. Black & Veatch should be notified to determine the effect on the structural integrity of the antenna mounting system.

- The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
- The configuration of antennas, mounts, and other appurtenances are as specified in the Loading Summary and the referenced drawings.
- All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
- Sector frame center line: located equidistant between top & bottom boom; Platform center line: located at the base perimeter of platform, unless otherwise specified.
- Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (GR B-46)
Pipe	ASTM A53 (GR B-35)
Connection Bolts	ASTM A325

5. RESULTS SUMMARY

Name	Bending Stress Ratio		Shear Stress Ratio	
Arm: HSS3X3X3	12.8%	Pass	2.8%	Pass
Bracing: Pipe 2.0 Std	17.2%	Pass	2.2%	Pass
Mount Pipe: Pipe 3.0 Std	8.7%	Pass	3.8%	Pass

*Von Mises SR = (Max Von Mises Value From RISA-3D)/(0.9*Fy)

**Capacity rating per TIA-222-H Section 15.5.

APPENDIX 1:
MOUNT ANALYSIS REPORT

BLACK & VEATCH

Client:	Eversource	Computed By:	Shaun Donley
Site Name:	THOMPSON CSP (848)	Date:	8/16/2021
		Verified By:	JJ
Title:	MOUNT ANALYSIS REPORT	Date:	8/16/2021

Dead and Live Loads

Maintenance Live Load: L_V = 250 lb

Installation Live Load: L_M = 0 lb

Appurtenance Dead Loads	
Name	Weight (lb)
871F-70-2	12.5

BLACK & VEATCH	Client: Eversource		Computed By: Shaun Donley
	Site Name: THOMPSON CSP (848)		Date: 8/16/2021
			Verified By: JJ
	Title: MOUNT ANALYSIS REPORT		Date: 8/16/2021

Appurtenance Wind Loading

			Equations	TIA-222-H
Exposure Category =	B		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	III			
Topographic Category =	1		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Basic Wind Speed, V =	140	mph		
Height Above Ground, z =	134	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Velocity Pressure Coefficient, K_z =	1.07		$K_e = e^{-0.000032 z s}$	2.6.8
Topographic Factor, K_{zt} =	1.09			
Wind Directionality Factor, K_d =	0.95		$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
Shielding Factor, K_a =	0.90			
Ground Elevation Factor, K_e =	1.000		$F_A = q_z G_h (EPA)$	2.6.11.2
Wind Velocity Pressure, q_z =	55.61	psf		
Gust Effect Factor, G_h =	1.00		$F_M = q_z G_h C_f D_p$	2.6.11.2

Appurtenance Wind Loads

Name	Height (ft)	Width (ft)	Depth (ft)	Normal			Tangential		
				C_a	EPA FT2	F_A (lb)	C_a	EPA FT2	F_A (lb)
871F-70-2	5.50	2.58	0.16	1.20	15.35	853.27	2.00	1.57	87.16

BLACK & VEATCH	Client:	Eversource	Computed By: Shaun Donley
	Site Name:	THOMPSON CSP (848)	Date: 8/16/2021
			Verified By: JJ
	Title:	MOUNT ANALYSIS REPORT	Date: 8/16/2021

Member Wind Loading

Exposure Category =	B	
Risk Category =	III	
Topographic Category =	1	
Basic Wind Speed, V =	140	mph
Height Above Ground, z =	134	ft
Crest Height, H =	110 ft	ft
Velocity Pressure Coefficient, K_z =	1.07	
Topographic Factor, K_{zt} =	1.09	
Wind Directionality Factor, K_d =	0.95	
Shielding Factor, K_a =	0.90	
Ground Elevation Factor, K_e =	1.000	
Wind Velocity Pressure, q_z =	55.61	psf
Gust Effect Factor, G_h =	1.00	

Equations

	TIA-222-H
$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
$K_e = e^{-0.000032 \cdot zs}$	2.6.8
$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
$F_A = q_z G_h (EPA)$	2.6.11.2
$F_M = q_z G_h C_f D_p$	2.6.11.2

Member Wind Loads

Name	Depth (ft)	Width (ft)	C_f	D_p (ft)	F_M (lb)
Arm: HSS3X3X3	0.25	0.25	2	0.25	27.80
Bracing: Pipe 2.0 Std	0.20		1.2	0.20	13.21
Mount Pipe: Pipe 3.0 Std	0.29		1.2	0.29	19.46

Client:	Eversource	Computed By:	Shaun Donley
Site Name:	THOMPSON CSP (848)	Date:	8/16/2021
		Verified By:	JJ
Title:	MOUNT ANALYSIS REPORT	Date:	8/16/2021

BLACK & VEATCH

Appurtenance Ice Dead Loading

			Equations	TIA-222-H
Exposure Category =	B			
Risk Category =	III		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Topographic Category =	1			
Height Above Ground, z =	134	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Design Ice Thickness, T_i =	2.00	in	$K_{iz} = (z/33)^{0.10}$	2.6.10
Importance Factor, I =	1.15			
Topographic Factor, K_{zt} =	1.09		$T_{iz} = T_i I K_{iz}(K_{zt})^{0.35}$	2.6.10
Height Escalation Factor, K_{iz} =	1.15			
Factored Ice Thickness, T_{iz} =	2.72	in	$DL_{ice}=[(H_{ice}*D_{ice}*W_{ice}) - (H*W*D)]*56pcf$	
Grating Ice Dead Load, D_{Gice} =	12.71	psf		

Appurtenance Ice Dead Loads

Name	Height w/ ice (ft)	Width w/ice (ft)	Depth w/ ice (ft)	V_{ice} (ft^3)	DL_{ice} (lb)
871F-70-2	5.95	3.04	0.61	8.82	493.98

BLACK & VEATCH

Client:	Eversource	Computed By:	Shaun Donley
Site Name:	THOMPSON CSP (848)	Date:	8/16/2021
		Verified By:	JJ
Title:	MOUNT ANALYSIS REPORT	Date:	8/16/2021

Member Ice Dead Loading

Exposure Category =	B		
Risk Category =	III		
Topographic Category =	1		
Height Above Ground, z =	134	ft	
Crest Height, H =	110 ft	ft	
Design Ice Thickness, T_i =	2.00	in	
Importance Factor, I =	1.15		
Topographic Factor, K_{zt} =	1.09		
Height Escalation Factor, K_{iz} =	1.15		
Factored Ice Thickness, T_{iz} =	2.72	in	
Grating Ice Dead Load, D_{Gice} =	12.71	psf	

Equations

	TIA-222-H
$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
$K_{iz} = (z/33)^{0.10}$	2.6.10
$T_{iz} = T_i I K_{iz}(K_{zt})^{0.35}$	2.6.10
Aiz = pi*Tiz*(Dc+Tiz)	2.6.10
DL_{ice}=Aiz*56pcf	

Member Ice Dead Loads

Name	Depth w/ ice (ft)	Width w/ ice (ft)	Dc (ft)	Aiz (ft^2)	DL_{ice} (lb/ft)
Arm: HSS3X3X3	0.70	0.70	0.35	0.41	23.18
Bracing: Pipe 2.0 Std	0.65		0.20	0.30	16.96
Mount Pipe: Pipe 3.0 Std	0.75		0.29	0.37	20.71

BLACK & VEATCH	Client: Eversource		Computed By: Shaun Donley
	Site Name: THOMPSON CSP (848)		Date: 8/16/2021
			Verified By: JJ
	Title: MOUNT ANALYSIS REPORT		Date: 8/16/2021

Appurtenance Ice Wind Loading

			Equations	TIA-222-H
Exposure Category =	B		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	III			
Topographic Category =	1		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Ice Wind Speed, V_{ice} =	50	mph		
Height Above Ground, z =	134	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Velocity Pressure Coefficient, K_z =	1.07	psf	$K_e = e^{-0.000032 \cdot zs}$	2.6.8
Topographic Factor, K_{zt} =	1.09			
Wind Directionality Factor, K_d =	0.95		$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
Shielding Factor, K_a =	0.90			
Ground Elevation Factory, K_e =	1.000		$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$	2.6.11.2
Ice Wind Velocity Pressure, $q_{z(ice)}$ =	7.093			
Factored Ice Thickness, T_{iz} =	2.72	in	$F_{M(ice)} = q_{z(ice)} G_h C_f D_{p(ice)}$	2.6.11.2
Gust Effect Factor, G_h =	1			

Appurtenance Ice Wind Loads

Name	Height w/ Ice (ft)	Width w/ Ice (ft)	Depth w/ Ice (ft)	Normal			Tangential		
				C_a	EPA FT2	F_A (lb)	C_a	EPA FT2	F_A (lb)
871F-70-2	5.95	3.04	0.61	-	17.79	126.15	-	3.32	23.53

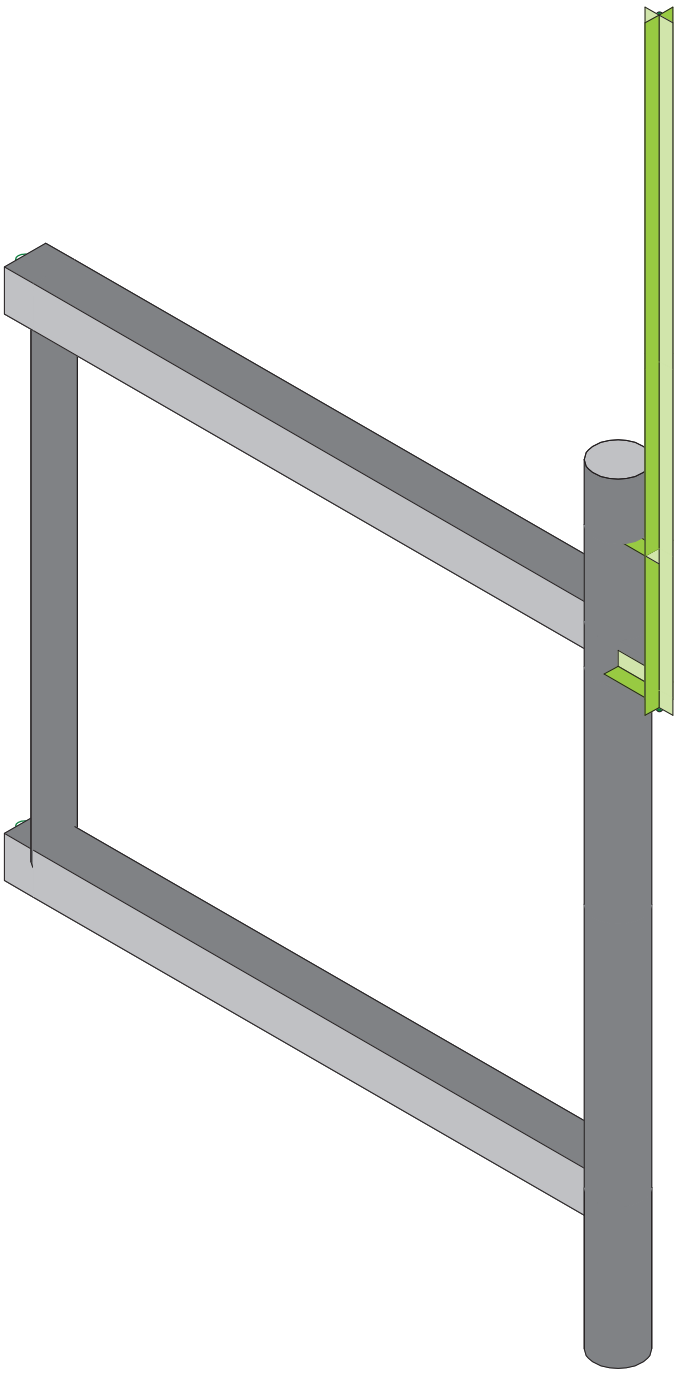
Member Ice Wind Loading

			Equations	TIA-222-H
Exposure Category =	B		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	III			
Topographic Category =	1		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Ice Wind Speed, V_{ice} =	50	mph		
Height Above Ground, z =	134	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Velocity Pressure Coefficient, K_z =	1.07	psf	$K_e = e^{-0.000032 z_s}$	2.6.8
Topographic Factor, K_{zt} =	1.09			
Wind Directionality Factor, K_d =	0.95		$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
Shielding Factor, K_a =	0.90			
Ground Elevation Factory, K_e =	1.000		$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$	2.6.11.2
Ice Wind Velocity Pressure, $q_{z(ice)}$ =	7.093			
Factored Ice Thickness, T_{iz} =	2.72	in	$F_{M(ice)} = q_{z(ice)} G_h C_f D_{p(ice)}$	2.6.11.2
Gust Effect Factor, G_h =	1			

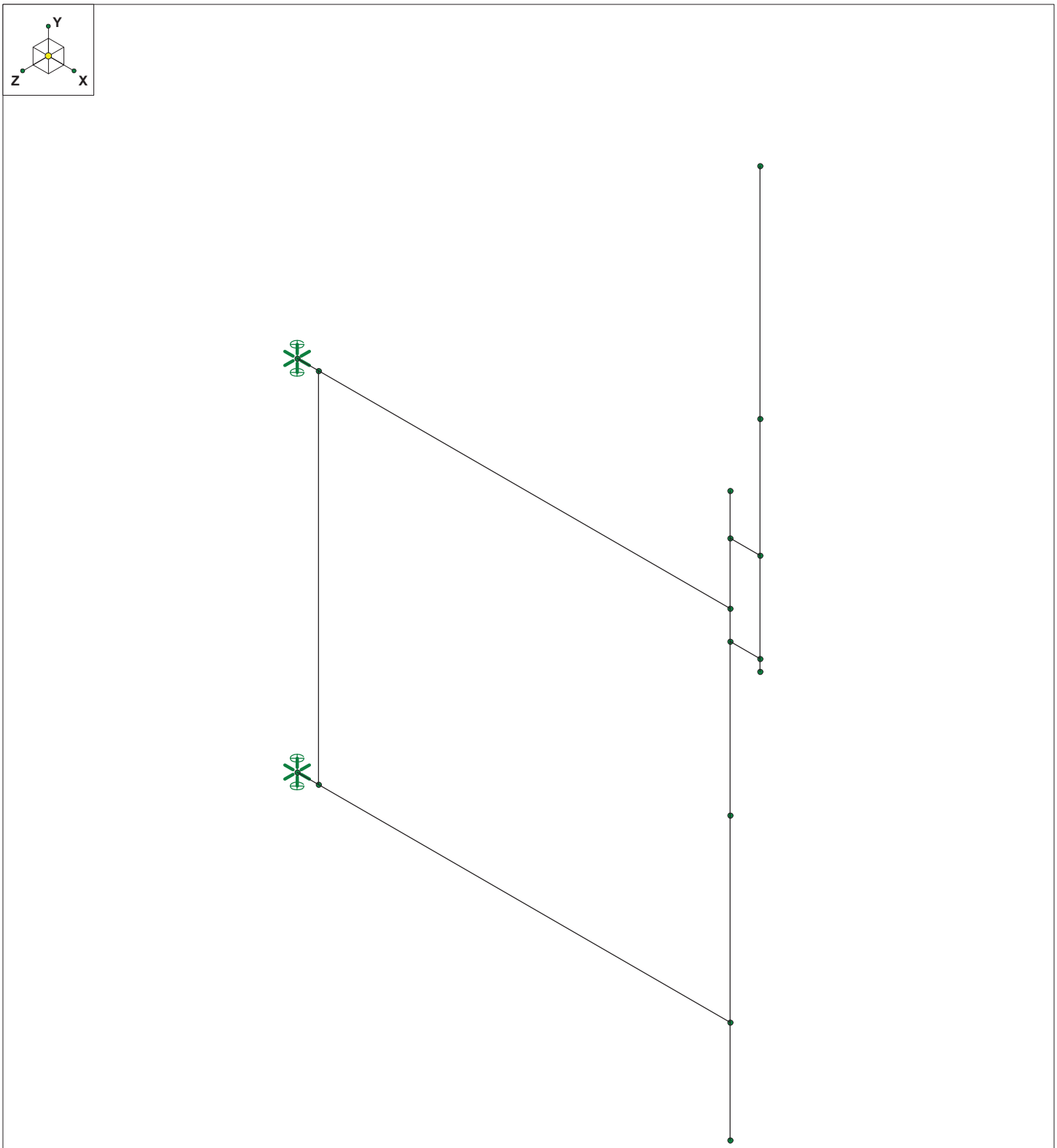
Member Ice Wind Loads

Name	Depth w/ Ice (ft)	Width w/ Ice (ft)	C_f	$D_{p(ice)}$ (ft)	$F_{M(ice)}$ (lb/ft)
Arm: HSS3X3X3	0.70	0.70	2	0.70	9.98
Bracing: Pipe 2.0 Std	0.65		1.2	0.65	5.55
Mount Pipe: Pipe 3.0 Std	0.75		1.2	0.75	6.35

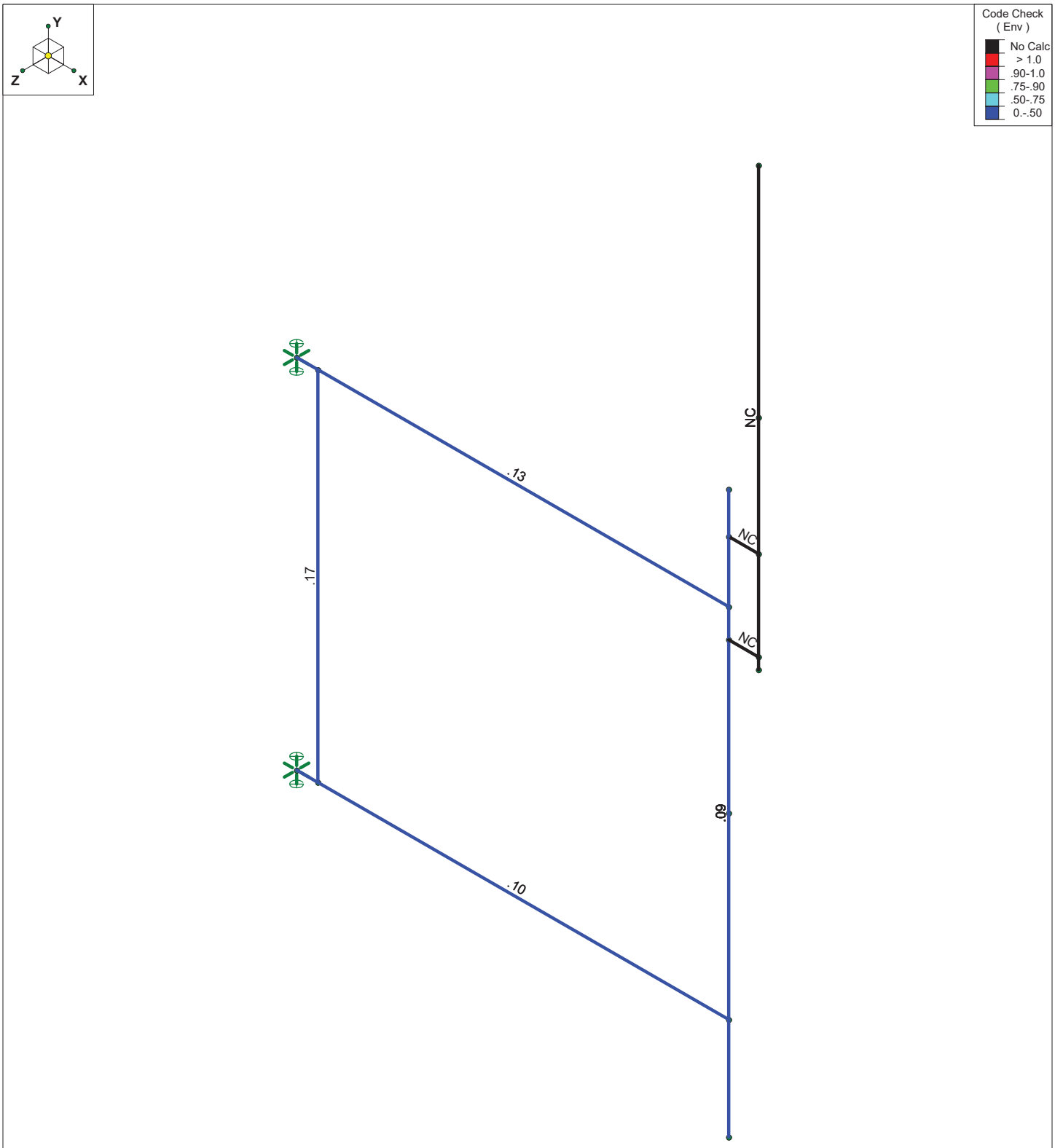
APPENDIX 2:
RISA PRINTOUTS



Black & Veatch	THOMPSONCSP USF-4U Model	SK - 1
Shaun Donley		Aug 16, 2021 at 12:37 PM
405025.3022.2200		405025.3022.2200 Risa Model.r3d

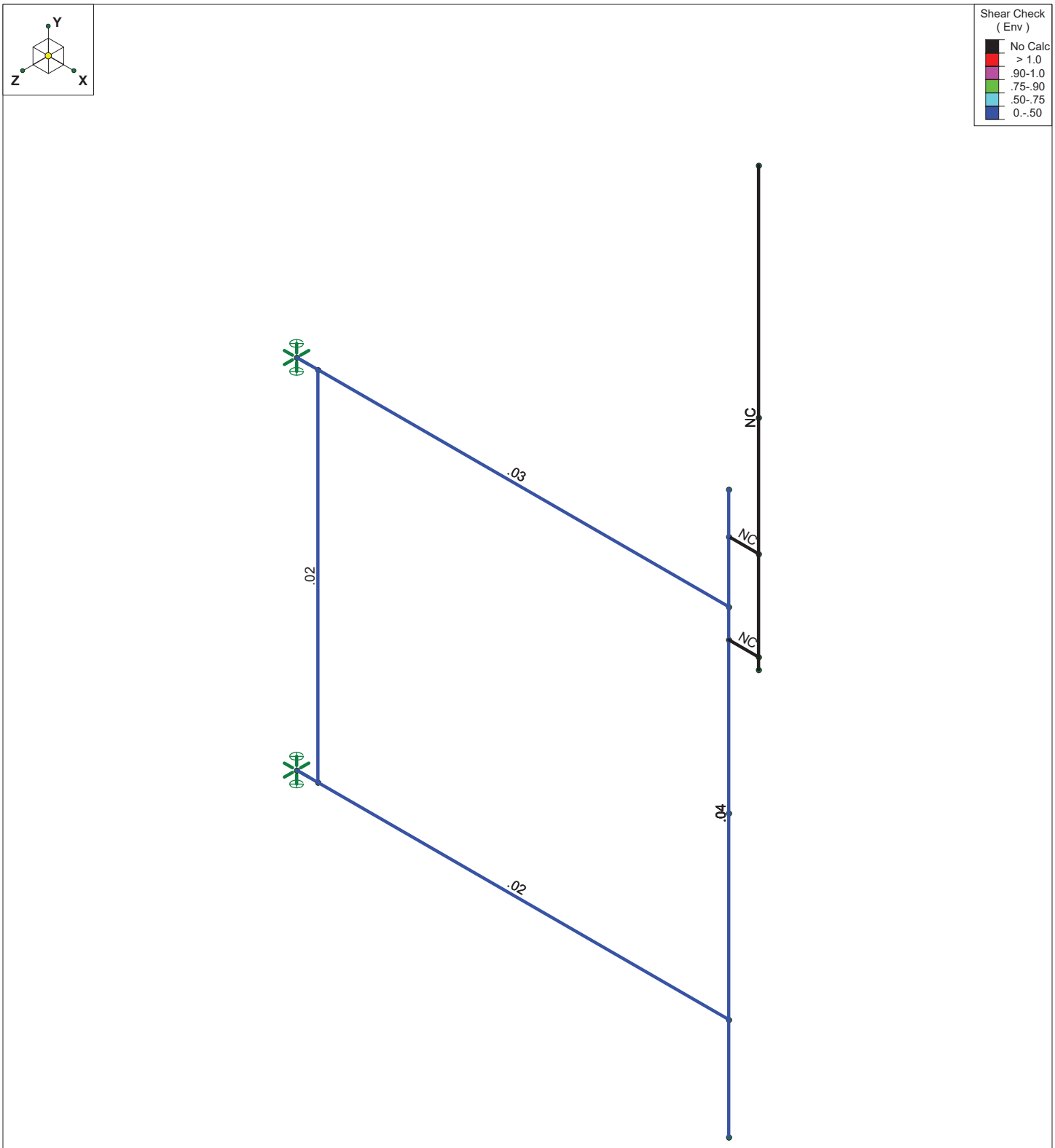


Black & Veatch	THOMPSONCSP USF-4U Model	SK - 2
Shaun Donley		Aug 16, 2021 at 12:38 PM
405025.3022.2200		405025.3022.2200 Risa Model.r3d



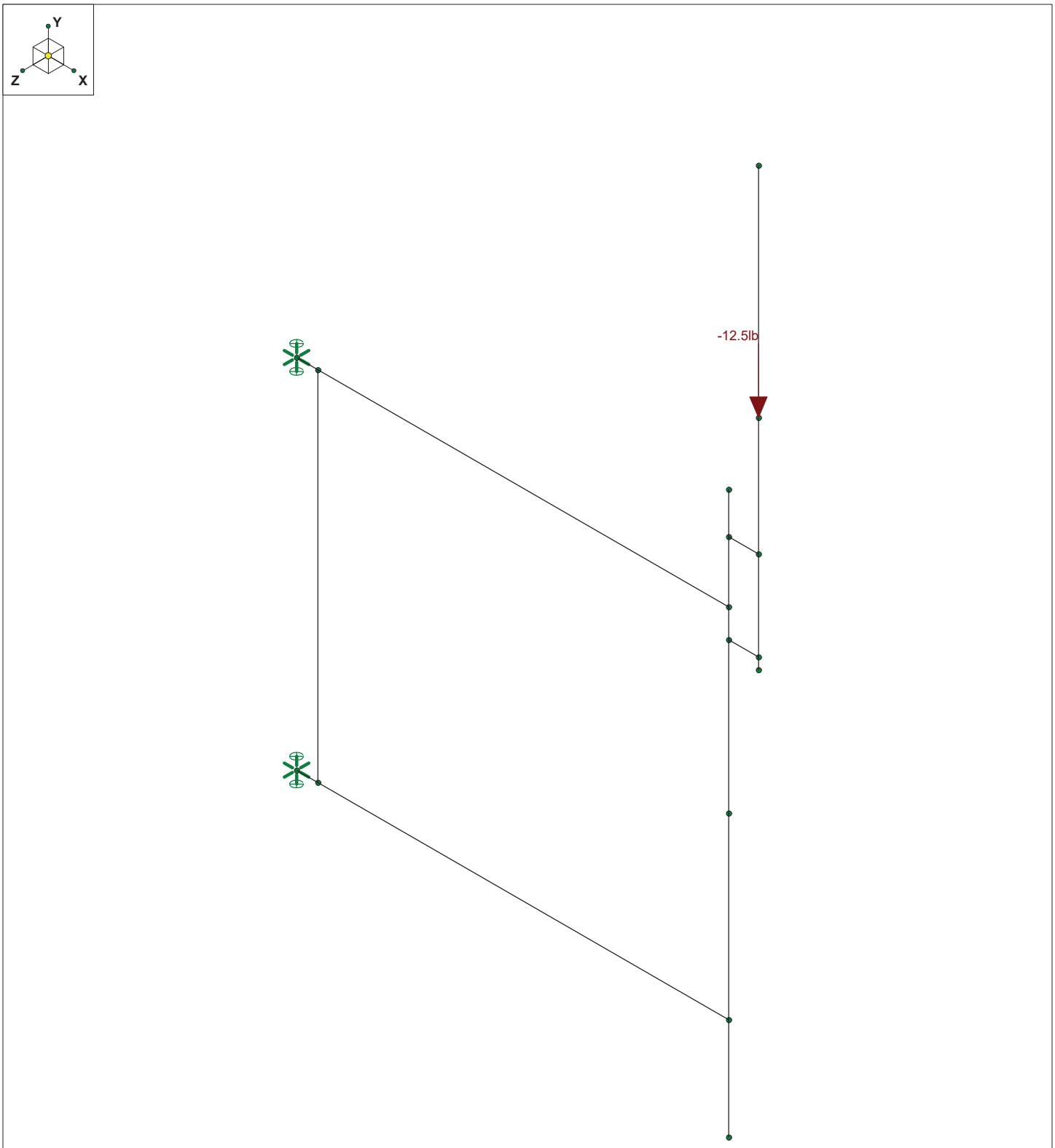
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Black & Veatch	THOMPSONCSP USF-4U Model	SK - 3
Shaun Donley		Aug 16, 2021 at 12:39 PM
405025.3022.2200		405025.3022.2200 Risa Model.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Black & Veatch	THOMPSONCSP USF-4U Model	SK - 4
Shaun Donley		Aug 16, 2021 at 12:39 PM
405025.3022.2200		405025.3022.2200 Risa Model.r3d



Loads: BLC 1, DL
Envelope Only Solution

Black & Veatch	THOMPSONCSP USF-4U Model	SK - 5
Shaun Donley		Aug 16, 2021 at 12:40 PM
405025.3022.2200		405025.3022.2200 Risa Model.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-16
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Arm	HSS3X3X3	Beam	SquareTube	A53 Gr.B	Typical	1.89	2.46	2.46	4.03
2	Bracing	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
3	Mount Pipe	PIPE_3.0	Column	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69

General Material Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[k/ft^3]
1	gen_Conc3NW	3155	1372	.15	.6	.145
2	gen_Conc4NW	3644	1584	.15	.6	.145
3	gen_Conc3LW	2085	906	.15	.6	.11
4	gen_Conc4LW	2408	1047	.15	.6	.11
5	gen_Alum	10100	4077	.3	1.29	.173
6	gen_Steel	29000	11154	.3	.65	.49
7	gen_Plywood	1800	38	0	.3	.035
8	RIGID	1e+6		.3	0	0

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction		Reaction	
2	N3	Reaction	Reaction	Reaction		Reaction	

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Ru...
1	M1	N1	N2			Arm	Beam	SquareTube	A53 Gr.B	Typical
2	M2	N3	N4			Arm	Beam	SquareTube	A53 Gr.B	Typical
3	M3	N5	N6			Bracing	Column	Pipe	A53 Gr.B	Typical
4	M4	N7	N8			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
5	M5	N9	N10			RIGID	None	None	RIGID	Typical
6	M6	N12	N13			RIGID	None	None	RIGID	Typical
7	M7	N15	N14			RIGID	None	None	RIGID	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes				None
2	M2						Yes				None
3	M3						Yes	** NA **			None
4	M4						Yes	** NA **			None
5	M5						Yes	** NA **			None
6	M6						Yes	** NA **			None
7	M7						Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[i...	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Arm	43.5			Lbyy						Lateral
2	M2	Arm	43.5			Lbyy						Lateral
3	M3	Bracing	36									Lateral
4	M4	Mount Pipe	56.5									Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	DL	DL		-1		1				
2	Maintenance LL - LV	LL				1				
3	Installation LL - LM	LL				1				
4	Wind - 0 Deg (X)	WL				1		4		
5	Wind - 30 Deg (X)	WL				1		4		
6	Wind - 60 Deg (X)	WL				1		4		
7	Wind - 90 Deg (X)	WL				1		4		
8	Wind - 120 Deg (X)	WL				1		4		
9	Wind - 150 Deg (X)	WL				1		4		
10	Wind - 180 Deg (X)	WL				1		4		
11	Wind - 210 Deg (X)	WL				1		4		
12	Wind - 240 Deg (X)	WL				1		4		
13	Wind - 270 Deg (X)	WL				1		4		
14	Wind - 300 Deg (X)	WL				1		4		
15	Wind - 330 Deg (X)	WL				1		4		
16	Wind - 0 Deg (Z)	WL				1		4		
17	Wind - 30 Deg (Z)	WL				1		4		
18	Wind - 60 Deg (Z)	WL				1		4		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
19	Wind - 90 Deg (Z)	WL				1		4		
20	Wind - 120 Deg (Z)	WL				1		4		
21	Wind - 150 Deg (Z)	WL				1		4		
22	Wind - 180 Deg (Z)	WL				1		4		
23	Wind - 210 Deg (Z)	WL				1		4		
24	Wind - 240 Deg (Z)	WL				1		4		
25	Wind - 270 Deg (Z)	WL				1		4		
26	Wind - 300 Deg (Z)	WL				1		4		
27	Wind - 330 Deg (Z)	WL				1		4		
28	Ice DL	DL				1		4		
29	Ice Wind - 0 Deg (X)	WL				1		4		
30	Ice Wind - 30 Deg (X)	WL				1		4		
31	Ice Wind - 60 Deg (X)	WL				1		4		
32	Ice Wind - 90 Deg (X)	WL				1		4		
33	Ice Wind - 120 Deg (X)	WL				1		4		
34	Ice Wind - 150 Deg (X)	WL				1		4		
35	Ice Wind - 180 Deg (X)	WL				1		4		
36	Ice Wind - 210 Deg (X)	WL				1		4		
37	Ice Wind - 240 Deg (X)	WL				1		4		
38	Ice Wind - 270 Deg (X)	WL				1		4		
39	Ice Wind - 300 Deg (X)	WL				1		4		
40	Ice Wind - 330 Deg (X)	WL				1		4		
41	Ice Wind - 0 Deg (Z)	WL				1		4		
42	Ice Wind - 30 Deg (Z)	WL				1		4		
43	Ice Wind - 60 Deg (Z)	WL				1		4		
44	Ice Wind - 90 Deg (Z)	WL				1		4		
45	Ice Wind - 120 Deg (Z)	WL				1		4		
46	Ice Wind - 150 Deg (Z)	WL				1		4		
47	Ice Wind - 180 Deg (Z)	WL				1		4		
48	Ice Wind - 210 Deg (Z)	WL				1		4		
49	Ice Wind - 240 Deg (Z)	WL				1		4		
50	Ice Wind - 270 Deg (Z)	WL				1		4		
51	Ice Wind - 300 Deg (Z)	WL				1		4		
52	Ice Wind - 330 Deg (Z)	WL				1		4		

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	WIND LOAD COMBOS (140 MPH)																									
2	1.2DL + WL (0 DEG)	Yes	Y		1	1.2	4	1	16	1																
3	1.2DL + WL (30 DEG)	Yes	Y		1	1.2	5	1	17	1																
4	1.2DL + WL (60 DEG)	Yes	Y		1	1.2	6	1	18	1																
5	1.2DL + WL (90 DEG)	Yes	Y		1	1.2	7	1	19	1																
6	1.2DL + WL (120 DEG)	Yes	Y		1	1.2	8	1	20	1																
7	1.2DL + WL (150 DEG)	Yes	Y		1	1.2	9	1	21	1																
8	1.2DL + WL (180 DEG)	Yes	Y		1	1.2	10	1	22	1																
9	1.2DL + WL (210 DEG)	Yes	Y		1	1.2	11	1	23	1																
10	1.2DL + WL (240 DEG)	Yes	Y		1	1.2	12	1	24	1																
11	1.2DL + WL (270 DEG)	Yes	Y		1	1.2	13	1	25	1																
12	1.2DL + WL (300 DEG)	Yes	Y		1	1.2	14	1	26	1																
13	1.2DL + WL (330 DEG)	Yes	Y		1	1.2	15	1	27	1																
14																										
15	MOUNT LOAD COMBOS (30 MPH)																									
16	1.4DL	Yes	Y		1	1.4																				
17	1.2DL + 1.5LV	Yes	Y		1	1.2	2	1.5																		
18	1.2DL + 1.5LM + WL (0 DEG)	Yes	Y		1	1.2	3	1.5	4	.046	16	.046														

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
19	1.2DL + 1.5LM + WL (30 DEG)	Yes	Y		1	1.2	3	1.5	5	.046	17	.046														
20	1.2DL + 1.5LM + WL (60 DEG)	Yes	Y		1	1.2	3	1.5	6	.046	18	.046														
21	1.2DL + 1.5LM + WL (90 DEG)	Yes	Y		1	1.2	3	1.5	7	.046	19	.046														
22	1.2DL + 1.5LM + WL (120 DEG)	Yes	Y		1	1.2	3	1.5	8	.046	20	.046														
23	1.2DL + 1.5LM + WL (150 DEG)	Yes	Y		1	1.2	3	1.5	9	.046	21	.046														
24	1.2DL + 1.5LM + WL (180 DEG)	Yes	Y		1	1.2	3	1.5	10	.046	22	.046														
25	1.2DL + 1.5LM + WL (210 DEG)	Yes	Y		1	1.2	3	1.5	11	.046	23	.046														
26	1.2DL + 1.5LM + WL (240 DEG)	Yes	Y		1	1.2	3	1.5	12	.046	24	.046														
27	1.2DL + 1.5LM + WL (270 DEG)	Yes	Y		1	1.2	3	1.5	13	.046	25	.046														
28	1.2DL + 1.5LM + WL (300 DEG)	Yes	Y		1	1.2	3	1.5	14	.046	26	.046														
29	1.2DL + 1.5LM + WL (330 DEG)	Yes	Y		1	1.2	3	1.5	15	.046	27	.046														
30																										
31	ICE LOAD COMBOS (2", 50 MPH)																									
32	1.2DL + Ice DL + Ice WL (0 DEG)	Yes	Y		1	1.2	28	1	29	1	41	1														
33	1.2DL + Ice DL + Ice WL (30 DEG)	Yes	Y		1	1.2	28	1	30	1	42	1														
34	1.2DL + Ice DL + Ice WL (60 DEG)	Yes	Y		1	1.2	28	1	31	1	43	1														
35	1.2DL + Ice DL + Ice WL (90 DEG)	Yes	Y		1	1.2	28	1	32	1	44	1														
36	1.2DL + Ice DL + Ice WL (120 DEG)	Yes	Y		1	1.2	28	1	33	1	45	1														
37	1.2DL + Ice DL + Ice WL (150 DEG)	Yes	Y		1	1.2	28	1	34	1	46	1														
38	1.2DL + Ice DL + Ice WL (180 DEG)	Yes	Y		1	1.2	28	1	35	1	47	1														
39	1.2DL + Ice DL + Ice WL (210 DEG)	Yes	Y		1	1.2	28	1	36	1	48	1														
40	1.2DL + Ice DL + Ice WL (240 DEG)	Yes	Y		1	1.2	28	1	37	1	49	1														
41	1.2DL + Ice DL + Ice WL (270 DEG)	Yes	Y		1	1.2	28	1	38	1	50	1														
42	1.2DL + Ice DL + Ice WL (300 DEG)	Yes	Y		1	1.2	28	1	39	1	51	1														
43	1.2DL + Ice DL + Ice WL (330 DEG)	Yes	Y		1	1.2	28	1	40	1	52	1														
44																										

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N1	max	288.513	2	310.985	38	297.152	5	0	43	656.451	11	0	43
2		min	-610.651	38	-20.698	2	-297.152	11	0	2	-656.451	5	0	2
3	N3	max	555.139	17	311.915	32	122.811	5	0	43	385.621	11	0	43
4		min	10.189	8	-18.194	8	-122.811	11	0	2	-385.621	5	0	2
5	Totals:	max	482.284	2	580.241	38	419.963	5						
6		min	-482.285	8	123.244	2	-419.963	11						

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shea...	Loc.....		L...	phi*Pn...	phi*Pn...	phi*Mn...	phi*Mn.....		Eqn
1	M1	HSS3X3X3	.128	0	11	.028	2.266	z	11	55265....	59535	5171.25	5171.25	2...	H1-1b
2	M2	HSS3X3X3	.100	43.5	17	.019	0	y	32	55265....	59535	5171.25	5171.25	2...	H1-1b
3	M3	PIPE_2.0	.172	0	17	.022	0		39	28843....	32130	1871.6...	1871.6...	2...	H1-1b
4	M4	PIPE_3.0	.087	45.906	17	.038	10....		17	57908....	65205	5748.75	5748.75	1...	H1-1b

APPENDIX 3:
ATTACHMENTS

EVERSOURCE ENERGY

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

PROJECT SUMMARY

THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:

1. INSTALL (1) OMNI/WHIP ANTENNA AT ELEVATION 159'–1 1/2" AGL AND INSTALL (1) NEW DIPOLE ANTENNA AT ELEVATION 135'–9"± AGL INSTEAD OF (1) OMNI/WHIP ANTENNA AT ELEVATION 136'–1 1/2± AGL AT A LATER DATE
2. REMOVE (2) EXISTING ANTENNAS AND THEIR ASSOCIATED COAX, (1) AT ELEVATION 127'–0"± AGL AND (1) AT ELEVATION 47'–0"± AGL
3. INSTALL (1) NEW RACK WITH DMR EQUIPMENT IN EXISTING TELECOM ROOM

GOVERNING CODES

2018 CONNECTICUT STATE BUILDING CODE (2015 IBC BASIS)
2017 NATIONAL ELECTRIC CODE
TIA–222–H

GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

SITE INFORMATION

SITE NAME:	THOMPSON CSP
SITE ID NUMBER:	#848
SITE ADDRESS:	97 MOUNTAIN HILL ROAD THOMPSON, CT 06255
MAP:	42
BLOCK:	88
LOT:	165
ZONE:	RA80
LATITUDE:	41° 59' 11.76" N
LONGITUDE:	71° 54' 49.11" W
ELEVATION:	558'± AMSL
FEMA/FIRM DESIGNATION:	C
ACREAGE:	0.23± AC (BOOK: 0248, PAGE: 0073)

CONTACT INFORMATION

APPLICANTS:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037

PROPERTY OWNER:
CONNECTICUT STATE POLICE
165 CAPITOL AVE
HARTFORD, CT 06106

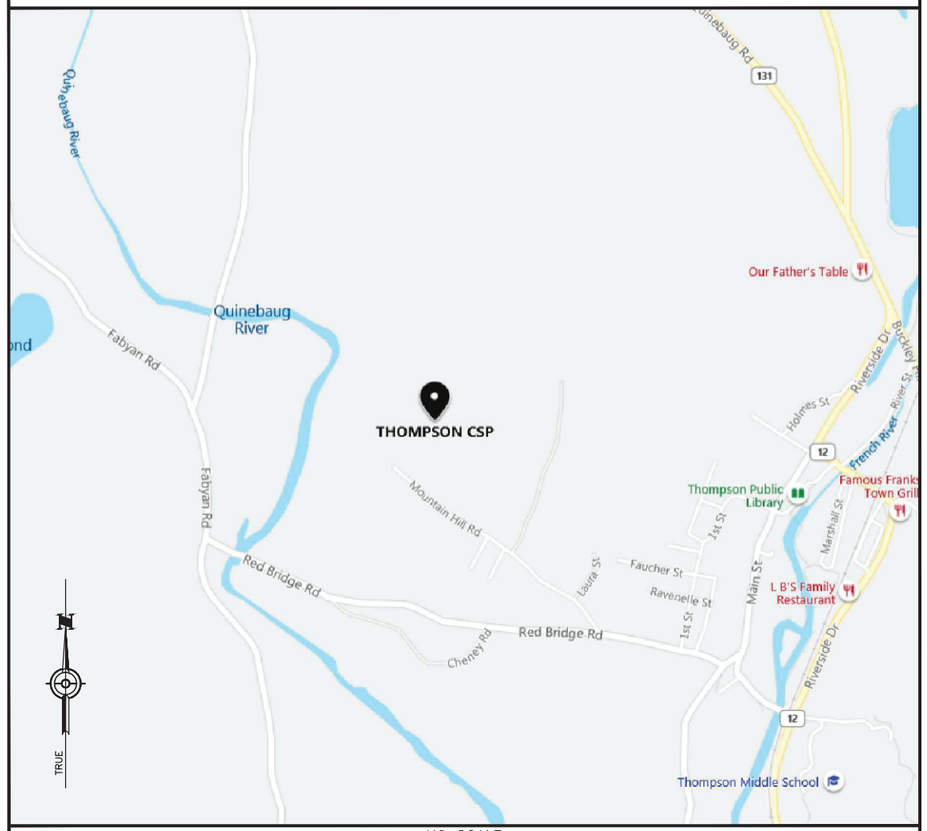
EVERSOURCE ENERGY
PROJECT MANAGER:
NIKOLL PRECI
(860) 655–3079

POWER PROVIDER:
EVERSOURCE ENERGY
(800) 286–2000

TELCO PROVIDER:
FRONTIER
(800) 921–8102

CALL BEFORE YOU DIG:
(800) 922–4455

LOCATION MAP



NO SCALE

DESIGN TYPE

SITE UPGRADE
SELF–SUPPORT TOWER

DRAWING INDEX

SHEET NO:	SHEET TITLE
T–1	TITLE SHEET
C–1	SITE PLAN
C–2	TOWER ELEVATION
G–1	GROUNDING DETAILS
N–1	NOTES & SPECIFICATIONS
N–2	NOTES & SPECIFICATIONS
N–3	NOTES & SPECIFICATIONS

DO NOT SCALE DRAWINGS

SUBCONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME

UNDERGROUND SERVICE ALERT
UTILITIES PROTECTION CENTER, INC.
811
48 HOURS BEFORE YOU DIG

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286–2000

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458–2522

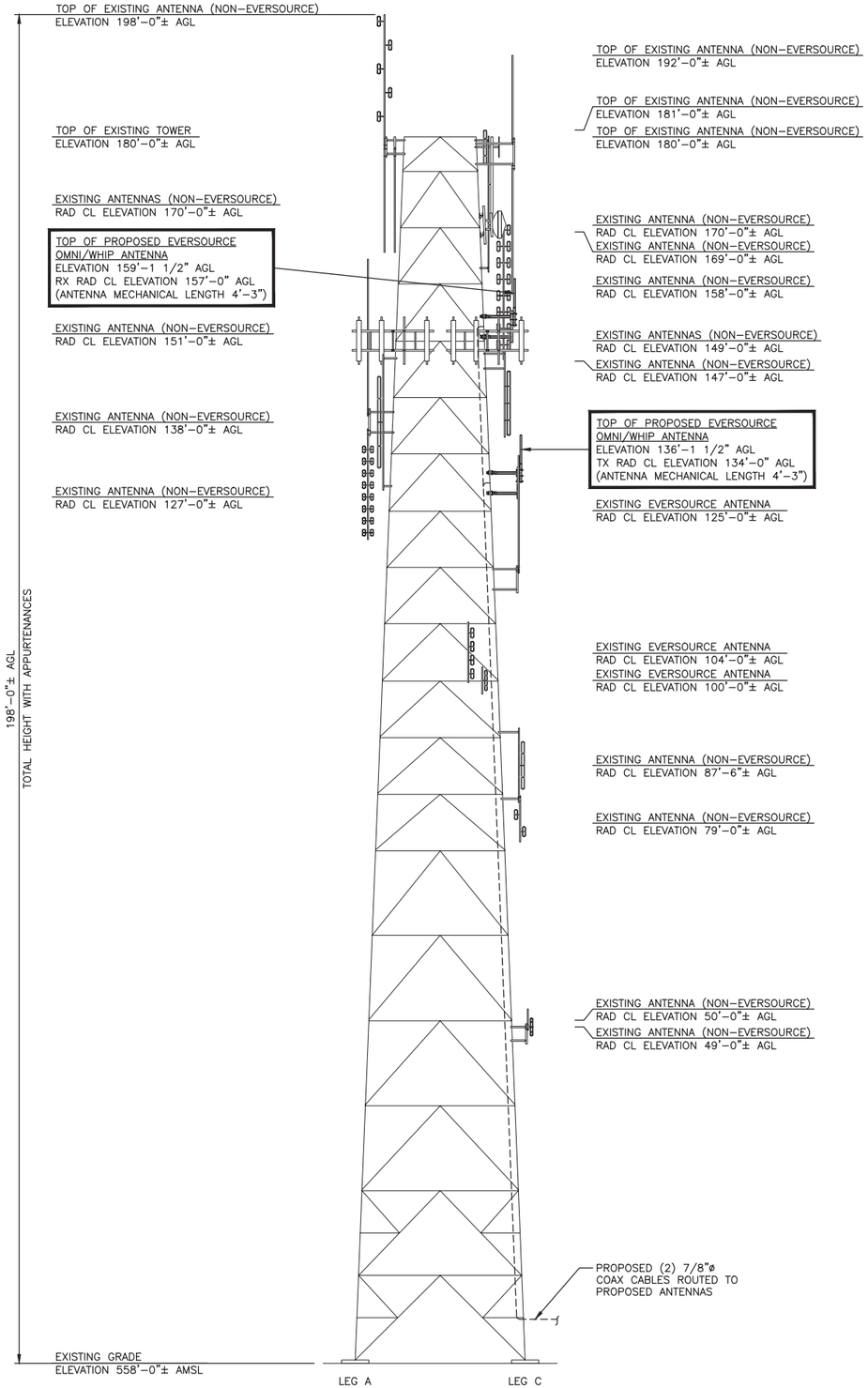
PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	TH

