



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

October 26, 2021

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

RE: **Notice of Exempt Modification for ATT: CTL02158**  
**Crown Site ID#876343**  
**1919 Boston Post Road, Guilford, CT 06437**  
**Latitude: 41° 18' 1.27" / Longitude: -72° 42' 29.13"**

Dear Ms. Bachman:

ATT currently maintains nine (9) antennas at the 108-foot mount level on the existing 150-foot monopole tower, located at 1919 Boston Post Road, Guilford, CT. The property is owned by DDR Guilford LLC. Crown Castle is the tower owner. ATT now intends to replace six (6) antennas, and ancillary equipment at the 108-ft 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:

- (4) CCI – DMP65R-BU6DA Antenna
- (2) CCI – DMP65R-BU4DA Antenna
- (3) Ericsson-RRH BB43 B2/B66A
- (3) Ericsson-RRH- 4478 B14
- (3) Ericsson-RRH- 4449 B5/B12
- (1) RAYCAP-DC9-48-60-24-8C-EV
- (1) RAYCAP-DC9-48-60-18-8F-EV
- (3) DC Cables (7/8")
- (1) Fiber Cable (3/8")

Remove:

- (3) KMW – AM-X-CD-14-65-00t-RET Antenna
- (3) Powerwave-7770 – Antenna
- (3) RRUS-11 B12
- (3) RRUS-12 B2
- (6) Powerwave-LGP21401 TMA
- (3) T-Arm Mounts
- (6) Coaxial Cables (1-5/8)

The Foundation for a Wireless World.

CrownCastle.com

Melanie A. Bachman

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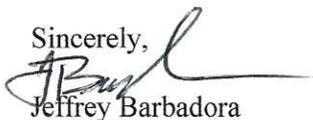
The facility was approved by the Connecticut Siting Council on May 22, 2008.

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. Matthew T. Hoey III, First Selectman, Town of Guilford, CT, Mr. George Kral, Town Planner, Town of Guilford, CT and DDR Guilford LLC, 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, ATT 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

Melanie A. Bachman

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cc:

Matthew T. Hoey III, First Selectman  
Town of Guilford Selectman's Office  
31 Park Street  
Guilford, CT 06437  
203-453-8015

George Kral, Town Planner  
Town of Guilford  
50 Boston Street  
Guilford, CT 06437  
203-453-8039

DDR Guilford LLC, Property Owner  
3300 Enterprise Pkwy  
Beachwood, OH 44122

Crown Castle Tower Owner

**DOCKET NO. 349** – Global Signal Acquisitions II application } Connecticut  
for a Certificate of Environmental Compatibility and Public Need }  
for the construction, maintenance and operation of a } Siting  
telecommunications facility located at 1919 Boston Post Road, }  
Guilford, Connecticut. } Council

May 22, 2008

### Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility, including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate, either alone or cumulatively with other effects, when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application, and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to Global Signal Acquisitions II, hereinafter referred to as the Certificate Holder, for an existing telecommunications facility to be relocated to the site identified as the Alternate Site in the Findings of Fact, located at 1919 Boston Post Road, Guilford, Connecticut. The Council denies certification of the site identified as the Application Site in the Findings of Fact, located at 1919 Boston Post Road, Guilford, Connecticut.

The facility shall be constructed, operated, and maintained substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of the wireless carriers that utilize the existing tower and other entities, both public and private, but such tower shall not exceed a height of 150 feet above ground level.
2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be served on the Town of Guilford for comment, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction and shall include:
  - a) a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment compound, radio equipment, access road, utility line, and landscaping; and
  - b) construction plans for site clearing, grading, landscaping, water drainage, and erosion and sedimentation controls consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

3. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case modeling of the electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of the electromagnetic radio frequency power density be submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.
4. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.
5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
6. The Certificate Holder shall provide reasonable space on the tower for no compensation for any Town of Guilford public safety services (police, fire and medical services), provided such use can be accommodated and is compatible with the structural integrity of the tower.
7. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed and providing wireless services within eighteen months from the date of the mailing of the Council's Findings of Fact, Opinion, and Decision and Order (collectively called "Final Decision"), this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's Final Decision shall not be counted in calculating this deadline.
8. Any request for extension of the time period referred to in Condition 7 shall be filed with the Council not later than 60 days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list, and the Town of Guilford. Any proposed modifications to this Decision and Order shall likewise be so served.
9. If the facility ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.
10. The Certificate Holder shall remove any nonfunctioning antenna, and associated antenna mounting equipment, within 60 days of the date the antenna ceased to function.

11. In accordance with Section 16-50j-77 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of the completion of site construction and the commencement of site operation.

Pursuant to General Statutes § 16-50p, the Council hereby directs that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in the New Haven Register and the Shoreline Times.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

The parties and intervenors to this proceeding are:

**APPLICANT**

Global Signal Acquisitions II

**ITS REPRESENTATIVE**

Julie Kohler, Esq.  
Carrie Larson, Esq.  
Cohen and Wolf, P.C.

**PARTY**

Anthony Poccia  
William and Myung Arabolos  
Margaret Rose  
Richard and Sandra Wilson

**ITS REPRESENTATIVE**

John S. Bennet, Esq.  
Gould, Larson, Bennet, Wells & McDonnell, P.C.

**INTERVENORS**

Heather Fernandes  
Diane and Alan Sholomskas  
Brian Denning  
Daniel Capozziello  
Joel and Donna Zemke

**THEIR REPRESENTATIVE**

John S. Bennet, Esq.  
Gould, Larson, Bennet, Wells & McDonnell, P.C.

### Parcel Information

Location:	1919 BOSTON POST RD	Map and Parcel:	079035	Census Tract:	1903
Zoning:	SCW	Developer's Map:	5074	Developer's Lot:	
Total Acreage:	27.83	Farm, Forest, Open Space Acres:		Unique ID:	7001

### Value Information

### Owner's Information

	Appraised Value	Assessed Value	Owner's Data
Land	6,694,400	4,686,080	DDR GUILFORD LLC 3300 ENTERPRISE PKWY BEACHWOOD OH 44122
Buildings	22,716,123	15,901,280	
Detached Outbuildings	695,997	487,200	
Total	30,106,520	21,074,560	

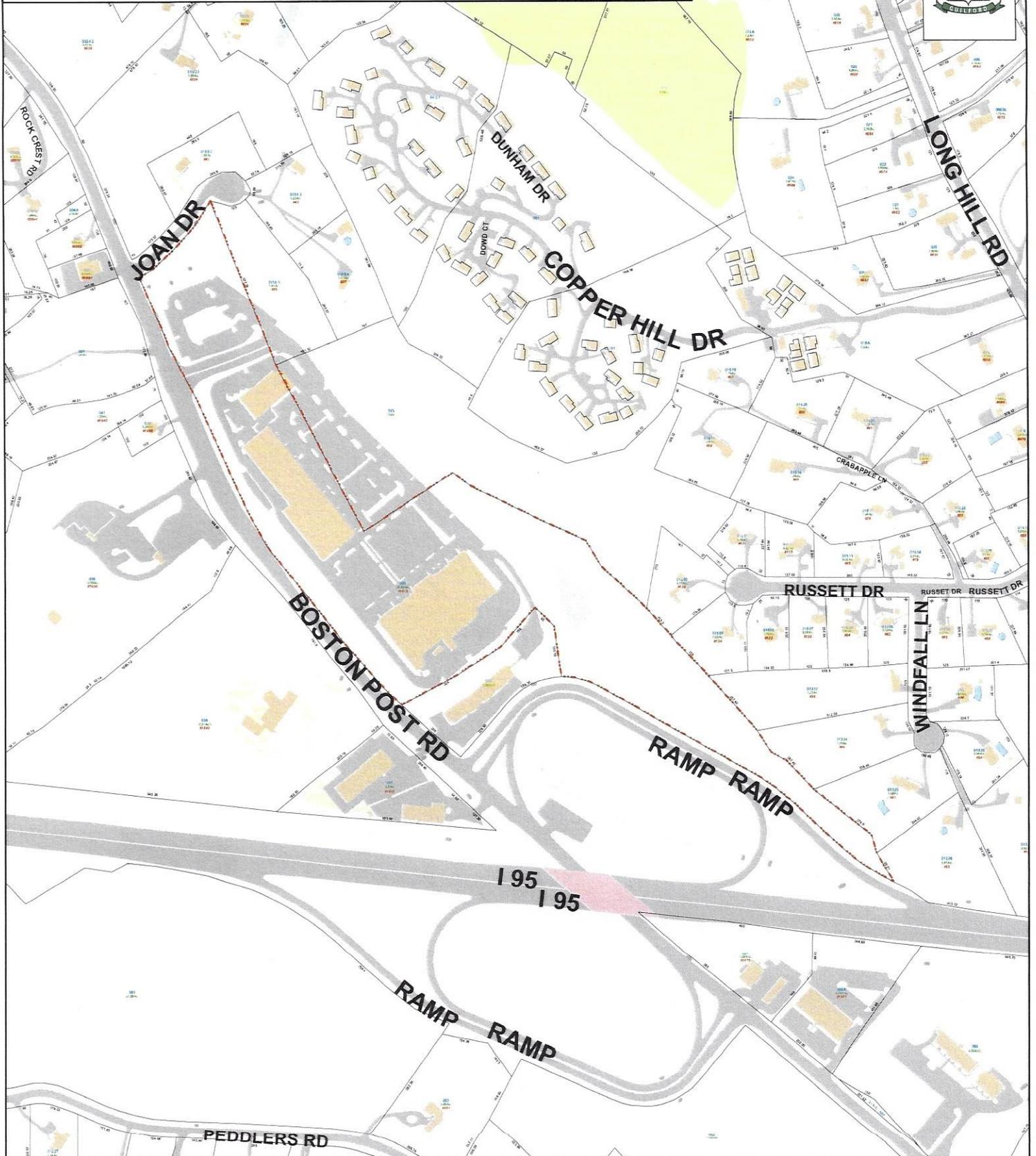
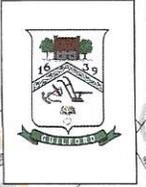
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# Town of Guilford, Connecticut - Assessment Parcel Map

Unique ID: 7001

Address: 1919 BOSTON POST RD



Approximate Scale: 1 inch = 400 feet



Map Produced:  
September 2020

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

Date: **June 17, 2021**



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

**Subject: Structural Analysis Report**

**Carrier Designation:** **AT&T Mobility Co-Locate**  
**Site Number:** CTL02158  
**Site Name:** Guilford Post Road  
**FA Number:** 10035218

**Crown Castle Designation:** **BU Number:** 876343  
**Site Name:** Guilford West Stone Property  
**JDE Job Number:** 658740  
**Work Order Number:** 1981268  
**Order Number:** 561999 Rev. 0

**Engineering Firm Designation:** **TEP Project Number:** 80750.559928

**Site Data:** **1919 Boston Post Rd., Guilford, New Haven County, CT 06437**  
**Latitude 41° 18' 1.27", Longitude -72° 42' 29.13"**  
**149 Foot - Monopole Tower**

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

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

LC7: Proposed Equipment Configuration

**Sufficient Capacity - 61.3%**

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2018 Connecticut Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

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

Respectfully submitted by:

Shawn Hoffmeyer, P.E.



Electronic Copy

06/17/21

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## 1) INTRODUCTION

This tower is a 149-ft monopole tower designed by Engineered Endeavors, Inc.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	130 mph
<b>Exposure Category:</b>	C
<b>Topographic Factor:</b>	1.0
<b>Ice Thickness:</b>	1.5 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Service Wind Speed:</b>	60 mph

**Table 1 - Proposed Equipment Configuration**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
106.0	108.0	3	Powerwave Technologies	7770.00	3 2 3 6	3/8 3/4 7/8 1-5/8
		4	CCI Antennas	DMP65R-BU6D		
		2	CCI Antennas	DMP65R-BU4D		
		6	Powerwave Technologies	LGP21401		
		1	Raycap	DC6-48-60-18-8F		
		3	Ericsson	RRUS 4478 B14_CCIV2		
		3	Ericsson	RRUS 8843 B2/B66A		
		1	Raycap	DC9-48-60-24-8C-EV		
	3	Ericsson	RRUS 4449 B5/B12			
	106.0	1	Site Pro 1	RMQLP-4120-H10		

**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)
148.0	148.0	3	RFS Celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe	1 1 7	7/8 1-1/4 1-5/8
		3	Ericsson	AIR 21 B2A B4P w/ Mount Pipe		
		3	Ericsson	AIR 21 B4A B2P w/ Mount Pipe		
		3	Ericsson	KRY 112 144/1		
		3	Ericsson	RADIO 4449 B12/B71		
		1	Tower Mounts	Sector Mount [SM 901-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
138.0	138.0	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		
129.0	129.0	1	Tower Mounts	Pipe Mount [PM 601-3]	-	-
	127.0	3	Alcatel Lucent	TME-800MHZ RRH		
	123.0	3	Alcatel Lucent	TME-1900MHz RRH (65MHz)		
128.0	130.0	3	RFS Celwave	APXVTM14-C-120 w/ Mount Pipe	4	1-1/4
		3	RFS Celwave	APXVSP18-C-A20 w/ Mount Pipe		
		3	Alcatel Lucent	800 EXTERNAL NOTCH FILTER		
		3	Alcatel Lucent	TD-RRH8X20-25		
	9	RFS Celwave	ACU-A20-N			
128.0	1	Tower Mounts	Sector Mount [SM 901-3]			
116.0	124.0	3	VZW	Sub6 Antenna - VZS01 w/ Mount Pipe	1 2 12	1/2 1-1/4 1-5/8
	122.0	6	Commscope	JAHH-65B-R3B w/ Mount Pipe		
		4	Andrew	DB846F65ZAXY w/ Mount Pipe		
		2	Decibel	DB846H80E-SX w/ Mount Pipe		
		1	Raycap	RVZDC-6627-PF-48		
		3	Commscope	CBC78T-DS-43-2X		
		3	Samsung Telecom.	RFV01U-D1A		
	3	Samsung Telecom.	RFV01U-D2A			
	120.0	3	Samsung Telecom.	CBRS w/ Mount Pipe		
	118.0	1	Maxrad	GPS-TMG-26NMS		
116.0	1	Tower Mounts	Sector Mount [SM 901-3]			
110.0	110.0	3	Ericsson	TME-RRUS 11	-	-
		1	Tower Mounts	Pipe Mount [PM 601-3]		
98.0	98.0	3	RFS Celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8

### 3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Geotechnical Report	1531881	CCISites
Tower Foundation Drawings	2262540	CCISites
Tower Manufacturer Drawings	8702523	CCISites

### 3.1) Analysis Method

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

### 3.2) Assumptions

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

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

## 4) ANALYSIS RESULTS

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

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (k)	$\phi P_{allow}$ (k)	% Capacity	Pass / Fail	
L1	149 - 135.04	Pole	TP26.77x22x0.1875	1	-3.82	922.77	8.5	Pass	
L2	135.04 - 92.17	Pole	TP40.91x25.0556x0.25	2	-24.43	1888.15	49.9	Pass	
L3	92.17 - 45.21	Pole	TP56.31x38.4888x0.3125	3	-36.15	3255.33	61.3	Pass	
L4	45.21 - 0	Pole	TP71x53.1183x0.375	4	-56.96	5023.87	59.3	Pass	
							Summary		
							Pole (L3)	61.3	Pass
							<b>RATING =</b>	<b>61.3</b>	<b>Pass</b>

**Table 5 - Tower Component Stresses vs. Capacity - LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	35.2	Pass
1,2	Base Plate	-	33.0	Pass
1,2	Base Foundation Structural	-	46.4	Pass
1,2	Base Foundation Soil Interaction	-	27.4	Pass

<b>Structure Rating (max from all components) =</b>	<b>61.3%</b>
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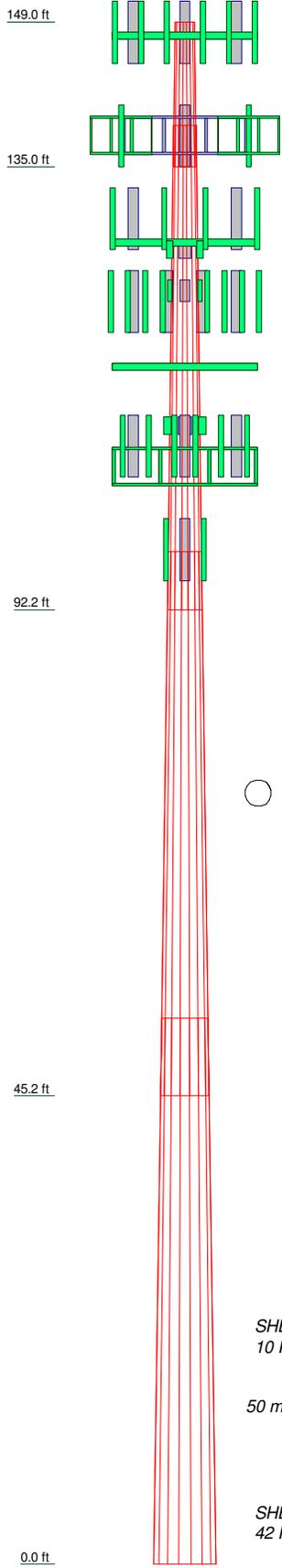
Notes:

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

### 4.1) Recommendations

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

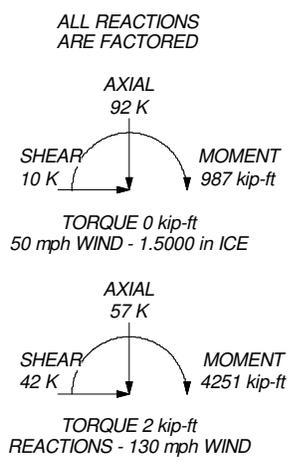
Section	1	2	3	4
Length (ft)	13.96	46.79	52.63	52.79
Number of Sides	18	18	18	18
Thickness (in)	0.1875	0.2500	0.3125	0.3750
Socket Length (ft)	3.92	5.67	7.58	53.1183
Top Dia (in)	22.0000	25.0556	38.4888	71.0000
Bot Dia (in)	26.7700	40.9100	56.3100	71.0000
Grade			A572-65	
Weight (K)	0.7	4.1	8.4	13.2

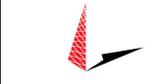


GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

**TOWER DESIGN NOTES**

1. Tower designed for Exposure C to the TIA-222-H Standard.
2. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 61.3%



 Tower Engineering Professionals	<b>Tower Engineering Professionals, Inc.</b>		Job: <b>Guilford West Stone Property (BU 876343)</b>		
	326 Tryon Road		Project: <b>TEP No. 80750.559928</b>		
	Raleigh, NC 27603		Client: Crown Castle	Drawn by: tmlester	App'd:
	Phone: (919) 661-6351		Code: TIA-222-H	Date: 06/17/21	Scale: NTS
	FAX: (919) 661-6350		Path:	Dwg No. E-1	

C:\Users\lmlester\Desktop\Guilford West Stone Property\876343\_1981268\_LC7.dwg

<b><i>tnxTower</i></b>  <b><i>Tower Engineering Professionals, Inc.</i></b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Guilford West Stone Property (BU 876343)	<b>Page</b> 1 of 21
	<b>Project</b> TEP No. 80750.559928	<b>Date</b> 11:44:39 06/17/21
	<b>Client</b> Crown Castle	<b>Designed by</b> tmlester

## Tower Input Data

The tower is a monopole.

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

The following design criteria apply:

Tower base elevation above sea level: 70.00 ft.

Basic wind speed of 130 mph.

Risk Category II.

Exposure Category C.

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

Topographic Category: 1.

Crest Height: 0.00 ft.

Nominal ice thickness of 1.5000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

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

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

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

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

Maximum demand-capacity ratio is: 1.05.

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

## Options

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





<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b>	Guilford West Stone Property (BU 876343)	<b>Page</b>	4 of 21
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### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	149.00-135.04	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.11
L2	135.04-92.17	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	11.296	0.000	1.07
L3	92.17-45.21	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	70.628	0.000	1.89
L4	45.21-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	67.996	0.000	1.82

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

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	149.00-135.04	A	1.475	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.11
L2	135.04-92.17	A	1.441	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	25.312	0.000	1.32
L3	92.17-45.21	A	1.370	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	135.186	0.000	3.22
L4	45.21-0.00	A	1.228	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	127.907	0.000	3.03

### Feed Line Center of Pressure

Section	Elevation ft	CP <sub>x</sub> in	CP <sub>z</sub> in	CP <sub>x</sub> Ice in	CP <sub>z</sub> Ice in
L1	149.00-135.04	0.0000	0.0000	0.0000	0.0000
L2	135.04-92.17	-1.5456	1.5308	-1.5096	1.9630
L3	92.17-45.21	-6.3598	4.9598	-5.3458	5.1505
L4	45.21-0.00	-6.8460	5.3456	-5.9374	5.6905

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

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### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
L2	18	RFFT-48SM-001-XXX(3/8)	92.17 - 106.00	1.0000	1.0000
L2	19	PWRT-606-S(7/8")	92.17 - 106.00	1.0000	1.0000
L2	23	LCF158-50JL(1-5/8)	92.17 - 98.00	1.0000	1.0000
L3	18	RFFT-48SM-001-XXX(3/8)	45.21 - 92.17	1.0000	1.0000
L3	19	PWRT-606-S(7/8")	45.21 - 92.17	1.0000	1.0000
L3	23	LCF158-50JL(1-5/8)	45.21 - 92.17	1.0000	1.0000
L4	18	RFFT-48SM-001-XXX(3/8)	0.00 - 45.21	1.0000	1.0000
L4	19	PWRT-606-S(7/8")	0.00 - 45.21	1.0000	1.0000
L4	23	LCF158-50JL(1-5/8)	0.00 - 45.21	1.0000	1.0000

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			ft ft ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.00	0.0000	148.00	No Ice	14.69	6.87	0.19
			0.00			1/2" Ice	15.46	7.55	0.31
			0.00			1" Ice	16.23	8.25	0.46
			0.00			2" Ice	17.82	9.67	0.79
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.00	0.0000	148.00	No Ice	14.69	6.87	0.19
			0.00			1/2" Ice	15.46	7.55	0.31
			0.00			1" Ice	16.23	8.25	0.46
			0.00			2" Ice	17.82	9.67	0.79
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.00	0.0000	148.00	No Ice	14.69	6.87	0.19
			0.00			1/2" Ice	15.46	7.55	0.31
			0.00			1" Ice	16.23	8.25	0.46
			0.00			2" Ice	17.82	9.67	0.79
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00	0.0000	148.00	No Ice	3.14	2.59	0.11
			0.00			1/2" Ice	3.45	2.88	0.16
			0.00			1" Ice	3.77	3.19	0.23
			0.00			2" Ice	4.43	3.84	0.38
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00	0.0000	148.00	No Ice	3.14	2.59	0.11
			0.00			1/2" Ice	3.45	2.88	0.16
			0.00			1" Ice	3.77	3.19	0.23
			0.00			2" Ice	4.43	3.84	0.38
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00	0.0000	148.00	No Ice	3.14	2.59	0.11
			0.00			1/2" Ice	3.45	2.88	0.16
			0.00			1" Ice	3.77	3.19	0.23
			0.00			2" Ice	4.43	3.84	0.38
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00	0.0000	148.00	No Ice	3.14	2.59	0.11
			0.00			1/2" Ice	3.45	2.88	0.16
			0.00			1" Ice	3.77	3.19	0.22
			0.00			2" Ice	4.43	3.84	0.37
ERICSSON AIR 21 B4A	B	From Leg	4.00	0.0000	148.00	No Ice	3.14	2.59	0.11

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	<b>Client</b>		Crown Castle				<b>Designed by</b>		tmlester	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral					
B2P w/ Mount Pipe			0.00						0.16
			0.00			1/2" Ice	3.45	2.88	0.22
						1" Ice	3.77	3.19	0.37
						2" Ice	4.43	3.84	0.11
ERICSSON AIR 21 B4A	C	From Leg	4.00	0.0000	148.00	No Ice	3.14	2.59	0.16
B2P w/ Mount Pipe			0.00			1/2" Ice	3.45	2.88	0.22
			0.00			1" Ice	3.77	3.19	0.37
						2" Ice	4.43	3.84	0.01
KRY 112 144/1	A	From Leg	4.00	0.0000	148.00	No Ice	0.35	0.17	0.01
			0.00			1/2" Ice	0.43	0.23	0.02
			0.00			1" Ice	0.51	0.30	0.03
						2" Ice	0.70	0.46	0.01
KRY 112 144/1	A	From Leg	4.00	0.0000	148.00	No Ice	0.35	0.17	0.01
			0.00			1/2" Ice	0.43	0.23	0.02
			0.00			1" Ice	0.51	0.30	0.03
						2" Ice	0.70	0.46	0.01
KRY 112 144/1	B	From Leg	4.00	0.0000	148.00	No Ice	0.35	0.17	0.01
			0.00			1/2" Ice	0.43	0.23	0.02
			0.00			1" Ice	0.51	0.30	0.03
						2" Ice	0.70	0.46	0.08
RADIO 4449 B12/B71	A	From Leg	4.00	0.0000	148.00	No Ice	1.64	1.15	0.09
			0.00			1/2" Ice	1.80	1.29	0.11
			0.00			1" Ice	1.97	1.44	0.16
						2" Ice	2.33	1.75	0.08
RADIO 4449 B12/B71	B	From Leg	4.00	0.0000	148.00	No Ice	1.64	1.15	0.09
			0.00			1/2" Ice	1.80	1.29	0.11
			0.00			1" Ice	1.97	1.44	0.16
						2" Ice	2.33	1.75	0.08
RADIO 4449 B12/B71	C	From Leg	4.00	0.0000	148.00	No Ice	1.64	1.15	0.09
			0.00			1/2" Ice	1.80	1.29	0.11
			0.00			1" Ice	1.97	1.44	0.16
						2" Ice	2.33	1.75	0.02
2.4" Dia. x 6-ft	A	From Leg	4.00	0.0000	148.00	No Ice	1.43	1.43	0.03
			0.00			1/2" Ice	1.92	1.92	0.05
			0.00			1" Ice	2.29	2.29	0.09
						2" Ice	3.06	3.06	0.02
2.4" Dia. x 6-ft	B	From Leg	4.00	0.0000	148.00	No Ice	1.43	1.43	0.03
			0.00			1/2" Ice	1.92	1.92	0.05
			0.00			1" Ice	2.29	2.29	0.09
						2" Ice	3.06	3.06	0.02
2.4" Dia. x 6-ft	C	From Leg	4.00	0.0000	148.00	No Ice	1.43	1.43	0.03
			0.00			1/2" Ice	1.92	1.92	0.05
			0.00			1" Ice	2.29	2.29	0.09
						2" Ice	3.06	3.06	0.03
L2x2x3/16 (14' long)	A	From Leg	4.00	0.0000	148.00	No Ice	4.67	0.00	0.06
			0.00			1/2" Ice	6.25	0.00	0.10
			0.00			1" Ice	7.84	0.00	0.21
						2" Ice	11.06	0.00	0.03
L2x2x3/16 (14' long)	B	From Leg	4.00	0.0000	148.00	No Ice	4.67	0.00	0.06
			0.00			1/2" Ice	6.25	0.00	0.10
			0.00			1" Ice	7.84	0.00	0.21
						2" Ice	11.06	0.00	0.03
L2x2x3/16 (14' long)	C	From Leg	4.00	0.0000	148.00	No Ice	4.67	0.00	0.06
			0.00			1/2" Ice	6.25	0.00	0.10
			0.00			1" Ice	7.84	0.00	0.21
						2" Ice	11.06	0.00	1.26
Sector Mount [SM 901-3]	C	None		0.0000	148.00	No Ice	12.78	12.78	1.45
						1/2" Ice	15.53	15.53	

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Vert					
						1" Ice	18.18	18.18	1.69
						2" Ice	22.76	22.76	2.30
***									
***									
MX08FRO665-21 w/ Mount Pipe	A	From Centroid-Le g	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.01 8.52 9.04 10.11	4.23 4.69 5.16 6.12	0.11 0.19 0.29 0.52
MX08FRO665-21 w/ Mount Pipe	B	From Centroid-Le g	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.01 8.52 9.04 10.11	4.23 4.69 5.16 6.12	0.11 0.19 0.29 0.52
MX08FRO665-21 w/ Mount Pipe	C	From Centroid-Le g	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.01 8.52 9.04 10.11	4.23 4.69 5.16 6.12	0.11 0.19 0.29 0.52
TA08025-B604	A	From Centroid-Le g	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.96 2.14 2.32 2.71	0.98 1.11 1.25 1.55	0.06 0.08 0.10 0.15
TA08025-B604	B	From Centroid-Le g	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.96 2.14 2.32 2.71	0.98 1.11 1.25 1.55	0.06 0.08 0.10 0.15
TA08025-B604	C	From Centroid-Le g	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.96 2.14 2.32 2.71	0.98 1.11 1.25 1.55	0.06 0.08 0.10 0.15
TA08025-B605	A	From Centroid-Le g	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.96 2.14 2.32 2.71	1.13 1.27 1.41 1.72	0.08 0.09 0.11 0.16
TA08025-B605	B	From Centroid-Le g	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.96 2.14 2.32 2.71	1.13 1.27 1.41 1.72	0.08 0.09 0.11 0.16
TA08025-B605	C	From Centroid-Le g	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.96 2.14 2.32 2.71	1.13 1.27 1.41 1.72	0.08 0.09 0.11 0.16
RDIDC-9181-PF-48	A	From Centroid-Le g	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.01 2.19 2.37 2.76	1.17 1.31 1.46 1.78	0.02 0.04 0.06 0.11
(2) 2.4" Dia x 6-ft Pipe	A	From Centroid-Le g	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.93 2.30 3.06	1.43 1.93 2.30 3.06	0.02 0.03 0.05 0.09
(2) 2.4" Dia x 6-ft Pipe	B	From Centroid-Le g	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.93 2.30 3.06	1.43 1.93 2.30 3.06	0.02 0.03 0.05 0.09
(2) 2.4" Dia x 6-ft Pipe	C	From Centroid-Le g	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.93 2.30 3.06	1.43 1.93 2.30 3.06	0.02 0.03 0.05 0.09
Platform Mount [LP 716-1]	C	None		0.0000	138.00	No Ice	26.80	26.80	1.51

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Vert						ft
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
						1/2" Ice	32.20	32.20	1.81	
						1" Ice	37.60	37.60	2.11	
						2" Ice	48.40	48.40	2.72	
***										
TME-800MHZ RRH	A	From Leg	0.50	0.00	0.0000	129.00	No Ice	2.13	1.77	0.05
			0.00				1/2" Ice	2.32	1.95	0.07
			-2.00				1" Ice	2.51	2.13	0.10
							2" Ice	2.92	2.51	0.16
TME-800MHZ RRH	B	From Leg	0.50	0.00	0.0000	129.00	No Ice	2.13	1.77	0.05
			0.00				1/2" Ice	2.32	1.95	0.07
			-2.00				1" Ice	2.51	2.13	0.10
							2" Ice	2.92	2.51	0.16
TME-800MHZ RRH	C	From Leg	0.50	0.00	0.0000	129.00	No Ice	2.13	1.77	0.05
			0.00				1/2" Ice	2.32	1.95	0.07
			-2.00				1" Ice	2.51	2.13	0.10
							2" Ice	2.92	2.51	0.16
TME-1900MHZ RRH (65MHz)	A	From Leg	0.50	0.00	0.0000	129.00	No Ice	2.31	2.38	0.06
			0.00				1/2" Ice	2.52	2.58	0.08
			-6.00				1" Ice	2.73	2.79	0.11
							2" Ice	3.17	3.24	0.18
TME-1900MHZ RRH (65MHz)	B	From Leg	0.50	0.00	0.0000	129.00	No Ice	2.31	2.38	0.06
			0.00				1/2" Ice	2.52	2.58	0.08
			-6.00				1" Ice	2.73	2.79	0.11
							2" Ice	3.17	3.24	0.18
TME-1900MHZ RRH (65MHz)	C	From Leg	0.50	0.00	0.0000	129.00	No Ice	2.31	2.38	0.06
			0.00				1/2" Ice	2.52	2.58	0.08
			-6.00				1" Ice	2.73	2.79	0.11
							2" Ice	3.17	3.24	0.18
Pipe Mount [PM 601-3]	C	None			0.0000	129.00	No Ice	3.17	3.17	0.20
							1/2" Ice	3.79	3.79	0.23
							1" Ice	4.42	4.42	0.28
							2" Ice	5.76	5.76	0.40
***										
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	128.00	No Ice	4.09	2.86	0.08
			0.00				1/2" Ice	4.48	3.23	0.13
			2.00				1" Ice	4.88	3.61	0.19
							2" Ice	5.71	4.40	0.33
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	128.00	No Ice	4.09	2.86	0.08
			0.00				1/2" Ice	4.48	3.23	0.13
			2.00				1" Ice	4.88	3.61	0.19
							2" Ice	5.71	4.40	0.33
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	128.00	No Ice	4.09	2.86	0.08
			0.00				1/2" Ice	4.48	3.23	0.13
			2.00				1" Ice	4.88	3.61	0.19
							2" Ice	5.71	4.40	0.33
APXVSP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	128.00	No Ice	4.60	4.01	0.10
			0.00				1/2" Ice	5.05	4.45	0.16
			2.00				1" Ice	5.50	4.89	0.23
							2" Ice	6.44	5.82	0.42
APXVSP18-C-A20 w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	128.00	No Ice	4.60	4.01	0.10
			0.00				1/2" Ice	5.05	4.45	0.16
			2.00				1" Ice	5.50	4.89	0.23
							2" Ice	6.44	5.82	0.42
APXVSP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	128.00	No Ice	4.60	4.01	0.10
			0.00				1/2" Ice	5.05	4.45	0.16
			2.00				1" Ice	5.50	4.89	0.23
							2" Ice	6.44	5.82	0.42

