



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

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

March 8, 2022

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

**RE: Notice of Exempt Modification  
Eversource Site # ES-055 Willimantic  
349R Mountain Street, Windham, CT 06280  
Latitude: 41-42-10.84 N / Longitude: 72-13-17.01 W**

Dear Ms. Bachman:

The Connecticut Light and Power Company doing business as Eversource Energy (“Eversource”) currently maintains multiple antennas at various mounting heights on an existing 196-foot self-support tower located at 349R Mountain Street in Windham. See [Attachment A](#), Parcel Map and Property Card. The tower and property are owned by SBA Properties Inc., doing business as SBA Communications Corporation (“SBA”). Eversource and SBA have entered into an agreement allowing the modification of Eversource’s equipment on the existing tower. See [Attachment B](#), Letter of Authorization. Eversource is seeking the Connecticut Siting Council’s authorization for the installation of one 15-foot 7-inch omni-directional antenna to be mounted at 153 feet above ground level (“AGL”) on a four-foot stand-off mount, and the removal of two 4-foot 3-inch omni-directional antennas and associated mounts. The antenna will be mounted to the tower on a new 4-foot stand-off mount. See [Attachment C](#), Mount Analysis. There will be no changes to the area of the fenced compound, the tower or existing antennas and equipment mounted on the tower. The tower and existing and proposed equipment are depicted on [Attachment D](#), Construction Drawings, dated February 28, 2022 and [Attachment E](#), Structural Analysis, dated February 9, 2022. The Connecticut Siting Council approved Eversource’s use of the tower at this location in Petition No. 910 in August 2009.

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-163-201002, dated October 19, 2020). 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 Tom DeVivo, Mayor of the Town of Windham, Jim Rivers, Town Manager of the Town of Windham, and

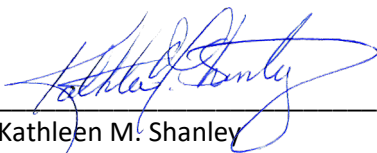
Matthew Vertefeuille, Director of Code Enforcement of the Town of Windham, via private carrier. Proof of delivery is attached. See Attachment F, Proof of Delivery of Notice.

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 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 February 25, 2022. (Attachment G – Power Density Report<sup>1</sup>)
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

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

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

By:   
Kathleen M. Shanley  
Manager – Transmission Siting

cc: Honorable Tom DeVivo, Mayor, Town of Windham  
Jim Rivers, Town Manager, Town of Windham  
Matthew Vertefeuille, Director of Code Enforcement  
SBA

#### 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

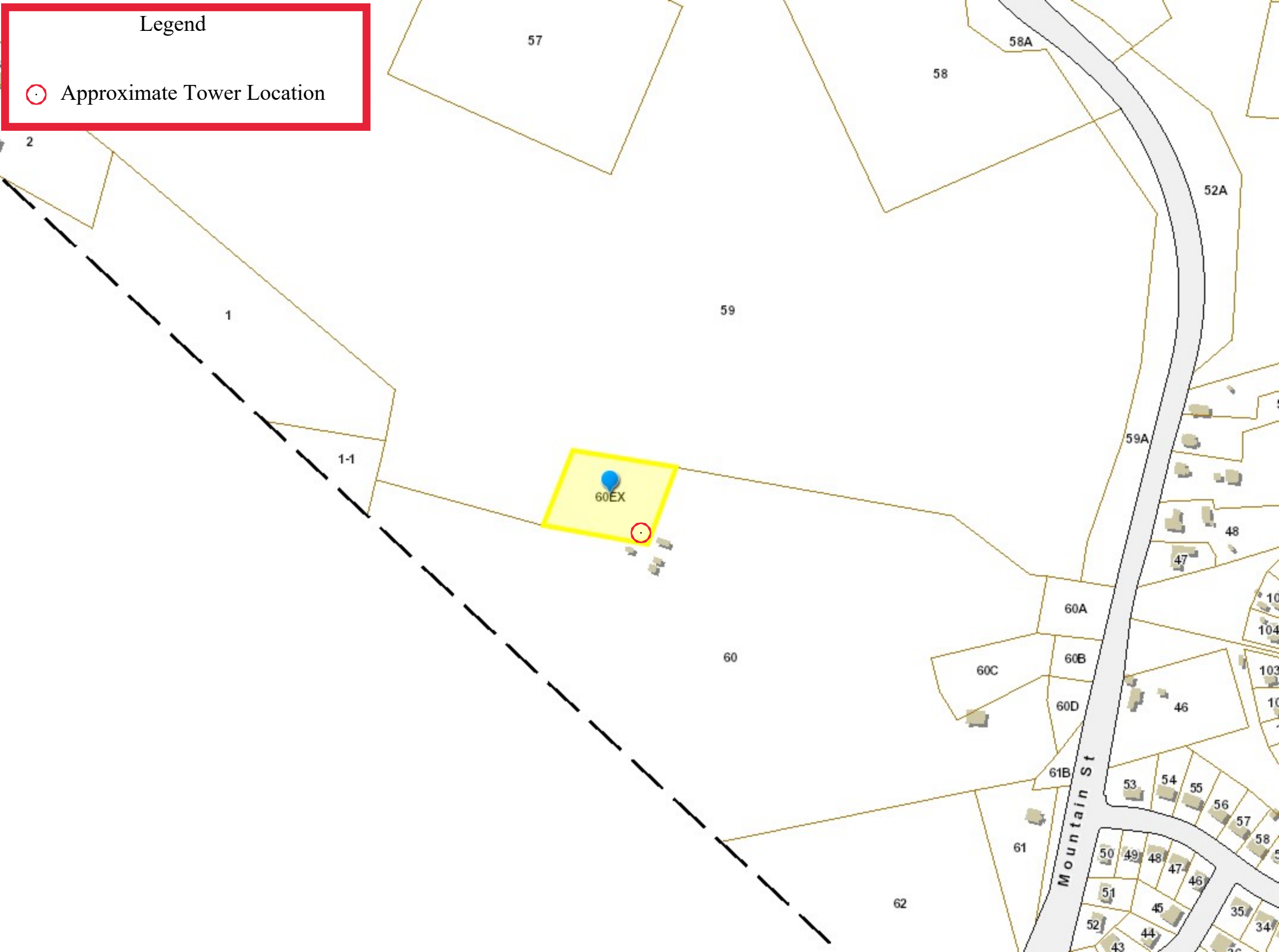
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<sup>1</sup> Receive-only antennas are not included in the Power Density Report, as they are irrelevant to the % MPE calculations.

ATTACHMENT A – PARCEL MAP AND PROPERTY CARD

Legend

○ Approximate Tower Location



CURRENT OWNER		TOPO.	UTILITIES	STRT./ROAD	LOCATION	CURRENT ASSESSMENT			
SBA PROPERTIES INC		2 Above Street	5 Well	3 Unpaved		Description	Code	Appraised Value	Assessed Value
8051 CONGRESS AVE		5 Steep	6 Septic			UTL LAND	4-1	124,400	87,080
BOCA RATON, FL 33487			0 None			UTL BLDG	4-2	29,900	20,930
Additional Owners:						UTL OUTBL	4-3	17,020	11,920
<b>SUPPLEMENTAL DATA</b>									
Other ID:	3- 9/154/ 60EX		LCI		C				
Zoning	R4		ParcelStatus						
Neighborhood	250 - 0		Cost Flag						
Living Units	0		Lot Number		0				
Census	8004		A_D						
District No	2		ASSOC PID#						
GIS ID:									
<b>Total</b>								<b>171,320</b>	<b>119,930</b>

6163  
WINDHAM, CT

VISION

RECORD OF OWNERSHIP		BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.	PREVIOUS ASSESSMENTS (HISTORY)								
SBA PROPERTIES INC		631/ 299	04/10/2001	U	I	108,650	22	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
NUTMEG BROADCASTING COMPANY		343/ 130	09/10/1990	U	I	0	0	2017	4-1	87,080	2016	4-1	87,080	2015	300	26,810
NUTMEG BROADCASTING COMPANY		304/ 277	10/09/1987	Q	I	75,000		2017	4-2	26,810	2016	4-2	26,810	2015	300	87,080
SYNCOM CAPITAL CORPORATION		285/ 647	09/01/1985	U	I	0		2017	4-3	0	2016	4-3	0			
DELTA COMMUNICATIONS CORPORATION		263/ 635	06/01/1980	U	I	0										
DAWSON JEROME & HILDA		241/ 106	04/01/1975	U	I	0										
<b>Total:</b>									<b>113,890</b>			<b>113,890</b>			<b>113,890</b>	

EXEMPTIONS			OTHER ASSESSMENTS					
Year	Type	Description	Amount	Code	Description	Number	Amount	Comm. Int.
<b>Total:</b>								

This signature acknowledges a visit by a Data Collector or Assessor

ASSESSING NEIGHBORHOOD				
NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
0001/A			433	I

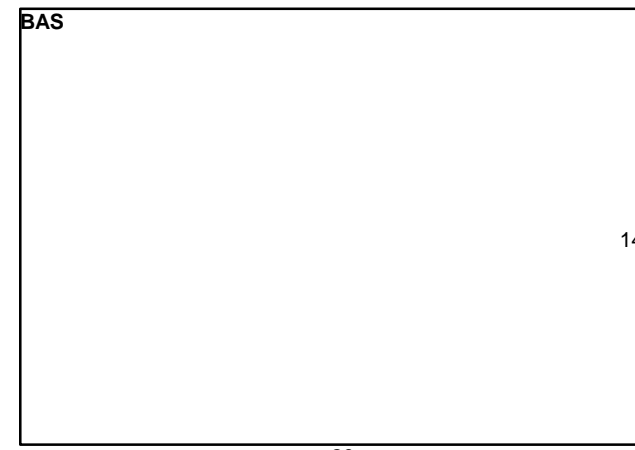
APPRAISED VALUE SUMMARY	
Appraised Bldg. Value (Card)	29,900
Appraised XF (B) Value (Bldg)	0
Appraised OB (L) Value (Bldg)	17,020
Appraised Land Value (Bldg)	124,400
Special Land Value	0
Total Appraised Parcel Value	171,320
Valuation Method:	C
Adjustment:	0
<b>Net Total Appraised Parcel Value</b>	<b>171,320</b>

NOTES									

BUILDING PERMIT RECORD									VISIT/ CHANGE HISTORY					
Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments	Date	Type	IS	ID	Cd.	Purpose/Result
34217	03/12/2018	53	Cell Tower/Antennae	15,000		0			10/02/2002			BM	I	ENTRY + SIGN
32161	09/13/2016	53	Cell Tower/Antennae	79,651		0								
14063	07/01/2003	BP		6,000	07/10/2003	0	07/10/2003	06-26						
13760	05/07/2003	BP		54,000	09/10/2003	0	09/10/2003	34-26						
11453	03/13/2002	BP		30,000	09/09/2002	0	09/09/2002	34-26						
10561	04/16/2001	BP		2,000	04/17/2001	0	04/17/2001	06-26						
3086	03/01/1992	BP		0		0		16 26 #274						

LAND LINE VALUATION SECTION																					
B #	Use Code	Use Description	Zone	D	Front	Depth	Units	Unit Price	I. Factor	S.A.	Acre Disc	C. Factor	ST. Idx	Adj.	Notes-Adj	Special Pricing	S Adj Fact	Adj. Unit Price	Land Value		
1	304	Public Utility C	R4				1.00	AC	80,000.00	1.0000	0	1.0000	1.00	250	1.00	Topography;		1.00	80,000		
1	304	Public Utility C					0.05	AC	1,400.00	1.0000	0	1.0000	1.00		0.00	Topography;		1.00	70		
1	304	Public Utility C					1.00	AC	44,330.00	1.0000	0	1.0000	1.00		0.00			1.00	44,330		
<b>Total Card Land Units:</b>							<b>2.05</b>	<b>AC</b>	<b>Parcel Total Land Area:</b>				<b>2.05 AC</b>	<b>Total Land Value:</b>							<b>124,400</b>

CONSTRUCTION DETAIL				CONSTRUCTION DETAIL (CONTINUED)			
Element	Cd.	Ch.	Description	Element	Cd.	Ch.	Description
Style	79		Telephone Bldg				
Model	94		Commercial				
Grade	03		Average				
Stories	1.0						
Occupancy	0						
Exterior Wall 1	15		Concrete/mas				
Level From	01	01					
Level To	01	01					
Uncov Parking	0						
Perimeter	68						
Identical Units	1						
Efficiency	0						
1 Bedroom	0						
2 Bedroom	0						
3 Bedroom	0						
AC Type	03		Central				
Structure Type	720	720					
Bldg Use	304		Public Utility C				
Percent Finish	100						
Heating	07		Electr Basebrd				
Frame Type	02		Wood Frame				
Plumbing	00		None				
Local Modifier	2.75						
Partitions	00		None				
Wall Height	10						
Size	280						
<b>MIXED USE</b>				<i>Code</i>	<i>Description</i>		<i>Percentage</i>
				304	Public Utility C		100
<b>COST/MARKET VALUATION</b>							
Adj. Base Rate:				146.29			
AYB				1975			
Dep Code				A			
Remodel Rating							
Year Remodeled							
Dep %				27			
Functional Obslnc							
External Obslnc							
Cost Trend Factor							
Condition							
% Complete				73			
Overall % Cond				29,900			
Apprais Val				0			
Dep % Ovr				0			
Dep Ovr Comment							
Misc Imp Ovr				0			
Misc Imp Ovr Comment							
Cost to Cure Ovr				0			
Cost to Cure Ovr Comment							



OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)												
Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value
FN30	CHAIN LINK 6			L	120	16.90	1975				50	1,010
SH10	SHED FRAME			L	288	15.00	1990				70	3,020
FN30	CHAIN LINK 6			L	80	16.90	1990				70	950
FN40	CHAIN LINK 8			L	320	22.25	2002				70	4,980
PC30	PAVING CONC			L	1,296	6.81	2002				80	7,060

**BUILDING SUB-AREA SUMMARY SECTION**

Code	Description	Gross Area	Living Area	Eff. Area
BAS	First Floor	280	280	
<b>Ttl. Gross Liv/Lease Area:</b>		<b>280</b>	<b>280</b>	



ATTACHMENT B – LETTER OF AUTHORIZATION



SBA Communications Corporation  
8051 Congress Avenue  
Boca Raton, FL 33487-1307

T + 561.995.7670  
F + 561.995.7626

[sbasite.com](http://sbasite.com)

## LETTER OF AUTHORIZATION

**SBA Site ID:** CT06462-A, Mountain Street

**Property Located at:** 349 Mountain Street, Windham, CT, 06226

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**THE CITY/COUNTY OF:** Windham / Windham/Windham

### APPLICATION FOR ZONING/USE/BUILDING PERMIT

This letter authorizes Eversource and its authorized agents to file for all necessary zoning, planning and building permits (local, state and federal) for the purposes of installing, operating and maintaining a telecommunications facility on the existing tower on the property referenced above on behalf of SBA Properties, LLC.

All approval conditions that may be granted to Eversource in connection with above referenced facility relating to this specific application are the sole responsibility of Eversource.

SBA Properties, LLC

A handwritten signature in black ink, appearing to read "Jason Silberstein", is written over a light blue horizontal line.

Jason Silberstein

Executive VP, Site Leasing

Date: 3/02/2022



ATTACHMENT C – MOUNT ANALYSIS

November 29, 2021

**MOUNT EVALUATION LETTER**

**Site Number:** 5568  
**Site Name:** WILLIMANTIC  
**Site Data:** 349 Mountain St.  
 Windham, CT 06280  
**Latitude:** 41° 42' 10.84"  
**Longitude:** -72° 13' 17.01"

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**

<b>Structure Rating (max from all components) =</b>	50.1%
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<b>Proposed Mounting System</b>
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:

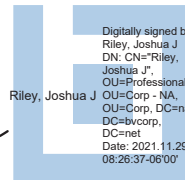
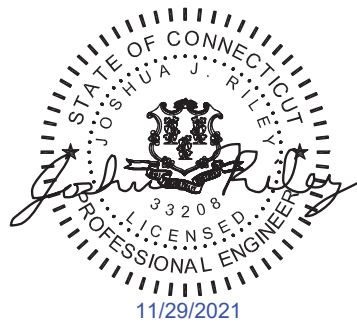
- Contractor shall be responsible for the means and methods of construction.
- Contractor shall inspect the condition of all existing and proposed structural members, all relevant members and connections and report any deficiencies to the engineer prior to installation of any new antennas and other equipment.

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: Joochwan Jung  
 Submitted By: Josh Riley, P.E.





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2. ANALYSIS CRITERIA SUMMARY
3. REFERENCES
4. ASSUMPTIONS
5. RESULTS SUMMARY

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APPENDIX 2: RISA PRINTOUTS

APPENDIX 3: ATTACHMENTS





## 2. ANALYSIS CRITERIA SUMMARY

ANALYSIS CRITERIA	
STANDARD	TIA-222-H
WIND SPEED	Ultimate of 140 mph
WIND SPEED WITH ICE	50 mph with 1" radial ice thickness
EXPOSURE CATEGORY	B
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	50.1%	Pass	20.4%	Pass
Bracing: Pipe 2.0 Std	34.2%	Pass	6.3%	Pass
Mount Pipe: Pipe 3.0 Std	29.3%	Pass	19.9%	Pass

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

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



**BLACK & VEATCH**

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*November 29, 2021*

*WILLIMANTIC*

**APPENDIX 1:  
MOUNT ANALYSIS REPORT**



**BLACK & VEATCH**

Client: Eversource  
Site Name: WILLIMANTIC (5568)

Computed By: JooHwan Jung

Date: 11/29/2021

Verified By: Josh Riley

Title: MOUNT ANALYSIS REPORT

Date: 11/29/2021

**Dead and Live Loads**

Maintenance Live Load:  $L_V = 250$  lb

Installation Live Load:  $L_M = 0$  lb

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







Client: Eversource  
 Site Name: WILLIMANTIC (5568)

Computed By: Joohwan Jung

Date: 11/29/2021

Verified By: Josh Riley

**BLACK & VEATCH**

Title: MOUNT ANALYSIS REPORT

Date: 11/29/2021

**Member Wind Loading**

Exposure Category = B  
 Risk Category = III  
 Topographic Category = 1  
 Basic Wind Speed, V = 140 mph  
 Height Above Ground, z = 161.2 ft  
 Crest Height, H = N/A ft  
 Velocity Pressure Coefficient,  $K_z$  = 1.13  
 Topographic Factor,  $K_{zt}$  = 1.00  
 Wind Directionality Factor,  $K_d$  = 0.95  
 Shielding Factor,  $K_a$  = 0.90  
 Ground Elevation Factor,  $K_e$  = 1.000  
 Wind Velocity Pressure,  $q_z$  = 53.99 psf  
 Gust Effect Factor,  $G_h$  = 1.00

**Equations**

$K_z = 2.01 (z / z_g)^{2/\alpha}$   
 $K_h = e^{(f \cdot z / H)}$   
 $K_{zt} = [1 + K_c K_t / K_h]^2$   
 $K_e = e^{-0.0005z^2}$   
 $q_z = 0.00256 K_z K_{zt} K_e K_d V^2$   
 $F_A = q_z G_h (EPA)$   
 $F_M = q_z G_h C_f D_p$

TIA-222-H  
 2.6.5.2  
 2.6.6.2.1  
 2.6.6.2.1  
 2.6.8  
 2.6.11.6  
 2.6.11.2  
 2.6.11.2

Member Wind Loads					
Name	Depth (ft)	Width (ft)	$C_f$	$D_p$ (ft)	$F_M$ (lb)
Arm: HSS3X3X3	0.25	0.25	2	0.25	27.00
Bracing: Pipe 2.0 Std	0.20		1.2	0.20	12.82
Mount Pipe: Pipe 3.0 Std	0.29		1.2	0.29	18.90



Client: Eversource  
 Site Name: WILLIMANTIC (5568)

Computed By: JooHwan Jung

Date: 11/29/2021

Verified By: Josh Riley

**BLACK & VEATCH**

Title: MOUNT ANALYSIS REPORT

Date: 11/29/2021

**Appurtenance Ice Dead Loading**

Exposure Category = B  
 Risk Category = III  
 Topographic Category = 1  
 Height Above Ground, z = 161.2 ft  
 Crest Height, H = N/A ft  
 Design Ice Thickness, T<sub>i</sub> = 1.00 in  
 Importance Factor, I = 1.15  
 Topographic Factor, K<sub>zt</sub> = 1.00  
 Height Escalation Factor, K<sub>iz</sub> = 1.17  
 Factored Ice Thickness, T<sub>iz</sub> = 1.35 in  
 Grating Ice Dead Load, D<sub>Gice</sub> = 6.29 psf

**Equations**

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_{iz} = (z/33)^{u \cdot 10}$$

$$T_{iz} = T_i I K_{iz} (K_{zt})^{u \cdot 30}$$

$$DL_{ice} = [(H_{ice} \cdot D_{ice} \cdot W_{ice}) - (H \cdot W \cdot D)] \cdot 56 \text{pcf}$$

TIA-222-H

2.6.6.2.1

2.6.6.2.1

2.6.10

2.6.10

**Appurtenance Ice Dead Loads**

Name	Height w/ ice (ft)	Width w/ice (ft)	Depth w/ ice (ft)	V <sub>ice</sub> (ft <sup>3</sup> )	DL <sub>ice</sub> (lb)
SP2D00P36D-D	15.82	0.47	0.47	2.59	145.02



**BLACK & VEATCH**

Client: Eversource  
 Site Name: WILLIMANTIC (5568)

Computed By: JooHwan Jung

Date: 11/29/2021

Verified By: Josh Riley

Title: MOUNT ANALYSIS REPORT

Date: 11/29/2021

**Member Ice Dead Loading**

Exposure Category = B  
 Risk Category = III  
 Topographic Category = 1  
 Height Above Ground, z = 161.2 ft  
 Crest Height, H = N/A ft  
 Design Ice Thickness, T<sub>i</sub> = 1.00 in  
 Importance Factor, I = 1.15  
 Topographic Factor, K<sub>zt</sub> = 1.00  
 Height Escalation Factor, K<sub>iz</sub> = 1.17  
 Factored Ice Thickness, T<sub>iz</sub> = 1.35 in  
 Grating Ice Dead Load, D<sub>Gice</sub> = 6.29 psf

**Equations**

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_{iz} = (z/33)^{0.10}$$

$$T_{iz} = T_i I K_{iz} (K_{zt})^{0.35}$$

$$A_{iz} = \pi \cdot T_{iz} \cdot (D_c + T_{iz})$$

$$DL_{ice} = A_{iz} \cdot 56 \text{pcf}$$

TIA-222-H

2.6.6.2.1

2.6.6.2.1

2.6.10

2.6.10

2.6.10

**Member Ice Dead Loads**

Name	Depth w/ ice (ft)	Width w/ ice (ft)	Dc (ft)	Aiz (ft <sup>2</sup> )	DL <sub>ice</sub> (lb/ft)
Arm: HSS3X3X3	0.47	0.47	0.35	0.16	9.20
Bracing: Pipe 2.0 Std	0.42		0.20	0.11	6.13
Mount Pipe: Pipe 3.0 Std	0.52		0.29	0.14	7.98





Client: Eversource  
 Site Name: WILLIMANTIC (5568)

Computed By: JooHwan Jung

Date: 11/29/2021

Verified By: Josh Riley

BLACK & VEATCH

Title: MOUNT ANALYSIS REPORT

Date: 11/29/2021

**Member Ice Wind Loading**

Exposure Category = B  
 Risk Category = III  
 Topographic Category = 1  
 Ice Wind Speed,  $V_{ice}$  = 50 mph  
 Height Above Ground,  $z$  = 161.2 ft  
 Crest Height,  $H$  = N/A ft  
 Velocity Pressure Coefficient,  $K_z$  = 1.13 psf  
 Topographic Factor,  $K_{zt}$  = 1.00  
 Wind Directionality Factor,  $K_d$  = 0.95  
 Shielding Factor,  $K_a$  = 0.90  
 Ground Elevation Factory,  $K_e$  = 1.000  
 Ice Wind Velocity Pressure,  $q_{z(ice)}$  = 6.887  
 Factored Ice Thickness,  $T_{iz}$  = 1.35 in  
 Gust Effect Factor,  $G_h$  = 1

**Equations**

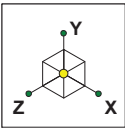
$K_z = 2.01 (z / z_g)^{2/\alpha}$   
 $K_h = e^{(f \cdot z / H)}$   
 $K_{zt} = [1 + K_c K_t / K_h]^2$   
 $K_e = e^{-0.0005z^2}$   
 $q_z = 0.00256 K_z K_{zt} K_e K_d V^2$   
 $F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$   
 $F_{M(ice)} = q_{z(ice)} G_h C_f D_{p(ice)}$

TIA-222-H

2.6.5.2  
 2.6.6.2.1  
 2.6.6.2.1  
 2.6.8  
 2.6.11.6  
 2.6.11.2  
 2.6.11.2

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	0.47	0.47	2	0.47	6.54
Bracing: Pipe 2.0 Std	0.42		1.2	0.42	3.49
Mount Pipe: Pipe 3.0 Std	0.52		1.2	0.52	4.27

**APPENDIX 2:  
RISA PRINTOUTS**



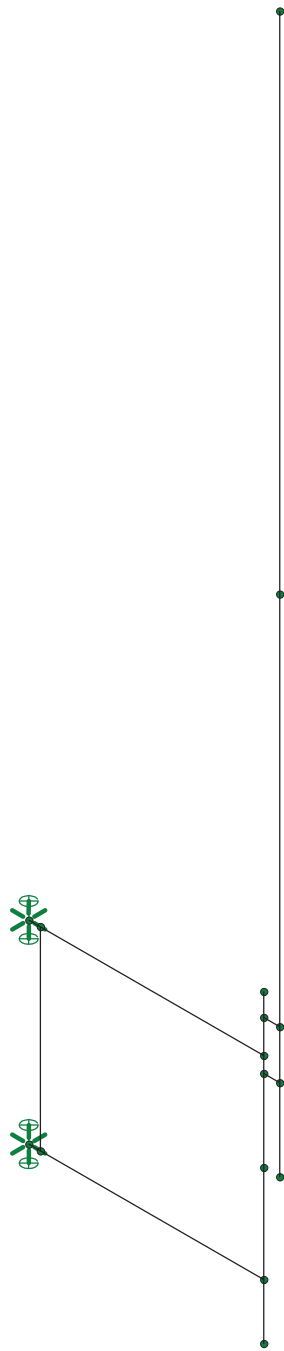
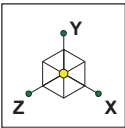
Envelope Only Solution

Black & Veatch
JooHwan Jung
405025.2021.2200

Willimantic USF-4U Model
--------------------------

SK - 1
Nov 28, 2021 at 9:29 AM
Willimantic USF-4U Model.r3d



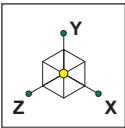


Envelope Only Solution

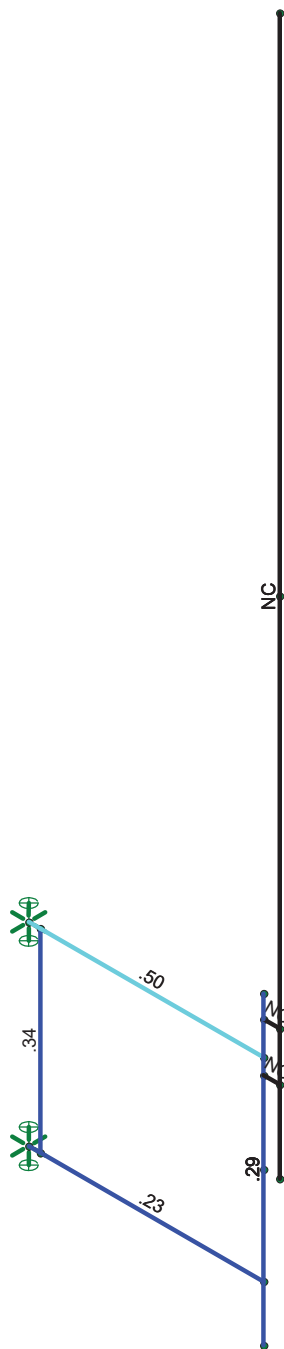
Black & Veatch
JooHwan Jung
405025.2021.2200

