EVERSOURCE ENERGY

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

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

February 14, 2022

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

RE: **Notice of Exempt Modification**
Eversource Site # ES-077 Litchfield
452 Bantam Road (AKA 438 Bantam Road), Litchfield, CT 06759
Latitude: 41-44-10.24 N / Longitude: 73-13-5.04 W

Dear Ms. Bachman:

The Connecticut Light and Power Company doing business as Eversource Energy ("Eversource") currently maintains two antennas on an existing 180-foot self-support tower located at 452 Bantam Road in Litchfield. 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 15-foot 7-7-inch omni-directional antenna to be mounted at 111 feet above ground level ("AGL") on a four-foot stand-off mount, and the removal of two 3-foot 8-inch omni directional antennas and associated mounts. There will be no changes to the area of the fenced compound, the tower or existing antennas and equipment mounted on the tower. The antenna will be mounted to the tower on a new 4-foot stand-off mount. See Attachment C, Mount Analysis. The tower and existing and proposed equipment are depicted on Attachment D, Construction Drawings, dated December 7, 2021 and Attachment E, Structural Analysis, dated January 12, 2022. The Connecticut Siting Council approved the self-support tower at this location in Docket No. 118 in February 1990.

The modification is required to eliminate transmitter induced noise issues from two antennas 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-130-210115, dated March 1, 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

Denise Raap, First Selectman for the Town of Litchfield and Dennis P. Tobin, PhD, Land Use Administrator for the Town of Litchfield, 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 proposed modifications will not require an extension of the site boundary.
3. The proposed modification 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 antennas 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 January 20, 2022 (Attachment G – Power Density Report)[1].
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure, antenna mounts, 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 copy of this notice is 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 Denise Raap, First Selectman, Town of Litchfield
Dennis P. Tobin, PhD, Land Use Administrator, Town of Litchfield
DESPP

Attachments

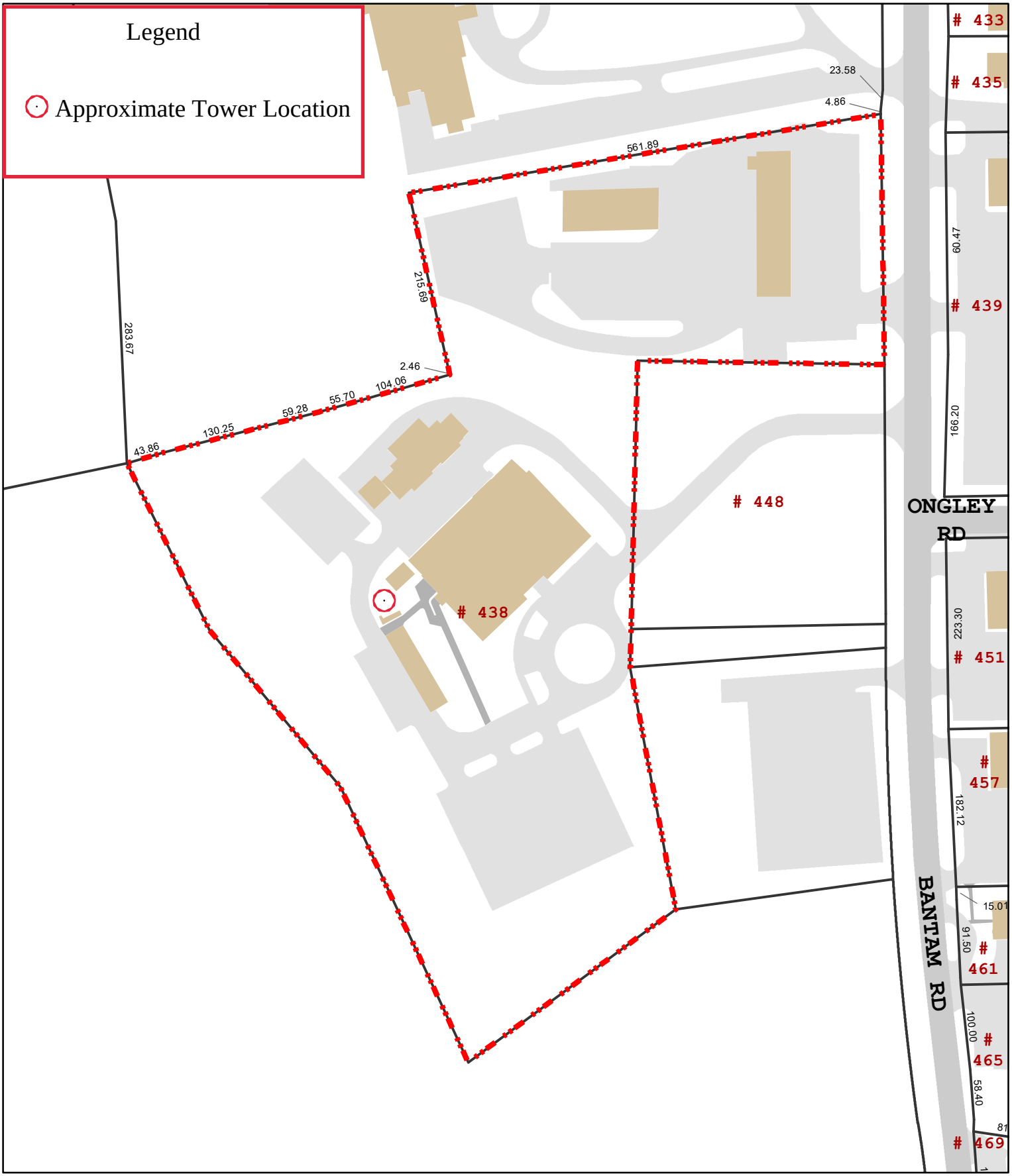
A. Parcel Map and Property Card
B. Letter of Authorization
C. Mount Analysis
D. Construction Drawings
E. Structural Analysis
F. Proof of Delivery of Notice
G. Power Density Report

[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

Town of Litchfield, CT: Parcel Map

MBL: 085-067-032 LOCATION: 438 BANTAM RD



Disclaimer: This map is for informational purposes only.
All information is subject to verification by any user.
The Town of Litchfield and its mapping contractors assume
no legal responsibility for the information contained herein.

1 inch = 200 feet

0 100 200 300 400 Feet

Map Produced
October 2019

Town of Litchfield, CT

Property Listing Report

Map Block Lot	085-067-032	Building #	1	Section #	1	Account	030050

Property Information

Property Location	438 BANTAM RD
Owner	CONNECTICUT STATE OF
Co-Owner	
Mailing Address	2800 BERLIN TURNPIKE NEWINGTON CT 06111-4113
Land Use	920 Exempt Comm
Land Class	E
Zoning Code	9
Census Tract	

Street Index	200
Acreage	10.92
Utilities	Water/Sewer/Electric
Lot Setting/Desc	High
Additional Info	

Photo

Sketch

Primary Construction Details

Year Built	1949	Bedrooms		Exterior Walls	Brick
Stories	1	Full Bathrooms	1	Exterior Walls 2	
Building Style	Comm Garage	Half Bathrooms		Interior Walls	Minimum
Building Use	Comm/Ind	Extra Fixtures		Interior Walls 2	
Building Condition	G	Bath Style		Heating Type	Forced Hot Air
Interior Floors 1	Concrete	Kitchen Style		Heating Fuel	Oil
Interior Floors 2		Roof Style	Flat	Sq. Ft. Basement	
Total Rooms	0	Roof Cover	Tar & Gravel	Fin BSMT Quality	
Basement Garages		AC Type	Partial	Extra Kitchens	
Occupancy	1	Fireplaces			
Building Grade					

Report Created On 2/27/2020

Town of Litchfield, CT

Property Listing Report

Map Block Lot	085-067-032	Building #	1	Section #	1	Account	030050

Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	7556780	5289750
Extras	9480	6630
Improvements		
Outbuildings	686880	480820
Land	784200	548940
Total	9037340	6326140

Outbuilding and Extra Features

Type	Description
Sprinklers-Wet	12580 S.F.
Shed	72 S.F.
Cell Tower	3 UNITS
Carport	2000 S.F.
Lights	9 UNITS
W/Double Light	1 UNITS
Gas Canopy	625 S.F.
Lights	2 UNITS
Paving	108400 S.F.
Air Condition	400 UNITS

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	6720	6720
Total Area	6720	6720

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
CONNECTICUT STATE OF	182/ 282	9/16/1985	0

Report Created On 2/27/2020

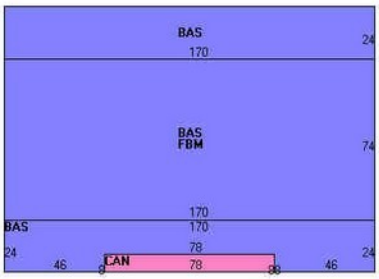
Town of Litchfield, CT

Property Listing Report

Map Block Lot	085-067-032	Building #	2	Section #	1	Account	030050

Photo

Sketch



Primary Construction Details

Year Built	1989	Bedrooms		Exterior Walls	Brick
Stories	2	Full Bathrooms	0	Exterior Walls 2	
Building Style	Jail	Half Bathrooms		Interior Walls	Drywall
Building Use	Comm/Ind	Extra Fixtures		Interior Walls 2	
Building Condition	G	Bath Style		Heating Type	Forced Hot Air
Interior Floors 1	Vinyl	Kitchen Style		Heating Fuel	Oil
Interior Floors 2		Roof Style	Hip	Sq. Ft. Basement	
Total Rooms	0	Roof Cover	Asphalt	Fin BSMT Quality	
Basement Garages		AC Type	Central	Extra Kitchens	
Occupancy	1	Fireplaces			
Building Grade					

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Finished Basement	12580	0
First Floor	20116	20116
Canopy	624	0

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area	33320	20116

Report Created On

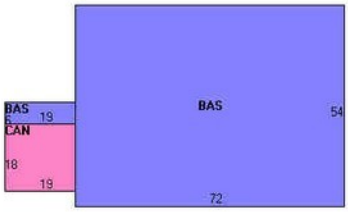
Town of Litchfield, CT

Property Listing Report

Map Block Lot	085-067-032	Building #	3	Section #	1	Account	030050

Photo

Sketch



Primary Construction Details

Year Built	1989	Bedrooms		Exterior Walls	Brick
Stories	1	Full Bathrooms	0	Exterior Walls 2	
Building Style	Comm Garage	Half Bathrooms		Interior Walls	Minimum
Building Use	Comm/Ind	Extra Fixtures		Interior Walls 2	
Building Condition	G	Bath Style		Heating Type	Forced Hot Air
Interior Floors 1	Concrete	Kitchen Style		Heating Fuel	Gas
Interior Floors 2		Roof Style	Flat	Sq. Ft. Basement	
Total Rooms	0	Roof Cover	Rolled	Fin BSMT Quality	
Basement Garages		AC Type	None	Extra Kitchens	
Occupancy	1	Fireplaces			
Building Grade					

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Canopy	342	0
First Floor	4002	4002

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area	4344	4002

Report Created On

Town of Litchfield, CT

Property Listing Report

Map Block Lot	085-067-032	Building #	4	Section #	1	Account	030050

Photo

Sketch

Primary Construction Details

Year Built	1990	Bedrooms		Exterior Walls	Wood Shingle
Stories	1	Full Bathrooms	0	Exterior Walls 2	
Building Style	Storage Building	Half Bathrooms		Interior Walls	Typical
Building Use	Comm/Ind	Extra Fixtures		Interior Walls 2	
Building Condition	G	Bath Style		Heating Type	None
Interior Floors 1	Concrete	Kitchen Style		Heating Fuel	None
Interior Floors 2		Roof Style	Mansard	Sq. Ft. Basement	
Total Rooms	0	Roof Cover	Arch Shingles	Fin BSMT Quality	
Basement Garages		AC Type	None	Extra Kitchens	
Occupancy	1	Fireplaces			
Building Grade					

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	4950	4950

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area	4950	4950

Report Created On

ATTACHMENT B – LETTER OF AUTHORIZATION

STATE OF CONNECTICUT

DEPARTMENT OF EMERGENCY SERVICES AND PUBLIC PROTECTION

May 5, 2020

Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Letter of Authorization** – Co-location on Connecticut State Police tower
Property address: 438 Bantam Road, Litchfield, CT
Latitude: 41-44-10.27" Longitude: 73-13-05.27"

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 438 Bantam Road, Litchfield, 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

November 28, 2021

MOUNT EVALUATION LETTER

Site Number: 3791
Site Name: LITCHFIELD TROOP L CSP
Site Data: 452 Bantam Rd.
Litchfield, CT 06759
Latitude: 41° 44' 10.24"
Longitude: -73° 13' 5.04"

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 existing antenna mounting system to be: **SUFFICIENT**

Structure Rating (max from all components) =	46.3%

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

This analysis analyzes the worst-case scenario for the proposed custom omni 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: Joohwan Jung
Submitted By: Josh Riley, P.E.

11/29/2021

Riley, Joshua J

Digitally signed by Riley, Joshua J
DN: CN="Riley, Joshua J", OU=Professionals, OU=Corp - NA, OU=Corp, DC=na, DC=bvcorp, DC=net
Date: 2021.11.29 09:02:02-06'00'

TABLE OF CONTENTS

1. LOADING SUMMARY

Appurtenance								
Carrier	Position	Sector	Antenna RAD Center (ft)	Mount Centerline (ft)	Qty	Type	Manufacturer	Model
Eversource	1	A	119	111	1	Omni	dbSpectra	SP2D00P36D-D

2. ANALYSIS CRITERIA SUMMARY

ANALYSIS CRITERIA	
STANDARD	TIA-222-H
WIND SPEED	Ultimate of 125 mph
WIND SPEED WITH ICE	40 mph with 2" radial ice thickness
EXPOSURE CATEGORY	C
RISK CATEGORY	III
TOPO CATEGORY	Flat
CREST HEIGHT	N/A

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	46.3%	Pass	18.9%	Pass
Bracing: Pipe 2.0 Std	31.7%	Pass	5.8%	Pass
Mount Pipe: Pipe 3.0 Std	27.2%	Pass	18.4%	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

Dead and Live Loads

Maintenance Live Load: L_V = 250 lb
Installation Live Load: L_M = 0 lb

Appurtenance Dead Loads	
Name	Weight (lb)
SP2D00P36D-D	45

BLACK & VEATCH

Client: Eversource | Computed By: Joohwan Jung
Site Name: LITCHFIELD TROOP L CSP (3791) | Date: 11/28/2021
Verified By: Josh Riley
Title: MOUNT ANALYSIS REPORT | Date: 11/28/2021

Appurtenance Wind Loading

			Equations	TIA-222-H
Exposure Category =	C		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	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 =	125	mph		
Height Above Ground, z =	119	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	N/A	ft		
Velocity Pressure Coefficient, K_z =	1.31		$K_e = e^{-0.000032 z_s}$	2.6.8
Topographic Factor, K_{zt} =	1.00			
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 =	49.89	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)
SP2D00P36D-D	15.60	0.25	0.25	2.00	7.02	350.21	2.00	7.02	350.21

BLACK & VEATCH	Client: Eversource		Computed By: Joohwan Jung
	Site Name: LITCHFIELD TROOP L CSP (3791)		Date: 11/28/2021
			Verified By: Josh Riley
	Title: MOUNT ANALYSIS REPORT		Date: 11/28/2021

Member Wind Loading

			Equations	TIA-222-H
Exposure Category =	C		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	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 =	125	mph		
Height Above Ground, z =	119	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	N/A	ft		
Velocity Pressure Coefficient, K_z =	1.31		$K_e = e^{-0.000032 z_s}$	2.6.8
Topographic Factor, K_{zt} =	1.00			
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 =	49.89	psf		
Gust Effect Factor, G_h =	1.00		$F_M = q_z G_h C_f D_p$	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	24.94
Bracing: Pipe 2.0 Std	0.20		1.2	0.20	11.85
Mount Pipe: Pipe 3.0 Std	0.29		1.2	0.29	17.46

Appurtenance Ice Dead Loading

			Equations	TIA-222-H
Exposure Category =	C			
Risk Category =	III		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Topographic Category =	1			
Height Above Ground, z =	119	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	N/A	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} =	1.00		$T_{iz} = T_i I K_{iz}(K_{zt})^{0.35}$	2.6.10
Height Escalation Factor, K_{iz} =	1.14			
Factored Ice Thickness, T_{iz} =	2.61	in	$DL_{ice}=[(H_{ice}*D_{ice}*W_{ice}) - (H*W*D)]*56pcf$	
Grating Ice Dead Load, D_{Gice} =	12.20	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)
SP2D00P36D-D	16.04	0.69	0.69	6.57	367.74

BLACK & VEATCH	Client:	Eversource	Computed By: Joohwan Jung
	Site Name:	LITCHFIELD TROOP L CSP (3791)	Date: 11/28/2021
			Verified By: Josh Riley
	Title:	MOUNT ANALYSIS REPORT	Date: 11/28/2021

Member Ice Dead Loading

Exposure Category =	C	
Risk Category =	III	
Topographic Category =	1	
Height Above Ground, z =	119	ft
Crest Height, H =	N/A	ft
Design Ice Thickness, T_i =	2.00	in
Importance Factor, I =	1.15	
Topographic Factor, K_{zt} =	1.00	
Height Escalation Factor, K_{iz} =	1.14	
Factored Ice Thickness, T_{iz} =	2.61	in
Grating Ice Dead Load, D_{Gice} =	12.20	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	0.69	0.69	0.35	0.39	21.91
Bracing: Pipe 2.0 Std	0.63		0.20	0.28	15.94
Mount Pipe: Pipe 3.0 Std	0.73		0.29	0.35	19.53

BLACK & VEATCH	Client: Eversource		Computed By: Joohwan Jung
	Site Name: LITCHFIELD TROOP L CSP (3791)		Date: 11/28/2021
			Verified By: Josh Riley
	Title: MOUNT ANALYSIS REPORT		Date: 11/28/2021

Appurtenance Ice Wind Loading

			Equations	TIA-222-H
Exposure Category =	C		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	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} =	40	mph		
Height Above Ground, z =	119	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	N/A	ft		
Velocity Pressure Coefficient, K_z =	1.31	psf	$K_e = e^{-0.000032 z_s}$	2.6.8
Topographic Factor, K_{zt} =	1.00			
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, $q_{z(ice)}$ =	5.108			
Factored Ice Thickness, T_{iz} =	2.61	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)
SP2D00P36D-D	16.04	0.69	0.69	-	14.27	72.88	-	14.27	72.88

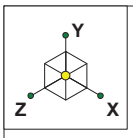
Member Ice Wind Loading

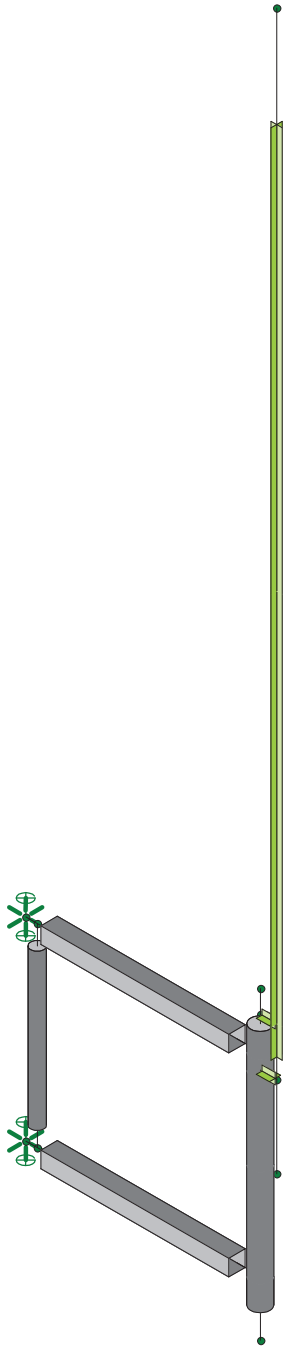
			Equations	TIA-222-H
Exposure Category =	C		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	III			
Topographic Category =	1		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Ice Wind Speed, V_{ice} =	40	mph		
Height Above Ground, z =	119	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	N/A	ft		
Velocity Pressure Coefficient, K_z =	1.31	psf	$K_e = e^{-0.000032 z_s}$	2.6.8
Topographic Factor, K_{zt} =	1.00			
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, $q_{z(ice)}$ =	5.108			
Factored Ice Thickness, T_{iz} =	2.61	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	0.69	0.69	2	0.69	7.01
Bracing: Pipe 2.0 Std	0.63		1.2	0.63	3.88
Mount Pipe: Pipe 3.0 Std	0.73		1.2	0.73	4.46

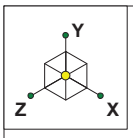
APPENDIX 2:
RISA PRINTOUTS

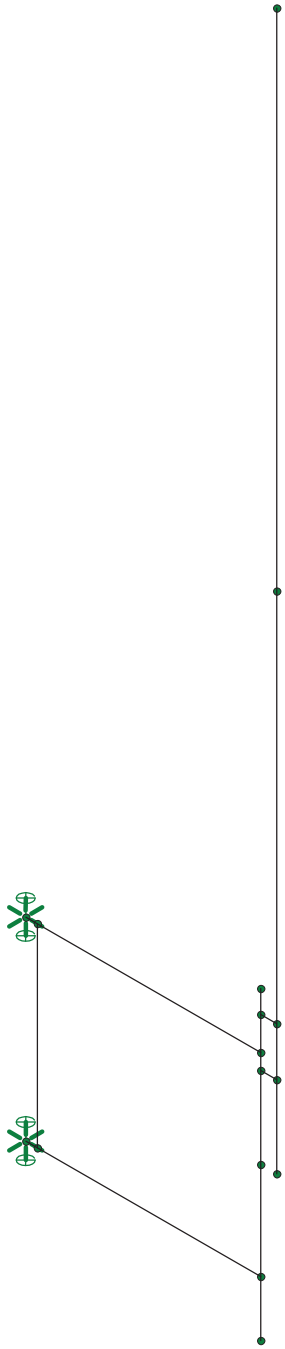




Envelope Only Solution

Black & Veatch	LITCHFIELDTRPL USF-4U Model	SK - 1
Joohwan Jung		Nov 27, 2021 at 3:03 PM
405025.2021.2200		LITCHFIELDTRPL USF-4U Model...





Envelope Only Solution

Black & Veatch	LITCHFIELDTRPL USF-4U Model	SK - 2
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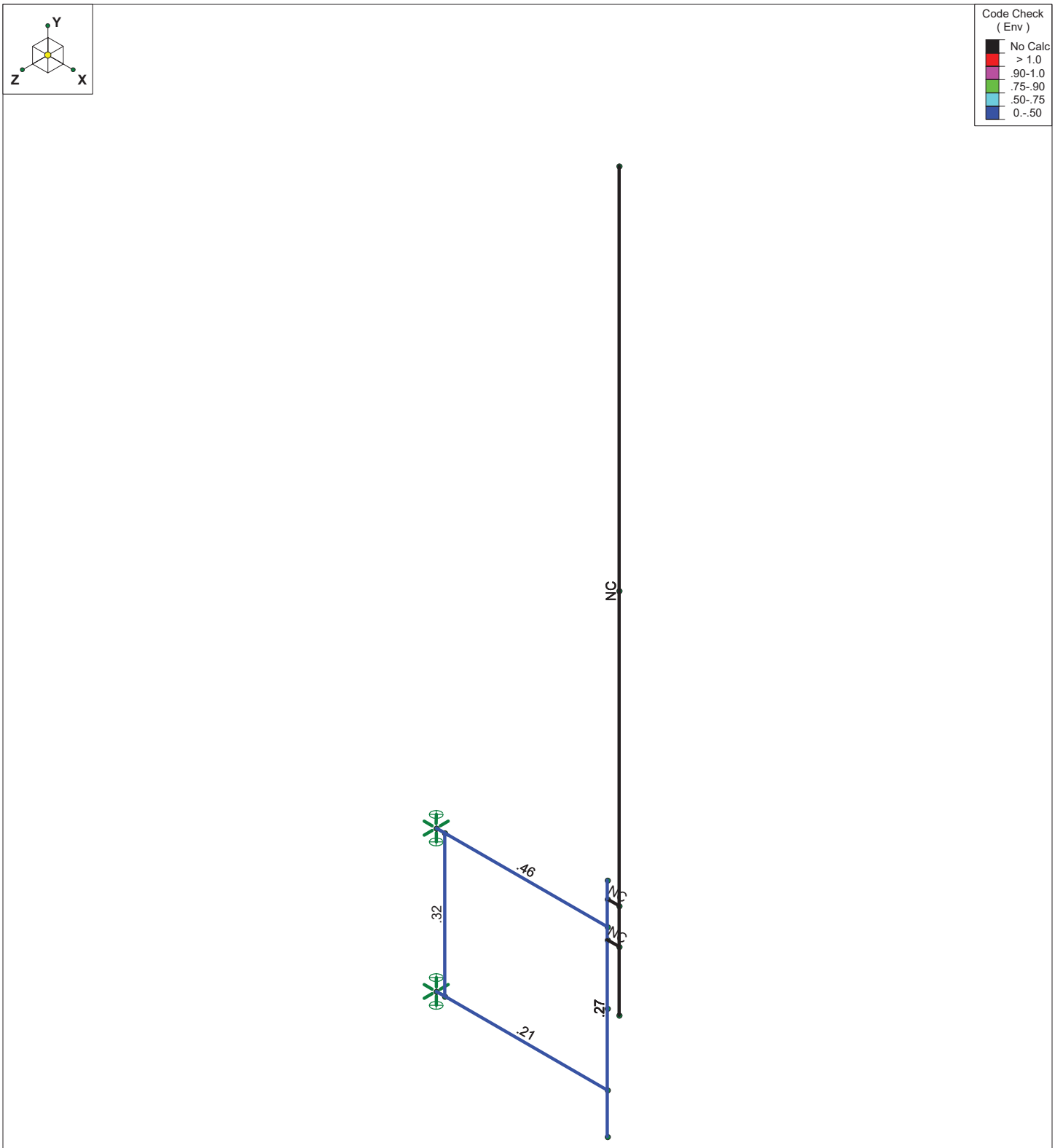
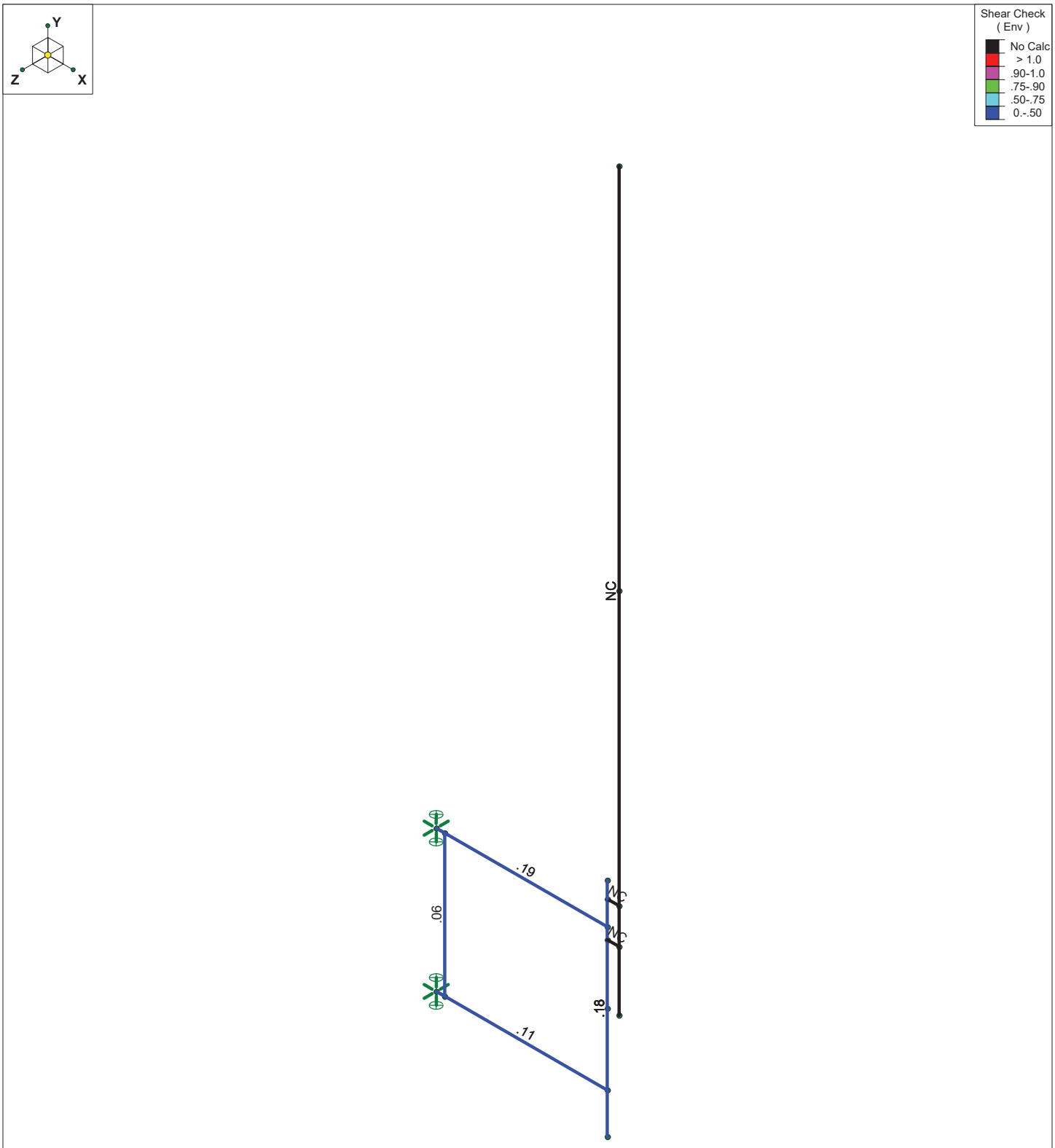
405025.2021.2200		LITCHFIELDTRPL USF-4U Model...



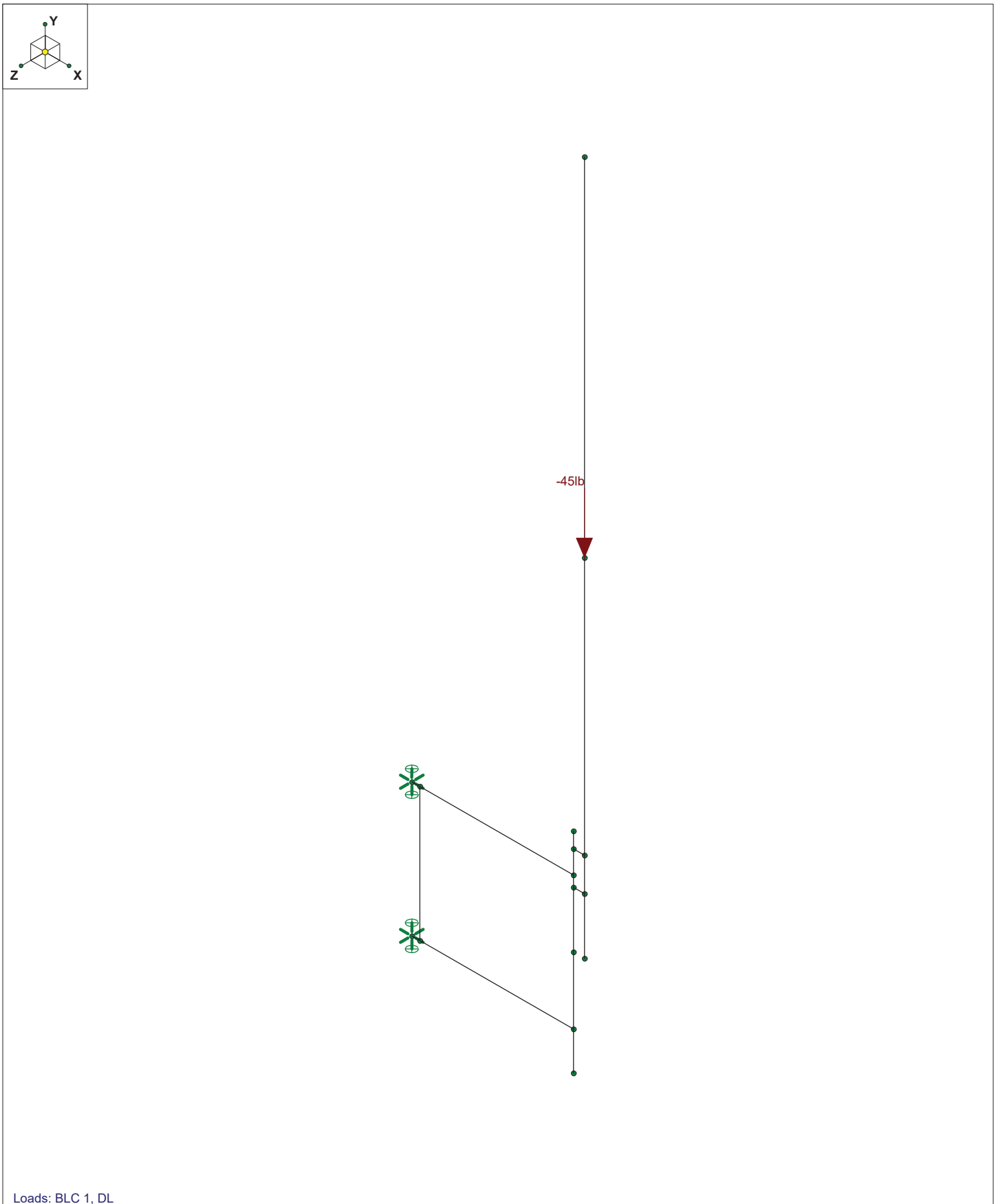
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Black & Veatch	LITCHFIELDTRPL USF-4U Model	SK - 3
Joohwan Jung		Nov 27, 2021 at 3:04 PM
405025.2021.2200		LITCHFIELDTRPL USF-4U Model...



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Black & Veatch	LITCHFIELDTRPL USF-4U Model	SK - 4
Joohwan Jung		Nov 27, 2021 at 3:04 PM
405025.2021.2200		LITCHFIELDTRPL USF-4U Model...



Loads: BLC 1, DL
Envelope Only Solution

Black & Veatch	LITCHFIELDTRPL USF-4U Model	SK - 5
Joohwan Jung		Nov 27, 2021 at 3:04 PM
405025.2021.2200		LITCHFIELDTRPL USF-4U Model...