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	<b>Project</b>	TEP No. 80750.559928	<b>Date</b>	11:44:39 06/17/21
	<b>Client</b>	Crown Castle	<b>Designed by</b>	tmlester

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert</i> <i>ft ft ft</i>	<i>Azimuth Adjustment</i> <i>°</i>	<i>Placement</i> <i>ft</i>	<i>CAA Front</i> <i>ft²</i>	<i>CAA Side</i> <i>ft²</i>	<i>Weight</i> <i>K</i>
800 EXTERNAL NOTCH FILTER	A	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 0.66 1/2" Ice 0.76 1" Ice 0.87 2" Ice 1.11	0.32 0.40 0.48 0.67	0.01 0.02 0.02 0.04
800 EXTERNAL NOTCH FILTER	B	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 0.66 1/2" Ice 0.76 1" Ice 0.87 2" Ice 1.11	0.32 0.40 0.48 0.67	0.01 0.02 0.02 0.04
800 EXTERNAL NOTCH FILTER	C	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 0.66 1/2" Ice 0.76 1" Ice 0.87 2" Ice 1.11	0.32 0.40 0.48 0.67	0.01 0.02 0.02 0.04
TD-RRH8X20-25	A	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 3.70 1/2" Ice 3.95 1" Ice 4.20 2" Ice 4.72	1.29 1.46 1.64 2.02	0.07 0.09 0.12 0.18
TD-RRH8X20-25	B	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 3.70 1/2" Ice 3.95 1" Ice 4.20 2" Ice 4.72	1.29 1.46 1.64 2.02	0.07 0.09 0.12 0.18
TD-RRH8X20-25	C	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 3.70 1/2" Ice 3.95 1" Ice 4.20 2" Ice 4.72	1.29 1.46 1.64 2.02	0.07 0.09 0.12 0.18
(3) ACU-A20-N	A	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 0.07 1/2" Ice 0.10 1" Ice 0.15 2" Ice 0.26	0.12 0.16 0.21 0.34	0.00 0.00 0.00 0.01
(3) ACU-A20-N	B	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 0.07 1/2" Ice 0.10 1" Ice 0.15 2" Ice 0.26	0.12 0.16 0.21 0.34	0.00 0.00 0.00 0.01
(3) ACU-A20-N	C	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 0.07 1/2" Ice 0.10 1" Ice 0.15 2" Ice 0.26	0.12 0.16 0.21 0.34	0.00 0.00 0.00 0.01
(2) 2.4" Dia. x 6-ft	A	From Leg	4.00 0.00 0.00	0.0000	128.00	No Ice 1.43 1/2" Ice 1.92 1" Ice 2.29 2" Ice 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
(2) 2.4" Dia. x 6-ft	B	From Leg	4.00 0.00 0.00	0.0000	128.00	No Ice 1.43 1/2" Ice 1.92 1" Ice 2.29 2" Ice 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
(2) 2.4" Dia. x 6-ft	C	From Leg	4.00 0.00 0.00	0.0000	128.00	No Ice 1.43 1/2" Ice 1.92 1" Ice 2.29 2" Ice 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
Sector Mount [SM 901-3]	C	None		0.0000	128.00	No Ice 12.78 1/2" Ice 15.53 1" Ice 18.18 2" Ice 22.76	12.78 15.53 18.18 22.76	1.26 1.45 1.69 2.30
*** (2) JAHH-65B-R3B w/ Mount Pipe	A	From Leg	4.00 0.00 6.00	0.0000	116.00	No Ice 5.50 1/2" Ice 5.97 1" Ice 6.45 2" Ice 7.44	4.38 4.84 5.30 6.26	0.10 0.17 0.25 0.46

<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b>	Guilford West Stone Property (BU 876343)	<b>Page</b>	10 of 21
	<b>Project</b>	TEP No. 80750.559928	<b>Date</b>	11:44:39 06/17/21
	<b>Client</b>	Crown Castle	<b>Designed by</b>	tmlester

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral					
(2) JAHH-65B-R3B w/ Mount Pipe	B	From Leg	4.00	0.0000	116.00	No Ice	5.50	4.38	0.10
			0.00			1/2" Ice	5.97	4.84	0.17
			6.00			1" Ice	6.45	5.30	0.25
						2" Ice	7.44	6.26	0.46
(2) JAHH-65B-R3B w/ Mount Pipe	C	From Leg	4.00	0.0000	116.00	No Ice	5.50	4.38	0.10
			0.00			1/2" Ice	5.97	4.84	0.17
			6.00			1" Ice	6.45	5.30	0.25
						2" Ice	7.44	6.26	0.46
(2) DB846F65ZAXY w/ Mount Pipe	A	From Leg	4.00	0.0000	116.00	No Ice	6.10	6.81	0.06
			0.00			1/2" Ice	6.80	7.52	0.12
			6.00			1" Ice	7.51	8.24	0.19
						2" Ice	8.98	9.73	0.37
(2) DB846H80E-SX w/ Mount Pipe	B	From Leg	4.00	0.0000	116.00	No Ice	4.12	6.38	0.05
			0.00			1/2" Ice	4.76	7.05	0.10
			6.00			1" Ice	5.42	7.74	0.17
						2" Ice	6.78	9.17	0.32
(2) DB846F65ZAXY w/ Mount Pipe	C	From Leg	4.00	0.0000	116.00	No Ice	6.10	6.81	0.06
			0.00			1/2" Ice	6.80	7.52	0.12
			6.00			1" Ice	7.51	8.24	0.19
						2" Ice	8.98	9.73	0.37
Sub6 Antenna - VZS01 w/ Mount Pipe	A	From Leg	4.00	0.0000	116.00	No Ice	4.92	2.69	0.10
			0.00			1/2" Ice	5.26	3.15	0.14
			8.00			1" Ice	5.62	3.63	0.19
						2" Ice	6.37	4.64	0.29
Sub6 Antenna - VZS01 w/ Mount Pipe	B	From Leg	4.00	0.0000	116.00	No Ice	4.92	2.69	0.10
			0.00			1/2" Ice	5.26	3.15	0.14
			8.00			1" Ice	5.62	3.63	0.19
						2" Ice	6.37	4.64	0.29
Sub6 Antenna - VZS01 w/ Mount Pipe	C	From Leg	4.00	0.0000	116.00	No Ice	4.92	2.69	0.10
			0.00			1/2" Ice	5.26	3.15	0.14
			8.00			1" Ice	5.62	3.63	0.19
						2" Ice	6.37	4.64	0.29
CBRS w/ Mount Pipe	A	From Leg	4.00	0.0000	116.00	No Ice	1.45	0.99	0.03
			0.00			1/2" Ice	1.67	1.18	0.05
			4.00			1" Ice	1.90	1.39	0.07
						2" Ice	2.42	1.85	0.12
CBRS w/ Mount Pipe	B	From Leg	4.00	0.0000	116.00	No Ice	1.45	0.99	0.03
			0.00			1/2" Ice	1.67	1.18	0.05
			4.00			1" Ice	1.90	1.39	0.07
						2" Ice	2.42	1.85	0.12
CBRS w/ Mount Pipe	C	From Leg	4.00	0.0000	116.00	No Ice	1.45	0.99	0.03
			0.00			1/2" Ice	1.67	1.18	0.05
			4.00			1" Ice	1.90	1.39	0.07
						2" Ice	2.42	1.85	0.12
GPS-TMG-26NMS	B	From Leg	4.00	0.0000	116.00	No Ice	0.08	0.08	0.00
			0.00			1/2" Ice	0.12	0.12	0.00
			2.00			1" Ice	0.18	0.18	0.00
						2" Ice	0.32	0.32	0.01
RVZDC-6627-PF-48	A	From Leg	4.00	0.0000	116.00	No Ice	3.79	2.51	0.03
			0.00			1/2" Ice	4.04	2.73	0.06
			6.00			1" Ice	4.30	2.95	0.10
						2" Ice	4.84	3.42	0.18
CBC78T-DS-43-2X	A	From Leg	4.00	0.0000	116.00	No Ice	0.37	0.51	0.02
			0.00			1/2" Ice	0.45	0.60	0.03
			6.00			1" Ice	0.53	0.70	0.04
						2" Ice	0.72	0.93	0.06
CBC78T-DS-43-2X	B	From Leg	4.00	0.0000	116.00	No Ice	0.37	0.51	0.02

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	<b>Project</b> TEP No. 80750.559928	<b>Date</b> 11:44:39 06/17/21
	<b>Client</b> Crown Castle	<b>Designed by</b> tmlester

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
				0.00			1/2" Ice	0.45	0.60	0.03
				6.00			1" Ice	0.53	0.70	0.04
							2" Ice	0.72	0.93	0.06
CBC78T-DS-43-2X	C	From Leg	4.00	0.0000	116.00		No Ice	0.37	0.51	0.02
			0.00				1/2" Ice	0.45	0.60	0.03
			6.00				1" Ice	0.53	0.70	0.04
							2" Ice	0.72	0.93	0.06
RFV01U-D1A	A	From Leg	4.00	0.0000	116.00		No Ice	1.88	1.25	0.08
			0.00				1/2" Ice	2.05	1.39	0.10
			6.00				1" Ice	2.22	1.54	0.12
							2" Ice	2.60	1.86	0.18
RFV01U-D1A	B	From Leg	4.00	0.0000	116.00		No Ice	1.88	1.25	0.08
			0.00				1/2" Ice	2.05	1.39	0.10
			6.00				1" Ice	2.22	1.54	0.12
							2" Ice	2.60	1.86	0.18
RFV01U-D1A	C	From Leg	4.00	0.0000	116.00		No Ice	1.88	1.25	0.08
			0.00				1/2" Ice	2.05	1.39	0.10
			6.00				1" Ice	2.22	1.54	0.12
							2" Ice	2.60	1.86	0.18
RFV01U-D2A	A	From Leg	4.00	0.0000	116.00		No Ice	1.88	1.01	0.07
			0.00				1/2" Ice	2.05	1.14	0.09
			6.00				1" Ice	2.22	1.28	0.11
							2" Ice	2.60	1.59	0.15
RFV01U-D2A	B	From Leg	4.00	0.0000	116.00		No Ice	1.88	1.01	0.07
			0.00				1/2" Ice	2.05	1.14	0.09
			6.00				1" Ice	2.22	1.28	0.11
							2" Ice	2.60	1.59	0.15
RFV01U-D2A	C	From Leg	4.00	0.0000	116.00		No Ice	1.88	1.01	0.07
			0.00				1/2" Ice	2.05	1.14	0.09
			6.00				1" Ice	2.22	1.28	0.11
							2" Ice	2.60	1.59	0.15
Sector Mount [SM 901-3]	C	None		0.0000	116.00		No Ice	12.78	12.78	1.26
							1/2" Ice	15.53	15.53	1.45
							1" Ice	18.18	18.18	1.69
							2" Ice	22.76	22.76	2.30
***										
TME-RRUS-11	A	From Leg	0.50	0.0000	110.00		No Ice	2.78	1.19	0.05
			0.00				1/2" Ice	2.99	1.33	0.07
			0.00				1" Ice	3.21	1.49	0.09
							2" Ice	3.66	1.83	0.15
TME-RRUS-11	B	From Leg	0.50	0.0000	110.00		No Ice	2.78	1.19	0.05
			0.00				1/2" Ice	2.99	1.33	0.07
			0.00				1" Ice	3.21	1.49	0.09
							2" Ice	3.66	1.83	0.15
TME-RRUS-11	C	From Leg	0.50	0.0000	110.00		No Ice	2.78	1.19	0.05
			0.00				1/2" Ice	2.99	1.33	0.07
			0.00				1" Ice	3.21	1.49	0.09
							2" Ice	3.66	1.83	0.15
Pipe Mount [PM 601-3]	C	None		0.0000	110.00		No Ice	3.17	3.17	0.20
							1/2" Ice	3.79	3.79	0.23
							1" Ice	4.42	4.42	0.28
							2" Ice	5.76	5.76	0.40
***										
7770.00	A	From Centroid-Le g	4.00	0.0000	106.00		No Ice	5.51	2.93	0.04
			0.00				1/2" Ice	5.87	3.27	0.07
			2.00				1" Ice	6.23	3.63	0.11
							2" Ice	6.99	4.35	0.20

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	<b>Project</b>	TEP No. 80750.559928	<b>Date</b>	11:44:39 06/17/21
	<b>Client</b>	Crown Castle	<b>Designed by</b>	tmlster

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
7770.00	B	From	4.00	0.0000	106.00	No Ice	5.51	2.93	0.04
		Centroid-Le	0.00			1/2" Ice	5.87	3.27	0.07
		g	2.00			1" Ice	6.23	3.63	0.11
						2" Ice	6.99	4.35	0.20
7770.00	C	From	4.00	0.0000	106.00	No Ice	5.51	2.93	0.04
		Centroid-Le	0.00			1/2" Ice	5.87	3.27	0.07
		g	2.00			1" Ice	6.23	3.63	0.11
						2" Ice	6.99	4.35	0.20
(2) DMP65R-BU6D	A	From	4.00	0.0000	106.00	No Ice	11.93	4.48	0.09
		Centroid-Le	0.00			1/2" Ice	12.68	5.12	0.16
		g	2.00			1" Ice	13.45	5.78	0.24
						2" Ice	15.03	7.16	0.43
(2) DMP65R-BU6D	B	From	4.00	0.0000	106.00	No Ice	11.93	4.48	0.09
		Centroid-Le	0.00			1/2" Ice	12.68	5.12	0.16
		g	2.00			1" Ice	13.45	5.78	0.24
						2" Ice	15.03	7.16	0.43
(2) DMP65R-BU6D	C	From	4.00	0.0000	106.00	No Ice	11.93	4.48	0.09
		Centroid-Le	0.00			1/2" Ice	12.68	5.12	0.16
		g	2.00			1" Ice	13.45	5.78	0.24
						2" Ice	15.03	7.16	0.43
(2) LGP21401	A	From	4.00	0.0000	106.00	No Ice	1.10	0.21	0.01
		Centroid-Le	0.00			1/2" Ice	1.24	0.27	0.02
		g	2.00			1" Ice	1.38	0.35	0.03
						2" Ice	1.69	0.52	0.05
(2) LGP21401	B	From	4.00	0.0000	106.00	No Ice	1.10	0.21	0.01
		Centroid-Le	0.00			1/2" Ice	1.24	0.27	0.02
		g	2.00			1" Ice	1.38	0.35	0.03
						2" Ice	1.69	0.52	0.05
(2) LGP21401	C	From	4.00	0.0000	106.00	No Ice	1.10	0.21	0.01
		Centroid-Le	0.00			1/2" Ice	1.24	0.27	0.02
		g	2.00			1" Ice	1.38	0.35	0.03
						2" Ice	1.69	0.52	0.05
DC6-48-60-18-8F	A	From	4.00	0.0000	106.00	No Ice	1.21	1.21	0.03
		Centroid-Le	0.00			1/2" Ice	1.89	1.89	0.05
		g	2.00			1" Ice	2.11	2.11	0.08
						2" Ice	2.57	2.57	0.14
(2) RRUS 4478 B14_CCIV2	A	From	4.00	0.0000	106.00	No Ice	2.02	1.25	0.06
		Centroid-Le	0.00			1/2" Ice	2.20	1.40	0.08
		g	2.00			1" Ice	2.39	1.55	0.10
						2" Ice	2.78	1.89	0.15
RRUS 4478 B14_CCIV2	B	From	4.00	0.0000	106.00	No Ice	2.02	1.25	0.06
		Centroid-Le	0.00			1/2" Ice	2.20	1.40	0.08
		g	2.00			1" Ice	2.39	1.55	0.10
						2" Ice	2.78	1.89	0.15
(2) RRUS 8843 B2/B66A	A	From	4.00	0.0000	106.00	No Ice	1.64	1.35	0.07
		Centroid-Le	0.00			1/2" Ice	1.80	1.50	0.09
		g	2.00			1" Ice	1.97	1.65	0.11
						2" Ice	2.32	1.99	0.16
RRUS 8843 B2/B66A	B	From	4.00	0.0000	106.00	No Ice	1.64	1.35	0.07
		Centroid-Le	0.00			1/2" Ice	1.80	1.50	0.09
		g	2.00			1" Ice	1.97	1.65	0.11
						2" Ice	2.32	1.99	0.16
DC9-48-60-24-8C-EV	A	From	4.00	0.0000	106.00	No Ice	1.14	1.14	0.03
		Centroid-Le	0.00			1/2" Ice	1.79	1.79	0.05
		g	2.00			1" Ice	2.00	2.00	0.07
						2" Ice	2.45	2.45	0.13
RRUS 4449 B5/B12	A	From	4.00	0.0000	106.00	No Ice	1.97	1.41	0.07

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	<b>Project</b> TEP No. 80750.559928	<b>Date</b> 11:44:39 06/17/21
	<b>Client</b> Crown Castle	<b>Designed by</b> tmlester

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	CAA Front	CAA Side	Weight
			ft ft ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
		Centroid-Left	0.00		1/2" Ice	2.14	1.56	0.09
			2.00		1" Ice	2.33	1.73	0.11
					2" Ice	2.72	2.07	0.16
(2) RRUS 4449 B5/B12	B	From Centroid-Left	4.00	0.0000	106.00	No Ice	1.97	1.41
			0.00			1/2" Ice	2.14	1.56
			2.00			1" Ice	2.33	1.73
						2" Ice	2.72	2.07
RMQLP-4120-H10	C	None		0.0000	106.00	No Ice	28.15	26.41
						1/2" Ice	34.10	32.35
						1" Ice	40.10	38.54
						2" Ice	51.95	50.17
***								
APXV18-206517S-C w/ Mount Pipe	A	From Leg	0.50	0.0000	98.00	No Ice	3.79	3.16
			0.00			1/2" Ice	4.38	3.75
			0.00			1" Ice	4.99	4.35
						2" Ice	6.25	5.59
APXV18-206517S-C w/ Mount Pipe	B	From Leg	0.50	0.0000	98.00	No Ice	3.79	3.16
			0.00			1/2" Ice	4.38	3.75
			0.00			1" Ice	4.99	4.35
						2" Ice	6.25	5.59
APXV18-206517S-C w/ Mount Pipe	C	From Leg	0.50	0.0000	98.00	No Ice	3.79	3.16
			0.00			1/2" Ice	4.38	3.75
			0.00			1" Ice	4.99	4.35
						2" Ice	6.25	5.59
***								

## Load Combinations

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

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Comb. No.	Description
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	149 - 135.04	Pole	Max Tension	27	0.00	0.00	-0.00
			Max. Compression	26	-8.48	-0.12	0.21
			Max. Mx	8	-3.83	-44.12	0.06
			Max. My	2	-3.82	-0.02	44.30
			Max. Vy	8	5.28	-44.12	0.06
			Max. Vx	2	-5.30	-0.02	44.30
			Max. Torque	8			0.16
L2	135.04 - 92.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47.86	-1.82	3.55
			Max. Mx	8	-24.45	-778.64	2.39
			Max. My	2	-24.43	-1.98	785.42
			Max. Vy	8	28.43	-778.64	2.39
			Max. Vx	2	-28.69	-1.98	785.42
			Max. Torque	22			-2.23
L3	92.17 - 45.21	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-64.31	-1.82	0.59
			Max. Mx	8	-36.16	-2194.65	2.57
			Max. My	2	-36.15	-2.73	2212.52
			Max. Vy	8	34.56	-2194.65	2.57
			Max. Vx	2	-34.82	-2.73	2212.52
			Max. Torque	22			-2.23
L4	45.21 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-91.59	-1.82	-4.09
			Max. Mx	8	-56.96	-4220.23	2.42

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-56.96	-3.55	4250.58
			Max. Vy	8	41.99	-4220.23	2.42
			Max. Vx	2	-42.24	-3.55	4250.58
			Max. Torque	22			-2.22

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	91.59	0.00	-9.80
	Max. H <sub>x</sub>	20	56.98	41.96	-0.02
	Max. H <sub>z</sub>	2	56.98	-0.02	42.21
	Max. M <sub>x</sub>	2	4250.58	-0.02	42.21
	Max. M <sub>z</sub>	8	4220.23	-41.96	0.02
	Max. Torsion	10	2.22	-36.33	-21.09
	Min. Vert	23	42.73	36.33	21.09
	Min. H <sub>x</sub>	8	56.98	-41.96	0.02
	Min. H <sub>z</sub>	14	56.98	0.02	-42.21
	Min. M <sub>x</sub>	14	-4250.51	0.02	-42.21
	Min. M <sub>z</sub>	20	-4217.92	41.96	-0.02
	Min. Torsion	22	-2.22	36.33	21.09

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	47.48	0.00	0.00	0.01	-0.92	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	56.98	0.02	-42.21	-4250.58	-3.55	0.74
0.9 Dead+1.0 Wind 0 deg - No Ice	42.73	0.02	-42.21	-4222.01	-3.23	0.73
1.2 Dead+1.0 Wind 30 deg - No Ice	56.98	20.99	-36.57	-3682.32	-2112.76	-0.43
0.9 Dead+1.0 Wind 30 deg - No Ice	42.73	20.99	-36.57	-3657.56	-2098.27	-0.43
1.2 Dead+1.0 Wind 60 deg - No Ice	56.98	36.35	-21.12	-2127.39	-3656.17	-1.48
0.9 Dead+1.0 Wind 60 deg - No Ice	42.73	36.35	-21.12	-2113.08	-3631.33	-1.47
1.2 Dead+1.0 Wind 90 deg - No Ice	56.98	41.96	-0.02	-2.42	-4220.23	-2.13
0.9 Dead+1.0 Wind 90 deg - No Ice	42.73	41.96	-0.02	-2.39	-4191.60	-2.12
1.2 Dead+1.0 Wind 120 deg - No Ice	56.98	36.33	21.09	2123.18	-3653.78	-2.22
0.9 Dead+1.0 Wind 120 deg - No Ice	42.73	36.33	21.09	2108.94	-3628.95	-2.20
1.2 Dead+1.0 Wind 150 deg - No Ice	56.98	20.97	36.55	3679.86	-2108.60	-1.71
0.9 Dead+1.0 Wind 150 deg - No Ice	42.73	20.97	36.55	3655.16	-2094.16	-1.70

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Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 180 deg - No Ice	56.98	-0.02	42.21	4250.51	1.24	-0.75
0.9 Dead+1.0 Wind 180 deg - No Ice	42.73	-0.02	42.21	4221.98	1.52	-0.74
1.2 Dead+1.0 Wind 210 deg - No Ice	56.98	-20.99	36.57	3682.25	2110.44	0.42
0.9 Dead+1.0 Wind 210 deg - No Ice	42.73	-20.99	36.57	3657.53	2096.56	0.42
1.2 Dead+1.0 Wind 240 deg - No Ice	56.98	-36.35	21.12	2127.33	3653.86	1.48
0.9 Dead+1.0 Wind 240 deg - No Ice	42.73	-36.35	21.12	2113.05	3629.61	1.47
1.2 Dead+1.0 Wind 270 deg - No Ice	56.98	-41.96	0.02	2.37	4217.92	2.14
0.9 Dead+1.0 Wind 270 deg - No Ice	42.73	-41.96	0.02	2.36	4189.89	2.13
1.2 Dead+1.0 Wind 300 deg - No Ice	56.98	-36.33	-21.09	-2123.25	3651.47	2.22
0.9 Dead+1.0 Wind 300 deg - No Ice	42.73	-36.33	-21.09	-2108.97	3627.25	2.21
1.2 Dead+1.0 Wind 330 deg - No Ice	56.98	-20.97	-36.55	-3679.93	2106.30	1.71
0.9 Dead+1.0 Wind 330 deg - No Ice	42.73	-20.97	-36.55	-3655.19	2092.45	1.69
1.2 Dead+1.0 Ice+1.0 Temp	91.59	0.00	-0.00	4.09	-1.82	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	91.59	0.00	-9.80	-979.00	-2.28	0.17
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	91.59	4.88	-8.49	-847.46	-491.14	-0.09
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	91.59	8.46	-4.90	-487.75	-848.94	-0.32
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	91.59	9.76	-0.00	3.74	-979.77	-0.47
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	91.59	8.45	4.90	495.32	-848.63	-0.49
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	91.59	4.88	8.49	855.26	-490.61	-0.38
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	91.59	-0.00	9.80	987.10	-1.66	-0.17
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	91.59	-4.88	8.49	855.56	487.21	0.09
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	91.59	-8.46	4.90	495.85	845.00	0.32
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	91.59	-9.76	0.00	4.36	975.83	0.47
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	91.59	-8.45	-4.90	-487.21	844.69	0.49
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	91.59	-4.88	-8.49	-847.15	486.67	0.38
Dead+Wind 0 deg - Service	47.48	0.00	-8.47	-849.71	-1.43	0.15
Dead+Wind 30 deg - Service	47.48	4.21	-7.34	-736.11	-423.07	-0.09
Dead+Wind 60 deg - Service	47.48	7.29	-4.24	-425.28	-731.59	-0.31
Dead+Wind 90 deg - Service	47.48	8.42	-0.00	-0.50	-844.35	-0.44
Dead+Wind 120 deg - Service	47.48	7.29	4.23	424.40	-731.11	-0.45
Dead+Wind 150 deg - Service	47.48	4.21	7.34	735.58	-422.24	-0.35
Dead+Wind 180 deg - Service	47.48	-0.00	8.47	849.66	-0.48	-0.15
Dead+Wind 210 deg - Service	47.48	-4.21	7.34	736.06	421.15	0.09
Dead+Wind 240 deg - Service	47.48	-7.29	4.24	425.23	729.68	0.31
Dead+Wind 270 deg - Service	47.48	-8.42	0.00	0.45	842.43	0.44
Dead+Wind 300 deg - Service	47.48	-7.29	-4.23	-424.45	729.20	0.45
Dead+Wind 330 deg - Service	47.48	-4.21	-7.34	-735.63	420.32	0.35

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## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-47.48	0.00	0.00	47.48	0.00	0.000%
2	0.02	-56.98	-42.21	-0.02	56.98	42.21	0.000%
3	0.02	-42.73	-42.21	-0.02	42.73	42.21	0.000%
4	20.99	-56.98	-36.57	-20.99	56.98	36.57	0.000%
5	20.99	-42.73	-36.57	-20.99	42.73	36.57	0.000%
6	36.35	-56.98	-21.12	-36.35	56.98	21.12	0.000%
7	36.35	-42.73	-21.12	-36.35	42.73	21.12	0.000%
8	41.96	-56.98	-0.02	-41.96	56.98	0.02	0.000%
9	41.96	-42.73	-0.02	-41.96	42.73	0.02	0.000%
10	36.33	-56.98	21.09	-36.33	56.98	-21.09	0.000%
11	36.33	-42.73	21.09	-36.33	42.73	-21.09	0.000%
12	20.97	-56.98	36.55	-20.97	56.98	-36.55	0.000%
13	20.97	-42.73	36.55	-20.97	42.73	-36.55	0.000%
14	-0.02	-56.98	42.21	0.02	56.98	-42.21	0.000%
15	-0.02	-42.73	42.21	0.02	42.73	-42.21	0.000%
16	-20.99	-56.98	36.57	20.99	56.98	-36.57	0.000%
17	-20.99	-42.73	36.57	20.99	42.73	-36.57	0.000%
18	-36.35	-56.98	21.12	36.35	56.98	-21.12	0.000%
19	-36.35	-42.73	21.12	36.35	42.73	-21.12	0.000%
20	-41.96	-56.98	0.02	41.96	56.98	-0.02	0.000%
21	-41.96	-42.73	0.02	41.96	42.73	-0.02	0.000%
22	-36.33	-56.98	-21.09	36.33	56.98	21.09	0.000%
23	-36.33	-42.73	-21.09	36.33	42.73	21.09	0.000%
24	-20.97	-56.98	-36.55	20.97	56.98	36.55	0.000%
25	-20.97	-42.73	-36.55	20.97	42.73	36.55	0.000%
26	0.00	-91.59	0.00	-0.00	91.59	0.00	0.000%
27	0.00	-91.59	-9.80	-0.00	91.59	9.80	0.000%
28	4.88	-91.59	-8.49	-4.88	91.59	8.49	0.000%
29	8.46	-91.59	-4.90	-8.46	91.59	4.90	0.000%
30	9.76	-91.59	-0.00	-9.76	91.59	0.00	0.000%
31	8.45	-91.59	4.90	-8.45	91.59	-4.90	0.000%
32	4.88	-91.59	8.49	-4.88	91.59	-8.49	0.000%
33	-0.00	-91.59	9.80	0.00	91.59	-9.80	0.000%
34	-4.88	-91.59	8.49	4.88	91.59	-8.49	0.000%
35	-8.46	-91.59	4.90	8.46	91.59	-4.90	0.000%
36	-9.76	-91.59	0.00	9.76	91.59	-0.00	0.000%
37	-8.45	-91.59	-4.90	8.45	91.59	4.90	0.000%
38	-4.88	-91.59	-8.49	4.88	91.59	8.49	0.000%
39	0.00	-47.48	-8.47	-0.00	47.48	8.47	0.000%
40	4.21	-47.48	-7.34	-4.21	47.48	7.34	0.000%
41	7.29	-47.48	-4.24	-7.29	47.48	4.24	0.000%
42	8.42	-47.48	-0.00	-8.42	47.48	0.00	0.000%
43	7.29	-47.48	4.23	-7.29	47.48	-4.23	0.000%
44	4.21	-47.48	7.34	-4.21	47.48	-7.34	0.000%
45	-0.00	-47.48	8.47	0.00	47.48	-8.47	0.000%
46	-4.21	-47.48	7.34	4.21	47.48	-7.34	0.000%
47	-7.29	-47.48	4.24	7.29	47.48	-4.24	0.000%
48	-8.42	-47.48	0.00	8.42	47.48	-0.00	0.000%
49	-7.29	-47.48	-4.23	7.29	47.48	4.23	0.000%
50	-4.21	-47.48	-7.34	4.21	47.48	7.34	0.000%

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## Non-Linear Convergence Results

<i>Load Combination</i>	<i>Converged?</i>	<i>Number of Cycles</i>	<i>Displacement Tolerance</i>	<i>Force Tolerance</i>
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00012738
3	Yes	4	0.00000001	0.00007390
4	Yes	5	0.00000001	0.00015241
5	Yes	5	0.00000001	0.00006871
6	Yes	5	0.00000001	0.00015817
7	Yes	5	0.00000001	0.00007157
8	Yes	4	0.00000001	0.00033907
9	Yes	4	0.00000001	0.00021371
10	Yes	5	0.00000001	0.00014702
11	Yes	5	0.00000001	0.00006629
12	Yes	5	0.00000001	0.00015778
13	Yes	5	0.00000001	0.00007142
14	Yes	4	0.00000001	0.00011596
15	Yes	4	0.00000001	0.00006619
16	Yes	5	0.00000001	0.00015469
17	Yes	5	0.00000001	0.00006996
18	Yes	5	0.00000001	0.00014875
19	Yes	5	0.00000001	0.00006712
20	Yes	4	0.00000001	0.00032507
21	Yes	4	0.00000001	0.00020487
22	Yes	5	0.00000001	0.00015918
23	Yes	5	0.00000001	0.00007215
24	Yes	5	0.00000001	0.00014861
25	Yes	5	0.00000001	0.00006700
26	Yes	4	0.00000001	0.00000295
27	Yes	4	0.00000001	0.00091865
28	Yes	5	0.00000001	0.00007186
29	Yes	5	0.00000001	0.00007194
30	Yes	4	0.00000001	0.00091526
31	Yes	5	0.00000001	0.00007111
32	Yes	5	0.00000001	0.00007158
33	Yes	4	0.00000001	0.00091286
34	Yes	5	0.00000001	0.00007101
35	Yes	5	0.00000001	0.00007066
36	Yes	4	0.00000001	0.00090767
37	Yes	5	0.00000001	0.00007141
38	Yes	5	0.00000001	0.00007122
39	Yes	4	0.00000001	0.00001437
40	Yes	4	0.00000001	0.00004923
41	Yes	4	0.00000001	0.00005602
42	Yes	4	0.00000001	0.00002048
43	Yes	4	0.00000001	0.00004561
44	Yes	4	0.00000001	0.00005565
45	Yes	4	0.00000001	0.00001426
46	Yes	4	0.00000001	0.00005146
47	Yes	4	0.00000001	0.00004615
48	Yes	4	0.00000001	0.00002028
49	Yes	4	0.00000001	0.00005781
50	Yes	4	0.00000001	0.00004634

## Maximum Tower Deflections - Service Wind

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 135.04	12.512	39	0.7517	0.0015
L2	138.96 - 92.17	10.938	39	0.7411	0.0014
L3	97.84 - 45.21	5.228	39	0.5399	0.0008
L4	52.79 - 0	1.426	39	0.2510	0.0002