REV	DATE	DESCRIPTION
1	07/13/21	ISSUED FOR FILING
0	12/16/20	ISSUED FOR FILING

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

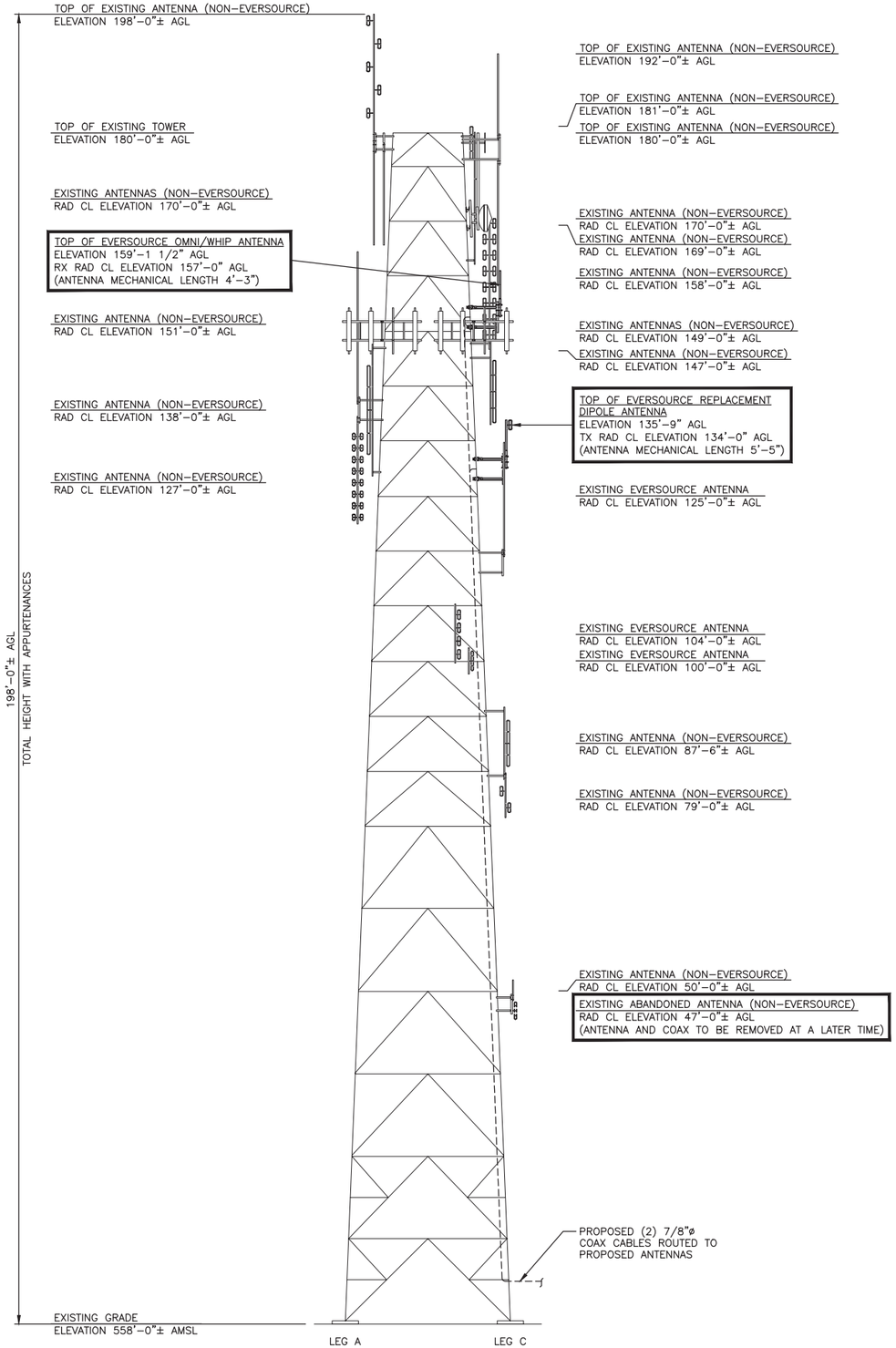
SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1



CSC SUBMITTED INSTALLATION CONFIGURATION

NO SCALE



CURRENT INSTALLATION CONFIGURATION

NO SCALE

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286–2000

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458–2522

PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	TH

REV	DATE	DESCRIPTION
1	07/13/21	ISSUED FOR FILING
0	12/16/20	ISSUED FOR FILING

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

SHEET TITLE

TOWER ELEVATION & ANTENNA EQUIPMENT

SHEET NUMBER

C-2

TELEWAVE, INC.®

ORIGINAL RECIEVE (RX) ANTENNA, UNCHANGED

195 - 260 MHz

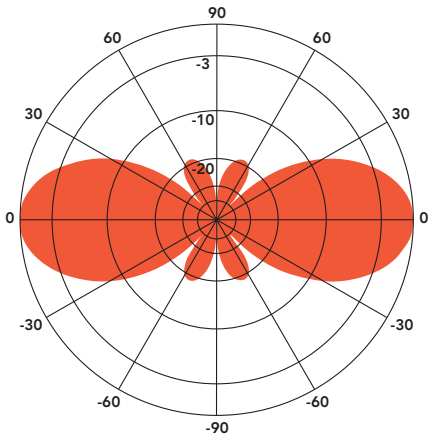
ANT220F2DIN

FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

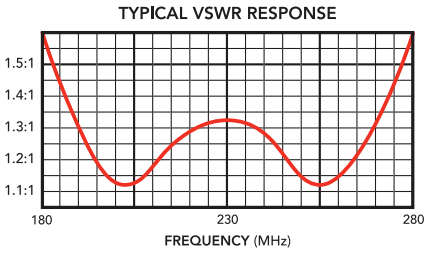
The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential for lightning impulse protection. The ANT220F2 is an excellent choice for wireless PTC systems in urban or rural areas.

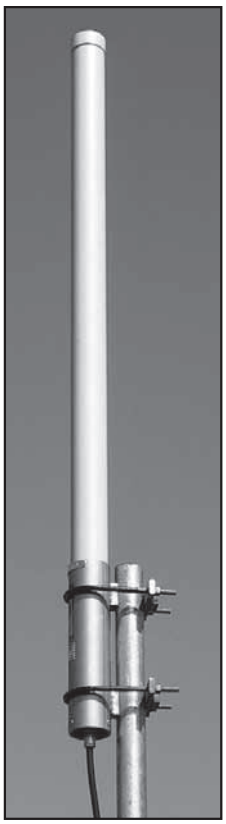
All junctions are fully soldered to prevent RF intermodulation, and each antenna is completely protected within a rugged, high-tech radome to ensure survivability in the worst environments. The "Cool Blue" radome provides maximum protection from corrosive gases, ultraviolet radiation, icing, salt spray, acid rain, and wind blown abrasives.

The ANT220F2 includes the ANTC485 dual clamp set for mounting to a 1.5" to 3" O.D. support pipe, and a 24" removable RG-213 DIN-Male jumper.



ANT220F2 - 230 MHz
Vertical Plane
Gain = 2.58 dBd





SPECIFICATIONS			
Frequency (continuous)	195-260 MHz	**Dimensions (L x base diam.) in.**	51 x 2.75
Gain	2.5 dBd	**Tower weight (antenna + clamps)**	11 lb.
Power rating (typ.)	500 watts	**Shipping weight**	14 lb.
Impedance	50 ohms	**Wind rating / with 0.5" ice**	200 / 150 MPH
VSWR	1.5:1 or less	**Maximum exposed area**	1.1 ft.²
Pattern	Omnidirectional	**Lateral thrust at 100 MPH**	44 lb.
Vertical beamwidth	38°	**Bending moment at top clamp**	47 ft. lb.
Termination	7-16 DIN-F	**(100 MPH, 40 PSF flat plate equiv.)**	

870 Series 220MHz Exposed Dipoles

The 870 Series 220MHz Exposed Dipoles are available in 1, 2, 4, 8 dipole configurations. All our antennas can be completely customized to your particular applications. Our antennas can be black anodized, adjustable, or fixed, side mount or top mount, and heavy-duty versions are available.

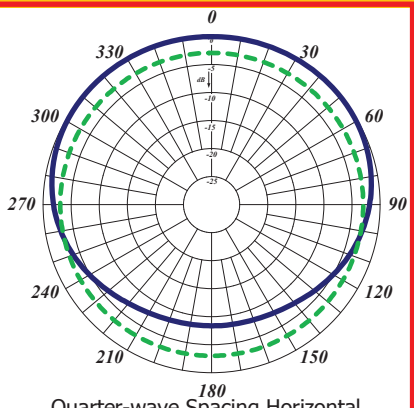
- Each antenna is offered in a 1/4, 3/8 or 1/2 wave spacing versions.
- The 87XA-70 has external cabling and a field-adjustable pattern.
- The 87XF-70 has internal cabling and fixed dipole-mast spacing.
- Heavy-duty versions are available. Please contact our Technical Support team for consultation.

Electrical Specifications	871F-70-2	872F-70-2	874F-70-2
Frequency Range, MHz	215-225	215-225	215-225
Nominal Gain, dBd	2.0-2.5	5.0-5.5	8.0-8.5
Number of Dipoles	1	2	4
Bandwidth 1.5:1 VSWR, MHz	10	10	10
Polarization	Vertical	Vertical	Vertical
Pattern	Offset / bi	Offset / bi	Offset / bi
Power Rating, Watts	200	300	500
Nominal Impedance, Ohms	50	50	50
Lightning Protection	DC Ground	DC Ground	DC Ground
Standard Termination	Type DIN Male	Type N Male	Type N Male
Mechanical Specifications	**871F-70-2**	**872F-70-2**	**874F-70-2**
Length, in (mm)	66 (1676)	112 (2845)	200 (5080)
Width (1/2 Wave Spacing), in (mm)	31 (787)	31 (787)	32 (813)
Weight, lbs. (kg)	12.5 (5.7)	21 (9.5)	51 (23)
Rated Wind Velocity, No Ice, mph (km/h)	165 (266)	150 (241)	145 (233)
Rated Wind Velocity, 0.5" (13mm) ice, mph (km/h)	140 (225)	130 (209)	105 (177)
Lateral Thrust @ 100 mph, wind, lbs. (kg)	40 (18)	66 (30)	143 (65)
Bending Moment @ top clamp: 100 mph, ft.*lb (kg*m)	58 (8)	150 (21)	610 (84)
Projected Area, ft^2 (m^2)	1.5 (0.14)	2.6 (0.24)	5.5 (0.51)
Mounting Information Mast O.D. (mm)	1.9" (48)	1.9" (48)	2.4" (60)
* See next page for ordering information (page 3) *			

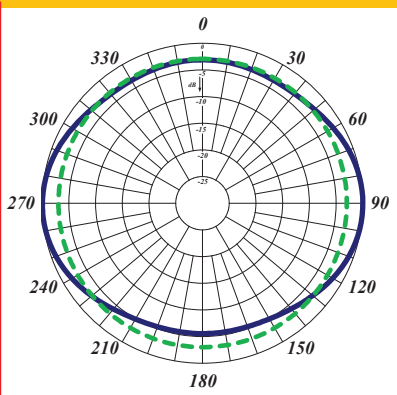
871F-70-2

220MHz EXPOSED DIPOLES — 215-225 MHz

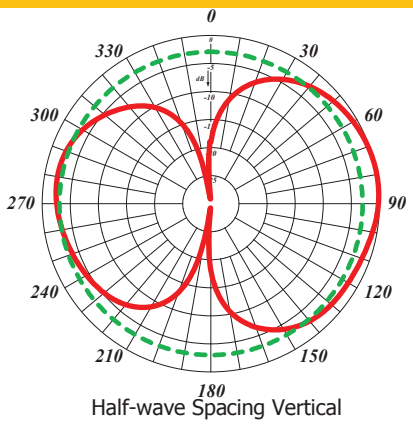
871F-70-2



Quarter-wave Spacing Horizontal

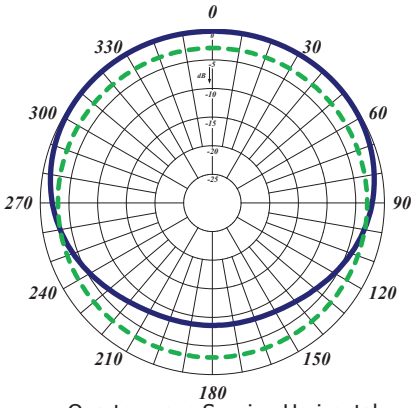


Half-wave Spacing Horizontal

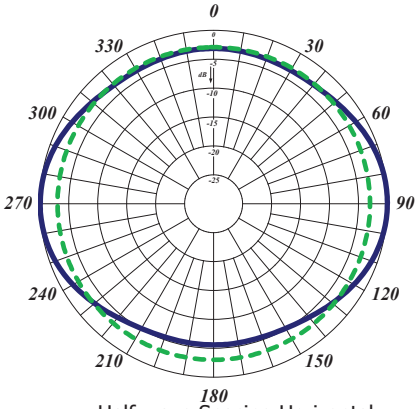


Half-wave Spacing Vertical

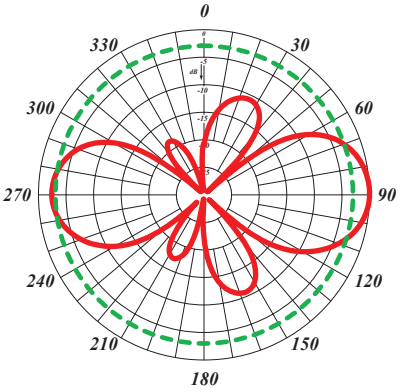
872F-70-2



Quarter-wave Spacing Horizontal

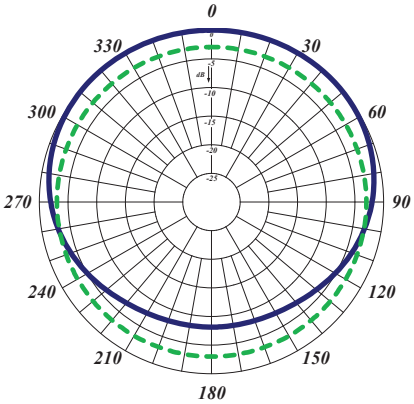


Half-wave Spacing Horizontal

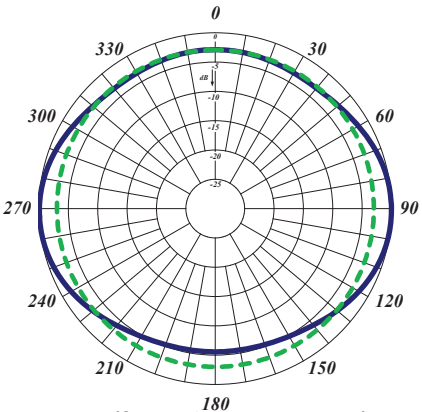


Half-wave Spacing Vertical

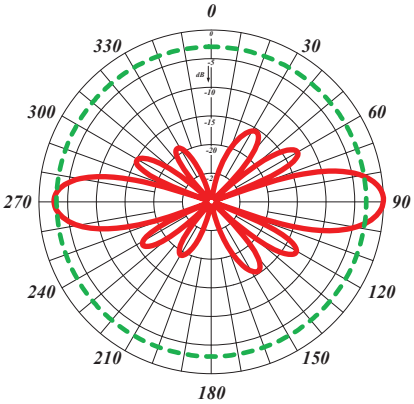
874F-70-2



Quarter-wave Spacing Horizontal



Half-wave Spacing Horizontal



Half-wave Spacing Vertical

COMPROD Simplifying RF Solutions
www.comprodcom.com
Tel: US 1.877.825.2007 / CAN 1.800.603.1454
Email: sales@comprodcom.com
Fax: 1.800.554.1033

TELEWAVE, INC.®

195 - 260 MHz

ORIGINAL TRANSMIT (TX) ANTENNA, REMOVED AND REPLACED

ANT220F2DIN

FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential for lightning impulse protection. The ANT220F2 is an excellent choice for wireless PTC systems in urban or rural areas.

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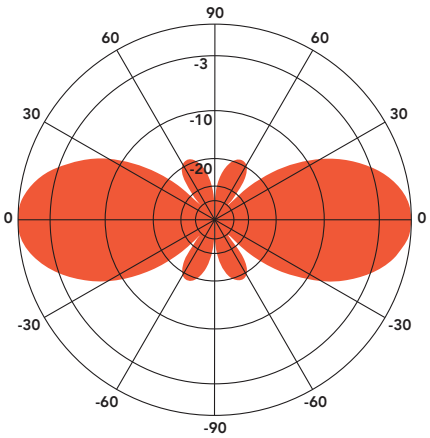
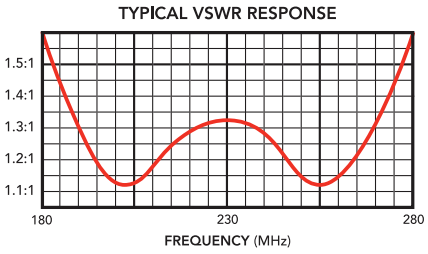
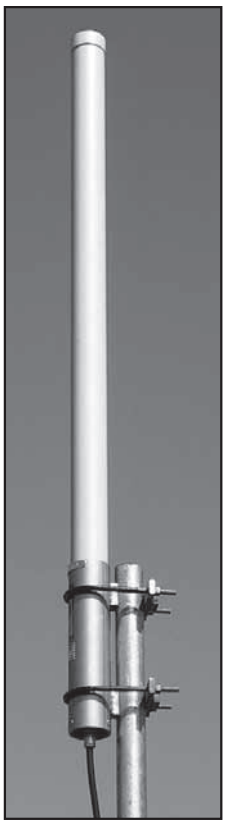


ANT220F2 - 230 MHz
Vertical Plane
Gain = 2.58 dBd





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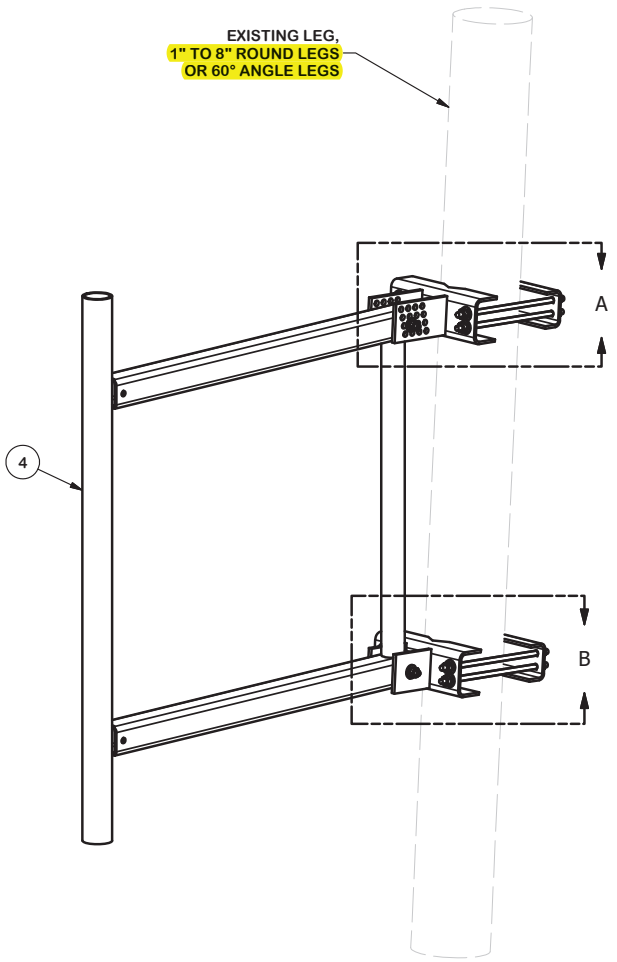
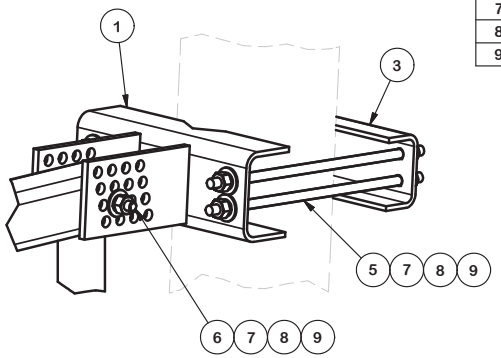
VSWR	1.5:1 or less	**Maximum exposed area**	1.1 ft.²
Pattern	Omnidirectional	**Lateral thrust at 100 MPH**	44 lb.
Vertical beamwidth	38°	**Bending moment at top clamp**	47 ft. lb.
Termination	7-16 DIN-F	**(100 MPH, 40 PSF flat plate equiv.)**	

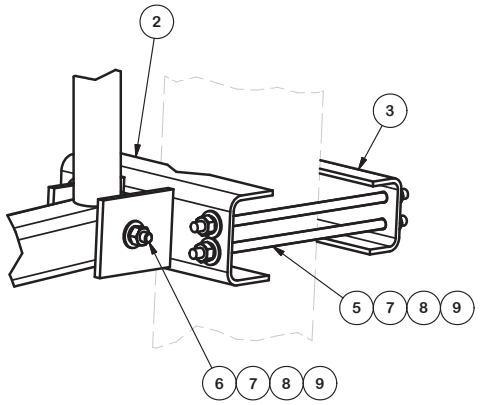
TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 5.0"± DIAMETER.

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	CFM	UPPER GATE FOOT WELDMENT		13.90	13.90
2	1	CFS	LOWER GATE FOOT WELDMENT		12.72	12.72
3	2	GBB	GATE BACKING BAR		4.53	9.06
4	1	4PBG	48" PIPE MOUNT STANDOFF ARM		113.96	113.96
5	8	G12R-12	1/2" x 12" GALV. THREADED ROD		0.67	5.35
5	8	G12R-15	1/2" x 15" GALV. THREADED ROD		0.84	6.69
6	2	A1205	1/2" x 5" A325 HDG BOLT		0.34	0.69
7	18	G12FW	1/2" HDG USS FLATWASHER		0.03	0.61
8	18	G12LW	1/2" HDG LOCKWASHER		0.01	0.25
9	18	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.29
					TOTAL WT. #	164.53

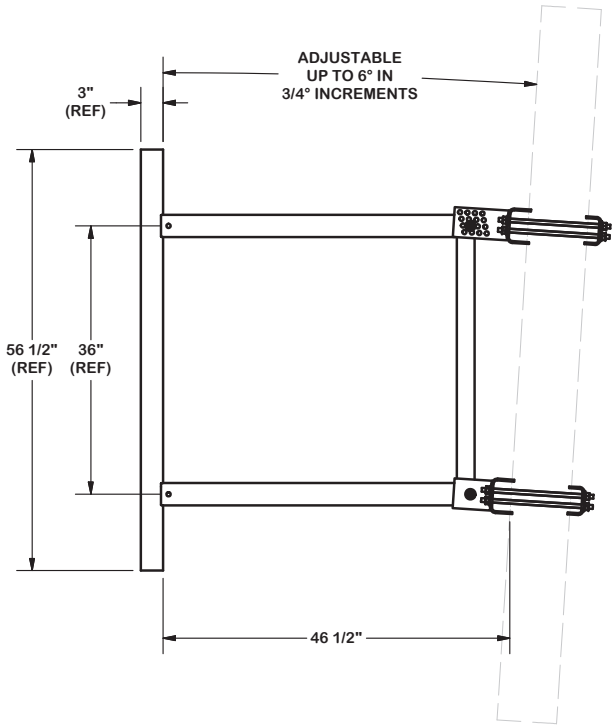




DETAIL A



DETAIL B



TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION: 48" ULTIMATE UNIVERSAL STANDOFF FRAME

SITE PRO 1 — A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
	RCH 2/4/2011		USF-4U	1 OF 1

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 2/16/2011	USF-4U

ATTACHMENT D – CONSTRUCTION DRAWINGS

EVERSOURCE ENERGY

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

PROJECT SUMMARY

THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:

1. INSTALL (1) OMNI/WHIP ANTENNA AT ELEVATION 159'–1 1/2" AGL AND INSTALL (1) NEW DIPOLE ANTENNA AT ELEVATION 135'–9"± AGL INSTEAD OF (1) OMNI/WHIP ANTENNA AT ELEVATION 136'–1 1/2± AGL
2. REMOVE (2) EXISTING ANTENNAS AND THEIR ASSOCIATED COAX, (1) AT ELEVATION 127'–0"± AGL AND (1) AT ELEVATION 47'–0"± AGL AT A LATER DATE
3. INSTALL (1) NEW RACK WITH DMR EQUIPMENT IN EXISTING TELECOM ROOM

GOVERNING CODES

2018 CONNECTICUT STATE BUILDING CODE (2015 IBC BASIS)
2017 NATIONAL ELECTRIC CODE
TIA–222–H

GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

SITE INFORMATION

SITE NAME:	THOMPSON CSP
SITE ID NUMBER:	#848
SITE ADDRESS:	97 MOUNTAIN HILL ROAD THOMPSON, CT 06255
MAP:	42
BLOCK:	88
LOT:	165
ZONE:	RA80
LATITUDE:	41° 59' 11.76" N
LONGITUDE:	71° 54' 49.11" W
ELEVATION:	558'± AMSL
FEMA/FIRM DESIGNATION:	C
ACREAGE:	0.23± AC (BOOK: 0248, PAGE: 0073)

CONTACT INFORMATION

APPLICANTS:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037

PROPERTY OWNER:
CONNECTICUT STATE POLICE
165 CAPITOL AVE
HARTFORD, CT 06106

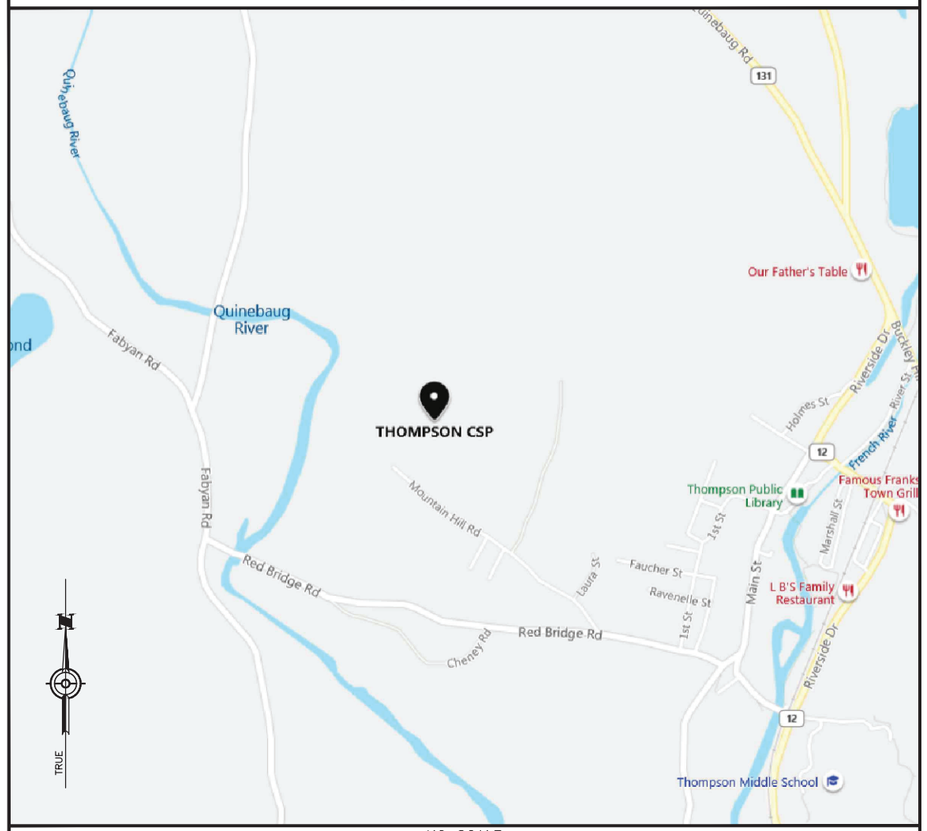
EVERSOURCE ENERGY
PROJECT MANAGER:
NIKOLL PRECI
(860) 655–3079

POWER PROVIDER:
EVERSOURCE ENERGY
(800) 286–2000

TELCO PROVIDER:
FRONTIER
(800) 921–8102

CALL BEFORE YOU DIG:
(800) 922–4455

LOCATION MAP



NO SCALE

DESIGN TYPE

SITE UPGRADE
SELF–SUPPORT TOWER

DRAWING INDEX

SHEET NO:	SHEET TITLE
T–1	TITLE SHEET
C–1	SITE PLAN
C–2	TOWER ELEVATION
G–1	GROUNDING DETAILS
N–1	NOTES & SPECIFICATIONS
N–2	NOTES & SPECIFICATIONS
N–3	NOTES & SPECIFICATIONS

DO NOT SCALE DRAWINGS

SUBCONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME

UNDERGROUND SERVICE ALERT
UTILITIES PROTECTION CENTER, INC.
811
48 HOURS BEFORE YOU DIG

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286–2000

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458–2522

PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	TH

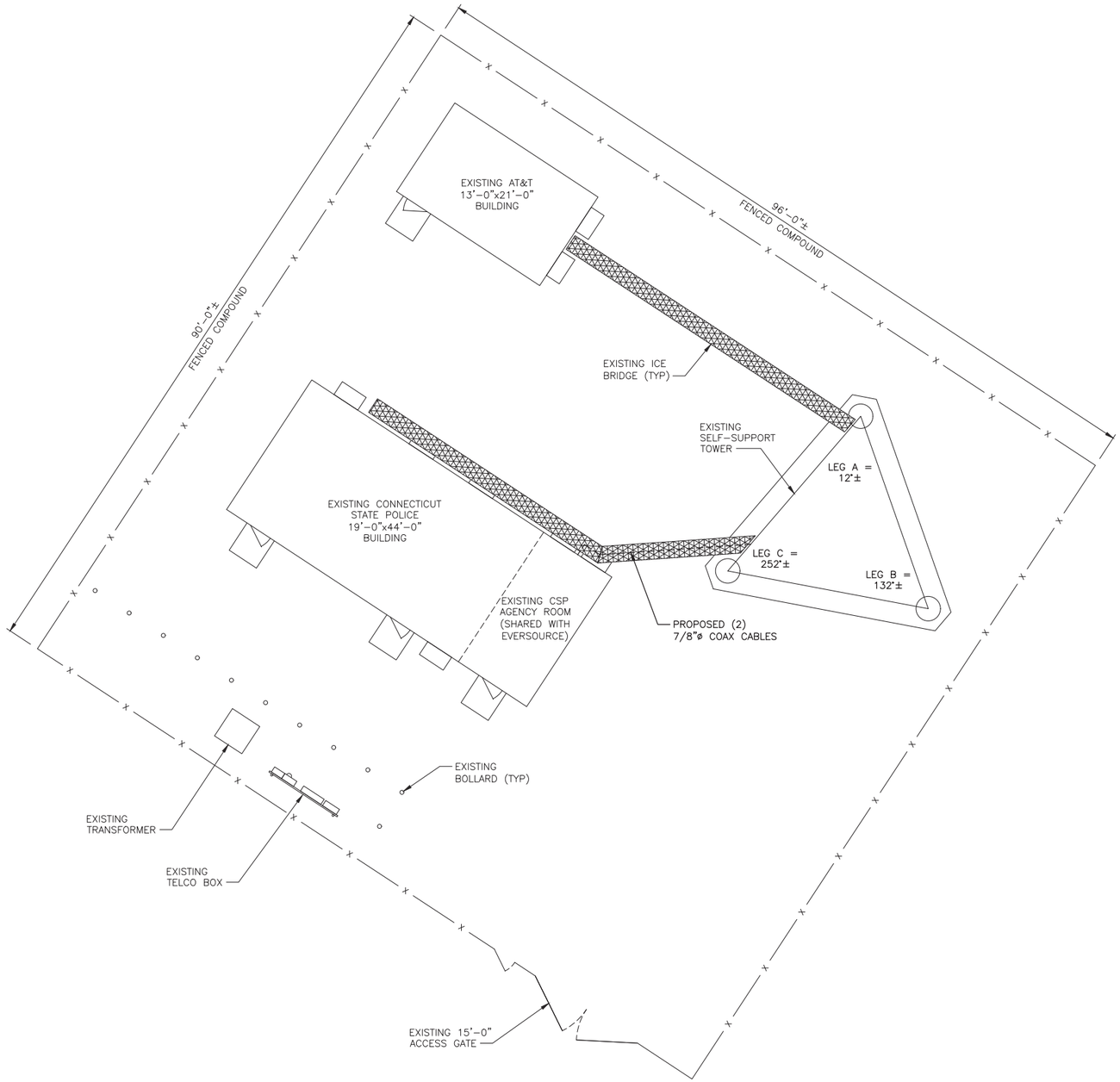
REV	DATE	DESCRIPTION
1	08/13/21	ISSUED FOR FILING
0	12/16/20	ISSUED FOR FILING

JOSHUA J. RILEY
STATE OF CONNECTICUT
33208
LICENSED PROFESSIONAL ENGINEER
08/17/2021

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1



SITE PLAN
NO SCALE

N

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
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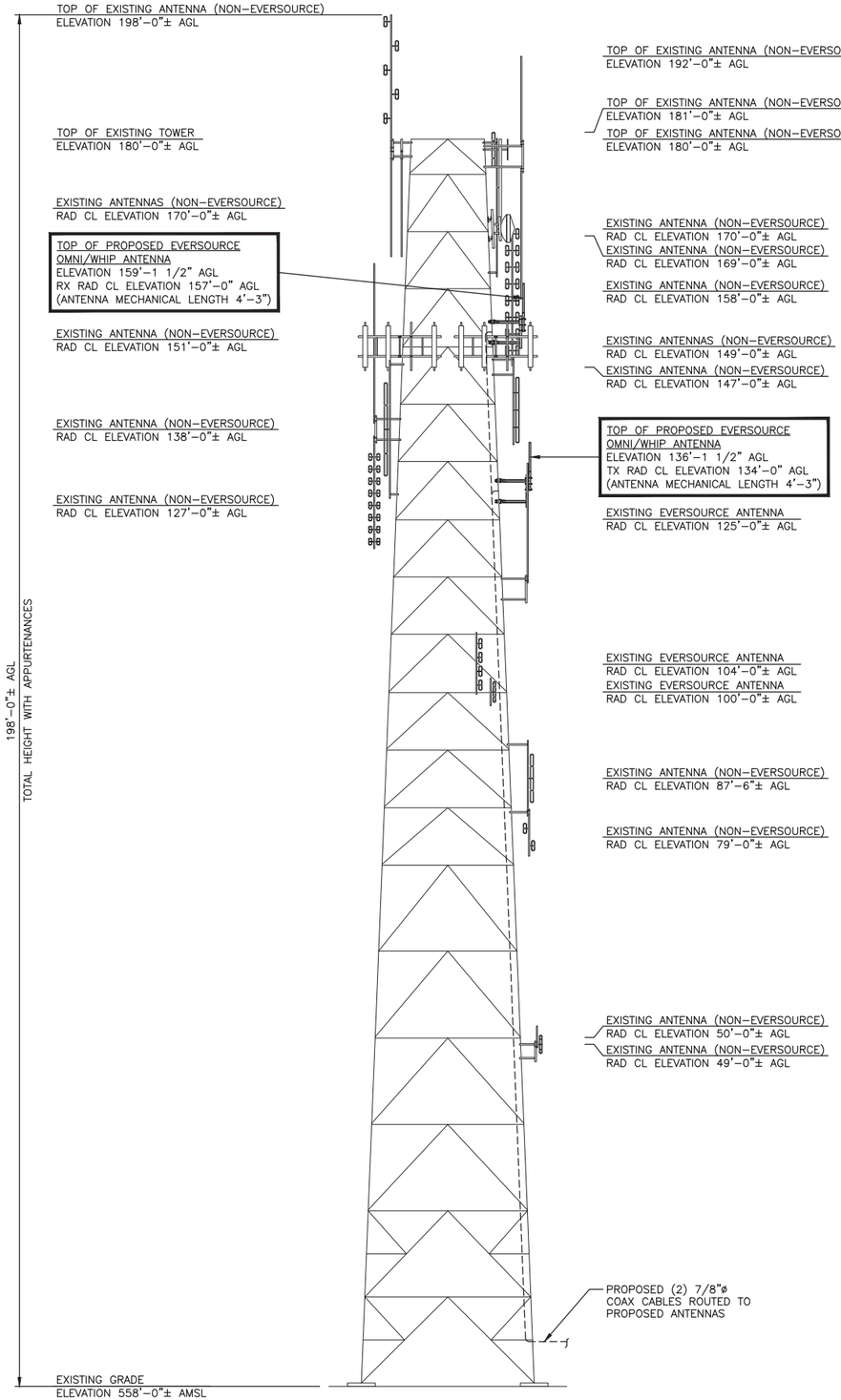
STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED
PROFESSIONAL ENGINEER
08/17/2021

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

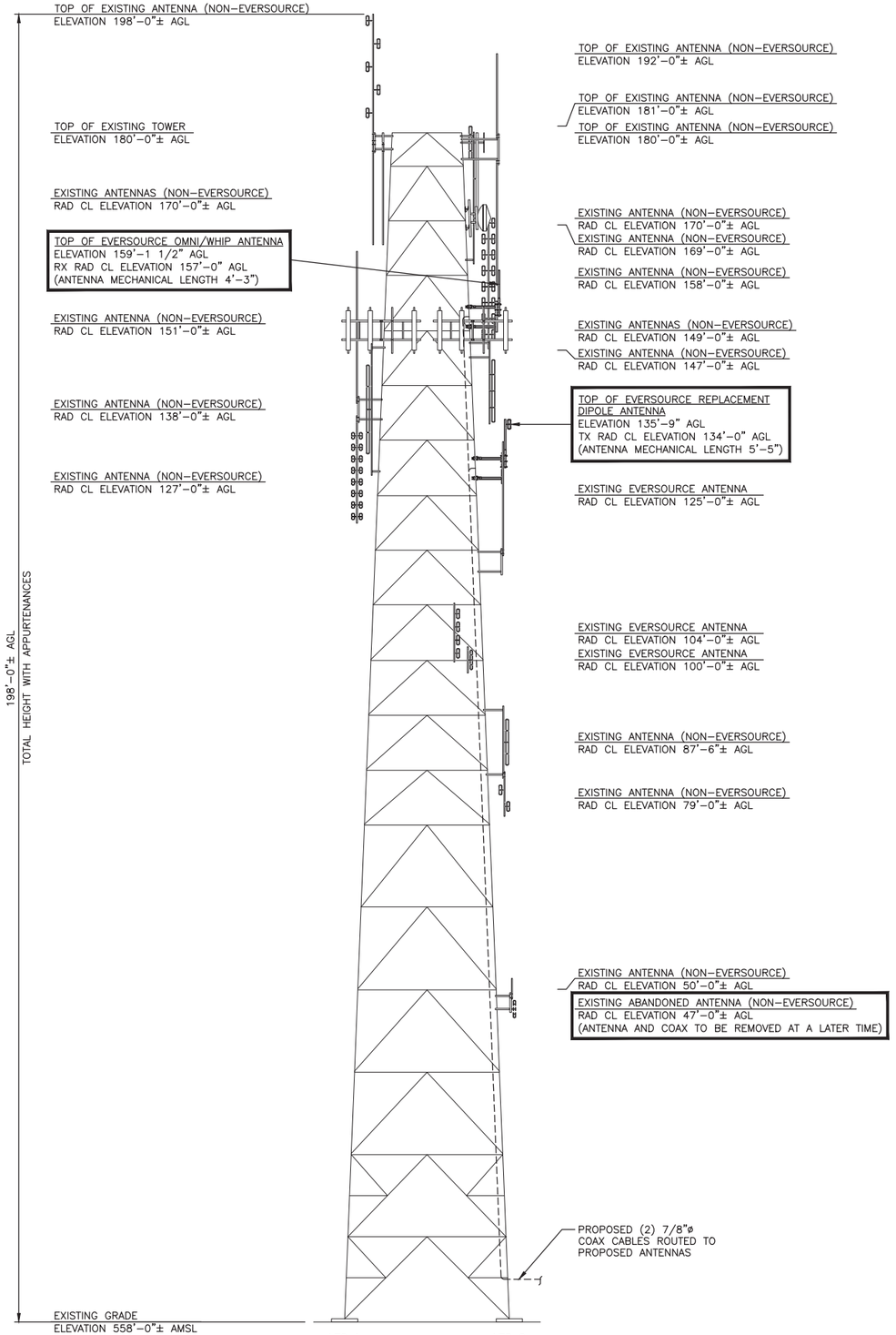
SHEET TITLE
SITE PLAN

SHEET NUMBER
C-1



CSC SUBMITTED INSTALLATION CONFIGURATION

NO SCALE



CURRENT INSTALLATION CONFIGURATION

NO SCALE

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-2522

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DRAWN BY:	TYW
CHECKED BY:	TH

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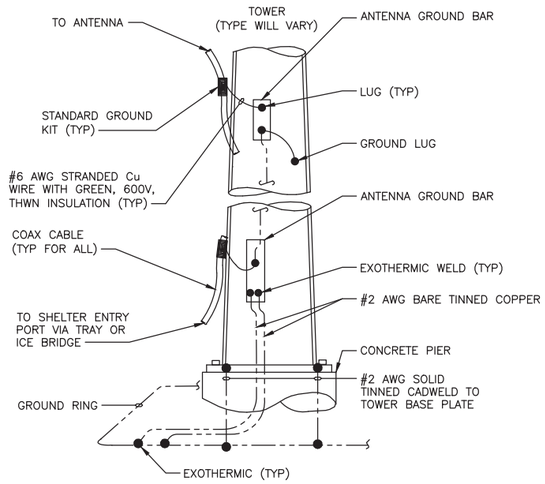
STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
08/17/2021

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

SHEET TITLE
TOWER ELEVATION & ANTENNA EQUIPMENT

SHEET NUMBER
C-2

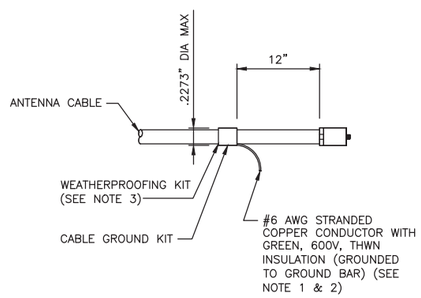


NOTE

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.

ANTENNA CABLE GROUNDING

NO SCALE

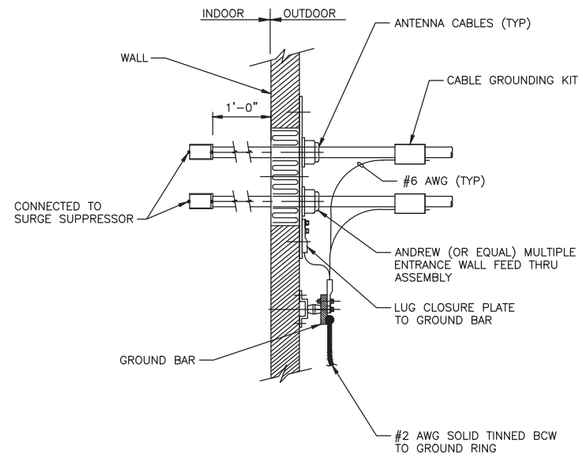


NOTES

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.

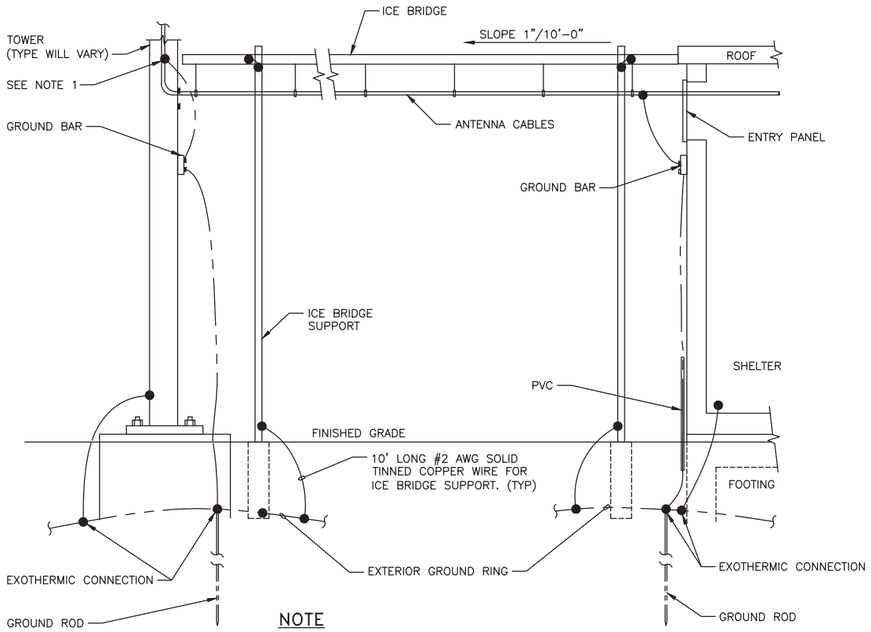
CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NO SCALE



CABLE INSTALLATION WITH WALL FEED THRU ASSEMBLY

NO SCALE



NOTE

1. PROVIDE GROUND KIT 6" BEFORE TURN

ICE BRIDGE AND ANTENNA CABLE DETAIL

NO SCALE

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-2522

PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	TH

REV	DATE	DESCRIPTION
1	08/13/21	ISSUED FOR FILING
0	12/16/20	ISSUED FOR FILING

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

SHEET TITLE

GROUNDING DETAILS

SHEET NUMBER

G-1

DESIGN BASIS

1. GOVERNING CODE: 2018 CONNECTICUT STATE BUILDING CODE (2015 IBC BASIS).

GENERAL CONDITIONS

1. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL BUILDING CODES, PERMIT CONDITIONS AND SAFETY CODES DURING CONSTRUCTION.