(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 (/1...	Density[k/f...	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 Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Arm	HSS3X3X3	Beam	None	A53 Gr.B	Typical	1.89	2.46	2.46	4.03
2	Bracing	PIPE_2.0	Column	None	A53 Gr.B	Typical	1.02	.627	.627	1.25
3	Mount Pipe	PIPE_3.0	Column	None	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(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2			Arm	Beam	None	A53 Gr.B	Typical
2	M2	N3	N4			Arm	Beam	None	A53 Gr.B	Typical
3	M3	N5	N6			Bracing	Column	None	A53 Gr.B	Typical
4	M4	N7	N8			Mount Pipe	Column	None	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[in]	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...	SR...	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 (125 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 MP...																									
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	.058	16	.058														

Load Combinations (Continued)

	Description	S...	P...	SR...	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	.058	17	.058												
20	1.2DL + 1.5LM + WL (60 DEG)	Yes	Y		1	1.2	3	1.5	6	.058	18	.058												
21	1.2DL + 1.5LM + WL (90 DEG)	Yes	Y		1	1.2	3	1.5	7	.058	19	.058												
22	1.2DL + 1.5LM + WL (120 DEG)	Yes	Y		1	1.2	3	1.5	8	.058	20	.058												
23	1.2DL + 1.5LM + WL (150 DEG)	Yes	Y		1	1.2	3	1.5	9	.058	21	.058												
24	1.2DL + 1.5LM + WL (180 DEG)	Yes	Y		1	1.2	3	1.5	10	.058	22	.058												
25	1.2DL + 1.5LM + WL (210 DEG)	Yes	Y		1	1.2	3	1.5	11	.058	23	.058												
26	1.2DL + 1.5LM + WL (240 DEG)	Yes	Y		1	1.2	3	1.5	12	.058	24	.058												
27	1.2DL + 1.5LM + WL (270 DEG)	Yes	Y		1	1.2	3	1.5	13	.058	25	.058												
28	1.2DL + 1.5LM + WL (300 DEG)	Yes	Y		1	1.2	3	1.5	14	.058	26	.058												
29	1.2DL + 1.5LM + WL (330 DEG)	Yes	Y		1	1.2	3	1.5	15	.058	27	.058												
30																								
31	ICE LOAD COMBOS (2", 40 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 DE...	Yes	Y		1	1.2	28	1	33	1	45	1												
37	1.2DL + Ice DL + Ice WL (150 DE...	Yes	Y		1	1.2	28	1	34	1	46	1												
38	1.2DL + Ice DL + Ice WL (180 DE...	Yes	Y		1	1.2	28	1	35	1	47	1												
39	1.2DL + Ice DL + Ice WL (210 DE...	Yes	Y		1	1.2	28	1	36	1	48	1												
40	1.2DL + Ice DL + Ice WL (240 DE...	Yes	Y		1	1.2	28	1	37	1	49	1												
41	1.2DL + Ice DL + Ice WL (270 DE...	Yes	Y		1	1.2	28	1	38	1	50	1												
42	1.2DL + Ice DL + Ice WL (300 DE...	Yes	Y		1	1.2	28	1	39	1	51	1												
43	1.2DL + Ice DL + Ice WL (330 DE...	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	1082.919	2	699.784	8	1236.329	5	0	43	2388.917	11	0	43
2		min	-1386.896	8	-536.523	2	-1236.329	11	0	2	-2388.917	5	0	2
3	N3	max	949.242	38	698.767	2	587.549	11	0	43	401.899	5	0	43
4		min	-434.134	2	-537.544	8	-587.549	5	0	2	-401.899	11	0	2
5	Totals:	max	648.784	2	828.597	32	648.78	5						
6		min	-648.785	8	162.24	8	-648.78	11						

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

	Member	Shape	Code Check	Loc[...	LC	Shear...	Loc[...	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	M1	HSS3X3X3	.463	0	11	.189	2.266	z	11	55265....	59535	5171.25	5171.25	2...	H1-1b
2	M2	HSS3X3X3	.213	43.5	10	.106	43.5	z	11	55265....	59535	5171.25	5171.25	2...	H1-1b
3	M3	PIPE_2.0	.317	0	11	.058	0		11	28843....	32130	1871.625	1871.625	2...	H1-1b
4	M4	PIPE_3.0	.272	13.5...	7	.184	13.5...		11	57908....	65205	5748.75	5748.75	1...	H1-1b

APPENDIX 3:
ATTACHMENTS

220 MHz Antenna – Omnidirectional, Low-PIM/Hi-PIP, Unity Gain
Models - SP2D00P36D-D

Specifications	
Design Type	True Corporate Feed
Frequency Range	217-220 MHz
Passive Intermodulation – PIM (2 x 20W sources)	-150 dBc, 3rd Order
Bandwidth	3 MHz
Gain - dBd (average over BW)	0 dBd
Isolation, min.	40 dB
Configuration	Dual antenna
Beam Tilt (electrical down-tilt)	None (0°)
Vertical Beamwidth (E-Plane)	60°
Impedance -- Ohms	50
VSWR / Return Loss -- dB	1.5 : 1 / 14 dB (min.)
Average Power Rating	500 W (each antenna)
Peak Instantaneous Power	25 kW (each antenna)
Polarization	Vertical
Lightning Protection	Direct Ground
Connector	7/16 DIN female
Equivalent Flat-Plate Area	2.59 sq. ft.
Lateral Wind-load Thrust @100mph	109 lbf.
Wind Speed rating	160 mph (without ice) 136 mph (½" radial ice)
Total Length	15.6 feet
Mounting Mast Length	35 inches
Mounting Hardware (Included)	DSH3V4N
Top Sway Brace (Recommended if side mounting antennas)	DSH2H3S (order separately)
Mast O.D.	3.5 inches
Radome color	Horizon Blue
Radome O.D.	3.0 inches
Weight, antenna, and hardware	45 lbs. (approx.)
Shipping Weight	80 lbs. (approx.)
Invertibility	Antennas are physically invertible, but the patterns are optimized for upright mount.

Features and Benefits

Antennas from dbSpectra provide long term, trouble-free service in severe environments!

Design is tested to stringent Peak Instantaneous Power (PIP) levels of 25 KW using dbSpectra's 12-channel P25 PIP test bed. High PIP level is demanded by today's digital systems.

True Corporate Feed Array – provides for excellent gain and pattern consistency across a wider frequency range.

PIM Rated Design – better than -150 dBc.

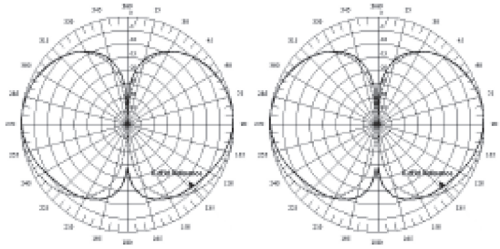
Sturdy Construction – Heavy-wall fiberglass radome minimizes tip deflection.

Excellent Lightning Protection – heavy internal conductor DC ground.

Radiation Pattern

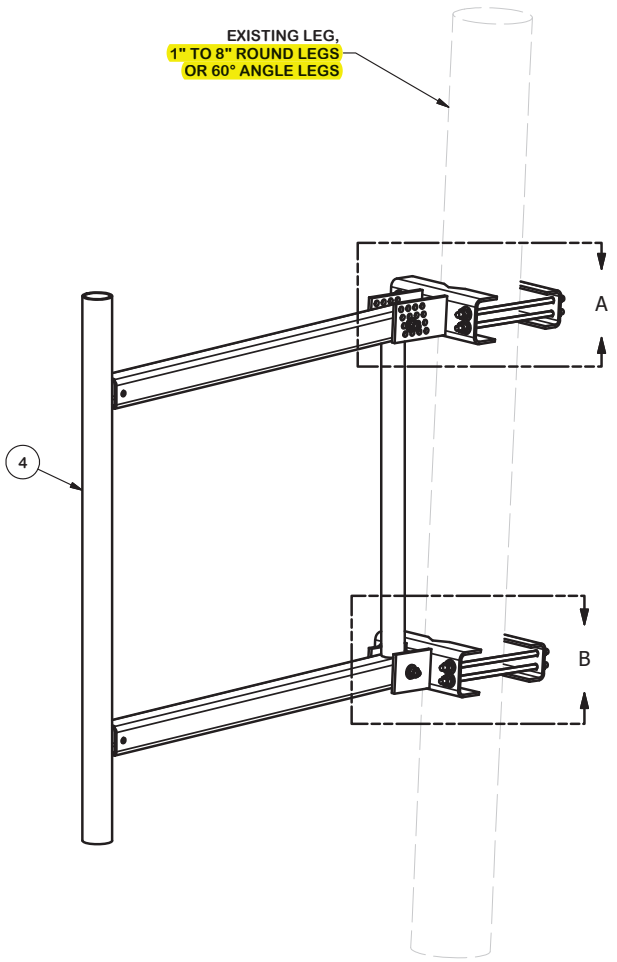
Vertical (No-Tilt)

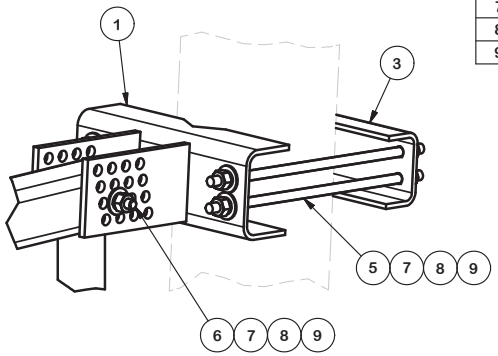
Top **Bottom**



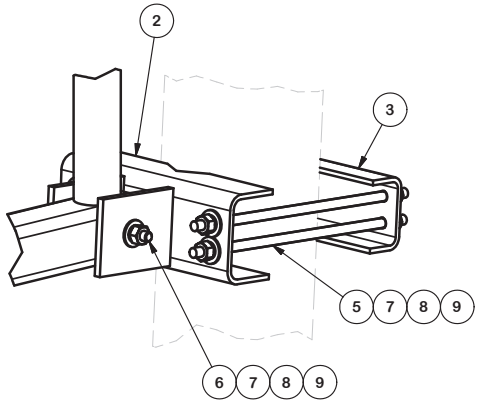
TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 5" ± DIAMETER.

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

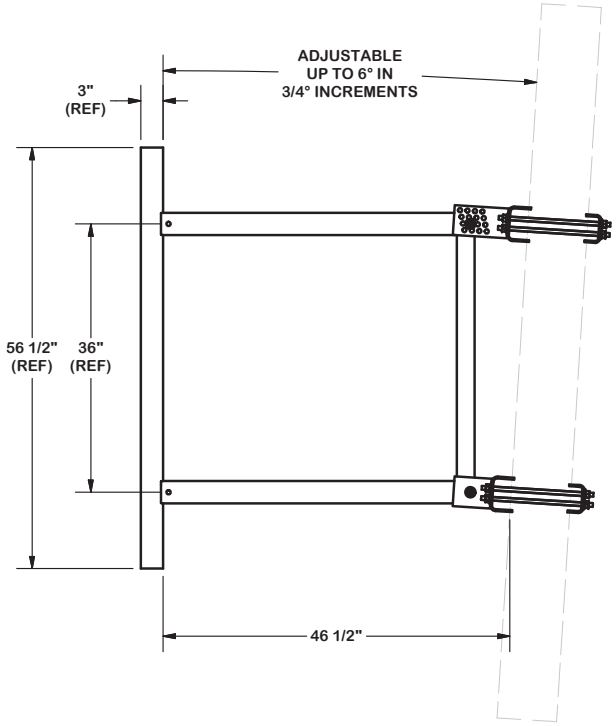




DETAIL A



DETAIL B



TOLERANCE NOTES

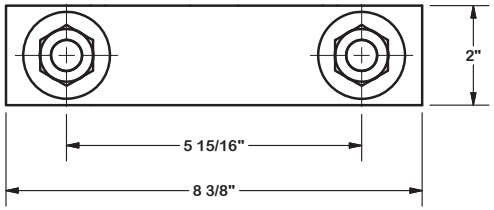
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

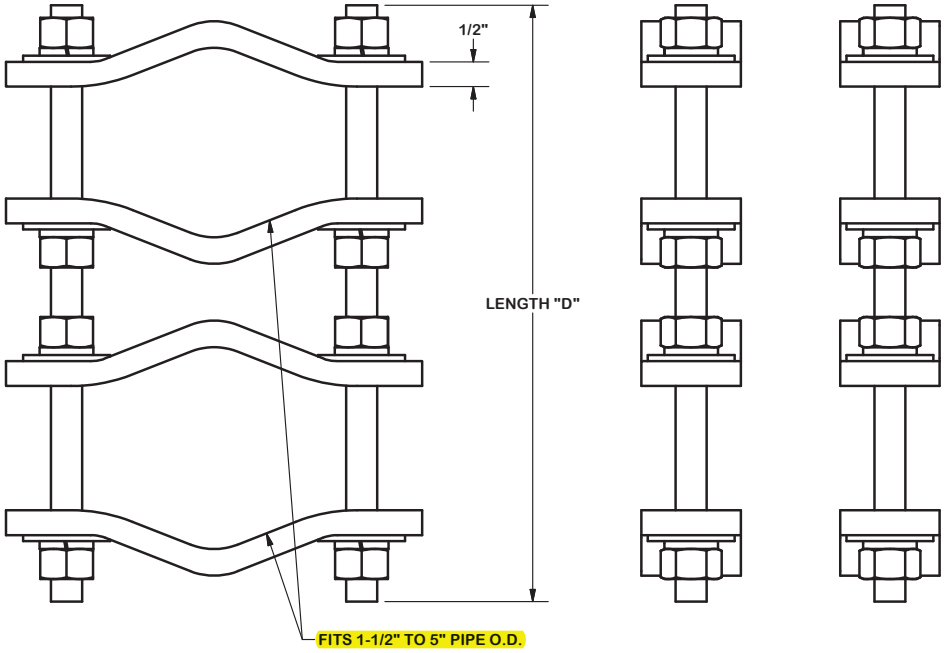
DESCRIPTION: 48" ULTIMATE UNIVERSAL STANDOFF FRAME

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

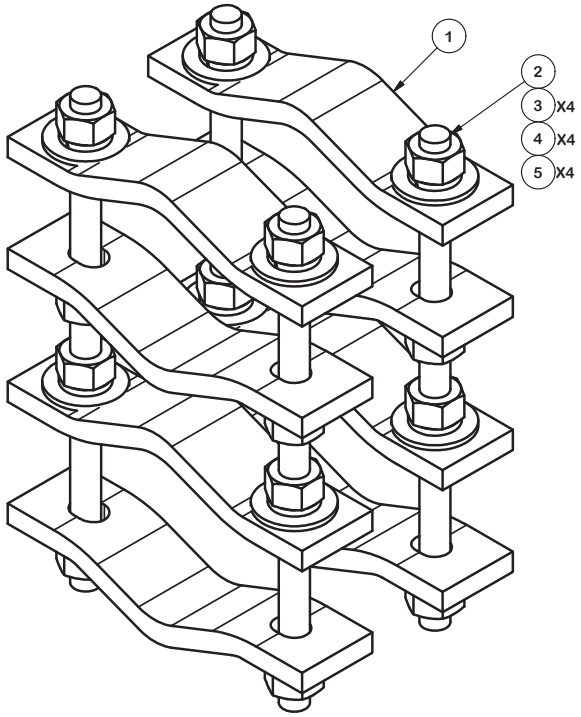
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 2/16/2011	USF-4U





PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	8	DCP	CLAMP HALF, 1/2" THICK, 8-3/8"		2.40	19.20
2	B	C	5/8" THREADED ROD	D	E	F
3	16	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	2.08
4	16	G58LW	5/8" HDG LOCKWASHER		0.03	0.42
5	16	G58FW	5/8" HDG USS FLATWASHER		0.07	1.13

VARIABLE PARTS TABLE						
ASSEMBLY "A"	QTY "B"	PART "C"	LENGTH "D"	UNIT WT. "E"	NET WT. "F"	TOTAL WEIGHT
DCP12K	4	G58R-12	12"	1.05	4.18	27.01
DCP18K	4	G58R-18	18"	1.57	6.27	29.10



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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
PIPE TO PIPE CLAMP SET
1-1/2" TO 5" PIPE
1/2" THICK CLAMP

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
	KC8 8/21/2012		SEE ASSEMBLY "A"	1 OF 1

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	CEK 1/22/2013	DCPxxK

ATTACHMENT D – CONSTRUCTION DRAWINGS

EVERSOURCE ENERGY

LITCHFIELD TROOP L CSP
452 BANTAM RD
LITCHFIELD, CT 06759

PROJECT SUMMARY

THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:

1. INSTALL (1) NEW OMNI/WHIP ANTENNA AT ELEVATION 126'–9"± AGL INSTEAD OF (2) OMNI/WHIP ANTENNAS, (1) AT ELEVATION 130'–4 3/16"± AGL AND (1) AT ELEVATION 115'–4 3/16"± AGL
2. INSTALL (1) NEW RACK WITH DMR EQUIPMENT IN EXISTING BUILDING

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:	LITCHFIELD TROOP L CSP
SITE ID NUMBER:	#3791
SITE ADDRESS:	452 BANTAM RD LITCHFIELD, CT 06759
MAP:	085
BLOCK:	067
LOT:	032
ZONE:	C202
LATITUDE:	41° 44' 10.24" N
LONGITUDE:	73° 13' 5.04" W
ELEVATION:	943'± AMSL
FEMA/FIRM DESIGNATION:	C
ACREAGE:	10.92± AC (BOOK: 182, PAGE: 282)

CONTACT INFORMATION

APPLICANTS:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037

PROPERTY OWNER:
STATE OF CONNECTICUT
24 WOLCOTT HILL RD
WETHERSFIELD, CT 06109

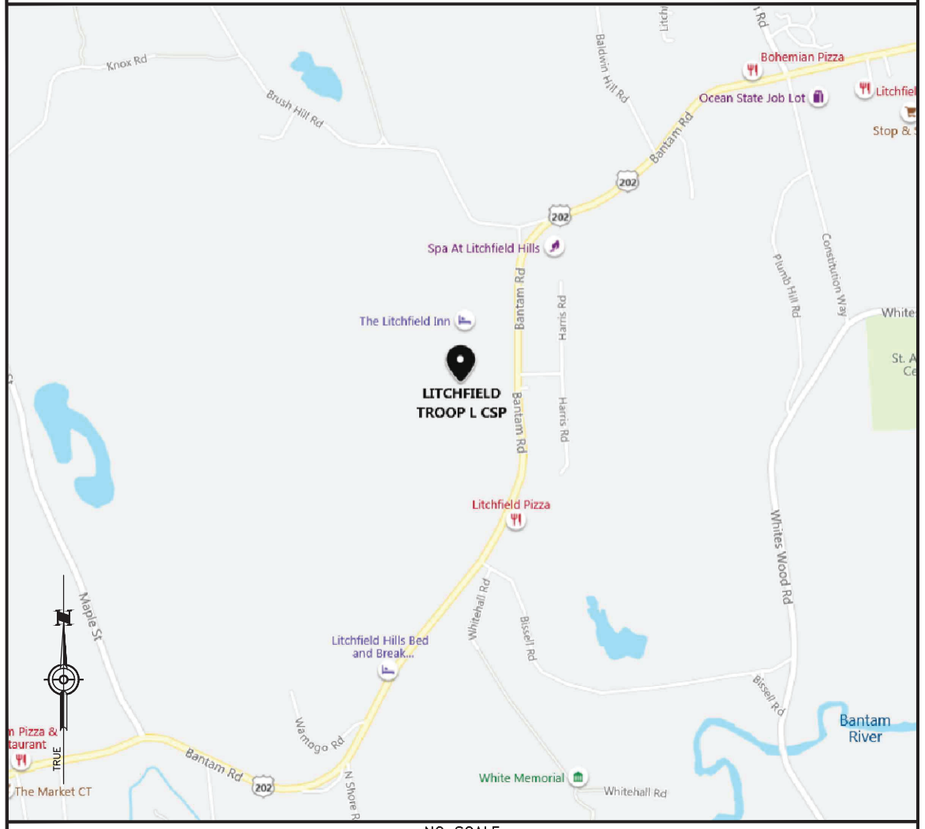
EVERSOURCE ENERGY
PROJECT MANAGER:
NIKOLL PRECI
(860) 655–3079

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) 458–3595

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

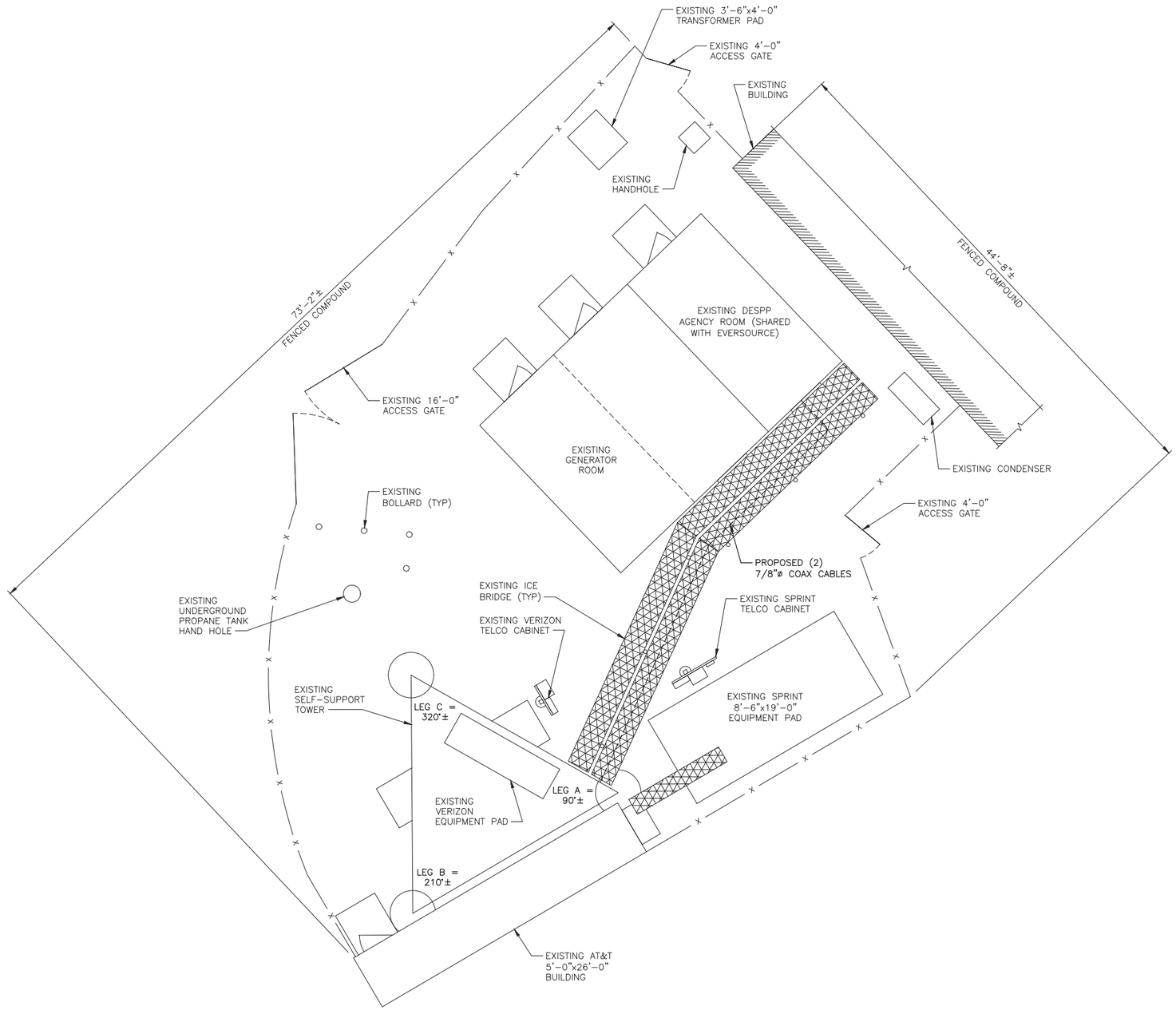
REV	DATE	DESCRIPTION
1	12/07/21	ISSUED FOR FILING
0	11/17/20	ISSUED FOR FILING

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
12/07/2021

LITCHFIELD TROOP L CSP
452 BANTAM RD
LITCHFIELD, CT 06759

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
PHONE: (913) 458-3595

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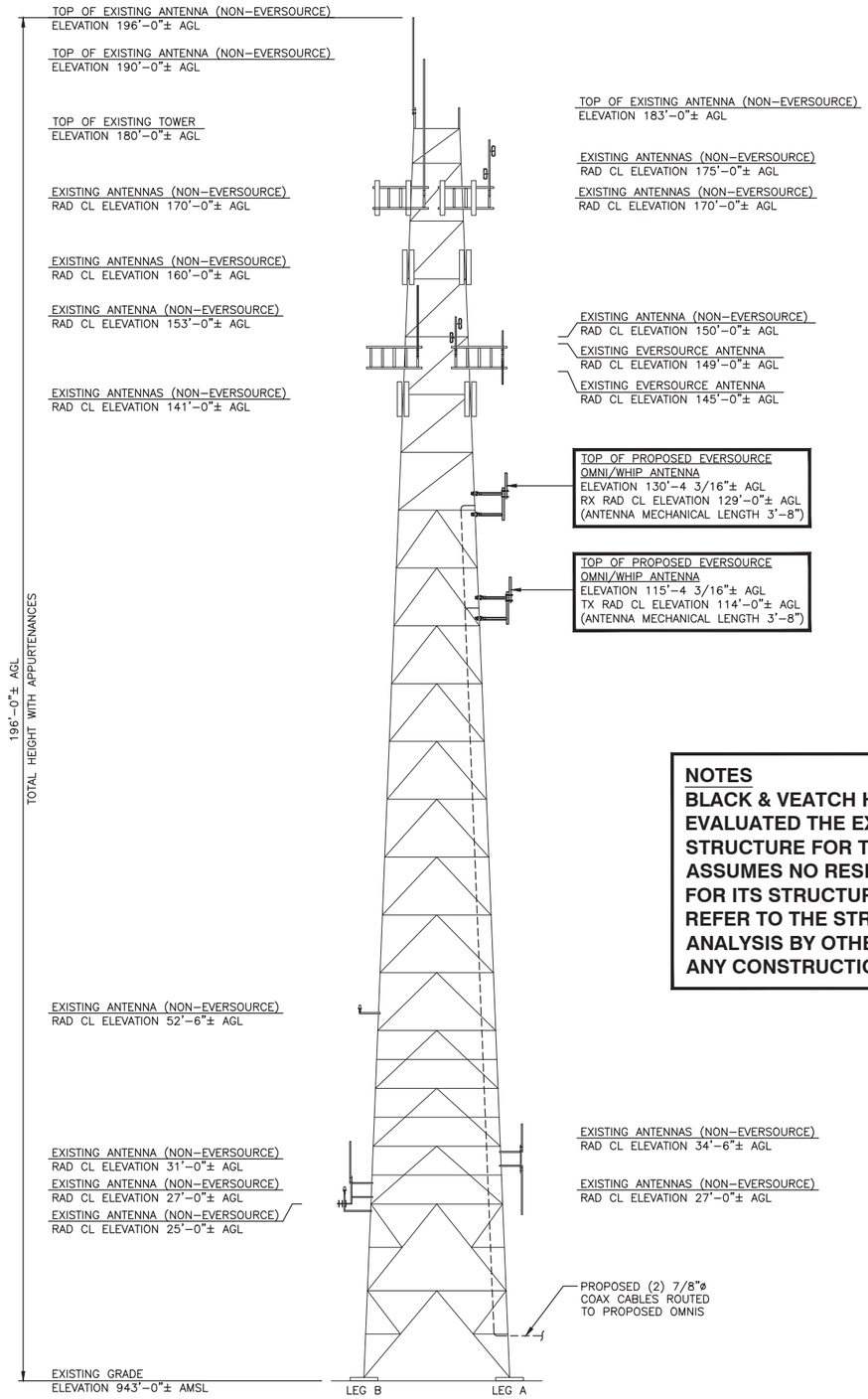
STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
12/07/2021

LITCHFIELD TROOP L CSP
452 BANTAM RD
LITCHFIELD, CT 06759

SHEET TITLE
SITE PLAN

SHEET NUMBER
C-1

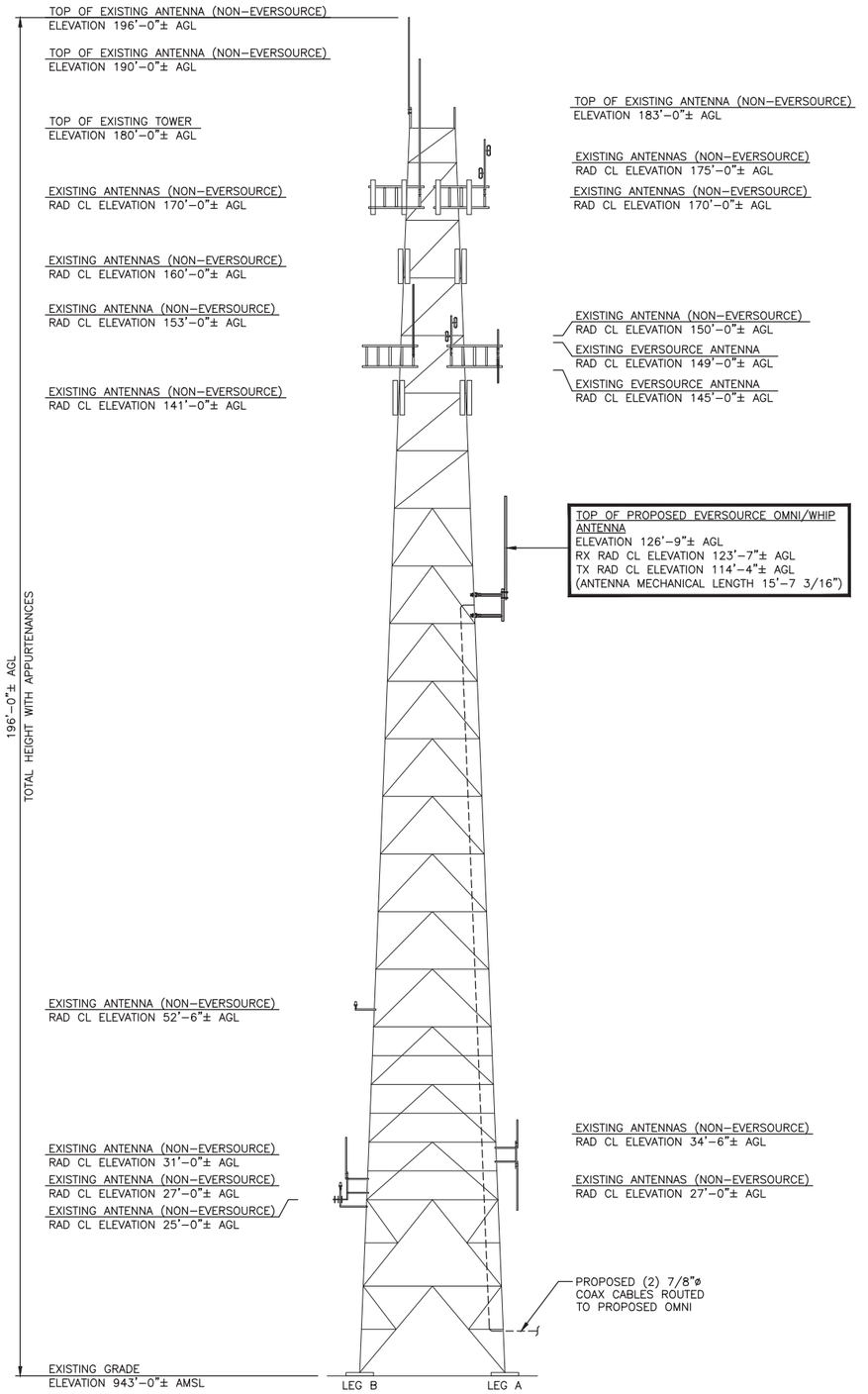


CSC SUBMITTED INSTALLATION CONFIGURATION

NO SCALE

NOTES

BLACK & VEATCH HAS NOT EVALUATED THE EXISTING STRUCTURE FOR THIS SITE AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY. REFER TO THE STRUCTURAL ANALYSIS BY OTHERS PRIOR TO ANY CONSTRUCTION.



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) 458-3595

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

REV	DATE	DESCRIPTION
1	12/07/21	ISSUED FOR FILING
0	11/17/20	ISSUED FOR FILING

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER

12/07/2021

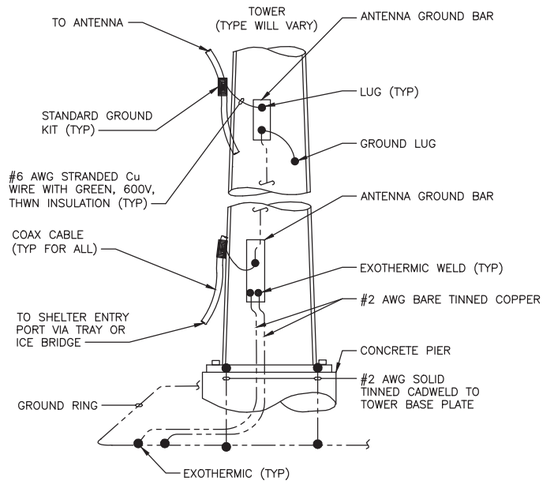
LITCHFIELD TROOP L CSP
452 BANTAM RD
LITCHFIELD, CT 06759

SHEET TITLE

TOWER ELEVATION & ANTENNA EQUIPMENT

SHEET NUMBER

C-2

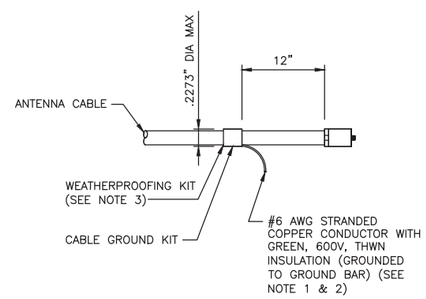


NOTE

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

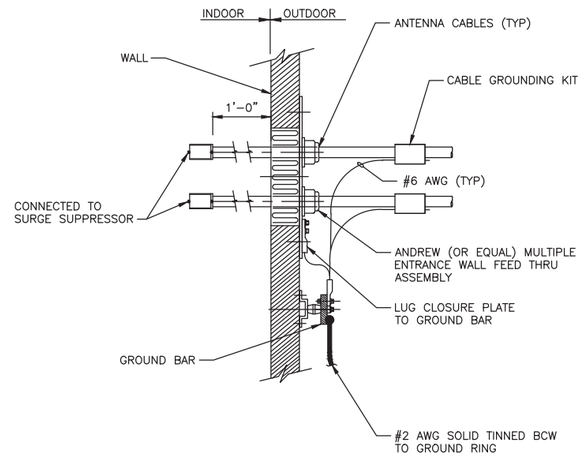


NOTES

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.