Willimantic USF-4U Model
--------------------------

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Willimantic USF-4U Model.r3d

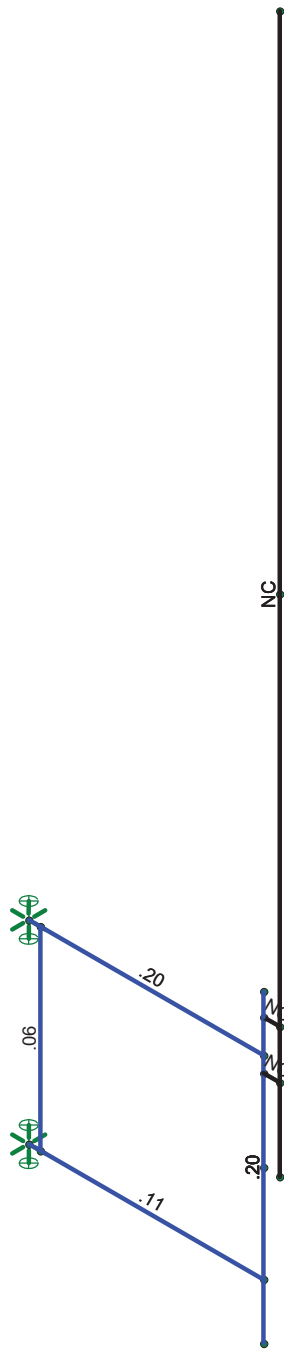
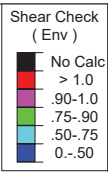
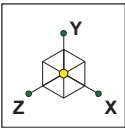


Code Check ( Env )	
Black	No Calc
Red	> 1.0
Pink	.90-1.0
Green	.75-.90
Light Blue	.50-.75
Dark Blue	0-.50



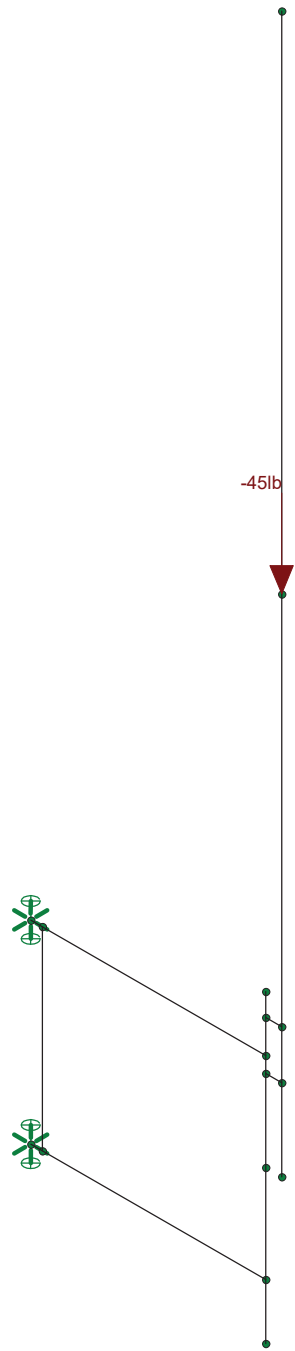
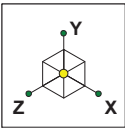
Member Code Checks Displayed (Enveloped)  
Envelope Only Solution

Black & Veatch	Willimantic USF-4U Model	SK - 3
Joochan Jung		Nov 28, 2021 at 9:29 AM
405025.2021.2200		Willimantic USF-4U Model.r3d



Member Shear Checks Displayed (Enveloped)  
Envelope Only Solution

Black & Veatch	Willimantic USF-4U Model	SK - 4
JooHwan Jung		Nov 28, 2021 at 9:29 AM
405025.2021.2200		Willimantic USF-4U Model.r3d



Loads: BLC 1, DL  
Envelope Only Solution

Black & Veatch	Willimantic USF-4U Model	SK - 5
JooHwan Jung		Nov 28, 2021 at 9:29 AM
405025.2021.2200		Willimantic USF-4U Model.r3d



**(Global) Model Settings**

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

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

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR SET ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8



**(Global) Model Settings, Continued**

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

**Hot Rolled Steel Properties**

	Label	E [ksi]	G [ksi]	Nu	Therm (/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...
1	WIND LOAD COMBOS (140 MPH)																	
2	1.2DL + WL (0 DEG)	Yes	Y		1	1.2	4	1	16	1								
3	1.2DL + WL (30 DEG)	Yes	Y		1	1.2	5	1	17	1								
4	1.2DL + WL (60 DEG)	Yes	Y		1	1.2	6	1	18	1								
5	1.2DL + WL (90 DEG)	Yes	Y		1	1.2	7	1	19	1								
6	1.2DL + WL (120 DEG)	Yes	Y		1	1.2	8	1	20	1								
7	1.2DL + WL (150 DEG)	Yes	Y		1	1.2	9	1	21	1								
8	1.2DL + WL (180 DEG)	Yes	Y		1	1.2	10	1	22	1								
9	1.2DL + WL (210 DEG)	Yes	Y		1	1.2	11	1	23	1								
10	1.2DL + WL (240 DEG)	Yes	Y		1	1.2	12	1	24	1								
11	1.2DL + WL (270 DEG)	Yes	Y		1	1.2	13	1	25	1								
12	1.2DL + WL (300 DEG)	Yes	Y		1	1.2	14	1	26	1								
13	1.2DL + WL (330 DEG)	Yes	Y		1	1.2	15	1	27	1								
14																		
15	MOUNT LOAD COMBOS (30 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	.046	16	.046						





**Load Combinations (Continued)**

Description	S...	P...	SR...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
19	1.2DL + 1.5LM + WL (30 DEG)	Yes	Y		1	1.2	3	1.5	5	.046	17	.046							
20	1.2DL + 1.5LM + WL (60 DEG)	Yes	Y		1	1.2	3	1.5	6	.046	18	.046							
21	1.2DL + 1.5LM + WL (90 DEG)	Yes	Y		1	1.2	3	1.5	7	.046	19	.046							
22	1.2DL + 1.5LM + WL (120 DEG)	Yes	Y		1	1.2	3	1.5	8	.046	20	.046							
23	1.2DL + 1.5LM + WL (150 DEG)	Yes	Y		1	1.2	3	1.5	9	.046	21	.046							
24	1.2DL + 1.5LM + WL (180 DEG)	Yes	Y		1	1.2	3	1.5	10	.046	22	.046							
25	1.2DL + 1.5LM + WL (210 DEG)	Yes	Y		1	1.2	3	1.5	11	.046	23	.046							
26	1.2DL + 1.5LM + WL (240 DEG)	Yes	Y		1	1.2	3	1.5	12	.046	24	.046							
27	1.2DL + 1.5LM + WL (270 DEG)	Yes	Y		1	1.2	3	1.5	13	.046	25	.046							
28	1.2DL + 1.5LM + WL (300 DEG)	Yes	Y		1	1.2	3	1.5	14	.046	26	.046							
29	1.2DL + 1.5LM + WL (330 DEG)	Yes	Y		1	1.2	3	1.5	15	.046	27	.046							
30																			
31	ICE LOAD COMBOS (1", 50 MPH)																		
32	1.2DL + Ice DL + Ice WL (0 DEG)	Yes	Y		1	1.2	28	1	29	1	41	1							
33	1.2DL + Ice DL + Ice WL (30 DEG)	Yes	Y		1	1.2	28	1	30	1	42	1							
34	1.2DL + Ice DL + Ice WL (60 DEG)	Yes	Y		1	1.2	28	1	31	1	43	1							
35	1.2DL + Ice DL + Ice WL (90 DEG)	Yes	Y		1	1.2	28	1	32	1	44	1							
36	1.2DL + Ice DL + Ice WL (120 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	1184.609	2	750.686	8	1338.067	5	0	43	2585.525	11	0	43
2		min	-1488.448	8	-587.305	2	-1338.067	11	0	2	-2585.525	5	0	2
3	N3	max	786.229	8	749.55	2	635.852	11	0	43	434.876	5	0	43
4		min	-482.389	2	-588.446	8	-635.852	5	0	2	-434.876	11	0	2
5	Totals:	max	702.219	2	537.238	17	702.215	5						
6		min	-702.22	8	162.24	8	-702.215	11						

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

Member	Shape	Code Check	Locf...	LC	Shear..	Locf...	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ..	phi*Mn ..Cb	Eqn	
1	M1	HSS3X3X3	.501	0	11	.204	2.266	z	11	55265....	59535	5171.25	5171.25 2...	H1-1b
2	M2	HSS3X3X3	.228	43.5	10	.115	43.5	z	11	55265....	59535	5171.25	5171.25 2...	H1-1b
3	M3	PIPE 2.0	.342	0	11	.063	0		11	28843....	32130	1871.625	1871.6252...	H1-1b
4	M4	PIPE 3.0	.293	13.5...	9	.199	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, 3 <sup>rd</sup> 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.

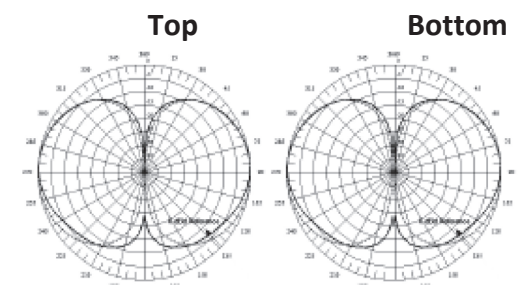
PIM Rated Design – better than -150 dBc.

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

Excellent Lightning Protection – heavy internal conductor DC ground.

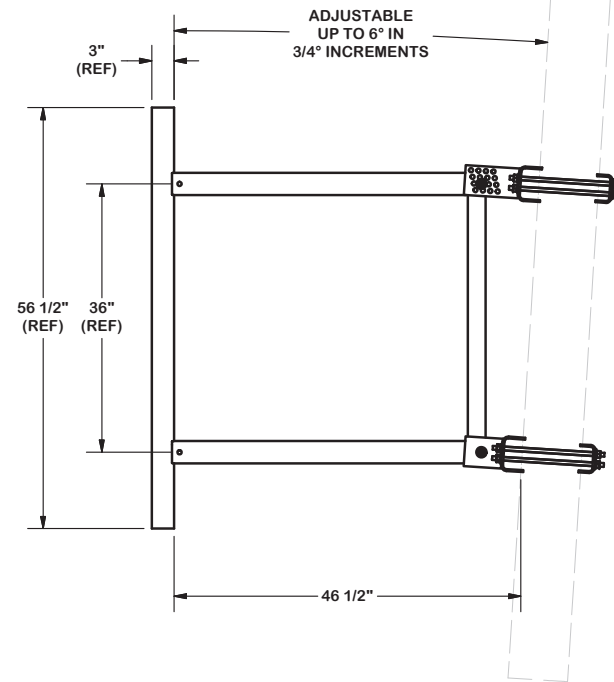
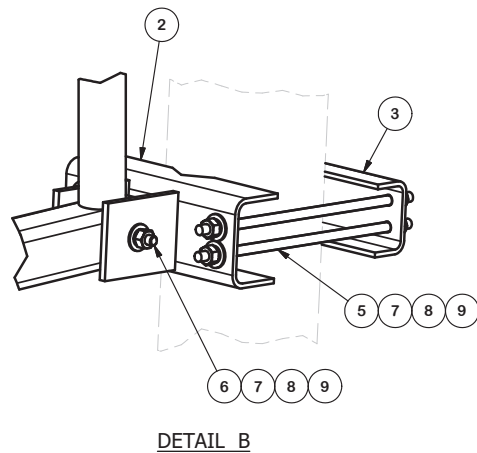
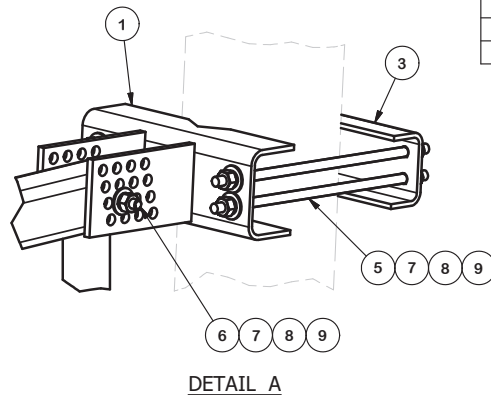
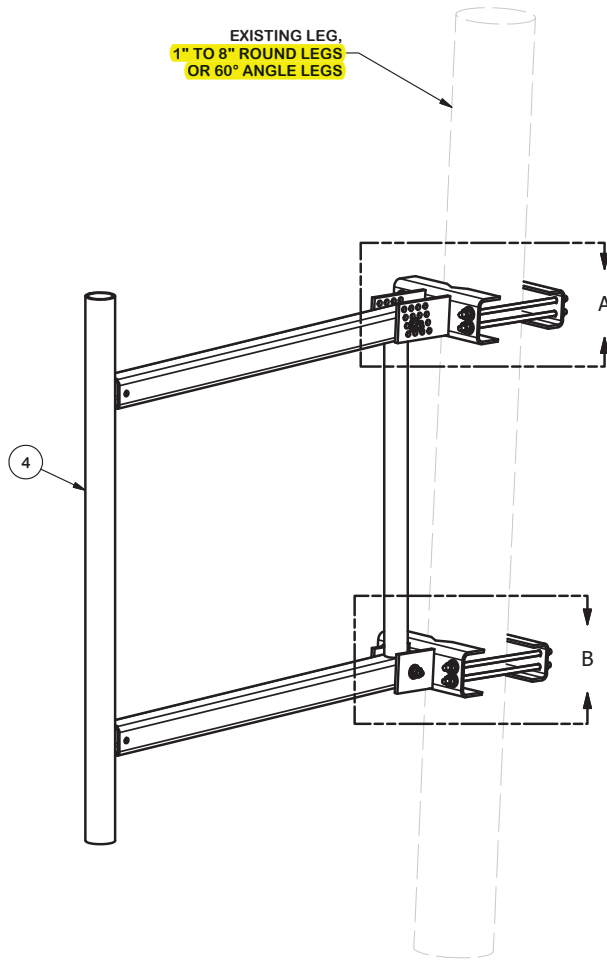
### Radiation Pattern

Vertical (No-Tilt)



TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 3.5"± DIAMETER.

EXISTING LEG,  
1" TO 8" ROUND LEGS  
OR 60° ANGLE LEGS



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

**TOLERANCE NOTES**

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

PROPRIETARY NOTE:  
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION  
 48" ULTIMATE UNIVERSAL  
 STANDOFF FRAME

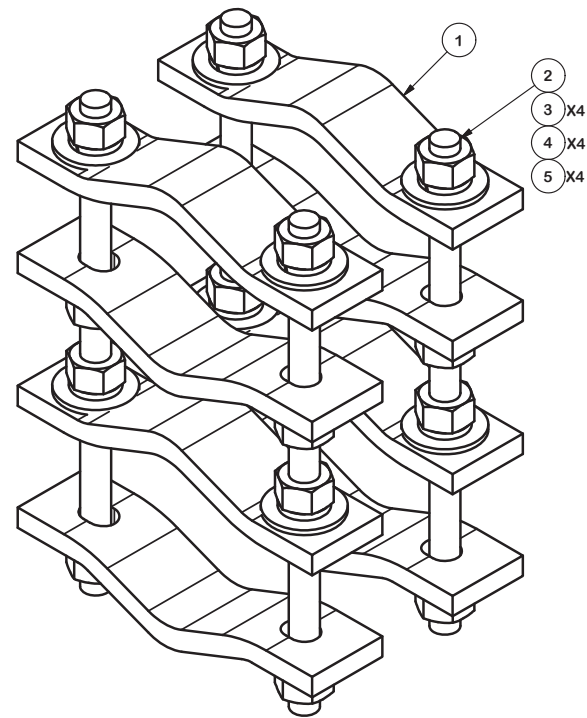
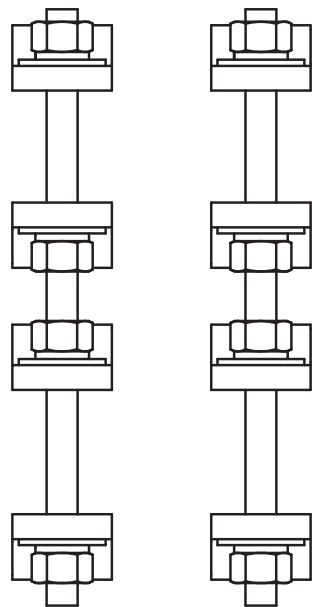
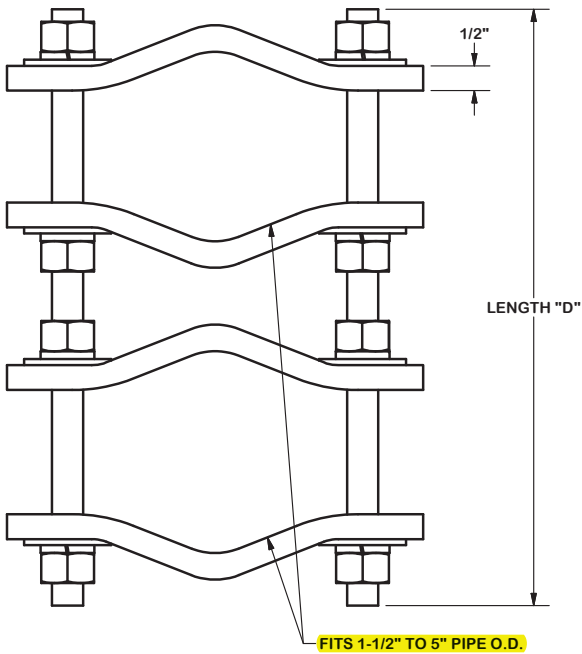
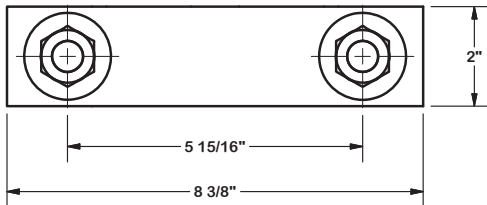
CPD NO.	DRAWN BY	ENG. APPROVAL
CLASS	DRAWING USAGE	CHECKED BY
81	01	CUSTOMER
		BMC 2/16/2011



Engineering  
 Support Team:  
 1-888-753-7446

Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Salem, OR  
 Dallas, TX

PART NO.	USF-4U
DWG. NO.	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

**TOLERANCE NOTES**

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

PROPRIETARY NOTE:  
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

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



Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Salem, OR  
 Dallas, TX

Engineering Support Team:  
 1-888-753-7446

CPD NO.	DRAWN BY	ENG. APPROVAL
CLASS	DRAWING USAGE	CHECKED BY
81	01	CUSTOMER
		CEK 1/22/2013

PART NO.	SEE ASSEMBLY "A"
DWG. NO.	DCPxxK

ATTACHMENT D – CONSTRUCTION DRAWINGS



## WILLIMANTIC (CT06462-A) 349 MOUNTAIN ST WINDHAM, CT 06280

**EVERSOURCE**  
ENERGY

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



**BLACK & VEATCH**

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

### PROJECT SUMMARY

- THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:
1. INSTALL (1) NEW OMNI/WHIP ANTENNA AT ELEVATION 169'-0"± AGL INSTEAD OF (2) OMNI/WHIP ANTENNAS, (1) AT ELEVATION 165'-1 1/2"± AGL AND (1) AT ELEVATION 157'-1 1/2"± AGL
  2. INSTALL (1) NEW RACK WITH DMR EQUIPMENT IN EXISTING SHELTER

### 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: WILLIMANTIC (CT06462-A)  
SITE ID NUMBER: #5568  
SITE ADDRESS: 349 MOUNTAIN ST  
WINDHAM, CT 06280  
MAP: 03  
BLOCK: 154  
LOT: 60  
ZONE: R4  
LATITUDE: 41° 42' 10.84" N  
LONGITUDE: 72° 13' 17.01" W  
ELEVATION: 525'± AMSL  
FEMA/FIRM DESIGNATION: X  
ACREAGE: 2.05± AC (BOOK: 0631, PAGE: 0299)

### CONTACT INFORMATION

**APPLICANTS:**  
EVERSOURCE ENERGY  
107 SELDEN STREET  
BERLIN, CT 06037  
**PROPERTY OWNER:**  
SBA PROPERTIES INC  
8051 CONGRESS AVE  
BOCA RATON, FL 33487  
**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



### 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

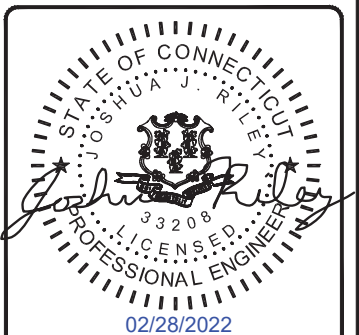


**UNDERGROUND SERVICE ALERT**  
**UTILITIES PROTECTION CENTER, INC.**  
811

48 HOURS BEFORE YOU DIG

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

REV	DATE	DESCRIPTION
1	12/10/21	ISSUED FOR FILING
0	06/18/20	ISSUED FOR FILING



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

WILLIMANTIC (CT06462-A)  
349 MOUNTAIN ST  
WINDHAM, CT 06280

SHEET TITLE  
TITLE SHEET

SHEET NUMBER  
**T-1**

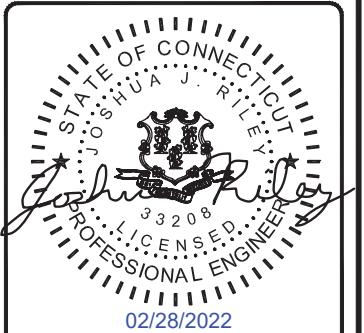


PROJECT NO: 405025

DRAWN BY: TYW

CHECKED BY: TH

REV	DATE	DESCRIPTION
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0	06/18/20	ISSUED FOR FILING

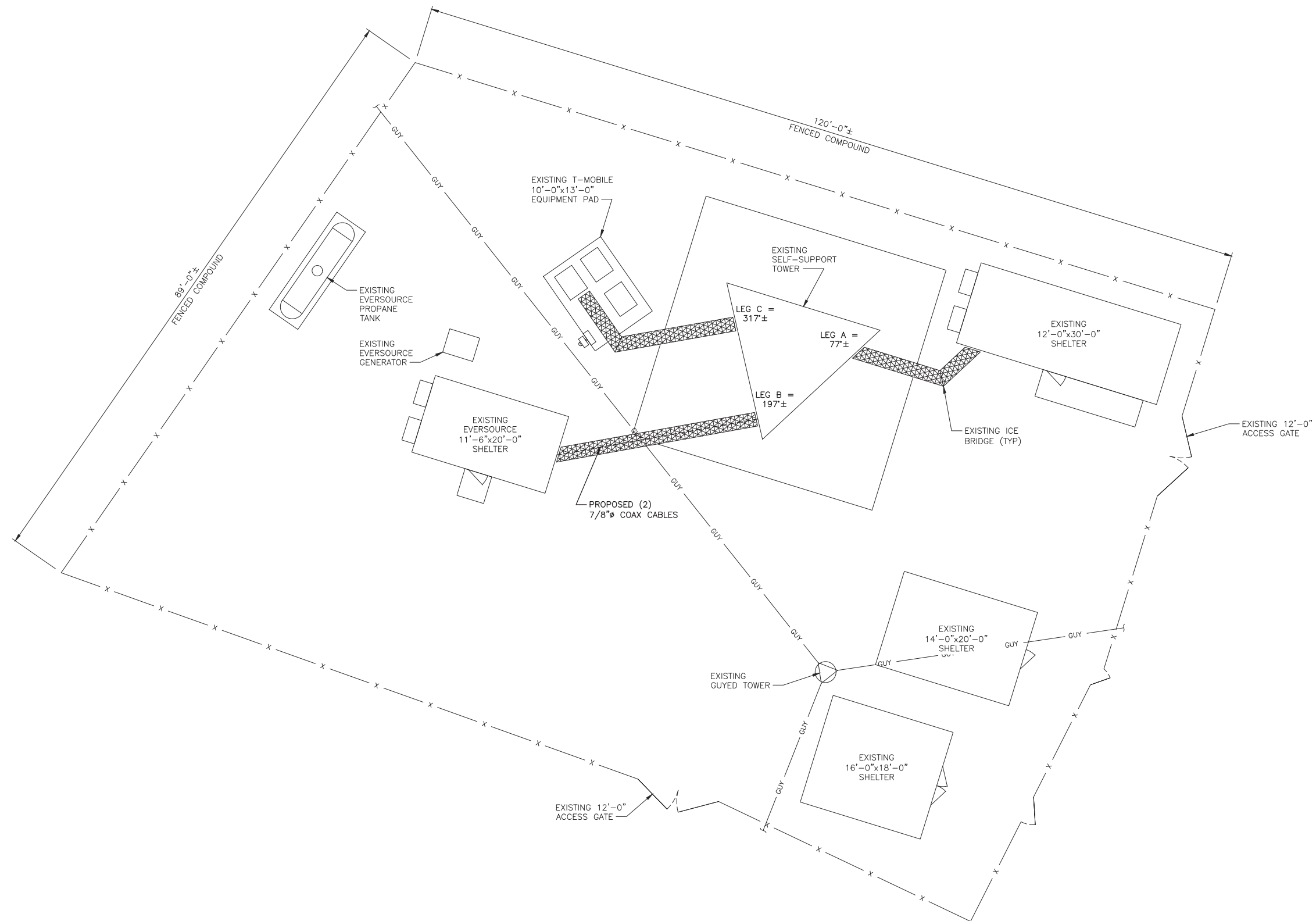


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WILLIMANTIC (CT06462-A)  
349 MOUNTAIN ST  
WINDHAM, CT 06280

