



Crown Castle  
3 Corporate Park Drive, Suite 101  
Clifton Park, NY 12065

June 27, 2022

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

RE: **Notice of Exempt Modification for T-Mobile: CTHA653A**  
**Crown Site ID: 876372**  
**71 Ashford Road, Eastford, CT 06272**  
**Latitude: 41° 54' 16.22" / Longitude: -72° 7' 25.92"**

Dear Ms. Bachman:

T-Mobile currently maintains twelve (6) antennas at the 177-foot mount on the existing 177-foot monopole tower located at 71 Ashford Road, Eastford, CT. The property is owned by Connecticut Forest & Park Association and the tower is owned by Crown Castle. T-Mobile now intends to replace six (6) antennas, add one (1) new microwave dish and ancillary equipment at the 177ft level. This modification/proposal includes hardware that is both 4G (LTE) and 5G capable through remote software configuration and either or both services may be turned on or off at various times.

**Panned Modification:**

**Tower:**

Installed New:

- (3) RFS – APX16VAALL24\_43-U-NA20 Antenna
  - (3) Ericsson- AIR6449 B41 Antenna
  - (1) Commscope – VHL P2-11W/A Microwave Dish
  - (1) Ceragon-IP-20A\_RFU-D ODU
  - (3) Ericsson Radio 4460 B2/B25 B66\_TMO Radios
  - (3) Ericsson – Radio 4480
  - (3) Hybrid Cables (1-5/8")
  - (2) Coax Cables (21/64)
  - (2) Coax Cables 7/32)
- Mount Modification Per Infinigy Engineering

Remove:

- (3) RFS/Celwave – APXVTM24-ALU-120 Antennas
- (3) Commscope – NNVV-65B-R4 Antennas
- (6) E Sprint Antenna
- (3) Alcatel lucent – 1900MHZ 4x45W-65MHZ
- (6) Alcatel Lucent – RRH2x50-800
- (3) Alcatel Lucent – TD-RRH8x20-25
- (4) Coaxial Cables

**Ground:**

Install New:

- (1) 6160 Site Support Cabinet
- (1) B160 Battery Cabinet
- (1) RBS 6601 IN SSC
- (1) DUG20 IN SSC
- (1.) CSR IXRE V2 Transport System
- (2) PSU4813 Voltage Booster
- (2) BB6648 IN 6160 SSC Cabinet

Remove:

- (2) E Sprint Cabinets
- (4) Hybrid Trunks (1-1/4")

The facility was originally approved by the Town of Eastford Building Official by way of Building Permit 00-13 on August 29<sup>h</sup> 2000. No conditions were included with the approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §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 letter is being sent to The First Selectwoman, Deborah Richards, for the Town of Eastford, Mr. Joe Pajak, Building Officer for the Town of Eastford and Connecticut Forest & Park Association as property owner. Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the 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 replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
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, T-Mobile respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeffrey Barbadora.

Melanie A. Bachman

Page 3

Sincerely,



Jeffrey Barbadora  
Site Acquisition Specialist  
1800 W. Park Drive  
Westborough, MA 01581  
(781) 970-0053  
Jeff.Barbadora@crowncastle.com

Attachments

cc:

Deborah Richards, First Selectwoman  
Town of Eastford  
16 Westford Road  
Eastford, CT 06242  
(860) 974-0133 x3

Joe Pajak, Building Official  
Town of Eastford  
16 Westford Road  
Eastford, CT 06242  
860-974-0624

Connecticut Forest & Park Association  
16 Meriden Road  
Rockfall, CT 06481

Crown Castle Tower Owner

# Building Permit

TOWN OF EASTFORD

No. 00-13

Sprint PCS/Sterling  
NAME

100 Ashford Rd  
STREET

Eastford, RI

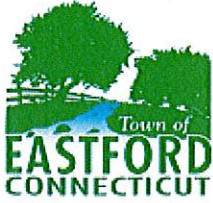
- Inspections Required (When checked)
- Footings or piers
  - Foundation walls prior to backfill
  - Rough framing
  - Rough electrical
  - Rough plumbing
  - Rough heating
  - Insulation
  - Chimneys and fireplaces
  - Final inspection for certificate or occupancy

**This Permit Must Be Attached to or in Front of Building  
To Be Removed Only By Building Inspector**

Date 8-29-00

Building Inspector Alvin H. Kelbe

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2018.



## TOWN OF EASTFORD

Connecticut

Information on the Property Records for the Municipality of Eastford was last updated on 6/27/2022.



### Parcel Information

Location:	71 ASHFORD RD	Property Use:	Vacant Land	Primary Use:	State Vacant
Unique ID:	00056820	Map Block Lot:	70 6 6 2	Acres:	13.0700
490 Acres:	0.00	Zone:		Volume / Page:	0055/0766
Developers Map / Lot:		Census:	9022		

### Value Information

	Appraised Value	Assessed Value
Land	64,800	45,400
Buildings	0	0
Detached Outbuildings	0	0

	Appraised Value	Assessed Value
Total	64,800	45,400

## Owner's Information

### Owner's Data

CONNECTICUT FOREST & PARK ASSOC  
 16 MERIDEN RD  
 ROCKFALL, CT 06481

## Owner History - Sales

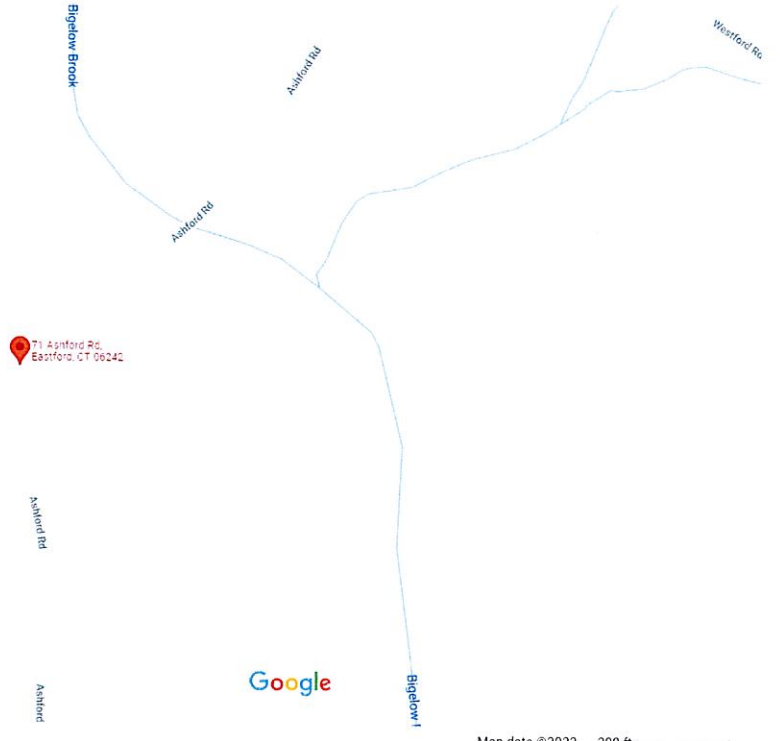
Owner Name	Volume	Page	Sale Date	Deed Type	Sale Price
CONNECTICUT FOREST & PARK ASSOC	0055	0766	08/29/2006	Warranty Deed	\$45,000
STERLING GROUP 1, LLC	0041	0255	01/29/2000		\$35,000
FULLANA JAMES A + SUSAN	0036	0651	01/16/1996	Warranty Deed	\$35,000
GREEN HERBERT EST	0031	0852	04/23/1991		\$0

## Building Permits

Permit Number	Permit Type	Date Opened	Reason
00-013	Miscellaneous	11/20/2000	CELL TOWER

Information Published With Permission From The Assessor

### 71 Ashford Rd



### 71 Ashford Rd

-   
Directions
-   
Save
-   
Nearby
-   
Send to phone
-   
Share

 71 Ashford Rd, Eastford, CT 06242  
WV3H+5Q Eastford, Connecticut

### Photos

**Barbadora, Jeff**

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**From:** TrackingUpdates@fedex.com  
**Sent:** Tuesday, June 28, 2022 3:49 PM  
**To:** Barbadora, Jeff  
**Subject:** FedEx Shipment 777240829515: Your package has been delivered

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.



Hi. Your package was  
delivered Tue, 06/28/2022 at  
3:47pm.



Delivered to 16 WESTFORD RD, EASTFORD, CT 06242  
Received by J.WOLFE

**OBTAIN PROOF OF DELIVERY**

TRACKING NUMBER [777240829515](#)



<b>FROM</b>	Jeff Barbadora 1800 W. Park Drive WESTBOROUGH, MA, US, 01581
<b>TO</b>	Town of Eastford Deborah Richards, First Selectwoman 16 Westford Road EASTFORD, CT, US, 06242
<b>REFERENCE</b>	799001.7680
<b>SHIPPER REFERENCE</b>	799001.7680
<b>SHIP DATE</b>	Mon 6/27/2022 05:19 PM
<b>DELIVERED TO</b>	Receptionist/Front Desk
<b>PACKAGING TYPE</b>	FedEx Envelope
<b>ORIGIN</b>	WESTBOROUGH, MA, US, 01581
<b>DESTINATION</b>	EASTFORD, CT, US, 06242
<b>SPECIAL HANDLING</b>	Deliver Weekday
<b>NUMBER OF PIECES</b>	1
<b>TOTAL SHIPMENT WEIGHT</b>	0.50 LB
<b>SERVICE TYPE</b>	FedEx Priority Overnight

**Barbadora, Jeff**

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**From:** TrackingUpdates@fedex.com  
**Sent:** Tuesday, June 28, 2022 3:49 PM  
**To:** Barbadora, Jeff  
**Subject:** FedEx Shipment 777240843953: Your package has been delivered

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Delivered to 16 WESTFORD RD, EASTFORD, CT 06242  
Received by J.WOLFE

**OBTAIN PROOF OF DELIVERY**

TRACKING NUMBER [777240843953](#)

<b>FROM</b>	Jeff Barbadora 1800 W. Park Drive WESTBOROUGH, MA, US, 01581
<b>TO</b>	Town of Eastford Joe Pajak - Building Official 16 Westford Road EASTFORD, CT, US, 06242
<b>REFERENCE</b>	799001.7680
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<b>SPECIAL HANDLING</b>	Deliver Weekday
<b>NUMBER OF PIECES</b>	1
<b>TOTAL SHIPMENT WEIGHT</b>	0.50 LB
<b>SERVICE TYPE</b>	FedEx Priority Overnight

**Barbadora, Jeff**

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**From:** TrackingUpdates@fedex.com  
**Sent:** Tuesday, June 28, 2022 10:34 AM  
**To:** Barbadora, Jeff  
**Subject:** FedEx Shipment 777240870659: Your package has been delivered

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Hi. Your package was  
delivered Tue, 06/28/2022 at  
10:30am.



Delivered to 16 MERIDEN RD, ROCKFALL, CT 06481  
Received by T.TERRY

[OBTAIN PROOF OF DELIVERY](#)

TRACKING NUMBER [777240870659](#)

<b>FROM</b>	Jeff Barbadora 1800 W. Park Drive WESTBOROUGH, MA, US, 01581
<b>TO</b>	Connecticut Forest & Park Associa Property Owner 16 Meriden Road ROCKFALL, CT, US, 06481
<b>REFERENCE</b>	799001.7680
<b>SHIPPER REFERENCE</b>	799001.7680
<b>SHIP DATE</b>	Mon 6/27/2022 05:19 PM
<b>DELIVERED TO</b>	Receptionist/Front Desk
<b>PACKAGING TYPE</b>	FedEx Envelope
<b>ORIGIN</b>	WESTBOROUGH, MA, US, 01581
<b>DESTINATION</b>	ROCKFALL, CT, US, 06481
<b>SPECIAL HANDLING</b>	Deliver Weekday
<b>NUMBER OF PIECES</b>	1
<b>TOTAL SHIPMENT WEIGHT</b>	0.50 LB
<b>SERVICE TYPE</b>	FedEx Priority Overnight

Date: **May 20, 2022**

# INFINIGY

Infinigy  
500 West Office Center Drive, Suite 150  
Fort Washington, PA 19034  
(518) 690-0790  
structural@infinigy.com

**Subject:** **Mount Analysis Report**

**Carrier Designation:** **T-Mobile MW**  
**Carrier Site Number:** CTHA653A  
**Carrier Site Name:** CT33XC074

**Crown Castle Designation:** **Crown Castle BU Number:** 876372  
**Crown Castle Site Name:** SMITH HILLS / STERLING GRP. (S  
**Crown Castle JDE Job Number:** 717189  
**Crown Castle Order Number:** 617436 Rev. 0

**Engineering Firm Designation:** **Infinigy Report Designation:** 1039-Z0001-B

**Site Data:** **71 Ashford Rd, Eastford, Windham County, CT, 06272**  
**Latitude 41°54'16.22" Longitude -72°7'25.92"**

**Structure Information:** **Tower Height & Type:** **177.0 ft Monopole**  
**Mount Elevation:** **177.0 ft**  
**Mount Type:** **10.5 ft Platform**

Infinigy is pleased to submit this “**Mount Analysis Report**” to determine the structural integrity of T-Mobile’s antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

**Platform**

**Sufficient**

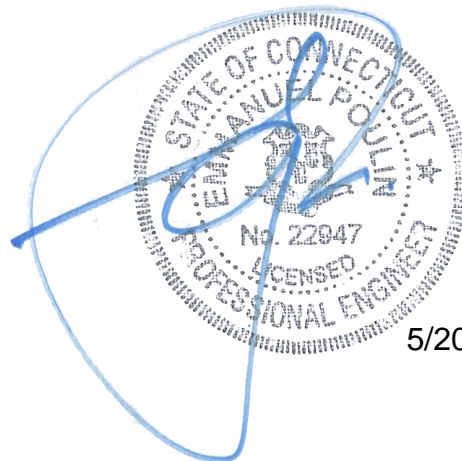
**\*See Section 4.1 of this report for the loading and structural modifications required in order for the mount to support the loading listed in Table 1.**

This analysis has been performed in accordance with the 2018 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 119 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Farhad Ahmadyar

Respectfully Submitted by: Emmanuel Poulin, P.E.

[structural@infinigy.com](mailto:structural@infinigy.com)



5/20/22

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Mount Modification Design Drawings (MDD) / Supplemental Drawings

**1) INTRODUCTION**

This is an existing 3-sector 10.5 ft Platform, designed by Engineered Endeavors Incorporated.

**2) ANALYSIS CRITERIA**

**Building Code:** 2015 IBC / 2018 Connecticut State Building Code  
**TIA-222 Revision:** TIA-222-H  
**Risk Category:** II  
**Ultimate Wind Speed:** 119 mph  
**Exposure Category:** C  
**Topographic Factor at Base:** 1.0  
**Topographic Factor at Mount:** 1.0  
**Ice Thickness:** 1.0 in  
**Wind Speed with Ice:** 50 mph  
**Seismic S<sub>s</sub>:** 0.172  
**Seismic S<sub>1</sub>:** 0.063  
**Live Loading Wind Speed:** 30 mph  
**Man Live Load at Mid/End-Points:** 250 lb  
**Man Live Load at Mount Pipes:** 500 lb

**Table 1 - Proposed Equipment Configuration**

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
177.0	180.0	3	ERICSSON	AIR6449 B41_T-MOBILE	10.5 ft Platform
		3	RFS/CELWAVE	APXVAALL24_43-U-NA20_TMO	
		3	ERICSSON	RADIO 4460 B2/B25 B66_TMO	
		3	ERICSSON	RADIO 4480_TMOV2	
	177.0	1	COMMSCOPE	VHLP2-11W/A	
		1	CERAGON	FIBEAIR IP-20A_RFU-D	



### 3) ANALYSIS PROCEDURE

**Table 2 - Documents Provided**

Document	Remarks	Reference	Source
Crown Application	T-Mobile Application	617436 Rev. 0	CCI Sites
Previous Mount Analysis Report	Infinigy Engineering	9959692	CCI Sites
Tower Manufacturer Drawings	Engineered Endeavors Incorporated	1615375	CCI Sites

#### 3.1) Analysis Method

RISA-3D (Version 20.0.0), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

Infinigy Mount Analysis Tool V2.1.7, a tool internally developed by Infinigy, was used to calculate wind loading on all appurtenances, dishes and mount members for various loading cases. Selected output from the analysis is included in Appendix B "Software Input Calculations".

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Mount Analysis* (Revision E).

#### 3.2) Assumptions

- 1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
- 2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
- 3) 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.
- 4) The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
- 5) Prior structural modifications to the tower mounting system are assumed to be installed as shown per available data.
- 6) Steel grades have been assumed as follows, unless noted otherwise:
 

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM A500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

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

**4) ANALYSIS RESULTS**

**Table 3 - Mount Component Stresses vs. Capacity (Platform, All Sectors)**

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,2	Mount Pipe(s)	MP7	177.0	49.1	Pass
	Horizontal(s)	HOR2		41.3	Pass
	Bracing(s)	BR2		44.4	Pass
	Handrail(s)	HR2		48.8	Pass
	Coner Plate(s)	M36		82.6	Pass
	Mount Connection(s)	--		4.1	Pass

<b>Structure Rating (max from all components) =</b>	<b>82.6%</b>
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Notes:

- 1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
- 2) See additional documentation in "Appendix D – Additional Calculations" for detailed mount connection calculations.

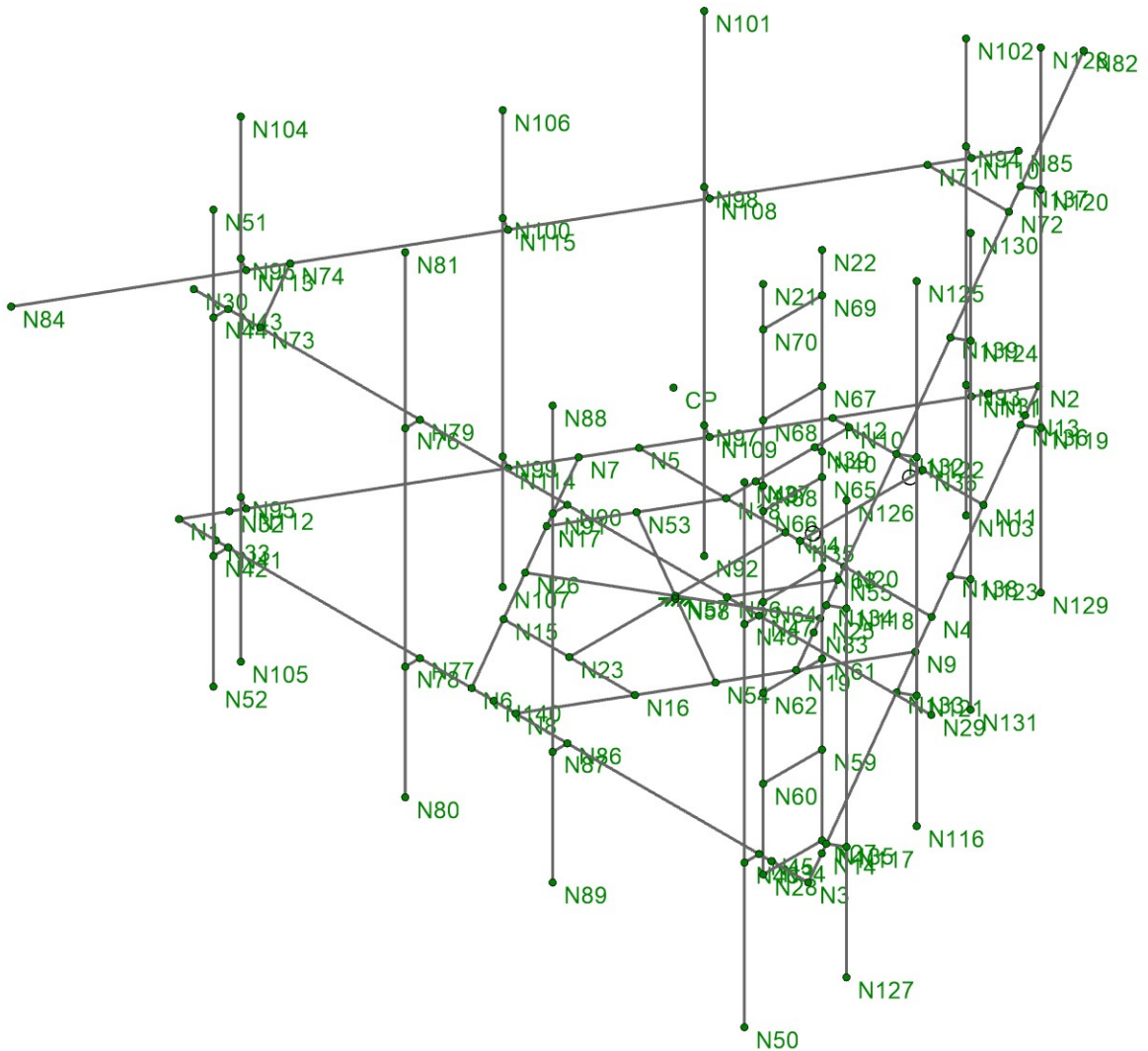
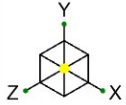
**4.1) Recommendations**

The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the structural modifications listed below must be completed.

1. Installation of (1) Site Pro 1 HRK12-U handrail kit.

Engineering detail drawings have been provided in Appendix E – Mount Modification Design Drawings. Connection from the mount to the tower and local stresses on the tower are sufficient.

**APPENDIX A**  
**WIRE FRAME AND RENDERED MODELS**



Infinigy

876372

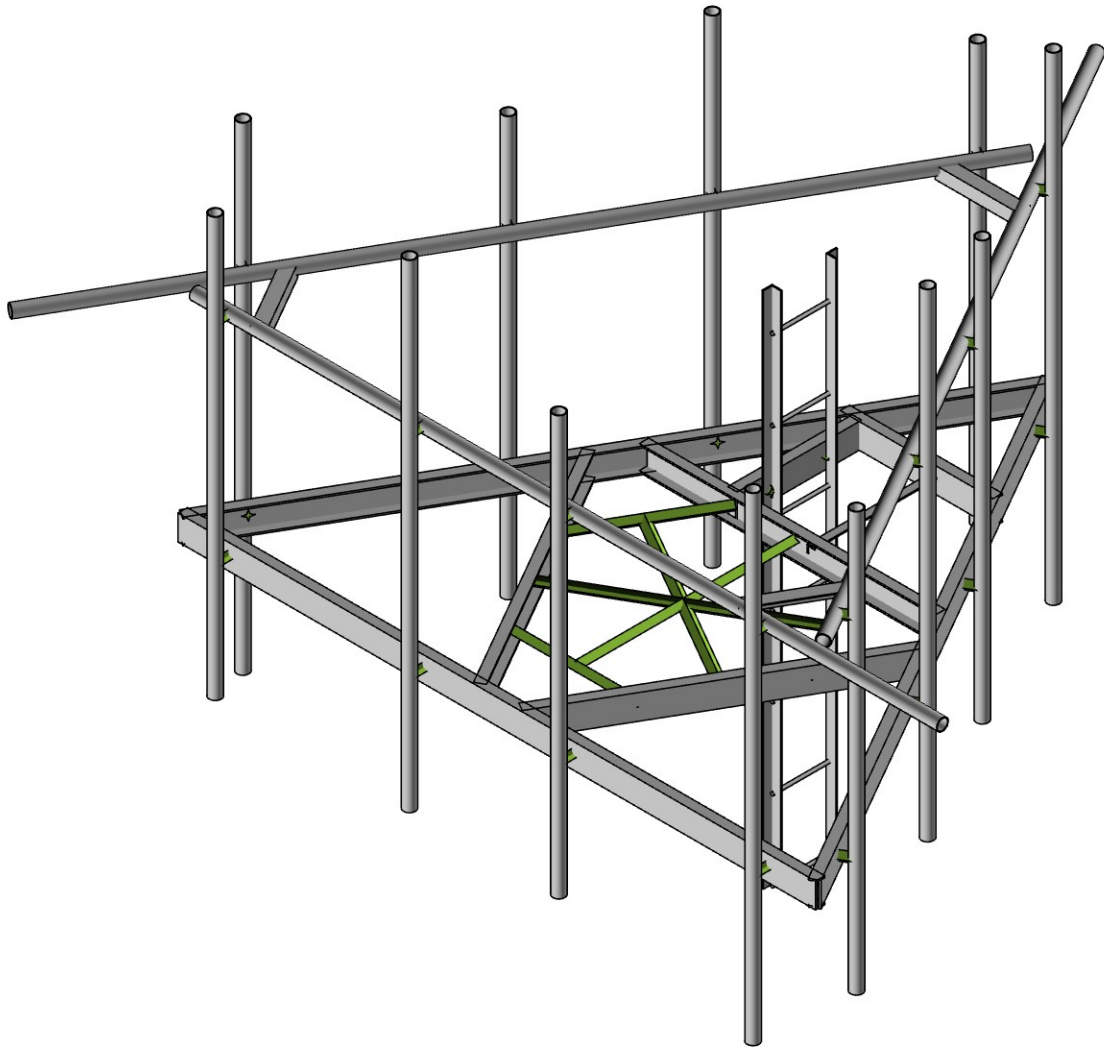
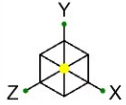
WIREFRAME1

FA

May 19, 2022

1039-Z0001-B

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Infinigy

FA

1039-Z0001-B

876372

RENDERED2

May 19, 2022

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**APPENDIX B**  
**SOFTWARE INPUT CALCULATIONS**

## Program Inputs

PROJECT INFORMATION		
Client:	Crown Castle	
Carrier:	T-Mobile	
Engineer:	Farhad Ahmadyar	

SITE INFORMATION		
Risk Category:	II	
Exposure Category:	C	
Topo Factor Procedure:	Method 1, Category 1	
Site Class:	D - Stiff Soil (Assumed)	
Ground Elevation:	672.24	ft *Rev H