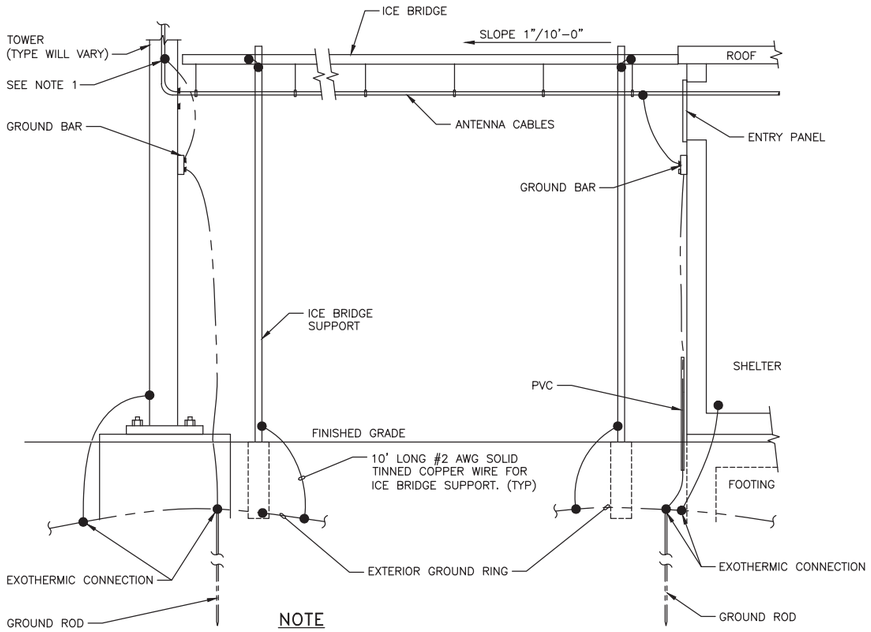
CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

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) 458-3595

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

REV	DATE	DESCRIPTION
1	12/07/21	ISSUED FOR FILING
0	11/17/20	ISSUED FOR FILING

LITCHFIELD TROOP L CSP
452 BANTAM RD
LITCHFIELD, CT 06759

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 A572, 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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PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	JR

REV	DATE	DESCRIPTION
1	12/07/21	ISSUED FOR FILING
0	11/17/20	ISSUED FOR FILING

LITCHFIELD TROOP L CSP
452 BANTAM RD
LITCHFIELD, CT 06759

SHEET TITLE
NOTES & SPECIFICATIONS

SHEET NUMBER
N-1

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.
12. GROUNDING SYSTEM RESISTANCE SHALL BE MEASURED, RECORDED, AND DATED USING MEGGER DET14 OR SIMILAR INSTRUMENT. GROUND RESISTANCE SHALL NOT EXCEED 5 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY CONSTRUCTION MANAGER FOR FURTHER INSTRUCTION.
13. COORDINATE WITH BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK INVOLVING EXISTING SYSTEMS OR EQUIPMENT IN ORDER TO DETERMINE THE EFFECT, IF ANY, ON OTHER TENANTS WITHIN THE BUILDING, AND TO DETERMINE THE APPROPRIATE TIME FOR PERFORMING THIS WORK.
14. THE CONTRACTOR SHALL BE REQUIRED TO VISIT THE SITE PRIOR TO SUBMITTING BID IN ORDER TO DETERMINE THE EXTENT OF THE EXISTING CONDITIONS.
15. ALL CONDUCTOR ENDS SHALL BE TAGGED AND ELECTRICAL EQUIPMENT LABELED WITH ENGRAVED IDENTIFICATION PLATES.
16. CONTRACTOR IS RESPONSIBLE FOR ALL CONTROL WIRING AND ALARM TIE–INS.

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.

EVERSOURCE ENERGY
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STATE OF CONNECTICUT · MARK P. STILES · 34358 · LICENSED PROFESSIONAL ENGINEER
12/07/21

LITCHFIELD TROOP L CSP
452 BANTAM RD
LITCHFIELD, CT 06759

SHEET TITLE
NOTES & SPECIFICATIONS

SHEET NUMBER
N-2

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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STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
12/07/2021

LITCHFIELD TROOP L CSP
452 BANTAM RD
LITCHFIELD, CT 06759

SHEET TITLE
NOTES & SPECIFICATIONS

SHEET NUMBER
N-3

REFERENCE CUTSHEETS

INSTALLED REPLACEMENT ANTENNA

220 MHz Antenna – Omnidirectional, Low-PIM/Hi-PIP, Unity Gain

Models - SP2D00P36D-D

Specifications	
Design Type	True Corporate Feed
Frequency Range	217-220 MHz
Passive Intermodulation – PIM (2 x 20W sources)	-150 dBc, 3rd Order
Bandwidth	3 MHz
Gain - dBd (average over BW)	0 dBd
Isolation, min.	40 dB
Configuration	Dual antenna
Beam Tilt (electrical down-tilt)	None (0°)
Vertical Beamwidth (E-Plane)	60°
Impedance -- Ohms	50
VSWR / Return Loss -- dB	1.5 : 1 / 14 dB (min.)
Average Power Rating	500 W (each antenna)
Peak Instantaneous Power	25 kW (each antenna)
Polarization	Vertical
Lightning Protection	Direct Ground
Connector	7/16 DIN female
Equivalent Flat-Plate Area	2.59 sq. ft.
Lateral Wind-load Thrust @100mph	109 lbf.
Wind Speed rating	160 mph (without ice) 136 mph (½" radial ice)
Total Length	15.6 feet
Mounting Mast Length	35 inches
Mounting Hardware (Included)	DSH3V4N
Top Sway Brace (Recommended if side mounting antennas)	DSH2H3S (order separately)
Mast O.D.	3.5 inches
Radome color	Horizon Blue
Radome O.D.	3.0 inches
Weight, antenna, and hardware	45 lbs. (approx.)
Shipping Weight	80 lbs. (approx.)
Invertibility	Antennas are physically invertible, but the patterns are optimized for upright mount.

Features and Benefits

Antennas from dbSpectra provide long term, trouble-free service in severe environments!

Design is tested to stringent Peak Instantaneous Power (PIP) levels of 25 KW using dbSpectra's 12-channel P25 PIP test bed. High PIP level is demanded by today's digital systems.

True Corporate Feed Array – provides for excellent gain and pattern consistency across a wider frequency range.

PIM Rated Design – better than -150 dBc.

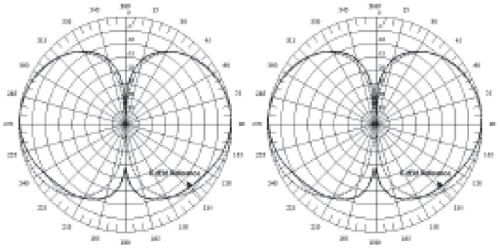
Sturdy Construction – Heavy-wall fiberglass radome minimizes tip deflection.

Excellent Lightning Protection – heavy internal conductor DC ground.

Radiation Pattern

Vertical (No-Tilt)

Top **Bottom**



TELEWAVE, INC.®

195 - 260 MHz

ORIGINALLY PROPOSED ANTENNAS, REMOVED OR REPLACED

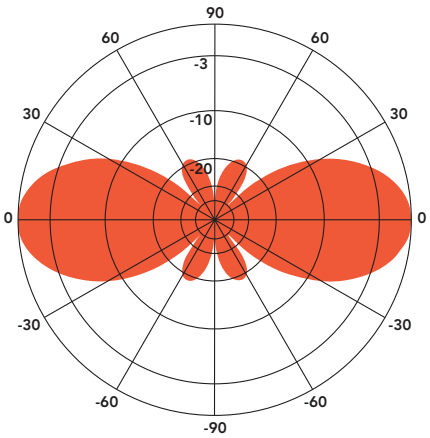
ANT220F2DIN

FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

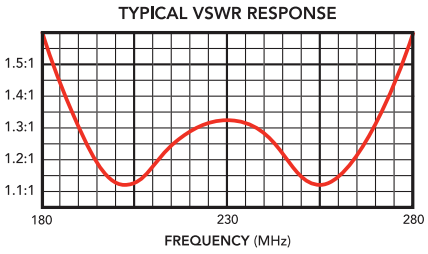
The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential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

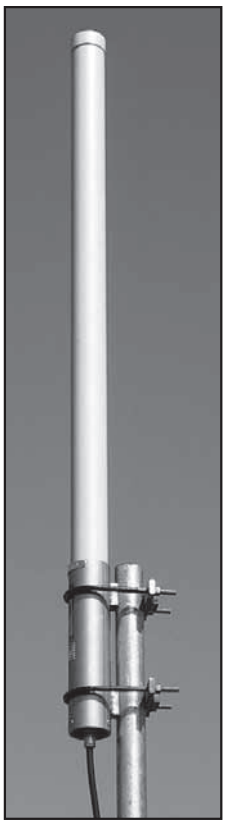
All junctions are fully soldered to prevent RF intermodulation, and each antenna is completely protected within a rugged, high-tech radome to ensure survivability in the worst environments. The "Cool Blue" radome provides maximum protection from corrosive gases, ultraviolet radiation, icing, salt spray,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



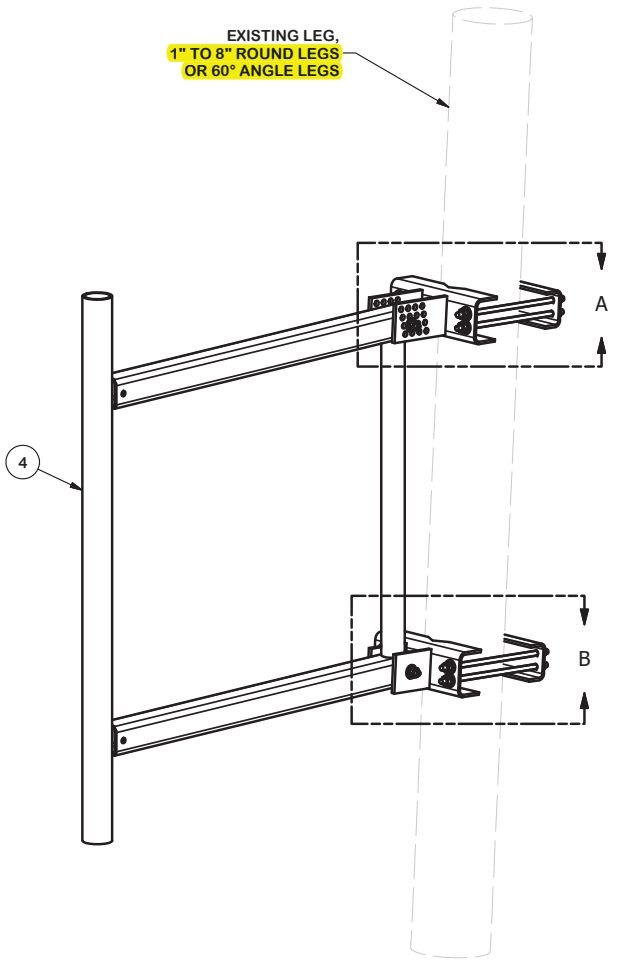


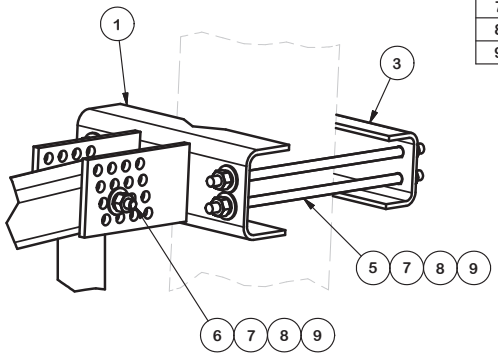
ONE SITE PRO 1 P/N DCP12K CLAMP SET REQUIRED.

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.)**	

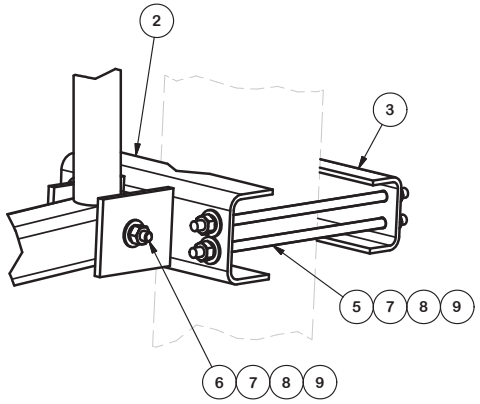
TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 5" ± DIAMETER.

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

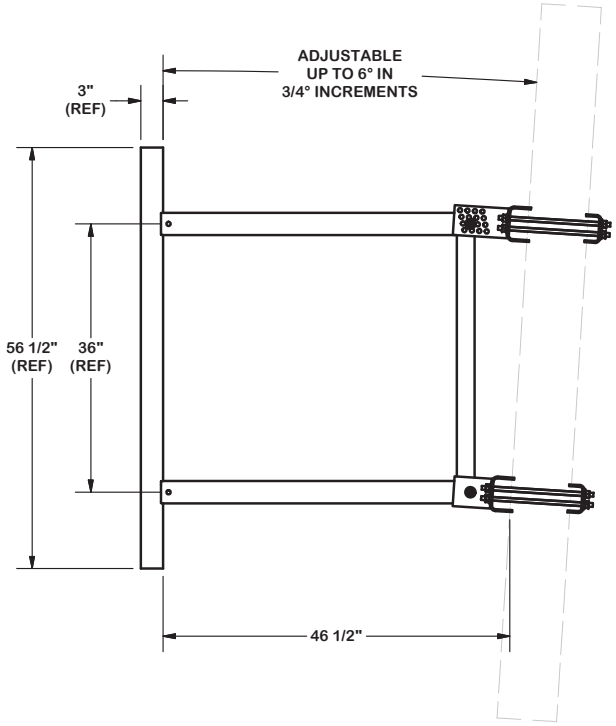




DETAIL A



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

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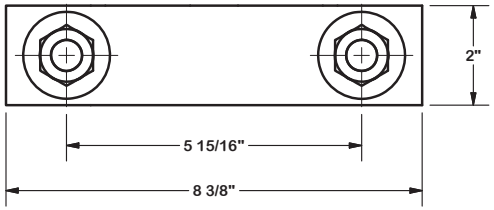
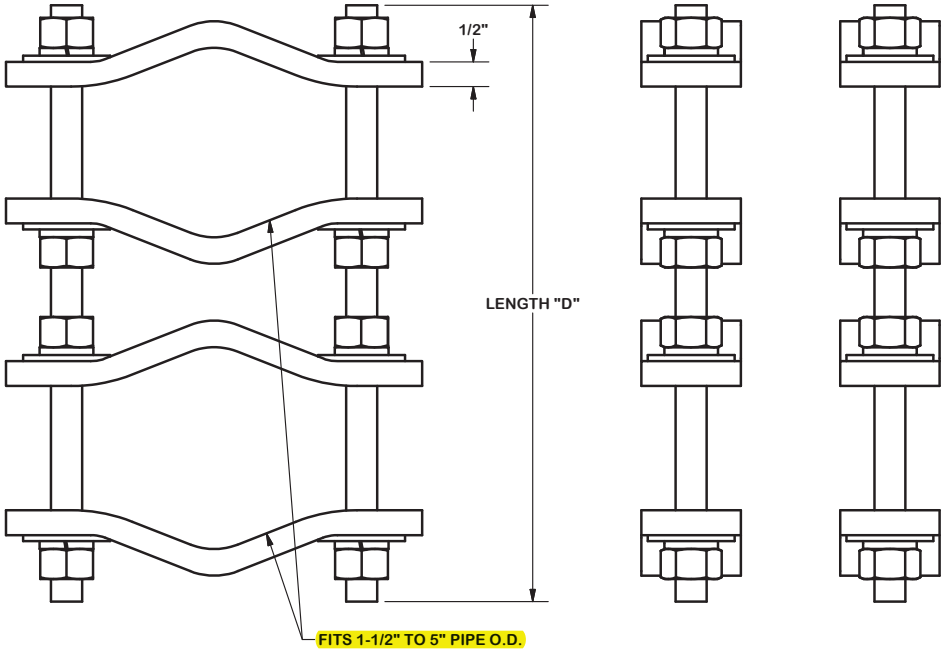
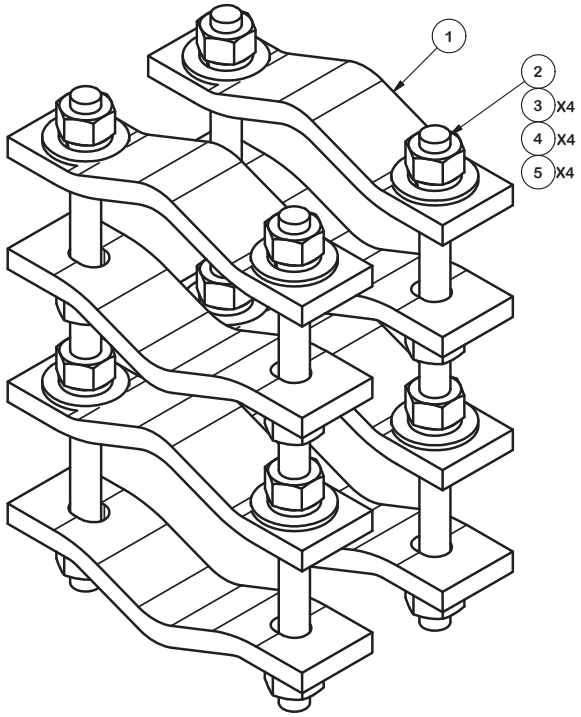
81	01	CUSTOMER	BMC 2/16/2011	USF-4U





PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	8	DCP	CLAMP HALF, 1/2" THICK, 8-3/8"		2.40	19.20
2	B	C	5/8" THREADED ROD	D	E	F
3	16	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	2.08
4	16	G58LW	5/8" HDG LOCKWASHER		0.03	0.42
5	16	G58FW	5/8" HDG USS FLATWASHER		0.07	1.13

VARIABLE PARTS TABLE						
ASSEMBLY "A"	QTY "B"	PART "C"	LENGTH "D"	UNIT WT. "E"	NET WT. "F"	TOTAL WEIGHT
DCP12K	4	G58R-12	12"	1.05	4.18	27.01
DCP18K	4	G58R-18	18"	1.57	6.27	29.10



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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
PIPE TO PIPE CLAMP SET
1-1/2" TO 5" PIPE
1/2" THICK CLAMP

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
	KC8 8/21/2012		SEE ASSEMBLY "A"	1 OF 1

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	CEK 1/22/2013	DCPxxK

ATTACHMENT E – STRUCTURAL ANALYSIS

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

180' Existing Lattice Tower

Proposed Eversource
Antenna Installation

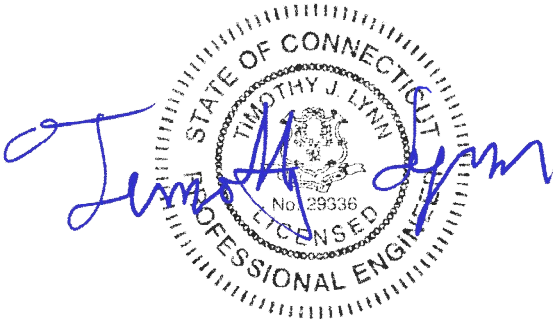
CSP Tower Ref: #7

452 Bantam Road
Litchfield, CT

CENTEK Project No. 21082.14

~~Date: December 1, 2021~~
Rev 1: January 12, 2022

Max Stress Ratio = 80.7%



Prepared for:
Eversource
107 Selden Street
Berlin, CT 06037

Table of Contents

Introduction

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

The host tower is a 180-ft, three legged, lattice tower originally designed and manufactured by Stainless, Inc. project no. 358803 dated 11/23/93. The tower geometry, structure member sizes and foundation information were taken from a previous structural analysis report prepared by AECOM job no. EVS-013 60624419 dated October 27, 2020.

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 pipe legs conforming to ASTM A572 Gr. 50/60 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 6.6-ft at the top and 21-ft at the bottom.

Antenna and Appurtenance Summary

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

- Tower (Existing):
  Antenna: One (1) lightning rod pipe mounted to the top of the tower.
- CSP - 22 (Existing):
  Antenna: One (1) PD1142 Omni-directional antenna pipe mounted with an elevation of 191-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 (Existing):
  Antenna: One (1) 8-ft Omni-directional antenna pipe mounted with an elevation of 184-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.
- LCD – 9 & 28 (Existing):
  Antenna: Two (2) 20' Omni-directional antennas mounted to the Sprint sector frames an elevation of 182-ft AGL.
  Cables: Two (2) 7/8"∅ cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP Troop-L - 44-47 (Reserved):
  Antenna: Three (3) SC479-HF1LDF Omni-directional antennas (one upright and two inverted) and one (1) TTA mounted on a 4-ft sidearm an elevation of 180-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.

- LCD – 27 (Existing):
  Antenna: One (1) PD220 dipole mounted to the Sprint sector frames an elevation of 176-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 - 3 (Existing):
  Antenna: One (1) 6-ft microwave dish pipe mounted with an elevation of 176-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.
- LCD – 10 (Existing):
  Antenna: One (1) DB292 Yagi mounted to the Sprint sector frames an elevation of 169-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.
- Sprint (Existing):
  Antenna: Six (6) DB980F90E-M panel antennas mounted on three (3) 13-ft sector frames with a RAD center elevation of ±169-ft above grade level.
  Cables: Six (6) 1-5/8" ∅ coax cables running on a face of the existing tower as specified in Section 3 of this report.
- AT&T (Existing):
  Antenna: Three (3) Powerwave 7770 panel antennas, three (3) CCI HPA65R-BU4A panel antennas, six (6) Powerwave LGP-21401 TMAs and three (3) Commscope TMAT1921XB68 TMAs leg mounted with a RAD center elevation of ±161-ft above grade level.
  Coax Cable: Twelve (12) 1-5/8" ∅ cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (Existing):
  Antenna: One (1) PD1142 Omni-directional antenna mounted to the Verizon sector frames an elevation of 158-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 (Existing):
  Antenna: One (1) DB222 dipole antenna mounted to the Verizon sector frames an elevation of 153-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 (Existing):
  Antenna: Two (2) DB586-y Omni-directional antennas (one upright and one inverted), one (1) 10-ft dipole and one (1) TTA mounted to the Verizon sector frames an elevation of 150-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.

- Verizon (Existing):
  Antenna: Three (3) Antel BXA-185085-12CF panel antennas and three (3) Antel BXA-80080-6CF panel antennas mounted on three (3) V-frames with a RAD center elevation of +/- 148-ft AGL.
  Coax Cable: Twelve (12) 1-5/8" ∅ cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- Sprint (Existing):
  Antenna: One (1) GPS mounted on (1) 1-ft side-arm with an elevation of 52-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 (Existing):
  Antenna: Two (2) DB803M Omni-directional antennas (one upright and one inverted) mounted on a 3-ft sidearm with an elevation of 31-ft AGL.
  Cables: Two (2) 1/2"∅ cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (Existing):
  Antenna: One (1) DB803M Omni-directional antennas mounted on a 3-ft sidearm with an elevation of 29-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 (Existing):
  Antenna: One (1) 3-ft Yagi leg mounted with an elevation of 16-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.
- Eversource (Existing):
  Antenna: One (1) dBspectra SP2D00P36D-D antenna mounted on one (1) 4-ft sidearm with an elevation of 111-ft AGL (Antenna Centerline @ 119' AGL).
  Cables: Two (2) 7/8"∅ 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.

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; 125 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]*
	Load Case 3; 90 mph wind speed w/ 0.5" radial ice plus gravity load – used in calculation of tower twist and sway.	*[TIA-222-F used for calculation of tower twist and sway per the requirements of the CSP]*

[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 (T12)	50.0' - 75.0'	78.5%	**PASS**
Diagonal (T11)	75.0' – 100.0'	80.7%	**PASS**
Horizontal (T13)	25.0' - 50.0'	72.6%	**PASS**

- The tower combined deflection **was not found to be within allowable limits of the DESPP standards**. DESPP/CTS Unit Telecommunications Engineering has allowed an exemption and temporary approval.

Deflection Criteria	Proposed (degrees)	Allowable (degrees)	Result
Sway (Tilt)	0.8525	n/a	**n/a**
Twist	0.2258	n/a	**n/a**
Combined	1.0783	0.75	**Temporarily Approved by DESPP/CTS Unit Telecommunications Engineering**

TIA-222-F standard used for calculation of tower twist and sway per the requirements of the CSP.

Foundation and Anchors

The existing foundation consists of a three (3) 3.5-ft ∅ x 23.0-ft long reinforced concrete caissons. The sub grade conditions used in the foundation analysis were derived from aforementioned structural analysis. The base of the tower is connected to the foundation by means of (6) 1.5"∅ 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	34 kips
Leg Compression	325 kips
Leg Tension	287 kips
Base Moment	5,631 ft-kips
Base Shear	59 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	63.4%	**PASS**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	(percentage of capacity)	Result
Reinforced Concrete Caissons	Uplift	31%	**PASS**
	Bearing	29%	**PASS**

Conclusion

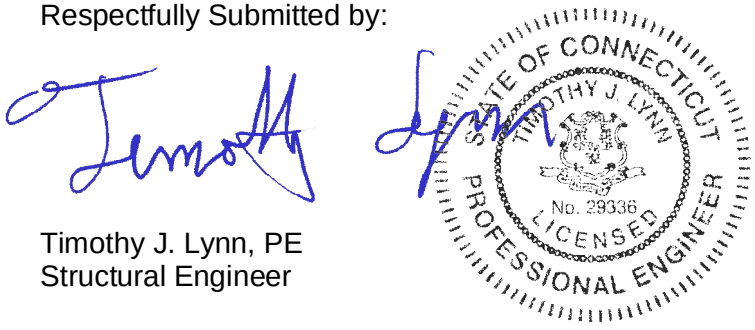
This analysis shows that the subject tower **is structurally adequate** to support the proposed antenna configuration.

The tower combined deflection **was not found to be within allowable limits of the DESPP standards**. DESPP/CTS Unit Telecommunications Engineering has allowed an exemption and temporary approval.

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.

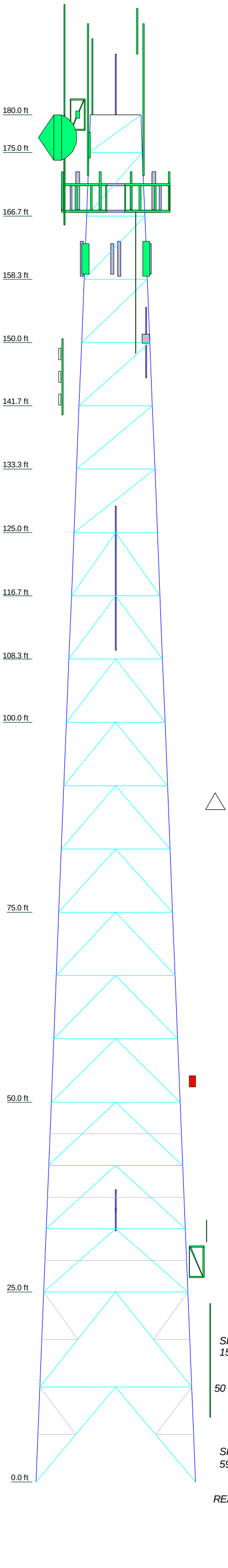
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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	T12	T13	T14
Section				HSS5x.25						HSS5x.4				HSS6.875x.5
Legs				A572-50								A572-60		
Leg Grade	A			2L2 1/2x2x3/16x3/8								2L2 1/2x2x3/16x3/8		
Diagonals					2L3x2 1/2x1/4x3/8						A36	2L2 1/2x2 1/2x1/4x3/8		2L3x3x5/16x3/8
Diagonal Grade	B													
Top Girts	N.A.			L2 1/2x2 1/2x3/16		L3x3x1/4		L2 1/2x2 1/2x1/4	L2 1/2x2 1/2x3/16		N.A.	L3x3x1/4		L4x4x1/4
Horizontals							N.A.		N.A.	N.A.		L2 1/2x2x3/16		L3x3x1/4
Red. Horizontals														
Red. Diagonals														L3x3x1/4
Red. Sub-Horizs														N.A.
Inner Bracing														L2 1/2x2 1/2x3/16
Face Width (ft)	6.6	7	8.33333	9			10.3333	11	11.6667	13		15	17	19
# Panels @ (ft)	1 @ 5									18 @ 8.33333				2 @ 12.5
Weight (K)	0.4	0.5	0.6	0.6	0.8	0.8	0.8	1.0	0.9	1.0	3.3	4.3	5.5	6.4



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4'	192	TMAT1921XB68 (ATT)	161
PD1142-30 (CSP 22)	191	(2) LPG21401 TMA (ATT)	161
6'x4" Pipe Mount (CSP 22)	191	7770.00 w/ mount pipe (ATT)	161
10'0"x4" Pipe Mount (Lighting Rod Extension)	185	HPA65R-BU4A (ATT)	161
8' x 2" Omni (CSP)	184	TMAT1921XB68 (ATT)	161
2'x3" Pipe Mount (CSP)	184	(2) LPG21401 TMA (ATT)	161
20' x 3" Dia Omni (LCD-9)	182	PD1142-1 (CSP)	158
20' x 3" Dia Omni (LCD-28)	182	TTA 432-83H-01T (CSP)	153
SC479-HF1LDF (CSP Troop L (inverted) - Reserved)	180	DB222 (CSP)	153
		DB586-Y (CSP (inverted))	150
SC479-HF1LDF (CSP Troop L (inverted) - Reserved)	180	DB586-Y (CSP)	150
		10' Dipole (CSP)	148
SC479-HF1LDF (CSP Troop L - Reserved)	180	BXA-80080/6CF w/mount pipe (Verizon)	148
TX/RX 432E-83I-01T (CSP Troop L - Reserved)	180	BXA-185085/12CF w/mount pipe (Verizon)	148
Pirod 4' Side Mount Standoff (1) (CSP Troop L - Reserved)	180	BXA-80080/6CF w/mount pipe (Verizon)	148
		BXA-185085/12CF w/mount pipe (Verizon)	148
PA6-65 6' Dish (CSP)	177	BXA-80080/6CF w/mount pipe (Verizon)	148
PD220 (LCD-27)	176	BXA-185085/12CF w/mount pipe (Verizon)	148
3'4"x4" Pipe Mount (CSP-3)	176	SitePro VFA12-HD (Verizon)	148
DB292-A (LCD-10)	170	SitePro VFA12-HD (Verizon)	148
(2) DB980F90E-M (Sprint)	170	SitePro VFA12-HD (Verizon)	148
(2) DB980F90E-M (Sprint)	170	SP2D03P36D-D (Eversource - Proposed)	119
(2) DB980F90E-M (Sprint)	170	SitePro USF-4U (Eversource - Proposed)	111
13-ft Sector Frame (Sprint)	169	GPS (Sprint)	52
13-ft Sector Frame (Sprint)	169	2.5" Tube x 2' Standoff (Sprint)	52
13-ft Sector Frame (Sprint)	169	DB803M-Y (CSP)	33.5
7770.00 w/ mount pipe (ATT)	161	DB803M-Y (CSP)	31
HPA65R-BU4A (ATT)	161	3' Standoff (CSP)	31
TMAT1921XB68 (ATT)	161	DB803M-Y (CSP)	29.5
(2) LPG21401 TMA (ATT)	161	3' Standoff (CSP)	29
7770.00 w/ mount pipe (ATT)	161	3' Yagi (CSP)	16
HPA65R-BU4A (ATT)	161		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2L2 1/2x2x3/16	B	L2 1/2x2x3/16

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			

TOWER DESIGN NOTES

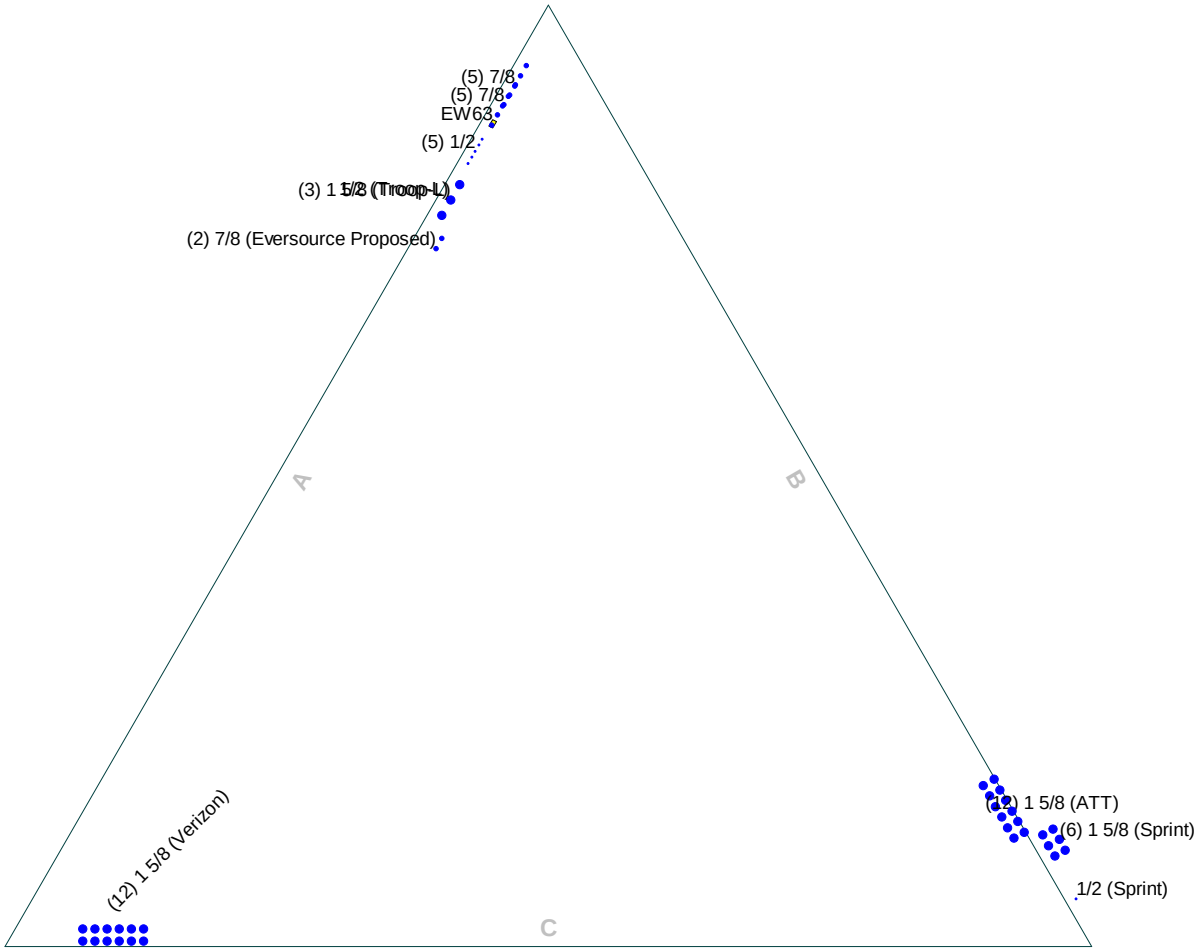
1. Tower designed for Exposure C to the TIA-222-H Standard.
2. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 80.7%