SHEET TITLE  
SITE PLAN

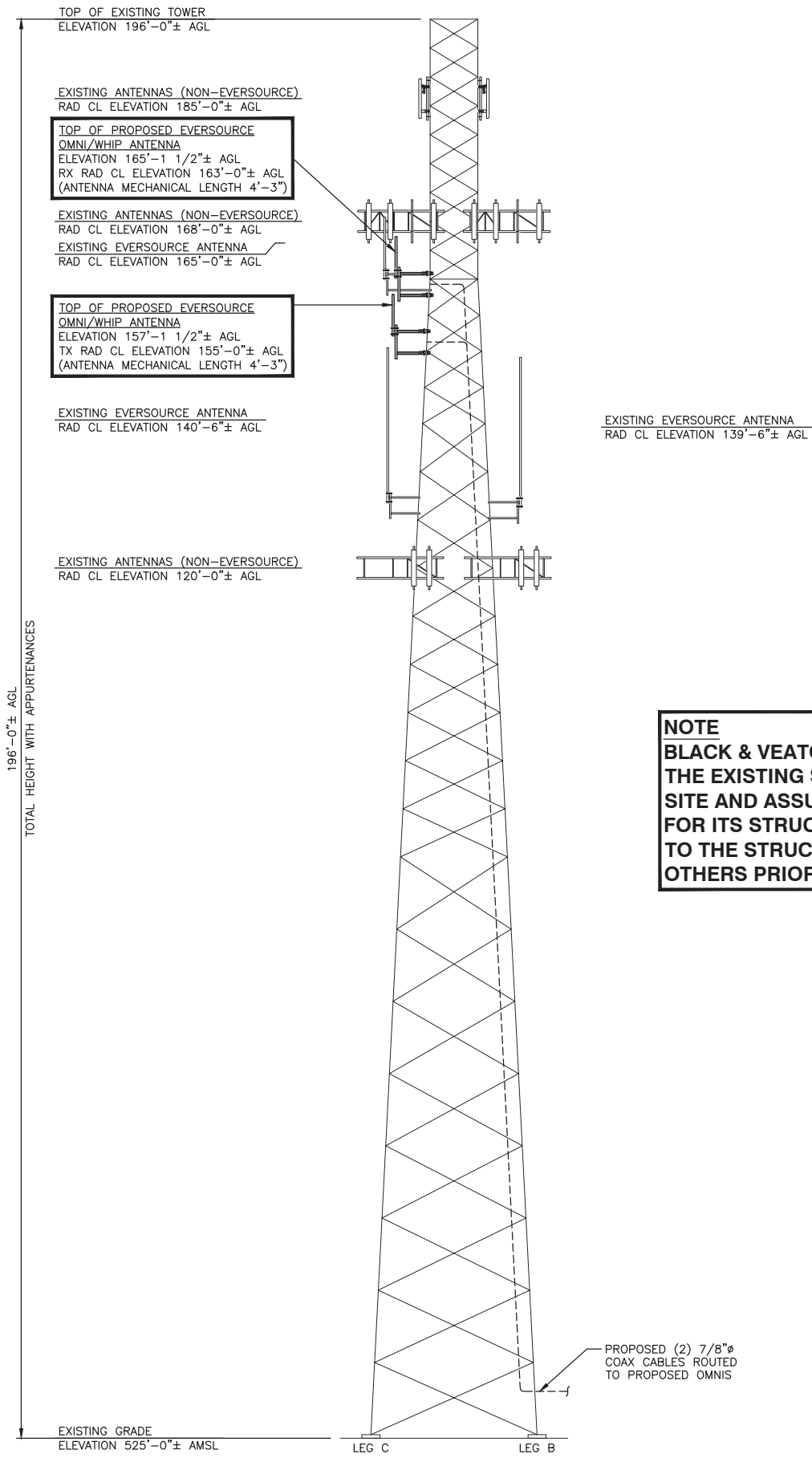
SHEET NUMBER  
**C-1**



**SITE PLAN**  
NO SCALE

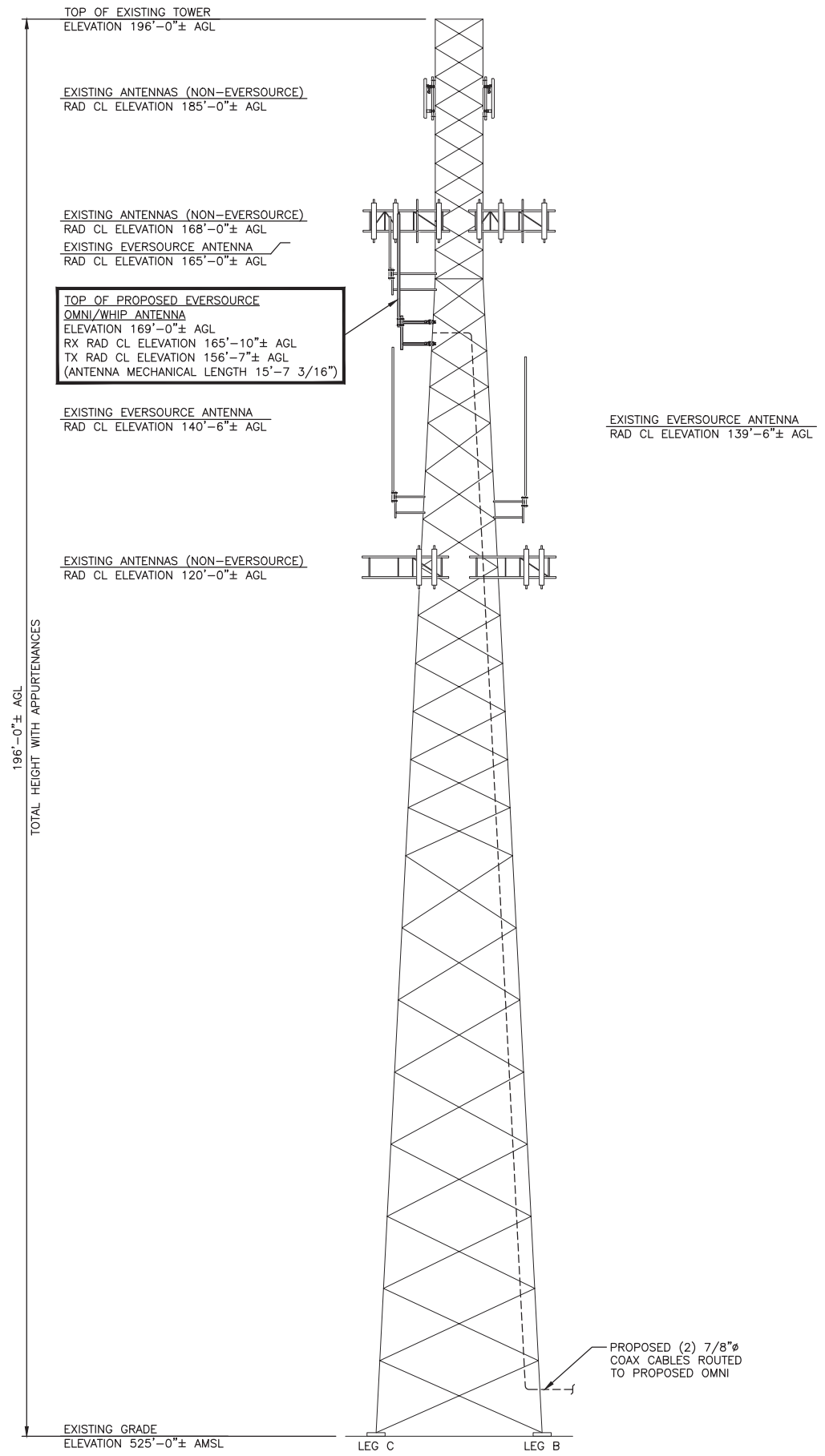






CSC SUBMITTED INSTALLATION CONFIGURATION  
NO SCALE

**NOTE**  
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



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



**BLACK & VEATCH**

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

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

REV	DATE	DESCRIPTION
1	12/10/21	ISSUED FOR FILING
0	06/18/20	ISSUED FOR FILING



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

WILLIMANTIC (CT06462-A)  
349 MOUNTAIN ST  
WINDHAM, CT 06280

SHEET TITLE  
TOWER ELEVATION &  
ANTENNA EQUIPMENT

SHEET NUMBER  
**C-2**

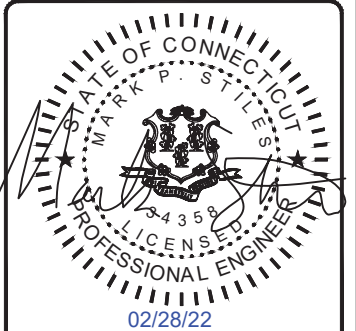


PROJECT NO: 405025

DRAWN BY: TYW

CHECKED BY: TH

REV	DATE	DESCRIPTION
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0	06/18/20	ISSUED FOR FILING

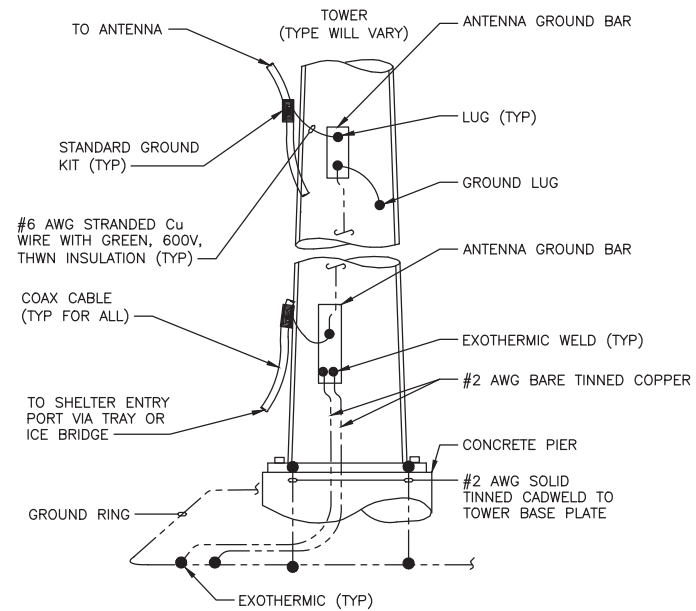


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WILLIMANTIC (CT06462-A)  
349 MOUNTAIN ST  
WINDHAM, CT 06280

SHEET TITLE  
**GROUNDING  
DETAILS**

SHEET NUMBER  
**G-1**

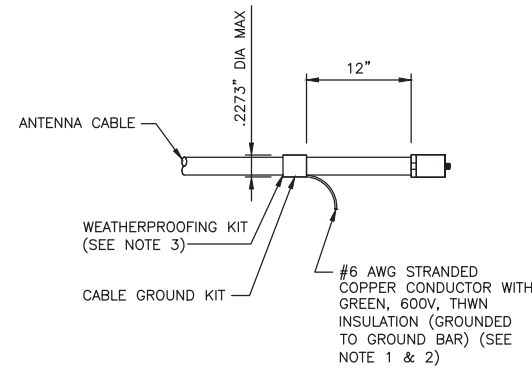


**NOTE**

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

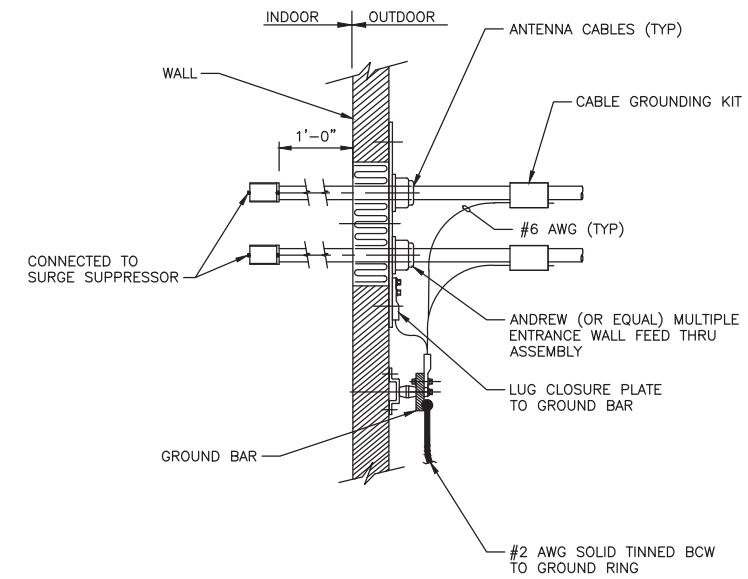


**NOTES**

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.

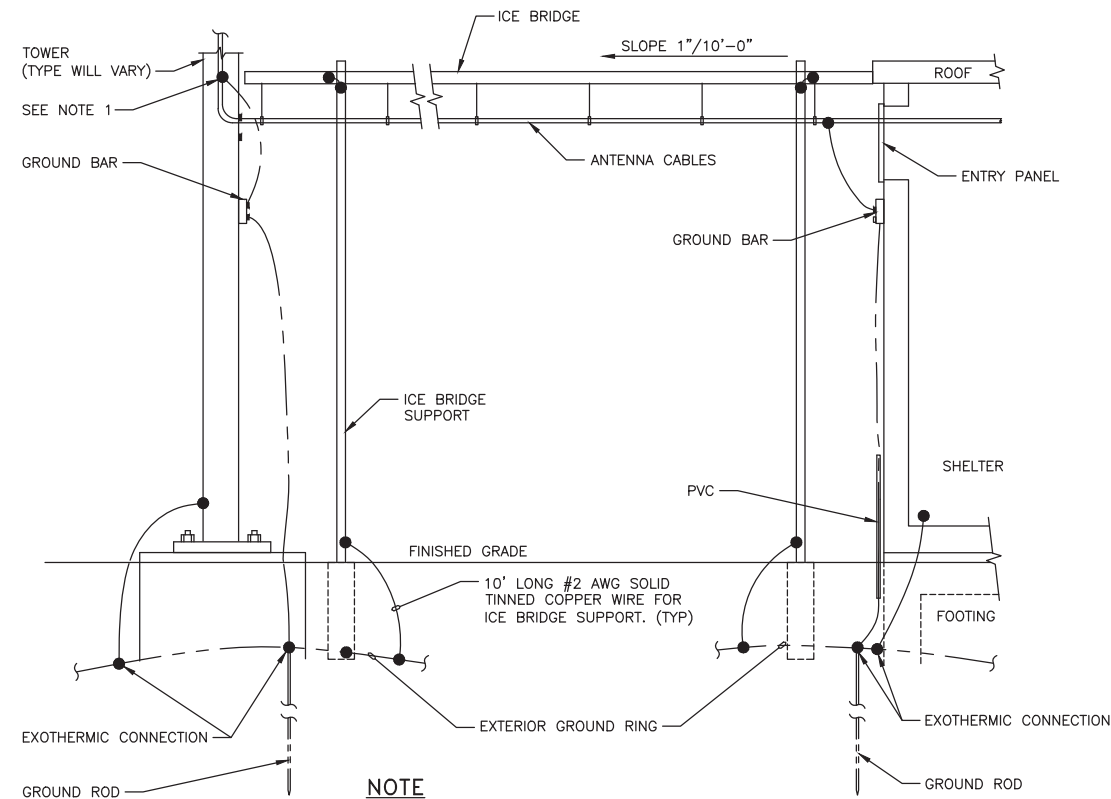
**CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE**

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

**DESIGN BASIS**

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

**GENERAL CONDITIONS**

- 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.
- 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.
- THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL PERMITS, INSPECTIONS, TESTING AND CERTIFICATES NEEDED FOR LEGAL OCCUPANCY OF THE FINISHED PROJECT.
- 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.
- DETAILS INCLUDED IN THIS PLAN SET ARE TYPICAL AND APPLY TO SIMILAR CONDITIONS.
- 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.
- 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.
- THE CONTRACTOR SHALL SAFEGUARD AGAINST: CREATING A FIRE HAZARD, AFFECTING TENANT EGRESS OR COMPROMISING BUILDING SITE SECURITY MEASURES.
- THE CONTRACTOR SHALL REMOVE ALL DEBRIS AND CONSTRUCTION WASTE FROM THE SITE EACH DAY. WORK AREAS SHALL BE SWEEPED AND MADE CLEAN AT THE END OF EACH WORK DAY.
- THE CONTRACTOR'S HOURS OF WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND ORDINANCES AND BE APPROVED BY OWNER.
- 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**

- 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.
- 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.
- FIRESTOPPING SHALL BE APPLIED AS SOON AS PRACTICABLE AFTER PENETRATIONS ARE MADE AND EQUIPMENT INSTALLED.
- 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.
- 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.
- ALL PENETRATIONS INTO AND/OR THROUGH BUILDING EXTERIOR WALLS SHALL BE SEALED WITH SILICONE SEALER.
- 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.
- CONTRACTOR TO REMOVE AND RE-INSTALL ALL FIRE PROOFING AS REQUIRED DURING CONSTRUCTION.

**SUBMITTALS**

- CONTRACTOR TO SUBMIT SHOP DRAWINGS TO ENGINEER FOR REVIEW PRIOR TO FABRICATION.
- CONTRACTOR TO NOTIFY ENGINEER FOR INSPECTION PRIOR TO CLOSING PENETRATIONS.
- 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.
- 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.
- 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**

- 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.
- 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.
- DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC "MANUAL OF STEEL CONSTRUCTION" 13TH EDITION.
- 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.
- ALL STEEL ELEMENTS SHALL BE INSTALLED PLUMB AND LEVEL.
- TOWER MANUFACTURER'S DESIGNS SHALL PREVAIL FOR TOWER.

**SITE GENERAL**

- CONTRACTOR SHALL FOLLOW CONDITIONS OF ALL APPLICABLE PERMITS AND WORK IN ACCORDANCE WITH OSHA REGULATIONS.
- 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.
- 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.
- IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
- 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.
- CONTRACTOR IS RESPONSIBLE FOR REPAIRING OR REPLACING STRUCTURES OR UTILITIES DAMAGED DURING CONSTRUCTION.
- 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.
- 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.
- 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.



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

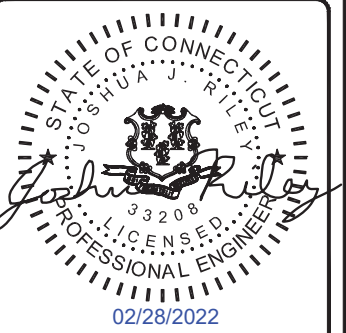


**BLACK & VEATCH**

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

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

REV	DATE	DESCRIPTION
1	12/10/21	ISSUED FOR FILING
0	06/18/20	ISSUED FOR FILING



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

WILLIMANTIC (CT06462-A)  
349 MOUNTAIN ST  
WINDHAM, CT 06280

SHEET TITLE  
**NOTES  
& SPECIFICATIONS**

SHEET NUMBER  
**N-1**

**ELECTRICAL**

- CONTRACTOR SHALL VERIFY EXISTING ELECTRIC SERVICE TYPE AND CAPACITY AND ORDER NEW ELECTRIC SERVICE FROM LOCAL ELECTRIC UTILITY, WHERE APPLICABLE.
- 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.
- 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.
- ALL ELECTRICAL CONDUCTORS SHALL BE 100% COPPER AND SHALL HAVE TYPE THHN INSULATION UNLESS INDICATED OTHERWISE.
- CONDUIT SHALL BE THREADED RIGID GALVANIZED STEEL OR EMT WITH ONLY COMPRESSION TYPE COUPLINGS AND CONNECTORS, ALL MADE UP WRENCH TIGHT.
- ALL BURIED CONDUIT SHALL BE MINIMUM SCH 40 PVC UNLESS NOTED OTHERWISE, OR AS PER LOCAL CODE REQUIREMENTS.
- 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.
- ALL BRANCH CIRCUITS AND FEEDERS SHALL HAVE A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR BONDED TO ALL ENCLOSURES, PULLBOXES, ETC.
- CONDUIT AND CABLE WITHIN CORRIDORS SHALL BE CONCEALED AND EXPOSED ELSEWHERE, UNLESS NOTED OTHERWISE.
- 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.
- WIRING DEVICES SHALL BE SPECIFICATION GRADE, AND WIRING DEVICE COVER PLATES SHALL BE PLASTIC WITH ENGRAVING AS SPECIFIED.

**GROUNDING**

- #6 THWN SHALL BE STRANDED #6 COPPER WITH GREEN THWN INSULATION SUITABLE FOR WET INSTALLATIONS.
- #2 THWN SHALL BE STRANDED #2 COPPER WITH THWN INSULATION SUITABLE FOR WET INSTALLATIONS.
- #2 BARE TINNED SHALL BE SOLID COPPER TINNED. ALL BURIED WIRE SHALL MEET THIS CRITERIA.
- 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).
- 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.
- 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-BELLEVILLE WASHER-NUT.
- 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.
- THE MINIMUM BEND RADIUS SHALL BE 8 INCHES FOR #6 WIRE AND SMALLER AND 12 INCHES FOR WIRE LARGER THAN #6.
- ALL CONNECTIONS TO THE GROUND RING SHALL BE EXOTHERMIC WELD.
- BOND THE FENCE TO THE GROUND RING AT EACH CORNER, AND AT EACH GATE POST WITH #2 SOLID TINNED WIRE. EXOTHERMIC WELD BOTH ENDS.
- GROUND KITS SHALL BE SOLID COPPER STRAP WITH #6 WIRE 2-HOLE COMPRESSION CRIMPED LUGS AND SHALL BE SEALED ACCORDING TO MANUFACTURER INSTRUCTIONS.
- FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL BE USED.
- 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.
- MGB GROUND CONNECTION SHALL BE EXOTHERMIC WELDED TO THE GROUND SYSTEM.
- ALL CABLE TRAY AND/OR PLATFORM STEEL SHALL BE BONDED TOGETHER WITH JUMPERS (#6 IN EQUIPMENT ROOM, #2 ELSEWHERE AND HOMERUN).

**ANTENNA & CABLE NOTES**

- 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.
- 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.
- 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.
- 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.
- MINIMUM BENDING RADIUS FOR COAXIAL CABLES:
  - 7/8 INCH, RMIN = 15 INCHES
  - 1 5/8 INCH, RMIN = 25 INCHES
- 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.
- ALL CABLE CONNECTIONS OUTSIDE SHALL BE COVERED WITH WATERPROOF SPLICING KIT.
- CONTRACTOR SHALL VERIFY EXACT LENGTH AND DIRECTION OF TRAVEL IN FIELD PRIOR TO CONSTRUCTION.
- CABLE SHALL BE FURNISHED WITHOUT SPLICES AND WITH CONNECTORS AT EACH END.



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

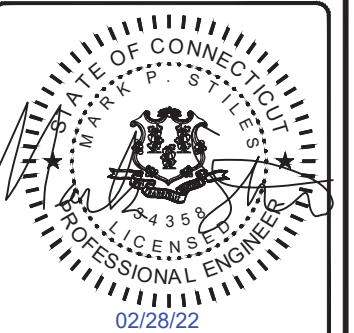


**BLACK & VEATCH**

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

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

REV	DATE	DESCRIPTION
1	12/10/21	ISSUED FOR FILING
0	06/18/20	ISSUED FOR FILING



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

WILLIMANTIC (CT06462-A)  
349 MOUNTAIN ST  
WINDHAM, CT 06280

SHEET TITLE  
**NOTES  
& SPECIFICATIONS**

SHEET NUMBER  
**N-2**

**SYMBOLS**

●	EXOTHERMIC CONNECTION
■	COMPRESSION CONNECTION
⊕	5/8"Øx10'-0" COPPER CLAD STEEL GROUND ROD.
⊕	TEST GROUND ROD WITH INSPECTION SLEEVE
---	GROUNDING CONDUCTOR
Ⓐ	KEY NOTES
— X — X — X — X — X —	CHAINLINK FENCE
— □ — □ — □ — □ — □ —	WOOD FENCE
---	LEASE AREA
▨	ICE BRIDGE
▧	CABLE TRAY
— G — G — G — G — G —	GAS LINE
— E/T — E/T — E/T — E/T —	UNDERGROUND ELECTRICAL/TELCO
— E/C — E/C — E/C — E/C —	UNDERGROUND ELECTRICAL/CONTROL
— E — E — E — E — E —	UNDERGROUND ELECTRICAL
— T — T — T — T — T —	UNDERGROUND TELCO
---	PROPERTY LINE (PL)

**ABBREVIATIONS**

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



107 SELDEN STREET  
BERLIN, CT 06037  
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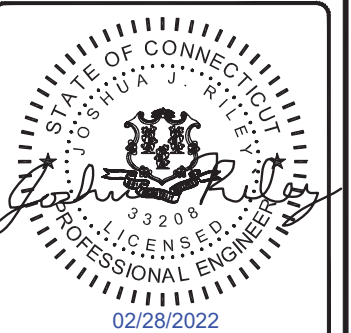


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WILLIMANTIC (CT06462-A)  
349 MOUNTAIN ST  
WINDHAM, CT 06280

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, 3 <sup>rd</sup> 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.

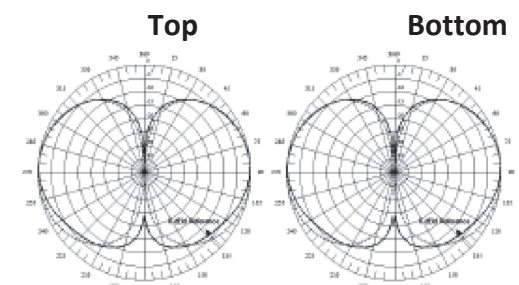
PIM Rated Design – better than -150 dBc.

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

Excellent Lightning Protection – heavy internal conductor DC ground.

### Radiation Pattern

Vertical (No-Tilt)



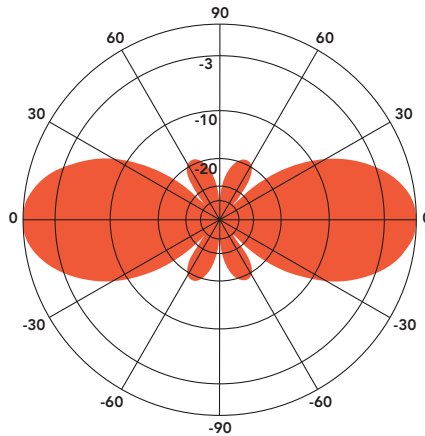
ORIGINALLY PROPOSED ANTENNAS, REMOVED OR REPLACED

## ANT220F2DIN FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

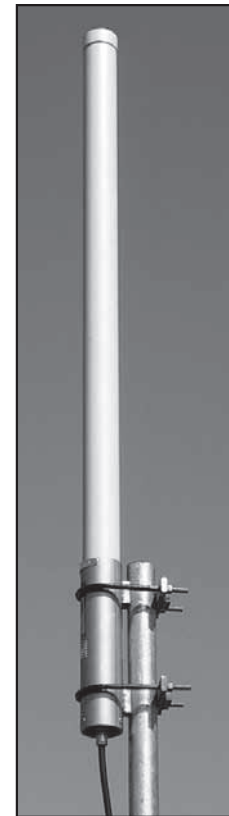
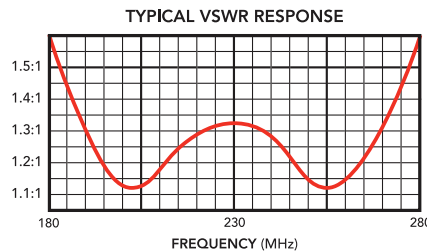
The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential 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



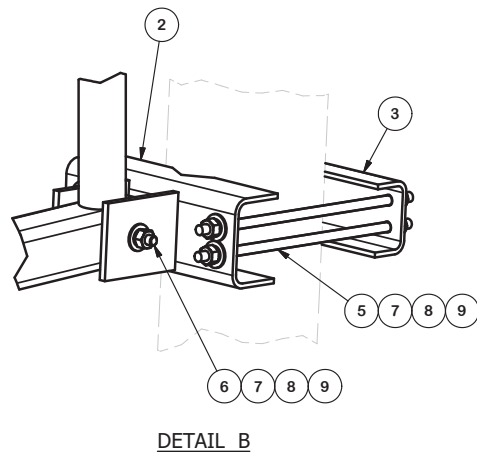
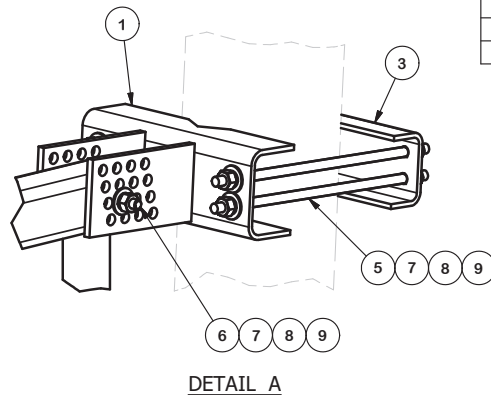
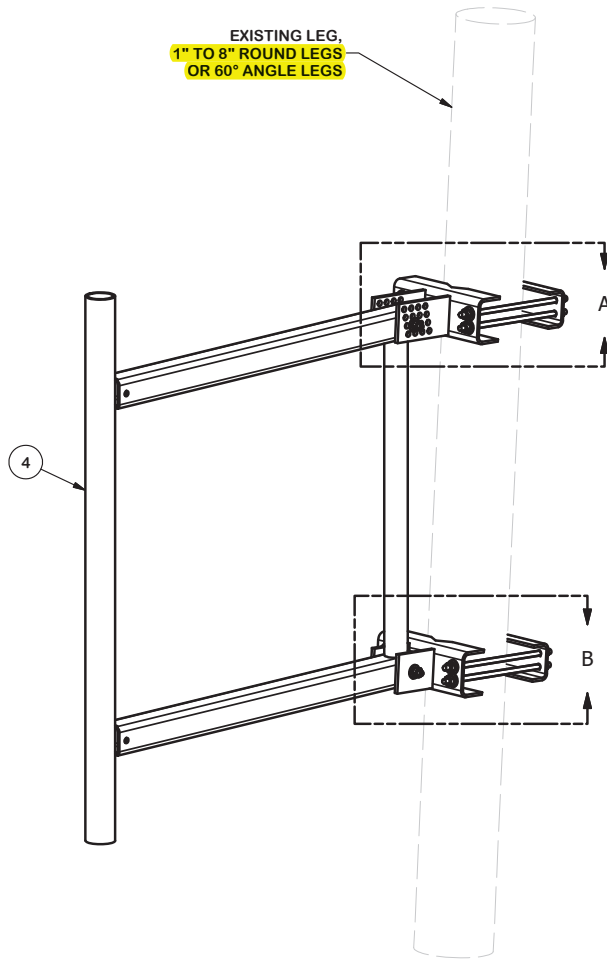
ONE SITE PRO 1 P/N DCP12K CLAMP SET REQUIRED.

