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

October 28, 2021

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

RE: **Notice of Exempt Modification for T-Mobile**
Crown#876369; T-Mobile Site ID CTNH558A
64 Hungerford Lane, Harwinton, CT 06791
Latitude: 41° 45′ 26.15" / Longitude: -73° 3′ 9.20″

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 178-foot mount on the existing 178-foot monopole tower located at 64 Hungerford Lane, Harwinton, CT. The property is owned by Red Wolf Broadcasting Corporation and the tower is owned by Crown Castle. T-Mobile now intends to replace six (6) antennas and ancillary equipment at the 178ft 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) Ericsson – AIR6449 B41 Antennas
(3) RFS-APXVAALL24_43-U-NA20 Antennas
(3) Ericsson- RRU 4460 B25+B66
(3) Ericsson- Radio 4480 B71+B85
(4) Hybrid 1-5/8" Cables
(3) New Antenna Mounts

Remove:

(3) RFS -APXVTM14-C-120 Antennas
(3) RFS -APXVSPP18C-A20
(6) Sprint -RRH
(9) Sprint -TMAs
(4) 1-1/4" Coax Cables
(3) Hybrid 1-5/8" Cables
(1) Antenna Mount Platform
(1) RRH Mount

Ground:

Install New:

(1) 6160 Cabinet
(1) B160 Battery Cabinet
(1) CSR IXRE V2 (Gen2) Router
(1) PSU 4813 Voltage Booster
(3.) BB 6648 In (P) Cabinet
(1) CSR IXRc V2 Router in (P) Cabinet

Remove:

(1.) MMBS Equipment Cabinet
(1.) BBU Equipment Cabinet

The facility was approved by the Town of Harwinton Building Official by way of building permit on May 29, 2001.

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 Mr. Michael R. Criss, First Selectman Town of Harwinton, Ms. Polly Redmond, Land Use Coordinator, Town of Harwinton and Red Wolf Broadcasting Corporation, 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.

Sincerely,

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

Attachments
cc:

Michael R. Criss, First Selectman
Town of Harwinton
100 Bentley Drive
Harwinton, CT 06791
(860) 485-9051

Polly Redmond, Land Use Coordinator
Town of Harwinton
100 Bentley Drive
Harwinton, CT 06791
(860) 485-2784

Red Wolf Broadcasting Corporation
758 Colonel Ledyard Highway
Ledway, CT 06339

Crown Castle, Tower Owner

Building Permit

09

TOWN OF HARWINTON

MINIMUM FEE: $.

DATE: 5/29/01

TYPE OF INSTALLATION

ELECTRICAL SERVICE-NEW OR CHANGE		WATER HEATER	
ELECTRICAL INSTALLATION		ROOFING	
ELECTRICAL-SWIMMING POOL		RE-ROOFING:	
PLUMBING INSTALLATION		HOW MANY LAYERS?	
HEATING INSTALLATION		SIDING	
AIR CONDITIONING		OTHER	
OIL BURNER-GAS BURNER			
WOODBURNING STOVE			
CHIMNEY INSTALLATION		Steve Flynn 485	

NAME OF CONTRACTOR Baron Wireless Corporation

ADDRESS OF CONTRACTOR 24 Corporate Circle Albany NY 12203

LICENSE # 009-00-619 EXPIRATION DATE _____ TELE. # 518-456-8114

REQUEST PERMISSION TO PERFORM _____

AT: LOT # 21A-21-3 STREET ADDRESS Hungerford Lane

ESTIMATED COST $272,000.00

REMARKS: _____

OWNER Tower owner: Sprint Spectrum LP

ADDRESS One International Blvd. 3rd Floor Mahwah NJ 07495

VALUATION OF WORK $272,000.00

FEE $4 per $1000.00

PERMIT # 4587

Frank Rydzik 4

BUILDING OFFICIAL

PAID DATE 5-29-01

10-15-2001

BUILDING INSPECTION DIVISION HARWINTON, CONN.

CERTIFICATE OF OCCUPANCY

Sprint Spectrum L P

This is to certify that the ~~new house~~ at Tele Communication Tower
Lot as constructed under Permit No conforms substantially to the requirements of the State Building Code and is hereby approved for occupancy as indicated below. At the date and time this Certificate is issued the house is owned by

Approved for occupancy: Sprint Spectrum L P

Basement
•

Towers ok

First Floor
•

Second Floor
•

Use Group:
Type of Construction:

Frank Lyle

This certificate is VOID unless signed by the Building Official

qPublic.net™ Town of Harwinton, CT

Summary

ParcelId	341
Account Number	595
Location Address	64 HUNGERFORD LA
Map-Block-Lot	D5 /02 /0032
Use Class/Description	2-1 COMM LAND
Assessing Neighborhood	0001A
Census Tract	2984
Acreage	40.28
Utilities	

Owner

RED WOLF BROADCASTING CORPORATION
758 COLONEL LEDYARD HIGHWAY
LEDYARD, CT 06339

Current Appraised Value

	2019	2018	2017
+ Building Value	$76,360	$76,360	$35,280
+ XF Value	$0	$0	$0
+ OB Value	$2,950	$2,950	$3,950
+ Land Value	$3,139,960	$3,139,960	$367,850
+ Special Land Value			
+ Total Appraised Value	$3,219,270	$3,219,270	$407,080
+ Net Appraised Value	$3,219,270	$3,219,270	$407,080
+ Current Assessment	$293,590	$293,590	$284,960

Assessment History

	2018	2017	2016	2015
+ Building Value	$53,450	$24,700	$24,700	$24,700
+ OB/Misc	$2,060	$2,760	$2,760	$2,760
+ Land	$238,080	$257,500	$257,500	$257,500
+ Total Assessment	$293,590	$284,960	$284,960	$284,960

Land

Use	Class	Zoning	Area	Value
2-1 COMM LAND	C	CR2	1 AC	$74,330
5-2V EX COMM V	C		10.97 AC	$78,980
3-1 IND LAND	I		1 BL	$180,000
6-2 FOREST LD	R		28.31 AC	$2,806,650

Commercial Building

Building #	1
Style	Office Bldg
Actual Year Built	1964
Effective Year Built	1965
Gross Area	1230
Stories	1
Grade	Below Average
Exterior Wall	Brick/Masonry
Interior Wall	Drywall/Sheet
Wall Height	8
Units	1
Roof Cover	Asph/F Gls/Cmp
Roof Structure	Gable/Hip
Floor Type	Quarry Tile
Heat Type	Oil
Heat Fuel	Forced Air-Duc
AC Type	HEAT/AC PKGS
Sprinkler	03

Construction	MASONRY
Plumbing	AVERAGE
Comm Walls	0

Building Sub Areas

Code	Description	Living Area	Gross Area	Effective Area
BAS		1200	1200	1200
FEP	Enclosed Porch	0	30	20
	Totals	1200	1230	1220

Out Buildings\Extra Features

Description	Sub Description	Area	Year Built	Value
SHED FRAME AVE		360S.F.	2004	$2,790
PATIO GOOD		36S.F.	2000	$160

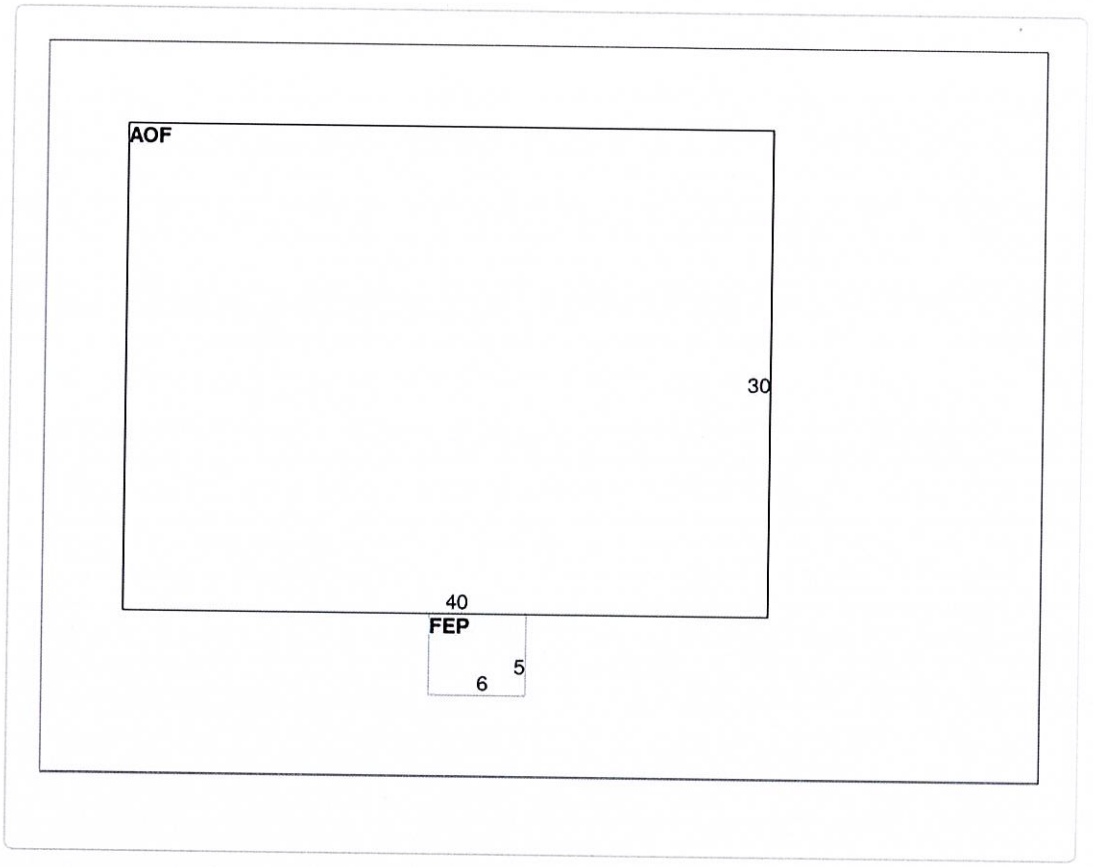
Sales History

Sales Date	Type of Document	Grantee	Vacant/Improved	Book/Page	Amount
04-04-2018		RED WOLF BROADCASTING CORPORATION	Improved	0256/0776	$407,080
07-09-2014		CONNOISSEUR MEDIA OF CONNECTICUT LLC	Improved	0243/1029	$407,080
07-23-1997		BUCKLEY BROADCASTING CORP OF CT	Improved	0145/0372	$0
01-09-1997		USA	Improved	0145/0216	$0
07-24-1985		CONSUMER SERVICE RADIO INC	Improved	0101/0665	$0

Permit Information

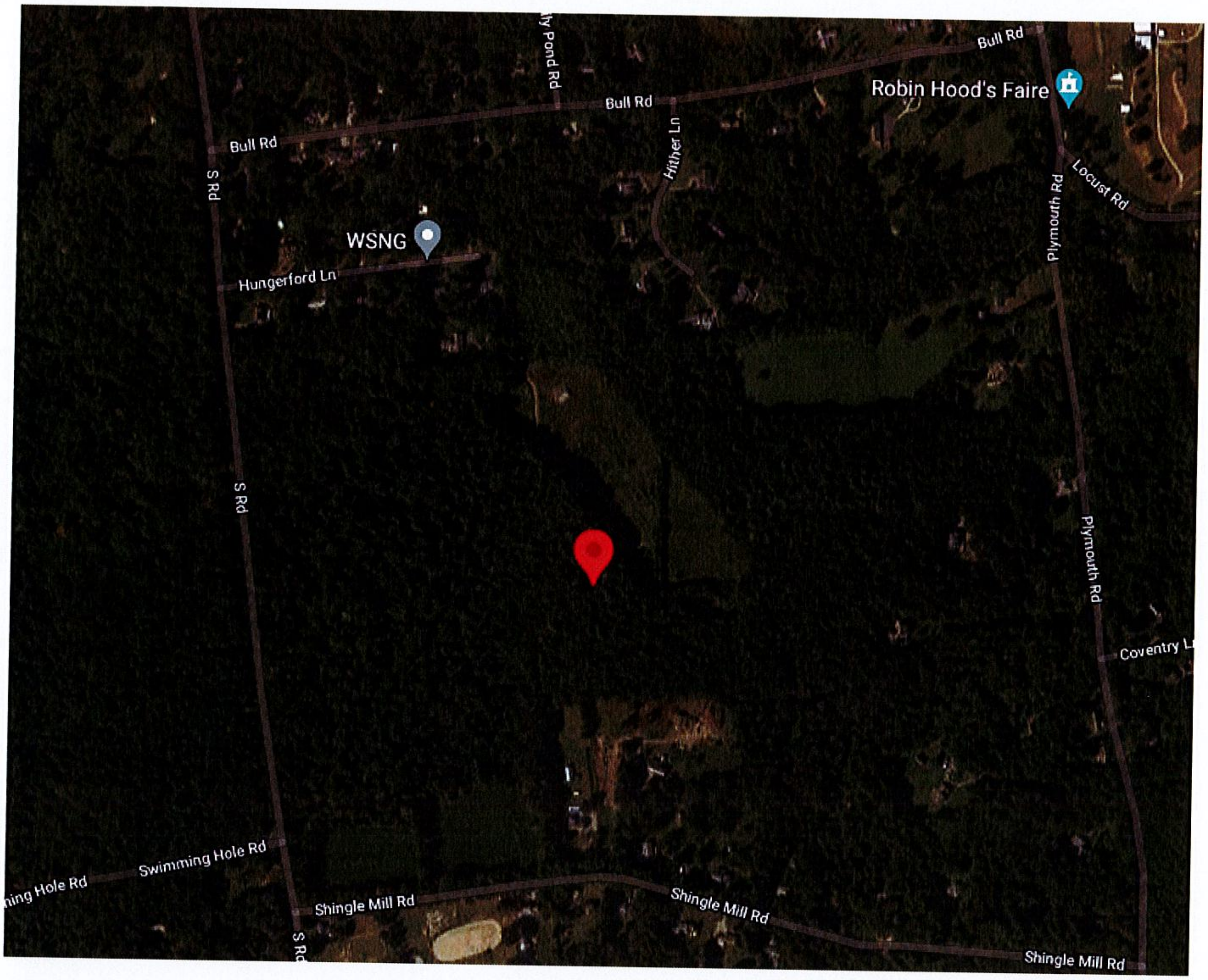
Permit ID	Issue Date	Type	Description	Amount	Inspection Date	% Complete	Date Complete	Comments
17126B	09-11-2017		3 ANTENNAS	$20,000		100		
	11-30-2015		CERTIFCATE OF APPROV	$0		0		
9417	10-24-2014		MODIFICATIONS	$20,000		0		
8721	11-29-2012		CELL TOWER MODIFICAT	$25,000		0		
8703	11-21-2012		ANTENNAS	$12,000		0		
8619	10-02-2012		REPLACE 6 ANTENNAS O	$10,000		0		
CO	04-17-2006		CO ISSUED	$0		0		
6239	01-17-2006			$50,000		0		PREFAB CONCRETE SHELTER

Sketch



Photos

No data available for the following modules: Building Data.


Bull Rd
Bull Rd
Bull Rd
Robin Hood's Faire
Hither Ln
Locust Rd
S Rd
WSNG
Hungerford Ln
Plymouth Rd
S Rd
Plymouth Rd
Swimming Hole Rd
Shingle Mill Rd
Shingle Mill Rd
Shingle Mill Rd

Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Friday, October 29, 2021 10:21 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 775058972717: Your package has been delivered

Hi. Your package was delivered Fri, 10/29/2021 at 10:19am.

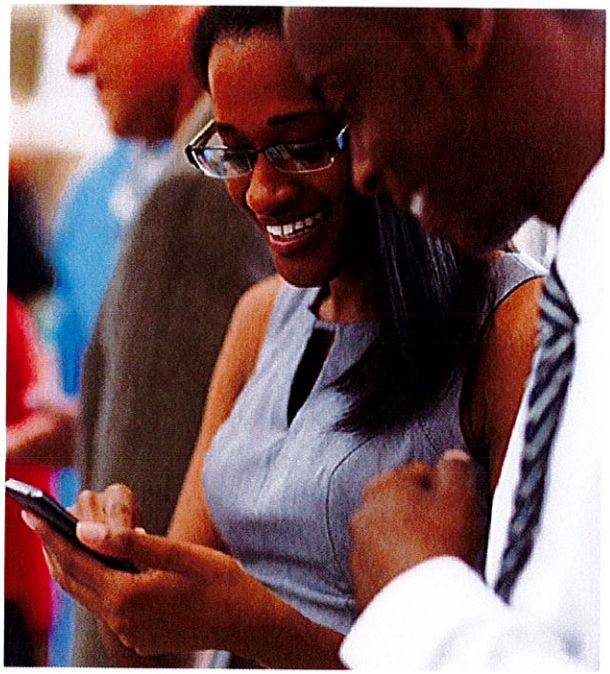
Delivered to 100 BENTLEY DR, HARWINTON, CT 06791

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER 775058972717

FROM Jeff Barbadora
1800 W. Park Drive
WESTBOROUGH, MA, US, 01581

TO	Town of Harwinton Polly Redmond 100 Bentley Drive HARWINTON, CT, US, 06791
REFERENCE	799001.7680
SHIPPER REFERENCE	799001.7680
SHIP DATE	Thu 10/28/2021 06:04 PM
PACKAGING TYPE	FedEx Envelope
ORIGIN	WESTBOROUGH, MA, US, 01581
DESTINATION	HARWINTON, CT, US, 06791
SPECIAL HANDLING	Deliver Weekday
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Priority Overnight



Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Friday, October 29, 2021 10:21 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 775058906587: Your package has been delivered

Hi. Your package was delivered Fri, 10/29/2021 at 10:19am.

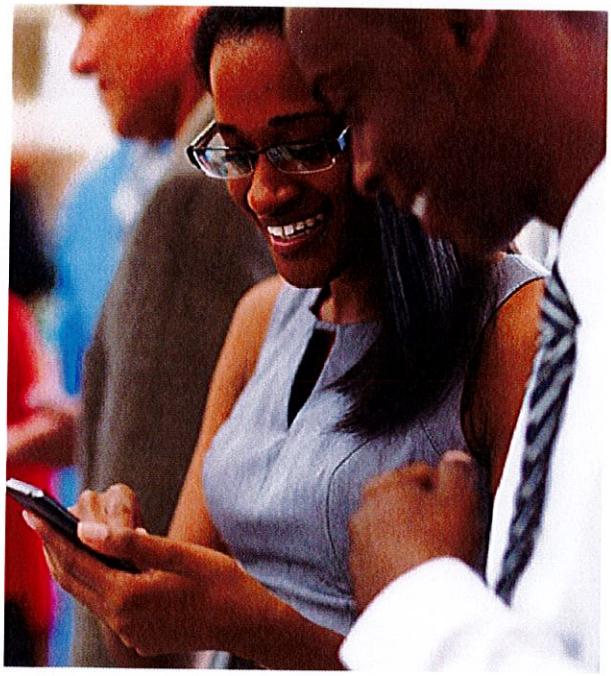
Delivered to 100 BENTLEY DR, HARWINTON, CT 06791

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER 775058906587

FROM Jeff Barbadora
1800 W. Park Drive
WESTBOROUGH, MA, US, 01581

TO	Town of Harwinton Michael R. Criss, First Selectman 100 Bentley Drive HARWINTON, CT, US, 06791
REFERENCE	799001.7680
SHIPPER REFERENCE	799001.7680
SHIP DATE	Thu 10/28/2021 06:04 PM
PACKAGING TYPE	FedEx Envelope
ORIGIN	WESTBOROUGH, MA, US, 01581
DESTINATION	HARWINTON, CT, US, 06791
SPECIAL HANDLING	Deliver Weekday
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Priority Overnight



Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Friday, October 29, 2021 11:53 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 775059109488: Your package has been delivered

FedEx®

Hi. Your package was delivered Fri, 10/29/2021 at 11:50am.

Delivered to 758 COLONEL LEDYARD HWY, LEDYARD, CT 06339
Received by K.SCHLOUGH

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER 775059109488

FROM	Jeff Barbadora 1800 W. Park Drive WESTBOROUGH, MA, US, 01581
TO	Red Wolf Broadcasting Corporation Red Wolf 758 Colonel Ledyard Highway LEDYARD, CT, US, 06339
REFERENCE	799001.7680
SHIPPER REFERENCE	799001.7680
SHIP DATE	Thu 10/28/2021 06:04 PM
DELIVERED TO	Receptionist/Front Desk
PACKAGING TYPE	FedEx Envelope
ORIGIN	WESTBOROUGH, MA, US, 01581
DESTINATION	LEDYARD, CT, US, 06339
SPECIAL HANDLING	Deliver Weekday
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Priority Overnight

Date: **October 04, 2021**

MORRISON HERSHFIELD

Morrison Hershfield
1455 Lincoln Parkway, Suite 500
Atlanta, GA 30346
(770) 397-8500

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Sprint PCS* Co-Locate**	
	Site Number:	CTNH558A
	Site Name:	CT33XC021
Crown Castle Designation:	**BU Number:**	876369
	Site Name:	Harwinton / Buckley Broadcasti
	JDE Job Number:	684636
	Work Order Number:	2014548
	Order Number:	584628 Rev. 0
Engineering Firm Designation:	**Morrison Hershfield Project Number:** CN9-742 / 2101398	
Site Data:	**64 Hungerford Lane, Harwinton, Litchfield County, CT 06791** **Latitude *41° 45' 26.15"*, Longitude *-73° 3' 9.2"*** **178 Foot – EEI Monopole Tower**	

Morrison Hershfield 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:

LC7: Proposed Equipment Configuration **Sufficient Capacity – 75%**

This analysis utilizes an ultimate 3-second gust wind speed of 115 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 – Analysis Criteria.

Respectfully submitted by:

STATE OF CONNECTICUT
G. LANCE COOKE
No. 28133
LICENSED PROFESSIONAL ENGINEER

G. Lance Cooke, P.E. (CT License No. PEN.0028133)
Senior Engineer

Digitally signed by G. Lance Cooke
Date: 2021.10.04 10:59:29-07'00'

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 178 ft Monopole tower designed by Engineered Endeavors, Inc.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	115 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	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)
178.0	180.0	3	ericsson	AIR6449 B41_T-MOBILE	3	1-5/8
		3	ericsson	RADIO 4460 B2/B25 B66_TMO		
		3	ericsson	Radio 4480_TMOV2		
		3	rfs celwave	APXVAALL24_43-U-NA20_TMO		
	178.0	12	-	8 ft Length, P2STD Mount Pipe		
		3	Site Pro 1	Sector Frame [#VFA12-HD]		
		1	Site Pro 1	Side Arm Mount [#MSFAA]		

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)
168.0	170.0	6	antel	LPA-80080/6CF w/ Mount Pipe	7	1-5/8
		6	quintel technology	QS6656-5D w/ Mount Pipe		
		3	samsung telecommunications	MT6407-77A w/ Mount Pipe		
		3	samsung telecommunications	RFV01U-D1A		
		3	samsung telecommunications	RFV01U-D2A		
		1	rfs celwave	DB-C1-12C-24AB-0Z		
	168.0	1	-	Platform Mount [LP 403-1_KCKR]		
156.0	158.0	1	cci antennas	HPA65R-BU6A w/ Mount Pipe	12 2 2 1 1	1-5/8 3/4 7/16 3/8 2C
		2	commscope	SBNHH-1D65A w/ Mount Pipe		
		3	kathrein	80010964 w/ Mount Pipe		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 8843 B2/B66A		
		6	lucent	LGP21401		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		1	raycap	DC6-48-60-18-8C-EV		
		1	raycap	DC6-48-60-18-8F		
	156.0	1	-	Platform Mount [LP 303-1]		
148.0	148.0	3	jma wireless	MX08FRO665-21 w/ Mount Pipe	1	1-1/2
		3	fujitsu	TA08025-B604		
		3	fujitsu	TA08025-B605		
		1	raycap	RDIDC-9181-PF-48		
		1	-	Commscope MC-PK8-DSH		
75.0	76.0	1	lucent	KS24019-L112A	1	1/2
	75.0	1	-	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	1532983	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	2150286	CCISITES
4-TOWER MANUFACTURER DRAWINGS	2150280	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) 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. Morrison Hershfield 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)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	178 - 129.87	Pole	TP29.64x19.5x0.25	1	-17.49	1388.85	67.3	Pass
L2	129.87 - 84.83	Pole	TP38.5x28.2446x0.375	2	-27.17	2706.28	65.5	Pass
L3	84.83 - 41.28	Pole	TP46.8x36.641x0.4375	3	-40.46	3840.74	64.6	Pass
L4	41.28 - 0	Pole	TP54.5x44.5907x0.5	4	-59.73	5264.00	60.4	Pass
							Summary	
						Pole (L1)	67.3	Pass
						Rating =	67.3	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	62.0	Pass
1	Base Plate		68.3	Pass
1	Base Foundation (Structure)	0	71.9	Pass
1	Base Foundation (Soil Interaction)		75.0	Pass

Structure Rating (max from all components) =	75%*

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) *Rating per TIA-222-H, Section 15.5.

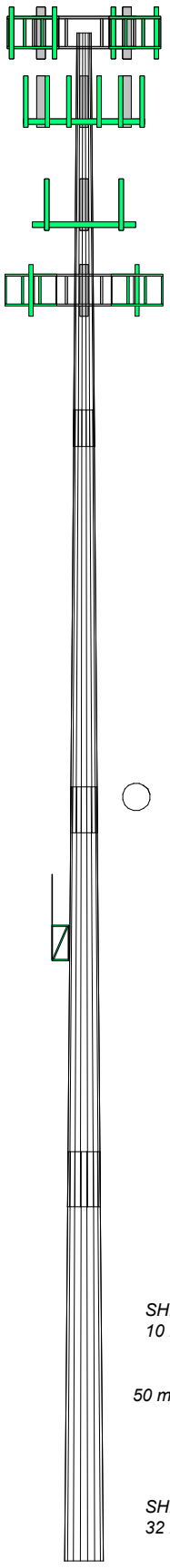
4.1) Recommendations

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

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	48.13	18	0.2500	4.25	19.5000	29.6400	A572-65	3.2
2	49.29	18	0.3750	5.33	28.2446	38.5000		6.6
3	48.88	18	0.4375	6.42	36.6410	46.8000		9.5
4	47.70	18	0.5000		44.5907	54.5000		12.6



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 115 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 67.3%

ALL REACTIONS ARE FACTORED

AXIAL 80 K

SHEAR 10 K *MOMENT 1302 kip-ft*

TORQUE 0 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 60 K

SHEAR 32 K *MOMENT 4246 kip-ft*

TORQUE 2 kip-ft
REACTIONS - 115 mph WIND

Morrison Hershfield
Consulting Engineers
1455 Lincoln Parkway, Suite 500
Atlanta, GA 30346
Phone: (770) 397-8500
FAX: (770) 397-8501

Job: ***CN9-742 / 2101398***			
Project: ***876369 / Harwinton / Buckley Broadcasti***			
Client: Crown Castle USA	Drawn by: BP	App'd:	
Code: TIA-222-H	Date: 10/04/21	Scale: NTS	
Path:		Dwg No. E-1	

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 Litchfield County, Connecticut.
Tower base elevation above sea level: 841.00 ft.
Basic wind speed of 115 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 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in 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

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	178.00-129.87	48.13	4.25	18	19.5000	29.6400	0.2500	1.0000	A572-65 (65 ksi)

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
L2	129.87-84.83	49.29	5.33	18	28.2446	38.5000	0.3750	1.5000	A572-65 (65 ksi)
L3	84.83-41.28	48.88	6.42	18	36.6410	46.8000	0.4375	1.7500	A572-65 (65 ksi)
L4	41.28-0.00	47.70		18	44.5907	54.5000	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	19.7623	15.2749	715.1161	6.8338	9.9060	72.1902	1431.1733	7.6389	2.9920	11.968
	30.0587	23.3210	2544.9728	10.4335	15.0571	169.0212	5093.2943	11.6627	4.7766	19.107
L2	29.5204	33.1718	3255.1307	9.8937	14.3483	226.8658	6514.5446	16.5891	4.3111	11.496
	39.0361	45.3783	8333.0732	13.5344	19.5580	426.0698	16677.1113	22.6935	6.1160	16.309
L3	38.2636	50.2731	8324.8252	12.8523	18.6136	447.2432	16660.6044	25.1413	5.6788	12.98
	47.4545	64.3801	17483.2823	16.4587	23.7744	735.3827	34989.5695	32.1962	7.4668	17.067
L4	46.5557	69.9719	17185.2300	15.6522	22.6521	758.6603	34393.0729	34.9926	6.9680	13.936
	55.2636	85.6980	31571.5320	19.1700	27.6860	1140.3428	63184.6066	42.8571	8.7120	17.424

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 178.00-129.87				1	1	1			
L2 129.87-84.83				1	1	1			
L3 84.83-41.28				1	1	1			
L4 41.28-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
*****										
Safety Line 3/8"	C	No	Surface Ar (CaAa)	178.00 - 10.00	1	1	0.450 0.450	0.3750		0.22
Climbing Pegs	C	No	Surface Ar (CaAa)	178.00 - 10.00	1	1	0.400 0.500	0.7050		1.80
LDF7-50A(1-5/8)	A	No	Surface Ar (CaAa)	168.00 - 9.00	2	2	-0.080 0.000	1.9800		0.82
***										
HB158-1-13U6-S6F18(1-5/8)	A	No	Surface Ar (CaAa)	168.00 - 9.00	1	1	-0.080 -0.080	1.9800		1.90
*****										
LDF4-50A(1/2)	C	No	Surface Ar (CaAa)	75.00 - 9.00	1	1	0.200 0.200	0.6250		0.15