MOUNT INFORMATION		
Mount Type:	Platform	
Num Sectors:	3	
Centerline AGL:	177.00	ft
Tower Height AGL:	177.00	ft

TOPOGRAPHIC DATA		
Topo Feature:	N/A	
Slope Distance:	N/A	ft
Crest Distance:	N/A	ft
Crest Height:	N/A	ft

FACTORS		
Directionality Fact. ( $K_d$ ):	0.950	
Ground Ele. Factor ( $K_e$ ):	0.976	*Rev H Only
Rooftop Speed-Up ( $K_s$ ):	1.000	*Rev H Only
Topographic Factor ( $K_{zt}$ ):	1.000	
Gust Effect Factor ( $G_h$ ):	1.000	

CODE STANDARDS		
Building Code:	2015 IBC	
TIA Standard:	TIA-222-H	
ASCE Standard:	ASCE 7-10	

WIND AND ICE DATA		
Ultimate Wind ( $V_{ult}$ ):	119	mph
Design Wind ( $V$ ):	N/A	mph
Ice Wind ( $V_{ice}$ ):	50	mph
Base Ice Thickness ( $t_i$ ):	1	in
Flat Pressure:	95.946	psf
Round Pressure:	57.568	psf
Ice Wind Pressure:	10.163	psf

SEISMIC DATA		
Short-Period Accel. ( $S_s$ ):	0.172	g
1-Second Accel. ( $S_1$ ):	0.063	g
Short-Period Design ( $S_{DS}$ ):	0.183	
1-Second Design ( $S_{D1}$ ):	0.101	
Short-Period Coeff. ( $F_a$ ):	1.600	
1-Second Coeff. ( $F_v$ ):	2.400	
Amplification Factor ( $A_s$ ):	3.000	
Response Mod. Coeff. ( $R$ ):	2.000	



Infinigy Load Calculator V2.1.7



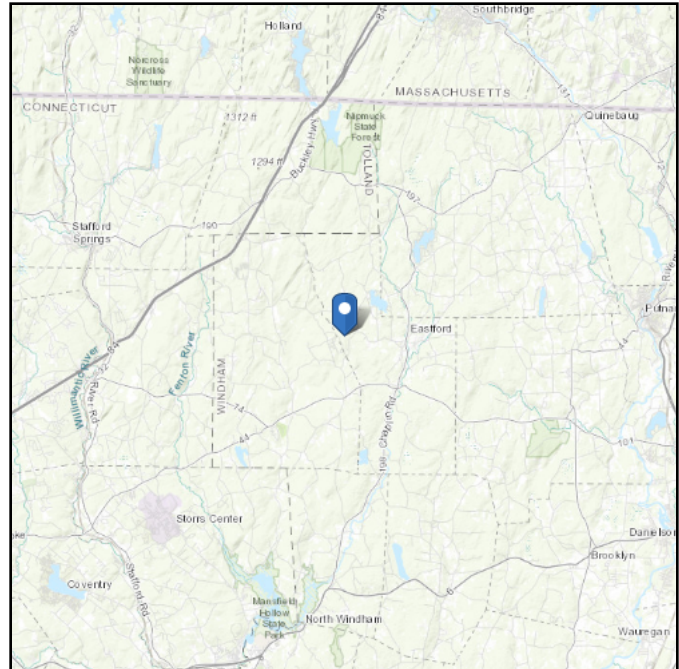
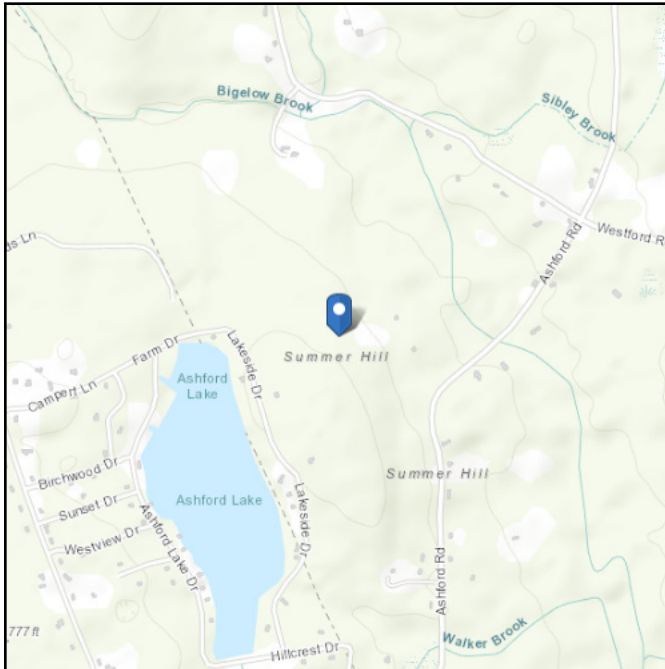


# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

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

**Elevation:** 672.24 ft (NAVD 88)  
**Latitude:** 41.904506  
**Longitude:** -72.123867



## Wind

### Results:

Wind Speed	119 Vmph per 2018 Connecticut State Building Code
10-year MRI	78 Vmph
25-year MRI	88 Vmph
50-year MRI	95 Vmph
100-year MRI	102 Vmph

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

**Date Accessed:** Thu May 19 2022

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

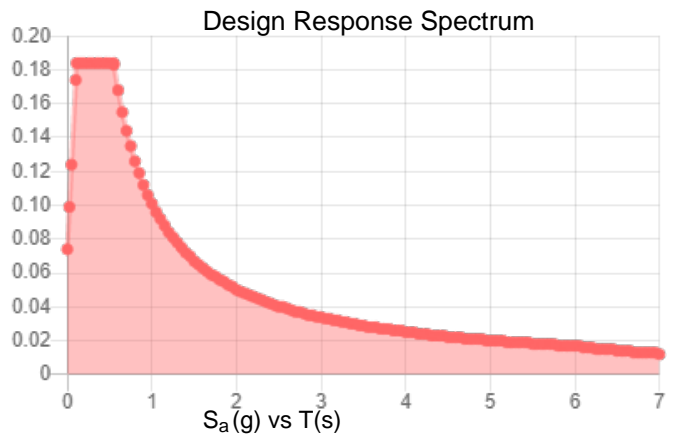
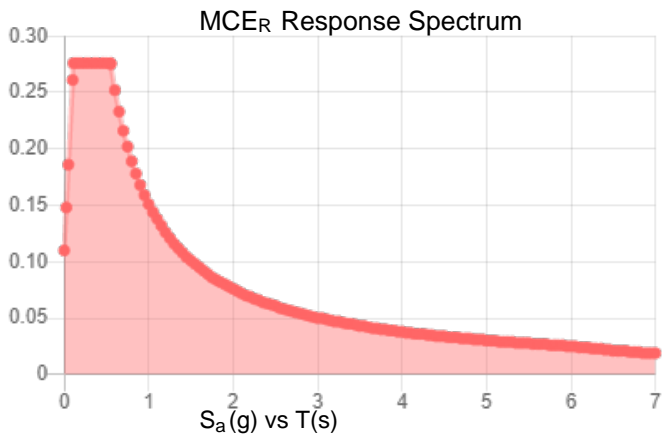
Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

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

**Results:**

$S_S$ :	0.172	$S_{DS}$ :	0.184
$S_1$ :	0.063	$S_{D1}$ :	0.101
$F_a$ :	1.6	$T_L$ :	6
$F_v$ :	2.4	PGA :	0.085
$S_{MS}$ :	0.276	PGA <sub>M</sub> :	0.136
$S_{M1}$ :	0.151	F <sub>PGA</sub> :	1.6
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:** Thu May 19 2022

**Date Source:**

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

## Ice

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**Results:**

Ice Thickness: 1.00 in.  
Concurrent Temperature: 5 F  
Gust Speed 50 mph

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

**Date Accessed:** Thu May 19 2022

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

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

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**APPENDIX C**  
**SOFTWARE ANALYSIS OUTPUT**

**Member Primary Data**

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	HOR1	N3	N1		Horizontal	Beam	Channel	A36 Gr.36	Typical
2	HOR2	N2	N1	180	Horizontal	Beam	Channel	A36 Gr.36	Typical
3	HOR3	N2	N3		Horizontal	Beam	Channel	A36 Gr.36	Typical
4	BR3	N4	N5	180	Support Channel	Beam	Channel	A36 Gr.36	Typical
5	BR2	N6	N7		Support Channel	Beam	Channel	A36 Gr.36	Typical
6	BR1	N8	N9	180	Support Channel	Beam	Channel	A36 Gr.36	Typical
7	M7	N18	N10	180	Support Channel	Beam	Channel	A36 Gr.36	Typical
8	BR4	N11	N12		Support Channel	Beam	Channel	A36 Gr.36	Typical
9	M9	N15	N16		RIGID	None	None	RIGID	Typical
10	M10	N17	N18		RIGID	None	None	RIGID	Typical
11	M11	N19	N20		RIGID	None	None	RIGID	Typical
12	M12	N21	N28	180	Ladder Rail	Column	Single Angle	A36 Gr.36	Typical
13	M13	N22	N27	90	Ladder Rail	Column	Single Angle	A36 Gr.36	Typical
14	M14	N23	N24		RIGID	None	None	RIGID	Typical
15	M15	N25	N26		RIGID	None	None	RIGID	Typical
16	M16	N27	N28		Ladder Step	Beam	BAR	A36 Gr.36	Typical
17	HR1	N29	N30	90	Handrails	Beam	Pipe	A53 Gr.B	Typical
18	M18	N35	N36	90	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
19	M19	N37	N38		RIGID	None	None	RIGID	Typical
20	M20	N39	N40		RIGID	None	None	RIGID	Typical
21	M21	N41	N42		RIGID	None	None	RIGID	Typical
22	M22	N43	N44		RIGID	None	None	RIGID	Typical
23	M23	N45	N46		RIGID	None	None	RIGID	Typical
24	M24	N47	N48		RIGID	None	None	RIGID	Typical
25	MP1	N49	N50		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
26	MP4	N51	N52		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
27	M27	N53	N54		RIGID	None	None	RIGID	Typical
28	M28	N55	N56	180	Handrail Corner Angle	Beam	Single Angle	A36 Gr.36	Typical
29	M29	N58	N57		RIGID	None	None	RIGID	Typical
30	M30	N59	N60		Ladder Step	Beam	BAR	A36 Gr.36	Typical
31	M31	N61	N62		Ladder Step	Beam	BAR	A36 Gr.36	Typical
32	M32	N63	N64		Ladder Step	Beam	BAR	A36 Gr.36	Typical
33	M33	N65	N66		Ladder Step	Beam	BAR	A36 Gr.36	Typical
34	M34	N67	N68		Ladder Step	Beam	BAR	A36 Gr.36	Typical
35	M35	N69	N70		Ladder Step	Beam	BAR	A36 Gr.36	Typical
36	M36	N71	N72	180	Handrail Corner Angle	Beam	Single Angle	A36 Gr.36	Typical
37	M37	N73	N74	180	Handrail Corner Angle	Beam	Single Angle	A36 Gr.36	Typical
38	M38	N77	N78		RIGID	None	None	RIGID	Typical
39	M39	N79	N76		RIGID	None	None	RIGID	Typical
40	MP3	N81	N80		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
41	HR3	N82	N83	90	Handrails	Beam	Pipe	A53 Gr.B	Typical
42	HR2	N84	N85	90	Handrails	Beam	Pipe	A53 Gr.B	Typical
43	MP2	N88	N89		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
44	M44	N86	N87		RIGID	None	None	RIGID	Typical
45	M45	N90	N91		RIGID	None	None	RIGID	Typical
46	M46	N108	N98		RIGID	None	None	RIGID	Typical
47	M47	N109	N97		RIGID	None	None	RIGID	Typical
48	M48	N110	N94		RIGID	None	None	RIGID	Typical
49	MP7	N101	N92		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
50	M50	N111	N93		RIGID	None	None	RIGID	Typical
51	M51	N112	N95		RIGID	None	None	RIGID	Typical
52	M52	N113	N96		RIGID	None	None	RIGID	Typical
53	M53	N114	N99		RIGID	None	None	RIGID	Typical
54	M54	N115	N100		RIGID	None	None	RIGID	Typical
55	MP8	N102	N103		Mount Pipe	Column	Pipe	A53 Gr.B	Typical

**Member Primary Data (Continued)**

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
56	MP5	N104	N105		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
57	MP6	N106	N107		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
58	M58	N132	N122		RIGID	None	None	RIGID	Typical
59	M59	N133	N121		RIGID	None	None	RIGID	Typical
60	M60	N134	N118		RIGID	None	None	RIGID	Typical
61	MP11	N125	N116		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
62	M62	N135	N117		RIGID	None	None	RIGID	Typical
63	M63	N136	N119		RIGID	None	None	RIGID	Typical
64	M64	N137	N120		RIGID	None	None	RIGID	Typical
65	M65	N138	N123		RIGID	None	None	RIGID	Typical
66	M66	N139	N124		RIGID	None	None	RIGID	Typical
67	MP12	N126	N127		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
68	MP9	N128	N129		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
69	MP10	N130	N131		Mount Pipe	Column	Pipe	A53 Gr.B	Typical

**Hot Rolled Steel Section Sets**

	Label	Shape	Type	Design List	Material	Design Rule	Area [in <sup>2</sup> ]	Iyy [in <sup>4</sup> ]	Izz [in <sup>4</sup> ]	J [in <sup>4</sup> ]
1	Ladder Rail	L2X2X4	Column	Single Angle	A36 Gr.36	Typical	0.944	0.346	0.346	0.021
2	Ladder Step	0.625SR	Beam	BAR	A36 Gr.36	Typical	0.307	0.007	0.007	0.015
3	Handrails	PIPE 2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
4	Mount Pipe	PIPE 2.0	Column	Pipe	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
5	Horizontal	C5X9	Beam	Channel	A36 Gr.36	Typical	2.64	0.624	8.89	0.109
6	2.5 Mount Pipe	PIPE 2.5	Column	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
7	Support Channel	C5X9	Beam	Channel	A36 Gr.36	Typical	2.64	0.624	8.89	0.109
8	Grating Angle	L1.5X1.5X4	Beam	Single Angle	A36 Gr.36	Typical	0.688	0.139	0.139	0.013
9	Handrail Corner Angle	L2.5X2.5X3	Beam	Single Angle	A36 Gr.36	Typical	0.901	0.535	0.535	0.011

**Basic Load Cases**

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed	Area(Member)
1	Self Weight	DL		-1			20		8
2	Wind Load AZI 0	WLZ					40		
3	Wind Load AZI 30	None					40		
4	Wind Load AZI 60	None					40		
5	Wind Load AZI 90	WLX					40		
6	Wind Load AZI 120	None					40		
7	Wind Load AZI 150	None					40		
8	Wind Load AZI 180	None					40		
9	Wind Load AZI 210	None					40		
10	Wind Load AZI 240	None					40		
11	Wind Load AZI 270	None					40		
12	Wind Load AZI 300	None					40		
13	Wind Load AZI 330	None					40		
14	Distr. Wind Load Z	WLZ						69	
15	Distr. Wind Load X	WLX						69	
16	Ice Weight	OL1					20	69	8
17	Ice Wind Load AZI 0	OL2					40		
18	Ice Wind Load AZI 30	None					40		
19	Ice Wind Load AZI 60	None					40		
20	Ice Wind Load AZI 90	OL3					40		
21	Ice Wind Load AZI 120	None					40		
22	Ice Wind Load AZI 150	None					40		
23	Ice Wind Load AZI 180	None					40		
24	Ice Wind Load AZI 210	None					40		

**Basic Load Cases (Continued)**

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed	Area(Member)
25	Ice Wind Load AZI 240	None					40		
26	Ice Wind Load AZI 270	None					40		
27	Ice Wind Load AZI 300	None					40		
28	Ice Wind Load AZI 330	None					40		
29	Distr. Ice Wind Load Z	OL2						69	
30	Distr. Ice Wind Load X	OL3						69	
31	Seismic Load Z	ELZ			-0.275		20		
32	Seismic Load X	ELX	-0.275				20		
33	Service Live Loads	LL				1			
34	Maintenance Load 1	LL				1			
35	Maintenance Load 2	LL				1			
36	Maintenance Load 3	LL				1			
37	Maintenance Load 4	LL				1			
38	Maintenance Load 5	LL				1			
39	Maintenance Load 6	LL				1			
40	Maintenance Load 7	LL				1			
41	Maintenance Load 8	LL				1			
42	Maintenance Load 9	LL				1			
43	Maintenance Load 10	LL				1			
44	Maintenance Load 11	LL				1			
45	Maintenance Load 12	LL				1			
46	BLC 1 Transient Area Loads	None						94	
47	BLC 16 Transient Area Loads	None						94	

**Load Combinations**

	Description	Solve P-Delta	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	
1	1.4DL	Yes	Y	1	1.4								
2	1.2DL + 1WL AZI 0	Yes	Y	1	1.2	2	1	14	1	15			
3	1.2DL + 1WL AZI 30	Yes	Y	1	1.2	3	1	14	0.866	15	0.5		
4	1.2DL + 1WL AZI 60	Yes	Y	1	1.2	4	1	14	0.5	15	0.866		
5	1.2DL + 1WL AZI 90	Yes	Y	1	1.2	5	1	14		15	1		
6	1.2DL + 1WL AZI 120	Yes	Y	1	1.2	6	1	14	-0.5	15	0.866		
7	1.2DL + 1WL AZI 150	Yes	Y	1	1.2	7	1	14	-0.866	15	0.5		
8	1.2DL + 1WL AZI 180	Yes	Y	1	1.2	8	1	14	-1	15			
9	1.2DL + 1WL AZI 210	Yes	Y	1	1.2	9	1	14	-0.866	15	-0.5		
10	1.2DL + 1WL AZI 240	Yes	Y	1	1.2	10	1	14	-0.5	15	-0.866		
11	1.2DL + 1WL AZI 270	Yes	Y	1	1.2	11	1	14		15	-1		
12	1.2DL + 1WL AZI 300	Yes	Y	1	1.2	12	1	14	0.5	15	-0.866		
13	1.2DL + 1WL AZI 330	Yes	Y	1	1.2	13	1	14	0.866	15	-0.5		
14	0.9DL + 1WL AZI 0	Yes	Y	1	0.9	2	1	14	1	15			
15	0.9DL + 1WL AZI 30	Yes	Y	1	0.9	3	1	14	0.866	15	0.5		
16	0.9DL + 1WL AZI 60	Yes	Y	1	0.9	4	1	14	0.5	15	0.866		
17	0.9DL + 1WL AZI 90	Yes	Y	1	0.9	5	1	14		15	1		
18	0.9DL + 1WL AZI 120	Yes	Y	1	0.9	6	1	14	-0.5	15	0.866		
19	0.9DL + 1WL AZI 150	Yes	Y	1	0.9	7	1	14	-0.866	15	0.5		
20	0.9DL + 1WL AZI 180	Yes	Y	1	0.9	8	1	14	-1	15			
21	0.9DL + 1WL AZI 210	Yes	Y	1	0.9	9	1	14	-0.866	15	-0.5		
22	0.9DL + 1WL AZI 240	Yes	Y	1	0.9	10	1	14	-0.5	15	-0.866		
23	0.9DL + 1WL AZI 270	Yes	Y	1	0.9	11	1	14		15	-1		
24	0.9DL + 1WL AZI 300	Yes	Y	1	0.9	12	1	14	0.5	15	-0.866		
25	0.9DL + 1WL AZI 330	Yes	Y	1	0.9	13	1	14	0.866	15	-0.5		
26	1.2D + 1.0Di	Yes	Y	1	1.2	16	1						
27	1.2D + 1.0Di + 1.0Wi AZI 0	Yes	Y	1	1.2	16	1	17	1	29	1	30	
28	1.2D + 1.0Di + 1.0Wi AZI 30	Yes	Y	1	1.2	16	1	18	1	29	0.866	30	0.5
29	1.2D + 1.0Di + 1.0Wi AZI 60	Yes	Y	1	1.2	16	1	19	1	29	0.5	30	0.866



**Load Combinations (Continued)**

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
30	1.2D + 1.0Di + 1.0Wi AZI 90	Yes	Y	1	1.2	16	1	20	1	29		30	1
31	1.2D + 1.0Di + 1.0Wi AZI 120	Yes	Y	1	1.2	16	1	21	1	29	-0.5	30	0.866
32	1.2D + 1.0Di + 1.0Wi AZI 150	Yes	Y	1	1.2	16	1	22	1	29	-0.866	30	0.5
33	1.2D + 1.0Di + 1.0Wi AZI 180	Yes	Y	1	1.2	16	1	23	1	29	-1	30	
34	1.2D + 1.0Di + 1.0Wi AZI 210	Yes	Y	1	1.2	16	1	24	1	29	-0.866	30	-0.5
35	1.2D + 1.0Di + 1.0Wi AZI 240	Yes	Y	1	1.2	16	1	25	1	29	-0.5	30	-0.866
36	1.2D + 1.0Di + 1.0Wi AZI 270	Yes	Y	1	1.2	16	1	26	1	29		30	-1
37	1.2D + 1.0Di + 1.0Wi AZI 300	Yes	Y	1	1.2	16	1	27	1	29	0.5	30	-0.866
38	1.2D + 1.0Di + 1.0Wi AZI 330	Yes	Y	1	1.2	16	1	28	1	29	0.866	30	-0.5
39	(1.2 + 0.2Sds)DL + 1.0E AZI 0	Yes	Y	1	1.237	31	1	32					
40	(1.2 + 0.2Sds)DL + 1.0E AZI 30	Yes	Y	1	1.237	31	0.866	32	0.5				
41	(1.2 + 0.2Sds)DL + 1.0E AZI 60	Yes	Y	1	1.237	31	0.5	32	0.866				
42	(1.2 + 0.2Sds)DL + 1.0E AZI 90	Yes	Y	1	1.237	31		32	1				
43	(1.2 + 0.2Sds)DL + 1.0E AZI 120	Yes	Y	1	1.237	31	-0.5	32	0.866				
44	(1.2 + 0.2Sds)DL + 1.0E AZI 150	Yes	Y	1	1.237	31	-0.866	32	0.5				
45	(1.2 + 0.2Sds)DL + 1.0E AZI 180	Yes	Y	1	1.237	31	-1	32					
46	(1.2 + 0.2Sds)DL + 1.0E AZI 210	Yes	Y	1	1.237	31	-0.866	32	-0.5				
47	(1.2 + 0.2Sds)DL + 1.0E AZI 240	Yes	Y	1	1.237	31	-0.5	32	-0.866				
48	(1.2 + 0.2Sds)DL + 1.0E AZI 270	Yes	Y	1	1.237	31		32	-1				
49	(1.2 + 0.2Sds)DL + 1.0E AZI 300	Yes	Y	1	1.237	31	0.5	32	-0.866				
50	(1.2 + 0.2Sds)DL + 1.0E AZI 330	Yes	Y	1	1.237	31	0.866	32	-0.5				
51	(0.9 - 0.2Sds)DL + 1.0E AZI 0	Yes	Y	1	0.863	31	1	32					
52	(0.9 - 0.2Sds)DL + 1.0E AZI 30	Yes	Y	1	0.863	31	0.866	32	0.5				
53	(0.9 - 0.2Sds)DL + 1.0E AZI 60	Yes	Y	1	0.863	31	0.5	32	0.866				
54	(0.9 - 0.2Sds)DL + 1.0E AZI 90	Yes	Y	1	0.863	31		32	1				
55	(0.9 - 0.2Sds)DL + 1.0E AZI 120	Yes	Y	1	0.863	31	-0.5	32	0.866				
56	(0.9 - 0.2Sds)DL + 1.0E AZI 150	Yes	Y	1	0.863	31	-0.866	32	0.5				
57	(0.9 - 0.2Sds)DL + 1.0E AZI 180	Yes	Y	1	0.863	31	-1	32					
58	(0.9 - 0.2Sds)DL + 1.0E AZI 210	Yes	Y	1	0.863	31	-0.866	32	-0.5				
59	(0.9 - 0.2Sds)DL + 1.0E AZI 240	Yes	Y	1	0.863	31	-0.5	32	-0.866				
60	(0.9 - 0.2Sds)DL + 1.0E AZI 270	Yes	Y	1	0.863	31		32	-1				
61	(0.9 - 0.2Sds)DL + 1.0E AZI 300	Yes	Y	1	0.863	31	0.5	32	-0.866				
62	(0.9 - 0.2Sds)DL + 1.0E AZI 330	Yes	Y	1	0.863	31	0.866	32	-0.5				
63	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 0	Yes	Y	1	1	2	0.254	14	0.254	15		33	1.5
64	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 30	Yes	Y	1	1	3	0.254	14	0.22	15	0.127	33	1.5
65	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 60	Yes	Y	1	1	4	0.254	14	0.127	15	0.22	33	1.5
66	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 90	Yes	Y	1	1	5	0.254	14		15	0.254	33	1.5
67	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 120	Yes	Y	1	1	6	0.254	14	-0.127	15	0.22	33	1.5
68	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 150	Yes	Y	1	1	7	0.254	14	-0.22	15	0.127	33	1.5
69	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 180	Yes	Y	1	1	8	0.254	14	-0.254	15		33	1.5
70	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 210	Yes	Y	1	1	9	0.254	14	-0.22	15	-0.127	33	1.5
71	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 240	Yes	Y	1	1	10	0.254	14	-0.127	15	-0.22	33	1.5
72	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 270	Yes	Y	1	1	11	0.254	14		15	-0.254	33	1.5
73	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 300	Yes	Y	1	1	12	0.254	14	0.127	15	-0.22	33	1.5
74	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 330	Yes	Y	1	1	13	0.254	14	0.22	15	-0.127	33	1.5
75	1.2DL + 1.5LL	Yes	Y	1	1.2	33	1.5						
76	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	34	1.5	2	0.064	14	0.064	15	
77	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	34	1.5	3	0.064	14	0.055	15	0.032
78	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	34	1.5	4	0.064	14	0.032	15	0.055
79	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	34	1.5	5	0.064	14		15	0.064
80	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	34	1.5	6	0.064	14	-0.032	15	0.055
81	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	34	1.5	7	0.064	14	-0.055	15	0.032
82	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	34	1.5	8	0.064	14	-0.064	15	
83	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	34	1.5	9	0.064	14	-0.055	15	-0.032
84	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	34	1.5	10	0.064	14	-0.032	15	-0.055