2. THE ENGINEER IS NOT: A GUARANTOR OF THE INSTALLING CONTRACTOR'S WORK; RESPONSIBLE FOR SAFETY IN, ON OR ABOUT THE WORK SITE; IN CONTROL OF THE SAFETY OR ADEQUACY OF ANY BUILDING COMPONENT, SCAFFOLDING OR SUPERINTENDING THE WORK.

3. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL PERMITS, INSPECTIONS, TESTING AND CERTIFICATES NEEDED FOR LEGAL OCCUPANCY OF THE FINISHED PROJECT.

4. THE CONTRACTOR IS RESPONSIBLE TO REVIEW THIS COMPLETE PLAN SET AND VERIFY THE EXISTING CONDITIONS SHOWN IN THESE PLANS AS THEY RELATE TO THE WORK PRIOR TO SUBMITTING PRICE. SIGNIFICANT DEVIATIONS FROM WHAT IS SHOWN AFFECTING THE WORK SHALL BE REPORTED IMMEDIATELY TO THE CONSTRUCTION MANAGER.

5. DETAILS INCLUDED IN THIS PLAN SET ARE TYPICAL AND APPLY TO SIMILAR CONDITIONS.

6. EXISTING ELECTRICAL AND MECHANICAL FIXTURES, PIPING, WIRING, AND EQUIPMENT OBSTRUCTING THE WORK SHALL BE REMOVED AND/OR RELOCATED AS DIRECTED BY THE CONSTRUCTION MANAGER. TEMPORARY SERVICE INTERRUPTIONS MUST BE COORDINATED WITH OWNER.

7. THE CONTRACTOR SHALL DILIGENTLY PROTECT THE EXISTING BUILDING/SITE CONDITIONS AND THOSE OF ANY ADJOINING BUILDING/SITES AND RESTORE ANY DAMAGE CAUSED BY HIS ACTIVITIES TO THE PRE-CONSTRUCTION CONDITION.

8. THE CONTRACTOR SHALL SAFEGUARD AGAINST: CREATING A FIRE HAZARD, AFFECTING TENANT EGRESS OR COMPROMISING BUILDING SITE SECURITY MEASURES.

9. THE CONTRACTOR SHALL REMOVE ALL DEBRIS AND CONSTRUCTION WASTE FROM THE SITE EACH DAY. WORK AREAS SHALL BE SWEPT AND MADE CLEAN AT THE END OF EACH WORK DAY.

10. THE CONTRACTOR'S HOURS OF WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND ORDINANCES AND BE APPROVED BY OWNER.

11. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CONSTRUCTION MANAGER IF ASBESTOS IS ENCOUNTERED DURING THE EXECUTION OF HIS WORK. THE CONTRACTOR SHALL CEASE ALL ACTIVITIES WHERE THE ASBESTOS MATERIAL IS FOUND UNTIL NOTIFIED BY THE CONSTRUCTION MANAGER TO RESUME OPERATIONS.

THERMAL & MOISTURE PROTECTION

1. FIRE-STOP ALL PENETRATIONS FOR ELECTRICAL CONDUITS OR WAVEGUIDE CABLING THROUGH BUILDING WALLS, FLOORS, AND CEILINGS SHALL BE FIRESTOPPED WITH ACCEPTED MATERIALS TO MAINTAIN THE FIRE RATING OF THE EXISTING ASSEMBLY. ALL FILL MATERIAL SHALL BE SHAPED, FITTED, AND PERMANENTLY SECURED IN PLACE. FIRESTOPPING SHALL BE INSTALLED IN ACCORDANCE WITH ASTM E814.

2. HILTI CP620 FIRE FOAM OR 3M FIRE BARRIER FILL, VOID OR CAVITY MATERIAL OR ACCEPTED EQUAL SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND ASSOCIATED UNDERWRITERS LABORATORIES (UL) SYSTEM NUMBER.

3. FIRESTOPPING SHALL BE APPLIED AS SOON AS PRACTICABLE AFTER PENETRATIONS ARE MADE AND EQUIPMENT INSTALLED.

4. FIRESTOPPED PENETRATIONS SHALL BE LEFT EXPOSED AND MADE AVAILABLE FOR INSPECTION BEFORE CONCEALING SUCH PENETRATIONS. FIRESTOPPING MATERIAL CERTIFICATES SHALL BE MADE AVAILABLE AT THE TIME OF INSPECTION.

5. ANY BUILDING ROOF PENETRATION AND/OR RESTORATION SHALL BE PERFORMED SO THAT THE ROOF WARRANTY IN PLACE IS NOT COMPROMISED. CONTRACTOR SHALL ARRANGE FOR OWNER'S ROOFING CONTRACTOR TO PERFORM ANY AND ALL ROOFING WORK IF SO REQUIRED BY EXISTING ROOF WARRANTY. OTHERWISE, ROOF SHALL BE MADE WATERTIGHT WITH LIKE CONSTRUCTION AS SOON AS PRACTICABLE AND AT COMPLETION OF CONSTRUCTION.

6. ALL PENETRATIONS INTO AND/OR THROUGH BUILDING EXTERIOR WALLS SHALL BE SEALED WITH SILICONE SEALER.

7. WHERE CONDUIT AND CABLES PENETRATES FIRE RATED WALLS AND FLOORS, FIRE GROUT ALL PENETRATIONS IN ORDER TO MAINTAIN THE FIRE RATING USING A LISTED FIRE SEALING DEVICE OR GROUT.

8. CONTRACTOR TO REMOVE AND RE-INSTALL ALL FIRE PROOFING AS REQUIRED DURING CONSTRUCTION.

SUBMITTALS

1. CONTRACTOR TO SUBMIT SHOP DRAWINGS TO ENGINEER FOR REVIEW PRIOR TO FABRICATION.

2. CONTRACTOR TO NOTIFY ENGINEER FOR INSPECTION PRIOR TO CLOSING PENETRATIONS.

3. CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. THE ENGINEER SHALL BE NOTIFIED OF ANY CONDITIONS WHICH PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

4. ALL STEEL MATERIAL EXPOSED TO WEATHER SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 " ZINC (HOT-DIPPED GALVANIZED) COATINGS" ON IRON AND STEEL PRODUCTS.

5. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS FOR REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.

STEEL

1. MATERIAL:

WIDE FLANGE:	ASTM A572, GR 50
TUBING:	ASTM A500, GR C
PIPE:	ASTM A53, GR B AND ASTM 572, GR 50
ANGLE:	ASTM A570, GR 50 AND ASTM A36
BOLTS:	ASTM A325
GRATING:	TYPE GW-2 (1"x3/16" BARS)
MISC. MATERIAL:	ASTM A36

ALL STEEL SHAPES SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123 WITH A COATING WEIGHT OF 2 OZ/SF.

2. DAMAGED GALVANIZED SURFACES SHALL BE CLEANED WITH A WIRE BRUSH AND PAINTED WITH TWO COATS OF COLD ZINC, "GALVANOX", "DRY GALV", "ZINC IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES. TOUCH UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT IN SHOP OR FIELD.

3. DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC "MANUAL OF STEEL CONSTRUCTION" 13TH EDITION.

4. THE STEEL STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER COMPLETION. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO INSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION.

5. ALL STEEL ELEMENTS SHALL BE INSTALLED PLUMB AND LEVEL.

6. TOWER MANUFACTURER'S DESIGNS SHALL PREVAIL FOR TOWER.

SITE GENERAL

1. CONTRACTOR SHALL FOLLOW CONDITIONS OF ALL APPLICABLE PERMITS AND WORK IN ACCORDANCE WITH OSHA REGULATIONS.

2. THESE PLANS DEPICT KNOWN UNDERGROUND STRUCTURES, CONDUITS, AND/OR PIPELINES. THE LOCATIONS FOR THESE ELEMENTS ARE BASED UPON THE VARIOUS RECORD DRAWINGS AVAILABLE. THE CONTRACTOR IS HEREBY ADVISED THAT THESE DRAWINGS MAY NOT ACCURATELY DEPICT AS-BUILT LOCATIONS AND OTHER UNKNOWN STRUCTURES. THE CONTRACTOR SHALL THEREFORE DETERMINE THE EXACT LOCATION OF EXISTING UNDERGROUND ELEMENTS AND EXCAVATE WITH CARE AFTER CALLING MARKOUT SERVICE AT 1-800-272-4480 48 HOURS BEFORE DIGGING, DRILLING OR BLASTING.

3. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, FIBER OPTIC, AND OTHER UTILITIES WHERE ENCOUNTERED, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION, SHALL BE RELOCATED AS DIRECTED BY ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. CONTRACTOR SHALL HAND DIG UTILITIES AS NEEDED. CONTRACTOR SHALL PROVIDE, BUT IS NOT LIMITED TO, APPROPRIATE A) FALL PROTECTION, B) CONFINED SPACE ENTRY, C) ELECTRICAL SAFETY, AND D) TRENCHING AND EXCAVATION.

4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.

5. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, FIBER OPTIC, OR OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT THE POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF THE CONSTRUCTION MANAGER.

6. CONTRACTOR IS RESPONSIBLE FOR REPAIRING OR REPLACING STRUCTURES OR UTILITIES DAMAGED DURING CONSTRUCTION.

7. CONTRACTOR SHALL PROTECT EXISTING PAVED AND GRAVEL SURFACES, CURBS, LANDSCAPE AND STRUCTURES AND RESTORE SITE OR PRE-CONSTRUCTION CONDITION WITH AS GOOD, OR BETTER, MATERIALS. NEW MATERIALS SHALL MATCH EXISTING THICKNESS AND TYPE.

8. THE CONTRACTOR SHALL SHORE ALL TRENCH EXCAVATIONS GREATER THAN 5 FEET IN DEPTH OR LESS WHERE SOIL CONDITIONS ARE DEEMED UNSTABLE. ALL SHEETING AND/OR SHORING METHODS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER.

9. THE CONTRACTOR IS RESPONSIBLE FOR MANAGING GROUNDWATER LEVELS IN THE VICINITY OF EXCAVATIONS TO PROTECT ADJACENT PROPERTIES AND NEW WORK. GROUNDWATER SHALL BE DRAINED IN ACCORDANCE WITH LOCAL SEDIMENTATION AND EROSION CONTROL GUIDELINES.

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ELECTRICAL

1. CONTRACTOR SHALL VERIFY EXISTING ELECTRIC SERVICE TYPE AND CAPACITY AND ORDER NEW ELECTRIC SERVICE FROM LOCAL ELECTRIC UTILITY, WHERE APPLICABLE.

2. ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH ALL APPLICABLE CODES, AND SHALL BE ACCEPTABLE TO ALL AUTHORITIES HAVING JURISDICTION. WHERE A CONFLICT EXISTS BETWEEN CODES, PLAN AND SPECIFICATIONS, OR AUTHORITIES HAVING JURISDICTION, THE MORE STRINGENT AUTHORITIES SHALL APPLY.

3. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC, FOR A COMPLETE AND PROPERLY OPERATIVE SYSTEM ENERGIZED THROUGHOUT AND AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN AND/OR OTHERWISE REQUIRED.

4. ALL ELECTRICAL CONDUCTORS SHALL BE 100% COPPER AND SHALL HAVE TYPE THHN INSULATION UNLESS INDICATED OTHERWISE.

5. CONDUIT SHALL BE THREADED RIGID GALVANIZED STEEL OR EMT WITH ONLY COMPRESSION TYPE COUPLINGS AND CONNECTORS, ALL MADE UP WRENCH TIGHT.

6. ALL BURIED CONDUIT SHALL BE MINIMUM SCH 40 PVC UNLESS NOTED OTHERWISE, OR AS PER LOCAL CODE REQUIREMENTS.

7. PROVIDE FLEXIBLE STEEL CONDUIT OR LIQUID TIGHT FLEXIBLE STEEL CONDUIT TO ALL VIBRATING EQUIPMENT, INCLUDING HVAC UNITS, TRANSFORMERS, MOTORS, ETC, OR WHERE EQUIPMENT IS PLACED UPON A SLAB ON GRADE.

8. ALL BRANCH CIRCUITS AND FEEDERS SHALL HAVE A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR BONDED TO ALL ENCLOSURES, PULLBOXES, ETC.

9. CONDUIT AND CABLE WITHIN CORRIDORS SHALL BE CONCEALED AND EXPOSED ELSEWHERE, UNLESS NOTED OTHERWISE.

10. ELECTRICAL MATERIALS INSTALLED ON ROOFTOP SHALL BE LISTED FOR NEMA 3R USE. –AND ALL WIRING WITHIN A VENTILATION DUCT SHALL BE LISTED FOR SUCH USE. IN GENERAL WIRING METHODS WITHIN A DUCT SHALL BE AN MC CABLE WITH SMOOTH OR CORRUGATED METAL JACKET AND HAVE NO OUTER COVERING OVER THE METAL JACKET. INTERLOCKED ARMOR TYPE OF MC CABLE IS NOT ACCEPTABLE FOR THIS APPLICATION. CONTRACTOR CAN ALSO USE TYPE MI CABLE IN THE VENTILATION DUCT PROVIDED IT DOES NOT HAVE ANY OUTER COVERINGS OVER THE METAL EXTERIOR.

11. WIRING DEVICES SHALL BE SPECIFICATION GRADE, AND WIRING DEVICE COVER PLATES SHALL BE PLASTIC WITH ENGRAVING AS SPECIFIED.

GROUNDING

1. #6 THWN SHALL BE STRANDED #6 COPPER WITH GREEN THWN INSULATION SUITABLE FOR WET INSTALLATIONS.

2. #2 THWN SHALL BE STRANDED #2 COPPER WITH THWN INSULATION SUITABLE FOR WET INSTALLATIONS.

3. #2 BARE TINNED SHALL BE SOLID COPPER TINNED. ALL BURIED WIRE SHALL MEET THIS CRITERIA.

4. ALL LUGS SHALL BE 2–HOLE, LONG BARREL, TINNED SOLID COPPER UNLESS OTHERWISE SPECIFIED, LUGS SHALL BE THOMAS AND BETTS SERIES 548##BE OR EQUIVALENT (IE #2 THWN – 54856BE, #2 SOLID – 54856BE, AND #6 THWN – 54852BE).

5. ALL HARDWARE, BOLTS, NUTS, AND WASHERS SHALL BE 18–8 STAINLESS STEEL. EVERY CONNECTION SHALL BE BOLT–FLAT WASHER–BUSS–LUG–FLAT WASHER–BELLEVILLE WASHER–NUT IN THAT EXACT ORDER. BACK–TO–BACK LUGGING, BOLT–FLAT WASHER–LUG–BUSS–LUG–FLAT WASHER–BELLEVILLE WASHER–NUT, IN THAT EXACT ORDER, IS ACCEPTED WHERE NECESSARY TO CONNECT MANY LUGS TO A BUSS BAR. STACKING OF LUGS, BUSS–LUG–LUG, IS NOT ACCEPTABLE.

6. WHERE CONNECTIONS ARE MADE TO STEEL OR DISSIMILAR METALS, A THOMAS AND BETTS DRAGON TOOTH WASHER MODEL DTWXXX SHALL BE USED BETWEEN THE LUG AND THE STEEL, BOLT–FLAT WASHER–STEEL–DRAGON TOOTH WASHER–LUG–FLAT WASHER–BELEVILE WASHER–NUT.

7. ALL CONNECTIONS, INTERIOR AND EXTERIOR, SHALL BE MADE WITH THOMAS AND BETTS KPOR–SHIELD. COAT ALL WIRES BEFORE LUGGING AND COAT ALL SURFACES BEFORE CONNECTING.

8. THE MINIMUM BEND RADIUS SHALL BE 8 INCHES FOR #6 WIRE AND SMALLER AND 12 INCHES FOR WIRE LARGER THAN #6.

9. ALL CONNECTIONS TO THE GROUND RING SHALL BE EXOTHERMIC WELD.

10. BOND THE FENCE TO THE GROUND RING AT EACH CORNER, AND AT EACH GATE POST WITH #2 SOLID TINNED WIRE. EXOTHERMIC WELD BOTH ENDS.

11. GROUND KITS SHALL BE SOLID COPPER STRAP WITH #6 WIRE 2–HOLE COMPRESSION CRIMPED LUGS AND SHALL BE SEALED ACCORDING TO MANUFACTURER INSTRUCTIONS.

12. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL BE USED.

13. GROUND BARS SHALL BE FURNISHED AND INSTALLED WITH PRE–DRILLED HOLE DIAMETERS AND SPACINGS. GROUND BARS SHALL NEITHER BE FIELD FABRICATED NOR NEW HOLES DRILLED. GROUND LUGS SHALL MATCH THE SPACING ON THE BAR. HARDWARE DIAMETER SHALL BE MINIMUM 3.8 INCH.

14. MGB GROUND CONNECTION SHALL BE EXOTHERMIC WELDED TO THE GROUND SYSTEM.

15. ALL CABLE TRAY AND/OR PLATFORM STEEL SHALL BE BONDED TOGETHER WITH JUMPERS (#6 IN EQUIPMENT ROOM, #2 ELSEWHERE AND HOMERUN).

ANTENNA & CABLE NOTES

1. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TRANSMISSION CABLES, JUMPERS, CONNECTORS, GROUNDING STRAPS, ANTENNAS, MOUNTS AND HARDWARE. ALL MATERIALS SHALL BE INSPECTED BY THE CONTRACTOR FOR DAMAGE UPON DELIVERY. JUMPERS SHALL BE SUPPLIED AT ANTENNAS AND EQUIPMENT INSIDE SHELTER COORDINATE LENGTH OF JUMP CABLES WITH EVERSOURCE. COORDINATE AND VERIFY ALL OF THE MATERIALS TO BE PROVIDED WITH EVERSOURCE PRIOR TO SUBMITTING BID AND ORDERING MATERIALS.

2. AFTER INSTALLATION, THE TRANSMISSION LINE SYSTEM SHALL BE PIM/SWEEP TESTED FOR PROPER INSTALLATION AND DAMAGE WITH ANTENNAS CONNECTED. CONTRACTOR TO OBTAIN LATEST TESTING PROCEDURES FROM EVERSOURCE PRIOR TO BIDDING.

3. ANTENNA CABLES SHALL BE COLOR CODED AT THE FOLLOWING LOCATIONS:
   - AT THE ANTENNAS.
   - AT THE WAVEGUIDE ENTRY PLATE ON BOTH SIDES OF THE EQUIPMENT SHELTER WALL.
   - JUMPER CABLES AT THE EQUIPMENT ENTER.

4. SYSTEM INSTALLATION:
   THE CONTRACTOR SHALL INSTALL ALL CABLES AND ANTENNAS TO THE MANUFACTURER'S SPECIFICATIONS. THE CONTRACTOR IS RESPONSIBLE FOR THE PROCUREMENT AND INSTALLATION OF THE FOLLOWING:
   - ALL CONNECTORS, ASSOCIATED CABLE MOUNTING, AND GROUNDING HARDWARE.
   - WALL MOUNTS, STANDOFFS, AND ASSOCIATED HARDWARE.
   - 1/2 INCH HELIAX ANTENNA JUMPERS OF APPROPRIATE LENGTHS.

5. MINIMUM BENDING RADIUS FOR COAXIAL CABLES:
   - 7/8 INCH, RMIN = 15 INCHES
   - 1 5/8 INCH, RMIN = 25 INCHES

6. CABLE SHALL BE INSTALLED WITH A MINIMUM NUMBER OF BENDS WHERE POSSIBLE. CABLE SHALL NOT BE LEFT UNTERMINATED AND SHALL BE SEALED IMMEDIATELY AFTER BEING INSTALLED.

7. ALL CABLE CONNECTIONS OUTSIDE SHALL BE COVERED WITH WATERPROOF SPLICING KIT.

8. CONTRACTOR SHALL VERIFY EXACT LENGTH AND DIRECTION OF TRAVEL IN FIELD PRIOR TO CONSTRUCTION.

9. CABLE SHALL BE FURNISHED WITHOUT SPLICES AND WITH CONNECTORS AT EACH END.

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STATE OF CONNECTICUT · MARK P. STILES · 34358 · LICENSED PROFESSIONAL ENGINEER
08/17/21

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97 MOUNTAIN HILL ROAD
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SHEET TITLE
NOTES
& SPECIFICATIONS

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SYMBOLS

●	EXOTHERMIC CONNECTION
■	COMPRESSION CONNECTION
	5/8"ø x 10'-0" COPPER CLAD STEEL GROUND ROD.
	TEST GROUND ROD WITH INSPECTION SLEEVE
	GROUNDING CONDUCTOR
(A)	KEY NOTES
CHAINLINK FENCE	X X X X X
WOOD FENCE	
LEASE AREA	
ICE BRIDGE	
CABLE TRAY	
GAS LINE	G G G G G
UNDERGROUND ELECTRICAL/TELCO	E/T E/T E/T E/T
UNDERGROUND ELECTRICAL/CONTROL	E/C E/C E/C E/C
UNDERGROUND ELECTRICAL	E E E E E
UNDERGROUND TELCO	T T T T T
PROPERTY LINE (PL)	

ABBREVIATIONS

AC	ALTERNATING CURRENT
AIC	AMPERAGE INTERRUPTION CAPACITY
ANI	AUXILIARY NETWORK INTERFACE
ATM	ASYNCHRONOUS TRANSFER MODE
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
AWS	ADVANCED WIRELESS SERVICES
BATT	BATTERY
BBU	BASEBAND UNIT
BTC	BARE TINNED COPPER CONDUCTOR
BTS	BASE TRANSCEIVER STATION
CCU	CLIMATE CONTROL UNIT
CDMA	CODE DIVISION MULTIPLE ACCESS
CHG	CHARGING
CLU	CLIMATE UNIT
COMM	COMMON
DC	DIRECT CURRENT
DIA	DIAMETER
DWG	DRAWING
EC	ELECTRICAL CONDUCTOR
EMT	ELECTRICAL METALLIC TUBING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
HVAC	HEAT/VENTILATION/AIR CONDITIONING
ICF	INTERCONNECTION FRAME
IGR	INTERIOR GROUNDING RING (HALO)
LTE	LONG TERM EVOLUTION
MGB	MASTER GROUNDING BAR
MIN	MINIMUM
MW	MICROWAVE
MTS	MANUAL TRANSFER SWITCH
NEC	NATIONAL ELECTRICAL CODE
OC	ON CENTER
PP	POLARIZING PRESERVING
PCU	PRIMARY CONTROL UNIT
PDU	PROTOCOL DATA UNIT
PWR	POWER
RECT	RECTIFIER
RET	REMOTE ELECTRICAL TILT
RMC	RIGID METALLIC CONDUIT
RF	RADIO FREQUENCY
RUC	RACK USER COMMISSIONING
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
RWY	RACEWAY
SFP	SMALL FORM-FACTOR PLUGGABLE
SIAD	SMART INTEGRATED ACCESS DEVICE
SSC	SITE SOLUTIONS CABINET
T1	1544KBPS DIGITAL LINE
TDMA	TIME-DIVISION MULTIPLE ACCESS
TMA	TOWER MOUNT AMPLIFIER
TVSS	TRANSIENT VOLTAGE SUPPRESSION SYSTEM
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATION SYSTEM
UPS	UNINTERRUPTIBLE POWER SUPPLY (DC POWER PLANT)

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33208
LICENSED PROFESSIONAL ENGINEER
STATE OF CONNECTICUT
08/17/2021

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& SPECIFICATIONS

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N-3

TELEWAVE, INC.®

195 - 260 MHz

RECIEVE (RX) ANTENNA, UNCHANGED

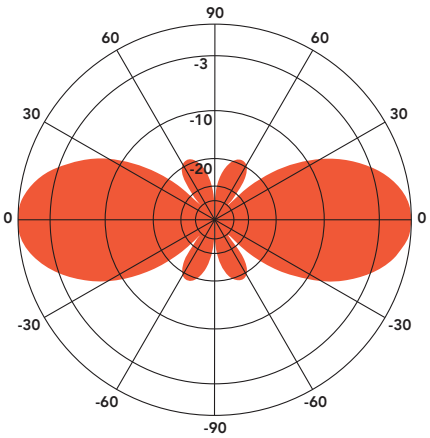
ANT220F2DIN

FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

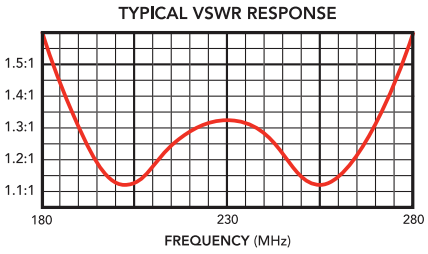
The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential for lightning impulse protection. The ANT220F2 is an excellent choice for wireless PTC systems in urban or rural areas.

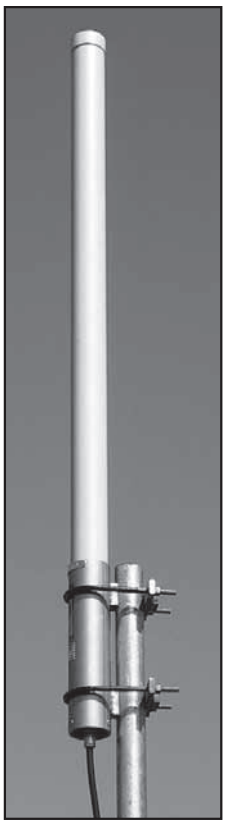
All junctions are fully soldered to prevent RF intermodulation, and each antenna is completely protected within a rugged, high-tech radome to ensure survivability in the worst environments. The "Cool Blue" radome provides maximum protection from corrosive gases, ultraviolet radiation, icing, salt spray, acid rain, and wind blown abrasives.

The ANT220F2 includes the ANTC485 dual clamp set for mounting to a 1.5" to 3" O.D. support pipe, and a 24" removable RG-213 DIN-Male jumper.



ANT220F2 - 230 MHz
Vertical Plane
Gain = 2.58 dBd





SPECIFICATIONS			
Frequency (continuous)	195-260 MHz	**Dimensions (L x base diam.) in.**	51 x 2.75
Gain	2.5 dBd	**Tower weight (antenna + clamps)**	11 lb.
Power rating (typ.)	500 watts	**Shipping weight**	14 lb.
Impedance	50 ohms	**Wind rating / with 0.5" ice**	200 / 150 MPH
VSWR	1.5:1 or less	**Maximum exposed area**	1.1 ft.²
Pattern	Omnidirectional	**Lateral thrust at 100 MPH**	44 lb.
Vertical beamwidth	38°	**Bending moment at top clamp**	47 ft. lb.
Termination	7-16 DIN-F	**(100 MPH, 40 PSF flat plate equiv.)**	

870 Series 220MHz Exposed Dipoles

The 870 Series 220MHz Exposed Dipoles are available in 1, 2, 4, 8 dipole configurations. All our antennas can be completely customized to your particular applications. Our antennas can be black anodized, adjustable, or fixed, side mount or top mount, and heavy-duty versions are available.

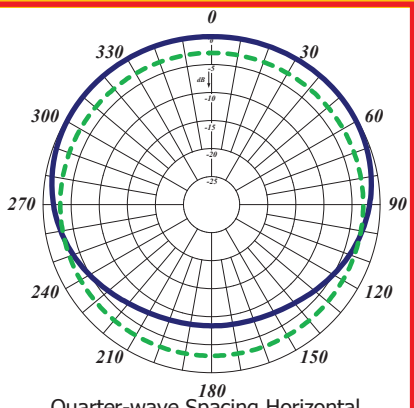
- Each antenna is offered in a 1/4, 3/8 or 1/2 wave spacing versions.
- The 87XA-70 has external cabling and a field-adjustable pattern.
- The 87XF-70 has internal cabling and fixed dipole-mast spacing.
- Heavy-duty versions are available. Please contact our Technical Support team for consultation.

Electrical Specifications	871F-70-2	872F-70-2	874F-70-2
Frequency Range, MHz	215-225	215-225	215-225
Nominal Gain, dBd	2.0-2.5	5.0-5.5	8.0-8.5
Number of Dipoles	1	2	4
Bandwidth 1.5:1 VSWR, MHz	10	10	10
Polarization	Vertical	Vertical	Vertical
Pattern	Offset / bi	Offset / bi	Offset / bi
Power Rating, Watts	200	300	500
Nominal Impedance, Ohms	50	50	50
Lightning Protection	DC Ground	DC Ground	DC Ground
Standard Termination	Type DIN Male	Type N Male	Type N Male
Mechanical Specifications	**871F-70-2**	**872F-70-2**	**874F-70-2**
Length, in (mm)	66 (1676)	112 (2845)	200 (5080)
Width (1/2 Wave Spacing), in (mm)	31 (787)	31 (787)	32 (813)
Weight, lbs. (kg)	12.5 (5.7)	21 (9.5)	51 (23)
Rated Wind Velocity, No Ice, mph (km/h)	165 (266)	150 (241)	145 (233)
Rated Wind Velocity, 0.5" (13mm) ice, mph (km/h)	140 (225)	130 (209)	105 (177)
Lateral Thrust @ 100 mph, wind, lbs. (kg)	40 (18)	66 (30)	143 (65)
Bending Moment @ top clamp: 100 mph, ft.*lb (kg*m)	58 (8)	150 (21)	610 (84)
Projected Area, ft^2 (m^2)	1.5 (0.14)	2.6 (0.24)	5.5 (0.51)
Mounting Information Mast O.D. (mm)	1.9" (48)	1.9" (48)	2.4" (60)
* See next page for ordering information (page 3) *			

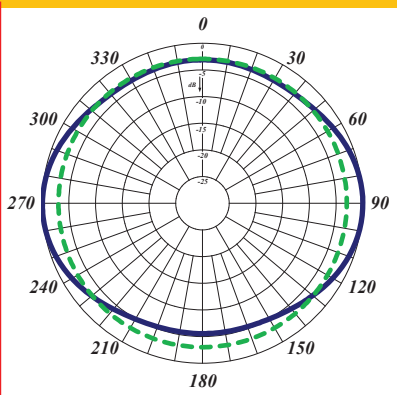
871F-70-2

220MHz EXPOSED DIPOLES — 215-225 MHz

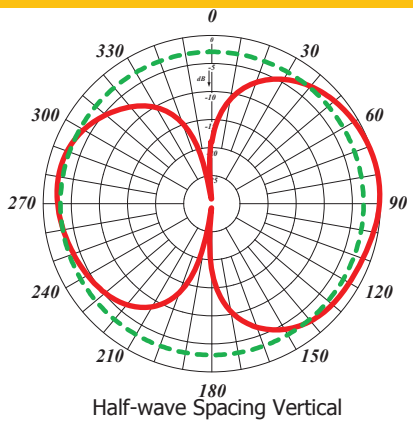
871F-70-2



Quarter-wave Spacing Horizontal

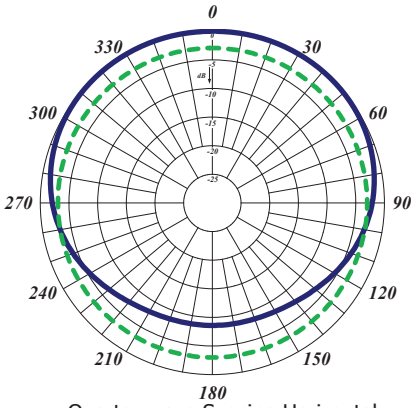


Half-wave Spacing Horizontal



Half-wave Spacing Vertical

872F-70-2



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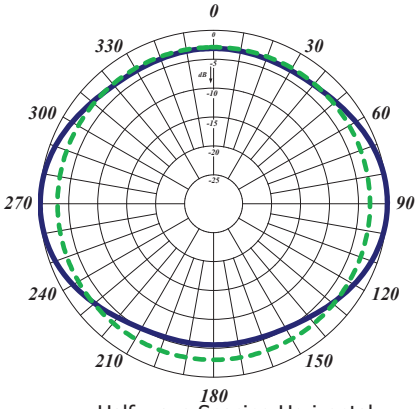
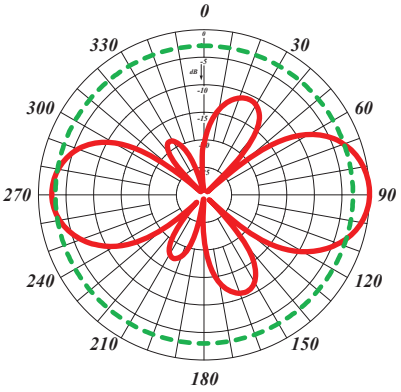
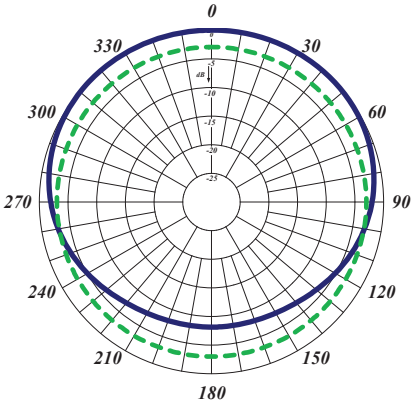


Half-wave Spacing Horizontal



Half-wave Spacing Vertical

874F-70-2



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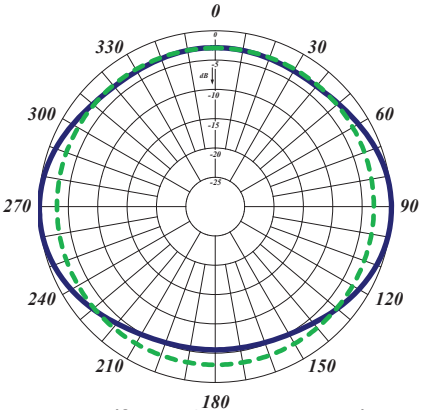
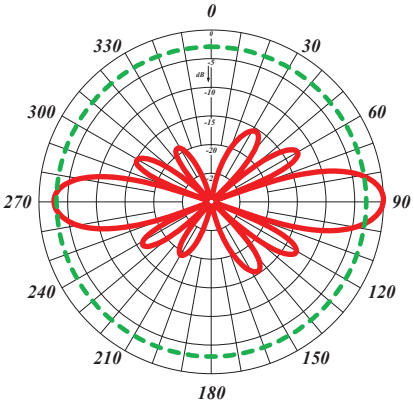


Half-wave Spacing Horizontal



Half-wave Spacing Vertical

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TELEWAVE, INC.®

195 - 260 MHz

ORIGINAL TRANSMIT (TX) ANTENNA, REMOVED AND REPLACED

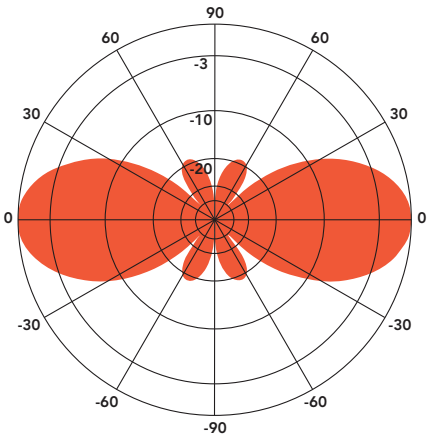
ANT220F2DIN

FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

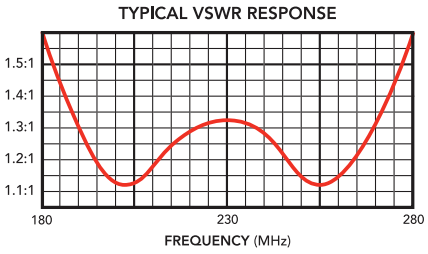
The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential for lightning impulse protection. The ANT220F2 is an excellent choice for wireless PTC systems in urban or rural areas.

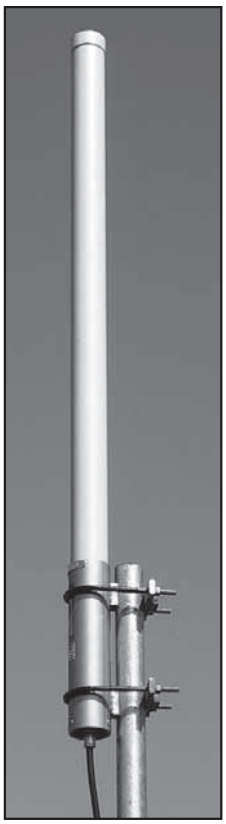
All junctions are fully soldered to prevent RF intermodulation, and each antenna is completely protected within a rugged, high-tech radome to ensure survivability in the worst environments. The "Cool Blue" radome provides maximum protection from corrosive gases, ultraviolet radiation, icing, salt spray, acid rain, and wind blown abrasives.

The ANT220F2 includes the ANTC485 dual clamp set for mounting to a 1.5" to 3" O.D. support pipe, and a 24" removable RG-213 DIN-Male jumper.



ANT220F2 - 230 MHz
Vertical Plane
Gain = 2.58 dBd

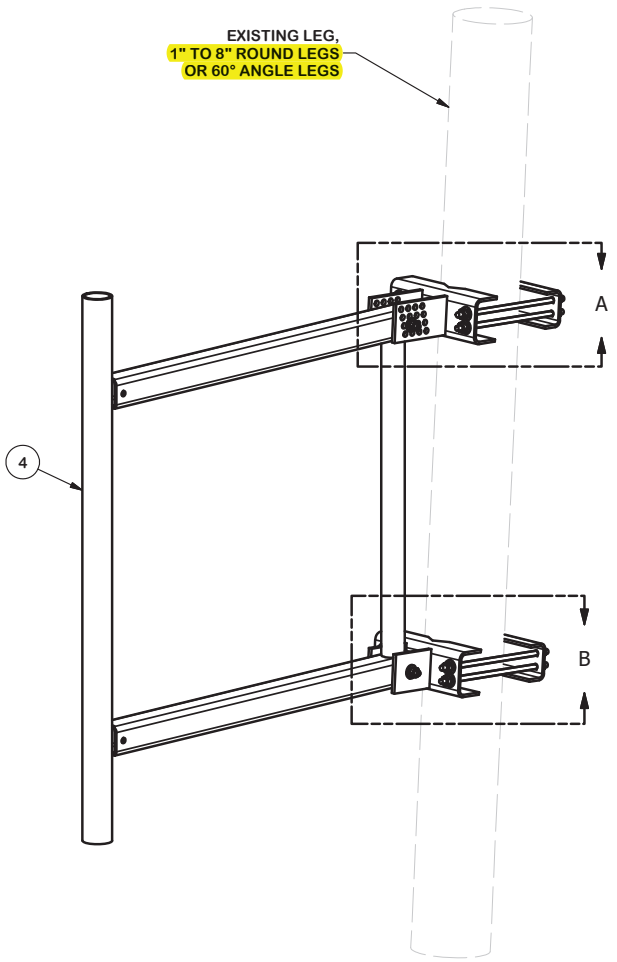


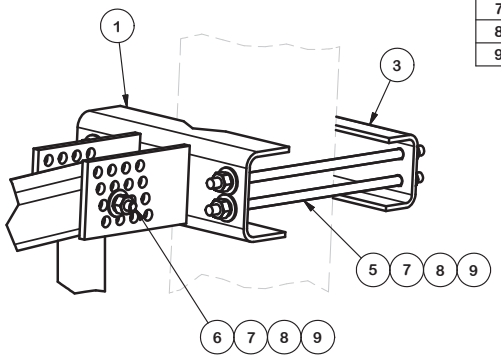


SPECIFICATIONS			
Frequency (continuous)	195-260 MHz	**Dimensions (L x base diam.) in.**	51 x 2.75
Gain	2.5 dBd	**Tower weight (antenna + clamps)**	11 lb.
Power rating (typ.)	500 watts	**Shipping weight**	14 lb.
Impedance	50 ohms	**Wind rating / with 0.5" ice**	200 / 150 MPH
VSWR	1.5:1 or less	**Maximum exposed area**	1.1 ft.²
Pattern	Omnidirectional	**Lateral thrust at 100 MPH**	44 lb.
Vertical beamwidth	38°	**Bending moment at top clamp**	47 ft. lb.
Termination	7-16 DIN-F	**(100 MPH, 40 PSF flat plate equiv.)**	

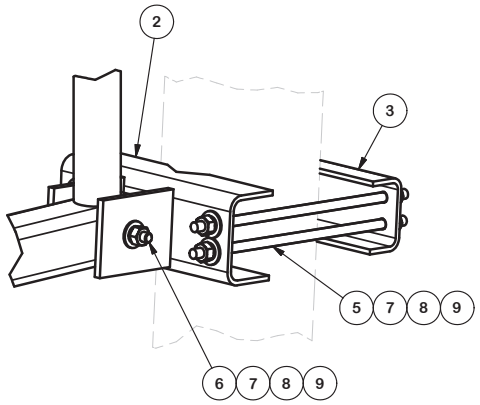
TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 5.0"± DIAMETER.

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	CFM	UPPER GATE FOOT WELDMENT		13.90	13.90
2	1	CFS	LOWER GATE FOOT WELDMENT		12.72	12.72
3	2	GBB	GATE BACKING BAR		4.53	9.06
4	1	4PBG	48" PIPE MOUNT STANDOFF ARM		113.96	113.96
5	8	G12R-12	1/2" x 12" GALV. THREADED ROD		0.67	5.35
5	8	G12R-15	1/2" x 15" GALV. THREADED ROD		0.84	6.69
6	2	A1205	1/2" x 5" A325 HDG BOLT		0.34	0.69
7	18	G12FW	1/2" HDG USS FLATWASHER		0.03	0.61
8	18	G12LW	1/2" HDG LOCKWASHER		0.01	0.25
9	18	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.29
					TOTAL WT. #	164.53

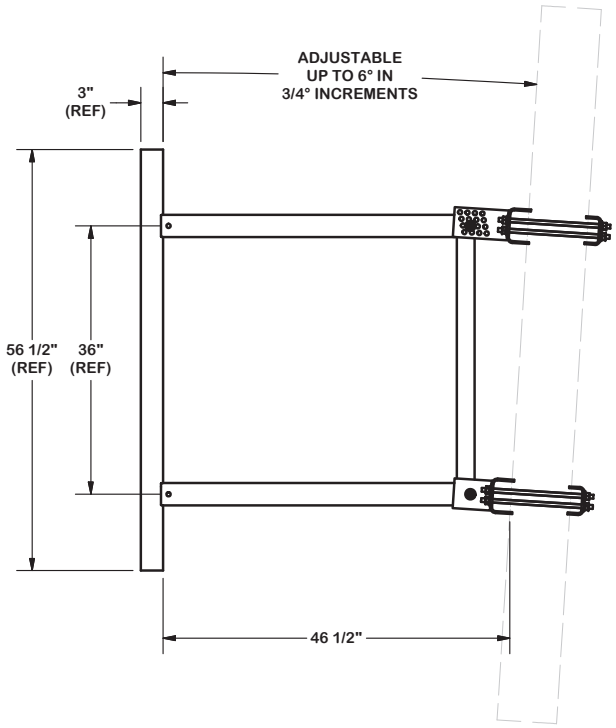




DETAIL A



DETAIL B



TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION: 48" ULTIMATE UNIVERSAL STANDOFF FRAME

SITE PRO 1 — A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

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ATTACHMENT E – STRUCTURAL ANALYSIS

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

180' Existing Lattice Tower

Eversource
Antenna Installation (As-built)

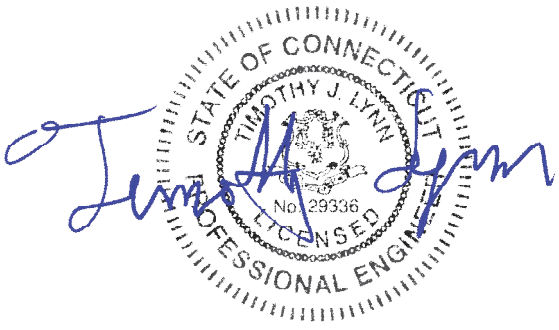
CSP Tower Ref: #62

97 Mountain Hill Road
Thompson, CT

CENTEK Project No. 21082.07

Date: August 18, 2021

Max Stress Ratio = 85%



Prepared for:

Eversource
107 Selden Street
Berlin, CT 06037

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the as-built antenna installation by Eversource on the existing lattice tower located in Thompson, Connecticut.

The host tower is a 180-ft, three legged, lattice tower originally designed and manufactured by Stainless Inc. project no. 358815 dated October 31, 1995. The tower geometry, structure member sizes and foundation information were taken from a combination of the original design document and previous structural analysis report prepared by AECOM job no. EVS-017 60619086 dated November 25, 2020. The tower has been previously reinforced multiple times. All previous reinforcements are assumed to be installed. See Primary Assumptions Section below for detailed reinforcement reference reports.

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

The tower consists of eight (8) vertical sections consisting of steel pipe legs conforming to ASTM A513-50 / A513-60 and steel angle lateral bracing conforming to ASTM A36. The vertical tower sections are connected by bolted flange plates with the diagonal and horizontal bracing to pipe legs consisting of bolted connections. The width of the tower face is 10.6-ft at the top and 25.0-ft at the bottom.