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.00	APXVAARR24_43-U-NA20 w/ Mount Pipe	39	12.354	0.7510	0.0015	50091
138.00	MX08FRO665-21 w/ Mount Pipe	39	10.790	0.7393	0.0014	24419
129.00	TME-800MHZ RRH	39	9.421	0.7133	0.0013	17017
128.00	APXVTM14-C-120 w/ Mount Pipe	39	9.272	0.7094	0.0013	16491
116.00	(2) JAHH-65B-R3B w/ Mount Pipe	39	7.549	0.6523	0.0011	12026
110.00	TME-RRUS-11	39	6.739	0.6175	0.0010	10592
106.00	7770.00	39	6.222	0.5928	0.0010	9812
98.00	APXV18-206517S-C w/ Mount Pipe	39	5.246	0.5409	0.0008	8653

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 135.04	62.547	2	3.7577	0.0072
L2	138.96 - 92.17	54.686	2	3.7054	0.0070
L3	97.84 - 45.21	26.151	2	2.7000	0.0041
L4	52.79 - 0	7.135	2	1.2559	0.0012

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.00	APXVAARR24_43-U-NA20 w/ Mount Pipe	2	61.760	3.7543	0.0072	10099
138.00	MX08FRO665-21 w/ Mount Pipe	2	53.943	3.6963	0.0069	4922
129.00	TME-800MHZ RRH	2	47.105	3.5665	0.0065	3430
128.00	APXVTM14-C-120 w/ Mount Pipe	2	46.362	3.5474	0.0064	3324
116.00	(2) JAHH-65B-R3B w/ Mount Pipe	2	37.753	3.2620	0.0056	2423
110.00	TME-RRUS-11	2	33.705	3.0882	0.0051	2133
106.00	7770.00	2	31.118	2.9644	0.0047	1976
98.00	APXV18-206517S-C w/ Mount Pipe	2	26.244	2.7052	0.0041	1742



<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Guilford West Stone Property (BU 876343)	<b>Page</b> 21 of 21
	<b>Project</b> TEP No. 80750.559928	<b>Date</b> 11:44:39 06/17/21
	<b>Client</b> Crown Castle	<b>Designed by</b> tmlester

Section No.	Elevation ft	Ratio $P_u$	Ratio $M_{ux}$	Ratio $M_{uy}$	Ratio $V_u$	Ratio $T_u$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	149 - 135.04 (1)	0.004	0.085	0.000	0.020	0.000	0.090	1.050	4.8.2
L2	135.04 - 92.17 (2)	0.014	0.507	0.000	0.053	0.000	0.524	1.050	4.8.2
L3	92.17 - 45.21 (3)	0.012	0.630	0.000	0.037	0.000	0.644	1.050	4.8.2
L4	45.21 - 0 (4)	0.012	0.610	0.000	0.029	0.000	0.623	1.050	4.8.2

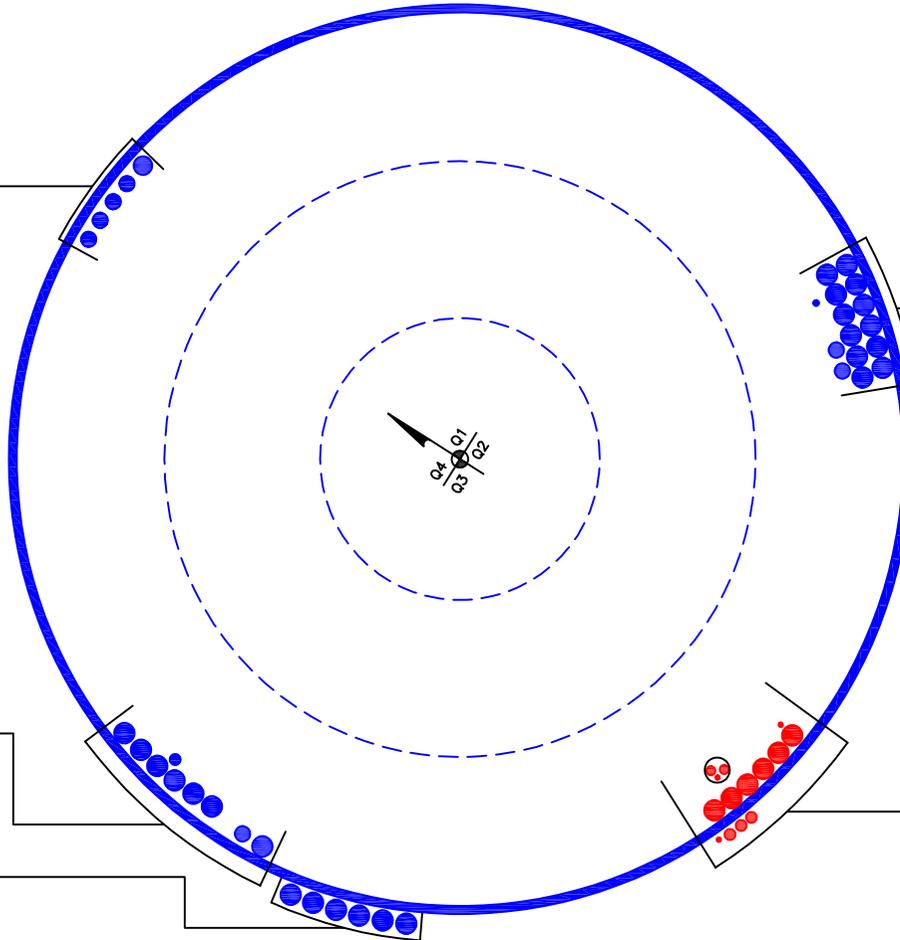
### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	149 - 135.04	Pole	TP26.77x22x0.1875	1	-3.82	922.77	8.5	Pass
L2	135.04 - 92.17	Pole	TP40.91x25.0556x0.25	2	-24.43	1888.15	49.9	Pass
L3	92.17 - 45.21	Pole	TP56.31x38.4888x0.3125	3	-36.15	3255.33	61.3	Pass
L4	45.21 - 0	Pole	TP71x53.1183x0.375	4	-56.96	5023.87	59.3	Pass
Summary								
Pole (L3)							61.3	Pass
<b>RATING =</b>							<b>61.3</b>	<b>Pass</b>

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



(OTHER CONSIDERED EQUIPMENT)  
(4) 1 1/4" TO 128 FT LEVEL  
(1) 1-1/2" TO 138 FT LEVEL



(OTHER CONSIDERED EQUIPMENT)  
(1) 1/2" TO 116 FT LEVEL  
(2) 1-1/4" TO 116 FT LEVEL  
(12) 1-5/8" TO 116 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)  
(1) 7/8" TO 148 FT LEVEL  
(1) 1-1/4" TO 148 FT LEVEL  
(7) 1-5/8" TO 148 FT LEVEL

(PROPOSED EQUIPMENT CONFIGURATION—IN CONDUIT)  
(1) 3/8" TO 106 FT LEVEL  
(2) 3/4" TO 106 FT LEVEL  
(PROPOSED EQUIPMENT CONFIGURATION)  
(2) 3/8" TO 106 FT LEVEL  
(3) 7/8" TO 106 FT LEVEL  
(6) 1-5/8" TO 106 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)  
(6) 1-5/8" TO 98 FT LEVEL

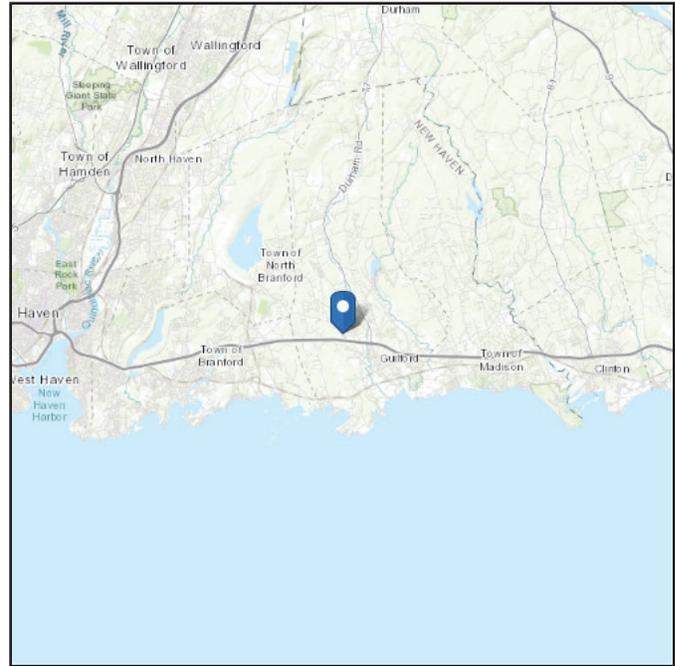
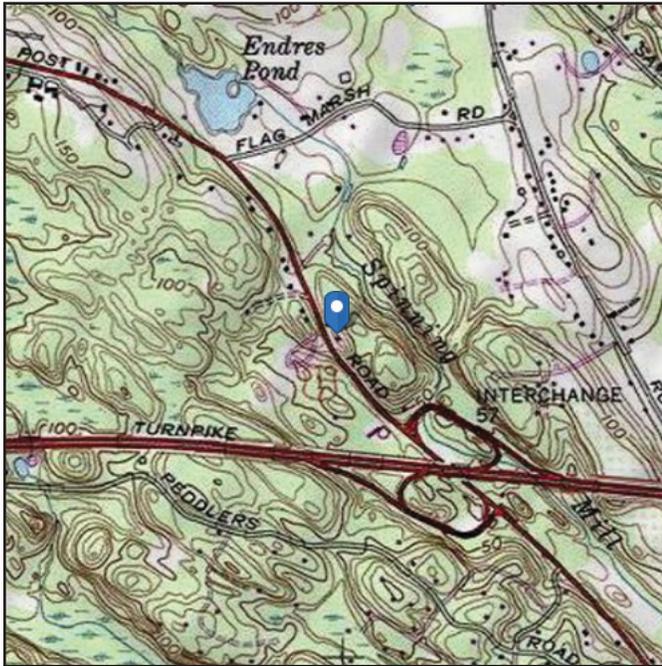
**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

# ASCE 7 Hazards Report

**Address:**  
No Address at This  
Location

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

**Elevation:** 70.13 ft (NAVD 88)  
**Latitude:** 41.300353  
**Longitude:** -72.708092



## Wind

### Results:

Wind Speed:	128 Vmph
10-year MRI	78 Vmph
25-year MRI	88 Vmph
50-year MRI	95 Vmph
100-year MRI	104 Vmph

130 Vmph as per JDX requirements

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

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

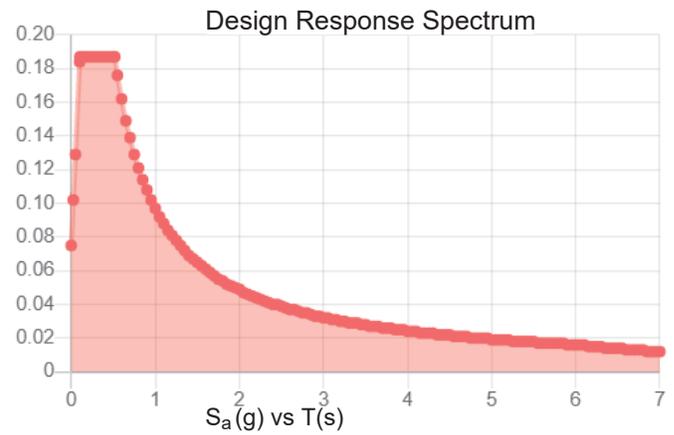
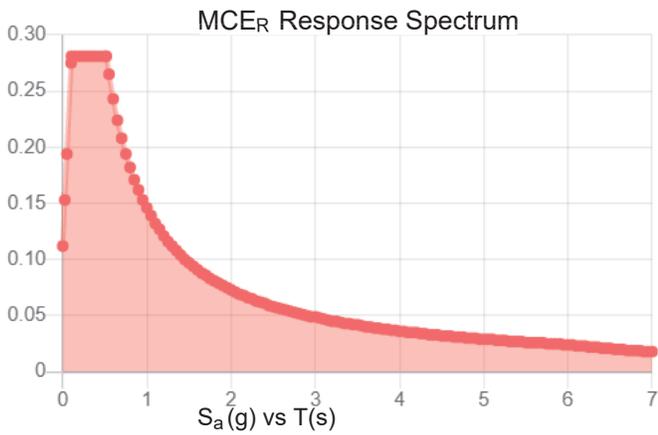
Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

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

**Results:**

$S_s$ :	0.176	$S_{DS}$ :	0.187
$S_1$ :	0.061	$S_{D1}$ :	0.097
$F_a$ :	1.6	$T_L$ :	6
$F_v$ :	2.4	PGA :	0.09
$S_{MS}$ :	0.281	PGA <sub>M</sub> :	0.144
$S_{M1}$ :	0.146	F <sub>PGA</sub> :	1.6
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:**

Wed Jun 16 2021

**Date Source:**

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

## Ice

---

**Results:**

Ice Thickness: 0.75 in.

Concurrent Temperature: 15 F

Gust Speed: 50 mph

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

**Date Accessed:** Wed Jun 16 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 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

---

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

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# Monopole Base Plate Connection

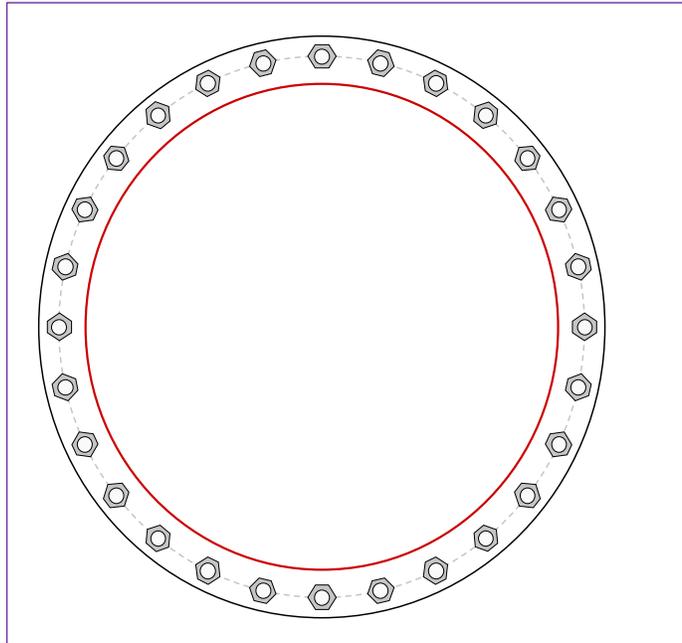


Site Info	
BU #	876343
Site Name	Guilford West Stone P
Order #	561999 Rev.0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$l_{ar}$ (in)	0.5

Applied Loads	
Moment (kip-ft)	4251.00
Axial Force (kips)	57.00
Shear Force (kips)	42.00

\*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data
(28) 2-1/4" $\phi$ bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 79" BC
Base Plate Data
85" OD x 2.75" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)
Stiffener Data
N/A
Pole Data
71" x 0.375" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Anchor Rod Summary		<i>(units of kips, kip-in)</i>
$Pu_t = 90.18$	$\phi Pn_t = 243.75$	<b>Stress Rating</b>
$Vu = 1.5$	$\phi Vn = 149.1$	<b>35.2%</b>
$Mu = n/a$	$\phi Mn = n/a$	<b>Pass</b>
Base Plate Summary		
Max Stress (ksi):	15.58	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	<b>33.0%</b>	<b>Pass</b>

# Pier and Pad Foundation



BU #: 876343  
 Site Name: Guilford West Ston  
 App. Number: 561999 Rev.0

TIA-222 Revision: H  
 Tower Type: Monopole

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

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	57	kips
Base Shear, $V_{u\_comp}$ :	42	kips
Moment, $M_u$ :	4251	ft-kips
Tower Height, $H$ :	149	ft
BP Dist. Above Fdn, $bp_{dist}$ :	2.75	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	818.38	42.00	4.9%	Pass
<i>Bearing Pressure (ksf)</i>	17.08	3.45	19.2%	Pass
<i>Overturning (kip*ft)</i>	17569.87	4806.63	27.4%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	9584.39	4671.00	46.4%	Pass
<i>Pier Compression (kip)</i>	45985.68	187.05	0.4%	Pass
<i>Pad Flexure (kip*ft)</i>	6263.43	1589.16	24.2%	Pass
<i>Pad Shear - 1-way (kips)</i>	1075.81	215.14	19.0%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.190	0.040	20.0%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	5814.50	2802.60	45.9%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$ :	8.5	ft
Ext. Above Grade, $E$ :	1	ft
Pier Rebar Size, $Sc$ :	9	
Pier Rebar Quantity, $mc$ :	48	
Pier Tie/Spiral Size, $St$ :	4	
Pier Tie/Spiral Quantity, $mt$ :	20	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	3	in

\*Rating per TIA-222-H Section 15.5

Structural Rating*:	46.4%
Soil Rating*:	27.4%

Pad Properties		
Depth, $D$ :	12	ft
Pad Width, $W_1$ :	30	ft
Pad Thickness, $T$ :	3	ft
Pad Rebar Size (Top dir.2), $Sp_{top2}$ :	8	
Pad Rebar Quantity (Top dir. 2), $mp_{top2}$ :	34	
Pad Rebar Size (Bottom dir. 2), $Sp_2$ :	8	
Pad Rebar Quantity (Bottom dir. 2), $mp_2$ :	58	
Pad Clear Cover, $cc_{pad}$ :	3	in

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

Soil Properties		
Total Soil Unit Weight, $\gamma$ :	120	pcf
Ultimate Net Bearing, $Q_{net}$ :	21.330	ksf
Cohesion, $C_u$ :		ksf
Friction Angle, $\phi$ :	30	degrees
SPT Blow Count, $N_{blows}$ :	50	
Base Friction, $\mu$ :	0.5	
Neglected Depth, $N$ :	4.25	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, $gw$ :	N/A	ft

<--Toggle between Gross and Net

Date: **June 7, 2021**

Darcy Tarr  
Crown Castle  
3530 Toringdon Way, Suite 300  
Charlotte, NC 28277  
(704) 405-6589

**INFINIGY**  
FROM ZERO TO INFINIGY  
the solutions are endless  
Infinigy Engineering, PLLC  
1033 Watervliet Shaker Road  
Albany, NY 12205  
518-690-0790  
structural@infinigy.com

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

**Carrier Designation:** **AT&T Mobility Direct**  
**Carrier Site Number:** CTL02158  
**Carrier Site Name:** GUILFORD POST ROAD  
**Carrier FA Number:** 10035218

**Crown Castle Designation:** **Crown Castle BU Number:** 876343  
**Crown Castle Site Name:** GUILFORD WEST STONE PROPERTY  
**Crown Castle JDE Job Number:** 658740  
**Crown Castle Order Number:** 561999 Rev. 0

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

**Site Data:** **1919 Boston Post Road, Guilford, New Haven County, CT, 06437**  
**Latitude 41°18'1.27", Longitude -72°42'29.13"**

**Structure Information:** **Tower Height & Type:** **149.0 ft Monopole**  
**Mount Elevation:** **106.0 ft**  
**Mount Type:** **14.5 ft Platform**

Dear Darcy Tarr,

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

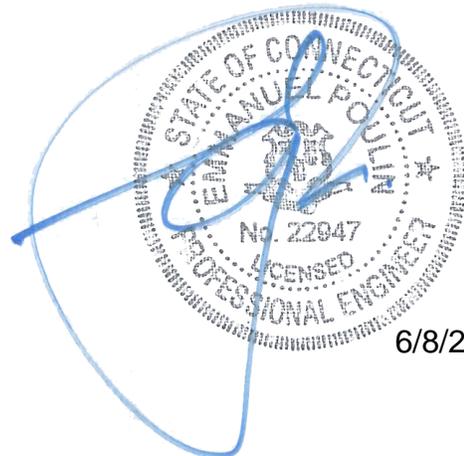
The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

**Platform** **Sufficient**  
**\*Sufficient upon completion of the changes listed in the ‘Recommendations’ section of this report.**

This analysis has been performed in accordance with the 2018 International Building Code based upon an ultimate 3-second gust wind speed of 130 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Andrew Gloriani, E.I.T.

Respectfully Submitted by:  
Emmanuel Poulin, P.E.  
518-690-0790  
[structural@infinigy.com](mailto:structural@infinigy.com)  
CT PE License No. 22947



6/8/21

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### 2) ANALYSIS CRITERIA

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### 4) ANALYSIS RESULTS

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### 8) APPENDIX D

Additional Calculations

**1) INTRODUCTION**

This is a proposed 3 sector 14.5 ft Platform, designed by Site Pro 1.

**2) ANALYSIS CRITERIA**

**Building Code:** 2018 IBC  
**TIA-222 Revision:** TIA-222-H  
**Risk Category:** II  
**Ultimate Wind Speed:** 130 mph  
**Exposure Category:** C  
**Topographic Factor at Base:** 1.0  
**Topographic Factor at Mount:** 1.0  
**Ice Thickness:** 1.0 in  
**Wind Speed with Ice:** 50 mph  
**Seismic S<sub>s</sub>:** 0.176  
**Seismic S<sub>1</sub>:** 0.061  
**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
106.0	108.0	3	Powerwave Technologies	7770.00	14.5 ft Platform [RMQLP-4120-H10]
		2	CCI Antennas	DMP65R-BU4D	
		4	CCI Antennas	DMP65R-BU6D	
		6	Powerwave Technologies	LGP21401	
		1	Raycap	DC6-48-60-18-8F	
		1	Raycap	DC9-48-60-24-8C-EV	
		3	Ericsson	RRUS 4449 B5/B12	
		3	Ericsson	RRUS 4478 B14 CCIV2	
		3	Ericsson	RRUS 8843 B2/B66A	

**3) ANALYSIS PROCEDURE**

**Table 2 - Documents Provided**

Document	Remarks	Reference	Source
Crown Application	AT&T Mobility Application	561999 Rev. 0	CCI Sites
Loading Document	AT&T Mobility	RFDS ID: 4427504	TSA
Mount Manufacturer Drawings	Site Pro 1	Part No. RMQLP-4120-H10	Infinigy

### 3.1) Analysis Method

RISA-3D (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.

Infinigy Mount Analysis Tool V2.1.6, a tool internally developed by Infinigy, was used to calculate wind loading on all appurtenances, dishes and mount members for various loading cases. Selected output from the analysis is included in Appendix B "Software Input Calculations".

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

### 3.2) Assumptions

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

Channel, Solid Round, Angle, Plate	Q345 (GR 36)
HSS (Rectangular)	Q235-GB (GR 35)
Pipe	Q235-GB (GR 35)
Connection Bolts	ASTM A325

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

**4) ANALYSIS RESULTS**

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

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1, 2	Mount Pipe(s)	MP7	106.0	37.3	Pass
	Horizontal(s)	MH6		20.1	Pass
	Standoff(s)	MS2		46.9	Pass
	Handrail(s)	MR2		47.5	Pass
	Guy Strand(s)	M81		38.9	Pass
	Support Angle(s)	M19		53.0	Pass
	Mount Connection(s)	-		24.7	Pass

<b>Structure Rating (max from all components) =</b>	<b>53.0%</b>
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Notes:

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

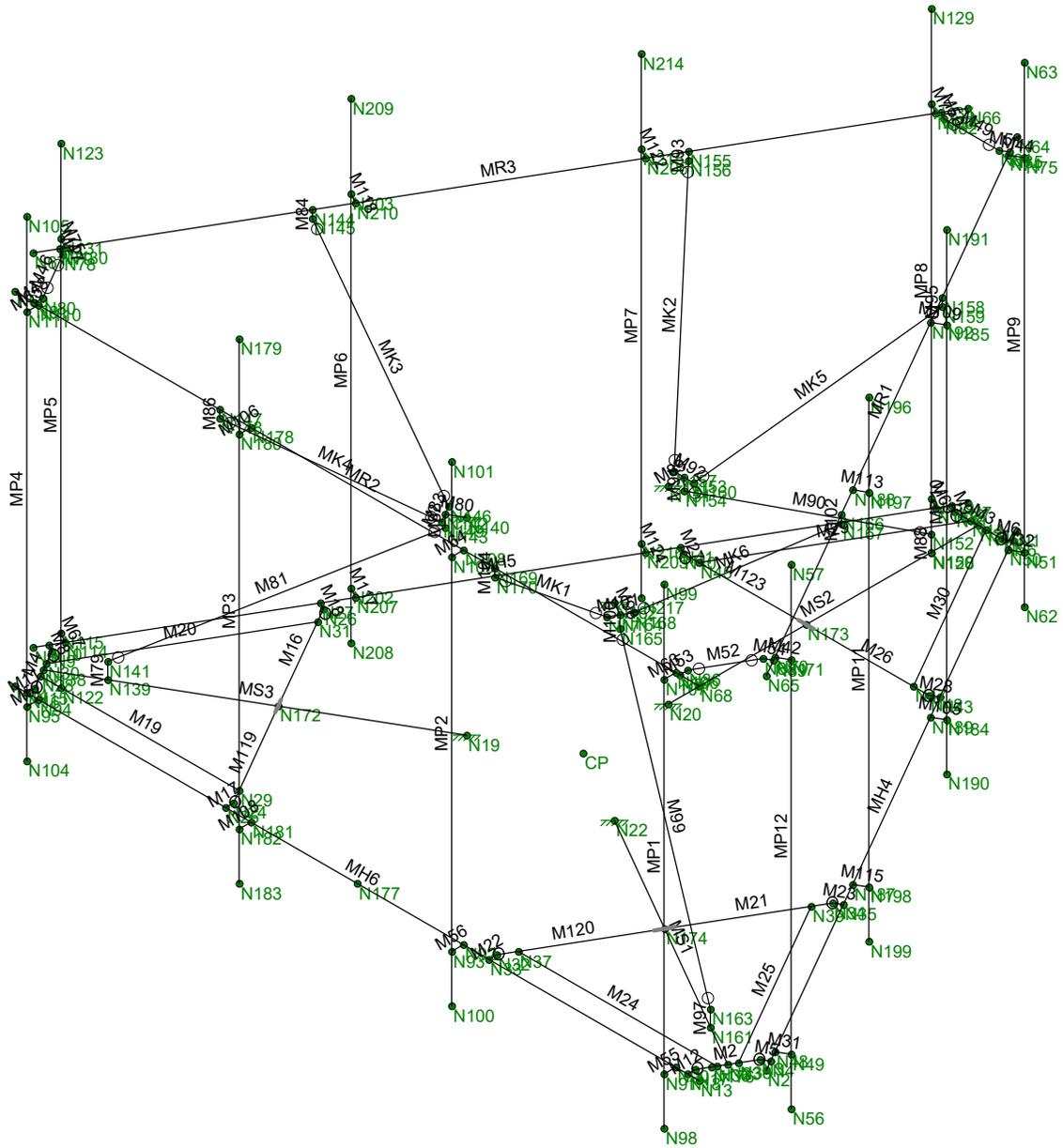
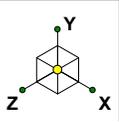
**4.1) Recommendations**

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

1. Site Pro 1 RMQLP-4120-H10.

No structural modifications are required at this time, provided that the above-listed changes are implemented.

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



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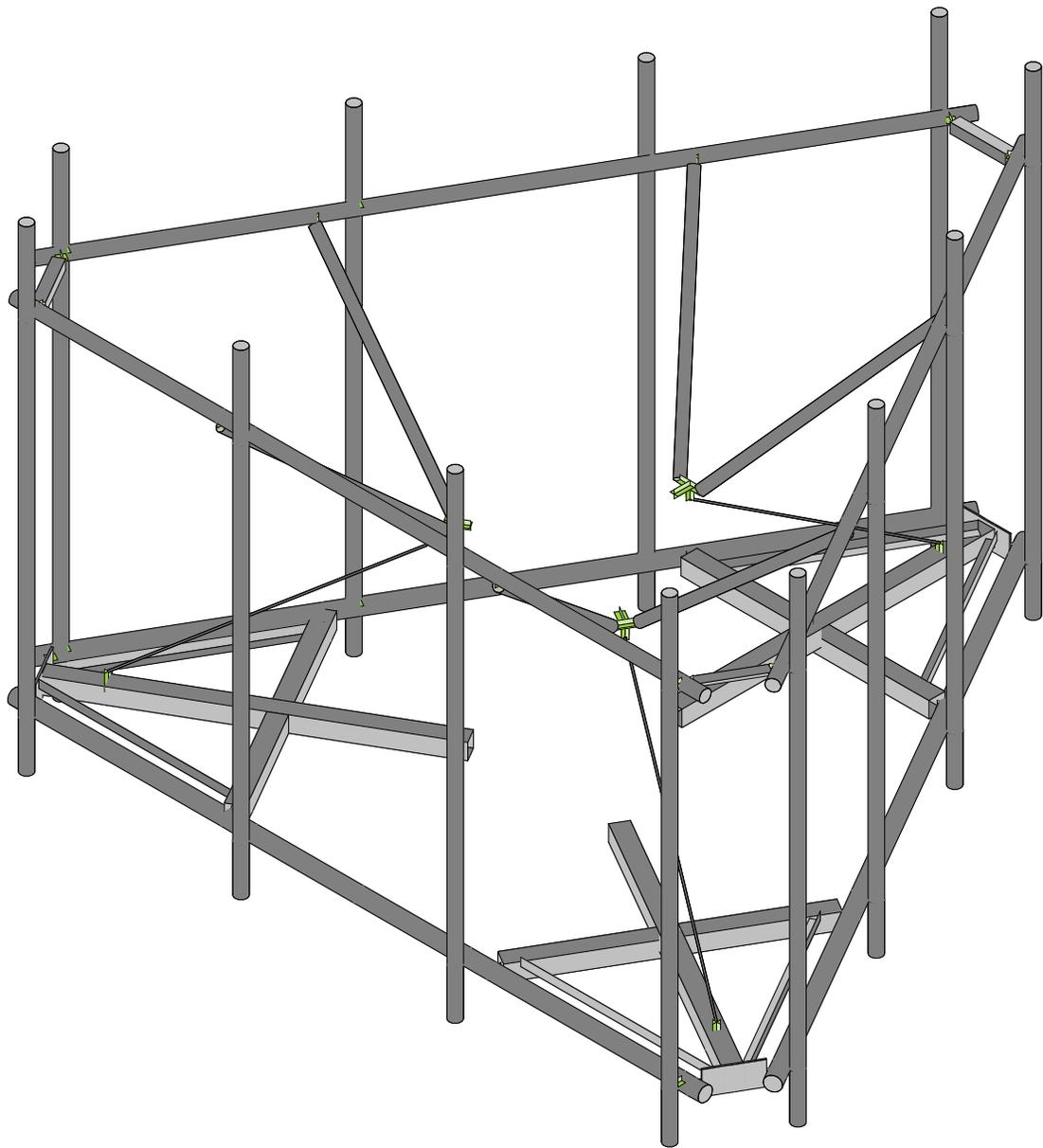
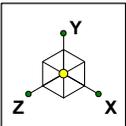
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Wireframe