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

Job: **21082.14**			
Project: ***180-ft Lattice Tower #7 Litchfield***			
Client: Eversource	Drawn by: TJL	App'd:	
Code: TIA-222-H	Date: 01/12/22	Scale: NTS	
Path:		Dwg No. E-1	

Feed Line Plan

Round Flat App In Face App Out Face



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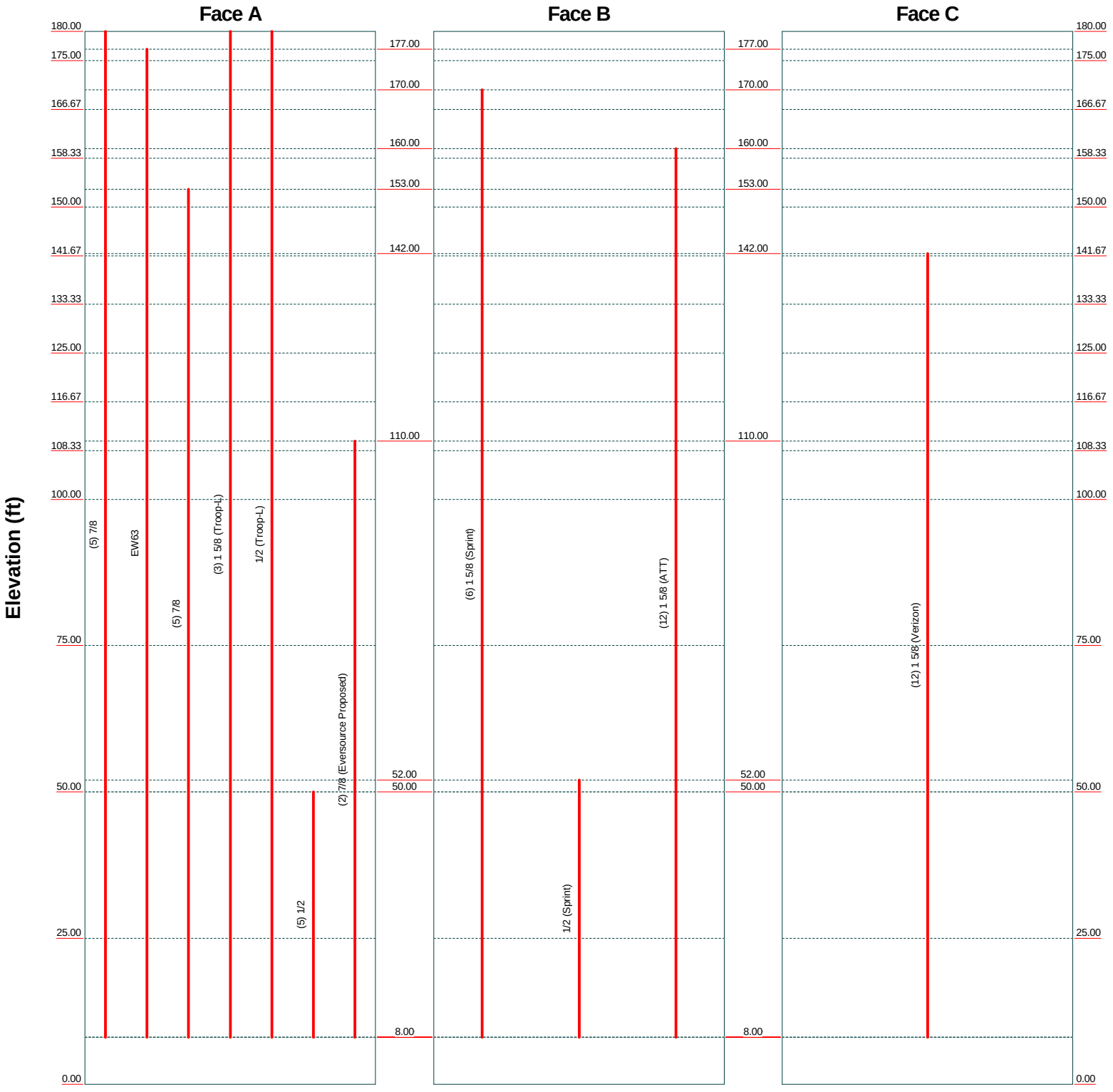
Code: TIA-222-H	Date: 01/12/22	Scale: NTS	
Path:		Dwg No. E-7	

Feed Line Distribution Chart
0' - 180'

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



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Client: Eversource	Drawn by: TJL	App'd:	
Code: TIA-222-H	Date: 01/12/22	Scale: NTS	
Path:		Dwg No. E-7	

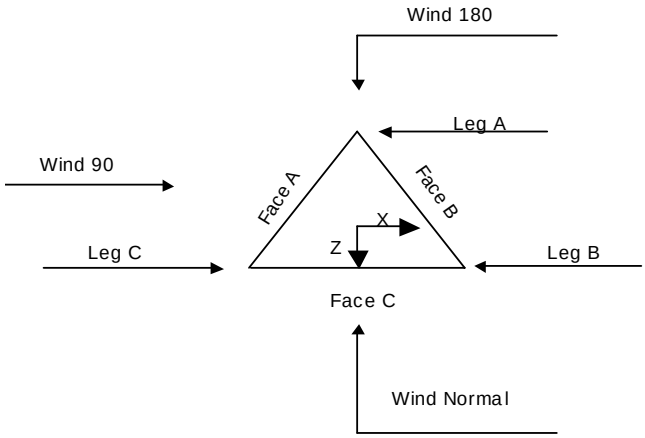
Tower Input Data

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 6.60 ft at the top and 21.00 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower base elevation above sea level: 0.00 ft.
Basic wind speed of 125 mph.
Risk Category III.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	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	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.00-175.00			6.60	1	5.00
T2-T3	175.00-158.33			7.00	2	8.33
T4	158.33-150.00			8.33	1	8.33
T5-T6	150.00-133.33			9.00	2	8.33
T7	133.33-125.00			10.33	1	8.33
T8	125.00-116.67			11.00	1	8.33
T9-T10	116.67-100.00			11.67	2	8.33
T11	100.00-75.00			13.00	1	25.00
T12	75.00-50.00			15.00	1	25.00
T13	50.00-25.00			17.00	1	25.00
T14	25.00-0.00			19.00	1	25.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180.00-175.00	5.00	Diag Up	No	Yes	0.0000	0.0000
T2-T3	175.00-158.33	8.33	Diag Up	No	Yes	0.0000	0.0000
T4	158.33-150.00	8.33	Diag Up	No	Yes	0.0000	0.0000
T5-T6	150.00-133.33	8.33	Diag Up	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
T7	133.33-125.00	8.33	Diag Up	No	Yes	0.0000	0.0000
T8	125.00-116.67	8.33	K Brace Down	No	Yes	0.0000	0.0000
T9-T10	116.67-100.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T11	100.00-75.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T12	75.00-50.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T13	50.00-25.00	8.33	K1 Down	No	Yes	0.0000	0.0000
T14	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	HSS5x.25	A572-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T2-T3 175.00-158.33	Pipe	HSS5x.25	A572-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16x3/8	A36 (36 ksi)
T4 158.33-150.00	Pipe	HSS5x.25	A572-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16x3/8	A36 (36 ksi)
T5-T6 150.00-133.33	Pipe	HSS5x.25	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4x3/8	A36 (36 ksi)
T7 133.33-125.00	Pipe	HSS5x.25	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4x3/8	A36 (36 ksi)
T8 125.00-116.67	Pipe	HSS5x.4	A572-60 (60 ksi)	Double Angle	2L2 1/2x2x3/16x3/8	A36 (36 ksi)
T9-T10 116.67-100.00	Pipe	HSS5x.4	A572-60 (60 ksi)	Double Angle	2L2 1/2x2x3/16x3/8	A36 (36 ksi)
T11 100.00-75.00	Pipe	HSS5x.4	A572-60 (60 ksi)	Double Angle	2L2 1/2x2x3/16x3/8	A36 (36 ksi)
T12 75.00-50.00	Pipe	HSS5x.5	A572-60 (60 ksi)	Double Angle	2L2 1/2x2 1/2x1/4x3/8	A36 (36 ksi)
T13 50.00-25.00	Pipe	HSS5x.5	A572-60 (60 ksi)	Double Angle	2L3x2 1/2x1/4x3/8	A36 (36 ksi)
T14 25.00-0.00	Pipe	HSS6.875x.5	A572-60 (60 ksi)	Double Angle	2L3x3x5/16x3/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180.00-175.00	None	Single Angle		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T2-T3 175.00-158.33	None	Equal Angle		A36 (36 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 158.33-150.00	None	Equal Angle		A36 (36 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5-T6 150.00-133.33	None	Equal Angle		A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T7 133.33-125.00	None	Equal Angle		A36 (36 ksi)	Equal Angle	L3x3x1/4	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
T8 125.00-116.67	None	Equal Angle		A36 (36 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T9-T10 116.67-100.00	None	Equal Angle		A36 (36 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T11 100.00-75.00	None	Single Angle		A36 (36 ksi)	Single Angle	L3x2 1/2x1/4	A36 (36 ksi)
T12 75.00-50.00	None	Equal Angle		A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T13 50.00-25.00	None	Equal Angle		A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T14 25.00-0.00	None	Equal Angle		A36 (36 ksi)	Equal Angle	L4x4x1/4	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
T11 100.00-75.00	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T12 75.00-50.00	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T13 50.00-25.00	Equal Angle		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T14 25.00-0.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T13 50.00-25.00	A36 (36 ksi)	Horizontal (1)	Equal Angle	L3x3x1/4	1
		Sub-Horizontal	Equal Angle	L3x3x1/4	1
T14 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) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 180.00-175.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	Third-Pt	Third-Pt

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
T2-T3 175.00-158.33	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	Third-Pt	Third-Pt
T4 158.33-150.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	Third-Pt	Third-Pt
T5-T6 150.00-133.33	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	Third-Pt	Third-Pt
T7 133.33-125.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	Third-Pt	Third-Pt
T8 125.00-116.67	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	Third-Pt	Third-Pt
T9-T10 116.67-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	Third-Pt	Third-Pt
T11 100.00-75.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	Third-Pt	Third-Pt
T12 75.00-50.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	Third-Pt	Third-Pt
T13 50.00-25.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	Third-Pt	Third-Pt
T14 25.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	Third-Pt	Third-Pt

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180.00-175.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2-T3 175.00-158.33	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 158.33-150.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5-T6 150.00-133.33	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 133.33-125.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 125.00-116.67	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9-T10 116.67-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T11 100.00-75.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T12 75.00-50.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T13 50.00-25.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T14 25.00-0.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		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-T3 175.00-158.33	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
T4 158.33-150.00	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
T5-T6 150.00-133.33	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 133.33-125.00	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
T8 125.00-116.67	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
T9-T10 116.67-100.00	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
T11 100.00-75.00	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
T12 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
T13 50.00-25.00	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
T14 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-T3 175.00-158.33	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
T4 158.33-150.00	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
T5-T6 150.00-133.33	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 133.33-125.00	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
T8 125.00-116.67	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
T9-T10 116.67-100.00	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
T11 100.00-75.00	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
T12 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
T13 50.00-25.00	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
T14 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 Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1 180.00-175.00	Flange	0.7500 A325N	6	0.7500 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T2-T3 175.00-158.33	Flange	0.7500 A325N	6	0.7500 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T4 158.33-150.00	Flange	0.7500 A325N	0	0.7500 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T5-T6 150.00-133.33	Flange	0.7500 A325N	6	0.7500 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T7 133.33-125.00	Flange	0.7500 A325N	0	0.7500 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T8 125.00-116.67	Flange	1.0000 A325N	6	0.7500 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T9-T10 116.67-100.00	Flange	1.0000 A325N	0	0.7500 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T11 100.00-75.00	Flange	1.0000 A325N	6	0.7500 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T12 75.00-50.00	Flange	1.0000 A325N	6	0.7500 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T13 50.00-25.00	Flange	1.0000 A325N	8	0.7500 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.7500 A325N	1
T14 25.00-0.00	Flange	1.5000 A615-75	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

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 5/8 (Sprint)	B	No	No	Ar (CaAa)	170.00 - 8.00	2.0000	0.4	6	3	0.7500	1.9800		1.04
1/2 (Sprint)	B	No	No	Ar (CaAa)	52.00 - 8.00	2.0000	0.455	1	1	0.5800	0.5800		0.25
7/8	A	No	No	Ar (CaAa)	180.00 - 8.00	-2.0000	0.42	5	5	1.5000	1.1100		0.54
EW63	A	No	No	Af (CaAa)	177.00 - 8.00	-2.0000	0.38	1	1	1.5742	1.5742		0.51
7/8	A	No	No	Ar (CaAa)	153.00 - 8.00	-2.0000	0.4	5	5	1.5000	1.1100		0.54
1 5/8 (Troop-L)	A	No	No	Ar (CaAa)	180.00 - 8.00	-2.0000	0.3	3	3	1.9800	1.9800		1.04
1/2 (Troop-L)	A	No	No	Ar (CaAa)	180.00 - 8.00	-2.0000	0.3	1	1	0.5800	0.5800		0.25
1/2	A	No	No	Ar (CaAa)	50.00 - 8.00	-2.0000	0.35	5	5	1.0000 1.5000	0.5800		0.25
1 5/8 (ATT)	B	No	No	Ar (CaAa)	160.00 - 8.00	-2.0000	0.35	12	6	0.7500	1.9800		1.04
1 5/8	C	No	No	Ar (CaAa)	142.00 -	-3.0000	0.4	12	6	0.7500	1.9800		1.04

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
(Verizon) 7/8 (Eversource Proposed)	A	No	No	Ar (CaAa)	8.00 110.00 - 8.00	-5.0000	0.26	2	2	1.5000	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 K
T1	180.00-175.00	A	0.000	0.000	6.560	0.000	0.03
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	175.00-166.67	A	0.000	0.000	12.245	0.000	0.05
		B	0.000	0.000	3.960	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
T3	166.67-158.33	A	0.000	0.000	12.245	0.000	0.05
		B	0.000	0.000	13.860	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
T4	158.33-150.00	A	0.000	0.000	13.910	0.000	0.06
		B	0.000	0.000	29.700	0.000	0.16
		C	0.000	0.000	0.000	0.000	0.00
T5	150.00-141.67	A	0.000	0.000	16.870	0.000	0.08
		B	0.000	0.000	29.700	0.000	0.16
		C	0.000	0.000	0.792	0.000	0.00
T6	141.67-133.33	A	0.000	0.000	16.870	0.000	0.08
		B	0.000	0.000	29.700	0.000	0.16
		C	0.000	0.000	19.800	0.000	0.10
T7	133.33-125.00	A	0.000	0.000	16.870	0.000	0.08
		B	0.000	0.000	29.700	0.000	0.16
		C	0.000	0.000	19.800	0.000	0.10
T8	125.00-116.67	A	0.000	0.000	16.870	0.000	0.08
		B	0.000	0.000	29.700	0.000	0.16
		C	0.000	0.000	19.800	0.000	0.10
T9	116.67-108.33	A	0.000	0.000	17.240	0.000	0.08
		B	0.000	0.000	29.700	0.000	0.16
		C	0.000	0.000	19.800	0.000	0.10
T10	108.33-100.00	A	0.000	0.000	18.720	0.000	0.09
		B	0.000	0.000	29.700	0.000	0.16
		C	0.000	0.000	19.800	0.000	0.10
T11	100.00-75.00	A	0.000	0.000	56.159	0.000	0.26
		B	0.000	0.000	89.100	0.000	0.47
		C	0.000	0.000	59.400	0.000	0.31
T12	75.00-50.00	A	0.000	0.000	56.159	0.000	0.26
		B	0.000	0.000	89.216	0.000	0.47
		C	0.000	0.000	59.400	0.000	0.31
T13	50.00-25.00	A	0.000	0.000	63.409	0.000	0.29
		B	0.000	0.000	90.550	0.000	0.47
		C	0.000	0.000	59.400	0.000	0.31
T14	25.00-0.00	A	0.000	0.000	43.118	0.000	0.20
		B	0.000	0.000	61.574	0.000	0.32
		C	0.000	0.000	40.392	0.000	0.21

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 K
T1	180.00-175.00	A	1.361	0.000	0.000	20.373	0.000	0.24
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	175.00-166.67	A	1.356	0.000	0.000	36.583	0.000	0.42
		B		0.000	0.000	5.239	0.000	0.09
		C		0.000	0.000	0.000	0.000	0.00
T3	166.67-158.33	A	1.349	0.000	0.000	36.525	0.000	0.42
		B		0.000	0.000	17.197	0.000	0.30
		C		0.000	0.000	0.000	0.000	0.00
T4	158.33-150.00	A	1.342	0.000	0.000	41.988	0.000	0.48
		B		0.000	0.000	33.630	0.000	0.63
		C		0.000	0.000	0.000	0.000	0.00
T5	150.00-141.67	A	1.334	0.000	0.000	51.726	0.000	0.59
		B		0.000	0.000	33.589	0.000	0.63
		C		0.000	0.000	0.822	0.000	0.02
T6	141.67-133.33	A	1.326	0.000	0.000	51.639	0.000	0.59
		B		0.000	0.000	33.545	0.000	0.62
		C		0.000	0.000	20.531	0.000	0.41
T7	133.33-125.00	A	1.318	0.000	0.000	51.547	0.000	0.58
		B		0.000	0.000	33.498	0.000	0.62
		C		0.000	0.000	20.509	0.000	0.40
T8	125.00-116.67	A	1.309	0.000	0.000	51.450	0.000	0.58
		B		0.000	0.000	33.449	0.000	0.62
		C		0.000	0.000	20.485	0.000	0.40
T9	116.67-108.33	A	1.300	0.000	0.000	52.873	0.000	0.59
		B		0.000	0.000	33.396	0.000	0.62
		C		0.000	0.000	20.460	0.000	0.40
T10	108.33-100.00	A	1.290	0.000	0.000	58.842	0.000	0.64
		B		0.000	0.000	33.340	0.000	0.61
		C		0.000	0.000	20.433	0.000	0.40
T11	100.00-75.00	A	1.268	0.000	0.000	175.593	0.000	1.89
		B		0.000	0.000	99.645	0.000	1.83
		C		0.000	0.000	61.116	0.000	1.19
T12	75.00-50.00	A	1.226	0.000	0.000	173.841	0.000	1.83
		B		0.000	0.000	99.545	0.000	1.80
		C		0.000	0.000	60.776	0.000	1.17
T13	50.00-25.00	A	1.165	0.000	0.000	201.538	0.000	2.02
		B		0.000	0.000	105.185	0.000	1.82
		C		0.000	0.000	60.281	0.000	1.14
T14	25.00-0.00	A	1.044	0.000	0.000	132.980	0.000	1.25
		B		0.000	0.000	69.729	0.000	1.17
		C		0.000	0.000	40.325	0.000	0.74

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	-0.8030	-8.8701	-1.3233	-14.2585
T2	175.00-166.67	2.7100	-9.0859	1.0359	-15.2096
T3	166.67-158.33	9.7109	-5.0242	5.9880	-12.3719
T4	158.33-150.00	16.4577	-1.5880	10.5035	-10.8477
T5	150.00-141.67	15.3581	-3.1491	9.5180	-13.9672
T6	141.67-133.33	4.7645	3.1496	3.0640	-9.0760

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T7	133.33-125.00	4.9734	3.3351	3.1663	-9.5493
T8	125.00-116.67	5.1251	3.4851	3.2048	-9.8239
T9	116.67-108.33	5.2756	3.4806	3.1659	-10.6481
T10	108.33-100.00	5.2379	2.8990	2.7087	-12.5344
T11	100.00-75.00	5.4930	3.1088	2.8028	-13.4383
T12	75.00-50.00	6.0075	3.4831	3.0745	-14.7818
T13	50.00-25.00	5.4830	1.8258	3.1102	-17.3478
T14	25.00-0.00	4.7990	1.6323	2.6688	-15.4592

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	3	7/8	175.00 - 180.00	0.6000	0.6000
T1	4	EW63	175.00 - 177.00	0.6000	0.6000
T1	6	1 5/8	175.00 - 180.00	0.6000	0.6000
T1	7	1/2	175.00 - 180.00	0.6000	0.6000
T2	1	1 5/8	166.67 - 170.00	0.6000	0.6000
T2	3	7/8	166.67 - 175.00	0.6000	0.6000
T2	4	EW63	166.67 - 175.00	0.6000	0.6000
T2	6	1 5/8	166.67 - 175.00	0.6000	0.6000
T2	7	1/2	166.67 - 175.00	0.6000	0.6000
T3	1	1 5/8	158.33 - 166.67	0.6000	0.6000
T3	3	7/8	158.33 - 166.67	0.6000	0.6000
T3	4	EW63	158.33 - 166.67	0.6000	0.6000
T3	6	1 5/8	158.33 - 166.67	0.6000	0.6000
T3	7	1/2	158.33 - 166.67	0.6000	0.6000
T3	9	1 5/8	158.33 - 160.00	0.6000	0.6000
T4	1	1 5/8	150.00 - 158.33	0.6000	0.6000
T4	3	7/8	150.00 - 158.33	0.6000	0.6000
T4	4	EW63	150.00 - 158.33	0.6000	0.6000
T4	5	7/8	150.00 - 153.00	0.6000	0.6000
T4	6	1 5/8	150.00 - 158.33	0.6000	0.6000
T4	7	1/2	150.00 - 158.33	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	9	1 5/8	150.00 - 158.33	0.6000	0.6000
T5	1	1 5/8	141.67 - 150.00	0.6000	0.6000
T5	3	7/8	141.67 - 150.00	0.6000	0.6000
T5	4	EW63	141.67 - 150.00	0.6000	0.6000
T5	5	7/8	141.67 - 150.00	0.6000	0.6000
T5	6	1 5/8	141.67 - 150.00	0.6000	0.6000
T5	7	1/2	141.67 - 150.00	0.6000	0.6000
T5	9	1 5/8	141.67 - 150.00	0.6000	0.6000
T5	10	1 5/8	141.67 - 142.00	0.6000	0.6000
T6	1	1 5/8	133.33 - 141.67	0.6000	0.6000
T6	3	7/8	133.33 - 141.67	0.6000	0.6000
T6	4	EW63	133.33 - 141.67	0.6000	0.6000
T6	5	7/8	133.33 - 141.67	0.6000	0.6000
T6	6	1 5/8	133.33 - 141.67	0.6000	0.6000
T6	7	1/2	133.33 - 141.67	0.6000	0.6000
T6	9	1 5/8	133.33 - 141.67	0.6000	0.6000
T6	10	1 5/8	133.33 - 141.67	0.6000	0.6000
T7	1	1 5/8	125.00 - 133.33	0.6000	0.6000
T7	3	7/8	125.00 - 133.33	0.6000	0.6000
T7	4	EW63	125.00 - 133.33	0.6000	0.6000
T7	5	7/8	125.00 - 133.33	0.6000	0.6000
T7	6	1 5/8	125.00 - 133.33	0.6000	0.6000
T7	7	1/2	125.00 - 133.33	0.6000	0.6000
T7	9	1 5/8	125.00 - 133.33	0.6000	0.6000
T7	10	1 5/8	125.00 - 133.33	0.6000	0.6000
T8	1	1 5/8	116.67 - 125.00	0.6000	0.6000
T8	3	7/8	116.67 - 125.00	0.6000	0.6000
T8	4	EW63	116.67 - 125.00	0.6000	0.6000
T8	5	7/8	116.67 - 125.00	0.6000	0.6000
T8	6	1 5/8	116.67 - 125.00	0.6000	0.6000
T8	7	1/2	116.67 - 125.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	9	1 5/8	116.67 - 125.00	0.6000	0.6000
T8	10	1 5/8	116.67 - 125.00	0.6000	0.6000
T9	1	1 5/8	108.33 - 116.67	0.6000	0.6000
T9	3	7/8	108.33 - 116.67	0.6000	0.6000
T9	4	EW63	108.33 - 116.67	0.6000	0.6000
T9	5	7/8	108.33 - 116.67	0.6000	0.6000
T9	6	1 5/8	108.33 - 116.67	0.6000	0.6000
T9	7	1/2	108.33 - 116.67	0.6000	0.6000
T9	9	1 5/8	108.33 - 116.67	0.6000	0.6000
T9	10	1 5/8	108.33 - 116.67	0.6000	0.6000
T9	11	7/8	108.33 - 110.00	0.6000	0.6000
T10	1	1 5/8	100.00 - 108.33	0.6000	0.6000
T10	3	7/8	100.00 - 108.33	0.6000	0.6000
T10	4	EW63	100.00 - 108.33	0.6000	0.6000
T10	5	7/8	100.00 - 108.33	0.6000	0.6000
T10	6	1 5/8	100.00 - 108.33	0.6000	0.6000
T10	7	1/2	100.00 - 108.33	0.6000	0.6000
T10	9	1 5/8	100.00 - 108.33	0.6000	0.6000
T10	10	1 5/8	100.00 - 108.33	0.6000	0.6000
T10	11	7/8	100.00 - 108.33	0.6000	0.6000
T11	1	1 5/8	75.00 - 100.00	0.6000	0.6000
T11	3	7/8	75.00 - 100.00	0.6000	0.6000
T11	4	EW63	75.00 - 100.00	0.6000	0.6000
T11	5	7/8	75.00 - 100.00	0.6000	0.6000
T11	6	1 5/8	75.00 - 100.00	0.6000	0.6000
T11	7	1/2	75.00 - 100.00	0.6000	0.6000
T11	9	1 5/8	75.00 - 100.00	0.6000	0.6000
T11	10	1 5/8	75.00 - 100.00	0.6000	0.6000
T11	11	7/8	75.00 - 100.00	0.6000	0.6000
T12	1	1 5/8	50.00 - 75.00	0.6000	0.6000
T12	2	1/2	50.00 - 52.00	0.6000	0.6000
T12	3	7/8	50.00 - 75.00	0.6000	0.6000
T12	4	EW63	50.00 - 75.00	0.6000	0.6000
T12	5	7/8	50.00 - 75.00	0.6000	0.6000
T12	6	1 5/8	50.00 - 75.00	0.6000	0.6000
T12	7	1/2	50.00 - 75.00	0.6000	0.6000
T12	9	1 5/8	50.00 - 75.00	0.6000	0.6000
T12	10	1 5/8	50.00 - 75.00	0.6000	0.6000
T12	11	7/8	50.00 - 75.00	0.6000	0.6000
T13	1	1 5/8	25.00 - 50.00	0.6000	0.6000
T13	2	1/2	25.00 - 50.00	0.6000	0.6000
T13	3	7/8	25.00 - 50.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T13	4	EW63	25.00 - 50.00	0.6000	0.6000
T13	5	7/8	25.00 - 50.00	0.6000	0.6000
T13	6	1 5/8	25.00 - 50.00	0.6000	0.6000
T13	7	1/2	25.00 - 50.00	0.6000	0.6000
T13	8	1/2	25.00 - 50.00	0.6000	0.6000
T13	9	1 5/8	25.00 - 50.00	0.6000	0.6000
T13	10	1 5/8	25.00 - 50.00	0.6000	0.6000
T13	11	7/8	25.00 - 50.00	0.6000	0.6000
T14	1	1 5/8	8.00 - 25.00	0.6000	0.6000
T14	2	1/2	8.00 - 25.00	0.6000	0.6000
T14	3	7/8	8.00 - 25.00	0.6000	0.6000
T14	4	EW63	8.00 - 25.00	0.6000	0.6000
T14	5	7/8	8.00 - 25.00	0.6000	0.6000
T14	6	1 5/8	8.00 - 25.00	0.6000	0.6000
T14	7	1/2	8.00 - 25.00	0.6000	0.6000
T14	8	1/2	8.00 - 25.00	0.6000	0.6000
T14	9	1 5/8	8.00 - 25.00	0.6000	0.6000
T14	10	1 5/8	8.00 - 25.00	0.6000	0.6000
T14	11	7/8	8.00 - 25.00	0.6000	0.6000