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
*****									
***									
HB158-21U6S24-xxM_TMO(1-5/8)	C	No	No	Inside Pole	178.00 - 9.00	3	No Ice	0.00	2.50
							1/2" Ice	0.00	2.50
							1" Ice	0.00	2.50
*****									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	168.00 - 9.00	4	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
*****									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	156.00 - 9.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
FB-L98B-002-75000(3/8)	A	No	No	Inside Pole	156.00 - 9.00	2	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
WR-VG122ST-BRDA(7/16)	A	No	No	Inside Pole	156.00 - 9.00	2	No Ice	0.00	0.14
							1/2" Ice	0.00	0.14
							1" Ice	0.00	0.14
WR-VG86ST-BRD(3/4)	A	No	No	Inside Pole	156.00 - 9.00	2	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
2" Rigid Conduit	C	No	No	Inside Pole	156.00 - 9.00	1	No Ice	0.00	2.80
							1/2" Ice	0.00	2.80
							1" Ice	0.00	2.80
*****									
CU12PSM9P6XXX (1-1/2)	B	No	No	Inside Pole	148.00 - 9.00	1	No Ice	0.00	2.35
							1/2" Ice	0.00	2.35
							1" Ice	0.00	2.35

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	178.00-129.87	A	0.000	0.000	22.649	0.000	0.56
		B	0.000	0.000	0.000	0.000	0.04
		C	0.000	0.000	5.198	0.000	0.53
L2	129.87-84.83	A	0.000	0.000	26.754	0.000	0.82
		B	0.000	0.000	0.000	0.000	0.11
		C	0.000	0.000	4.864	0.000	0.56
L3	84.83-41.28	A	0.000	0.000	25.869	0.000	0.79
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	6.811	0.000	0.54
L4	41.28-0.00	A	0.000	0.000	19.174	0.000	0.59
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	5.396	0.000	0.40

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	178.00-129.87	A	0.991	0.000	0.000	43.421	0.000	0.90
		B		0.000	0.000	0.000	0.000	0.04
		C		0.000	0.000	24.269	0.000	0.71
L2	129.87-84.83	A	0.956	0.000	0.000	51.290	0.000	1.23
		B		0.000	0.000	0.000	0.000	0.11
		C		0.000	0.000	22.710	0.000	0.72

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L3	84.83-41.28	A	0.906	0.000	0.000	48.910	0.000	1.17
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	29.905	0.000	0.76
L4	41.28-0.00	A	0.812	0.000	0.000	35.535	0.000	0.85
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	22.587	0.000	0.56

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	178.00-129.87	-3.3650	-0.8594	-3.6834	-0.2773
L2	129.87-84.83	-4.0316	-1.1340	-4.4606	-0.5276
L3	84.83-41.28	-4.2708	-0.8716	-4.8811	0.0288
L4	41.28-0.00	-3.5327	-0.6639	-4.1688	0.1065

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	2	Safety Line 3/8"	129.87 - 178.00	1.0000	1.0000
L1	3	Climbing Pegs	129.87 - 178.00	1.0000	1.0000
L1	11	LDF7-50A(1-5/8)	129.87 - 168.00	1.0000	1.0000
L1	13	HB158-1-13U6-S6F18(1-5/8)	129.87 - 168.00	1.0000	1.0000
L2	2	Safety Line 3/8"	84.83 - 129.87	1.0000	1.0000
L2	3	Climbing Pegs	84.83 - 129.87	1.0000	1.0000
L2	11	LDF7-50A(1-5/8)	84.83 - 129.87	1.0000	1.0000
L2	13	HB158-1-13U6-S6F18(1-5/8)	84.83 - 129.87	1.0000	1.0000
L3	2	Safety Line 3/8"	41.28 - 84.83	1.0000	1.0000
L3	3	Climbing Pegs	41.28 - 84.83	1.0000	1.0000
L3	11	LDF7-50A(1-5/8)	41.28 - 84.83	1.0000	1.0000
L3	13	HB158-1-13U6-S6F18(1-5/8)	41.28 - 84.83	1.0000	1.0000
L3	23	LDF4-50A(1/2)	41.28 - 75.00	1.0000	1.0000
L4	2	Safety Line 3/8"	10.00 - 41.28	1.0000	1.0000
L4	3	Climbing Pegs	10.00 - 41.28	1.0000	1.0000
L4	11	LDF7-50A(1-5/8)	9.00 - 41.28	1.0000	1.0000
L4	13	HB158-1-13U6-S6F18(1-5/8)	9.00 - 41.28	1.0000	1.0000
L4	23	LDF4-50A(1/2)	9.00 - 41.28	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***** ***									
APXVAALL24_43-U-NA20_TMO	A	From Leg	4.00 0.00 2.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	14.67 15.43 16.21	5.32 5.99 6.68	0.15 0.26 0.38
APXVAALL24_43-U-NA20_TMO	B	From Leg	4.00 0.00 2.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	14.67 15.43 16.21	5.32 5.99 6.68	0.15 0.26 0.38

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVAALL24_43-U-NA20_TMO	C	From Leg	4.00 0.00 2.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	14.67 15.43 16.21	5.32 5.99 6.68	0.15 0.26 0.38
AIR6449 B41_T-MOBILE	A	From Leg	4.00 0.00 2.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	5.27 5.70 6.14	2.03 2.36 2.70	0.11 0.15 0.20
AIR6449 B41_T-MOBILE	B	From Leg	4.00 0.00 2.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	5.27 5.70 6.14	2.03 2.36 2.70	0.11 0.15 0.20
AIR6449 B41_T-MOBILE	C	From Leg	4.00 0.00 2.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	5.27 5.70 6.14	2.03 2.36 2.70	0.11 0.15 0.20
RADIO 4460 B2/B25 B66_TMO	A	From Leg	4.00 0.00 2.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
RADIO 4460 B2/B25 B66_TMO	B	From Leg	4.00 0.00 2.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
RADIO 4460 B2/B25 B66_TMO	C	From Leg	4.00 0.00 2.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
Radio 4480_TMOV2	A	From Leg	4.00 0.00 2.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
Radio 4480_TMOV2	B	From Leg	4.00 0.00 2.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
Radio 4480_TMOV2	C	From Leg	4.00 0.00 2.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
(4) 8 ft Length, P2STD Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
(4) 8 ft Length, P2STD Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
(4) 8 ft Length, P2STD Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
Side Arm Mount [#MSFAA]	C	None		0.0000	178.00	No Ice 1/2" Ice 1" Ice	7.64 8.80 10.16	7.64 8.80 10.16	0.23 0.36 0.52
Sector Frame [#VFA12-HD]	A	From Leg	2.00 0.00 0.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	13.20 19.50 25.80	9.20 14.60 20.00	0.66 0.80 0.95
Sector Frame [#VFA12-HD]	B	From Leg	2.00 0.00 0.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	13.20 19.50 25.80	9.20 14.60 20.00	0.66 0.80 0.95
Sector Frame [#VFA12-	C	From Leg	2.00	0.0000	178.00	No Ice	13.20	9.20	0.66

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
HD]			0.00 0.00			1/2" Ice 1" Ice	19.50 25.80	14.60 20.00	0.80 0.95
***** *****									
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.56 5.11 5.61	10.26 11.43 12.31	0.05 0.11 0.19
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.56 5.11 5.61	10.26 11.43 12.31	0.05 0.11 0.19
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.56 5.11 5.61	10.26 11.43 12.31	0.05 0.11 0.19
***									
(2) QS6656-5D w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.04 4.42 4.82	4.18 4.57 4.97	0.11 0.18 0.26
(2) QS6656-5D w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.04 4.42 4.82	4.18 4.57 4.97	0.11 0.18 0.26
(2) QS6656-5D w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.04 4.42 4.82	4.18 4.57 4.97	0.11 0.18 0.26
MT6407-77A w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
MT6407-77A w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
MT6407-77A w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
RFV01U-D1A	A	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	0.08 0.10 0.12
RFV01U-D1A	B	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	0.08 0.10 0.12
RFV01U-D1A	C	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	0.08 0.10 0.12
RFV01U-D2A	A	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	0.07 0.09 0.11
RFV01U-D2A	B	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	0.07 0.09 0.11
RFV01U-D2A	C	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice	1.88 2.05 2.22	1.01 1.14 1.28	0.07 0.09 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
DB-C1-12C-24AB-0Z	A	From Leg	4.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.06 4.32 4.58	3.10 3.34 3.58	0.03 0.07 0.11
Platform Mount [LP 403-1_KCKR]	C	None		0.0000	168.00	No Ice 1/2" Ice 1" Ice	30.16 37.53 45.13	30.16 37.53 45.13	1.77 2.32 2.97
*****									
7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
80010964 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	8.61 9.18 9.77	4.10 4.59 5.10	0.12 0.19 0.26
80010964 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	8.61 9.18 9.77	4.10 4.59 5.10	0.12 0.19 0.26
80010964 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	8.61 9.18 9.77	4.10 4.59 5.10	0.12 0.19 0.26
HPA65R-BU6A w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	5.83 6.40 6.99	5.00 5.56 6.13	0.08 0.14 0.22
SBNHH-1D65A w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	3.04 3.34 3.65	2.45 2.75 3.05	0.05 0.10 0.16
SBNHH-1D65A w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	3.04 3.34 3.65	2.45 2.75 3.05	0.05 0.10 0.16
(2) LGP21401	A	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	0.82 0.94 1.06	0.35 0.44 0.54	0.02 0.02 0.03
(2) LGP21401	B	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	0.82 0.94 1.06	0.35 0.44 0.54	0.02 0.02 0.03
(2) LGP21401	C	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	0.82 0.94 1.06	0.35 0.44 0.54	0.02 0.02 0.03
RRUS 4449 B5/B12	A	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	1.97 2.14 2.33	1.41 1.56 1.73	0.07 0.09 0.11
RRUS 4449 B5/B12	B	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice Ice	1.97 2.14 2.33	1.41 1.56 1.73	0.07 0.09 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
RRUS 4449 B5/B12	C	From Leg	4.00	0.0000	156.00	No Ice	1.97	1.41	0.07
			0.00			1/2" Ice	2.14	1.56	0.09
			2.00			1" Ice	2.33	1.73	0.11
RRUS 8843 B2/B66A	A	From Leg	4.00	0.0000	156.00	No Ice	1.64	1.35	0.07
			0.00			1/2" Ice	1.80	1.50	0.09
			2.00			1" Ice	1.97	1.65	0.11
RRUS 8843 B2/B66A	B	From Leg	4.00	0.0000	156.00	No Ice	1.64	1.35	0.07
			0.00			1/2" Ice	1.80	1.50	0.09
			2.00			1" Ice	1.97	1.65	0.11
RRUS 8843 B2/B66A	C	From Leg	4.00	0.0000	156.00	No Ice	1.64	1.35	0.07
			0.00			1/2" Ice	1.80	1.50	0.09
			2.00			1" Ice	1.97	1.65	0.11
DC6-48-60-18-8C-EV	A	From Leg	4.00	0.0000	156.00	No Ice	2.74	2.74	0.03
			0.00			1/2" Ice	2.96	2.96	0.05
			2.00			1" Ice	3.20	3.20	0.08
DC6-48-60-18-8F	C	From Leg	4.00	0.0000	156.00	No Ice	0.92	0.92	0.02
			0.00			1/2" Ice	1.46	1.46	0.04
			2.00			1" Ice	1.64	1.64	0.06
6' x 2" Mount Pipe	A	From Leg	4.00	0.0000	156.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05
6' x 2" Mount Pipe	B	From Leg	4.00	0.0000	156.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05
6' x 2" Mount Pipe	C	From Leg	4.00	0.0000	156.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05
Platform Mount [LP 303-1]	C	None		0.0000	156.00	No Ice	14.69	14.69	1.25
						1/2" Ice	18.01	18.01	1.57
						1" Ice	21.34	21.34	1.94
*****									
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00	0.0000	148.00	No Ice	8.01	4.23	0.11
			0.00			1/2" Ice	8.52	4.69	0.19
			0.00			1" Ice	9.04	5.16	0.29
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00	0.0000	148.00	No Ice	8.01	4.23	0.11
			0.00			1/2" Ice	8.52	4.69	0.19
			0.00			1" Ice	9.04	5.16	0.29
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00	0.0000	148.00	No Ice	8.01	4.23	0.11
			0.00			1/2" Ice	8.52	4.69	0.19
			0.00			1" Ice	9.04	5.16	0.29
TA08025-B604	A	From Leg	4.00	0.0000	148.00	No Ice	1.96	0.98	0.06
			0.00			1/2" Ice	2.14	1.11	0.08
			0.00			1" Ice	2.32	1.25	0.10
TA08025-B604	B	From Leg	4.00	0.0000	148.00	No Ice	1.96	0.98	0.06
			0.00			1/2" Ice	2.14	1.11	0.08
			0.00			1" Ice	2.32	1.25	0.10
TA08025-B604	C	From Leg	4.00	0.0000	148.00	No Ice	1.96	0.98	0.06
			0.00			1/2" Ice	2.14	1.11	0.08
			0.00			1" Ice	2.32	1.25	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
TA08025-B605	A	From Leg	4.00	0.0000	148.00	No Ice	1.96	1.13	0.08
			0.00			1/2"	2.14	1.27	0.09
			0.00			Ice	2.32	1.41	0.11
						1" Ice			
TA08025-B605	B	From Leg	4.00	0.0000	148.00	No Ice	1.96	1.13	0.08
			0.00			1/2"	2.14	1.27	0.09
			0.00			Ice	2.32	1.41	0.11
						1" Ice			
TA08025-B605	C	From Leg	4.00	0.0000	148.00	No Ice	1.96	1.13	0.08
			0.00			1/2"	2.14	1.27	0.09
			0.00			Ice	2.32	1.41	0.11
						1" Ice			
RDIDC-9181-PF-48	A	From Leg	4.00	0.0000	148.00	No Ice	2.01	1.17	0.02
			0.00			1/2"	2.19	1.31	0.04
			0.00			Ice	2.37	1.46	0.06
						1" Ice			
8'x2" Antenna Mount Pipe	A	From Leg	4.00	0.0000	148.00	No Ice	1.90	1.90	0.03
			0.00			1/2"	2.73	2.73	0.04
			0.00			Ice	3.40	3.40	0.06
						1" Ice			
8'x2" Antenna Mount Pipe	B	From Leg	4.00	0.0000	148.00	No Ice	1.90	1.90	0.03
			0.00			1/2"	2.73	2.73	0.04
			0.00			Ice	3.40	3.40	0.06
						1" Ice			
8'x2" Antenna Mount Pipe	C	From Leg	4.00	0.0000	148.00	No Ice	1.90	1.90	0.03
			0.00			1/2"	2.73	2.73	0.04
			0.00			Ice	3.40	3.40	0.06
						1" Ice			
Commscope MC-PK8-DSH	C	None		0.0000	148.00	No Ice	34.24	34.24	1.75
						1/2"	62.95	62.95	2.10
						Ice	91.66	91.66	2.45
						1" Ice			
*****									
KS24019-L112A	B	From Leg	3.00	0.0000	75.00	No Ice	0.14	0.14	0.01
			0.00			1/2"	0.20	0.20	0.01
			1.00			Ice	0.26	0.26	0.01
						1" Ice			
Side Arm Mount [SO 701-1]	C	From Leg	1.50	0.0000	75.00	No Ice	0.85	1.67	0.07
			0.00			1/2"	1.14	2.34	0.08
			0.00			Ice	1.43	3.01	0.09
						1" Ice			

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

Comb. No.	Description
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
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	178 - 129.87	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.84	0.86	1.61
			Max. Mx	20	-17.53	641.27	0.46
			Max. My	2	-17.52	0.27	643.78
			Max. Vy	20	-21.12	641.27	0.46
			Max. Vx	2	-21.21	0.27	643.78
			Max. Torque	9			1.68
L2	129.87 - 84.83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.35	1.70	1.74
			Max. Mx	20	-27.21	1648.36	0.53
			Max. My	2	-27.20	0.56	1654.52
			Max. Vy	20	-24.68	1648.36	0.53
			Max. Vx	2	-24.77	0.56	1654.52
			Max. Torque	9			1.67
L3	84.83 - 41.28	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.74	2.80	1.50
			Max. Mx	20	-40.48	2774.04	0.79
			Max. My	2	-40.47	1.44	2783.73
			Max. Vy	20	-28.20	2774.04	0.79
			Max. Vx	2	-28.30	1.44	2783.73
			Max. Torque	9			1.66
L4	41.28 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-80.35	3.67	1.43
			Max. Mx	20	-59.73	4201.12	1.43

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-59.73	2.41	4215.29
			Max. Vy	20	-31.35	4201.12	1.43
			Max. Vx	2	-31.45	2.41	4215.29
			Max. Torque	21			-1.54

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	80.35	0.00	9.53
	Max. H_x	20	59.75	31.31	0.01
	Max. H_z	2	59.75	0.01	31.41
	Max. M_x	2	4215.29	0.01	31.41
	Max. M_z	8	4198.45	-31.31	-0.01
	Max. Torsion	9	1.54	-31.31	-0.01
	Min. Vert	7	44.81	-27.11	15.69
	Min. H_x	8	59.75	-31.31	-0.01
	Min. H_z	14	59.75	-0.01	-31.41
	Min. M_x	14	-4214.50	-0.01	-31.41
	Min. M_z	20	-4201.12	31.31	0.01
	Min. Torsion	21	-1.54	31.31	0.01

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	49.79	0.00	0.00	-0.28	1.04	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	59.75	-0.01	-31.41	-4215.29	2.41	-0.29
0.9 Dead+1.0 Wind 0 deg - No Ice	44.81	-0.01	-31.41	-4138.98	2.05	-0.29
1.2 Dead+1.0 Wind 30 deg - No Ice	59.75	15.77	-27.41	-3681.16	-2115.55	-1.01
0.9 Dead+1.0 Wind 30 deg - No Ice	44.81	15.77	-27.41	-3614.54	-2077.65	-1.02
1.2 Dead+1.0 Wind 60 deg - No Ice	59.75	27.11	-15.69	-2106.93	-3635.25	-1.47
0.9 Dead+1.0 Wind 60 deg - No Ice	44.81	27.11	-15.69	-2068.73	-3569.85	-1.48
1.2 Dead+1.0 Wind 90 deg - No Ice	59.75	31.31	0.01	0.71	-4198.45	-1.54
0.9 Dead+1.0 Wind 90 deg - No Ice	44.81	31.31	0.01	0.80	-4122.88	-1.54
1.2 Dead+1.0 Wind 120 deg - No Ice	59.75	27.12	15.72	2108.05	-3636.29	-1.19
0.9 Dead+1.0 Wind 120 deg - No Ice	44.81	27.12	15.72	2070.04	-3570.88	-1.19
1.2 Dead+1.0 Wind 150 deg - No Ice	59.75	15.67	27.21	3650.38	-2099.43	-0.52
0.9 Dead+1.0 Wind 150 deg - No Ice	44.81	15.67	27.21	3584.49	-2061.82	-0.52
1.2 Dead+1.0 Wind 180 deg - No Ice	59.75	0.01	31.41	4214.50	0.27	0.29
0.9 Dead+1.0 Wind 180 deg - No Ice	44.81	0.01	31.41	4138.41	-0.07	0.29
1.2 Dead+1.0 Wind 210 deg - No Ice	59.75	-15.77	27.41	3680.39	2118.21	1.02
0.9 Dead+1.0 Wind 210 deg - No Ice	44.81	-15.77	27.41	3613.98	2079.60	1.02

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 240 deg - No Ice	59.75	-27.11	15.69	2106.19	3637.90	1.48
0.9 Dead+1.0 Wind 240 deg - No Ice	44.81	-27.11	15.69	2068.20	3571.80	1.48
1.2 Dead+1.0 Wind 270 deg - No Ice	59.75	-31.31	-0.01	-1.43	4201.12	1.54
0.9 Dead+1.0 Wind 270 deg - No Ice	44.81	-31.31	-0.01	-1.32	4124.85	1.54
1.2 Dead+1.0 Wind 300 deg - No Ice	59.75	-27.12	-15.72	-2108.78	3639.00	1.18
0.9 Dead+1.0 Wind 300 deg - No Ice	44.81	-27.12	-15.72	-2070.56	3572.88	1.19
1.2 Dead+1.0 Wind 330 deg - No Ice	59.75	-15.67	-27.21	-3651.15	2102.15	0.52
0.9 Dead+1.0 Wind 330 deg - No Ice	44.81	-15.67	-27.21	-3585.04	2063.82	0.52
1.2 Dead+1.0 Ice+1.0 Temp	80.35	-0.00	-0.00	-1.43	3.67	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	80.35	-0.00	-9.53	-1301.13	4.27	-0.09
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	80.35	4.75	-8.25	-1126.88	-643.92	-0.24
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	80.35	8.23	-4.76	-651.03	-1118.53	-0.33
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	80.35	9.51	0.00	-1.15	-1292.33	-0.33
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	80.35	8.24	4.77	648.62	-1118.91	-0.24
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	80.35	4.76	8.26	1124.18	-644.58	-0.08
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	80.35	0.00	9.53	1298.06	3.50	0.09
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	80.35	-4.75	8.25	1123.80	651.68	0.24
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	80.35	-8.23	4.76	647.96	1126.29	0.33
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	80.35	-9.51	-0.00	-1.92	1300.10	0.33
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	80.35	-8.24	-4.77	-651.69	1126.67	0.24
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	80.35	-4.76	-8.26	-1127.26	652.35	0.08
Dead+Wind 0 deg - Service	49.79	-0.00	-8.05	-1070.77	1.39	-0.08
Dead+Wind 30 deg - Service	49.79	4.04	-7.03	-935.18	-536.54	-0.27
Dead+Wind 60 deg - Service	49.79	6.95	-4.02	-535.33	-922.46	-0.39
Dead+Wind 90 deg - Service	49.79	8.03	0.00	-0.06	-1065.47	-0.40
Dead+Wind 120 deg - Service	49.79	6.95	4.03	535.14	-922.73	-0.31
Dead+Wind 150 deg - Service	49.79	4.02	6.98	926.86	-532.43	-0.13
Dead+Wind 180 deg - Service	49.79	0.00	8.05	1070.11	0.84	0.08
Dead+Wind 210 deg - Service	49.79	-4.04	7.03	934.52	538.76	0.27
Dead+Wind 240 deg - Service	49.79	-6.95	4.02	534.67	924.68	0.39
Dead+Wind 270 deg - Service	49.79	-8.03	-0.00	-0.60	1067.69	0.40
Dead+Wind 300 deg - Service	49.79	-6.95	-4.03	-535.80	924.96	0.31
Dead+Wind 330 deg - Service	49.79	-4.02	-6.98	-927.52	534.65	0.13

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-49.79	0.00	0.00	49.79	0.00	0.000%
2	-0.01	-59.75	-31.41	0.01	59.75	31.41	0.000%
3	-0.01	-44.81	-31.41	0.01	44.81	31.41	0.000%
4	15.77	-59.75	-27.41	-15.77	59.75	27.41	0.000%
5	15.77	-44.81	-27.41	-15.77	44.81	27.41	0.000%
6	27.11	-59.75	-15.69	-27.11	59.75	15.69	0.000%
7	27.11	-44.81	-15.69	-27.11	44.81	15.69	0.000%
8	31.31	-59.75	0.01	-31.31	59.75	-0.01	0.000%
9	31.31	-44.81	0.01	-31.31	44.81	-0.01	0.000%
10	27.12	-59.75	15.72	-27.12	59.75	-15.72	0.000%
11	27.12	-44.81	15.72	-27.12	44.81	-15.72	0.000%
12	15.67	-59.75	27.21	-15.67	59.75	-27.21	0.000%
13	15.67	-44.81	27.21	-15.67	44.81	-27.21	0.000%
14	0.01	-59.75	31.41	-0.01	59.75	-31.41	0.000%
15	0.01	-44.81	31.41	-0.01	44.81	-31.41	0.000%
16	-15.77	-59.75	27.41	15.77	59.75	-27.41	0.000%
17	-15.77	-44.81	27.41	15.77	44.81	-27.41	0.000%
18	-27.11	-59.75	15.69	27.11	59.75	-15.69	0.000%
19	-27.11	-44.81	15.69	27.11	44.81	-15.69	0.000%
20	-31.31	-59.75	-0.01	31.31	59.75	0.01	0.000%
21	-31.31	-44.81	-0.01	31.31	44.81	0.01	0.000%
22	-27.12	-59.75	-15.72	27.12	59.75	15.72	0.000%
23	-27.12	-44.81	-15.72	27.12	44.81	15.72	0.000%
24	-15.67	-59.75	-27.21	15.67	59.75	27.21	0.000%
25	-15.67	-44.81	-27.21	15.67	44.81	27.21	0.000%
26	0.00	-80.35	0.00	0.00	80.35	0.00	0.000%
27	-0.00	-80.35	-9.53	0.00	80.35	9.53	0.000%
28	4.75	-80.35	-8.25	-4.75	80.35	8.25	0.000%
29	8.23	-80.35	-4.76	-8.23	80.35	4.76	0.000%
30	9.51	-80.35	0.00	-9.51	80.35	-0.00	0.000%
31	8.24	-80.35	4.77	-8.24	80.35	-4.77	0.000%
32	4.76	-80.35	8.26	-4.76	80.35	-8.26	0.000%
33	0.00	-80.35	9.53	-0.00	80.35	-9.53	0.000%
34	-4.75	-80.35	8.25	4.75	80.35	-8.25	0.000%
35	-8.23	-80.35	4.76	8.23	80.35	-4.76	0.000%
36	-9.51	-80.35	-0.00	9.51	80.35	0.00	0.000%
37	-8.24	-80.35	-4.77	8.24	80.35	4.77	0.000%
38	-4.76	-80.35	-8.26	4.76	80.35	8.26	0.000%
39	-0.00	-49.79	-8.05	0.00	49.79	8.05	0.000%
40	4.04	-49.79	-7.03	-4.04	49.79	7.03	0.000%
41	6.95	-49.79	-4.02	-6.95	49.79	4.02	0.000%
42	8.03	-49.79	0.00	-8.03	49.79	-0.00	0.000%
43	6.95	-49.79	4.03	-6.95	49.79	-4.03	0.000%
44	4.02	-49.79	6.98	-4.02	49.79	-6.98	0.000%
45	0.00	-49.79	8.05	-0.00	49.79	-8.05	0.000%
46	-4.04	-49.79	7.03	4.04	49.79	-7.03	0.000%
47	-6.95	-49.79	4.02	6.95	49.79	-4.02	0.000%
48	-8.03	-49.79	-0.00	8.03	49.79	0.00	0.000%
49	-6.95	-49.79	-4.03	6.95	49.79	4.03	0.000%
50	-4.02	-49.79	-6.98	4.02	49.79	6.98	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00005257
3	Yes	5	0.00000001	0.00002132
4	Yes	6	0.00000001	0.00056490
5	Yes	6	0.00000001	0.00017780
6	Yes	6	0.00000001	0.00057287
7	Yes	6	0.00000001	0.00018193
8	Yes	5	0.00000001	0.00021197

9	Yes	5	0.00000001	0.00010128
10	Yes	6	0.00000001	0.00055498
11	Yes	6	0.00000001	0.00017528
12	Yes	6	0.00000001	0.00056751
13	Yes	6	0.00000001	0.00017990
14	Yes	5	0.00000001	0.00004952
15	Yes	5	0.00000001	0.00001971
16	Yes	6	0.00000001	0.00057774
17	Yes	6	0.00000001	0.00018256
18	Yes	6	0.00000001	0.00055410
19	Yes	6	0.00000001	0.00017489
20	Yes	5	0.00000001	0.00021676
21	Yes	5	0.00000001	0.00010349
22	Yes	6	0.00000001	0.00057233
23	Yes	6	0.00000001	0.00018160
24	Yes	6	0.00000001	0.00056025
25	Yes	6	0.00000001	0.00017699
26	Yes	4	0.00000001	0.00003080
27	Yes	5	0.00005775	0.00098514
28	Yes	6	0.00000001	0.00023687
29	Yes	6	0.00000001	0.00023999
30	Yes	5	0.00005774	0.00097748
31	Yes	6	0.00000001	0.00023489
32	Yes	6	0.00000001	0.00023689
33	Yes	5	0.00005771	0.00097894
34	Yes	6	0.00000001	0.00023990
35	Yes	6	0.00000001	0.00023652
36	Yes	5	0.00005773	0.00098434
37	Yes	6	0.00000001	0.00024187
38	Yes	6	0.00000001	0.00024010
39	Yes	4	0.00000001	0.00027931
40	Yes	5	0.00000001	0.00013171
41	Yes	5	0.00000001	0.00013948
42	Yes	4	0.00000001	0.00033065
43	Yes	5	0.00000001	0.00012705
44	Yes	5	0.00000001	0.00013509
45	Yes	4	0.00000001	0.00027820
46	Yes	5	0.00000001	0.00014045
47	Yes	5	0.00000001	0.00012680
48	Yes	4	0.00000001	0.00033246
49	Yes	5	0.00000001	0.00013921
50	Yes	5	0.00000001	0.00013102

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	178 - 129.87	40.050	40	2.1725	0.0044
L2	134.12 - 84.83	21.681	46	1.6760	0.0021
L3	90.16 - 41.28	9.156	46	1.0142	0.0008
L4	47.7 - 0	2.448	46	0.4751	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178.00	APXVAALL24_43-U-NA20_TMO	40	40.050	2.1725	0.0044	27162
168.00	(2) LPA-80080/6CF w/ Mount Pipe	40	35.594	2.0700	0.0039	13581
156.00	7770.00 w/ Mount Pipe	40	30.372	1.9421	0.0032	6172
148.00	MX08FRO665-21 w/ Mount Pipe	40	27.037	1.8511	0.0028	4525
75.00	KS24019-L112A	46	6.181	0.8037	0.0006	4317

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	178 - 129.87	157.520	4	8.5720	0.0172
L2	134.12 - 84.83	85.410	16	6.6160	0.0082
L3	90.16 - 41.28	36.083	16	4.0024	0.0031
L4	47.7 - 0	9.646	16	1.8728	0.0011

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178.00	APXVAALL24_43-U-NA20_TMO	4	157.520	8.5720	0.0172	7169
168.00	(2) LPA-80080/6CF w/ Mount Pipe	4	140.038	8.1687	0.0150	3583
156.00	7770.00 w/ Mount Pipe	4	119.544	7.6650	0.0124	1625
148.00	MX08FRO665-21 w/ Mount Pipe	4	106.451	7.3062	0.0107	1189
75.00	KS24019-L112A	16	24.360	3.1704	0.0021	1100