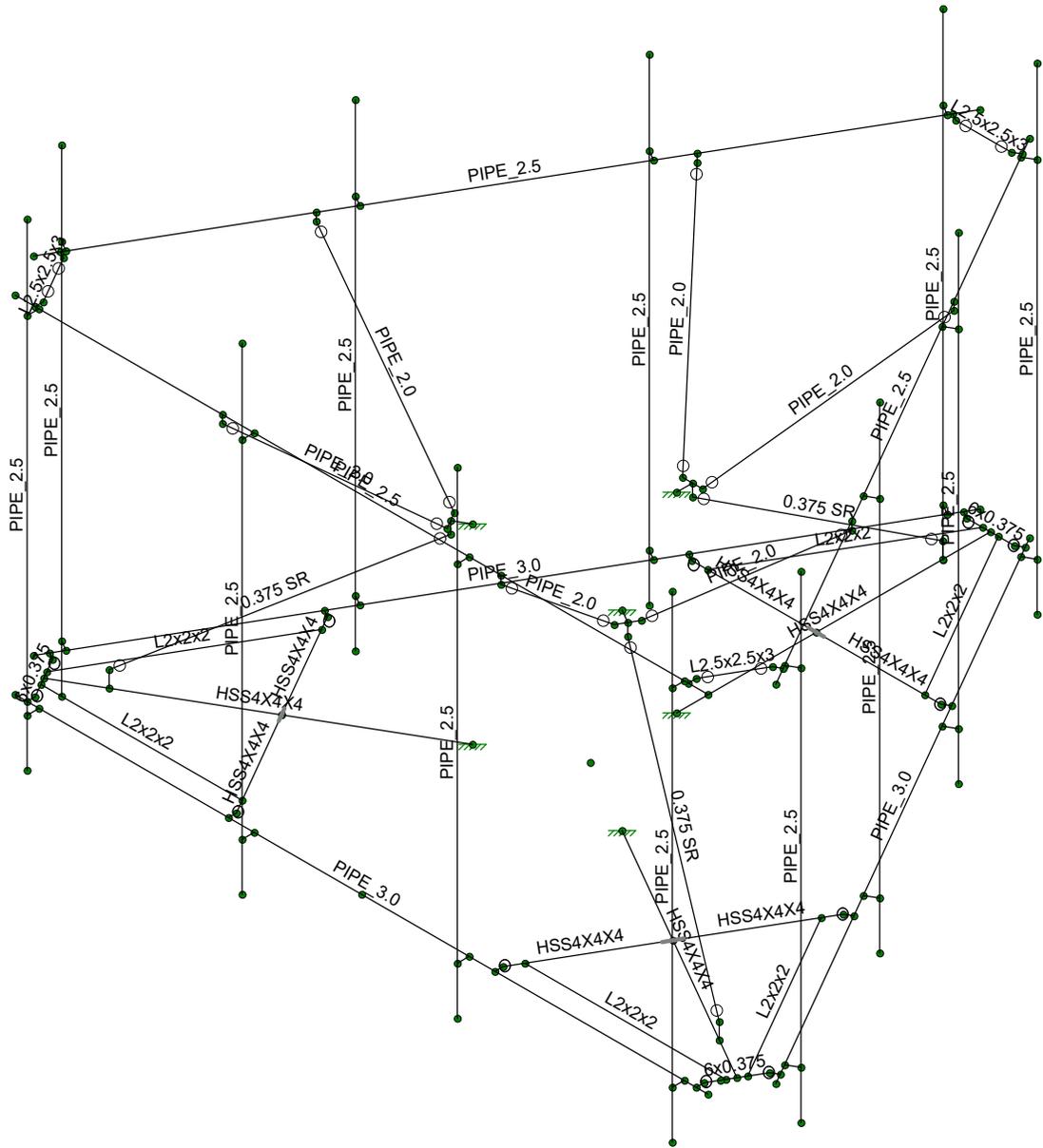
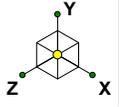
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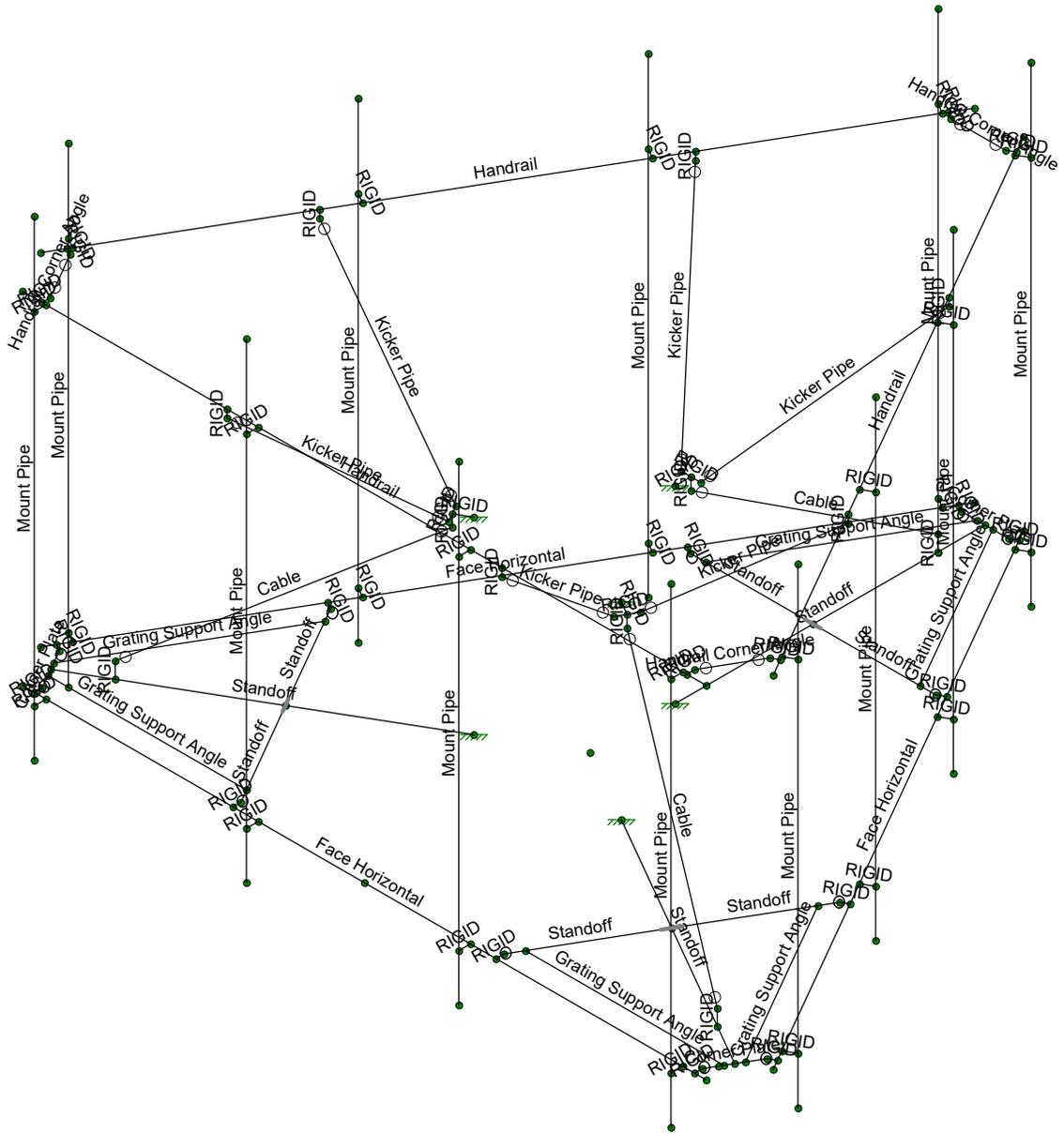
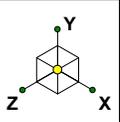
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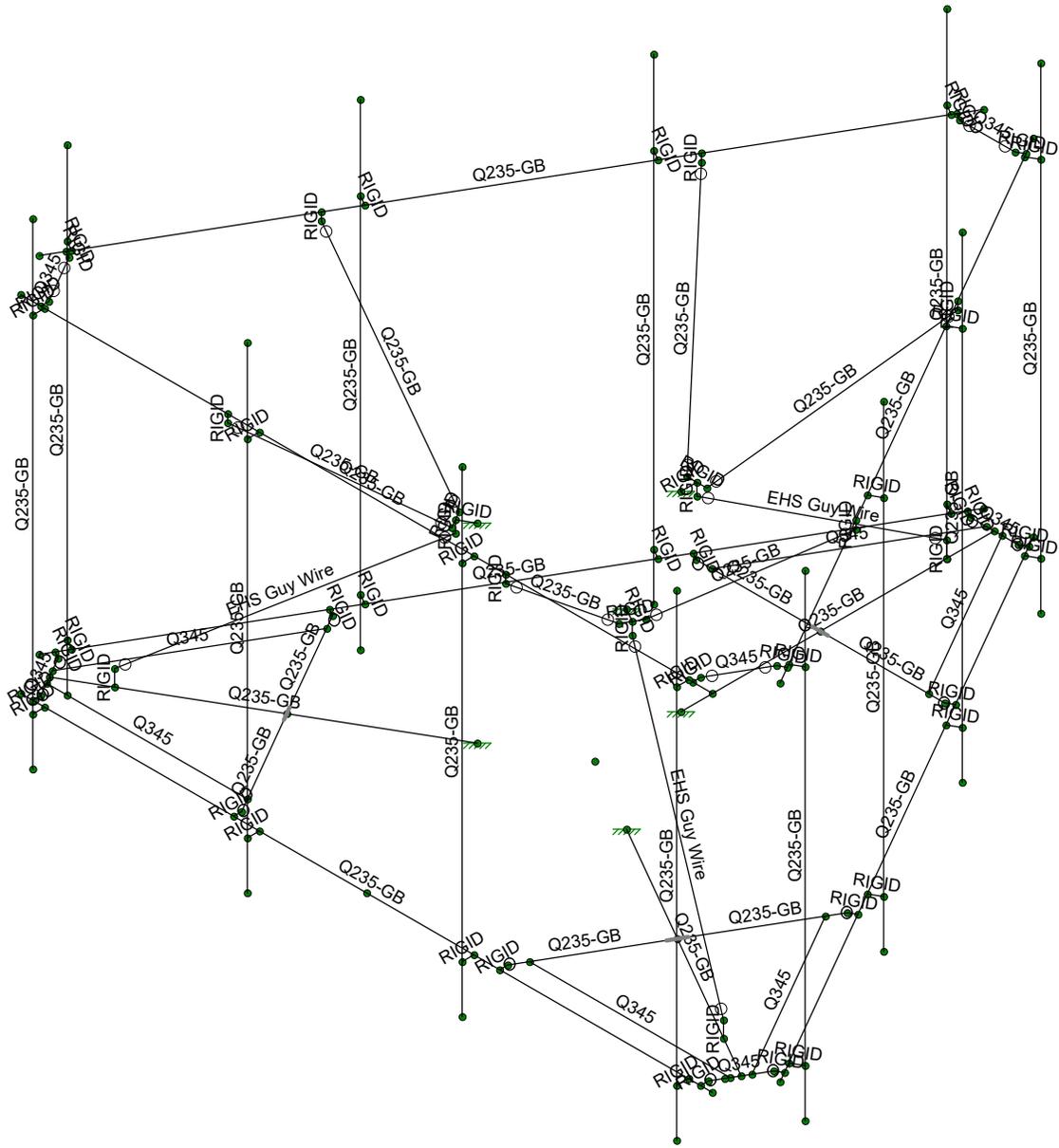
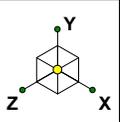
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Section Sets

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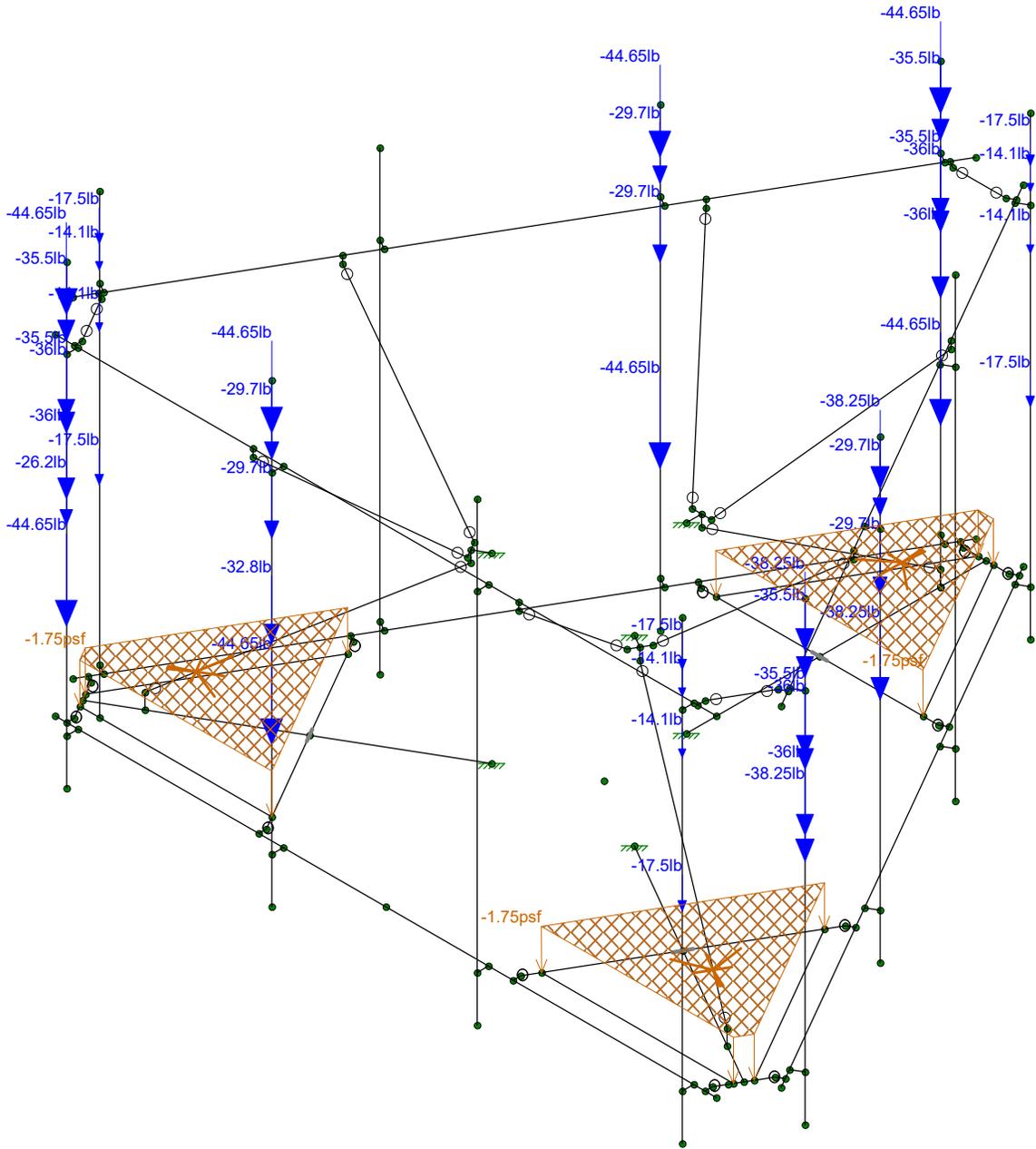
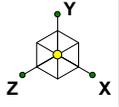
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Grade

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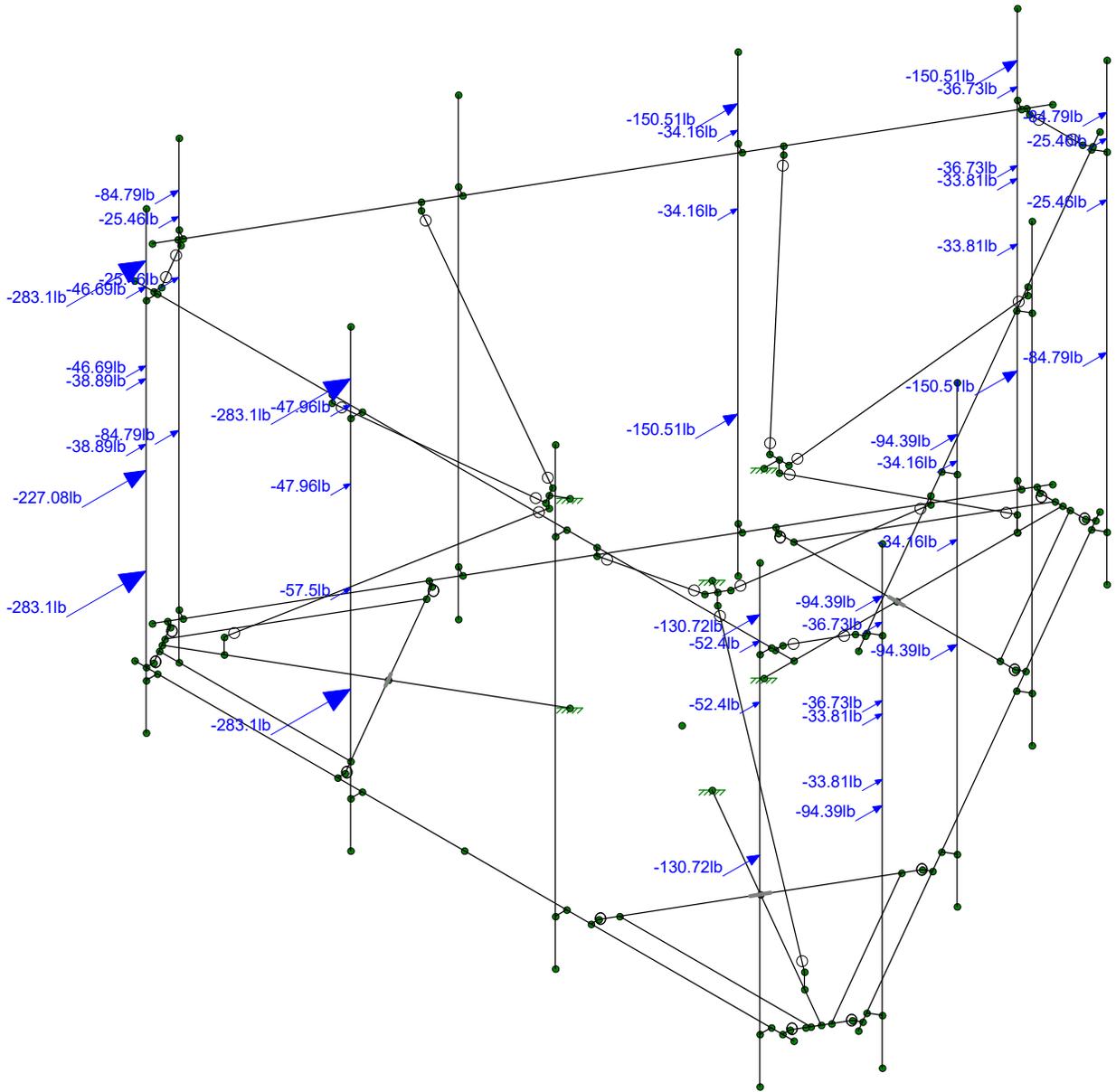
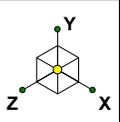
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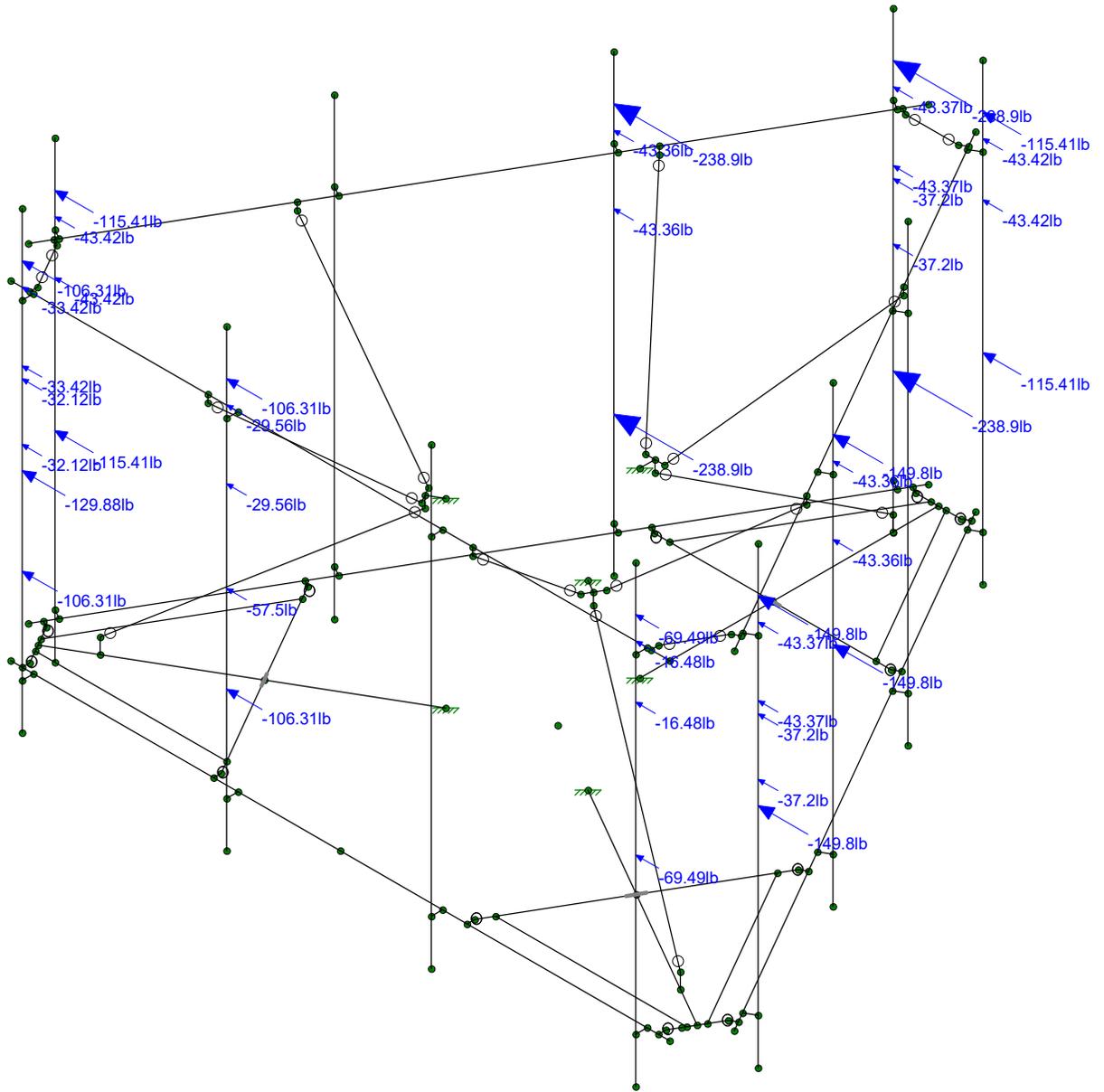
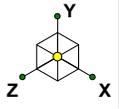
Loads: BLC 1, Self Weight  
Envelope Only Solution

Infinigy Engineering, PLLC	876343	Self Weight
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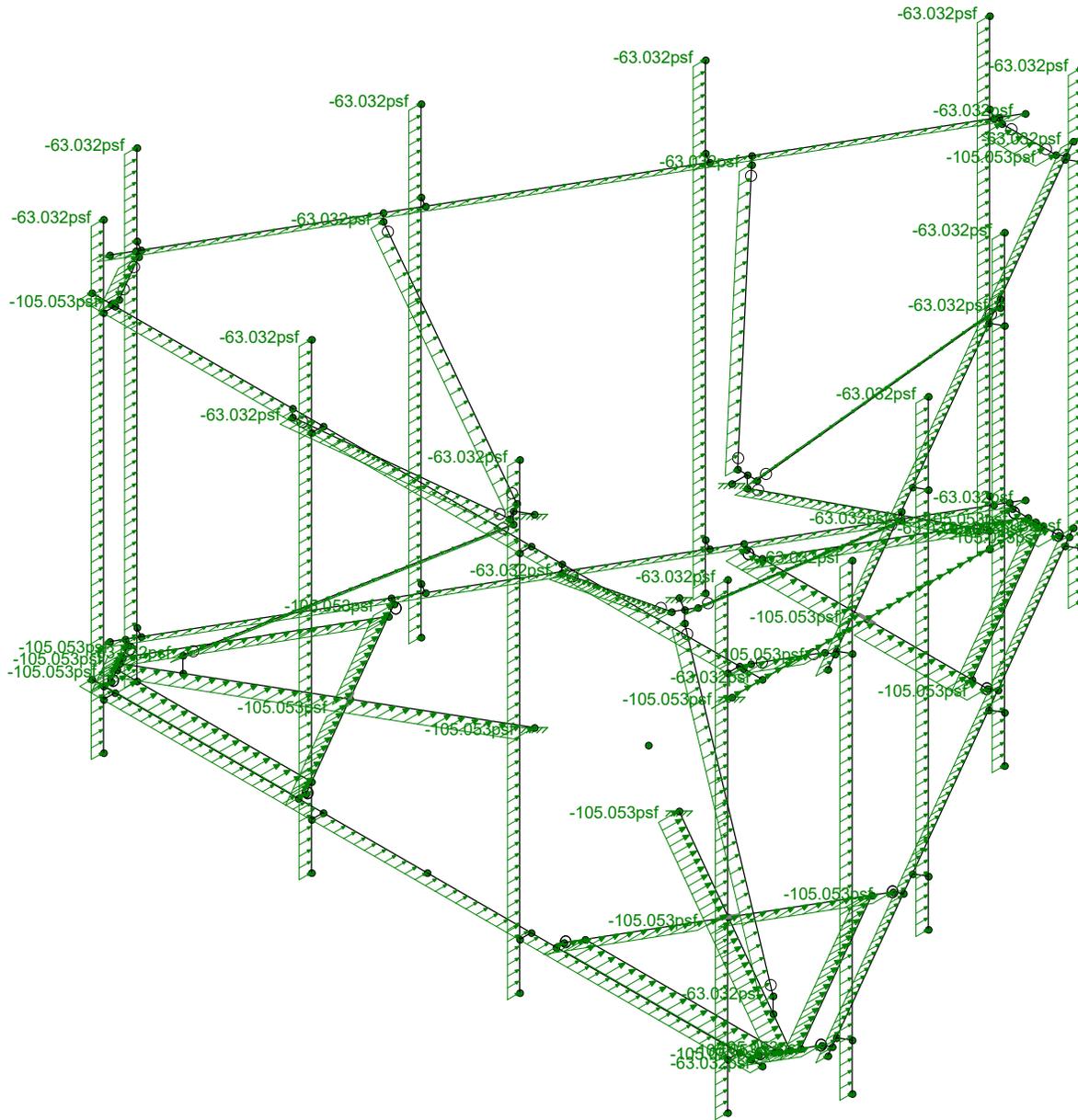
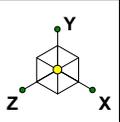
Loads: BLC 2, Wind Load AZI 0  
Envelope Only Solution

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AG		June 7, 2021 at 3:26 PM
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Loads: BLC 5, Wind Load AZI 90  
Envelope Only Solution

Infinigy Engineering, PLLC	876343	Wind Loading X
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Loads: BLC 14, Distr. Wind Load Z  
Envelope Only Solution

Infinigy Engineering, PLLC

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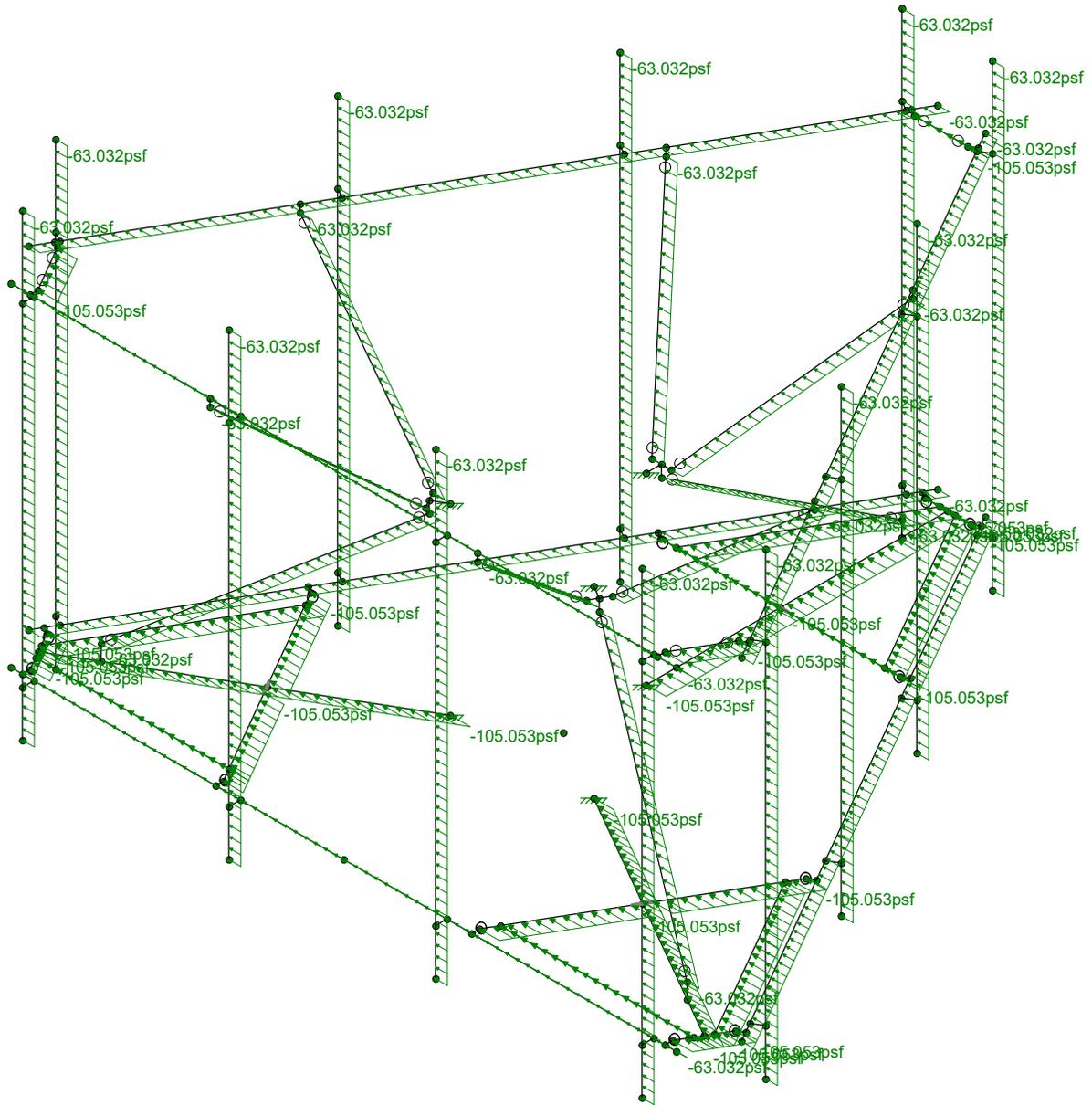
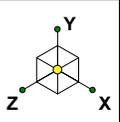
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Dist. Wind Loading Z

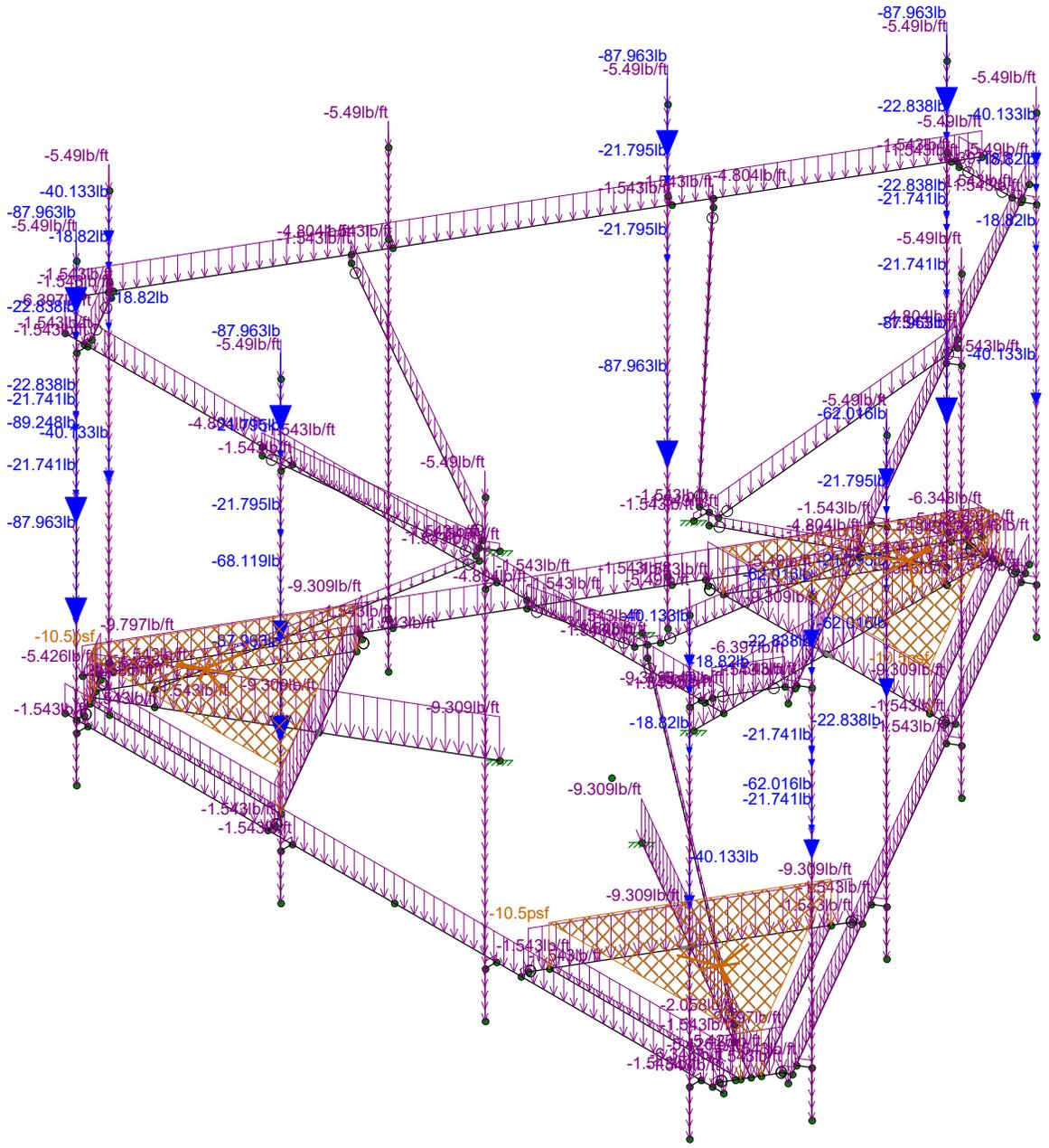
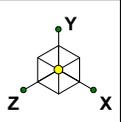
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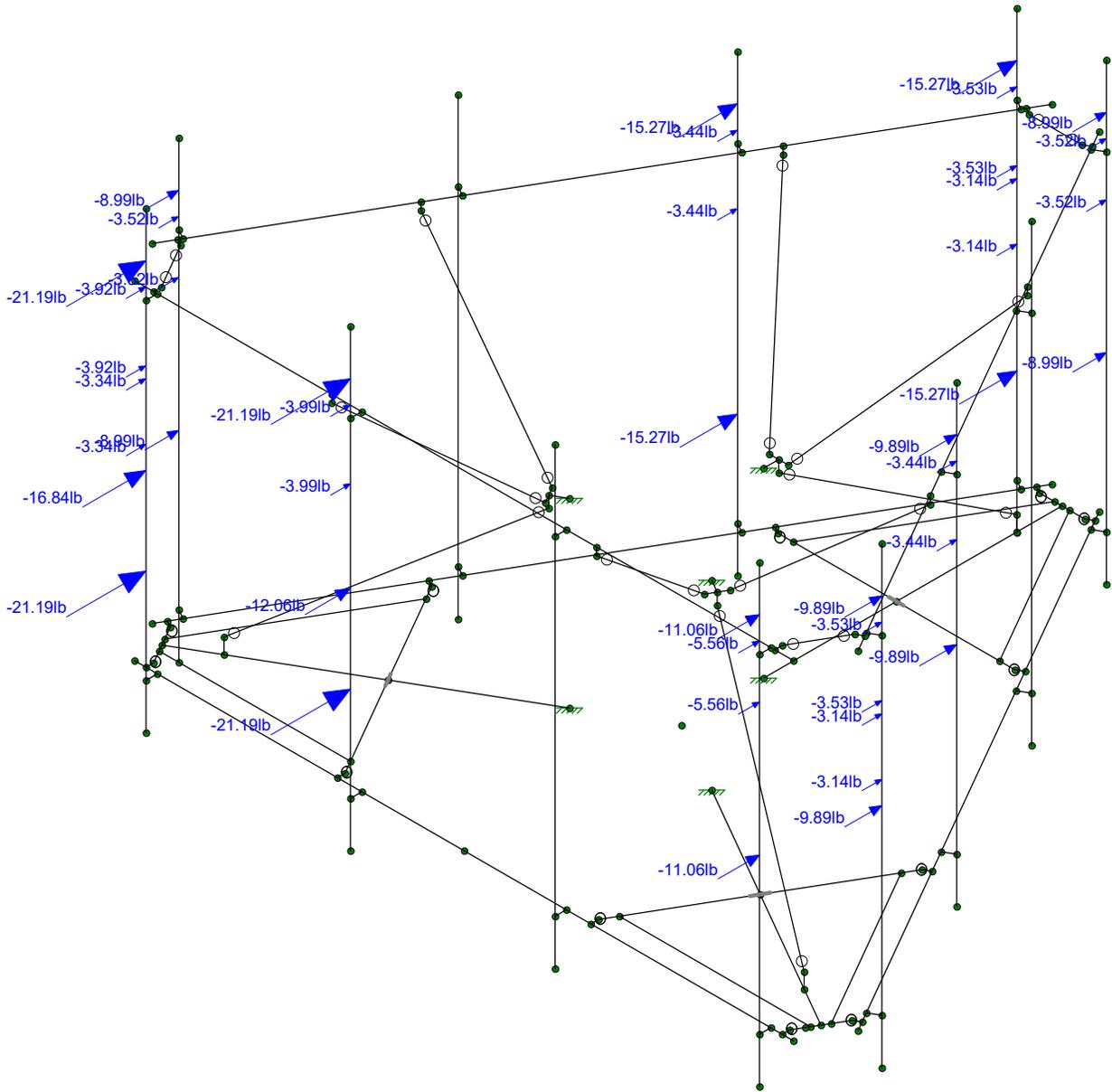
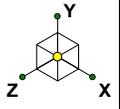
Loads: BLC 15, Distr. Wind Load X  
Envelope Only Solution