Discrete Tower Loads

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 K
Lightning Rod 5/8x4'	C	From Leg	0.00	0.00	0.0000	192.00	No Ice	0.25	0.25	0.03
			0.00	0.00			1/2" Ice	0.66	0.66	0.03
			0.00	0.00			1" Ice	0.97	0.97	0.04
10'0"x4" Pipe Mount (Lighting Rod Extension)	C	From Leg	0.00	0.00	0.0000	185.00	No Ice	3.12	3.12	0.11
			0.00	0.00			1/2" Ice	5.24	5.24	0.14
			0.00	0.00			1" Ice	5.85	5.85	0.18
PD1142-30 (CSP 22)	B	From Leg	0.00	0.00	0.0000	191.00	No Ice	0.14	0.14	0.01
			0.00	0.00			1/2" Ice	1.49	1.49	0.11
			0.00	0.00			1" Ice	2.84	2.84	0.21
6'x4" Pipe Mount (CSP 22)	B	From Leg	0.00	0.00	0.0000	191.00	No Ice	1.70	1.70	0.05
			0.00	0.00			1/2" Ice	2.46	2.46	0.07
			0.00	0.00			1" Ice	2.83	2.83	0.09
8' x 2" Omni (CSP)	A	From Leg	0.50	0.00	0.0000	184.00	No Ice	1.60	1.60	0.02
			0.00	0.00			1/2" Ice	2.42	2.42	0.03
			0.00	0.00			1" Ice	3.24	3.24	0.05
2'x3" Pipe Mount (CSP)	A	From Leg	0.50	0.00	0.0000	184.00	No Ice	0.41	0.41	0.01
			0.00	0.00			1/2" Ice	0.56	0.56	0.02
			0.00	0.00			1" Ice	0.72	0.72	0.03
PD220 (LCD-27)	A	From Leg	0.50	0.00	0.0000	176.00	No Ice	3.56	3.56	0.02
			0.00	0.00			1/2" Ice	7.13	7.13	0.05
			0.00	0.00			1" Ice	10.70	10.70	0.07
20' x 3" Dia Omni (LCD-9)	B	From Leg	0.50	0.00	0.0000	182.00	No Ice	6.00	6.00	0.05
			0.00	0.00			1/2" Ice	8.03	8.03	0.09
			0.00	0.00			1" Ice	10.08	10.08	0.15
20' x 3" Dia Omni (LCD-28)	C	From Leg	0.50	0.00	0.0000	182.00	No Ice	6.00	6.00	0.05
			0.00	0.00			1/2" Ice	8.03	8.03	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	10.08	10.08	0.15
3'4"x4" Pipe Mount	C	From Leg	0.00	0.0000	176.00	No Ice	0.88	0.88	0.04
(CSP-3)			0.00			1/2" Ice	1.27	1.27	0.05
			0.00			1" Ice	1.49	1.49	0.06
DB292-A	C	From Leg	0.50	0.0000	170.00	No Ice	1.80	1.80	0.01
(LCD-10)			5.00			1/2" Ice	3.24	3.24	0.02
			0.00			1" Ice	4.68	4.68	0.02
PD1142-1	B	From Leg	0.50	0.0000	158.00	No Ice	1.88	1.88	0.01
(CSP)			4.00			1/2" Ice	3.78	3.78	0.03
			0.00			1" Ice	5.70	5.70	0.06
DB222	A	From Leg	0.50	0.0000	153.00	No Ice	1.60	1.60	0.02
(CSP)			-4.00			1/2" Ice	2.88	2.88	0.02
			0.00			1" Ice	4.16	4.16	0.03
DB586-Y	A	From Leg	0.50	0.0000	150.00	No Ice	1.01	1.01	0.01
(CSP)			4.00			1/2" Ice	1.28	1.28	0.02
			2.50			1" Ice	1.56	1.56	0.03
DB586-Y	A	From Leg	0.50	0.0000	150.00	No Ice	1.01	1.01	0.01
(CSP (inverted))			4.00			1/2" Ice	1.28	1.28	0.02
			-2.50			1" Ice	1.56	1.56	0.03
TTA 432-83H-01T	A	From Leg	0.50	0.0000	153.00	No Ice	1.40	0.82	0.03
(CSP)			4.00			1/2" Ice	1.55	0.94	0.04
			-2.50			1" Ice	1.70	1.06	0.05
10' Dipole	C	From Leg	0.50	0.0000	148.00	No Ice	4.00	4.00	0.05
(CSP)			4.00			1/2" Ice	6.00	6.00	0.07
			-2.50			1" Ice	8.00	8.00	0.10
GPS	B	From Leg	2.00	0.0000	52.00	No Ice	0.44	0.44	0.00
(Sprint)			0.00			1/2" Ice	0.62	0.62	0.00
			0.00			1" Ice	0.80	0.80	0.00
2.5" Tube x 2' Standoff	B	From Leg	1.00	0.0000	52.00	No Ice	1.11	0.63	0.12
(Sprint)			0.00			1/2" Ice	1.44	0.84	0.13
			0.00			1" Ice	1.79	1.06	0.14
DB803M-Y	A	From Leg	3.00	0.0000	33.50	No Ice	0.50	0.50	0.00
(CSP)			0.00			1/2" Ice	0.68	0.68	0.01
			3.50			1" Ice	0.87	0.87	0.02
DB803M-Y	A	From Leg	3.00	0.0000	31.00	No Ice	0.50	0.50	0.00
(CSP)			0.00			1/2" Ice	0.68	0.68	0.01
			3.50			1" Ice	0.87	0.87	0.02
3' Standoff	A	From Leg	1.50	0.0000	31.00	No Ice	2.72	2.72	0.05
(CSP)			0.00			1/2" Ice	4.91	4.91	0.09
			0.00			1" Ice	7.10	7.10	0.13
DB803M-Y	B	From Leg	3.00	0.0000	29.50	No Ice	0.50	0.50	0.00
(CSP)			0.00			1/2" Ice	0.68	0.68	0.01
			3.50			1" Ice	0.87	0.87	0.02
3' Standoff	B	From Leg	1.50	0.0000	29.00	No Ice	2.72	2.72	0.05
(CSP)			0.00			1/2" Ice	4.91	4.91	0.09
			0.00			1" Ice	7.10	7.10	0.13
3' Yagi	B	From Leg	3.00	0.0000	16.00	No Ice	2.08	2.08	0.03
(CSP)			0.00			1/2" Ice	3.79	3.79	0.05
			0.00			1" Ice	5.52	5.52	0.09
SC479-HF1LDF	C	From Leg	4.00	0.0000	180.00	No Ice	4.52	4.52	0.03
(CSP Troop L (inverted) -			0.00			1/2" Ice	6.54	6.54	0.07
Reserved)			-7.25			1" Ice	8.04	8.04	0.11
SC479-HF1LDF	C	From Leg	4.00	0.0000	180.00	No Ice	4.52	4.52	0.03
(CSP Troop L (inverted) -			0.00			1/2" Ice	6.54	6.54	0.07
Reserved)			-7.25			1" Ice	8.04	8.04	0.11
SC479-HF1LDF	C	From Leg	4.00	0.0000	180.00	No Ice	4.52	4.52	0.03
(CSP Troop L - Reserved)			0.00			1/2" Ice	6.54	6.54	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			7.25			1" Ice	8.04	8.04	0.11
TX/RX 432E-83I-01T	C	From Leg	2.00	0.0000	180.00	No Ice	1.20	0.75	0.03
(CSP Troop L - Reserved)			0.00			1/2" Ice	1.34	0.86	0.04
			0.00			1" Ice	1.48	0.98	0.05
Pirod 4' Side Mount Standoff	C	From Leg	2.00	0.0000	180.00	No Ice	2.72	2.72	0.05
(1)			0.00			1/2" Ice	4.91	4.91	0.09
(CSP Troop L - Reserved)			0.00			1" Ice	7.10	7.10	0.13
SP2D03P36D-D	A	From Leg	6.00	0.0000	119.00	No Ice	4.75	4.75	0.08
(Eversource - Proposed)			0.00			1/2" Ice	6.68	6.68	0.11
			0.00			1" Ice	8.63	8.63	0.16
SitePro USF-4U	A	From Leg	3.00	0.0000	111.00	No Ice	5.75	5.75	0.16
(Eversource - Proposed)			0.00			1/2" Ice	8.00	8.00	0.21
			0.00			1" Ice	10.25	10.25	0.26
(2) DB980F90E-M	A	From Leg	1.00	0.0000	170.00	No Ice	3.90	2.29	0.01
(Sprint)			0.00			1/2" Ice	4.28	2.65	0.03
			0.00			1" Ice	4.66	3.02	0.06
(2) DB980F90E-M	B	From Leg	1.00	0.0000	170.00	No Ice	3.90	2.29	0.01
(Sprint)			0.00			1/2" Ice	4.28	2.65	0.03
			0.00			1" Ice	4.66	3.02	0.06
(2) DB980F90E-M	C	From Leg	1.00	0.0000	170.00	No Ice	3.90	2.29	0.01
(Sprint)			0.00			1/2" Ice	4.28	2.65	0.03
			0.00			1" Ice	4.66	3.02	0.06
13-ft Sector Frame	A	From Leg	0.50	0.0000	169.00	No Ice	12.00	12.00	0.35
(Sprint)			0.00			1/2" Ice	16.00	16.00	0.53
			0.00			1" Ice	20.00	20.00	0.70
13-ft Sector Frame	B	From Leg	0.50	0.0000	169.00	No Ice	12.00	12.00	0.35
(Sprint)			0.00			1/2" Ice	16.00	16.00	0.53
			0.00			1" Ice	20.00	20.00	0.70
13-ft Sector Frame	C	From Leg	0.50	0.0000	169.00	No Ice	12.00	12.00	0.35
(Sprint)			0.00			1/2" Ice	16.00	16.00	0.53
			0.00			1" Ice	20.00	20.00	0.70
7770.00 w/ mount pipe	A	From Face	0.50	0.0000	161.00	No Ice	5.62	4.26	0.06
(ATT)			-4.00			1/2" Ice	6.00	4.91	0.11
			0.00			1" Ice	6.40	5.57	0.17
HPA65R-BU4A	A	From Face	0.50	0.0000	161.00	No Ice	4.96	3.51	0.03
(ATT)			4.00			1/2" Ice	5.28	3.81	0.06
			0.00			1" Ice	5.61	4.12	0.10
TMAT1921XB68	A	From Face	0.50	0.0000	161.00	No Ice	0.66	0.31	0.02
(ATT)			-4.00			1/2" Ice	0.76	0.39	0.03
			0.00			1" Ice	0.87	0.47	0.03
(2) LPG21401 TMA	A	From Face	0.50	0.0000	161.00	No Ice	0.82	0.35	0.02
(ATT)			4.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
7770.00 w/ mount pipe	B	From Face	0.50	0.0000	161.00	No Ice	5.62	4.26	0.06
(ATT)			-4.00			1/2" Ice	6.00	4.91	0.11
			0.00			1" Ice	6.40	5.57	0.17
HPA65R-BU4A	B	From Face	0.50	0.0000	161.00	No Ice	4.96	3.51	0.03
(ATT)			4.00			1/2" Ice	5.28	3.81	0.06
			0.00			1" Ice	5.61	4.12	0.10
TMAT1921XB68	B	From Face	0.50	0.0000	161.00	No Ice	0.66	0.31	0.02
(ATT)			-4.00			1/2" Ice	0.76	0.39	0.03
			0.00			1" Ice	0.87	0.47	0.03
(2) LPG21401 TMA	B	From Face	0.50	0.0000	161.00	No Ice	0.82	0.35	0.02
(ATT)			4.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
7770.00 w/ mount pipe	C	From Face	0.50	0.0000	161.00	No Ice	5.62	4.26	0.06
(ATT)			-4.00			1/2" Ice	6.00	4.91	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	6.40	5.57	0.17
HPA65R-BU4A	C	From Face	0.50	0.0000	161.00	No Ice	4.96	3.51	0.03
(ATT)			4.00			1/2" Ice	5.28	3.81	0.06
			0.00			1" Ice	5.61	4.12	0.10
TMAT1921XB68	C	From Face	0.50	0.0000	161.00	No Ice	0.66	0.31	0.02
(ATT)			-4.00			1/2" Ice	0.76	0.39	0.03
			0.00			1" Ice	0.87	0.47	0.03
(2) LPG21401 TMA	C	From Face	0.50	0.0000	161.00	No Ice	0.82	0.35	0.02
(ATT)			4.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
BXA-80080/6CF w/mount	A	From Face	1.50	0.0000	148.00	No Ice	7.91	5.35	0.04
pipe			5.50			1/2" Ice	8.45	6.29	0.10
(Verizon)			0.00			1" Ice	9.01	7.11	0.17
BXA-185085/12CF w/mount	A	From Face	1.50	0.0000	148.00	No Ice	4.79	5.04	0.03
pipe			-5.50			1/2" Ice	5.24	5.98	0.08
(Verizon)			0.00			1" Ice	5.70	6.80	0.13
BXA-80080/6CF w/mount	B	From Face	1.50	0.0000	148.00	No Ice	7.91	5.35	0.04
pipe			5.50			1/2" Ice	8.45	6.29	0.10
(Verizon)			0.00			1" Ice	9.01	7.11	0.17
BXA-185085/12CF w/mount	B	From Face	1.50	0.0000	148.00	No Ice	4.79	5.04	0.03
pipe			-5.50			1/2" Ice	5.24	5.98	0.08
(Verizon)			0.00			1" Ice	5.70	6.80	0.13
BXA-80080/6CF w/mount	C	From Face	1.50	0.0000	148.00	No Ice	7.91	5.35	0.04
pipe			5.50			1/2" Ice	8.45	6.29	0.10
(Verizon)			0.00			1" Ice	9.01	7.11	0.17
BXA-185085/12CF w/mount	C	From Face	1.50	0.0000	148.00	No Ice	4.79	5.04	0.03
pipe			-5.50			1/2" Ice	5.24	5.98	0.08
(Verizon)			0.00			1" Ice	5.70	6.80	0.13
SitePro VFA12-HD	A	From Face	1.50	0.0000	148.00	No Ice	21.00	21.00	0.75
(Verizon)			-5.50			1/2" Ice	25.00	25.00	0.90
			0.00			1" Ice	29.00	29.00	1.05
SitePro VFA12-HD	B	From Face	1.50	0.0000	148.00	No Ice	21.00	21.00	0.75
(Verizon)			-5.50			1/2" Ice	25.00	25.00	0.90
			0.00			1" Ice	29.00	29.00	1.05
SitePro VFA12-HD	C	From Face	1.50	0.0000	148.00	No Ice	21.00	21.00	0.75
(Verizon)			-5.50			1/2" Ice	25.00	25.00	0.90
			0.00			1" Ice	29.00	29.00	1.05

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 K
PA6-65 6' Dish	C	Paraboloid	From	2.00	0.0000		177.00	6.00	No Ice	28.27	0.14
(CSP)		w/Radome	Leg	0.00					1/2" Ice	29.07	0.29
				0.00					1" Ice	29.86	0.44

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	1.428	48.6	36.085	A	2.939	4.171	4.171	58.66	6.560	0.000
180.00-175.00					B	2.939	4.171		58.66	0.000	0.000
					C	2.939	4.171		58.66	0.000	0.000
T2	170.83	1.417	48.2	64.586	A	3.553	6.952	6.952	66.18	12.245	0.000
175.00-166.67					B	3.553	6.952		66.18	3.960	0.000
					C	3.553	6.952		66.18	0.000	0.000
T3	162.50	1.402	47.7	70.142	A	3.792	6.952	6.952	64.71	12.245	0.000
166.67-158.33					B	3.792	6.952		64.71	13.860	0.000
					C	3.792	6.952		64.71	0.000	0.000
T4	154.17	1.386	47.1	75.697	A	4.034	6.952	6.952	63.28	13.910	0.000
158.33-150.00					B	4.034	6.952		63.28	29.700	0.000
					C	4.034	6.952		63.28	0.000	0.000
T5	145.83	1.37	46.6	81.253	A	5.135	6.952	6.952	57.52	16.870	0.000
150.00-141.67					B	5.135	6.952		57.52	29.700	0.000
					C	5.135	6.952		57.52	0.792	0.000
T6	137.50	1.353	46.0	86.808	A	5.432	6.952	6.952	56.14	16.870	0.000
141.67-133.33					B	5.432	6.952		56.14	29.700	0.000
					C	5.432	6.952		56.14	19.800	0.000
T7	129.17	1.336	45.4	92.364	A	5.731	6.952	6.952	54.81	16.870	0.000
133.33-125.00					B	5.731	6.952		54.81	29.700	0.000
					C	5.731	6.952		54.81	19.800	0.000
T8	120.83	1.317	44.8	97.919	A	6.293	6.952	6.952	52.49	16.870	0.000
125.00-116.67					B	6.293	6.952		52.49	29.700	0.000
					C	6.293	6.952		52.49	19.800	0.000
T9	112.50	1.297	44.1	103.475	A	6.518	6.952	6.952	51.61	17.240	0.000
116.67-108.33					B	6.518	6.952		51.61	29.700	0.000
					C	6.518	6.952		51.61	19.800	0.000
T10	104.17	1.277	43.4	109.031	A	6.746	6.952	6.952	50.75	18.720	0.000
108.33-100.00					B	6.746	6.952		50.75	29.700	0.000
					C	6.746	6.952		50.75	19.800	0.000
T11	87.50	1.231	41.8	360.425	A	23.281	20.856	20.856	47.25	56.159	0.000
100.00-75.00					B	23.281	20.856		47.25	89.100	0.000
					C	23.281	20.856		47.25	59.400	0.000
T12	62.50	1.146	39.0	410.425	A	25.654	20.856	20.856	44.84	56.159	0.000
75.00-50.00					B	25.654	20.856		44.84	89.216	0.000
					C	25.654	20.856		44.84	59.400	0.000
T13	37.50	1.029	35.0	460.425	A	44.289	20.856	20.856	32.01	63.409	0.000
50.00-25.00					B	44.289	20.856		32.01	90.550	0.000
					C	44.289	20.856		32.01	59.400	0.000
T14 25.00-0.00	12.50	0.85	28.9	514.334	A	40.219	28.676	28.676	41.62	43.118	0.000
					B	40.219	28.676		41.62	61.574	0.000
					C	40.219	28.676		41.62	40.392	0.000

Tower Pressure - With Ice

G_H = 0.850

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

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
T1	177.50	1.428	7.8	1.3607	37.220	A	2.939	9.641	6.441	51.20	20.373	0.000
180.00-175.00						B	2.939	9.641		51.20	0.000	0.000
						C	2.939	9.641		51.20	0.000	0.000
T2	170.83	1.417	7.7	1.3555	66.470	A	3.553	14.574	10.721	59.14	36.583	0.000
175.00-166.67						B	3.553	14.574		59.14	5.239	0.000
						C	3.553	14.574		59.14	0.000	0.000
T3	162.50	1.402	7.6	1.3488	72.016	A	3.792	14.794	10.702	57.58	36.525	0.000
166.67-158.33						B	3.792	14.794		57.58	17.197	0.000
						C	3.792	14.794		57.58	0.000	0.000
T4	154.17	1.386	7.5	1.3417	77.562	A	4.034	15.013	10.683	56.09	41.988	0.000
158.33-150.00						B	4.034	15.013		56.09	33.630	0.000
						C	4.034	15.013		56.09	0.000	0.000
T5	145.83	1.37	7.5	1.3342	83.107	A	5.135	15.229	10.662	52.36	51.726	0.000
150.00-141.67						B	5.135	15.229		52.36	33.589	0.000
						C	5.135	15.229		52.36	0.822	0.000
T6	137.50	1.353	7.4	1.3264	88.652	A	5.432	15.443	10.640	50.97	51.639	0.000
141.67-133.33						B	5.432	15.443		50.97	33.545	0.000
						C	5.432	15.443		50.97	20.531	0.000
T7	129.17	1.336	7.3	1.3181	94.196	A	5.731	15.654	10.617	49.65	51.547	0.000
133.33-125.00						B	5.731	15.654		49.65	33.498	0.000
						C	5.731	15.654		49.65	20.509	0.000
T8	120.83	1.317	7.2	1.3094	99.739	A	6.293	17.184	10.593	45.12	51.450	0.000
125.00-116.67						B	6.293	17.184		45.12	33.449	0.000
						C	6.293	17.184		45.12	20.485	0.000
T9	112.50	1.297	7.1	1.3001	105.282	A	6.518	17.346	10.567	44.28	52.873	0.000
116.67-108.33						B	6.518	17.346		44.28	33.396	0.000
						C	6.518	17.346		44.28	20.460	0.000
T10	104.17	1.277	6.9	1.2901	110.824	A	6.746	17.501	10.539	43.47	58.842	0.000
108.33-100.00						B	6.746	17.501		43.47	33.340	0.000
						C	6.746	17.501		43.47	20.433	0.000
T11	87.50	1.231	6.7	1.2678	365.712	A	23.281	53.365	31.432	41.01	175.593	0.000
100.00-75.00						B	23.281	53.365		41.01	99.645	0.000
						C	23.281	53.365		41.01	61.116	0.000
T12 75.00-50.00	62.50	1.146	6.2	1.2258	415.537	A	25.654	54.371	31.082	38.84	173.841	0.000
						B	25.654	54.371		38.84	99.545	0.000
						C	25.654	54.371		38.84	60.776	0.000
T13 50.00-25.00	37.50	1.029	5.6	1.1648	465.282	A	44.289	64.965	30.573	27.98	201.538	0.000
						B	44.289	64.965		27.98	105.185	0.000
						C	44.289	64.965		27.98	60.281	0.000
T14 25.00-0.00	12.50	0.85	4.6	1.0436	518.686	A	40.219	63.170	37.382	36.16	132.980	0.000
						B	40.219	63.170		36.16	69.729	0.000
						C	40.219	63.170		36.16	40.325	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	1.428	11.2	36.085	A	2.939	4.171	4.171	58.66	6.560	0.000
180.00-175.00					B	2.939	4.171		58.66	0.000	0.000
					C	2.939	4.171		58.66	0.000	0.000
T2	170.83	1.417	11.1	64.586	A	3.553	6.952	6.952	66.18	12.245	0.000

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
175.00-166.67					B	3.553	6.952		66.18	3.960	0.000
					C	3.553	6.952		66.18	0.000	0.000
T3	162.50	1.402	11.0	70.142	A	3.792	6.952	6.952	64.71	12.245	0.000
166.67-158.33					B	3.792	6.952		64.71	13.860	0.000
					C	3.792	6.952		64.71	0.000	0.000
T4	154.17	1.386	10.9	75.697	A	4.034	6.952	6.952	63.28	13.910	0.000
158.33-150.00					B	4.034	6.952		63.28	29.700	0.000
					C	4.034	6.952		63.28	0.000	0.000
T5	145.83	1.37	10.7	81.253	A	5.135	6.952	6.952	57.52	16.870	0.000
150.00-141.67					B	5.135	6.952		57.52	29.700	0.000
					C	5.135	6.952		57.52	0.792	0.000
T6	137.50	1.353	10.6	86.808	A	5.432	6.952	6.952	56.14	16.870	0.000
141.67-133.33					B	5.432	6.952		56.14	29.700	0.000
					C	5.432	6.952		56.14	19.800	0.000
T7	129.17	1.336	10.5	92.364	A	5.731	6.952	6.952	54.81	16.870	0.000
133.33-125.00					B	5.731	6.952		54.81	29.700	0.000
					C	5.731	6.952		54.81	19.800	0.000
T8	120.83	1.317	10.3	97.919	A	6.293	6.952	6.952	52.49	16.870	0.000
125.00-116.67					B	6.293	6.952		52.49	29.700	0.000
					C	6.293	6.952		52.49	19.800	0.000
T9	112.50	1.297	10.2	103.475	A	6.518	6.952	6.952	51.61	17.240	0.000
116.67-108.33					B	6.518	6.952		51.61	29.700	0.000
					C	6.518	6.952		51.61	19.800	0.000
T10	104.17	1.277	10.0	109.031	A	6.746	6.952	6.952	50.75	18.720	0.000
108.33-100.00					B	6.746	6.952		50.75	29.700	0.000
					C	6.746	6.952		50.75	19.800	0.000
T11	87.50	1.231	9.6	360.425	A	23.281	20.856	20.856	47.25	56.159	0.000
100.00-75.00					B	23.281	20.856		47.25	89.100	0.000
					C	23.281	20.856		47.25	59.400	0.000
T12	62.50	1.146	9.0	410.425	A	25.654	20.856	20.856	44.84	56.159	0.000
75.00-50.00					B	25.654	20.856		44.84	89.216	0.000
					C	25.654	20.856		44.84	59.400	0.000
T13	37.50	1.029	8.1	460.425	A	44.289	20.856	20.856	32.01	63.409	0.000
50.00-25.00					B	44.289	20.856		32.01	90.550	0.000
					C	44.289	20.856		32.01	59.400	0.000
T14 25.00-0.00	12.50	0.85	6.7	514.334	A	40.219	28.676	28.676	41.62	43.118	0.000
					B	40.219	28.676		41.62	61.574	0.000
					C	40.219	28.676		41.62	40.392	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.37	A	0.197	2.606	48.6	1	1	5.010	0.70	140.26	C
180.00-175.00			B	0.197	2.606		1	1	5.010			
			C	0.197	2.606		1	1	5.010			
T2	0.08	0.55	A	0.163	2.725	48.2	1	1	6.919	1.17	140.42	C
175.00-166.67			B	0.163	2.725		1	1	6.919			
			C	0.163	2.725		1	1	6.919			
T3	0.13	0.56	A	0.153	2.76	47.7	1	1	7.144	1.43	171.99	C
166.67-158.33			B	0.153	2.76		1	1	7.144			
			C	0.153	2.76		1	1	7.144			
T4	0.22	0.57	A	0.145	2.79	47.1	1	1	7.376	1.87	224.73	C
158.33-150.00			B	0.145	2.79		1	1	7.376			
			C	0.145	2.79		1	1	7.376			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T5	0.24	0.77	A	0.149	2.776	46.6	1	1	8.494	2.06	247.10	C
150.00-141.67			B	0.149	2.776		1	1	8.494			
			C	0.149	2.776		1	1	8.494			
T6	0.34	0.79	A	0.143	2.799	46.0	1	1	8.788	2.52	302.34	C
141.67-133.33			B	0.143	2.799		1	1	8.788			
			C	0.143	2.799		1	1	8.788			
T7	0.34	0.81	A	0.137	2.819	45.4	1	1	9.087	2.53	303.10	C
133.33-125.00			B	0.137	2.819		1	1	9.087			
			C	0.137	2.819		1	1	9.087			
T8	0.34	0.96	A	0.135	2.826	44.8	1	1	9.655	2.55	306.54	C
125.00-116.67			B	0.135	2.826		1	1	9.655			
			C	0.135	2.826		1	1	9.655			
T9	0.34	0.94	A	0.13	2.846	44.1	1	1	9.883	2.56	306.72	C
116.67-108.33			B	0.13	2.846		1	1	9.883			
			C	0.13	2.846		1	1	9.883			
T10	0.35	0.96	A	0.126	2.863	43.4	1	1	10.115	2.58	309.43	C
108.33-100.00			B	0.126	2.863		1	1	10.115			
			C	0.126	2.863		1	1	10.115			
T11	1.04	3.29	A	0.122	2.875	41.8	1	1	33.464	7.79	311.55	C
100.00-75.00			B	0.122	2.875		1	1	33.464			
			C	0.122	2.875		1	1	33.464			
T12	1.04	4.28	A	0.113	2.911	39.0	1	1	35.965	7.54	301.57	C
75.00-50.00			B	0.113	2.911		1	1	35.965			
			C	0.113	2.911		1	1	35.965			
T13	1.08	5.48	A	0.141	2.803	35.0	1	1	54.981	8.39	335.76	C
50.00-25.00			B	0.141	2.803		1	1	54.981			
			C	0.141	2.803		1	1	54.981			
T14	0.73	6.43	A	0.134	2.831	28.9	1	1	53.365	5.85	234.01	C
25.00-0.00			B	0.134	2.831		1	1	53.365			
			C	0.134	2.831		1	1	53.365			
Sum Weight:	6.28	26.75						OTM	4224.44 kip-ft	49.54		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.37	A	0.197	2.606	48.6	0.8	1	4.422	0.64	127.62	C
180.00-175.00			B	0.197	2.606		0.8	1	4.422			
			C	0.197	2.606		0.8	1	4.422			
T2	0.08	0.55	A	0.163	2.725	48.2	0.8	1	6.209	1.09	130.91	C
175.00-166.67			B	0.163	2.725		0.8	1	6.209			
			C	0.163	2.725		0.8	1	6.209			
T3	0.13	0.56	A	0.153	2.76	47.7	0.8	1	6.385	1.35	161.82	C
166.67-158.33			B	0.153	2.76		0.8	1	6.385			
			C	0.153	2.76		0.8	1	6.385			
T4	0.22	0.57	A	0.145	2.79	47.1	0.8	1	6.569	1.78	213.91	C
158.33-150.00			B	0.145	2.79		0.8	1	6.569			
			C	0.145	2.79		0.8	1	6.569			
T5	0.24	0.77	A	0.149	2.776	46.6	0.8	1	7.467	1.95	233.55	C
150.00-141.67			B	0.149	2.776		0.8	1	7.467			
			C	0.149	2.776		0.8	1	7.467			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T6	0.34	0.79	A	0.143	2.799	46.0	0.8	1	7.701	2.40	288.07	C
141.67-133.33			B	0.143	2.799		0.8	1	7.701			
			C	0.143	2.799		0.8	1	7.701			
T7	0.34	0.81	A	0.137	2.819	45.4	0.8	1	7.941	2.40	288.14	C
133.33-125.00			B	0.137	2.819		0.8	1	7.941			
			C	0.137	2.819		0.8	1	7.941			
T8	0.34	0.96	A	0.135	2.826	44.8	0.8	1	8.397	2.42	290.29	C
125.00-116.67			B	0.135	2.826		0.8	1	8.397			
			C	0.135	2.826		0.8	1	8.397			
T9	0.34	0.94	A	0.13	2.846	44.1	0.8	1	8.579	2.42	290.03	C
116.67-108.33			B	0.13	2.846		0.8	1	8.579			
			C	0.13	2.846		0.8	1	8.579			
T10	0.35	0.96	A	0.126	2.863	43.4	0.8	1	8.766	2.44	292.32	C
108.33-100.00			B	0.126	2.863		0.8	1	8.766			
			C	0.126	2.863		0.8	1	8.766			
T11	1.04	3.29	A	0.122	2.875	41.8	0.8	1	28.808	7.31	292.51	C
100.00-75.00			B	0.122	2.875		0.8	1	28.808			
			C	0.122	2.875		0.8	1	28.808			
T12	1.04	4.28	A	0.113	2.911	39.0	0.8	1	30.834	7.04	281.78	C
75.00-50.00			B	0.113	2.911		0.8	1	30.834			
			C	0.113	2.911		0.8	1	30.834			
T13	1.08	5.48	A	0.141	2.803	35.0	0.8	1	46.123	7.66	306.21	C
50.00-25.00			B	0.141	2.803		0.8	1	46.123			
			C	0.141	2.803		0.8	1	46.123			
T14	0.73	6.43	A	0.134	2.831	28.9	0.8	1	45.321	5.29	211.63	C
25.00-0.00			B	0.134	2.831		0.8	1	45.321			
			C	0.134	2.831		0.8	1	45.321			
Sum Weight:	6.28	26.75						OTM	3968.92 kip-ft	46.18		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.37	A	0.197	2.606	48.6	0.85	1	4.569	0.65	130.78	C
180.00-175.00			B	0.197	2.606		0.85	1	4.569			
			C	0.197	2.606		0.85	1	4.569			
T2	0.08	0.55	A	0.163	2.725	48.2	0.85	1	6.386	1.11	133.28	C
175.00-166.67			B	0.163	2.725		0.85	1	6.386			
			C	0.163	2.725		0.85	1	6.386			
T3	0.13	0.56	A	0.153	2.76	47.7	0.85	1	6.575	1.37	164.36	C
166.67-158.33			B	0.153	2.76		0.85	1	6.575			
			C	0.153	2.76		0.85	1	6.575			
T4	0.22	0.57	A	0.145	2.79	47.1	0.85	1	6.771	1.81	216.61	C
158.33-150.00			B	0.145	2.79		0.85	1	6.771			
			C	0.145	2.79		0.85	1	6.771			
T5	0.24	0.77	A	0.149	2.776	46.6	0.85	1	7.724	1.97	236.94	C
150.00-141.67			B	0.149	2.776		0.85	1	7.724			
			C	0.149	2.776		0.85	1	7.724			
T6	0.34	0.79	A	0.143	2.799	46.0	0.85	1	7.973	2.43	291.64	C
141.67-133.33			B	0.143	2.799		0.85	1	7.973			
			C	0.143	2.799		0.85	1	7.973			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T7	0.34	0.81	A	0.137	2.819	45.4	0.85	1	8.227	2.43	291.88	C
133.33-125.00			B	0.137	2.819		0.85	1	8.227			
			C	0.137	2.819		0.85	1	8.227			
T8	0.34	0.96	A	0.135	2.826	44.8	0.85	1	8.712	2.45	294.36	C
125.00-116.67			B	0.135	2.826		0.85	1	8.712			
			C	0.135	2.826		0.85	1	8.712			
T9	0.34	0.94	A	0.13	2.846	44.1	0.85	1	8.905	2.45	294.20	C
116.67-108.33			B	0.13	2.846		0.85	1	8.905			
			C	0.13	2.846		0.85	1	8.905			
T10	0.35	0.96	A	0.126	2.863	43.4	0.85	1	9.104	2.47	296.60	C
108.33-100.00			B	0.126	2.863		0.85	1	9.104			
			C	0.126	2.863		0.85	1	9.104			
T11	1.04	3.29	A	0.122	2.875	41.8	0.85	1	29.972	7.43	297.27	C
100.00-75.00			B	0.122	2.875		0.85	1	29.972			
			C	0.122	2.875		0.85	1	29.972			
T12	1.04	4.28	A	0.113	2.911	39.0	0.85	1	32.117	7.17	286.72	C
75.00-50.00			B	0.113	2.911		0.85	1	32.117			
			C	0.113	2.911		0.85	1	32.117			
T13	1.08	5.48	A	0.141	2.803	35.0	0.85	1	48.338	7.84	313.60	C
50.00-25.00			B	0.141	2.803		0.85	1	48.338			
			C	0.141	2.803		0.85	1	48.338			
T14	0.73	6.43	A	0.134	2.831	28.9	0.85	1	47.332	5.43	217.22	C
25.00-0.00			B	0.134	2.831		0.85	1	47.332			
			C	0.134	2.831		0.85	1	47.332			
Sum Weight:	6.28	26.75						OTM	4032.80 kip-ft	47.02		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.24	0.95	A	0.338	2.2	7.8	1	1	8.836	0.21	41.82	C
180.00-175.00			B	0.338	2.2		1	1	8.836			
			C	0.338	2.2		1	1	8.836			
T2	0.51	1.35	A	0.273	2.371	7.7	1	1	12.165	0.35	42.40	C
175.00-166.67			B	0.273	2.371		1	1	12.165			
			C	0.273	2.371		1	1	12.165			
T3	0.72	1.39	A	0.258	2.413	7.6	1	1	12.476	0.40	48.49	C
166.67-158.33			B	0.258	2.413		1	1	12.476			
			C	0.258	2.413		1	1	12.476			
T4	1.11	1.43	A	0.246	2.451	7.5	1	1	12.800	0.49	59.04	C
158.33-150.00			B	0.246	2.451		1	1	12.800			
			C	0.246	2.451		1	1	12.800			
T5	1.23	1.74	A	0.245	2.452	7.5	1	1	14.025	0.55	65.45	C
150.00-141.67			B	0.245	2.452		1	1	14.025			
			C	0.245	2.452		1	1	14.025			
T6	1.61	1.79	A	0.235	2.482	7.4	1	1	14.413	0.62	74.49	C
141.67-133.33			B	0.235	2.482		1	1	14.413			
			C	0.235	2.482		1	1	14.413			
T7	1.61	1.85	A	0.227	2.508	7.3	1	1	14.806	0.62	74.46	C
133.33-125.00			B	0.227	2.508		1	1	14.806			
			C	0.227	2.508		1	1	14.806			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T8	1.60	2.12	A	0.235	2.482	7.2	1	1	16.287	0.63	75.75	C
125.00-116.67			B	0.235	2.482		1	1	16.287			
			C	0.235	2.482		1	1	16.287			
T9	1.61	2.12	A	0.227	2.509	7.1	1	1	16.573	0.63	76.04	C
116.67-108.33			B	0.227	2.509		1	1	16.573			
			C	0.227	2.509		1	1	16.573			
T10	1.65	2.15	A	0.219	2.534	6.9	1	1	16.862	0.65	78.13	C
108.33-100.00			B	0.219	2.534		1	1	16.862			
			C	0.219	2.534		1	1	16.862			
T11	4.91	7.46	A	0.21	2.564	6.7	1	1	54.031	1.94	77.47	C
100.00-75.00			B	0.21	2.564		1	1	54.031			
			C	0.21	2.564		1	1	54.031			
T12	4.81	8.68	A	0.193	2.621	6.2	1	1	56.820	1.85	74.09	C
75.00-50.00			B	0.193	2.621		1	1	56.820			
			C	0.193	2.621		1	1	56.820			
T13	4.98	11.50	A	0.235	2.484	5.6	1	1	82.062	2.02	80.74	C
50.00-25.00			B	0.235	2.484		1	1	82.062			
			C	0.235	2.484		1	1	82.062			
T14	3.16	11.39	A	0.199	2.598	4.6	1	1	76.501	1.35	54.17	C
25.00-0.00			B	0.199	2.598		1	1	76.501			
			C	0.199	2.598		1	1	76.501			
Sum Weight:	29.75	55.92						OTM	1077.27 kip-ft	12.32		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.24	0.95	A	0.338	2.2	7.8	0.8	1	8.248	0.20	40.11	C
180.00-175.00			B	0.338	2.2		0.8	1	8.248			
			C	0.338	2.2		0.8	1	8.248			
T2	0.51	1.35	A	0.273	2.371	7.7	0.8	1	11.455	0.34	41.08	C
175.00-166.67			B	0.273	2.371		0.8	1	11.455			
			C	0.273	2.371		0.8	1	11.455			
T3	0.72	1.39	A	0.258	2.413	7.6	0.8	1	11.718	0.39	47.07	C
166.67-158.33			B	0.258	2.413		0.8	1	11.718			
			C	0.258	2.413		0.8	1	11.718			
T4	1.11	1.43	A	0.246	2.451	7.5	0.8	1	11.993	0.48	57.52	C
158.33-150.00			B	0.246	2.451		0.8	1	11.993			
			C	0.246	2.451		0.8	1	11.993			
T5	1.23	1.74	A	0.245	2.452	7.5	0.8	1	12.998	0.53	63.53	C
150.00-141.67			B	0.245	2.452		0.8	1	12.998			
			C	0.245	2.452		0.8	1	12.998			
T6	1.61	1.79	A	0.235	2.482	7.4	0.8	1	13.327	0.60	72.47	C
141.67-133.33			B	0.235	2.482		0.8	1	13.327			
			C	0.235	2.482		0.8	1	13.327			
T7	1.61	1.85	A	0.227	2.508	7.3	0.8	1	13.660	0.60	72.33	C
133.33-125.00			B	0.227	2.508		0.8	1	13.660			
			C	0.227	2.508		0.8	1	13.660			
T8	1.60	2.12	A	0.235	2.482	7.2	0.8	1	15.028	0.61	73.47	C
125.00-116.67			B	0.235	2.482		0.8	1	15.028			
			C	0.235	2.482		0.8	1	15.028			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T9	1.61	2.12	A	0.227	2.509	7.1	0.8	1	15.269	0.61	73.68	C
116.67-108.33			B	0.227	2.509		0.8	1	15.269			
			C	0.227	2.509		0.8	1	15.269			
T10	1.65	2.15	A	0.219	2.534	6.9	0.8	1	15.513	0.63	75.71	C
108.33-100.00			B	0.219	2.534		0.8	1	15.513			
			C	0.219	2.534		0.8	1	15.513			
T11	4.91	7.46	A	0.21	2.564	6.7	0.8	1	49.375	1.87	74.75	C
100.00-75.00			B	0.21	2.564		0.8	1	49.375			
			C	0.21	2.564		0.8	1	49.375			
T12	4.81	8.68	A	0.193	2.621	6.2	0.8	1	51.690	1.78	71.24	C
75.00-50.00			B	0.193	2.621		0.8	1	51.690			
			C	0.193	2.621		0.8	1	51.690			
T13	4.98	11.50	A	0.235	2.484	5.6	0.8	1	73.204	1.91	76.55	C
50.00-25.00			B	0.235	2.484		0.8	1	73.204			
			C	0.235	2.484		0.8	1	73.204			
T14	3.16	11.39	A	0.199	2.598	4.6	0.8	1	68.458	1.27	50.89	C
25.00-0.00			B	0.199	2.598		0.8	1	68.458			
			C	0.199	2.598		0.8	1	68.458			
Sum Weight:	29.75	55.92						OTM	1041.08 kip-ft	11.84		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.24	0.95	A	0.338	2.2	7.8	0.85	1	8.395	0.20	40.54	C
180.00-175.00			B	0.338	2.2		0.85	1	8.395			
			C	0.338	2.2		0.85	1	8.395			
T2	0.51	1.35	A	0.273	2.371	7.7	0.85	1	11.632	0.35	41.41	C
175.00-166.67			B	0.273	2.371		0.85	1	11.632			
			C	0.273	2.371		0.85	1	11.632			
T3	0.72	1.39	A	0.258	2.413	7.6	0.85	1	11.908	0.40	47.43	C
166.67-158.33			B	0.258	2.413		0.85	1	11.908			
			C	0.258	2.413		0.85	1	11.908			
T4	1.11	1.43	A	0.246	2.451	7.5	0.85	1	12.195	0.48	57.90	C
158.33-150.00			B	0.246	2.451		0.85	1	12.195			
			C	0.246	2.451		0.85	1	12.195			
T5	1.23	1.74	A	0.245	2.452	7.5	0.85	1	13.255	0.53	64.01	C
150.00-141.67			B	0.245	2.452		0.85	1	13.255			
			C	0.245	2.452		0.85	1	13.255			
T6	1.61	1.79	A	0.235	2.482	7.4	0.85	1	13.598	0.61	72.98	C
141.67-133.33			B	0.235	2.482		0.85	1	13.598			
			C	0.235	2.482		0.85	1	13.598			
T7	1.61	1.85	A	0.227	2.508	7.3	0.85	1	13.947	0.61	72.86	C
133.33-125.00			B	0.227	2.508		0.85	1	13.947			
			C	0.227	2.508		0.85	1	13.947			
T8	1.60	2.12	A	0.235	2.482	7.2	0.85	1	15.343	0.62	74.04	C
125.00-116.67			B	0.235	2.482		0.85	1	15.343			
			C	0.235	2.482		0.85	1	15.343			
T9	1.61	2.12	A	0.227	2.509	7.1	0.85	1	15.595	0.62	74.27	C
116.67-108.33			B	0.227	2.509		0.85	1	15.595			
			C	0.227	2.509		0.85	1	15.595			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T10	1.65	2.15	A	0.219	2.534	6.9	0.85	1	15.850	0.64	76.32	C
108.33-100.00			B	0.219	2.534		0.85	1	15.850			
			C	0.219	2.534		0.85	1	15.850			
T11	4.91	7.46	A	0.21	2.564	6.7	0.85	1	50.539	1.89	75.43	C
100.00-75.00			B	0.21	2.564		0.85	1	50.539			
			C	0.21	2.564		0.85	1	50.539			
T12	4.81	8.68	A	0.193	2.621	6.2	0.85	1	52.972	1.80	71.95	C
75.00-50.00			B	0.193	2.621		0.85	1	52.972			
			C	0.193	2.621		0.85	1	52.972			
T13	4.98	11.50	A	0.235	2.484	5.6	0.85	1	75.419	1.94	77.60	C
50.00-25.00			B	0.235	2.484		0.85	1	75.419			
			C	0.235	2.484		0.85	1	75.419			
T14	3.16	11.39	A	0.199	2.598	4.6	0.85	1	70.469	1.29	51.71	C
25.00-0.00			B	0.199	2.598		0.85	1	70.469			
			C	0.199	2.598		0.85	1	70.469			
Sum Weight:	29.75	55.92						OTM	1050.13 kip-ft	11.96		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.03	0.37	A	0.197	2.606	11.2	1	1	5.333	0.17	33.92	C
180.00-175.00			B	0.197	2.606		1	1	5.333			
			C	0.197	2.606		1	1	5.333			
T2	0.08	0.55	A	0.163	2.725	11.1	1	1	7.508	0.28	34.17	C
175.00-166.67			B	0.163	2.725		1	1	7.508			
			C	0.163	2.725		1	1	7.508			
T3	0.13	0.56	A	0.153	2.76	11.0	1	1	7.740	0.35	41.47	C
166.67-158.33			B	0.153	2.76		1	1	7.740			
			C	0.153	2.76		1	1	7.740			
T4	0.22	0.57	A	0.145	2.79	10.9	1	1	7.976	0.45	53.63	C
158.33-150.00			B	0.145	2.79		1	1	7.976			
			C	0.145	2.79		1	1	7.976			
T5	0.24	0.77	A	0.149	2.776	10.7	1	1	9.079	0.49	58.71	C
150.00-141.67			B	0.149	2.776		1	1	9.079			
			C	0.149	2.776		1	1	9.079			
T6	0.34	0.79	A	0.143	2.799	10.6	1	1	9.372	0.60	71.43	C
141.67-133.33			B	0.143	2.799		1	1	9.372			
			C	0.143	2.799		1	1	9.372			
T7	0.34	0.81	A	0.137	2.819	10.5	1	1	9.669	0.60	71.59	C
133.33-125.00			B	0.137	2.819		1	1	9.669			
			C	0.137	2.819		1	1	9.669			
T8	0.34	0.96	A	0.135	2.826	10.3	1	1	10.229	0.60	72.33	C
125.00-116.67			B	0.135	2.826		1	1	10.229			
			C	0.135	2.826		1	1	10.229			
T9	0.34	0.94	A	0.13	2.846	10.2	1	1	10.452	0.60	72.34	C
116.67-108.33			B	0.13	2.846		1	1	10.452			
			C	0.13	2.846		1	1	10.452			
T10	0.35	0.96	A	0.126	2.863	10.0	1	1	10.677	0.61	72.93	C
108.33-100.00			B	0.126	2.863		1	1	10.677			
			C	0.126	2.863		1	1	10.677			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T11	1.04	3.29	A	0.122	2.875	9.6	1	1	35.071	1.83	73.30	C
100.00-75.00			B	0.122	2.875		1	1	35.071			
			C	0.122	2.875		1	1	35.071			
T12	1.04	4.28	A	0.113	2.911	9.0	1	1	37.434	1.77	70.79	C
75.00-50.00			B	0.113	2.911		1	1	37.434			
			C	0.113	2.911		1	1	37.434			
T13	1.08	5.48	A	0.141	2.803	8.1	1	1	56.109	1.96	78.23	C
50.00-25.00			B	0.141	2.803		1	1	56.109			
			C	0.141	2.803		1	1	56.109			
T14	0.73	6.43	A	0.134	2.831	6.7	1	1	56.453	1.40	55.89	C
25.00-0.00			B	0.134	2.831		1	1	56.453			
			C	0.134	2.831		1	1	56.453			
Sum Weight:	6.28	26.75						OTM	999.76 kip-ft	11.70		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.03	0.37	A	0.197	2.606	11.2	0.8	1	4.745	0.16	31.00	C
180.00-175.00			B	0.197	2.606		0.8	1	4.745			
			C	0.197	2.606		0.8	1	4.745			
T2	0.08	0.55	A	0.163	2.725	11.1	0.8	1	6.798	0.27	31.98	C
175.00-166.67			B	0.163	2.725		0.8	1	6.798			
			C	0.163	2.725		0.8	1	6.798			
T3	0.13	0.56	A	0.153	2.76	11.0	0.8	1	6.981	0.33	39.13	C
166.67-158.33			B	0.153	2.76		0.8	1	6.981			
			C	0.153	2.76		0.8	1	6.981			
T4	0.22	0.57	A	0.145	2.79	10.9	0.8	1	7.169	0.43	51.14	C
158.33-150.00			B	0.145	2.79		0.8	1	7.169			
			C	0.145	2.79		0.8	1	7.169			
T5	0.24	0.77	A	0.149	2.776	10.7	0.8	1	8.052	0.46	55.59	C
150.00-141.67			B	0.149	2.776		0.8	1	8.052			
			C	0.149	2.776		0.8	1	8.052			
T6	0.34	0.79	A	0.143	2.799	10.6	0.8	1	8.286	0.57	68.14	C
141.67-133.33			B	0.143	2.799		0.8	1	8.286			
			C	0.143	2.799		0.8	1	8.286			
T7	0.34	0.81	A	0.137	2.819	10.5	0.8	1	8.522	0.57	68.14	C
133.33-125.00			B	0.137	2.819		0.8	1	8.522			
			C	0.137	2.819		0.8	1	8.522			
T8	0.34	0.96	A	0.135	2.826	10.3	0.8	1	8.970	0.57	68.59	C
125.00-116.67			B	0.135	2.826		0.8	1	8.970			
			C	0.135	2.826		0.8	1	8.970			
T9	0.34	0.94	A	0.13	2.846	10.2	0.8	1	9.148	0.57	68.50	C
116.67-108.33			B	0.13	2.846		0.8	1	9.148			
			C	0.13	2.846		0.8	1	9.148			
T10	0.35	0.96	A	0.126	2.863	10.0	0.8	1	9.328	0.57	68.99	C
108.33-100.00			B	0.126	2.863		0.8	1	9.328			
			C	0.126	2.863		0.8	1	9.328			
T11	1.04	3.29	A	0.122	2.875	9.6	0.8	1	30.415	1.72	68.91	C
100.00-75.00			B	0.122	2.875		0.8	1	30.415			
			C	0.122	2.875		0.8	1	30.415			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T12	1.04	4.28	A	0.113	2.911	9.0	0.8	1	32.303	1.66	66.23	C
75.00-50.00			B	0.113	2.911		0.8	1	32.303			
			C	0.113	2.911		0.8	1	32.303			
T13	1.08	5.48	A	0.141	2.803	8.1	0.8	1	47.251	1.79	71.42	C
50.00-25.00			B	0.141	2.803		0.8	1	47.251			
			C	0.141	2.803		0.8	1	47.251			
T14	0.73	6.43	A	0.134	2.831	6.7	0.8	1	48.409	1.27	50.74	C
25.00-0.00			B	0.134	2.831		0.8	1	48.409			
			C	0.134	2.831		0.8	1	48.409			
Sum Weight:	6.28	26.75						OTM	940.89 kip-ft	10.92		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.37	A	0.197	2.606	11.2	0.85	1	4.892	0.16	31.73	C
180.00-175.00			B	0.197	2.606		0.85	1	4.892			
			C	0.197	2.606		0.85	1	4.892			
T2	0.08	0.55	A	0.163	2.725	11.1	0.85	1	6.975	0.27	32.53	C
175.00-166.67			B	0.163	2.725		0.85	1	6.975			
			C	0.163	2.725		0.85	1	6.975			
T3	0.13	0.56	A	0.153	2.76	11.0	0.85	1	7.171	0.33	39.71	C
166.67-158.33			B	0.153	2.76		0.85	1	7.171			
			C	0.153	2.76		0.85	1	7.171			
T4	0.22	0.57	A	0.145	2.79	10.9	0.85	1	7.371	0.43	51.76	C
158.33-150.00			B	0.145	2.79		0.85	1	7.371			
			C	0.145	2.79		0.85	1	7.371			
T5	0.24	0.77	A	0.149	2.776	10.7	0.85	1	8.309	0.47	56.37	C
150.00-141.67			B	0.149	2.776		0.85	1	8.309			
			C	0.149	2.776		0.85	1	8.309			
T6	0.34	0.79	A	0.143	2.799	10.6	0.85	1	8.557	0.57	68.96	C
141.67-133.33			B	0.143	2.799		0.85	1	8.557			
			C	0.143	2.799		0.85	1	8.557			
T7	0.34	0.81	A	0.137	2.819	10.5	0.85	1	8.809	0.57	69.00	C
133.33-125.00			B	0.137	2.819		0.85	1	8.809			
			C	0.137	2.819		0.85	1	8.809			
T8	0.34	0.96	A	0.135	2.826	10.3	0.85	1	9.285	0.58	69.53	C
125.00-116.67			B	0.135	2.826		0.85	1	9.285			
			C	0.135	2.826		0.85	1	9.285			
T9	0.34	0.94	A	0.13	2.846	10.2	0.85	1	9.474	0.58	69.46	C
116.67-108.33			B	0.13	2.846		0.85	1	9.474			
			C	0.13	2.846		0.85	1	9.474			
T10	0.35	0.96	A	0.126	2.863	10.0	0.85	1	9.665	0.58	69.98	C
108.33-100.00			B	0.126	2.863		0.85	1	9.665			
			C	0.126	2.863		0.85	1	9.665			
T11	1.04	3.29	A	0.122	2.875	9.6	0.85	1	31.579	1.75	70.01	C
100.00-75.00			B	0.122	2.875		0.85	1	31.579			
			C	0.122	2.875		0.85	1	31.579			
T12	1.04	4.28	A	0.113	2.911	9.0	0.85	1	33.586	1.68	67.37	C
75.00-50.00			B	0.113	2.911		0.85	1	33.586			
			C	0.113	2.911		0.85	1	33.586			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T13	1.08	5.48	A	0.141	2.803	8.1	0.85	1	49.465	1.83	73.12	C
50.00-25.00			B	0.141	2.803		0.85	1	49.465			
			C	0.141	2.803		0.85	1	49.465			
T14	0.73	6.43	A	0.134	2.831	6.7	0.85	1	50.420	1.30	52.03	C
25.00-0.00			B	0.134	2.831		0.85	1	50.420			
			C	0.134	2.831		0.85	1	50.420			
Sum Weight:	6.28	26.75						OTM	955.61 kip-ft	11.12		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	10.69					
Bracing Weight	16.06					
Total Member Self-Weight	26.75			2.34	-6.24	
Total Weight	38.41			2.34	-6.24	
Wind 0 deg - No Ice		0.13	-59.17	-5733.42	-30.46	18.03
Wind 30 deg - No Ice		28.48	-49.27	-4836.74	-2806.12	18.70
Wind 60 deg - No Ice		48.55	-28.04	-2761.58	-4791.14	14.52
Wind 90 deg - No Ice		56.91	-0.03	-4.07	-5594.91	6.44
Wind 120 deg - No Ice		51.31	29.47	2849.24	-4983.32	-3.51
Wind 150 deg - No Ice		28.32	48.75	4747.29	-2776.04	-12.55
Wind 180 deg - No Ice		0.04	55.51	5429.15	-11.68	-17.98
Wind 210 deg - No Ice		-28.32	49.00	4791.98	2764.47	-18.53
Wind 240 deg - No Ice		-51.29	29.62	2876.28	4969.23	-14.52
Wind 270 deg - No Ice		-56.58	0.03	8.18	5525.04	-6.61
Wind 300 deg - No Ice		-48.05	-27.79	-2715.79	4688.46	3.46
Wind 330 deg - No Ice		-28.05	-48.90	-4770.03	2716.08	12.55
Member Ice	29.17					
Total Weight Ice	98.63			-22.32	-20.37	
Wind 0 deg - Ice		0.02	-14.95	-1508.54	-24.49	1.75
Wind 30 deg - Ice		7.32	-12.67	-1292.35	-754.66	-5.53
Wind 60 deg - Ice		12.57	-7.26	-751.39	-1282.78	-11.30
Wind 90 deg - Ice		14.63	-0.00	-23.40	-1487.07	-14.05
Wind 120 deg - Ice		12.95	7.45	717.22	-1309.16	-13.06
Wind 150 deg - Ice		7.29	12.58	1231.66	-749.54	-8.57
Wind 180 deg - Ice		0.01	14.42	1418.59	-21.31	-1.74
Wind 210 deg - Ice		-7.29	12.62	1239.28	708.94	5.56
Wind 240 deg - Ice		-12.95	7.48	721.81	1268.14	11.30
Wind 270 deg - Ice		-14.58	0.00	-21.33	1436.54	14.02
Wind 300 deg - Ice		-12.48	-7.21	-743.59	1226.66	13.05
Wind 330 deg - Ice		-7.25	-12.61	-1280.98	700.71	8.57
Total Weight	38.41			2.34	-6.24	
Wind 0 deg - Service		0.03	-13.95	-1355.23	-5.16	4.01
Wind 30 deg - Service		6.72	-11.63	-1144.26	-660.98	4.23
Wind 60 deg - Service		11.46	-6.62	-654.20	-1130.28	3.36
Wind 90 deg - Service		13.43	-0.01	-2.56	-1319.84	1.58
Wind 120 deg - Service		12.09	6.95	671.16	-1174.55	-0.66
Wind 150 deg - Service		6.68	11.50	1120.42	-654.05	-2.72
Wind 180 deg - Service		0.01	13.11	1281.89	-0.83	-4.00
Wind 210 deg - Service		-6.68	11.56	1130.71	655.11	-4.20