Antenna and Appurtenance Summary

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

- Tower:
  Antenna: One (1) lightning rod pipe mounted to the top of the tower.
- CSP-19 (HGT-30):
  Antenna: One (1) PD440-2 dipole antenna mounted on (2) 4-ft standoffs with an elevation of 181-ft AGL.
  Cables: One (1) 7/8”∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP-1 (HGT-27):
  Antenna: One (1) 10-ft microwave dish pipe mounted with an elevation of 178-ft AGL.
  Cables: One (1) WEP65 elliptical cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP-17 (HGT-31):
  Antenna: One (1) DB225-A dipole antenna leg mounted with an elevation of 177-ft AGL.
  Cables: One (1) 1/2”∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP-4 & 6 (HGT-24, 25 & 26):
  Antenna: Two (2) OGT9-840 Omni-directional antennas (inverted) and one (1) distribution box mounted on (1) 4-ft standoff with an elevation of 177-ft AGL.
  Cables: Three (3) 1-5/8” ∅ and one (1) 1/2”∅ cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- CSP-5 & 7 (HGT-28 & 29):
  Antenna: Two (2) OGT9-840 Omni-directional antennas (one upright and one inverted) mounted on (1) 4-ft standoff with an elevation of 175-ft AGL.
  Cables: Two (2) 1-5/8" ∅ cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP – Troop D:
  Antenna: Two (2) SC479-HF1LDF Omni-directional antennas (inverted), one (1) SE4192-SWBP4LDF panel antenna and one (1) TTA mounted on (1) USF-2U side arm with an elevation of 175-ft AGL.
  Cables: Two (2) 1-5/8"∅ and one (1) 1/2"∅ cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP-3 (HGT-23):
  Antenna: One (1) 8-ft microwave dish pipe mounted with an elevation of 169-ft AGL.
  Cables: One (1) EW63 elliptical cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP-2 (HGT-22):
  Antenna: One (1) 8-ft microwave dish pipe mounted with an elevation of 168-ft AGL.
  Cables: One (1) EW63 elliptical cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- **Eversource:**
  Antenna: One (1) ANT220F2 Omni-directional antenna mounted on (1) USF-4U sidearm with an elevation of 157-ft AGL.
  Cables: One (1) 7/8" ∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- AT&T (Existing):
  Antenna: Six (6) Powerwave 7770 panel antennas, two (2) KMW AM-X-CD-17-65-00T panel antennas, one (1) KMW AM-X-CD-16-65-00T panel antenna, six (6) TMAs, three (3) RRUS-11 remote radio heads, three (3) RRUS-12 remote radio heads and one (1) surge arrestor mounted on three (3) sector frames with a RAD center elevation of +/- 150-ft AGL.
  Cable: Twelve (12) 1-5/8" ∅ cables, one (1) fiber trunk and two (2) DC trunks running on a leg/face of the existing tower as specified in Section 3 of this report
- CSP-9,11 & 20 (HGT-14, 15 & 17):
  Antenna: One (1) PD200 Omni-directional antenna and two (2) 20-ft dipoles (one upright and one inverted) mounted on (2) 4-ft standoffs with an elevation of 138-ft AGL.
  Cables: Three (3) 7/8"∅ cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (HGT-11):
  Antenna: One (1) 12-ft dipole antenna mounted on (1) 4-ft standoff with an elevation of 138-ft AGL.
  Cables: One (1) 1/2"∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- CSP-12 (HGT-16):
  Antenna: One (1) DB420 dipole antenna (inverted) mounted on (1) 4-ft standoff with an elevation of 138-ft AGL.
  Cables: One (1) 7/8"∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (HGT-13):
  Antenna: One (1) DB224 dipole antenna mounted on (1) 1-ft standoff with an elevation of 138-ft AGL.
  Cables: One (1) 7/8"∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- **Eversource:**
  Antenna: One (1) Comprod 871F-70-2 Omni-directional antenna mounted on (1) USF-4U sidearm with an elevation of 134-ft AGL.
  Cables: One (1) 7/8" ∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP -38:
  Antenna: One (1) BCD806-09NE whip antenna leg mounted with an elevation of 127-ft AGL.
  Cables: One (1) 7/8"∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP-24 (HGT-9 & 10):
  Antenna: One (1) DS9A09F36D-N Omni-directional antenna and one (1) distribution box mounted on (1) 4-ft standoff with an elevation of 116-ft AGL.
  Cables: Three (3) 7/8" ∅ and one (1) 1/2"∅ cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP -14 (HGT-8):
  Antenna: One (1) PD458-1 dipole antenna pipe mounted with an elevation of 105-ft AGL.
  Cables: One (1) 7/8"∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP -13 (HGT-7):
  Antenna: One (1) DB222 dipole antenna pipe mounted with an elevation of 100-ft AGL.
  Cables: One (1) 7/8"∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP-8 & 15 (HGT-5 & 6):
  Antenna: One (1) 15-ft dipole and one (1) DB212 Omni-directional antennas (inverted) mounted on (1) 4-ft standoff with an elevation of 81-ft AGL.
  Cables: One (1) 7/8" ∅ and one (1) 1/2"∅ cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP -22 (HGT-4):
  Antenna: One (1) DB222 dipole antenna pipe mounted with an elevation of 81-ft AGL.
  Cables: One (1) 1/2"∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- CSP-16 (HGT-3):
  Antenna: One (1) 8-ft microwave dish pipe mounted with an elevation of 79-ft AGL.
  Cables: One (1) EW63 elliptical cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP-21 (HGT-2):
  Antenna: One (1) DB-803M-XT Omni-directional antenna mounted on (1) 4-ft standoff with an elevation of 49-ft AGL.
  Cables: One (1) 1/2"∅ cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP -23:
  Antenna: One (1) DB212 dipole antenna leg mounted with an elevation of 47-ft AGL.
  Cables: One (1) 1/2"∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables should be routed as specified in section 3 of this report.
- **All previous reinforcements per the below listed structural analysis and modification reports are assumed to be installed.**
  - **Structural report prepared by URS Corp for AT&T project no. CTK-010 / 36917368 dated 11/5/12.**
  - **Structural report prepared by KM Consulting Engineers for CSP project no. 161010.01 dated 10/2/17.**
  - **Structural report prepared by AECOM for Eversource project no. EVS-017 / 60619086 dated 11/25/20.**

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-H entitled "Structural Standard for Antenna Support Structures, Antennas and Small Wind Turbine Support Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-H Standard.

Tower Loading

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

Load Cases:	Load Case 1; 140 mph (Risk Cat III) wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 1.00" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-H]*

[1] The 2015 International Building Code as amended by the 2018 Connecticut State Building Code (CSBC).

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower.

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

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T10)	25.0' - 37.5'	82.2%	**PASS**
Diagonal (T11)	0.0' – 25.0'	78.9%	**PASS**
Horizontal (T10)	25.0' - 37.5'	84.6%	**PASS**

Foundation and Anchors

The existing foundation consists of three (3) individual 3-ft diameter x 3.25-ft long reinforced concrete piers supported on a 6-ft square x 2.5-ft tall pads w/ (4) rock anchors. A concrete mat was added to the foundation per the aforementioned KM structural report. The base of the tower is connected to the foundation by means of (6) 1.75"∅ anchor bolts per leg embedded into the concrete foundation structure.

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

Load Effect	Proposed Tower Reactions
Leg Shear	46 kips
Leg Compression	381 kips
Leg Tension	329 kips
Base Moment	7,841 ft-kips
Base Shear	82 kips

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

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Compression and Shear	51%	**PASS**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	(percentage of capacity)	Result
Reinforced Concrete Pad and Piers w/ Rock Anchors	Uplift	74%	**PASS**
	Bearing	78%	**PASS**

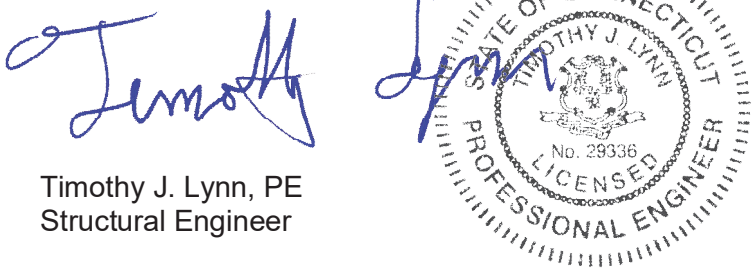
Conclusion

This analysis shows that the subject tower **is adequate** to support the as-built antenna configuration.

The analysis is based, in part, on the information provided to this office by Eversource. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

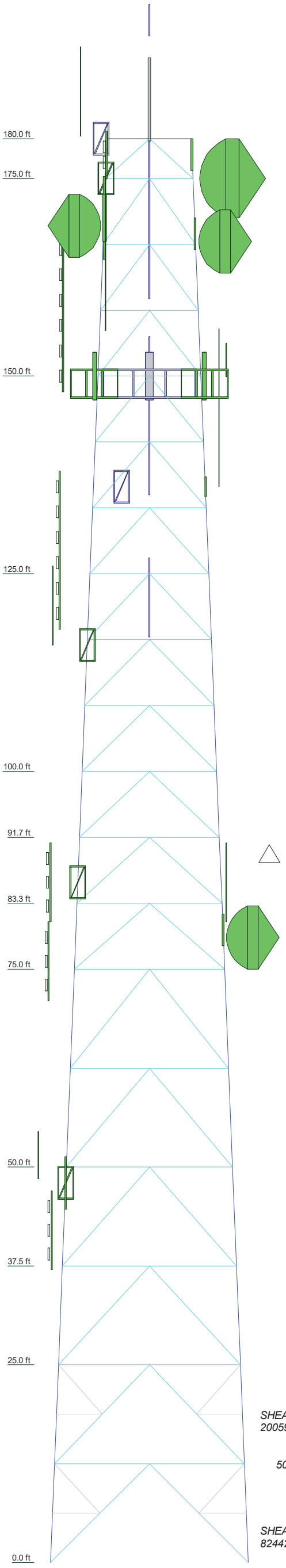
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11
Section											
Legs		HSS5x0.25		HSS5x.375		HSS5x.4		HSS6.875x.4		HSS6.875x.5	
Leg Grade			A572-50						A572-60		
Diagonals		2L2 1/2x2x3/16x3/8		2L3x2 1/2x1/4x3/8				2L3 1/2x3x3/8x3/8			2L3x3 1/2x5/16x3/8
Diagonal Grade					A36						A500-50
Top Girts	L3x3x1/4										
Horizontals	N.A.		L3x3x1/4		N.A.	L3x4x1/4	L3x4x1/2	L4x4x1/4			L4x4x1/2
Red. Horizontals		N.A.		N.A.							L3x3x1/4
Red. Diagonals					N.A.						L3x3x1/4
Inner Bracing		N.A.		L2 1/2x2 1/2x3/16							L3x3x1/4
Face Width (ft)	10.6	11	13	15	17	17.6667	18.3333	19	21	22	23
# Panels @ (ft)	1 @ 5		12 @ 8.33333							6 @ 12.5	
Weight (lb)	880.0	2435.0	3454.1	4090.2	1516.0	1543.7	1863.6	6061.2	3269.4		3325.1
											8143.2



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
OGT9-840 (HGT-29 / CSP#5)	181	LGP 21401 TMA Units (ATI)	150
PD440-2 (HGT-30 / CSP-19)	181	LGP 21401 TMA Units (ATI)	150
Pirod 4' Side Mount Standoff (1) (HGT-30 / CSP#19)	180	LGP 21401 TMA Units (ATI)	150
		LGP 21401 TMA Units (ATI)	150
Pirod 4' Side Mount Standoff (1) (HGT-30 / CSP#19)	180	LGP 21401 TMA Units (ATI)	150
		LGP 21401 TMA Units (ATI)	150
432E-83I-01T TTA Unit (CSP - Troop D)	180	Raycap DC6-48-60-18-8C Distribution Unit (ATI / Squid Unit)	150
10'6"x4" Pipe Mount (Tower)	180		
Lightning Rod 5/8x4' (Tower)	180	Pirod 12' T-Frame Sector Mount (1) (ATI)	149
4'x4" Pipe Mount (HGT-27 / CSP#1)	178	Pirod 12' T-Frame Sector Mount (1) (ATI)	149
DB225-A (HGT-31 / CSP#-17)	178	Pirod 12' T-Frame Sector Mount (1) (ATI)	149
OGT9-840 (HGT-24 / CSP#6)	177	20' 8 Bay Di-Pole (HGT-17 / CSP#20)	148
OGT9-840 (HGT-25 / CSP#4)	177	Pirod 4' Side Mount Standoff (1) (Shared HGT-1617 / CSP#12,#20)	143
DB-B1-6C-8AB-0Z Dist. Box (HGT-26)	177		
Pirod 4' Side Mount Standoff (1) (Shared HGT-24,25,26 / CSP# 4,6)	177	PD200 (HGT-15 / CSP#9)	140
		(inverted) DB420 (HGT-16 / CSP#12)	138
3'4"x4" Pipe Mount (CSP - Troop D)	177	Pirod 4' Side Mount Standoff (1) (HGT-11 / CSP)	138
(inverted) OGT9-840 (HGT-28 / CSP#7)	175	12' Dipole (HGT-11 / CSP)	138
Pirod 4' Side Mount Standoff (1) (Shared HGT-28, 29 / CSP# 5,7)	175	(inverted) 20' 8 Bay Di-Pole (HGT-14 / CSP#11)	136
		2'6"x4" Pipe Mount (HGT-13 / CSP)	136
Pirod 4' Side Mount Standoff (1) (Shared HGT-28, 29 / CSP# 5,7)	175	Pirod 4' Side Mount Standoff (1) (Shared HGT-1415 / CSP#11,#9)	136
USF-2U w/ TAM-II adapter with 8' 2-3/8" Pipe (CSP - Troop D)	175	DB224-A (HGT-13 / CSP)	136
		Pirod 4' Side Mount Standoff (1) (Shared HGT-1415 / CSP#11,#9)	136
10 FT DISH (HGT-27 / CSP#1)	175		
(inverted) SC479-HF1LDF (CSP - Troop D)	173	871F-70 (Eversource)	134
(inverted) SC479-HF1LDF (CSP - Troop D)	173	SitePro USF-4U (Eversource)	134
10'6"x4" Pipe Mount (CSP - Troop D)	170	BCD-80609-NE (CSP#38 (inverted))	127
SE4192-SWBP4LDF(Dxx-E6461) Panel Anenna (CSP - Troop D)	170	Pirod 4' Side Mount Standoff (1) (HGT-9,10 / CSP#24)	116
4'x4" Pipe Mount (HGT-23 / CSP#3)	169	DS9A09F36D-N 19 ft Omni w/ Mount Pipe (HGT-9 / CSP)	116
8 FT DISH (HGT-23 / CSP#3)	169		
4'x4" Pipe Mount (HGT-22 / CSP#2)	168	DB-B1-6C-8AB-0Z Dist. Box (HGT-10 / CSP#24)	116
8 FT DISH (HGT-22 / CSP#2)	167	PD458-1 (HGT-8 / CSP#14 (Twr Face Mt.))	105
ANT220F2 (Eversource)	157	DB222 (HGT-7 / CSP#13 (Twr Face Mt.))	100
SitePro USF-4U (Eversource)	157	Pirod 4' Side Mount Standoff (1) (Shared HGT-56 / CSP#8,15)	86
(2) 7770.00 panel antenna (ATI)	150		
(2) 7770.00 panel antenna (ATI)	150	DB212-1 (HGT-6/CSP#15)	86
(2) 7770.00 panel antenna (ATI)	150	DB222 (HGT-4/CSP#22)	81
AM-X-CD-17-65-00T-RET (ATI)	150	(inverted) DB212-1 (HGT-5/CSP#8)	81
AM-X-CD-17-65-00T-RET (ATI)	150	4'x4" Pipe Mount (Shared HGT-34/CSP#16,#22)	80
AM-X-CD-16-65-00T-RET(72") (ATI)	150	8 FT DISH (HGT-3/CSP#16)	79
RRUS-11 (ATI)	150	DB803M-XT (HGT-2/CSP#21)	49
RRUS-11 (ATI)	150	Pirod 4' Side Mount Standoff (1) (Shared HGT-12 / CSP#23,21)	48
RRUS-11 (ATI)	150		
Ericsson RRUS-12 RRH Unit (ATI)	150	6'8"x4" Pipe Mount (Shared HGT-12 / CSP#23,21)	48
Ericsson RRUS-12 RRH Unit (ATI)	150	DB212-1 (CSP#23)	47
Ericsson RRUS-12 RRH Unit (ATI)	150		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A572-60	60 ksi	75 ksi
A36	36 ksi	58 ksi	A500-50	50 ksi	62 ksi

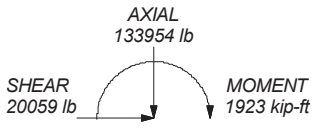
TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 140 mph basic wind in accordance with the TIA-222-H 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 Risk Category III.
7. Topographic Category 3 with Crest Height of 110.00 ft
8. TOWER RATING: 84.6%

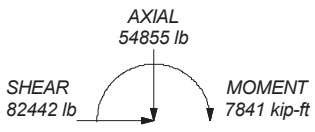
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 380445 lb
SHEAR: 46198 lb

UPLIFT: -329173 lb
SHEAR: 41165 lb



TORQUE 39 kip-ft
50 mph WIND - 1.0000 in ICE



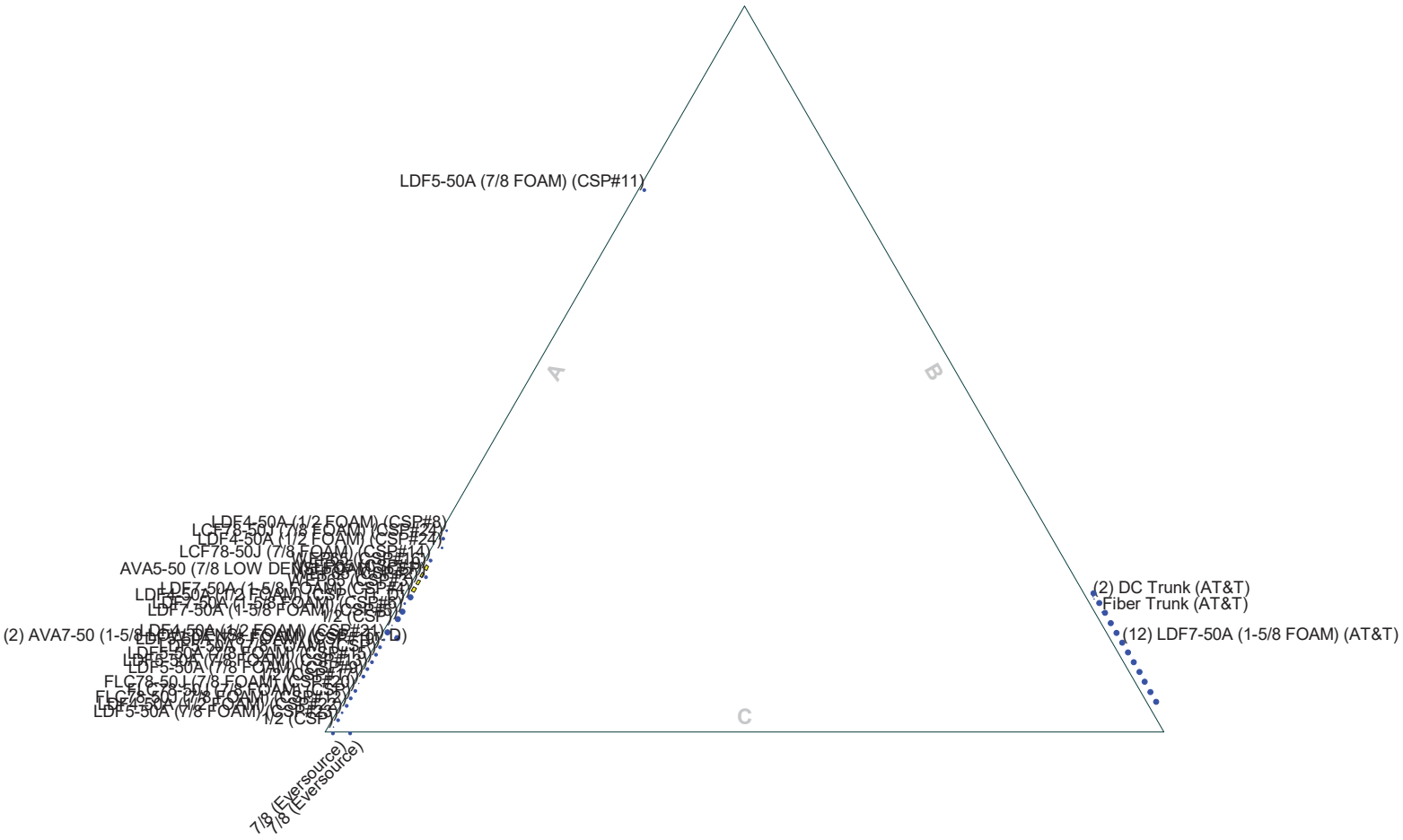
TORQUE 111 kip-ft
REACTIONS - 140 mph WIND

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

Job: 21082.07		
Project: 180-ft Lattice Tower #62 Thompson		
Client: Eversource	Drawn by: TJL	App'd:
Code: TIA-222-H	Date: 08/18/21	Scale: NTS
Path:		Dwg No. E-1

Feed Line Plan

Round Flat App In Face App Out Face



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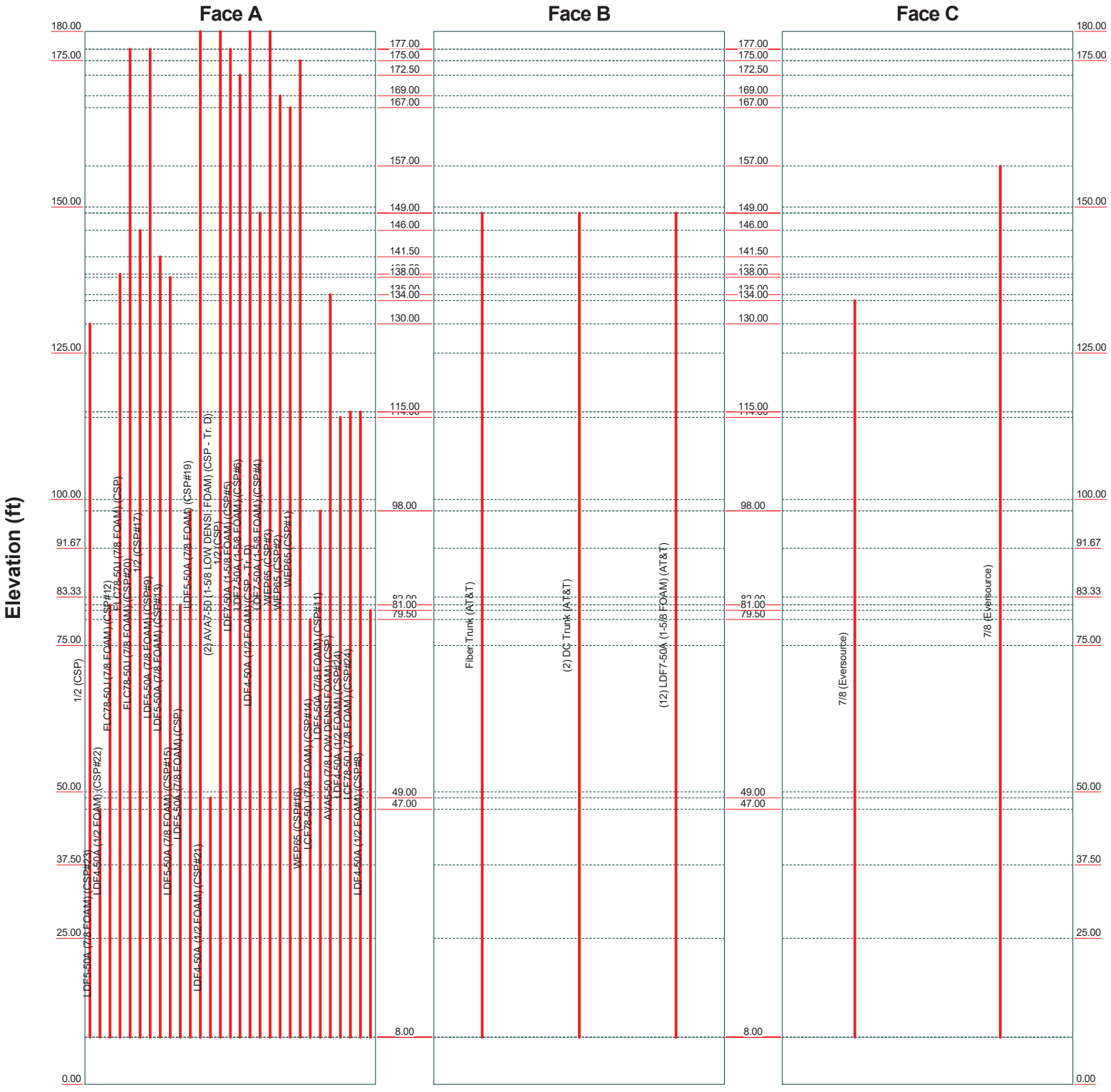
Job: ***21082.07***			
Project: ***180-ft Lattice Tower #62 Thompson***			
Client: Eversource	Drawn by: TJL	App'd:	
Code: TIA-222-H	Date: 08/17/21	Scale: NTS	
Path:		Dwg No. E-7	

Feed Line Distribution Chart
0' - 180'

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



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Project: ***180-ft Lattice Tower #62 Thompson***			
Client: Eversource	Drawn by: TJL	App'd:	
Code: TIA-222-H	Date: 08/17/21	Scale: NTS	
Path:		Dwg No. E-7	

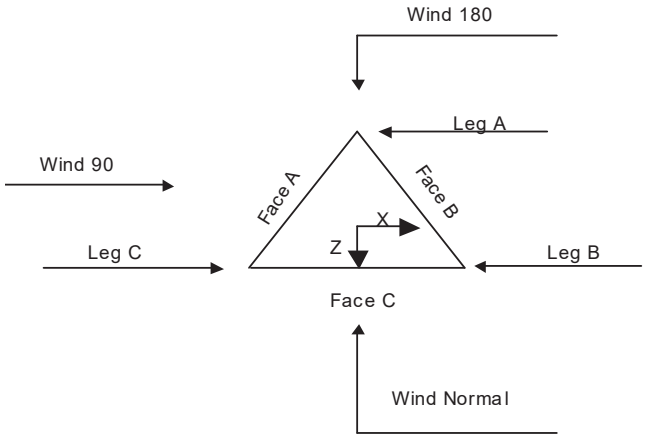
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 10.60 ft at the top and 25.00 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Windham County, Connecticut.
Tower base elevation above sea level: 0.00 ft.
Basic wind speed of 140 mph.
Risk Category III.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 3.
Crest Height: 110.00 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

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	180.00-175.00			10.60	1	5.00
T2	175.00-150.00			11.00	1	25.00
T3	150.00-125.00			13.00	1	25.00
T4	125.00-100.00			15.00	1	25.00
T5	100.00-91.67			17.00	1	8.33
T6	91.67-83.33			17.67	1	8.33
T7	83.33-75.00			18.33	1	8.33
T8	75.00-50.00			19.00	1	25.00
T9	50.00-37.50			21.00	1	12.50
T10	37.50-25.00			22.00	1	12.50
T11	25.00-0.00			23.00	1	25.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	180.00-175.00	5.00	K Brace Down	No	Yes	0.0000	0.0000
T2	175.00-150.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T3	150.00-125.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T4	125.00-100.00	8.33	K Brace Down	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T5	100.00-91.67	8.33	K Brace Down	No	Yes	0.0000	0.0000
T6	91.67-83.33	8.33	K Brace Down	No	Yes	0.0000	0.0000
T7	83.33-75.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T8	75.00-50.00	12.50	K Brace Down	No	Yes	0.0000	0.0000
T9	50.00-37.50	12.50	K Brace Down	No	Yes	0.0000	0.0000
T10	37.50-25.00	12.50	K Brace Down	No	Yes	0.0000	0.0000
T11	25.00-0.00	12.50	K1 Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-175.00	Pipe	HSS5x0.25	A572-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16x3/8	A36 (36 ksi)
T2 175.00-150.00	Pipe	HSS5x0.25	A572-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16x3/8	A36 (36 ksi)
T3 150.00-125.00	Pipe	HSS5x0.25	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4x3/8	A36 (36 ksi)
T4 125.00-100.00	Pipe	HSS5x.375	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4x3/8	A36 (36 ksi)
T5 100.00-91.67	Pipe	HSS5x.4	A572-60 (60 ksi)	Double Angle	2L3x2 1/2x1/4x3/8	A36 (36 ksi)
T6 91.67-83.33	Pipe	HSS5x.4	A572-60 (60 ksi)	Double Angle	2L3x2 1/2x1/4x3/8	A36 (36 ksi)
T7 83.33-75.00	Pipe	HSS5x.4	A572-60 (60 ksi)	Double Angle	2L3x2 1/2x1/4x3/8	A36 (36 ksi)
T8 75.00-50.00	Pipe	HSS6.875x.4	A572-60 (60 ksi)	Double Angle	2L3 1/2x3x3/8x3/8	A36 (36 ksi)
T9 50.00-37.50	Pipe	HSS6.875x.5	A572-60 (60 ksi)	Double Angle	2L3 1/2x3x3/8x3/8	A36 (36 ksi)
T10 37.50-25.00	Pipe	HSS6.875x.5	A572-60 (60 ksi)	Double Angle	2L3 1/2x3x3/8x3/8	A36 (36 ksi)
T11 25.00-0.00	Pipe	HSS6.875x.5	A572-60 (60 ksi)	Double Angle	2L3x3 1/2x5/16x3/8	A500-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180.00-175.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T2 175.00-150.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T3 150.00-125.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T4 125.00-100.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T5 100.00-91.67	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x4x1/4	A36 (36 ksi)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T6 91.67-83.33	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x4x1/4	A36 (36 ksi)
T7 83.33-75.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x4x1/2	A36 (36 ksi)
T8 75.00-50.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)
T9 50.00-37.50	None	Flat Bar		A36 (36 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)
T10 37.50-25.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)
T11 25.00-0.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L4x4x1/2	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T3 150.00-125.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 125.00-100.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 100.00-91.67	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 91.67-83.33	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 83.33-75.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T8 75.00-50.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T9 50.00-37.50	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T10 37.50-25.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T11 25.00-0.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T11 25.00-0.00	A36 (36 ksi)	Horizontal (1)	Equal Angle	L3x3x1/4	1
		Diagonal (1)	Equal Angle	L3x3x1/4	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 180.00-175.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T2 175.00-150.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T3 150.00-125.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T4 125.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T5 100.00-91.67	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T6 91.67-83.33	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T7 83.33-75.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T8 75.00-50.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T9 50.00-37.50	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T10 37.50-25.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T11 25.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Single Diags X	K Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
180.00-175.00				1	1	1	1	1	1	1	1	1	1	1	1
T2	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
175.00-150.00				1	1	1	1	1	1	1	1	1	1	1	1
T3	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
150.00-125.00				1	1	1	1	1	1	1	1	1	1	1	1
T4	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
125.00-100.00				1	1	1	1	1	1	1	1	1	1	1	1
T5	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
100.00-91.67				1	1	1	1	1	1	1	1	1	1	1	1
T6	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
91.67-83.33				1	1	1	1	1	1	1	1	1	1	1	1
T7	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
83.33-75.00				1	1	1	1	1	1	1	1	1	1	1	1
T8	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
75.00-50.00				1	1	1	1	1	1	1	1	1	1	1	1
T9	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
50.00-37.50				1	1	1	1	1	1	1	1	1	1	1	1
T10	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
37.50-25.00				1	1	1	1	1	1	1	1	1	1	1	1
T11	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
25.00-0.00				1	1	1	1	1	1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 180.00-175.00	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 175.00-150.00	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 150.00-125.00	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 125.00-100.00	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
T5 100.00-91.67	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 91.67-83.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 83.33-75.00	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
T8 75.00-50.00	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
T9 50.00-37.50	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 37.50-25.00	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
T11 25.00-0.00	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 180.00-175.00	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 175.00-150.00	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 150.00-125.00	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 125.00-100.00	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
T5 100.00-91.67	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 91.67-83.33	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 83.33-75.00	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
T8 75.00-50.00	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
T9 50.00-37.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 37.50-25.00	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
T11 25.00-0.00	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 180.00-175.00	Flange	0.7500 A325X	0	1.0000 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T2 175.00-150.00	Flange	0.7500 A325X	6	1.0000 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T3 150.00-125.00	Flange	0.7500 A325X	6	1.0000 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T4 125.00-100.00	Flange	0.7500 A325X	6	1.0000 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T5 100.00-91.67	Flange	0.7500 A325X	6	1.0000 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T6 91.67-83.33	Flange	0.7500 A325X	0	1.0000 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T7 83.33-75.00	Flange	0.7500 A325X	0	1.0000 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T8 75.00-50.00	Flange	1.0000 A325X	8	1.0000 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T9 50.00-37.50	Flange	1.0000 A325X	8	1.0000 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T10 37.50-25.00	Flange	1.0000 A325X	0	1.0000 A325X	1	0.6250 A325X	2	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T11 25.00-0.00	Flange	1.0000 A325X	8	1.0000 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1/2 (CSP)	A	No	No	Ar (CaAa)	130.00 - 8.00	-1.5000	-0.49	1	1	0.5800	0.5800		0.25
LDF5-50A (7/8 FOAM) (CSP#23)	A	No	No	Ar (CaAa)	47.00 - 8.00	-1.5000	-0.48	1	1	1.0900	1.0900		0.33
LDF4-50A (1/2 FOAM) (CSP#22)	A	No	No	Ar (CaAa)	82.00 - 8.00	-1.5000	-0.47	1	1	0.6300	0.6300		0.15
FLC78-50J (7/8 FOAM) (CSP#12)	A	No	No	Ar (CaAa)	138.50 - 8.00	-1.5000	-0.46	1	1	1.1200	1.1200		0.40
FLC78-50J (7/8 FOAM) (CSP)	A	No	No	Ar (CaAa)	177.00 - 8.00	-1.5000	-0.45	1	1	1.1200	1.1200		0.40
FLC78-50J (7/8 FOAM) (CSP#20)	A	No	No	Ar (CaAa)	146.00 - 8.00	-1.5000	-0.44	1	1	1.1200	1.1200		0.40
1/2 (CSP#17)	A	No	No	Ar (CaAa)	177.00 - 8.00	-1.5000	-0.43	1	1	0.5800	0.5800		0.25
LDF5-50A (7/8 FOAM) (CSP#9)	A	No	No	Ar (CaAa)	141.50 - 8.00	-1.5000	-0.42	1	1	1.0900	1.0900		0.33

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF5-50A (7/8 FOAM) (CSP#13)	A	No	No	Ar (CaAa)	138.00 - 8.00	-1.5000	-0.41	1	1	1.0900	1.0900		0.33
LDF5-50A (7/8 FOAM) (CSP#15)	A	No	No	Ar (CaAa)	82.00 - 8.00	-1.5000	-0.4	1	1	1.0900	1.0900		0.33
LDF5-50A (7/8 FOAM) (CSP)	A	No	No	Ar (CaAa)	98.00 - 8.00	-1.5000	-0.39	1	1	1.0900	1.0900		0.33
LDF5-50A (7/8 FOAM) (CSP#19)	A	No	No	Ar (CaAa)	180.00 - 8.00	-1.5000	-0.38	1	1	1.0900	1.0900		0.33
LDF4-50A (1/2 FOAM) (CSP#21)	A	No	No	Ar (CaAa)	49.00 - 8.00	-1.5000	-0.37	1	1	0.6300	0.6300		0.15
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP - Tr. D)	A	No	No	Ar (CaAa)	180.00 - 8.00	-4.5000	-0.36	2	1	1.9800	1.9800		0.72
1/2 (CSP)	A	No	No	Ar (CaAa)	177.00 - 8.00	-1.5000	-0.35	1	1	0.5800	0.5800		0.25
LDF7-50A (1-5/8 FOAM) (CSP#5)	A	No	No	Ar (CaAa)	172.50 - 8.00	-1.5000	-0.34	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (CSP#6)	A	No	No	Ar (CaAa)	180.00 - 8.00	-1.5000	-0.33	1	1	1.9800	1.9800		0.82
LDF4-50A (1/2 FOAM) (CSP - Tr. D)	A	No	No	Ar (CaAa)	149.00 - 8.00	-1.5000	-0.32	1	1	0.6300	0.6300		0.15
LDF7-50A (1-5/8 FOAM) (CSP#4)	A	No	No	Ar (CaAa)	180.00 - 8.00	-1.5000	-0.31	1	1	1.9800	1.9800		0.82
WEP65 (CSP#3)	A	No	No	Af (CaAa)	169.00 - 8.00	-1.5000	-0.3	1	1	1.5836	1.5836		0.53
WEP65 (CSP#2)	A	No	No	Af (CaAa)	167.00 - 8.00	-1.5000	-0.29	1	1	1.5836	1.5836		0.53
WEP65 (CSP#1)	A	No	No	Af (CaAa)	175.00 - 8.00	-1.5000	-0.28	1	1	1.5836	1.5836		0.53
WEP65 (CSP#16)	A	No	No	Af (CaAa)	79.50 - 8.00	-1.5000	-0.27	1	1	1.5836	1.5836		0.53
LCF78-50J (7/8 FOAM) (CSP#14)	A	No	No	Ar (CaAa)	98.00 - 8.00	-1.5000	-0.26	1	1	1.1000	1.1000		0.53
LDF5-50A (7/8 FOAM) (CSP#11)	A	No	No	Ar (CaAa)	135.00 - 8.00	-1.5000	0.25	1	1	1.0900	1.0900		0.33
AVA5-50 (7/8 LOW DENSI.FOAM) (CSP)	A	No	No	Ar (CaAa)	114.00 - 8.00	-3.0000	-0.28	1	1	1.1000	1.1000		0.30
LDF4-50A (1/2 FOAM) (CSP#24)	A	No	No	Ar (CaAa)	115.00 - 8.00	-3.0000	-0.24	1	1	0.6300	0.6300		0.15
LCF78-50J (7/8 FOAM) (CSP#24)	A	No	No	Ar (CaAa)	115.00 - 8.00	-1.5000	-0.23	1	1	1.1000	1.1000		0.53
LDF4-50A	A	No	No	Ar (CaAa)	81.00 - 8.00	-1.5000	-0.22	1	1	0.6300	0.6300		0.15

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
(1/2 FOAM) (CSP#8)													
Fiber Trunk (AT&T)	B	No	No	Ar (CaAa)	149.00 - 8.00	2.0000	0.34	1	1	0.4000	0.4000		1.00
DC Trunk (AT&T)	B	No	No	Ar (CaAa)	149.00 - 8.00	2.0000	0.32	2	2	0.4000	0.4000		0.11
LDF7-50A (1-5/8 FOAM) (AT&T)	B	No	No	Ar (CaAa)	149.00 - 8.00	2.0000	0.39	12	12	1.9800	1.9800		0.82
7/8 (Eversource)	C	No	No	Ar (CaAa)	134.00 - 8.00	0.0000	0.47	1	1	1.1100	1.1100		0.54
7/8 (Eversource)	C	No	No	Ar (CaAa)	157.00 - 8.00	0.0000	0.49	1	1	1.1100	1.1100		0.54

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	180.00-175.00	A	0.000	0.000	4.961	0.000	18.85
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	175.00-150.00	A	0.000	0.000	48.780	0.000	158.53
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.777	0.000	3.78
T3	150.00-125.00	A	0.000	0.000	62.941	0.000	199.69
		B	0.000	0.000	59.904	0.000	265.44
		C	0.000	0.000	3.774	0.000	18.36
T4	125.00-100.00	A	0.000	0.000	73.905	0.000	237.15
		B	0.000	0.000	62.400	0.000	276.50
		C	0.000	0.000	5.550	0.000	27.00
T5	100.00-91.67	A	0.000	0.000	27.002	0.000	87.86
		B	0.000	0.000	20.800	0.000	92.17
		C	0.000	0.000	1.850	0.000	9.00
T6	91.67-83.33	A	0.000	0.000	27.440	0.000	89.58
		B	0.000	0.000	20.800	0.000	92.17
		C	0.000	0.000	1.850	0.000	9.00
T7	83.33-75.00	A	0.000	0.000	30.210	0.000	96.23
		B	0.000	0.000	20.800	0.000	92.17
		C	0.000	0.000	1.850	0.000	9.00
T8	75.00-50.00	A	0.000	0.000	94.793	0.000	297.75
		B	0.000	0.000	62.400	0.000	276.50
		C	0.000	0.000	5.550	0.000	27.00
T9	50.00-37.50	A	0.000	0.000	49.156	0.000	153.74
		B	0.000	0.000	31.200	0.000	138.25
		C	0.000	0.000	2.775	0.000	13.50
T10	37.50-25.00	A	0.000	0.000	49.546	0.000	154.88
		B	0.000	0.000	31.200	0.000	138.25
		C	0.000	0.000	2.775	0.000	13.50
T11	25.00-0.00	A	0.000	0.000	67.383	0.000	210.63
		B	0.000	0.000	42.432	0.000	188.02
		C	0.000	0.000	3.774	0.000	18.36

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	180.00-175.00	A	1.379	0.000	0.000	14.961	0.000	174.40
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	175.00-150.00	A	1.372	0.000	0.000	133.852	0.000	1554.16
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	2.698	0.000	32.91
T3	150.00-125.00	A	1.363	0.000	0.000	180.050	0.000	2070.69
		B		0.000	0.000	168.034	0.000	2158.77
		C		0.000	0.000	13.039	0.000	158.30
T4	125.00-100.00	A	1.356	0.000	0.000	221.923	0.000	2536.02
		B		0.000	0.000	174.894	0.000	2240.50
		C		0.000	0.000	19.107	0.000	231.19
T5	100.00-91.67	A	1.353	0.000	0.000	82.484	0.000	942.67
		B		0.000	0.000	58.281	0.000	745.87
		C		0.000	0.000	6.361	0.000	76.88
T6	91.67-83.33	A	1.353	0.000	0.000	83.987	0.000	960.15
		B		0.000	0.000	58.278	0.000	745.69
		C		0.000	0.000	6.359	0.000	76.84
T7	83.33-75.00	A	1.353	0.000	0.000	93.389	0.000	1062.02
		B		0.000	0.000	58.279	0.000	745.73
		C		0.000	0.000	6.360	0.000	76.85
T8	75.00-50.00	A	1.354	0.000	0.000	291.707	0.000	3314.39
		B		0.000	0.000	174.867	0.000	2238.95
		C		0.000	0.000	19.094	0.000	230.89
T9	50.00-37.50	A	1.356	0.000	0.000	153.412	0.000	1740.94
		B		0.000	0.000	87.449	0.000	1120.37
		C		0.000	0.000	9.554	0.000	115.62
T10	37.50-25.00	A	1.352	0.000	0.000	154.616	0.000	1750.88
		B		0.000	0.000	87.411	0.000	1118.19
		C		0.000	0.000	9.536	0.000	115.19
T11	25.00-0.00	A	1.308	0.000	0.000	205.766	0.000	2272.07
		B		0.000	0.000	118.253	0.000	1484.54
		C		0.000	0.000	12.665	0.000	149.67

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180.00-175.00	-6.7713	3.1467	-12.5437	5.6557
T2	175.00-150.00	-14.9256	6.2409	-22.9782	9.6645
T3	150.00-125.00	0.0756	13.0802	-1.0217	17.8404
T4	125.00-100.00	-2.2765	14.8246	-5.5835	20.1998
T5	100.00-91.67	-4.0731	15.8311	-8.6346	21.5593
T6	91.67-83.33	-4.5159	16.2888	-9.4076	22.2393
T7	83.33-75.00	-6.6578	17.0826	-12.7951	23.3507
T8	75.00-50.00	-8.1135	18.2203	-14.9008	24.9215
T9	50.00-37.50	-9.6128	19.5816	-17.7582	27.0008
T10	37.50-25.00	-10.1824	20.3099	-18.7865	28.1233
T11	25.00-0.00	-7.2702	14.7687	-14.5587	22.6938