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. <sup>2</sup>
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.)	

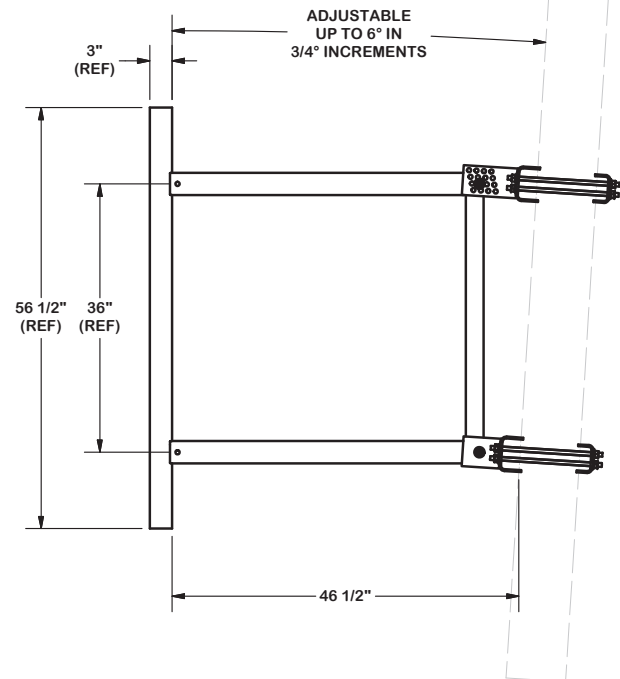


TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 3.5"± DIAMETER.

EXISTING LEG,  
1" TO 8" ROUND LEGS  
OR 60° ANGLE LEGS



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



**TOLERANCE NOTES**

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

PROPRIETARY NOTE:  
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION  
 48" ULTIMATE UNIVERSAL  
 STANDOFF FRAME

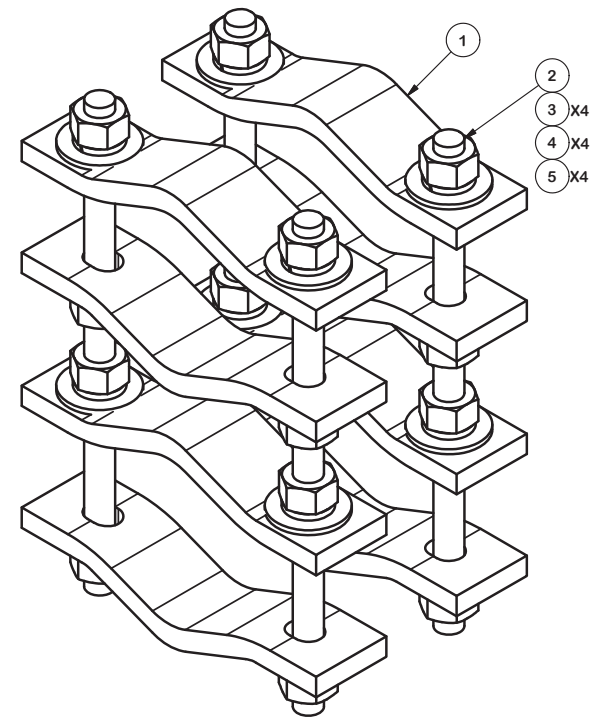
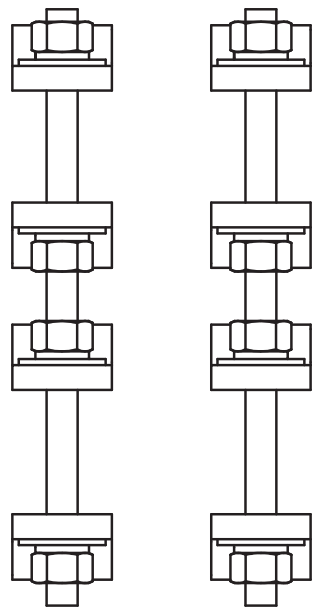
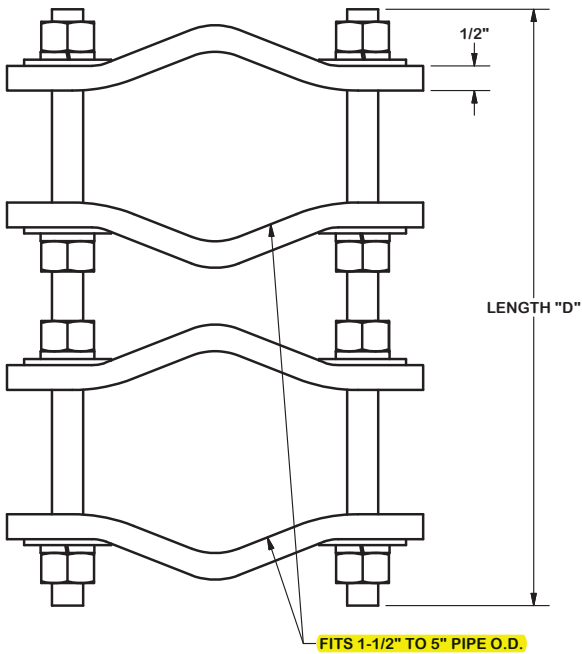
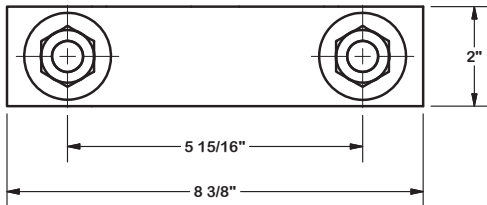
CPD NO.	DRAWN BY	ENG. APPROVAL
CLASS	DRAWING USAGE	CHECKED BY
81	01	CUSTOMER
		BMC 2/16/2011



Engineering  
 Support Team:  
 1-888-753-7446

Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Salem, OR  
 Dallas, TX

PART NO.	USF-4U
DWG. NO.	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

**TOLERANCE NOTES**

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:  
 SAWED, SHEARED AND GAS CUT EDGES ( $\pm 0.030"$ )  
 DRILLED AND GAS CUT HOLES ( $\pm 0.030"$ ) - NO CONING OF HOLES  
 LASER CUT EDGES AND HOLES ( $\pm 0.010"$ ) - NO CONING OF HOLES  
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 ALL OTHER ASSEMBLY ( $\pm 0.060"$ )

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

**SITE PRO 1**  
 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
81	KC8 8/21/2012	CEK 1/22/2013
CLASS	DRAWING USAGE	CHECKED BY
81	CUSTOMER	CEK 1/22/2013

PART NO.	SEE ASSEMBLY "A"
DWG. NO.	DCPxxK

ATTACHMENT E – STRUCTURAL ANALYSIS



**Tower Engineering Solutions**

Phone (972) 483-0607, Fax (972) 975-9615  
1320 Greenway Drive, Suite 600, Irving, Texas 75038

---

**Structural Analysis Report**

**Existing 196 ft Rohn Self Supporting Tower**

**Customer Name: SBA Communications Corp**

**Customer Site Number: CT06462-A-2**

**Customer Site Name: Mountain Street**

**Carrier Name: Connecticut Light & Power (App#: 186494, V1)**

**Carrier Site ID / Name: ES-055 / Willimantic**

**Site Location: 349 Mountain Street**

**Windham, Connecticut**

**Windham County**

**Latitude: 41.703011**

**Longitude: -72.221391**

**Analysis Result:**

**Max Structural Usage: 53.6% [Pass]**

**Max Foundation Usage: 44.0% [Pass]**

**Additional Usage Caused by New Mount/Mount Modification: N/A**



**Report Prepared By: Sital Shrestha**



**Tower Engineering Solutions**

Phone (972) 483-0607, Fax (972) 975-9615  
1320 Greenway Drive, Suite 600, Irving, Texas 75038

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**Max Structural Usage: 53.6% [Pass]**

**Max Foundation Usage: 44.0% [Pass]**

**Additional Usage Caused by New Mount/Mount Modification: N/A**

**Report Prepared By: Sital Shrestha**

## Introduction

The purpose of this report is to summarize the analysis results on the 196 ft Rohn Self Supporting Tower to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

## Sources of Information

<b>Tower Drawings</b>	Original fabrications drawings prepared by ROHN Industries, Inc. Dated 09-27-2001. Drawing No C011214. Eng. File No 49204TT. Previous structural report prepared by FDH Velocitel. Dated 05-10-2017. Project No 17QEIQ1400.
<b>Foundation Drawing</b>	Original foundation drawings prepared by ROHN Industries, Inc. Dated 08-31-2001. Drawing No A012046-1. Eng. File No 49204TT.
<b>Geotechnical Report</b>	Geotechnical report prepared by BL Companies. Dated 12-01-2000. Project No 00C672-C.
<b>Modification Drawings</b>	N/A

## Analysis Criteria

The comprehensive analysis was performed in accordance with the requirements and stipulations of the TIA-222-H. In accordance with this standard, the structure was analyzed using **TESTowers**, a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

<b>Wind Speed Used in the Analysis:</b>	121.0 mph (3-Sec. Gust) (Ultimate wind speed)
<b>Wind Speed with Ice:</b>	50 mph (3-Sec. Gust) with 1" radial ice concurrent
<b>Service Load Wind Speed:</b>	60 mph + 0" Radial ice
<b>Standard/Codes:</b>	TIA-222-H / 2018 IBC / 2018 Connecticut State Building Code
<b>Exposure Category:</b>	B
<b>Risk Category:</b>	II
<b>Topographic Category:</b>	1
<b>Crest Height:</b>	0 ft
<b>Seismic Parameters:</b>	$S_5 = 0.192$ , $S_1 = 0.055$

This structural analysis is based upon the tower being classified as a Risk Category II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

## Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft.)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	185.0	3	Antel BXA-80080/4CF - Panel	Direct	(3) 1 5/8"	Verizon
2		6	Rfs Celwave FD9R6004/2C-3L Diplexers			
3	169.0	3	Ericsson AIR21-6449 B41 - Panel	(3) 10' T Frames	(9) 1 5/8" Coax (2) 1 5/8" Hybrid	Verizon/T-Mobile (A-11) <sup>1</sup>
4		3	RFS APXVAARR24_43-U-NA20 - Panel			
5		3	Ericsson AIR32 KRD901146-1 - Panel			
6		3	72" x 12" x 6" Panel			
7		3	Ericsson KRY11271 TMA's			
8		3	Commscope SDX192 6Q-43 Diplexers			
9		3	Ericsson 4449 B71 + B85 RRU's			
10		3	Ericsson 4415 B25 RRU's			
-	167.0	1	Commscope DB586-Y Omni	(1) Sidearm (Commscope S-200)	(8) 7/8" Coax (1) 1/2" Coax	Connecticut Light & Power
-	166.5	1	RFS 458-2 Omni	(1) Sidearm (Commscope S-400)		
-	165.0	1	RFS BA1312-0 Omni	(1) Sidearm		
-	164.0	1	Powerwave LGP104 TMA	(Commscope S-400)		
-	163.0	1	Telewave ANT220F2 Omni	(1) Sidearm (Site Pro USF-4U)		
-	155.0	1	Telewave ANT220F2 Omni	(1) Sidearm (Site Pro USF-4U)		
-	140.4	1	RFS 220-3AN Omni	(1) 6' Sidearm (Commscope S-600)		
-	139.5	1	RFS 220-7N Omni	(1) 4' Sidearm (Wireless Solutions WS-S400)		
-	137.0	1	Kreco CO-36A Omni	(1) 6' Sidearm (Commscope S-600)		
19	120.0	2	Commscope sbnhh-1d45b - Panel	(3) 10' T-Frames	(8) 1 5/8" (2) 1 5/8" Fiber	Verizon
20		4	Commscope SBNHH-1D65B - Panel			
21		3	Samsung MT6407-77A - Panel			
22		3	Samsung B2/B66A RRH-BR049 (RFV01U-D1A) RRU's			
23		3	Samsung B5/B13 RRH-BR04C (RFV01U-D2A) RRU's			
24		2	Rfs Celwave DB-T1-6Z-8AB-0Z Junction Box			

<sup>1</sup> Verizon has a separate lease under (A-09).

## **Proposed Carrier’s Final Configuration of Antennas, Mounts and Transmission Lines**

Information pertaining to the proposed carrier’s final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
11	167.0	1	Commscope DB586-Y -Omni	(1) Sidearm (Commscope S-200)	(8) 7/8" Coax (1) 1/2" Coax	Connecticut Light & Power
12	166.5	1	RFS 458-2-Omni	(1) Sidearm (Commscope S-400)		
13	165.0	1	RFS BA1312-0- Omni	(1) Sidearm (Commscope S-400)		
14	164.0	1	Powerwave LGP104- TMA			
15	161.2	1	dbSpectra SP2D00P36D-D-Omni	(1) Sidearm (Site Pro USF-4U)		
16	140.4	1	RFS 220-3AN- Omni	(1) Sidearm (Commscope S-600)		
17	139.5	1	RFS 220-7N- Omni	(1) Sidearm (Wireless Solutions WS-S400)		
18	137.0	1	Kreco CO-36A- Omni	(1) Sidearm (Commscope S-600)		

See the attached coax layout for the line placement considered in the analysis.



## **Analysis Results**

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

Tower Component	Legs	Diagonals	Horizontals	Anchor Bolts
Max. Usage:	<b>53.6%</b>	<b>53.3%</b>	<b>3.5%</b>	<b>35.0%</b>
Pass/Fail	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>

## **Foundations**

	Compression (Kips)	Uplift (Kips)	Shear (Kips)
Analysis Reactions	238.1	198.2	25.7

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

## **Service Load Condition (Rigidity):**

Operational characteristics of the tower are found to be within the limits prescribed by TIA-222 for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 0.1574 degrees under the operational wind speed as specified in the Analysis Criteria.

## **Conclusions**

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the TIA-222 Standard under the design basic wind speed as specified in the Analysis Criteria.

## Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC**. Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.
2. The structural analysis was performance based upon the evidence available at the time of this report. All information provided by the client is considered to be accurate.
3. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the ANSI/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.
4. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.
5. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.
6. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

## Structure: CT06462-A-2-SBA

<b>Site Name:</b> Mountain Street	<b>Code:</b> TIA-222-H	2/9/2022
<b>Type:</b> Self Support	<b>Base Shape:</b> Triangle	<b>Basic WS:</b> 121.00
<b>Height:</b> 196.00 (ft)	<b>Base Width:</b> 23.00	<b>Basic Ice WS:</b> 50.00
<b>Base Elev:</b> 0.00 (ft)	<b>Top Width:</b> 6.60	<b>Operational WS:</b> 60.00



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### Section Properties

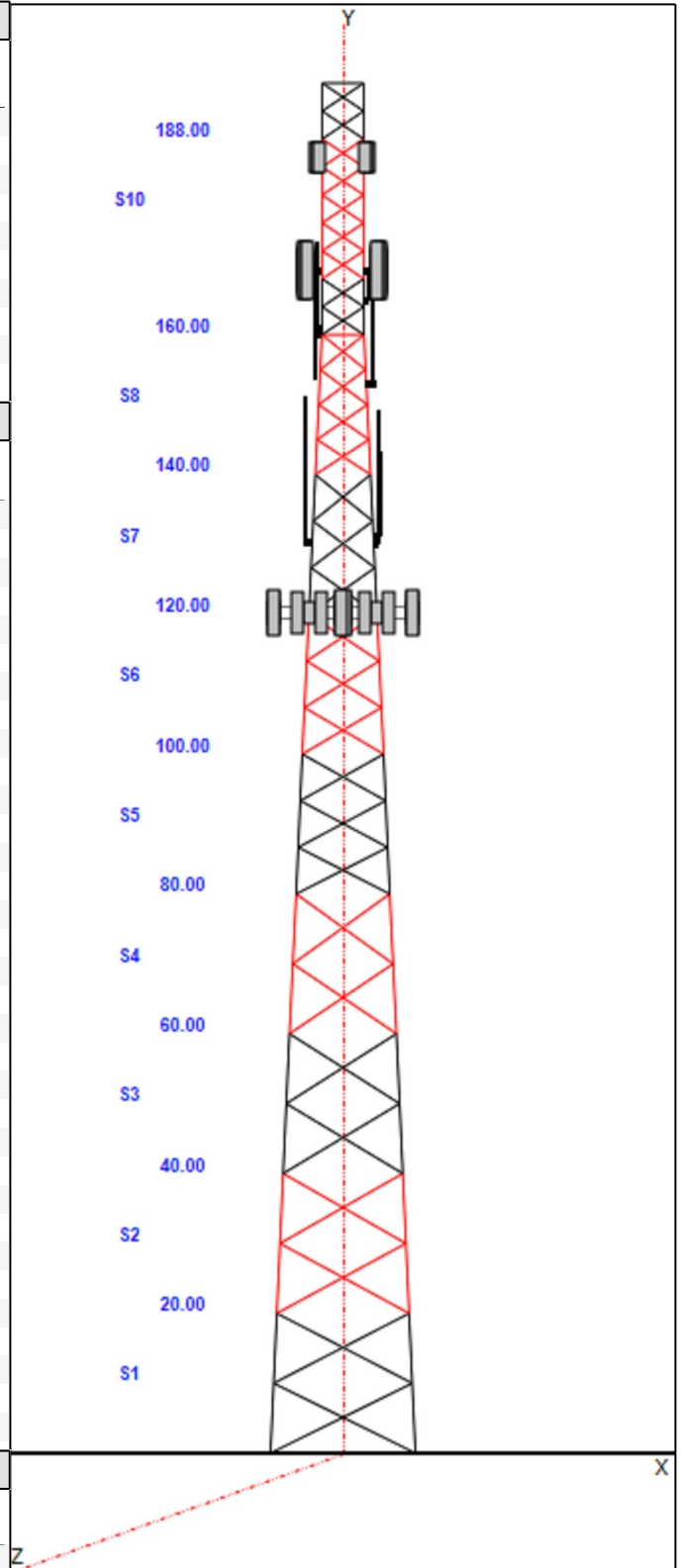
Sect	Leg Members	Diagonal Members	Horizontal Members
1	PX 8" DIA PIPE	SAE 4X4X0.25	
2	PSP ROHN 8 EHS	SAE 4X4X0.25	
3	PSP ROHN 8 EHS	SAE 3.5X3.5X0.25	
4	PX 6" DIA PIPE	SAE 3.5X3.5X0.25	
5	PSP ROHN 6 EHS	SAE 3X3X0.25	
6	PX 5" DIA PIPE	SAE 2.5X2.5X0.25	
7	PX 4" DIA PIPE	SAE 2.5X2.5X0.25	
8	PX 3" DIA PIPE	SAE 2X2X0.1875	SAE 1.75X1.75X0.1875
9-10	PST 3" DIA PIPE	SAE 2X2X0.25	
11	PST 3" DIA PIPE	SAE 1.75X1.75X0.1875	SAE 1.75X1.75X0.1875

### Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description
185.00	185.00	3	Antel BXA-80080/4CF
185.00	185.00	6	Rfs Celwave FD9R6004/2C-3L Diplexers
169.00	169.00	3	Ericsson AIR21-6449 B41
169.00	169.00	3	RFS APXVAARR24_43-U-NA20
169.00	169.00	3	Ericsson AIR32 KRD901146-1
169.00	169.00	3	72" x 12" x 6" Panel
169.00	169.00	3	Ericsson KRY11271 TMA's
169.00	169.00	3	Commscope SDX192 6Q-43 Diplexers
169.00	169.00	3	Ericsson 4449 B71 + B85 RRU's
169.00	169.00	3	Ericsson 4415 B25 RRU's
169.00	169.00	3	10' T Frames
164.81	167.00	1	Commscope DB586-Y Omni
164.81	164.00	1	Powerwave LGP104 TMA
164.81	164.81	1	Sidearm (Commscope/Andrew S-200)
160.67	165.00	1	RFS BA1312-0 Omni
160.67	160.67	1	Sidearm (Commscope S-400)
159.85	159.85	1	Sidearm (Commscope S-400)
159.85	166.50	1	RFS 458-2 Omni
153.30	161.20	1	SP2D00P36D-D
152.88	152.88	1	Sidearm (Site Pro USF-4U)
131.00	137.00	1	Kreco CO-36A Omni
131.00	131.00	1	6' Sidearm (Commscope S-600)
130.07	140.40	1	RFS 220-3AN Omni
130.07	130.07	1	6' Sidearm (Commscope/Andrew S-600)
130.00	139.50	1	RFS 220-7N Omni
130.00	130.00	1	4' Sidearm (Wireless Solutions WS-S400)
120.00	120.00	2	Commscope sbnhh-1d45b
120.00	120.00	4	Commscope SBNHH-1D65B
120.00	120.00	3	Samsung MT6407-77A
120.00	120.00	3	Samsung B2/B66A RRH-BR049 (RFV01U-D1A)
120.00	120.00	3	Samsung B5/B13 RRH-BR04C (RFV01U-D2A)
120.00	120.00	2	Rfs Celwave DB-T1-6Z-8AB-0Z Junction Box
120.00	120.00	3	10' T-Frames

### Linear Appurtenances

Elev From (ft)	Elev To (ft)	Qty	Description
1.00	196.00	1	Safety Climb
3.00	196.00	0	Step bolts (ladder)
3.00	196.00	0	Step bolts (ladder)



**Structure: CT06462-A-2-SBA**

<b>Site Name:</b> Mountain Street	<b>Code:</b> TIA-222-H	2/9/2022
<b>Type:</b> Self Support	<b>Base Shape:</b> Triangle	<b>Basic WS:</b> 121.00
<b>Height:</b> 196.00 (ft)	<b>Base Width:</b> 23.00	<b>Basic Ice WS:</b> 50.00
<b>Base Elev:</b> 0.00 (ft)	<b>Top Width:</b> 6.60	<b>Operational WS:</b> 60.00



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3.00	196.00	0	Step bolts (ladder)
0.00	185.00	1	W/G Ladder (VZW)
3.00	185.00	3	1 5/8" Coax
0.00	169.00	1	W/G Ladder (TMO)
3.00	169.00	9	1 5/8" Coax
3.00	169.00	2	1 5/8" Hybrid
0.00	160.00	1	W/G Ladder (CLP)
3.00	160.00	1	1/2" Coax
3.00	160.00	8	7/8" Coax
3.00	120.00	8	1 5/8" Coax
3.00	120.00	2	1 5/8" Fiber

**Base Reactions**

Leg	Overturning
Max Uplift: -198.24 (kips)	Moment: 4432.37 (ft-kips)
Max Down: 238.06 (kips)	Total Down: 46.62 (kips)
Max Shear: 25.68 (kips)	Total Shear: 42.07 (kips)