**Load Combinations (Continued)**

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
85	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	34	1.5	11	0.064	14		15	-0.064
86	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	34	1.5	12	0.064	14	0.032	15	-0.055
87	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	34	1.5	13	0.064	14	0.055	15	-0.032
88	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	35	1.5	2	0.064	14	0.064	15	
89	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	35	1.5	3	0.064	14	0.055	15	0.032
90	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	35	1.5	4	0.064	14	0.032	15	0.055
91	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	35	1.5	5	0.064	14		15	0.064
92	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	35	1.5	6	0.064	14	-0.032	15	0.055
93	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	35	1.5	7	0.064	14	-0.055	15	0.032
94	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	35	1.5	8	0.064	14	-0.064	15	
95	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	35	1.5	9	0.064	14	-0.055	15	-0.032
96	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	35	1.5	10	0.064	14	-0.032	15	-0.055
97	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	35	1.5	11	0.064	14		15	-0.064
98	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	35	1.5	12	0.064	14	0.032	15	-0.055
99	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	35	1.5	13	0.064	14	0.055	15	-0.032
100	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	36	1.5	2	0.064	14	0.064	15	
101	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	36	1.5	3	0.064	14	0.055	15	0.032
102	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	36	1.5	4	0.064	14	0.032	15	0.055
103	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	36	1.5	5	0.064	14		15	0.064
104	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	36	1.5	6	0.064	14	-0.032	15	0.055
105	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	36	1.5	7	0.064	14	-0.055	15	0.032
106	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	36	1.5	8	0.064	14	-0.064	15	
107	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	36	1.5	9	0.064	14	-0.055	15	-0.032
108	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	36	1.5	10	0.064	14	-0.032	15	-0.055
109	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	36	1.5	11	0.064	14		15	-0.064
110	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	36	1.5	12	0.064	14	0.032	15	-0.055
111	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	36	1.5	13	0.064	14	0.055	15	-0.032
112	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	37	1.5	2	0.064	14	0.064	15	
113	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	37	1.5	3	0.064	14	0.055	15	0.032
114	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	37	1.5	4	0.064	14	0.032	15	0.055
115	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	37	1.5	5	0.064	14		15	0.064
116	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	37	1.5	6	0.064	14	-0.032	15	0.055
117	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	37	1.5	7	0.064	14	-0.055	15	0.032
118	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	37	1.5	8	0.064	14	-0.064	15	
119	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	37	1.5	9	0.064	14	-0.055	15	-0.032
120	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	37	1.5	10	0.064	14	-0.032	15	-0.055
121	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	37	1.5	11	0.064	14		15	-0.064
122	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	37	1.5	12	0.064	14	0.032	15	-0.055
123	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	37	1.5	13	0.064	14	0.055	15	-0.032
124	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	38	1.5	2	0.064	14	0.064	15	
125	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	38	1.5	3	0.064	14	0.055	15	0.032
126	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	38	1.5	4	0.064	14	0.032	15	0.055
127	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	38	1.5	5	0.064	14		15	0.064
128	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	38	1.5	6	0.064	14	-0.032	15	0.055
129	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	38	1.5	7	0.064	14	-0.055	15	0.032
130	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	38	1.5	8	0.064	14	-0.064	15	
131	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	38	1.5	9	0.064	14	-0.055	15	-0.032
132	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	38	1.5	10	0.064	14	-0.032	15	-0.055
133	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	38	1.5	11	0.064	14		15	-0.064
134	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	38	1.5	12	0.064	14	0.032	15	-0.055
135	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	38	1.5	13	0.064	14	0.055	15	-0.032
136	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	39	1.5	2	0.064	14	0.064	15	
137	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	39	1.5	3	0.064	14	0.055	15	0.032
138	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	39	1.5	4	0.064	14	0.032	15	0.055
139	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	39	1.5	5	0.064	14		15	0.064

**Load Combinations (Continued)**

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
140	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	39	1.5	6	0.064	14	-0.032	15	0.055
141	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	39	1.5	7	0.064	14	-0.055	15	0.032
142	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	39	1.5	8	0.064	14	-0.064	15	
143	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	39	1.5	9	0.064	14	-0.055	15	-0.032
144	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	39	1.5	10	0.064	14	-0.032	15	-0.055
145	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	39	1.5	11	0.064	14		15	-0.064
146	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	39	1.5	12	0.064	14	0.032	15	-0.055
147	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	39	1.5	13	0.064	14	0.055	15	-0.032
148	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	40	1.5	2	0.064	14	0.064	15	
149	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	40	1.5	3	0.064	14	0.055	15	0.032
150	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	40	1.5	4	0.064	14	0.032	15	0.055
151	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	40	1.5	5	0.064	14		15	0.064
152	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	40	1.5	6	0.064	14	-0.032	15	0.055
153	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	40	1.5	7	0.064	14	-0.055	15	0.032
154	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	40	1.5	8	0.064	14	-0.064	15	
155	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	40	1.5	9	0.064	14	-0.055	15	-0.032
156	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	40	1.5	10	0.064	14	-0.032	15	-0.055
157	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	40	1.5	11	0.064	14		15	-0.064
158	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	40	1.5	12	0.064	14	0.032	15	-0.055
159	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	40	1.5	13	0.064	14	0.055	15	-0.032
160	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	41	1.5	2	0.064	14	0.064	15	
161	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	41	1.5	3	0.064	14	0.055	15	0.032
162	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	41	1.5	4	0.064	14	0.032	15	0.055
163	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	41	1.5	5	0.064	14		15	0.064
164	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	41	1.5	6	0.064	14	-0.032	15	0.055
165	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	41	1.5	7	0.064	14	-0.055	15	0.032
166	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	41	1.5	8	0.064	14	-0.064	15	
167	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	41	1.5	9	0.064	14	-0.055	15	-0.032
168	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	41	1.5	10	0.064	14	-0.032	15	-0.055
169	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	41	1.5	11	0.064	14		15	-0.064
170	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	41	1.5	12	0.064	14	0.032	15	-0.055
171	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	41	1.5	13	0.064	14	0.055	15	-0.032
172	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	42	1.5	2	0.064	14	0.064	15	
173	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	42	1.5	3	0.064	14	0.055	15	0.032
174	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	42	1.5	4	0.064	14	0.032	15	0.055
175	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	42	1.5	5	0.064	14		15	0.064
176	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	42	1.5	6	0.064	14	-0.032	15	0.055
177	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	42	1.5	7	0.064	14	-0.055	15	0.032
178	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	42	1.5	8	0.064	14	-0.064	15	
179	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	42	1.5	9	0.064	14	-0.055	15	-0.032
180	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	42	1.5	10	0.064	14	-0.032	15	-0.055
181	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	42	1.5	11	0.064	14		15	-0.064
182	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	42	1.5	12	0.064	14	0.032	15	-0.055
183	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	42	1.5	13	0.064	14	0.055	15	-0.032
184	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	43	1.5	2	0.064	14	0.064	15	
185	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	43	1.5	3	0.064	14	0.055	15	0.032
186	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	43	1.5	4	0.064	14	0.032	15	0.055
187	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	43	1.5	5	0.064	14		15	0.064
188	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	43	1.5	6	0.064	14	-0.032	15	0.055
189	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	43	1.5	7	0.064	14	-0.055	15	0.032
190	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	43	1.5	8	0.064	14	-0.064	15	
191	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	43	1.5	9	0.064	14	-0.055	15	-0.032
192	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	43	1.5	10	0.064	14	-0.032	15	-0.055
193	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	43	1.5	11	0.064	14		15	-0.064
194	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	43	1.5	12	0.064	14	0.032	15	-0.055

**Load Combinations (Continued)**

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
195	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	43	1.5	13	0.064	14	0.055	15	-0.032
196	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	44	1.5	2	0.064	14	0.064	15	
197	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	44	1.5	3	0.064	14	0.055	15	0.032
198	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	44	1.5	4	0.064	14	0.032	15	0.055
199	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	44	1.5	5	0.064	14		15	0.064
200	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	44	1.5	6	0.064	14	-0.032	15	0.055
201	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	44	1.5	7	0.064	14	-0.055	15	0.032
202	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	44	1.5	8	0.064	14	-0.064	15	
203	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	44	1.5	9	0.064	14	-0.055	15	-0.032
204	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	44	1.5	10	0.064	14	-0.032	15	-0.055
205	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	44	1.5	11	0.064	14		15	-0.064
206	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	44	1.5	12	0.064	14	0.032	15	-0.055
207	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	44	1.5	13	0.064	14	0.055	15	-0.032
208	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	45	1.5	2	0.064	14	0.064	15	
209	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	45	1.5	3	0.064	14	0.055	15	0.032
210	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	45	1.5	4	0.064	14	0.032	15	0.055
211	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	45	1.5	5	0.064	14		15	0.064
212	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	45	1.5	6	0.064	14	-0.032	15	0.055
213	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	45	1.5	7	0.064	14	-0.055	15	0.032
214	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	45	1.5	8	0.064	14	-0.064	15	
215	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	45	1.5	9	0.064	14	-0.055	15	-0.032
216	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	45	1.5	10	0.064	14	-0.032	15	-0.055
217	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	45	1.5	11	0.064	14		15	-0.064
218	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	45	1.5	12	0.064	14	0.032	15	-0.055

**Material Take-Off**

	Material	Size	Pieces	Length[in]	Weight[K]
1	General Members				
2	RIGID		33	287.5	0
3	Total General		33	287.5	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	0.625SR	7	84	0.007
7	A36 Gr.36	C5X9	8	618.2	0.463
8	A36 Gr.36	L1.5X1.5X4	1	25	0.005
9	A36 Gr.36	L2.5X2.5X3	3	49.6	0.013
10	A36 Gr.36	L2X2X4	2	208	0.056
11	A53 Gr.B	PIPE 2.0	15	1530	0.443
12	Total HR Steel		36	2514.8	0.986

**Envelope Node Reactions**

Node Label	X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC		
1	N58	max	5416.919	17	6431.294	32	5602.896	2	8800.866	2	3613.402	24	8177.771	23
2		min	-5416.92	11	2237.493	62	-5602.894	20	-8383.966	20	-3608.673	6	-8622.971	5
3	Totals:	max	5416.919	17	6431.294	32	5602.896	2						
4		min	-5416.92	11	2237.493	62	-5602.894	20						

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

Member	Shape	Code Check	Loc[in]	LC	Shear	Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
1	M36	L2.5X2.5X3	0.826	16.547	6	0.107	0	y	6	27229.407	29192.4	872.574	1971.83	1.5	H2-1
2	M37	L2.5X2.5X3	0.774	16.547	10	0.111	0	y	9	27229.407	29192.4	872.574	1971.83	1.5	H2-1
3	M28	L2.5X2.5X3	0.703	16.547	2	0.095	16.547	y	7	27229.407	29192.4	872.574	1971.83	1.5	H2-1

**Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks (Continued)**

Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn	
4	M7	C5X9	0.602	0	12	0.244	5.985	z	5	74436.578	85536	1909.122	11853	1.694	H1-1b
5	MP7	PIPE 2.0	0.491	73	7	0.09	73		3	14916.096	32130	1871.625	1871.625	1	H1-1b
6	HR2	PIPE 2.0	0.488	40.625	3	0.387	40.625		10	6295.422	32130	1871.625	1871.625	1	H3-6
7	HR3	PIPE 2.0	0.473	40.625	11	0.391	40.625		6	6295.422	32130	1871.625	1871.625	1	H3-6
8	MP5	PIPE 2.0	0.471	67	4	0.083	67		4	14916.096	32130	1871.625	1871.625	1	H1-1b
9	MP3	PIPE 2.0	0.469	73	10	0.092	73		9	14916.096	32130	1871.625	1871.625	1	H1-1b
10	MP2	PIPE 2.0	0.464	60.375	5	0.1	60.375		3	17855.085	32130	1871.625	1871.625	1	H1-1b
11	MP6	PIPE 2.0	0.459	60.375	2	0.08	60.375		12	17855.085	32130	1871.625	1871.625	1	H1-1b
12	HR1	PIPE 2.0	0.452	40.625	7	0.34	40.625		2	6295.422	32130	1871.625	1871.625	1	H3-6
13	BR2	C5X9	0.444	42.154	6	0.114	42.154	y	6	38865.728	85536	1909.122	11853	1.702	H1-1b
14	MP10	PIPE 2.0	0.444	60.375	9	0.078	60.375		8	17855.085	32130	1871.625	1871.625	1	H1-1b
15	MP1	PIPE 2.0	0.431	67	7	0.095	67		8	14916.096	32130	1871.625	1871.625	1	H1-1b
16	BR1	C5X9	0.43	17.358	10	0.121	17.358	y	10	38865.728	85536	1909.122	11853	1.714	H1-1b
17	HOR2	C5X9	0.413	68	6	0.255	58.667	y	5	84014.745	85536	1909.122	11853	1.151	H1-1b
18	MP9	PIPE 2.0	0.401	67	12	0.102	67		12	14916.096	32130	1871.625	1871.625	1	H1-1b
19	MP8	PIPE 2.0	0.399	60.375	6	0.091	60.375		5	17855.085	32130	1871.625	1871.625	1	H1-1b
20	MP4	PIPE 2.0	0.376	60.375	10	0.069	60.375		9	17855.085	32130	1871.625	1871.625	1	H1-1b
21	MP11	PIPE 2.0	0.363	73	2	0.084	73		13	14916.096	32130	1871.625	1871.625	1	H1-1b
22	HOR1	C5X9	0.36	68	10	0.271	69.333	y	9	85153.123	85536	1909.122	11853	1.079	H1-1b
23	M13	L2X2X4	0.357	35.75	2	0.047	35.75	y	2	30368.666	30585.6	690.934	1576.849	1.111	H2-1
24	M12	L2X2X4	0.347	35.75	11	0.03	39	z	13	30368.666	30585.6	690.934	1576.849	1.007	H2-1
25	HOR3	C5X9	0.336	68	9	0.256	58.667	y	12	84014.745	85536	1909.122	11853	1.24	H1-1b
26	MP12	PIPE 2.0	0.283	60.375	2	0.076	60.375		13	17855.085	32130	1871.625	1871.625	1	H1-1b
27	M31	0.625SR	0.275	12	2	0.04	0		8	7286.847	9940.19	103.542	103.542	1	H1-1b
28	BR3	C5X9	0.275	17.358	2	0.062	17.358	y	3	38865.728	85536	1909.122	11853	2.24	H1-1b
29	M32	0.625SR	0.255	12	2	0.045	0		8	7286.847	9940.19	103.542	103.542	1	H1-1b
30	M30	0.625SR	0.236	12	2	0.024	0		8	7286.847	9940.19	103.542	103.542	1	H1-1b
31	M16	0.625SR	0.195	12	2	0.011	0		8	7286.847	9940.19	103.542	103.542	1	H1-1b
32	BR4	C5X9	0.183	0	13	0.045	27.472	y	13	69371.456	85536	1909.122	11853	1.479	H1-1b
33	M33	0.625SR	0.12	0	2	0.017	0		8	7286.847	9940.19	103.542	103.542	1	H1-1b
34	M35	0.625SR	0.07	12	8	0.021	0		2	7286.847	9940.19	103.542	103.542	1	H1-1b
35	M34	0.625SR	0.058	12	8	0.019	0		3	7286.847	9940.19	103.542	103.542	1	H1-1b
36	M18	L1.5X1.5X4	0.053	12.49	18	0.008	24.981	y	4	15152.936	22275	360.337	834.026	1.136	H2-1

**Envelope AISI S100-16: LRFD Member Cold Formed Steel Code Checks**

No Data to Print...														
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**APPENDIX D**  
**ADDITIONAL CALCUATIONS**

## Bolt Calculation Tool, V1.5.1

PROJECT DATA	
Site Name:	SMITH HILLS / STERLING GRP. (S
Site Number:	876372
Connection Description:	Platform to Pole

MAXIMUM BOLT LOADS		
Bolt Tension:	1166.10	lbs
Bolt Shear:	735.96	lbs

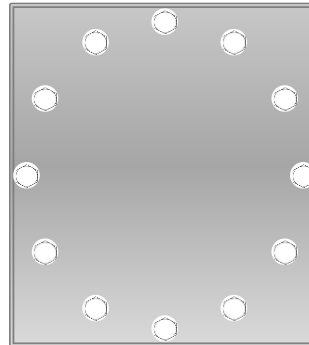
WORST CASE BOLT LOADS <sup>1</sup>		
Bolt Tension:	0.00	lbs
Bolt Shear:	735.96	lbs

BOLT PROPERTIES		
Bolt Type:	Bolt	-
Bolt Diameter:	0.75	in
Bolt Grade:	A325	-
# of Bolts:	12	-
Threads Excluded?	No	-

<sup>1</sup> Worst case bolt loads correspond to Load combination #24 on member M29 in RISA-3D, which causes the maximum demand on the bolts.

Member Information
I nodes of M29

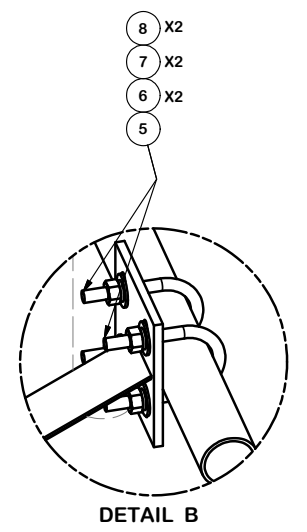
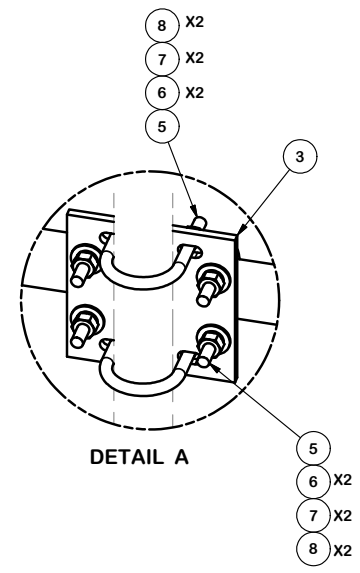
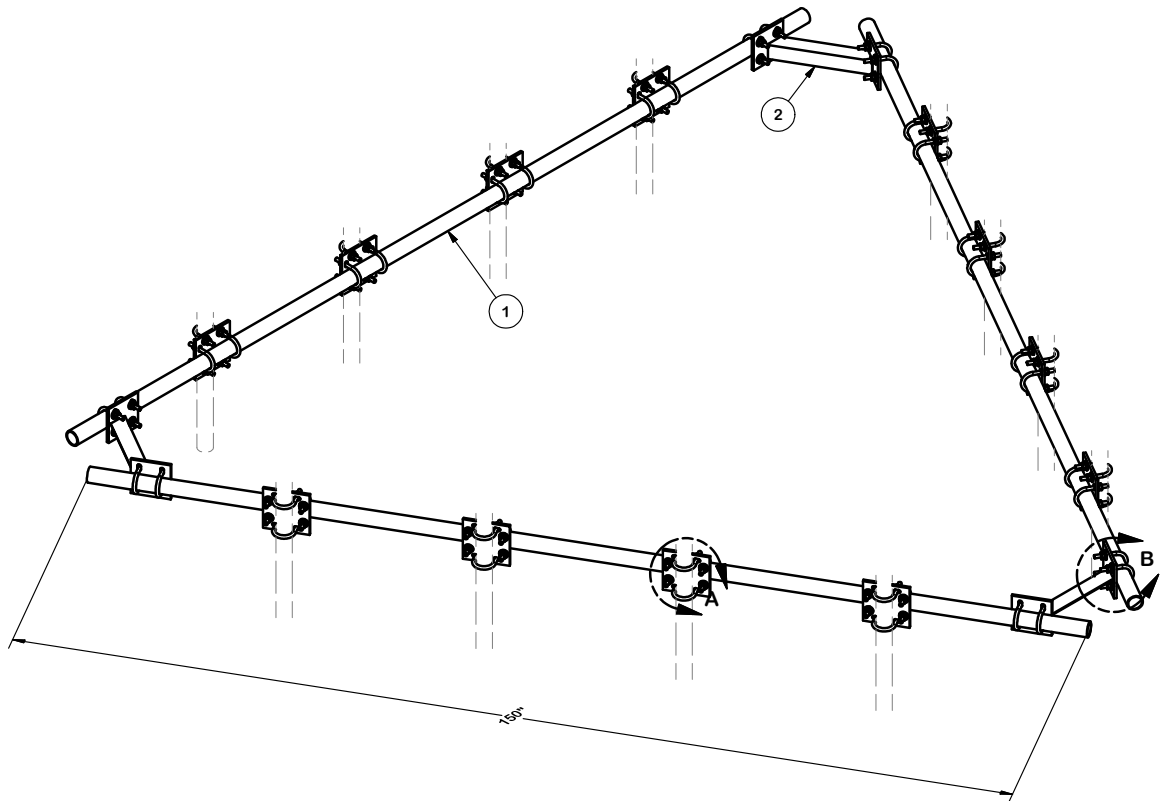
BOLT CHECK	
Tensile Strength	30101.39
Shear Strength	17892.35
Max Tensile Usage	3.9%
Max Shear Usage	4.1%
Interaction Check (Worst Case)	0.00 <b>≤1.05</b>
Result	Pass



**APPENDIX E**

**MOUNT MODIFICATION DESIGN DRAWINGS (MDD) / SUPPLEMENTAL DRAWINGS**

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	P2150	2-3/8" OD X 150" SCH 40 GALVANIZED PIPE	150 in	45.77	137.31
2	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
3	12	SCX2	CROSSOVER PLATE	7 in	4.80	57.56
4	24	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.73	17.56
5	60	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.73	43.90
6	120	G12FW	1/2" HDG USS FLATWASHER		0.03	4.09
7	120	G12LW	1/2" HDG LOCKWASHER		0.01	1.67
8	120	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	8.60
					TOTAL WT. #	302.21



**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  
**UNIVERSAL HANDRAIL KIT  
 FOR 12' PLATFORM  
 2-3/8" & 2-7/8" ANTENNA PIPES**

**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 <b>CEK</b>	ENG. APPROVAL
CLASS <b>81</b>	SUB <b>01</b>	CHECKED BY <b>BMC</b>
DRAWING USAGE <b>CUSTOMER</b>		DATE <b>3/10/2015</b>

PART NO. <b>HRK12-U</b>	PAGE <b>1 OF 1</b>
DWG. NO. <b>HRK12-U</b>	



Date: **May 26, 2022**



Tower Engineering Professionals  
326 Tryon Road  
Raleigh, NC 27603  
(919) 661-6351

**Subject: Structural Analysis Report**

**Carrier Designation:**

**Site Number:** CTHA653A  
**Site Name:** N/A

**Crown Castle Designation:**

**BU Number:** 876372  
**Site Name:** Smith Hills / Sterling GRP. (S)  
**JDE Job Number:** 717189  
**Work Order Number:** 2115646  
**Order Number:** 617436 Rev. 0

**Engineering Firm Designation:**

**TEP Project Number:** 218032.704651

**Site Data:**

**71 Ashford Rd., Eastford, Windham County, CT 06272**  
**Latitude 41° 54' 16.22", Longitude -72° 7' 25.92"**  
**177 Foot - Monopole Tower**

*Tower Engineering Professionals* is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above-mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Proposed Equipment Configuration

**Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 119 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Gautam Sopal, E.I. / DEN

Respectfully submitted by:

Aaron T. Rucker, P.E.



Electronic Copy

05/26/2022

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### 2) ANALYSIS CRITERIA

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Table 2 - Other Considered Equipment

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3.2) Assumptions

### 4) ANALYSIS RESULTS

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Table 6 - Dish Twist/Sway Results for 60 mph Service Wind Speed  
4.1) Recommendations

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tnxTower Output

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Base Level Drawing

### 7) APPENDIX C

Additional Calculations

## 1) INTRODUCTION

This tower is a 177-ft monopole tower designed by Engineered Endeavors, Inc.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	119 mph
<b>Exposure Category:</b>	C
<b>Topographic Factor:</b>	1.0
<b>Ice Thickness:</b>	1.5 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Service Wind Speed:</b>	60 mph

**Table 1 - Proposed Equipment Configuration**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
177.0	180.0	3	RFS Celwave	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	3 2 2	1-5/8 21/64 7/32
		3	Ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe		
		3	Ericsson	RADIO 4460 B2/B25 B66_TMO		
		3	Ericsson	Radio 4480_TMOV2		
	177.0	1	Commscope	VHLP2-11W/A		
		1	Ceragon	FIBEAIR IP-20A_RFU-D		
		1	Tower Mounts	Platform Mount [LP 604-1]		
		1	Site Pro 1	HRK12		

**Table 2 - Other Considered Equipment**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
50.0	50.0	1	Lucent	KS24019-L112A	1	1/2
		1	Tower Mounts	Side Arm Mount [SO 701-1]		

## 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Reference	Source
Geotechnical Report	1531936	CCISites
Tower Foundation Drawings	1615434	CCISites
Tower Manufacturer Drawings	1615375	CCISites

### 3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

### 3.2) Assumptions

- 1) The tower and structures were maintained in accordance with the TIA-222 Standard.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2, and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Tower Engineering Professionals should be notified to determine the effect on the structural integrity of the tower.