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	178 - 129.87 (1)	TP29.64x19.5x0.25	48.13	0.00	0.0	22.6105	-17.49	1322.71	0.013
L2	129.87 - 84.83 (2)	TP38.5x28.2446x0.375	49.29	0.00	0.0	44.0583	-27.17	2577.41	0.011
L3	84.83 - 41.28 (3)	TP46.8x36.641x0.4375	48.88	0.00	0.0	62.5273	-40.46	3657.85	0.011
L4	41.28 - 0 (4)	TP54.5x44.5907x0.5	47.70	0.00	0.0	85.6980	-59.73	5013.33	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	178 - 129.87 (1)	TP29.64x19.5x0.25	646.51	936.75	0.690	0.00	936.75	0.000
L2	129.87 - 84.83 (2)	TP38.5x28.2446x0.375	1665.39	2463.21	0.676	0.00	2463.21	0.000
L3	84.83 - 41.28 (3)	TP46.8x36.641x0.4375	2804.34	4208.83	0.666	0.00	4208.83	0.000
L4	41.28 - 0 (4)	TP54.5x44.5907x0.5	4246.42	6831.09	0.622	0.00	6831.09	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	178 - 129.87 (1)	TP29.64x19.5x0.25	21.35	396.81	0.054	0.95	990.22	0.001
L2	129.87 - 84.83 (2)	TP38.5x28.2446x0.375	25.00	773.22	0.032	0.94	2506.54	0.000
L3	84.83 - 41.28 (3)	TP46.8x36.641x0.4375	28.52	1097.35	0.026	1.02	4327.24	0.000
L4	41.28 - 0 (4)	TP54.5x44.5907x0.5	31.66	1504.00	0.021	1.02	7112.49	0.000

Pole Interaction Design Data

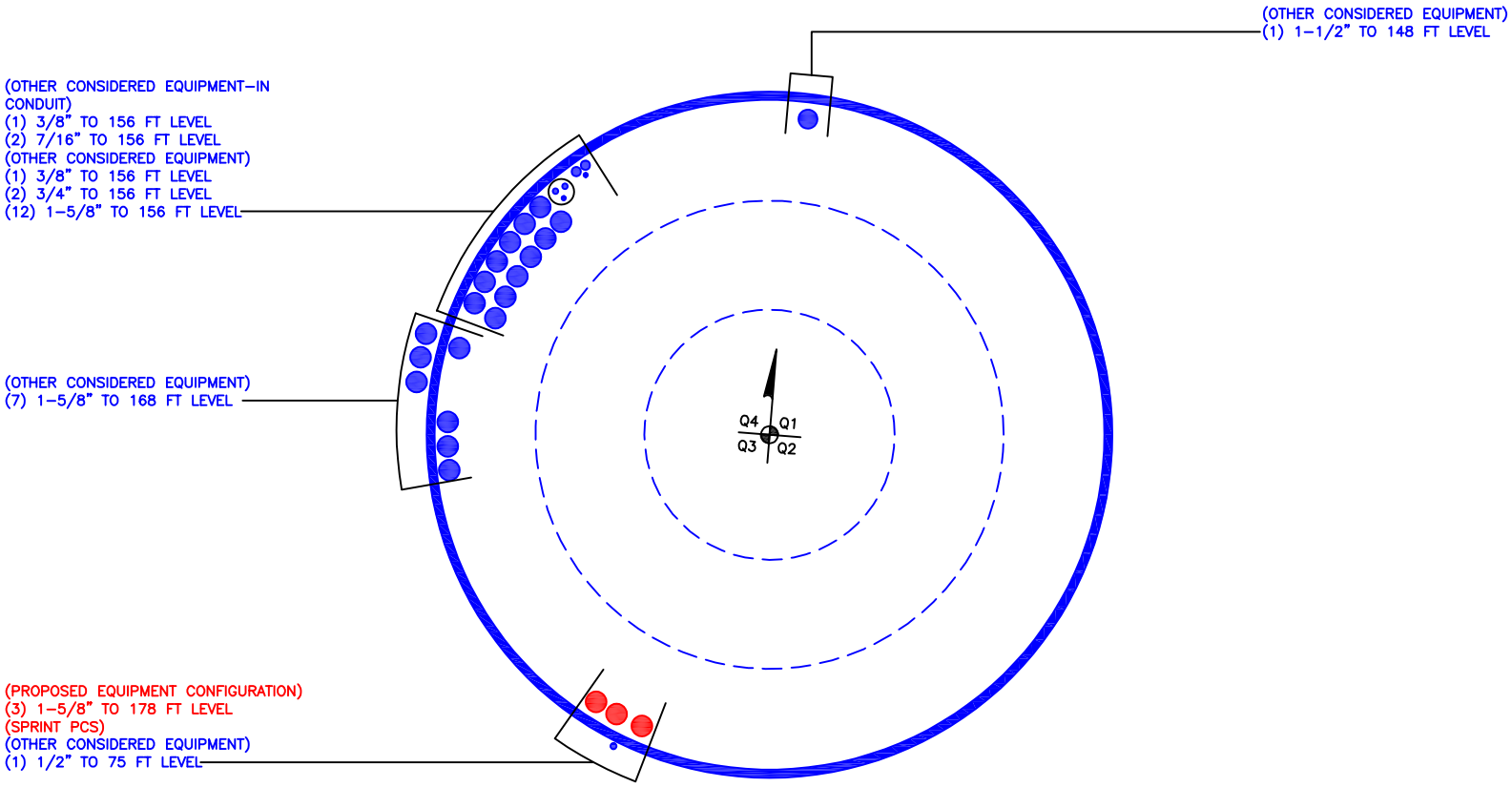
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	178 - 129.87 (1)	0.013	0.690	0.000	0.054	0.001	0.706	1.050	4.8.2
L2	129.87 - 84.83 (2)	0.011	0.676	0.000	0.032	0.000	0.688	1.050	4.8.2
L3	84.83 - 41.28 (3)	0.011	0.666	0.000	0.026	0.000	0.678	1.050	4.8.2
L4	41.28 - 0 (4)	0.012	0.622	0.000	0.021	0.000	0.634	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	178 - 129.87	Pole	TP29.64x19.5x0.25	1	-17.49	1388.85	67.3	Pass
L2	129.87 - 84.83	Pole	TP38.5x28.2446x0.375	2	-27.17	2706.28	65.5	Pass
L3	84.83 - 41.28	Pole	TP46.8x36.641x0.4375	3	-40.46	3840.74	64.6	Pass
L4	41.28 - 0	Pole	TP54.5x44.5907x0.5	4	-59.73	5264.00	60.4	Pass
							Summary	
						Pole (L1)	67.3	Pass
						RATING =	**67.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876369 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

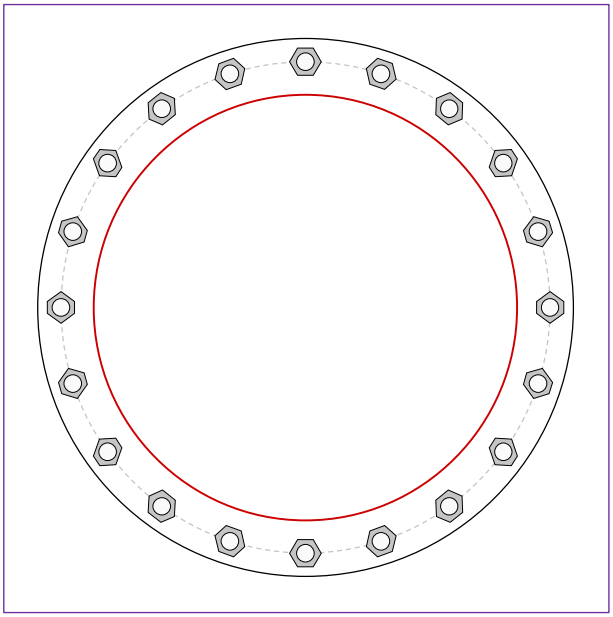
Monopole Base Plate Connection

Site Info	
BU #	876369
Site Name	Harwinton / Buckley B
Order #	584628 Rev.0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1

Applied Loads	
Moment (kip-ft)	4246.42
Axial Force (kips)	59.73
Shear Force (kips)	31.66

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(20) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 63" BC

Base Plate Data

69" OD x 2.25" Plate (A871 Gr60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

54.5" x 0.5" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_t = 158.7	ϕPn_t = 243.75	**Stress Rating**
Vu = 1.58	ϕVn = 149.1	**62.0%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	38.73	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**68.3%**	**Pass**

Pier and Pad Foundation

BU # :	876369
Site Name:	Harwinton /
App. Number:	584628 Rev.0

TIA-222 Revision:	H
Tower Type:	Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp}:	59.58	kips
Base Shear, Vu_comp:	32.3	kips
Moment, M_u:	4322.65	ft-kips
Tower Height, **H**:	178	ft
BP Dist. Above Fdn, bp_{dist}:	3.25	in

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**:	46	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	13	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties		
Depth, **D**:	6.5	ft
Pad Width, W_1:	28	ft
Pad Thickness, **T**:	3	ft
Pad Rebar Size (Top dir.2), Sp_{top2}:	8	
Pad Rebar Quantity (Top dir. 2), mp_{top2}:	30	
Pad Rebar Size (Bottom dir. 2), Sp_2:	8	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	68	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	4	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	125	pcf
Ultimate Gross Bearing, Qult:	8.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	38	degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:	0.6	
Neglected Depth, **N**:	4.00	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	2	ft

<--Toggle between Gross and Net

Foundation Analysis Checks	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	317.54	32.30	**9.7%**	**Pass**
Bearing Pressure (ksf)	6.00	1.98	**33.0%**	**Pass**
*Overturning (kip*ft)*	6098.97	4573.65	**75.0%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	5917.29	4468.00	**71.9%**	**Pass**
Pier Compression (kip)	31187.52	93.77	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	7273.78	2065.58	**27.0%**	**Pass**
Pad Shear - 1-way (kips)	1004.09	277.10	**26.3%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.190	0.043	**21.6%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	6039.46	2680.80	**42.3%**	**Pass**

**Rating per TIA-222-H Section 15.5*

Structural Rating*:	**71.9%**
Soil Rating*:	**75.0%**

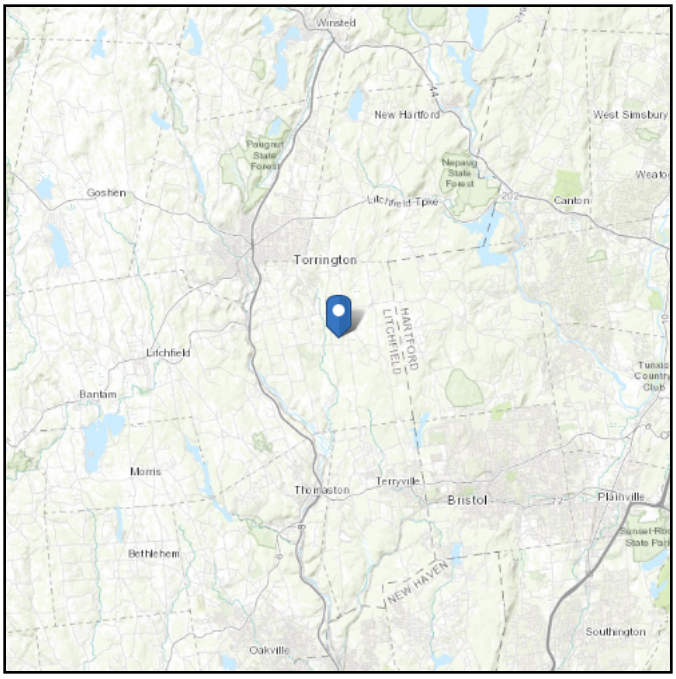
Version 4.1.1

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: 840.53 ft (NAVD 88)
Latitude: 41.757264
Longitude: -73.052556



Wind

Results:

Wind Speed:	115 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	89 Vmph
100-year MRI	96 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:	Fri Oct 01 2021

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.

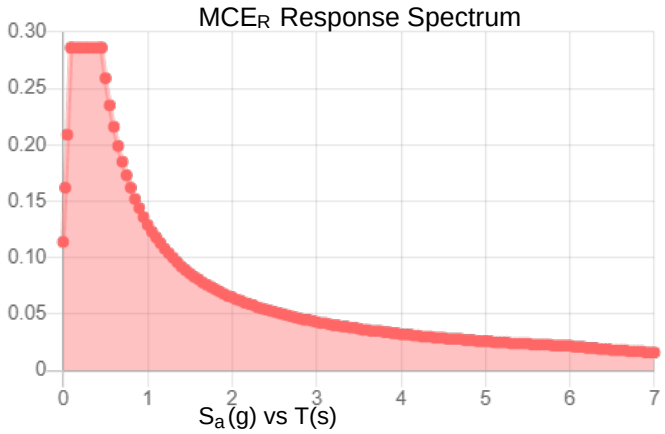
Seismic

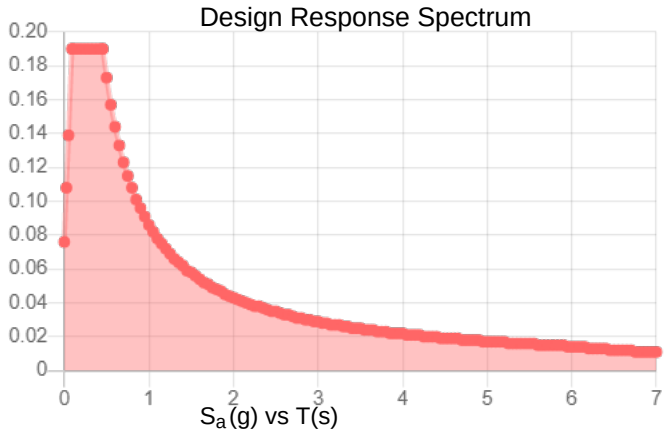
Site Soil Class: D - Default (see Section 11.4.3)

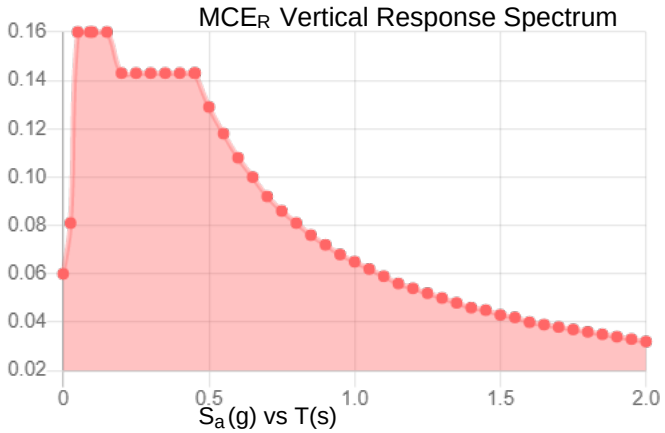
Results:

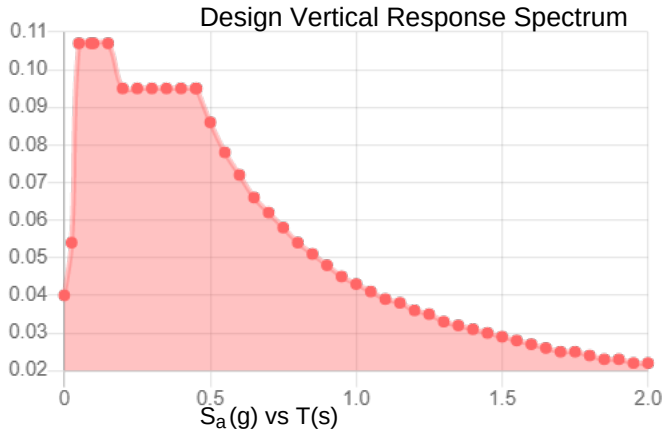
S_S :	0.179	S_{D1} :	0.086
S_1 :	0.054	T_L :	6
F_a :	1.6	PGA :	0.095
F_v :	2.4	PGA_M :	0.153
S_{MS} :	0.286	F_{PGA} :	1.6
S_{M1} :	0.129	I_e :	1
S_{DS} :	0.19	C_v :	0.7

Seismic Design Category B









Data Accessed: Fri Oct 01 2021

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:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Fri Oct 01 2021

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.

Date: **September 29, 2021**

GPD Engineering and Architecture
Professional Corporation
520 South Main Street, Suite 2531
Akron, Ohio 44311
(216) 927-8663
CrownMA@gpdgroup.com

Subject:	**Mount Replacement Analysis Report**	
Carrier Designation:	***T-Mobile* Equipment Change-Out**	
	Carrier Site Number:	CTNH558A
	Carrier Site Name:	ctnh558a_crown_876369_ harwinton_buckley_broadcasti
Crown Castle Designation:	**BU Number:**	876369
	Site Name:	HARWINTON / BUCKLEY BROADCASTI
	JDE Job Number:	684636
	Order Number:	584628 Rev. 0
Engineering Firm Designation:	**GPD Report Designation:**	2021777.876369.04
Site Data:	**64 Hungerford Lane, Harwinton, Litchfield County, CT 06791 Latitude 41° 45' 26.15" Longitude -73° 3' 9.20"**	
Structure Information:	**Tower Height & Type:**	**178.0 ft Monopole Tower**
	Mount Elevation:	**178.0 ft**
	Mount Type:	**12.5 ft Sector Mount**

GPD is pleased to submit this **"Mount Replacement Analysis Report"** to determine the structural integrity of T-Mobile's antenna mounting system with the proposed appurtenance and equipment addition on the above mentioned 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:

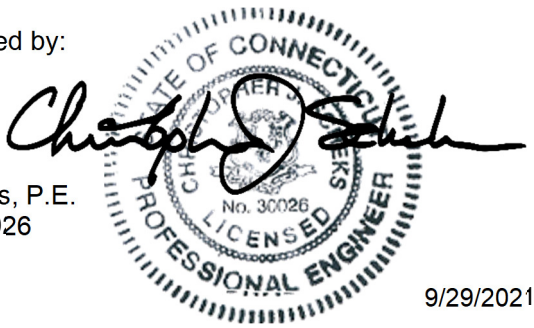
Sector Mount **Sufficient – 42.9%***

***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 utilizes an ultimate 3-second gust wind speed of 115 mph as required by the 2018 Connecticut Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Brandon Brookbank

Respectfully Submitted by:



Christopher J. Scheks, P.E.
Connecticut #: 0030026

9/29/2021

TABLE OF CONTENTS

1) INTRODUCTION

This is a proposed 3-sector 10.5' sector mount designed by Site Pro 1 (Part #: VFA12-HD, dated 6/29/2018) with a sector frame attachment assembly by Site Pro 1 (Part #: MSFAA, dated 5/2/2016) and (4) 8'-0" long P2 STD (2.375" O.D. x 0.154" thick) mount pipes per sector.

2) ANALYSIS CRITERIA

Building Code:	2018 Connecticut Building Code
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	115 mph
Exposure Category:	C
Topographic Factor at Base:	1
Topographic Factor at Mount:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 mph
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
178.0	180.0	3	Ericsson	AIR6449 B41_T-MOBILE	(3) 12.5 ft. Sector Mounts
		3	RFS/Celwave	APXVAALL24_43-U-NA20_TMO	
		3	Ericsson	RADIO 4460 B2/B25 B66_TMO	
		3	Ericsson	Radio 4480_TMOV2	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
CCI Application	Crown Order Number 584628 Rev. 0	-	CCI
RF Data Sheet	Sprint Retain RFDS #: CTNH558A, dated 8/02/2021	-	CCI
Mount Design	Site Pro 1 Drawing #: VFA12-HD, dated 6/29/2018	-	Site Pro 1
Mount Design	Site Pro 1 Drawing #: MSFAA, dated 5/2/2016	-	Site Pro 1

3.1) Analysis Method

RISA-3D Edition (Version 17.0.4), 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.

A tool internally developed by GPD, using Microsoft Excel, was used to calculate wind loading on all appurtenances, dishes, and mount members for various load cases. Selected output from the analysis is included in Appendix B.

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

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) This analysis assumes all information reference in Table 2 is current and correct.
5) 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.
6) Steel grades have been assumed as follows, unless noted otherwise:

Solid Round, Plate	ASTM A36 (GR 36)
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. GPD should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3a - Mount Component Stresses vs. Capacity (Sector Mount, Alpha Sector)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,3	Front Horizontals	A5	178.0	41.6	Pass
	Standoff Horizontals	A7		32.5	Pass
	Standoff Diagonals	A15		27.1	Pass
	Standoff Verticals	A14		37.3	Pass
	Connection Plate	A30		42.6	Pass
	Mount Pipe	AP1		39.3	Pass
	Stabilizer	A125		7.4	Pass
	MSFAA Pipe	A37		9.4	Pass
2,3	Mount to Tower Connection	-		4.8	Pass

Table 3b - Mount Component Stresses vs. Capacity (Sector Mount, Beta Sector)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,3	Front Horizontals	B46	178.0	39.5	Pass
	Standoff Horizontals	B51		34.5	Pass
	Standoff Diagonals	B56		27.1	Pass
	Standoff Verticals	B55		37.3	Pass
	Connection Plate	B71		42.9	Pass
	Mount Pipe	BP1		39.3	Pass
	Stabilizer	B126		7.2	Pass
	MSFAA Pipe	B78		9.4	Pass
2,3	Mount to Tower Connection	-		6.5	Pass

Table 3c - Mount Component Stresses vs. Capacity (Sector Mount, Gamma Sector)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,3	Front Horizontals	C87	178.0	42.1	Pass
	Standoff Horizontals	C92		39.8	Pass
	Standoff Diagonals	C97		27.2	Pass
	Standoff Verticals	C96		37.4	Pass
	Connection Plate	C112		42.5	Pass
	Mount Pipe	CP1		39.4	Pass
	Stabilizer	C128		7.6	Pass
	MSFAA Pipe	C119		9.6	Pass
2,3	Mount to Tower Connection	-		6.1	Pass

Structure Rating (max from all components) =	42.9%[3]

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 calculations supporting the % capacity consumed.
3) Ratings per TIA-222-H section 15.5.

4.1) Recommendations

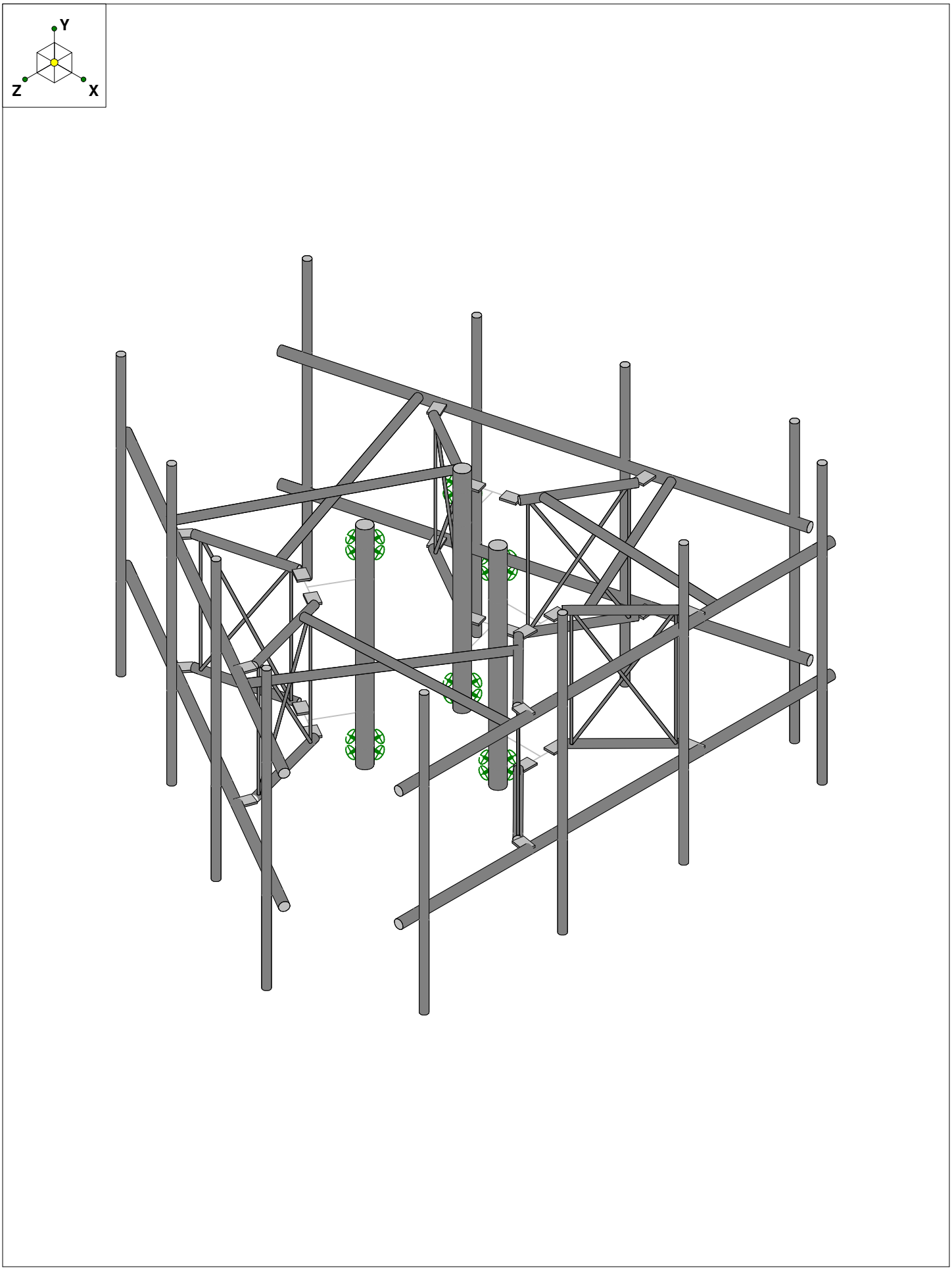
The proposed mount has sufficient capacity to support the proposed loading configuration. In order for the results of this analysis to be considered valid, the mount listed below shall be installed.

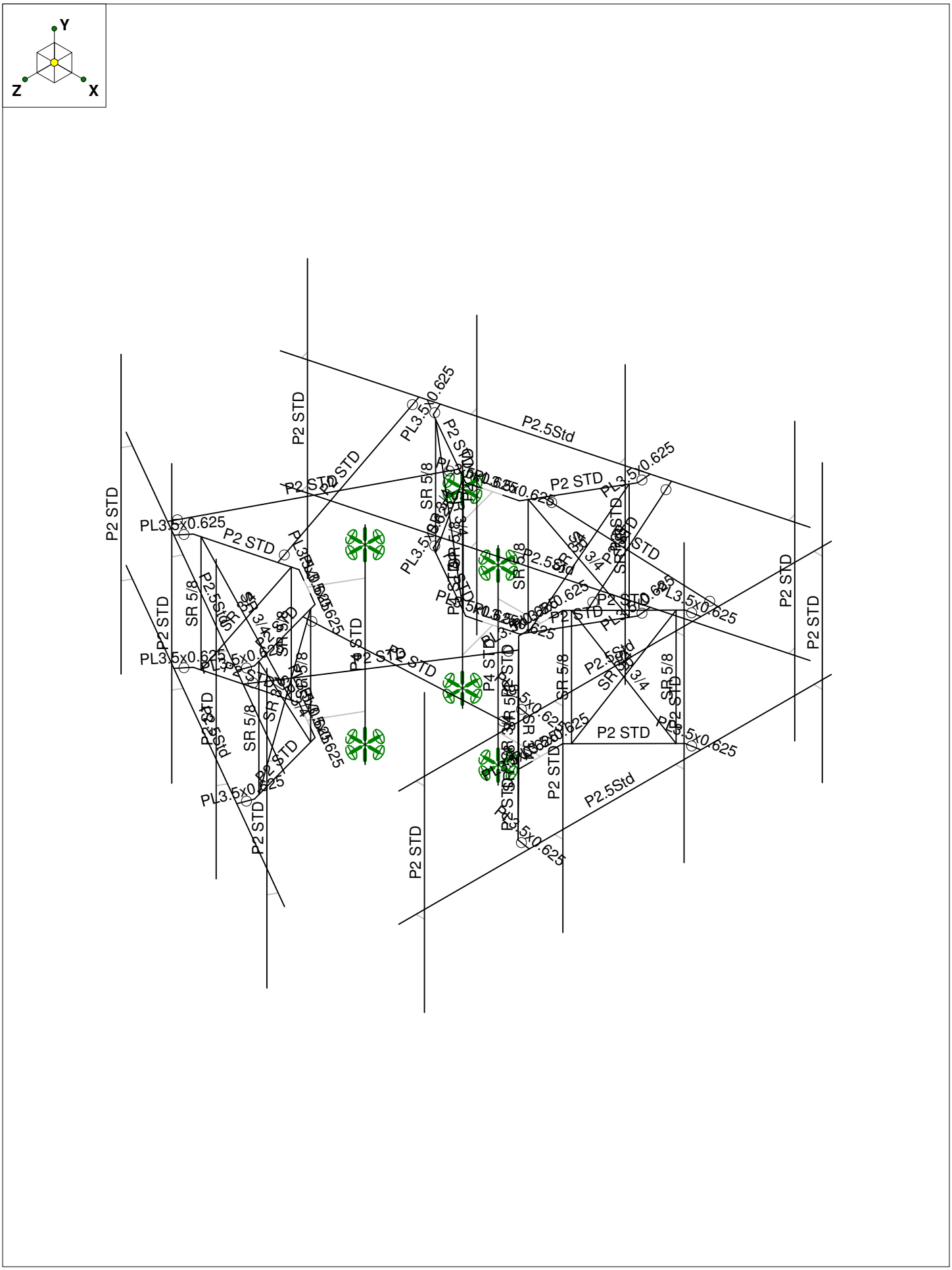
1. Site Pro 1 Part #: VFA12-HD with Site Pro 1 Part #: MSFAA and (4) 8'-0" long P2 STD (2.375" O.D. x 0.154" thick) mount pipes per sector

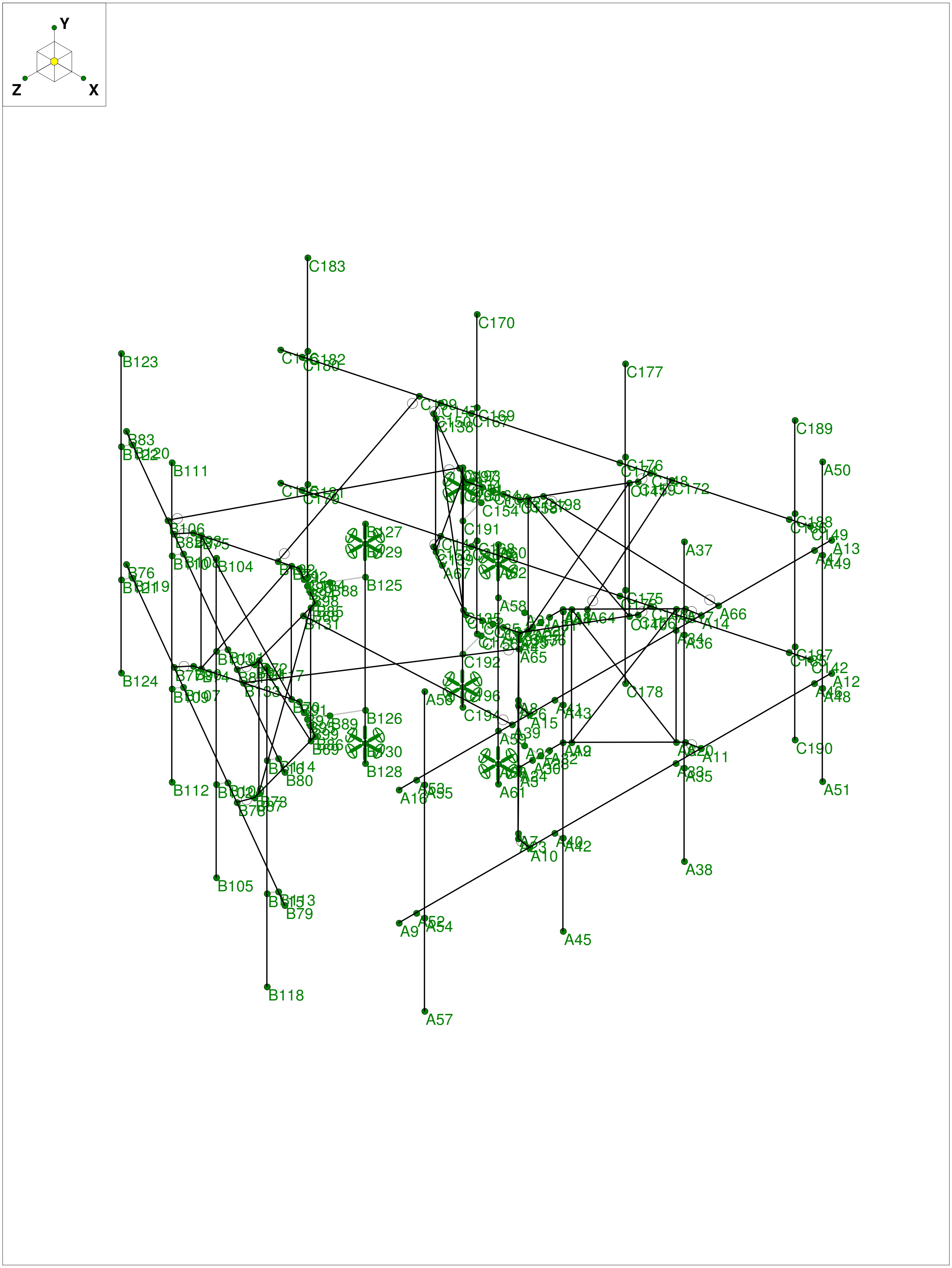
Beyond the mount replacement, no structural modifications are required at this time, provided that the above-listed changes are implemented.