# Structure: CT06462-A-2-SBA

**Site Name:** Mountain Street

**Type:** Self Support

**Height:** 196.00 (ft)

**Base Elev:** 0.00 (ft)

**Base Shape:** Triangle

**Base Width:** 23.00

**Top Width:** 6.60

**Code:** TIA-222-H

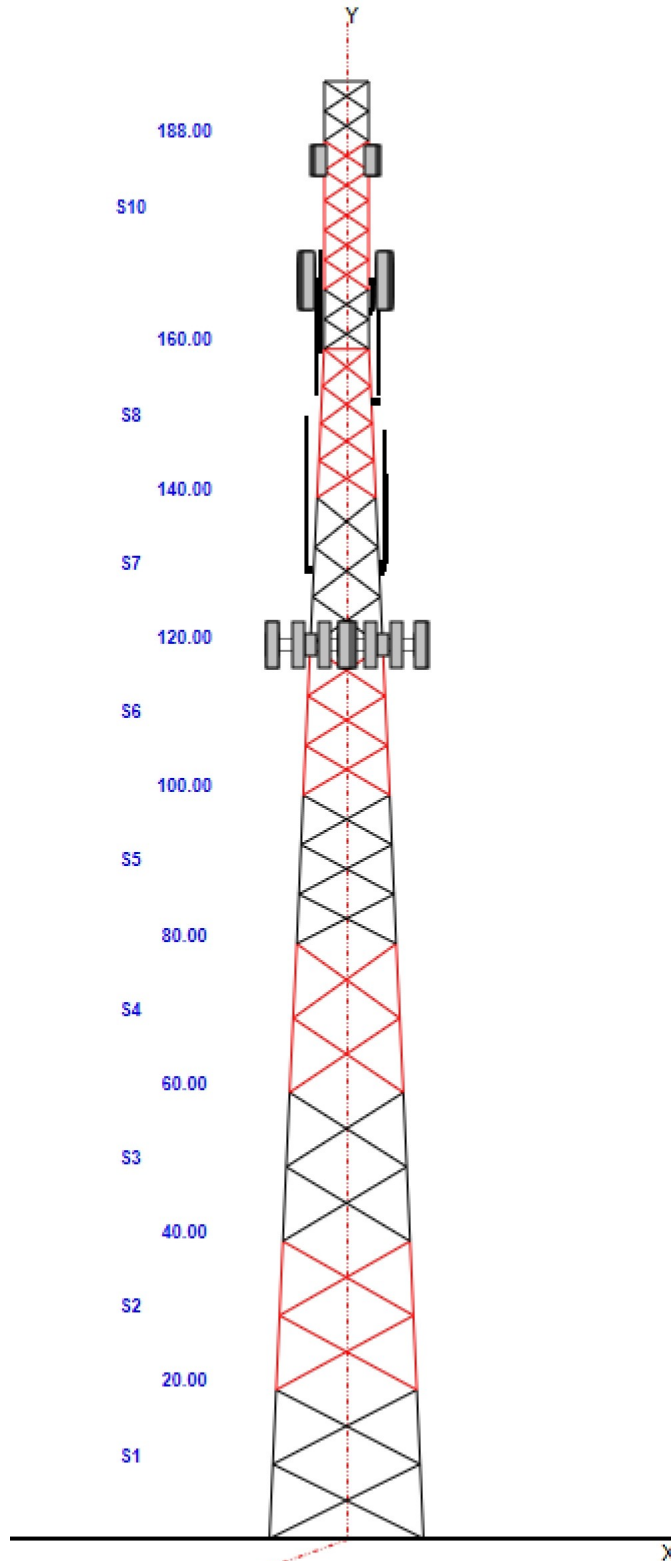
**Basic WS:** 121.00

**Basic Ice WS:** 50.00

**Operational WS:** 60.00

2/9/2022

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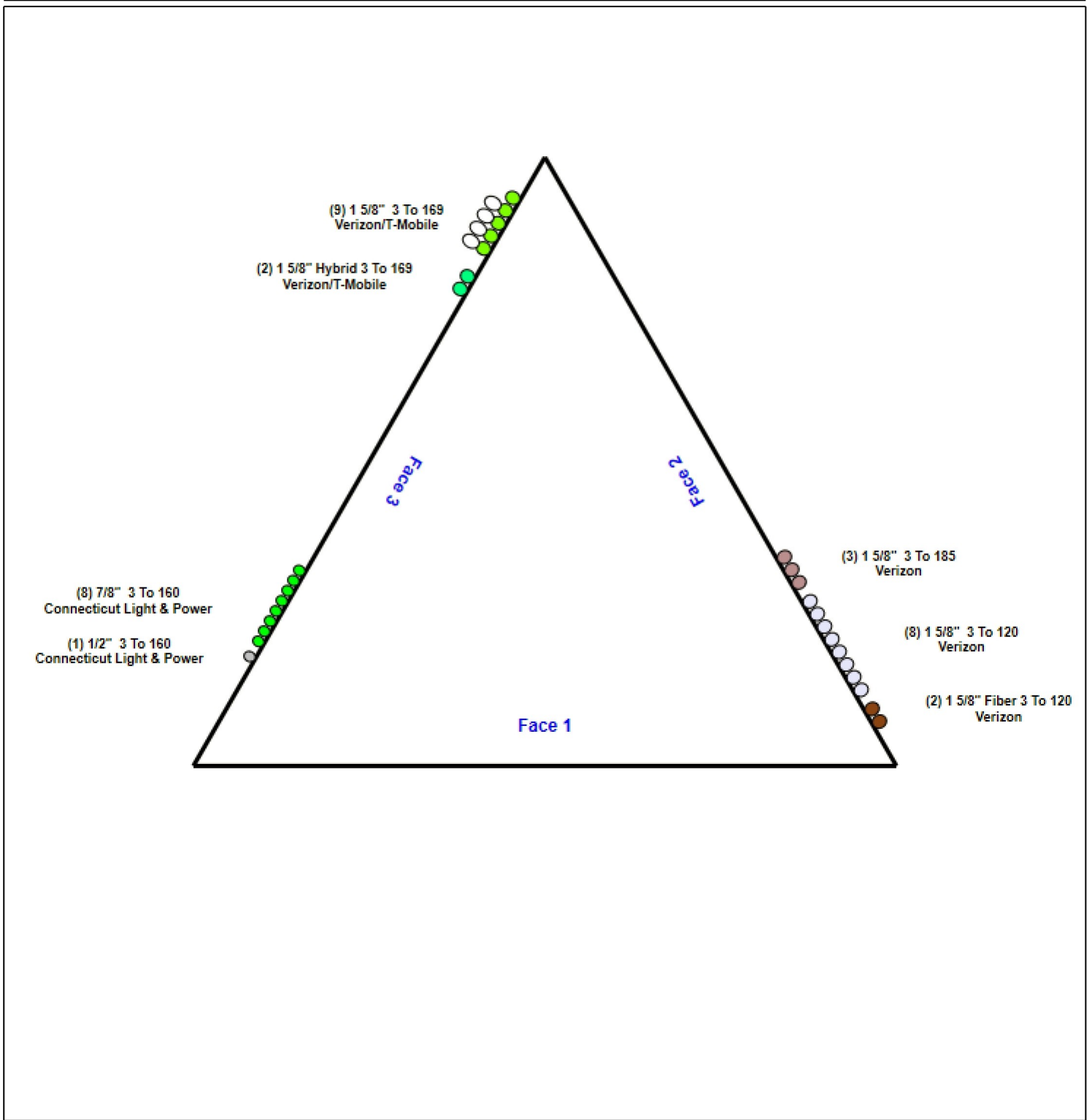


# Structure: CT06462-A-2-SBA - Coax Line Placement

**Type:** Self Support  
**Site Name:** Mountain Street  
**Height:** 196.00 (ft)

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## Loading Summary

<b>Structure:</b> CT06462-A-2-SBA	<b>Code:</b> TIA-222-H	2/9/2022
<b>Site Name:</b> Mountain Street	<b>Exposure:</b> B	
<b>Height:</b> 196.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II



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### Discrete Appurtenances Properties

Attach Elev (ft)	Description	Qty	No Ice		Ice		Len (in)	Width (in)	Depth (in)	Ka	Orientation Factor	Vert Ecc (ft)
			Weight (lb)	CaAa (sf)	Weight (lb)	CaAa (sf)						
185.00	Antel BXA-80080/4CF	3	14.30	4.800	87.68	6.070	48.200	11.200	5.900	1.00	1.00	0.000
185.00	Rfs Celwave FD9R6004/2C-3L	6	3.10	0.310	8.54	0.569	6.500	5.800	1.500	1.00	0.60	0.000
169.00	Ericsson AIR21-6449 B41	3	103.00	22.840	195.23	25.425	88.000	33.000	20.000	0.80	0.82	0.000
169.00	RFS APXVAARR24_43-U-NA20	3	128.00	20.240	405.88	21.503	95.900	24.000	8.700	0.80	0.72	0.000
169.00	Ericsson AIR32 KR901146-1	3	132.20	6.050	242.46	6.768	56.000	12.000	8.700	0.80	0.67	0.000
169.00	72" x 12" x 6" Panel	3	45.00	8.130	156.02	10.008	72.000	12.000	6.000	0.80	0.79	0.000
169.00	Ericsson KRY11271 TMA's	3	11.00	1.140	20.59	2.000	13.230	10.340	6.300	0.80	0.60	0.000
169.00	Commscope SDX192 6Q-43	3	6.50	0.240	17.55	0.256	6.930	4.170	2.910	0.80	0.60	0.000
169.00	Ericsson 4449 B71 + B85 RRU's	3	75.00	1.950	125.69	2.335	17.900	13.100	10.600	0.80	0.67	0.000
169.00	Ericsson 4415 B25 RRU's	3	46.00	1.840	79.29	2.221	16.500	13.400	5.900	0.80	0.67	0.000
169.00	10' T Frames	3	500.00	15.000	734.78	23.804	0.000	0.000	0.000	0.75	0.75	0.000
164.81	Commscope DB586-Y Omni	1	8.25	1.010	39.42	1.657	52.560	2.500	2.500	1.00	1.00	2.190
164.81	Powerwave LGP104 TMA	1	7.00	0.230	12.73	0.386	7.000	4.000	1.200	1.00	1.00	-0.810
164.81	Sidearm (Commscope/Andrew	1	40.00	2.630	94.00	6.645	10.000	0.000	0.000	1.00	1.00	0.000
160.67	RFS BA1312-0 Omni	1	4.40	1.730	55.43	3.804	104.000	2.000	2.000	1.00	1.00	4.330
160.67	Sidearm (Commscope S-400)	1	53.32	3.500	124.71	8.829	10.000	0.000	0.000	1.00	1.00	0.000
159.85	Sidearm (Commscope S-400)	1	41.00	3.500	95.86	8.795	10.000	0.000	0.000	1.00	1.00	0.000
159.85	RFS 458-2 Omni	1	22.00	3.720	58.09	6.679	159.600	2.800	2.800	1.00	1.00	6.650
153.30	SP2D00P36D-D	1	45.00	5.530	103.51	9.293	189.600	3.500	3.500	1.00	1.00	7.900
152.88	Sidearm (Site Pro USF-4U)	1	165.00	5.150	329.55	9.688	20.000	0.000	0.000	1.00	1.00	0.000
131.00	Kreco CO-36A Omni	1	12.00	0.750	29.94	1.339	144.000	0.620	0.620	1.00	1.00	6.000
131.00	6' Sidearm (Commscope S-600)	1	70.00	5.150	162.33	12.831	15.000	0.000	0.000	1.00	1.00	0.000
130.07	RFS 220-3AN Omni	1	24.00	5.680	119.09	10.490	248.400	2.750	2.750	1.00	1.00	10.33
130.07	6' Sidearm (Commscope/Andrew	1	70.00	5.150	138.82	9.623	15.000	0.000	0.000	1.00	1.00	0.000
130.00	RFS 220-7N Omni	1	22.00	5.320	157.72	9.776	228.000	2.800	2.800	1.00	1.00	9.500
130.00	4' Sidearm (Wireless Solutions	1	53.32	3.500	123.70	8.753	10.000	0.000	0.000	1.00	1.00	0.000
120.00	Commscope sbnhh-1d45b	2	96.00	14.770	328.32	15.789	76.800	22.300	12.200	0.80	0.80	0.000
120.00	Commscope SBNHH-1D65B	4	50.71	8.050	171.98	8.865	72.000	11.850	7.100	0.80	0.83	0.000
120.00	Samsung MT6407-77A	3	87.10	4.700	169.00	5.385	35.120	16.060	5.510	0.80	0.70	0.000
120.00	Samsung B2/B66A RRH-BR049	3	84.40	1.880	129.75	2.229	15.000	15.000	10.000	0.80	0.67	0.000
120.00	Samsung B5/B13 RRH-BR04C	3	70.30	1.880	111.17	2.229	15.000	15.000	8.100	0.80	0.67	0.000
120.00	Rfs Celwave DB-T1-6Z-8AB-OZ	2	44.00	4.800	131.14	5.351	24.000	24.000	10.000	0.80	0.67	0.000
120.00	10' T-Frames	3	500.00	15.000	838.38	27.633	0.000	0.000	0.000	0.75	0.75	0.000
<b>Totals:</b>		<b>71</b>	<b>6,547.13</b>		<b>13,243.42</b>						<b>Number of Appurtenances :</b>	<b>33</b>

## Loading Summary

<b>Structure:</b> CT06462-A-2-SBA	<b>Code:</b> TIA-222-H	2/9/2022
<b>Site Name:</b> Mountain Street	<b>Exposure:</b> B	
<b>Height:</b> 196.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II



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### Linear Appurtenances Properties

Elev. From (ft)	Elev. To (ft)	Description	Qty	Width (in)	Weight (lb/ft)	Pct In Block	Spread On Faces	Bundling Arrangement	Cluster Dia (in)	Out of Zone	Spacing (in)	Orientation Factor	Ka Override
1.00	196.00	Safety Climb	1	0.38	0.27	100.00	1	Individual NR		N	1.00	1.00	
3.00	196.00	Step bolts (ladder)		0.63	1.04	100.00	3	Individual NR		N	1.00	1.00	
3.00	196.00	Step bolts (ladder)		0.63	1.04	100.00	1	Individual NR		N	1.00	1.00	
3.00	196.00	Step bolts (ladder)		0.63	1.04	100.00	2	Individual NR		N	1.00	1.00	
0.00	185.00	W/G Ladder (VZW)	1	2.00	6.00	100.00	2	Individual NR		N	1.00	1.00	
3.00	185.00	1 5/8" Coax	3	1.98	1.04	100.00	2	Individual IR		N	0.50	0.64	
0.00	169.00	W/G Ladder (TMO)	1	2.50	6.00	100.00	3	Individual NR		N	1.00	1.00	
3.00	169.00	1 5/8" Coax	9	1.98	1.04	50.00	3	Block		N	0.50	1.00	
3.00	169.00	1 5/8" Hybrid	2	2.00	1.10	100.00	3	Individual IR		N	0.50	1.00	
0.00	160.00	W/G Ladder (CLP)	1	3.00	6.00	100.00	3	Individual NR		N	1.00	1.00	
3.00	160.00	1/2" Coax	1	0.65	0.16	100.00	3	Individual IR		N	1.00	1.00	
3.00	160.00	7/8" Coax	8	1.11	0.52	100.00	3	Individual IR		N	0.50	1.00	
3.00	120.00	1 5/8" Coax	8	1.98	1.04	100.00	2	Individual IR		N	0.50	0.42	
3.00	120.00	1 5/8" Fiber	2	1.98	1.04	100.00	2	Individual IR		N	0.50	0.76	



## Section Forces

**Structure:** CT06462-A-2-SBA  
**Site Name:** Mountain Street  
**Height:** 196.00 (ft)  
**Base Elev:** 0.000 (ft)  
**Gh:** 0.85

**Topography:** 1

**Code:** TIA-222-H  
**Exposure:** B  
**Crest Height:** 0.00  
**Site Class:** D - Stiff Soil  
**Struct Class:** II

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**Load Case:** 1.2D + 1.0W Normal Wind

1.2D + 1.0W 121 mph Wind at Normal To Face

<b>Wind Load Factor:</b> 1.00	<b>Wind Importance Factor:</b> 1.00
<b>Dead Load Factor:</b> 1.20	<b>Ice Importance Factor:</b> 1.00
<b>Ice Dead Load Factor:</b> 0.00	

Sect Seq	Wind Height (ft)	qz (psf)	Total	Total	Ice	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Ice		Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
			Flat Area (sqft)	Round Area (sqft)	Round Area (sqft)							Linear	Linear					
1	10.0	22.30	31.267	28.80	0.00	0.13	2.84	1.00	1.00	0.00	43.67	85.58	0.00	6,467.1	0.0	2349.60	1225.61	3,575.21
2	30.0	22.32	28.860	28.80	0.00	0.14	2.81	1.00	1.00	0.00	41.35	98.41	0.00	5,655.3	0.0	2205.88	1411.97	3,617.85
3	50.0	25.83	23.184	28.80	0.00	0.14	2.81	1.00	1.00	0.00	35.08	98.41	0.00	5,249.6	0.0	2166.27	1633.85	3,800.12
4	70.0	28.43	21.246	22.13	0.00	0.13	2.84	1.00	1.00	0.00	31.63	98.41	0.00	4,775.7	0.0	2171.13	1798.72	3,969.85
5	90.0	30.55	22.280	22.12	0.00	0.15	2.76	1.00	1.00	0.00	32.63	98.41	0.00	4,421.7	0.0	2336.98	1932.62	4,269.60
6	110.0	32.35	16.430	18.58	0.00	0.14	2.80	1.00	1.00	0.00	25.69	98.41	0.00	3,849.5	0.0	1979.23	2046.66	4,025.90
7	130.0	33.93	14.331	15.03	0.00	0.14	2.79	1.00	1.00	0.00	22.39	65.41	0.00	3,024.9	0.0	1803.83	1461.38	3,265.21
8	150.0	35.35	12.808	11.69	0.00	0.15	2.76	1.00	1.00	0.00	19.44	65.41	0.00	2,332.0	0.0	1613.38	1522.36	3,135.74
9	164.0	36.26	4.976	4.67	0.00	0.17	2.69	1.00	1.00	0.00	7.64	17.81	0.00	833.3	0.0	632.37	439.28	1,071.66
10	178.0	37.12	12.376	11.67	0.00	0.17	2.68	1.00	1.00	0.00	19.03	13.41	0.00	1,645.7	0.0	1611.60	310.22	1,921.82
11	192.0	37.93	5.252	4.67	0.00	0.18	2.66	1.00	1.00	0.00	7.92	0.25	0.00	506.9	0.0	680.23	5.80	686.04
														<b>38,761.8</b>	<b>0.0</b>			<b>33,338.99</b>

**Load Case:** 1.2D + 1.0W 60° Wind

1.2D + 1.0W 121 mph Wind at 60° From Face

<b>Wind Load Factor:</b> 1.00	<b>Wind Importance Factor:</b> 1.00
<b>Dead Load Factor:</b> 1.20	<b>Ice Importance Factor:</b> 1.00
<b>Ice Dead Load Factor:</b> 0.00	

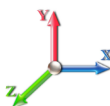
Sect Seq	Wind Height (ft)	qz (psf)	Total	Total	Ice	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Ice		Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
			Flat Area (sqft)	Round Area (sqft)	Round Area (sqft)							Linear	Linear					
1	10.0	22.30	31.267	28.80	0.00	0.13	2.84	0.80	1.00	0.00	37.42	85.58	0.00	6,467.1	0.0	2013.18	1225.61	3,238.78
2	30.0	22.32	28.860	28.80	0.00	0.14	2.81	0.80	1.00	0.00	35.58	98.41	0.00	5,655.3	0.0	1897.97	1411.97	3,309.94
3	50.0	25.83	23.184	28.80	0.00	0.14	2.81	0.80	1.00	0.00	30.44	98.41	0.00	5,249.6	0.0	1879.96	1633.85	3,513.80
4	70.0	28.43	21.246	22.13	0.00	0.13	2.84	0.80	1.00	0.00	27.38	98.41	0.00	4,775.7	0.0	1879.45	1798.72	3,678.17
5	90.0	30.55	22.280	22.12	0.00	0.15	2.76	0.80	1.00	0.00	28.18	98.41	0.00	4,421.7	0.0	2017.89	1932.62	3,950.51
6	110.0	32.35	16.430	18.58	0.00	0.14	2.80	0.80	1.00	0.00	22.40	98.41	0.00	3,849.5	0.0	1726.05	2046.66	3,772.72
7	130.0	33.93	14.331	15.03	0.00	0.14	2.79	0.80	1.00	0.00	19.53	65.41	0.00	3,024.9	0.0	1572.97	1461.38	3,034.35
8	150.0	35.35	12.808	11.69	0.00	0.15	2.76	0.80	1.00	0.00	16.88	65.41	0.00	2,332.0	0.0	1400.83	1522.36	2,923.19
9	164.0	36.26	4.976	4.67	0.00	0.17	2.69	0.80	1.00	0.00	6.64	17.81	0.00	833.3	0.0	549.98	439.28	989.26
10	178.0	37.12	12.376	11.67	0.00	0.17	2.68	0.80	1.00	0.00	16.56	13.41	0.00	1,645.7	0.0	1402.00	310.22	1,712.21
11	192.0	37.93	5.252	4.67	0.00	0.18	2.66	0.80	1.00	0.00	6.87	0.25	0.00	506.9	0.0	589.99	5.80	595.80
														<b>38,761.8</b>	<b>0.0</b>			<b>30,718.73</b>

## Section Forces

**Structure:** CT06462-A-2-SBA  
**Site Name:** Mountain Street  
**Height:** 196.00 (ft)  
**Base Elev:** 0.000 (ft)  
**Gh:** 0.85

**Topography:** 1

**Code:** TIA-222-H  
**Exposure:** B  
**Crest Height:** 0.00  
**Site Class:** D - Stiff Soil  
**Struct Class:** II

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<b>Load Case:</b> 1.2D + 1.0W 90° Wind	1.2D + 1.0W 121 mph Wind at 90° From Face
<b>Wind Load Factor:</b> 1.00	<b>Wind Importance Factor:</b> 1.00
<b>Dead Load Factor:</b> 1.20	
<b>Ice Dead Load Factor:</b> 0.00	<b>Ice Importance Factor:</b> 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total	Total	Ice	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear	Linear	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
			Flat Area (sqft)	Round Area (sqft)	Round Area (sqft)							Area (sqft)	Area (sqft)					
1	10.0	22.30	31.267	28.80	0.00	0.13	2.84	0.85	1.00	0.00	38.98	85.58	0.00	6,467.1	0.0	2097.28	1225.61	3,322.89
2	30.0	22.32	28.860	28.80	0.00	0.14	2.81	0.85	1.00	0.00	37.02	98.41	0.00	5,655.3	0.0	1974.94	1411.97	3,386.92
3	50.0	25.83	23.184	28.80	0.00	0.14	2.81	0.85	1.00	0.00	31.60	98.41	0.00	5,249.6	0.0	1951.54	1633.85	3,585.38
4	70.0	28.43	21.246	22.13	0.00	0.13	2.84	0.85	1.00	0.00	28.44	98.41	0.00	4,775.7	0.0	1952.37	1798.72	3,751.09
5	90.0	30.55	22.280	22.12	0.00	0.15	2.76	0.85	1.00	0.00	29.29	98.41	0.00	4,421.7	0.0	2097.66	1932.62	4,030.28
6	110.0	32.35	16.430	18.58	0.00	0.14	2.80	0.85	1.00	0.00	23.22	98.41	0.00	3,849.5	0.0	1789.35	2046.66	3,836.01
7	130.0	33.93	14.331	15.03	0.00	0.14	2.79	0.85	1.00	0.00	20.25	65.41	0.00	3,024.9	0.0	1630.69	1461.38	3,092.06
8	150.0	35.35	12.808	11.69	0.00	0.15	2.76	0.85	1.00	0.00	17.52	65.41	0.00	2,332.0	0.0	1453.97	1522.36	2,976.33
9	164.0	36.26	4.976	4.67	0.00	0.17	2.69	0.85	1.00	0.00	6.89	17.81	0.00	833.3	0.0	570.57	439.28	1,009.86
10	178.0	37.12	12.376	11.67	0.00	0.17	2.68	0.85	1.00	0.00	17.18	13.41	0.00	1,645.7	0.0	1454.40	310.22	1,764.62
11	192.0	37.93	5.252	4.67	0.00	0.18	2.66	0.85	1.00	0.00	7.13	0.25	0.00	506.9	0.0	612.55	5.80	618.36
														<b>38,761.8</b>	<b>0.0</b>			<b>31,373.79</b>

<b>Load Case:</b> 0.9D + 1.0W Normal Wind	0.9D + 1.0W 121 mph Wind at Normal To Face
<b>Wind Load Factor:</b> 1.00	<b>Wind Importance Factor:</b> 1.00
<b>Dead Load Factor:</b> 0.90	
<b>Ice Dead Load Factor:</b> 0.00	<b>Ice Importance Factor:</b> 1.00

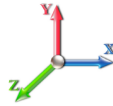
Sect Seq	Wind Height (ft)	qz (psf)	Total	Total	Ice	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear	Linear	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
			Flat Area (sqft)	Round Area (sqft)	Round Area (sqft)							Area (sqft)	Area (sqft)					
1	10.0	22.30	31.267	28.80	0.00	0.13	2.84	1.00	1.00	0.00	43.67	85.58	0.00	4,850.4	0.0	2349.60	1225.61	3,575.21
2	30.0	22.32	28.860	28.80	0.00	0.14	2.81	1.00	1.00	0.00	41.35	98.41	0.00	4,241.5	0.0	2205.88	1411.97	3,617.85
3	50.0	25.83	23.184	28.80	0.00	0.14	2.81	1.00	1.00	0.00	35.08	98.41	0.00	3,937.2	0.0	2166.27	1633.85	3,800.12
4	70.0	28.43	21.246	22.13	0.00	0.13	2.84	1.00	1.00	0.00	31.63	98.41	0.00	3,581.8	0.0	2171.13	1798.72	3,969.85
5	90.0	30.55	22.280	22.12	0.00	0.15	2.76	1.00	1.00	0.00	32.63	98.41	0.00	3,316.3	0.0	2336.98	1932.62	4,269.60
6	110.0	32.35	16.430	18.58	0.00	0.14	2.80	1.00	1.00	0.00	25.69	98.41	0.00	2,887.1	0.0	1979.23	2046.66	4,025.90
7	130.0	33.93	14.331	15.03	0.00	0.14	2.79	1.00	1.00	0.00	22.39	65.41	0.00	2,268.6	0.0	1803.83	1461.38	3,265.21
8	150.0	35.35	12.808	11.69	0.00	0.15	2.76	1.00	1.00	0.00	19.44	65.41	0.00	1,749.0	0.0	1613.38	1522.36	3,135.74
9	164.0	36.26	4.976	4.67	0.00	0.17	2.69	1.00	1.00	0.00	7.64	17.81	0.00	625.0	0.0	632.37	439.28	1,071.66
10	178.0	37.12	12.376	11.67	0.00	0.17	2.68	1.00	1.00	0.00	19.03	13.41	0.00	1,234.3	0.0	1611.60	310.22	1,921.82
11	192.0	37.93	5.252	4.67	0.00	0.18	2.66	1.00	1.00	0.00	7.92	0.25	0.00	380.2	0.0	680.23	5.80	686.04
														<b>29,071.3</b>	<b>0.0</b>			<b>33,338.99</b>

## Section Forces

**Structure:** CT06462-A-2-SBA  
**Site Name:** Mountain Street  
**Height:** 196.00 (ft)  
**Base Elev:** 0.000 (ft)  
**Gh:** 0.85

**Topography:** 1

**Code:** TIA-222-H  
**Exposure:** B  
**Crest Height:** 0.00  
**Site Class:** D - Stiff Soil  
**Struct Class:** II

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**Load Case:** 0.9D + 1.0W 60° Wind

0.9D + 1.0W 121 mph Wind at 60° From Face

**Wind Load Factor:** 1.00  
**Dead Load Factor:** 0.90  
**Ice Dead Load Factor:** 0.00

**Wind Importance Factor:** 1.00  
**Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)	
1	10.0	22.30	31.267	28.80	0.00	0.13	2.84	0.80	1.00	0.00	37.42	85.58	0.00	4,850.4	0.0	2013.18	1225.61	3,238.78	
2	30.0	22.32	28.860	28.80	0.00	0.14	2.81	0.80	1.00	0.00	35.58	98.41	0.00	4,241.5	0.0	1897.97	1411.97	3,309.94	
3	50.0	25.83	23.184	28.80	0.00	0.14	2.81	0.80	1.00	0.00	30.44	98.41	0.00	3,937.2	0.0	1879.96	1633.85	3,513.80	
4	70.0	28.43	21.246	22.13	0.00	0.13	2.84	0.80	1.00	0.00	27.38	98.41	0.00	3,581.8	0.0	1879.45	1798.72	3,678.17	
5	90.0	30.55	22.280	22.12	0.00	0.15	2.76	0.80	1.00	0.00	28.18	98.41	0.00	3,316.3	0.0	2017.89	1932.62	3,950.51	
6	110.0	32.35	16.430	18.58	0.00	0.14	2.80	0.80	1.00	0.00	22.40	98.41	0.00	2,887.1	0.0	1726.05	2046.66	3,772.72	
7	130.0	33.93	14.331	15.03	0.00	0.14	2.79	0.80	1.00	0.00	19.53	65.41	0.00	2,268.6	0.0	1572.97	1461.38	3,034.35	
8	150.0	35.35	12.808	11.69	0.00	0.15	2.76	0.80	1.00	0.00	16.88	65.41	0.00	1,749.0	0.0	1400.83	1522.36	2,923.19	
9	164.0	36.26	4.976	4.67	0.00	0.17	2.69	0.80	1.00	0.00	6.64	17.81	0.00	625.0	0.0	549.98	439.28	989.26	
10	178.0	37.12	12.376	11.67	0.00	0.17	2.68	0.80	1.00	0.00	16.56	13.41	0.00	1,234.3	0.0	1402.00	310.22	1,712.21	
11	192.0	37.93	5.252	4.67	0.00	0.18	2.66	0.80	1.00	0.00	6.87	0.25	0.00	380.2	0.0	589.99	5.80	595.80	
														<b>29,071.3</b>	<b>0.0</b>				<b>30,718.73</b>