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	5	FLC78-50J (7/8 FOAM)	175.00 - 177.00	0.6000	0.6000
T1	7	1/2	175.00 - 177.00	0.6000	0.6000
T1	12	LDF5-50A (7/8 FOAM)	175.00 - 180.00	0.6000	0.6000
T1	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	175.00 - 180.00	0.6000	0.6000
T1	15	1/2	175.00 - 177.00	0.6000	0.6000
T1	17	LDF7-50A (1-5/8 FOAM)	175.00 - 180.00	0.6000	0.6000
T1	19	LDF7-50A (1-5/8 FOAM)	175.00 - 180.00	0.6000	0.6000
T2	5	FLC78-50J (7/8 FOAM)	150.00 - 175.00	0.6000	0.6000
T2	7	1/2	150.00 - 175.00	0.6000	0.6000
T2	12	LDF5-50A (7/8 FOAM)	150.00 - 175.00	0.6000	0.6000
T2	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	150.00 - 175.00	0.6000	0.6000
T2	15	1/2	150.00 - 175.00	0.6000	0.6000
T2	16	LDF7-50A (1-5/8 FOAM)	150.00 - 172.50	0.6000	0.6000
T2	17	LDF7-50A (1-5/8 FOAM)	150.00 - 175.00	0.6000	0.6000
T2	19	LDF7-50A (1-5/8 FOAM)	150.00 - 175.00	0.6000	0.6000
T2	20	WEP65	150.00 - 169.00	0.6000	0.6000
T2	21	WEP65	150.00 - 167.00	0.6000	0.6000
T2	22	WEP65	150.00 - 175.00	0.6000	0.6000
T2	34	7/8	150.00 - 157.00	0.6000	0.6000
T3	1	1/2	125.00 - 130.00	0.6000	0.6000
T3	4	FLC78-50J (7/8 FOAM)	125.00 - 138.50	0.6000	0.6000
T3	5	FLC78-50J (7/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T3	6	FLC78-50J (7/8 FOAM)	125.00 - 146.00	0.6000	0.6000
T3	7	1/2	125.00 - 150.00	0.6000	0.6000
T3	8	LDF5-50A (7/8 FOAM)	125.00 - 141.50	0.6000	0.6000
T3	9	LDF5-50A (7/8 FOAM)	125.00 - 138.00	0.6000	0.6000
T3	12	LDF5-50A (7/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T3	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	125.00 - 150.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	15	1/2	125.00 - 150.00	0.6000	0.6000
T3	16	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T3	17	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T3	18	LDF4-50A (1/2 FOAM)	125.00 - 149.00	0.6000	0.6000
T3	19	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T3	20	WEP65	125.00 - 150.00	0.6000	0.6000
T3	21	WEP65	125.00 - 150.00	0.6000	0.6000
T3	22	WEP65	125.00 - 150.00	0.6000	0.6000
T3	25	LDF5-50A (7/8 FOAM)	125.00 - 135.00	0.6000	0.6000
T3	30	Fiber Trunk	125.00 - 149.00	0.6000	0.6000
T3	31	DC Trunk	125.00 - 149.00	0.6000	0.6000
T3	32	LDF7-50A (1-5/8 FOAM)	125.00 - 149.00	0.6000	0.6000
T3	33	7/8	125.00 - 134.00	0.6000	0.6000
T3	34	7/8	125.00 - 150.00	0.6000	0.6000
T4	1	1/2	100.00 - 125.00	0.6000	0.6000
T4	4	FLC78-50J (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	5	FLC78-50J (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	6	FLC78-50J (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	7	1/2	100.00 - 125.00	0.6000	0.6000
T4	8	LDF5-50A (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	9	LDF5-50A (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	12	LDF5-50A (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 125.00	0.6000	0.6000
T4	15	1/2	100.00 - 125.00	0.6000	0.6000
T4	16	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	17	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	18	LDF4-50A (1/2 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	19	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	20	WEP65	100.00 - 125.00	0.6000	0.6000
T4	21	WEP65	100.00 - 125.00	0.6000	0.6000
T4	22	WEP65	100.00 - 125.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	25	LDF5-50A (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	26	AVA5-50 (7/8 LOW DENSI.FOAM)	100.00 - 114.00	0.6000	0.6000
T4	27	LDF4-50A (1/2 FOAM)	100.00 - 115.00	0.6000	0.6000
T4	28	LCF78-50J (7/8 FOAM)	100.00 - 115.00	0.6000	0.6000
T4	30	Fiber Trunk	100.00 - 125.00	0.6000	0.6000
T4	31	DC Trunk	100.00 - 125.00	0.6000	0.6000
T4	32	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	33	7/8	100.00 - 125.00	0.6000	0.6000
T4	34	7/8	100.00 - 125.00	0.6000	0.6000
T5	1	1/2	91.67 - 100.00	0.6000	0.6000
T5	4	FLC78-50J (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	5	FLC78-50J (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	6	FLC78-50J (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	7	1/2	91.67 - 100.00	0.6000	0.6000
T5	8	LDF5-50A (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	9	LDF5-50A (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	11	LDF5-50A (7/8 FOAM)	91.67 - 98.00	0.6000	0.6000
T5	12	LDF5-50A (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T5	15	1/2	91.67 - 100.00	0.6000	0.6000
T5	16	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	17	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	18	LDF4-50A (1/2 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	19	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	20	WEP65	91.67 - 100.00	0.6000	0.6000
T5	21	WEP65	91.67 - 100.00	0.6000	0.6000
T5	22	WEP65	91.67 - 100.00	0.6000	0.6000
T5	24	LCF78-50J (7/8 FOAM)	91.67 - 98.00	0.6000	0.6000
T5	25	LDF5-50A (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	26	AVA5-50 (7/8 LOW DENSI.FOAM)	91.67 - 100.00	0.6000	0.6000
T5	27	LDF4-50A (1/2 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	28	LCF78-50J (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	30	Fiber Trunk	91.67 - 100.00	0.6000	0.6000
T5	31	DC Trunk	91.67 - 100.00	0.6000	0.6000
T5	32	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	33	7/8	91.67 - 100.00	0.6000	0.6000
T5	34	7/8	91.67 - 100.00	0.6000	0.6000
T6	1	1/2	83.33 - 91.67	0.6000	0.6000
T6	4	FLC78-50J (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	5	FLC78-50J (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	6	FLC78-50J (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	7	1/2	83.33 - 91.67	0.6000	0.6000
T6	8	LDF5-50A (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	9	LDF5-50A (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	11	LDF5-50A (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	12	LDF5-50A (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T6	15	1/2	83.33 - 91.67	0.6000	0.6000
T6	16	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	17	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	18	LDF4-50A (1/2 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	19	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	20	WEP65	83.33 - 91.67	0.6000	0.6000
T6	21	WEP65	83.33 - 91.67	0.6000	0.6000
T6	22	WEP65	83.33 - 91.67	0.6000	0.6000
T6	24	LCF78-50J (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	25	LDF5-50A (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	26	AVA5-50 (7/8 LOW DENSI.FOAM)	83.33 - 91.67	0.6000	0.6000
T6	27	LDF4-50A (1/2 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	28	LCF78-50J (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	30	Fiber Trunk	83.33 - 91.67	0.6000	0.6000
T6	31	DC Trunk	83.33 - 91.67	0.6000	0.6000
T6	32	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	33	7/8	83.33 - 91.67	0.6000	0.6000
T6	34	7/8	83.33 - 91.67	0.6000	0.6000
T7	1	1/2	75.00 - 83.33	0.6000	0.6000
T7	3	LDF4-50A (1/2 FOAM)	75.00 - 82.00	0.6000	0.6000
T7	4	FLC78-50J (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	5	FLC78-50J (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	6	FLC78-50J (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	7	1/2	75.00 - 83.33	0.6000	0.6000
T7	8	LDF5-50A (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	9	LDF5-50A (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	10	LDF5-50A (7/8 FOAM)	75.00 - 82.00	0.6000	0.6000
T7	11	LDF5-50A (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	12	LDF5-50A (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T7	15	1/2	75.00 - 83.33	0.6000	0.6000
T7	16	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	17	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	18	LDF4-50A (1/2 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	19	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	20	WEP65	75.00 - 83.33	0.6000	0.6000
T7	21	WEP65	75.00 - 83.33	0.6000	0.6000
T7	22	WEP65	75.00 - 83.33	0.6000	0.6000
T7	23	WEP65	75.00 - 79.50	0.6000	0.6000
T7	24	LCF78-50J (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	25	LDF5-50A (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	26	AVA5-50 (7/8 LOW DENSI.FOAM)	75.00 - 83.33	0.6000	0.6000
T7	27	LDF4-50A (1/2 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	28	LCF78-50J (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	29	LDF4-50A (1/2 FOAM)	75.00 - 81.00	0.6000	0.6000
T7	30	Fiber Trunk	75.00 - 83.33	0.6000	0.6000
T7	31	DC Trunk	75.00 - 83.33	0.6000	0.6000
T7	32	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	33	7/8	75.00 - 83.33	0.6000	0.6000
T7	34	7/8	75.00 - 83.33	0.6000	0.6000
T8	1	1/2	50.00 - 75.00	0.6000	0.6000
T8	3	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	4	FLC78-50J (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	5	FLC78-50J (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	6	FLC78-50J (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	7	1/2	50.00 - 75.00	0.6000	0.6000
T8	8	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	9	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	10	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	11	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	12	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	14	AVA7-50 (1-5/8 LOW	50.00 - 75.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		DENSI. FOAM)			
T8	15	1/2	50.00 - 75.00	0.6000	0.6000
T8	16	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	17	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	18	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	19	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	20	WEP65	50.00 - 75.00	0.6000	0.6000
T8	21	WEP65	50.00 - 75.00	0.6000	0.6000
T8	22	WEP65	50.00 - 75.00	0.6000	0.6000
T8	23	WEP65	50.00 - 75.00	0.6000	0.6000
T8	24	LCF78-50J (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	25	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	26	AVA5-50 (7/8 LOW DENSI.FOAM)	50.00 - 75.00	0.6000	0.6000
T8	27	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	28	LCF78-50J (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	29	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	30	Fiber Trunk	50.00 - 75.00	0.6000	0.6000
T8	31	DC Trunk	50.00 - 75.00	0.6000	0.6000
T8	32	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	33	7/8	50.00 - 75.00	0.6000	0.6000
T8	34	7/8	50.00 - 75.00	0.6000	0.6000
T9	1	1/2	37.50 - 50.00	0.6000	0.6000
T9	2	LDF5-50A (7/8 FOAM)	37.50 - 47.00	0.6000	0.6000
T9	3	LDF4-50A (1/2 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	4	FLC78-50J (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	5	FLC78-50J (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	6	FLC78-50J (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	7	1/2	37.50 - 50.00	0.6000	0.6000
T9	8	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	9	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	10	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	11	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	12	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	13	LDF4-50A (1/2 FOAM)	37.50 - 49.00	0.6000	0.6000
T9	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	37.50 - 50.00	0.6000	0.6000
T9	15	1/2	37.50 - 50.00	0.6000	0.6000
T9	16	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	17	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	18	LDF4-50A (1/2 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	19	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	20	WEP65	37.50 - 50.00	0.6000	0.6000
T9	21	WEP65	37.50 - 50.00	0.6000	0.6000
T9	22	WEP65	37.50 - 50.00	0.6000	0.6000
T9	23	WEP65	37.50 - 50.00	0.6000	0.6000
T9	24	LCF78-50J (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	25	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	26	AVA5-50 (7/8 LOW DENSI.FOAM)	37.50 - 50.00	0.6000	0.6000
T9	27	LDF4-50A (1/2 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	28	LCF78-50J (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	29	LDF4-50A (1/2 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	30	Fiber Trunk	37.50 - 50.00	0.6000	0.6000
T9	31	DC Trunk	37.50 - 50.00	0.6000	0.6000
T9	32	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	33	7/8	37.50 - 50.00	0.6000	0.6000
T9	34	7/8	37.50 - 50.00	0.6000	0.6000
T10	1	1/2	25.00 - 37.50	0.6000	0.6000
T10	2	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	3	LDF4-50A (1/2 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	4	FLC78-50J (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T10	5	FLC78-50J (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	6	FLC78-50J (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	7	1/2	25.00 - 37.50	0.6000	0.6000
T10	8	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	9	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	10	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	11	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	12	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	13	LDF4-50A (1/2 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 37.50	0.6000	0.6000
T10	15	1/2	25.00 - 37.50	0.6000	0.6000
T10	16	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	17	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	18	LDF4-50A (1/2 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	19	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	20	WEP65	25.00 - 37.50	0.6000	0.6000
T10	21	WEP65	25.00 - 37.50	0.6000	0.6000
T10	22	WEP65	25.00 - 37.50	0.6000	0.6000
T10	23	WEP65	25.00 - 37.50	0.6000	0.6000
T10	24	LCF78-50J (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	25	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	26	AVA5-50 (7/8 LOW DENSI.FOAM)	25.00 - 37.50	0.6000	0.6000
T10	27	LDF4-50A (1/2 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	28	LCF78-50J (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	29	LDF4-50A (1/2 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	30	Fiber Trunk	25.00 - 37.50	0.6000	0.6000
T10	31	DC Trunk	25.00 - 37.50	0.6000	0.6000
T10	32	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	33	7/8	25.00 - 37.50	0.6000	0.6000
T10	34	7/8	25.00 - 37.50	0.6000	0.6000
T11	1	1/2	8.00 - 25.00	0.6000	0.6000
T11	2	LDF5-50A (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	3	LDF4-50A (1/2 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	4	FLC78-50J (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	5	FLC78-50J (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	6	FLC78-50J (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	7	1/2	8.00 - 25.00	0.6000	0.6000
T11	8	LDF5-50A (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	9	LDF5-50A (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	10	LDF5-50A (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	11	LDF5-50A (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	12	LDF5-50A (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	13	LDF4-50A (1/2 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	8.00 - 25.00	0.6000	0.6000
T11	15	1/2	8.00 - 25.00	0.6000	0.6000
T11	16	LDF7-50A (1-5/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	17	LDF7-50A (1-5/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	18	LDF4-50A (1/2 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	19	LDF7-50A (1-5/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	20	WEP65	8.00 - 25.00	0.6000	0.6000
T11	21	WEP65	8.00 - 25.00	0.6000	0.6000
T11	22	WEP65	8.00 - 25.00	0.6000	0.6000
T11	23	WEP65	8.00 - 25.00	0.6000	0.6000
T11	24	LCF78-50J (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	25	LDF5-50A (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	26	AVA5-50 (7/8 LOW DENSI.FOAM)	8.00 - 25.00	0.6000	0.6000
T11	27	LDF4-50A (1/2 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	28	LCF78-50J (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T11	29	LDF4-50A (1/2 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	30	Fiber Trunk	8.00 - 25.00	0.6000	0.6000
T11	31	DC Trunk	8.00 - 25.00	0.6000	0.6000
T11	32	LDF7-50A (1-5/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	33	7/8	8.00 - 25.00	0.6000	0.6000
T11	34	7/8	8.00 - 25.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
*** Hightower CLimb Inventory - 10/24/2016									
Pirod 4' Side Mount Standoff (1)	C	From Leg	0.00	0.0000	48.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
(Shared HGT-1&2 / CSP#23,21)			0.00			1" Ice	7.10	7.10	128.00
6'8"x4" Pipe Mount (Shared HGT-1&2 / CSP#23,21)	C	From Leg	0.00	0.0000	48.00	No Ice	1.93	1.93	72.00
			0.00			1/2" Ice	3.01	3.01	93.13
			0.00			1" Ice	3.42	3.42	118.95
DB803M-XT (HGT-2/CSP#21)	C	From Leg	4.00	0.0000	49.00	No Ice	0.50	0.50	4.30
			0.00			1/2" Ice	0.68	0.68	8.98
			2.50			1" Ice	0.87	0.87	15.80
4'x4" Pipe Mount (Shared HGT-3&4/CSP#16,#22)	B	From Leg	0.00	0.0000	80.00	No Ice	1.08	1.08	44.00
			0.00			1/2" Ice	1.58	1.58	56.99
			0.00			1" Ice	1.84	1.84	73.03
DB222 (HGT-4/CSP#22)	B	From Leg	0.50	0.0000	81.00	No Ice	1.60	1.60	16.00
			0.00			1/2" Ice	2.88	2.88	20.80
			5.00			1" Ice	4.16	4.16	25.60
(inverted) DB212-1 (HGT-5/CSP#8)	C	From Leg	4.00	0.0000	81.00	No Ice	4.50	4.50	31.00
			0.00			1/2" Ice	8.10	8.10	40.30
			-5.00			1" Ice	11.70	11.70	49.60
DB212-1 (HGT-6/CSP#15)	C	From Leg	4.00	0.0000	86.00	No Ice	4.50	4.50	31.00
			0.00			1/2" Ice	8.10	8.10	40.30
			0.00			1" Ice	11.70	11.70	49.60
Pirod 4' Side Mount Standoff (1)	C	From Leg	0.00	0.0000	86.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
(Shared HGT-5&6 / CSP#8,15)			0.00			1" Ice	7.10	7.10	128.00
DB222 (HGT-7 / CSP#13 (Twr Face Mt.))	C	From Face	0.00	0.0000	100.00	No Ice	1.60	1.60	16.00
			-3.00			1/2" Ice	2.88	2.88	20.80
			0.00			1" Ice	4.16	4.16	25.60
PD458-1 (HGT-8 / CSP#14 (Twr Face Mt.))	C	From Face	0.00	0.0000	105.00	No Ice	2.88	2.88	24.00
			-4.00			1/2" Ice	4.34	4.34	46.22
			0.00			1" Ice	5.83	5.83	77.59
DS9A09F36D-N 19 ft Omni w/ Mount Pipe (HGT-9 / CSP)	C	From Leg	5.00	0.0000	116.00	No Ice	6.95	6.95	98.25
			0.00			1/2" Ice	9.21	9.21	152.99
			5.00			1" Ice	11.49	11.49	221.39
DB-B1-6C-8AB-0Z Dist. Box (HGT-10 / CSP#24)	C	From Leg	2.50	0.0000	116.00	No Ice	5.60	2.33	45.00
			0.00			1/2" Ice	5.92	2.56	81.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1" Ice	6.24	2.79	121.22
Pirod 4' Side Mount Standoff (1) (HGT-9,10 / CSP#24)	C	From Leg	0.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice	2.72 4.91 7.10	2.72 4.91 7.10	50.00 89.00 128.00
12' Dipole (HGT-11 / CSP)	A	From Leg	5.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice	6.00 8.00 10.00	6.00 8.00 10.00	70.00 90.00 110.00
Pirod 4' Side Mount Standoff (1) (HGT-11 / CSP)	A	From Leg	0.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice	2.72 4.91 7.10	2.72 4.91 7.10	50.00 89.00 128.00
DB224-A (HGT-13 / CSP)	B	From Leg	2.00 0.00 10.00	0.0000	136.00	No Ice 1/2" Ice 1" Ice	3.15 5.67 8.19	3.15 5.67 8.19	32.00 41.60 51.20
2'6"x4" Pipe Mount (HGT-13 / CSP)	B	From Leg	0.00 0.00 0.00	0.0000	136.00	No Ice 1/2" Ice 1" Ice	0.64 0.91 1.09	0.64 0.91 1.09	27.00 35.41 45.95
(inverted) 20' 8 Bay Di-Pole (HGT-14 / CSP#11)	A	From Face	4.00 0.00 -10.00	0.0000	136.00	No Ice 1/2" Ice 1" Ice	4.00 6.00 8.00	4.00 6.00 8.00	55.00 100.00 145.00
Pirod 4' Side Mount Standoff (1) (Shared HGT-14&15 / CSP#11,#9)	A	From Leg	0.00 0.00 0.00	-30.0000	136.00	No Ice 1/2" Ice 1" Ice	2.72 4.91 7.10	2.72 4.91 7.10	50.00 89.00 128.00
Pirod 4' Side Mount Standoff (1) (Shared HGT-14&15 / CSP#11,#9)	A	From Face	0.00 0.00 0.00	30.0000	136.00	No Ice 1/2" Ice 1" Ice	2.72 4.91 7.10	2.72 4.91 7.10	50.00 89.00 128.00
PD200 (HGT-15 / CSP#9)	A	From Leg	4.00 0.00 5.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.03 4.94 7.85	2.03 4.94 7.85	20.00 49.00 78.00
(inverted) DB420 (HGT-16 / CSP#12)	C	From Leg	5.00 0.00 -10.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice	3.33 5.99 8.66	3.33 5.99 8.66	34.00 44.20 54.40
20' 8 Bay Di-Pole (HGT-17 / CSP#20)	C	From Leg	5.00 0.00 10.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	4.00 6.00 8.00	4.00 6.00 8.00	55.00 100.00 145.00
Pirod 4' Side Mount Standoff (1) (Shared HGT-16&17 / CSP#12,#20)	A	From Leg	0.00 0.00 0.00	0.0000	143.00	No Ice 1/2" Ice 1" Ice	2.72 4.91 7.10	2.72 4.91 7.10	50.00 89.00 128.00
4'x4" Pipe Mount (HGT-22 / CSP#2)	B	From Leg	0.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	1.06 1.58 1.84	1.06 1.58 1.84	44.00 56.99 73.03
4'x4" Pipe Mount (HGT-23 / CSP#3)	C	From Leg	0.00 0.00 0.00	0.0000	169.00	No Ice 1/2" Ice 1" Ice	1.06 1.58 1.84	1.06 1.58 1.84	44.00 56.99 73.03
OGT9-840 (HGT-24 / CSP#6)	A	From Leg	5.00 0.00 -7.25	0.0000	177.00	No Ice 1/2" Ice 1" Ice	2.27 3.44 4.61	2.27 3.44 4.61	18.50 36.09 60.98
OGT9-840 (HGT-25 / CSP#4)	A	From Leg	5.00 0.00 -7.25	0.0000	177.00	No Ice 1/2" Ice 1" Ice	2.27 3.44 4.61	2.27 3.44 4.61	18.50 36.09 60.98
DB-B1-6C-8AB-0Z Dist. Box (HGT-26)	A	From Leg	0.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	5.60 5.92 6.24	2.33 2.56 2.79	45.00 81.13 121.22
Pirod 4' Side Mount Standoff (1)	A	From Leg	0.00 0.00	0.0000	177.00	No Ice 1/2" Ice	2.72 4.91	2.72 4.91	50.00 89.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(Shared HGT-24,25,26 / CSP# 4,6)			0.00			1" Ice	7.10	7.10	128.00
4'x4" Pipe Mount	B	From Leg	0.00	0.0000	178.00	No Ice	1.06	1.06	44.00
(HGT-27 / CSP#1)			0.00			1/2" Ice	1.58	1.58	56.99
			0.00			1" Ice	1.84	1.84	73.03
(inverted) OGT9-840	C	From Leg	4.00	0.0000	175.00	No Ice	2.27	2.27	18.50
(HGT-28 / CSP#7)			0.00			1/2" Ice	3.44	3.44	36.09
			-5.00			1" Ice	4.61	4.61	60.98
OGT9-840	C	From Leg	4.00	0.0000	181.00	No Ice	2.27	2.27	18.50
(HGT-29 / CSP#5)			0.00			1/2" Ice	3.44	3.44	36.09
			5.00			1" Ice	4.61	4.61	60.98
Pirod 4' Side Mount Standoff	C	From Leg	0.00	-30.0000	175.00	No Ice	2.72	2.72	50.00
(1)			0.00			1/2" Ice	4.91	4.91	89.00
(Shared HGT-28, 29 / CSP# 5,7)			0.00			1" Ice	7.10	7.10	128.00
Pirod 4' Side Mount Standoff	C	From Face	4.00	30.0000	175.00	No Ice	2.72	2.72	50.00
(1)			0.00			1/2" Ice	4.91	4.91	89.00
(Shared HGT-28, 29 / CSP# 5,7)			0.00			1" Ice	7.10	7.10	128.00
Pirod 4' Side Mount Standoff	A	From Leg	0.00	-30.0000	180.00	No Ice	2.72	2.72	50.00
(1)			0.00			1/2" Ice	4.91	4.91	89.00
(HGT-30 / CSP#19)			0.00			1" Ice	7.10	7.10	128.00
Pirod 4' Side Mount Standoff	A	From Face	4.00	30.0000	180.00	No Ice	2.72	2.72	50.00
(1)			0.00			1/2" Ice	4.91	4.91	89.00
(HGT-30 / CSP#19)			0.00			1" Ice	7.10	7.10	128.00
PD440-2	A	From Leg	4.00	0.0000	181.00	No Ice	1.38	1.38	19.00
(HGT-30 / CSP-19)			0.00			1/2" Ice	2.48	2.48	24.70
			5.00			1" Ice	3.59	3.59	30.40
DB225-A	C	From Leg	0.00	0.0000	178.00	No Ice	3.21	3.21	37.00
(HGT-31 / CSP#-17)			0.00			1/2" Ice	5.78	5.78	48.10
			0.00			1" Ice	8.35	8.35	59.20
*** Hightower CLimb Inventory - 10/24/2016									
*** CSP Additional Antennas - 10/2/2017									
USF-2U w/ TAM-ll adapter	C	From Leg	0.00	0.0000	175.00	No Ice	3.44	6.04	197.50
with 8' 2-3/8" Pipe			0.00			1/2" Ice	4.59	7.76	214.60
(CSP - Troop D)			0.00			1" Ice	5.76	9.48	236.60
10'6"x4" Pipe Mount	C	From Leg	0.00	0.0000	170.00	No Ice	3.20	3.20	114.00
(CSP - Troop D)			0.00			1/2" Ice	5.62	5.62	146.84
			0.00			1" Ice	6.25	6.25	186.71
SE4192-SWBP4LDF(Dxx-E6	C	From Leg	0.00	0.0000	170.00	No Ice	8.70	25.50	56.00
461) Panel Anenna			0.00			1/2" Ice	10.73	26.96	144.00
(CSP - Troop D)			0.00			1" Ice	12.78	28.25	246.93
(inverted) SC479-HF1LDF	C	From Leg	0.00	0.0000	173.00	No Ice	5.06	5.06	30.00
(CSP - Troop D)			0.00			1/2" Ice	6.54	6.54	69.82
			-7.25			1" Ice	8.04	8.04	114.98
3'4"x4" Pipe Mount	C	From Leg	0.00	0.0000	177.00	No Ice	0.87	0.87	36.00
(CSP - Troop D)			0.00			1/2" Ice	1.27	1.27	46.95
			0.00			1" Ice	1.49	1.49	60.55
(inverted) SC479-HF1LDF	C	From Leg	0.00	0.0000	173.00	No Ice	5.06	5.06	30.00
(CSP - Troop D)			0.00			1/2" Ice	6.54	6.54	69.82
			-7.25			1" Ice	8.04	8.04	114.98
432E-83I-01T TTA Unit	C	From Leg	0.00	0.0000	180.00	No Ice	2.85	0.97	25.00
(CSP - Troop D)			0.00			1/2" Ice	3.06	1.11	44.70
			0.00			1" Ice	3.28	1.26	67.39
*** CSP Additional Antennas									

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
- 10/2/2017									
*** T-Mobile Additions 12/2017									
*** SMK-006 Proposed AT&T Config (01202020)									
Pirod 12' T-Frame Sector Mount (1)	A	From Leg	0.50	0.0000	149.00	No Ice	13.60	13.60	465.00
			0.00			1/2" Ice	18.40	18.40	600.00
(AT&T)			0.00			1" Ice	23.20	23.20	735.00
Pirod 12' T-Frame Sector Mount (1)	B	From Leg	0.50	0.0000	149.00	No Ice	13.60	13.60	465.00
			0.00			1/2" Ice	18.40	18.40	600.00
(AT&T)			0.00			1" Ice	23.20	23.20	735.00
Pirod 12' T-Frame Sector Mount (1)	C	From Leg	0.50	0.0000	149.00	No Ice	13.60	13.60	465.00
			0.00			1/2" Ice	18.40	18.40	600.00
(AT&T)			0.00			1" Ice	23.20	23.20	735.00
(2) 7770.00 panel antenna	A	From Leg	0.50	0.0000	150.00	No Ice	5.53	4.01	52.03
(AT&T)			0.00			1/2" Ice	5.89	4.64	97.08
			0.00			1" Ice	6.26	5.28	148.33
(2) 7770.00 panel antenna	B	From Leg	0.50	0.0000	150.00	No Ice	5.53	4.01	52.03
(AT&T)			0.00			1/2" Ice	5.89	4.64	97.08
			0.00			1" Ice	6.26	5.28	148.33
(2) 7770.00 panel antenna	C	From Leg	0.50	0.0000	150.00	No Ice	5.53	4.01	52.03
(AT&T)			0.00			1/2" Ice	5.89	4.64	97.08
			0.00			1" Ice	6.26	5.28	148.33
AM-X-CD-17-65-00T-RET	A	From Leg	0.50	0.0000	150.00	No Ice	11.31	6.80	60.00
(AT&T)			0.00			1/2" Ice	11.93	7.38	121.39
			0.00			1" Ice	12.55	7.98	190.36
AM-X-CD-17-65-00T-RET	B	From Leg	0.50	0.0000	150.00	No Ice	11.31	6.80	60.00
(AT&T)			0.00			1/2" Ice	11.93	7.38	121.39
			0.00			1" Ice	12.55	7.98	190.36
AM-X-CD-16-65-00T-RET(72")	C	From Leg	0.50	0.0000	150.00	No Ice	8.02	4.64	50.00
			0.00			1/2" Ice	8.48	5.09	96.50
(AT&T)			0.00			1" Ice	8.94	5.54	149.00
RRUS-11	A	From Leg	0.50	0.0000	150.00	No Ice	2.57	1.07	50.00
(AT&T)			0.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
RRUS-11	B	From Leg	0.50	0.0000	150.00	No Ice	2.57	1.07	50.00
(AT&T)			0.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
RRUS-11	C	From Leg	0.50	0.0000	150.00	No Ice	2.57	1.07	50.00
(AT&T)			0.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
Ericsson RRUS-12 RRH Unit	A	From Leg	0.50	0.0000	150.00	No Ice	3.15	1.29	58.00
(AT&T)			0.00			1/2" Ice	3.36	1.44	81.22
			0.00			1" Ice	3.59	1.60	107.64
Ericsson RRUS-12 RRH Unit	B	From Leg	0.50	0.0000	150.00	No Ice	3.15	1.29	58.00
(AT&T)			0.00			1/2" Ice	3.36	1.44	81.22
			0.00			1" Ice	3.59	1.60	107.64
Ericsson RRUS-12 RRH Unit	C	From Leg	0.50	0.0000	150.00	No Ice	3.15	1.29	58.00
(AT&T)			0.00			1/2" Ice	3.36	1.44	81.22
			0.00			1" Ice	3.59	1.60	107.64
* tower Lightning Rod 10'6"x4" Pipe Mount	A	From Leg	0.00	0.0000	180.00	No Ice	3.19	3.19	114.00
(Tower)			0.00			1/2" Ice	5.62	5.62	146.84
			5.00			1" Ice	6.25	6.25	186.71
Lightning Rod 5/8x4'	A	From Leg	0.00	0.0000	180.00	No Ice	0.25	0.25	31.00
(Tower)			0.00			1/2" Ice	0.66	0.66	33.82
			15.00			1" Ice	0.97	0.97	39.29

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
* 05-2020 Invnetory Update AT&T									
LGP 21401 TMA Units (AT&T)	A	From Leg	0.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	0.82 0.94 1.06	0.35 0.44 0.54	17.50 23.31 30.86
LGP 21401 TMA Units (AT&T)	A	From Leg	0.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	0.82 0.94 1.06	0.35 0.44 0.54	17.50 23.31 30.86
LGP 21401 TMA Units (AT&T)	B	From Leg	0.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	0.82 0.94 1.06	0.35 0.44 0.54	17.50 23.31 30.86
LGP 21401 TMA Units (AT&T)	B	From Leg	0.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	0.82 0.94 1.06	0.35 0.44 0.54	17.50 23.31 30.86
LGP 21401 TMA Units (AT&T)	C	From Leg	0.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	0.82 0.94 1.06	0.35 0.44 0.54	17.50 23.31 30.86
LGP 21401 TMA Units (AT&T)	C	From Leg	0.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	0.82 0.94 1.06	0.35 0.44 0.54	17.50 23.31 30.86
Raycap DC6-48-60-18-8C Distribution Unit (AT&T / Squid Unit)	A	From Leg	0.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	0.79 1.27 1.75	0.79 1.27 1.75	20.00 35.12 52.57
BCD-80609-NE (CSP#38 (inverted))	A	From Leg	2.00 0.00 -5.00	0.0000	127.00	No Ice 1/2" Ice 1" Ice	2.95 4.11 5.29	2.95 4.11 5.29	26.50 48.29 77.42
DB212-1 (CSP#23)	C	From Leg	2.00 0.00 -5.00	0.0000	47.00	No Ice 1/2" Ice 1" Ice	4.50 8.10 11.70	4.50 8.10 11.70	31.00 40.30 49.60
ANT220F2 (Eversource)	B	From Leg	4.00 0.00 -5.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice	1.03 1.29 1.56	1.03 1.29 1.56	15.00 23.80 35.62
SitePro USF-4U (Eversource)	B	From Leg	2.00 0.00 -5.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice	5.75 8.00 10.25	5.75 8.00 10.25	160.00 208.00 256.00
871F-70 (Eversource)	A	From Leg	4.00 0.00 -5.00	0.0000	134.00	No Ice 1/2" Ice 1" Ice	2.40 3.20 4.00	2.40 3.20 4.00	15.00 25.00 35.00
SitePro USF-4U (Eversource)	A	From Leg	2.00 0.00 -5.00	0.0000	134.00	No Ice 1/2" Ice 1" Ice	5.75 8.00 10.25	5.75 8.00 10.25	160.00 208.00 256.00

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
10 FT DISH (HGT-27 / CSP#1)	B	Paraboloid w/Radome	From Leg	1.00 0.00	Worst		175.00	10.00	No Ice 1/2" Ice	78.54 79.81	317.00 726.71

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight lb
				0.00					1" Ice	81.09	1136.42
8 FT DISH	C	Paraboloid	From	0.50	Worst		169.00	8.00	No Ice	50.30	251.00
(HGT-23 / CSP#3)		w/Radome	Leg	0.00					1/2" Ice	51.29	514.30
				0.00					1" Ice	52.28	777.60
8 FT DISH	B	Paraboloid	From	0.50	Worst		167.00	8.00	No Ice	50.30	251.00
(HGT-22 / CSP#2)		w/Radome	Leg	0.00					1/2" Ice	51.29	514.30
				0.00					1" Ice	52.28	777.60
8 FT DISH	B	Paraboloid	From	0.50	Worst		79.00	8.00	No Ice	50.30	251.00
(HGT-3/CSP#16)		w/Radome	Leg	0.00					1/2" Ice	51.29	514.30
				0.00					1" Ice	52.28	777.60

222-H Verification Constants

Constant	Value
K_d	0.85
Ice Thickness Importance Factor	1.15
Z_g	1200
α	7
K_{zmin}	0.7
K_c	0.9
K_t	0.53
f	2
K_e	1

222-H Section Verification ArRr By Element

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft²	A_r w/Ice ft²	A_rR_r ft²	A_rR_r w/Ice ft²
T1	1	HSS5x0.25	64.134	35.536	C	0.173	0.308	2.086	3.236	1.002	1.946
180.00-175.00											
	1	HSS5x0.25	64.134	35.536	A	0.173	0.308	2.086	3.236	1.002	1.946
	2	HSS5x0.25	64.134	35.536	C	0.173	0.308	2.086	3.236	1.002	1.946
	2	HSS5x0.25	64.134	35.536	B	0.173	0.308	2.086	3.236	1.002	1.946
	3	HSS5x0.25	64.134	35.536	B	0.173	0.308	2.086	3.236	1.002	1.946
	3	HSS5x0.25	64.134	35.536	A	0.173	0.308	2.086	3.236	1.002	1.946
					A		Sum:	4.171	6.471	2.003	3.892
					B			4.171	6.471	2.003	3.892
					C			4.171	6.471	2.003	3.892
T2	13	HSS5x0.25	63.699	35.236	C	0.135	0.236	10.428	16.151	4.880	9.397
175.00-150.00											
	13	HSS5x0.25	63.699	35.236	A	0.135	0.236	10.428	16.151	4.880	9.397
	14	HSS5x0.25	63.699	35.236	C	0.135	0.236	10.428	16.151	4.880	9.397
	14	HSS5x0.25	63.699	35.236	B	0.135	0.236	10.428	16.151	4.880	9.397
	15	HSS5x0.25	63.699	35.236	B	0.135	0.236	10.428	16.151	4.880	9.397
	15	HSS5x0.25	63.699	35.236	A	0.135	0.236	10.428	16.151	4.880	9.397
					A		Sum:	20.856	32.302	9.759	18.793
					B			20.856	32.302	9.759	18.793
					C			20.856	32.302	9.759	18.793
T3	43	HSS5x0.25	63.064	34.798	C	0.13	0.223	10.428	16.111	4.889	9.327
150.00-125.00											
	43	HSS5x0.25	63.064	34.798	A	0.13	0.223	10.428	16.111	4.889	9.327

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft²	A_r w/Ice ft²	A_rR_r ft²	A_rR_r w/Ice ft²
	44	HSS5x0.25	63.064	34.798	C	0.13	0.223	10.428	16.111	4.889	9.327
	44	HSS5x0.25	63.064	34.798	B	0.13	0.223	10.428	16.111	4.889	9.327
	45	HSS5x0.25	63.064	34.798	B	0.13	0.223	10.428	16.111	4.889	9.327
	45	HSS5x0.25	63.064	34.798	A	0.13	0.223	10.428	16.111	4.889	9.327
					A		Sum:	20.856	32.222	9.779	18.655
					B			20.856	32.222	9.779	18.655
					C			20.856	32.222	9.779	18.655
T4	82	HSS5x.375	62.611	34.487	C	0.12	0.208	10.428	16.082	4.877	9.261
125.00-100.00											
	82	HSS5x.375	62.611	34.487	A	0.12	0.208	10.428	16.082	4.877	9.261
	83	HSS5x.375	62.611	34.487	C	0.12	0.208	10.428	16.082	4.877	9.261
	83	HSS5x.375	62.611	34.487	B	0.12	0.208	10.428	16.082	4.877	9.261
	84	HSS5x.375	62.611	34.487	B	0.12	0.208	10.428	16.082	4.877	9.261
	84	HSS5x.375	62.611	34.487	A	0.12	0.208	10.428	16.082	4.877	9.261
					A		Sum:	20.856	32.165	9.755	18.523
					B			20.856	32.165	9.755	18.523
					C			20.856	32.165	9.755	18.523
T5 100.00-91.67	121	HSS5x.4	62.451	34.377	C	0.115	0.199	3.476	5.357	1.623	3.077
	121	HSS5x.4	62.451	34.377	A	0.115	0.199	3.476	5.357	1.623	3.077
	122	HSS5x.4	62.451	34.377	C	0.115	0.199	3.476	5.357	1.623	3.077
	122	HSS5x.4	62.451	34.377	B	0.115	0.199	3.476	5.357	1.623	3.077
	123	HSS5x.4	62.451	34.377	B	0.115	0.199	3.476	5.357	1.623	3.077
	123	HSS5x.4	62.451	34.377	A	0.115	0.199	3.476	5.357	1.623	3.077
					A		Sum:	6.952	10.715	3.245	6.155
					B			6.952	10.715	3.245	6.155
					C			6.952	10.715	3.245	6.155
T6 91.67-83.33	136	HSS5x.4	62.422	34.358	C	0.113	0.196	3.476	5.357	1.621	3.074
	136	HSS5x.4	62.422	34.358	A	0.113	0.196	3.476	5.357	1.621	3.074
	137	HSS5x.4	62.422	34.358	C	0.113	0.196	3.476	5.357	1.621	3.074
	137	HSS5x.4	62.422	34.358	B	0.113	0.196	3.476	5.357	1.621	3.074
	138	HSS5x.4	62.422	34.358	B	0.113	0.196	3.476	5.357	1.621	3.074
	138	HSS5x.4	62.422	34.358	A	0.113	0.196	3.476	5.357	1.621	3.074
					A		Sum:	6.952	10.714	3.242	6.147
					B			6.952	10.714	3.242	6.147
					C			6.952	10.714	3.242	6.147
T7 83.33-75.00	151	HSS5x.4	62.428	34.361	C	0.111	0.193	3.476	5.357	1.619	3.071
	151	HSS5x.4	62.428	34.361	A	0.111	0.193	3.476	5.357	1.619	3.071
	152	HSS5x.4	62.428	34.361	C	0.111	0.193	3.476	5.357	1.619	3.071
	152	HSS5x.4	62.428	34.361	B	0.111	0.193	3.476	5.357	1.619	3.071
	153	HSS5x.4	62.428	34.361	B	0.111	0.193	3.476	5.357	1.619	3.071
	153	HSS5x.4	62.428	34.361	A	0.111	0.193	3.476	5.357	1.619	3.071
					A		Sum:	6.952	10.714	3.237	6.141
					B			6.952	10.714	3.237	6.141
					C			6.952	10.714	3.237	6.141
T8 75.00-50.00	166	HSS6.875x.4	85.972	42.802	C	0.116	0.18	14.338	19.987	5.767	11.419
	166	HSS6.875x.4	85.972	42.802	A	0.116	0.18	14.338	19.987	5.767	11.419
	167	HSS6.875x.4	85.972	42.802	C	0.116	0.18	14.338	19.987	5.767	11.419
	167	HSS6.875x.4	85.972	42.802	B	0.116	0.18	14.338	19.987	5.767	11.419
	168	HSS6.875x.4	85.972	42.802	B	0.116	0.18	14.338	19.987	5.767	11.419
	168	HSS6.875x.4	85.972	42.802	A	0.116	0.18	14.338	19.987	5.767	11.419
					A		Sum:	28.676	39.975	11.534	22.837
					B			28.676	39.975	11.534	22.837
					C			28.676	39.975	11.534	22.837
T9 50.00-37.50	193	HSS6.875x.5	86.108	42.883	C	0.111	0.173	7.169	9.997	2.867	5.701
	193	HSS6.875x.5	86.108	42.883	A	0.111	0.173	7.169	9.997	2.867	5.701
	194	HSS6.875x.5	86.108	42.883	C	0.111	0.173	7.169	9.997	2.867	5.701
	194	HSS6.875x.5	86.108	42.883	B	0.111	0.173	7.169	9.997	2.867	5.701
	195	HSS6.875x.5	86.108	42.883	B	0.111	0.173	7.169	9.997	2.867	5.701
	195	HSS6.875x.5	86.108	42.883	A	0.111	0.173	7.169	9.997	2.867	5.701
					A		Sum:	14.338	19.994	5.734	11.402

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft^2	A_r w/Ice ft^2	A_rR_r ft^2	A_rR_r w/Ice ft^2
					B			14.338	19.994	5.734	11.402
					C			14.338	19.994	5.734	11.402
T10 37.50-25.00	208	HSS6.875x.5	85.777	42.686	C	0.108	0.169	7.169	9.989	2.858	5.691
	208	HSS6.875x.5	85.777	42.686	A	0.108	0.169	7.169	9.989	2.858	5.691
	209	HSS6.875x.5	85.777	42.686	C	0.108	0.169	7.169	9.989	2.858	5.691
	209	HSS6.875x.5	85.777	42.686	B	0.108	0.169	7.169	9.989	2.858	5.691
	210	HSS6.875x.5	85.777	42.686	B	0.108	0.169	7.169	9.989	2.858	5.691
	210	HSS6.875x.5	85.777	42.686	A	0.108	0.169	7.169	9.989	2.858	5.691
					A		Sum:	14.338	19.979	5.715	11.381
					B			14.338	19.979	5.715	11.381
					C			14.338	19.979	5.715	11.381
T11 25.00-0.00	223	HSS6.875x.5	92.61	45.656	C	0.121	0.197	14.338	19.792	5.804	11.361
	223	HSS6.875x.5	92.61	45.656	A	0.121	0.197	14.338	19.792	5.804	11.361
	224	HSS6.875x.5	92.61	45.656	C	0.121	0.197	14.338	19.792	5.804	11.361
	224	HSS6.875x.5	92.61	45.656	B	0.121	0.197	14.338	19.792	5.804	11.361
	225	HSS6.875x.5	92.61	45.656	B	0.121	0.197	14.338	19.792	5.804	11.361
	225	HSS6.875x.5	92.61	45.656	A	0.121	0.197	14.338	19.792	5.804	11.361
					A		Sum:	28.676	39.584	11.607	22.722
					B			28.676	39.584	11.607	22.722
					C			28.676	39.584	11.607	22.722

222-H Section Verification Tables - No Ice

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft^2
T1 180.00-175.00	177.50		1.164	25.211	1.038		52	A	0.173	2.003
								B	0.173	2.003
								C	0.173	2.003
T2 175.00-150.00	162.50		1.135	19.193	1.05		51	A	0.135	9.759
								B	0.135	9.759
								C	0.135	9.759
T3 150.00-125.00	137.50		1.082	12.182	1.08		50	A	0.13	9.779
								B	0.13	9.779
								C	0.13	9.779
T4 125.00-100.00	112.50		1.022	7.733	1.127		49	A	0.12	9.755
								B	0.12	9.755
								C	0.12	9.755
T5 100.00-91.67	95.83		0.976	5.711	1.174		49	A	0.115	3.245
								B	0.115	3.245
								C	0.115	3.245
T6 91.67-83.33	87.50		0.951	4.908	1.204		49	A	0.113	3.242
								B	0.113	3.242
								C	0.113	3.242
T7 83.33-75.00	79.17		0.924	4.218	1.239		49	A	0.111	3.237
								B	0.111	3.237
								C	0.111	3.237
T8 75.00-50.00	62.50		0.864	3.115	1.33		49	A	0.116	11.534
								B	0.116	11.534
								C	0.116	11.534
T9 50.00-37.50	43.75		0.78	2.215	1.477		49	A	0.111	5.734
								B	0.111	5.734

Section Elevation	z_{wind}	z_{ice}	K_z	K_h	K_{zt}	t_z	q_z	Face	e	A_rR_r
ft	ft	ft				in	psf			ft^2
								C	0.111	5.734
T10 37.50-25.00	31.25		0.709	1.765	1.614		49	A	0.108	5.715
								B	0.108	5.715
								C	0.108	5.715
T11 25.00-0.00	12.50		0.7	1.255	1.904		57	A	0.121	11.607
								B	0.121	11.607
								C	0.121	11.607

222-H Section Verification Tables - Ice

Section Elevation	z_{wind}	z_{ice}	K_z	K_h	K_{zt}	t_z	q_z	Face	e	A_rR_r
ft	ft	ft				in	psf			ft^2
T1 180.00-175.00	177.50	177.50	1.164	25.211	1.038	1.3787	7	A	0.308	7.276
								B	0.308	7.276
								C	0.308	7.276
T2 175.00-150.00	162.50	162.50	1.135	19.193	1.05	1.3721	6	A	0.236	31.283
								B	0.236	31.283
								C	0.236	31.283
T3 150.00-125.00	137.50	137.50	1.082	12.182	1.08	1.3626	6	A	0.223	32.302
								B	0.223	32.302
								C	0.223	32.302
T4 125.00-100.00	112.50	112.50	1.022	7.733	1.127	1.3557	6	A	0.208	33.355
								B	0.208	33.355
								C	0.208	33.355
T5 100.00-91.67	95.83	95.83	0.976	5.711	1.174	1.3533	6	A	0.199	11.376
								B	0.199	11.376
								C	0.199	11.376
T6 91.67-83.33	87.50	87.50	0.951	4.908	1.204	1.3528	6	A	0.196	11.512
								B	0.196	11.512
								C	0.196	11.512
T7 83.33-75.00	79.17	79.17	0.924	4.218	1.239	1.3529	6	A	0.193	11.653
								B	0.193	11.653
								C	0.193	11.653
T8 75.00-50.00	62.50	62.50	0.864	3.115	1.33	1.3544	6	A	0.18	35.826
								B	0.18	35.826
								C	0.18	35.826
T9 50.00-37.50	43.75	43.75	0.78	2.215	1.477	1.3559	6	A	0.173	18.215
								B	0.173	18.215
								C	0.173	18.215
T10 37.50-25.00	31.25	31.25	0.709	1.765	1.614	1.3522	6	A	0.169	18.386
								B	0.169	18.386
								C	0.169	18.386
T11 25.00-0.00	12.50	12.50	0.7	1.255	1.904	1.3076	7	A	0.197	43.802
								B	0.197	43.802
								C	0.197	43.802

222-H Section Verification Tables - Service

Section Elevation	z_{wind}	z_{ice}	K_z	K_h	K_{zt}	t_z	q_z	Face	e	A_rR_r
ft	ft	ft				in	psf			ft^2

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T1 180.00-175.00	177.50		1.164	25.211	1.038		9	A	0.173	2.379
								B	0.173	2.379
								C	0.173	2.379
T2 175.00-150.00	162.50		1.135	19.193	1.05		9	A	0.135	11.808
								B	0.135	11.808
								C	0.135	11.808
T3 150.00-125.00	137.50		1.082	12.182	1.08		9	A	0.13	11.800
								B	0.13	11.800
								C	0.13	11.800
T4 125.00-100.00	112.50		1.022	7.733	1.127		9	A	0.12	11.787
								B	0.12	11.787
								C	0.12	11.787
T5 100.00-91.67	95.83		0.976	5.711	1.174		9	A	0.115	3.927
								B	0.115	3.927
								C	0.115	3.927
T6 91.67-83.33	87.50		0.951	4.908	1.204		9	A	0.113	3.926
								B	0.113	3.926
								C	0.113	3.926
T7 83.33-75.00	79.17		0.924	4.218	1.239		9	A	0.111	3.926
								B	0.111	3.926
								C	0.111	3.926
T8 75.00-50.00	62.50		0.864	3.115	1.33		9	A	0.116	16.201
								B	0.116	16.201
								C	0.116	16.201
T9 50.00-37.50	43.75		0.78	2.215	1.477		9	A	0.111	8.097
								B	0.111	8.097
								C	0.111	8.097
T10 37.50-25.00	31.25		0.709	1.765	1.614		9	A	0.108	8.095
								B	0.108	8.095
								C	0.108	8.095
T11 25.00-0.00	12.50		0.7	1.255	1.904		10	A	0.121	16.128
								B	0.121	16.128
								C	0.121	16.128

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	177.50	1.164	52	56.085	A	5.526	4.171	4.171	43.01	4.961	0.000
180.00-175.00					B	5.526	4.171		43.01	0.000	0.000
					C	5.526	4.171		43.01	0.000	0.000
T2	162.50	1.135	51	310.425	A	20.963	20.856	20.856	49.87	48.780	0.000
175.00-150.00					B	20.963	20.856		49.87	0.000	0.000
					C	20.963	20.856		49.87	0.777	0.000
T3	137.50	1.082	50	360.425	A	25.950	20.856	20.856	44.56	62.941	0.000
150.00-125.00					B	25.950	20.856		44.56	59.904	0.000
					C	25.950	20.856		44.56	3.774	0.000
T4	112.50	1.022	49	410.425	A	28.497	20.856	20.856	42.26	73.905	0.000
125.00-100.00					B	28.497	20.856		42.26	62.400	0.000
					C	28.497	20.856		42.26	5.550	0.000
T5	95.83	0.976	49	147.919	A	10.075	6.952	6.952	40.83	27.002	0.000
100.00-91.67					B	10.075	6.952		40.83	20.800	0.000