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 240 deg - Service		-12.09	6.98	677.39	1175.03	-3.36
Wind 270 deg - Service		-13.35	0.01	0.27	1307.46	-1.62
Wind 300 deg - Service		-11.34	-6.56	-643.65	1110.34	0.64
Wind 330 deg - Service		-6.62	-11.54	-1128.89	643.96	2.72

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 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service

Comb. No.	Description
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 175	Leg	Max Tension	23	1.75	-0.40	0.04
			Max. Compression	33	-3.21	0.03	-0.10
			Max. Mx	6	0.14	-0.45	0.05
			Max. My	24	0.45	-0.05	0.47
			Max. Vy	6	-0.63	0.00	0.00
			Max. Vx	12	-1.18	0.00	0.00
		Diagonal	Max Tension	10	2.80	0.00	0.00
			Max. Compression	2	-2.65	0.00	0.00
			Max. Mx	30	0.89	0.12	0.00
			Max. My	35	0.02	0.00	-0.00
			Max. Vy	30	-0.06	0.00	0.00
			Max. Vx	35	0.00	0.00	0.00
		Top Girt	Max Tension	23	1.27	0.00	0.00
			Max. Compression	10	-1.35	0.00	0.00
			Max. Mx	26	-0.00	-0.06	0.00
			Max. My	35	0.09	0.00	0.00
			Max. Vy	26	0.04	0.00	0.00
			Max. Vx	35	0.00	0.00	0.00
T2	175 - 166.667	Leg	Max Tension	23	5.30	-0.40	0.04
			Max. Compression	16	-7.05	0.60	-0.33
			Max. Mx	14	1.74	-0.73	-0.01
			Max. My	21	-1.20	-0.00	-0.74
			Max. Vy	14	0.54	-0.73	-0.01
			Max. Vx	20	0.56	-0.01	-0.74
		Diagonal	Max Tension	10	5.47	0.00	0.00
			Max. Compression	2	-5.61	0.00	0.00
			Max. Mx	30	1.59	0.18	0.00
			Max. My	35	0.19	0.00	-0.01
			Max. Vy	30	0.07	0.00	0.00
			Max. Vx	35	0.00	0.00	0.00
		Horizontal	Max Tension	23	2.93	0.00	0.00
			Max. Compression	10	-3.18	0.00	0.00
			Max. Mx	26	-0.03	-0.07	0.00
			Max. My	35	0.38	0.00	0.00
			Max. Vy	26	-0.04	0.00	0.00
			Max. Vx	35	-0.00	0.00	0.00
T3	166.667 - 158.333	Leg	Max Tension	5	10.70	-0.63	0.33
			Max. Compression	10	-13.49	0.20	0.05
			Max. Mx	14	7.95	-0.73	-0.01
			Max. My	21	-2.38	-0.00	-0.74
			Max. Vy	22	0.32	-0.19	-0.05
			Max. Vx	4	0.36	0.03	-0.27
		Diagonal	Max Tension	16	7.47	0.00	0.00
			Max. Compression	4	-7.74	0.00	0.00
			Max. Mx	30	2.11	0.21	0.00
			Max. My	35	0.26	0.00	-0.01
			Max. Vy	30	-0.07	0.00	0.00
			Max. Vx	35	0.00	0.00	0.00
		Horizontal	Max Tension	4	4.50	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	10	-4.62	0.00	0.00
			Max. Mx	31	-0.06	-0.09	0.00
			Max. My	36	1.04	0.00	0.00
			Max. Vy	31	0.04	0.00	0.00
			Max. Vx	36	-0.00	0.00	0.00
T4	158.333 - 150	Leg	Max Tension	7	18.57	-0.19	-0.01
			Max. Compression	10	-22.24	0.82	0.13
			Max. Mx	14	15.91	-0.88	0.01
			Max. My	16	0.52	-0.05	0.88
			Max. Vy	14	0.19	-0.88	0.01
			Max. Vx	2	0.25	-0.44	-0.82
		Diagonal	Max Tension	8	8.43	0.00	0.00
			Max. Compression	4	-8.48	0.00	0.00
			Max. Mx	30	2.35	0.23	0.00
			Max. My	35	0.24	0.00	-0.01
			Max. Vy	30	-0.08	0.00	0.00
			Max. Vx	35	-0.00	0.00	0.00
		Horizontal	Max Tension	4	5.70	0.00	0.00
			Max. Compression	8	-5.56	0.00	0.00
			Max. Mx	29	-0.02	-0.10	0.00
			Max. My	36	1.40	0.00	0.00
			Max. Vy	29	0.05	0.00	0.00
			Max. Vx	36	-0.00	0.00	0.00
T5	150 - 141.667	Leg	Max Tension	7	29.30	-0.86	-0.06
			Max. Compression	18	-34.45	0.56	0.04
			Max. Mx	22	27.26	1.01	-0.11
			Max. My	12	-5.75	-0.02	1.01
			Max. Vy	14	-0.99	-0.88	0.01
			Max. Vx	8	1.00	-0.05	0.87
		Diagonal	Max Tension	8	11.51	0.00	0.00
			Max. Compression	4	-11.58	0.00	0.00
			Max. Mx	30	3.04	0.34	0.00
			Max. My	35	0.35	0.00	-0.01
			Max. Vy	30	-0.11	0.00	0.00
			Max. Vx	35	-0.00	0.00	0.00
		Horizontal	Max Tension	4	7.36	0.00	0.00
			Max. Compression	8	-7.39	0.00	0.00
			Max. Mx	29	-0.15	-0.15	0.00
			Max. My	36	1.79	0.00	0.00
			Max. Vy	29	0.07	0.00	0.00
			Max. Vx	36	0.00	0.00	0.00
T6	141.667 - 133.333	Leg	Max Tension	7	41.48	-0.58	-0.04
			Max. Compression	18	-48.31	0.17	0.08
			Max. Mx	6	40.64	-0.58	-0.04
			Max. My	4	-7.54	-0.00	-0.61
			Max. Vy	19	0.14	0.56	0.04
			Max. Vx	4	-0.17	-0.00	-0.61
		Diagonal	Max Tension	8	12.99	0.00	0.00
			Max. Compression	4	-12.82	0.00	0.00
			Max. Mx	30	3.33	0.38	0.00
			Max. My	35	0.38	0.00	-0.01
			Max. Vy	30	-0.12	0.00	0.00
			Max. Vx	35	0.00	0.00	0.00
		Horizontal	Max Tension	4	9.18	0.00	0.00
			Max. Compression	8	-9.28	0.00	0.00
			Max. Mx	31	0.13	-0.17	0.00
			Max. My	36	2.24	0.00	0.00
			Max. Vy	31	0.07	0.00	0.00
			Max. Vx	36	0.00	0.00	0.00
T7	133.333 - 125	Leg	Max Tension	7	55.03	-0.15	-0.07

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	18	-62.90	0.49	-0.17
			Max. Mx	19	-61.73	0.49	-0.17
			Max. My	4	-8.40	-0.11	-0.56
			Max. Vy	19	-0.13	0.49	-0.17
			Max. Vx	4	0.16	-0.11	-0.56
		Diagonal	Max Tension	8	13.74	0.00	0.00
			Max. Compression	20	-13.59	0.00	0.00
			Max. Mx	30	3.40	0.42	0.00
			Max. My	35	0.38	0.00	-0.01
			Max. Vy	30	-0.12	0.00	0.00
			Max. Vx	35	-0.00	0.00	0.00
		Horizontal	Max Tension	20	10.20	0.00	0.00
			Max. Compression	8	-10.42	0.00	0.00
			Max. Mx	29	0.11	-0.20	0.00
			Max. My	36	2.49	0.00	0.00
			Max. Vy	29	-0.08	0.00	0.00
			Max. Vx	36	-0.00	0.00	0.00
T8	125 - 116.667	Leg	Max Tension	7	62.02	-0.48	0.11
			Max. Compression	18	-70.58	0.32	0.09
			Max. Mx	19	-69.19	0.49	-0.17
			Max. My	4	-4.48	-0.11	-0.56
			Max. Vy	19	0.13	0.49	-0.17
			Max. Vx	8	-0.18	-0.01	0.40
		Diagonal	Max Tension	8	10.08	0.00	0.00
			Max. Compression	8	-10.21	0.00	0.00
			Max. Mx	28	2.71	0.13	0.00
			Max. My	31	0.04	0.00	0.01
			Max. Vy	28	-0.05	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
		Horizontal	Max Tension	20	10.82	0.02	0.01
			Max. Compression	8	-11.05	0.02	0.01
			Max. Mx	29	0.15	0.06	0.01
			Max. My	36	-1.57	0.05	0.02
			Max. Vy	29	0.05	0.06	0.01
			Max. Vx	36	-0.00	0.00	0.00
T9	116.667 - 108.333	Leg	Max Tension	7	75.51	-0.31	-0.07
			Max. Compression	18	-85.29	0.39	-0.04
			Max. Mx	19	-83.88	0.39	-0.04
			Max. My	8	-4.96	-0.01	0.40
			Max. Vy	14	0.15	-0.37	0.06
			Max. Vx	10	-0.19	-0.21	0.39
		Diagonal	Max Tension	8	10.44	0.00	0.00
			Max. Compression	8	-10.56	0.00	0.00
			Max. Mx	28	2.88	0.14	0.00
			Max. My	31	0.13	0.00	0.01
			Max. Vy	28	0.05	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
		Horizontal	Max Tension	20	6.21	0.02	0.01
			Max. Compression	8	-6.28	0.02	0.01
			Max. Mx	29	0.13	0.06	0.01
			Max. My	27	0.24	0.05	0.02
			Max. Vy	29	0.04	0.06	0.01
			Max. Vx	27	-0.00	0.00	0.00
T10	108.333 - 100	Leg	Max Tension	7	89.48	-0.38	0.04
			Max. Compression	18	-100.57	0.39	0.05
			Max. Mx	3	-98.75	0.39	-0.02
			Max. My	4	-5.76	-0.01	-0.43
			Max. Vy	3	-0.09	0.39	-0.02
			Max. Vx	16	-0.12	-0.01	0.42
		Diagonal	Max Tension	8	10.91	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	8	-11.04	0.00	0.00
			Max. Mx	28	3.00	0.15	0.00
			Max. My	31	0.17	0.00	0.01
			Max. Vy	28	0.06	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
		Horizontal	Max Tension	8	6.73	0.02	0.01
			Max. Compression	12	-6.74	0.02	0.01
			Max. Mx	29	0.16	0.06	0.02
			Max. My	30	1.27	0.05	0.02
			Max. Vy	29	0.05	0.06	0.02
			Max. Vx	30	-0.00	0.00	0.00
T11	100 - 75	Leg	Max Tension	7	133.34	-0.38	-0.03
			Max. Compression	18	-149.06	0.52	0.04
			Max. Mx	19	-147.02	0.52	0.04
			Max. My	4	-7.58	-0.01	-0.55
			Max. Vy	3	-0.10	0.52	-0.04
			Max. Vx	4	0.12	-0.01	-0.55
		Diagonal	Max Tension	9	12.22	0.00	0.00
			Max. Compression	8	-12.42	0.00	0.00
			Max. Mx	28	3.19	0.18	0.00
			Max. My	31	0.13	0.00	0.01
			Max. Vy	28	0.06	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
		Horizontal	Max Tension	8	8.17	0.04	-0.00
			Max. Compression	9	-8.26	0.03	-0.00
			Max. Mx	29	0.27	0.11	0.00
			Max. My	18	0.75	-0.01	-0.01
			Max. Vy	29	-0.06	0.11	0.00
			Max. Vx	18	0.00	-0.01	-0.01
		Inner Bracing	Max Tension	19	0.00	0.00	0.00
			Max. Compression	6	-0.01	0.00	0.00
			Max. Mx	26	-0.01	-0.07	0.00
			Max. My	18	0.00	0.00	-0.00
			Max. Vy	26	-0.04	0.00	0.00
			Max. Vx	18	0.00	0.00	0.00
T12	75 - 50	Leg	Max Tension	7	178.76	-0.44	-0.03
			Max. Compression	18	-200.13	0.53	0.03
			Max. Mx	19	-197.55	0.53	0.03
			Max. My	4	-7.98	-0.01	-0.55
			Max. Vy	22	0.11	-0.53	-0.00
			Max. Vx	4	0.12	-0.03	-0.50
		Diagonal	Max Tension	9	13.36	0.00	0.00
			Max. Compression	8	-13.65	0.00	0.00
			Max. Mx	28	3.36	0.25	0.00
			Max. My	31	0.12	0.00	0.01
			Max. Vy	28	-0.08	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
		Horizontal	Max Tension	8	9.56	0.05	-0.00
			Max. Compression	9	-9.66	0.04	-0.00
			Max. Mx	29	0.36	0.14	0.00
			Max. My	18	0.31	0.01	-0.02
			Max. Vy	29	-0.07	0.14	0.00
			Max. Vx	18	0.00	-0.00	-0.02
		Inner Bracing	Max Tension	19	0.01	0.00	0.00
			Max. Compression	6	-0.01	0.00	0.00
			Max. Mx	26	-0.01	-0.08	0.00
			Max. My	18	0.01	0.00	-0.00
			Max. Vy	26	-0.04	0.00	0.00
			Max. Vx	18	0.00	0.00	0.00
T13	50 - 25	Leg	Max Tension	7	224.83	-0.66	-0.01
			Max. Compression	10	-253.00	-1.66	0.03

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	10	-253.00	-1.66	0.03
			Max. My	4	-12.55	-0.27	-2.08
			Max. Vy	18	0.58	0.52	-0.02
			Max. Vx	4	0.56	-0.27	-2.08
		Diagonal	Max Tension	25	14.77	0.00	0.00
			Max. Compression	24	-15.21	0.00	0.00
			Max. Mx	31	-4.39	-0.09	-0.02
			Max. My	37	-3.95	-0.09	0.02
			Max. Vy	31	0.07	-0.09	-0.02
			Max. Vx	29	0.00	0.00	0.00
		Horizontal	Max Tension	24	11.22	0.07	-0.00
			Max. Compression	25	-11.14	0.05	-0.00
			Max. Mx	29	0.53	0.16	0.00
			Max. My	18	0.40	0.02	-0.02
			Max. Vy	29	-0.08	0.16	0.00
			Max. Vx	18	0.00	0.01	-0.02
		Redund Horz 1 Bracing	Max Tension	6	0.66	0.00	0.00
			Max. Compression	19	-0.49	0.00	0.00
			Max. Mx	35	-0.01	-0.04	0.00
			Max. My	30	0.14	0.00	0.00
			Max. Vy	35	0.03	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Redund Sub Horz Bracing	Max Tension	7	0.53	0.00	0.00
			Max. Compression	18	-0.61	0.00	0.00
			Max. Mx	26	-0.16	-0.15	0.00
			Max. My	30	-0.17	0.00	0.00
			Max. Vy	26	0.06	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
		Inner Bracing	Max Tension	11	0.00	0.00	0.00
			Max. Compression	6	-0.01	0.00	0.00
			Max. Mx	26	-0.01	-0.10	0.00
			Max. My	18	0.00	0.00	-0.00
			Max. Vy	26	0.04	0.00	0.00
			Max. Vx	18	0.00	0.00	0.00
T14	25 - 0	Leg	Max Tension	7	261.29	5.59	-0.09
			Max. Compression	10	-297.25	-0.00	0.00
			Max. Mx	10	-296.99	7.89	-0.01
			Max. My	4	-14.76	-0.58	-3.80
			Max. Vy	18	2.45	7.88	-0.07
			Max. Vx	4	0.97	-0.58	-3.80
		Diagonal	Max Tension	25	19.81	-0.19	-0.01
			Max. Compression	24	-20.17	0.00	0.00
			Max. Mx	6	14.66	-0.27	0.02
			Max. My	37	-4.87	-0.08	0.03
			Max. Vy	29	0.08	-0.15	-0.03
			Max. Vx	37	0.01	0.00	0.00
		Horizontal	Max Tension	25	11.76	0.08	-0.00
			Max. Compression	25	-12.26	0.08	-0.00
			Max. Mx	29	-0.30	0.24	0.01
			Max. My	18	0.85	-0.01	-0.04
			Max. Vy	29	-0.10	0.24	0.01
			Max. Vx	18	0.01	-0.02	-0.04
		Redund Horz 1 Bracing	Max Tension	8	2.37	0.00	0.00
			Max. Compression	9	-2.55	0.00	0.00
			Max. Mx	32	0.48	-0.04	0.00
			Max. My	31	0.66	0.00	0.00
			Max. Vy	32	0.03	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Redund Diag 1 Bracing	Max Tension	8	2.23	0.00	0.00
			Max. Compression	8	-1.85	0.00	0.00
			Max. Mx	31	-0.28	-0.06	0.00
			Max. My	31	0.47	0.00	-0.00
			Max. Vy	31	0.03	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
		Inner Bracing	Max Tension	3	0.01	0.00	0.00
			Max. Compression	6	-0.02	0.00	0.00
			Max. Mx	26	-0.01	-0.12	0.00
			Max. My	18	0.00	0.00	-0.00
			Max. Vy	26	-0.05	0.00	0.00
			Max. Vx	18	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	324.96	29.64	-16.66
	Max. H_x	18	324.96	29.64	-16.66
	Max. H_z	5	-249.79	-22.07	15.71
	Min. Vert	7	-286.53	-26.89	15.06
	Min. H_x	7	-286.53	-26.89	15.06
	Min. H_z	18	324.96	29.64	-16.66
Leg B	Max. Vert	10	325.00	-29.37	-17.06
	Max. H_x	23	-280.42	26.32	15.31
	Max. H_z	25	-243.70	21.33	16.28
	Min. Vert	23	-280.42	26.32	15.31
	Min. H_x	10	325.00	-29.37	-17.06
	Min. H_z	10	325.00	-29.37	-17.06
Leg A	Max. Vert	2	324.53	0.49	33.97
	Max. H_x	21	11.08	5.85	0.76
	Max. H_z	2	324.53	0.49	33.97
	Min. Vert	15	-280.97	-0.50	-30.46
	Min. H_x	9	11.76	-5.87	0.80
	Min. H_z	15	-280.97	-0.50	-30.46