**Load Case:** 0.9D + 1.0W 90° Wind

0.9D + 1.0W 121 mph Wind at 90° From Face

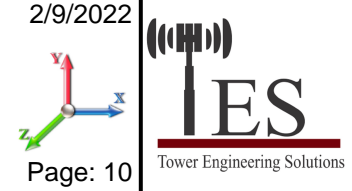
**Wind Load Factor:** 1.00  
**Dead Load Factor:** 0.90  
**Ice Dead Load Factor:** 0.00

**Wind Importance Factor:** 1.00  
**Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)	
1	10.0	22.30	31.267	28.80	0.00	0.13	2.84	0.85	1.00	0.00	38.98	85.58	0.00	4,850.4	0.0	2097.28	1225.61	3,322.89	
2	30.0	22.32	28.860	28.80	0.00	0.14	2.81	0.85	1.00	0.00	37.02	98.41	0.00	4,241.5	0.0	1974.94	1411.97	3,386.92	
3	50.0	25.83	23.184	28.80	0.00	0.14	2.81	0.85	1.00	0.00	31.60	98.41	0.00	3,937.2	0.0	1951.54	1633.85	3,585.38	
4	70.0	28.43	21.246	22.13	0.00	0.13	2.84	0.85	1.00	0.00	28.44	98.41	0.00	3,581.8	0.0	1952.37	1798.72	3,751.09	
5	90.0	30.55	22.280	22.12	0.00	0.15	2.76	0.85	1.00	0.00	29.29	98.41	0.00	3,316.3	0.0	2097.66	1932.62	4,030.28	
6	110.0	32.35	16.430	18.58	0.00	0.14	2.80	0.85	1.00	0.00	23.22	98.41	0.00	2,887.1	0.0	1789.35	2046.66	3,836.01	
7	130.0	33.93	14.331	15.03	0.00	0.14	2.79	0.85	1.00	0.00	20.25	65.41	0.00	2,268.6	0.0	1630.69	1461.38	3,092.06	
8	150.0	35.35	12.808	11.69	0.00	0.15	2.76	0.85	1.00	0.00	17.52	65.41	0.00	1,749.0	0.0	1453.97	1522.36	2,976.33	
9	164.0	36.26	4.976	4.67	0.00	0.17	2.69	0.85	1.00	0.00	6.89	17.81	0.00	625.0	0.0	570.57	439.28	1,009.86	
10	178.0	37.12	12.376	11.67	0.00	0.17	2.68	0.85	1.00	0.00	17.18	13.41	0.00	1,234.3	0.0	1454.40	310.22	1,764.62	
11	192.0	37.93	5.252	4.67	0.00	0.18	2.66	0.85	1.00	0.00	7.13	0.25	0.00	380.2	0.0	612.55	5.80	618.36	
														<b>29,071.3</b>	<b>0.0</b>				<b>31,373.79</b>

## Section Forces

<b>Structure:</b> CT06462-A-2-SBA	<b>Code:</b> TIA-222-H	2/9/2022
<b>Site Name:</b> Mountain Street	<b>Exposure:</b> B	
<b>Height:</b> 196.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II
		Page: 10



<b>Load Case:</b> 1.2D + 1.0Di + 1.0Wi Normal Wind	1.2D + 1.0Di + 1.0Wi 50 mph Wind at Normal From Face
<b>Wind Load Factor:</b> 1.00	<b>Wind Importance Factor:</b> 1.00
<b>Dead Load Factor:</b> 1.20	
<b>Ice Dead Load Factor:</b> 1.00	<b>Ice Importance Factor:</b> 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Ice		Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)	
												Linear Area (sqft)	Linear Area (sqft)						
1	10.0	3.81	31.267	49.02	20.23	0.18	2.68	1.00	1.00	0.89	59.24	115.94	11.68	10,548.	4081.6	513.83	309.27	823.10	
2	30.0	3.81	28.860	50.18	21.38	0.19	2.63	1.00	1.00	0.99	57.60	136.52	13.21	10,319.	4663.6	491.16	359.55	850.71	
3	50.0	4.41	23.184	50.07	21.27	0.19	2.62	1.00	1.00	1.04	51.90	137.73	13.90	9,782.0	4532.4	508.99	421.41	930.39	
4	70.0	4.86	21.246	42.84	20.72	0.19	2.62	1.00	1.00	1.08	45.80	138.56	14.37	9,154.7	4379.0	495.52	468.60	964.11	
5	90.0	5.22	22.280	46.53	24.41	0.24	2.48	1.00	1.00	1.11	49.34	139.20	14.74	9,084.5	4662.8	543.07	500.82	1,043.89	
6	110.0	5.52	16.430	41.48	22.90	0.23	2.50	1.00	1.00	1.13	40.51	139.73	15.04	8,056.9	4207.5	474.69	534.16	1,008.86	
7	130.0	5.79	14.331	36.28	21.26	0.24	2.45	1.00	1.00	1.15	35.51	92.86	15.29	6,312.3	3287.5	429.30	455.81	885.11	
8	150.0	6.04	12.808	35.04	23.35	0.29	2.32	1.00	1.00	1.16	33.70	89.25	19.39	5,524.3	3192.3	401.03	467.46	868.50	
9	164.0	6.19	4.976	13.87	9.20	0.33	2.22	1.00	1.00	1.17	13.42	23.51	4.70	1,899.8	1066.5	156.71	119.00	275.72	
10	178.0	6.34	12.376	34.78	23.11	0.33	2.21	1.00	1.00	1.18	33.58	18.61	7.50	3,752.8	2107.1	400.41	97.63	498.04	
11	192.0	6.48	5.252	15.29	10.63	0.36	2.14	1.00	1.00	1.19	14.75	0.25	1.59	1,289.9	783.0	174.03	7.75	181.78	
														<b>75,725.0</b>	<b>36963.2</b>				<b>8,330.22</b>

<b>Load Case:</b> 1.2D + 1.0Di + 1.0Wi 60° Wind	1.2D + 1.0Di + 1.0Wi 50 mph Wind at 60° From Face
<b>Wind Load Factor:</b> 1.00	<b>Wind Importance Factor:</b> 1.00
<b>Dead Load Factor:</b> 1.20	
<b>Ice Dead Load Factor:</b> 1.00	<b>Ice Importance Factor:</b> 1.00

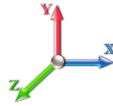
Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Ice		Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)	
												Linear Area (sqft)	Linear Area (sqft)						
1	10.0	3.81	31.267	49.02	20.23	0.18	2.68	0.80	1.00	0.89	52.99	115.94	11.68	10,548.	4081.6	459.59	309.27	768.86	
2	30.0	3.81	28.860	50.18	21.38	0.19	2.63	0.80	1.00	0.99	51.82	136.52	13.21	10,319.	4663.6	441.94	359.55	801.49	
3	50.0	4.41	23.184	50.07	21.27	0.19	2.62	0.80	1.00	1.04	47.26	137.73	13.90	9,782.0	4532.4	463.51	421.41	884.91	
4	70.0	4.86	21.246	42.84	20.72	0.19	2.62	0.80	1.00	1.08	41.55	138.56	14.37	9,154.7	4379.0	449.55	468.60	918.14	
5	90.0	5.22	22.280	46.53	24.41	0.24	2.48	0.80	1.00	1.11	44.88	139.20	14.74	9,084.5	4662.8	494.02	500.82	994.85	
6	110.0	5.52	16.430	41.48	22.90	0.23	2.50	0.80	1.00	1.13	37.23	139.73	15.04	8,056.9	4207.5	436.19	534.16	970.35	
7	130.0	5.79	14.331	36.28	21.26	0.24	2.45	0.80	1.00	1.15	32.64	92.86	15.29	6,312.3	3287.5	394.65	455.81	850.46	
8	150.0	6.04	12.808	35.04	23.35	0.29	2.32	0.80	1.00	1.16	31.14	89.25	19.39	5,524.3	3192.3	370.55	467.46	838.02	
9	164.0	6.19	4.976	13.87	9.20	0.33	2.22	0.80	1.00	1.17	12.42	23.51	4.70	1,899.8	1066.5	145.09	119.00	264.09	
10	178.0	6.34	12.376	34.78	23.11	0.33	2.21	0.80	1.00	1.18	31.11	18.61	7.50	3,752.8	2107.1	370.90	97.63	468.53	
11	192.0	6.48	5.252	15.29	10.63	0.36	2.14	0.80	1.00	1.19	13.69	0.25	1.59	1,289.9	783.0	161.63	7.75	169.39	
														<b>75,725.0</b>	<b>36963.2</b>				<b>7,929.10</b>

## Section Forces

**Structure:** CT06462-A-2-SBA  
**Site Name:** Mountain Street  
**Height:** 196.00 (ft)  
**Base Elev:** 0.000 (ft)  
**Gh:** 0.85

**Topography:** 1

**Code:** TIA-222-H  
**Exposure:** B  
**Crest Height:** 0.00  
**Site Class:** D - Stiff Soil  
**Struct Class:** II

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<b>Load Case:</b> 1.2D + 1.0Di + 1.0Wi 90° Wind	1.2D + 1.0Di + 1.0Wi 50 mph Wind at 90° From Face
<b>Wind Load Factor:</b> 1.00	<b>Wind Importance Factor:</b> 1.00
<b>Dead Load Factor:</b> 1.20	
<b>Ice Dead Load Factor:</b> 1.00	<b>Ice Importance Factor:</b> 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total	Total	Ice	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear	Linear	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
			Flat Area (sqft)	Round Area (sqft)	Round Area (sqft)							Area (sqft)	Area (sqft)					
1	10.0	3.81	31.267	49.02	20.23	0.18	2.68	0.85	1.00	0.89	54.55	115.94	11.68	10,548.	4081.6	473.15	309.27	782.42
2	30.0	3.81	28.860	50.18	21.38	0.19	2.63	0.85	1.00	0.99	53.27	136.52	13.21	10,319.	4663.6	454.24	359.55	813.80
3	50.0	4.41	23.184	50.07	21.27	0.19	2.62	0.85	1.00	1.04	48.42	137.73	13.90	9,782.0	4532.4	474.88	421.41	896.28
4	70.0	4.86	21.246	42.84	20.72	0.19	2.62	0.85	1.00	1.08	42.62	138.56	14.37	9,154.7	4379.0	461.04	468.60	929.64
5	90.0	5.22	22.280	46.53	24.41	0.24	2.48	0.85	1.00	1.11	46.00	139.20	14.74	9,084.5	4662.8	506.28	500.82	1,007.11
6	110.0	5.52	16.430	41.48	22.90	0.23	2.50	0.85	1.00	1.13	38.05	139.73	15.04	8,056.9	4207.5	445.82	534.16	979.98
7	130.0	5.79	14.331	36.28	21.26	0.24	2.45	0.85	1.00	1.15	33.36	92.86	15.29	6,312.3	3287.5	403.31	455.81	859.12
8	150.0	6.04	12.808	35.04	23.35	0.29	2.32	0.85	1.00	1.16	31.78	89.25	19.39	5,524.3	3192.3	378.17	467.46	845.64
9	164.0	6.19	4.976	13.87	9.20	0.33	2.22	0.85	1.00	1.17	12.67	23.51	4.70	1,899.8	1066.5	148.00	119.00	267.00
10	178.0	6.34	12.376	34.78	23.11	0.33	2.21	0.85	1.00	1.18	31.73	18.61	7.50	3,752.8	2107.1	378.28	97.63	475.91
11	192.0	6.48	5.252	15.29	10.63	0.36	2.14	0.85	1.00	1.19	13.96	0.25	1.59	1,289.9	783.0	164.73	7.75	172.49
														<b>75,725.0</b>	<b>36963.2</b>			<b>8,029.38</b>

<b>Load Case:</b> 1.0D + 1.0W Normal Wind	1.0D + 1.0W 60 mph Wind at Normal To Face
<b>Wind Load Factor:</b> 1.00	<b>Wind Importance Factor:</b> 1.00
<b>Dead Load Factor:</b> 1.00	
<b>Ice Dead Load Factor:</b> 0.00	<b>Ice Importance Factor:</b> 1.00

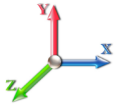
Sect Seq	Wind Height (ft)	qz (psf)	Total	Total	Ice	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear	Linear	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
			Flat Area (sqft)	Round Area (sqft)	Round Area (sqft)							Area (sqft)	Area (sqft)					
1	10.0	5.48	31.267	28.80	0.00	0.13	2.84	1.00	1.00	0.00	47.57	85.58	0.00	5,389.3	0.0	629.21	301.36	930.57
2	30.0	5.49	28.860	28.80	0.00	0.14	2.81	1.00	1.00	0.00	45.17	98.41	0.00	4,712.8	0.0	592.56	347.18	939.74
3	50.0	6.35	23.184	28.80	0.00	0.14	2.81	1.00	1.00	0.00	39.50	98.41	0.00	4,374.7	0.0	599.72	401.74	1,001.45
4	70.0	6.99	21.246	22.13	0.00	0.13	2.84	1.00	1.00	0.00	33.77	98.41	0.00	3,979.7	0.0	569.94	442.28	1,012.21
5	90.0	7.51	22.280	22.12	0.00	0.15	2.76	1.00	1.00	0.00	34.84	98.41	0.00	3,684.7	0.0	613.49	475.20	1,088.69
6	110.0	7.96	16.430	18.58	0.00	0.14	2.80	1.00	1.00	0.00	26.96	98.41	0.00	3,207.9	0.0	510.73	503.24	1,013.97
7	130.0	8.34	14.331	15.03	0.00	0.14	2.79	1.00	1.00	0.00	22.85	65.41	0.00	2,520.7	0.0	452.57	359.33	811.90
8	150.0	8.69	12.808	11.69	0.00	0.15	2.76	1.00	1.00	0.00	19.44	65.41	0.00	1,943.4	0.0	396.71	374.33	771.03
9	164.0	8.92	4.976	4.67	0.00	0.17	2.69	1.00	1.00	0.00	7.64	17.81	0.00	694.4	0.0	155.49	108.01	263.50
10	178.0	9.13	12.376	11.67	0.00	0.17	2.68	1.00	1.00	0.00	19.03	13.41	0.00	1,371.4	0.0	396.27	76.28	472.55
11	192.0	9.33	5.252	4.67	0.00	0.18	2.66	1.00	1.00	0.00	7.92	0.25	0.00	422.4	0.0	167.26	1.43	168.69
														<b>32,301.5</b>	<b>0.0</b>			<b>8,474.31</b>

## Section Forces

**Structure:** CT06462-A-2-SBA  
**Site Name:** Mountain Street  
**Height:** 196.00 (ft)  
**Base Elev:** 0.000 (ft)  
**Gh:** 0.85

**Topography:** 1

**Code:** TIA-222-H  
**Exposure:** B  
**Crest Height:** 0.00  
**Site Class:** D - Stiff Soil  
**Struct Class:** II

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**Load Case:** 1.0D + 1.0W 60° Wind

1.0D + 1.0W 60 mph Wind at 60° From Face

**Wind Load Factor:** 1.00  
**Dead Load Factor:** 1.00  
**Ice Dead Load Factor:** 0.00

**Wind Importance Factor:** 1.00  
**Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Ice		Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
												Linear Area (sqft)	Linear Area (sqft)					
1	10.0	5.48	31.267	28.80	0.00	0.13	2.84	0.80	1.00	0.00	41.31	85.58	0.00	5,389.3	0.0	546.49	301.36	847.85
2	30.0	5.49	28.860	28.80	0.00	0.14	2.81	0.80	1.00	0.00	39.40	98.41	0.00	4,712.8	0.0	516.85	347.18	864.03
3	50.0	6.35	23.184	28.80	0.00	0.14	2.81	0.80	1.00	0.00	34.86	98.41	0.00	4,374.7	0.0	529.31	401.74	931.05
4	70.0	6.99	21.246	22.13	0.00	0.13	2.84	0.80	1.00	0.00	29.52	98.41	0.00	3,979.7	0.0	498.22	442.28	940.49
5	90.0	7.51	22.280	22.12	0.00	0.15	2.76	0.80	1.00	0.00	30.39	98.41	0.00	3,684.7	0.0	535.03	475.20	1,010.23
6	110.0	7.96	16.430	18.58	0.00	0.14	2.80	0.80	1.00	0.00	23.67	98.41	0.00	3,207.9	0.0	448.48	503.24	951.72
7	130.0	8.34	14.331	15.03	0.00	0.14	2.79	0.80	1.00	0.00	19.98	65.41	0.00	2,520.7	0.0	395.80	359.33	755.13
8	150.0	8.69	12.808	11.69	0.00	0.15	2.76	0.80	1.00	0.00	16.88	65.41	0.00	1,943.4	0.0	344.44	374.33	718.77
9	164.0	8.92	4.976	4.67	0.00	0.17	2.69	0.80	1.00	0.00	6.64	17.81	0.00	694.4	0.0	135.23	108.01	243.24
10	178.0	9.13	12.376	11.67	0.00	0.17	2.68	0.80	1.00	0.00	16.56	13.41	0.00	1,371.4	0.0	344.73	76.28	421.01
11	192.0	9.33	5.252	4.67	0.00	0.18	2.66	0.80	1.00	0.00	6.87	0.25	0.00	422.4	0.0	145.07	1.43	146.50
														<b>32,301.5</b>	<b>0.0</b>			<b>7,830.02</b>

**Load Case:** 1.0D + 1.0W 90° Wind

1.0D + 1.0W 60 mph Wind at 90° From Face

**Wind Load Factor:** 1.00  
**Dead Load Factor:** 1.00  
**Ice Dead Load Factor:** 0.00

**Wind Importance Factor:** 1.00  
**Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Ice		Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
												Linear Area (sqft)	Linear Area (sqft)					
1	10.0	5.48	31.267	28.80	0.00	0.13	2.84	0.85	1.00	0.00	42.88	85.58	0.00	5,389.3	0.0	567.17	301.36	868.53
2	30.0	5.49	28.860	28.80	0.00	0.14	2.81	0.85	1.00	0.00	40.85	98.41	0.00	4,712.8	0.0	535.77	347.18	882.96
3	50.0	6.35	23.184	28.80	0.00	0.14	2.81	0.85	1.00	0.00	36.02	98.41	0.00	4,374.7	0.0	546.91	401.74	948.65
4	70.0	6.99	21.246	22.13	0.00	0.13	2.84	0.85	1.00	0.00	30.58	98.41	0.00	3,979.7	0.0	516.15	442.28	958.42
5	90.0	7.51	22.280	22.12	0.00	0.15	2.76	0.85	1.00	0.00	31.50	98.41	0.00	3,684.7	0.0	554.64	475.20	1,029.84
6	110.0	7.96	16.430	18.58	0.00	0.14	2.80	0.85	1.00	0.00	24.49	98.41	0.00	3,207.9	0.0	464.04	503.24	967.28
7	130.0	8.34	14.331	15.03	0.00	0.14	2.79	0.85	1.00	0.00	20.70	65.41	0.00	2,520.7	0.0	409.99	359.33	769.32
8	150.0	8.69	12.808	11.69	0.00	0.15	2.76	0.85	1.00	0.00	17.52	65.41	0.00	1,943.4	0.0	357.51	374.33	731.83
9	164.0	8.92	4.976	4.67	0.00	0.17	2.69	0.85	1.00	0.00	6.89	17.81	0.00	694.4	0.0	140.30	108.01	248.31
10	178.0	9.13	12.376	11.67	0.00	0.17	2.68	0.85	1.00	0.00	17.18	13.41	0.00	1,371.4	0.0	357.61	76.28	433.89
11	192.0	9.33	5.252	4.67	0.00	0.18	2.66	0.85	1.00	0.00	7.13	0.25	0.00	422.4	0.0	150.62	1.43	152.04
														<b>32,301.5</b>	<b>0.0</b>			<b>7,991.09</b>

## Force/Stress Compression Summary

<b>Structure:</b> CT06462-A-2-SBA	<b>Code:</b> EIA/TIA-222-H	<b>2/9/2022</b>
<b>Site Name:</b> Mountain Street	<b>Exposure:</b> B	
<b>Height:</b> 196.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Struct Class:</b> II	
<b>Topography:</b> 1		<b>Page:</b> 13



### LEG MEMBERS

Sect	Top Elev	Member	Force (kips)		Load Case	Len (ft)	Bracing %			Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls	
			X	Y			Z	KL/R						
1	20	PX - 8" DIA PIPE	-231.81	1.2D + 1.0W	Normal Wind	10.02	100	100	100	41.77	50.00	505.44	45.9	Member X
2	40	PSP - ROHN 8 EHS	-207.01	1.2D + 1.0W	Normal Wind	10.02	100	100	100	41.17	50.00	386.42	53.6	Member X
3	60	PSP - ROHN 8 EHS	-180.20	1.2D + 1.0W	Normal Wind	10.02	100	100	100	41.17	50.00	386.42	46.6	Member X
4	80	PX - 6" DIA PIPE	-153.19	1.2D + 1.0W	Normal Wind	10.02	100	100	100	54.90	50.00	303.24	50.5	Member X
5	100	PSP - ROHN 6 EHS	-127.75	1.2D + 1.0W	Normal Wind	6.68	100	100	100	36.01	50.00	274.76	46.5	Member X
6	120	PX - 5" DIA PIPE	-98.79	1.2D + 1.0W	Normal Wind	6.68	100	100	100	43.56	50.00	239.34	41.3	Member X
7	140	PX - 4" DIA PIPE	-69.26	1.2D + 1.0W	Normal Wind	6.68	100	100	100	54.15	50.00	160.15	43.2	Member X
8	160	PX - 3" DIA PIPE	-45.42	1.2D + 1.0W	Normal Wind	5.01	100	100	100	52.73	50.00	110.90	41.0	Member X
9	168	PST - 3" DIA PIPE	-19.34	1.2D + 1.0W	Normal Wind	4.00	100	100	100	41.38	50.00	88.54	21.8	Member X
10	188	PST - 3" DIA PIPE	-7.95	1.2D + 1.0W	Normal Wind	4.00	100	100	100	41.38	50.00	88.54	9.0	Member X
11	196	PST - 3" DIA PIPE	-0.65	1.2D + 1.0W	Normal Wind	4.00	100	100	100	41.38	50.00	88.54	0.7	Member X

### Splices

Sect	Top Elev	Load Case	Top Splice				Load Case	Bottom Splice					
			Force (kips)	Cap (kips)	Use %	Bolt Type		Num Bolts	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts
1	20	1.2D + 1.0W Normal Wind	213.52	0.00	0.0		1.2D + 1.0W Normal Wind	238.41	0.00				
2	40	1.2D + 1.0W Normal Wind	187.09	0.00	0.0		1.2D + 1.0W Normal Wind	213.52	0.00		1	A325	8
3	60	1.2D + 1.0W Normal Wind	159.81	0.00	0.0		1.2D + 1.0W Normal Wind	187.09	0.00		1	A325	8
4	80	1.2D + 1.0W Normal Wind	132.74	0.00	0.0		1.2D + 1.0W Normal Wind	159.81	0.00		1	A325	8
5	100	1.2D + 1.0W Normal Wind	103.37	0.00	0.0		1.2D + 1.0W Normal Wind	132.74	0.00		1	A325	6
6	120	1.2D + 1.0W Normal Wind	74.67	0.00	0.0		1.2D + 1.0W Normal Wind	103.37	0.00		1	A325	6
7	140	1.2D + 1.0W Normal Wind	48.46	0.00	0.0		1.2D + 1.0W Normal Wind	74.67	0.00		1	A325	4
8	160	1.2D + 1.0W Normal Wind	22.43	0.00	0.0		1.2D + 1.0W Normal Wind	48.46	0.00		7/8	A325	4
9	168	1.2D + 1.0W Normal Wind	10.70	0.00	0.0		1.2D + 1.0W Normal Wind	22.43	0.00		7/8	A325	4
10	188	1.2D + 1.0W Normal Wind	0.99	0.00	0.0		1.2D + 1.0W Normal Wind	10.70	0.00		7/8	A325	4
11	196	1.2D + 1.0Di + 1.0Wi 60° Wind	0.21	0.00	0.0		1.2D + 1.0W Normal Wind	0.99	0.00		3/4	A325	4

### HORIZONTAL MEMBERS

Sect	Top Elev	Member	Force (kips)		Load Case	Len (ft)	Bracing %			Fy (ksi)	Mem		Shear		Bear Cap Use %	Controls		
			X	Y			Z	KL/R	Cap (kips)		Num Bolts	Num Holes	Cap (kips)					
1	20									0.00	0	0						
2	40									0.00	0	0						
3	60									0.00	0	0						
4	80									0.00	0	0						
5	100									0.00	0	0						
6	120									0.00	0	0						
7	140									0.00	0	0						
8	160	SAE - 1.75X1.75X0.1875	-0.28	1.2D + 1.0W	90° Wind	6.69	50	50	50	118.51	36.00	12.46	1	1	13.81	13.05	2.3	Member Z
9	168									0.00	0	0						
10	188									0.00	0	0						
11	196	SAE - 1.75X1.75X0.1875	-0.01	0.9D + 1.0W	60° Wind	6.60	100	100	100	230.90	36.00	3.33	1	1	13.81	13.05	0.3	Member Z

### DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)		Load Case	Len (ft)	Bracing %			Fy (ksi)	Mem		Shear		Bear Cap Use %	Controls		
			X	Y			Z	KL/R	Cap (kips)		Num Bolts	Num Holes	Cap (kips)					
1	20	SAE - 4X4X0.25	-7.54	1.2D + 1.0W	90° Wind	24.62	50	50	50	185.84	36.00	16.08	1	1	19.87	20.8	46.9	Member Z
2	40	SAE - 4X4X0.25	-7.77	1.2D + 1.0W	90° Wind	22.81	50	50	50	172.16	36.00	18.73	1	1	19.87	20.8	41.5	Member Z
3	60	SAE - 3.5X3.5X0.25	-7.38	1.2D + 1.0W	90° Wind	21.03	50	50	50	181.81	36.00	14.63	1	1	19.87	20.8	50.4	Member Z

## Force/Stress Compression Summary

<b>Structure:</b> CT06462-A-2-SBA	<b>Code:</b> EIA/TIA-222-H	2/9/2022
<b>Site Name:</b> Mountain Street	<b>Exposure:</b> B	
<b>Height:</b> 196.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II



### DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing %			Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap		Bear Cap (kips)	Use %	Controls
						X	Y	Z					(kips)	(kips)			
4	80	SAE - 3.5X3.5X0.25	-6.68	1.2D + 1.0W 90° Wind	19.26	50	50	50	166.49	36.00	17.45	1	1	19.87	20.8	38.3	Member Z
5	100	SAE - 3X3X0.25	-6.04	1.2D + 1.0W 90° Wind	15.99	50	50	50	162.02	36.00	15.70	1	1	19.87	20.8	38.5	Member Z
6	120	SAE - 2.5X2.5X0.25	-5.29	1.2D + 1.0W 90° Wind	14.23	50	50	50	173.91	36.00	11.26	1	1	19.87	20.8	47.0	Member Z
7	140	SAE - 2.5X2.5X0.25	-4.06	1.2D + 1.0W Normal Wind	12.43	50	50	50	151.85	36.00	14.77	1	1	13.81	17.4	29.4	Bolt Shear
8	160	SAE - 2X2X0.1875	-3.13	1.2D + 1.0W 90° Wind	9.86	50	50	50	150.21	36.00	9.01	1	1	13.81	13.0	34.7	Member Z
9	168	SAE - 2X2X0.25	-3.23	1.2D + 1.0W 90° Wind	7.78	50	50	50	119.49	36.00	18.65	1	1	13.81	17.4	23.4	Bolt Shear
10	188	SAE - 2X2X0.25	-1.35	1.2D + 1.0W Normal Wind	7.72	50	50	50	118.82	36.00	18.82	1	1	13.81	17.4	9.8	Bolt Shear
11	196	SAE - 1.75X1.75X0.1875	-0.23	1.2D + 1.0W 90° Wind	7.72	50	50	50	135.00	36.00	9.74	1	1	13.81	13.0	2.4	Member Z