Infinigy Engineering, PLLC	876343	Dist. Wind Loading X
AG		June 7, 2021 at 3:26 PM
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Loads: BLC 16, Ice Weight  
Envelope Only Solution

Infinigy Engineering, PLLC		Ice Weight
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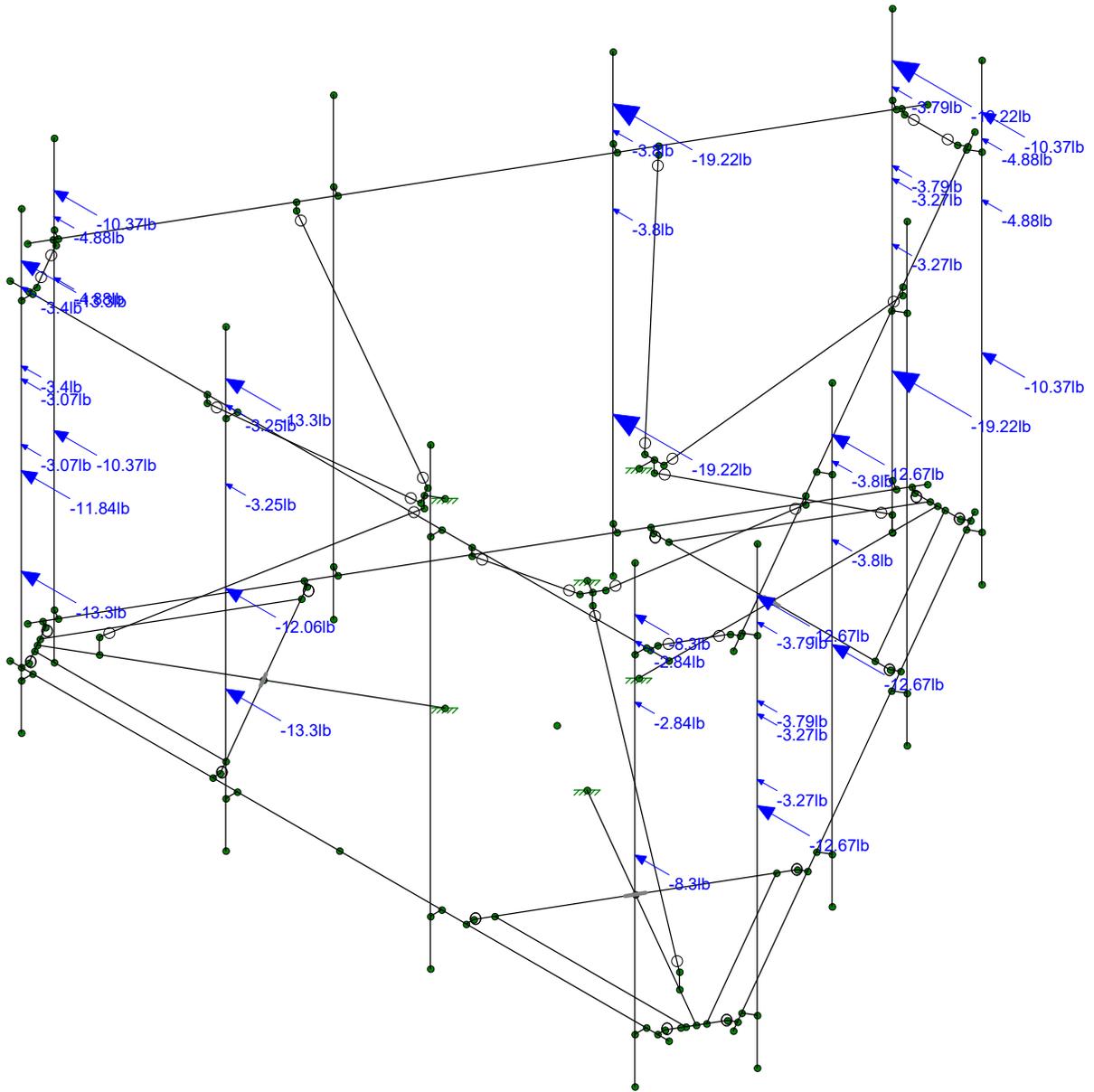
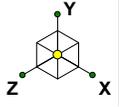


Loads: BLC 17, Ice Wind Load AZI 0  
Envelope Only Solution

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Ice Wind Loading Z  
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Loads: BLC 20, Ice Wind Load AZI 90  
Envelope Only Solution

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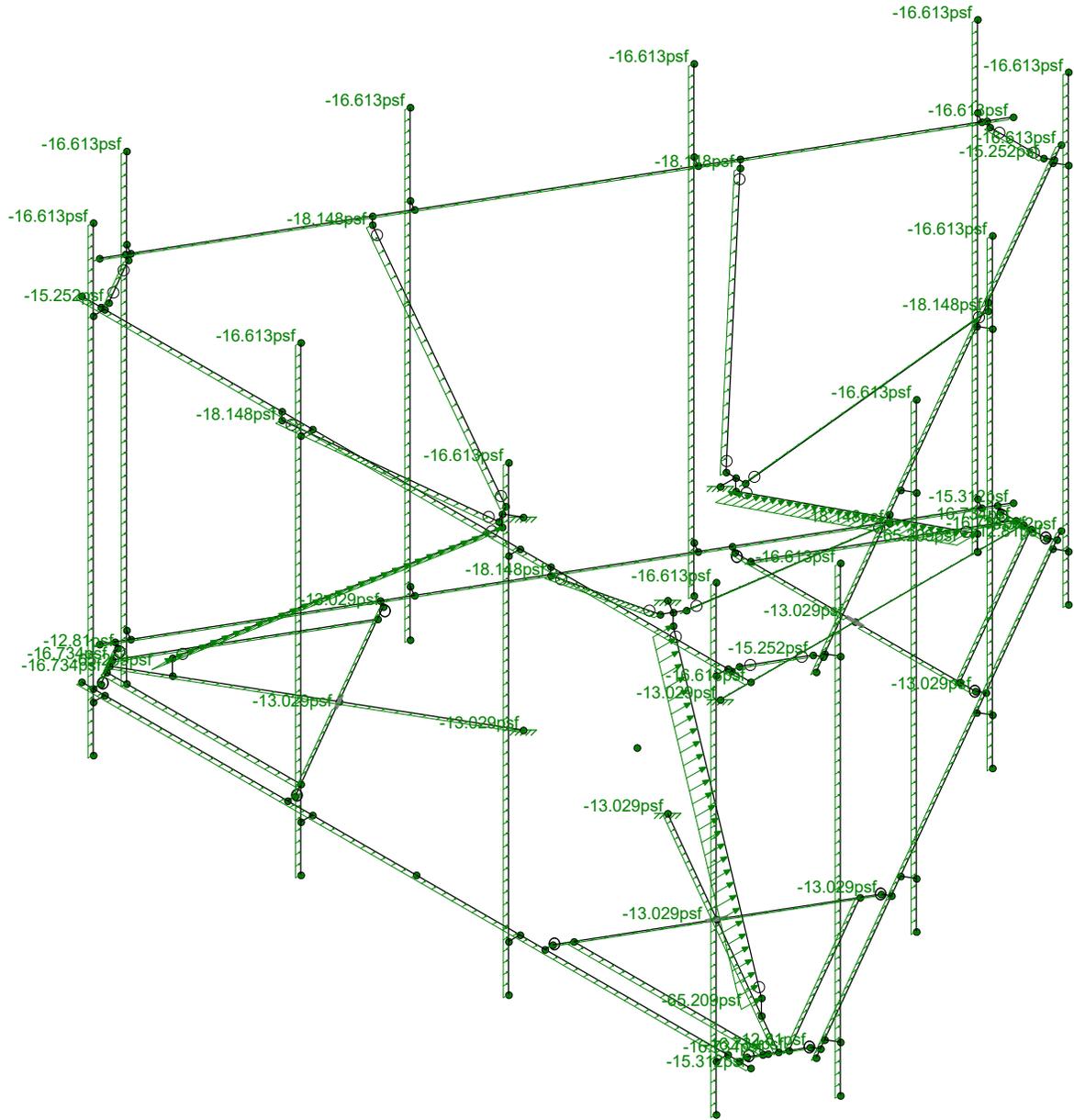
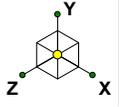
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Ice Wind Loading X

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Loads: BLC 29, Distr. Ice Wind Load Z  
Envelope Only Solution

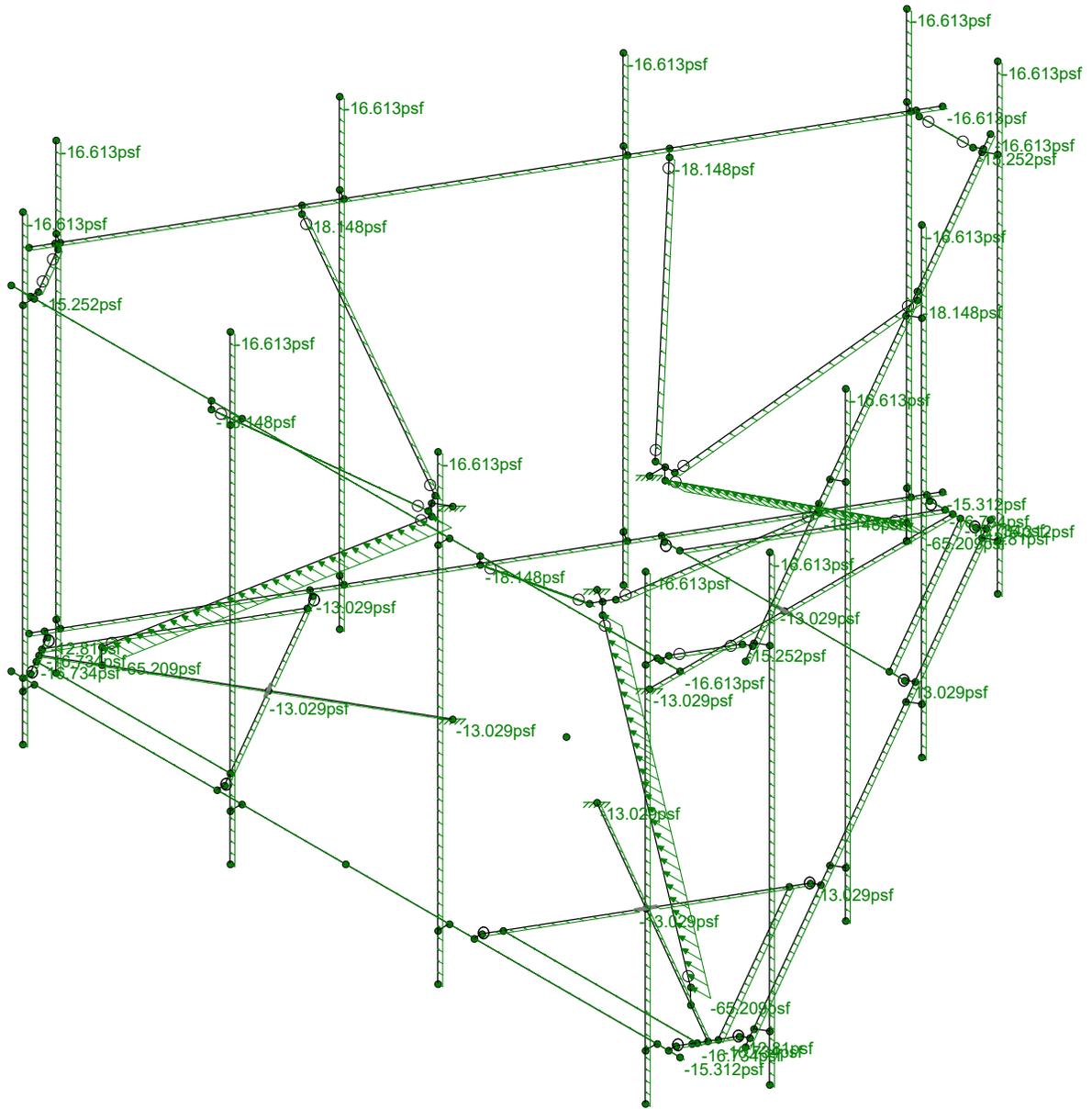
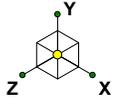
Infinigy Engineering, PLLC  
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Dist. Ice Wind Loading Z

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Loads: BLC 30, Distr. Ice Wind Load X  
Envelope Only Solution

Infinigy Engineering, PLLC

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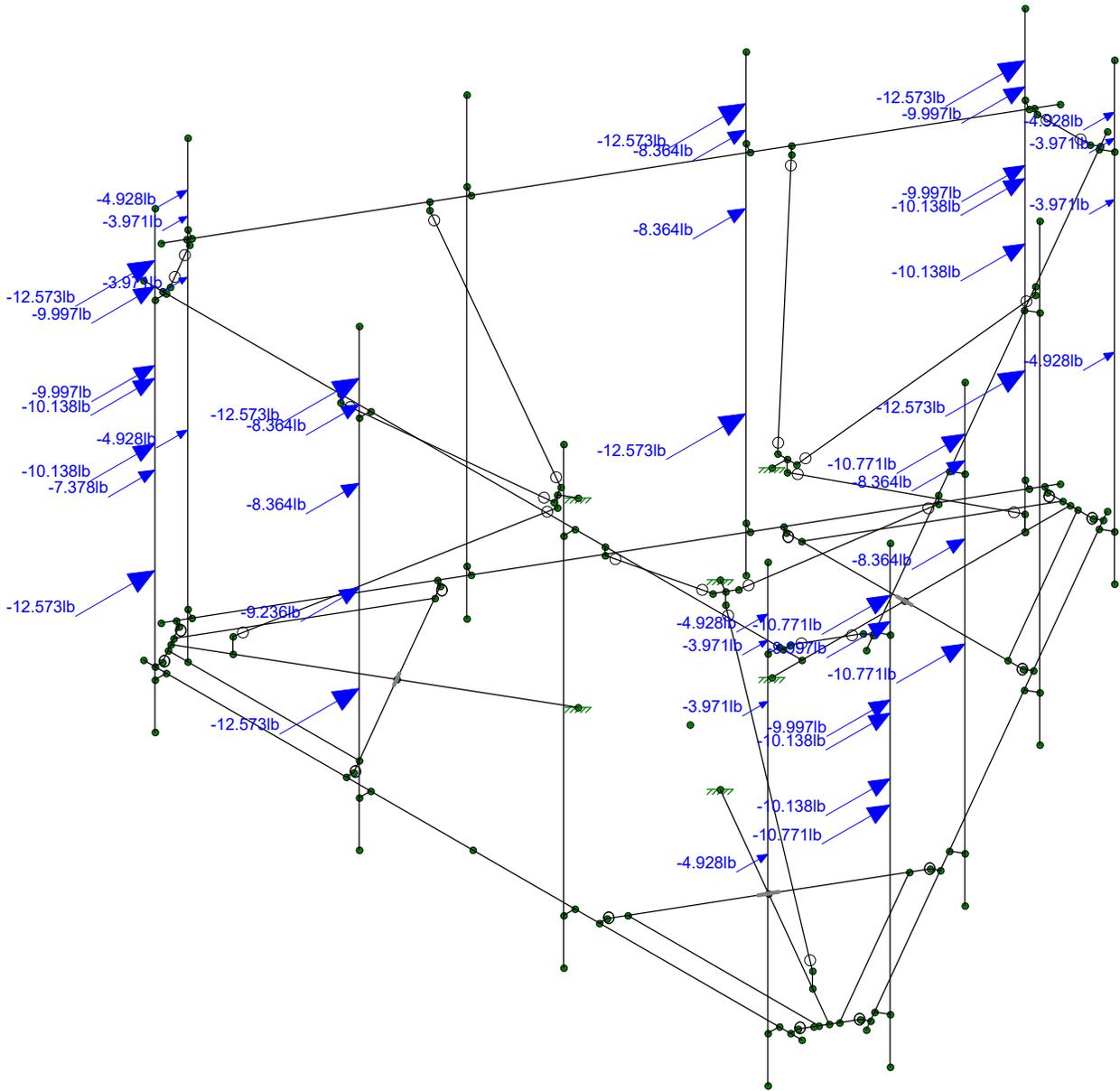
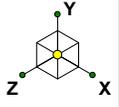
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Dist. Ice Wind Loading X

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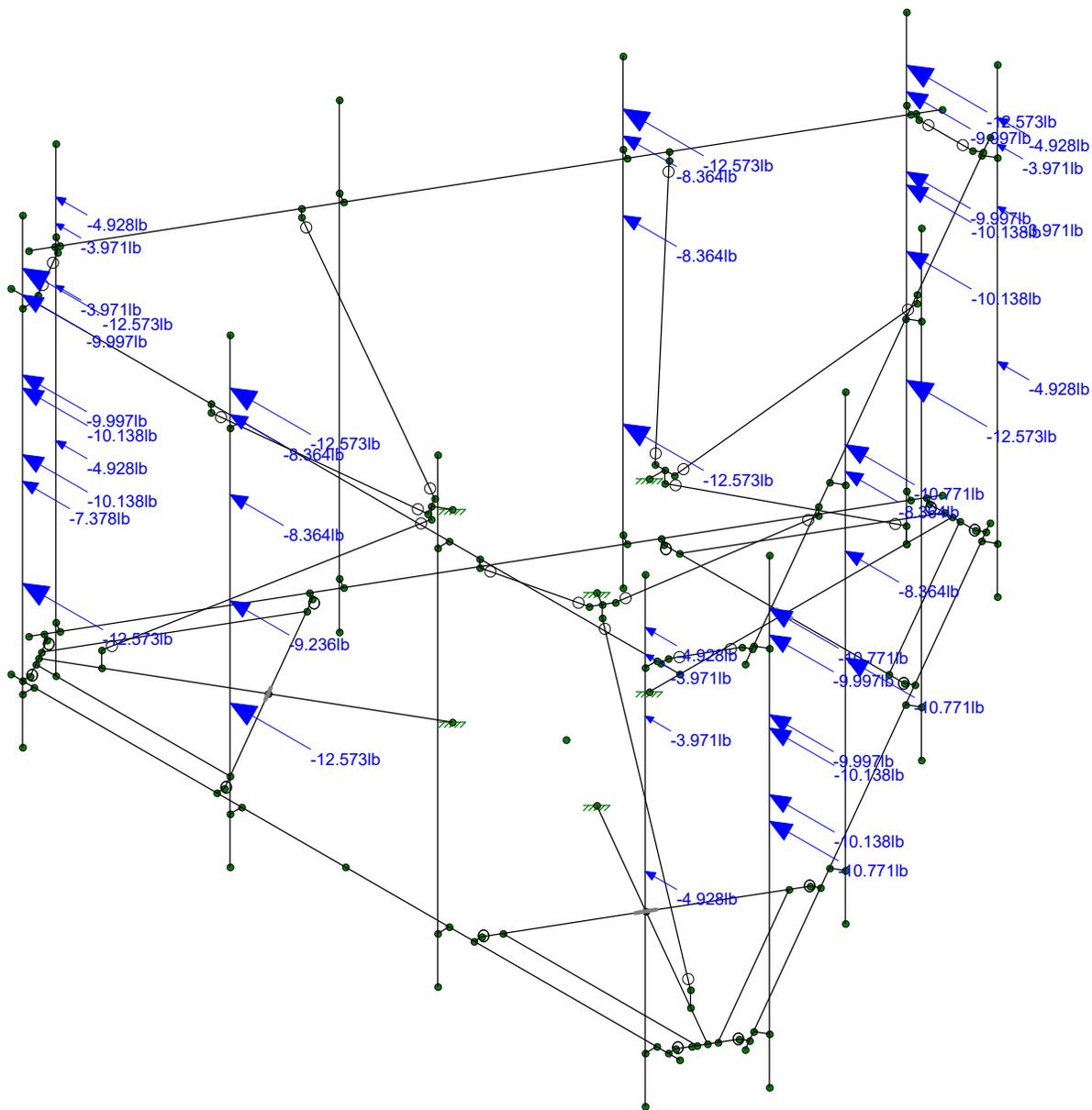
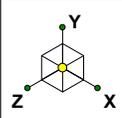


Loads: BLC 31, Seismic Load Z  
Envelope Only Solution

Infinigy Engineering, PLLC
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1039-Z0001-B

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Seismic Loading Z
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Loads: BLC 32, Seismic Load X  
Envelope Only Solution

Infinigy Engineering, PLLC

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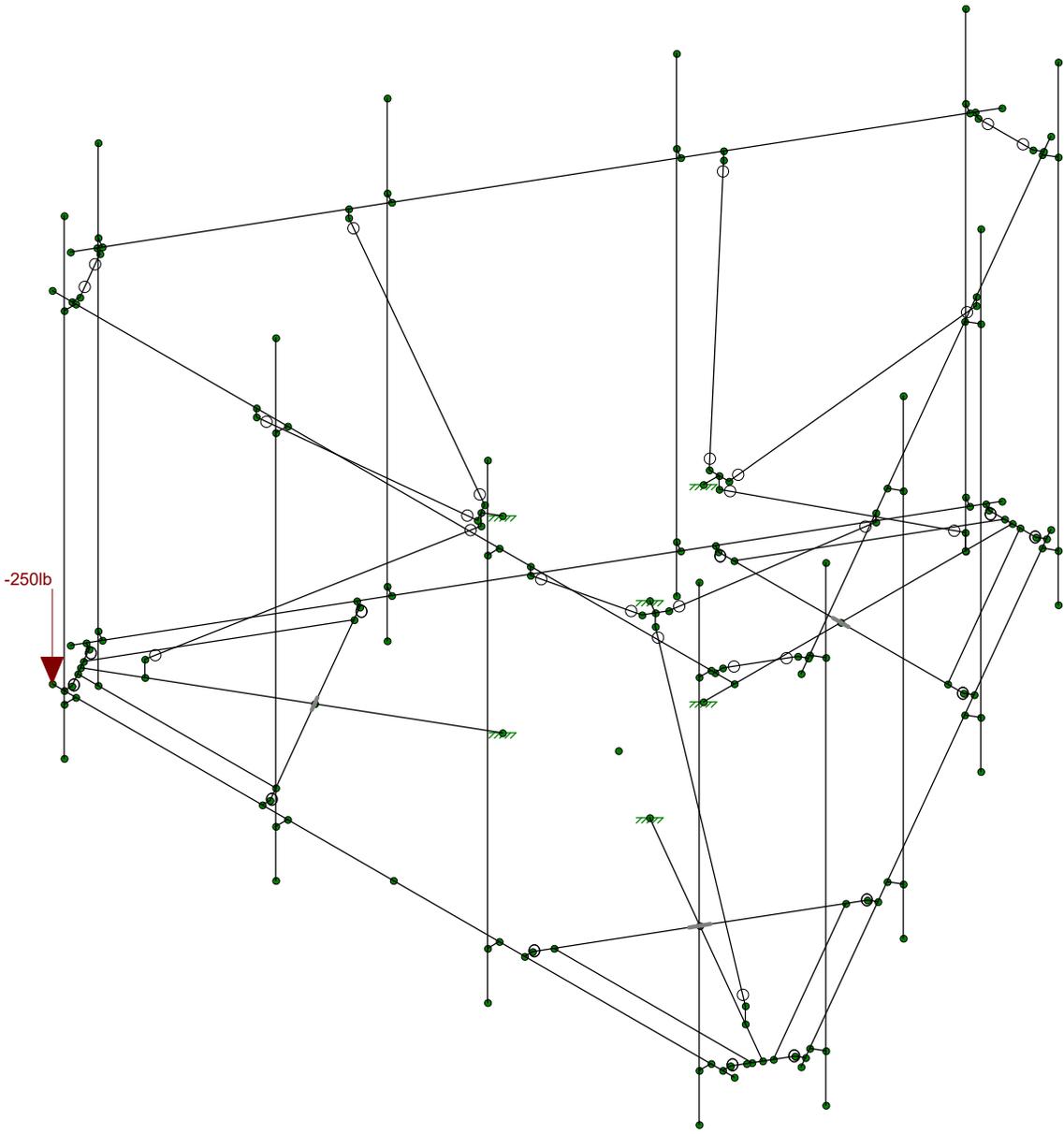
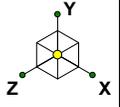
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Seismic Loading X

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Loads: BLC 33, Service Live Loads  
Envelope Only Solution

Infinigy Engineering, PLLC

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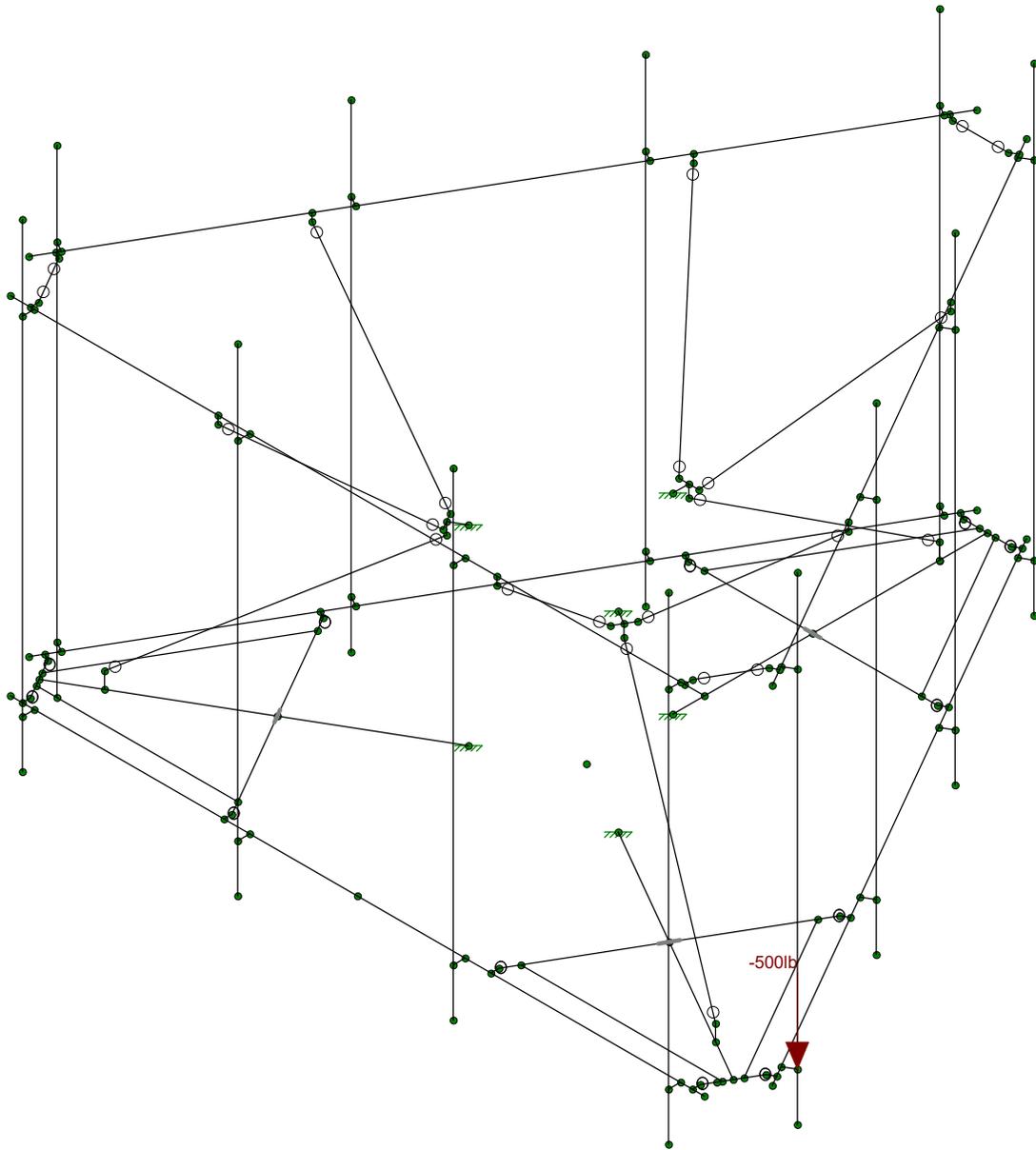
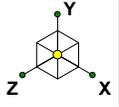
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Service

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Loads: BLC 34, Maintenance Load 1  
Envelope Only Solution

Infinigy Engineering, PLLC

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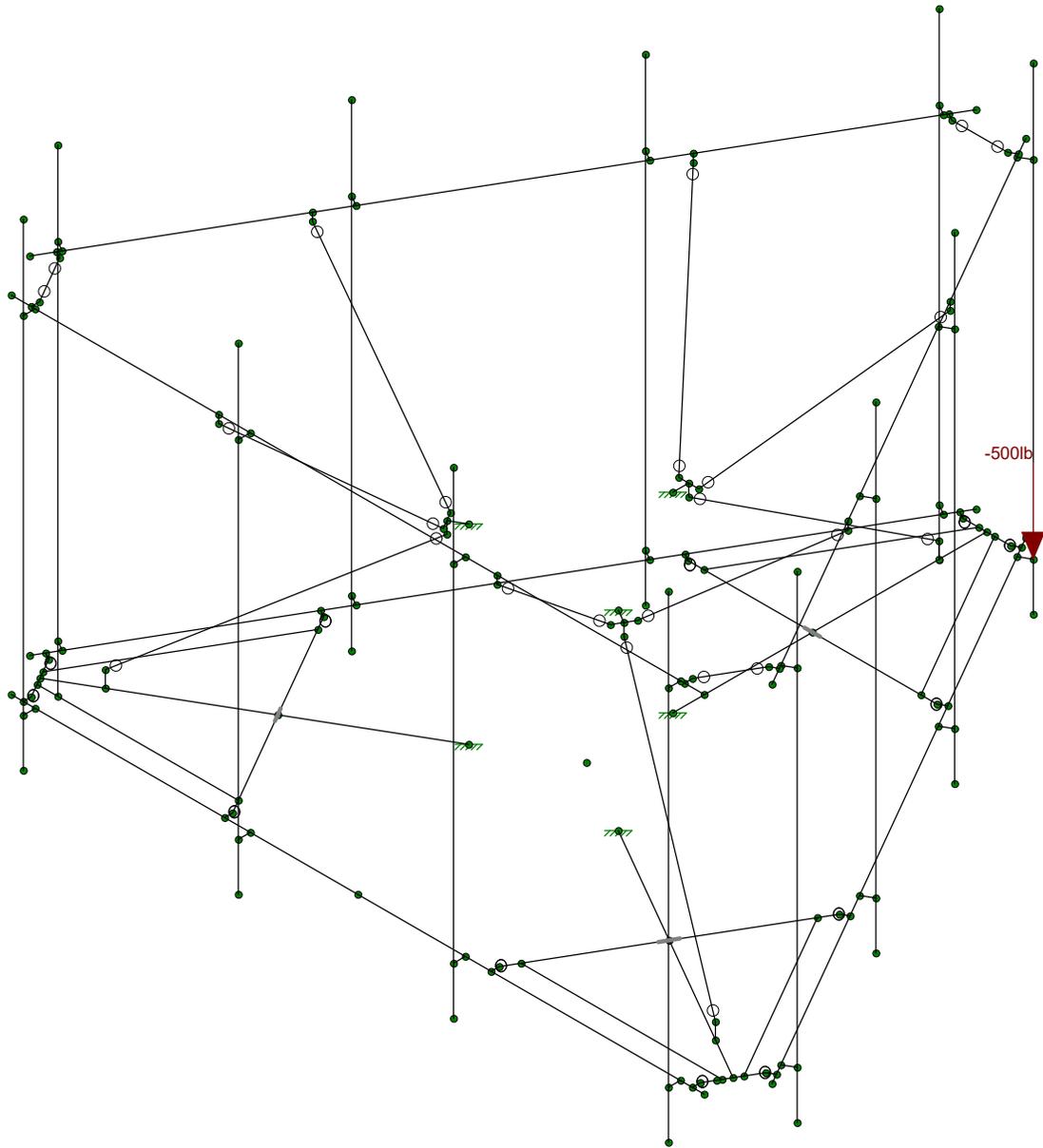
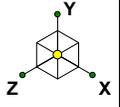
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876343