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	38.41	0.00	0.00	2.34	-6.24	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	46.10	0.13	-59.17	-5622.59	-31.89	18.05
0.9 Dead+1.0 Wind 0 deg - No Ice	34.57	0.13	-59.17	-5617.91	-29.98	18.04
1.2 Dead+1.0 Wind 30 deg - No Ice	46.10	28.48	-49.27	-4744.97	-2754.75	18.72
0.9 Dead+1.0 Wind 30 deg - No Ice	34.57	28.48	-49.27	-4741.10	-2750.23	18.72
1.2 Dead+1.0 Wind 60 deg - No	46.10	48.55	-28.04	-2709.18	-4702.53	14.56

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Ice						
0.9 Dead+1.0 Wind 60 deg - No Ice	34.57	48.55	-28.04	-2707.27	-4696.12	14.55
1.2 Dead+1.0 Wind 90 deg - No Ice	46.10	56.91	-0.03	-3.61	-5490.78	6.46
0.9 Dead+1.0 Wind 90 deg - No Ice	34.57	56.91	-0.03	-4.30	-5483.62	6.46
1.2 Dead+1.0 Wind 120 deg - No Ice	46.10	51.31	29.47	2794.41	-4889.05	-3.54
0.9 Dead+1.0 Wind 120 deg - No Ice	34.57	51.31	29.47	2791.05	-4882.50	-3.54
1.2 Dead+1.0 Wind 150 deg - No Ice	46.10	28.32	48.75	4655.99	-2724.52	-12.59
0.9 Dead+1.0 Wind 150 deg - No Ice	34.57	28.32	48.75	4650.84	-2720.03	-12.58
1.2 Dead+1.0 Wind 180 deg - No Ice	46.10	0.04	55.51	5325.32	-13.02	-18.00
0.9 Dead+1.0 Wind 180 deg - No Ice	34.57	0.04	55.51	5319.52	-11.14	-17.99
1.2 Dead+1.0 Wind 210 deg - No Ice	46.10	-28.32	49.00	4700.96	2710.34	-18.56
0.9 Dead+1.0 Wind 210 deg - No Ice	34.57	-28.32	49.00	4695.74	2709.61	-18.55
1.2 Dead+1.0 Wind 240 deg - No Ice	46.10	-51.29	29.62	2821.64	4872.39	-14.56
0.9 Dead+1.0 Wind 240 deg - No Ice	34.57	-51.29	29.62	2818.23	4869.60	-14.55
1.2 Dead+1.0 Wind 270 deg - No Ice	46.10	-56.58	0.03	8.72	5418.09	-6.63
0.9 Dead+1.0 Wind 270 deg - No Ice	34.57	-56.58	0.03	8.00	5414.76	-6.63
1.2 Dead+1.0 Wind 300 deg - No Ice	46.10	-48.05	-27.79	-2663.19	4596.83	3.48
0.9 Dead+1.0 Wind 300 deg - No Ice	34.57	-48.05	-27.79	-2661.34	4594.30	3.48
1.2 Dead+1.0 Wind 330 deg - No Ice	46.10	-28.05	-48.90	-4677.97	2661.73	12.58
0.9 Dead+1.0 Wind 330 deg - No Ice	34.57	-28.05	-48.90	-4674.19	2661.06	12.58
1.2 Dead+1.0 Ice+1.0 Temp	106.31	0.00	0.00	-21.89	-21.64	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	106.31	0.02	-14.95	-1488.15	-25.96	1.78
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	106.31	7.32	-12.67	-1275.27	-746.35	-5.52
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	106.31	12.57	-7.26	-741.54	-1267.53	-11.32
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	106.31	14.63	-0.00	-23.19	-1469.04	-14.08
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	106.31	12.95	7.45	707.30	-1293.16	-13.10
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	106.31	7.29	12.58	1214.84	-741.19	-8.61
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	106.31	0.01	14.42	1399.38	-22.74	-1.77
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	106.31	-7.29	12.62	1222.55	697.76	5.55
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	106.31	-12.95	7.48	711.95	1249.30	11.32
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	106.31	-14.58	0.00	-21.10	1415.55	14.05
1.2 Dead+1.0 Wind 300	106.31	-12.48	-7.21	-733.64	1208.35	13.09

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	106.31	-7.25	-12.61	-1263.76	689.41	8.61
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	38.41	0.03	-13.95	-1325.18	-11.86	4.02
Dead+Wind 30 deg - Service	38.41	6.72	-11.63	-1118.81	-654.94	4.24
Dead+Wind 60 deg - Service	38.41	11.46	-6.62	-638.25	-1115.25	3.36
Dead+Wind 90 deg - Service	38.41	13.43	-0.01	0.86	-1301.07	1.58
Dead+Wind 120 deg - Service	38.41	12.09	6.95	661.25	-1158.18	-0.66
Dead+Wind 150 deg - Service	38.41	6.68	11.50	1101.71	-647.99	-2.73
Dead+Wind 180 deg - Service	38.41	0.01	13.11	1260.12	-7.52	-4.01
Dead+Wind 210 deg - Service	38.41	-6.68	11.56	1112.05	635.68	-4.20
Dead+Wind 240 deg - Service	38.41	-12.09	6.98	667.51	1145.30	-3.36
Dead+Wind 270 deg - Service	38.41	-13.35	0.01	3.70	1275.29	-1.62
Dead+Wind 300 deg - Service	38.41	-11.34	-6.56	-627.64	1081.84	0.65
Dead+Wind 330 deg - Service	38.41	-6.62	-11.54	-1103.37	624.50	2.73

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-38.41	0.00	0.00	38.41	0.00	0.000%
2	0.13	-46.10	-59.17	-0.13	46.10	59.17	0.000%
3	0.13	-34.57	-59.17	-0.13	34.57	59.17	0.000%
4	28.48	-46.10	-49.27	-28.48	46.10	49.27	0.000%
5	28.48	-34.57	-49.27	-28.48	34.57	49.27	0.000%
6	48.55	-46.10	-28.04	-48.55	46.10	28.04	0.000%
7	48.55	-34.57	-28.04	-48.55	34.57	28.04	0.000%
8	56.91	-46.10	-0.03	-56.91	46.10	0.03	0.000%
9	56.91	-34.57	-0.03	-56.91	34.57	0.03	0.000%
10	51.31	-46.10	29.47	-51.31	46.10	-29.47	0.000%
11	51.31	-34.57	29.47	-51.31	34.57	-29.47	0.000%
12	28.32	-46.10	48.75	-28.32	46.10	-48.75	0.000%
13	28.32	-34.57	48.75	-28.32	34.57	-48.75	0.000%
14	0.04	-46.10	55.51	-0.04	46.10	-55.51	0.000%
15	0.04	-34.57	55.51	-0.04	34.57	-55.51	0.000%
16	-28.32	-46.10	49.00	28.32	46.10	-49.00	0.000%
17	-28.32	-34.57	49.00	28.32	34.57	-49.00	0.000%
18	-51.29	-46.10	29.62	51.29	46.10	-29.62	0.000%
19	-51.29	-34.57	29.62	51.29	34.57	-29.62	0.000%
20	-56.58	-46.10	0.03	56.58	46.10	-0.03	0.000%
21	-56.58	-34.57	0.03	56.58	34.57	-0.03	0.000%
22	-48.05	-46.10	-27.79	48.05	46.10	27.79	0.000%
23	-48.05	-34.57	-27.79	48.05	34.57	27.79	0.000%
24	-28.05	-46.10	-48.90	28.05	46.10	48.90	0.000%
25	-28.05	-34.57	-48.90	28.05	34.57	48.90	0.000%
26	0.00	-106.31	0.00	0.00	106.31	0.00	0.000%
27	0.02	-106.31	-14.95	-0.02	106.31	14.95	0.000%
28	7.32	-106.31	-12.67	-7.32	106.31	12.67	0.000%
29	12.57	-106.31	-7.26	-12.57	106.31	7.26	0.000%
30	14.63	-106.31	-0.00	-14.63	106.31	0.00	0.000%
31	12.95	-106.31	7.45	-12.95	106.31	-7.45	0.000%
32	7.29	-106.31	12.58	-7.29	106.31	-12.58	0.000%
33	0.01	-106.31	14.42	-0.01	106.31	-14.42	0.000%
34	-7.29	-106.31	12.62	7.29	106.31	-12.62	0.000%
35	-12.95	-106.31	7.48	12.95	106.31	-7.48	0.000%
36	-14.58	-106.31	0.00	14.58	106.31	-0.00	0.000%
37	-12.48	-106.31	-7.21	12.48	106.31	7.21	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
38	-7.25	-106.31	-12.61	7.25	106.31	12.61	0.000%
39	0.03	-38.41	-13.95	-0.03	38.41	13.95	0.000%
40	6.72	-38.41	-11.63	-6.72	38.41	11.63	0.000%
41	11.46	-38.41	-6.62	-11.46	38.41	6.62	0.000%
42	13.43	-38.41	-0.01	-13.43	38.41	0.01	0.000%
43	12.09	-38.41	6.95	-12.09	38.41	-6.95	0.000%
44	6.68	-38.41	11.50	-6.68	38.41	-11.50	0.000%
45	0.01	-38.41	13.11	-0.01	38.41	-13.11	0.000%
46	-6.68	-38.41	11.56	6.68	38.41	-11.56	0.000%
47	-12.09	-38.41	6.98	12.09	38.41	-6.98	0.000%
48	-13.35	-38.41	0.01	13.35	38.41	-0.01	0.000%
49	-11.34	-38.41	-6.56	11.34	38.41	6.56	0.000%
50	-6.62	-38.41	-11.54	6.62	38.41	11.54	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	0.00000098
3	Yes	4	0.00000001	0.00000086
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	0.00000070
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000098
11	Yes	4	0.00000001	0.00000086
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
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	0.00000098
19	Yes	4	0.00000001	0.00000087
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	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000245
28	Yes	4	0.00000001	0.00000242
29	Yes	4	0.00000001	0.00000237
30	Yes	4	0.00000001	0.00000241
31	Yes	4	0.00000001	0.00000244
32	Yes	4	0.00000001	0.00000239
33	Yes	4	0.00000001	0.00000234
34	Yes	4	0.00000001	0.00000238
35	Yes	4	0.00000001	0.00000243
36	Yes	4	0.00000001	0.00000239
37	Yes	4	0.00000001	0.00000236
38	Yes	4	0.00000001	0.00000240

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

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.7500	6	0.29	30.10	0.010 ✓	1	Bolt Tension
		Diagonal	A325X	0.7500	1	2.80	18.92	0.148 ✓	1	Member Bearing
T2	175	Leg	A325N	0.7500	6	0.88	30.10	0.029 ✓	1	Bolt Tension
		Diagonal	A325X	0.7500	1	5.47	18.92	0.289 ✓	1	Member Bearing
		Horizontal	A325X	0.6250	2	1.47	10.44	0.140 ✓	1	Member Bearing
T3	166.667	Leg	A325N	0.7500	6	1.78	30.10	0.059 ✓	1	Bolt Tension
		Diagonal	A325X	0.7500	1	7.47	18.92	0.395 ✓	1	Member Bearing
		Horizontal	A325X	0.6250	2	2.25	10.44	0.215 ✓	1	Member Bearing
T4	158.333	Diagonal	A325X	0.7500	1	8.43	18.92	0.446 ✓	1	Member Bearing
		Horizontal	A325X	0.6250	2	2.85	10.44	0.273 ✓	1	Member Bearing
T5	150	Leg	A325N	0.7500	6	4.88	30.10	0.162 ✓	1	Bolt Tension
		Diagonal	A325X	0.7500	1	11.51	25.23	0.456 ✓	1	Member Bearing
		Horizontal	A325X	0.6250	2	3.68	13.92	0.264 ✓	1	Member Bearing
T6	141.667	Leg	A325N	0.7500	6	6.91	30.10	0.230 ✓	1	Bolt Tension
		Diagonal	A325X	0.7500	1	12.99	25.23	0.515 ✓	1	Member Bearing
		Horizontal	A325X	0.6250	2	4.59	13.92	0.330 ✓	1	Member Bearing
T7	133.333	Diagonal	A325X	0.7500	1	13.74	25.23	0.544 ✓	1	Member Bearing
		Horizontal	A325X	0.6250	2	5.10	13.92	0.366 ✓	1	Member Bearing
T8	125	Leg	A325N	1.0000	6	10.34	54.52	0.190 ✓	1	Bolt Tension
		Diagonal	A325X	0.7500	1	10.08	18.92	0.533 ✓	1	Member Bearing
		Horizontal	A325X	0.6250	2	5.41	13.92	0.389 ✓	1	Member Bearing
T9	116.667	Diagonal	A325X	0.7500	1	10.44	18.92	0.552 ✓	1	Member Bearing
		Horizontal	A325X	0.6250	2	3.11	10.44	0.298 ✓	1	Member Bearing
T10	108.333	Diagonal	A325X	0.7500	1	10.91	18.92	0.576 ✓	1	Member Bearing
		Horizontal	A325X	0.6250	2	3.37	10.44	0.322 ✓	1	Member Bearing
T11	100	Leg	A325N	1.0000	6	22.22	54.52	0.408 ✓	1	Bolt Tension
		Diagonal	A325X	0.7500	1	12.22	18.92	0.646 ✓	1	Member Bearing

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Horizontal	A325X	0.6250	2	4.09	13.92	0.294 ✔	1	Member Bearing
T12	75	Leg	A325N	1.0000	6	29.79	54.52	0.546 ✔	1	Bolt Tension
		Diagonal	A325X	0.7500	1	13.36	25.23	0.529 ✔	1	Member Bearing
		Horizontal	A325X	0.6250	2	4.78	13.92	0.343 ✔	1	Member Bearing
T13	50	Leg	A325N	1.0000	8	28.09	54.52	0.515 ✔	1	Bolt Tension
		Diagonal	A325X	0.7500	1	14.77	25.23	0.585 ✔	1	Member Bearing
		Horizontal	A325X	0.6250	2	5.61	13.92	0.403 ✔	1	Member Bearing
T14	25	Leg	A615-75	1.5000	6	43.49	105.39	0.413 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	19.81	42.41	0.467 ✔	1	Member Bearing
		Horizontal	A325X	0.6250	2	5.88	13.92	0.422 ✔	1	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	HSS5x.25	5.01	5.01	35.6 K=1.00	3.4894	-3.21	143.13	0.022 [1] ✔
T2	175 - 166.667	HSS5x.25	8.34	8.34	59.3 K=1.00	3.4894	-7.05	121.40	0.058 [1] ✔
T3	166.667 - 158.333	HSS5x.25	8.34	8.34	59.3 K=1.00	3.4894	-13.49	121.40	0.111 [1] ✔
T4	158.333 - 150	HSS5x.25	8.34	8.34	59.3 K=1.00	3.4894	-22.24	121.40	0.183 [1] ✔
T5	150 - 141.667	HSS5x.25	8.34	8.34	59.3 K=1.00	3.4894	-34.45	121.40	0.284 [1] ✔
T6	141.667 - 133.333	HSS5x.25	8.34	8.34	59.3 K=1.00	3.4894	-48.31	121.40	0.398 [1] ✔
T7	133.333 - 125	HSS5x.25	8.34	8.34	59.3 K=1.00	3.4894	-62.90	121.40	0.518 [1] ✔
T8	125 - 116.667	HSS5x.4	8.34	8.34	61.3 K=1.00	5.7805	-70.58	224.43	0.314 [1] ✔
T9	116.667 - 108.333	HSS5x.4	8.34	8.34	61.3 K=1.00	5.7805	-85.29	224.43	0.380 [1] ✔
T10	108.333 - 100	HSS5x.4	8.34	8.34	61.3 K=1.00	5.7805	-100.57	224.43	0.448 [1] ✔
T11	100 - 75	HSS5x.4	25.03	8.34	61.3 K=1.00	5.7805	-149.06	224.43	0.664 [1] ✔
T12	75 - 50	HSS5x.5	25.03	8.34	62.1 K=1.00	6.6249	-200.13	255.02	0.785 [1] ✔
T13	50 - 25	HSS5x.5	25.03	4.17	31.1	6.6249	-253.01	328.72	0.770 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T14	25 - 0	HSS6.875x.5	25.03	6.26	K=1.00 33.0 K=1.00	9.3640	-297.25	459.46	✔ 0.647 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	2L2 1/2x2x3/16	8.44	7.65	116.3 K=1.00	1.6200	-2.65	33.54	0.079 [1] ✔
T2	175 - 166.667	2L2 1/2x2x3/16x3/8	11.10	10.20	163.5 K=1.00	1.6200	-5.61	16.66	0.337 [1] ✔
T3	166.667 - 158.333	2L2 1/2x2x3/16x3/8	11.55	10.65	170.7 K=1.00	1.6200	-7.74	15.33	0.505 [1] ✔
T4	158.333 - 150	2L2 1/2x2x3/16x3/8	12.02	11.18	179.1 K=1.00	1.6200	-8.48	13.98	0.606 [1] ✔
T5	150 - 141.667	2L3x2 1/2x1/4x3/8	12.51	11.68	152.4 K=1.00	2.6300	-11.58	31.26	0.370 [1] ✔
T6	141.667 - 133.333	2L3x2 1/2x1/4x3/8	13.02	12.19	159.0 K=1.00	2.6300	-12.82	28.81	0.445 [1] ✔
T7	133.333 - 125	2L3x2 1/2x1/4x3/8	13.54	12.74	166.2 K=1.00	2.6300	-13.59	26.46	0.513 [1] ✔
T8	125 - 116.667	2L2 1/2x2x3/16x3/8	10.17	9.54	152.9 K=1.00	1.6200	-10.21	18.92	0.539 [1] ✔
T9	116.667 - 108.333	2L2 1/2x2x3/16x3/8	10.37	9.75	156.2 K=1.00	1.6200	-10.56	18.16	0.582 [1] ✔
T10	108.333 - 100	2L2 1/2x2x3/16x3/8	10.57	9.95	159.4 K=1.00	1.6200	-11.04	17.47	0.632 [1] ✔
T11	100 - 75	2L2 1/2x2x3/16x3/8	11.21	10.63	170.4 K=1.00	1.6200	-12.42	15.39	0.807 [1] ✔
T12	75 - 50	2L2 1/2x2 1/2x1/4x3/8	11.91	11.34	177.0 K=1.00	2.3800	-13.65	21.74	0.628 [1] ✔
T13	50 - 25	2L3x2 1/2x1/4x3/8	12.64	12.09	136.7 K=1.00	2.6300	-15.21	38.49	0.395 [1] ✔
T14	25 - 0	2L3x3x5/16x3/8	16.33	15.55	143.9 K=1.00	3.5500	-19.84	48.04	0.413 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	175 - 166.667	L2 1/2x2 1/2x3/16	7.00	6.19	138.4 K=0.92	0.9020	-3.18	13.47	0.236 [1] ✔
T3	166.667 - 158.333	L2 1/2x2 1/2x3/16	7.67	6.85	148.4 K=0.89	0.9020	-4.62	11.72	0.394 [1] ✔
T4	158.333 - 150	L2 1/2x2 1/2x3/16	8.33	7.52	158.3 K=0.87	0.9020	-5.56	10.30	0.540 [1] ✔
T5	150 - 141.667	L3x3x1/4	9.00	8.19	148.3 K=0.89	1.4400	-7.39	18.75	0.394 [1] ✔
T6	141.667 - 133.333	L3x3x1/4	9.67	8.85	156.6 K=0.87	1.4400	-9.28	16.81	0.552 [1] ✔
T7	133.333 - 125	L3x3x1/4	10.33	9.52	164.9 K=0.85	1.4400	-10.42	15.16	0.687 [1] ✔
T8	125 - 116.667	L2 1/2x2 1/2x1/4	11.00	5.09	123.5 K=0.99	1.1900	-11.05	22.31	0.495 [1] ✔
T9	116.667 - 108.333	L2 1/2x2 1/2x3/16	11.67	5.43	128.9 K=0.98	0.9020	-6.28	15.55	0.404 [1] ✔
T10	108.333 - 100	L2 1/2x2 1/2x3/16	12.33	5.76	135.0 K=0.97	0.9020	-6.74	14.16	0.476 [1] ✔
T11	100 - 75	L3x2 1/2x1/4	14.33	6.76	145.7 K=0.95	1.3100	-8.26	17.67	0.468 [1] ✔
T12	75 - 50	L3x3x1/4	16.33	7.76	148.5 K=0.94	1.4400	-9.66	18.70	0.517 [1] ✔
T13	50 - 25	L3x3x1/4	18.33	8.76	163.9 K=0.92	1.4400	-11.14	15.34	0.726 [1] ✔
T14	25 - 0	L4x4x1/4	20.00	9.52	138.0 K=0.96	1.9400	-12.26	29.14	0.421 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	L2 1/2x2x3/16	6.60	6.18	153.1 K=0.88	0.8090	-1.35	9.88	0.136 [1] ✔

[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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T13	50 - 25	L3x3x1/4	4.58	4.38	104.3 K=1.18	1.4400	-4.39	34.09	0.129 [1] ✔
T14	25 - 0	L3x3x1/4	5.00	4.71	107.8	1.4400	-5.15	32.91	0.157 [1]

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
					K=1.13				✔

[1] P_u / ϕP_n controls

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T14	25 - 0	L3x3x1/4	7.85	7.38	149.6 K=1.00	1.4400	-4.05	18.43	0.220 [1] ✔

[1] P_u / ϕP_n controls

Redundant Sub-Horizontal Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T13	50 - 25	L3x3x1/4	9.50	9.50	192.6 K=1.00	1.4400	-0.61	11.11	0.055 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T11	100 - 75	L2 1/2x2x3/16	7.17	7.17	201.4 K=1.00	0.8090	-0.01	5.71	0.001 [1] ✔
T12	75 - 50	L2 1/2x2x3/16	8.17	8.17	229.5 K=1.00	0.8090	-0.01	4.40	0.002 [1] ✔
T13	50 - 25	L2 1/2x2x3/16	9.17	9.17	257.6 K=1.00	0.8090	-0.01	3.49	0.003 [1] ✔
T14	25 - 0	KL/R > 250 (C) - 201 L2 1/2x2 1/2x3/16	10.00	10.00	242.4 K=1.00	0.9020	-0.02	4.39	0.004 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	HSS5x.25	5.01	5.01	35.6	3.4894	1.75	157.02	0.011 [1] ✔
T2	175 - 166.667	HSS5x.25	8.34	8.34	59.3	3.4894	5.30	157.02	0.034 [1] ✔
T3	166.667 - 158.333	HSS5x.25	8.34	8.34	59.3	3.4894	10.70	157.02	0.068 [1] ✔
T4	158.333 - 150	HSS5x.25	8.34	8.34	59.3	3.4894	18.57	157.02	0.118 [1] ✔
T5	150 - 141.667	HSS5x.25	8.34	8.34	59.3	3.4894	29.30	157.02	0.187 [1] ✔
T6	141.667 - 133.333	HSS5x.25	8.34	8.34	59.3	3.4894	41.48	157.02	0.264 [1] ✔
T7	133.333 - 125	HSS5x.25	8.34	8.34	59.3	3.4894	55.03	157.02	0.350 [1] ✔
T8	125 - 116.667	HSS5x.4	8.34	8.34	61.3	5.7805	62.02	312.15	0.199 [1] ✔
T9	116.667 - 108.333	HSS5x.4	8.34	8.34	61.3	5.7805	75.51	312.15	0.242 [1] ✔
T10	108.333 - 100	HSS5x.4	8.34	8.34	61.3	5.7805	89.48	312.15	0.287 [1] ✔
T11	100 - 75	HSS5x.4	25.03	8.34	61.3	5.7805	133.35	312.15	0.427 [1] ✔
T12	75 - 50	HSS5x.5	25.03	8.34	62.1	6.6249	178.76	357.75	0.500 [1] ✔
T13	50 - 25	HSS5x.5	25.03	4.17	31.1	6.6249	224.83	357.75	0.628 [1] ✔
T14	25 - 0	HSS6.875x.5	25.03	6.26	33.0	9.3640	261.29	505.65	0.517 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	2L2 1/2x2x3/16	8.44	7.65	120.4	0.9689	2.80	42.15	0.066 [1] ✔
T2	175 - 166.667	2L2 1/2x2x3/16x3/8	11.10	10.20	158.5	0.9689	5.47	42.15	0.130 [1] ✔
T3	166.667 - 158.333	2L2 1/2x2x3/16x3/8	11.55	10.65	165.3	0.9689	7.47	42.15	0.177 [1] ✔
T4	158.333 - 150	2L2 1/2x2x3/16x3/8	12.02	11.18	173.2	0.9689	8.43	42.15	0.200 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T5	150 - 141.667	2L3x2 1/2x1/4x3/8	12.51	11.68	151.8	1.6444	11.51	71.53	0.161 [1]
T6	141.667 - 133.333	2L3x2 1/2x1/4x3/8	13.02	12.19	158.2	1.6444	12.99	71.53	0.182 [1]
T7	133.333 - 125	2L3x2 1/2x1/4x3/8	13.54	12.74	165.2	1.6444	13.74	71.53	0.192 [1]
T8	125 - 116.667	2L2 1/2x2x3/16x3/8	10.17	9.54	148.5	0.9689	10.08	42.15	0.239 [1]
T9	116.667 - 108.333	2L2 1/2x2x3/16x3/8	10.37	9.75	151.6	0.9689	10.44	42.15	0.248 [1]
T10	108.333 - 100	2L2 1/2x2x3/16x3/8	10.57	9.95	154.7	0.9689	10.91	42.15	0.259 [1]
T11	100 - 75	2L2 1/2x2x3/16x3/8	11.21	10.63	165.0	0.9689	12.22	42.15	0.290 [1]
T12	75 - 50	2L2 1/2x2 1/2x1/4x3/8	11.91	11.34	181.2	1.4569	13.36	63.37	0.211 [1]
T13	50 - 25	2L3x2 1/2x1/4x3/8	12.64	12.09	131.3	1.6444	14.77	71.53	0.206 [1]
T14	25 - 0	2L3x3x5/16x3/8	16.01	15.23	133.4	2.1352	19.81	92.88	0.213 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	175 - 166.667	L2 1/2x2 1/2x3/16	7.00	6.19	101.5	0.5710	2.93	24.84	0.118 [1]
T3	166.667 - 158.333	L2 1/2x2 1/2x3/16	7.67	6.85	111.8	0.5710	4.50	24.84	0.181 [1]
T4	158.333 - 150	L2 1/2x2 1/2x3/16	8.33	7.52	122.1	0.5710	5.70	24.84	0.229 [1]
T5	150 - 141.667	L3x3x1/4	9.00	8.19	110.8	0.9394	7.36	40.86	0.180 [1]
T6	141.667 - 133.333	L3x3x1/4	9.67	8.85	119.4	0.9394	9.18	40.86	0.225 [1]
T7	133.333 - 125	L3x3x1/4	10.33	9.52	128.0	0.9394	10.20	40.86	0.250 [1]
T8	125 - 116.667	L2 1/2x2 1/2x1/4	11.00	5.09	123.9	0.7519	10.82	32.71	0.331 [1]
T9	116.667 - 108.333	L2 1/2x2 1/2x3/16	11.67	5.43	130.1	0.5710	6.21	24.84	0.250 [1]
T10	108.333 - 100	L2 1/2x2 1/2x3/16	12.33	5.76	137.9	0.5710	6.73	24.84	0.271 [1]
T11	100 - 75	L3x2 1/2x1/4	14.33	6.76	111.1	0.8419	8.17	36.62	0.223 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T12	75 - 50	L3x3x1/4	16.33	7.76	102.7	0.9394	9.56	40.86	0.234 [1] ✔
T13	50 - 25	L3x3x1/4	18.33	8.76	115.6	0.9394	11.22	40.86	0.275 [1] ✔
T14	25 - 0	L4x4x1/4	20.00	9.52	93.3	1.3144	11.76	57.18	0.206 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	L2 1/2x2x3/16	6.60	6.18	123.7	0.8090	1.27	26.21	0.048 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T13	50 - 25	L3x3x1/4	4.58	4.38	56.5	1.4400	4.39	46.66	0.094 [1] ✔
T14	25 - 0	L3x3x1/4	5.00	4.71	60.8	1.4400	5.15	46.66	0.110 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T14	25 - 0	L3x3x1/4	7.70	7.23	93.3	1.4400	4.18	46.66	0.090 [1] ✔

[1] P_u / ϕP_n controls

Redundant Sub-Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T13	50 - 25	L3x3x1/4	9.50	9.50	122.6	1.4400	0.53	46.66	0.011 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T11	100 - 75	L2 1/2x2x3/16	6.50	6.50	130.1	0.8090	0.00	26.21	0.000 [1] ✔
T12	75 - 50	L2 1/2x2x3/16	7.50	7.50	150.1	0.8090	0.01	26.21	0.000 [1] ✔
T13	50 - 25	L2 1/2x2x3/16	8.50	8.50	170.1	0.8090	0.00	26.21	0.000 [1] ✔
T14	25 - 0	L2 1/2x2 1/2x3/16	9.50	9.50	146.5	0.9020	0.01	29.22	0.000 [1] ✔

[1] P_u / ϕP_n controls

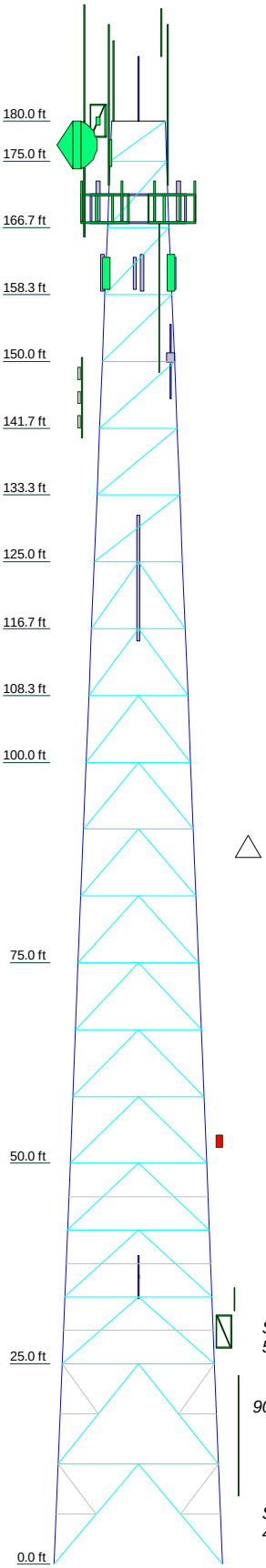
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 175	Leg	HSS5x.25	1	-3.21	143.13	2.5	Pass
T2	175 - 166.667	Leg	HSS5x.25	10	-7.05	121.40	5.8	Pass
T3	166.667 - 158.333	Leg	HSS5x.25	20	-13.49	121.40	11.1	Pass
T4	158.333 - 150	Leg	HSS5x.25	29	-22.24	121.40	18.3	Pass
T5	150 - 141.667	Leg	HSS5x.25	37	-34.45	121.40	28.4	Pass
T6	141.667 - 133.333	Leg	HSS5x.25	46	-48.31	121.40	39.8	Pass
T7	133.333 - 125	Leg	HSS5x.25	55	-62.90	121.40	51.8	Pass
T8	125 - 116.667	Leg	HSS5x.4	64	-70.58	224.43	31.4	Pass
T9	116.667 - 108.333	Leg	HSS5x.4	76	-85.29	224.43	38.0	Pass
T10	108.333 - 100	Leg	HSS5x.4	88	-100.57	224.43	44.8	Pass
T11	100 - 75	Leg	HSS5x.4	100	-149.06	224.43	66.4	Pass
T12	75 - 50	Leg	HSS5x.5	139	-200.13	255.02	78.5	Pass
T13	50 - 25	Leg	HSS5x.5	179	-253.01	328.72	77.0	Pass
T14	25 - 0	Leg	HSS6.875x.5	245	-297.25	459.46	64.7	Pass
T1	180 - 175	Diagonal	2L2 1/2x2x3/16	9	-2.65	33.54	7.9 14.8 (b)	Pass
T2	175 - 166.667	Diagonal	2L2 1/2x2x3/16x3/8	18	-5.61	16.66	33.7	Pass
T3	166.667 - 158.333	Diagonal	2L2 1/2x2x3/16x3/8	27	-7.74	15.33	50.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T4	158.333 - 150	Diagonal	2L2 1/2x2x3/16x3/8	36	-8.48	13.98	60.6	Pass
T5	150 - 141.667	Diagonal	2L3x2 1/2x1/4x3/8	45	-11.58	31.26	37.0	Pass
							45.6 (b)	
T6	141.667 - 133.333	Diagonal	2L3x2 1/2x1/4x3/8	54	-12.82	28.81	44.5	Pass
							51.5 (b)	
T7	133.333 - 125	Diagonal	2L3x2 1/2x1/4x3/8	61	-13.59	26.46	51.3	Pass
							54.4 (b)	
T8	125 - 116.667	Diagonal	2L2 1/2x2x3/16x3/8	69	-10.21	18.92	53.9	Pass
T9	116.667 - 108.333	Diagonal	2L2 1/2x2x3/16x3/8	81	-10.56	18.16	58.2	Pass
T10	108.333 - 100	Diagonal	2L2 1/2x2x3/16x3/8	93	-11.04	17.47	63.2	Pass
T11	100 - 75	Diagonal	2L2 1/2x2x3/16x3/8	105	-12.42	15.39	80.7	Pass
T12	75 - 50	Diagonal	2L2 1/2x2 1/2x1/4x3/8	144	-13.65	21.74	62.8	Pass
T13	50 - 25	Diagonal	2L3x2 1/2x1/4x3/8	190	-15.21	38.49	39.5	Pass
							58.5 (b)	
T14	25 - 0	Diagonal	2L3x3x5/16x3/8	258	-19.84	48.04	41.3	Pass
							46.7 (b)	
T2	175 - 166.667	Horizontal	L2 1/2x2 1/2x3/16	13	-3.18	13.47	23.6	Pass
T3	166.667 - 158.333	Horizontal	L2 1/2x2 1/2x3/16	22	-4.62	11.72	39.4	Pass
T4	158.333 - 150	Horizontal	L2 1/2x2 1/2x3/16	31	-5.56	10.30	54.0	Pass
T5	150 - 141.667	Horizontal	L3x3x1/4	40	-7.39	18.75	39.4	Pass
T6	141.667 - 133.333	Horizontal	L3x3x1/4	49	-9.28	16.81	55.2	Pass
T7	133.333 - 125	Horizontal	L3x3x1/4	58	-10.42	15.16	68.7	Pass
T8	125 - 116.667	Horizontal	L2 1/2x2 1/2x1/4	67	-11.05	22.31	49.5	Pass
T9	116.667 - 108.333	Horizontal	L2 1/2x2 1/2x3/16	79	-6.28	15.55	40.4	Pass
T10	108.333 - 100	Horizontal	L2 1/2x2 1/2x3/16	94	-6.74	14.16	47.6	Pass
T11	100 - 75	Horizontal	L3x2 1/2x1/4	103	-8.26	17.67	46.8	Pass
T12	75 - 50	Horizontal	L3x3x1/4	142	-9.66	18.70	51.7	Pass
T13	50 - 25	Horizontal	L3x3x1/4	187	-11.14	15.34	72.6	Pass
T14	25 - 0	Horizontal	L4x4x1/4	254	-12.26	29.14	42.1	Pass
							42.2 (b)	
T1	180 - 175	Top Girt	L2 1/2x2x3/16	4	-1.35	9.88	13.6	Pass
T13	50 - 25	Redund Horz 1 Bracing	L3x3x1/4	185	-4.39	34.09	12.9	Pass
T14	25 - 0	Redund Horz 1 Bracing	L3x3x1/4	252	-5.15	32.91	15.7	Pass
T14	25 - 0	Redund Diag 1 Bracing	L3x3x1/4	257	-4.05	18.43	22.0	Pass
T13	50 - 25	Redund Sub Horz Bracing	L3x3x1/4	192	-0.61	11.11	5.5	Pass
T11	100 - 75	Inner Bracing	L2 1/2x2x3/16	114	-0.01	5.71	0.4	Pass
T12	75 - 50	Inner Bracing	L2 1/2x2x3/16	151	-0.01	4.40	0.4	Pass
T13	50 - 25	Inner Bracing	L2 1/2x2x3/16	199	-0.01	3.49	0.5	Pass
T14	25 - 0	Inner Bracing	L2 1/2x2 1/2x3/16	268	-0.02	4.39	0.5	Pass
							Summary	
						Leg (T12)	78.5	Pass
						Diagonal (T11)	80.7	Pass
						Horizontal (T13)	72.6	Pass
						Top Girt (T1)	13.6	Pass
						Redund Horz 1 Bracing (T14)	15.7	Pass
						Redund Diag 1	22.0	Pass