APPENDIX A

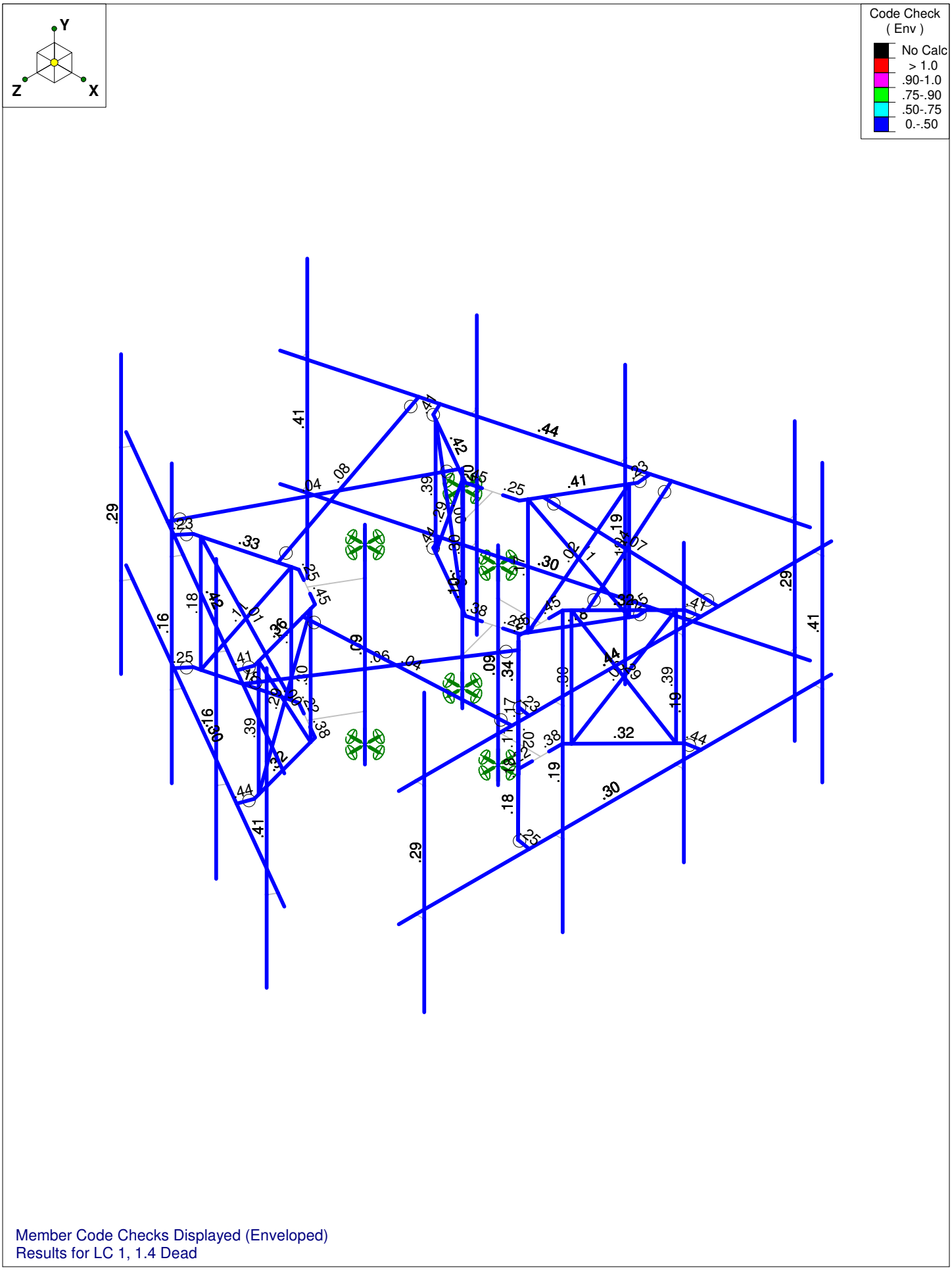
WIRE FRAME AND RENDERED MODELS


Y
Z
X

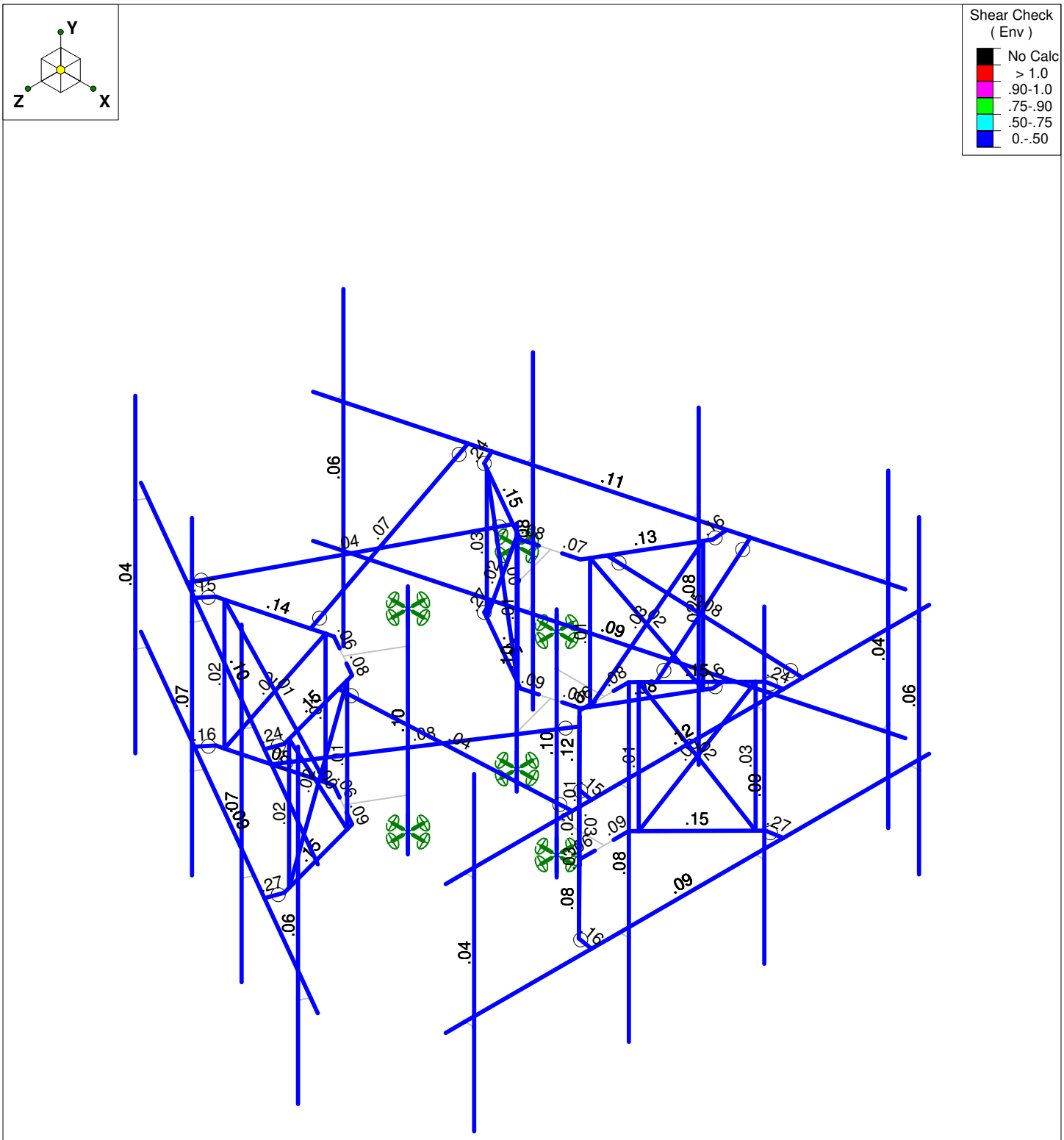

Y
Z
X
P2 STD
PL3.5x0.625
P2.5Std
SR 5/8
SR 3/4
P4 STD



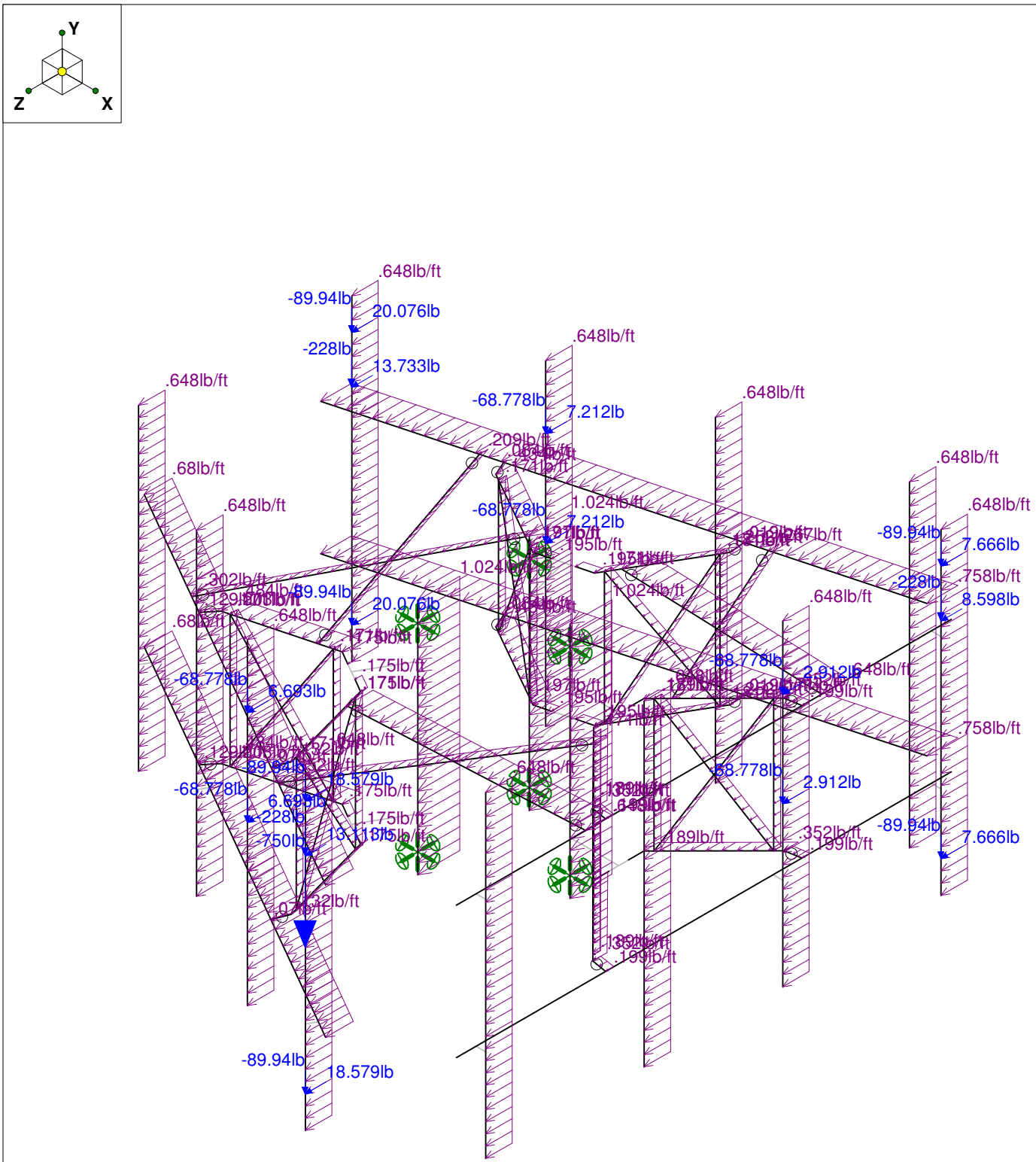
Y
Z
X
C183
C170
C177
C189
B123
A50
B111
B104
B105
B118
B112
B124
A37
A38
A45
A57
A51
C190
C178
A58
A61
A65
A66
C191
C192
B125
B126
B128



Member Code Checks Displayed (Enveloped)
Results for LC 1, 1.4 Dead



Member Shear Checks Displayed (Enveloped)
Results for LC 1, 1.4 Dead



Loads: LC 89, 1.2 Dead + 1.5 Live_M - BP1 + 1.0 Wind @ 90°

APPENDIX B

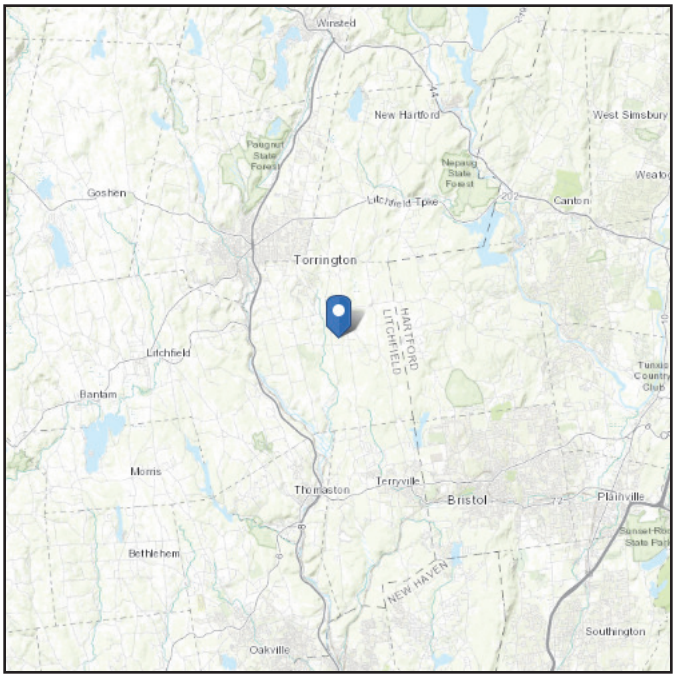
SOFTWARE INPUT CALCULATIONS

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: 840.53 ft (NAVD 88)
Latitude: 41.757264
Longitude: -73.052556



Wind

Results:

Wind Speed:	115 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	89 Vmph
100-year MRI	96 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:	Wed Sep 29 2021

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.

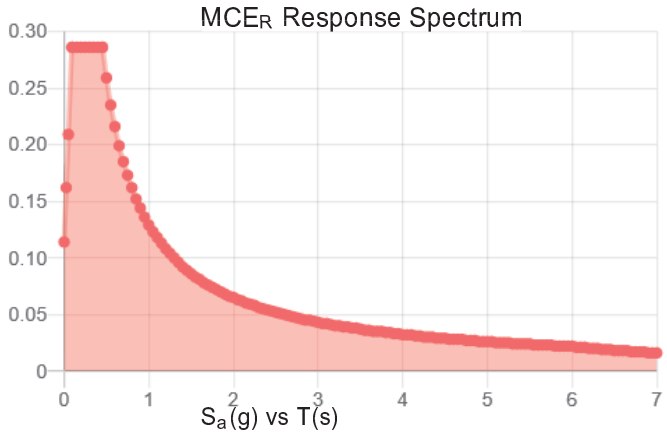
Seismic

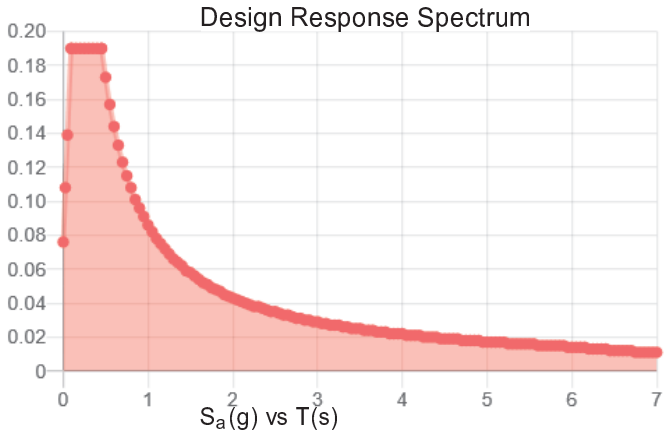
Site Soil Class: D - Default (see Section 11.4.3)

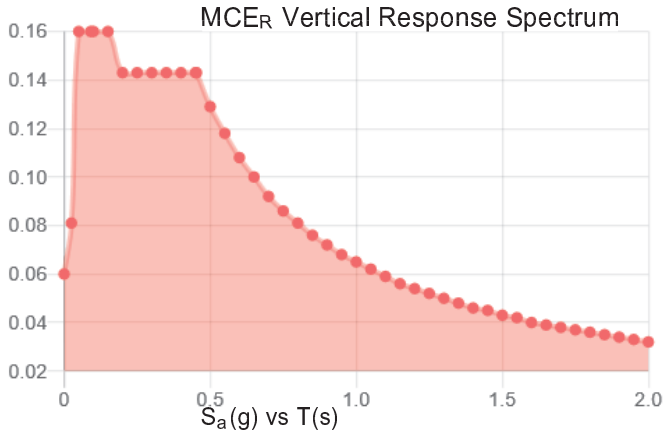
Results:

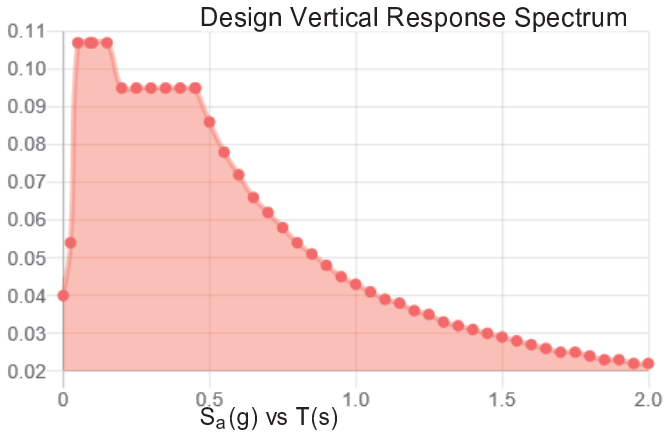
S_S :	0.179	S_{D1} :	0.086
S_1 :	0.054	T_L :	6
F_a :	1.6	PGA :	0.095
F_v :	2.4	PGA_M :	0.153
S_{MS} :	0.286	F_{PGA} :	1.6
S_{M1} :	0.129	I_e :	1
S_{DS} :	0.19	C_v :	0.7

Seismic Design Category B









Data Accessed: Wed Sep 29 2021

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:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Wed Sep 29 2021

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.

TIA-222-H: Mount Analysis Wind Loading
876369 - HARWINTON / BUCKLEY BROADCASTI
2021777.876369.04

Structure Information		
Structure Type:	Monopole	
Structure Height:	178	ft
z (Mount Centerline) =	178	ft
Gh (Mount Gust Effect Factor) =	1.00	
Risk Category:	II	

Code Specifications		
TIA/EIA Code:	H	
Ultimate Wind Speed (No Ice) =	115	mph (3-s gust)
Ultimate Wind Speed (With Ice) =	50	mph (3-s gust)
Ice Thickness	1	in
Exposure Category	C	
Tower Base Elevation (AMSL)	841	ft

Topographic Inputs	
Topographic Feature:	N/A

Section Sets										No Ice	Ice Output	
Mount Components	Member Type	Length (in)	Side (Longest seeing wind) (in)	Other Side (in)	Calculated Dc, for ice weight (in)	Dc, for ice weight (in)	Area Type (Round or Flat)	K_a	User's Wind Multiplier	Normal Wind Force (lb/ft)*	Normal Ice Wind Force (lb/ft)*	Ice Weight (lb/ft)*
Front Horizontals	Pipe	150.000	2.875	2.875		2.88	Round	0.90	1.00	12.82	4.42	5.87
Standoff Horizontals	Pipe	30.000	2.375	2.375		2.38	Round	0.90	1.00	8.16	2.61	5.15
Standoff Diagonals	Pipe	47.512	0.75	0.75		0.75	Round	0.90	1.00	3.34	2.15	2.80
Standoff Verticals	Pipe	40.000	0.625	0.625		0.63	Round	0.90	1.00	2.79	1.98	2.62
Connection Plate	Square/Rect.	4.778	0.625	3.5		3.56	Flat	0.90	1.00	3.30	1.69	6.85
Mount Pipe	Pipe	96.000	2.375	2.375		2.38	Round	0.90	1.00	10.59	3.64	5.15
Stabilizer	Pipe	78.351	2.375	2.375		2.38	Round	0.90	1.00	10.59	3.37	5.15
MSFAA Pipe	Pipe	72.000	4.5	4.5		4.50	Round	0.90	1.00	16.72	4.23	8.22

*All forces are unfactored.

Appurtenances							Shielding			No Ice		Ice Output	
Appurtenance Model	Loading Elevation (ft)	Height (in)	Front Width (in)	Side Depth (in)	Wt (lbs)	Type for Area	Front Shielding (%)	Side Shielding (%)	K_a and/or block shielding	Normal Wind Force (lbs)*	Wt (lbs) (no ice)*	Normal Wind Force (lbs) (w/ ice)*	Wt (lbs) (only ice)*
(3) AIR6449 B41_T-MOBILE	180	33.11	20.51	8.54	114.63	CFD	0%	0%	0.90	211.95	114.63	47.96	100.35
(3) APXVAALL24_43-U-NA20_TMO	180	95.9	24	8.5	149.9	CFD	0%	0%	0.90	590.00	149.90	125.47	281.26
(3) RADIO 4460 B2/B25 B66_TMO	180	17	15.1	11.9	109	Flat	0%	0%	0.90	86.03	109.00	19.28	57.49
(3) Radio 4480_TMOV2	180	22	15.7	7.5	81	Flat	0%	0%	0.90	115.76	81.00	25.39	56.90

*All forces are unfactored.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design ...	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Front Horizontals	P2.5Std	None	None	A53-b	Typical	1.704	1.53	1.53	3.059
2	Standoff Horizontals	P2 STD	None	None	A53-b	Typical	1.075	.666	.666	1.331
3	Standoff Diagonals	SR 3/4	None	None	A36 Gr.36	Typical	.442	.016	.016	.031
4	Standoff Verticals	SR 5/8	None	None	A36 Gr.36	Typical	.307	.007	.007	.015
5	Connection Plate	PL3.5x0.625	None	None	A36 Gr.36	Typical	2.188	.071	2.233	.253
6	Mount Pipe	P2 STD	None	None	A53-b	Typical	1.075	.666	.666	1.331
7	Stabilizer	P2 STD	None	None	A53-b	Typical	1.075	.666	.666	1.331
8	MSFAA Pipe	P4 STD	None	None	A53-b	Typical	3.174	7.233	7.233	14.465

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	DL		-1			18			
2	No Ice Wind 0 deg	None					18	87		
3	No Ice Wind 30 deg	None					36	162		
4	No Ice Wind 60 deg	None					36	174		
5	No Ice Wind 90 deg	None					18	81		
6	No Ice Wind 120 deg	None					36	174		
7	No Ice Wind 150 deg	None					36	174		
8	No Ice Wind 180 deg	None					18	87		
9	No Ice Wind 210 deg	None					36	162		
10	No Ice Wind 240 deg	None					36	174		
11	No Ice Wind 270 deg	None					18	81		
12	No Ice Wind 300 deg	None					36	174		
13	No Ice Wind 330 deg	None					36	174		
14	Ice Weight	None					18	87		
15	Ice Wind 0 deg	None					18	87		
16	Ice Wind 30 deg	None					36	162		
17	Ice Wind 60 deg	None					36	174		
18	Ice Wind 90 deg	None					18	81		
19	Ice Wind 120 deg	None					36	174		
20	Ice Wind 150 deg	None					36	174		
21	Ice Wind 180 deg	None					18	87		
22	Ice Wind 210 deg	None					36	162		
23	Ice Wind 240 deg	None					36	174		
24	Ice Wind 270 deg	None					18	81		
25	Ice Wind 300 deg	None					36	174		
26	Ice Wind 330 deg	None					36	174		
27	Live Load - AP1	None					1			
28	Live Load - AP2	None					1			
29	Live Load - AP3	None					1			
30	Live Load - AP4	None					1			
31	Live Load - BP1	None					1			
32	Live Load - BP2	None					1			
33	Live Load - BP3	None					1			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
34	Live Load - BP4	None					1			
35	Live Load - CP1	None					1			
36	Live Load - CP2	None					1			
37	Live Load - CP3	None					1			
38	Live Load - CP4	None					1			
39	Live Load - A5 (Start)	None					1			
40	Live Load - A5 (Middl...	None					1			
41	Live Load - A5 (End)	None					1			
42	Live Load - A6 (Start)	None					1			
43	Live Load - A6 (Middl...	None					1			
44	Live Load - A6 (End)	None					1			
45	Live Load - A7 (Start)	None					1			
46	Live Load - A7 (Middl...	None					1			
47	Live Load - A7 (End)	None					1			
48	Live Load - A8 (Start)	None					1			
49	Live Load - A8 (Middl...	None					1			
50	Live Load - A8 (End)	None					1			
51	Live Load - A9 (Start)	None					1			
52	Live Load - A9 (Middl...	None					1			
53	Live Load - A9 (End)	None					1			
54	Live Load - A10 (Start)	None					1			
55	Live Load - A10 (Mid...	None					1			
56	Live Load - A10 (End)	None					1			
57	Live Load - B46 (Start)	None					1			
58	Live Load - B46 (Mid...	None					1			
59	Live Load - B46 (End)	None					1			
60	Live Load - B47 (Start)	None					1			
61	Live Load - B47 (Mid...	None					1			
62	Live Load - B47 (End)	None					1			
63	Live Load - B48 (Start)	None					1			
64	Live Load - B48 (Mid...	None					1			
65	Live Load - B48 (End)	None					1			
66	Live Load - B49 (Start)	None					1			
67	Live Load - B49 (Mid...	None					1			
68	Live Load - B49 (End)	None					1			
69	Live Load - B50 (Start)	None					1			
70	Live Load - B50 (Mid...	None					1			
71	Live Load - B50 (End)	None					1			
72	Live Load - B51 (Start)	None					1			
73	Live Load - B51 (Mid...	None					1			
74	Live Load - B51 (End)	None					1			
75	Live Load - C87 (Start)	None					1			
76	Live Load - C87 (Mid...	None					1			
77	Live Load - C87 (End)	None					1			
78	Live Load - C88 (Start)	None					1			
79	Live Load - C88 (Mid...	None					1			
80	Live Load - C88 (End)	None					1			
81	Live Load - C89 (Start)	None					1			
82	Live Load - C89 (Mid...	None					1			
83	Live Load - C89 (End)	None					1			
84	Live Load - C90 (Start)	None					1			
85	Live Load - C90 (Mid...	None					1			
86	Live Load - C90 (End)	None					1			
87	Live Load - C91 (Start)	None					1			
88	Live Load - C91 (Mid...	None					1			
89	Live Load - C91 (End)	None					1			
90	Live Load - C92 (Start)	None					1			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
91	Live Load - C92 (Mid...	None					1			
92	Live Load - C92 (End)	None					1			