## 4) ANALYSIS RESULTS

**Table 4 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (k)	$\Phi P_{allow}$ (k)	% Capacity	Pass / Fail
L1	177 - 133.71	Pole	TP24.46x14x0.25	1	-5.94	1137.85	39.9	Pass
L2	133.71 - 88.04	Pole	TP34.86x23.095x0.3125	2	-11.82	2033.23	40.7	Pass
L3	88.04 - 43.42	Pole	TP44.89x33.0597x0.375	3	-21.17	3147.00	37.9	Pass
L4	43.42 - 0	Pole	TP54.5x42.669x0.375	4	-34.93	3957.13	43.4	Pass
							<b>Summary</b>	
						Pole (L4)	43.4	Pass
						<b>RATING =</b>	<b>43.4</b>	<b>Pass</b>

**Table 5 - Tower Component Stresses vs. Capacity - LC5**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	37.9	Pass
1,2	Base Plate	-	56.7	Pass
1,2	Base Foundation Structural	-	41.1	Pass
1,2	Base Foundation Soil Interaction	-	22.9	Pass

<b>Structure Rating (max from all components) =</b>	<b>56.7%</b>
---	--------------

Notes:

- 1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
- 2) Rating per TIA-222-H Section 15.5

**Table 6 - Dish Twist/Sway Results for 60 mph Service Wind Speed**

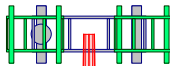
Elevation (ft)	Dish Model	Beam Deflection		
		Deflection (in)	Tilt (deg)	Twist (deg)
177.0	Commscope VHLP2-11W/A	25.311	1.5800	0.0101

#### **4.1) Recommendations**

- 1) The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

**APPENDIX A**  
**TNXTOWER OUTPUT**

177.0 ft



**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

**TOWER DESIGN NOTES**

1. Tower is located in Windham County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 119 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 43.4%

133.7 ft

88.0 ft

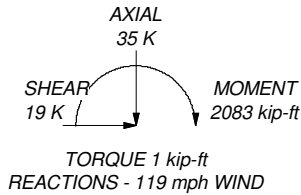
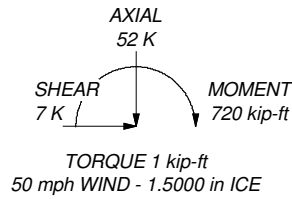
43.4 ft

0.0 ft

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	43.29	18	0.2500	3.58	14.0000	24.4800	A572-65	2.2
2	49.25	18	0.3125	4.92	23.0950	34.8600	A572-65	4.8
3	49.54	18	0.3750	6.16	33.0597	44.8900	A572-65	7.7
4	49.58	18	0.3750	42.6690	54.5000		A572-65	9.7



ALL REACTIONS ARE FACTORED



**Tower Engineering Professionals**

326 Tryon Road  
Raleigh, NC 27603  
Phone: (919) 661-6351  
FAX: (919) 661-6350

Tower Engineering Professionals

Job: <b>Smith Hills / Sterling GRP. (S (BU 876372))</b>		
Project: <b>TEP No. 218032.704651</b>		
Client: <b>Crown Castle</b>	Drawn by: <b>SPT</b>	App'd:
Code: <b>TIA-222-H</b>	Date: <b>05/26/22</b>	Scale: <b>NTS</b>
Path:		Dwg No. <b>E-1</b>

<b>tnxTower</b>  <b>Tower Engineering Professionals</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Smith Hills / Sterling GRP. (S (BU 876372))	<b>Page</b> 1 of 14
	<b>Project</b> TEP No. 218032.704651	<b>Date</b> 16:56:09 05/25/22
	<b>Client</b> Crown Castle	<b>Designed by</b> SPT

## Tower Input Data

The tower is a monopole.

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

The following design criteria apply:

Tower is located in Windham County, Connecticut.

Tower base elevation above sea level: 672.00 ft.

Basic wind speed of 119 mph.

Risk Category II.

Exposure Category C.

Simplified Topographic Factor Procedure for wind speed-up calculations is used.

Topographic Category: 1.

Crest Height: 0.00 ft.

Nominal ice thickness of 1.5000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

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

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Tower analysis based on target reliabilities in accordance with Annex S.

Load Modification Factors used:  $K_{es}(F_w) = 0.95$ ,  $K_{es}(t_i) = 0.85$ .

Maximum demand-capacity ratio is: 1.05.

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

## Options

<ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>SR Members Have Cut Ends</li> <li>SR Members Are Concentric</li> </ul>	<ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>Use Clear Spans For KL/r</li> <li>Retension Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>√ Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>Add IBC .6D+W Combination</li> <li>√ Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> <li>Treat Feed Line Bundles As Cylinder</li> <li>Ignore KL/ry For 60 Deg. Angle Legs</li> </ul>	<ul style="list-style-type: none"> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feed Line Torque</li> <li>Include Angle Block Shear Check</li> <li>Use TIA-222-H Bracing Resist. Exemption</li> <li>Use TIA-222-H Tension Splice Exemption</li> </ul> <p style="text-align: center; background-color: #e0e0e0; margin: 5px 0;">Poles</p> <ul style="list-style-type: none"> <li>√ Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> <li>√ Pole Without Linear Attachments</li> <li>Pole With Shroud Or No Appurtenances</li> <li>Outside and Inside Corner Radii Are Known</li> </ul>
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	<b>Client</b> Crown Castle	<b>Designed by</b> SPT

### Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	177.00-133.71	43.29	3.58	18	14.0000	24.4600	0.2500	1.0000	A572-65 (65 ksi)
L2	133.71-88.04	49.25	4.92	18	23.0950	34.8600	0.3125	1.2500	A572-65 (65 ksi)
L3	88.04-43.42	49.54	6.16	18	33.0597	44.8900	0.3750	1.5000	A572-65 (65 ksi)
L4	43.42-0.00	49.58		18	42.6690	54.5000	0.3750	1.5000	A572-65 (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	w in	w/t
L1	14.1774	10.9106	260.6108	4.8812	7.1120	36.6438	521.5646	5.4563	2.0240	8.096
	24.7988	19.2106	1422.5540	8.5945	12.4257	114.4850	2846.9798	9.6071	3.8650	15.46
L2	24.2714	22.5974	1481.8262	8.0878	11.7322	126.3037	2965.6023	11.3008	3.5147	11.247
	35.3496	34.2668	5167.0691	12.2644	17.7089	291.7784	10340.9372	17.1367	5.5854	17.873
L3	34.7049	38.9030	5250.5987	11.6031	16.7943	312.6413	10508.1064	19.4552	5.1585	13.756
	45.5247	52.9840	13264.6188	15.8028	22.8041	581.6764	26546.6915	26.4970	7.2406	19.308
L4	44.7620	50.3404	11376.5634	15.0144	21.6758	524.8500	22768.0964	25.1750	6.8497	18.266
	55.2829	64.4223	23843.4650	19.2144	27.6860	861.2102	47718.3038	32.2173	8.9320	23.819

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 177.00-133.71				1	1	1			
L2 133.71-88.04				1	1	1			
L3 88.04-43.42				1	1	1			
L4 43.42-0.00				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
***											

### Feed Line/Linear Appurtenances - Entered As Area

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Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C <sub>AA</sub> ft <sup>2</sup> /ft	Weight plf
***Misc1***									
Safety Line 3/8	A	No	No	CaAa (Out Of Face)	177.00 - 0.00	1	No Ice	0.04	0.22
							1/2" Ice	0.14	0.75
							1" Ice	0.24	1.28
							2" Ice	0.44	2.34
Step Pegs (5/8" SR) 7-in. w/30" step	A	No	No	CaAa (Out Of Face)	177.00 - 0.00	1	No Ice	0.03	0.49
							1/2" Ice	0.14	1.01
							1" Ice	0.23	2.07
							2" Ice	0.43	6.09
***177***									
HB158-21U6S24-xx M_TMO(1-5/8)	B	No	No	Inside Pole	177.00 - 0.00	3	No Ice	0.00	2.50
							1/2" Ice	0.00	2.50
							1" Ice	0.00	2.50
							2" Ice	0.00	2.50
2CX14AWG_TMO(21/64)	B	No	No	Inside Pole	177.00 - 0.00	2	No Ice	0.00	0.07
							1/2" Ice	0.00	0.07
							1" Ice	0.00	0.07
							2" Ice	0.00	0.07
DUPLEX ARMOR I/O_TMO(7/32)	B	No	No	Inside Pole	177.00 - 0.00	2	No Ice	0.00	0.02
							1/2" Ice	0.00	0.02
							1" Ice	0.00	0.02
							2" Ice	0.00	0.02
***50***									
LDF4-50A(1/2")	B	No	No	Inside Pole	50.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
***									

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	177.00-133.71	A	0.000	0.000	0.000	3.139	0.03
		B	0.000	0.000	0.000	0.000	0.33
		C	0.000	0.000	0.000	0.000	0.00
L2	133.71-88.04	A	0.000	0.000	0.000	3.311	0.03
		B	0.000	0.000	0.000	0.000	0.35
		C	0.000	0.000	0.000	0.000	0.00
L3	88.04-43.42	A	0.000	0.000	0.000	3.235	0.03
		B	0.000	0.000	0.000	0.000	0.34
		C	0.000	0.000	0.000	0.000	0.00
L4	43.42-0.00	A	0.000	0.000	0.000	3.148	0.03
		B	0.000	0.000	0.000	0.000	0.34
		C	0.000	0.000	0.000	0.000	0.00

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

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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	177.00-133.71	A	1.487	0.000	0.000	0.000	28.886	0.25
		B		0.000	0.000	0.000	0.000	0.33
		C		0.000	0.000	0.000	0.000	0.00
L2	133.71-88.04	A	1.438	0.000	0.000	0.000	30.474	0.27
		B		0.000	0.000	0.000	0.000	0.35
		C		0.000	0.000	0.000	0.000	0.00
L3	88.04-43.42	A	1.365	0.000	0.000	0.000	28.896	0.25
		B		0.000	0.000	0.000	0.000	0.34
		C		0.000	0.000	0.000	0.000	0.00
L4	43.42-0.00	A	1.223	0.000	0.000	0.000	26.850	0.23
		B		0.000	0.000	0.000	0.000	0.34
		C		0.000	0.000	0.000	0.000	0.00

### Feed Line Center of Pressure

Section	Elevation ft	CP <sub>X</sub> in	CP <sub>Z</sub> in	CP <sub>X</sub> Ice in	CP <sub>Z</sub> Ice in
L1	177.00-133.71	0.0000	-0.6362	0.0000	-2.3533
L2	133.71-88.04	0.0000	-0.6509	0.0000	-2.6779
L3	88.04-43.42	0.0000	-0.6583	0.0000	-2.8001
L4	43.42-0.00	0.0000	-0.6625	0.0000	-2.8093

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
***177***									
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	A	From Centroid-Le g	4.00	0.0000	177.00	No Ice	14.69	6.87	0.18
			0.00			1/2" Ice	15.46	7.55	0.31
			3.00			1" Ice	16.23	8.25	0.45
						2" Ice	17.82	9.67	0.78
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	B	From Centroid-Le g	4.00	0.0000	177.00	No Ice	14.69	6.87	0.18
			0.00			1/2" Ice	15.46	7.55	0.31
			3.00			1" Ice	16.23	8.25	0.45
						2" Ice	17.82	9.67	0.78
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	C	From Centroid-Le g	4.00	0.0000	177.00	No Ice	14.69	6.87	0.18
			0.00			1/2" Ice	15.46	7.55	0.31
			3.00			1" Ice	16.23	8.25	0.45
						2" Ice	17.82	9.67	0.78
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Centroid-Le g	4.00	0.0000	177.00	No Ice	5.19	2.71	0.13
			0.00			1/2" Ice	5.59	3.04	0.17
			3.00			1" Ice	6.02	3.38	0.23
						2" Ice	6.90	4.12	0.35

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub>		Weight
			Horz	Vert			Front	Side	
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Centroid-Le g	4.00	0.0000	177.00	No Ice	5.19	2.71	0.13
			0.00	1/2" Ice		5.59	3.04	0.17	
			3.00	1" Ice		6.02	3.38	0.23	
				2" Ice		6.90	4.12	0.35	
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Centroid-Le g	4.00	0.0000	177.00	No Ice	5.19	2.71	0.13
			0.00	1/2" Ice		5.59	3.04	0.17	
			3.00	1" Ice		6.02	3.38	0.23	
				2" Ice		6.90	4.12	0.35	
(2) RADIO 4460 B2/B25 B66_TMO	A	From Centroid-Le g	4.00	0.0000	177.00	No Ice	2.14	1.69	0.11
			0.00	1/2" Ice		2.32	1.85	0.13	
			3.00	1" Ice		2.51	2.02	0.16	
				2" Ice		2.91	2.39	0.22	
RADIO 4460 B2/B25 B66_TMO	B	From Centroid-Le g	4.00	0.0000	177.00	No Ice	2.14	1.69	0.11
			0.00	1/2" Ice		2.32	1.85	0.13	
			3.00	1" Ice		2.51	2.02	0.16	
				2" Ice		2.91	2.39	0.22	
Radio 4480_TMOV2	B	From Centroid-Le g	4.00	0.0000	177.00	No Ice	2.88	1.40	0.08
			0.00	1/2" Ice		3.09	1.56	0.10	
			3.00	1" Ice		3.31	1.73	0.13	
				2" Ice		3.78	2.09	0.19	
(2) Radio 4480_TMOV2	C	From Centroid-Le g	4.00	0.0000	177.00	No Ice	2.88	1.40	0.08
			0.00	1/2" Ice		3.09	1.56	0.10	
			3.00	1" Ice		3.31	1.73	0.13	
				2" Ice		3.78	2.09	0.19	
FIBEAIR IP-20A_RFU-D	A	From Centroid-Le g	4.00	0.0000	177.00	No Ice	0.69	0.29	0.01
			0.00	1/2" Ice		0.80	0.37	0.02	
			0.00	1" Ice		0.91	0.45	0.03	
				2" Ice		1.16	0.64	0.05	
8' Ladder	C	From Centroid-Le g	3.00	0.0000	177.00	No Ice	1.53	5.33	0.10
			0.00	1/2" Ice		4.36	8.08	0.11	
			-2.00	1" Ice		7.19	10.83	0.13	
				2" Ice		12.86	16.33	0.16	
(2) 2.4" x 8' Pipe	A	From Centroid-Le g	4.00	0.0000	177.00	No Ice	1.90	1.90	0.03
			0.00	1/2" Ice		2.73	2.73	0.05	
			0.00	1" Ice		3.42	3.42	0.07	
				2" Ice		4.46	4.46	0.13	
(2) 2.4" x 8' Pipe	B	From Centroid-Le g	4.00	0.0000	177.00	No Ice	1.90	1.90	0.03
			0.00	1/2" Ice		2.73	2.73	0.05	
			0.00	1" Ice		3.42	3.42	0.07	
				2" Ice		4.46	4.46	0.13	
(2) 2.4" x 8' Pipe	C	From Centroid-Le g	4.00	0.0000	177.00	No Ice	1.90	1.90	0.03
			0.00	1/2" Ice		2.73	2.73	0.05	
			0.00	1" Ice		3.42	3.42	0.07	
				2" Ice		4.46	4.46	0.13	
Platform Mount [LP 604-1]	C	None		0.0000	177.00	No Ice	23.03	23.03	0.93
				1/2" Ice		26.44	26.44	1.32	
				1" Ice		29.80	29.80	1.77	
				2" Ice		36.34	36.34	2.80	
Site Pro 1 F3P-HRK12	C	None		0.0000	177.00	No Ice	5.38	4.64	0.41
				1/2" Ice		7.22	6.35	0.50	
				1" Ice		8.88	8.13	0.59	
				2" Ice		12.20	11.69	0.77	
***50*** KS24019-L112A	C	From Face	3.00	0.0000	50.00	No Ice	0.08	0.08	0.01
			0.00	1/2" Ice		0.13	0.13	0.01	
			0.00	1" Ice		0.19	0.19	0.01	
				2" Ice		0.35	0.35	0.02	

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			ft ft ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
Side Arm Mount [SO 701-1]	C	From Face	2.00 0.00 0.00	0.0000	50.00	No Ice 0.85 1/2" Ice 1.14 1" Ice 1.43 2" Ice 2.01	1.67 2.34 3.01 4.35	0.07 0.08 0.09 0.12
***								

### Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight
				ft ft ft	°	°	ft	ft	ft <sup>2</sup>	K
VHLP2-11W/A	A	Paraboloid w/Shroud (HP)	From Centroid -Leg	4.00 -5.00 0.00	-49.0000		177.00	2.17	No Ice 3.69 1/2" Ice 3.98 1" Ice 4.27 2" Ice 4.84	0.02 0.04 0.06 0.10
*										

### Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice

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Comb. No.	Description
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

### Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	177 - 133.71	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-12.76	0.82	0.72
			Max. Mx	8	-5.95	-268.29	-5.94
			Max. My	14	-5.95	-6.57	-268.21
			Max. Vy	8	7.71	-268.29	-5.94
			Max. Vx	14	7.72	-6.57	-268.21
			Max. Torque	16			-1.23
L2	133.71 - 88.04	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.32	0.84	1.07
			Max. Mx	8	-11.83	-680.03	-13.04
			Max. My	14	-11.83	-14.44	-680.18
			Max. Vy	8	10.97	-680.03	-13.04
			Max. Vx	14	10.98	-14.44	-680.18
			Max. Torque	16			-1.31
L3	88.04 - 43.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.01	0.84	0.97
			Max. Mx	8	-21.17	-1235.52	-20.26
			Max. My	14	-21.17	-22.12	-1236.19
			Max. Vy	8	14.73	-1235.52	-20.26
			Max. Vx	14	14.70	-22.12	-1236.19
			Max. Torque	16			-1.40
L4	43.42 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.88	0.84	1.51
			Max. Mx	8	-34.93	-2066.16	-27.91
			Max. My	14	-34.93	-30.66	-2065.49
			Max. Vy	8	18.63	-2066.16	-27.91
			Max. Vx	14	18.60	-30.66	-2065.49
			Max. Torque	16			-1.40

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
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### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	37	51.88	5.64	3.26
	Max. H <sub>x</sub>	20	34.94	18.57	0.13
	Max. H <sub>z</sub>	3	26.20	0.14	18.56
	Max. M <sub>x</sub>	2	2060.65	0.14	18.56
	Max. M <sub>z</sub>	8	2066.16	-18.61	-0.15
	Max. Torsion	4	1.37	-9.18	16.05
	Min. Vert	17	26.20	9.19	-16.04
	Min. H <sub>x</sub>	8	34.94	-18.61	-0.15
	Min. H <sub>z</sub>	14	34.94	-0.17	-18.59
	Min. M <sub>x</sub>	14	-2065.49	-0.17	-18.59
	Min. M <sub>z</sub>	20	-2060.03	18.57	0.13
	Min. Torsion	16	-1.40	9.19	-16.04

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	29.11	0.00	0.00	-0.06	0.25	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	34.94	-0.14	-18.56	-2060.65	25.37	-0.99
0.9 Dead+1.0 Wind 0 deg - No Ice	26.20	-0.14	-18.56	-2038.72	24.96	-0.98
1.2 Dead+1.0 Wind 30 deg - No Ice	34.94	9.18	-16.05	-1779.77	-1010.68	-1.37
0.9 Dead+1.0 Wind 30 deg - No Ice	26.20	9.18	-16.05	-1760.84	-1000.07	-1.36
1.2 Dead+1.0 Wind 60 deg - No Ice	34.94	16.07	-9.15	-1006.88	-1780.70	-1.09
0.9 Dead+1.0 Wind 60 deg - No Ice	26.20	16.07	-9.15	-996.21	-1761.87	-1.08
1.2 Dead+1.0 Wind 90 deg - No Ice	34.94	18.61	0.15	27.91	-2066.16	-0.57
0.9 Dead+1.0 Wind 90 deg - No Ice	26.20	18.61	0.15	27.56	-2044.29	-0.56
1.2 Dead+1.0 Wind 120 deg - No Ice	34.94	16.16	9.39	1050.28	-1797.70	-0.03
0.9 Dead+1.0 Wind 120 deg - No Ice	26.20	16.16	9.39	1039.09	-1778.65	-0.03
1.2 Dead+1.0 Wind 150 deg - No Ice	34.94	9.41	16.15	1797.86	-1051.63	0.62
0.9 Dead+1.0 Wind 150 deg - No Ice	26.20	9.41	16.15	1778.74	-1040.49	0.61
1.2 Dead+1.0 Wind 180 deg - No Ice	34.94	0.17	18.59	2065.49	-30.66	1.03
0.9 Dead+1.0 Wind 180 deg - No Ice	26.20	0.17	18.59	2043.56	-30.34	1.02

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Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 210 deg - No Ice	34.94	-9.19	16.04	1777.87	1012.09	1.40
0.9 Dead+1.0 Wind 210 deg - No Ice	26.20	-9.19	16.04	1759.02	1001.30	1.39
1.2 Dead+1.0 Wind 240 deg - No Ice	34.94	-16.06	9.17	1010.58	1779.58	1.18
0.9 Dead+1.0 Wind 240 deg - No Ice	26.20	-16.06	9.17	999.91	1760.60	1.17
1.2 Dead+1.0 Wind 270 deg - No Ice	34.94	-18.57	-0.13	-24.22	2060.03	0.50
0.9 Dead+1.0 Wind 270 deg - No Ice	26.20	-18.57	-0.13	-23.87	2038.07	0.49
1.2 Dead+1.0 Wind 300 deg - No Ice	34.94	-16.13	-9.36	-1044.53	1791.38	-0.02
0.9 Dead+1.0 Wind 300 deg - No Ice	26.20	-16.13	-9.36	-1033.37	1772.25	-0.02
1.2 Dead+1.0 Wind 330 deg - No Ice	34.94	-9.37	-16.11	-1791.20	1045.66	-0.61
0.9 Dead+1.0 Wind 330 deg - No Ice	26.20	-9.37	-16.11	-1772.12	1034.43	-0.61
1.2 Dead+1.0 Ice+1.0 Temp	51.88	-0.00	-0.00	-1.51	0.84	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	51.88	-0.03	-6.50	-716.67	5.97	-0.39
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	51.88	3.23	-5.62	-620.08	-353.19	-0.89
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	51.88	5.63	-3.22	-354.32	-618.58	-1.09
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	51.88	6.52	0.03	4.16	-716.33	-1.00
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	51.88	5.65	3.27	359.98	-621.84	-0.68
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	51.88	3.28	5.64	620.44	-361.43	-0.16
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	51.88	0.03	6.50	714.64	-5.53	0.39
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	51.88	-3.24	5.62	616.50	355.16	0.89
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	51.88	-5.63	3.23	352.02	619.97	1.11
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	51.88	-6.51	-0.03	-6.46	716.57	1.00
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	51.88	-5.64	-3.26	-361.81	622.04	0.68
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	51.88	-3.27	-5.63	-622.06	361.71	0.16
Dead+Wind 0 deg - Service	29.11	-0.03	-4.44	-490.48	6.23	-0.25
Dead+Wind 30 deg - Service	29.11	2.20	-3.84	-423.62	-240.34	-0.34
Dead+Wind 60 deg - Service	29.11	3.85	-2.19	-239.69	-423.59	-0.26
Dead+Wind 90 deg - Service	29.11	4.46	0.04	6.58	-491.55	-0.13
Dead+Wind 120 deg - Service	29.11	3.87	2.25	249.91	-427.66	0.00
Dead+Wind 150 deg - Service	29.11	2.25	3.87	427.84	-250.09	0.15
Dead+Wind 180 deg - Service	29.11	0.04	4.45	491.53	-7.09	0.24
Dead+Wind 210 deg - Service	29.11	-2.20	3.84	423.06	241.07	0.33
Dead+Wind 240 deg - Service	29.11	-3.85	2.20	240.46	423.72	0.28
Dead+Wind 270 deg - Service	29.11	-4.45	-0.03	-5.81	490.47	0.13
Dead+Wind 300 deg - Service	29.11	-3.86	-2.24	-248.65	426.54	0.00
Dead+Wind 330 deg - Service	29.11	-2.24	-3.86	-426.36	249.06	-0.15