Section Elevation	z	K_Z	q_z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
					C	10.075	6.952		40.83	1.850	0.000
T6 91.67-83.33	87.50	0.951	49	153.475	A	10.367	6.952	6.952	40.14	27.440	0.000
					B	10.367	6.952		40.14	20.800	0.000
					C	10.367	6.952		40.14	1.850	0.000
T7 83.33-75.00	79.17	0.924	49	159.031	A	10.660	6.952	6.952	39.47	30.210	0.000
					B	10.660	6.952		39.47	20.800	0.000
					C	10.660	6.952		39.47	1.850	0.000
T8 75.00-50.00	62.50	0.864	49	514.334	A	30.955	28.676	28.676	48.09	94.793	0.000
					B	30.955	28.676		48.09	62.400	0.000
					C	30.955	28.676		48.09	5.550	0.000
T9 50.00-37.50	43.75	0.78	49	275.917	A	16.271	14.338	14.338	46.84	49.156	0.000
					B	16.271	14.338		46.84	31.200	0.000
					C	16.271	14.338		46.84	2.775	0.000
T10	31.25	0.709	49	288.417	A	16.805	14.338	14.338	46.04	49.546	0.000
37.50-25.00					B	16.805	14.338		46.04	31.200	0.000
					C	16.805	14.338		46.04	2.775	0.000
T11 25.00-0.00	12.50	0.7	57	614.334	A	45.951	28.676	28.676	38.43	67.383	0.000
					B	45.951	28.676		38.43	42.432	0.000
					C	45.951	28.676		38.43	3.774	0.000

Tower Pressure - With Ice

$G_H = 0.850$

Section Elevation	z	K_Z	q_z	t_Z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	in	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
T1	177.50	1.164	7	1.3787	57.235	A	5.526	12.098	6.471	36.72	14.961	0.000
180.00-175.00						B	5.526	12.098		36.72	0.000	0.000
						C	5.526	12.098		36.72	0.000	0.000
T2	162.50	1.135	6	1.3721	316.147	A	20.963	53.770	32.302	43.22	133.852	0.000
175.00-150.00						B	20.963	53.770		43.22	0.000	0.000
						C	20.963	53.770		43.22	2.698	0.000
T3	137.50	1.082	6	1.3626	366.107	A	25.950	55.794	32.222	39.42	180.050	0.000
150.00-125.00						B	25.950	55.794		39.42	168.034	0.000
						C	25.950	55.794		39.42	13.039	0.000
T4	112.50	1.022	6	1.3557	416.078	A	28.497	57.921	32.165	37.22	221.923	0.000
125.00-100.00						B	28.497	57.921		37.22	174.894	0.000
						C	28.497	57.921		37.22	19.107	0.000
T5 100.00-91.67	95.83	0.976	6	1.3533	149.800	A	10.075	19.805	10.715	35.86	82.484	0.000
						B	10.075	19.805		35.86	58.281	0.000
						C	10.075	19.805		35.86	6.361	0.000
T6 91.67-83.33	87.50	0.951	6	1.3528	155.355	A	10.367	20.063	10.714	35.21	83.987	0.000
						B	10.367	20.063		35.21	58.278	0.000
						C	10.367	20.063		35.21	6.359	0.000
T7 83.33-75.00	79.17	0.924	6	1.3529	160.911	A	10.660	20.329	10.714	34.57	93.389	0.000
						B	10.660	20.329		34.57	58.279	0.000
						C	10.660	20.329		34.57	6.360	0.000
T8 75.00-50.00	62.50	0.864	6	1.3544	519.982	A	30.955	62.711	39.975	42.68	291.707	0.000
						B	30.955	62.711		42.68	174.867	0.000
						C	30.955	62.711		42.68	19.094	0.000
T9 50.00-37.50	43.75	0.78	6	1.3559	278.744	A	16.271	31.941	19.994	41.47	153.412	0.000
						B	16.271	31.941		41.47	87.449	0.000
						C	16.271	31.941		41.47	9.554	0.000
T10 37.50-25.00	31.25	0.709	6	1.3522	291.237	A	16.805	32.274	19.979	40.71	154.616	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						B	16.805	32.274		40.71	87.411	0.000
						C	16.805	32.274		40.71	9.536	0.000
T11 25.00-0.00	12.50	0.7	7	1.3076	619.787	A	45.951	76.309	39.584	32.38	205.766	0.000
						B	45.951	76.309		32.38	118.253	0.000
						C	45.951	76.309		32.38	12.665	0.000

Tower Pressure - Service

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	177.50	1.164	9	56.085	A	5.526	4.171	4.171	43.01	4.961	0.000
180.00-175.00					B	5.526	4.171		43.01	0.000	0.000
					C	5.526	4.171		43.01	0.000	0.000
T2	162.50	1.135	9	310.425	A	20.963	20.856	20.856	49.87	48.780	0.000
175.00-150.00					B	20.963	20.856		49.87	0.000	0.000
					C	20.963	20.856		49.87	0.777	0.000
T3	137.50	1.082	9	360.425	A	25.950	20.856	20.856	44.56	62.941	0.000
150.00-125.00					B	25.950	20.856		44.56	59.904	0.000
					C	25.950	20.856		44.56	3.774	0.000
T4	112.50	1.022	9	410.425	A	28.497	20.856	20.856	42.26	73.905	0.000
125.00-100.00					B	28.497	20.856		42.26	62.400	0.000
					C	28.497	20.856		42.26	5.550	0.000
T5	95.83	0.976	9	147.919	A	10.075	6.952	6.952	40.83	27.002	0.000
100.00-91.67					B	10.075	6.952		40.83	20.800	0.000
					C	10.075	6.952		40.83	1.850	0.000
T6 91.67-83.33	87.50	0.951	9	153.475	A	10.367	6.952	6.952	40.14	27.440	0.000
					B	10.367	6.952		40.14	20.800	0.000
					C	10.367	6.952		40.14	1.850	0.000
T7 83.33-75.00	79.17	0.924	9	159.031	A	10.660	6.952	6.952	39.47	30.210	0.000
					B	10.660	6.952		39.47	20.800	0.000
					C	10.660	6.952		39.47	1.850	0.000
T8 75.00-50.00	62.50	0.864	9	514.334	A	30.955	28.676	28.676	48.09	94.793	0.000
					B	30.955	28.676		48.09	62.400	0.000
					C	30.955	28.676		48.09	5.550	0.000
T9 50.00-37.50	43.75	0.78	9	275.917	A	16.271	14.338	14.338	46.84	49.156	0.000
					B	16.271	14.338		46.84	31.200	0.000
					C	16.271	14.338		46.84	2.775	0.000
T10	31.25	0.709	9	288.417	A	16.805	14.338	14.338	46.04	49.546	0.000
37.50-25.00					B	16.805	14.338		46.04	31.200	0.000
					C	16.805	14.338		46.04	2.775	0.000
T11 25.00-0.00	12.50	0.7	10	614.334	A	45.951	28.676	28.676	38.43	67.383	0.000
					B	45.951	28.676		38.43	42.432	0.000
					C	45.951	28.676		38.43	3.774	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	18.85	579.99	A	0.173	2.689	52	1	1	7.529	1017.65	203.53	C
180.00-175.00			B	0.173	2.689		1	1	7.529			
			C	0.173	2.689		1	1	7.529			
T2	162.31	2435.04	A	0.135	2.829	51	1	1	30.722	5041.77	201.67	C
175.00-150.00			B	0.135	2.829		1	1	30.722			
			C	0.135	2.829		1	1	30.722			
T3	483.49	3454.06	A	0.13	2.847	50	1	1	35.729	7528.94	301.16	C
150.00-125.00			B	0.13	2.847		1	1	35.729			
			C	0.13	2.847		1	1	35.729			
T4	540.65	4090.16	A	0.12	2.884	49	1	1	38.252	8161.95	326.48	C
125.00-100.00			B	0.12	2.884		1	1	38.252			
			C	0.12	2.884		1	1	38.252			
T5	189.03	1515.98	A	0.115	2.904	49	1	1	13.321	2845.23	341.43	C
100.00-91.67			B	0.115	2.904		1	1	13.321			
			C	0.115	2.904		1	1	13.321			
T6	190.75	1543.68	A	0.113	2.913	49	1	1	13.608	2893.20	347.18	C
91.67-83.33			B	0.113	2.913		1	1	13.608			
			C	0.113	2.913		1	1	13.608			
T7	197.39	1863.56	A	0.111	2.921	49	1	1	13.897	3002.41	360.29	C
83.33-75.00			B	0.111	2.921		1	1	13.897			
			C	0.111	2.921		1	1	13.897			
T8	601.25	6061.16	A	0.116	2.901	49	1	1	42.488	9200.26	368.01	C
75.00-50.00			B	0.116	2.901		1	1	42.488			
			C	0.116	2.901		1	1	42.488			
T9	305.49	3269.36	A	0.111	2.92	49	1	1	22.005	4769.07	381.53	C
50.00-37.50			B	0.111	2.92		1	1	22.005			
			C	0.111	2.92		1	1	22.005			
T10	306.63	3325.11	A	0.108	2.932	49	1	1	22.520	4815.50	385.24	C
37.50-25.00			B	0.108	2.932		1	1	22.520			
			C	0.108	2.932		1	1	22.520			
T11	417.01	8143.22	A	0.121	2.879	57	1	1	57.558	11303.04	452.12	C
25.00-0.00			B	0.121	2.879		1	1	57.558			
			C	0.121	2.879		1	1	57.558			
Sum Weight:	3412.84	36281.32						OTM	4792.32 kip-ft	60579.01		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	18.85	579.99	A	0.173	2.689	52	0.825	1	6.562	903.70	180.74	C
180.00-175.00			B	0.173	2.689		0.825	1	6.562			
			C	0.173	2.689		0.825	1	6.562			
T2	162.31	2435.04	A	0.135	2.829	51	0.825	1	27.054	4593.22	183.73	C
175.00-150.00			B	0.135	2.829		0.825	1	27.054			
			C	0.135	2.829		0.825	1	27.054			
T3	483.49	3454.06	A	0.13	2.847	50	0.825	1	31.188	6981.14	279.25	C
150.00-125.00			B	0.13	2.847		0.825	1	31.188			
			C	0.13	2.847		0.825	1	31.188			
T4	540.65	4090.16	A	0.12	2.884	49	0.825	1	33.265	7561.27	302.45	C
125.00-100.00			B	0.12	2.884		0.825	1	33.265			
			C	0.12	2.884		0.825	1	33.265			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T5	189.03	1515.98	A	0.115	2.904	49	0.825	1	11.558	2632.47	315.90	C
100.00-91.67			B	0.115	2.904		0.825	1	11.558			
			C	0.115	2.904		0.825	1	11.558			
T6	190.75	1543.68	A	0.113	2.913	49	0.825	1	11.794	2673.82	320.86	C
91.67-83.33			B	0.113	2.913		0.825	1	11.794			
			C	0.113	2.913		0.825	1	11.794			
T7	197.39	1863.56	A	0.111	2.921	49	0.825	1	12.032	2776.15	333.14	C
83.33-75.00			B	0.111	2.921		0.825	1	12.032			
			C	0.111	2.921		0.825	1	12.032			
T8	601.25	6061.16	A	0.116	2.901	49	0.825	1	37.071	8545.78	341.83	C
75.00-50.00			B	0.116	2.901		0.825	1	37.071			
			C	0.116	2.901		0.825	1	37.071			
T9	305.49	3269.36	A	0.111	2.92	49	0.825	1	19.157	4421.63	353.73	C
50.00-37.50			B	0.111	2.92		0.825	1	19.157			
			C	0.111	2.92		0.825	1	19.157			
T10	306.63	3325.11	A	0.108	2.932	49	0.825	1	19.579	4457.97	356.64	C
37.50-25.00			B	0.108	2.932		0.825	1	19.579			
			C	0.108	2.932		0.825	1	19.579			
T11	417.01	8143.22	A	0.121	2.879	57	0.825	1	49.517	10184.07	407.36	C
25.00-0.00			B	0.121	2.879		0.825	1	49.517			
			C	0.121	2.879		0.825	1	49.517			
Sum Weight:	3412.84	36281.32						OTM	4417.54 kip-ft	55731.23		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	18.85	579.99	A	0.173	2.689	52	0.8	1	6.424	887.42	177.48	C
180.00-175.00			B	0.173	2.689		0.8	1	6.424			
			C	0.173	2.689		0.8	1	6.424			
T2	162.31	2435.04	A	0.135	2.829	51	0.8	1	26.530	4529.14	181.17	C
175.00-150.00			B	0.135	2.829		0.8	1	26.530			
			C	0.135	2.829		0.8	1	26.530			
T3	483.49	3454.06	A	0.13	2.847	50	0.8	1	30.539	6902.88	276.12	C
150.00-125.00			B	0.13	2.847		0.8	1	30.539			
			C	0.13	2.847		0.8	1	30.539			
T4	540.65	4090.16	A	0.12	2.884	49	0.8	1	32.552	7475.46	299.02	C
125.00-100.00			B	0.12	2.884		0.8	1	32.552			
			C	0.12	2.884		0.8	1	32.552			
T5	189.03	1515.98	A	0.115	2.904	49	0.8	1	11.306	2602.08	312.25	C
100.00-91.67			B	0.115	2.904		0.8	1	11.306			
			C	0.115	2.904		0.8	1	11.306			
T6	190.75	1543.68	A	0.113	2.913	49	0.8	1	11.535	2642.48	317.10	C
91.67-83.33			B	0.113	2.913		0.8	1	11.535			
			C	0.113	2.913		0.8	1	11.535			
T7	197.39	1863.56	A	0.111	2.921	49	0.8	1	11.765	2743.83	329.26	C
83.33-75.00			B	0.111	2.921		0.8	1	11.765			
			C	0.111	2.921		0.8	1	11.765			
T8	601.25	6061.16	A	0.116	2.901	49	0.8	1	36.297	8452.29	338.09	C
75.00-50.00			B	0.116	2.901		0.8	1	36.297			
			C	0.116	2.901		0.8	1	36.297			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T9	305.49	3269.36	A	0.111	2.92	49	0.8	1	18.751	4372.00	349.76	C
50.00-37.50			B	0.111	2.92		0.8	1	18.751			
			C	0.111	2.92		0.8	1	18.751			
T10	306.63	3325.11	A	0.108	2.932	49	0.8	1	19.159	4406.90	352.55	C
37.50-25.00			B	0.108	2.932		0.8	1	19.159			
			C	0.108	2.932		0.8	1	19.159			
T11	417.01	8143.22	A	0.121	2.879	57	0.8	1	48.368	10024.22	400.97	C
25.00-0.00			B	0.121	2.879		0.8	1	48.368			
			C	0.121	2.879		0.8	1	48.368			
Sum Weight:	3412.84	36281.32						OTM	4364.00 kip-ft	55038.69		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	18.85	579.99	A	0.173	2.689	52	0.85	1	6.701	919.98	184.00	C
180.00-175.00			B	0.173	2.689		0.85	1	6.701			
			C	0.173	2.689		0.85	1	6.701			
T2	162.31	2435.04	A	0.135	2.829	51	0.85	1	27.578	4657.30	186.29	C
175.00-150.00			B	0.135	2.829		0.85	1	27.578			
			C	0.135	2.829		0.85	1	27.578			
T3	483.49	3454.06	A	0.13	2.847	50	0.85	1	31.836	7059.39	282.38	C
150.00-125.00			B	0.13	2.847		0.85	1	31.836			
			C	0.13	2.847		0.85	1	31.836			
T4	540.65	4090.16	A	0.12	2.884	49	0.85	1	33.977	7647.08	305.88	C
125.00-100.00			B	0.12	2.884		0.85	1	33.977			
			C	0.12	2.884		0.85	1	33.977			
T5	189.03	1515.98	A	0.115	2.904	49	0.85	1	11.809	2662.87	319.54	C
100.00-91.67			B	0.115	2.904		0.85	1	11.809			
			C	0.115	2.904		0.85	1	11.809			
T6	190.75	1543.68	A	0.113	2.913	49	0.85	1	12.053	2705.16	324.62	C
91.67-83.33			B	0.113	2.913		0.85	1	12.053			
			C	0.113	2.913		0.85	1	12.053			
T7	197.39	1863.56	A	0.111	2.921	49	0.85	1	12.298	2808.47	337.02	C
83.33-75.00			B	0.111	2.921		0.85	1	12.298			
			C	0.111	2.921		0.85	1	12.298			
T8	601.25	6061.16	A	0.116	2.901	49	0.85	1	37.845	8639.28	345.57	C
75.00-50.00			B	0.116	2.901		0.85	1	37.845			
			C	0.116	2.901		0.85	1	37.845			
T9	305.49	3269.36	A	0.111	2.92	49	0.85	1	19.564	4471.27	357.70	C
50.00-37.50			B	0.111	2.92		0.85	1	19.564			
			C	0.111	2.92		0.85	1	19.564			
T10	306.63	3325.11	A	0.108	2.932	49	0.85	1	19.999	4509.05	360.72	C
37.50-25.00			B	0.108	2.932		0.85	1	19.999			
			C	0.108	2.932		0.85	1	19.999			
T11	417.01	8143.22	A	0.121	2.879	57	0.85	1	50.666	10343.93	413.76	C
25.00-0.00			B	0.121	2.879		0.85	1	50.666			
			C	0.121	2.879		0.85	1	50.666			
Sum Weight:	3412.84	36281.32						OTM	4471.08 kip-ft	56423.77		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	174.40	1549.82	A	0.308	2.275	7	1	1	12.802	212.97	42.59	C
180.00-175.00			B	0.308	2.275		1	1	12.802			
			C	0.308	2.275		1	1	12.802			
T2	1587.07	6336.81	A	0.236	2.479	6	1	1	52.246	1165.85	46.63	C
175.00-150.00			B	0.236	2.479		1	1	52.246			
			C	0.236	2.479		1	1	52.246			
T3	4387.76	8447.54	A	0.223	2.52	6	1	1	58.252	1964.38	78.58	C
150.00-125.00			B	0.223	2.52		1	1	58.252			
			C	0.223	2.52		1	1	58.252			
T4	5007.71	9448.96	A	0.208	2.57	6	1	1	61.852	2176.32	87.05	C
125.00-100.00			B	0.208	2.57		1	1	61.852			
			C	0.208	2.57		1	1	61.852			
T5	1765.42	3451.79	A	0.199	2.598	6	1	1	21.451	763.19	91.58	C
100.00-91.67			B	0.199	2.598		1	1	21.451			
			C	0.199	2.598		1	1	21.451			
T6	1782.69	3526.56	A	0.196	2.61	6	1	1	21.878	774.52	92.94	C
91.67-83.33			B	0.196	2.61		1	1	21.878			
			C	0.196	2.61		1	1	21.878			
T7	1884.59	3894.72	A	0.193	2.621	6	1	1	22.313	811.85	97.42	C
83.33-75.00			B	0.193	2.621		1	1	22.313			
			C	0.193	2.621		1	1	22.313			
T8	5784.23	11716.88	A	0.18	2.664	6	1	1	66.781	2493.06	99.72	C
75.00-50.00			B	0.18	2.664		1	1	66.781			
			C	0.18	2.664		1	1	66.781			
T9	2976.93	6213.45	A	0.173	2.689	6	1	1	34.485	1294.88	103.59	C
50.00-37.50			B	0.173	2.689		1	1	34.485			
			C	0.173	2.689		1	1	34.485			
T10	2984.27	6335.65	A	0.169	2.705	6	1	1	35.191	1301.54	104.12	C
37.50-25.00			B	0.169	2.705		1	1	35.191			
			C	0.169	2.705		1	1	35.191			
T11	3906.28	15416.29	A	0.197	2.605	7	1	1	89.753	2686.65	107.47	C
25.00-0.00			B	0.197	2.605		1	1	89.753			
			C	0.197	2.605		1	1	89.753			
Sum Weight:	32241.35	76338.46						OTM	1234.10 kip-ft	15645.21		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	174.40	1549.82	A	0.308	2.275	7	0.825	1	11.835	200.67	40.13	C
180.00-175.00			B	0.308	2.275		0.825	1	11.835			
			C	0.308	2.275		0.825	1	11.835			
T2	1587.07	6336.81	A	0.236	2.479	6	0.825	1	48.577	1115.70	44.63	C
175.00-150.00			B	0.236	2.479		0.825	1	48.577			
			C	0.236	2.479		0.825	1	48.577			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T3	4387.76	8447.54	A	0.223	2.52	6	0.825	1	53.711	1902.53	76.10	C
150.00-125.00			B	0.223	2.52		0.825	1	53.711			
			C	0.223	2.52		0.825	1	53.711			
T4	5007.71	9448.96	A	0.208	2.57	6	0.825	1	56.865	2108.03	84.32	C
125.00-100.00			B	0.208	2.57		0.825	1	56.865			
			C	0.208	2.57		0.825	1	56.865			
T5	1765.42	3451.79	A	0.199	2.598	6	0.825	1	19.688	738.92	88.67	C
100.00-91.67			B	0.199	2.598		0.825	1	19.688			
			C	0.199	2.598		0.825	1	19.688			
T6	1782.69	3526.56	A	0.196	2.61	6	0.825	1	20.064	749.45	89.93	C
91.67-83.33			B	0.196	2.61		0.825	1	20.064			
			C	0.196	2.61		0.825	1	20.064			
T7	1884.59	3894.72	A	0.193	2.621	6	0.825	1	20.447	785.96	94.32	C
83.33-75.00			B	0.193	2.621		0.825	1	20.447			
			C	0.193	2.621		0.825	1	20.447			
T8	5784.23	11716.88	A	0.18	2.664	6	0.825	1	61.363	2416.41	96.66	C
75.00-50.00			B	0.18	2.664		0.825	1	61.363			
			C	0.18	2.664		0.825	1	61.363			
T9	2976.93	6213.45	A	0.173	2.689	6	0.825	1	31.638	1254.08	100.33	C
50.00-37.50			B	0.173	2.689		0.825	1	31.638			
			C	0.173	2.689		0.825	1	31.638			
T10	2984.27	6335.65	A	0.169	2.705	6	0.825	1	32.250	1259.48	100.76	C
37.50-25.00			B	0.169	2.705		0.825	1	32.250			
			C	0.169	2.705		0.825	1	32.250			
T11	3906.28	15416.29	A	0.197	2.605	7	0.825	1	81.711	2557.51	102.30	C
25.00-0.00			B	0.197	2.605		0.825	1	81.711			
			C	0.197	2.605		0.825	1	81.711			
Sum Weight:	32241.35	76338.46						OTM	1191.50 kip-ft	15088.74		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	174.40	1549.82	A	0.308	2.275	7	0.8	1	11.697	198.92	39.78	C
180.00-175.00			B	0.308	2.275		0.8	1	11.697			
			C	0.308	2.275		0.8	1	11.697			
T2	1587.07	6336.81	A	0.236	2.479	6	0.8	1	48.053	1108.54	44.34	C
175.00-150.00			B	0.236	2.479		0.8	1	48.053			
			C	0.236	2.479		0.8	1	48.053			
T3	4387.76	8447.54	A	0.223	2.52	6	0.8	1	53.062	1893.69	75.75	C
150.00-125.00			B	0.223	2.52		0.8	1	53.062			
			C	0.223	2.52		0.8	1	53.062			
T4	5007.71	9448.96	A	0.208	2.57	6	0.8	1	56.153	2098.28	83.93	C
125.00-100.00			B	0.208	2.57		0.8	1	56.153			
			C	0.208	2.57		0.8	1	56.153			
T5	1765.42	3451.79	A	0.199	2.598	6	0.8	1	19.436	735.45	88.25	C
100.00-91.67			B	0.199	2.598		0.8	1	19.436			
			C	0.199	2.598		0.8	1	19.436			
T6	1782.69	3526.56	A	0.196	2.61	6	0.8	1	19.805	745.87	89.50	C
91.67-83.33			B	0.196	2.61		0.8	1	19.805			
			C	0.196	2.61		0.8	1	19.805			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T7	1884.59	3894.72	A	0.193	2.621	6	0.8	1	20.181	782.26	93.87	C
83.33-75.00			B	0.193	2.621		0.8	1	20.181			
			C	0.193	2.621		0.8	1	20.181			
T8	5784.23	11716.88	A	0.18	2.664	6	0.8	1	60.590	2405.46	96.22	C
75.00-50.00			B	0.18	2.664		0.8	1	60.590			
			C	0.18	2.664		0.8	1	60.590			
T9	2976.93	6213.45	A	0.173	2.689	6	0.8	1	31.231	1248.25	99.86	C
50.00-37.50			B	0.173	2.689		0.8	1	31.231			
			C	0.173	2.689		0.8	1	31.231			
T10	2984.27	6335.65	A	0.169	2.705	6	0.8	1	31.830	1253.47	100.28	C
37.50-25.00			B	0.169	2.705		0.8	1	31.830			
			C	0.169	2.705		0.8	1	31.830			
T11	3906.28	15416.29	A	0.197	2.605	7	0.8	1	80.563	2539.06	101.56	C
25.00-0.00			B	0.197	2.605		0.8	1	80.563			
			C	0.197	2.605		0.8	1	80.563			
Sum Weight:	32241.35	76338.46						OTM	1185.42 kip-ft	15009.24		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	174.40	1549.82	A	0.308	2.275	7	0.85	1	11.973	202.43	40.49	C
180.00-175.00			B	0.308	2.275		0.85	1	11.973			
			C	0.308	2.275		0.85	1	11.973			
T2	1587.07	6336.81	A	0.236	2.479	6	0.85	1	49.101	1122.87	44.91	C
175.00-150.00			B	0.236	2.479		0.85	1	49.101			
			C	0.236	2.479		0.85	1	49.101			
T3	4387.76	8447.54	A	0.223	2.52	6	0.85	1	54.359	1911.36	76.45	C
150.00-125.00			B	0.223	2.52		0.85	1	54.359			
			C	0.223	2.52		0.85	1	54.359			
T4	5007.71	9448.96	A	0.208	2.57	6	0.85	1	57.578	2117.79	84.71	C
125.00-100.00			B	0.208	2.57		0.85	1	57.578			
			C	0.208	2.57		0.85	1	57.578			
T5	1765.42	3451.79	A	0.199	2.598	6	0.85	1	19.940	742.38	89.09	C
100.00-91.67			B	0.199	2.598		0.85	1	19.940			
			C	0.199	2.598		0.85	1	19.940			
T6	1782.69	3526.56	A	0.196	2.61	6	0.85	1	20.323	753.03	90.36	C
91.67-83.33			B	0.196	2.61		0.85	1	20.323			
			C	0.196	2.61		0.85	1	20.323			
T7	1884.59	3894.72	A	0.193	2.621	6	0.85	1	20.714	789.66	94.76	C
83.33-75.00			B	0.193	2.621		0.85	1	20.714			
			C	0.193	2.621		0.85	1	20.714			
T8	5784.23	11716.88	A	0.18	2.664	6	0.85	1	62.137	2427.36	97.09	C
75.00-50.00			B	0.18	2.664		0.85	1	62.137			
			C	0.18	2.664		0.85	1	62.137			
T9	2976.93	6213.45	A	0.173	2.689	6	0.85	1	32.045	1259.91	100.79	C
50.00-37.50			B	0.173	2.689		0.85	1	32.045			
			C	0.173	2.689		0.85	1	32.045			
T10	2984.27	6335.65	A	0.169	2.705	6	0.85	1	32.670	1265.49	101.24	C
37.50-25.00			B	0.169	2.705		0.85	1	32.670			
			C	0.169	2.705		0.85	1	32.670			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T11	3906.28	15416.29	A	0.197	2.605	7	0.85	1	82.860	2575.96	103.04	C
25.00-0.00			B	0.197	2.605		0.85	1	82.860			
			C	0.197	2.605		0.85	1	82.860			
Sum Weight:	32241.35	76338.46						OTM	1197.59 kip-ft	15168.23		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	18.85	579.99	A	0.173	2.689	9	1	1	7.905	195.03	39.01	C
180.00-175.00			B	0.173	2.689		1	1	7.905			
			C	0.173	2.689		1	1	7.905			
T2	162.31	2435.04	A	0.135	2.829	9	1	1	32.771	972.04	38.88	C
175.00-150.00			B	0.135	2.829		1	1	32.771			
			C	0.135	2.829		1	1	32.771			
T3	483.49	3454.06	A	0.13	2.847	9	1	1	37.750	1427.65	57.11	C
150.00-125.00			B	0.13	2.847		1	1	37.750			
			C	0.13	2.847		1	1	37.750			
T4	540.65	4090.16	A	0.12	2.884	9	1	1	40.285	1544.10	61.76	C
125.00-100.00			B	0.12	2.884		1	1	40.285			
			C	0.12	2.884		1	1	40.285			
T5	189.03	1515.98	A	0.115	2.904	9	1	1	14.003	537.70	64.52	C
100.00-91.67			B	0.115	2.904		1	1	14.003			
			C	0.115	2.904		1	1	14.003			
T6	190.75	1543.68	A	0.113	2.913	9	1	1	14.293	546.61	65.59	C
91.67-83.33			B	0.113	2.913		1	1	14.293			
			C	0.113	2.913		1	1	14.293			
T7	197.39	1863.56	A	0.111	2.921	9	1	1	14.586	566.80	68.02	C
83.33-75.00			B	0.111	2.921		1	1	14.586			
			C	0.111	2.921		1	1	14.586			
T8	601.25	6061.16	A	0.116	2.901	9	1	1	47.155	1793.41	71.74	C
75.00-50.00			B	0.116	2.901		1	1	47.155			
			C	0.116	2.901		1	1	47.155			
T9	305.49	3269.36	A	0.111	2.92	9	1	1	24.368	928.91	74.31	C
50.00-37.50			B	0.111	2.92		1	1	24.368			
			C	0.111	2.92		1	1	24.368			
T10	306.63	3325.11	A	0.108	2.932	9	1	1	24.901	937.63	75.01	C
37.50-25.00			B	0.108	2.932		1	1	24.901			
			C	0.108	2.932		1	1	24.901			
T11	417.01	8143.22	A	0.121	2.879	10	1	1	62.079	2191.61	87.66	C
25.00-0.00			B	0.121	2.879		1	1	62.079			
			C	0.121	2.879		1	1	62.079			
Sum Weight:	3412.84	36281.32						OTM	916.24 kip-ft	11641.50		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	18.85	579.99	A	0.173	2.689	9	0.825	1	6.938	174.11	34.82	C
180.00-175.00			B	0.173	2.689		0.825	1	6.938			
			C	0.173	2.689		0.825	1	6.938			
T2	162.31	2435.04	A	0.135	2.829	9	0.825	1	29.102	889.65	35.59	C
175.00-150.00			B	0.135	2.829		0.825	1	29.102			
			C	0.135	2.829		0.825	1	29.102			
T3	483.49	3454.06	A	0.13	2.847	9	0.825	1	33.209	1327.03	53.08	C
150.00-125.00			B	0.13	2.847		0.825	1	33.209			
			C	0.13	2.847		0.825	1	33.209			
T4	540.65	4090.16	A	0.12	2.884	9	0.825	1	35.298	1433.77	57.35	C
125.00-100.00			B	0.12	2.884		0.825	1	35.298			
			C	0.12	2.884		0.825	1	35.298			
T5	189.03	1515.98	A	0.115	2.904	9	0.825	1	12.239	498.63	59.84	C
100.00-91.67			B	0.115	2.904		0.825	1	12.239			
			C	0.115	2.904		0.825	1	12.239			
T6	190.75	1543.68	A	0.113	2.913	9	0.825	1	12.479	506.32	60.76	C
91.67-83.33			B	0.113	2.913		0.825	1	12.479			
			C	0.113	2.913		0.825	1	12.479			
T7	197.39	1863.56	A	0.111	2.921	9	0.825	1	12.720	525.24	63.03	C
83.33-75.00			B	0.111	2.921		0.825	1	12.720			
			C	0.111	2.921		0.825	1	12.720			
T8	601.25	6061.16	A	0.116	2.901	9	0.825	1	41.738	1673.20	66.93	C
75.00-50.00			B	0.116	2.901		0.825	1	41.738			
			C	0.116	2.901		0.825	1	41.738			
T9	305.49	3269.36	A	0.111	2.92	9	0.825	1	21.520	865.10	69.21	C
50.00-37.50			B	0.111	2.92		0.825	1	21.520			
			C	0.111	2.92		0.825	1	21.520			
T10	306.63	3325.11	A	0.108	2.932	9	0.825	1	21.960	871.96	69.76	C
37.50-25.00			B	0.108	2.932		0.825	1	21.960			
			C	0.108	2.932		0.825	1	21.960			
T11	417.01	8143.22	A	0.121	2.879	10	0.825	1	54.038	1986.09	79.44	C
25.00-0.00			B	0.121	2.879		0.825	1	54.038			
			C	0.121	2.879		0.825	1	54.038			
Sum Weight:	3412.84	36281.32						OTM	847.41 kip-ft	10751.10		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	18.85	579.99	A	0.173	2.689	9	0.8	1	6.799	171.12	34.22	C
180.00-175.00			B	0.173	2.689		0.8	1	6.799			
			C	0.173	2.689		0.8	1	6.799			
T2	162.31	2435.04	A	0.135	2.829	9	0.8	1	28.578	877.88	35.12	C
175.00-150.00			B	0.135	2.829		0.8	1	28.578			
			C	0.135	2.829		0.8	1	28.578			
T3	483.49	3454.06	A	0.13	2.847	9	0.8	1	32.560	1312.65	52.51	C
150.00-125.00			B	0.13	2.847		0.8	1	32.560			
			C	0.13	2.847		0.8	1	32.560			
T4	540.65	4090.16	A	0.12	2.884	9	0.8	1	34.585	1418.01	56.72	C
125.00-100.00			B	0.12	2.884		0.8	1	34.585			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
			C	0.12	2.884		0.8	1	34.585			
T5	189.03	1515.98	A	0.115	2.904	9	0.8	1	11.987	493.04	59.17	C
100.00-91.67			B	0.115	2.904		0.8	1	11.987			
			C	0.115	2.904		0.8	1	11.987			
T6	190.75	1543.68	A	0.113	2.913	9	0.8	1	12.220	500.56	60.07	C
91.67-83.33			B	0.113	2.913		0.8	1	12.220			
			C	0.113	2.913		0.8	1	12.220			
T7	197.39	1863.56	A	0.111	2.921	9	0.8	1	12.454	519.31	62.32	C
83.33-75.00			B	0.111	2.921		0.8	1	12.454			
			C	0.111	2.921		0.8	1	12.454			
T8	601.25	6061.16	A	0.116	2.901	9	0.8	1	40.965	1656.03	66.24	C
75.00-50.00			B	0.116	2.901		0.8	1	40.965			
			C	0.116	2.901		0.8	1	40.965			
T9	305.49	3269.36	A	0.111	2.92	9	0.8	1	21.114	855.98	68.48	C
50.00-37.50			B	0.111	2.92		0.8	1	21.114			
			C	0.111	2.92		0.8	1	21.114			
T10	306.63	3325.11	A	0.108	2.932	9	0.8	1	21.540	862.58	69.01	C
37.50-25.00			B	0.108	2.932		0.8	1	21.540			
			C	0.108	2.932		0.8	1	21.540			
T11	417.01	8143.22	A	0.121	2.879	10	0.8	1	52.889	1956.73	78.27	C
25.00-0.00			B	0.121	2.879		0.8	1	52.889			
			C	0.121	2.879		0.8	1	52.889			
Sum Weight:	3412.84	36281.32						OTM	837.57 kip-ft	10623.90		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	18.85	579.99	A	0.173	2.689	9	0.85	1	7.076	177.10	35.42	C
180.00-175.00			B	0.173	2.689		0.85	1	7.076			
			C	0.173	2.689		0.85	1	7.076			
T2	162.31	2435.04	A	0.135	2.829	9	0.85	1	29.626	901.42	36.06	C
175.00-150.00			B	0.135	2.829		0.85	1	29.626			
			C	0.135	2.829		0.85	1	29.626			
T3	483.49	3454.06	A	0.13	2.847	9	0.85	1	33.858	1341.40	53.66	C
150.00-125.00			B	0.13	2.847		0.85	1	33.858			
			C	0.13	2.847		0.85	1	33.858			
T4	540.65	4090.16	A	0.12	2.884	9	0.85	1	36.010	1449.53	57.98	C
125.00-100.00			B	0.12	2.884		0.85	1	36.010			
			C	0.12	2.884		0.85	1	36.010			
T5	189.03	1515.98	A	0.115	2.904	9	0.85	1	12.491	504.21	60.51	C
100.00-91.67			B	0.115	2.904		0.85	1	12.491			
			C	0.115	2.904		0.85	1	12.491			
T6	190.75	1543.68	A	0.113	2.913	9	0.85	1	12.738	512.08	61.45	C
91.67-83.33			B	0.113	2.913		0.85	1	12.738			
			C	0.113	2.913		0.85	1	12.738			
T7	197.39	1863.56	A	0.111	2.921	9	0.85	1	12.987	531.18	63.74	C
83.33-75.00			B	0.111	2.921		0.85	1	12.987			
			C	0.111	2.921		0.85	1	12.987			
T8	601.25	6061.16	A	0.116	2.901	9	0.85	1	42.512	1690.38	67.62	C
75.00-50.00			B	0.116	2.901		0.85	1	42.512			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
			C	0.116	2.901		0.85	1	42.512			
T9	305.49	3269.36	A	0.111	2.92	9	0.85	1	21.927	874.21	69.94	C
50.00-37.50			B	0.111	2.92		0.85	1	21.927			
			C	0.111	2.92		0.85	1	21.927			
T10	306.63	3325.11	A	0.108	2.932	9	0.85	1	22.380	881.34	70.51	C
37.50-25.00			B	0.108	2.932		0.85	1	22.380			
			C	0.108	2.932		0.85	1	22.380			
T11	417.01	8143.22	A	0.121	2.879	10	0.85	1	55.186	2015.45	80.62	C
25.00-0.00			B	0.121	2.879		0.85	1	55.186			
			C	0.121	2.879		0.85	1	55.186			
Sum Weight:	3412.84	36281.32						OTM	857.24 kip-ft	10878.30		

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	11604.31					
Bracing Weight	24677.01					
Total Member Self-Weight	36281.32			15.50	3.85	
Total Weight	45712.89			15.50	3.85	
Wind 0 deg - No Ice		0.00	-82442.03	-8021.59	3.85	-27.75
Wind 30 deg - No Ice		39143.39	-67798.35	-6666.62	-3854.07	31.41
Wind 45 deg - No Ice		54867.42	-54867.42	-5402.57	-5414.22	58.79
Wind 60 deg - No Ice		66598.83	-38450.85	-3788.89	-6585.53	82.16
Wind 90 deg - No Ice		78286.79	0.00	15.50	-7711.99	110.89
Wind 120 deg - No Ice		71396.89	41221.01	4034.04	-6956.47	109.91
Wind 135 deg - No Ice		56826.22	56826.22	5585.00	-5565.65	98.03
Wind 150 deg - No Ice		39143.39	67798.35	6697.62	-3854.07	79.48
Wind 180 deg - No Ice		0.00	76901.71	7624.27	3.85	27.75
Wind 210 deg - No Ice		-39143.39	67798.35	6697.62	3861.78	-31.41
Wind 225 deg - No Ice		-54867.42	54867.42	5433.57	5421.92	-58.79
Wind 240 deg - No Ice		-71396.89	41221.01	4034.04	6964.17	-82.16
Wind 270 deg - No Ice		-78286.79	0.00	15.50	7719.70	-110.89
Wind 300 deg - No Ice		-66598.83	-38450.85	-3788.89	6593.24	-109.91
Wind 315 deg - No Ice		-54867.42	-54867.42	-5402.57	5421.92	-98.03
Wind 330 deg - No Ice		-39143.39	-67798.35	-6666.62	3861.78	-79.48
Member Ice	40057.14					
Total Weight Ice	124811.82			116.34	48.93	
Wind 0 deg - Ice		0.00	-20058.90	-1757.34	48.93	-20.10
Wind 30 deg - Ice		9790.96	-16958.44	-1474.70	-869.66	-0.95
Wind 45 deg - Ice		13790.30	-13790.30	-1178.43	-1245.85	9.06
Wind 60 deg - Ice		16820.75	-9711.46	-796.16	-1531.57	18.45
Wind 90 deg - Ice		19581.92	0.00	116.34	-1788.25	32.90
Wind 120 deg - Ice		17371.52	10029.45	1053.18	-1573.73	38.54
Wind 135 deg - Ice		14015.15	14015.15	1428.33	-1263.06	37.47
Wind 150 deg - Ice		9790.96	16958.44	1707.38	-869.66	33.85
Wind 180 deg - Ice		0.00	19422.93	1941.35	48.93	20.10
Wind 210 deg - Ice		-9790.96	16958.44	1707.38	967.52	0.95
Wind 225 deg - Ice		-13790.30	13790.30	1411.12	1343.71	-9.06
Wind 240 deg - Ice		-17371.52	10029.45	1053.18	1671.59	-18.45
Wind 270 deg - Ice		-19581.92	0.00	116.34	1886.11	-32.90

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 300 deg - Ice		-16820.75	-9711.46	-796.16	1629.43	-38.54
Wind 315 deg - Ice		-13790.30	-13790.30	-1178.43	1343.71	-37.47
Wind 330 deg - Ice		-9790.96	-16958.44	-1474.70	967.52	-33.85
Total Weight	45712.89			15.50	3.85	
Wind 0 deg - Service		0.00	-15697.36	-1513.71	2.99	-5.19
Wind 30 deg - Service		7467.08	-12933.35	-1259.18	-726.73	5.70
Wind 45 deg - Service		10470.09	-10470.09	-1020.30	-1022.04	10.75
Wind 60 deg - Service		12713.03	-7339.87	-715.16	-1243.89	15.07
Wind 90 deg - Service		14934.15	0.00	4.73	-1456.45	20.40
Wind 120 deg - Service		13594.31	7848.68	763.95	-1312.02	20.26
Wind 135 deg - Service		10829.87	10829.87	1057.57	-1049.85	18.10
Wind 150 deg - Service		7467.08	12933.35	1268.64	-726.73	14.70
Wind 180 deg - Service		0.00	14679.75	1444.50	2.99	5.19
Wind 210 deg - Service		-7467.08	12933.35	1268.64	732.70	-5.70
Wind 225 deg - Service		-10470.09	10470.09	1029.75	1028.01	-10.75
Wind 240 deg - Service		-13594.31	7848.68	763.95	1317.99	-15.07
Wind 270 deg - Service		-14934.15	0.00	4.73	1462.42	-20.40
Wind 300 deg - Service		-12713.03	-7339.87	-715.16	1249.86	-20.26
Wind 315 deg - Service		-10470.09	-10470.09	-1020.30	1028.01	-18.10
Wind 330 deg - Service		-7467.08	-12933.35	-1259.18	732.70	-14.70