Load Combinations

	Description	S...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4 Dead	Yes	Y		1	1.4	0		0		0		0		0		0		0					
2	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	2	1	0		0		0		0		0		0					
3	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	2	1	0		0		0		0		0		0					
4	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	3	1	0		0		0		0		0		0					
5	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	3	1	0		0		0		0		0		0					
6	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	4	1	0		0		0		0		0		0					
7	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	4	1	0		0		0		0		0		0					
8	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	5	1	0		0		0		0		0		0					
9	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	5	1	0		0		0		0		0		0					
10	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	6	1	0		0		0		0		0		0					
11	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	6	1	0		0		0		0		0		0					
12	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	7	1	0		0		0		0		0		0					
13	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	7	1	0		0		0		0		0		0					
14	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	8	1	0		0		0		0		0		0					
15	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	8	1	0		0		0		0		0		0					
16	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	9	1	0		0		0		0		0		0					
17	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	9	1	0		0		0		0		0		0					
18	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	10	1	0		0		0		0		0		0					
19	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	10	1	0		0		0		0		0		0					
20	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	11	1	0		0		0		0		0		0					
21	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	11	1	0		0		0		0		0		0					
22	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	12	1	0		0		0		0		0		0					
23	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	12	1	0		0		0		0		0		0					
24	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	13	1	0		0		0		0		0		0					
25	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	13	1	0		0		0		0		0		0					
26	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	15	1	14	1		1	0		0		0		0					
27	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	16	1	14	1		1	0		0		0		0					
28	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	17	1	14	1		1	0		0		0		0					
29	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	18	1	14	1		1	0		0		0		0					
30	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	19	1	14	1		1	0		0		0		0					
31	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	20	1	14	1		1	0		0		0		0					
32	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	21	1	14	1		1	0		0		0		0					
33	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	22	1	14	1		1	0		0		0		0					
34	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	23	1	14	1		1	0		0		0		0					
35	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	24	1	14	1		1	0		0		0		0					
36	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	25	1	14	1		1	0		0		0		0					
37	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	26	1	14	1		1	0		0		0		0					
38	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	2	.068	0		0		0		0		0					
39	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	3	.068	0		0		0		0		0					
40	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	4	.068	0		0		0		0		0					
41	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	5	.068	0		0		0		0		0					
42	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	6	.068	0		0		0		0		0					
43	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	7	.068	0		0		0		0		0					
44	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	8	.068	0		0		0		0		0					
45	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	9	.068	0		0		0		0		0					
46	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	10	.068	0		0		0		0		0					
47	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	11	.068	0		0		0		0		0					
48	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	12	.068	0		0		0		0		0					
49	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	13	.068	0		0		0		0		0					
50	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	2	.068	0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
51	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	3	.068	0		0		0		0		0					
52	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	4	.068	0		0		0		0		0					
53	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	5	.068	0		0		0		0		0					
54	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	6	.068	0		0		0		0		0					
55	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	7	.068	0		0		0		0		0					
56	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	8	.068	0		0		0		0		0					
57	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	9	.068	0		0		0		0		0					
58	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	10	.068	0		0		0		0		0					
59	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	11	.068	0		0		0		0		0					
60	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	12	.068	0		0		0		0		0					
61	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	13	.068	0		0		0		0		0					
62	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	2	.068	0		0		0		0		0					
63	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	3	.068	0		0		0		0		0					
64	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	4	.068	0		0		0		0		0					
65	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	5	.068	0		0		0		0		0					
66	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	6	.068	0		0		0		0		0					
67	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	7	.068	0		0		0		0		0					
68	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	8	.068	0		0		0		0		0					
69	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	9	.068	0		0		0		0		0					
70	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	10	.068	0		0		0		0		0					
71	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	11	.068	0		0		0		0		0					
72	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	12	.068	0		0		0		0		0					
73	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	13	.068	0		0		0		0		0					
74	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	2	.068	0		0		0		0		0					
75	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	3	.068	0		0		0		0		0					
76	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	4	.068	0		0		0		0		0					
77	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	5	.068	0		0		0		0		0					
78	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	6	.068	0		0		0		0		0					
79	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	7	.068	0		0		0		0		0					
80	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	8	.068	0		0		0		0		0					
81	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	9	.068	0		0		0		0		0					
82	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	10	.068	0		0		0		0		0					
83	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	11	.068	0		0		0		0		0					
84	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	12	.068	0		0		0		0		0					
85	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	13	.068	0		0		0		0		0					
86	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	2	.068	0		0		0		0		0					
87	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	3	.068	0		0		0		0		0					
88	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	4	.068	0		0		0		0		0					
89	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	5	.068	0		0		0		0		0					
90	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	6	.068	0		0		0		0		0					
91	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	7	.068	0		0		0		0		0					
92	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	8	.068	0		0		0		0		0					
93	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	9	.068	0		0		0		0		0					
94	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	10	.068	0		0		0		0		0					
95	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	11	.068	0		0		0		0		0					
96	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	12	.068	0		0		0		0		0					
97	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	13	.068	0		0		0		0		0					
98	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	2	.068	0		0		0		0		0					
99	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	3	.068	0		0		0		0		0					
100	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	4	.068	0		0		0		0		0					
101	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	5	.068	0		0		0		0		0					
102	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	6	.068	0		0		0		0		0					
103	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	7	.068	0		0		0		0		0					
104	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	8	.068	0		0		0		0		0					
105	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	9	.068	0		0		0		0		0					
106	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	10	.068	0		0		0		0		0					
107	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	11	.068	0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
108	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	12	.068	0		0		0		0		0					
109	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	13	.068	0		0		0		0		0					
110	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	2	.068	0		0		0		0		0					
111	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	3	.068	0		0		0		0		0					
112	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	4	.068	0		0		0		0		0					
113	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	5	.068	0		0		0		0		0					
114	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	6	.068	0		0		0		0		0					
115	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	7	.068	0		0		0		0		0					
116	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	8	.068	0		0		0		0		0					
117	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	9	.068	0		0		0		0		0					
118	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	10	.068	0		0		0		0		0					
119	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	11	.068	0		0		0		0		0					
120	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	12	.068	0		0		0		0		0					
121	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	13	.068	0		0		0		0		0					
122	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	2	.068	0		0		0		0		0					
123	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	3	.068	0		0		0		0		0					
124	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	4	.068	0		0		0		0		0					
125	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	5	.068	0		0		0		0		0					
126	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	6	.068	0		0		0		0		0					
127	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	7	.068	0		0		0		0		0					
128	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	8	.068	0		0		0		0		0					
129	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	9	.068	0		0		0		0		0					
130	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	10	.068	0		0		0		0		0					
131	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	11	.068	0		0		0		0		0					
132	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	12	.068	0		0		0		0		0					
133	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	13	.068	0		0		0		0		0					
134	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	2	.068	0		0		0		0		0					
135	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	3	.068	0		0		0		0		0					
136	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	4	.068	0		0		0		0		0					
137	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	5	.068	0		0		0		0		0					
138	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	6	.068	0		0		0		0		0					
139	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	7	.068	0		0		0		0		0					
140	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	8	.068	0		0		0		0		0					
141	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	9	.068	0		0		0		0		0					
142	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	10	.068	0		0		0		0		0					
143	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	11	.068	0		0		0		0		0					
144	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	12	.068	0		0		0		0		0					
145	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	13	.068	0		0		0		0		0					
146	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	2	.068	0		0		0		0		0					
147	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	3	.068	0		0		0		0		0					
148	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	4	.068	0		0		0		0		0					
149	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	5	.068	0		0		0		0		0					
150	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	6	.068	0		0		0		0		0					
151	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	7	.068	0		0		0		0		0					
152	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	8	.068	0		0		0		0		0					
153	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	9	.068	0		0		0		0		0					
154	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	10	.068	0		0		0		0		0					
155	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	11	.068	0		0		0		0		0					
156	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	12	.068	0		0		0		0		0					
157	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	13	.068	0		0		0		0		0					
158	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	2	.068	0		0		0		0		0					
159	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	3	.068	0		0		0		0		0					
160	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	4	.068	0		0		0		0		0					
161	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	5	.068	0		0		0		0		0					
162	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	6	.068	0		0		0		0		0					
163	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	7	.068	0		0		0		0		0					
164	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	8	.068	0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
165	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	9	.068	0		0		0		0		0					
166	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	10	.068	0		0		0		0							
167	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	11	.068	0		0		0		0							
168	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	12	.068	0		0		0		0							
169	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	13	.068	0		0		0		0							
170	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	2	.068	0		0		0		0							
171	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	3	.068	0		0		0		0							
172	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	4	.068	0		0		0		0							
173	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	5	.068	0		0		0		0							
174	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	6	.068	0		0		0		0							
175	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	7	.068	0		0		0		0							
176	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	8	.068	0		0		0		0							
177	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	9	.068	0		0		0		0							
178	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	10	.068	0		0		0		0							
179	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	11	.068	0		0		0		0							
180	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	12	.068	0		0		0		0							
181	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	13	.068	0		0		0		0							
182	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	39	1.5	0		0		0		0		0							
183	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	40	1.5	0		0		0		0		0							
184	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	41	1.5	0		0		0		0		0							
185	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	42	1.5	0		0		0		0		0							
186	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	43	1.5	0		0		0		0		0							
187	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	44	1.5	0		0		0		0		0							
188	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	45	1.5	0		0		0		0		0							
189	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	46	1.5	0		0		0		0		0							
190	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	47	1.5	0		0		0		0		0							
191	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	48	1.5	0		0		0		0		0							
192	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	49	1.5	0		0		0		0		0							
193	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	50	1.5	0		0		0		0		0							
194	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	51	1.5	0		0		0		0		0							
195	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	52	1.5	0		0		0		0		0							
196	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	53	1.5	0		0		0		0		0							
197	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	54	1.5	0		0		0		0		0							
198	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	55	1.5	0		0		0		0		0							
199	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	56	1.5	0		0		0		0		0							
200	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	57	1.5	0		0		0		0		0							
201	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	58	1.5	0		0		0		0		0							
202	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	59	1.5	0		0		0		0		0							
203	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	60	1.5	0		0		0		0		0							
204	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	61	1.5	0		0		0		0		0							
205	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	62	1.5	0		0		0		0		0							
206	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	63	1.5	0		0		0		0		0							
207	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	64	1.5	0		0		0		0		0							
208	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	65	1.5	0		0		0		0		0							
209	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	66	1.5	0		0		0		0		0							
210	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	67	1.5	0		0		0		0		0							
211	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	68	1.5	0		0		0		0		0							
212	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	69	1.5	0		0		0		0		0							
213	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	70	1.5	0		0		0		0		0							
214	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	71	1.5	0		0		0		0		0							
215	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	72	1.5	0		0		0		0		0							
216	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	73	1.5	0		0		0		0		0							
217	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	74	1.5	0		0		0		0		0							
218	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	75	1.5	0		0		0		0		0							
219	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	76	1.5	0		0		0		0		0							
220	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	77	1.5	0		0		0		0		0							
221	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	78	1.5	0		0		0		0		0							

Load Combinations (Continued)

	Description	S...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
222	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	79	1.5	0		0		0		0		0		0					
223	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	80	1.5	0		0		0		0		0		0					
224	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	81	1.5	0		0		0		0		0		0					
225	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	82	1.5	0		0		0		0		0		0					
226	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	83	1.5	0		0		0		0		0		0					
227	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	84	1.5	0		0		0		0		0		0					
228	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	85	1.5	0		0		0		0		0		0					
229	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	86	1.5	0		0		0		0		0		0					
230	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	87	1.5	0		0		0		0		0		0					
231	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	88	1.5	0		0		0		0		0		0					
232	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	89	1.5	0		0		0		0		0		0					
233	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	90	1.5	0		0		0		0		0		0					
234	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	91	1.5	0		0		0		0		0		0					
235	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	92	1.5	0		0		0		0		0		0					

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	A62	max	89.433	13	1144.074	26	1783.681	16	.615	5	0	235	.285	13
2		min	-1533.36	37	386.943	13	-742.842	5	-1.002	16	0	1	-.453	24
3	A63	max	1732.61	32	1054.359	32	439.822	82	.2	84	0	235	.237	3
4		min	-107.775	3	347.659	3	-1629.282	40	-.725	42	0	1	-.619	14
5	B129	max	1022.95	127	1152.198	29	741.148	21	1.017	8	0	235	.363	13
6		min	-888.61	24	367.843	21	-2273.11	8	-.692	21	0	1	-.614	24
7	B130	max	727.922	91	1066.403	35	2117.098	35	.801	20	0	235	.378	133
8		min	-1081.75	133	333.979	9	-10.266	9	-.245	9	0	1	-.426	91
9	C195	max	2448.546	16	1159.304	35	1583.036	20	.634	9	0	235	1.286	16
10		min	-1175.393	5	362.288	9	-711.363	9	-.667	20	0	1	-.904	5
11	C196	max	65.066	177	1056.559	29	287.542	21	.32	21	0	235	.822	135
12		min	-1950.827	135	313.45	21	-1487.553	173	-.584	8	0	1	-.155	17
13	Totals:	max	4187.994	14	6519.998	37	4688.326	21						
14		min	-4187.994	3	2486.93	13	-4688.332	8						

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

	Member	Shape	Code ...	Loc[...	LC	Shear...	Loc[in]	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	B71	PL3.5x0.625	.450	0	89	.078	0	y	89	68391....	70875	.923	5.168	1...	H1-1b
2	A30	PL3.5x0.625	.447	0	48	.077	0	y	49	68391....	70875	.923	5.168	1...	H1-1b
3	C112	PL3.5x0.625	.446	0	140	.075	0	y	143	68391....	70875	.923	5.168	1...	H1-1b
4	C87	P2.5Std	.442	110....	20	.110	110.526		8	50779....	53677....	3.812	3.812	2...	H1-1b
5	C85	PL3.5x0.625	.441	4.778	143	.272	4.778	y	143	69777....	70875	.923	5.168	1...	H1-1b
6	A3	PL3.5x0.625	.438	4.778	39	.270	4.778	y	38	69777....	70875	.923	5.168	1...	H1-1b
7	B44	PL3.5x0.625	.438	4.778	91	.270	0	y	90	69777....	70875	.923	5.168	1...	H1-1b
8	A5	P2.5Std	.437	110....	2	.115	110.526		14	50779....	53677....	3.812	3.812	2...	H1-1b
9	C92	P2 STD	.418	30	4	.153	30		143	32801....	33847....	1.997	1.997	2...	H1-1b
10	B46	P2.5Std	.415	110....	10	.104	110.526		22	50779....	53677....	3.812	3.812	2...	H1-1b
11	C89	P2 STD	.415	23.6...	16	.134	27.632		4	32801....	33847....	1.997	1.997	1...	H1-1b
12	CP1	P2 STD	.414	65.6...	137	.059	30.316		137	15808....	33847....	1.997	1.997	4...	H1-1b
13	BP1	P2 STD	.413	65.6...	95	.059	65.684		96	15808....	33847....	1.997	1.997	4...	H1-1b
14	AP1	P2 STD	.413	65.6...	44	.059	65.684		44	15808....	33847....	1.997	1.997	3...	H1-1b
15	B45	PL3.5x0.625	.406	4.778	95	.242	0	y	95	69777....	70875	.923	5.168	1...	H1-1b
16	C86	PL3.5x0.625	.406	4.778	135	.244	0	y	135	69777....	70875	.923	5.168	1...	H1-1b
17	A4	PL3.5x0.625	.405	4.778	42	.241	0	y	43	69777....	70875	.923	5.168	1...	H1-1b
18	C96	SR 5/8	.393	40	134	.027	0		20	4378.175	9940.19	.104	.104	2...	H1-1a
19	A14	SR 5/8	.392	40	39	.030	0		4	4378.175	9940.19	.104	.104	1	H1-1a
20	B55	SR 5/8	.392	40	91	.020	0		12	4378.175	9940.19	.104	.104	2...	H1-1a

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

	Member	Shape	Code ...	Loc[...	LC	Shear...	Loc[in]	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
21	C117	PL3.5x0.625	.381	0	135	.087	0	y	148	68391....	70875	.923	5.168	1...	H1-1b
22	B76	PL3.5x0.625	.380	0	95	.086	0	y	107	68391....	70875	.923	5.168	1...	H1-1b
23	A35	PL3.5x0.625	.376	0	43	.086	0	y	56	68391....	70875	.923	5.168	1...	H1-1b
24	B51	P2 STD	.362	30	20	.151	30		91	32801....	33847....	1.997	1.997	2...	H1-1b
25	A7	P2 STD	.341	30	16	.118	30		12	32801....	33847....	1.997	1.997	2...	H1-1b
26	B48	P2 STD	.328	23.6...	20	.141	30		20	32801....	33847....	1.997	1.997	1...	H1-1b
27	A10	P2 STD	.325	23.6...	4	.151	30		39	32801....	33847....	1.997	1.997	2...	H1-1b
28	C91	P2 STD	.320	2.368	143	.147	1.579		143	32801....	33847....	1.997	1.997	2...	H1-1b
29	A9	P2 STD	.318	2.368	39	.146	1.579		39	32801....	33847....	1.997	1.997	2...	H1-1b
30	B50	P2 STD	.318	2.368	91	.146	1.579		91	32801....	33847....	1.997	1.997	2...	H1-1b
31	C95	SR 5/8	.304	0	143	.011	40		24	4378.175	9940.19	.104	.104	1	H1-1a
32	A13	SR 5/8	.304	0	39	.011	40		8	4378.175	9940.19	.104	.104	1...	H1-1a
33	B47	P2.5Std	.303	102....	22	.085	106.579		10	50779....	53677....	3.812	3.812	2...	H1-1b
34	B54	SR 5/8	.302	0	91	.011	40		16	4378.175	9940.19	.104	.104	2...	H1-1a
35	A6	P2.5Std	.302	102....	14	.093	106.579		2	50779....	53677....	3.812	3.812	2...	H1-1b
36	C88	P2.5Std	.300	102....	8	.094	106.579		20	50779....	53677....	3.812	3.812	2...	H1-1b
37	BP4	P2 STD	.288	65.6...	127	.041	65.684		125	15808....	33847....	1.997	1.997	4...	H1-1b
38	AP4	P2 STD	.288	65.6...	75	.041	65.684		85	15808....	33847....	1.997	1.997	4...	H1-1b
39	CP4	P2 STD	.287	65.6...	179	.041	65.684		177	15808....	33847....	1.997	1.997	4...	H1-1b
40	C97	SR 3/4	.286	47.5...	143	.019	0		16	3789.856	14320.8	.184	.184	2...	H1-1a
41	A15	SR 3/4	.285	47.5...	39	.018	47.512		41	3789.856	14320.8	.184	.184	2...	H1-1a
42	B56	SR 3/4	.285	47.5...	91	.018	0		8	3789.856	14320.8	.184	.184	2...	H1-1a
43	C84	PL3.5x0.625	.252	4.778	173	.158	4.778	y	176	69777....	70875	.923	5.168	1...	H1-1b
44	A2	PL3.5x0.625	.251	4.778	81	.158	4.778	y	81	69777....	70875	.923	5.168	1...	H1-1b
45	B43	PL3.5x0.625	.250	4.778	133	.158	4.778	y	133	69777....	70875	.923	5.168	1...	H1-1b
46	A26	PL3.5x0.625	.250	4.696	75	.062	4.696	y	64	68391....	70875	.923	5.168	1...	H1-1b
47	B67	PL3.5x0.625	.248	4.697	127	.057	4.697	y	115	68391....	70875	.923	5.168	1...	H1-1b
48	C108	PL3.5x0.625	.247	4.697	179	.070	0	y	159	68391....	70875	.923	5.168	1...	H1-1b
49	B42	PL3.5x0.625	.232	4.778	132	.150	4.778	y	132	69777....	70875	.923	5.168	1...	H1-1b
50	A1	PL3.5x0.625	.232	4.778	80	.154	4.778	y	80	69777....	70875	.923	5.168	1...	H1-1b
51	C83	PL3.5x0.625	.229	4.778	173	.161	0	y	173	69777....	70875	.923	5.168	1...	H1-1b
52	A28	PL3.5x0.625	.222	4.696	81	.059	0	y	72	68391....	70875	.923	5.168	1...	H1-1b
53	B69	PL3.5x0.625	.221	4.697	133	.059	0	y	112	68391....	70875	.923	5.168	1...	H1-1b
54	C110	PL3.5x0.625	.218	4.697	173	.059	0	y	164	68391....	70875	.923	5.168	1...	H1-1b
55	CP2	P2 STD	.198	30.3...	20	.084	30.316		20	15808....	33847....	1.997	1.997	3...	H1-1b
56	AP2	P2 STD	.195	30.3...	16	.088	30.316		4	15808....	33847....	1.997	1.997	2...	H1-1b
57	AP3	P2 STD	.192	65.6...	4	.076	30.316		4	15808....	33847....	1.997	1.997	2...	H1-1b
58	CP3	P2 STD	.187	65.6...	20	.077	30.316		20	15808....	33847....	1.997	1.997	4...	H1-1b
59	A8	P2 STD	.183	2.368	81	.083	1.579		81	32801....	33847....	1.997	1.997	2...	H1-1b
60	C90	P2 STD	.183	2.368	173	.084	1.579		173	32801....	33847....	1.997	1.997	2...	H1-1b
61	B49	P2 STD	.183	2.368	133	.083	1.579		133	32801....	33847....	1.997	1.997	2...	H1-1b
62	A11	SR 5/8	.181	40	81	.028	40		4	4378.175	9940.19	.104	.104	1	H1-1b*
63	B52	SR 5/8	.181	40	133	.017	40		12	4378.175	9940.19	.104	.104	2...	H1-1b*
64	C93	SR 5/8	.180	40	173	.025	40		20	4378.175	9940.19	.104	.104	1	H1-1b*
65	B53	SR 5/8	.171	40	133	.015	40		10	4378.175	9940.19	.104	.104	2...	H1-1b*
66	A12	SR 5/8	.171	40	81	.012	40		24	4378.175	9940.19	.104	.104	1	H1-1b*
67	C94	SR 5/8	.168	40	173	.012	40		16	4378.175	9940.19	.104	.104	1	H1-1b*
68	BP3	P2 STD	.160	30.3...	12	.066	30.316		12	15808....	33847....	1.997	1.997	4...	H1-1b
69	BP2	P2 STD	.157	30.3...	24	.071	30.316		12	15808....	33847....	1.997	1.997	4...	H1-1b
70	C99	SR 3/4	.110	0	173	.022	0		16	3789.856	14320.8	.184	.184	2...	H1-1b
71	A17	SR 3/4	.110	0	81	.016	0		24	3789.856	14320.8	.184	.184	2...	H1-1b
72	B58	SR 3/4	.110	0	133	.021	0		8	3789.856	14320.8	.184	.184	2...	H1-1b
73	C119	P4 STD	.095	15.1...	32	.101	17.053		141	88992....	99982....	11.318	11.318	4...	H1-1b
74	B78	P4 STD	.095	15.1...	29	.099	17.053		89	88992....	99982....	11.318	11.318	1...	H1-1b
75	A37	P4 STD	.094	15.1...	37	.099	17.053		49	88992....	99982....	11.318	11.318	2...	H1-1b
76	C128	P2 STD	.080	78.3...	9	.070	0		144	20383....	33847....	1.997	1.997	1...	H1-1b*
77	A125	P2 STD	.074	63.2...	17	.078	63.276		40	24315.51	33847....	1.997	1.997	1...	H1-1b*

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

	Member	Shape	Code ...	Loc[...	LC	Shear...	Loc[in]	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
78	B126	P2 STD	.057	69.0...	23	.076	69.077		91	22821.38	33847....	1.997	1.997	1...	H1-1b*
79	C129	P2 STD	.043	58.6...	5	.048	58.637		174	25478....	33847....	1.997	1.997	1...	H1-1b*
80	B127	P2 STD	.039	74.8...	21	.039	0		122	21303....	33847....	1.997	1.997	1...	H1-1b*
81	A124	P2 STD	.036	34.5...	8	.043	69.077		82	22821....	33847....	1.997	1.997	1...	H1-1b
82	C100	SR 3/4	.017	47.5...	21	.029	47.512		4	3789.856	14320.8	.184	.184	2...	H1-1b*
83	A18	SR 3/4	.017	0	5	.028	47.512		4	3789.856	14320.8	.184	.184	2...	H1-1b*
84	B59	SR 3/4	.012	0	13	.013	0		19	3789.856	14320.8	.184	.184	2...	H1-1b*
85	A16	SR 3/4	.000	0	235	.000	0		235	3789.856	14320.8	.184	.184	1	H1-1a
86	B57	SR 3/4	.000	0	235	.000	0		235	3789.856	14320.8	.184	.184	1	H1-1a
87	C98	SR 3/4	.000	0	235	.000	0		235	3789.856	14320.8	.184	.184	1	H1-1a

APPENDIX D

ADDITIONAL CALCULATIONS

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Alpha Sector
2021777.875123.02

Bolt Information		
Bolt Diameter (d)	0.625	in
Net Tensile Area (An)	0.226	in^2
# of Bolts Total (n)	6	
Bolt Distance Up-Down	6	in
Bolt Distance Left-Right	6	in
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions (Up-Down)		
Moment (M)	0.45	k-ft
Axial (T)	1.28	kips
Shear (V)	1.47	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	1.23	kips
Shear (V)	1.93	kips

Bolt Capacity (Up-Down)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	0.52	kips
Bolt Shear Force (V_{ub})	0.246	kips
$T_{ub}/\phi R_{nt}$	0.04829	
$V_{ub}/\phi R_{nv}$	0.03389	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00365	
Bolt Capacity =	4.8%	OK

*Rating per TIA-222-H, Section 15.5

Bolt Capacity (Left-Right)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	0.20	kips
Bolt Shear Force (V_{ub})	0.322	kips
$T_{ub}/\phi R_{nt}$	0.01919	
$V_{ub}/\phi R_{nv}$	0.04443	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00246	
Bolt Capacity =	4.4%	OK

*Rating per TIA-222-H, Section 15.5

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Beta Sector
2021777.875123.02

Bolt Information		
Bolt Diameter (d)	0.625	in
Net Tensile Area (An)	0.226	in^2
# of Bolts Total (n)	6	
Bolt Distance Up-Down	6	in
Bolt Distance Left-Right	6	in
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions (Up-Down)		
Moment (M)	0.64	k-ft
Axial (T)	1.61	kips
Shear (V)	1.87	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	1.31	kips
Shear (V)	1.93	kips

Bolt Capacity (Up-Down)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	0.70	kips
Bolt Shear Force (V_{ub})	0.311	kips
$T_{ub}/\phi R_{nt}$	0.06515	
$V_{ub}/\phi R_{nv}$	0.04290	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00639	
Bolt Capacity =	6.5%	OK

*Rating per TIA-222-H, Section 15.5

Bolt Capacity (Left-Right)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	0.22	kips
Bolt Shear Force (V_{ub})	0.322	kips
$T_{ub}/\phi R_{nt}$	0.02042	
$V_{ub}/\phi R_{nv}$	0.04436	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00250	
Bolt Capacity =	4.4%	OK

*Rating per TIA-222-H, Section 15.5

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Gamma Sector
2021777.875123.02

Bolt Information		
Bolt Diameter (d)	0.625	in
Net Tensile Area (An)	0.226	in^2
# of Bolts Total (n)	6	
Bolt Distance Up-Down	6	in
Bolt Distance Left-Right	6	in
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions (Up-Down)		
Moment (M)	0.59	k-ft
Axial (T)	1.55	kips
Shear (V)	1.99	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	1.35	kips
Shear (V)	2.13	kips

Bolt Capacity (Up-Down)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	0.65	kips
Bolt Shear Force (V_{ub})	0.332	kips
$T_{ub}/\phi R_{nt}$	0.06104	
$V_{ub}/\phi R_{nv}$	0.04586	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00612	
Bolt Capacity =	6.1%	OK

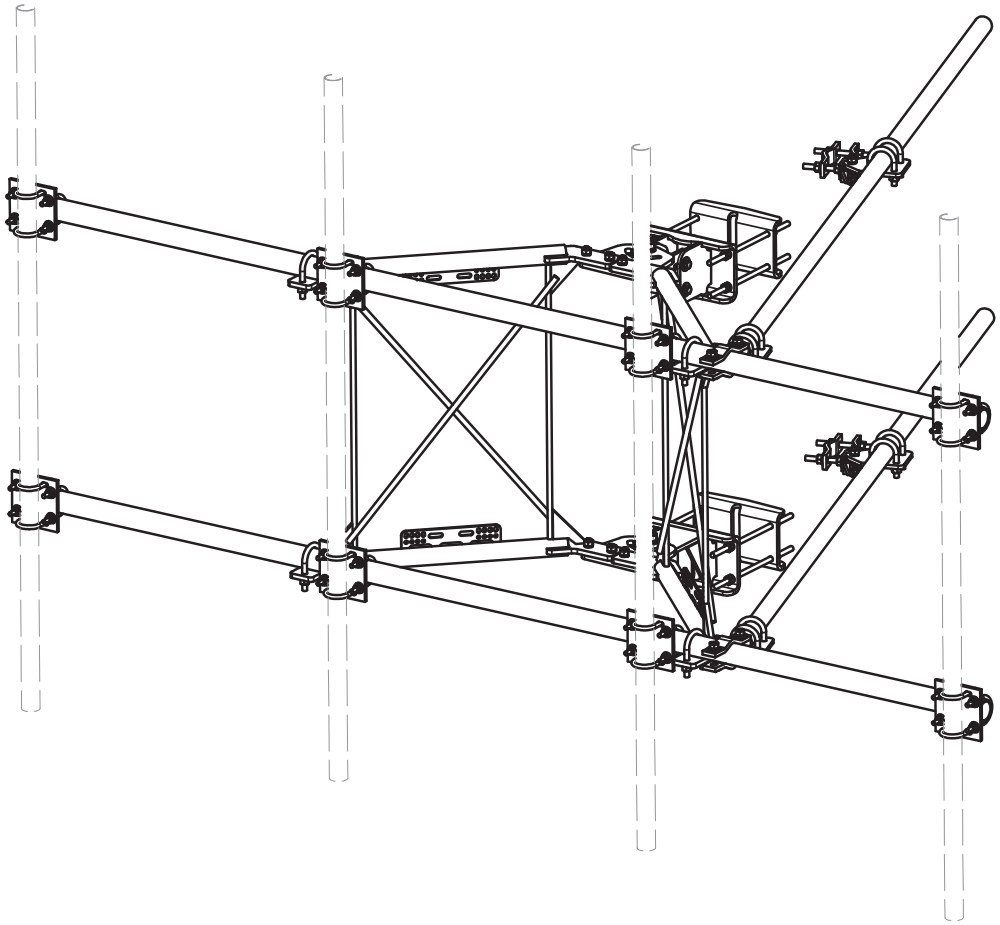
*Rating per TIA-222-H, Section 15.5

Bolt Capacity (Left-Right)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	0.22	kips
Bolt Shear Force (V_{ub})	0.355	kips
$T_{ub}/\phi R_{nt}$	0.02105	
$V_{ub}/\phi R_{nv}$	0.04902	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00299	
Bolt Capacity =	4.9%	OK