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## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-29.11	0.00	0.00	29.11	0.00	0.000%
2	-0.14	-34.94	-18.56	0.14	34.94	18.56	0.000%
3	-0.14	-26.20	-18.56	0.14	26.20	18.56	0.000%
4	9.18	-34.94	-16.05	-9.18	34.94	16.05	0.000%
5	9.18	-26.20	-16.05	-9.18	26.20	16.05	0.000%
6	16.07	-34.94	-9.15	-16.07	34.94	9.15	0.000%
7	16.07	-26.20	-9.15	-16.07	26.20	9.15	0.000%
8	18.61	-34.94	0.15	-18.61	34.94	-0.15	0.000%
9	18.61	-26.20	0.15	-18.61	26.20	-0.15	0.000%
10	16.16	-34.94	9.39	-16.16	34.94	-9.39	0.000%
11	16.16	-26.20	9.39	-16.16	26.20	-9.39	0.000%
12	9.41	-34.94	16.15	-9.41	34.94	-16.15	0.000%
13	9.41	-26.20	16.15	-9.41	26.20	-16.15	0.000%
14	0.17	-34.94	18.59	-0.17	34.94	-18.59	0.000%
15	0.17	-26.20	18.59	-0.17	26.20	-18.59	0.000%
16	-9.19	-34.94	16.04	9.19	34.94	-16.04	0.000%
17	-9.19	-26.20	16.04	9.19	26.20	-16.04	0.000%
18	-16.06	-34.94	9.17	16.06	34.94	-9.17	0.000%
19	-16.06	-26.20	9.17	16.06	26.20	-9.17	0.000%
20	-18.57	-34.94	-0.13	18.57	34.94	0.13	0.000%
21	-18.57	-26.20	-0.13	18.57	26.20	0.13	0.000%
22	-16.13	-34.94	-9.36	16.13	34.94	9.36	0.000%
23	-16.13	-26.20	-9.36	16.13	26.20	9.36	0.000%
24	-9.37	-34.94	-16.11	9.37	34.94	16.11	0.000%
25	-9.37	-26.20	-16.11	9.37	26.20	16.11	0.000%
26	0.00	-51.88	0.00	0.00	51.88	0.00	0.000%
27	-0.03	-51.88	-6.50	0.03	51.88	6.50	0.000%
28	3.23	-51.88	-5.62	-3.23	51.88	5.62	0.000%
29	5.63	-51.88	-3.22	-5.63	51.88	3.22	0.000%
30	6.52	-51.88	0.03	-6.52	51.88	-0.03	0.000%
31	5.65	-51.88	3.27	-5.65	51.88	-3.27	0.000%
32	3.28	-51.88	5.64	-3.28	51.88	-5.64	0.000%
33	0.03	-51.88	6.50	-0.03	51.88	-6.50	0.000%
34	-3.24	-51.88	5.62	3.24	51.88	-5.62	0.000%
35	-5.63	-51.88	3.23	5.63	51.88	-3.23	0.000%
36	-6.51	-51.88	-0.03	6.51	51.88	0.03	0.000%
37	-5.64	-51.88	-3.26	5.64	51.88	3.26	0.000%
38	-3.27	-51.88	-5.63	3.27	51.88	5.63	0.000%
39	-0.03	-29.11	-4.44	0.03	29.11	4.44	0.000%
40	2.20	-29.11	-3.84	-2.20	29.11	3.84	0.000%
41	3.85	-29.11	-2.19	-3.85	29.11	2.19	0.000%
42	4.46	-29.11	0.04	-4.46	29.11	-0.04	0.000%
43	3.87	-29.11	2.25	-3.87	29.11	-2.25	0.000%
44	2.25	-29.11	3.87	-2.25	29.11	-3.87	0.000%
45	0.04	-29.11	4.45	-0.04	29.11	-4.45	0.000%
46	-2.20	-29.11	3.84	2.20	29.11	-3.84	0.000%
47	-3.85	-29.11	2.20	3.85	29.11	-2.20	0.000%
48	-4.45	-29.11	-0.03	4.45	29.11	0.03	0.000%
49	-3.86	-29.11	-2.24	3.86	29.11	2.24	0.000%
50	-2.24	-29.11	-3.86	2.24	29.11	3.86	0.000%

## Non-Linear Convergence Results

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Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00007875
3	Yes	4	0.00000001	0.00095380
4	Yes	5	0.00000001	0.00067391
5	Yes	5	0.00000001	0.00030558
6	Yes	5	0.00000001	0.00072998
7	Yes	5	0.00000001	0.00033384
8	Yes	4	0.00000001	0.00066508
9	Yes	4	0.00000001	0.00026588
10	Yes	5	0.00000001	0.00075626
11	Yes	5	0.00000001	0.00034175
12	Yes	5	0.00000001	0.00073310
13	Yes	5	0.00000001	0.00033001
14	Yes	4	0.00000001	0.00070694
15	Yes	4	0.00000001	0.00031730
16	Yes	5	0.00000001	0.00074512
17	Yes	5	0.00000001	0.00034116
18	Yes	5	0.00000001	0.00068065
19	Yes	5	0.00000001	0.00030893
20	Yes	4	0.00000001	0.00093914
21	Yes	4	0.00000001	0.00050493
22	Yes	5	0.00000001	0.00073719
23	Yes	5	0.00000001	0.00033290
24	Yes	5	0.00000001	0.00076532
25	Yes	5	0.00000001	0.00034688
26	Yes	4	0.00000001	0.00001662
27	Yes	5	0.00000001	0.00035155
28	Yes	5	0.00000001	0.00045390
29	Yes	5	0.00000001	0.00047116
30	Yes	5	0.00000001	0.00034832
31	Yes	5	0.00000001	0.00046626
32	Yes	5	0.00000001	0.00046574
33	Yes	5	0.00000001	0.00034799
34	Yes	5	0.00000001	0.00047205
35	Yes	5	0.00000001	0.00045354
36	Yes	5	0.00000001	0.00035110
37	Yes	5	0.00000001	0.00047655
38	Yes	5	0.00000001	0.00047766
39	Yes	4	0.00000001	0.00007518
40	Yes	4	0.00000001	0.00018408
41	Yes	4	0.00000001	0.00023651
42	Yes	4	0.00000001	0.00003514
43	Yes	4	0.00000001	0.00023258
44	Yes	4	0.00000001	0.00021009
45	Yes	4	0.00000001	0.00006005
46	Yes	4	0.00000001	0.00025204
47	Yes	4	0.00000001	0.00018812
48	Yes	4	0.00000001	0.00004116
49	Yes	4	0.00000001	0.00021976
50	Yes	4	0.00000001	0.00024864

**Maximum Tower Deflections - Service Wind**

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	177 - 133.71	25.311	44	1.5800	0.0099

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L2	137.29 - 88.04	13.901	44	1.1025	0.0027
L3	92.96 - 43.42	5.875	44	0.6260	0.0009
L4	49.58 - 0	1.624	44	0.3048	0.0003

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
177.00	VHLP2-11W/A	44	25.311	1.5800	0.0101	28052
50.00	KS24019-L112A	44	1.650	0.3075	0.0003	6997

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	177 - 133.71	106.514	12	6.6534	0.0422
L2	137.29 - 88.04	58.509	12	4.6488	0.0116
L3	92.96 - 43.42	24.721	12	2.6368	0.0040
L4	49.58 - 0	6.831	12	1.2824	0.0014

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
177.00	VHLP2-11W/A	12	106.514	6.6534	0.0422	6822
50.00	KS24019-L112A	12	6.940	1.2937	0.0014	1663

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KI/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L1	177 - 133.71 (1)	TP24.46x14x0.25	43.29	0.00	0.0	18.5242	-5.94	1083.67	0.005
L2	133.71 - 88.04 (2)	TP34.86x23.095x0.3125	49.25	0.00	0.0	33.1010	-11.82	1936.41	0.006
L3	88.04 - 43.42	TP44.89x33.0597x0.375	49.54	0.00	0.0	51.2331	-21.17	2997.14	0.007

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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L4	(3) 43.42 - 0 (4)	TP54.5x42.669x0.375	49.58	0.00	0.0	64.4223	-34.93	3768.70	0.009

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>nx</sub> kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M <sub>uy</sub> kip-ft	φM <sub>ny</sub> kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	177 - 133.71 (1)	TP24.46x14x0.25	271.87	658.81	0.413	0.00	658.81	0.000
L2	133.71 - 88.04 (2)	TP34.86x23.095x0.3125	688.20	1635.56	0.421	0.00	1635.56	0.000
L3	88.04 - 43.42 (3)	TP44.89x33.0597x0.375	1248.42	3199.78	0.390	0.00	3199.78	0.000
L4	43.42 - 0 (4)	TP54.5x42.669x0.375	2082.84	4673.19	0.446	0.00	4673.19	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V <sub>u</sub> K	φV <sub>n</sub> K	Ratio $\frac{V_u}{\phi V_n}$	Actual T <sub>u</sub> kip-ft	φT <sub>n</sub> kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	177 - 133.71 (1)	TP24.46x14x0.25	7.82	325.10	0.024	0.81	664.65	0.001
L2	133.71 - 88.04 (2)	TP34.86x23.095x0.3125	11.07	580.92	0.019	0.72	1697.79	0.000
L3	88.04 - 43.42 (3)	TP44.89x33.0597x0.375	14.81	899.14	0.016	0.74	3389.38	0.000
L4	43.42 - 0 (4)	TP54.5x42.669x0.375	18.70	1130.61	0.017	0.62	5359.09	0.000

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	177 - 133.71 (1)	0.005	0.413	0.000	0.024	0.001	0.419	1.050	4.8.2
L2	133.71 - 88.04 (2)	0.006	0.421	0.000	0.019	0.000	0.427	1.050	4.8.2
L3	88.04 - 43.42 (3)	0.007	0.390	0.000	0.016	0.000	0.397	1.050	4.8.2
L4	43.42 - 0 (4)	0.009	0.446	0.000	0.017	0.000	0.455	1.050	4.8.2

<b>tnxTower</b>  <b>Tower Engineering Professionals</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Smith Hills / Sterling GRP. (S (BU 876372)	<b>Page</b> 14 of 14
	<b>Project</b> TEP No. 218032.704651	<b>Date</b> 16:56:09 05/25/22
	<b>Client</b> Crown Castle	<b>Designed by</b> SPT

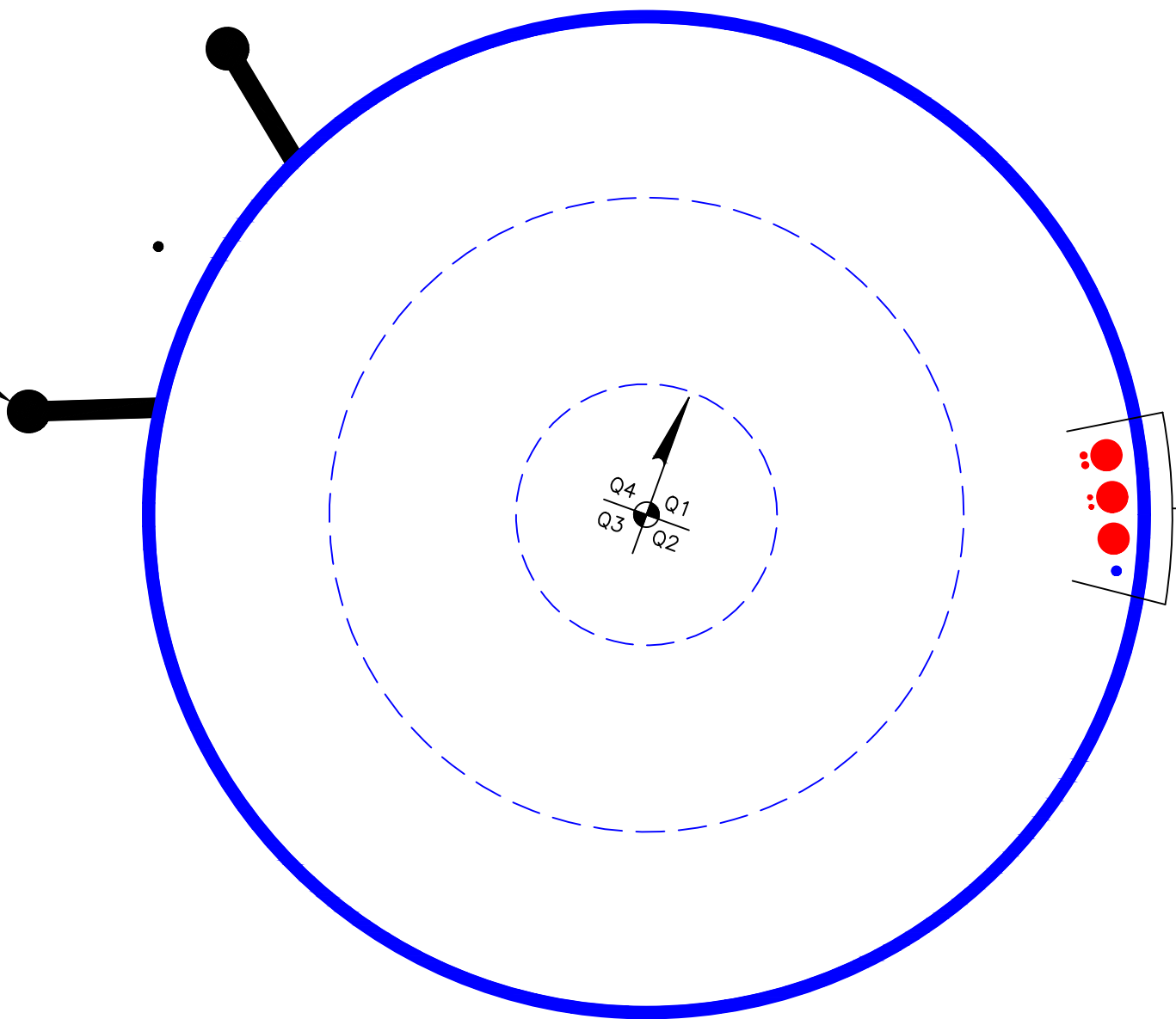
**Section Capacity Table**

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail	
L1	177 - 133.71	Pole	TP24.46x14x0.25	1	-5.94	1137.85	39.9	Pass	
L2	133.71 - 88.04	Pole	TP34.86x23.095x0.3125	2	-11.82	2033.23	40.7	Pass	
L3	88.04 - 43.42	Pole	TP44.89x33.0597x0.375	3	-21.17	3147.00	37.9	Pass	
L4	43.42 - 0	Pole	TP54.5x42.669x0.375	4	-34.93	3957.13	43.4	Pass	
							Summary		
							Pole (L4)	43.4	Pass
							<b>RATING =</b>	<b>43.4</b>	<b>Pass</b>

**APPENDIX B**  
**BASE LEVEL DRAWING**



CLIMBING PEGS  
W/  
SAFETY CLIMB



(PROPOSED EQUIPMENT CONFIGURATION)  
(2) 7/32" TO 177 FT LEVEL  
(2) 21/64" TO 177 FT LEVEL  
(3) 1-5/8" TO 177 FT LEVEL  
(OTHER CONSIDERED EQUIPMENT)  
(1) 1/2" TO 50 FT LEVEL

**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

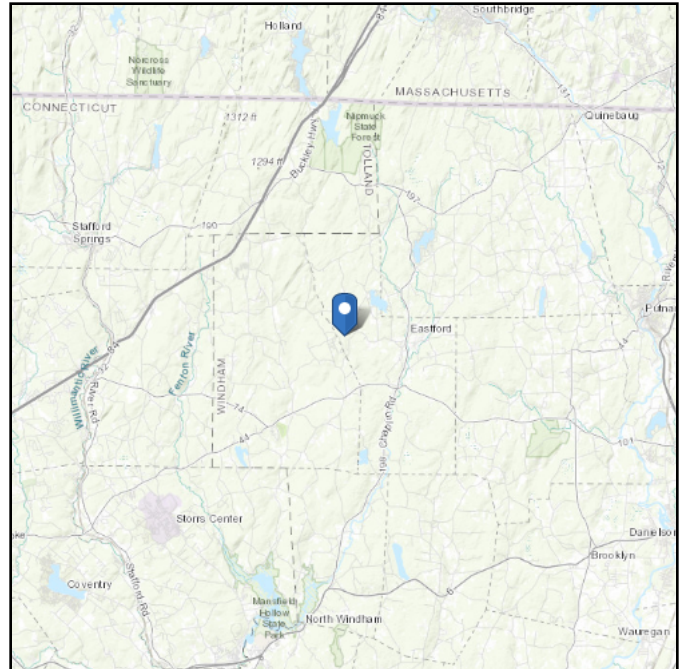
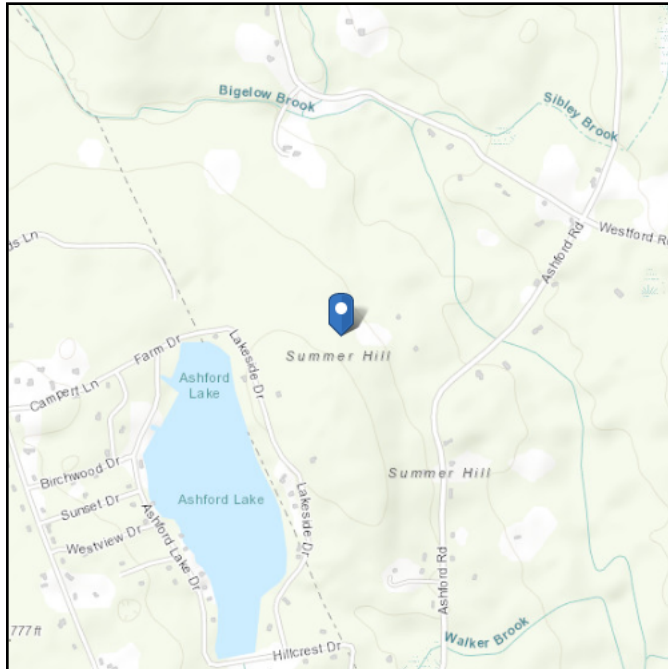


# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

**Standard:** ASCE/SEI 7-16  
**Risk Category:** II  
**Soil Class:** D - Default (see Section 11.4.3)

**Elevation:** 672.24 ft (NAVD 88)  
**Latitude:** 41.904506  
**Longitude:** -72.123867



## Wind

### Results:

Wind Speed	119 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	91 Vmph
100-year MRI	98 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2  
Date Accessed: Tue May 24 2022

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

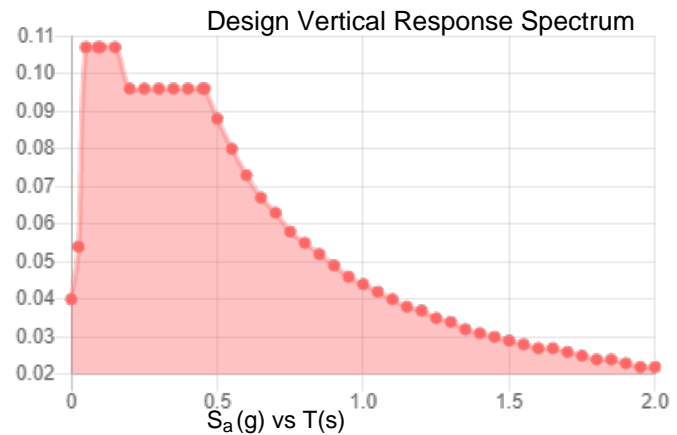
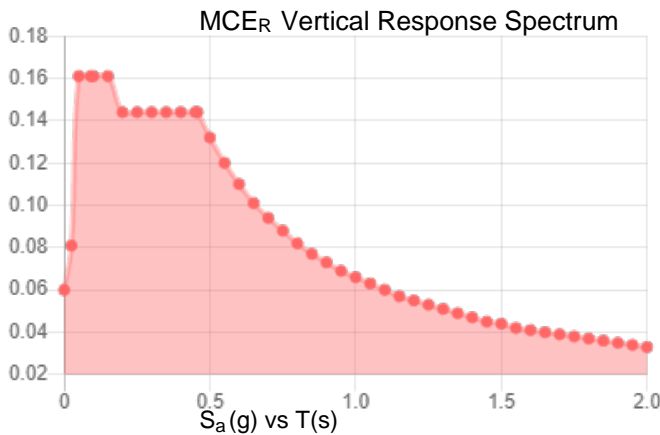
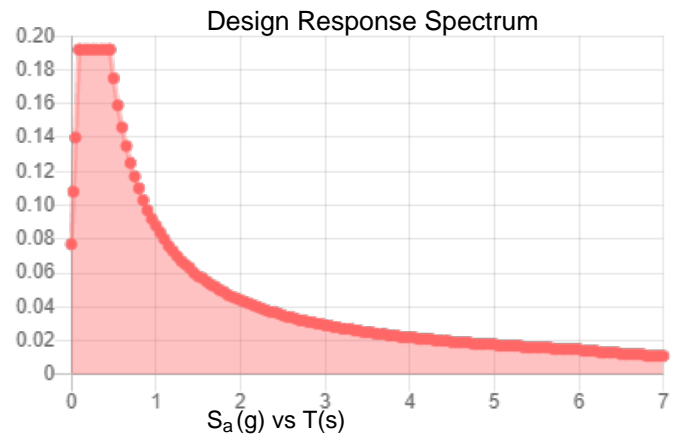
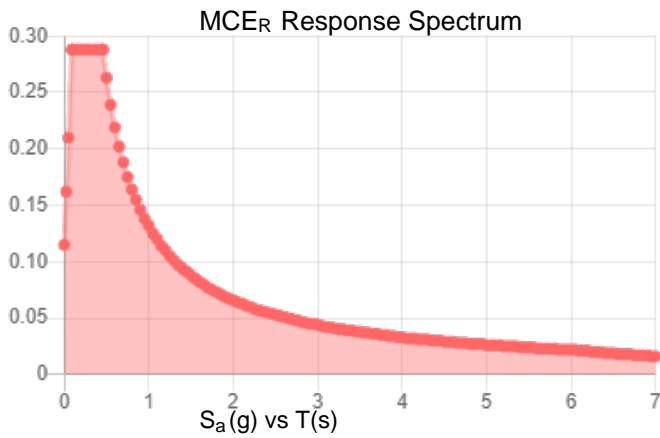
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

**Site Soil Class:** D - Default (see Section 11.4.3)

**Results:**

$S_S$ :	0.18	$S_{D1}$ :	0.088
$S_1$ :	0.055	$T_L$ :	6
$F_a$ :	1.6	PGA :	0.096
$F_v$ :	2.4	PGA <sub>M</sub> :	0.154
$S_{MS}$ :	0.288	$F_{PGA}$ :	1.6
$S_{M1}$ :	0.132	$I_e$ :	1
$S_{DS}$ :	0.192	$C_v$ :	0.7

**Seismic Design Category** B



**Data Accessed:** Tue May 24 2022

**Date Source:**

**USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.**

## Ice

---

**Results:**

Ice Thickness: 1.50 in.  
Concurrent Temperature: 15 F  
Gust Speed 50 mph

**Data Source:** Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

**Date Accessed:** Tue May 24 2022

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

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

---

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

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# Monopole Base Plate Connection

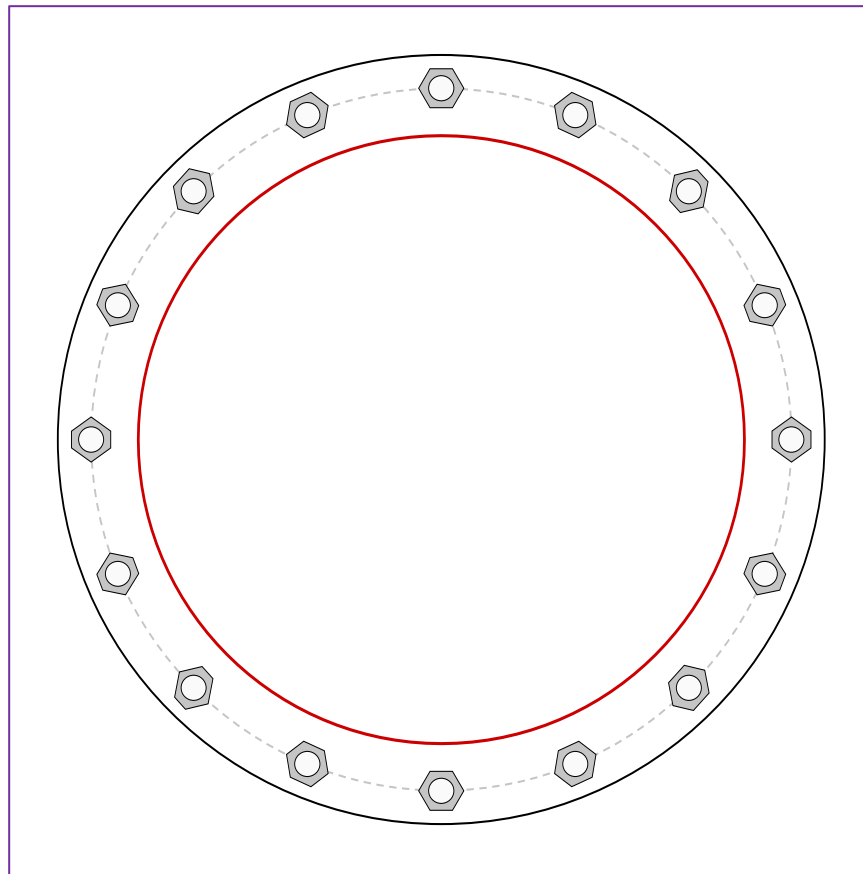


Site Info	
BU #	876372
Site Name	Smith Hills / Sterling G
Order #	617436 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$l_{ar}$ (in)	1.5

Applied Loads	
Moment (kip-ft)	2083.00
Axial Force (kips)	35.00
Shear Force (kips)	19.00

\*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results	
<b>Anchor Rod Data</b>	<b>Anchor Rod Summary</b> <span style="float: right;"><i>(units of kips, kip-in)</i></span>	
(16) 2-1/4" $\phi$ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 63" BC	$Pu_t = 96.95$	$\phi Pn_t = 243.75$ <b>Stress Rating</b>
<b>Base Plate Data</b>	$Vu = 1.19$	$\phi Vn = 149.1$ <b>37.9%</b>
69" OD x 1.75" Plate (A871-60; $F_y=60$ ksi, $F_u=75$ ksi)	$Mu = n/a$	$\phi Mn = n/a$ <b>Pass</b>
<b>Stiffener Data</b>	<b>Base Plate Summary</b>	
N/A	Max Stress (ksi):	32.16 (Flexural)
<b>Pole Data</b>	Allowable Stress (ksi):	54
54.5" x 0.375" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)	Stress Rating:	<b>56.7%</b> <b>Pass</b>

# Pier and Pad Foundation



**BU #:** 876372  
**Site Name:** Smith Hills / Sterling  
**App. Number:** 617436 Rev. 0

**TIA-222 Revision:** H  
**Tower Type:** Monopole

**Top & Bot. Pad Rein. Different?:**   
**Block Foundation?:**   
**Rectangular Pad?:**

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	35	kips
Base Shear, $Vu_{comp}$ :	19	kips
Moment, $M_u$ :	2083	ft-kips
Tower Height, $H$ :	177	ft
BP Dist. Above Fdn, $bp_{dist}$ :	3.75	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	386.75	19.00	4.7%	Pass
<i>Bearing Pressure (ksf)</i>	14.16	1.61	10.8%	Pass
<i>Overturning (kip*ft)</i>	9791.80	2240.94	22.9%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	5047.75	2178.00	41.1%	Pass
<i>Pier Compression (kip)</i>	31187.52	79.10	0.2%	Pass
<i>Pad Flexure (kip*ft)</i>	3509.24	816.73	22.2%	Pass
<i>Pad Shear - 1-way (kips)</i>	1022.02	110.32	10.3%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.190	0.023	11.6%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	3464.79	1306.80	35.9%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$ :	7	ft
Ext. Above Grade, $E$ :	1	ft
Pier Rebar Size, $Sc$ :	8	
Pier Rebar Quantity, $mc$ :	39	
Pier Tie/Spiral Size, $St$ :	4	
Pier Tie/Spiral Quantity, $mt$ :	6	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	3	in

\*Rating per TIA-222-H Section 15.5

Structural Rating*:	41.1%
Soil Rating*:	22.9%

Pad Properties		
Depth, $D$ :	7	ft
Pad Width, $W_1$ :	28.5	ft
Pad Thickness, $T$ :	3	ft
Pad Rebar Size (Top dir.2), $Sp_{top2}$ :	8	
Pad Rebar Quantity (Top dir. 2), $mp_{top2}$ :	25	
Pad Rebar Size (Bottom dir. 2), $Sp_2$ :	8	
Pad Rebar Quantity (Bottom dir. 2), $mp_2$ :	32	
Pad Clear Cover, $cc_{pad}$ :	3	in

Material Properties		
Rebar Grade, $F_y$ :	60	ksi
Concrete Compressive Strength, $F'_c$ :	4	ksi
Dry Concrete Density, $\delta_c$ :	150	pcf

Soil Properties		
Total Soil Unit Weight, $\gamma$ :	125	pcf
Ultimate Net Bearing, $Q_{net}$ :	18.000	ksf
Cohesion, $C_u$ :	0.000	ksf
Friction Angle, $\phi$ :	35	degrees
SPT Blow Count, $N_{blows}$ :	31	
Base Friction, $\mu$ :	0.4	
Neglected Depth, $N$ :	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, $gw$ :	N/A	ft

<--Toggle between Gross and Net



# Radio Frequency Emissions Analysis Report



**Site ID: CTHA653A**

CT33XC074  
71 Ashford Road  
Eastford, CT 06272

**June 21, 2022**

**Fox Hill Telecom Project Number: 221374**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>5.40 %</b>

June 21, 2022

T-MOBILE  
Attn: RF Manager  
35 Griffin Road South  
Bloomfield, CT 06009

### Emissions Analysis for Site: **CTHA653A – CT33XC074**

Fox Hill Telecom, Inc (“Fox Hill”) was directed to analyze the proposed upgrades to the T-MOBILE facility located at **71 Ashford Road, Eastford, CT**, for the purpose of determining whether the emissions from the Proposed T-MOBILE Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

General population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 600 MHz & 700 MHz bands are approximately  $400 \mu\text{W}/\text{cm}^2$  and  $467 \mu\text{W}/\text{cm}^2$  respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS), 2500 MHz (BRS) and 11 GHz microwave bands is  $1000 \mu\text{W}/\text{cm}^2$ . Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.