Load Combinations

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

Comb. No.	Description
32	1.2 Dead+1.0 Wind 330 deg - No Ice
33	0.9 Dead+1.0 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 175	Leg	Max Tension	29	0.51	-0.85	0.55
			Max. Compression	35	-1415.64	0.13	0.11
			Max. Mx	8	-211.76	-0.87	0.12
			Max. My	17	-204.96	-0.02	-1.52
			Max. Vy	18	383.55	-0.86	-0.67
			Max. Vx	2	-490.08	-0.45	1.38
		Diagonal	Max Tension	25	517.98	0.00	0.00
			Max. Compression	24	-641.10	0.00	0.00
			Max. Mx	44	79.72	0.09	0.00
			Max. My	40	-176.20	0.00	-0.00
			Max. Vy	44	49.58	0.00	0.00
			Max. Vx	40	1.65	0.00	0.00
		Top Girt	Max Tension	9	466.12	0.01	0.00
			Max. Compression	24	-493.68	0.02	0.00
			Max. Mx	48	-122.01	0.05	0.01
			Max. My	46	-20.74	0.05	0.01
			Max. Vy	48	50.93	0.05	0.01
			Max. Vx	46	-3.82	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T2	175 - 150	Leg	Max Tension	19	15649.28	0.06	0.12
			Max. Compression	24	-19168.92	0.50	0.11
			Max. Mx	8	-1452.81	1.32	-0.07
			Max. My	32	-1545.14	-0.02	-2.52
			Max. Vy	8	1494.55	-0.96	-0.07
			Max. Vx	14	2080.82	-0.27	-1.67
		Diagonal	Max Tension	10	9919.25	0.00	0.00
			Max. Compression	10	-10055.80	0.00	0.00
			Max. Mx	44	1272.43	0.15	0.00
			Max. My	40	208.26	0.00	-0.01
			Max. Vy	44	-58.43	0.00	0.00
			Max. Vx	40	2.37	0.00	0.00
		Horizontal	Max Tension	10	6055.78	0.03	0.02
			Max. Compression	11	-5994.28	0.02	0.02
			Max. Mx	43	-115.11	0.08	0.02
			Max. My	46	257.51	0.08	0.02
			Max. Vy	43	60.77	0.08	0.02
			Max. Vx	46	-4.85	0.00	0.00
T3	150 - 125	Leg	Max Tension	19	52694.58	-0.54	-0.04
			Max. Compression	24	-62286.13	0.19	0.08
			Max. Mx	18	24136.37	-0.56	-0.06
			Max. My	26	-2660.76	-0.02	-0.66
			Max. Vy	8	-678.74	-0.51	-0.12
			Max. Vx	16	-767.18	-0.02	-0.62
		Diagonal	Max Tension	11	14033.47	0.00	0.00
			Max. Compression	10	-14306.66	0.00	0.00
			Max. Mx	44	2582.89	0.25	0.00
			Max. My	40	51.40	0.00	-0.01
			Max. Vy	44	-88.77	0.00	0.00
			Max. Vx	40	3.25	0.00	0.00
		Horizontal	Max Tension	10	9489.21	0.04	-0.00
			Max. Compression	11	-9400.20	0.03	-0.00
			Max. Mx	43	-210.50	0.12	0.00
			Max. My	2	1339.48	0.01	-0.02
			Max. Vy	43	-70.95	0.12	0.00
			Max. Vx	2	4.33	0.01	-0.02
		Inner Bracing	Max Tension	3	7.72	0.00	0.00
			Max. Compression	26	-13.50	0.00	0.00
			Max. Mx	34	-6.46	-0.08	0.00
			Max. My	12	6.37	0.00	-0.00
			Max. Vy	34	42.42	0.00	0.00
			Max. Vx	12	0.13	0.00	0.00
T4	125 - 100	Leg	Max Tension	19	99836.10	-0.36	-0.03
			Max. Compression	24	-115029.24	0.40	0.09
			Max. Mx	25	-113186.04	0.40	0.09
			Max. My	14	13603.19	-0.11	-0.48
			Max. Vy	8	-302.73	-0.38	-0.05
			Max. Vx	32	599.76	-0.01	0.47
		Diagonal	Max Tension	11	15809.10	0.00	0.00
			Max. Compression	10	-16125.46	0.00	0.00
			Max. Mx	44	2976.48	0.30	0.00
			Max. My	40	154.15	0.00	-0.01
			Max. Vy	44	-100.22	0.00	0.00
			Max. Vx	40	3.39	0.00	0.00
		Horizontal	Max Tension	10	11406.80	0.05	-0.00
			Max. Compression	11	-11323.98	0.04	-0.00
			Max. Mx	43	-193.96	0.14	0.00
			Max. My	2	238.10	0.02	-0.02
			Max. Vy	43	-79.44	0.14	0.00
			Max. Vx	2	3.87	0.02	-0.02
		Inner Bracing	Max Tension	15	6.27	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	10	-12.37	0.00	0.00
			Max. Mx	34	-7.05	-0.10	0.00
			Max. My	24	5.24	0.00	-0.00
			Max. Vy	34	48.12	0.00	0.00
			Max. Vx	24	0.13	0.00	0.00
T5	100 - 91.6667	Leg	Max Tension	19	116051.87	-0.38	0.03
			Max. Compression	24	-133243.14	0.32	-0.03
			Max. Mx	25	-131037.97	0.40	0.09
			Max. My	20	-6833.05	-0.01	0.45
			Max. Vy	3	138.58	0.40	-0.03
			Max. Vx	24	194.82	-0.21	0.45
		Diagonal	Max Tension	11	16323.95	0.00	0.00
			Max. Compression	10	-16667.46	0.00	0.00
			Max. Mx	44	3059.45	0.32	0.00
			Max. My	40	146.01	0.00	-0.01
			Max. Vy	44	-104.01	0.00	0.00
			Max. Vx	40	3.44	0.00	0.00
		Horizontal	Max Tension	10	11996.12	0.07	-0.00
			Max. Compression	11	-11921.68	0.05	-0.00
			Max. Mx	43	-170.32	0.17	0.01
			Max. My	2	283.51	0.03	-0.05
			Max. Vy	43	-94.48	0.17	0.01
			Max. Vx	12	6.32	0.03	-0.05
		Inner Bracing	Max Tension	3	10.91	0.00	0.00
			Max. Compression	10	-17.07	0.00	0.00
			Max. Mx	34	-7.57	-0.11	0.00
			Max. My	24	10.52	0.00	-0.00
			Max. Vy	34	-50.01	0.00	0.00
			Max. Vx	24	0.12	0.00	0.00
T6	91.6667 - 83.3333	Leg	Max Tension	19	132417.86	-0.30	-0.14
			Max. Compression	24	-151836.54	0.89	0.39
			Max. Mx	2	-150867.43	0.90	-0.19
			Max. My	22	28063.10	-0.24	1.23
			Max. Vy	3	-244.99	0.90	-0.19
			Max. Vx	14	368.01	-0.24	-0.98
		Diagonal	Max Tension	11	16695.15	0.00	0.00
			Max. Compression	10	-17056.25	0.00	0.00
			Max. Mx	44	3193.91	0.33	0.00
			Max. My	40	169.35	0.00	-0.01
			Max. Vy	44	-107.89	0.00	0.00
			Max. Vx	40	-3.49	0.00	0.00
		Horizontal	Max Tension	10	12484.24	0.07	-0.00
			Max. Compression	11	-12410.28	0.05	-0.00
			Max. Mx	43	-174.75	0.19	0.01
			Max. My	2	152.51	0.03	-0.05
			Max. Vy	43	-98.10	0.19	0.01
			Max. Vx	2	6.14	0.03	-0.05
		Inner Bracing	Max Tension	15	10.27	0.00	0.00
			Max. Compression	10	-16.74	0.00	0.00
			Max. Mx	34	-7.81	-0.11	0.00
			Max. My	24	9.80	0.00	-0.00
			Max. Vy	34	51.95	0.00	0.00
			Max. Vx	24	0.12	0.00	0.00
T7	83.3333 - 75	Leg	Max Tension	19	148788.92	-0.87	0.19
			Max. Compression	24	-170512.88	1.24	0.57
			Max. Mx	3	-167258.77	1.24	-0.40
			Max. My	20	-8917.00	-0.03	1.77
			Max. Vy	28	492.45	-1.22	0.17
			Max. Vx	20	-844.49	-0.03	1.77
		Diagonal	Max Tension	11	18095.46	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	10	-18572.22	0.00	0.00
			Max. Mx	44	3353.60	0.35	0.00
			Max. My	40	194.19	0.00	-0.01
			Max. Vy	44	-111.80	0.00	0.00
			Max. Vx	40	3.55	0.00	0.00
		Horizontal	Max Tension	10	13746.48	0.15	-0.00
			Max. Compression	11	-13727.12	0.11	-0.00
			Max. Mx	43	-245.33	0.28	0.00
			Max. My	2	615.55	0.07	-0.05
			Max. Vy	43	-139.79	0.28	0.00
			Max. Vx	12	6.93	0.07	-0.05
		Inner Bracing	Max Tension	3	9.16	0.00	0.00
			Max. Compression	10	-17.61	0.00	0.00
			Max. Mx	34	-9.07	-0.12	0.00
			Max. My	2	8.67	0.00	-0.00
			Max. Vy	34	53.91	0.00	0.00
			Max. Vx	2	0.11	0.00	0.00
T8	75 - 50	Leg	Max Tension	19	192455.32	-0.94	-0.19
			Max. Compression	24	-220829.08	0.93	0.15
			Max. Mx	3	-186495.37	1.24	-0.40
			Max. My	20	-9516.27	-0.03	1.77
			Max. Vy	3	218.27	1.24	-0.40
			Max. Vx	14	311.28	-0.29	-1.42
		Diagonal	Max Tension	11	24494.74	0.00	0.00
			Max. Compression	10	-25074.48	0.00	0.00
			Max. Mx	44	4664.91	0.71	0.00
			Max. My	40	473.72	0.00	-0.03
			Max. Vy	44	-174.39	0.00	0.00
			Max. Vx	40	6.44	0.00	0.00
		Horizontal	Max Tension	10	15850.59	0.11	-0.00
			Max. Compression	11	-15871.59	0.08	-0.00
			Max. Mx	43	-277.11	0.29	0.01
			Max. My	2	834.99	0.00	-0.05
			Max. Vy	43	-126.98	0.29	0.01
			Max. Vx	2	6.30	-0.00	-0.05
		Inner Bracing	Max Tension	15	8.90	0.00	0.00
			Max. Compression	26	-21.02	0.00	0.00
			Max. Mx	34	-12.07	-0.15	0.00
			Max. My	24	7.64	0.00	-0.00
			Max. Vy	34	58.87	0.00	0.00
			Max. Vx	24	0.10	0.00	0.00
T9	50 - 37.5	Leg	Max Tension	19	219149.60	-0.93	-0.15
			Max. Compression	24	-251877.77	1.91	0.08
			Max. Mx	12	-251484.31	1.92	-0.24
			Max. My	14	48246.73	-0.29	-1.42
			Max. Vy	3	-305.83	1.91	0.16
			Max. Vx	14	-542.54	-0.29	-1.42
		Diagonal	Max Tension	11	25426.58	0.00	0.00
			Max. Compression	10	-26029.60	0.00	0.00
			Max. Mx	44	4939.30	0.76	0.00
			Max. My	40	546.15	0.00	-0.03
			Max. Vy	44	-182.75	0.00	0.00
			Max. Vx	40	6.53	0.00	0.00
		Horizontal	Max Tension	10	16903.59	0.12	-0.00
			Max. Compression	11	-16924.20	0.09	-0.00
			Max. Mx	43	-393.47	0.31	0.01
			Max. My	2	814.11	0.02	-0.05
			Max. Vy	43	-132.37	0.31	0.01
			Max. Vx	2	6.03	0.02	-0.05
		Inner Bracing	Max Tension	15	7.43	0.00	0.00
			Max. Compression	26	-20.53	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	34	-12.45	-0.16	0.00
			Max. My	24	5.65	0.00	-0.00
			Max. Vy	34	61.88	0.00	0.00
			Max. Vx	24	0.08	0.00	0.00
T10	37.5 - 25	Leg	Max Tension	19	246169.80	-1.71	-0.16
			Max. Compression	24	-283299.05	-1.55	0.23
			Max. Mx	12	-282380.63	1.92	-0.24
			Max. My	14	53657.02	0.11	-2.46
			Max. Vy	2	476.36	1.91	0.16
			Max. Vx	14	406.99	0.11	-2.46
		Diagonal	Max Tension	11	26311.96	0.00	0.00
			Max. Compression	10	-26943.82	0.00	0.00
			Max. Mx	44	5198.86	0.81	0.00
			Max. My	40	573.86	0.00	-0.03
			Max. Vy	44	-190.74	0.00	0.00
			Max. Vx	40	-6.61	0.00	0.00
		Horizontal	Max Tension	10	17933.26	0.13	-0.00
			Max. Compression	11	-17960.05	0.10	-0.00
			Max. Mx	43	-297.22	0.34	0.00
			Max. My	2	460.51	0.03	-0.05
			Max. Vy	43	-138.16	0.34	0.00
			Max. Vx	12	5.83	0.03	-0.05
		Inner Bracing	Max Tension	15	6.46	0.00	0.00
			Max. Compression	26	-20.08	0.00	0.00
			Max. Mx	34	-12.81	-0.18	0.00
			Max. My	24	4.38	0.00	-0.00
			Max. Vy	34	64.67	0.00	0.00
			Max. Vx	24	0.06	0.00	0.00
T11	25 - 0	Leg	Max Tension	19	299070.65	4.98	-0.12
			Max. Compression	24	-346795.51	-0.00	-0.00
			Max. Mx	24	-346529.49	7.48	-0.27
			Max. My	14	65870.75	0.89	-4.18
			Max. Vy	24	-2360.21	7.48	-0.27
			Max. Vx	14	1160.31	0.89	-4.18
		Diagonal	Max Tension	11	28652.30	-0.20	-0.01
			Max. Compression	10	-29269.37	0.00	0.00
			Max. Mx	28	16742.62	-0.29	-0.02
			Max. My	39	-8028.29	-0.13	0.04
			Max. Vy	43	111.41	-0.21	0.03
			Max. Vx	39	7.94	0.00	0.00
		Horizontal	Max Tension	10	19682.47	0.29	-0.01
			Max. Compression	11	-20055.09	0.22	-0.00
			Max. Mx	43	410.71	0.52	0.00
			Max. My	2	1229.67	0.12	-0.06
			Max. Vy	43	-197.60	0.47	0.00
			Max. Vx	12	6.82	0.12	-0.05
		Redund Horz 1 Bracing	Max Tension	26	2394.50	0.00	0.00
			Max. Compression	27	-2636.96	0.00	0.00
			Max. Mx	39	393.33	-0.07	0.00
			Max. My	48	192.71	0.00	0.00
			Max. Vy	39	44.23	0.00	0.00
			Max. Vx	48	1.02	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	26	2097.25	0.00	0.00
			Max. Compression	27	-1642.48	0.00	0.00
			Max. Mx	46	-86.83	-0.09	0.00
			Max. My	40	494.78	0.00	0.00
			Max. Vy	46	42.39	0.00	0.00
			Max. Vx	40	-1.46	0.00	0.00
		Inner Bracing	Max Tension	15	3.60	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	10	-21.02	0.00	0.00
			Max. Mx	34	-15.69	-0.27	0.00
			Max. My	24	1.02	0.00	-0.00
			Max. Vy	34	88.48	0.00	0.00
			Max. Vx	24	0.07	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	24	380445.10	40913.29	-21456.35
	Max. H_x	24	380445.10	40913.29	-21456.35
	Max. H_z	5	-286343.82	-29231.30	21573.37
	Min. Vert	9	-328065.10	-36595.99	18907.38
	Min. H_x	9	-328065.10	-36595.99	18907.38
	Min. H_z	20	319614.72	31218.90	-22540.01
Leg B	Max. Vert	12	380074.71	-41225.58	-20906.32
	Max. H_x	29	-328344.12	36923.34	18347.65
	Max. H_z	33	-286625.35	29788.91	20597.05
	Min. Vert	29	-328344.12	36923.34	18347.65
	Min. H_x	12	380074.71	-41225.58	-20906.32
	Min. H_z	14	360841.99	-37641.48	-21993.68
Leg A	Max. Vert	2	378966.78	-634.30	46142.43
	Max. H_x	27	13051.50	6868.72	1089.15
	Max. H_z	2	378966.78	-634.30	46142.43
	Min. Vert	19	-329172.56	650.13	-41160.21
	Min. H_x	11	13050.88	-6872.66	1088.81
	Min. H_z	19	-329172.56	650.13	-41160.21

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	45712.89	-0.00	0.00	15.50	3.85	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	54855.47	-0.01	-82442.07	-7808.99	4.72	-27.81
0.9 Dead+1.0 Wind 0 deg - No Ice	41141.60	-0.01	-82442.06	-7808.51	3.55	-27.80
1.2 Dead+1.0 Wind 30 deg - No Ice	54855.47	39143.37	-67798.37	-6491.97	-3754.41	31.42
0.9 Dead+1.0 Wind 30 deg - No Ice	41141.60	39143.38	-67798.36	-6492.34	-3753.09	31.42
1.2 Dead+1.0 Wind 45 deg - No Ice	54855.47	54867.40	-54867.42	-5260.64	-5274.96	58.85
0.9 Dead+1.0 Wind 45 deg - No Ice	41141.60	54867.41	-54867.42	-5261.83	-5272.63	58.83
1.2 Dead+1.0 Wind 60 deg - No Ice	54855.47	66598.83	-38450.84	-3688.42	-6416.77	82.25
0.9 Dead+1.0 Wind 60 deg - No Ice	41141.60	66598.83	-38450.85	-3690.64	-6413.68	82.23
1.2 Dead+1.0 Wind 90 deg - No	54855.47	78286.79	0.07	19.03	-7513.27	111.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	kip-ft	kip-ft	kip-ft
Ice						
0.9 Dead+1.0 Wind 90 deg - No Ice	41141.60	78286.79	0.05	14.35	-7509.46	110.97
1.2 Dead+1.0 Wind 120 deg - No Ice	54855.47	71396.91	41221.08	3932.80	-6774.14	109.99
0.9 Dead+1.0 Wind 120 deg - No Ice	41141.60	71396.91	41221.07	3925.54	-6770.83	109.96
1.2 Dead+1.0 Wind 135 deg - No Ice	54855.47	56826.24	56826.24	5444.34	-5420.63	98.11
0.9 Dead+1.0 Wind 135 deg - No Ice	41141.60	56826.24	56826.24	5436.09	-5418.21	98.08
1.2 Dead+1.0 Wind 150 deg - No Ice	54855.47	39143.42	67798.34	6529.46	-3754.12	79.55
0.9 Dead+1.0 Wind 150 deg - No Ice	41141.60	39143.41	67798.35	6520.48	-3752.79	79.53
1.2 Dead+1.0 Wind 180 deg - No Ice	54855.47	-0.00	76901.70	7433.29	4.71	27.81
0.9 Dead+1.0 Wind 180 deg - No Ice	41141.60	-0.00	76901.70	7423.71	3.54	27.80
1.2 Dead+1.0 Wind 210 deg - No Ice	54855.47	-39143.42	67798.34	6529.39	3763.49	-31.42
0.9 Dead+1.0 Wind 210 deg - No Ice	41141.60	-39143.42	67798.34	6520.42	3759.84	-31.42
1.2 Dead+1.0 Wind 225 deg - No Ice	54855.47	-54867.45	54867.43	5298.24	5283.96	-58.85
0.9 Dead+1.0 Wind 225 deg - No Ice	41141.60	-54867.44	54867.43	5290.08	5279.30	-58.83
1.2 Dead+1.0 Wind 240 deg - No Ice	54855.47	-71396.91	41221.07	3932.72	6783.44	-82.26
0.9 Dead+1.0 Wind 240 deg - No Ice	41141.60	-71396.91	41221.06	3925.47	6777.81	-82.24
1.2 Dead+1.0 Wind 270 deg - No Ice	54855.47	-78286.79	0.08	19.02	7522.56	-111.00
0.9 Dead+1.0 Wind 270 deg - No Ice	41141.60	-78286.79	0.06	14.34	7516.42	-110.97
1.2 Dead+1.0 Wind 300 deg - No Ice	54855.47	-66598.83	-38450.83	-3688.37	6426.10	-109.99
0.9 Dead+1.0 Wind 300 deg - No Ice	41141.60	-66598.83	-38450.84	-3690.59	6420.69	-109.96
1.2 Dead+1.0 Wind 315 deg - No Ice	54855.47	-54867.41	-54867.42	-5260.58	5284.32	-98.11
0.9 Dead+1.0 Wind 315 deg - No Ice	41141.60	-54867.41	-54867.42	-5261.76	5279.66	-98.08
1.2 Dead+1.0 Wind 330 deg - No Ice	54855.47	-39143.38	-67798.36	-6491.91	3763.81	-79.55
0.9 Dead+1.0 Wind 330 deg - No Ice	41141.60	-39143.39	-67798.36	-6492.28	3760.16	-79.53
1.2 Dead+1.0 Ice+1.0 Temp	133954.40	-0.00	0.00	120.07	49.96	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	133954.40	-0.00	-20058.90	-1697.10	50.11	-20.15
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	133954.40	9790.96	-16958.44	-1423.14	-841.05	-0.94
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	133954.40	13790.30	-13790.30	-1135.73	-1206.00	9.11
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	133954.40	16820.75	-9711.46	-764.93	-1483.24	18.54
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	133954.40	19581.92	0.00	120.36	-1732.21	33.04
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	133954.40	17371.52	10029.45	1029.10	-1523.87	38.69
1.2 Dead+1.0 Wind 135	133954.40	14015.15	14015.15	1393.00	-1222.66	37.61

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	kip-ft	kip-ft	kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	133954.40	9790.96	16958.44	1663.81	-841.08	33.97
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	133954.40	-0.00	19422.93	1890.81	50.03	20.15
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	133954.40	-9790.96	16958.44	1663.78	941.18	0.94
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	133954.40	-13790.30	13790.30	1376.40	1306.15	-9.11
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	133954.40	-17371.52	10029.45	1029.05	1623.99	-18.54
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	133954.40	-19581.92	0.00	120.33	1832.33	-33.04
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	133954.40	-16820.75	-9711.46	-764.94	1583.39	-38.69
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	133954.40	-13790.30	-13790.30	-1135.74	1306.17	-37.61
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	133954.40	-9790.96	-16958.44	-1423.15	941.23	-33.97
Dead+Wind 0 deg - Service	45712.89	-0.00	-15697.36	-1462.31	3.87	-5.20
Dead+Wind 30 deg - Service	45712.89	7467.08	-12933.35	-1215.09	-706.62	5.70
Dead+Wind 45 deg - Service	45712.89	10470.09	-10470.09	-982.55	-994.22	10.76
Dead+Wind 60 deg - Service	45712.89	12713.03	-7339.87	-685.46	-1210.34	15.08
Dead+Wind 90 deg - Service	45712.89	14934.15	0.00	15.55	-1417.13	20.42
Dead+Wind 120 deg - Service	45712.89	13594.31	7848.68	754.49	-1275.99	20.28
Dead+Wind 135 deg - Service	45712.89	10829.87	10829.87	1040.42	-1021.05	18.11
Dead+Wind 150 deg - Service	45712.89	7467.08	12933.35	1246.16	-706.64	14.71
Dead+Wind 180 deg - Service	45712.89	-0.00	14679.75	1417.57	3.87	5.20
Dead+Wind 210 deg - Service	45712.89	-7467.08	12933.35	1246.15	714.37	-5.71
Dead+Wind 225 deg - Service	45712.89	-10470.09	10470.09	1013.61	1001.97	-10.76
Dead+Wind 240 deg - Service	45712.89	-13594.31	7848.68	754.48	1283.71	-15.08
Dead+Wind 270 deg - Service	45712.89	-14934.15	0.00	15.55	1424.86	-20.42
Dead+Wind 300 deg - Service	45712.89	-12713.03	-7339.87	-685.46	1218.08	-20.28
Dead+Wind 315 deg - Service	45713.05	-10470.26	-10469.84	-982.54	1001.96	-18.12
Dead+Wind 330 deg - Service	45712.89	-7467.08	-12933.35	-1215.08	714.37	-14.71

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	lb	lb	lb	lb	lb	lb	
1	-0.00	-45712.89	0.00	0.00	45712.89	-0.00	0.000%
2	-0.00	-54855.47	-82442.03	0.01	54855.47	82442.07	0.000%
3	-0.00	-41141.60	-82442.03	0.01	41141.60	82442.06	0.000%
4	39143.39	-54855.47	-67798.35	-39143.37	54855.47	67798.37	0.000%
5	39143.39	-41141.60	-67798.35	-39143.38	41141.60	67798.36	0.000%
6	54867.42	-54855.47	-54867.42	-54867.40	54855.47	54867.42	0.000%
7	54867.42	-41141.60	-54867.42	-54867.41	41141.60	54867.42	0.000%
8	66598.83	-54855.47	-38450.85	-66598.83	54855.47	38450.84	0.000%
9	66598.83	-41141.60	-38450.85	-66598.83	41141.60	38450.85	0.000%
10	78286.79	-54855.47	-0.00	-78286.79	54855.47	-0.07	0.000%
11	78286.79	-41141.60	-0.00	-78286.79	41141.60	-0.05	0.000%
12	71396.89	-54855.47	41221.01	-71396.91	54855.47	-41221.08	0.000%
13	71396.89	-41141.60	41221.01	-71396.91	41141.60	-41221.07	0.000%
14	56826.22	-54855.47	56826.22	-56826.24	54855.47	-56826.24	0.000%
15	56826.22	-41141.60	56826.22	-56826.24	41141.60	-56826.24	0.000%
16	39143.39	-54855.47	67798.35	-39143.42	54855.47	-67798.34	0.000%
17	39143.39	-41141.60	67798.35	-39143.41	41141.60	-67798.35	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
18	0.00	-54855.47	76901.71	0.00	54855.47	-76901.70	0.000%
19	0.00	-41141.60	76901.71	0.00	41141.60	-76901.70	0.000%
20	-39143.39	-54855.47	67798.35	39143.42	54855.47	-67798.34	0.000%
21	-39143.39	-41141.60	67798.35	39143.42	41141.60	-67798.34	0.000%
22	-54867.42	-54855.47	54867.42	54867.45	54855.47	-54867.43	0.000%
23	-54867.42	-41141.60	54867.42	54867.44	41141.60	-54867.43	0.000%
24	-71396.89	-54855.47	41221.01	71396.91	54855.47	-41221.07	0.000%
25	-71396.89	-41141.60	41221.01	71396.91	41141.60	-41221.06	0.000%
26	-78286.79	-54855.47	-0.00	78286.79	54855.47	-0.08	0.000%
27	-78286.79	-41141.60	-0.00	78286.79	41141.60	-0.06	0.000%
28	-66598.83	-54855.47	-38450.85	66598.83	54855.47	38450.83	0.000%
29	-66598.83	-41141.60	-38450.85	66598.83	41141.60	38450.84	0.000%
30	-54867.42	-54855.47	-54867.42	54867.41	54855.47	54867.42	0.000%
31	-54867.42	-41141.60	-54867.42	54867.41	41141.60	54867.42	0.000%
32	-39143.39	-54855.47	-67798.35	39143.38	54855.47	67798.36	0.000%
33	-39143.39	-41141.60	-67798.35	39143.39	41141.60	67798.36	0.000%
34	-0.00	-133954.40	0.00	0.00	133954.40	-0.00	0.000%
35	-0.00	-133954.40	-20058.90	0.00	133954.40	20058.90	0.000%
36	9790.96	-133954.40	-16958.44	-9790.96	133954.40	16958.44	0.000%
37	13790.30	-133954.40	-13790.30	-13790.30	133954.40	13790.30	0.000%
38	16820.75	-133954.40	-9711.46	-16820.75	133954.40	9711.46	0.000%
39	19581.92	-133954.40	-0.00	-19581.92	133954.40	-0.00	0.000%
40	17371.52	-133954.40	10029.45	-17371.52	133954.40	-10029.45	0.000%
41	14015.15	-133954.40	14015.15	-14015.15	133954.40	-14015.15	0.000%
42	9790.96	-133954.40	16958.44	-9790.96	133954.40	-16958.44	0.000%
43	0.00	-133954.40	19422.93	0.00	133954.40	-19422.93	0.000%
44	-9790.96	-133954.40	16958.44	9790.96	133954.40	-16958.44	0.000%
45	-13790.30	-133954.40	13790.30	13790.30	133954.40	-13790.30	0.000%
46	-17371.52	-133954.40	10029.45	17371.52	133954.40	-10029.45	0.000%
47	-19581.92	-133954.40	0.00	19581.92	133954.40	-0.00	0.000%
48	-16820.75	-133954.40	-9711.46	16820.75	133954.40	9711.46	0.000%
49	-13790.30	-133954.40	-13790.30	13790.30	133954.40	13790.30	0.000%
50	-9790.96	-133954.40	-16958.44	9790.96	133954.40	16958.44	0.000%
51	-0.00	-45712.89	-15697.36	0.00	45712.89	15697.36	0.000%
52	7467.08	-45712.89	-12933.35	-7467.08	45712.89	12933.35	0.000%
53	10470.09	-45712.89	-10470.09	-10470.09	45712.89	10470.09	0.000%
54	12713.03	-45712.89	-7339.87	-12713.03	45712.89	7339.87	0.000%
55	14934.15	-45712.89	-0.00	-14934.15	45712.89	-0.00	0.000%
56	13594.31	-45712.89	7848.68	-13594.31	45712.89	-7848.68	0.000%
57	10829.87	-45712.89	10829.87	-10829.87	45712.89	-10829.87	0.000%
58	7467.08	-45712.89	12933.35	-7467.08	45712.89	-12933.35	0.000%
59	0.00	-45712.89	14679.75	0.00	45712.89	-14679.75	0.000%
60	-7467.08	-45712.89	12933.35	7467.08	45712.89	-12933.35	0.000%
61	-10470.09	-45712.89	10470.09	10470.09	45712.89	-10470.09	0.000%
62	-13594.31	-45712.89	7848.68	13594.31	45712.89	-7848.68	0.000%
63	-14934.15	-45712.89	-0.00	14934.15	45712.89	-0.00	0.000%
64	-12713.03	-45712.89	-7339.87	12713.03	45712.89	7339.87	0.000%
65	-10470.09	-45712.89	-10470.09	10470.26	45713.05	10469.84	0.001%
66	-7467.08	-45712.89	-12933.35	7467.08	45712.89	12933.35	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000078

3	Yes	4	0.00000001	0.00000069
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000082
13	Yes	4	0.00000001	0.00000073
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000081
25	Yes	4	0.00000001	0.00000072
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001
51	Yes	4	0.00000001	0.00000001
52	Yes	4	0.00000001	0.00000001
53	Yes	4	0.00000001	0.00000001
54	Yes	4	0.00000001	0.00000001
55	Yes	4	0.00000001	0.00000001
56	Yes	4	0.00000001	0.00000001
57	Yes	4	0.00000001	0.00000001
58	Yes	4	0.00000001	0.00000001
59	Yes	4	0.00000001	0.00000001
60	Yes	4	0.00000001	0.00000001
61	Yes	4	0.00000001	0.00000001
62	Yes	4	0.00000001	0.00000001
63	Yes	4	0.00000001	0.00000001
64	Yes	4	0.00000001	0.00000001
65	Yes	4	0.00000001	0.00000001
66	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 175	2.779	62	0.1187	0.0334
T2	175 - 150	2.654	62	0.1187	0.0338
T3	150 - 125	2.019	62	0.1158	0.0254
T4	125 - 100	1.430	62	0.1019	0.0202
T5	100 - 91.6667	0.923	62	0.0841	0.0157
T6	91.6667 - 83.3333	0.777	62	0.0773	0.0142
T7	83.3333 - 75	0.642	62	0.0700	0.0126
T8	75 - 50	0.524	62	0.0619	0.0112
T9	50 - 37.5	0.245	62	0.0425	0.0073
T10	37.5 - 25	0.142	62	0.0329	0.0053
T11	25 - 0	0.065	62	0.0226	0.0034

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
181.00	OGT9-840	62	2.779	0.1187	0.0334	143769
180.00	Pirod 4' Side Mount Standoff (1)	62	2.779	0.1187	0.0334	143769
178.00	4'x4" Pipe Mount	62	2.729	0.1187	0.0336	143769
177.00	OGT9-840	62	2.704	0.1187	0.0337	143769
175.00	10 FT DISH	62	2.654	0.1187	0.0338	143769
173.00	(inverted) SC479-HF1LDF	62	2.604	0.1187	0.0336	138222
170.00	10'6"x4" Pipe Mount	62	2.528	0.1187	0.0331	176139
169.00	8 FT DISH	62	2.503	0.1187	0.0329	199365
168.00	4'x4" Pipe Mount	62	2.477	0.1187	0.0326	229625
167.00	8 FT DISH	62	2.452	0.1186	0.0323	270715
157.00	ANT220F2	62	2.196	0.1176	0.0283	249066
150.00	(2) 7770.00 panel antenna	62	2.019	0.1158	0.0254	122989
149.00	Pirod 12' T-Frame Sector Mount (1)	62	1.994	0.1155	0.0251	118487
148.00	20' 8 Bay Di-Pole	62	1.969	0.1151	0.0247	115478
143.00	Pirod 4' Side Mount Standoff (1)	62	1.847	0.1129	0.0233	109124
140.00	PD200	62	1.775	0.1113	0.0226	106347
138.00	12' Dipole	62	1.727	0.1102	0.0222	104572
136.00	DB224-A	62	1.680	0.1090	0.0219	102856
134.00	871F-70	62	1.634	0.1078	0.0215	101196
127.00	BCD-80609-NE	62	1.475	0.1032	0.0205	95654
116.00	DS9A09F36D-N 19 ft Omni w/ Mount Pipe	62	1.237	0.0957	0.0187	83192
105.00	PD458-1	62	1.017	0.0878	0.0166	72693
100.00	DB222	62	0.923	0.0841	0.0157	69961
86.00	DB212-1	62	0.684	0.0724	0.0131	55179
81.00	DB222	62	0.608	0.0677	0.0122	52316
80.00	4'x4" Pipe Mount	62	0.593	0.0667	0.0121	53445
79.00	8 FT DISH	62	0.579	0.0657	0.0119	54898
49.00	DB803M-XT	62	0.236	0.0418	0.0071	81060
48.00	Pirod 4' Side Mount Standoff (1)	62	0.227	0.0410	0.0070	81303
47.00	DB212-1	62	0.218	0.0403	0.0068	81426

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 175	14.640	24	0.6220	0.1824
T2	175 - 150	13.989	24	0.6221	0.1841
T3	150 - 125	10.651	24	0.6090	0.1384
T4	125 - 100	7.547	24	0.5367	0.1099
T5	100 - 91.6667	4.872	24	0.4432	0.0854
T6	91.6667 - 83.3333	4.098	24	0.4079	0.0771
T7	83.3333 - 75	3.389	24	0.3690	0.0688
T8	75 - 50	2.762	24	0.3265	0.0609
T9	50 - 37.5	1.290	24	0.2243	0.0396
T10	37.5 - 25	0.749	24	0.1736	0.0290
T11	25 - 0	0.344	24	0.1192	0.0184

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
181.00	OGT9-840	24	14.640	0.6220	0.1824	28029
180.00	Pirod 4' Side Mount Standoff (1)	24	14.640	0.6220	0.1824	28029
178.00	4'x4" Pipe Mount	24	14.380	0.6220	0.1834	28029
177.00	OGT9-840	24	14.250	0.6220	0.1838	28029
175.00	10 FT DISH	24	13.989	0.6221	0.1841	28029
173.00	(inverted) SC479-HF1LDF	24	13.725	0.6221	0.1834	27080
170.00	10'6"x4" Pipe Mount	24	13.327	0.6221	0.1806	35058
169.00	8 FT DISH	24	13.193	0.6221	0.1793	40078
168.00	4'x4" Pipe Mount	24	13.059	0.6220	0.1778	46774
167.00	8 FT DISH	24	12.925	0.6219	0.1761	56158
157.00	ANT220F2	24	11.581	0.6176	0.1542	52467
150.00	(2) 7770.00 panel antenna	24	10.651	0.6090	0.1384	24120
149.00	Pirod 12' T-Frame Sector Mount (1)	24	10.520	0.6072	0.1365	23154
148.00	20' 8 Bay Di-Pole	24	10.389	0.6053	0.1346	22510
143.00	Pirod 4' Side Mount Standoff (1)	24	9.745	0.5940	0.1269	21126
140.00	PD200	24	9.365	0.5860	0.1232	20514
138.00	12' Dipole	24	9.114	0.5801	0.1210	20125
136.00	DB224-A	24	8.866	0.5740	0.1191	19751
134.00	871F-70	24	8.621	0.5676	0.1173	19391
127.00	BCD-80609-NE	24	7.781	0.5438	0.1115	18206
116.00	DS9A09F36D-N 19 ft Omni w/ Mount Pipe	24	6.528	0.5045	0.1016	15822
105.00	PD458-1	24	5.366	0.4631	0.0905	13843
100.00	DB222	24	4.872	0.4432	0.0854	13324
86.00	DB212-1	24	3.608	0.3820	0.0714	10467
81.00	DB222	24	3.205	0.3571	0.0666	9912
80.00	4'x4" Pipe Mount	24	3.129	0.3520	0.0656	10123
79.00	8 FT DISH	24	3.053	0.3468	0.0647	10396
49.00	DB803M-XT	24	1.242	0.2204	0.0388	15327
48.00	Pirod 4' Side Mount Standoff (1)	24	1.195	0.2164	0.0380	15375
47.00	DB212-1	24	1.149	0.2125	0.0371	15402

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Diagonal	A325X	1.0000	1	517.98	18288.30	0.028 ✔	1	Member Block Shear
T2	175	Leg	A325X	0.7500	6	244.55	30101.40	0.008 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	9919.25	18288.30	0.542 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	3027.89	10263.30	0.295 ✔	1	Member Block Shear
T3	150	Leg	A325X	0.7500	6	4186.31	30101.40	0.139 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	14033.50	27103.10	0.518 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	4744.60	10263.30	0.462 ✔	1	Member Block Shear
T4	125	Leg	A325X	0.7500	6	11361.30	30101.40	0.377 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	15809.10	27103.10	0.583 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	5703.40	10263.30	0.556 ✔	1	Member Block Shear
T5	100	Leg	A325X	0.7500	6	19342.00	30101.40	0.643 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	16323.90	27103.10	0.602 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	5998.06	10263.30	0.584 ✔	1	Member Block Shear
T6	91.6667	Diagonal	A325X	1.0000	1	16695.20	27103.10	0.616 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	6242.12	10263.30	0.608 ✔	1	Member Block Shear
T7	83.3333	Diagonal	A325X	1.0000	1	18095.50	27103.10	0.668 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	6873.24	17257.30	0.398 ✔	1	Bolt Shear
T8	75	Leg	A325X	1.0000	8	20745.10	54517.00	0.381 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	24494.70	48810.90	0.502 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	7925.30	11622.70	0.682 ✔	1	Member Block Shear
T9	50	Leg	A325X	1.0000	8	27393.70	54517.00	0.502 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	25426.60	48810.90	0.521 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	8451.80	11622.70	0.727 ✔	1	Member Block Shear
T10	37.5	Diagonal	A325X	1.0000	1	26312.00	48810.90	0.539 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	8966.63	11622.70	0.771 ✔	1	Member Block Shear
T11	25	Leg	A325X	1.0000	8	33897.20	54517.00	0.622 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	28652.30	36328.10	0.789 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	10027.50	17257.30	0.581 ✔	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	HSS5x0.25	5.01	5.01	35.6 K=1.00	3.4894	-1415.64	143130.00	0.010 [1]
T2	175 - 150	HSS5x0.25	25.03	8.34	59.3 K=1.00	3.4894	-19168.90	121395.00	0.158 [1]
T3	150 - 125	HSS5x0.25	25.03	8.34	59.3 K=1.00	3.4894	-62286.10	121395.00	0.513 [1]
T4	125 - 100	HSS5x.375	25.03	8.34	60.7 K=1.00	5.0994	-115029.00	175270.00	0.656 [1]
T5	100 - 91.6667	HSS5x.4	8.34	8.34	61.3 K=1.00	5.7805	-133243.00	224425.00	0.594 [1]
T6	91.6667 - 83.3333	HSS5x.4	8.34	8.34	61.3 K=1.00	5.7805	-151837.00	224425.00	0.677 [1]
T7	83.3333 - 75	HSS5x.4	8.34	8.34	61.3 K=1.00	5.7805	-170513.00	224425.00	0.760 [1]
T8	75 - 50	HSS6.875x.4	25.03	12.51	65.5 K=1.00	8.1367	-220829.00	301661.00	0.732 [1]
T9	50 - 37.5	HSS6.875x.5	12.51	12.51	66.1 K=1.00	9.3640	-251878.00	344700.00	0.731 [1]
T10	37.5 - 25	HSS6.875x.5	12.51	12.51	66.1 K=1.00	9.3640	-283299.00	344700.00	0.822 [1]
T11	25 - 0	HSS6.875x.5	25.03	6.26	33.0 K=1.00	9.3640	-346796.00	459464.00	0.755 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	2L2 1/2x2x3/16x3/8	7.43	7.15	114.6 K=1.00	1.6200	-641.10	31902.60	0.020 [1]
T2	175 - 150	2L2 1/2x2x3/16x3/8	10.57	10.23	164.0 K=1.00	1.6200	-9897.64	16563.10	0.598 [1]
T3	150 - 125	2L3x2 1/2x1/4x3/8	11.21	10.90	142.2 K=1.00	2.6300	-14306.70	35690.50	0.401 [1]
T4	125 - 100	2L3x2 1/2x1/4x3/8	11.91	11.61	151.5 K=1.00	2.6300	-16125.50	31623.00	0.510 [1]
T5	100 - 91.6667	2L3x2 1/2x1/4x3/8	12.15	11.86	154.7 K=1.00	2.6300	-16667.50	30376.70	0.549 [1]
T6	91.6667 - 83.3333	2L3x2 1/2x1/4x3/8	12.39	12.11	157.9 K=1.00	2.6300	-17056.30	29183.60	0.584 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T7	83.3333 - 75	2L3x2 1/2x1/4x3/8	12.64	12.36	161.3 K=1.00	2.6300	-18572.20	28042.30	0.662 [1] ✔
T8	75 - 50	2L3 1/2x3x3/8x3/8	16.33	15.88	174.8 K=1.00	4.5900	-25074.50	42971.90	0.584 [1] ✔
T9	50 - 37.5	2L3 1/2x3x3/8x3/8	16.65	16.22	178.6 K=1.00	4.5900	-26029.60	41201.20	0.632 [1] ✔
T10	37.5 - 25	2L3 1/2x3x3/8x3/8	16.99	16.56	182.4 K=1.00	4.5900	-26943.80	39503.20	0.682 [1] ✔
T11	25 - 0	2L3x3 1/2x5/16x3/8	17.68	17.28	137.0 K=1.00	3.8700	-29269.40	57793.70	0.506 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	175 - 150	L3x3x1/4	12.33	5.96	120.8 K=1.00	1.4400	-5994.28	28061.80	0.214 [1] ✔
T3	150 - 125	L3x3x1/4	14.33	6.96	141.0 K=1.00	1.4400	-9400.20	20717.20	0.454 [1] ✔
T4	125 - 100	L3x3x1/4	16.33	7.96	161.3 K=1.00	1.4400	-11324.00	15837.90	0.715 [1] ✔
T5	100 - 91.6667	L3x4x1/4	17.00	8.29	152.8 K=1.00	1.6900	-11921.70	20706.20	0.576 [1] ✔
T6	91.6667 - 83.3333	L3x4x1/4	17.67	8.63	159.0 K=1.00	1.6900	-12410.30	19136.60	0.649 [1] ✔
T7	83.3333 - 75	L3x4x1/2	18.33	8.96	168.2 K=1.00	3.2500	-13727.10	32867.40	0.418 [1] ✔
T8	75 - 50	L4x4x1/4	20.00	9.71	146.6 K=1.00	1.9400	-15871.60	25829.50	0.614 [1] ✔
T9	50 - 37.5	L4x4x1/4	21.00	10.21	154.2 K=1.00	1.9400	-16924.20	23362.50	0.724 [1] ✔
T10	37.5 - 25	L4x4x1/4	22.00	10.71	161.7 K=1.00	1.9400	-17960.10	21232.70	0.846 [1] ✔
T11	25 - 0	L4x4x1/2	24.00	11.71	179.7 K=1.00	3.7500	-20055.10	33220.30	0.604 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	L3x3x1/4	10.60	5.09	103.2	1.4400	-493.68	34476.00	0.014 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
					K=1.00				✔

[1] P_u / ϕP_n controls

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T11	25 - 0	L3x3x1/4	6.00	5.71	115.8 K=1.00	1.4400	-6011.48	29975.50	0.201 [1] ✔

[1] P_u / ϕP_n controls

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T11	25 - 0	L3x3x1/4	8.49	8.07	163.6 K=1.00	1.4400	-4255.06	15399.40	0.276 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T3	150 - 125	L2 1/2x2 1/2x3/16	7.17	7.17	173.7 K=1.00	0.9020	-12.30	8552.99	0.001 [1] ✔
T4	125 - 100	L2 1/2x2 1/2x3/16	8.17	8.17	198.0 K=1.00	0.9020	-12.28	6586.62	0.002 [1] ✔
T5	100 - 91.6667	L2 1/2x2 1/2x3/16	8.50	8.50	206.1 K=1.00	0.9020	-17.07	6080.15	0.003 [1] ✔
T6	91.6667 - 83.3333	L2 1/2x2 1/2x3/16	8.83	8.83	214.1 K=1.00	0.9020	-16.74	5629.93	0.003 [1] ✔
T7	83.3333 - 75	L2 1/2x2 1/2x3/16	9.17	9.17	222.2 K=1.00	0.9020	-17.61	5227.92	0.003 [1] ✔
T8	75 - 50	L2 1/2x2 1/2x3/16	10.00	10.00	242.4 K=1.00	0.9020	-20.41	4392.91	0.005 [1] ✔
T9	50 - 37.5	L2 1/2x2 1/2x3/16	10.50	10.50	254.5 K=1.00	0.9020	-20.53	3984.50	0.005 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T10	37.5 - 25	KL/R > 250 (C) - 205 L2 1/2x2 1/2x3/16	11.00	11.00	266.7 K=1.00	0.9020	-20.08	3630.50	0.006 [1] ✔
T11	25 - 0	KL/R > 250 (C) - 220 L3x3x1/4	12.00	12.00	243.2 K=1.00	1.4400	-21.02	6965.92	0.003 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	HSS5x0.25	5.01	5.01	35.6	3.4894	0.51	157023.00	0.000 [1] ✔
T2	175 - 150	HSS5x0.25	25.03	8.34	59.3	3.4894	15649.30	157023.00	0.100 [1] ✔
T3	150 - 125	HSS5x0.25	25.03	8.34	59.3	3.4894	52694.60	157023.00	0.336 [1] ✔
T4	125 - 100	HSS5x.375	25.03	8.34	60.7	5.0994	99836.10	229474.00	0.435 [1] ✔
T5	100 - 91.6667	HSS5x.4	8.34	8.34	61.3	5.7805	116052.00	312149.00	0.372 [1] ✔
T6	91.6667 - 83.3333	HSS5x.4	8.34	8.34	61.3	5.7805	132418.00	312149.00	0.424 [1] ✔
T7	83.3333 - 75	HSS5x.4	8.34	8.34	61.3	5.7805	148789.00	312149.00	0.477 [1] ✔
T8	75 - 50	HSS6.875x.4	25.03	12.51	65.5	8.1367	192455.00	439383.00	0.438 [1] ✔
T9	50 - 37.5	HSS6.875x.5	12.51	12.51	66.1	9.3640	219150.00	505655.00	0.433 [1] ✔
T10	37.5 - 25	HSS6.875x.5	12.51	12.51	66.1	9.3640	246170.00	505655.00	0.487 [1] ✔
T11	25 - 0	HSS6.875x.5	25.03	6.26	33.0	9.3640	299071.00	505655.00	0.591 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	2L2 1/2x2x3/16x3/8	7.43	7.15	108.2	0.8986	517.98	39088.80	0.013 [1] ✔
T2	175 - 150	2L2 1/2x2x3/16x3/8	10.37	10.03	151.8	0.8986	9919.25	39088.80	0.254 [1] ✔
T3	150 - 125	2L3x2 1/2x1/4x3/8	11.21	10.90	138.4	1.5506	14033.50	67452.20	0.208 [1] ✔
T4	125 - 100	2L3x2 1/2x1/4x3/8	11.91	11.61	147.5	1.5506	15809.10	67452.20	0.234 [1] ✔
T5	100 - 91.6667	2L3x2 1/2x1/4x3/8	12.15	11.86	150.6	1.5506	16323.90	67452.20	0.242 [1] ✔
T6	91.6667 - 83.3333	2L3x2 1/2x1/4x3/8	12.39	12.11	153.8	1.5506	16695.20	67452.20	0.248 [1] ✔
T7	83.3333 - 75	2L3x2 1/2x1/4x3/8	12.64	12.36	157.0	1.5506	18095.50	67452.20	0.268 [1] ✔
T8	75 - 50	2L3 1/2x3x3/8x3/8	16.33	15.88	174.8	2.8097	24494.70	122221.00	0.200 [1] ✔
T9	50 - 37.5	2L3 1/2x3x3/8x3/8	16.65	16.22	178.6	2.8097	25426.60	122221.00	0.208 [1] ✔
T10	37.5 - 25	2L3 1/2x3x3/8x3/8	16.99	16.56	182.4	2.8097	26312.00	122221.00	0.215 [1] ✔
T11	25 - 0	2L3x3 1/2x5/16x3/8	17.68	17.28	124.9	2.3752	28652.30	110445.00	0.259 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	175 - 150	L3x3x1/4	12.33	5.96	115.3	0.9394	6055.78	40862.80	0.148 [1] ✔
T3	150 - 125	L3x3x1/4	14.33	6.96	89.8	0.9394	9489.21	40862.80	0.232 [1] ✔
T4	125 - 100	L3x3x1/4	16.33	7.96	102.7	0.9394	11406.80	40862.80	0.279 [1] ✔
T5	100 - 91.6667	L3x4x1/4	17.00	8.29	110.9	1.1269	11996.10	49019.10	0.245 [1] ✔
T6	91.6667 - 83.3333	L3x4x1/4	17.67	8.63	115.4	1.1269	12484.20	49019.10	0.255 [1] ✔
T7	83.3333 - 75	L3x4x1/2	18.33	8.96	124.6	2.1563	13746.50	93796.90	0.147 [1] ✔
T8	75 - 50	L4x4x1/4	20.00	9.71	93.3	1.3144	15850.60	57175.30	0.277 [1] ✔
T9	50 - 37.5	L4x4x1/4	21.00	10.21	98.1	1.3144	16903.60	57175.30	0.296 [1] ✔
T10	37.5 - 25	L4x4x1/4	22.00	10.71	102.8	1.3144	17933.30	57175.30	0.314 [1] ✔
T11	25 - 0	L4x4x1/2	24.00	11.71	115.2	2.5313	19682.50	110109.00	0.179 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
									✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	L3x3x1/4	10.60	5.09	98.5	1.4400	466.12	46656.00	0.010 [1] ✔