*Rating per TIA-222-H, Section 15.5

APPENDIX E

SUPPLEMENTAL DRAWINGS



PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	2	X-VFAW	SUPPORT ARM		71.41	142.81
2	1	X-HDCAMTBW	CLAMP WELDMENT FOR BCAM-HD		33.86	33.86
3	1	X-MHTPHD	MULTI-HOLE TAPER PLATE WELDMENT		36.24	36.24
4	2	X-VFAPL4	VFA-HD PIVOT PLATE	12 in	15.88	31.77
5	2	X-LCBP4	BENT BACKING PLATE	13 in	19.00	38.01
6	1	X-HDCAMSS	ANGLE ADJUSTMENT WELDMENT FOR BCAM-HD		16.39	16.39
7	4	X-SPTB	SLIDING PIPE TIE BACK PLATE	5 1/2 in	5.87	23.49
8	1	X-HDCAMSP	POSITIONING PLATE WELDMENT FOR BCAM-HD		2.58	2.58
9	4	X-TBCA	TIE BACK CLIP ANGLE		2.01	8.02
10	8	SCX2	CROSSOVER PLATE	7 in	4.80	38.37
11	4	MCP	CLAMP HALF 1/2" THICK, 11-5/8" LONG	12 1/16 in	3.59	14.37
12	8	DCP	1/2" THICK, 5-3/4" CNTER TO CENTER CLAMP HALF	8 1/8 in	2.36	18.90
13	2	P2126	2-3/8" X 126" (2" SCH. 40) GALVANIZED PIPE	126 in	40.75	81.50
14	2	P30150	2-7/8" X 150" (2-1/2" SCH. 40) GALVANIZED PIPE	150 in	76.94	153.87
15	4	A34212	3/4" x 2-1/2" UNC HEX BOLT (A325)	2 1/2 in	0.48	1.92
16	4	G34FW	3/4" HDG USS FLATWASHER		0.06	0.24
17	4	G34LW	3/4" HDG LOCKWASHER		0.04	0.17
18	4	G34NUT	3/4" HDG HEAVY 2H HEX NUT		0.21	0.85
19	8	G58R-18	5/8" x 18" THREADED ROD (HDG.)	18 in	0.40	3.19
20	4	G58R-12	5/8" x 12" THREADED ROD (HDG.)		1.05	4.18
21	4	G58R-8	5/8" x 8" THREADED ROD (HDG.)		0.70	2.79
22	4	X-UB5300	5/8" X 3" X 5-1/4" X 2-1/2" U-BOLT (HDG.)		1.15	4.60
23	8	X-UB5258	5/8" X 2-5/8" X 4-1/2" X 2" U-BOLT (HDG.)		1.00	8.00
24	2	G5807	5/8" x 7" HDG HEX BOLT GR5 FULL THREAD	7 in	0.70	1.41
25	1	G5806	5/8" x 6" HDG HEX BOLT GR5 FULL THREAD	6 in	0.62	0.62
26	8	G5804	5/8" x 4" HDG HEX BOLT GR5		0.44	3.55
27	4	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.08
28	8	A582114	5/8" x 2-1/4" HDG A325 HEX BOLT	2 1/4 in	0.31	2.50
29	25	G58FW	5/8" HDG USS FLATWASHER	1/8 in	0.07	1.76
30	66	G58LW	5/8" HDG LOCKWASHER		0.03	1.72
31	71	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	9.22
32	32	X-UB1300	1/2" X 3" X 5" X 2" GALV U-BOLT		0.74	23.64
33	16	X-UB1212	1/2" X 2" X 3" X 1-1/4" U-BOLT (HDG.)		0.60	9.56
34	64	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	2.18
35	64	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	0.89
36	64	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	4.58
					TOTAL WT. #	738.06

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION		CEK	12/7/2017
B	CHANGED TIE-BACK BACK CONNECTION		CEK	7/31/2017
A	CHANGED TIE-BACK FRONT CONNECTION		CEK	2/2/2017

REVISION HISTORY

TOLERANCE NOTES

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

DESCRIPTION
12' 6" HEAVY DUTY
V-FRAME ASSEMBLY
WITH TWO STIFF ARMS

SITE PRO 1
A valmont COMPANY

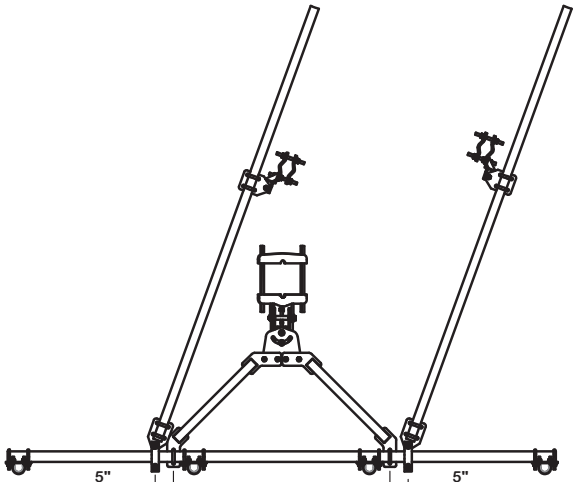
Engineering Support Team:
1-888-753-7446

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

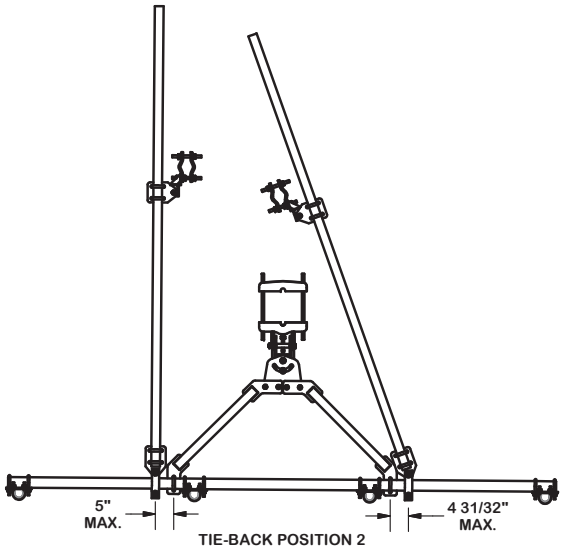
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	CEK 1/25/2017		VFA12-HD

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 12/13/2017	VFA12-HD

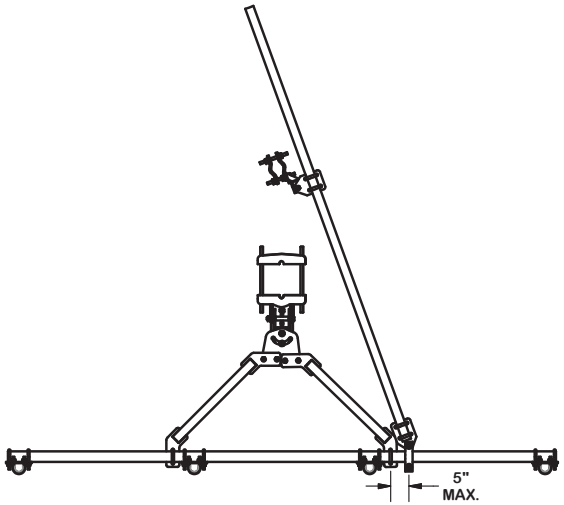
TIE-BACK POSITIONS



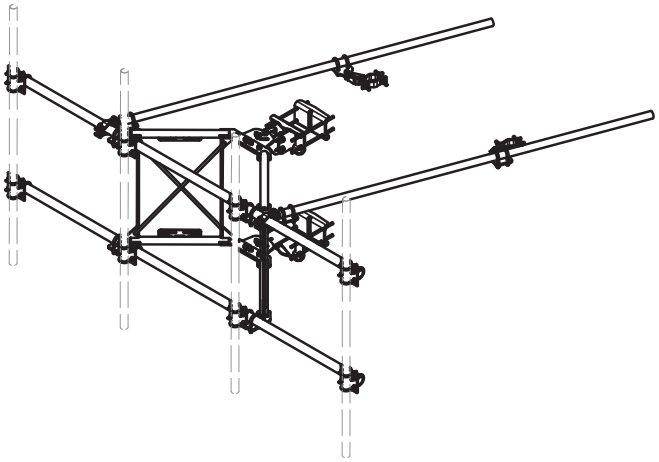
TIE-BACK POSITION 1
-20° / +20° TOP PARALLEL

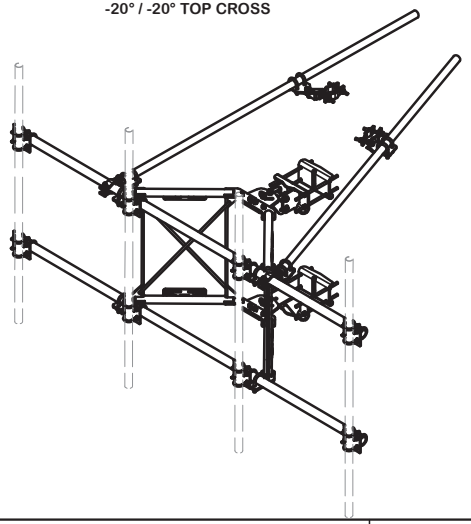


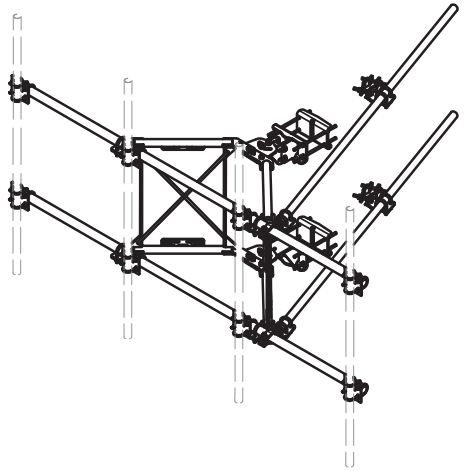
TIE-BACK POSITION 2
-20° / -20° TOP CROSS



TIE-BACK POSITION 3
-20° SAME SIDE STACKED







REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION		CEK	12/7/2017
B	CHANGED TIE-BACK BACK CONNECTION		CEK	7/31/2017
A	CHANGED TIE-BACK FRONT CONNECTION		CEK	2/2/2017

REVISION HISTORY

TOLERANCE NOTES

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

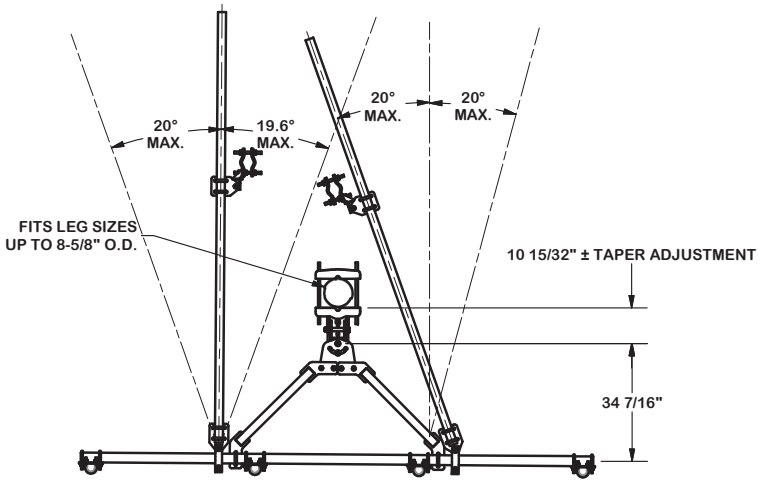
DESCRIPTION
12' 6" HEAVY DUTY
V-FRAME ASSEMBLY
WITH TWO STIFF ARMS

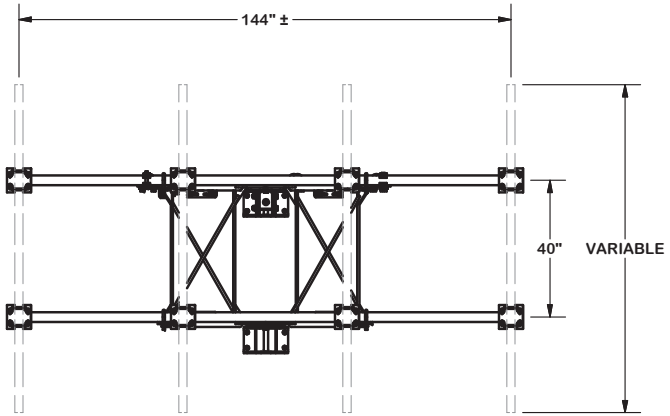
SITE PRO 1
A valmont COMPANY
Engineering Support Team:
1-888-753-7446

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

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
	CEK 1/25/2017		VFA12-HD	2 OF 5

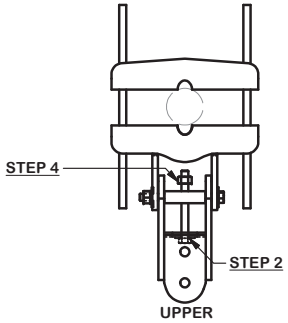
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 12/13/2017	VFA12-HD

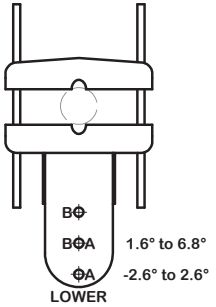


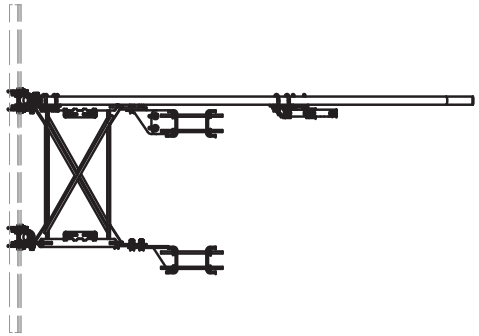


ANGLE CALIBRATING PROCEDURE:

1. MEASURE TOWER TAPER AND PICK LOWER BRACKET HOLE:
   - HOLE A = -2.6° TO 2.6°
   - HOLE B = 1.6° TO 6.8°
2. USE CALIBRATING BOLT TO ADJUST FRAME TO DESIRED TAPER
3. TORQUE LOCKING BOLTS TO 100 ft.-lbs.
4. ADVANCE LOCKING NUT TO POSITIONING PLATE, THEN TIGHTEN.







REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION		CEK	12/7/2017
B	CHANGED TIE-BACK BACK CONNECTION		CEK	7/31/2017
A	CHANGED TIE-BACK FRONT CONNECTION		CEK	2/2/2017

REVISION HISTORY

TOLERANCE NOTES

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

DESCRIPTION
12' 6" HEAVY DUTY
V-FRAME ASSEMBLY
WITH TWO STIFF ARMS

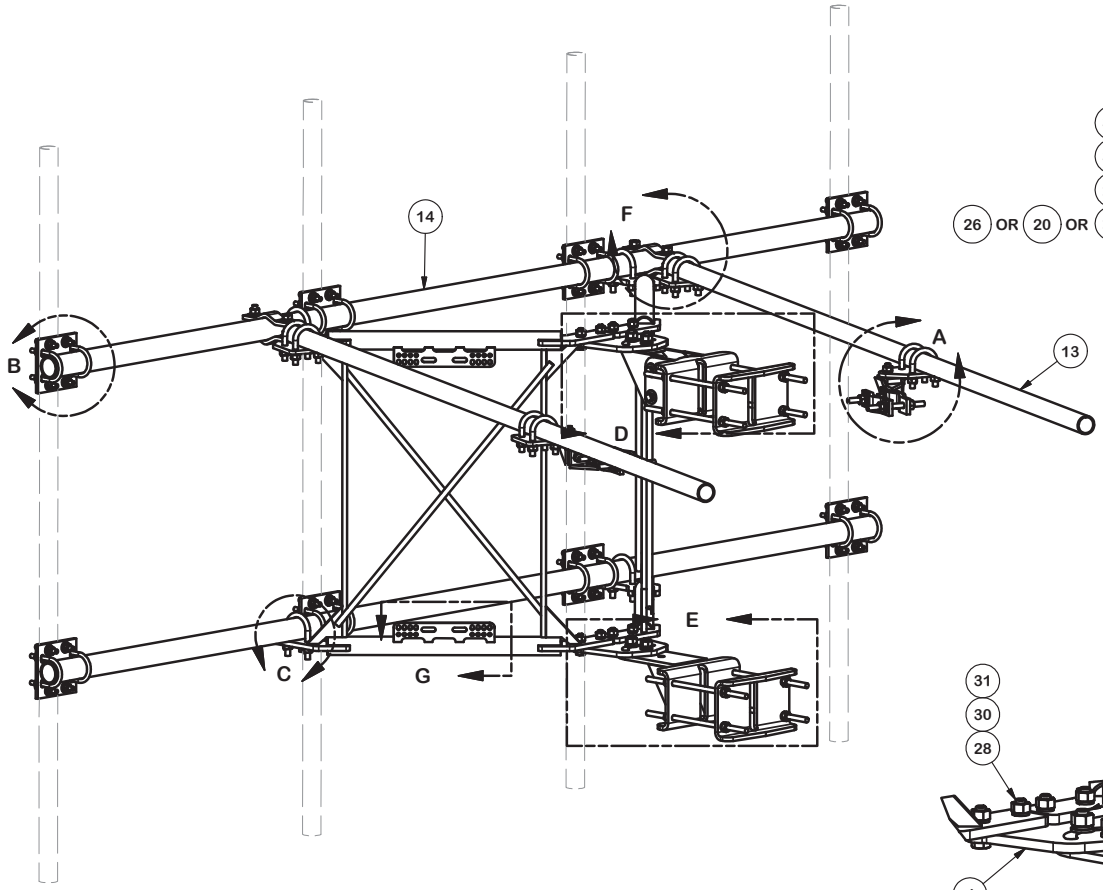
SITE PRO 1 — A valmont COMPANY

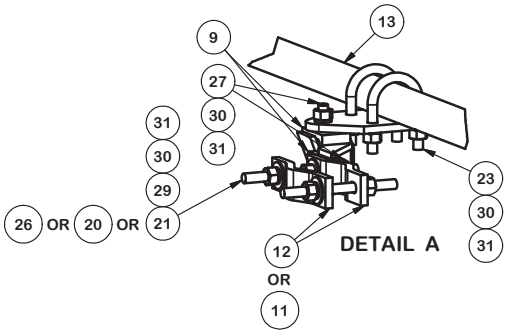
Engineering Support Team:
1-888-753-7446

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

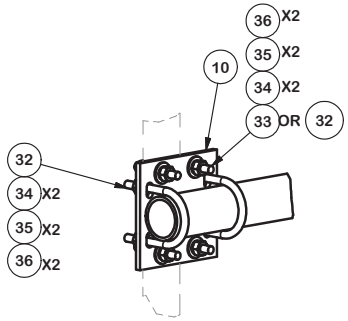
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	CEK 1/25/2017		VFA12-HD

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 12/13/2017	VFA12-HD

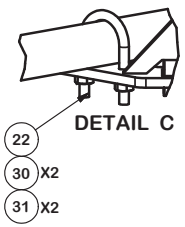




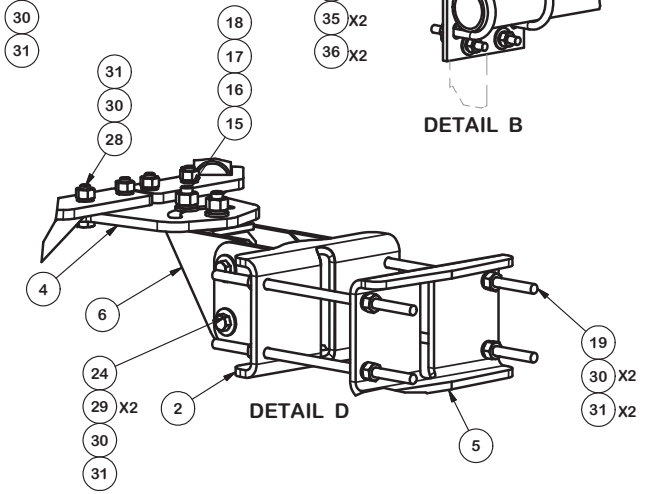
DETAIL A



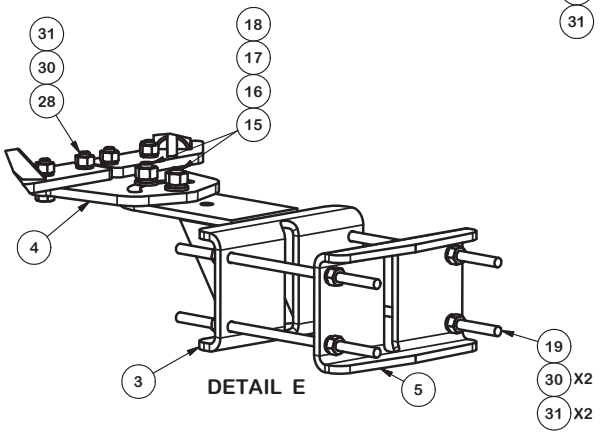
DETAIL B



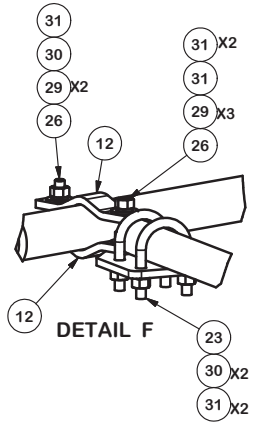
DETAIL C



DETAIL D



DETAIL E

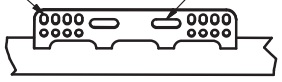


DETAIL F

7/16" LUG HOLES

REVIEW CARRIER STANDARDS FOR PROPER SURFACE PREPARTION AND ASSEMBLY OF ELECTRICAL CONNECTIONS

9/16" SLOTTED HOLE FOR EQUIPMENT PIPE U-BOLT



DETAIL G

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION		CEK	12/7/2017
B	CHANGED TIE-BACK BACK CONNECTION		CEK	7/31/2017
A	CHANGED TIE-BACK FRONT CONNECTION		CEK	2/2/2017

REVISION HISTORY

TOLERANCE NOTES

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

DESCRIPTION
12' 6" HEAVY DUTY
V-FRAME ASSEMBLY
WITH TWO STIFF ARMS

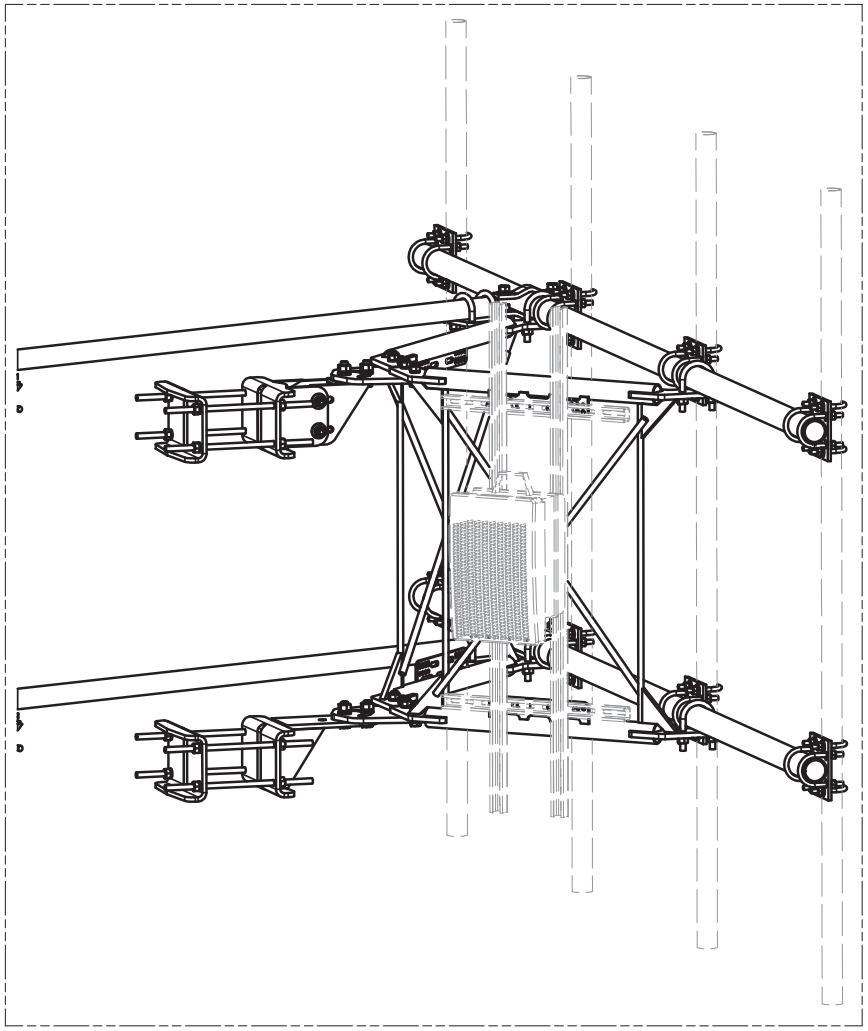
SITE PRO 1 — A valmont COMPANY

Engineering Support Team: 1-888-753-7446

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

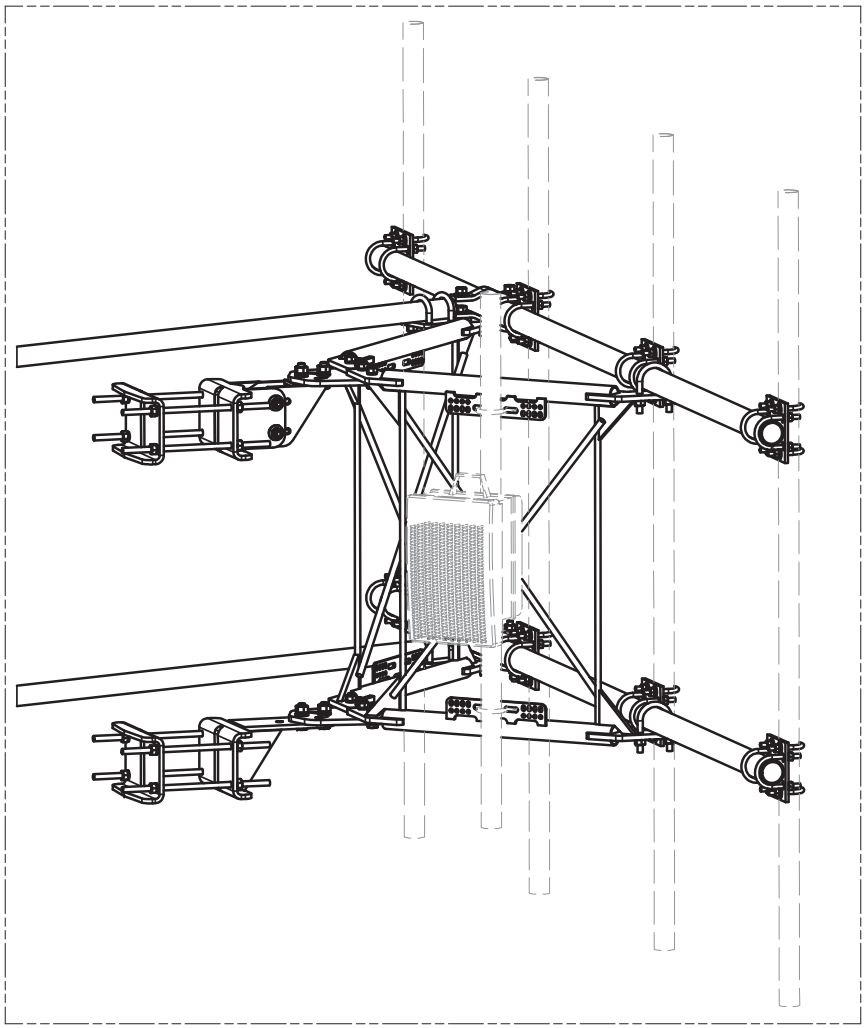
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	CEK 1/25/2017		VFA12-HD

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 12/13/2017	VFA12-HD



UNISTRUT AND HARDWARE
SOLD SEPARATELY.

REQUIRES 3/8" HARDWARE



EQUIPMENT PIPE AND HARDWARE
SOLD SEPARATELY.