Maintenance

June 7, 2021 at 3:29 PM

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Loads: BLC 35, Maintenance Load 2  
Envelope Only Solution

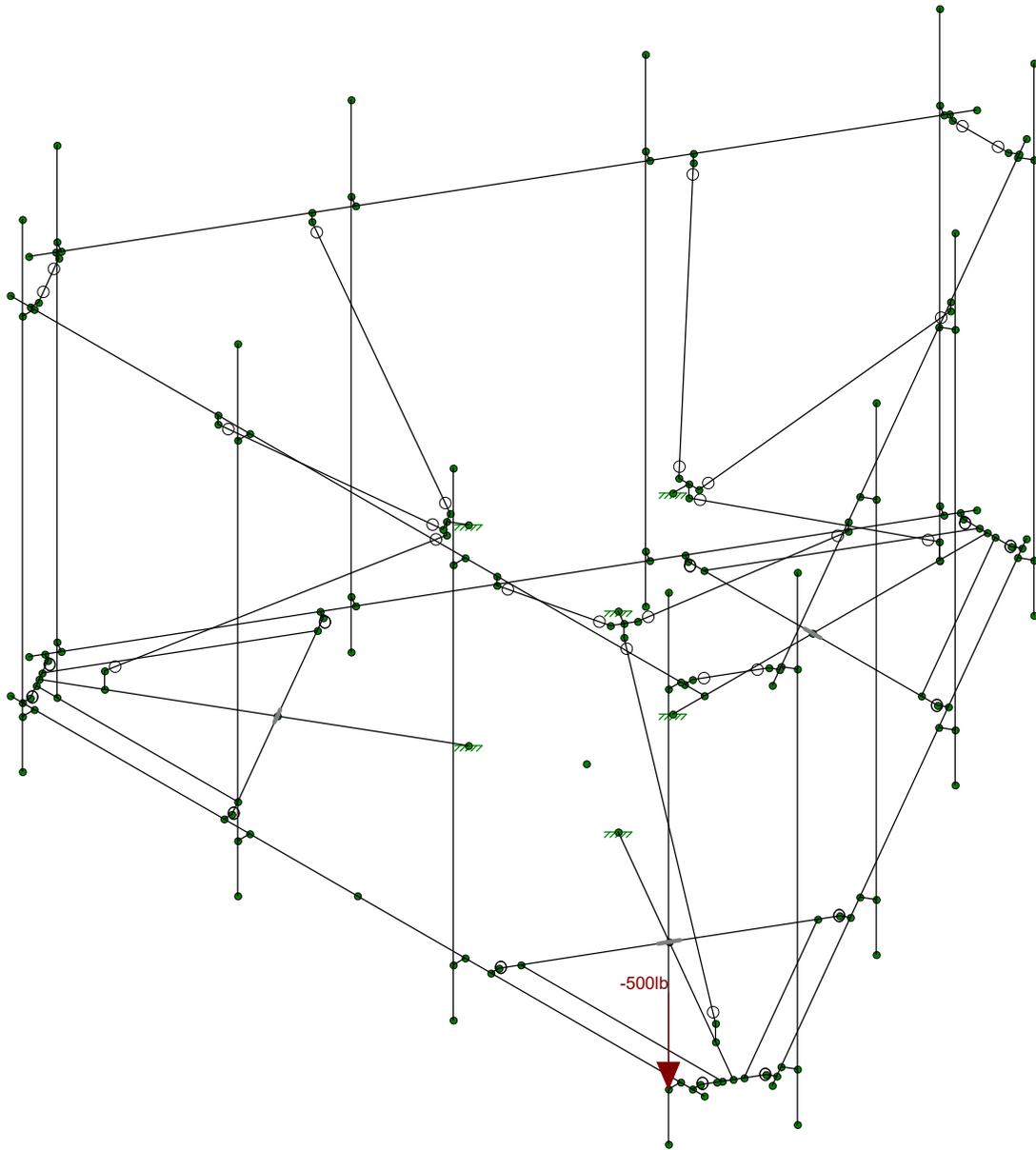
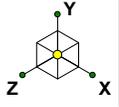
Infinigy Engineering, PLLC  
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Maintenance

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Loads: BLC 36, Maintenance Load 3  
Envelope Only Solution

Infinigy Engineering, PLLC

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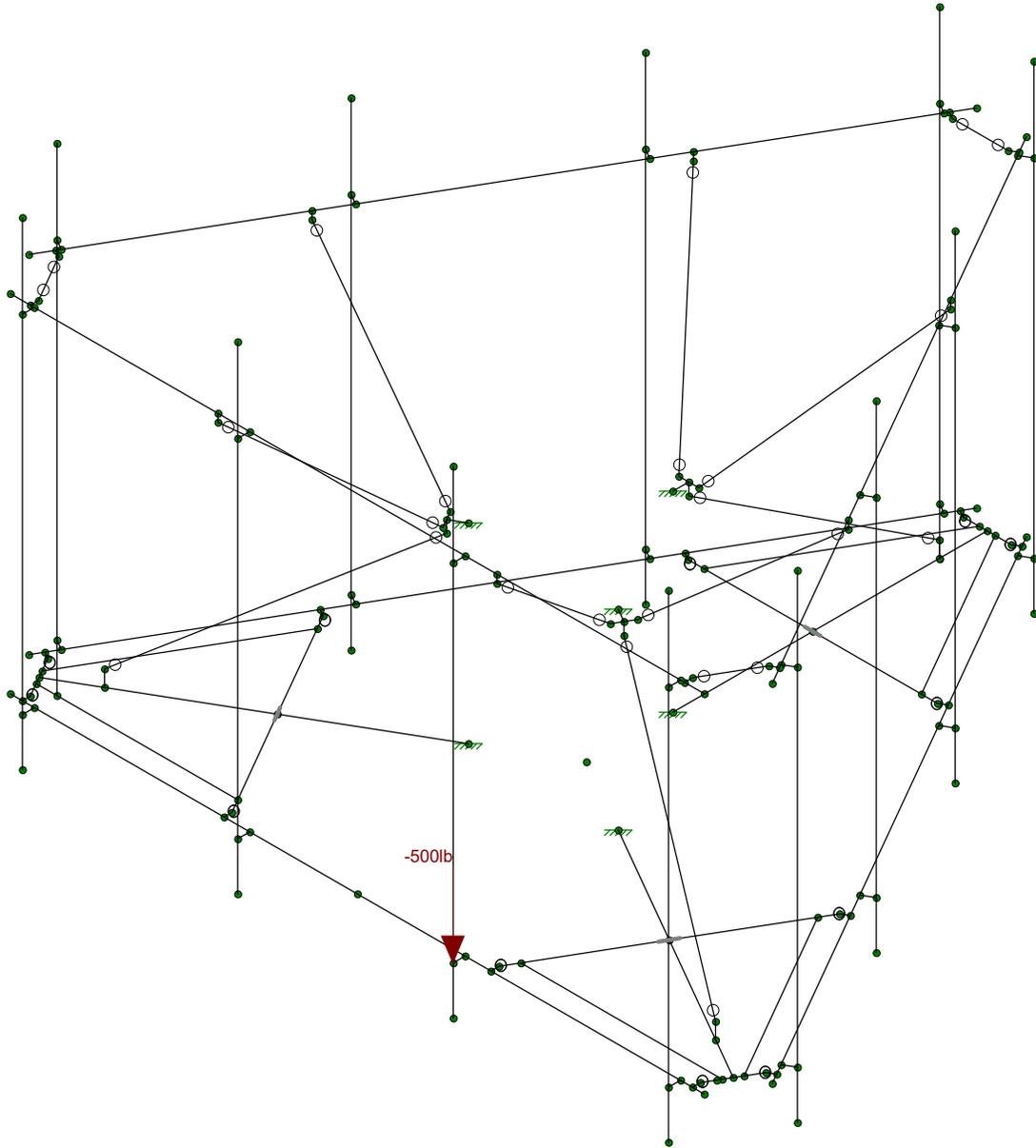
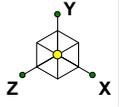
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Maintenance

June 7, 2021 at 3:30 PM

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Loads: BLC 37, Maintenance Load 4  
Envelope Only Solution

Infinigy Engineering, PLLC

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876343

Maintenance

June 7, 2021 at 3:30 PM

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

## Program Inputs

PROJECT INFORMATION		
Client:	Crown Castle	
Carrier:	AT&T Mobility	
Engineer:	Andrew Gloriani	

SITE INFORMATION		
Risk Category:	II	
Exposure Category:	C	
Topo Factor Procedure:	Method 1, Category 1	
Site Class:	D - Stiff Soil (Assumed)	
Ground Elevation:	70.13	ft *Rev H

MOUNT INFORMATION		
Mount Type:	Platform	
Num Sectors:	3	
Centerline AGL:	106.00	ft
Tower Height AGL:	149.00	ft

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

FACTORS		
Directionality Fact. ( $K_d$ ):	0.950	
Ground Ele. Factor ( $K_e$ ):	0.997	*Rev H Only
Rooftop Speed-Up ( $K_s$ ):	1.000	*Rev H Only
Topographic Factor ( $K_{zt}$ ):	1.000	
Gust Effect Factor ( $G_h$ ):	1.000	

CODE STANDARDS		
Building Code:	2018 IBC	
TIA Standard:	TIA-222-H	
ASCE Standard:	ASCE 7-16	

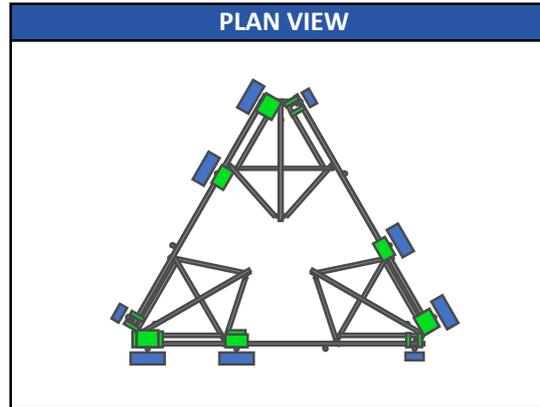
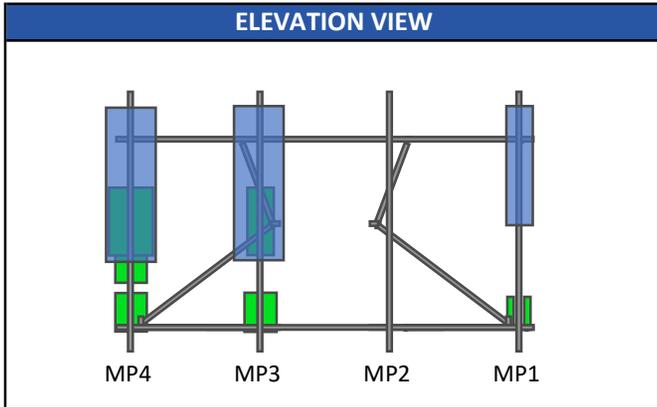
WIND AND ICE DATA		
Ultimate Wind ( $V_{ult}$ ):	130	mph
Design Wind ( $V$ ):	N/A	mph
Ice Wind ( $V_{ice}$ ):	50	mph
Base Ice Thickness ( $t_i$ ):	1.0	in
Flat Pressure:	105.053	psf
Round Pressure:	63.032	psf
Ice Wind Pressure:	9.324	psf

SEISMIC DATA		
Short-Period Accel. ( $S_s$ ):	0.176	g
1-Second Accel. ( $S_1$ ):	0.061	g
Short-Period Design ( $S_{DS}$ ):	0.188	
1-Second Design ( $S_{D1}$ ):	0.098	
Short-Period Coeff. ( $F_a$ ):	1.600	
1-Second Coeff. ( $F_v$ ):	2.400	
Amplification Factor ( $A_s$ ):	3.000	
Response Mod. Coeff. (R):	2.000	



Infinigy Load Calculator V2.1.6

# Program Inputs



Infinigy Load Calculator V2.1.6

## APPURTENANCE INFORMATION

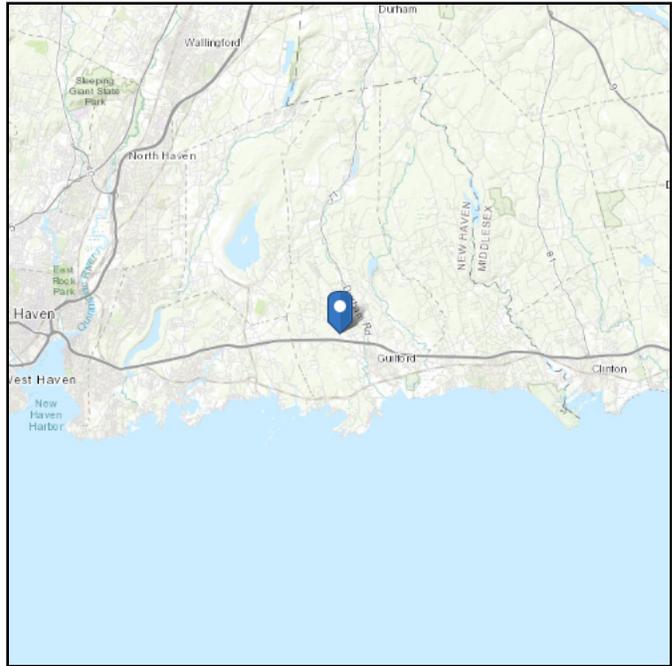
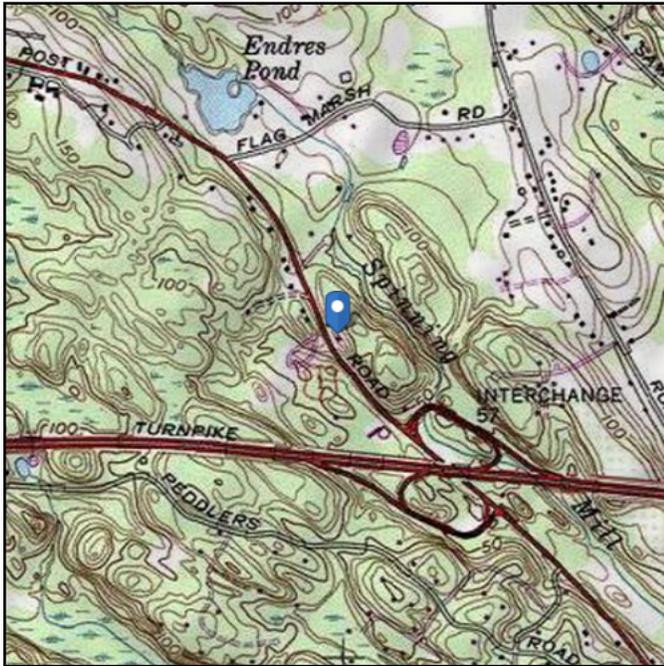
Appurtenance Name	Elevation	Qty.	K <sub>a</sub>	q <sub>z</sub> (psf)	EPA <sub>N</sub> (ft <sup>2</sup> )	EPA <sub>T</sub> (ft <sup>2</sup> )	Wind F <sub>z</sub> (lbs)	Wind F <sub>x</sub> (lbs)	Weight (lbs)	Seismic F (lbs)	Member (α sector)
POWERWAVE TECHNOLOGIES 7770.00	108.0	3	0.90	52.73	5.51	2.93	#NAME?	#NAME?	####	9.86	MP1
CCI ANTENNAS DMP65R-BU4D	108.0	1	0.90	52.73	7.48	2.81	#NAME?	#NAME?	####	21.54	Leg/Flush
CCI ANTENNAS DMP65R-BU4D	108.0	1	0.90	52.73	7.48	2.81	#NAME?	#NAME?	####	21.54	Leg/Flush
CCI ANTENNAS DMP65R-BU6D	108.0	2	0.90	52.73	11.93	4.48	#NAME?	#NAME?	####	25.15	MP3
CCI ANTENNAS DMP65R-BU6D	108.0	2	0.90	52.73	11.93	4.48	#NAME?	#NAME?	####	25.15	MP4
POWERWAVE TECHNOLOGIES TME-LGP21401	108.0	3	0.90	52.73	1.10	0.35	#NAME?	#NAME?	####	3.97	MP1
POWERWAVE TECHNOLOGIES TME-LGP21401	108.0	3	0.90	52.73	1.10	0.35	#NAME?	#NAME?	####	3.97	MP1
RAYCAP TME-DC6-48-60-18-8F	108.0	1	0.90	52.73	1.21	1.21	#NAME?	#NAME?	####	9.24	MP3
RAYCAP TME-DC9-48-60-24-8C-EV	108.0	1	0.90	52.73	4.78	2.74	#NAME?	#NAME?	####	7.38	MP4
ERICSSON RRUS 4449 B5/B12	108.0	3	0.90	52.73	1.97	1.41	#NAME?	#NAME?	####	19.99	MP4
ERICSSON RRUS 4478 B14_CCIV2	108.0	3	0.90	52.73	2.02	1.25	#NAME?	#NAME?	####	16.73	MP3
ERICSSON RRUS 8843 B2/B66A	108.0	3	0.90	52.73	1.64	1.35	#NAME?	#NAME?	####	20.28	MP4

# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

**Standard:** ASCE/SEI 7-16  
**Risk Category:** II  
**Soil Class:** D - Stiff Soil

**Elevation:** 70.13 ft (NAVD 88)  
**Latitude:** 41.300353  
**Longitude:** -72.708092



## Wind

**Results:**

Wind Speed:	130 Vmph per JDX Requirements
10-year MRI	75 Vmph
25-year MRI	85 Vmph
50-year MRI	93 Vmph
100-year MRI	100 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: Thu Jun 03 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).

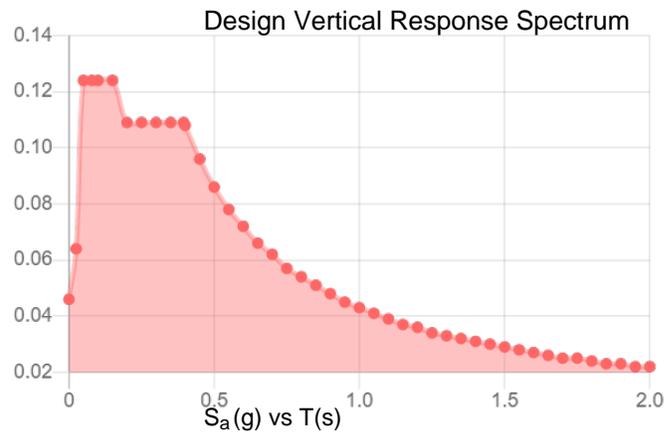
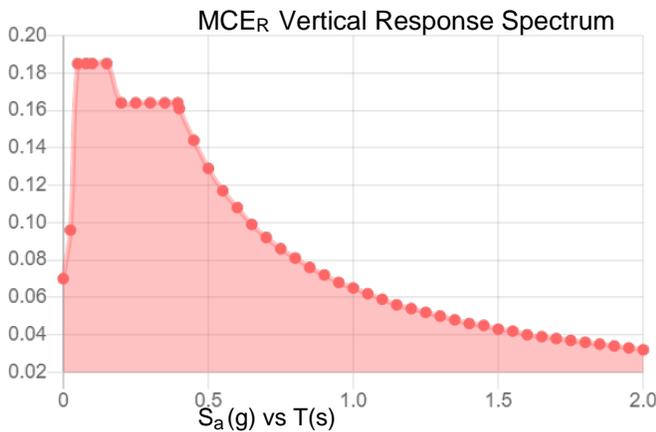
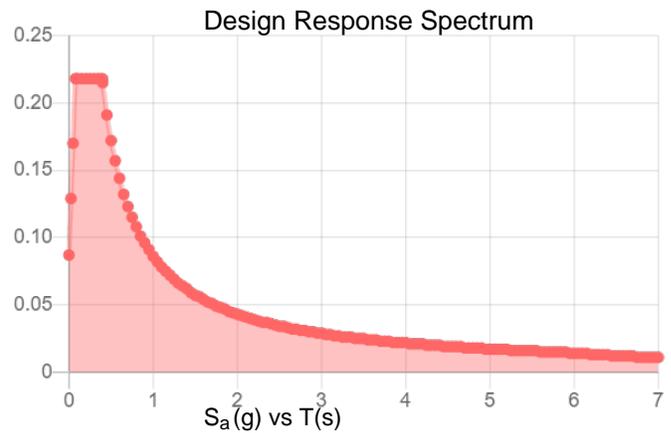
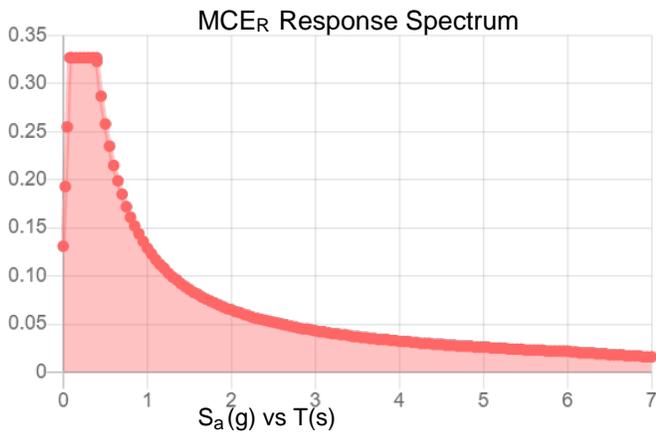
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

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

**Results:** Per JDX Requirements

$S_s$ :	0.176	$S_{D1}$ :	0.086
$S_1$ :	0.061	$T_L$ :	6
$F_a$ :	1.6	PGA :	0.114
$F_v$ :	2.4	PGA <sub>M</sub> :	0.18
$S_{MS}$ :	0.327	$F_{PGA}$ :	1.571
$S_{M1}$ :	0.129	$I_e$ :	1
$S_{DS}$ :	0.218	$C_v$ :	0.709

**Seismic Design Category** B



**Data Accessed:**

Thu Jun 03 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

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**Results:**

Ice Thickness: 1.00 in.

Concurrent Temperature: 15 F

Gust Speed: 50 mph

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

**Date Accessed:** Thu Jun 03 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.

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

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

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

















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	Ř ā ö S ä ^!	ŠÖÉ	Öä^&ā)	T äç } ä ā ÿ Þ ä É ä É ä É ä É ä É ä É ä É ä É ä
F	PIJ	Š	ÿ	İ €

**>c]bh@UXg'UbX'9bZ'fWX'8]gd'UMWa YbHg f6 @ " ) : 'A UjbhYbUbWV'@UX'&L**

	Ř ā ö S ä ^!	ŠÖÉ	Öä^&ā)	T äç } ä ā ÿ Þ ä É ä É ä É ä É ä É ä É ä É ä É ä
F	PIF	Š	ÿ	İ €

**>c]bh@UXg'UbX'9bZ'fWX'8]gd'UMWa YbHg f6 @ " \* : 'A UjbhYbUbWV'@UX''L**

	Ř ā ö S ä ^!	ŠÖÉ	Öä^&ā)	T äç } ä ā ÿ Þ ä É ä É ä É ä É ä É ä É ä É ä É ä
F	PIJF	Š	ÿ	İ €

**>c]bh@UXg'UbX'9bZ'fWX'8]gd'UMWa YbHg f6 @ " + : 'A UjbhYbUbWV'@UX' (L**

	Ř ā ö S ä ^!	ŠÖÉ	Öä^&ā)	T äç } ä ā ÿ Þ ä É ä É ä É ä É ä É ä É ä É ä É ä
F	PIJH	Š	ÿ	İ €

**>c]bh@UXg'UbX'9bZ'fWX'8]gd'UMWa YbHg f6 @ " , : 'A UjbhYbUbWV'@UX')L**

	Ř ā ö S ä ^!	ŠÖÉ	Öä^&ā)	T äç } ä ā ÿ Þ ä É ä É ä É ä É ä É ä É ä É ä É ä
F	PIJ	Š	ÿ	İ €

**>c]bh@UXg'UbX'9bZ'fWX'8]gd'UMWa YbHg f6 @ " - : 'A UjbhYbUbWV'@UX''L**

	Ř ā ö S ä ^!	ŠÖÉ	Öä^&ā)	T äç } ä ā ÿ Þ ä É ä É ä É ä É ä É ä É ä É ä É ä
F	PIFI	Š	ÿ	İ €

**>c]bh@UXg'UbX'9bZ'fWX'8]gd'UMWa YbHg f6 @ " \$ : 'A UjbhYbUbWV'@UX'+L**

	Ř ā ö S ä ^!	ŠÖÉ	Öä^&ā)	T äç } ä ā ÿ Þ ä É ä É ä É ä É ä É ä É ä É ä É ä
F	PIFJ	Š	ÿ	İ €

**>c]bh@UXg'UbX'9bZ'fWX'8]gd'UMWa YbHg f6 @ " % : 'A UjbhYbUbWV'@UX',L**

	Ř ā ö S ä ^!	ŠÖÉ	Öä^&ā)	T äç } ä ā ÿ Þ ä É ä É ä É ä É ä É ä É ä É ä É ä









## A Ya Vyf Dc ]bh@UXg f6 @ ' : 'K JpX' @ UX'5 N=" \$Lif7 c b]hi YXL

	T^ { à^Λ/Àæ^ ^	Öá^&ç	T æ } æ à^ ÕäPaÉçá	Š &ç   ÕÉ á
GF	T ÚH	Ý	ÈI ÈI	Í €
GG	T ÚH	Z	ÈG ÈG	Í €
GH	T ÚH	Ý	ÈI ÈI	Í €
Q	T ÚH	Z	ÈG ÈG	Í €
Q	T ÚI	Ý	È È	Í €
Q	T ÚI	Z	ÈÌ È F	Í €
Q	T ÚI	Ý	È È	Í €
Q	T ÚI	Z	ÈÌ È F	Í €
GJ	T ÚI	Ý	ÈGFÈJ	FÌ
H€	T ÚI	Z	ÈI ÈÌ	FÌ
HF	T ÚI	Ý	ÈGFÈJ	HÌ
HG	T ÚI	Z	ÈI ÈÌ	HÌ
HH	T ÚH	Ý	ÈGFÈÌ	FÌ
HI	T ÚH	Z	ÈI ÈÌ	FÌ
HÍ	T ÚH	Ý	ÈGFÈÌ	HÌ
HÌ	T ÚH	Z	ÈI ÈÌ	HÌ
HÏ	T ÚI	Ý	ÈI È	HJ
HÏ	T ÚI	Z	ÈHGÇG	HJ
HJ	T ÚI	Ý	ÈI È	ÌI
I €	T ÚI	Z	ÈHGÇG	ÌI
IF	T ÚI	Ý	ÈÌ È	FG
IG	T ÚI	Z	ÈJÈÌ	FG
IH	T ÚI	Ý	ÈÌ È	ÌÌ
IÌ	T ÚI	Z	ÈJÈÌ	ÌÌ
IÍ	T ÚI	Ý	ÈFJÈÌ	FG
IÎ	T ÚI	Z	ÈÈ È	FG
IÏ	T ÚI	Ý	ÈFJÈÌ	ÌH
IÏ	T ÚI	Z	ÈÈ È	ÌH
IJ	T ÚI	Ý	ÈFJÈÌ	FG
Í €	T ÚI	Z	ÈÈ È	FG
ÍF	T ÚI	Ý	ÈFJÈÌ	ÌH
ÍG	T ÚI	Z	ÈÈ È	ÌH
ÍH	T ÚI	Ý	ÈÈ È	FÌ
ÌI	T ÚI	Z	ÈI È	FÌ
ÌÌ	T ÚI	Ý	ÈÈ È	HG
ÌÏ	T ÚI	Z	ÈI È	HG
ÌÏ	T ÚI	Ý	ÈÈ È	FÌ
ÌÏ	T ÚI	Z	ÈI È	FÌ
ÍJ	T ÚI	Ý	ÈÈ È	HG
Í €	T ÚI	Z	ÈI È	HG
ÍF	T ÚI	Ý	ÈGFÈJ	FÌ
ÍG	T ÚI	Z	ÈI ÈÌ	FÌ
ÍH	T ÚI	Ý	ÈGFÈJ	HÌ
ÎI	T ÚI	Z	ÈI ÈÌ	HÌ
ÎÌ	T ÚI	Ý	ÈGFÈÌ	FÌ
ÎÏ	T ÚI	Z	ÈI ÈÌ	FÌ
ÎÏ	T ÚI	Ý	ÈGFÈÌ	HÌ
ÎÏ	T ÚI	Z	ÈI ÈÌ	HÌ
ÍJ	T ÚI	Ý	ÈI È	HJ
Í €	T ÚI	Z	ÈHGÇG	HJ
ÍF	T ÚI	Ý	ÈI È	ÌI
ÍG	T ÚI	Z	ÈHGÇG	ÌI



























**A Ya Vyf Dc ]bh @ UXg f6 @ '%\$. 'K ]pX' @ UX'5 Nè'& \$L**

	T ^{ a^!Àæ^}	Öá^&ç}	T æ} æ^ à^ZããÉçá	Š &ç} Zã á
F	T ÚF	Ý	Ï ÈH	FG
G	T ÚF	Z	I ÇÈ	FG
H	T ÚF	Ý	Ï ÈH	ÏÏ
I	T ÚF	Z	I ÇÈ	ÏÏ
Í	T ÚH	Ý	FHÈH	FG
Î	T ÚH	Z	Ï ÍÈ	FG
Ï	T ÚH	Ý	FHÈH	ÏH
Ì	T ÚH	Z	Ï ÍÈ	ÏH
J	T ÚI	Ý	FHÈH	FG
ƒ	T ÚI	Z	Ï ÍÈ	FG
FF	T ÚI	Ý	FHÈH	ÏH
FG	T ÚI	Z	Ï ÍÈ	ÏH
FH	T ÚF	Ý	FFÈG	FÌ
FI	T ÚF	Z	Ï ÈÈ	FÌ
FÍ	T ÚF	Ý	FFÈG	HG
FÎ	T ÚF	Z	Ï ÈÈ	HG
FÏ	T ÚF	Ý	FFÈG	FÌ
FÌ	T ÚF	Z	Ï ÈÈ	FÌ
FJ	T ÚF	Ý	FFÈG	HG
œ	T ÚF	Z	Ï ÈÈ	HG
GF	T ÚH	Ý	G ÈÛ	Ï€
GG	T ÚH	Z	FI ÈÈ	Ï€
GH	T ÚH	Ý	G ÈÛ	Ï€
G	T ÚH	Z	FI ÈÈ	Ï€
Ĝ	T ÚI	Ý	ÏÏÈÏ	Ï€
Ĝ	T ÚI	Z	HÈÈÏ	Ï€
Ĝ	T ÚI	Ý	ÏÏÈÏ	Ï€
Ĝ	T ÚI	Z	HÈÈÏ	Ï€
GJ	T ÚI	Ý	HFÈF	FÌ
H€	T ÚI	Z	FI ÈÈ	FÌ
HF	T ÚI	Ý	HFÈF	HÌ
HG	T ÚI	Z	FI ÈÈ	HÌ
HH	T ÚH	Ý	GÈÈJ	FÌ
H	T ÚH	Z	FI ÈÈ	FÌ
H	T ÚH	Ý	GÈÈJ	HÌ
H	T ÚH	Z	FI ÈÈ	HÌ
H	T ÚI	Ý	GÈÈ	HJ
H	T ÚI	Z	FI ÈF	HJ
HJ	T ÚI	Ý	GÈÈ	ÏÏ
I€	T ÚI	Z	FI ÈF	ÏÏ
IF	T ÚI	Ý	FFÈG	FG
IG	T ÚI	Z	ÏÏÈÈ	FG
IH	T ÚI	Ý	FFÈG	ÏÏ
II	T ÚI	Z	ÏÏÈÈ	ÏÏ
Í	T ÚI	Ý	GÍÈÈ	FG
Î	T ÚI	Z	FI ÈÈÏ	FG
Ï	T ÚI	Ý	GÍÈÈ	ÏH
Ì	T ÚI	Z	FI ÈÈÏ	ÏH
IJ	T ÚI	Ý	GÍÈÈ	FG
Í€	T ÚI	Z	FI ÈÈÏ	FG
ÍF	T ÚI	Ý	GÍÈÈ	ÏH
ÍG	T ÚI	Z	FI ÈÈÏ	ÏH