[1] P_u / ϕP_n controls

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T11	25 - 0	L3x3x1/4	6.00	5.71	73.7	1.4400	6011.48	46656.00	0.129 [1] ✔

[1] P_u / ϕP_n controls

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T11	25 - 0	L3x3x1/4	8.33	7.90	102.0	1.4400	4352.66	46656.00	0.093 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T3	150 - 125	L2 1/2x2 1/2x3/16	6.50	6.50	100.3	0.9020	7.72	29224.80	0.000 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T4	125 - 100	L2 1/2x2 1/2x3/16	7.50	7.50	115.7	0.9020	6.27	29224.80	0.000 [1]
T5	100 - 91.6667	L2 1/2x2 1/2x3/16	8.50	8.50	131.1	0.9020	10.91	29224.80	0.000 [1]
T6	91.6667 - 83.3333	L2 1/2x2 1/2x3/16	8.83	8.83	136.2	0.9020	10.27	29224.80	0.000 [1]
T7	83.3333 - 75	L2 1/2x2 1/2x3/16	9.17	9.17	141.4	0.9020	9.16	29224.80	0.000 [1]
T8	75 - 50	L2 1/2x2 1/2x3/16	9.50	9.50	146.5	0.9020	8.90	29224.80	0.000 [1]
T9	50 - 37.5	L2 1/2x2 1/2x3/16	10.50	10.50	162.0	0.9020	7.43	29224.80	0.000 [1]
T10	37.5 - 25	L2 1/2x2 1/2x3/16	11.00	11.00	169.7	0.9020	6.46	29224.80	0.000 [1]
T11	25 - 0	L3x3x1/4	11.50	11.50	148.4	1.4400	3.60	46656.00	0.000 [1]

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	180 - 175	Leg	HSS5x0.25	1	-747.23	143130.00	1.1	Pass
		Leg	HSS5x0.25	2	-150.56	143130.00	0.9	Pass
		Leg	HSS5x0.25	3	-1415.64	143130.00	1.1	Pass
T2	175 - 150	Leg	HSS5x0.25	13	-19168.90	121395.00	15.8	Pass
		Leg	HSS5x0.25	14	-18972.30	121395.00	15.6	Pass
		Leg	HSS5x0.25	15	-18371.80	121395.00	15.1	Pass
T3	150 - 125	Leg	HSS5x0.25	43	-62286.10	121395.00	51.3	Pass
		Leg	HSS5x0.25	44	-62019.80	121395.00	51.1	Pass
		Leg	HSS5x0.25	45	-61943.30	121395.00	51.0	Pass
T4	125 - 100	Leg	HSS5x.375	82	-115029.00	175270.00	65.6	Pass
		Leg	HSS5x.375	83	-114548.00	175270.00	65.4	Pass
		Leg	HSS5x.375	84	-114249.00	175270.00	65.2	Pass
T5	100 - 91.6667	Leg	HSS5x.4	121	-133243.00	224425.00	59.4 63.9 (b)	Pass
		Leg	HSS5x.4	122	-132794.00	224425.00	59.2 64.1 (b)	Pass
		Leg	HSS5x.4	123	-132422.00	224425.00	59.0 64.3 (b)	Pass
T6	91.6667 - 83.3333	Leg	HSS5x.4	136	-151837.00	224425.00	67.7	Pass
		Leg	HSS5x.4	137	-151295.00	224425.00	67.4	Pass
		Leg	HSS5x.4	138	-150867.00	224425.00	67.2	Pass
T7	83.3333 - 75	Leg	HSS5x.4	151	-170513.00	224425.00	76.0	Pass
		Leg	HSS5x.4	152	-170322.00	224425.00	75.9	Pass
		Leg	HSS5x.4	153	-169452.00	224425.00	75.5	Pass
T8	75 - 50	Leg	HSS6.875x.4	166	-220829.00	301661.00	73.2	Pass
		Leg	HSS6.875x.4	167	-220640.00	301661.00	73.1	Pass
		Leg	HSS6.875x.4	168	-219637.00	301661.00	72.8	Pass
T9	50 - 37.5	Leg	HSS6.875x.5	193	-251878.00	344700.00	73.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Leg	HSS6.875x.5	194	-251484.00	344700.00	73.0	Pass
		Leg	HSS6.875x.5	195	-250426.00	344700.00	72.7	Pass
T10	37.5 - 25	Leg	HSS6.875x.5	208	-283299.00	344700.00	82.2	Pass
		Leg	HSS6.875x.5	209	-282904.00	344700.00	82.1	Pass
		Leg	HSS6.875x.5	210	-281793.00	344700.00	81.8	Pass
T11	25 - 0	Leg	HSS6.875x.5	223	-346796.00	459464.00	75.5	Pass
		Leg	HSS6.875x.5	224	-346410.00	459464.00	75.4	Pass
		Leg	HSS6.875x.5	225	-345260.00	459464.00	75.1	Pass
T1	180 - 175	Diagonal	2L2 1/2x2x3/16x3/8	7	-263.46	31902.60	0.8	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	8	-274.35	31902.60	0.9	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	9	-606.22	31902.60	1.9 2.5 (b)	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	10	-582.23	31902.60	1.8 2.6 (b)	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	11	-620.74	31902.60	1.9 2.8 (b)	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	12	-641.10	31902.60	2.0 2.8 (b)	Pass
T2	175 - 150	Diagonal	2L2 1/2x2x3/16x3/8	17	-9889.52	16563.10	59.7	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	18	-9897.64	16563.10	59.8	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	20	-6550.99	16563.10	39.6	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	21	-6812.36	16563.10	41.1	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	23	-6774.53	16563.10	40.9	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	24	-6511.35	16563.10	39.3	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	26	-10034.30	17204.40	58.3	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	27	-10055.80	17204.40	58.4	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	29	-6327.05	17204.40	36.8	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	30	-6511.92	17204.40	37.9	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	32	-6861.64	17204.40	39.9	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	33	-6661.31	17204.40	38.7	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	35	-5723.03	17858.70	32.0	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	36	-5737.81	17858.70	32.1	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	38	-4287.58	17858.70	24.0	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	39	-4378.81	17858.70	24.5	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	41	-3675.92	17858.70	20.6	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	42	-3652.05	17858.70	20.4	Pass
T3	150 - 125	Diagonal	2L3x2 1/2x1/4x3/8	47	-14295.50	35690.50	40.1 51.8 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	48	-14306.70	35690.50	40.1 51.7 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	50	-11659.90	35690.50	32.7 42.0 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	51	-11661.10	35690.50	32.7 42.0 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	53	-12071.60	35690.50	33.8 43.5 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	54	-12059.30	35690.50	33.8 43.5 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	59	-13772.20	37104.10	37.1 49.9 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	60	-13783.60	37104.10	37.1 49.9 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	62	-10580.30	37104.10	28.5 38.2 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	63	-10596.80	37104.10	28.6 38.1 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	65	-10929.10	37104.10	29.5 39.3 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	66	-10901.30	37104.10	29.4 39.4 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	71	-13173.80	38560.40	34.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Diagonal	2L3x2 1/2x1/4x3/8	72	-13183.70	38560.40	47.7 (b) 34.2	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	74	-9591.20	38560.40	47.7 (b) 24.9	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	75	-9618.18	38560.40	34.6 (b) 24.9	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	77	-9807.47	38560.40	34.5 (b) 25.4	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	78	-9770.59	38560.40	35.2 (b) 25.3	Pass
T4	125 - 100	Diagonal	2L3x2 1/2x1/4x3/8	86	-16107.00	31623.00	35.3 (b) 50.9	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	87	-16125.50	31623.00	58.3 (b) 51.0	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	89	-12637.40	31623.00	58.3 (b) 40.0	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	90	-12646.50	31623.00	45.5 (b) 40.0	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	92	-13659.80	31623.00	45.5 (b) 43.2	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	93	-13632.20	31623.00	49.2 (b) 43.1	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	98	-15576.00	32890.90	49.2 (b) 47.4	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	99	-15595.50	32890.90	56.4 (b) 47.4	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	101	-12237.30	32890.90	56.4 (b) 37.2	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	102	-12243.60	32890.90	44.1 (b) 37.2	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	104	-13240.50	32890.90	44.1 (b) 40.3	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	105	-13214.70	32890.90	47.7 (b) 40.2	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	110	-14597.20	34206.30	47.7 (b) 42.7	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	111	-14606.30	34206.30	52.8 (b) 42.7	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	113	-11950.70	34206.30	52.8 (b) 34.9	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	114	-11955.10	34206.30	43.1 (b) 34.9	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	116	-12313.70	34206.30	43.1 (b) 36.0	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	117	-12300.30	34206.30	44.4 (b) 36.0	Pass
T5	100 - 91.6667	Diagonal	2L3x2 1/2x1/4x3/8	125	-16651.70	30376.70	44.4 (b) 54.8	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	126	-16667.50	30376.70	60.2 (b) 54.9	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	128	-13106.50	30376.70	60.2 (b) 43.1	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	129	-13118.90	30376.70	47.2 (b) 43.2	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	131	-14036.00	30376.70	47.1 (b) 46.2	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	132	-14007.80	30376.70	50.4 (b) 46.1	Pass
T6	91.6667 - 83.3333	Diagonal	2L3x2 1/2x1/4x3/8	140	-17038.60	29183.60	50.5 (b) 58.4 61.6 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Diagonal	2L3x2 1/2x1/4x3/8	141	-17056.30	29183.60	58.4 61.5 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	143	-13340.60	29183.60	45.7 48.0 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	144	-13353.30	29183.60	45.8 47.9 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	146	-14522.40	29183.60	49.8 52.2 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	147	-14492.20	29183.60	49.7 52.3 (b)	Pass
T7	83.3333 - 75	Diagonal	2L3x2 1/2x1/4x3/8	155	-18558.70	28042.30	66.2 66.8 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	156	-18572.20	28042.30	66.2 66.7 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	158	-14426.80	28042.30	51.4 51.6 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	159	-14449.00	28042.30	51.5	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	161	-15260.80	28042.30	54.4 54.5 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	162	-15225.00	28042.30	54.3 54.6 (b)	Pass
T8	75 - 50	Diagonal	2L3 1/2x3x3/8x3/8	170	-25067.10	42971.90	58.3	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	171	-25074.50	42971.90	58.4	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	173	-19607.40	42971.90	45.6	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	174	-19646.00	42971.90	45.7	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	176	-20184.60	42971.90	47.0	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	177	-20138.60	42971.90	46.9	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	182	-24489.60	44739.90	54.7	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	183	-24496.00	44739.90	54.8	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	185	-19165.60	44739.90	42.8	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	186	-19205.00	44739.90	42.9	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	188	-19375.80	44739.90	43.3	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	189	-19330.00	44739.90	43.2	Pass
T9	50 - 37.5	Diagonal	2L3 1/2x3x3/8x3/8	197	-26015.40	41201.20	63.1	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	198	-26029.60	41201.20	63.2	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	200	-20083.20	41201.20	48.7	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	201	-20124.00	41201.20	48.8	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	203	-21136.80	41201.20	51.3	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	204	-21081.80	41201.20	51.2	Pass
T10	37.5 - 25	Diagonal	2L3 1/2x3x3/8x3/8	212	-26928.70	39503.20	68.2	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	213	-26943.80	39503.20	68.2	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	215	-20800.50	39503.20	52.7	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	216	-20841.10	39503.20	52.8	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	218	-22131.50	39503.20	56.0	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	219	-22075.70	39503.20	55.9	Pass
T11	25 - 0	Diagonal	2L3x3 1/2x5/16x3/8	227	-29255.70	57793.70	50.6 78.9 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	230	-29269.40	57793.70	50.6 78.8 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	234	-22954.40	57793.70	39.7 61.8 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	237	-23052.90	57793.70	39.9 61.7 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	241	-24883.40	57793.70	43.1 66.0 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	244	-24514.60	57793.70	42.4 66.1 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	251	-28371.30	60138.30	47.2 76.3 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	254	-28384.10	60138.30	47.2 76.3 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Diagonal	2L3x3 1/2x5/16x3/8	258	-22336.00	60138.30	37.1 60.0 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	261	-22593.90	60138.30	37.6 59.9 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	265	-24220.10	60138.30	40.3 63.7 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	268	-23723.50	60138.30	39.4 63.8 (b)	Pass
T2	175 - 150	Horizontal	L3x3x1/4	16	-5994.28	28061.80	21.4 29.5 (b)	Pass
		Horizontal	L3x3x1/4	19	-4236.79	28061.80	15.1 20.1 (b)	Pass
		Horizontal	L3x3x1/4	22	-4209.31	28061.80	15.0 20.0 (b)	Pass
		Horizontal	L3x3x1/4	25	-5904.87	30647.90	19.3 28.9 (b)	Pass
		Horizontal	L3x3x1/4	28	-4384.38	30647.90	14.3 21.0 (b)	Pass
		Horizontal	L3x3x1/4	31	-4595.02	30647.90	15.0 21.9 (b)	Pass
		Horizontal	L3x3x1/4	34	-3587.95	33085.10	10.8 17.4 (b)	Pass
		Horizontal	L3x3x1/4	37	-3106.58	33085.10	9.4 15.1 (b)	Pass
		Horizontal	L3x3x1/4	40	-2706.53	33085.10	8.2 13.1 (b)	Pass
T3	150 - 125	Horizontal	L3x3x1/4	46	-9400.20	20717.20	45.4 46.2 (b)	Pass
		Horizontal	L3x3x1/4	49	-7636.44	20717.20	36.9 37.6 (b)	Pass
		Horizontal	L3x3x1/4	52	-7907.57	20717.20	38.2 38.9 (b)	Pass
		Horizontal	L3x3x1/4	58	-8821.16	22854.40	38.6 43.4 (b)	Pass
		Horizontal	L3x3x1/4	61	-6884.27	22854.40	30.1 33.3 (b)	Pass
		Horizontal	L3x3x1/4	64	-7130.57	22854.40	31.2 34.4 (b)	Pass
		Horizontal	L3x3x1/4	70	-8242.62	25340.20	32.5 40.2 (b)	Pass
		Horizontal	L3x3x1/4	73	-6631.39	25340.20	26.2 31.3 (b)	Pass
		Horizontal	L3x3x1/4	76	-6768.65	25340.20	26.7 32.0 (b)	Pass
T4	125 - 100	Horizontal	L3x3x1/4	85	-11324.00	15837.90	71.5	Pass
		Horizontal	L3x3x1/4	88	-8848.84	15837.90	55.9	Pass
		Horizontal	L3x3x1/4	91	-9579.86	15837.90	60.5	Pass
		Horizontal	L3x3x1/4	97	-10727.90	17252.90	62.2	Pass
		Horizontal	L3x3x1/4	100	-8388.50	17252.90	48.6	Pass
		Horizontal	L3x3x1/4	103	-9135.85	17252.90	53.0	Pass
		Horizontal	L3x3x1/4	109	-9819.41	18866.30	52.0	Pass
		Horizontal	L3x3x1/4	112	-8008.26	18866.30	42.4	Pass
		Horizontal	L3x3x1/4	115	-8251.73	18866.30	43.7	Pass
T5	100 - 91.6667	Horizontal	L3x4x1/4	124	-11921.70	20706.20	57.6 58.4 (b)	Pass
		Horizontal	L3x4x1/4	127	-9348.33	20706.20	45.1 45.8 (b)	Pass
		Horizontal	L3x4x1/4	130	-10029.40	20706.20	48.4 49.1 (b)	Pass
T6	91.6667 - 83.3333	Horizontal	L3x4x1/4	139	-12410.30	19136.60	64.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Horizontal	L3x4x1/4	142	-9681.03	19136.60	50.6	Pass
		Horizontal	L3x4x1/4	145	-10550.60	19136.60	55.1	Pass
T7	83.3333 - 75	Horizontal	L3x4x1/2	154	-13727.10	32867.40	41.8	Pass
		Horizontal	L3x4x1/2	157	-10743.50	32867.40	32.7	Pass
		Horizontal	L3x4x1/2	160	-11449.30	32867.40	34.8	Pass
T8	75 - 50	Horizontal	L4x4x1/4	169	-15871.60	25829.50	61.4 68.2 (b)	Pass
		Horizontal	L4x4x1/4	172	-12569.10	25829.50	48.7 53.1 (b)	Pass
		Horizontal	L4x4x1/4	175	-12964.90	25829.50	50.2 54.6 (b)	Pass
		Horizontal	L4x4x1/4	181	-15030.40	28709.00	52.4 64.9 (b)	Pass
		Horizontal	L4x4x1/4	184	-11959.50	28709.00	41.7 50.7 (b)	Pass
		Horizontal	L4x4x1/4	187	-12084.80	28709.00	42.1 51.1 (b)	Pass
T9	50 - 37.5	Horizontal	L4x4x1/4	196	-16924.20	23362.50	72.4 72.7 (b)	Pass
		Horizontal	L4x4x1/4	199	-13279.90	23362.50	56.8	Pass
		Horizontal	L4x4x1/4	202	-14048.00	23362.50	60.1	Pass
T10	37.5 - 25	Horizontal	L4x4x1/4	211	-17960.10	21232.70	84.6	Pass
		Horizontal	L4x4x1/4	214	-13898.40	21232.70	65.5	Pass
		Horizontal	L4x4x1/4	217	-14903.20	21232.70	70.2	Pass
T11	25 - 0	Horizontal	L4x4x1/2	226	-20055.10	33220.30	60.4	Pass
		Horizontal	L4x4x1/2	233	-16073.40	33220.30	48.4	Pass
		Horizontal	L4x4x1/2	240	-17350.90	33220.30	52.2	Pass
		Horizontal	L4x4x1/2	250	-19094.60	36248.90	52.7 55.3 (b)	Pass
		Horizontal	L4x4x1/2	257	-14896.40	36248.90	41.1 43.2 (b)	Pass
		Horizontal	L4x4x1/2	264	-16031.90	36248.90	44.2 46.4 (b)	Pass
T1	180 - 175	Top Girt	L3x3x1/4	4	-172.86	34476.00	0.5	Pass
		Top Girt	L3x3x1/4	5	-472.21	34476.00	1.4	Pass
		Top Girt	L3x3x1/4	6	-493.68	34476.00	1.4	Pass
T11	25 - 0	Redund Horz 1 Bracing	L3x3x1/4	228	-6011.48	29975.50	20.1	Pass
		Redund Horz 1 Bracing	L3x3x1/4	231	-6004.80	29975.50	20.0	Pass
		Redund Horz 1 Bracing	L3x3x1/4	235	-6004.80	29975.50	20.0	Pass
		Redund Horz 1 Bracing	L3x3x1/4	238	-5984.85	29975.50	20.0	Pass
		Redund Horz 1 Bracing	L3x3x1/4	242	-5984.85	29975.50	20.0	Pass
		Redund Horz 1 Bracing	L3x3x1/4	245	-6011.48	29975.50	20.1	Pass
		Redund Horz 1 Bracing	L3x3x1/4	252	-6011.48	31847.00	18.9	Pass
		Redund Horz 1 Bracing	L3x3x1/4	255	-6004.80	31847.00	18.9	Pass
		Redund Horz 1 Bracing	L3x3x1/4	259	-6004.80	31847.00	18.9	Pass
		Redund Horz 1 Bracing	L3x3x1/4	262	-5984.85	31847.00	18.8	Pass
		Redund Horz 1 Bracing	L3x3x1/4	266	-5984.85	31847.00	18.8	Pass
		Redund Horz 1 Bracing	L3x3x1/4	269	-6011.48	31847.00	18.9	Pass
T11	25 - 0	Redund Diag 1	L3x3x1/4	229	-4255.06	15399.40	27.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Bracing						
		Redund Diag 1 Bracing	L3x3x1/4	232	-4250.33	15399.40	27.6	Pass
		Redund Diag 1 Bracing	L3x3x1/4	236	-4250.33	15399.40	27.6	Pass
		Redund Diag 1 Bracing	L3x3x1/4	239	-4236.21	15399.40	27.5	Pass
		Redund Diag 1 Bracing	L3x3x1/4	243	-4236.21	15399.40	27.5	Pass
		Redund Diag 1 Bracing	L3x3x1/4	246	-4255.06	15399.40	27.6	Pass
		Redund Diag 1 Bracing	L3x3x1/4	253	-4352.66	16057.80	27.1	Pass
		Redund Diag 1 Bracing	L3x3x1/4	256	-4347.82	16057.80	27.1	Pass
		Redund Diag 1 Bracing	L3x3x1/4	260	-4347.82	16057.80	27.1	Pass
		Redund Diag 1 Bracing	L3x3x1/4	263	-4333.38	16057.80	27.0	Pass
		Redund Diag 1 Bracing	L3x3x1/4	267	-4333.38	16057.80	27.0	Pass
		Redund Diag 1 Bracing	L3x3x1/4	270	-4352.66	16057.80	27.1	Pass
T3	150 - 125	Inner Bracing	L2 1/2x2 1/2x3/16	55	-12.28	8552.99	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	56	-11.86	8552.99	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	57	-12.30	8552.99	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	67	-12.49	9407.78	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	68	-11.76	9407.78	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	69	-12.48	9407.78	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	79	-13.50	10397.40	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	80	-12.66	10397.40	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	81	-13.50	10397.40	0.4	Pass
T4	125 - 100	Inner Bracing	L2 1/2x2 1/2x3/16	94	-12.28	6586.62	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	95	-11.20	6586.62	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	96	-12.28	6586.62	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	106	-12.37	7159.11	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	107	-11.48	7159.11	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	108	-12.37	7159.11	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	118	-11.85	7809.62	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	119	-11.29	7809.62	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	120	-11.85	7809.62	0.5	Pass
T5	100 - 91.6667	Inner Bracing	L2 1/2x2 1/2x3/16	133	-17.07	6080.15	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	134	-16.60	6080.15	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	135	-17.07	6080.15	0.5	Pass
T6	91.6667 - 83.3333	Inner Bracing	L2 1/2x2 1/2x3/16	148	-16.74	5629.93	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	149	-16.14	5629.93	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	150	-16.74	5629.93	0.6	Pass
T7	83.3333 - 75	Inner Bracing	L2 1/2x2 1/2x3/16	163	-17.60	5227.92	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	164	-16.85	5227.92	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	165	-17.61	5227.92	0.6	Pass
T8	75 - 50	Inner Bracing	L2 1/2x2 1/2x3/16	178	-20.41	4392.91	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	179	-18.45	4392.91	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	180	-20.41	4392.91	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	190	-21.02	4867.49	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	191	-19.24	4867.49	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	192	-21.01	4867.49	0.6	Pass
T9	50 - 37.5	Inner Bracing	L2 1/2x2 1/2x3/16	205	-20.53	3984.50	0.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	206	-18.23	3984.50	0.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	207	-20.52	3984.50	0.7	Pass
T10	37.5 - 25	Inner Bracing	L2 1/2x2 1/2x3/16	220	-20.08	3630.50	0.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Inner Bracing	L2 1/2x2 1/2x3/16	221	-17.52	3630.50	0.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	222	-20.08	3630.50	0.7	Pass
T11	25 - 0	Inner Bracing	L3x3x1/4	247	-21.01	6965.92	0.6	Pass
		Inner Bracing	L3x3x1/4	248	-18.52	6965.92	0.6	Pass
		Inner Bracing	L3x3x1/4	249	-21.02	6965.92	0.6	Pass
		Inner Bracing	L3x3x1/4	271	-20.46	7584.82	0.6	Pass
		Inner Bracing	L3x3x1/4	272	-18.08	7584.82	0.6	Pass
		Inner Bracing	L3x3x1/4	273	-20.44	7584.82	0.6	Pass
							Summary	
						Leg (T10)	82.2	Pass
						Diagonal (T11)	78.9	Pass
						Horizontal (T10)	84.6	Pass
						Top Girt (T1)	1.4	Pass
						Redund Horz 1 Bracing (T11)	20.1	Pass
						Redund Diag 1 Bracing (T11)	27.6	Pass
						Inner Bracing (T10)	0.7	Pass
						Bolt Checks	78.9	Pass
						RATING =	**84.6**	**Pass**

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Subject:	Anchor Bolt Analysis
Location:	180-ft Lattice Tower Thompson, CT
Rev. 0: 8/17/21	Prepared by: T.J.L. Checked by: C.F.C. Job No. 21082.07

Anchor Bolt Analysis:

Input Data:

Tower Reactions:

Tension Force =	Tension := 329·kips	(Input From tnxTower)
Compression Force =	Compression := 381·kips	(Input From tnxTower)
Shear Force =	Shear := 46·kips	(Input From tnxTower)

Anchor Bolt Data:

ASTMA615 Grade 75

Number of Anchor Bolts =	N := 6	(User Input)
Bolt Ultimate Strength =	F_u := 75·ksi	(User Input)
Bolt Yield Strength =	F_y := 60·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 1.75·in	(User Input)
Threads per Inch =	n := 5	(User Input)
Length from Top of Pier to Bottom of Leveling Nut =	L_{ar} := 0·in	(User Input)

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 2.405 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 = 1.899 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 1.555 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.389 \cdot in$

Elastic Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.369 \cdot in^3$

Plastic Section Modulus of Bolt = $Z_x := \frac{D_n^3}{6} = 0.627 \cdot in^3$

Anchor Bolt Design Strength:

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

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

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

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

Design Tensile Strength = $\Phi R_{nt} := \phi_t \cdot F_u \cdot A_n = 106.8 \cdot k$

Design Compression Strength = $\Phi R_{nc} := \phi_c \cdot F_y \cdot A_g = 129.9 \cdot k$

Design Shear Strength (Tension) = $\Phi R_{nv} := \phi_v \cdot 0.5 F_u \cdot A_g = 67.6 \cdot k$

Design Shear Strength (Compression) = $\Phi R_{nvc} := \phi_c \cdot 0.6 F_y \cdot A_g \cdot 0.75 = 58.4 \cdot k$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $P_{ut} := \frac{Tension}{N} = 54.8 \cdot kips$

Maximum Compressive Force = $P_{uc} := \frac{Compression}{N} = 63.5 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 7.7 \cdot kips$

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

Condition1 = "OK"

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

Condition2 = "OK"

Bolt % of Capacity = $\max\left[\left(\frac{P_{ut}}{\Phi R_{nt}}\right)^2 + \left(\frac{V_u}{\Phi R_{nv}}\right)^2, \left(\frac{P_{uc}}{\Phi R_{nc}}\right) + \left(\frac{V_u}{\Phi R_{nvc}}\right)^2\right] = 50.6 \cdot \%$

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Subject:	FOUNDATION WITH ROCK ANCHORS
Location:	Thompson, CT
Rev. 0: 8/17/21	Prepared by: T.J.L. Checked by: C.F.C. Job No. 21082.07

Rock Anchor Foundation Analysis:

Input Data:

Max Pier Reactions:

Uplift =	Uplift := 329·kips	*user input*	
Shear =	Shear := 46·kips	*user input*	
Compression =	Axial := 381·kips	*user input*	

Structure:

Footing Width =	$B_{ftg} := 6ft$	*user input*	
Footing Length =	$L_{ftg} := 6ft$	*user input*	
Footing Thickness =	$T_{ftg} := 2.5ft$	*user input*	
Pier Length/Width =	$L_{pier} := 3ft$	*user input*	
Pier Height =	$T_{pier} := 3.25ft$	*user input*	
Pier Projection Above Grade =	$P_p := 1·ft$	*user input*	

Depths:

Depth to Bottom of Footing =	$D_{ftg} := 4.75ft$	*user input*	(from grade line)
Depth to Suitable Rock =	$D_{rock} := 3.5ft$	*user input*	(from grade line)
Depth to Suitable Earth =	$D_{earth} := 1ft$	*user input*	(from grade line)
Anchor Length =	$L_{anchor} := 17ft$	*user input*	(from grade line)
Depth to Top of Submerged Anchor =	$D_{anchortop} := 2.75ft$	*user input*	(from grade line)
Anchor Depth =	$D_{anchor} := D_{anchortop} + L_{anchor}$		(from grade line)
	$D_{anchor} = 19.75\,ft$		

Subgrade Properties:

Internal Friction Angle =	$\phi := 30deg$	*user input*	
Unit Weight of Earth =	$\gamma_{earth} := 120\frac{lb}{ft^3}$	*user input*	
Unit Weight of Rock =	$\gamma_{rock} := 165\frac{lb}{ft^3}$	*user input*	
Unit Weight of Conc =	$\gamma_{conc} := 150\frac{lb}{ft^3}$	*user input*	
Ultimate Bearing =	Bearing := 19000·psf	*user input*	

Rock Anchor Properties:

Number of Anchors =	$N_{anchor} := 4$	*user input*
Hole Diameter =	$hole_d := 3in$	*user input*
Ultimate Bond Stress Between Rock and Grout =	$\sigma_{bond} := 100 \cdot psi$	*user input*
Grout Allowable Compressive Stress =	$fc_g := 5000 \cdot psi$	*user input*
Anchor Spacing* (along length) =	$S_{anchor} := 3ft$	*user input*
Required Factor of Safety =	$F_S := 1.0$	*user input*

Total Volume of Concrete =	$V_{conc} := B_{ftg} \cdot L_{ftg} \cdot T_{ftg} + \frac{\pi \cdot L_{pier}^2}{4} \cdot T_{pier} = 113 \cdot ft^3$
Weight of Pad =	$W_{pad} := \left(B_{ftg} \cdot L_{ftg} \cdot T_{ftg}\right) \cdot \gamma_{conc} = 13.5 \cdot kips$
Weight of Pier =	$W_{pier} := \left(L_{pier}^2 \cdot T_{pier}\right) \cdot \gamma_{conc} = 4.39 \cdot kips$
Weight of Mat =	$W_{mat} := \frac{\left(1350 \cdot ft^3\right)}{3} \cdot \gamma_{conc} = 67.5 \cdot kips$
Total Weight of Concrete =	$W_{conc} := W_{pad} + W_{pier} + W_{mat} = 85.4 \cdot kips$

Calculated Uplift Resistance:

Intermediate Dimension:

Suitable Earth Height = $H := D_{rock} - D_{earth} = 2.5\,ft$

Suitable Rock Height = $Z := \left(D_{anchor} - D_{rock}\right) = 16.25\,ft$

Total Anchor Width = $W := S_{anchor} = 3\,ft$

Volumes:

Base Area 1 of Resisting Pyramid = $B_1 := W^2 = 9\,ft^2$

Base Area 3 of Resisting Pyramid = $B_2 := [\tan(\phi)\cdot(Z)\cdot 2 + W]^2 = 473.7\,ft^2$

Volume of Rock = $V_{rock} := \frac{\left[(Z)\cdot\left(B_1 + B_2 + \sqrt{B_1\cdot B_2}\right)\right]}{3} = 2968.1\cdot ft^3$

Resisting Forces:

Resisting Rock Force = $W_{rock} := V_{rock}\cdot\gamma_{rock} = 489.7\cdot kips$

Total Resisting Force = $W_{total} := 0.75W_{rock} + 0.9W_{conc} = 444.2\cdot kips$

Foundation Uplift Check:

Factor of Safety = $\frac{W_{total}}{Uplift} = 1.35$

$Uplift\_Check := if\left(\frac{W_{total}}{Uplift} \geq F_S, "OK", "Overstressed"\right)$

Uplift_Check = "OK"

Rock Bearing Capacity Check:

Bearing Force = $MaxBearing := \left[\frac{\left(Axial + 1.2\cdot W_{pad} + 1.2\cdot W_{pier}\right)}{B_{ftg}\cdot L_{ftg}}\right] = 11180\cdot psf$

$\frac{MaxBearing}{0.75Bearing} = 0.78$

$Rock\_Bearing\_Check := if\left(\frac{MaxBearing}{0.75Bearing} \leq 1.00, "OK", "Overstressed"\right)$

Rock_Bearing_Check = "OK"

Rock Anchor Req'd Development Length in Rock:

Actual Tension Force per Anchor = $T_a := \frac{Uplift - W_{conc}}{N_{anchor}} = 60.9\cdot kips$

Required Rock/Grout Bond Length: $L_b := \frac{T_a}{\pi\cdot hole_d\cdot\sigma_{bond}\cdot 0.6} = 8.98\,ft$

$Bond\_Length\_Check := if\left(\frac{L_b}{Z} \leq 1.00, "OK", "Increase Length"\right)$

Bond_Length_Check = "OK"

ATTACHMENT F – PROOF OF DELIVERY OF NOTICE

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ATTACHMENT G - POWER DENSITY REPORT

C Squared Systems, LLC
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Calculated Radio Frequency Emissions Report

EVERSOURCE ENERGY

ES-051

97 Mountain Hill Road

Thompson, CT 06255

August 18, 2021

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the Eversource installation on the self-support tower at 97 Mountain Hill Road in Thompson, CT. Eversource has recently installed two omnidirectional antennas – one transmit and one receive-only antenna – as part of its 220 MHz communications system.

The previous compliance report was based on a different antenna model that has since changed. This report is intended to reflect the analysis with the actual 220 MHz installation.

This report considers the updated antenna configuration as detailed by Eversource along with % MPE (Maximum Permissible Exposure) measurements of the existing tower to determine FCC compliance of the facility.

Figure 1: View of ES-051 Thompson

Site Address	97 Mountain Hill Road
Latitude	41° 59' 11.7" N
Longitude	71° 54' 49.1" W
Site Elevation AMSL	558’
Survey Engineer	Marc Salas
Survey Date/Time	6/16/2020; 9:00 AM – 9:45 AM

Table 1: Survey Information

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached “FCC Limits for Maximum Permissible Exposure (MPE)” in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. Power Density Calculation Methods

The power density calculation results were generated using the following formula as outlined in FCC bulletin OET 65, and Connecticut Siting Council recommendations:

$$\text{Power Density} = \left(\frac{1.6^2 \times 1.64 \times \text{ERP}}{4\pi \times R^2}\right) \text{X Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power = 1.64 x ERP

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna

V = Vertical Distance from radiation center of antenna

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and full power, and that all antenna channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not consider actual terrain elevations which could attenuate the signal. As a result, the calculated power density and corresponding % MPE levels reported below are much higher than the actual levels will be from the final installation.

4. Proposed Antenna Configuration

Table 2 below lists the technical details of the proposed Eversource installation, which has been recently installed. These parameters are applied to the above calculation methods in order to calculate the % MPE values of this equipment. Any receive-only antennas recently installed have not been included in the table as they are irrelevant in terms of the % MPE calculations.

Operator	Antenna Model	TX Freq. (MHz)	Ant Gain (dBd)	Power ERP (Watts)	Number of Channels	Vertical Beamwidth	Length (ft)	Antenna Centerline Height (ft)
Eversource	Comprod 871F-70-220	217	2.5	124	4	~110°	5.5	134

Table 2: Eversource Antenna Configuration (Proposed)[1] [2]

[1] Transmit power assumes 0 dB of cable loss.

[2] Antenna height listed for the proposed antenna is based on the stamped Black & Veatch construction drawings dated August 13, 2021 (Rev. 1).

5. Measurement Procedure

Frequencies from 300 KHz to 50 GHz were measured using the Narda Probe EA 5091, E-Field, shaped, FCC probe in conjunction with the NBM550 survey meter. The EA 5091 probe is "shaped" such that in a mixed signal environment (i.e.: more than one frequency band is used in a particular location), it accurately measures the percent of MPE.

From FCC OET Bulletin No. 65 - Edition 97-01 – "A useful characteristic of broadband probes used in multiple-frequency RF environments is a frequency-dependent response that corresponds to the variation in MPE limits with frequency. Broadband probes having such a "shaped" response permit direct assessment of compliance at sites where RF fields result from antennas transmitting over a wide range of frequencies. Such probes can express the composite RF field as a percentage of the applicable MPEs".

Probe Description - As suggested in FCC OET Bulletin No. 65 - Edition 97-01, the response of the measurement instrument should be essentially isotropic, (i.e., independent of orientation or rotation angle of the probe). For this reason, the Narda EA 5091 probe was used for these measurements.

Sampling Description - At each measurement location, a spatially averaged measurement is collected over the height of an average human body. The NBM550 survey meter performs a time average measurement while the user slowly moves the probe over a distance range of 20 cm to 200 cm (about 6 feet) above ground level. The results recorded at each measurement location include average values over the spatial distance.

Instrumentation Information - A summary of specifications for the equipment used is provided in the table below.

Manufacturer	Narda Microwave			
Probe	EA 5091, Serial# 01116			
Calibration Date	May 2020			
Calibration Interval	24 Months			
Meter	NBM550, Serial# E-1069			
Calibration Date	May 2020			
Calibration Interval	24 Months			
Probe Specifications	**Frequency Range**	**Field Measured**	**Standard**	**Measurement Range**
	300 KHz-50 GHz	Electric Field	U.S. FCC 1997 Occupational/Controlled	0.2 – 600 % of Standard

Table 3: Instrumentation Information

Instrument Measurement Uncertainty - The total measurement uncertainty of the NARDA measurement probe and meter is no greater than ±3 dB (0.5% to 6%), ±1 dB (6% to 100%), ±2 dB (100% to 600%). The factors which contribute to this include the probe's frequency response deviation, calibration uncertainty, ellipse ratio, and isotropic response[3]. Every effort is taken to reduce the overall uncertainty during measurement collection including pointing the probe directly at the likely highest source of emissions.

[3] For further details, please refer to Narda Safety Test Solutions NBM550 Probe Specifications, pg. 64
http://www.narda-sts.us/pdf_files/DataSheets/NBM-Probes_DataSheet.pdf

6. Surveyed and Calculated % MPE Results

Measured and calculated results and a description of each survey location are detailed in the table below. Measurements were recorded on June 16, 2020 between 9:00 AM and 9:45 AM. The calculated % MPE contribution from the recent equipment modifications was then added to the measured % MPE values in the "Composite % MPE" column. These calculated values incorporate the antenna pattern of the antenna model specified by Eversource to determine the "Off Beam Loss" factor shown in the power density formula from Section 3. All % MPE values are in reference to the FCC Uncontrolled/General Population exposure limit.

Table 4 below lists 11 measurements recorded in the vicinity of the tower. The highest spatially averaged measurement was 9.89% (Average Uncontrolled/General Population MPE) and was recorded at Location 10 near 66 Mountain Hill Road. The highest composite (measured + calculated) % MPE value is calculated to be 10.02% (Average Uncontrolled/General Population) and is also calculated to occur at Location 10.

Meas. Location	Location Description	Latitude	Longitude	Dist. From Site (feet)	Measured % MPE (Uncontrolled / General)	Calculated % MPE (Eversource Proposed)	Composite % MPE (Uncontrolled / General)
1	Western corner of fenced compound	41.98653	-71.91400	100	1.64%	2.00%	3.64%
2	Southwest side of fenced compound gate	41.98648	-71.91392	86	1.82%	2.08%	3.90%
3	Left of fenced compound gate	41.98645	-71.91384	76	2.14%	2.07%	4.22%
4	Fenced compound gate	41.98640	-71.91376	79	2.26%	2.02%	4.29%
5	Parking area in front of compound gate	41.98634	-71.91383	105	2.48%	1.98%	4.45%
6	Along access way to tower	41.98616	-71.91388	172	1.03%	1.25%	2.27%
7	Access road, split with private drive	41.98582	-71.91397	297	2.08%	0.59%	2.67%
8	Tower access road and Mountain Hill Road	41.98500	-71.91471	652	1.87%	0.17%	2.04%
9	Cul-de-sac at end of Mountain Hill Road	41.98529	-71.91526	650	7.22%	0.17%	7.39%
10	**66 Mountain Hill Road**	**41.98458**	**-71.91423**	**755**	**9.89%**	**0.13%**	**10.02%**
11	86 Mountain Hill Road	41.98419	-71.91360	878	9.58%	0.10%	9.67%

Table 4: Measured and Calculated % MPE Results [4] [5]

[4] Due to measurement uncertainty at low levels (See Table 3), any readings outside the measurement range of the probe (< 1.00 % FCC General Population/Uncontrolled MPE) are noted as such.

[5] Measured and calculated % MPE values listed are rounded to two decimal points and the composite % MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not identically match the total composite values reflected in the table.

Figures 2 and 3 below are aerial views of the tower location and the surrounding area, along with the measurement locations listed in Table 4.

Figure 2: Measurement Points – Zoom In

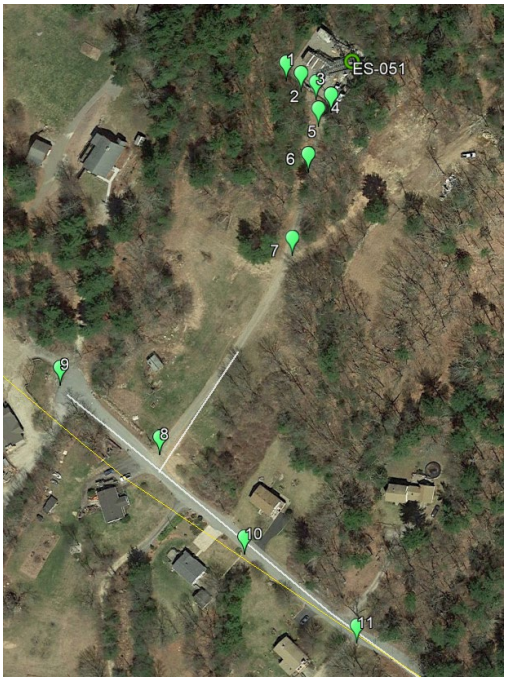

Figure 3: All Measurement Points

7. Conclusion

A number of accessible areas around the tower at 97 Mountain Hill Road in Thompson, CT were surveyed and found to be well within the mandated General Population/Uncontrolled limits for Maximum Permissible Exposure, as delineated in the Federal Communications Commission's Radio Frequency exposure rules published in 47 CFR 1.1307(b)(1)-(b)(3).

The highest spatially averaged % MPE measurement of all surveyed points based on the 1997 FCC standard for exposure to the general population is 9.89% MPE. This measurement was recorded at Location 10, near 66 Mountain Hill Road.

The highest composite (measured + calculated) power density is **10.02% of the FCC General Population MPE limit** with the new 220 MHz Eversource equipment and is also calculated to occur at Location 10.

The above analysis concludes that RF exposure at ground level around the tower, both at the time of measurement and with the updated 220 MHz antenna installation, are below the maximum power density limits as outlined by the FCC in the OET Bulletin 65 Ed. 97-01.

As noted previously, the calculated % MPE levels are more conservative (higher) than the actual levels will be from the finished installation.

8. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in FCC OET Bulletin 65 Edition 97-01, IEEE Std. C95.1, and IEEE Std. C95.3.

Keith Vellante

August 18, 2021

Report Prepared By: Keith Vellante
Director of RF Services
C Squared Systems, LLC

Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

IEEE C95.1-2005, IEEE Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz IEEE-SA Standards Board

IEEE C95.3-2002 (R2008), IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz-300 GHz IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure[6]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure[7]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 5: FCC Limits for Maximum Permissible Exposure (MPE)

[6] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure

[7] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

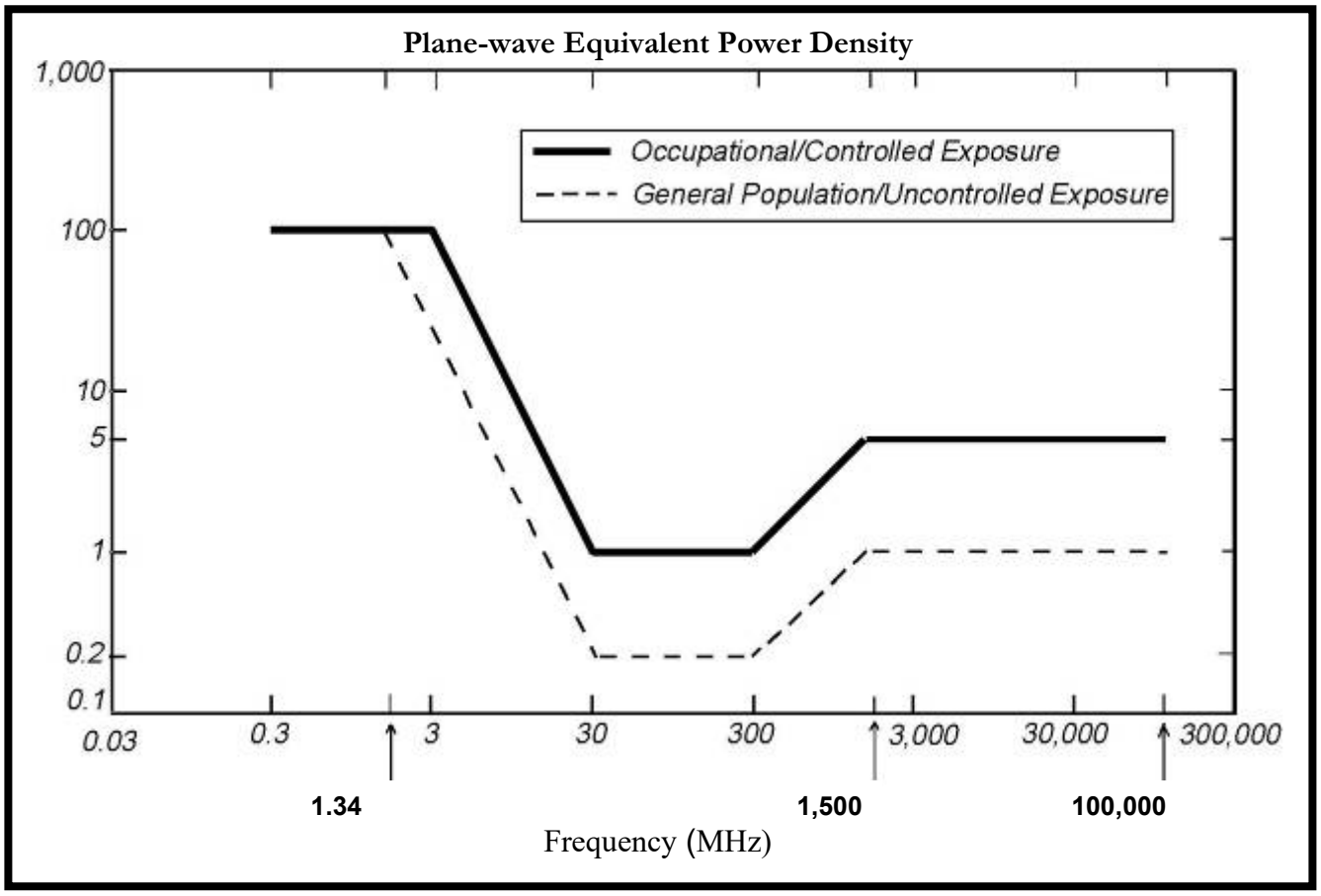

Figure 4: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Eversource Antenna Data Sheet and Electrical Patterns

217 MHz

Manufacturer:	Comprod
Model #:	871F-70-220
Frequency Band:	215-225 MHz
Gain:	2.5 dBd
Vertical Beamwidth:	~ 110°
Horizontal Beamwidth:	360°
Polarization:	Vertical-Polarization
Length:	5.5’