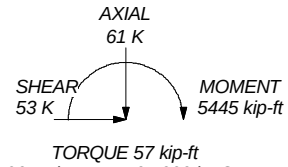
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
						Bracing (T14)		
						Redund Sub Horz Bracing (T13)	5.5	Pass
						Inner Bracing (T14)	0.5	Pass
						Bolt Checks	64.6	Pass
						RATING =	**80.7**	**Pass**

Section	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	HSS6.875x.5	HSS5x.5	A572-60	HSS5x.4				HSS5x.25						
Leg Grade								A572-50						
Diagonals	2L3x3x5/16x3/8	2L3x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2x3/16x3/8				2L3x2 1/2x1/4x3/8				2L2 1/2x2x3/16x3/8		
Diagonal Grade				A36										
Top Girts				N.A.										A
Horizontals	L4x4x1/4	L3x3x1/4		L3x2 1/2x1/4	L2 1/2x2 1/2x3/16		B		L3x3x1/4			L2 1/2x2 1/2x3/16		N.A.
Red. Horizontals	L3x3x1/4					N.A.								
Red. Diagonals	L3x3x1/4			N.A.										
Red. Sub-Horizs	N.A.	L3x3x1/4				N.A.								
Inner Bracing	L2 1/2x2 1/2x3/16		L2 1/2x2x3/16					N.A.						
Face Width (ft)	19	17	15	13	11.6667	11	10.3333	9	8.33333	7	6.6			
# Panels @ (ft)	2 @ 12.5			18 @ 8.33333							1 @ 5			
Weight (K)	26.8	6.4	5.5	4.3	3.3	1.0	0.9	0.8	0.8	0.8	0.6	0.6	0.5	0.4

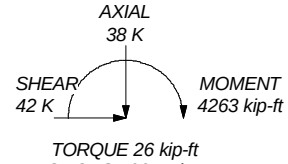


MAX. CORNER REACTIONS at BASE:
DOWN: 320 K
SHEAR: 31 K

UPLIFT: -272 K
SHEAR: 28 K



TORQUE 57 kip-ft
90 mph WIND - 0.5000 in ICE



TORQUE 26 kip-ft
REACTIONS - 90 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4'	192	7770.00 w/ mount pipe (ATT)	161
PD1142-30 (CSP 22)	191	HPA65R-BU4A (ATT)	161
6'x4" Pipe Mount (CSP 22)	191	TMAT1921XB68 (ATT)	161
10'0"x4" Pipe Mount (Lighting Rod Extension)	185	(2) LPG21401 TMA (ATT)	161
8' x 2" Omni (CSP)	184	PD1142-1 (CSP)	158
2'x3" Pipe Mount (CSP)	184	TTA 432-83H-01T (CSP)	153
20' x 3" Dia Omni (LCD-9)	182	DB222 (CSP)	153
20' x 3" Dia Omni (LCD-28)	182	DB586-Y (CSP (inverted))	150
SC479-HF1LDF (CSP Troop L (inverted) - Reserved)	180	DB586-Y (CSP)	150
SC479-HF1LDF (CSP Troop L (inverted) - Reserved)	180	10' Dipole (CSP)	148
SC479-HF1LDF (CSP Troop L - Reserved)	180	BXA-80080/6CF w/mount pipe (Verizon)	148
TX/RX 432E-83I-01T (CSP Troop L - Reserved)	180	BXA-185085/12CF w/mount pipe (Verizon)	148
Pirod 4' Side Mount Standoff (1) (CSP Troop L - Reserved)	180	BXA-80080/6CF w/mount pipe (Verizon)	148
PA6-65 6' Dish (CSP)	177	BXA-185085/12CF w/mount pipe (Verizon)	148
PD220 (LCD-27)	176	BXA-80080/6CF w/mount pipe (Verizon)	148
3'4"x4" Pipe Mount (CSP-3)	176	BXA-185085/12CF w/mount pipe (Verizon)	148
DB292-A (LCD-10)	170	SitePro VFA12-HD (Verizon)	148
(2) DB980F90E-M (Sprint)	170	SitePro VFA12-HD (Verizon)	148
(2) DB980F90E-M (Sprint)	170	SitePro VFA12-HD (Verizon)	148
(2) DB980F90E-M (Sprint)	170	SP2D00P36D-D (Eversource - Proposed)	119
13-ft Sector Frame (Sprint)	169	SitePro USF-4U (Eversource - Proposed)	111
13-ft Sector Frame (Sprint)	169	GPS (Sprint)	52
13-ft Sector Frame (Sprint)	169	2.5" Tube x 2' Standoff (Sprint)	52
7770.00 w/ mount pipe (ATT)	161	DB803M-Y (CSP)	33.5
HPA65R-BU4A (ATT)	161	DB803M-Y (CSP)	31
TMAT1921XB68 (ATT)	161	3' Standoff (CSP)	31
(2) LPG21401 TMA (ATT)	161	DB803M-Y (CSP)	29.5
7770.00 w/ mount pipe (ATT)	161	3' Standoff (CSP)	29
HPA65R-BU4A (ATT)	161	3' Yagi (CSP)	16
TMAT1921XB68 (ATT)	161		
(2) LPG21401 TMA (ATT)	161		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2 1/2x2x3/16	B	L2 1/2x2 1/2x1/4

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			

TOWER DESIGN NOTES

1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 90 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 90 mph wind.

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

Job: **21082.14**			
Project: **180-ft Lattice Tower #7 Litchfield**			
Client: Eversource	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 01/12/22	Scale: NTS	
Path:		Dwg No. E-1	

Load Combinations

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

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 175	14.924	35	0.6688	0.1333
T2	175 - 166.667	14.216	35	0.6682	0.1242
T3	166.667 - 158.333	13.026	35	0.6641	0.1011
T4	158.333 - 150	11.831	35	0.6543	0.0910
T5	150 - 141.667	10.655	35	0.6375	0.0818
T6	141.667 - 133.333	9.515	35	0.6127	0.0737
T7	133.333 - 125	8.418	35	0.5796	0.0662
T8	125 - 116.667	7.389	35	0.5388	0.0596
T9	116.667 - 108.333	6.447	35	0.5128	0.0562

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T10	108.333 - 100	5.553	35	0.4833	0.0508
T11	100 - 75	4.713	35	0.4508	0.0447
T12	75 - 50	2.589	35	0.3374	0.0300
T13	50 - 25	1.095	35	0.2221	0.0190
T14	25 - 0	0.240	35	0.0950	0.0082

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
192.00	Lightning Rod 5/8x4'	35	14.924	0.6688	0.1333	61865
191.00	PD1142-30	35	14.924	0.6688	0.1333	61865
185.00	10'0"x4" Pipe Mount	35	14.924	0.6688	0.1333	61865
184.00	8' x 2" Omni	35	14.924	0.6688	0.1333	61865
182.00	20' x 3" Dia Omni	35	14.924	0.6688	0.1333	61865
180.00	SC479-HF1LDF	35	14.924	0.6688	0.1333	61865
177.00	PA6-65 6' Dish	35	14.499	0.6685	0.1282	61865
176.00	PD220	35	14.357	0.6684	0.1263	61865
170.00	DB292-A	35	13.503	0.6664	0.1106	65287
169.00	13-ft Sector Frame	35	13.361	0.6658	0.1075	69321
161.00	7770.00 w/ mount pipe	35	12.213	0.6581	0.0942	81112
158.00	PD1142-1	35	11.784	0.6538	0.0906	41659
153.00	DB222	35	11.075	0.6444	0.0850	25322
150.00	DB586-Y	35	10.655	0.6375	0.0818	21779
148.00	10' Dipole	35	10.378	0.6322	0.0795	21074
119.00	SP2D00P36D-D	35	6.705	0.5195	0.0575	15771
111.00	SitePro USF-4U	35	5.834	0.4933	0.0526	16915
52.00	GPS	35	1.192	0.2320	0.0198	12365
33.50	DB803M-Y	35	0.452	0.1365	0.0117	10486
31.00	DB803M-Y	35	0.381	0.1239	0.0106	10239
29.50	DB803M-Y	35	0.341	0.1164	0.0100	10096
29.00	3' Standoff	35	0.329	0.1140	0.0097	10052
16.00	3' Yagi	35	0.105	0.0572	0.0049	15139

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 175	19.000	19	0.8525	0.2258
T2	175 - 166.667	18.101	19	0.8516	0.2259
T3	166.667 - 158.333	16.589	19	0.8459	0.2135
T4	158.333 - 150	15.070	19	0.8329	0.2043
T5	150 - 141.667	13.574	19	0.8111	0.1953
T6	141.667 - 133.333	12.124	19	0.7797	0.1797
T7	133.333 - 125	10.730	19	0.7378	0.1607
T8	125 - 116.667	9.420	19	0.6862	0.1435
T9	116.667 - 108.333	8.222	19	0.6531	0.1331
T10	108.333 - 100	7.083	19	0.6158	0.1198
T11	100 - 75	6.014	19	0.5746	0.1057
T12	75 - 50	3.305	19	0.4305	0.0691

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T13	50 - 25	1.399	19	0.2838	0.0430
T14	25 - 0	0.305	19	0.1215	0.0182

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
192.00	Lightning Rod 5/8x4'	19	19.000	0.8525	0.2258	49289
191.00	PD1142-30	19	19.000	0.8525	0.2258	49289
185.00	10'0"x4" Pipe Mount	19	19.000	0.8525	0.2258	49289
184.00	8' x 2" Omni	19	19.000	0.8525	0.2258	49289
182.00	20' x 3" Dia Omni	19	19.000	0.8525	0.2258	49289
180.00	SC479-HF1LDF	19	19.000	0.8525	0.2258	49289
177.00	PA6-65 6' Dish	19	18.461	0.8521	0.2263	49289
176.00	PD220	19	18.281	0.8519	0.2262	49289
170.00	DB292-A	19	17.196	0.8490	0.2201	52184
169.00	13-ft Sector Frame	19	17.014	0.8482	0.2183	56610
161.00	7770.00 w/ mount pipe	19	15.555	0.8380	0.2061	59305
158.00	PD1142-1	19	15.009	0.8322	0.2040	31478
153.00	DB222	19	14.108	0.8201	0.1993	19302
150.00	DB586-Y	19	13.574	0.8111	0.1953	16620
148.00	10' Dipole	19	13.221	0.8044	0.1921	16132
119.00	SP2D00P36D-D	19	8.550	0.6617	0.1364	12425
111.00	SitePro USF-4U	19	7.442	0.6285	0.1242	13349
52.00	GPS	19	1.522	0.2963	0.0450	9706
33.50	DB803M-Y	19	0.577	0.1745	0.0262	8205
31.00	DB803M-Y	19	0.486	0.1583	0.0237	8008
29.50	DB803M-Y	19	0.436	0.1488	0.0223	7895
29.00	3' Standoff	19	0.420	0.1457	0.0218	7860
16.00	3' Yagi	23	0.133	0.0732	0.0110	11831

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	Anchor Bolt Analysis
Location:	180-ft Lattice Tower Litchfield, CT
Rev. 1: 1/12/22	Prepared by: T.J.L. Checked by: C.F.C. Job No. 21082.14

Anchor Bolt Analysis:

Input Data:

Tower Reactions:

Tension Force =	Tension := 287·kips	(Input From tnxTower)
Compression Force =	Compression := 325·kips	(Input From tnxTower)
Shear Force =	Shear := 34·kips	(Input From tnxTower)

Anchor Bolt Data:

ASTMA36

Number of Anchor Bolts =	N := 6	(User Input)
Bolt Ultimate Strength =	F_u := 58·ksi	(User Input)
Bolt Yield Strength =	F_y := 36·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 1.5·in	(User Input)
Threads per Inch =	n := 6	(User Input)
Length from Top of Pier to Bottom of Leveling Nut =	L_{ar} := 0·in	(User Input)
Base Plate Grouted =	Grout := "Yes"	(User Input)

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Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 1.767 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 = 1.405 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 1.338 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.334 \cdot in$

Elastic Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.235 \cdot in^3$

Plastic Section Modulus of Bolt = $Z_x := \frac{D_n^3}{6} = 0.399 \cdot in^3$

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 = $\Phi R_{nt} := \phi_t \cdot F_u \cdot A_n = 61.1 \cdot k$

Design Compression Strength = $\Phi R_{nc} := \phi_c \cdot F_y \cdot A_g = 57.3 \cdot k$

Design Shear Strength (Tension) = $\Phi R_{nv} := \phi_v \cdot 0.5 F_u \cdot A_g = 38.4 \cdot k$

Design Shear Strength (Compression) = $\Phi R_{nvc} := \phi_c \cdot 0.6 F_y \cdot A_g \cdot 0.75 = 25.8 \cdot k$

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Subject:	Anchor Bolt Analysis
Location:	180-ft Lattice Tower Litchfield, CT
Rev. 1: 1/12/22	Prepared by: T.J.L. Checked by: C.F.C. Job No. 21082.14

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $P_{ut} := \frac{Tension}{N} = 47.8 \cdot kips$

Maximum Compressive Force = $P_{uc} := if\left(Grout = "Yes", 0 \cdot kips, \frac{Compression}{N}\right) = 0 kips$

Per TIA-222-H, Addendum 1, Section 15.7 "Exemptions for Existing Structures Designed Under Previous Version of TIA" Note #7

"Section 4.9.9 Cementitious grout need not be ignored for determining anchor rod forces"

Maximum Shear Force = $V_u := \frac{Shear}{N} = 5.7 \cdot kips$

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 = $\max\left[\left(\frac{P_{ut}}{\Phi R_{nt}}\right)^2 + \left(\frac{V_u}{\Phi R_{nv}}\right)^2, \left(\frac{P_{uc}}{\Phi R_{nc}}\right) + \left(\frac{V_u}{\Phi R_{nvc}}\right)^2\right] = 63.4 \cdot \%$

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Subject:	FOUNDATION ANALYSIS
Location:	180-ft Lattice Tower Litchfield, CT
Rev. 1: 1/12/22	Prepared by: T.J.L Checked by: C.F.C. Job no. 21082.14

Caisson Foundation:

Input Data:

Tower Data

Uplift =	Uplift := 287·kips	(User Input)
Compression =	Comp := 325·kips	(User Input)
Shear Force =	Shear := 34·kips	(User Input)
Tower Height =	H_t := 180·ft	(User Input)

Footing Data:

Length of Caisson =	L_c := 23·ft	(User Input)
Extension of Caisson Above Grade =	L_{cag} := 1·ft	(User Input)
Diameter of Caisson =	d_c := 3.5·ft	(User Input)
Length of Caisson Above Wate Table =	$L_{c.AWT}$:= 17·ft	(User Input)
Length of Caisson Above Wate Table =	$L_{c.BWT}$:= 6·ft	(User Input)

Material Properties:

Concrete Compressive Strength =	f_c := 4000·psi	(User Input)
Steel Reinforcment Yield Strength =	f_y := 60000·psi	(User Input)
Ultimate Skin Friction =	μ := 6·ksf	(User Input)
Ultimate Bearing Capacity =	q_u := 48000·psf	(User Input)
Unit Weight of Soil =	γ_{soil} := 120·pcf	(User Input)
Unit Weight of Concrete =	γ_{conc} := 150·pcf	(User Input)
Depth to Neglect =	n := 4·ft	(User Input)
Resistance Factor for Bearing =	$\Phi_{sBearing}$:= 0.75	(TIA-222-G 9.4.1)
Resistance Factor for Friction =	$\Phi_{sFriction}$:= 0.75	(TIA-222-G 9.4.1)

Calculated Properties:

Adjusted Concrete Unit Weight = $\gamma_c := \gamma_{conc} - 62.4pcf = 87.6 \cdot pcf$

Weight of Concrete Caisson (no water) = $WT_{c.comp} := \frac{\pi}{4} \cdot \left(d_c^{\,2} L_c \right) \cdot \gamma_{conc} = 33.193 \cdot kip$

Weight of Concrete Caisson (water) = $WT_{c.uplift} := \frac{\pi}{4} \cdot \left[\left(d_c^{\,2} L_{c.AWT} \right) \cdot \gamma_{conc} + \left(d_c^{\,2} L_{c.BWT} \right) \cdot \gamma_c \right] = 29.591 \cdot kip$

Check Uplift:

Uplift Resistance from Concrete Weight = $Uplift_{conc} := WT_{c.uplift} \cdot 0.9 = 26.632 \cdot kips$

Uplift Resistance from Skin Friction = $Uplift_{SF} := \pi \cdot d_c \cdot \left(L_c - L_{cag} - n \right) \cdot \mu \cdot \Phi_{sFriction} = 890.642 \cdot kips$

Total Uplift Resistance = $Uplift_R := Uplift_{conc} + Uplift_{SF} = 917.273 \cdot kips$

Uplift Check = $\frac{Uplift}{Uplift_R} = 31.29 \cdot \%$

$Uplift\_Check := if\left(\frac{Uplift_R}{Uplift} \geq 1.0, "Okay", "No\ Good" \right)$

Uplift_Check = "Okay"

Check Compression:

Total Compression Force = $Comp_{tot} := WT_{c.comp} + Comp = 358.193 \cdot kips$

Compression Resistance from Bearing = $Comp_{bearing} := \frac{\pi}{4} \cdot d_c^{\,2} \cdot q_u \cdot \Phi_{sBearing} = 346.361 \cdot kips$

Compression Resistance from Skin Friction = $Comp_{SF} := \pi \cdot d_c \cdot \left(L_c - L_{cag} - n \right) \cdot \mu \cdot \Phi_{sFriction} = 890.642 \cdot kips$

Total Compression Resistance = $Comp_R := Comp_{bearing} + Comp_{SF} = 1237 \cdot kips$

Compression Check = $\frac{Comp_{tot}}{Comp_R} = 28.96 \cdot \%$

$Compression\_Check := if\left(\frac{Comp_R}{Comp_{tot}} \geq 1.0, "Okay", "No\ Good" \right)$

Compression_Check = "Okay"

ATTACHMENT F – PROOF OF DELIVERY OF NOTICE

ORIGIN ID:EFBA (203) 562-9885
SHIPPING
JOSEPH MERRITT CO.
60 HAMILTON STREET

NEW HAVEN, CT 065115920
UNITED STATES US

SHIP DATE: 11FEB22
ACTWGT: 5.00 LB MAN
CAD: 0517347/CAFE3509

BILL THIRD PARTY

TO

CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE

NEW BRITAIN CT 06051

PO: S0423853

FedEx Express

TRK# 0201 6437 3911 1888

MON - 14 FEB 4:30P
STANDARD OVERNIGHT

00 BDLA

06051
CT-US BDL

Part # 156148-434 RIT2 01/14

ORIGIN ID:EFBA (203) 562-9885
SHIPPING
JOSEPH MERRITT CO.
50 HAMILTON STREET

NEW HAVEN, CT 065115920
UNITED STATES US

SHIP DATE: 11FEB22
ACTWGT: 2.00 LB MAN
CAD: 0517347/CAFE3509

BILL THIRD PARTY

TO BRIAN BENITO
DEPT OF EMER. SERV. & PUBLIC PROT.
1111COUNTRY CLUB ROAD

MIDDLETOWN CT 06457

PO: S0423853

FedEx
Express

TRK# 6437 3911 1877

MON - 14 FEB 4:30P
STANDARD OVERNIGHT

00 BDLA

06457
CT-US BDL

Part # 156148-434 RIT2 01/14

ORIGIN ID:EFBA (203) 562-9885
SHIPPING
JOSEPH MERRITT CO.
50 HAMILTON STREET

EW HAVEN, CT 065115920
NITED STATES US

SHIP DATE: 11FEB22
ACTWGT: 2.00 LB MAN
CAD: 0517347/CAFE3509

BILL THIRD PARTY

570C2/027C/6F4D

DENNIS P. TOBIN
TOWN OF LITCHFIELD
74 WEST STREET

LITCHFIELD CT 06759

PO: S0423853

FedEx
Express

J211020121101uv

MON - 14 FEB 4:30P
STANDARD OVERNIGHT

TRK# 6437 3911 1866
0201

00 HFDA

06759
CT-US BDL

Part # 156148-434 RIT2 01/14

ORIGIN ID:EFBA (203) 562-9885
SHIPPING
JOSEPH MERRITT CO.
60 HAMILTON STREET

NEW HAVEN, CT 065115920
UNITED STATES US

SHIP DATE: 11FEB22
ACTWGT: 2.00 LB MAN
CAD: 0517347/CAFE3509

BILL THIRD PARTY

TO HONORABLE DENISE RAAP
TOWN OF LITCHFIELD
74 WEST STREET

LITCHFIELD CT 06759

REF: S0423853

FedEx
Express

J211020121101uv

TRK# 0201 6437 3911 1855

MON - 14 FEB 4:30P
STANDARD OVERNIGHT

00 HFDA

06759
CT-US BDL

Part # 156146-434 RITE 01/14

ATTACHMENT G - POWER DENSITY REPORT

C Squared Systems, LLC
65 Dartmouth Drive
Auburn, NH 03032
603-644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions Report

ES-077 – Litchfield Troop L CSP

452 Bantam Road

Litchfield, CT 06759

January 20, 2022

Table of Contents

List of Tables

List of Figures

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the Eversource installation on the tower at 452 Bantam Road in Litchfield, CT. Eversource has recently installed one omnidirectional antenna for both transmit and receive purposes as part of its 220 MHz communications system. The original proposal consisted of two omnidirectional antennas – one for transmit and one receive-only antenna.

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

Additionally, power density information for the proposed AT&T installation as detailed in its Notice of Exempt Modification filing dated July 23, 2021 (EM-CING-074-210726) is include for completeness.

Site Address	452 Bantam Road
Latitude	41° 44' 10.24" N
Longitude	73° 13' 5.04" W
Site Elevation AMSL	743’
Survey Engineer	Marc Salas
Survey Date/Time	8/24/2020; 12:00 PM – 12:45 PM

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 Eversource installation. These parameters are applied to the above calculation methods in order to calculate the % MPE values of the recently installed Eversource equipment. Any receive only antennas are not included in the % MPE calculations and are therefore not listed in the table below.

Operator	Antenna Model	TX Freq. (MHz)	Ant Gain (dBd)	Power ERP (Watts)	Number of Channels	Vertical Beamwidth	Length (ft)	Antenna Centerline Height (ft)
Eversource	dB Spectra SP2D00P36D-D	217	0.0	124	4	60°	15.6	114

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

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

[2] Transmit antenna height listed is based on the Centek Structural Analysis Report dated January 12, 2022 (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# 01265			
Calibration Date	January 2019			
Calibration Interval	24 Months			
Meter	NBM550, Serial# F-0147			
Calibration Date	March 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 August 24, 2020 between 12:00 PM and 12:45 PM. The calculated % MPE contribution from the recently installed Eversource equipment along with the net change of AT&T's % MPE from its petition[4] was then added to the measured % MPE values in the "Composite % MPE" column. These calculated values the Eversource 220 MHz equipment 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 14 measurements recorded in the vicinity of the tower. The highest spatially averaged measurement was 8.70% (Average Uncontrolled / General Population MPE) and was recorded at Location 7 near the CT State Police (CSP) building entrance. The highest composite (measured + calculated) % MPE value is calculated to be 11.06% (Average Uncontrolled / General Population) and is also calculated to occur at Location 7.

Meas. Location	Location Description	Latitude	Longitude	Dist. From Site (feet)	Measured % MPE (Uncontrolled / General)	Calculated % MPE (Eversource 220 MHz)	Calculated AT&T % MPE change from EM-CING-074-210726	Composite % MPE (Uncontrolled / General)
1	Compound access gate	41.73632	-73.21813	54	2.40%	2.32%	0.42%	5.15%
2	South of compound in parking lot	41.73604	-73.21817	54	3.43%	1.97%		5.82%
3	Sidewalk south of CSP building	41.73580	-73.21766	178	4.85%	2.08%		7.35%
4	SW in large parking lot	41.73533	-73.21748	351	5.83%	0.65%		6.90%
5	SE in large parking lot	41.73542	-73.21721	365	6.42%	0.60%		7.44%
6	Center of memorial	41.73605	-73.21723	239	8.34%	1.32%		10.07%
7	**CSP building entrance**	**41.73616**	**-73.21740**	**189**	**8.70%**	**1.94%**		**11.06%**
8	Along CSP building access road	41.73674	-73.21640	504	8.32%	0.31%		9.05%
9	Car lot south of CSP building	41.73593	-73.21591	602	7.03%	0.22%		7.67%
10	South end of Harris Road	41.73459	-73.21403	1248	7.67%	0.05%		8.13%
11	Intersection of Ongley Road and Harris Road	41.73648	-73.21410	1094	6.60%	0.06%		7.08%
12	North end of Harris Road	41.73917	-73.21412	1539	6.08%	0.03%		6.53%
13	Litchfield Inn parking lot	41.73774	-73.21762	587	5.95%	0.23%		6.59%
14	In front of Toyota dealer	41.73614	-73.21562	674	7.23%	0.17%		7.82%

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

[4] Connecticut Siting Council Notice of Exempt Modification, 438 Bantam Road, Litchfield, CT dated July 23, 2021 https://portal.ct.gov/-/media/CSC/2_EMS-medialibrary/Litchfield/BantamRd/ATT-CING/em-cing-074-210726_filing_438BantamRd_Litchfield.pdf

[5] 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.

Figures 2 and 3 below are aerial views[6] of the tower location and the surrounding area, along with the measurement locations listed in Table 4.

Figure 2: Measurement Points – Zoom In

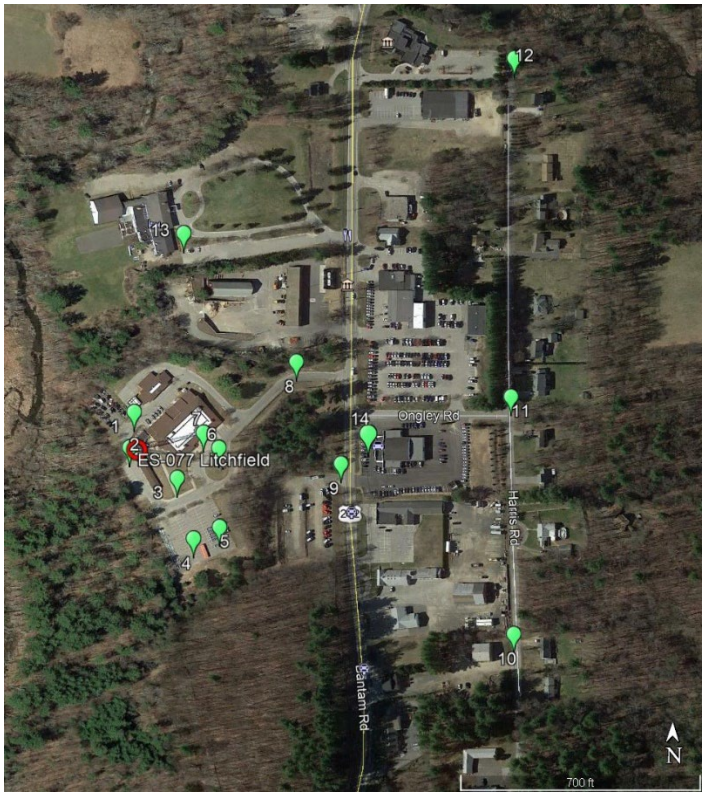

Figure 3: All Measurement Points

[6] Map showing location of telecommunications facility and the surrounding area. *Google Earth*, https://earth.google.com/web/.

7. Conclusion

A number of accessible areas around the tower at 452 Bantam Road in Litchfield, 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 8.70% MPE. This measurement was recorded at Location 7 by the main entrance to the CT State Police building.

The highest composite (measured + calculated) power density is **11.06% of the FCC General Population MPE limit** with the recently installed Eversource 220 MHz equipment and net % MPE change of AT&T's equipment (as documented in their petition), is also calculated to occur at Location 7.

The above analysis concludes that RF exposure at ground level around the tower, both currently and with the proposed antenna installation, will be 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

January 20, 2022

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[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)
0.3-3.0	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[8]

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)

[7] 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

[8] 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

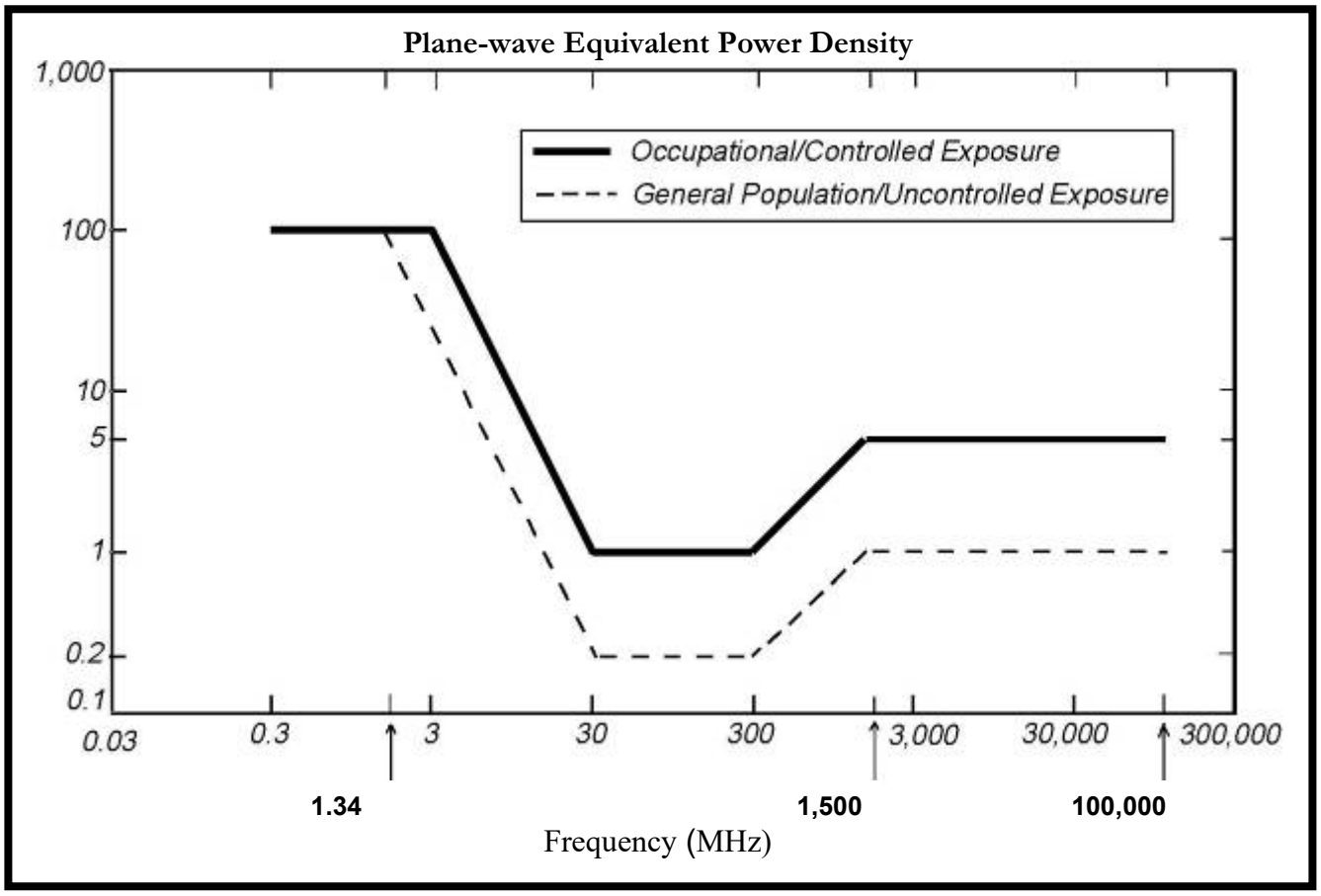

Figure 4: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Eversource Antenna Data Sheet and Electrical Patterns

217 MHz

Manufacturer:	dB Spectra
Model #:	SP2D00P36D-D
Frequency Band:	217-220 MHz
Gain:	0 dBd
Vertical Beamwidth:	60°
Horizontal Beamwidth:	360°
Polarization:	Vertical-Polarization
Length:	15.6’