## CALCULATIONS

Calculations were performed for the proposed upgrades to the T-MOBILE antenna facility located at **71 Ashford Road, Eastford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-MOBILE is proposing highly focused directional panel and parabolic dish antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in **Table 1**, with the exception of the 11 GHz microwave which is located on **Sector A** exclusively. The proposed 11 GHz microwave antenna and its emissions contributions were added to the **Sector A** configuration since this was the closest azimuth to the pointing direction of the microwave antenna listed at an azimuth of **311 degrees** from true north (TN).

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20
LTE	1900 MHz (PCS)	4	40
GSM	1900 MHz (PCS)	1	15
LTE	2100 MHz (AWS)	4	40
Microwave	11 GHz	1	1

*Table 1: Channel Data Table*



The following antennas listed in *Table 2* were used in the modeling for transmission in the 600 MHz, 700 MHz, 1900 MHz (PCS), 2100 MHz (AWS), 2500 MHz (BRS) and 11 GHz Microwave frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction. The proposed 11 GHz microwave antenna and its emissions contributions were added to the **Sector A** configuration since this was the closest azimuth to the pointing direction of the microwave antenna listed at an azimuth of **311 degrees** from true north (TN).

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	RFS APXVAALL24_43-U-NA20	180
A	2	Ericsson AIR6449 B41	180
A	3	Commscope VHLP2-11W/A	177
B	1	RFS APXVAALL24_43-U-NA20	180
B	2	Ericsson AIR6449 B41	180
C	1	RFS APXVAALL24_43-U-NA20	180
C	2	Ericsson AIR6449 B41	180

*Table 2: Antenna Data*

All calculations were done with respect to uncontrolled / general population threshold limits.



## RESULTS

Per the calculations completed for the proposed T-MOBILE configurations *Table 3* shows resulting emissions power levels and percentages of the FCC’s allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	RFS APXVAALL24_43-U-NA20	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	13.65 / 13.85 / 16.65 / 16.95	13	455	18,843.43	2.70
Antenna A2	Ericsson AIR6449 B41	2500 MHz (BRS)	21.5	8	160	22,600.60	2.68
Antenna A3	Commscope VHLP2-11W/A	11 GHz Microwave	32.35	1	1	1,717.91	0.02
Sector A Composite MPE%							<b>5.40</b>
Antenna B1	RFS APXVAALL24_43-U-NA20	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	13.65 / 13.85 / 16.65 / 16.95	13	455	18,843.43	2.70
Antenna B2	Ericsson AIR6449 B41	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	13.65 / 13.85 / 16.65 / 16.95	8	160	22,600.60	2.68
Sector B Composite MPE%							<b>5.38</b>
Antenna C1	RFS APXVAALL24_43-U-NA20	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	13.65 / 13.85 / 16.65 / 16.95	13	455	18,843.43	2.70
Antenna C2	Ericsson AIR6449 B41	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	13.65 / 13.85 / 16.65 / 16.95	8	160	22,600.60	2.68
Sector C Composite MPE%							<b>5.38</b>

*Table 3: T-MOBILE Emissions Levels*



The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum T-MOBILE MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, the sector with the largest calculated MPE% is **Sector A** due to the proposed 11 GHz microwave antenna broadcasting in this direction. *Table 5* below shows a summary for each T-MOBILE Sector as well as the composite MPE value for the site. There were no additional carriers listed in the CSC active MPE database for this site.

<b>Site Composite MPE%</b>	
<b>Carrier</b>	<b>MPE%</b>
T-MOBILE – Max Value (Sector A)	<b>5.40 %</b>
No Additional Carriers	NA
<b>Site Total MPE %:</b>	<b>5.40 %</b>

*Table 4: All Carrier MPE Contributions*

T-MOBILE Sector A Total:	<b>5.40 %</b>
T-MOBILE Sector B Total:	5.38 %
T-MOBILE Sector C Total:	5.38 %
Site Total:	5.40 %

*Table 5: Site MPE Summary*



FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated T-MOBILE sector(s). For this site, the sector with the largest calculated MPE% is **Sector A** due to the proposed 11 GHz microwave antenna broadcasting in this direction.

T-MOBILE _ Frequency Band / Technology Max Power Values (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
T-Mobile 600 MHz LTE / 5G NR	2	926.96	180	2.20	600 MHz	400	0.55%
T-Mobile 700 MHz LTE	2	485.32	180	1.15	700 MHz	467	0.25%
T-Mobile 1900 MHz (PCS) LTE	4	1,849.52	180	8.78	1900 MHz (PCS)	1000	0.88%
T-Mobile 1900 MHz (PCS) GSM	1	693.57	180	0.82	1900 MHz (PCS)	1000	0.08%
T-Mobile 2100 MHz (AWS) LTE	4	1,981.80	180	9.41	2100 MHz (AWS)	1000	0.94%
T-Mobile 2500 MHz (BRS) LTE / 5G NR	8	2,825.08	180	26.84	2500 MHz (BRS)	1000	2.68%
T-Mobile 11 GHz Microwave	1	1,717.91	177	0.21	11 GHz	1000	0.02%
						<b>Total:</b>	<b>5.40%</b>

Table 6: T-MOBILE Maximum MPE Power Values (Sector A)



## Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the T-MOBILE facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-MOBILE Sector	Power Density Value (%)
Sector A:	5.40 %
Sector B:	5.38 %
Sector C:	5.38 %
T-MOBILE Maximum Total (per sector):	5.40 %
Site Total:	5.40 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **5.40 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Scott Heffernan  
Principal RF Engineer  
**Fox Hill Telecom, Inc**  
Worcester, MA 01605  
(978)660-3998

# T-Mobile

**T-MOBILE SITE NUMBER: CTHA653A**  
**T-MOBILE SITE NAME: CT33XC074**  
**SITE TYPE: MONOPOLE**  
**TOWER HEIGHT: 177'-0"**

**BUSINESS UNIT #: 876372**  
**SITE ADDRESS: 71 ASHFORD ROAD**  
**EASTFORD, CT 06272**  
**COUNTY: WINDHAM**  
**JURISDICTION: WINDHAM COUNTY**

## CTHA653A \_SPRINT RETAIN: TBD

T-Mobile  
 35 GRIFFIN ROAD  
 BLOOMFIELD, CT 06002

**CROWN CASTLE**  
 3 CORPORATE PARK DRIVE, SUITE 101  
 CLIFTON PARK, NY 12065

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T-MOBILE SITE NUMBER:  
**CTHA653A**  
 BU #: **876372**  
**SMITH HILLS / STERLING GRP. (S)**

71 Ashford ROAD  
 EASTFORD, CT 06272  
 EXISTING 177'-0" MONOPOLE

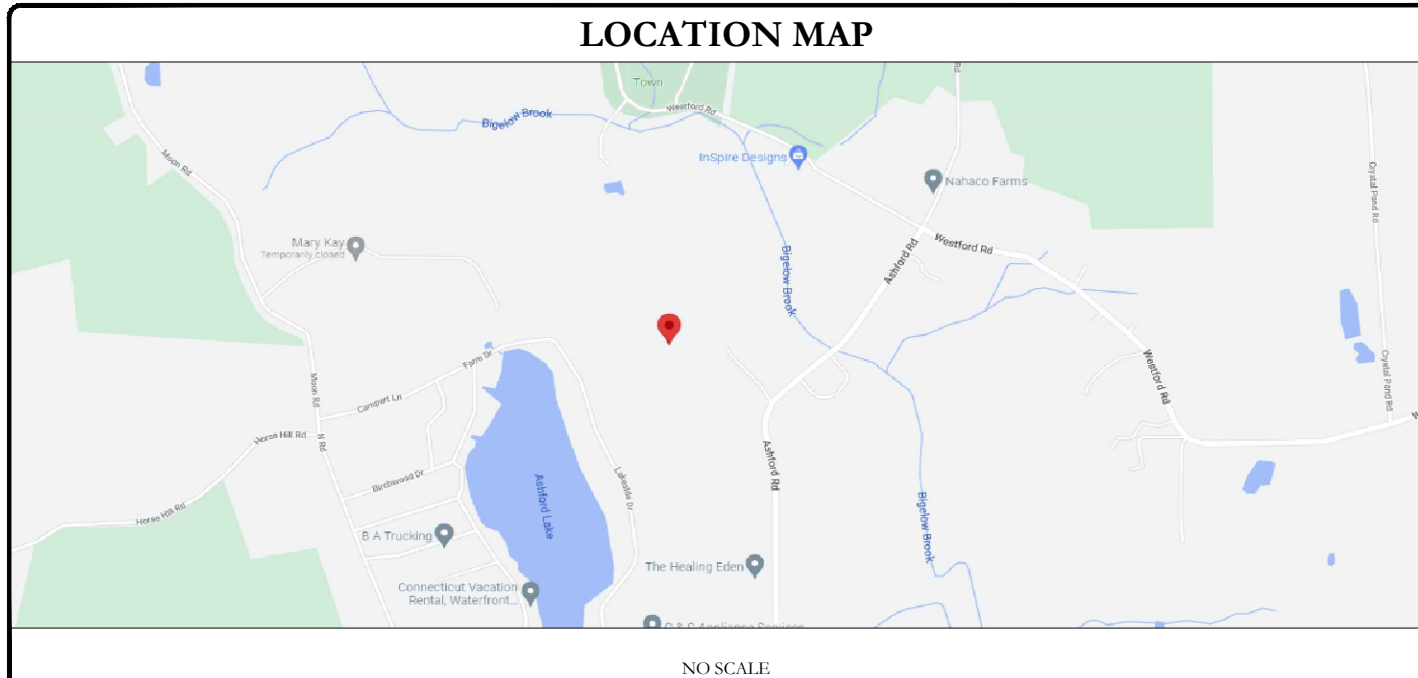
**ISSUED FOR:**

REV	DATE	DRWN	DESCRIPTION	DES/QA
A	06/01/22	RCD	PRELIMINARY	SS
0	06/16/22	CB	100% FINALS	SS

SITE INFORMATION	
CROWN CASTLE USA INC. SITE NAME:	SMITH HILLS / STERLING GRP. (S)
SITE ADDRESS:	71 Ashford ROAD EASTFORD, CT 06272
COUNTY:	WINDHAM
MAP/PARCEL #:	VERIFY
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.904506° (41° 54' 16.22")
LONGITUDE:	-72.123867° (-77° 07' 25.92")
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	±683.0 FT
CURRENT ZONING:	TBD
JURISDICTION:	WINDHAM COUNTY
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	TBD
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002
ELECTRIC PROVIDER:	TBD
TELCO PROVIDER:	TBD

DRAWING INDEX	
SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1	SITE PLAN & ENLARGED SITE PLAN
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	ANTENNA & CABLE SCHEDULE
C-4	MICROWAVE PATH INFO
C-5	EQUIPMENT SPECS
C-6	EQUIPMENT SPECS
E-1	AC PANEL SCHEDULES & ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11X17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.



PROJECT TEAM	
A&E FIRM:	INFINIGY 500 WEST OFFICE CENTER DR. SUITE 150, FORT WASHINGTON, PA 19034
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3 CORPORATE PARK DRIVE, SUITE 101 CLIFTON PARK, NY 12065
	TBD - PROJECT MANAGER
	TBD - CONSTRUCTION MANAGER

PROJECT DESCRIPTION	
THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.	
TOWER SCOPE OF WORK:	
<ul style="list-style-type: none"> <li>REMOVE (6) ANTENNAS</li> <li>REMOVE (9) RRHS</li> <li>REMOVE (4) COAX CABLES</li> <li>INSTALL (6) ANTENNAS</li> <li>INSTALL (6) RRHS</li> <li>INSTALL (1) MW DISH</li> <li>INSTALL (1) ODU</li> <li>INSTALL (3) HYBRID CABLES</li> <li>INSTALL (4) COAX CABLES</li> <li>INSTALL ANTENNA MOUNT MODS</li> </ul>	
GROUND SCOPE OF WORK:	
<ul style="list-style-type: none"> <li>REMOVE (2) EQUIPMENT CABINETS</li> <li>INSTALL (1) 6160 &amp; (1) B160 BATTERY CABINET</li> <li>INSTALL (2) PSU4813 VOLTAGE BOOSTER IN (P) CABINET</li> <li>INSTALL (1) CSR IXRE ROUTER IN (P) CABINET</li> <li>INSTALL (2) BB6648 IN (P) CABINET</li> <li>INSTALL (1) 6601, DUG20 IN (P) CABINET</li> <li>UPGRADE POWER SERVICE TO 200A</li> </ul>	
NOTE: PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER.	

APPLICABLE CODES/REFERENCE DOCUMENTS	
ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:	
CODE TYPE	CODE
BUILDING	2018 CT STATE BUILDING CODE
MECHANICAL	2015 IMC
ELECTRICAL	2017 NEC
REFERENCE DOCUMENTS:	
STRUCTURAL ANALYSIS:	TOWER ENGINEERING PROFESSIONALS
DATED:	05/26/2022
MOUNT ANALYSIS:	INFINIGY
DATED:	05/20/2022
RFDS REVISION:	TBD
DATED:	TBD
ORDER ID:	617436
REVISION:	0

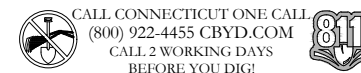
APPROVALS		
APPROVAL	SIGNATURE	DATE
PROPERTY OWNER OR REP.	_____	_____
LAND USE PLANNER	_____	_____
T-MOBILE	_____	_____
OPERATIONS	_____	_____
RF	_____	_____
NETWORK	_____	_____
BACKHAUL	_____	_____
CONSTRUCTION MANAGER	_____	_____

THE PARTIES ABOVE HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES AND MODIFICATIONS THEY MAY IMPOSE.

06/16/22

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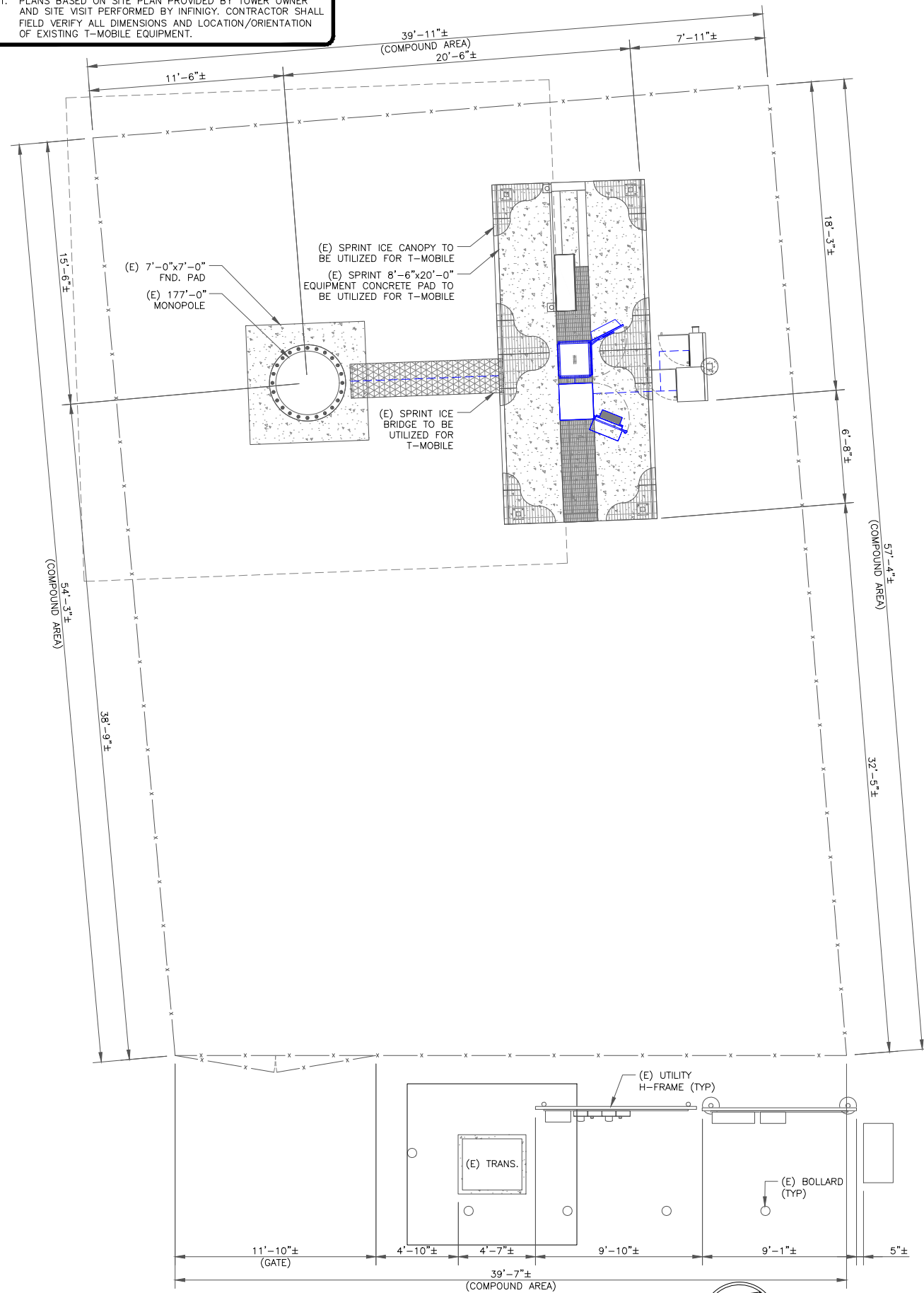
SHEET NUMBER: <b>T-1</b>	REVISION: <b>0</b>
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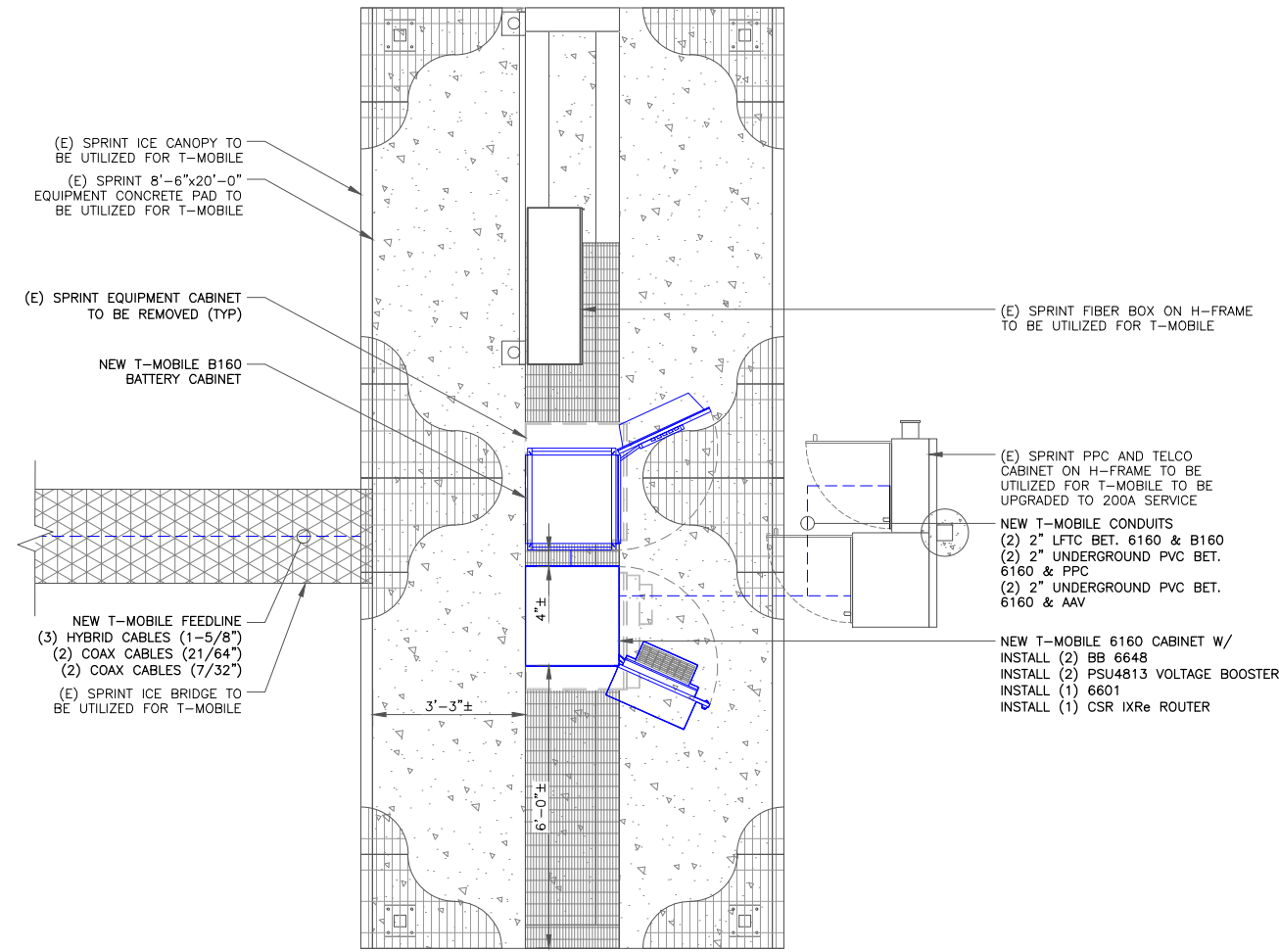




**NOTE:**  
 1. PLANS BASED ON SITE PLAN PROVIDED BY TOWER OWNER AND SITE VISIT PERFORMED BY INFINIGY. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING T-MOBILE EQUIPMENT.