## Force/Stress Tension Summary

<b>Structure:</b> CT06462-A-2-SBA	<b>Code:</b> EIA/TIA-222-H	2/9/2022
<b>Site Name:</b> Mountain Street	<b>Exposure:</b> B	
<b>Height:</b> 196.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II



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### LEG MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
1	20	PX - 8" DIA PIPE	193.76	0.9D + 1.0W 60° Wind	50	574.20	33.7	Member
2	40	PSP - ROHN 8 EHS	172.94	0.9D + 1.0W 60° Wind	50	437.40	39.5	Member
3	60	PSP - ROHN 8 EHS	150.91	0.9D + 1.0W 60° Wind	50	437.40	34.5	Member
4	80	PX - 6" DIA PIPE	128.33	0.9D + 1.0W 60° Wind	50	378.00	34.0	Member
5	100	PSP - ROHN 6 EHS	106.93	0.9D + 1.0W 60° Wind	50	302.09	35.4	Member
6	120	PX - 5" DIA PIPE	81.78	0.9D + 1.0W 60° Wind	50	274.95	29.7	Member
7	140	PX - 4" DIA PIPE	57.50	0.9D + 1.0W 60° Wind	50	198.45	29.0	Member
8	160	PX - 3" DIA PIPE	37.13	0.9D + 1.0W 60° Wind	50	135.90	27.3	Member
9	168	PST - 3" DIA PIPE	14.13	0.9D + 1.0W 60° Wind	50	100.35	14.1	Member
10	188	PST - 3" DIA PIPE	5.95	0.9D + 1.0W 60° Wind	50	100.35	5.9	Member
11	196	PST - 3" DIA PIPE	0.30	0.9D + 1.0W 60° Wind	50	100.35	0.3	Member

### Splices

Sect	Top Elev	Top Splice					Bottom Splice						
		Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts
1	20	0.9D + 1.0W 60° Wind	177.69	0.00	0.0		0.9D + 1.0W 60° Wind	199.7	0.00				
2	40	0.9D + 1.0W 60° Wind	155.69	0.00	0.0		0.9D + 1.0W 60° Wind	177.6	424.08	41.9	1 A325	8	
3	60	0.9D + 1.0W 60° Wind	133.06	0.00	0.0		0.9D + 1.0W 60° Wind	155.6	424.08	36.7	1 A325	8	
4	80	0.9D + 1.0W 60° Wind	110.25	0.00	0.0		0.9D + 1.0W 60° Wind	133.0	424.08	31.4	1 A325	8	
5	100	0.9D + 1.0W 60° Wind	85.31	0.00	0.0		0.9D + 1.0W 60° Wind	110.2	318.06	34.7	1 A325	6	
6	120	0.9D + 1.0W 60° Wind	60.01	0.00	0.0		0.9D + 1.0W 60° Wind	85.31	318.06	26.8	1 A325	6	
7	140	0.9D + 1.0W 60° Wind	39.46	0.00	0.0		0.9D + 1.0W 60° Wind	60.01	212.04	28.3	1 A325	4	
8	160	0.9D + 1.0W 60° Wind	16.60	0.00	0.0		0.9D + 1.0W 60° Wind	39.46	166.24	23.7	7/8 A325	4	
9	168	0.9D + 1.0W 60° Wind	6.18	0.00	0.0		0.9D + 1.0W 60° Wind	16.60	166.24	10.0	7/8 A325	4	
10	188	0.9D + 1.0W 60° Wind	0.42	0.00	0.0		0.9D + 1.0W 60° Wind	6.18	166.24	3.7	7/8 A325	4	
11	196		0.00	0.00	0.0		0.9D + 1.0W 60° Wind	0.42	120.40	0.3	3/4 A325	4	

### HORIZONTAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	20	-			36	0.00	0	0					
2	40	-			36	0.00	0	0					
3	60	-			36	0.00	0	0					
4	80	-			36	0.00	0	0					
5	100	-			36	0.00	0	0					
6	120	-			36	0.00	0	0					
7	140	-			36	0.00	0	0					
8	160	SAE - 1.75X1.75X0.1875	0.27	0.9D + 1.0W 90° Wind	36	20.09	1	1	13.81	9.79	7.50	3.5	Blck Shear
9	168	-			36	0.00	0	0					
10	188	-			36	0.00	0	0					
11	196	SAE - 1.75X1.75X0.1875	0.02	1.2D + 1.0W Normal Wi	36	20.09	1	1	13.81	9.79	7.50	0.3	Blck Shear

### DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	20	SAE - 4X4X0.25	7.66	1.2D + 1.0W 90° Wind	36	62.86	1	1	19.87	14.35	16.62	53.3	Bolt Bear
2	40	SAE - 4X4X0.25	7.61	0.9D + 1.0W 90° Wind	36	62.86	1	1	19.87	14.35	16.62	53.0	Bolt Bear
3	60	SAE - 3.5X3.5X0.25	7.25	0.9D + 1.0W 90° Wind	36	54.76	1	1	19.87	14.35	16.62	50.5	Bolt Bear
4	80	SAE - 3.5X3.5X0.25	6.63	1.2D + 1.0W 90° Wind	36	54.76	1	1	19.87	14.35	16.62	46.2	Bolt Bear

## Force/Stress Tension Summary

<b>Structure:</b> CT06462-A-2-SBA	<b>Code:</b> EIA/TIA-222-H	2/9/2022
<b>Site Name:</b> Mountain Street	<b>Exposure:</b> B	
<b>Height:</b> 196.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II

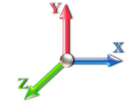


### DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
5	100	SAE - 3X3X0.25	5.98	1.2D + 1.0W 90° Wind	36	46.66	1	1	19.87	14.35	13.90	43.0	Blck Shear
6	120	SAE - 2.5X2.5X0.25	5.24	1.2D + 1.0W 90° Wind	36	38.56	1	1	19.87	14.35	12.54	41.8	Blck Shear
7	140	SAE - 2.5X2.5X0.25	4.10	0.9D + 1.0W 90° Wind	36	38.56	1	1	13.81	13.05	12.71	32.3	Blck Shear
8	160	SAE - 2X2X0.1875	3.22	1.2D + 1.0W 90° Wind	36	23.00	1	1	13.81	9.79	7.50	43.0	Blck Shear
9	168	SAE - 2X2X0.25	3.29	1.2D + 1.0W 90° Wind	36	30.46	1	1	13.81	13.05	9.99	32.9	Blck Shear
10	188	SAE - 2X2X0.25	1.25	0.9D + 1.0W 60° Wind	36	30.46	1	1	13.81	13.05	9.99	12.5	Blck Shear
11	196	SAE - 1.75X1.75X0.1875	0.24	1.2D + 1.0W 90° Wind	36	20.09	1	1	13.81	9.79	7.50	3.2	Blck Shear

## Seismic Section Forces

<b>Structure:</b> CT06462-A-2-SBA	<b>Code:</b> TIA-222-H	2/9/2022
<b>Site Name:</b> Mountain Street	<b>Exposure:</b> B	
<b>Height:</b> 196.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 1.2D + 1.0Ev + 1.0Eh

<b>Dead Load Factor</b>	1.20	<b>Sds</b>	0.204	<b>Ss</b>	0.1920	<b>Fa</b>	1.6000	<b>Ke</b>	1.0698	<b>TL</b>	6.0000
<b>Seismic Load Factor</b>	1.00	<b>Sd1</b>	0.088	<b>S1</b>	0.0550	<b>Fv</b>	2.4000	<b>Kg</b>	0.0000	<b>Cs</b>	0.0459
<b>Seismic Importance Factor</b>	1.00	<b>W1</b>	18.96	<b>R</b>	3.0000	<b>Vs</b>	1.7825	<b>T</b>	0.6396	<b>f1</b>	1.5634

Sect #	Elev (ft)	Wz (lb)	Lateral Fsz (lbs)	Vertical Ev (lbs)
1	10.00	5389.2	24.59	220.86
2	30.00	4712.7	69.00	193.13
3	50.00	4374.6	110.05	179.28
4	70.00	3979.7	142.55	163.09
5	90.00	3684.7	171.77	151.00
6	110.00	5916.1	353.31	242.45
7	130.00	2772.0	187.74	113.60
8	150.00	2216.3	172.22	90.83
9	164.00	807.42	64.33	33.09
10	178.00	4573.0	448.89	187.40
11	192.00	422.41	38.07	17.31

**Load Case:** 0.9D + 1.0Ev + 1.0Eh

<b>Dead Load Factor</b>	0.90	<b>Sds</b>	0.204	<b>Ss</b>	0.1920	<b>Fa</b>	1.6000	<b>Ke</b>	1.0698	<b>TL</b>	6.0000
<b>Seismic Load Factor</b>	1.00	<b>Sd1</b>	0.088	<b>S1</b>	0.0550	<b>Fv</b>	2.4000	<b>Kg</b>	0.0000	<b>Cs</b>	0.0459
<b>Seismic Importance Factor</b>	1.00	<b>W1</b>	18.96	<b>R</b>	3.0000	<b>Vs</b>	1.7825	<b>T</b>	0.6396	<b>f1</b>	1.5634

Sect #	Elev (ft)	Wz (lb)	Lateral Fsz (lbs)	Vertical Ev (lbs)
1	10.00	5389.2	24.59	220.86
2	30.00	4712.7	69.00	193.13
3	50.00	4374.6	110.05	179.28
4	70.00	3979.7	142.55	163.09
5	90.00	3684.7	171.77	151.00
6	110.00	5916.1	353.31	242.45
7	130.00	2772.0	187.74	113.60
8	150.00	2216.3	172.22	90.83
9	164.00	807.42	64.33	33.09
10	178.00	4573.0	448.89	187.40
11	192.00	422.41	38.07	17.31

## Support Forces Summary

**Structure:** CT06462-A-2-SBA  
**Site Name:** Mountain Street  
**Height:** 196.00 (ft)  
**Base Elev:** 0.000 (ft)  
**Gh:** 0.85

**Topography:** 1

**Code:** TIA-222-H  
**Exposure:** B  
**Crest Height:** 0.00  
**Site Class:** D - Stiff Soil  
**Struct Class:** II

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Load Case	Node	FX (kips)	FY (kips)	FZ (kips)	(-) = Uplift (+) = Down
1.2D + 1.0W Normal Wind	1	0.01	238.06	-25.68	
	1a	8.40	-95.74	-8.20	
	1b	-8.41	-95.70	-8.19	
1.2D + 1.0W 60° Wind	1	-2.67	120.81	-12.62	
	1a	-12.23	120.34	4.05	
	1b	-19.29	-194.53	-11.16	
1.2D + 1.0W 90° Wind	1	-3.18	15.55	-1.01	
	1a	-19.30	199.98	9.40	
	1b	-17.65	-168.91	-8.39	
0.9D + 1.0W Normal Wind	1	0.01	233.98	-25.42	
	1a	8.62	-99.53	-8.33	
	1b	-8.63	-99.49	-8.32	
0.9D + 1.0W 60° Wind	1	-2.68	116.83	-12.36	
	1a	-12.00	116.37	3.92	
	1b	-19.51	-198.24	-11.29	
0.9D + 1.0W 90° Wind	1	-3.18	11.66	-0.75	
	1a	-19.07	195.94	9.27	
	1b	-17.87	-172.63	-8.52	
1.2D + 1.0Di + 1.0Wi Normal Wind	1	0.00	85.09	-4.65	
	1a	3.60	1.35	-2.87	
	1b	-3.60	1.39	-2.87	
1.2D + 1.0Di + 1.0Wi 60° Wind	1	-0.66	56.27	-1.47	
	1a	-1.59	56.14	0.18	
	1b	-6.40	-24.58	-3.70	
1.2D + 1.0Di + 1.0Wi 90° Wind	1	-0.78	29.27	1.48	
	1a	-3.37	76.28	1.52	
	1b	-5.95	-17.71	-3.00	
1.2D + 1.0Ev + 1.0Eh	1	0.00	27.21	5.24	
	1a	5.89	10.50	-3.49	
	1b	-5.89	10.50	-3.49	
0.9D + 1.0Ev + 1.0Eh	1	0.00	23.31	5.50	
	1a	6.12	6.62	-3.62	
	1b	-6.12	6.62	-3.62	
1.0D + 1.0W Normal Wind	1	0.00	68.26	-7.07	
	1a	1.58	-14.72	-1.77	
	1b	-1.58	-14.69	-1.76	
1.0D + 1.0W 60° Wind	1	-0.69	39.12	-3.78	
	1a	-3.61	38.99	1.30	
	1b	-4.32	-39.25	-2.50	
1.0D + 1.0W 90° Wind	1	-0.82	12.95	-0.86	
	1a	-5.39	58.77	2.66	
	1b	-3.91	-32.87	-1.80	

### Max Reactions

---

Leg		Overturning	
Max Uplift:	-198.24 (kips)	Moment:	4432.37 (ft-kips)
Max Down:	238.06 (kips)	Total Down:	46.62 (kips)
Max Shear:	25.68 (kips)	Total Shear:	42.07 (kips)

## Analysis Summary

<b>Structure:</b> CT06462-A-2-SBA	<b>Code:</b> TIA-222-H	2/9/2022
<b>Site Name:</b> Mountain Street	<b>Exposure:</b> B	
<b>Height:</b> 196.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II
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### Max Reactions

	Leg	Overturning
Max Uplift:	-198.24 (kips)	Moment: 4432.37 (ft-kips)
Max Down:	238.06 (kips)	Total Down: 46.62 (kips)
Max Shear:	25.68 (kips)	Total Shear: 42.07 (kips)

### Anchor Bolts

Bolt Size (in.): 1.00	Number Bolts: 10	Type: UnGrouted
Yield Strength (Ksi): 109.00	Tensile Strength (Ksi): 125.00	
	Length: 0.75	

**Interaction Ratios:**

Tensile: **0.35**      Compression: **0.31**

### Max Usages

Max Leg: 53.6% (1.2D + 1.0W Normal Wind - Sect 2)  
 Max Diag: 53.3% (1.2D + 1.0W 90° Wind - Sect 1)  
 Max Horiz: 3.5% (0.9D + 1.0W 90° Wind - Sect 8)


### Max Deflection, Twist and Sway

Load Case	Elevation (ft)	Deflection (ft)	Twist (deg)	Sway (deg)
0.9D + 1.0Ev + 1.0Eh - Normal To Face	120.00	0.0239	-0.0011	0.0227
	126.67	0.0265	0.0012	0.0245
	133.33	0.0294	-0.0012	0.0266
	155.00	0.0405	0.0015	0.0343
	160.00	0.0413	0.0000	0.0355
	164.00	0.0460	0.0015	0.0367
	168.00	0.0487	0.0014	0.0384
	184.00	0.0596	0.0012	0.0395
0.9D + 1.0W 121 mph Wind at 60° From Face	120.00	0.4045	-0.1400	0.3913
	126.67	0.4501	0.0425	0.3929
	133.33	0.5016	-0.2014	0.4391
	155.00	0.6884	-0.2779	0.5296
	160.00	0.7365	-0.2875	0.5216
	164.00	0.7742	0.0672	0.5709
	168.00	0.8160	-0.2855	0.5742
	184.00	0.9770	-0.2812	0.5831
0.9D + 1.0W 121 mph Wind at 90° From Face	120.00	0.4095	-0.1907	0.3987
	126.67	0.4565	0.0875	0.3748
	133.33	0.5076	-0.2757	0.4416
	155.00	0.6964	-0.3888	0.5212
	160.00	0.7455	-0.4044	0.4936
	164.00	0.7837	0.1254	0.5702
	168.00	0.8260	-0.4041	0.5803
	184.00	0.9887	-0.4010	0.5908

0.9D + 1.0W 121 mph Wind at Normal To Face	120.00	0.4275	-0.0708	0.4135
	126.67	0.4766	-0.0900	0.4872
	133.33	0.5303	0.0142	0.5186
	155.00	0.7281	-0.1119	0.6104
	160.00	0.7789	-0.0001	0.6402
	164.00	0.8205	-0.1075	0.6139
	168.00	0.8638	-0.1053	0.6115
	184.00	1.0351	-0.1004	0.6206
1.0D + 1.0W 60 mph Wind at 60° From Face	120.00	0.1000	-0.0342	0.0963
	126.67	0.1113	0.0066	0.0968
	133.33	0.1238	-0.0493	0.1081
	155.00	0.1697	-0.0655	0.1299
	160.00	0.1815	-0.0670	0.1280
	164.00	0.1908	0.0098	0.1399
	168.00	0.2010	-0.0636	0.1410
	184.00	0.2404	-0.0585	0.1427
1.0D + 1.0W 60 mph Wind at 90° From Face	120.00	0.1012	-0.0408	0.0979
	126.67	0.1129	0.0191	0.0922
	133.33	0.1253	-0.0589	0.1087
	155.00	0.1716	-0.0784	0.1284
	160.00	0.1837	-0.0802	0.1215
	164.00	0.1931	0.0240	0.1397
	168.00	0.2034	-0.0761	0.1426
	184.00	0.2432	-0.0699	0.1445
1.0D + 1.0W 60 mph Wind at Normal To Face	120.00	0.1059	-0.0166	0.1017
	126.67	0.1179	-0.0211	0.1199
	133.33	0.1312	0.0031	0.1274
	155.00	0.1799	-0.0252	0.1501
	160.00	0.1923	0.0000	0.1574
	164.00	0.2025	-0.0236	0.1508
	168.00	0.2131	-0.0228	0.1502
	184.00	0.2552	-0.0209	0.1524
1.2D + 1.0Di + 1.0Wi 50 mph Wind at 60° From Face	120.00	0.1051	-0.0421	0.1010
	126.67	0.1154	0.0070	0.1006
	133.33	0.1299	-0.0610	0.1134
	155.00	0.1774	-0.0804	0.1354
	160.00	0.1888	-0.0822	0.1312
	164.00	0.1984	0.0099	0.1449
	168.00	0.2097	-0.0779	0.1470
	184.00	0.2509	-0.0717	0.1485
1.2D + 1.0Di + 1.0Wi 50 mph Wind at 90° From Face	120.00	0.1056	-0.0503	0.1022
	126.67	0.1161	0.0231	0.0936
	133.33	0.1305	-0.0729	0.1131
	155.00	0.1782	-0.0964	0.1321
	160.00	0.1903	-0.0986	0.1212
	164.00	0.1994	0.0282	0.1439
	168.00	0.2107	-0.0934	0.1477
	184.00	0.2520	-0.0858	0.1495
1.2D + 1.0Di + 1.0Wi 50 mph Wind at Normal From Face	120.00	0.1082	-0.0222	0.1043
	126.67	0.1207	-0.0280	0.1260
	133.33	0.1340	0.0049	0.1335
	155.00	0.1837	-0.0332	0.1546
	160.00	0.1955	0.0000	0.1640
	164.00	0.2069	-0.0313	0.1532
	168.00	0.2177	-0.0303	0.1531
	184.00	0.2606	-0.0278	0.1554
1.2D + 1.0Ev + 1.0Eh - Normal To Face	120.00	0.0239	0.0011	0.0227
	126.67	0.0265	0.0012	0.0246
	133.33	0.0294	-0.0012	0.0267
	155.00	0.0405	-0.0015	0.0344
	160.00	0.0413	0.0000	0.0355
	164.00	0.0460	0.0015	0.0367
	168.00	0.0487	-0.0014	0.0385
	184.00	0.0596	-0.0012	0.0396

1.2D + 1.0W 121 mph Wind at 60° From Face	120.00	0.4050	-0.1400	0.3918
	126.67	0.4507	0.0425	0.3935
	133.33	0.5022	-0.2014	0.4398
	155.00	0.6892	-0.2780	0.5303
	160.00	0.7374	-0.2876	0.5224
	164.00	0.7751	0.0673	0.5717
	168.00	0.8170	-0.2856	0.5749
	184.00	0.9782	-0.2812	0.5840
-----				
1.2D + 1.0W 121 mph Wind at 90° From Face	120.00	0.4100	-0.1908	0.3991
	126.67	0.4570	0.0875	0.3753
	133.33	0.5081	-0.2757	0.4423
	155.00	0.6973	-0.3889	0.5221
	160.00	0.7464	-0.4045	0.4944
	164.00	0.7847	0.1255	0.5711
	168.00	0.8270	-0.4042	0.5813
	184.00	0.9899	-0.4012	0.5916
-----				
1.2D + 1.0W 121 mph Wind at Normal To Face	120.00	0.4280	-0.0707	0.4140
	126.67	0.4772	-0.0899	0.4878
	133.33	0.5309	0.0141	0.5191
	155.00	0.7291	-0.1118	0.6113
	160.00	0.7799	-0.0001	0.6412
	164.00	0.8216	-0.1074	0.6149
	168.00	0.8649	-0.1052	0.6122
	184.00	1.0365	-0.1003	0.6216
-----				



	Mat Foundation Design for Self Supporting Tower			Date
				2/9/2022
	Customer Name:	SBA Communications Corp	TIA Standard:	TIA-222-H
	Site Name:		Structure Height (Ft.):	196
	Site Nmber:	CT06462-A-2-SBA	Engineer Name:	J. Tibbetts
Engr. Number:	123543	Engineer Login ID:		

**Foundation Info Obtained from:**

**Analysis or Design?**

**Number of Tower Legs:**

**Base Reactions (Factored):**

(1). Individual Leg:

Axial Load (Kips):	238.1	Uplift Force (Kips):	198.2
Shear Force (Kips):	25.7		

(2). Tower Base:

Total Vertical Load (Kips):	46.6	Total Shear Force (Kips):	42.1
Moment (Kips-ft):	4432.4		

**Foundation Geometries:**

Leg distance (Center-to-Center ft.):	23.0	Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	Round 2.2	Pier Height A. G. (ft.):	0.00
Tower center to mat center (ft):	0	Depth of Base BG (ft.):	3.5
Length of Pad (ft.):	36	Width of Pad (ft.):	36
Thickness of Pad (ft):	4.00		

**Material Properties and Rebar Info:**

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi):	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	7	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	20	Tie Spacing (in):	6.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	7	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf

Rebar at the bottom of the concrete pad:

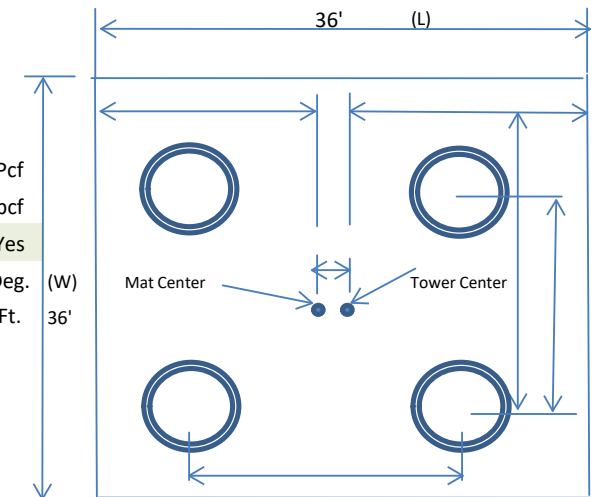
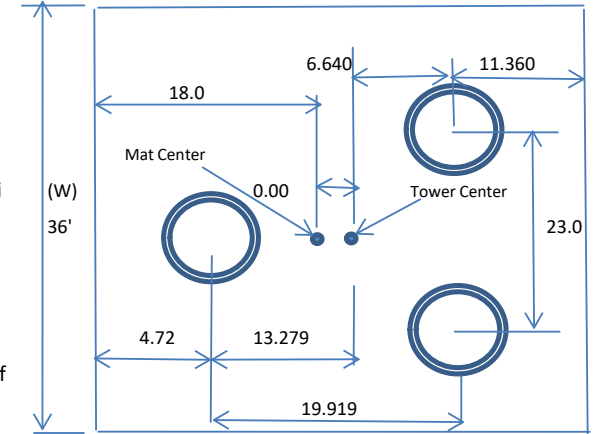
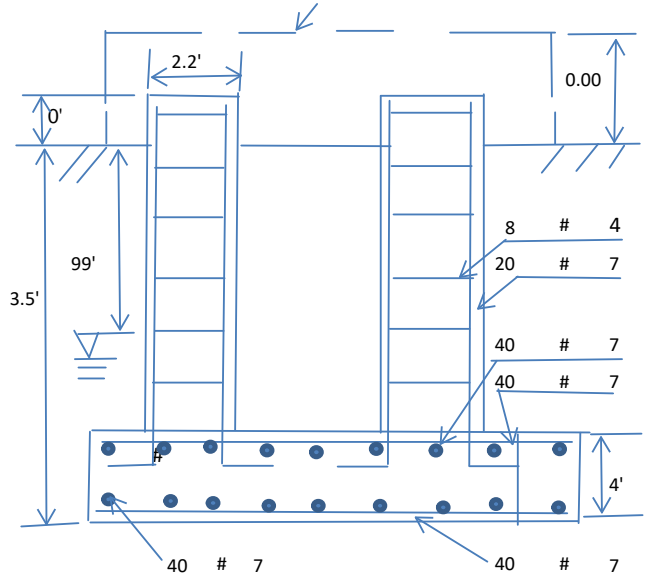
Qty. of Rebar in Pad (L):	40	Qty. of Rebar in Pad (W):	40
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Rebar at the top of the concrete pad:

Qty. of Rebar in Pad (L):	40	Qty. of Rebar in Pad (W):	40
---------------------------	----	---------------------------	----

**Soil Design Parameters:**

Soil Unit Weight (pcf):	120.0	Soil Buoyant Weight:	50.0	Pcf
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf
Ultimate Bearing Pressure (psf):	4000	Consider ties in concrete shear strength:	Yes	
Consider Soil Lateral Resistance ?	Yes	Enter soil C (psf) or Phi (deg.):	30.0	Deg. (W)
		Depth to ignor lateral resistance	1.0	Ft. 36'



Apply 1.35 for e/w per G/H: 1.35

<b>Foundation Analysis and Design:</b>	Uplift Strength Reduction Factor:	0.75	Compression Strength Reduction Factor:	0.75
Total Dry Soil Volume (cu. Ft.):	2.57	Total Dry Soil Weight (Kips):	0.31	
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00	
Total Effective Soil Weight (Kips):	0.31	Weight from the Concrete Block at Top (K):	0.00	
Total Dry Concrete Volume (cu. Ft.):	5184.08	Total Dry Concrete Weight (Kips):	777.61	
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00	
Total Effective Concrete Weight (Kips):	777.61	Total Vertical Load on Base (Kips):	824.54	

**Check Soil Capacities:**

Calculated Maxium Net Soil Pressure under the base (psf):	1205.34	<	Allowable Factored Soil Bearing (psf):	3000	0.40	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	13441.4	>	Design Factored Momont (kips-ft):	4601	0.34	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	2.92					OK!