**A Ya Vyf Dc ]bhi @ UXg f6 @ '%\$. 'K ]pX' @ UX'5 NÉ' & \$L'f7 cb]jbi YXL**

	T ^{ à^! / Åæ ^!}	Öä ^ & ç   }	T æ } æ à ^ ]ã ]ã Éçá	Š } & çã   } ]ã Éç á
Í H	T ÚÍ	Ý	GĚ J	FÌ
Ì I	T ÚÍ	Z	FĚ F	FÌ
Í I	T ÚÍ	Ý	GĚ J	HG
Ì I	T ÚÍ	Z	FĚ F	HG
Í I	T ÚÍ	Ý	GĚ J	FÌ
Ì I	T ÚÍ	Z	FĚ F	FÌ
Í J	T ÚÍ	Ý	GĚ J	HG
Í €	T ÚÍ	Z	FĚ F	HG
Í F	T ÚÍ	Ý	I Ě H	FÌ
Í G	T ÚÍ	Z	G Ě H	FÌ
Í H	T ÚÍ	Ý	I Ě H	HÌ
Í I	T ÚÍ	Z	G Ě H	HÌ
Í I	T ÚÍ	Ý	I Ě I	FÌ
Í I	T ÚÍ	Z	G Ě I	FÌ
Í I	T ÚÍ	Ý	I Ě I	HÌ
Í I	T ÚÍ	Z	G Ě I	HÌ
Í J	T ÚÍ	Ý	H Ě I	HJ
Í €	T ÚÍ	Z	F Ě I	HJ
Í F	T ÚÍ	Ý	H Ě I	IÌ
Í G	T ÚÍ	Z	F Ě I	IÌ
Í H	T ÚJ	Ý	I Ě H	FG
Ì I	T ÚJ	Z	I Ě	FG
Í I	T ÚJ	Ý	I Ě H	IÌ
Ì I	T ÚJ	Z	I Ě	IÌ
Ì I	T ÚFF	Ý	I Ě I	FG
Ì I	T ÚFF	Z	I Ě J	FG
Ì J	T ÚFF	Ý	I Ě I	Í €
Ì €	T ÚFF	Z	I Ě J	Í €
Ì F	T ÚFG	Ý	I Ě I	FG
Ì G	T ÚFG	Z	I Ě J	FG
Ì H	T ÚFG	Ý	I Ě I	Í €
Ì I	T ÚFG	Z	I Ě J	Í €
Ì I	T ÚJ	Ý	F Ě G	FÌ
Ì I	T ÚJ	Z	I Ě I	FÌ
Ì I	T ÚJ	Ý	F Ě G	HG
Ì I	T ÚJ	Z	I Ě I	HG
Ì J	T ÚJ	Ý	F Ě G	FÌ
J €	T ÚJ	Z	I Ě I	FÌ
J F	T ÚJ	Ý	F Ě G	HG
J G	T ÚJ	Z	I Ě I	HG
J H	T ÚFG	Ý	H Ě F	FÌ
J I	T ÚFG	Z	F I Ě I	FÌ
J Í	T ÚFG	Ý	H Ě F	HÌ
J Î	T ÚFG	Z	F I Ě I	HÌ
J Ī	T ÚFF	Ý	G Ě J	FÌ
J Ĭ	T ÚFF	Z	F I Ě	FÌ
J Ĵ	T ÚFF	Ý	G Ě J	HÌ
F Ċ	T ÚFF	Z	F I Ě	HÌ
F Ą	T ÚFG	Ý	G Ě G	HJ
F Ę	T ÚFG	Z	F I Ě F	HJ
F ħ	T ÚFG	Ý	G Ě G	IÌ
F ĩ	T ÚFG	Z	F I Ě F	IÌ



















### A Ya Vyf Dc ] b h i @ U X g f b @ % : . ð W K ] b X ' @ U X ' 5 N ' = ' \$ L

	T ^ { á ^ Á á æ ^ Á	Ö á ^ & c á }	T æ ) á á ^ Á á á á á á á	Š } & æ á } á á á á á
F	T Ú F	Ý	É É I	FG
G	T Ú F	Z	É É I	FG
H	T Ú F	Ý	É É I	Í Í
I	T Ú F	Z	É É I	Í Í
Í	T Ú H	Ý	É É F	FG
Î	T Ú H	Z	É É I	FG
Ï	T Ú H	Ý	É É F	Ì H
Ë	T Ú H	Z	É É I	Ì H
J	T Ú I	Ý	É É F	FG
€	T Ú I	Z	É É I	FG
FF	T Ú I	Ý	É É F	Ì H
FG	T Ú I	Z	É É I	Ì H
FH	T Ú F	Ý	É É G	FÌ
FI	T Ú F	Z	É É F	FÌ
FÍ	T Ú F	Ý	É É G	HG
FÎ	T Ú F	Z	É É F	HG
FÏ	T Ú F	Ý	É É G	FÌ
FË	T Ú F	Z	É É F	FÌ
FJ	T Ú F	Ý	É É G	HG
œ	T Ú F	Z	É É F	HG
GF	T Ú H	Ý	É É G	Í É
GG	T Ú H	Z	É É H	Í É
GH	T Ú H	Ý	É É G	Í É
G	T Ú H	Z	É É H	Í É
Ğ	T Ú I	Ý	É É I	Í É
Ĝ	T Ú I	Z	É É I	Í É
G̈	T Ú I	Ý	É É I	Í É
Ḡ	T Ú I	Z	É É I	Í É
GJ	T Ú I	Ý	É É I	FÌ
€	T Ú I	Z	É É I	FÌ
HF	T Ú I	Ý	É É I	HÌ
HG	T Ú I	Z	É É I	HÌ
HH	T Ú H	Ý	É É I	FÌ
H	T Ú H	Z	É É I	FÌ
H́	T Ú H	Ý	É É I	HÌ
Ĥ	T Ú H	Z	É É I	HÌ
H̃	T Ú I	Ý	É É I	HU
H̄	T Ú I	Z	É É I	HU
HJ	T Ú I	Ý	É É I	Í Í
Í €	T Ú I	Z	É É I	Í Í
IF	T Ú I	Ý	É É I	FG
IG	T Ú I	Z	É É I	FG
IH	T Ú I	Ý	É É I	Í Í
II	T Ú I	Z	É É I	Í Í
ÍÍ	T Ú I	Ý	É É F	FG
ÎÎ	T Ú I	Z	É É I	FG
ÏÏ	T Ú I	Ý	É É F	Ì H
ËË	T Ú I	Z	É É I	Ì H
IJ	T Ú I	Ý	É É F	FG
Í €	T Ú I	Z	É É I	FG
ÍF	T Ú I	Ý	É É F	Ì H
ÍG	T Ú I	Z	É É I	Ì H

**A Ya Vyf Dc ]bi @ UXg f6 @ % : ÆWK ]bX' @ UX'5 N=" \$L'f7 cb]bi YXL**

	T ^{ à^!Äæ^}	Öä^&ä}	T æ} æ à^Zä]aÉcá	Š &æ] } Ž Ä á
í H	T ÚÍ	Ý	Ê ÊG	FÌ
í I	T ÚÍ	Z	Ê ÊF	FÌ
í Í	T ÚÍ	Ý	Ê ÊG	HG
í Î	T ÚÍ	Z	Ê ÊF	HG
í Ï	T ÚÍ	Ý	Ê ÊG	FÌ
í Ñ	T ÚÍ	Z	Ê ÊF	FÌ
í J	T ÚÍ	Ý	Ê ÊG	HG
í €	T ÚÍ	Z	Ê ÊF	HG
í F	T ÚÍ	Ý	Ê Ê	FÌ
í G	T ÚÍ	Z	Ê Ê	FÌ
í H	T ÚÍ	Ý	Ê Ê	HÌ
í I	T ÚÍ	Z	Ê Ê	HÌ
í Í	T ÚÍ	Ý	Ê Ê	FÌ
í Î	T ÚÍ	Z	Ê Ê	FÌ
í Ï	T ÚÍ	Ý	Ê Ê	HÌ
í Ñ	T ÚÍ	Z	Ê Ê	HÌ
í J	T ÚÍ	Ý	Ê Ê I	HJ
í €	T ÚÍ	Z	Ê Ê I	HJ
í F	T ÚÍ	Ý	Ê Ê I	Í I
í G	T ÚÍ	Z	Ê Ê I	Í I
í H	T ÚJ	Ý	Ê Ê I	FG
í I	T ÚJ	Z	Ê Ê J	FG
í Í	T ÚJ	Ý	Ê Ê I	Í I
í Î	T ÚJ	Z	Ê Ê J	Í I
í Ï	T ÚFF	Ý	Ê Ê	FG
í Ñ	T ÚFF	Z	Ê Ê	FG
í J	T ÚFF	Ý	Ê Ê	í €
í €	T ÚFF	Z	Ê Ê	í €
í F	T ÚFG	Ý	Ê Ê	FG
í G	T ÚFG	Z	Ê Ê	FG
í H	T ÚFG	Ý	Ê Ê	í €
í I	T ÚFG	Z	Ê Ê	í €
í Í	T ÚJ	Ý	Ê Ê F	FÌ
í Î	T ÚJ	Z	Ê Ê H	FÌ
í Ï	T ÚJ	Ý	Ê Ê F	HG
í Ñ	T ÚJ	Z	Ê Ê H	HG
í J	T ÚJ	Ý	Ê Ê F	FÌ
J€	T ÚJ	Z	Ê Ê H	FÌ
JF	T ÚJ	Ý	Ê Ê F	HG
JG	T ÚJ	Z	Ê Ê H	HG
JH	T ÚFG	Ý	Ê Ê	FÌ
JI	T ÚFG	Z	Ê Ê	FÌ
JÍ	T ÚFG	Ý	Ê Ê	HÌ
JÎ	T ÚFG	Z	Ê Ê	HÌ
JÏ	T ÚFF	Ý	Ê Ê H	FÌ
JÑ	T ÚFF	Z	Ê Ê F	FÌ
JJ	T ÚFF	Ý	Ê Ê H	HÌ
F€€	T ÚFF	Z	Ê Ê F	HÌ
F€F	T ÚFG	Ý	Ê Ê I	HJ
F€G	T ÚFG	Z	Ê Ê I	HJ
F€H	T ÚFG	Ý	Ê Ê I	Í I
F€I	T ÚFG	Z	Ê Ê I	Í I

**A Ya Vyf'Dc]bh@UXg f6 @ '% : 'WYK ]bX'@UX'5 N:'\* \$L**

	T^ { a^!Áæ^}	Öá^&ç)	T æ) æ à^ZããÉçá	Š &ç) Ž É á
F	T ÚF	Ý	É É I	FG
G	T ÚF	Z	É É J	FG
H	T ÚF	Ý	É É I	Í I
I	T ÚF	Z	É É J	Í I
Í	T ÚH	Ý	É É G G	FG
Î	T ÚH	Z	É É H	FG
Ï	T ÚH	Ý	É É G G	Ì H
Ì	T ÚH	Z	É É H	Ì H
J	T ÚI	Ý	É É G G	FG
F€	T ÚI	Z	É É H	FG
FF	T ÚI	Ý	É É G G	Ì H
FG	T ÚI	Z	É É H	Ì H
FH	T ÚF	Ý	É É G	FÌ
FI	T ÚF	Z	É É I	FÌ
FÍ	T ÚF	Ý	É É G	HG
FÎ	T ÚF	Z	É É I	HG
FÏ	T ÚF	Ý	É É G	FÌ
FÌ	T ÚF	Z	É É I	FÌ
FJ	T ÚF	Ý	É É G	HG
Q€	T ÚF	Z	É É I	HG
QF	T ÚH	Ý	É É H	Ì €
QG	T ÚH	Z	É É G	Ì €
QH	T ÚH	Ý	É É H	Ì €
QI	T ÚH	Z	É É G	Ì €
QÍ	T ÚI	Ý	É É I	Ì €
QÎ	T ÚI	Z	É É I	Ì €
QÏ	T ÚI	Ý	É É I	Ì €
QÌ	T ÚI	Z	É É I	Ì €
QJ	T ÚI	Ý	É É I	FÌ
H€	T ÚI	Z	É É I	FÌ
HF	T ÚI	Ý	É É I	HÌ
HG	T ÚI	Z	É É I	HÌ
HH	T ÚH	Ý	É É I	FÌ
HI	T ÚH	Z	É É G	FÌ
HÍ	T ÚH	Ý	É É I	HÌ
HÎ	T ÚH	Z	É É G	HÌ
HÏ	T ÚI	Ý	É É G	HJ
HÌ	T ÚI	Z	É É I	HJ
HJ	T ÚI	Ý	É É G	Í I
I€	T ÚI	Z	É É I	Í I
IF	T ÚI	Ý	É É I	FG
IG	T ÚI	Z	É É H	FG
IH	T ÚI	Ý	É É I	Í I
II	T ÚI	Z	É É H	Í I
IÍ	T ÚI	Ý	É É I	FG
IÎ	T ÚI	Z	É É J	FG
IÏ	T ÚI	Ý	É É I	Ì H
IÌ	T ÚI	Z	É É J	Ì H
IJ	T ÚI	Ý	É É I	FG
I€	T ÚI	Z	É É J	FG
IÍ	T ÚI	Ý	É É I	Ì H
IÎ	T ÚI	Z	É É J	Ì H

**A Ya Vyf Dc ]bh @ UXg f6 @ % . : WYK ]bX @ UX 5 N : \* \$L f7 cb ]bi YXL**

	T ^{ a^!Àæ^}	Öä^&ç}	T æ) æ à^ZãEçá	Š &ç} Ž Æ á
Í H	T ÚÍ	Ý	ÈÈ F	FÌ
Í I	T ÚÍ	Z	ÈÈ U	FÌ
Í Í	T ÚÍ	Ý	ÈÈ F	HG
Í Î	T ÚÍ	Z	ÈÈ U	HG
Í Ï	T ÚÍ	Ý	ÈÈ F	FÌ
Í Ñ	T ÚÍ	Z	ÈÈ U	FÌ
Í J	T ÚÍ	Ý	ÈÈ F	HG
Í €	T ÚÍ	Z	ÈÈ U	HG
Í F	T ÚÍ	Ý	ÈÈ È	FÌ
Í G	T ÚÍ	Z	ÈÈ Í	FÌ
Í H	T ÚÍ	Ý	ÈÈ È	HÌ
Í I	T ÚÍ	Z	ÈÈ Í	HÌ
Í Í	T ÚÍ	Ý	ÈÈ È	FÌ
Í Î	T ÚÍ	Z	ÈÈ J	FÌ
Í Ï	T ÚÍ	Ý	ÈÈ È	HÌ
Í Ñ	T ÚÍ	Z	ÈÈ J	HÌ
Í J	T ÚÍ	Ý	ÈÈ J	HJ
Í €	T ÚÍ	Z	ÈÈ È	HJ
Í F	T ÚÍ	Ý	ÈÈ J	Í
Í G	T ÚÍ	Z	ÈÈ È	Í
Í H	T ÚJ	Ý	ÈÈ È	FG
Í I	T ÚJ	Z	ÈÈ J	FG
Í Í	T ÚJ	Ý	ÈÈ È	Í
Í Î	T ÚJ	Z	ÈÈ J	Í
Í Ï	T ÚFF	Ý	ÈÈ È	FG
Í Ñ	T ÚFF	Z	ÈÈ Í	FG
Í J	T ÚFF	Ý	ÈÈ È	Í €
Í €	T ÚFF	Z	ÈÈ Í	Í €
Í F	T ÚFG	Ý	ÈÈ È	FG
Í G	T ÚFG	Z	ÈÈ Í	FG
Í H	T ÚFG	Ý	ÈÈ È	Í €
Í I	T ÚFG	Z	ÈÈ Í	Í €
Í Í	T ÚJ	Ý	ÈÈ G	FÌ
Í Î	T ÚJ	Z	ÈÈ Í	FÌ
Í Ï	T ÚJ	Ý	ÈÈ G	HG
Í Ñ	T ÚJ	Z	ÈÈ Í	HG
Í J	T ÚJ	Ý	ÈÈ G	FÌ
J €	T ÚJ	Z	ÈÈ Í	FÌ
J F	T ÚJ	Ý	ÈÈ G	HG
J G	T ÚJ	Z	ÈÈ Í	HG
J H	T ÚFG	Ý	ÈÈ È	FÌ
J I	T ÚFG	Z	ÈÈ È	FÌ
J Í	T ÚFG	Ý	ÈÈ È	HÌ
J Î	T ÚFG	Z	ÈÈ È	HÌ
J Ï	T ÚFF	Ý	ÈÈ È	FÌ
J Ñ	T ÚFF	Z	ÈÈ G	FÌ
J J	T ÚFF	Ý	ÈÈ È	HÌ
F €€	T ÚFF	Z	ÈÈ G	HÌ
F €F	T ÚFG	Ý	ÈÈ G	HJ
F €G	T ÚFG	Z	ÈÈ È	HJ
F €H	T ÚFG	Ý	ÈÈ G	Í
F €I	T ÚFG	Z	ÈÈ È	Í



















**A Ya Vyf'Dc]bhi@UXg'f6 @ '&(' :WY'K]bX'@UX'5 N'=&%'\$L'f7 cb]bi YXL**

	T^ { a^/Àæ^}	Öá^&ç}	T æ) æ^ à^ZããEçá	Š &çã} Ž Æ á
Í H	T ÚÍ	Ý	FÈG	FÌ
Í I	T ÚÍ	Z	GÈF	FÌ
Í Í	T ÚÍ	Ý	FÈG	HG
Í Î	T ÚÍ	Z	GÈF	HG
Í Ï	T ÚÍ	Ý	FÈG	FÌ
Í Ñ	T ÚÍ	Z	GÈF	FÌ
Í J	T ÚÍ	Ý	FÈG	HG
Í €	T ÚÍ	Z	GÈF	HG
Í F	T ÚÍ	Ý	FÈ	FÌ
Í G	T ÚÍ	Z	HÈ	FÌ
Í H	T ÚÍ	Ý	FÈ	HÌ
Í I	T ÚÍ	Z	HÈ	HÌ
Í Í	T ÚÍ	Ý	FÈ	FÌ
Í Î	T ÚÍ	Z	HÈ	FÌ
Í Ï	T ÚÍ	Ý	FÈ	HÌ
Í Ñ	T ÚÍ	Z	HÈ	HÌ
Í J	T ÚÍ	Ý	FÈ I	HJ
Í €	T ÚÍ	Z	GÈ I	HJ
Í F	T ÚÍ	Ý	FÈ I	IÌ
Í G	T ÚÍ	Z	GÈ I	IÌ
Í H	T ÚJ	Ý	I È I	FG
Í I	T ÚJ	Z	I È J	FG
Í Í	T ÚJ	Ý	I È I	IÌ
Í Î	T ÚJ	Z	I È J	IÌ
Í Ï	T ÚFF	Ý	I È	FG
Í Ñ	T ÚFF	Z	I È I	FG
Í J	T ÚFF	Ý	I È	Í €
Í €	T ÚFF	Z	I È I	Í €
Í F	T ÚFG	Ý	I È	FG
Í G	T ÚFG	Z	I È I	FG
Í H	T ÚFG	Ý	I È	Í €
Í I	T ÚFG	Z	I È I	Í €
Í Í	T ÚJ	Ý	È F	FÌ
Í Î	T ÚJ	Z	FÈH	FÌ
Í Ï	T ÚJ	Ý	È F	HG
Í Ñ	T ÚJ	Z	FÈH	HG
Í J	T ÚJ	Ý	È F	FÌ
J €	T ÚJ	Z	FÈH	FÌ
J F	T ÚJ	Ý	È F	HG
J G	T ÚJ	Z	FÈH	HG
J H	T ÚFG	Ý	FÈ	FÌ
J I	T ÚFG	Z	GÈ I	FÌ
J Í	T ÚFG	Ý	FÈ	HÌ
J Î	T ÚFG	Z	GÈ I	HÌ
J Ï	T ÚFF	Ý	FÈ H	FÌ
J Ñ	T ÚFF	Z	GÈ F	FÌ
J J	T ÚFF	Ý	FÈ H	HÌ
F €€	T ÚFF	Z	GÈ F	HÌ
F €F	T ÚFG	Ý	FÈ I	HJ
F €G	T ÚFG	Z	GÈ I	HJ
F €H	T ÚFG	Ý	FÈ I	IÌ
F €I	T ÚFG	Z	GÈ I	IÌ

**A Ya Vyf'Dc]bh@UXg f6 @' & ) : 'W'K ]bX'@UX'5 N'=& \$L**

	T ^{ a^!Áæ^}	Öá^&ç)	T æ) æ à^]ããÉçá	Š &ç) Ž Æ á
F	T ÚF	Ý	Ï ÈÌ	FG
G	T ÚF	Z	Ï ÈJ	FG
H	T ÚF	Ý	Ï ÈÌ	ÏÏ
I	T ÚF	Z	Ï ÈJ	ÏÏ
Í	T ÚH	Ý	FÈGG	FG
Î	T ÚH	Z	Ï ÈH	FG
Ï	T ÚH	Ý	FÈGG	ÏH
Ì	T ÚH	Z	Ï ÈH	ÏH
J	T ÚÌ	Ý	FÈGG	FG
ƒ	T ÚÌ	Z	Ï ÈH	FG
FF	T ÚÌ	Ý	FÈGG	ÏH
FG	T ÚÌ	Z	Ï ÈH	ÏH
FH	T ÚF	Ý	FÈG	FÌ
FI	T ÚF	Z	ÈÌ	FÌ
FÍ	T ÚF	Ý	FÈG	HG
FÎ	T ÚF	Z	ÈÌ	HG
FÏ	T ÚF	Ý	FÈG	FÌ
FÌ	T ÚF	Z	ÈÌ	FÌ
FJ	T ÚF	Ý	FÈG	HG
œ	T ÚF	Z	ÈÌ	HG
GF	T ÚH	Ý	Ï ÈH	Ï€
GG	T ÚH	Z	HÈG	Ï€
GH	T ÚH	Ý	Ï ÈH	Ï€
G	T ÚH	Z	HÈG	Ï€
Ĝ	T ÚÌ	Ý	Ï ÈÌ	Ï€
Ĝ	T ÚÌ	Z	HÈ	Ï€
Ĝ	T ÚÌ	Ý	Ï ÈÌ	Ï€
Ĝ	T ÚÌ	Z	HÈ	Ï€
GJ	T ÚÌ	Ý	HÈ	FÌ
€	T ÚÌ	Z	FÈÌ	FÌ
HF	T ÚÌ	Ý	HÈ	H
HG	T ÚÌ	Z	FÈÌ	H
HH	T ÚH	Ý	GÈÌ	FÌ
H	T ÚH	Z	FÈG	FÌ
HÍ	T ÚH	Ý	GÈÌ	H
HÎ	T ÚH	Z	FÈG	H
HÏ	T ÚÌ	Ý	GÈG	HJ
HÌ	T ÚÌ	Z	FÈÌ	HJ
HJ	T ÚÌ	Ý	GÈG	ÌÌ
€	T ÚÌ	Z	FÈÌ	ÌÌ
IF	T ÚÌ	Ý	JÈÌ	FG
IG	T ÚÌ	Z	Ï ÈH	FG
IH	T ÚÌ	Ý	JÈÌ	ÏÏ
II	T ÚÌ	Z	Ï ÈH	ÏÏ
Í	T ÚÌ	Ý	FÌÈ	FG
Î	T ÚÌ	Z	FÈJ	FG
Ï	T ÚÌ	Ý	FÌÈ	ÏH
Ì	T ÚÌ	Z	FÈJ	ÏH
IJ	T ÚÌ	Ý	FÌÈ	FG
€	T ÚÌ	Z	FÈJ	FG
ÍF	T ÚÌ	Ý	FÌÈ	ÏH
ÍG	T ÚÌ	Z	FÈJ	ÏH



**A Ya Vyf'Dc]bh@UXg f6 @ '&'. 'WY'K ]bX'@UX'5 N='&+\$L**

	T^ { a^!Àæ^ ^	Öá^&ç	T æ } æ à^ ÌãÈá	Š &ç } Ž Æ á
F	T ÚF	Ý	Ì ÈH	FG
G	T ÚF	Z	€	FG
H	T ÚF	Ý	Ì ÈH	ÌÌ
I	T ÚF	Z	€	ÌÌ
Í	T ÚH	Ý	FÈH	FG
Î	T ÚH	Z	€	FG
Ï	T ÚH	Ý	FÈH	Ì H
Ë	T ÚH	Z	€	Ì H
J	T ÚI	Ý	FÈH	FG
F€	T ÚI	Z	€	FG
FF	T ÚI	Ý	FÈH	Ì H
FG	T ÚI	Z	€	Ì H
FH	T ÚF	Ý	FÈ G	FÌ
FI	T ÚF	Z	€	FÌ
FÍ	T ÚF	Ý	FÈ G	HG
FÎ	T ÚF	Z	€	HG
FÏ	T ÚF	Ý	FÈ G	FÌ
FË	T ÚF	Z	€	FÌ
FJ	T ÚF	Ý	FÈ G	HG
Q€	T ÚF	Z	€	HG
QF	T ÚH	Ý	Ì ÈH	Ì €
QG	T ÚH	Z	€	Ì €
QH	T ÚH	Ý	Ì ÈH	Ì €
QI	T ÚH	Z	€	Ì €
QÍ	T ÚI	Ý	Ì ÈG	Ì €
QÎ	T ÚI	Z	€	Ì €
QÏ	T ÚI	Ý	Ì ÈG	Ì €
QË	T ÚI	Z	€	Ì €
QJ	T ÚI	Ý	HÈ	FÌ
H€	T ÚI	Z	€	FÌ
HF	T ÚI	Ý	HÈ	HÌ
HG	T ÚI	Z	€	HÌ
HH	T ÚH	Ý	HÈ	FÌ
HI	T ÚH	Z	€	FÌ
HÍ	T ÚH	Ý	HÈ	HÌ
HÎ	T ÚH	Z	€	HÌ
HÏ	T ÚI	Ý	HÈ	HJ
HË	T ÚI	Z	€	HJ
HJ	T ÚI	Ý	HÈ	ÌÌ
I€	T ÚI	Z	€	ÌÌ
IF	T ÚI	Ý	FÈH	FG
IG	T ÚI	Z	€	FG
IH	T ÚI	Ý	FÈH	ÌÌ
II	T ÚI	Z	€	ÌÌ
IÍ	T ÚI	Ý	FJÈG	FG
IÎ	T ÚI	Z	€	FG
IÏ	T ÚI	Ý	FJÈG	Ì H
IË	T ÚI	Z	€	Ì H
IJ	T ÚI	Ý	FJÈG	FG
Í€	T ÚI	Z	€	FG
ÍF	T ÚI	Ý	FJÈG	Ì H
ÍG	T ÚI	Z	€	Ì H



**A Ya Vyf'Dc]bh@UXg f6 @ '&+. :WYK ]bX'@UX'5 N=' '\$\$L**

	T^ { a^!Àæ^ ^	Öá^&ç)	T æ) æ à^ZããÉçá	Š &ç) Ž É á
F	T ÚF	Ý	Í ÈÌ	FG
G	T ÚF	Z	È ÈJ	FG
H	T ÚF	Ý	Í ÈÌ	ÌÌ
I	T ÚF	Z	È ÈJ	ÌÌ
Í	T ÚH	Ý	FÈÈG	FG
Î	T ÚH	Z	È ÈH	FG
Ï	T ÚH	Ý	FÈÈG	ÌH
Ë	T ÚH	Z	È ÈH	ÌH
J	T ÚÌ	Ý	FÈÈG	FG
F€	T ÚÌ	Z	È ÈH	FG
FF	T ÚÌ	Ý	FÈÈG	ÌH
FG	T ÚÌ	Z	È ÈH	ÌH
FH	T ÚF	Ý	FÈÈG	FÌ
FI	T ÚF	Z	È ÈÌ	FÌ
FÍ	T ÚF	Ý	FÈÈG	HG
FÎ	T ÚF	Z	È ÈÌ	HG
FÏ	T ÚF	Ý	FÈÈG	FÌ
FË	T ÚF	Z	È ÈÌ	FÌ
FJ	T ÚF	Ý	FÈÈG	HG
Q€	T ÚF	Z	È ÈÌ	HG
QF	T ÚH	Ý	Í ÈH	Ì€
QG	T ÚH	Z	È ÈG	Ì€
QH	T ÚH	Ý	Í ÈH	Ì€
QI	T ÚH	Z	È ÈG	Ì€
QÍ	T ÚÌ	Ý	Í ÈÌ	Ì€
QÎ	T ÚÌ	Z	È ÈÌ	Ì€
QÏ	T ÚÌ	Ý	Í ÈÌ	Ì€
QË	T ÚÌ	Z	È ÈÌ	Ì€
QJ	T ÚÌ	Ý	HÈÈ	FÌ
H€	T ÚÌ	Z	È ÈÌ	FÌ
HF	T ÚÌ	Ý	HÈÈ	HÌ
HG	T ÚÌ	Z	È ÈÌ	HÌ
HH	T ÚH	Ý	GÈÈ	FÌ
HI	T ÚH	Z	È ÈG	FÌ
HÍ	T ÚH	Ý	GÈÈ	HÌ
HÎ	T ÚH	Z	È ÈG	HÌ
HÏ	T ÚÌ	Ý	GÈÈG	HJ
HË	T ÚÌ	Z	È ÈÌ	HJ
HJ	T ÚÌ	Ý	GÈÈG	ÌÌ
Ì€	T ÚÌ	Z	È ÈÌ	ÌÌ
IF	T ÚÌ	Ý	Í ÈÌ	FG
IG	T ÚÌ	Z	È ÈJ	FG
IH	T ÚÌ	Ý	Í ÈÌ	ÌÌ
II	T ÚÌ	Z	È ÈJ	ÌÌ
IÍ	T ÚÌ	Ý	FÈÈG	FG
IÎ	T ÚÌ	Z	È ÈH	FG
IÏ	T ÚÌ	Ý	FÈÈG	ÌH
IË	T ÚÌ	Z	È ÈH	ÌH
IJ	T ÚÌ	Ý	FÈÈG	FG
Í€	T ÚÌ	Z	È ÈH	FG
ÍF	T ÚÌ	Ý	FÈÈG	ÌH
ÍG	T ÚÌ	Z	È ÈH	ÌH







**A Ya Vyf Dc ]bh@ UXg f6 @ ' ' % ' GYba JW@ UK'NL**

	T ^{ a^! /æ^ }	Öä^&ç)	T æ} æ à^ ŽããÉçá	Š &çã) Žã á
F	T ÚF	Z	È ÈG	FG
G	T ÚF	Z	È ÈG	Ï
H	T ÚH	Z	ÈÈÏ H	FG
I	T ÚH	Z	ÈÈÏ H	Ï H
Í	T ÚI	Z	ÈÈÏ H	FG
Î	T ÚI	Z	ÈÈÏ H	Ï H
Ï	T ÚF	Z	ÈÈÏ	FÏ
Ì	T ÚF	Z	ÈÈÏ	HG
J	T ÚF	Z	ÈÈÏ	FÏ
F€	T ÚF	Z	ÈÈÏ	HG
FF	T ÚH	Z	È ÈF	Ï €
FG	T ÚH	Z	È ÈF	Ï €
FH	T ÚI	Z	ÈÈÏ J	Ï €
FI	T ÚI	Z	ÈÈÏ J	Ï €
FÍ	T ÚI	Z	ÈÈÏ J	FÏ
FÎ	T ÚI	Z	ÈÈÏ J	HÏ
FÏ	T ÚH	Z	È ÈI	FÏ
FÌ	T ÚH	Z	È ÈI	HÏ
FJ	T ÚI	Z	ÈÈF H	HJ
F€	T ÚI	Z	ÈÈF H	Ï
F€	T ÚI	Z	È ÈG	FG
GG	T ÚI	Z	È ÈG	Ï
GH	T ÚI	Z	ÈÈÏ H	FG
G	T ÚI	Z	ÈÈÏ H	Ï H
Ġ	T ÚI	Z	ÈÈÏ H	FG
ġ	T ÚI	Z	ÈÈÏ H	Ï H
Ģ	T ÚI	Z	ÈÈÏ	FÏ
Ĥ	T ÚI	Z	ÈÈÏ	HG
GJ	T ÚI	Z	ÈÈÏ	FÏ
H€	T ÚI	Z	ÈÈÏ	HG
HF	T ÚI	Z	ÈÈÏ J	FÏ
HG	T ÚI	Z	ÈÈÏ J	HÏ
HH	T ÚI	Z	È ÈI	FÏ
H	T ÚI	Z	È ÈI	HÏ
HÍ	T ÚI	Z	ÈÈF H	HJ
HÎ	T ÚI	Z	ÈÈF H	Ï
HÏ	T ÚJ	Z	È ÈG	FG
HÌ	T ÚJ	Z	È ÈG	Ï
HJ	T ÚFF	Z	ÈÈÏ F	FG
Í €	T ÚFF	Z	ÈÈÏ F	Ï €
IF	T ÚFG	Z	ÈÈÏ F	FG
IG	T ÚFG	Z	ÈÈÏ F	Ï €
IH	T ÚJ	Z	ÈÈÏ	FÏ
II	T ÚJ	Z	ÈÈÏ	HG
Í	T ÚJ	Z	ÈÈÏ	FÏ
Î	T ÚJ	Z	ÈÈÏ	HG
Ï	T ÚFG	Z	ÈÈÏ J	FÏ
Ì	T ÚFG	Z	ÈÈÏ J	HÏ
IJ	T ÚFF	Z	È ÈI	FÏ
Í €	T ÚFF	Z	È ÈI	HÏ
ÍF	T ÚFG	Z	ÈÈF H	HJ
ÍG	T ÚFG	Z	ÈÈF H	Ï