REQUIRES 1/2" HARDWARE
AND 2-3/8" TO 4-1/2" O.D. PIPE

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION		CEK	12/7/2017
B	CHANGED TIE-BACK BACK CONNECTION		CEK	7/31/2017
A	CHANGED TIE-BACK FRONT CONNECTION		CEK	2/2/2017

REVISION HISTORY

TOLERANCE NOTES

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

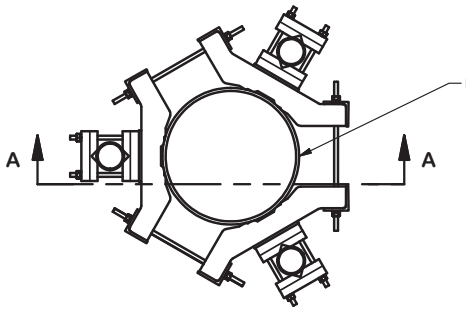
DESCRIPTION
12' 6" HEAVY DUTY
V-FRAME ASSEMBLY
WITH TWO STIFF ARMS

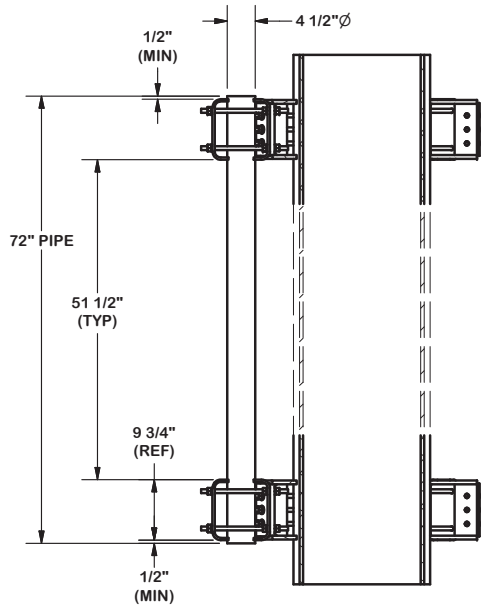
SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	CEK 1/25/2017		VFA12-HD

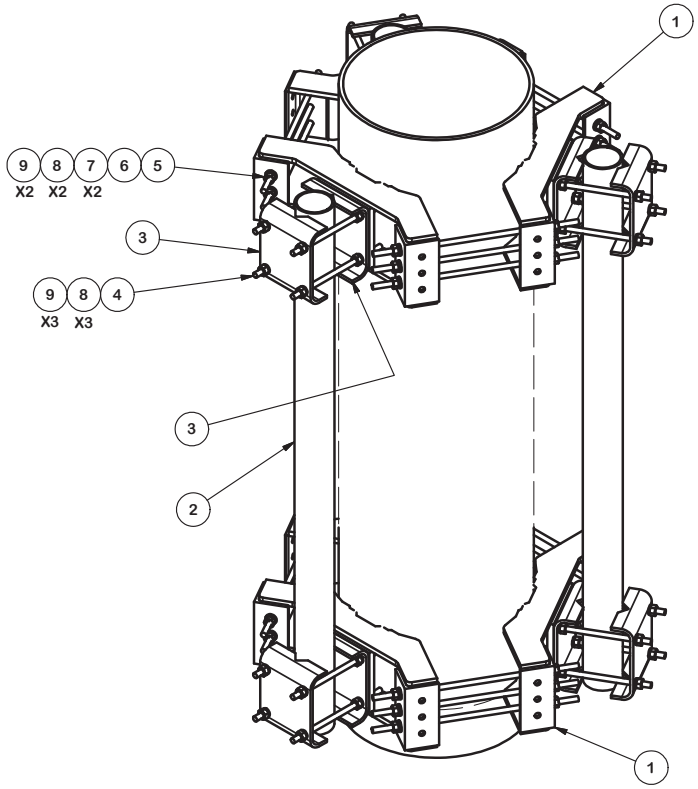
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 12/13/2017	VFA12-HD

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT
1	6	X-LWRM	RING MOUNT WELDMENT		68.16	408.96
2	3	P472	4-1/2" X 72" SCH. 40 GALVANIZED PIPE	72 in	64.89	194.68
3	12	X-214130	BENT PLATE V-CLAMP	12 5/8 in	11.43	137.16
4	24	G58R-14	5/8" x 14" THREADED ROD (HDG.)	14 in	0.40	9.57
5	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)	48 in	.55	9.90
6	18	G58R-24	5/8" x 24" THREADED ROD (HDG.)	24 in	.55	9.90
7	36	A58FW	5/8" HDG A325 FLATWASHER		.03	1.08
8	108	G58LW	5/8" HDG LOCKWASHER		0.03	3.24
9	108	A58NUT	5/8" HDG A325 HEX NUT		0.13	14.04
					TOTAL WT. #	788.53





SECTION A-A



TOLERANCE NOTES

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

DESCRIPTION: MONOPOLE SECTOR FRAME ATTACHMENT ASSEMBLY

SITE PRO 1 — A valmont COMPANY

Engineering Support Team: 1-888-753-7446

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

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	KC8 3/18/2016	3RD PARTY	MSFAA

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
01	01	CUSTOMER	BMC 5/2/2016	MSFAA

EBI Consulting

environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CTNH558A

876369
64 Hungerford Lane
Harwinton, Connecticut 06791

October 27, 2021

EBI Project Number: 6221006478

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**12.23%**

October 27, 2021

T-Mobile
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, Connecticut 06002

Emissions Analysis for Site: CTNH558A - 876369

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **64 Hungerford Lane** in **Harwinton, Connecticut** 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu W/cm^2$). The number of $\mu W/cm^2$ 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.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. 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 done for the proposed T-Mobile Wireless antenna facility located at 64 Hungerford Lane in Harwinton, Connecticut 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 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 manufacturer's 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. For power density calculations, the broadcast footprint of the AIR6449 antenna has been considered. Due to the beamforming nature of this antenna, the actual beam locations vary depending on demand and are narrow in nature. Using the broadcast footprint accounts for the potential location of beams at any given time.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.

3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

5) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

6) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

7) 1 LTE Traffic channel (LTE 1C and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 60 Watts.

8) 1 LTE Broadcast channel (LTE 1C and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 20 Watts.

9) 1 NR Traffic channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.

10) 1 NR Broadcast channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 40 Watts.

11) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. 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. This is rarely the case, and if so, is never continuous.

12) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

13) The antennas used in this modeling are the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector A, the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector B, the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's 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.

14) The antenna mounting height centerline of the proposed antennas is 180 feet above ground level (AGL).

15) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd / 16.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd / 16.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd / 16.45 dBd
Height (AGL):	180 feet	Height (AGL):	180 feet	Height (AGL):	180 feet
Channel Count:	13	Channel Count:	13	Channel Count:	13
Total TX Power (W):	560 Watts	Total TX Power (W):	560 Watts	Total TX Power (W):	560 Watts
ERP (W):	17,868.72	ERP (W):	17,868.72	ERP (W):	17,868.72
Antenna A1 MPE %:	**2.80%**	Antenna B1 MPE %:	**2.80%**	Antenna C1 MPE %:	**2.80%**
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz
Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd
Height (AGL):	180 feet	Height (AGL):	180 feet	Height (AGL):	180 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	36,356.09	ERP (W):	36,356.09	ERP (W):	36,356.09
Antenna A2 MPE %:	**4.32%**	Antenna B2 MPE %:	**4.32%**	Antenna C2 MPE %:	**4.32%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	7.12%
Verizon	1.43%
AT&T	3.68%
Site Total MPE % :	12.23%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	7.12%
T-Mobile Sector B Total:	7.12%
T-Mobile Sector C Total:	7.12%
Site Total MPE % :	12.23%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 600 MHz LTE	2	591.73	180.0	1.41	600 MHz LTE	400	0.35%
T-Mobile 600 MHz NR	1	1577.94	180.0	1.87	600 MHz NR	400	0.47%
T-Mobile 700 MHz LTE	2	695.22	180.0	1.65	700 MHz LTE	467	0.35%
T-Mobile 1900 MHz GSM	4	1052.26	180.0	5.00	1900 MHz GSM	1000	0.50%
T-Mobile 1900 MHz LTE	2	2104.51	180.0	5.00	1900 MHz LTE	1000	0.50%
T-Mobile 2100 MHz LTE	2	2649.42	180.0	6.29	2100 MHz LTE	1000	0.63%
T-Mobile 2500 MHz LTE 1C & 2C Traffic	1	11044.63	180.0	13.12	2500 MHz LTE 1C & 2C Traffic	1000	1.31%
T-Mobile 2500 MHz LTE 1C & 2C Broadcast	1	1074.06	180.0	1.28	2500 MHz LTE 1C & 2C Broadcast	1000	0.13%
T-Mobile 2500 MHz NR Traffic	1	22089.26	180.0	26.23	2500 MHz NR Traffic	1000	2.62%
T-Mobile 2500 MHz NR Broadcast	1	2148.13	180.0	2.55	2500 MHz NR Broadcast	1000	0.26%
						Total:	**7.12%**

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

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:	7.12%
Sector B:	7.12%
Sector C:	7.12%
T-Mobile Maximum MPE % (Sector A):	7.12%
Site Total:	12.23%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **12.23%** 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.

T-Mobile

T-MOBILE SITE NUMBER: CTNH558A
T-MOBILE SITE NAME: CTNH558A
SITE TYPE: MONOPOLE
TOWER HEIGHT: 178'-0"

BUSINESS UNIT #: 876369
SITE ADDRESS: 64 HUNGERFORD LANE HARWINTON, CT 06791
COUNTY: LITCHFIELD
JURISDICTION: TOWN OF HARWINTON

T-MOBILE SPRINT RETAIN SITE CONFIGURATION: 67E5998E_1xAIR+1OP

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	HARWINTON / BUCKLEY BROADCASTI
SITE ADDRESS:	64 HUNGERFORD LANE HARWINTON, CT 06791
COUNTY:	LITCHFIELD
MAP/PARCEL #:	D5/02/0032
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.75726000° (41° 45' 26.15")
LONGITUDE:	-73.05260000° (-73° 3' 9.20")
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	857.0 FT
CURRENT ZONING:	2-1 COMM LAND
JURISDICTION:	TOWN OF HARWINTON
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	CROWN CASTEL USA 2000 CORPORATE DRIVE CANONSBURG, PA
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002
ELECTRIC PROVIDER:	CONNECTICUT LIGHT AND POWER (800) 286-2000
TELCO PROVIDER:	TBD --

PROJECT TEAM

A&E FIRM:	INFINIGY 1033 WATERVLIET SHAKER RD. ALBANY, NY 12205
CROWN CASTLE USA INC. DISTRICT CONTACTS:	1500 CORPORATE DRIVE CANONSBURG, PA 15317
	TRICIA PELON - PROJECT MANAGER (518) 373-3507
	JASON D'AMICO - CONSTRUCTION MANAGER (860) 209-0104

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	PLUMBING DIAGRAM
C-5	EQUIPMENT SPECS
C-6	EQUIPMENT SPECS
E-1	AC PANEL SCHEDULE & ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR ----. 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 DESCRIPTION

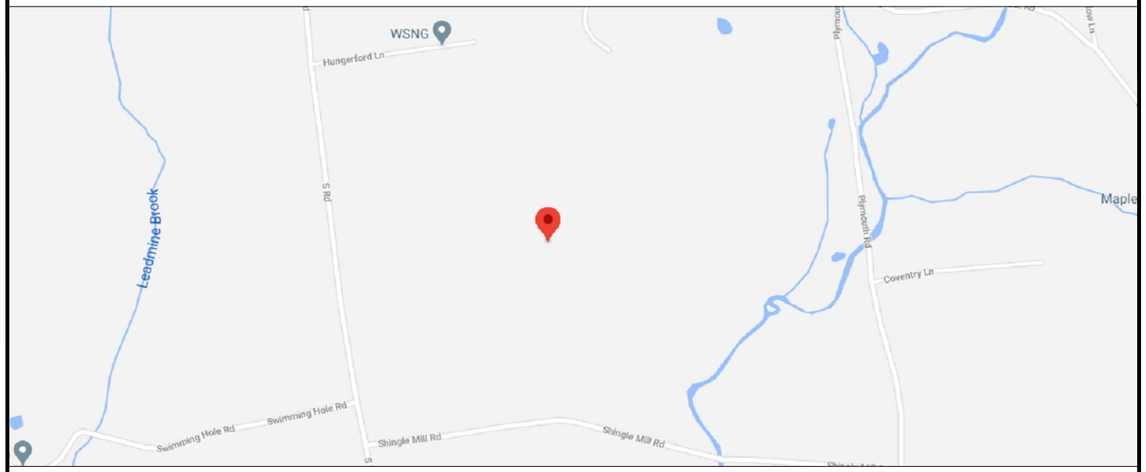
THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (6) ANTENNAS
- REMOVE (9) TMAS
- REMOVE (6) RRHs
- REMOVE (1) RRH MOUNT
- REMOVE (3) HYBRID CABLES
- INSTALL (6) ANTENNAS
- INSTALL (6) RRHs
- INSTALL (4) HYBRID CABLES
- REMOVE (1) ANTENNA MOUNT PLATFORM
- INSTALL (3) ANTENNA MOUNTS W/ (1) RING MOUNT

GROUND SCOPE OF WORK:
- REMOVE (1) MMBS EQUIPMENT CABINET
- REMOVE (1) BBU EQUIPMENT CABINET
- INSTALL (1) 6160 & (1) B160 BATTERY CABINETS
- INSTALL (1) PSU4813 BOOSTER IN (P) CABINET
- INSTALL (3) BB6648 IN (P) CABINET
- INSTALL (1) IXRE ROUTER IN (P) CABINET

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER.

LOCATION MAP



NO SCALE

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:	MORRISON HERSHFIELD
DATED:	OCTOBER 04, 2021
MOUNT ANALYSIS:	GPD ENGINEERING AND ARCHITECTURE
DATED:	PROFESSIONAL CORPORATION SEPTEMBER 29, 2021
RFDS REVISION:	1
DATED:	08/02/2021
ORDER ID:	584628
REVISION:	0

CALL CONNECTICUT ONE CALL
(800) 922-4455 CBYD.COM
CALL 2 WORKING DAYS BEFORE YOU DIG!

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.

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com

T-MOBILE SITE NUMBER:
CTNH558A

BU #: **876369**
HARWINTON / BUCKLEY BROADCASTI

64 HUNGERFORD LANE
HARWINTON, CT 06791

EXISTING 178'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	04/22/21	BMM	FINAL	SS
1	10/07/21	CB	FINAL	SS
2	10/19/21	SS	APP # UPDATE	SS

STATE OF CONNECTICUT
SHUHEI SAKANO
34916
LICENSED PROFESSIONAL ENGINEER
10/19/21

SHEET NUMBER: T-1
REVISION: 2

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
   THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE," CED–STD–10294 "STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES," AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
   CARRIER: T–MOBILE
   TOWER OWNER: CROWN CASTLE USA INC.
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CROWN CASTLE.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
   #4 BARS AND SMALLER....................40 ksi
   #5 BARS AND LARGER....................60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH....................3"
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 BARS AND LARGER....................2"
   #5 BARS AND SMALLER....................1–1/2"
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
   SLAB AND WALLS....................3/4"
   BEAMS AND COLUMNS....................1–1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
   4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
   4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "T–MOBILE".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE		
SYSTEM	CONDUCTOR	COLOR
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
277/480V, 3Ø	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
	GROUND	GREEN
DC VOLTAGE	POS (+)	RED**
	NEG (–)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

APWA UNIFORM COLOR CODE:

WHITE	PROPOSED EXCAVATION
PINK	TEMPORARY SURVEY MARKINGS
RED	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES

ABBREVIATIONS:

ANT	ANTENNA
(E)	EXISTING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
LTE	LONG TERM EVOLUTION
MGB	MASTER GROUND BAR
MW	MICROWAVE
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
(P)	PROPOSED
PP	POWER PLANT
QTY	QUANTITY
RECT	RECTIFIER
RBS	RADIO BASE STATION
RET	REMOTE ELECTRIC TILT
RFDS	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com

T-MOBILE SITE NUMBER:
CTNH558A

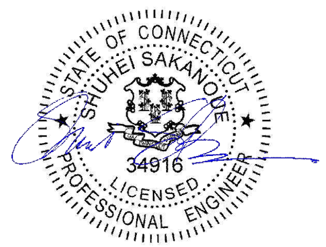
BU #: **876369**
HARWINTON / BUCKLEY BROADCASTI

64 HUNGERFORD LANE
HARWINTON, CT 06791

EXISTING 178'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	04/22/21	BMM	FINAL	SS
1	10/07/21	CB	FINAL	SS
2	10/19/21	SS	APP # UPDATE	SS



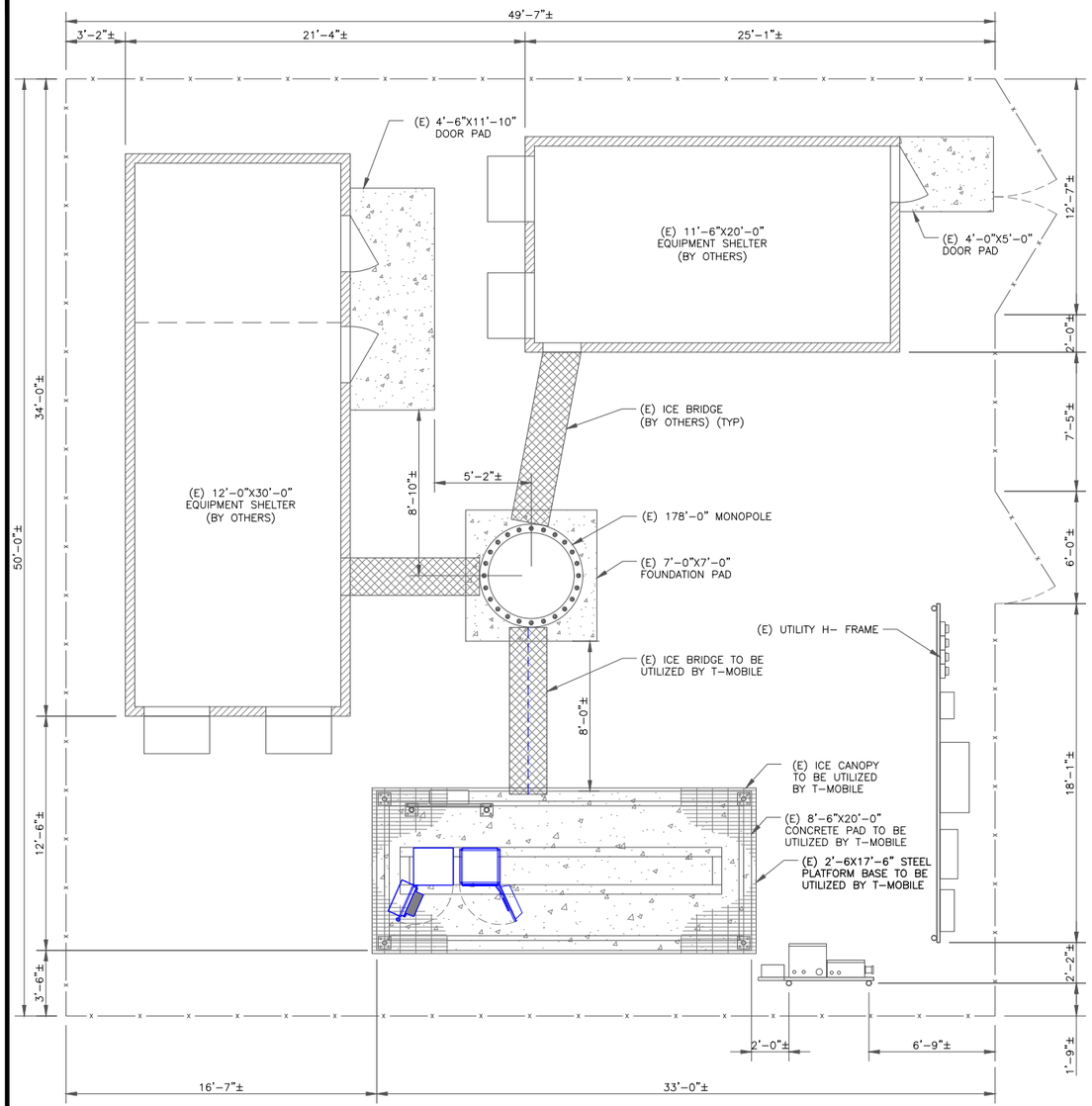
10/19/21

SHEET NUMBER: **T-2**

REVISION: **2**

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.

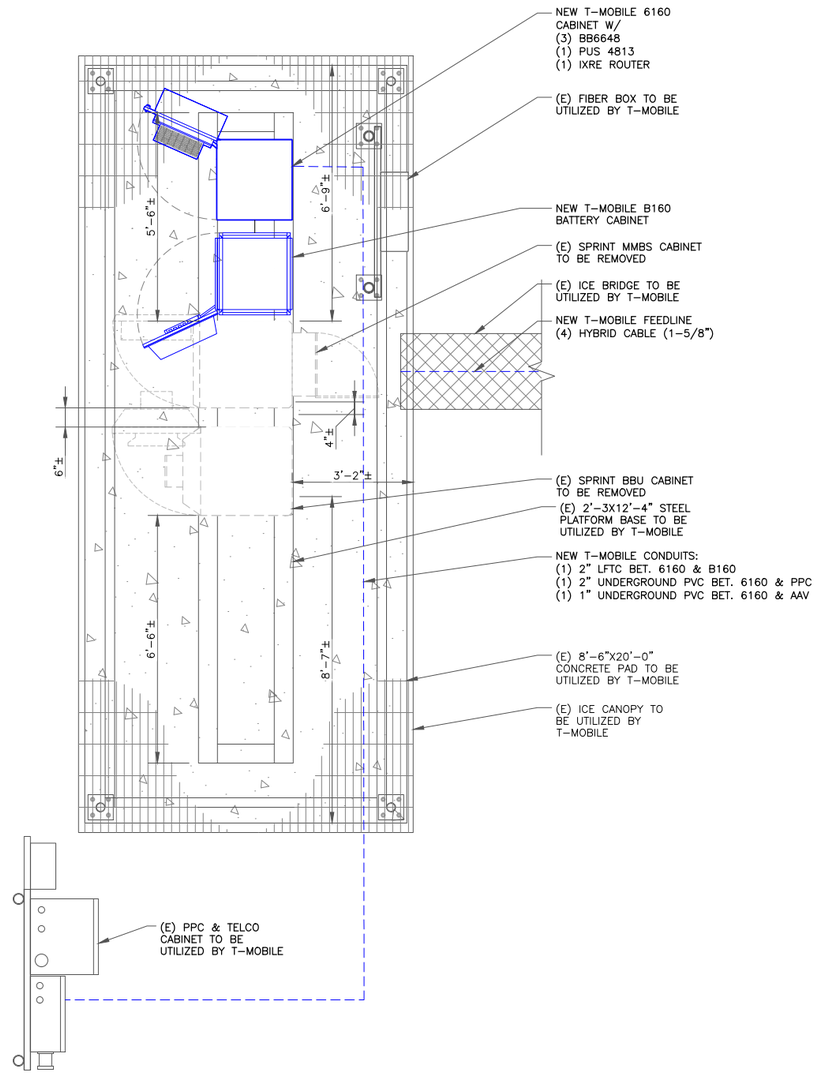


1 SITE PLAN
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

N

NOTES:

THE POWER DESIGN FOR ANY AC ELECTRICAL POWER CHANGES IS TO BE PERFORMED BY OTHERS AND IS SHOWN HERE FOR REFERENCE PURPOSES ONLY. T-MOBILE IS SOLELY RESPONSIBLE FOR THE ELECTRICAL POWER DESIGN.



2 ENLARGED SITE PLAN
SCALE: 1' 6" 0 1' 1"=1'-0" (FULL SIZE) 1/2"=1'-0" (11x17)

N

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com

T-MOBILE SITE NUMBER:
CTNH558A

BU #: **876369**
HARWINTON / BUCKLEY BROADCASTI

64 HUNGERFORD LANE
HARWINTON, CT 06791

EXISTING 178'-0" MONOPOLE

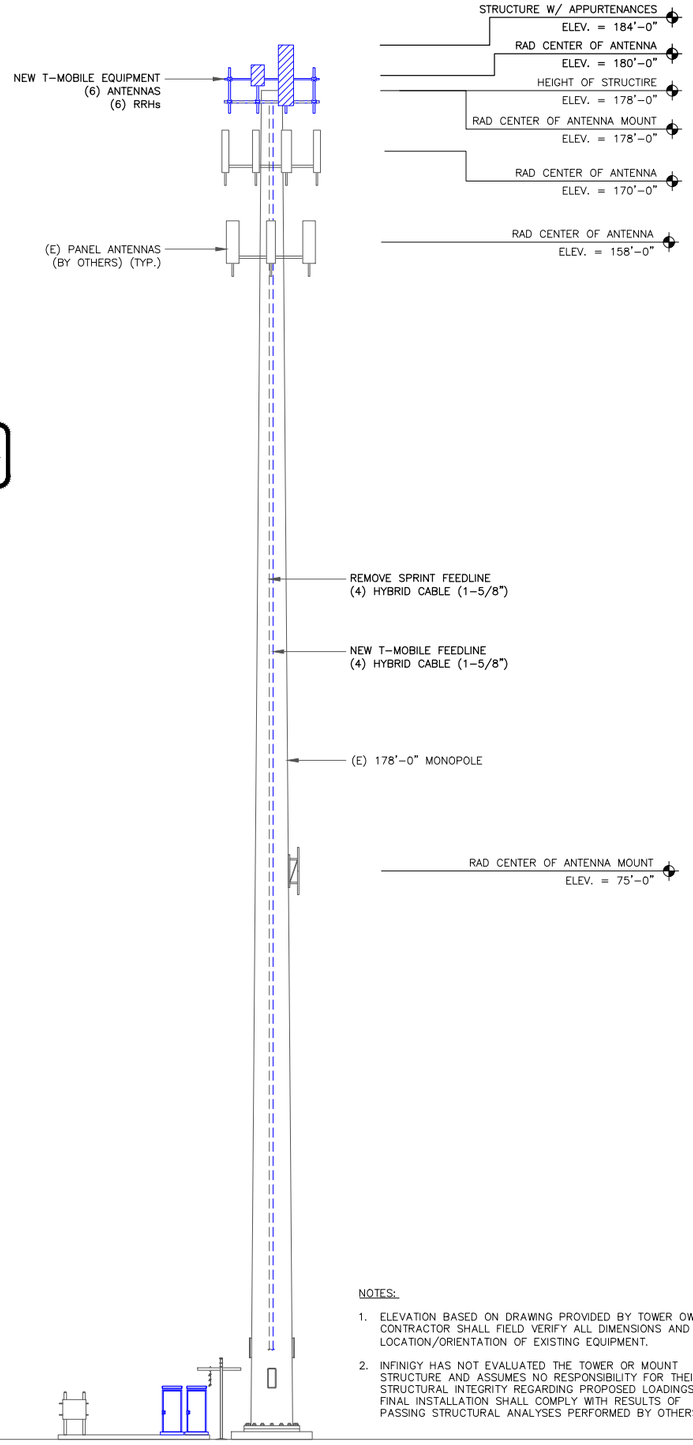
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	04/22/21	BMM	FINAL	SS
1	10/07/21	CB	FINAL	SS
2	10/19/21	SS	APP # UPDATE	SS

STATE OF CONNECTICUT
SHUHEI SAKANOUE
34916
LICENSED PROFESSIONAL ENGINEER
10/19/21

SHEET NUMBER: C-1

REVISION: 2



T-MOBILE EQUIPMENT

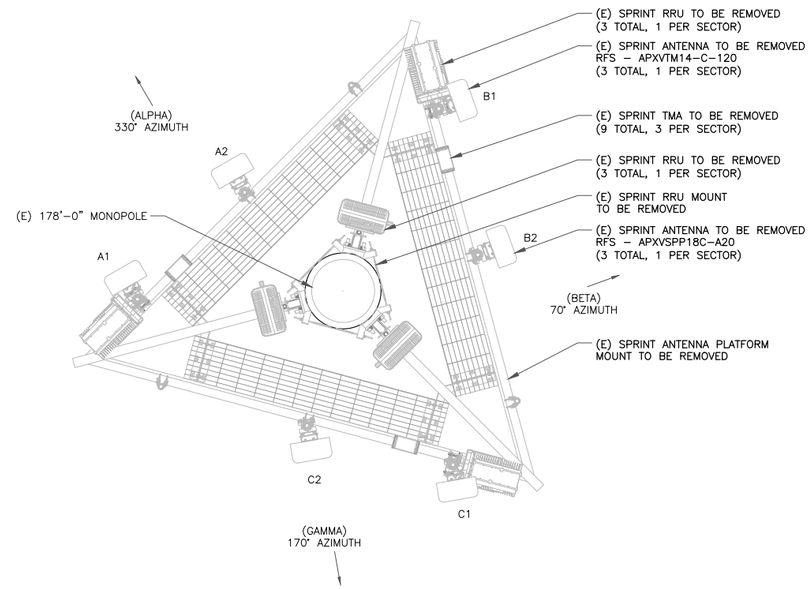
ANTENNA CL: 180'-0"
MOUNT CL: 178'-0"

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

NOTES:

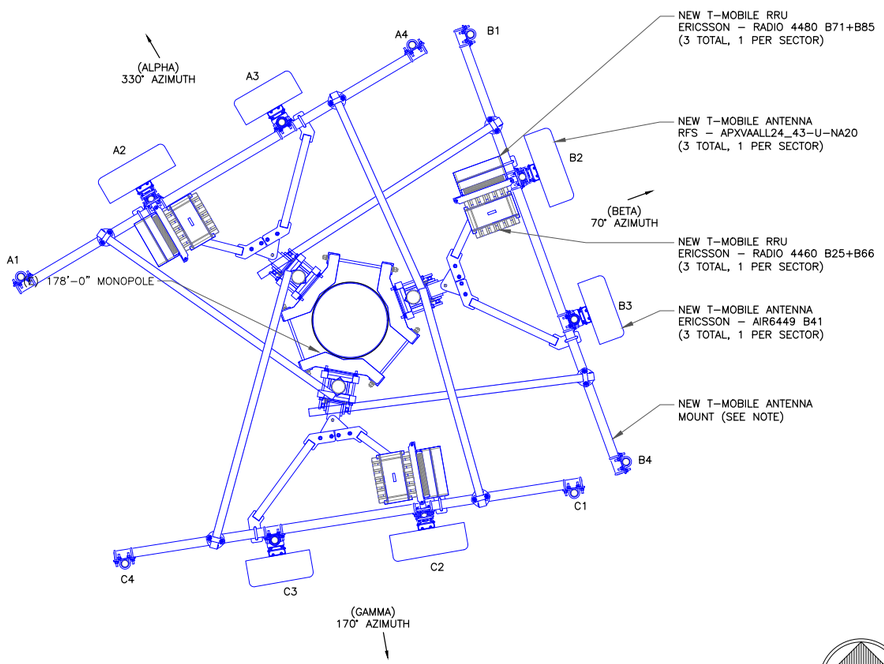
1. ELEVATION BASED ON DRAWING PROVIDED BY TOWER OWNER. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING EQUIPMENT.
2. INFINIGY HAS NOT EVALUATED THE TOWER OR MOUNT STRUCTURE AND ASSUMES NO RESPONSIBILITY FOR THEIR STRUCTURAL INTEGRITY REGARDING PROPOSED LOADINGS. FINAL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

1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE

N



NOTE:
A STRUCTURAL EVALUATION OF THE T-MOBILE ANTENNA MOUNTS HAS BEEN PERFORMED BY GPD ENGINEERING. REFER TO ANTENNA MOUNT STRUCTURAL ANALYSIS DATED TBD PRIOR TO CONSTRUCTION.