**Check the capacities of Reinforceing Concrete:**

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75			
Strength reduction factor (Axial compression):	0.65	Wind Load Factor on Concrete Design:	1.00			
<b>(1) Concrete Pier:</b>						
Vertical Steel Rebar Area (sq. in./each):	0.60	Tie / Stirrup Area (sq. in./each):	0.20			
Calculated Moment Capacity (Mn,Kips-Ft):	358.1	>	Design Factored Moment (Mu, Kips-Ft)	0.2	0.00	OK!
Calculated Shear Capacity (Kips):	70.5	>	Design Factored Shear (Kips):	25.7	0.36	OK!
Calculated Tension Capacity (Tn, Kips):	648.0	>	Design Factored Tension (Tu Kips):	198.2	0.31	OK!
Calculated Compression Capacity (Pn, Kips):	709.9	>	Design Factored Axial Load (Pu Kips):	238.1	0.34	OK!
Moment & Tension Strength Combination:	0.00	OK!	Check Tie Spacing (Design/Req'd):	0.57		
Pier Reinforcement Ratio:	0.022		Reinforcement Ratio is satisfied per ACI			

**(2).Concrete Pad:**

One-Way Design Shear Capacity (L or W Direction, Kips):	1581.6	>	One-Way Factored Shear (L/W-Dir Kips)	399.0	0.25	OK!
One-Way Design Shear Capacity (Diagonal Dir., Kips):	1332.7	>	One-Way Factored Shear (Dia. Dir, Kips)	358.9	0.27	OK!
Lower Steel Pad Reinforcement Ratio (L or W-Direct. ):	0.0012		Lower Steel Reinf. Ratio (Dia. Dir.):	0.0011		
Lower Steel Pad Moment Capacity (L or W-Dir. Kips-ft):	4742.2	>	Moment at Bottom ( L-Direct. K-Ft):	2097.8	0.44	OK!
Lower Steel Pad Moment Capacity (Dia. Direction,K-ft):	4597.7	>	Moment at Bottom ( Dia. Dir. K-Ft):	1744.6	0.38	OK!
Upper Steel Pad Reinforcement Ratio (L or W -Direction):	0.0012		Upper Steel Reinf. Ratio (Dia. Dir.):	0.0011		
Upper Steel Pad Moment Capacity (L or W-Dir., Kips-ft):	4742.2	>	Moment at the top (L-Dir Kips-Ft):	977.2	0.21	OK!
Upper Steel Pad Moment Capacity (Dia. Direction, K-ft):	4597.7	>	Moment at the top (Dia. Dir., K-Ft):	605.5	0.13	OK!
Punching Failure Capacity From Down Load (Kips):	1632.4	>	Punch. Failure Factored Shear (K):	238.1	0.15	OK!
Punching Failure Capacity From Uplift (Kips):	1474.3	>	Punch. Failure Factored Shear (K):	198.2	0.13	OK!

**(3). Check Max. eccentricity of Loading:**

The maximum eccentricity of Loading:	5.58	ft.	Allowable eccentricity (0.45 W, ft.):	16.2		OK!
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ATTACHMENT F – PROOF OF DELIVERY OF NOTICE

Ref: ES-055  
Dep: cdt

Date: 07Mar22  
Wgt: 1.00 LBS  
DV: 0.00

SHIPPING: 0.00  
SPECIAL: 0.00  
HANDLING: 0.00  
TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT  
TRCK: 6437 3911 2016

ORIGIN ID: EFBA (203) 562-9885  
SHIPPING  
JOSEPH MERRITT CO.  
60 HAMILTON STREET  
NEW HAVEN, CT 065115920  
UNITED STATES US

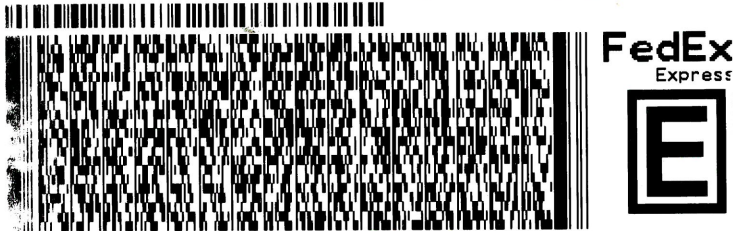
SHIP DATE: 07MAR22  
ACTWGT: 1.00 LB MAN  
CAD: 0517347/CAFE3509  
BILL THIRD PARTY

TO: HONORABLE TOM DEVIVI MAYOR  
TOWN OF WINDHAM  
979 MAIN STREET

WILLIMANTIC CT 06226

REF: ES-055

DEPT: CDT



57RCL/9888/6E40

J211828121101uv

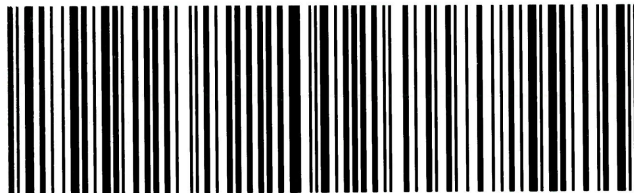
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0201

TUE - 08 MAR 10:30A  
PRIORITY OVERNIGHT

00 GONA

06226  
CT-US BDL

Part # 156148-434 RIT2 01/14



Order: ES-055 WILLIMANT Date: 07Mar22  
Weight: 1.00 LBS  
DV: 0.00

SHIPPING: 0.00  
SPECIAL: 0.00  
HANDLING: 0.00  
TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT  
TRCK: 6437 3911 2027

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

SHIP DATE: 07MAR22  
ACTWGT: 1.00 LB MAN  
CAD: 0517347/CAFE3509

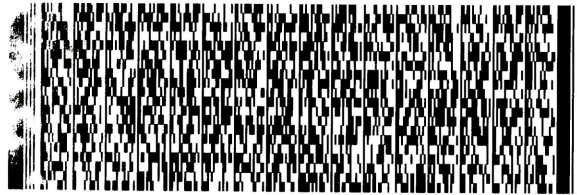
NEW HAVEN, CT 065115920  
UNITED STATES US

BILL THIRD PARTY

TO JIM RIVERS  
TOWN OF WINDHAM  
979 MAIN STREET

WILLIMANTIC CT 06226

REF: ES-055 WILLIMANTIC



FedEx  
Express



1511020121101110

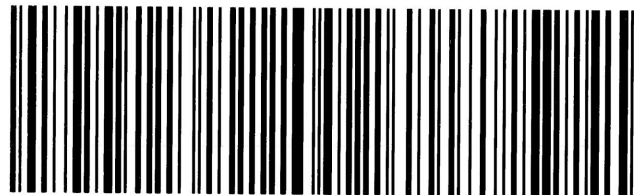
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PRIORITY OVERNIGHT

00 GONA

06226  
CT-US BDL

Part # 156148-434 RIT2 01/14



Ref: ES-055 WILLIMANT Date: 07Mar22 SHIPPING: 0.00  
 Dep: Wgt: 1.00 LBS SPECIAL: 0.00  
 DV: 0.00 HANDLING: 0.00  
 TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT  
 TRCK: 6437 3911 2038

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

SHIP DATE: 07MAR22  
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 CAD: 0517347/CAFE3509

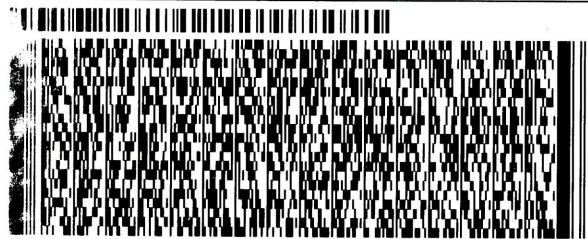
NEW HAVEN, CT 065115920  
 UNITED STATES US

BILL THIRD PARTY


MATTHEW VERTEFEUILLE DIR OF CODE EN  
 TOWN OF WINDHAM  
 929 MAIN STREET  
 WILLIMANTIC CT 06226

5700 3/0800/6E40

REF: ES-055 WILLIMANTIC



FedEx  
Express



J21102012110100

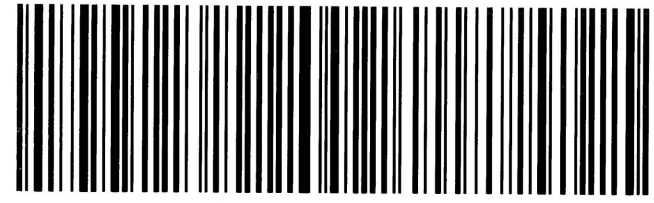
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 0201

TUE - 08 MAR 10:30A  
 PRIORITY OVERNIGHT

00 GONA

06226  
 CT-US BDL

Part # 158148-434 RIT2 01/14



f CT578150  
Dep: cdt

Date: 07Mar22  
Wgt: 1.00 LBS

SHIPPING: 0.00  
SPECIAL: 0.00  
HANDLING: 0.00  
TOTAL: 0.00

DV: 0.00

Svcs: PRIORITY OVERNIGHT  
TRCK: 6437 3911 2050

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

SHIP DATE: 07MAR22  
ACTWGT: 1.00 LB MAN  
CAD: 0517347/CAFE3509

NEW HAVEN, CT 065115920  
UNITED STATES US

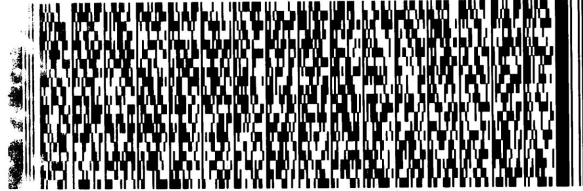
BILL THIRD PARTY

TO

CONNECTICUT SITING COUNCIL  
10 FRANKLIN SQUARE

NEW BRITAIN CT 06051  
REF: CT578150

DEPT: CDT



FedEx  
Express



578150/0000/0000

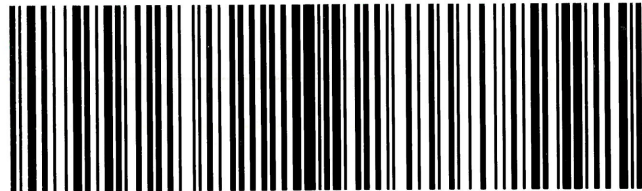
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PRIORITY OVERNIGHT

TRK# 6437 3911 2050  
0201

00 BDLA

06051  
CT-US BDL

Part # 156148-434 RIT2 01/14



Ref: ES-055 WILLIMANT Date: 07Mar22  
Dep: Wgt: 1.00 LBS  
DV: 0.00

SHIPPING: 0.00  
SPECIAL: 0.00  
HANDLING: 0.00  
TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT  
TRCK: 6437 3911 2049

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

SHIP DATE: 07MAR22  
ACTWGT: 1.00 LB MAN  
CAD: 0517347/CAFE3509

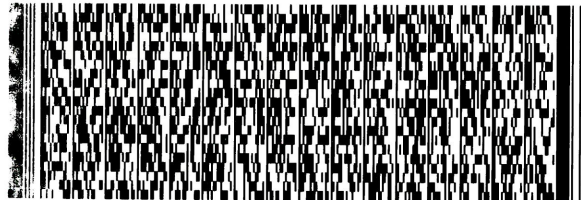
NEW HAVEN, CT 065115920  
UNITED STATES US

BILL THIRD PARTY

TO CT06462-A, MOUNTAIN STREET  
SBA COMMUNICATIONS CORP  
8051 CONMGRESS AVENUE

BOCA RATON FL 33487

REF: ES-055 WILLIMANTIC



579C 7/9886/6540  
J211020121101LW

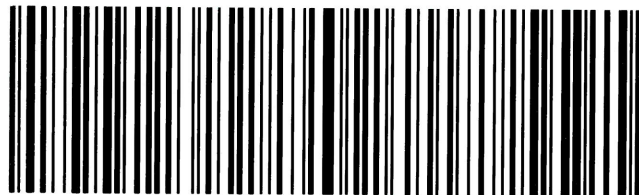
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TUE - 08 MAR 10:30A  
PRIORITY OVERNIGHT

XG BCTA

33487  
FL-US FLL

Part # 156148-034 RIT2 01/14





ATTACHMENT G - POWER DENSITY REPORT



C Squared Systems, LLC  
65 Dartmouth Drive  
Auburn, NH 03032  
603-644-2800  
[support@csquaredsystems.com](mailto:support@csquaredsystems.com)

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Calculated Radio Frequency Emissions Report



**ES-055 – Willimantic**

349 Mountain Road

Windham, CT 06280

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February 25, 2022

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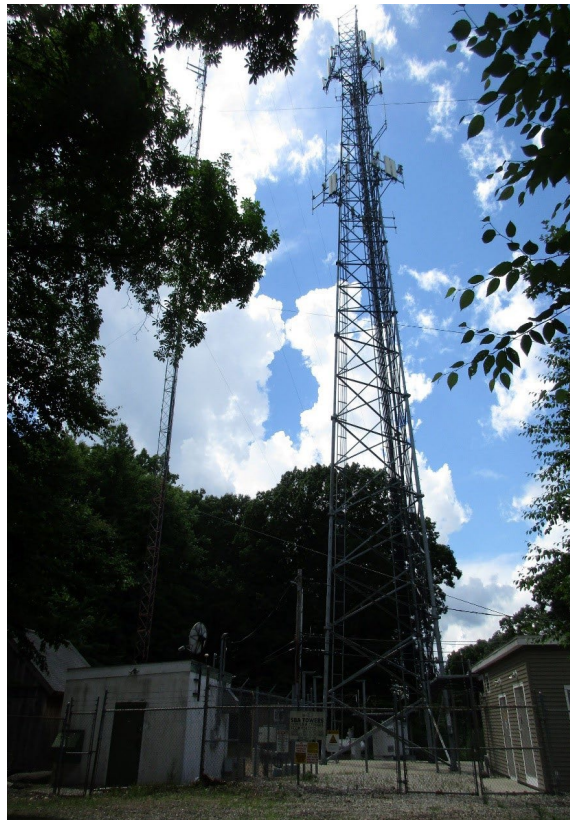
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## 1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the Eversource installation on the self-support tower at 349 Mountain Street in Windham, 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. Please note that there is a guyed tower within the same compound (see below), which would contribute to the % MPE measurements recorded during the field survey.

In order to account for any configuration changes by others since the field measurements were recorded, application materials posted on the CT Siting Council website for the subject site were reviewed. That research indicates that Verizon has recently completed modifications to their equipment and power density information for that installation as detailed in its Notice of Exempt Modification filing dated August 4, 2021 (EM-VER-163-210805) is considered for completeness.



**Figure 1: View of ES-055 Willimantic**

Site Address	349 Mountain Street
Latitude	41° 42' 10.84" N
Longitude	73° 13' 17.01" W
Site Elevation AMSL	525'
Survey Engineer	Marc Salas
Survey Date/Time	6/29/2020; 1:30 PM – 2:15 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 ( $\text{mW}/\text{cm}^2$ ). 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:

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

Where:

ERP = 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 installation.

### 4. Installed 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	156.5

**Table 2: Eversource Antenna Configuration (Proposed)<sup>1 2</sup>**

<sup>1</sup> Transmit power assumes 0 dB of cable loss.

<sup>2</sup> Transmit antenna height listed is based on the Tower Engineering Solutions Structural Analysis Report dated February 9, 2022.

## 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.

<b>Manufacturer</b>	Narda Microwave			
<b>Probe</b>	EA 5091, Serial# 0116			
<b>Calibration Date</b>	May 2020			
<b>Calibration Interval</b>	24 Months			
<b>Meter</b>	NBM550, Serial# E-1069			
<b>Calibration Date</b>	May 2020			
<b>Calibration Interval</b>	24 Months			
<b>Probe Specifications</b>	<b>Frequency Range</b>	<b>Field Measured</b>	<b>Standard</b>	<b>Measurement Range</b>
	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  $\pm 3$  dB (0.5% to 6%),  $\pm 1$  dB (6% to 100%),  $\pm 2$  dB (100% to 600%). The factors which contribute to this include the probe’s frequency response deviation, calibration uncertainty, ellipse ratio, and isotropic response<sup>3</sup>. Every effort is taken to reduce the overall uncertainty during measurement collection including pointing the probe directly at the likely highest source of emissions.

<sup>3</sup> 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](http://www.narda-sts.us/pdf_files/DataSheets/NBM-Probes_DataSheet.pdf)

## 6. Surveyed and Calculated % MPE Results

Measured and calculated results and a description of each survey location are detailed in the table below. Measurements were recorded on June 29, 2020 between 1:30 PM and 2:15 PM. The calculated % MPE contribution from the recently installed Eversource equipment along with the net change of Verizon’s % MPE from its recent petition (13.70%)<sup>4</sup> compared to Verizon’s % MPE (10.00%) listed in the CT Siting Council power density database dated July 7, 2021 was then added to the measured % MPE values in the “Composite % MPE” column. These calculated values for 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 16 measurements recorded in the vicinity of the tower. The highest spatially averaged measurement was 5.71% (Average Uncontrolled / General Population MPE) and was recorded at Location 11 by the mailbox for 875 Mountain Street. The highest composite (measured + calculated) % MPE value is calculated to be 9.46% (Average Uncontrolled / General Population) and is also calculated to occur at Location 11.

Meas. Location	Location Description	Latitude	Longitude	Dist. From Site (feet)	Measured % MPE (Uncontrolled / General)	Calculated % MPE (Eversource Proposed)	Calculated Verizon % MPE change from EM-VER-163-210805	Composite % MPE (Uncontrolled / General)
1	Double swing gate on east side of fenced compound	41.70297	-72.22119	56	1.86%	0.77%	3.70%	6.33%
2	Single swing on east side of fenced compound near wood framed shelter	41.70285	-72.22124	72	2.58%	1.06%		7.34%
3	Double swing gate on south side of fenced compound	41.70282	-72.22148	74	2.31%	1.11%		7.12%
4	Near the NE corner of the fenced compound	41.70310	-72.22131	40	< 1.00%	0.48%		< 4.18%
5	Near the NW corner of the fenced compound	41.70318	-72.22157	80	< 1.00%	1.14%		< 4.84%
6	NE of compound, along power line access way	41.70308	-72.22095	121	1.19%	1.57%		6.46%
7	Along gravel access road	41.70283	-72.22066	208	< 1.00%	1.30%		< 5.00%
8	Along gravel access road	41.70271	-72.22025	328	< 1.00%	0.67%		< 4.37%
9	Along gravel access road at bend	41.70261	-72.21965	495	< 1.00%	0.32%		< 4.02%
10	At tower access road gate	41.70199	-72.21879	801	< 1.00%	0.12%		< 3.82%
11	<b>By mailbox for 875 Mountain Street</b>	<b>41.70191</b>	<b>-72.21744</b>	<b>1149</b>	<b>5.71%</b>	<b>0.06%</b>		<b>9.46%</b>
12	By stop sign on Southridge Drive at Mountain Street intersection	41.70127	-72.21729	1284	5.12%	0.05%		8.86%
13	Spring View Lane, end of cul-de-sac	41.69999	-72.21718	1593	3.45%	0.03%		7.18%
14	SW corner of Orchard Hill Lane split	41.70165	-72.21337	2244	3.82%	0.02%		7.54%
15	By stop sign on Young Street at Lebanon Avenue intersection	41.70667	-72.21476	2246	3.01%	0.02%		6.73%
16	Adam Heights Road, at dead end	41.70277	-72.22406	735	1.52%	0.15%		5.36%

**Table 4: Measured and Calculated % MPE Results <sup>5</sup>**

<sup>4</sup> Connecticut Siting Council Notice of Exempt Modification, 349R Mountain Street, Windham (Willimantic), CT dated August 4, 2021 [https://portal.ct.gov/-/media/CSC/2\\_EMS-medialibrary/Windham\\_Willimantic/MountainSt/Verizon/em-ver-163-210805\\_filing\\_349R-Mountain-Street-Windham-Willimantic-CT-with-Attachments.pdf](https://portal.ct.gov/-/media/CSC/2_EMS-medialibrary/Windham_Willimantic/MountainSt/Verizon/em-ver-163-210805_filing_349R-Mountain-Street-Windham-Willimantic-CT-with-Attachments.pdf)

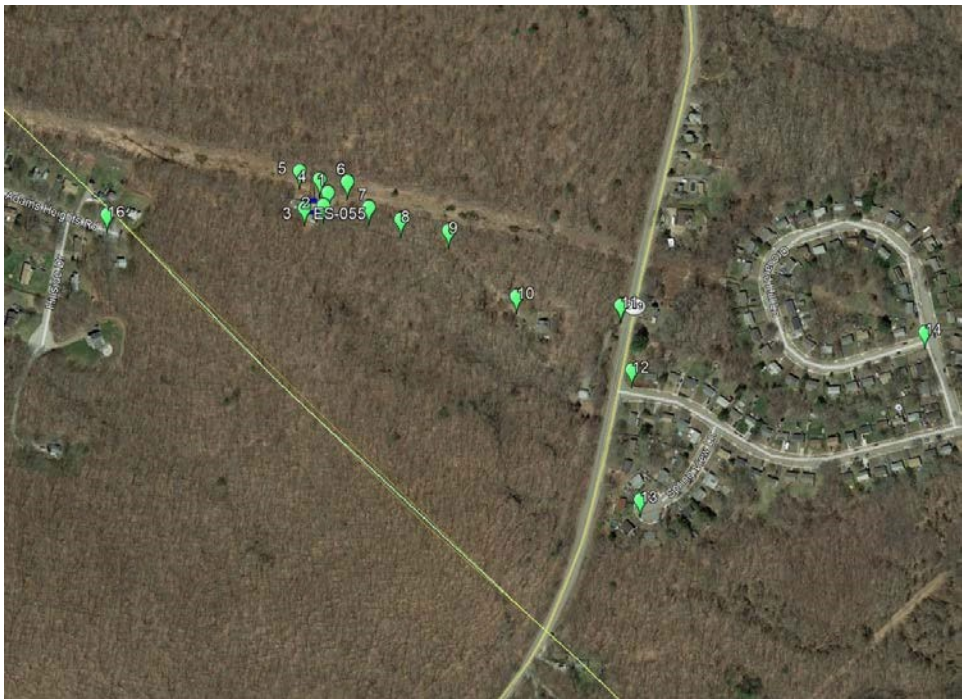
<sup>5</sup> Due to measurement uncertainty at low levels (See Table 3), any readings outside the measurement range of the probe (< 1.00 % FCC General Population/Uncontrolled MPE) are noted as such.



Figures 2 and 3 below are aerial views<sup>6</sup> 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**

<sup>6</sup> 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 349 Mountain Street in Windham, 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 5.71% MPE. This measurement was recorded at Location 11 by the mailbox for 875 Mountain Street.

The highest composite (measured + calculated) power density is **9.46% of the FCC General Population MPE limit** with the recently installed Eversource 220 MHz equipment and net % MPE change of Verizon's equipment modifications (as documented in their latest petition and the CT Siting Council power density database), is also calculated to occur at Location 11.

The above analysis concludes that RF exposure at ground level around the tower 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*

February 25, 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<sup>7</sup>**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f <sup>2</sup> )*	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<sup>8</sup>**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	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)**

<sup>7</sup> 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

<sup>8</sup> 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

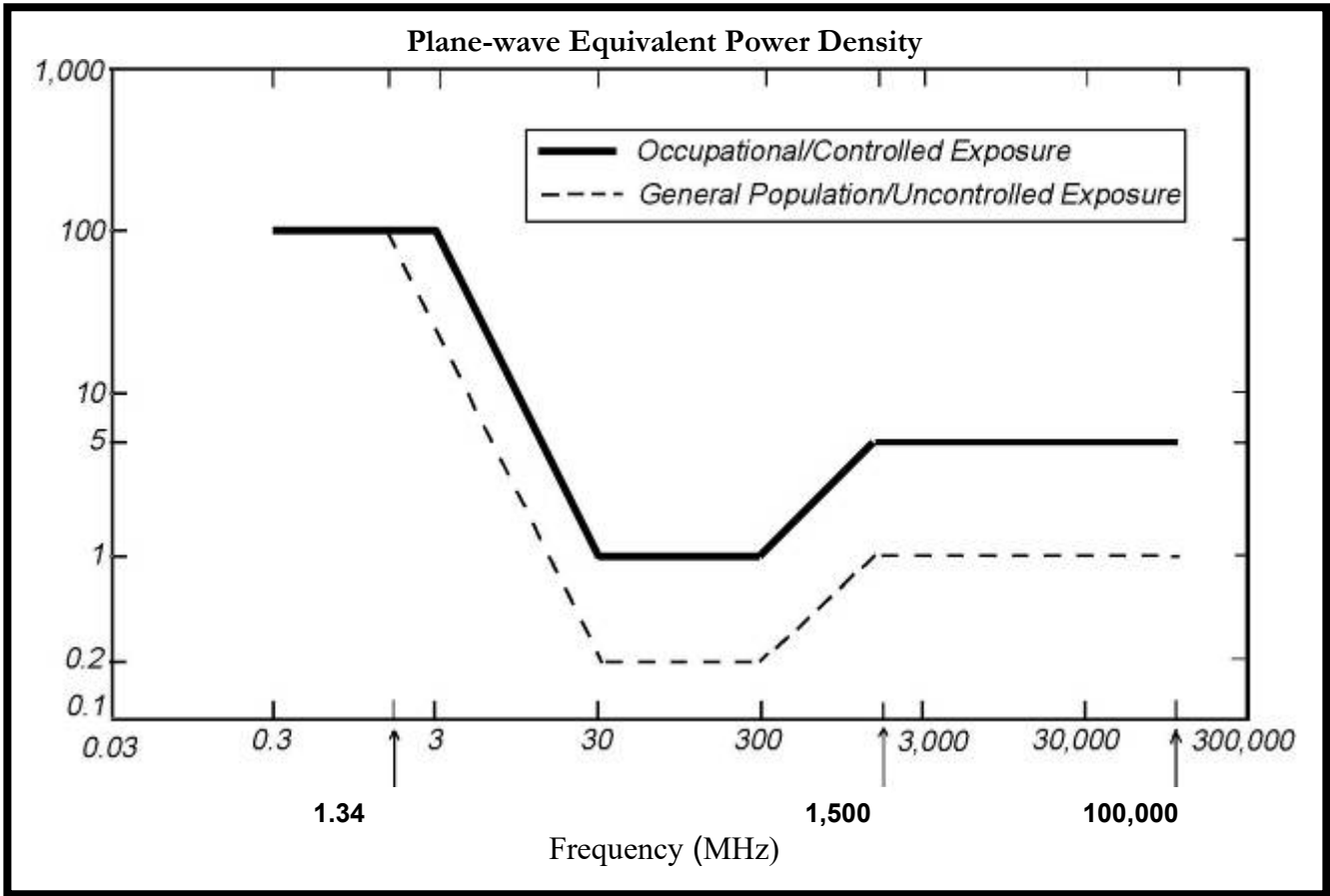
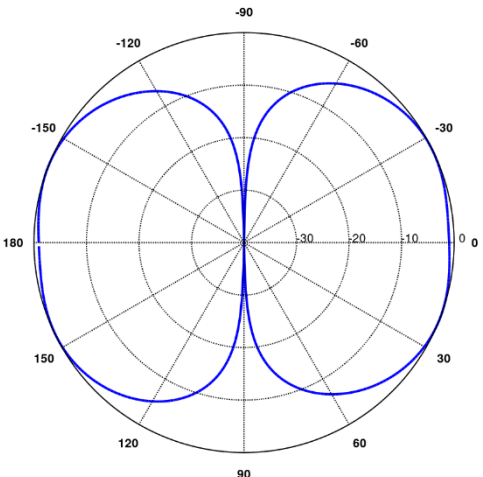


Figure 4: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

**Attachment C: Eversource Antenna Data Sheet and Electrical Patterns**

<p><b>217 MHz</b></p> <p>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'</p>	
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