**1 SITE PLAN**  
 SCALE: 1/4"=1'-0" (FULL SIZE)  
 1/8"=1'-0" (11x17)



**2 ENLARGED SITE PLAN**  
 SCALE: 3/4"=1'-0" (FULL SIZE)  
 3/8"=1'-0" (11x17)

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T-MOBILE SITE NUMBER:  
**CTHA653A**  
 BU #: 876372  
**SMITH HILLS / STERLING GRP. (S)**  
 71 Ashford ROAD  
 EASTFORD, CT 06272

EXISTING 177'-0" MONOPOLE

**ISSUED FOR:**

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A	06/01/22	RCD	PRELIMINARY	SS
0	06/16/22	CB	100% FINALS	SS



06/16/22

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SHEET NUMBER: **C-1** REVISION: **0**

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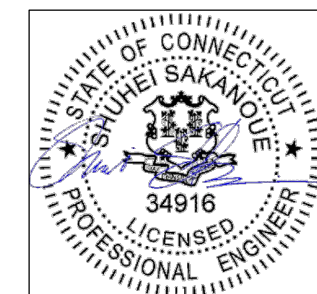
BU #: 876372  
**SMITH HILLS / STERLING GRP. (S)**

71 Ashford ROAD  
EASTFORD, CT 06272

EXISTING 177'-0" MONOPOLE

**ISSUED FOR:**

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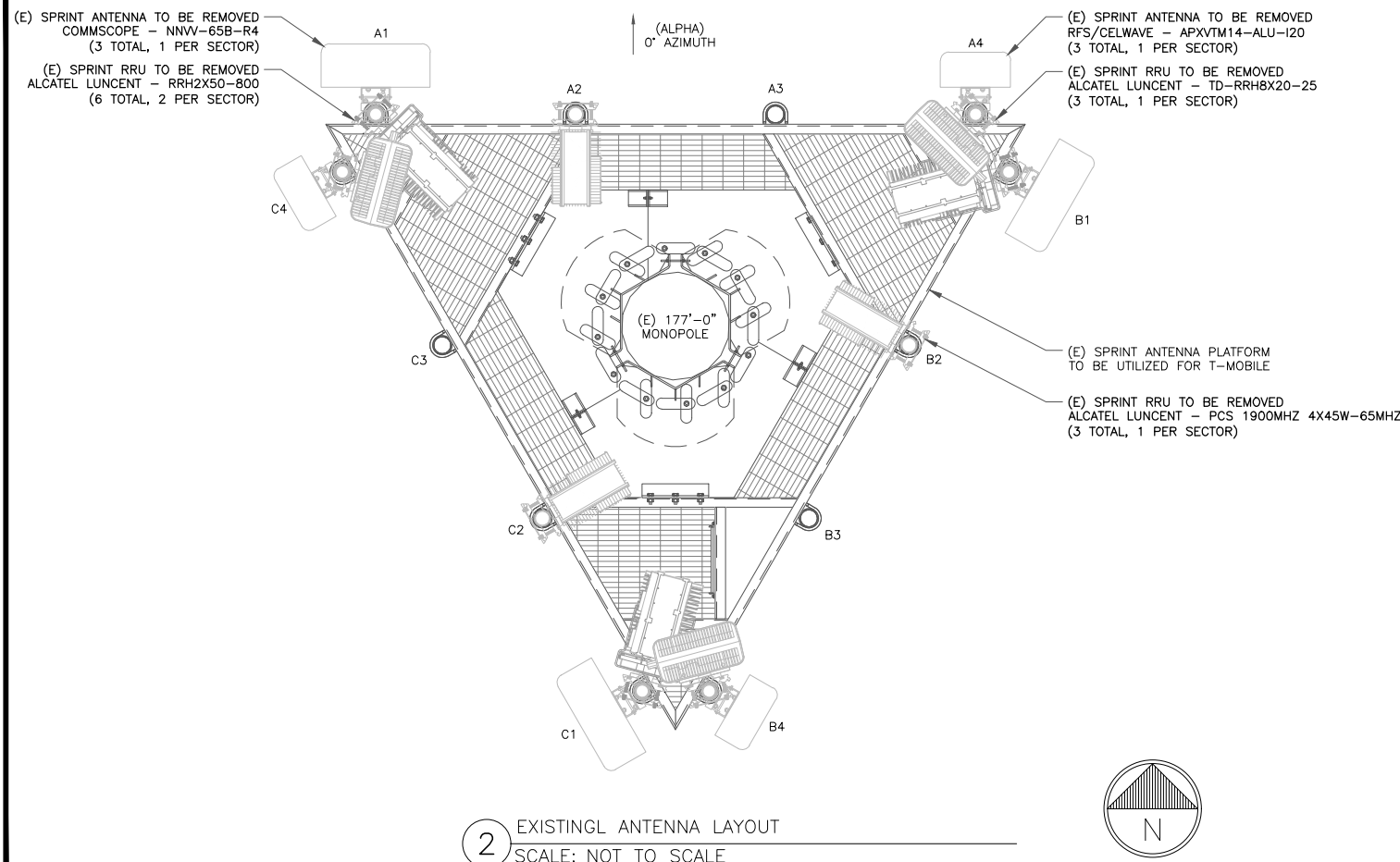


06/16/22

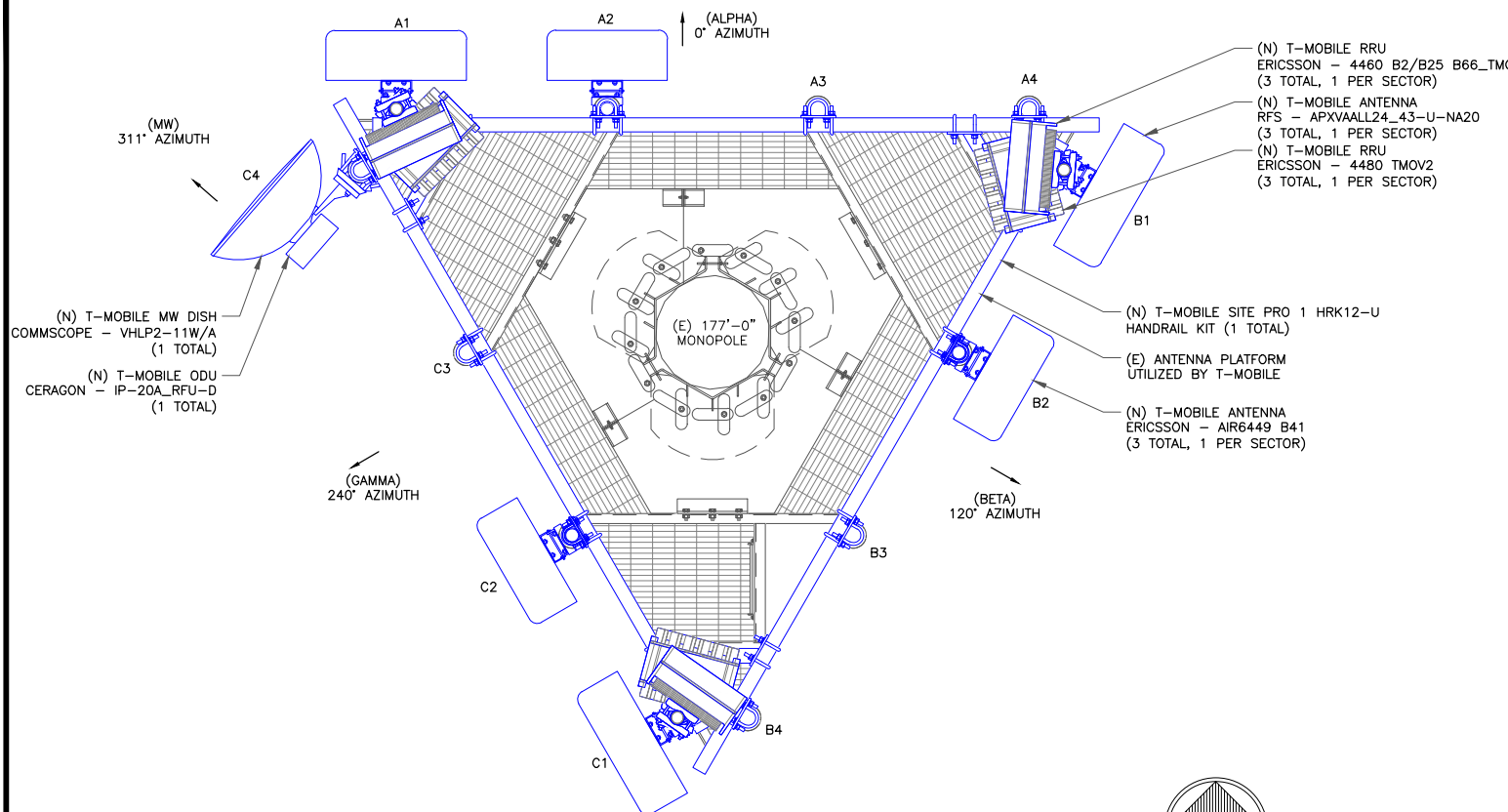
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SHEET NUMBER: REVISION:

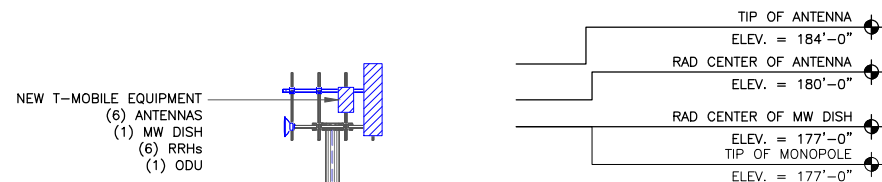
**C-2** **0**



2 EXISTING ANTENNA LAYOUT  
SCALE: NOT TO SCALE



3 FINAL ANTENNA LAYOUT  
SCALE: NOT TO SCALE



1 FINAL ELEVATION  
SCALE: NOT TO SCALE

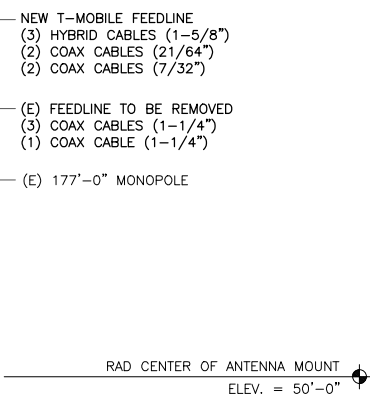
**NOTES:**

- ELEVATION BASED ON DRAWING PROVIDED BY TOWER OWNER. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING EQUIPMENT.
- INFINIGY HAS NOT EVALUATED THE TOWER OR MOUNT STRUCTURE AND ASSUMES NO RESPONSIBILITY FOR THEIR STRUCTURAL INTEGRITY REGARDING PROPOSED LOADINGS. FINAL INSTALLATION SHALL COMPLY WITH RESULTS OF PASSING STRUCTURAL ANALYSES PERFORMED BY OTHERS.

**T-MOBILE EQUIPMENT**

ANTENNA CL: 180'-0"  
MW DISH CL: 177'-0"  
MOUNT CL: 177'-0"

ANY AND ALL TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ EXISTING SAFETY CLIMB

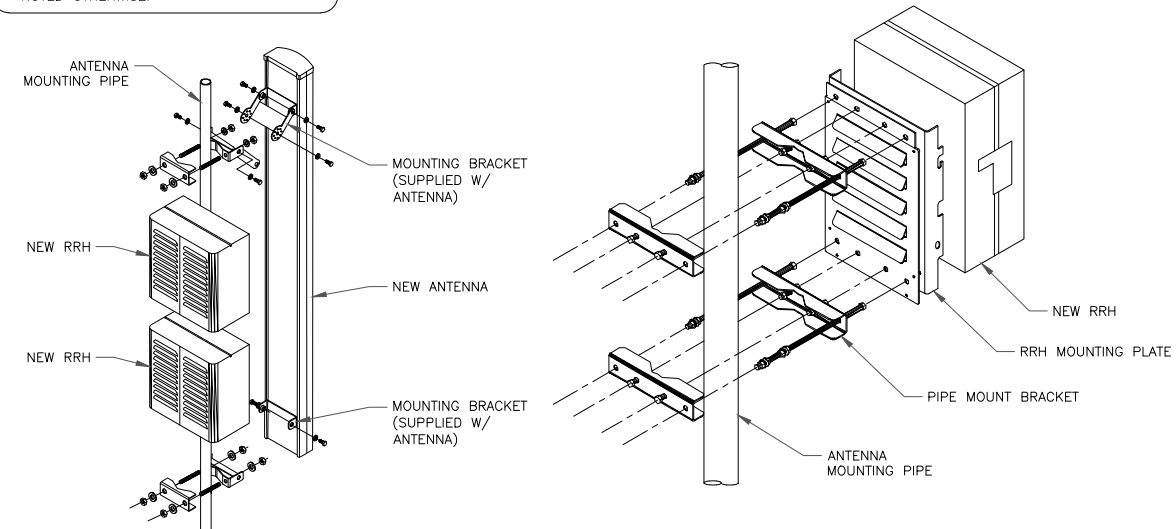


ANTENNA SCHEDULE										
SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	L700, L600, N600, L2100, L1900, G1900	180'-0"	0°	RFS	APXVAALL24_43-U-NA20	-	-	(1) ERICSSON - RRU 4480 TMOV2 (1) ERICSSON - RRUS 4460 B2/B25 B66_TMO	(1) 1-5/8" HYBRID
ALPHA	A2	L2500, N2500	180'-0"	0°	ERICSSON	ERICSSON - AIR6449 B41	-	-	-	-
ALPHA	A3	-	-	-	-	-	-	-	-	-
ALPHA	A4	-	-	-	-	-	-	-	-	-
BETA	B1	L700, L600, N600, L2100, L1900, G1900	180'-0"	120°	RFS	APXVAALL24_43-U-NA20	-	-	(1) ERICSSON - RRU 4480 TMOV2 (1) ERICSSON - RRUS 4460 B2/B25 B66_TMO	(1) 1-5/8" HYBRID
BETA	B2	L2500, N2500	180'-0"	120°	ERICSSON	ERICSSON - AIR6449 B41	-	-	-	-
BETA	B3	-	-	-	-	-	-	-	-	-
BETA	B4	-	-	-	-	-	-	-	-	-
GAMMA	C1	L700, L600, N600, L2100, L1900, G1900	180'-0"	240°	RFS	APXVAALL24_43-U-NA20	-	-	(1) ERICSSON - RRU 4480 TMOV2 (1) ERICSSON - RRUS 4460 B2/B25 B66_TMO	(1) 1-5/8" HYBRID
GAMMA	C2	L2500, N2500	180'-0"	240°	ERICSSON	ERICSSON - AIR6449 B41	-	-	-	-
GAMMA	C3	-	-	-	-	-	-	-	-	-
GAMMA	C4	-	-	-	-	-	-	-	-	-
MW	C4	-	177'-0"	311°	ERICSSON	COMMSCOPE - VHLP2-11W/A	-	-	-	(2) 21/64" COAX (2) 7/32" COAX

1 ANTENNA AND CABLE SCHEDULE  
SCALE: NOT TO SCALE

**INSTALLER NOTES:**

1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.



**NOTE:**

1. CONTRACTOR SHALL INSTALL 3RD DUAL RRH MOUNT TO ACCOMMODATE ALL RRH BRACKETS HOLES IF NECESSARY.

2 ANTENNA WITH RRHs MOUNTING DETAIL  
SCALE: NOT TO SCALE

**T-Mobile**  
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BLOOMFIELD, CT 06002

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T-MOBILE SITE NUMBER:  
**CTHA653A**

BU #: 876372  
**SMITH HILLS / STERLING GRP. (S)**

71 Ashford ROAD  
EASTFORD, CT 06272

EXISTING 177'-0" MONOPOLE

**ISSUED FOR:**

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A	06/01/22	RCD	PRELIMINARY	SS
0	06/16/22	CB	100% FINALS	SS

STATE OF CONNECTICUT  
SHUHEI SAKANOU  
34916  
LICENSED PROFESSIONAL ENGINEER

06/16/22

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SHEET NUMBER: **C-3** REVISION: **0**

**iQ.link — Link Budget Report**

Date Printed: 30-MAR-2022    Link ID: 2010002    Region: Northeast  
 Create Date: 30-MAR-2022    Link Name: CT11353C\_CTHA653A    Created By: Ajikia1

Path length (4.92 mi)

CT11353C	Frequency (GHz) = 11.00 GHz	CTHA653A
Latitude: 41-57- 7.0 N	K1: 1.00	Latitude: 41-54-16.2 N
Longitude: 72-11-43.0 W	%F1: 0.60	Longitude: 72-07-26.0 W
Azimuth: 131.65 Deg	K2: 0.67	Azimuth: 311.70 Deg
Elevation: 1082.68 ft	%F2: 0.30	Elevation: 688.98 ft
Antenna CL: 158.00 ft AGL	K3: 1.33	Antenna CL: 177.00 ft AGL
	%F3: 1.00	

Transmission details		
SITE ID:	CT11353C	CTHA653A
[CLUSTER_ID_LABEL]:	[CLUSTER_ID_A]	[CLUSTER_ID_B]
[CALL_SIGN_LABEL]:	[CALL_SIGN_A]	[CALL_SIGN_B]
ASR #:		
AAV_CONTRACT_ID:	CRN14B	TMW01
AAV_CONTRACT_STATUS:	Selected	Selected
Ethernet Installed:	Ethernet	No
Latitude:	41-57- 7.0 N	41-54-16.2 N
Longitude:	72-11-43.0 W	72-07-26.0 W
Azimuth (deg):	131.65 Deg	311.70 Deg
Vertical angle (deg):	0.85 Down	0.80 Up
Elevation:	1082.68 ft	688.98 ft
Antenna model:	VHLP2-11WA	VHLP2-11WA
Antenna manufacturer:	ANDREW CORPORATION	ANDREW CORPORATION
Antenna Id:	207	207
Antenna gain (dBi):	34.70 dBi	34.70 dBi
Antenna diameter:	1.97 ft	1.97 ft
Antenna CL:	158.00 ft AGL	177.00 ft AGL
Diversity Antenna model:		
Diversity Antenna manufacturer:		
Diversity Antenna Id:		
Diversity Antenna gain (dBi):		
Diversity Antenna diameter:		
Diversity Antenna CL:		
Branch Loss Tx/Rx (dB):	4.60/4.60	4.60/4.60
Attenuator Common/Tx/Rx (dB):		
Waveguide #1 Model, Len, Loss(dB):		
Waveguide #2 Model, Len, Loss(dB):		
Waveguide #3 Model, Len, Loss(dB):		
Total Waveguide Loss (dB):		
Other Losses (dB):	0.00	0.00
Frequency (GHz):	11.00 GHz	
Path length:	4.92 mi	
Free space loss (dB):	131.28 dB	
Atmospheric absorption loss (dB):	0.12 dB	
Obstruction Loss (dB):	0.00 dB (oLOS)	
Field margin (dB):	1.00 dB	
Net path loss (dB):	67.57 dB	67.57 dB
Configuration:	4+0/DP/DM	4+0/DP/DM
Radio model:	IP20D-HP11-80X-A_4501	IP20D-HP11-80X-A_4501
Radio manufacturer:	Ceragon Networks	Ceragon Networks
Radio Id:	754	754
Frequency Plan: Frequency (MHz):	High: N/A	Low: N/A
Polarization:	N/A	N/A
Emission designator:	80M0D7W	80M0D7W
Climatic factor:	1.00	

1 MICROWAVE PATH INFO  
 SCALE: NOT TO SCALE

**T-Mobile**  
 35 GRIFFIN ROAD  
 BLOOMFIELD, CT 06002

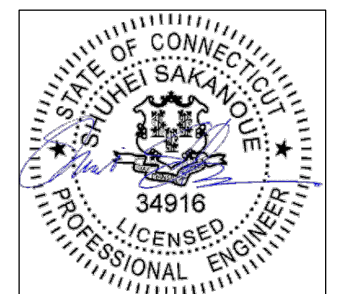
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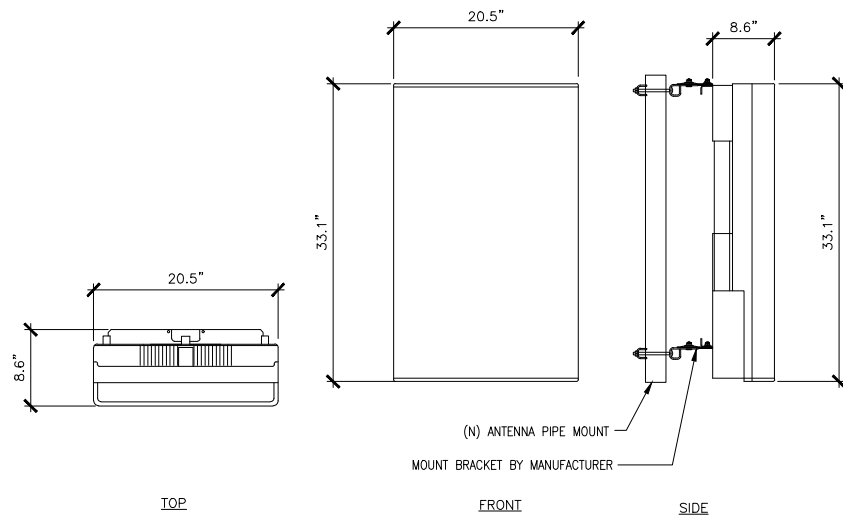


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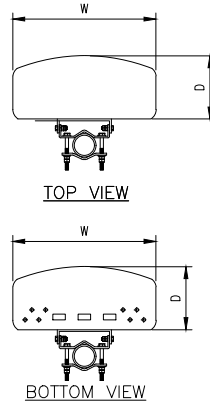
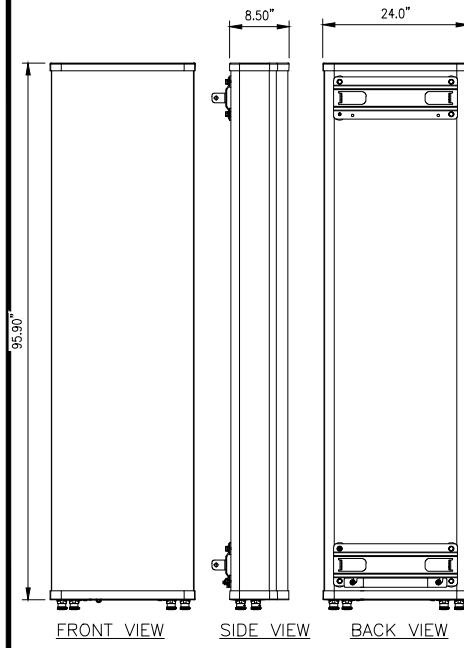
SHEET NUMBER: **C-4**    REVISION: **0**

MANUFACTURER: ERICSSON  
 MODEL: AIR6449 B41  
 WEIGHT: 104 LBS (W/ MOUNT BRACKET 113)  
 DIMENSIONS: 33.1"H. X 20.5"W. X 8.6"D.  
 FREQUENCY: REFER TO RF DATA SHEET



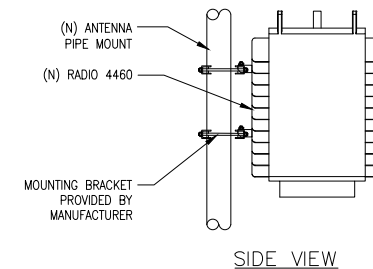
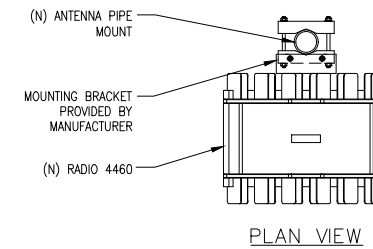
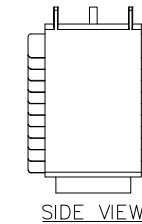
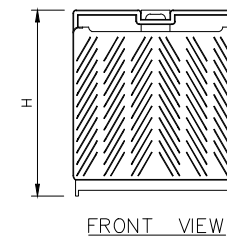
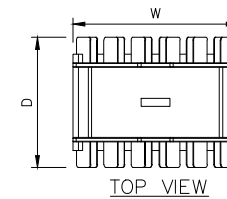
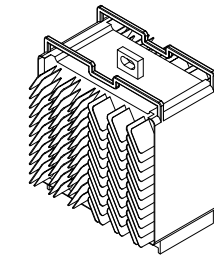
1 (N) AIR6449 B41 ANTENNA SPEC  
 SCALE: NOT TO SCALE

700MHz RFS ANTENNAS	
MODEL	WEIGHT (lb)
(8') APXVAALL24_43-U-NA20	149.90
WEIGHT W/ MOUNTING BRACKET (lb):	154



2 (N) APXVAALL24\_43-U-NA20 ANTENNA SPEC  
 SCALE: NOT TO SCALE

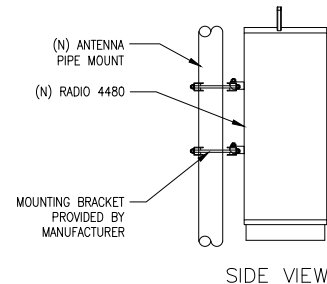
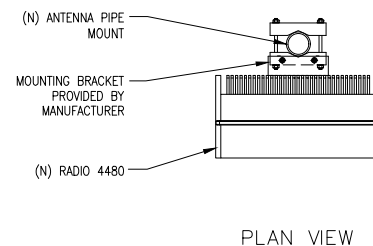
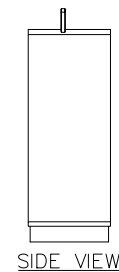
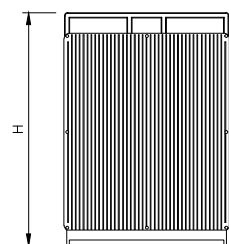
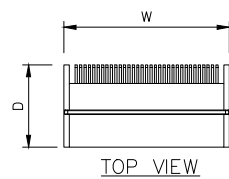
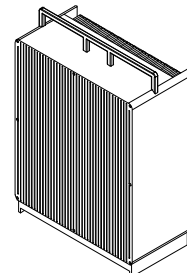
ERICSSON RADIO-4460 B2/B25 B66\_TMO  
 DIMENSIONS, WxDxH: 17.0"x15.1"x11.9"  
 MAX OUTPUT POWER: 4x80W (2x(2x80W))  
 TOTAL WEIGHT: 109 lbs  
 TEMPERATURE: -40° TO 55° C



3 (N) RADIO 4460 SPEC  
 SCALE: NOT TO SCALE

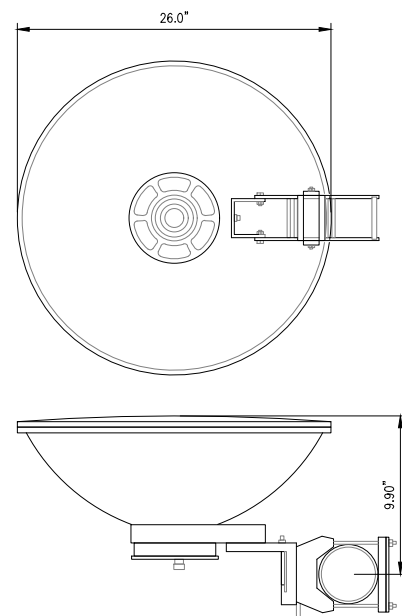
ERICSSON RADIO-4480 TMOV2

DIMENSIONS, WxDxH: 22.0"x15.7"x7.5"  
 MAX OUTPUT POWER: 4x80W (2x(2x80W))  
 TOTAL WEIGHT: 81.00 lbs  
 TEMPERATURE: -40° TO 55° C