INFINIGY HAS NOT EVALUATED THE TOWER FOR THIS SITE AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY. CONTRACTOR TO COORDINATE LOADING WITH RF ENGINEER. REFER TO STRUCTURAL ANALYSIS PERFORMED BY OTHERS PRIOR TO CONSTRUCTION.

3 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

N

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com

T-MOBILE SITE NUMBER:
CTNH558A

BU #: **876369**
HARWINTON / BUCKLEY BROADCASTI

64 HUNGERFORD LANE
HARWINTON, CT 06791

EXISTING 178'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	04/22/21	BMM	FINAL	SS
1	10/07/21	CB	FINAL	SS
2	10/19/21	SS	APP # UPDATE	SS

SHEET NUMBER: C-2

REVISION: 2

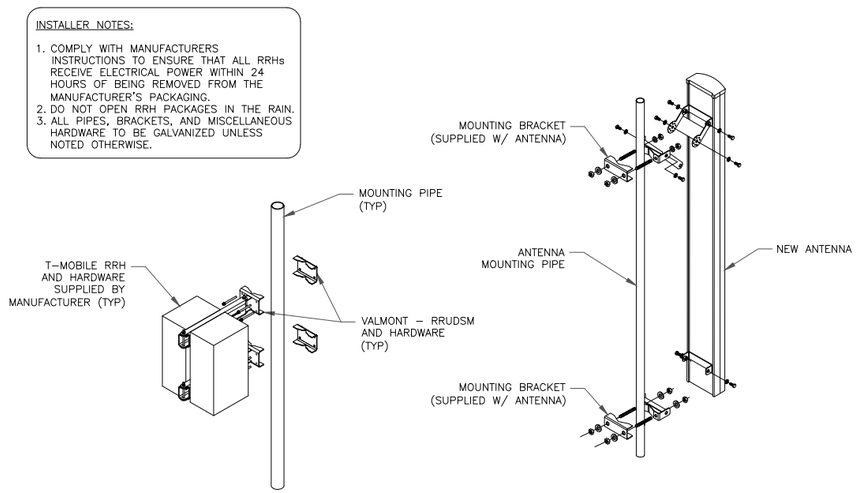
ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	--	--	--	--	--	--	--	--	(4) 6X24 HCS HYBRID (SHARED)
ALPHA	A2	L700, L600, N600, L1900, G1900, L2100	180'-0"	330°	RFS	APXVAALL24_43-U-NA20	--	--	(1) ERICSSON - RRUS 4480 B71+B85 (1) ERICSSON - RRUS 4460 B25+B66	
ALPHA	A3	L2500, N2500	180'-0"	330°	ERICSSON	AIR6449 B41	--	--	--	
ALPHA	A4	--	--	--	--	--	--	--	--	
BETA	B1	--	--	--	--	--	--	--	--	(4) 6X24 HCS HYBRID (SHARED)
BETA	B2	L700, L600, N600, L1900, G1900, L2100	180'-0"	70°	RFS	APXVAALL24_43-U-NA20	--	--	(1) ERICSSON - RRUS 4480 B71+B85 (1) ERICSSON - RRUS 4460 B25+B66	
BETA	B3	L2500, N2500	180'-0"	70°	ERICSSON	AIR6449 B41	--	--	--	
BETA	B4	--	--	--	--	--	--	--	--	
GAMMA	C1	--	--	--	--	--	--	--	--	(4) 6X24 HCS HYBRID (SHARED)
GAMMA	C2	L700, L600, N600, L1900, G1900, L2100	180'-0"	170°	RFS	APXVAALL24_43-U-NA20	--	--	(1) ERICSSON - RRUS 4480 B71+B85 (1) ERICSSON - RRUS 4460 B25+B66	
GAMMA	C3	L2500, N2500	180'-0"	170°	ERICSSON	AIR6449 B41	--	--	--	
GAMMA	C4	--	--	--	--	--	--	--	--	

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.



2 ANTENNA WITH RRHs MOUNTING DETAIL
SCALE: NOT TO SCALE

NOTE:

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

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com

T-MOBILE SITE NUMBER:
CTNH558A

BU #: **876369**
HARWINTON / BUCKLEY BROADCASTI

64 HUNGERFORD LANE
HARWINTON, CT 06791

EXISTING 178'-0" MONOPOLE

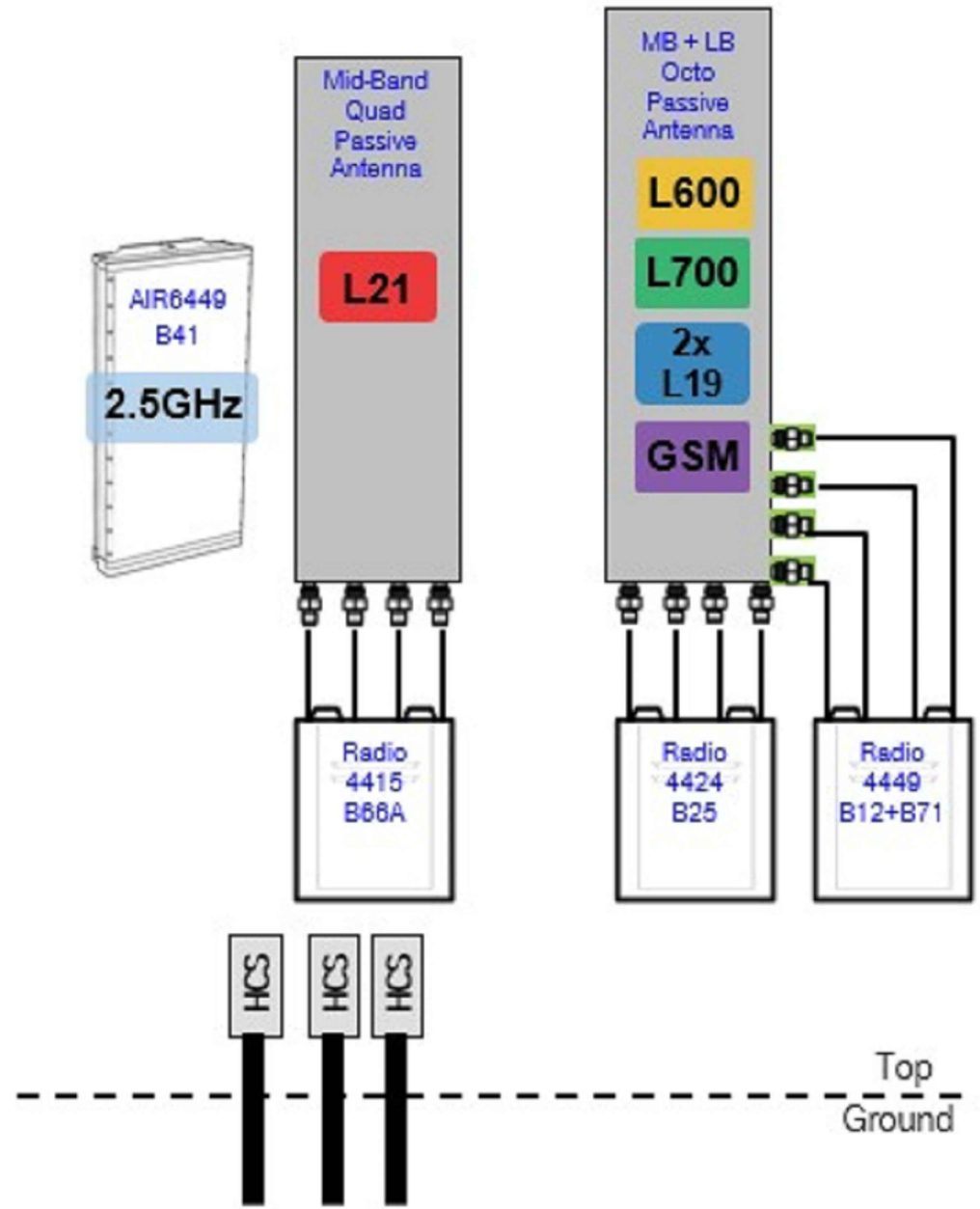
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	04/22/21	BMM	FINAL	SS
1	10/07/21	CB	FINAL	SS
2	10/19/21	SS	APP # UPDATE	SS

STATE OF CONNECTICUT
SHUHEI SAKANO
34916
LICENSED PROFESSIONAL ENGINEER
10/19/21

SHEET NUMBER: C-3

REVISION: 2



T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com

T-MOBILE SITE NUMBER:
CTNH558A

BU #: **876369**
HARWINTON / BUCKLEY BROADCASTI

64 HUNGERFORD LANE
HARWINTON, CT 06791

EXISTING 178'-0" MONOPOLE

ISSUED FOR:

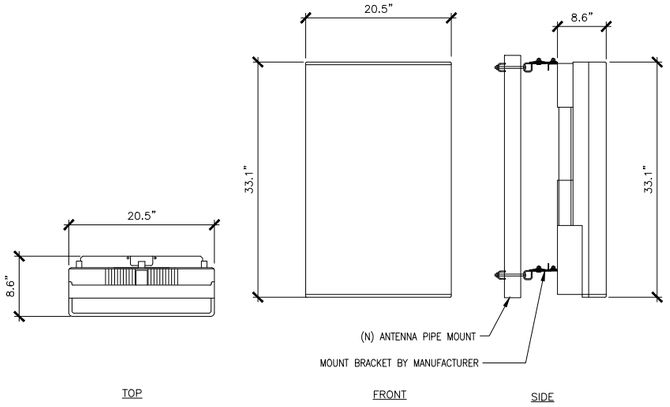
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	04/22/21	BMM	FINAL	SS
1	10/07/21	CB	FINAL	SS
2	10/19/21	SS	APP # UPDATE	SS

STATE OF CONNECTICUT
SHUHEI SAKANOUE
34916
LICENSED PROFESSIONAL ENGINEER
10/19/21

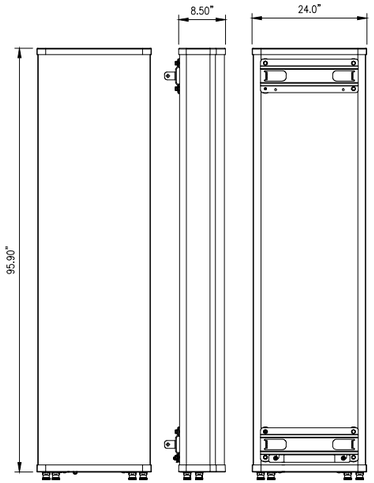
SHEET NUMBER: C-4

REVISION: 2

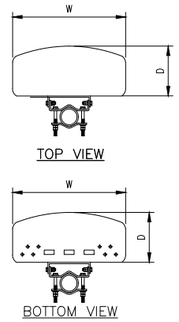
MANUFACTURER: ERICSSON
MODEL: AIR6449 B41
WEIGHT: 104 LBS (W/ MOUNT BRACKET 113)
DIMENSIONS: 33.1"H. X 20.5"W. X 8.6"D.
FREQUENCY: REFER TO RF DATA SHEET



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



700MHz RFS ANTENNAS	
MODEL	WEIGHT (lb)
(8') APXVAALL24_43-UNA20	149.90
WEIGHT W/ MOUNTING BRACKET (lb):	154

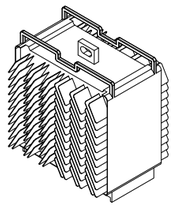


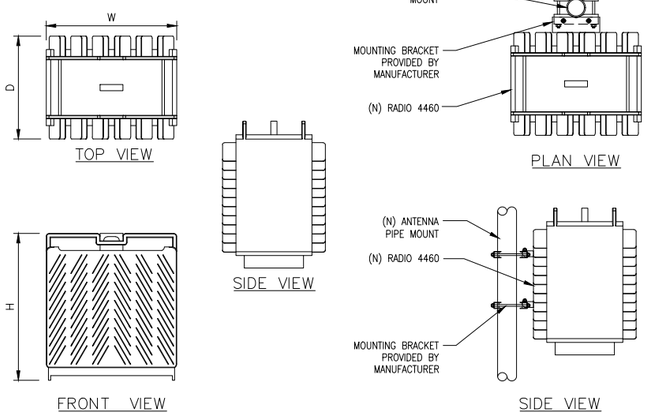
2 (N) APXVAALL24_43-UNA20 ANTENNA SPEC
SCALE: NOT TO SCALE

3 NOT USED
SCALE: NOT TO SCALE

ERICSSON RADIO-4460 B25 B66

DIMENSIONS, WxDxH:	17.0"x15.1"x11.9"
MAX OUTPUT POWER:	4x80W (2x(2x80W))
TOTAL WEIGHT:	109 lbs
TEMPERATURE:	-40° TO 55° C

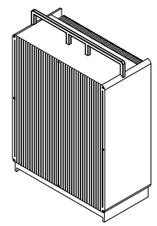


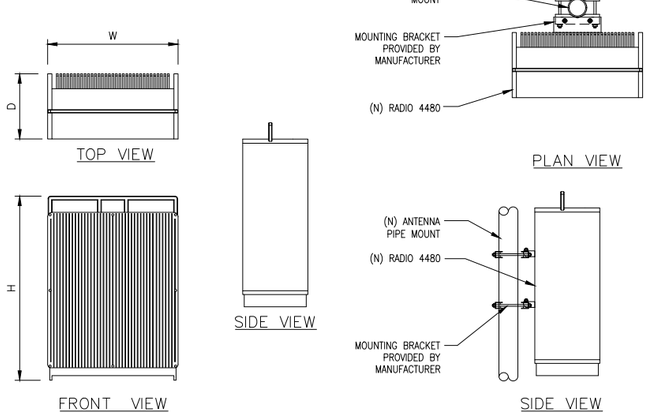


4 (N) RADIO 4460 SPEC
SCALE: NOT TO SCALE

ERICSSON RADIO-4480 B71 B85

DIMENSIONS, WxDxH:	21.8"x15.7"x7.5"
MAX OUTPUT POWER:	4x80W (2x(2x80W))
TOTAL WEIGHT:	93 lbs
TEMPERATURE:	-40° TO 55° C





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

6 NOT USED
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com

T-MOBILE SITE NUMBER:
CTNH558A

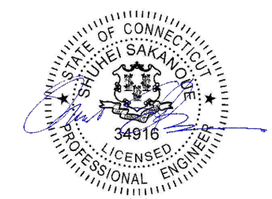
BU #: **876369**
HARWINTON / BUCKLEY BROADCASTI

64 HUNGERFORD LANE
HARWINTON, CT 06791

EXISTING 178'-0" MONOPOLE

ISSUED FOR:

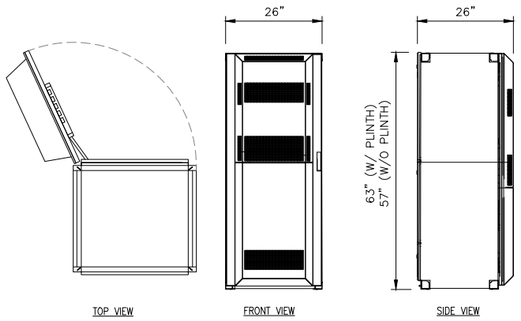
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	04/22/21	BMM	FINAL	SS
1	10/07/21	CB	FINAL	SS
2	10/19/21	SS	APP # UPDATE	SS



10/19/21

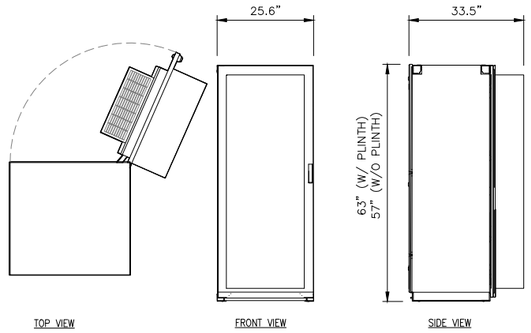
SHEET NUMBER: C-5

REVISION: 2



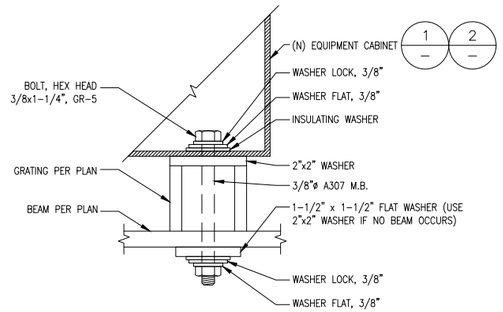
ERICSSON MODEL NO.:	B160
RACK SPACE:	19U
DIMENSIONS, HxWxD:	63"x26"x26" (W/ 6" PLINTH)
CABINET WEIGHT, EMPTY:	485 LBS
MAXIMUM WEIGHT:	2100± LBS

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

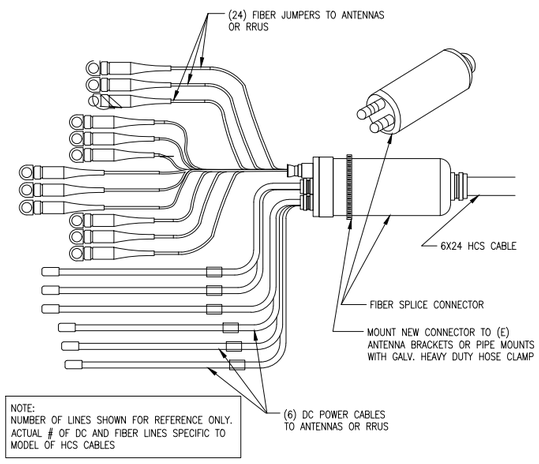


ERICSSON MODEL NO.:	6160
RACK SPACE:	19U
DIMENSIONS, HxWxD:	63"x25.6"x25.6" (W/ 6" PLINTH)
CABINET WEIGHT, EMPTY:	410 LBS
MAXIMUM WEIGHT:	770± LBS

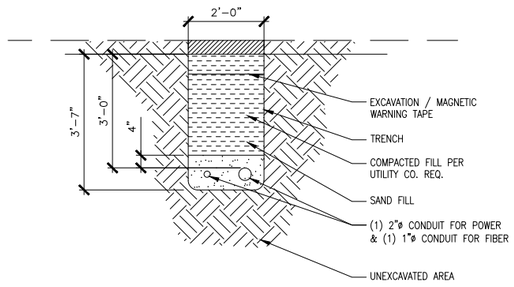
2 (N) 6160 CABINET DETAIL
SCALE: NOT TO SCALE



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



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



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

6 NOT USED
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com

T-MOBILE SITE NUMBER:
CTNH558A

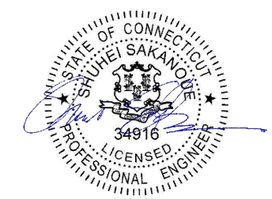
BU #: **876369**
HARWINTON / BUCKLEY BROADCASTI

64 HUNGERFORD LANE
HARWINTON, CT 06791

EXISTING 178'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	04/22/21	BMM	FINAL	SS
1	10/07/21	CB	FINAL	SS
2	10/19/21	SS	APP # UPDATE	SS



SHEET NUMBER: C-6

REVISION: 2

T-MOBILE PANEL SCHEDULE

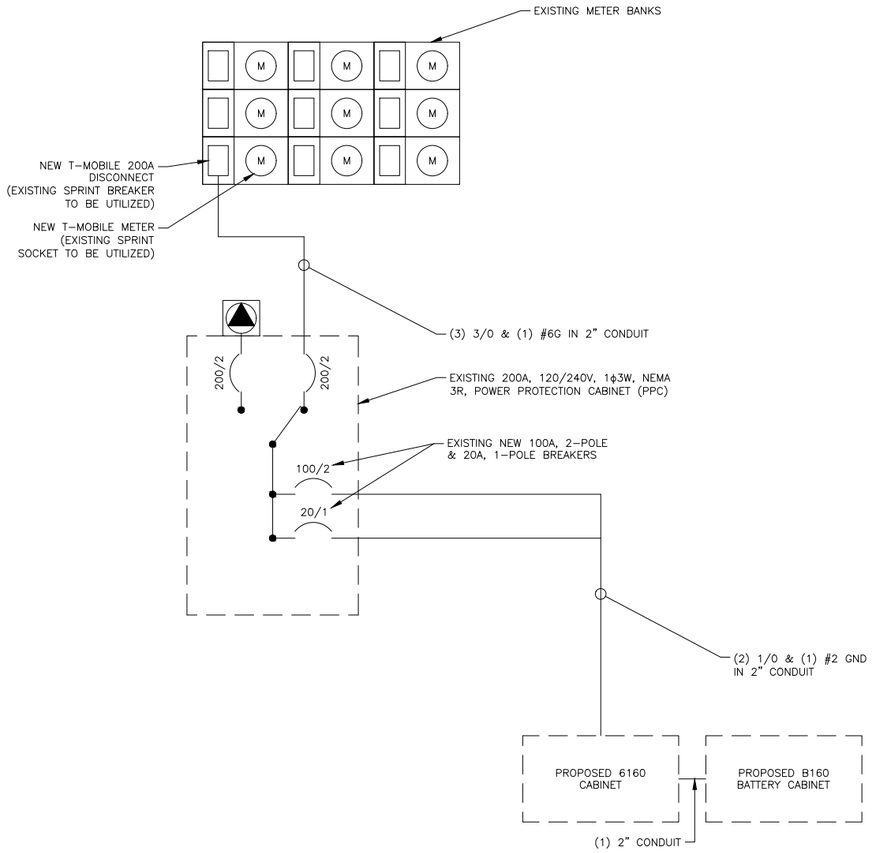
MAIN: 200A MAIN BREAKER			**VOTAGE/PHASE:** 120/240V, 1-PHASE, 3-WIRE						**SHORT CIRCUIT CURRENT RATING:** --		
MOUNTING: INSIDE PPC ENCLOSURE			**ENCLOSURE:** NEMA 3R						**SURGE PROTECTION DEVICE:** YES		
					PHASE LOADS (VA)						
DESCRIPTION	LOAD (VA)	C or NC	C/B	CIR No.	A	B	CIR No.	C/B	C or NC	LOAD (VA)	DESCRIPTION
6160**	**7000**	**C**	**100**	**1**	7000		7	60	NC	0	(NOT CONNECTED)
	7000	**C**		**2**		7000	8		NC	0	
outside lights	**200**	**NC**	**20**	**3**	200		9		NC	0	Blank
6160 GFI**	180	NC	20	4		180	10		NC	0	Blank
NID Outlet	180	NC	15	5	1260		11	15	NC	1080	Not Labeled
Telco Fan (OFF)	0	NC	10	6		0	12			**0**	BLANK
				BASE LOAD (VA) =	8640	7180					
				25% OF CONTINUOUS LOAD (VA) =	2115	1795					
				TOTAL LOAD (VA) =	10755	8975					
				TOTAL LOAD (A) =	89.6	74.8					

C = CONTINUOUS LOAD; NC = NON-CONTINUOUS LOAD
*INDICATES NEW LOAD. ALL OTHER LOADS ARE EXISTING.
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

1 AC PANEL SCHEDULE
SCALE: NOT TO SCALE

NOTES:

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



2 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com

T-MOBILE SITE NUMBER:
CTNH558A

BU #: **876369**
HARWINTON / BUCKLEY BROADCASTI

64 HUNGERFORD LANE
HARWINTON, CT 06791

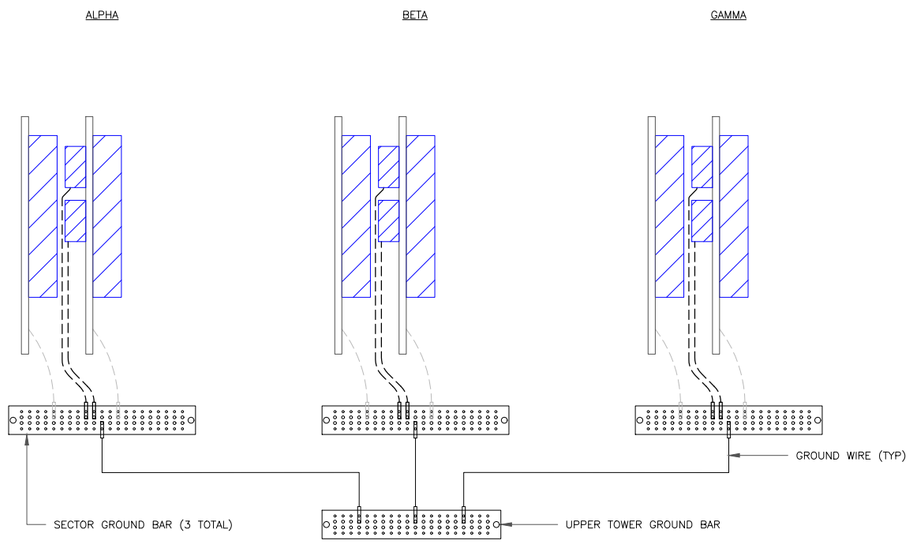
EXISTING 178'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	04/22/21	BMM	FINAL	SS
1	10/07/21	CB	FINAL	SS
2	10/19/21	SS	APP # UPDATE	SS

SHEET NUMBER: E-1

REVISION: 2



NOTE:

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

1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com

T-MOBILE SITE NUMBER:
CTNH558A

BU #: **876369**
HARWINTON / BUCKLEY BROADCASTI

64 HUNGERFORD LANE
HARWINTON, CT 06791

EXISTING 178'-0" MONOPOLE

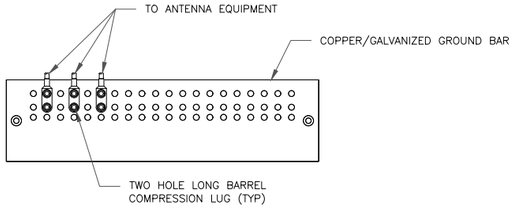
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	04/22/21	BMM	FINAL	SS
1	10/07/21	CB	FINAL	SS
2	10/19/21	SS	APP # UPDATE	SS

STATE OF CONNECTICUT
SHUHEI SAKANOUE
34916
LICENSED PROFESSIONAL ENGINEER
10/19/21

SHEET NUMBER: G-1

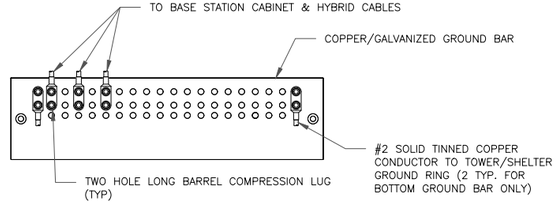
REVISION: 2



NOTES:

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

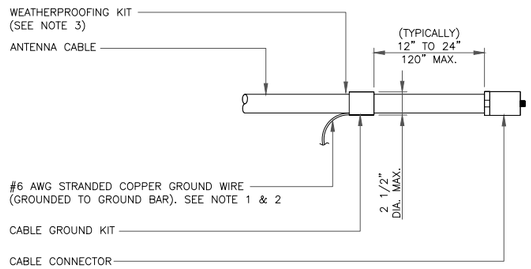
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

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

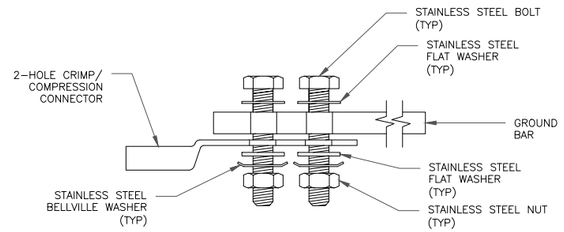
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



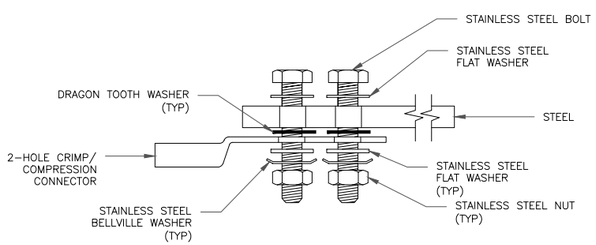
NOTES:

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

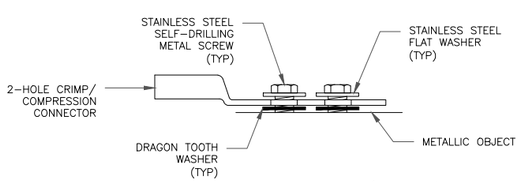
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

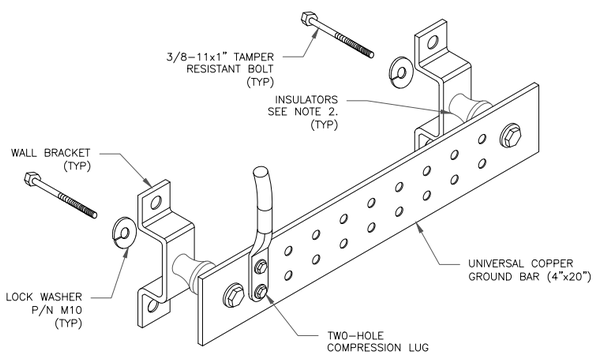


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

4 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

5 GROUND BAR DETAIL
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com

T-MOBILE SITE NUMBER:
CTNH558A

BU #: **876369**
HARWINTON / BUCKLEY BROADCASTI

64 HUNGERFORD LANE
HARWINTON, CT 06791

EXISTING 178'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	04/22/21	BMM	FINAL	SS
1	10/07/21	CB	FINAL	SS
2	10/19/21	SS	APP # UPDATE	SS

STATE OF CONNECTICUT
SHUHEI SAKANO
34916
LICENSED PROFESSIONAL ENGINEER
10/19/21

SHEET NUMBER: G-2
REVISION: 2