4 (N) RADIO 4480 SPEC  
 SCALE: NOT TO SCALE

MANUFACTURER: COMMSCOPE  
 PART # VHLP2-11W/A  
 DIAMETER: 26.0"  
 DEPTH: 9.90"  
 OFFSET: --  
 WEIGHT: 17.60 LBS



5 (N) VHLP2-11W/A MW DISH SPEC  
 SCALE: NOT TO SCALE

MANUFACTURER: CERAGON  
 MODEL : FIBEAIR IP-20A\_RFU-D  
 HEIGHT: 9.05"  
 WIDTH: 9.17"  
 DEPTH: 3.85"  
 WEIGHT: 14.33 LBS



6 (N) FIBEAIR IP-20A\_RFU-D ODU SPEC  
 SCALE: NOT TO SCALE

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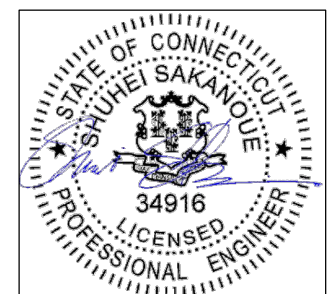
BU #: 876372  
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 GRP. (S)

71 Ashford ROAD  
 EASTFORD, CT 06272

EXISTING 177'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	06/01/22	RCD	PRELIMINARY	SS
0	06/16/22	CB	100% FINALS	SS



06/16/22

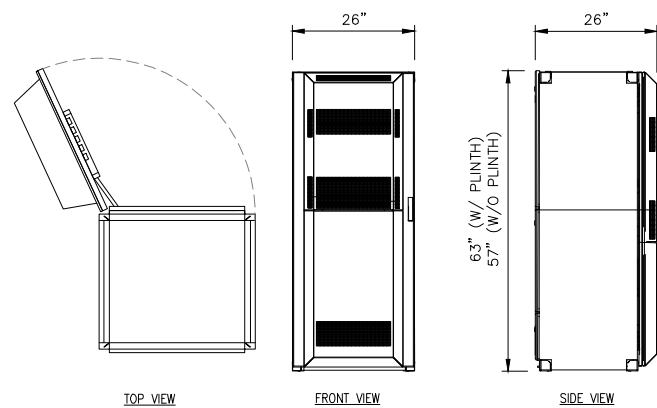
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SHEET NUMBER:

C-5

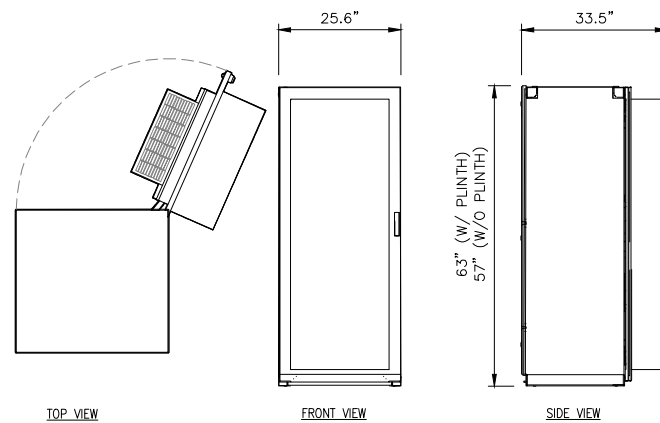
REVISION:

0



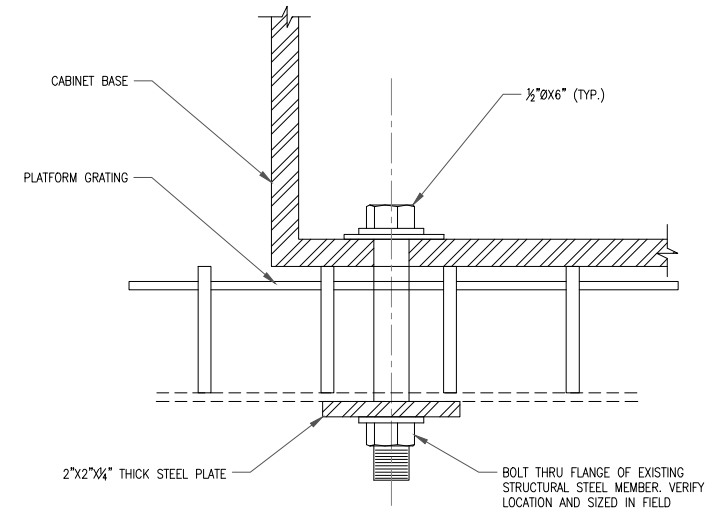
ERICSSON MODEL NO.:	B160
RACK SPACE:	19U
DIMENSIONS, HxWxD:	63"x26"x26" (W/ 6" PLINTH)
CABINET WEIGHT, EMPTY:	485 LBS
MAXIMUM WEIGHT:	2100± LBS

1 (N) B160 CABINET DETAIL  
SCALE: NOT TO SCALE

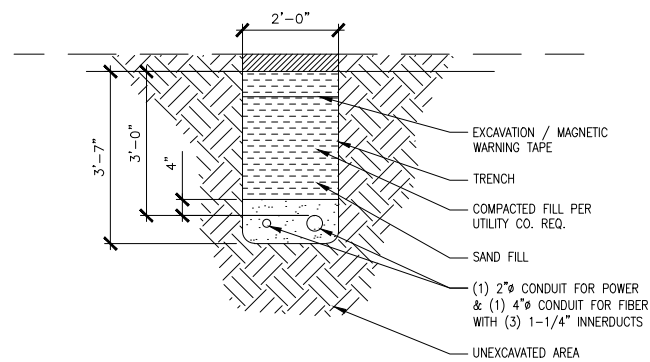


ERICSSON MODEL NO.:	6160
RACK SPACE:	19U
DIMENSIONS, HxWxD:	63"x25.6"x25.6" (W/ 6" PLINTH)
CABINET WEIGHT, EMPTY:	410 LBS
MAXIMUM WEIGHT:	770± LBS

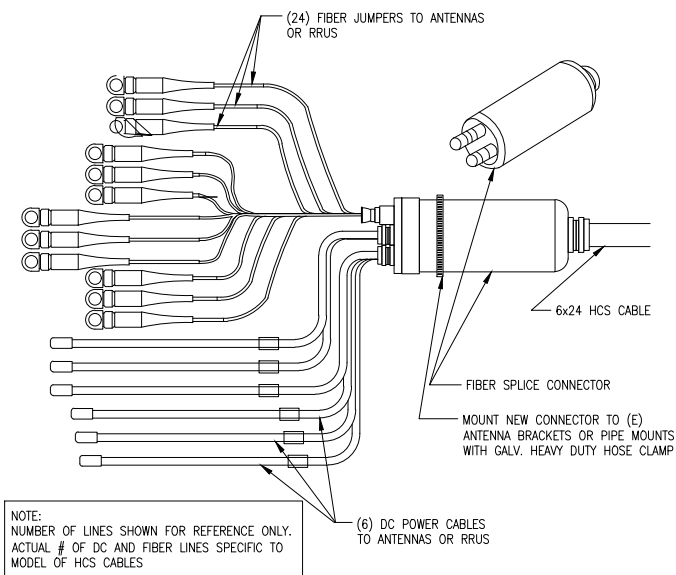
2 (N) 6160 CABINET DETAIL  
SCALE: NOT TO SCALE



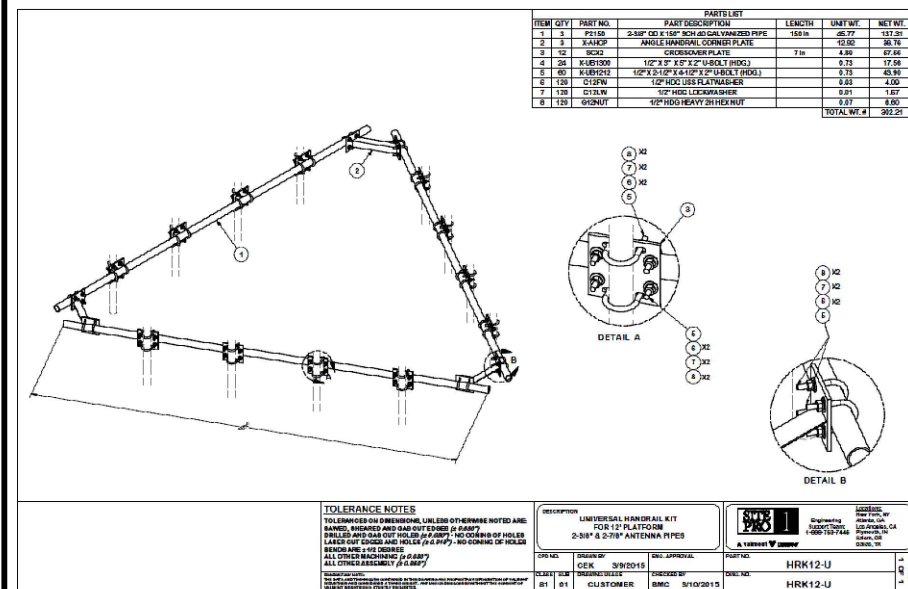
3 (N) EQUIPMENT CABINET MOUNTING DETAIL  
SCALE: NOT TO SCALE



4 (N) CONDUIT TRENCH DETAIL  
SCALE: NOT TO SCALE



5 (N) 6X24 HCS CABLE DETAIL  
SCALE: NOT TO SCALE



6 (N) SITE PRO 1 HRK12-U HANDRAIL KIT SPEC  
SCALE: NOT TO SCALE

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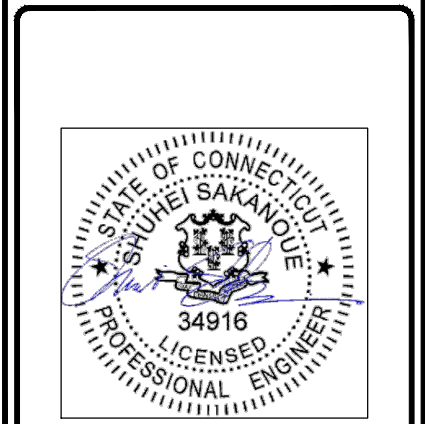
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BU #: 876372  
**SMITH HILLS / STERLING GRP. (S)**  
  
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EXISTING 177'-0" MONOPOLE

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SHEET NUMBER: **C-6** REVISION: **0**

**NOTES:**

- EXISTING DISTRIBUTION PANEL WAS NOT ACCESSIBLE DURING SITE VISIT PERFORMED BY INFINIGY. CONTRACTOR SHALL INFORM ENGINEER IF THERE ARE ANY DISCREPANCIES IN PANEL SCHEDULE.

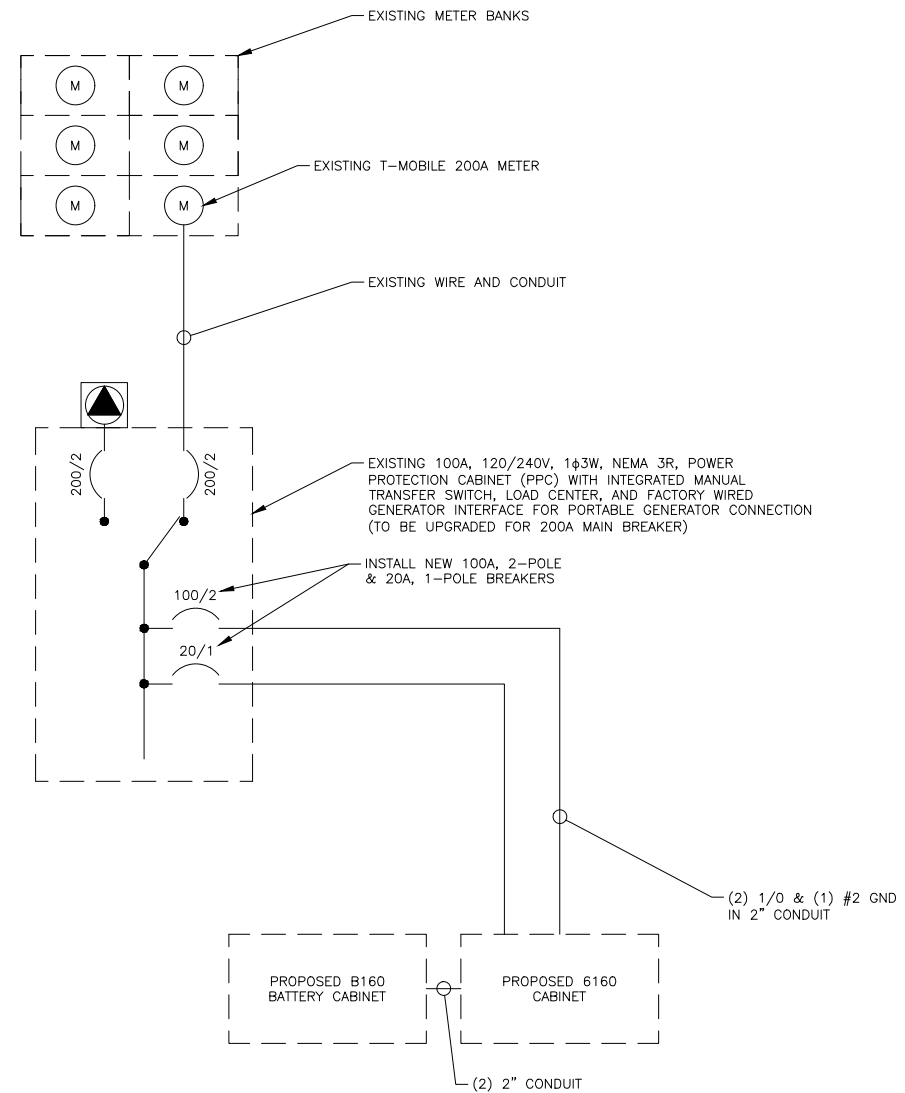
**T-MOBILE PANEL SCHEDULE**

<b>MAIN: 200A MAIN BREAKER</b>			<b>VOTAGE/PHASE: 120/240V, 1-PHASE, 3-WIRE</b>				<b>SHORT CIRCUIT CURRENT RATING: --</b>				
<b>MOUNTING: INSIDE PPC ENCLOSURE</b>			<b>ENCLOSURE: NEMA 3R</b>				<b>SURGE PROTECTION DEVICE: YES</b>				
DESCRIPTION	LOAD (VA)	C or NC	C/B	CIR No.	PHASE LOADS (VA)		CIR No.	C/B	C or NC	LOAD (VA)	DESCRIPTION
					A	B					
<b>6160</b>	<b>8750</b>	<b>C</b>	<b>100</b>	<b>1</b>	8751		<b>7</b>	<b>60</b>	<b>NC</b>	<b>1</b>	<b>SURGE ARRESTOR</b>
	<b>8750</b>	<b>C</b>		<b>2</b>		8751	<b>8</b>			<b>NC</b>	
<b>6160 GFI</b>	<b>180</b>	<b>NC</b>	<b>20</b>	<b>3</b>	180		<b>9</b>	<b>20</b>	<b>NC</b>	<b>0</b>	<b>OFF</b>
TELCO FAN	200	NC	10	4		200	10	20	NC	0	OFF
MMBS (TO BE OFF)	0	C	100	5	180		11	20	NC	180	EXTERNAL RECEPTACLE
	0	C		6		180	12	20	NC	180	INTERNAL RECEPTACLE
BASE LOAD (VA) =					9111	9131	C = CONTINUOUS LOAD; NC = NON-CONTINUOUS LOAD				
25% OF CONTINUOUS LOAD (VA) =					2188	2188	NEW BREAKER TO BE SAME TYPE AND HAVE SAME AIC RATING AS EXISTING. CUSTOMER HAS NOT PROVIDED LOADS FOR EQUIPMENT CABINETS THEREFORE THE CABINET LOADS SHOWN ARE ESTIMATED VALUES.				
TOTAL LOAD (VA) =					11299	11319					
TOTAL LOAD (A) =					94	94					

1 AC PANEL SCHEDULE  
SCALE: NOT TO SCALE

**NOTES:**

- ALL NEW CONDUCTORS TO BE INSTALLED SHALL BE COPPER. ALL CONDUCTORS SHALL BE THHW, THWN, THWN-2, XHHW, OR XHHW-2 UNLESS NOTED OTHERWISE.
- CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
- ALL GROUNDING AND BONDING PER THE NEC.



2 ONE LINE DIAGRAM  
SCALE: NOT TO SCALE



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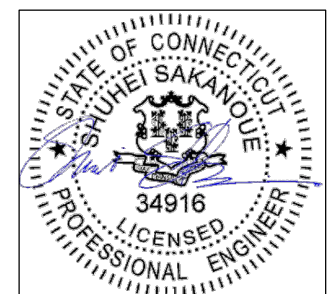
BU #: **876372**  
**SMITH HILLS / STERLING GRP. (S)**

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EXISTING 177'-0" MONOPOLE

**ISSUED FOR:**

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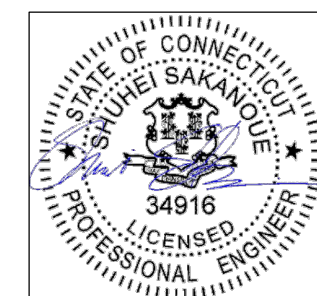
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EXISTING 177'-0" MONOPOLE

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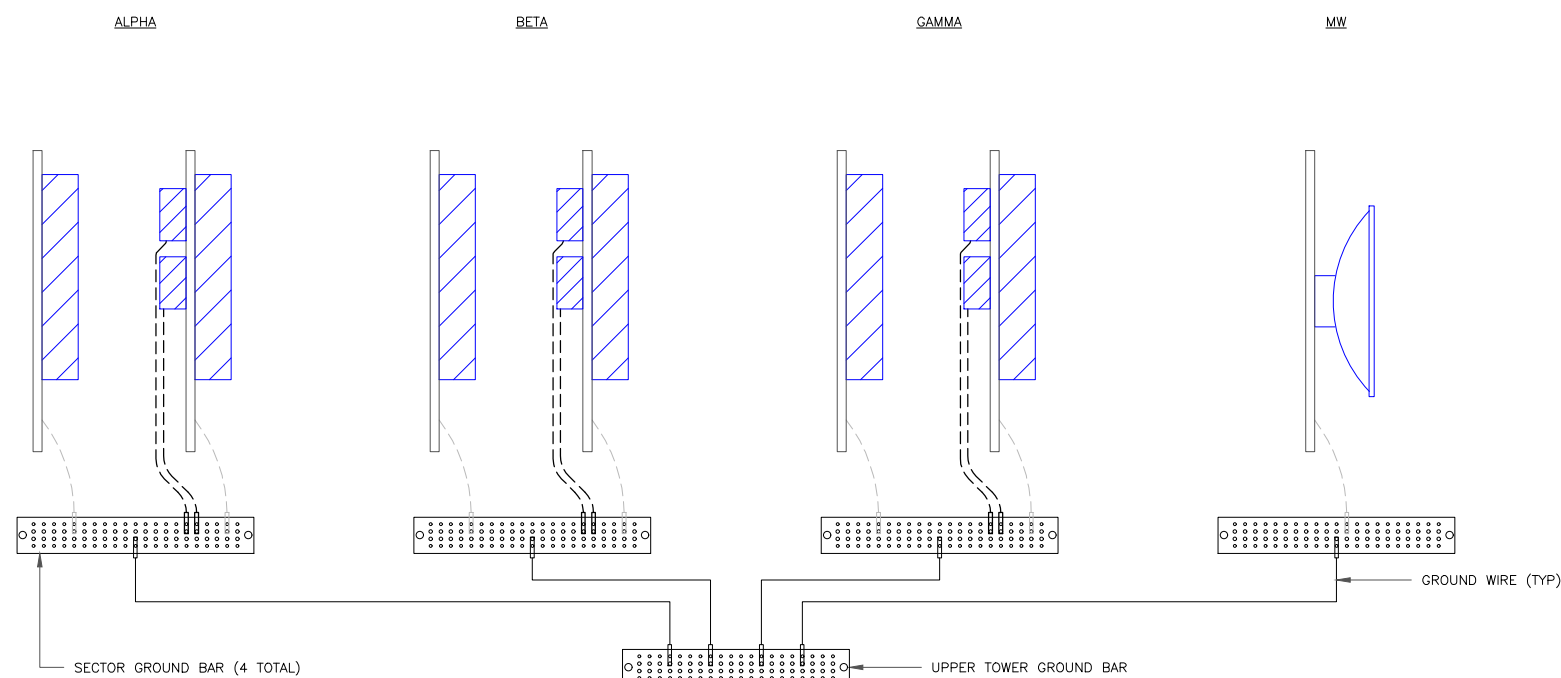


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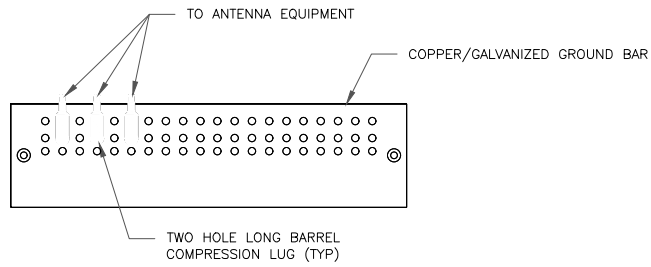
**G-1 0**



**NOTE:**  
ALL NEW GROUNDS TO BE #6 STRANDED  
COPPER WITH GREEN INSULATION UNLESS  
NOTED OTHERWISE.

**1** ANTENNA GROUNDING DIAGRAM  
SCALE: NOT TO SCALE

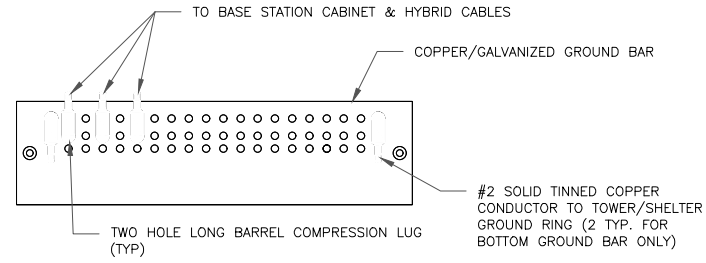




NOTES:

- DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
- EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
- GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO ANTENNA MOUNT STEEL.

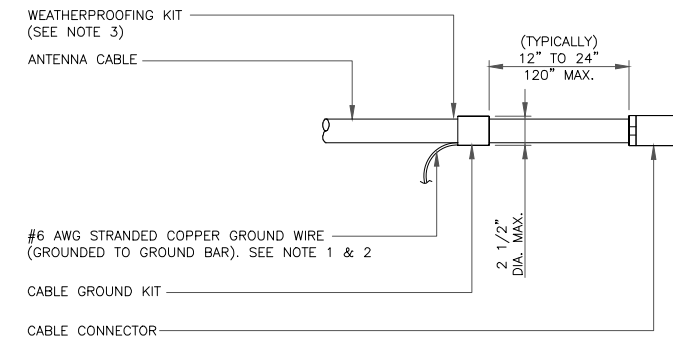
1 ANTENNA SECTOR GROUND BAR DETAIL  
SCALE: NOT TO SCALE



NOTES:

- EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
- GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
- GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

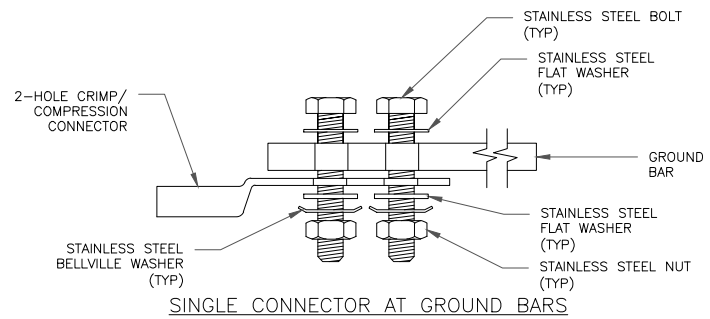
2 TOWER/SHELTER GROUND BAR DETAIL  
SCALE: NOT TO SCALE



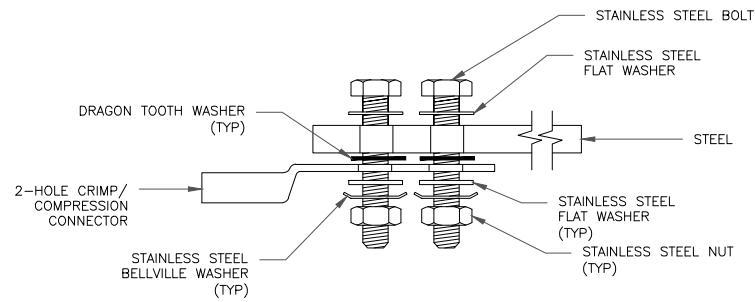
NOTES:

- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
- GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
- WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

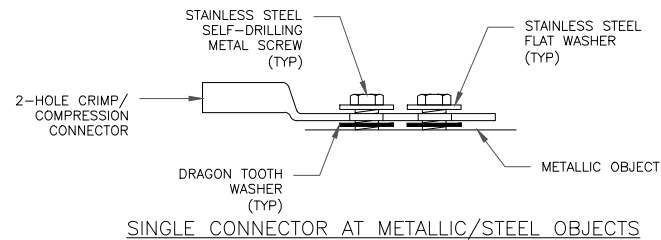
3 CABLE GROUND KIT CONNECTION  
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS



SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

4 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS  
SCALE: NOT TO SCALE

5 NOT USED  
SCALE: NOT TO SCALE

6 NOT USED  
SCALE: NOT TO SCALE

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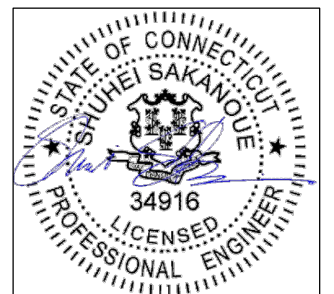
T-MOBILE SITE NUMBER:  
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BU #: 876372  
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