**A Ya Vyf Dc ]bh @ UXg f6 @ ' & : GYba JW @ UK LL**

	T^ { a^/Äæ^}	Öä^&ç)	T æ} æ^ à^ ŽããÉçá	Š &çã) Žã á
F	T ÚF	Ý	È ÈG	FG
G	T ÚF	Ý	È ÈG	ÍÍ
H	T ÚH	Ý	ÈÈÏ H	FG
I	T ÚH	Ý	ÈÈÏ H	ÌH
Í	T ÚI	Ý	ÈÈÏ H	FG
Ì	T ÚI	Ý	ÈÈÏ H	ÌH
Ï	T ÚF	Ý	ÈÈÌ Í	FÌ
Ì	T ÚF	Ý	ÈÈÌ Í	HG
J	T ÚF	Ý	ÈÈÌ Í	FÌ
F€	T ÚF	Ý	ÈÈÌ Í	HG
FF	T ÚH	Ý	ÈÈÈ F	Í€
FG	T ÚH	Ý	ÈÈÈ F	Í€
FH	T ÚI	Ý	ÈÈÈ J	Í€
FI	T ÚI	Ý	ÈÈÈ J	Í€
FÌ	T ÚI	Ý	ÈÈJ Ì	FÌ
FÌ	T ÚI	Ý	ÈÈJ Ì	HÌ
FÌ	T ÚH	Ý	ÈÈÌ Í	FÌ
FÌ	T ÚH	Ý	ÈÈÌ Í	HÌ
FJ	T ÚI	Ý	ÈÈÈ H	HJ
QE	T ÚI	Ý	ÈÈÈ H	ÌÌ
QF	T ÚI	Ý	ÈÈG	FG
QG	T ÚI	Ý	ÈÈG	ÌÌ
QH	T ÚI	Ý	ÈÈÏ H	FG
Q	T ÚI	Ý	ÈÈÏ H	ÌH
Q	T ÚI	Ý	ÈÈÏ H	FG
Q	T ÚI	Ý	ÈÈÏ H	ÌH
Q	T ÚI	Ý	ÈÈÌ Í	FÌ
Q	T ÚI	Ý	ÈÈÌ Í	HG
QJ	T ÚI	Ý	ÈÈÌ Í	FÌ
H€	T ÚI	Ý	ÈÈÌ Í	HG
HF	T ÚI	Ý	ÈÈJ Ì	FÌ
HG	T ÚI	Ý	ÈÈJ Ì	HÌ
HH	T ÚI	Ý	ÈÈÌ Í	FÌ
H	T ÚI	Ý	ÈÈÌ Í	HÌ
H	T ÚI	Ý	ÈÈÈ H	HJ
H	T ÚI	Ý	ÈÈÈ H	ÌÌ
H	T ÚJ	Ý	ÈÈG	FG
H	T ÚJ	Ý	ÈÈG	ÌÌ
HJ	T ÚFF	Ý	ÈÈÏ F	FG
Í€	T ÚFF	Ý	ÈÈÏ F	Í€
IF	T ÚFG	Ý	ÈÈÏ F	FG
IG	T ÚFG	Ý	ÈÈÏ F	Í€
IH	T ÚJ	Ý	ÈÈÌ Í	FÌ
II	T ÚJ	Ý	ÈÈÌ Í	HG
ÍÍ	T ÚJ	Ý	ÈÈÌ Í	FÌ
ÌÌ	T ÚJ	Ý	ÈÈÌ Í	HG
ÌÌ	T ÚFG	Ý	ÈÈJ Ì	FÌ
ÌÌ	T ÚFG	Ý	ÈÈJ Ì	HÌ
IJ	T ÚFF	Ý	ÈÈÌ Í	FÌ
Í€	T ÚFF	Ý	ÈÈÌ Í	HÌ
ÍF	T ÚFG	Ý	ÈÈÈ H	HJ
ÍG	T ÚFG	Ý	ÈÈÈ H	ÌÌ

**A Ya Vyf'8 ]ghf]Vi hyX'@ UXg'f6 @ '% : '8 ]ghf"K ]bX'@ UX'NL**

	T ^{ à^Aæ^}	Öã^&ç)	ÛcæAæ } æ à^ãã^Aæ^ã	Ò;ãAæ } æ à^ãã^Aæ^ã	€	À FEE
F	TPI	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
G	TG	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
H	TH	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
I	TI	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
Í	TÍ	ÜZ	€	€	€	À FEE
î	Tî	ÜZ	€	€	€	À FEE
ï	TPÍ	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
ì	Tì	ÜZ	€	€	€	À FEE
J	TJ	ÜZ	€	€	€	À FEE
F€	TPÎ	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
FF	TFF	ÜZ	€	€	€	À FEE
FG	TFG	ÜZ	€	€	€	À FEE
FH	TUH	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
FI	TÜG	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
FÍ	TÜF	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
Fî	TÏ	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
FÌ	TÏ	ÜZ	€	€	€	À FEE
Fì	TÏ	ÜZ	€	€	€	À FEE
FJ	Tfj	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
G€	T€	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
GF	TGF	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
GG	TGG	ÜZ	€	€	€	À FEE
GH	TGH	ÜZ	€	€	€	À FEE
G	TG	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
Ĝ	TĜ	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
Ḡ	TḠ	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
Ḣ	TḢ	ÜZ	€	€	€	À FEE
Ḡ	TḠ	ÜZ	€	€	€	À FEE
GJ	TGJ	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
H€	TH€	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
HF	THF	ÜZ	€	€	€	À FEE
HG	THG	ÜZ	€	€	€	À FEE
HH	TUFG	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
H	TUJ	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
HÍ	TÜF	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
Hî	TÜH	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
Hì	TÜG	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
HÌ	TIG	ÜZ	€	€	€	À FEE
HJ	TIJ	ÜZ	€	€	€	À FEE
I€	TÍ	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
IF	TÍ	ÜZ	€	€	€	À FEE
IG	TÍ	ÜZ	€	€	€	À FEE
IH	TIJ	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
II	TÍ€	ÜZ	€	€	€	À FEE
IÍ	TÍF	ÜZ	€	€	€	À FEE
Iî	TÍG	ÜZ	Ë HËHG	Ë HËHG	€	À FEE
Iì	TÍH	ÜZ	€	€	€	À FEE
IÌ	TÍ	ÜZ	€	€	€	À FEE
IJ	TÍ	ÜZ	€	€	€	À FEE
Í€	TÍ	ÜZ	€	€	€	À FEE
ÍF	TÍ	ÜZ	€	€	€	À FEE







































**APPENDIX D**  
**ADDITIONAL CALCUATIONS**

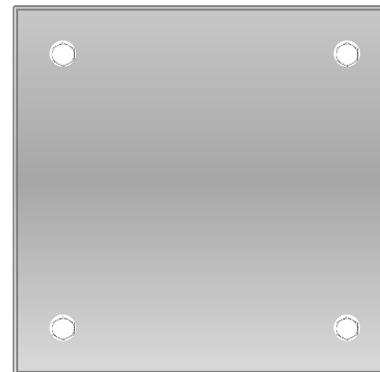
**Bolt Calculation Tool, V1.4**

PROJECT DATA	
Site Name:	UILFORD WEST STONE PROPERTY
Site Number:	876343
Job Code:	1039-Z0001-B
Connection Description:	Standoff to Collar

APPLIED LOADS		
Bolt Tension:	5016.55	lbs
Bolt Shear:	504.51	lbs

BOLT PROPERTIES		
Bolt Type:	Bolt	-
Bolt Diameter:	0.625	in
Bolt Grade:	A325	-
# of Bolts:	4	-
Threads Excluded?	No	-

BOLT CHECK		
Tensile Strength	20340.15	
Shear Strength	13805.83	
Tensile Usage	24.7%	
Shear Usage	3.7%	
Interaction Check	0.06	<b>≤1.05</b>
Result	Pass	



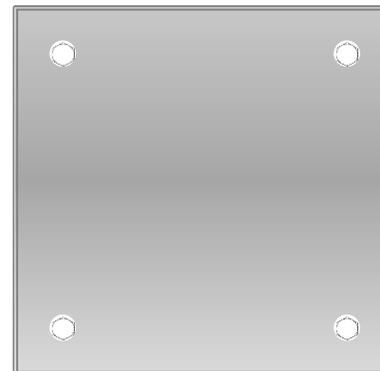
**Bolt Calculation Tool, V1.4**

PROJECT DATA	
Site Name:	UILFORD WEST STONE PROPERT
Site Number:	876343
Job Code:	1039-Z0001-B
Connection Description:	Top Collar Connection

APPLIED LOADS		
Bolt Tension:	1720.37	lbs
Bolt Shear:	410.30	lbs

BOLT PROPERTIES		
Bolt Type:	Bolt	-
Bolt Diameter:	0.625	in
Bolt Grade:	A325	-
# of Bolts:	4	-
Threads Excluded?	No	-

BOLT CHECK		
Tensile Strength	20340.15	
Shear Strength	13805.83	
Tensile Usage	8.5%	
Shear Usage	3.0%	
Interaction Check	0.01	<b>≤1.05</b>
Result	Pass	





# **NIER Study Report**

**SITE NUMBER:**

**876343**

**SITE NAME:**

**AT&T 2158 Guilford Post Road**

**LOCATION:**

**Guilford, Connecticut**

**COMPANY:**

**Crown Castle  
Mahwah, New Jersey**

*October 8<sup>th</sup>, 2021*



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## Disclaimer Notice

This work is based upon our best interpretation of available information. However, these data and their interpretation are constantly changing. Therefore, we do not warrant that any undertaking based on this report will be successful, or that others will not require further research or actions in support of this proposal or future undertaking. In the event of errors, our liability is strictly limited to replacement of this document with a corrected one. Liability for consequential damages is specifically disclaimed. Any use of this document constitutes an agreement to hold Tower Engineering Professionals and its employees harmless and indemnify it for all liability, claims, demands, and litigation expenses and attorney's fees arising out of such use.

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KINSTON, NORTH CAROLINA



## **NIER STUDY REPORT**

**876343**

*Guilford, CT*

### **INTRODUCTION**

Tower Engineering Professionals (TEP) of Raleigh, NC has been retained by Crown Castle (Crown) of Mahwah, NJ to evaluate the contribution of RF emissions for a proposed AT&T (AT&T) facility on an existing tower at this location.

### **SITE AND FACILITY CONSIDERATIONS**

Site 876343 will be located at 1919 Boston Post Rd. in Guilford, CT at coordinates 41.3003250, -72.7076381. The support structure is a 146' monopole. AT&T will be installing antennae with a radiation center of 110' above ground level. The results of this study are based solely upon the AT&T installation and does not include any other unknown RF emitters. All data used in this study was provided by one or more of the following sources:

1. AT&T & Crown furnished data.
2. Compiled from carrier and manufacturer standard configurations.
3. Empirical data collected by TEP.

A satellite view of the study area is located in Appendix 1.



### POWER DENSITY CALCULATIONS

Graphs of the power density at different distances from the transmitter, compared to FCC MPE general population and occupational limits, may be seen in Appendix 2. These limits are based upon the Information Relating to MPE Standards found in Appendix 3. Study methodology may be seen in Appendix 4, which describes the Non-Ionizing Radiation Prediction Models. This site **WILL BE** in compliance with FCC OET-65 MPE limits.

### FCC 5% RULE

The installation of the AT&T antennae **WILL NOT** contribute in excess of 5% to the MPE limit at this site.

October 8<sup>th</sup>, 2021

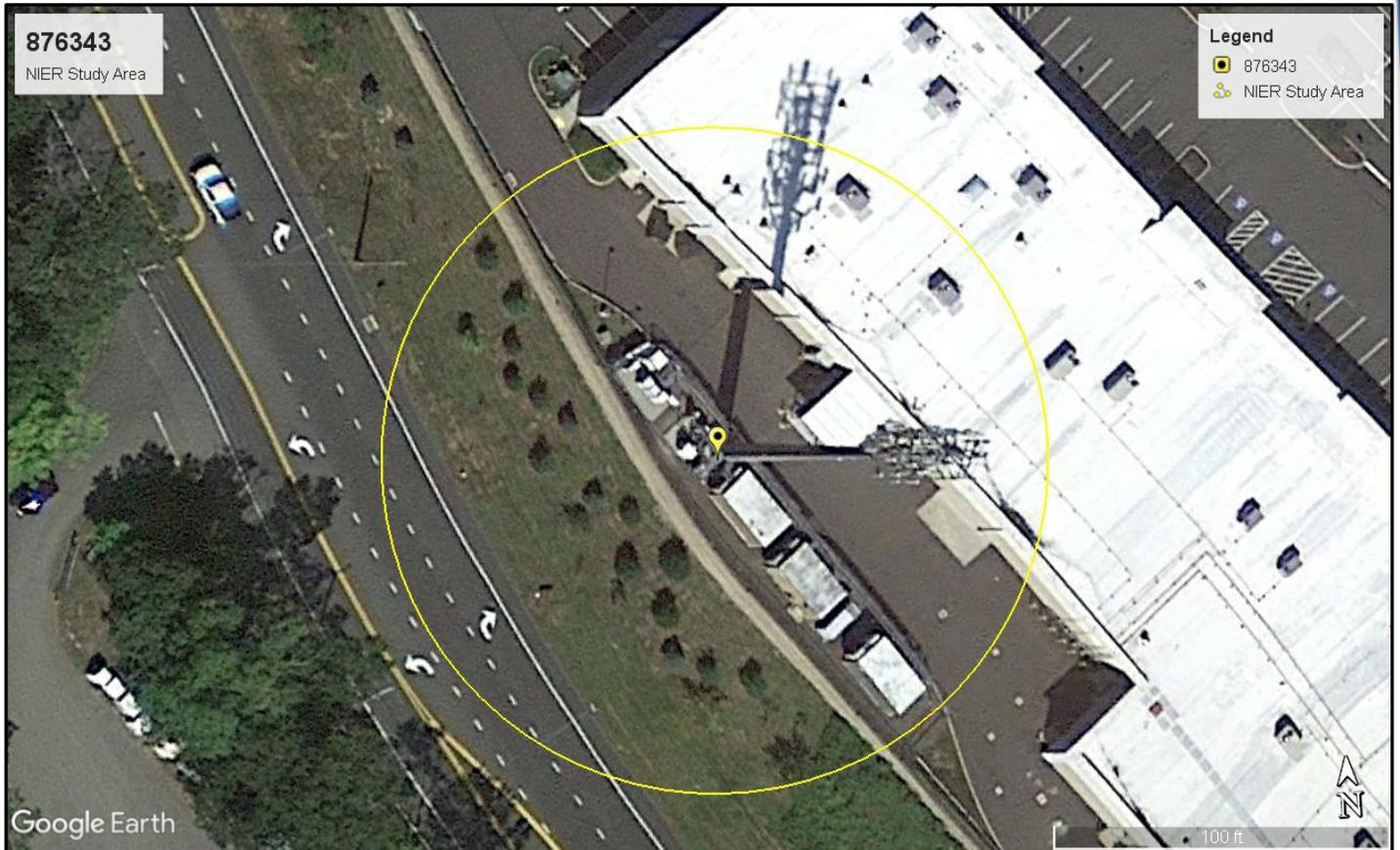
#### Prepared By:

Michael W. Hayden NCE CPBE CBNT AMD CPI  
Director, RF Design and Services  
Tower Engineering Professionals

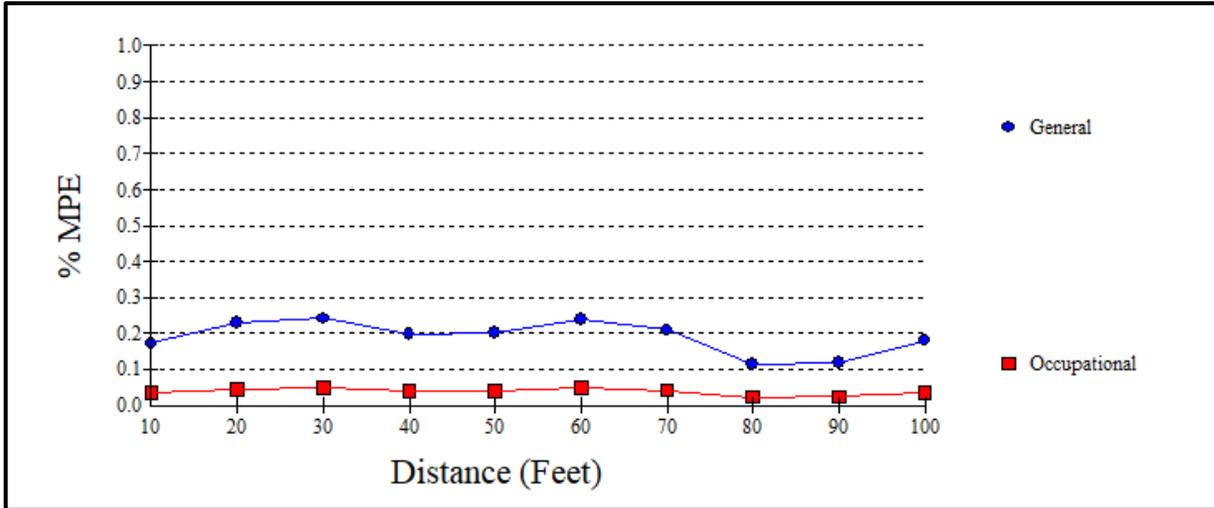
#### Approved By:



## APPENDIX 1 Satellite Photo



## APPENDIX 2 FCC OET-65 MPE Limit Study



Maximum Power Density (@30'):	0.0013 mW/cm <sup>2</sup>
General Population MPE (@30'):	0.2415%
Occupational MPE (@30'):	0.0483%



### APPENDIX 3 Information Pertaining to MPE Studies

In 1985, the FCC first adopted guidelines to be used for evaluating human exposure to RF emissions. The FCC revised and updated these guidelines on August 1, 1996, as a result of a rule-making proceeding initiated in 1993. The new guidelines incorporate limits for Maximum Permissible Exposure (MPE) in terms of electric and magnetic field strength and power density for transmitters operating at frequencies between 300 kHz and 100 GHz.

The FCC's MPE limits are based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP) and, over a wide range of frequencies, the exposure limits were developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI) to replace the 1982 ANSI guidelines. Limits for localized absorption are based on recommendations of both ANSI/IEEE and NCRP.

The FCC's limits, and the NCRP and ANSI/IEEE limits on which they are based, are derived from exposure criteria quantified in terms of specific absorption rate (SAR). The basis for these limits is a whole-body averaged SAR threshold level of 4 watts per kilogram (4 W/kg), as averaged over the entire mass of the body, above which expert organizations have determined that potentially hazardous exposures may occur. The MPE limits are derived by incorporating safety factors that lead, in some cases, to limits that are more conservative than the limits originally adopted by the FCC in 1985. Where more conservative limits exist, they do not arise from a fundamental change in the RF safety criteria for whole-body averaged SAR, but from a precautionary desire to protect subgroups of the general population who, potentially, may be more at risk.

The FCC exposure limits are also based on data showing that the human body absorbs RF energy at some frequencies more efficiently than at others. The most restrictive limits occur in the frequency range of 30-300 MHz where whole-body absorption of RF energy by human beings is most efficient. At other frequencies, whole-body absorption is less efficient, and consequently, the MPE limits are less restrictive.



MPE limits are defined in terms of power density (units of milliwatts per centimeter squared:  $\text{mW}/\text{cm}^2$ ), electric field strength (units of volts per meter:  $\text{V}/\text{m}$ ) and magnetic field strength (units of amperes per meter:  $\text{A}/\text{m}$ ). The far-field of a transmitting antenna is where the electric field vector (E), the magnetic field vector (H), and the direction of propagation can be considered to be all mutually orthogonal ("plane-wave" conditions).

**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.

**General population/uncontrolled exposure** limits apply to situations in which the general public 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 public 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. Additional details can be found in FCC OET 65.



## APPENDIX 4 MPE Standards Methodology

This study predicts RF field strength and power density levels that emanate from communications system antennae. It considers all transmitter power levels (less filter and line losses) delivered to each active transmitting antenna at the communications site. Calculations are performed to determine power density and MPE levels for each antenna as well as composite levels from all antennas. The calculated levels are based on where a human (Observer) would be standing at various locations at the site. The point of interest where the MPE level is predicted is based on the height of the Observer.

Compliance with the FCC limits on RF emissions are determined by spatially averaging a person's exposure over the projected area of an adult human body, that is approximately six-feet or two-meters, as defined in the ANSI/IEEE C95.1 standard. The MPE limits are specified as time-averaged exposure limits. This means that exposure is averaged over an identifiable time interval. It is 30 minutes for the general population/uncontrolled RF environment and 6 minutes for the occupational/controlled RF environment. However, in the case of the general public, time averaging should not be applied because the general public is typically not aware of RF exposure and they do not have control of their exposure time. Therefore, it should be assumed that any RF exposure to the general public will be continuous.

The FCC's limits for exposure at different frequencies are shown in the following Tables.

<b>Limits for Occupational/Controlled Exposure</b>				
<b>Frequency Range (MHz)</b>	<b>Electric Field Strength (E) (V/m)</b>	<b>Magnetic Field Strength (H) (A/m)</b>	<b>Power Density (S) (mW/cm<sup>2</sup>)</b>	<b>Averaging Time  E <sup>2</sup>,  H <sup>2</sup> or S (minutes)</b>
0.3 - 3.0	614	1.63	100*	6
3.0 - 30	1842/f	4.89/f	900/F <sup>2</sup>	6
30 - 300	61.4	0.163	1.0	6
300 - 1500	--	--	f/300	6
1500 - 100,000	--	--	5	6

f = frequency

\* = Plane-wave equivalent power density



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

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3 - 1.34	614	1.63	100*	30
1.34 - 30	824/f	2.19/f	180/F <sup>2</sup>	30
30 -300	27.5	0.073	0.2	30
300 -1500	--	--	f/1500	30
1500 -100,000	--	--	1.0	30

f = frequency

\* = Plane-wave equivalent power density

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

It is important to understand that these limits apply cumulatively to all sources of RF emissions affecting a given area. For example, if several different communications system antennas occupy a shared facility such as a tower or rooftop, then the total exposure from all systems at the facility must be within compliance of the FCC guidelines.

The field strength emanating from an antenna can be estimated based on the characteristics of an antenna radiating in free space. There are basically two field areas associated with a radiating antenna. When close to the antenna, the region is known as the Near Field. Within this region, the characteristics of the RF fields are very complex and the wave front is extremely curved. As you move further from the antenna, the wave front has less curvature and becomes planar. The wave front still has a curvature but it appears to occupy a flat plane in space (plane-wave radiation). This region is known as the Far Field.



Two models are utilized to predict Near and Far field power densities. They are based on the formulae in FCC OET 65. As this study is concerned only with Near Field calculations, we will only describe the model used for this study. For additional details, refer to FCC OET Bulletin 65.

### **Cylindrical Model (Near Field Predictions)**

Spatially averaged plane-wave equivalent power densities parallel to the antenna may be estimated by dividing the antenna input power by the surface area of an imaginary cylinder surrounding the length of the radiating antenna. While the actual power density will vary along the height of the antenna, the average value along its length will closely follow the relation given by the following equation:

$$S = P \div 2\pi RL$$

Where:

S = Power Density

P = Total Power into antenna

R = Distance from the antenna

L = Antenna aperture length

For directional-type antennas, power densities can be estimated by dividing the input power by that portion of a cylindrical surface area corresponding to the angular beam width of the antenna. For example, for the case of a 120-degree azimuthal beam width, the surface area should correspond to 1/3 that of a full cylinder. This would increase the power density near the antenna by a factor of three over that for a purely omni-directional antenna. Mathematically, this can be represented by the following formula:

$$S = (180 / \theta_{BW}) P \div \pi RL$$

Where:

S = Power Density

$\theta_{BW}$  = Beam width of antenna in degrees (3 dB half-power point)

P = Total Power into antenna

R = Distance from the antenna

L = Antenna aperture length

If the antenna is a 360-degree omni-directional antenna, this formula would be equivalent to the previous formula.



## Spherical Model (Far Field Predictions)

Spatially averaged plane-wave power densities in the Far Field of an antenna may be estimated by considering the additional factors of antenna gain and reflective waves that would contribute to exposure.

The radiation pattern of an antenna has developed in the Far Field region and the power gain needs to be considered in exposure predictions. Also, if the vertical radiation pattern of the antenna is considered, the exposure predictions would most likely be reduced significantly at ground level, resulting in a more realistic estimate of the actual exposure levels.

Additionally, to model a truly "worst case" prediction of exposure levels at or near a surface, such as at ground-level or on a rooftop, reflection off the surface of antenna radiation power can be assumed, resulting in a potential four-fold increase in power density.

These additional factors are considered and the Far Field prediction model is determined by the following equation:

$$S = EIRP \times Rc \div 4\pi R^2$$

Where:

S = Power Density

EIRP = Effective Radiated Power from antenna

Rc = Reflection Coefficient (2.56)

R = Distance from the antenna

The EIRP includes the antenna gain. If the antenna pattern is considered, the antenna gain is relative based on the horizontal and vertical pattern gain values at that particular location in space, on a rooftop or on the ground. However, it is recommended that the antenna radiation pattern characteristics not be considered to provide a conservative "worst case" prediction. This is the equation is utilized for the Far Field exposure predictions herein.

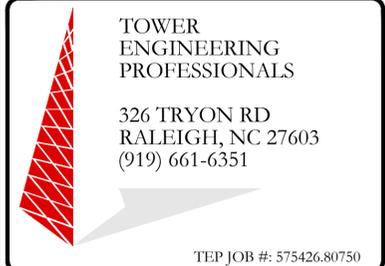


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CALL 2 WORKING DAYS  
BEFORE YOU DIG!



**AT&T SITE NUMBER:** CTL02158  
**AT&T SITE NAME:** 2158 GUILFORD POST ROAD  
**AT&T FA CODE:** 10035218  
**AT&T PACE NUMBER:** MRCTB050451, MRCTB050471, MRCTB050456, MRCTB050449, MRCTN050450  
**AT&T PROJECT:** 2022 LTE NEXT CARRIER

**BUSINESS UNIT #:** 876343  
**SITE ADDRESS:** 1919 BOSTON POST ROAD, GUILFORD, CT 06437  
**COUNTY:** NEW HAVEN  
**SITE TYPE:** MONOPOLE  
**TOWER HEIGHT:** 149'-0"



**AT&T SITE NUMBER:** CTL02158  
**BU #:** 876343  
**GUILFORD WEST STONE PROPERTY**  
 1919 BOSTON POST ROAD  
 GUILFORD, CT 06437  
 (NEW HAVEN COUNTY)  
 EXISTING 149' MONOPOLE

**ISSUED FOR:**

REV	DATE	DRWN	DESCRIPTION	DES/QA
0	08/05/21	SPK	CONSTRUCTION	BSE
1	09/14/21	EDR	CONSTRUCTION	JTC

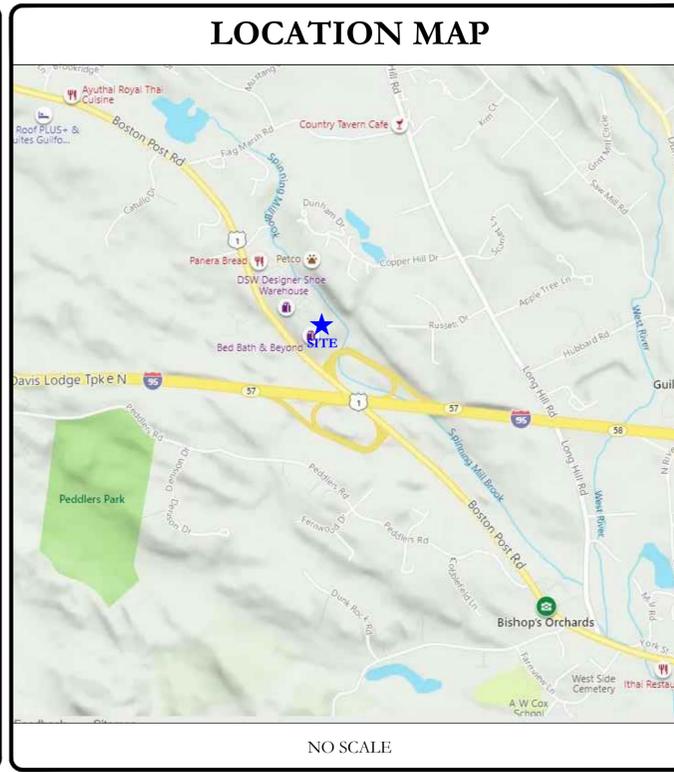
**SITE INFORMATION**

CROWN CASTLE USA INC. SITE NAME:	GUILFORD WEST STONE PROPERTY
SITE ADDRESS:	1919 BOSTON POST ROAD GUILFORD, CT 06437
COUNTY:	NEW HAVEN
PARCEL #:	079035
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41° 18' 01.27" (41.3003250)
LONGITUDE:	72° 42' 29.13" (-72.7076381)
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	70' (AMSL)
CURRENT ZONING:	SCW
JURISDICTION:	TOWN OF GUILFORD
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	DDR GUILFORD LLC 3300 ENTERPRISE PARKWAY BEACHWOOD, OHIO 44122
TOWER OWNER:	CROWN CASTLE USA INC. 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	AT&T TOWER ASSET GROUP 575 MOROSGO DRIVE ATLANTA, GA 30324-3300
ELECTRIC PROVIDER:	CONNECTICUT LIGHT AND POWER CO (800) 286-2000
TELCO PROVIDER:	LIGHTOWER (800) 483-2000

**DRAWING INDEX**

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.1	COMPOUND PLAN
C-1.2	EQUIPMENT LAYOUT
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	FINAL EQUIPMENT SCHEDULE
C-4	EQUIPMENT DETAILS
C-5	EQUIPMENT DETAILS
C-6	COLOR CODE CHART
C-7	LTE RET NAMING CONVENTION
E-1	ELECTRICAL NOTES
E-2	EQUIPMENT ONE-LINE DIAGRAM
G-1	GROUNDING SCHEMATIC
G-2	GROUNDING DETAILS
ATTACHED	PLUMBING DIAGRAMS
	MOUNT SPECIFICATIONS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 22x34. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.



**PROJECT TEAM**

A&E FIRM:	TOWER ENGINEERING PROFESSIONALS 326 TRYON ROAD RALEIGH, NC 27603 BRITTON S. ENGLAND - PROJECT MANAGER (919) 661-6351 ANDREW T. HALDANE - CIVIL ENGINEER (919) 661-6351 ANDREW T. HALDANE - ELECTRICAL ENGINEER (919) 661-6351
CROWN CASTLE USA INC. DISTRICT CONTACTS:	1200 MACARTHUR BLVD, SUITE 200 MAHWAH, NJ 07430 ROBERT FOREST - A&E SPECIALIST (917) 924-7092

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

**PROJECT DESCRIPTION**

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

**TOWER SCOPE OF WORK:**

- REMOVE (6) ANTENNAS
- REMOVE (6) RRU's
- REMOVE (6) TMA's
- REMOVE (3) T-ARMS MOUNTS
- REMOVE (6) COAX CABLES (1-5/8")
- INSTALL (6) ANTENNAS
- INSTALL (9) RRU's
- INSTALL (1) DC9 RAYCAP
- INSTALL (3) DC POWER CABLES
- INSTALL (1) FIBER CABLE
- INSTALL (1) PLATFORM MOUNT
- INSTALL (3) STANDOFF ARM MAST
- INSTALL (6) Y-CABLES

**GROUND SCOPE OF WORK:**

- (6) DIPLEXERS TO BE CAPPED AND LEFT IN PLACE

**APPLICABLE CODES/REFERENCE DOCUMENTS**

CODE TYPE	CODE
BUILDING	2018 CONNECTICUT BUILDING CODE
MECHANICAL	2018 INTERNATIONAL MECHANICAL CODE
ELECTRICAL	2017 NEC

**REFERENCE DOCUMENTS:**

STRUCTURAL ANALYSIS: BY TOWER ENGINEERING PROFESSIONALS  
DATED: 06/17/2021

MOUNT ANALYSIS: BY INFINIGY ENGINEERING, PLLC  
DATED: 06/07/2021

RFDS REVISION: 2.00  
DATED: 05/25/2021

ORDER ID: 561999  
REVISION: 0

**NOTE:**  
THE POWER DESIGN FOR ANY AC ELECTRICAL POWER CHANGES IS TO BE PERFORMED BY OTHERS AND IS SHOWN HERE FOR REFERENCE PURPOSES ONLY. AT&T IS SOLELY RESPONSIBLE FOR THE ELECTRICAL POWER DESIGN.

09/14/21

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

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

**CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:**

- 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.
- "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.
- 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.
- 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).
- 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." 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.
- 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.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
- 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.
- ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS. LATEST APPROVED REVISION.
- 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.
- 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.
- 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.
- THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
- THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
- 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.
- 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.
- 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.
- 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.
- CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
- 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.

**GREENFIELD GROUNDING NOTES:**

- 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.
- THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
- ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
- USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
- EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
- ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
- COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
- ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
- APPROVED ANTI-OXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
- ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
- MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
- BOND ALL METALLIC OBJECTS WITHIN 6 FT. OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
- 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.
- 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).
- 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).

**GENERAL NOTES:**

- FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:  
CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION  
CARRIER: AT&T  
TOWER OWNER: CROWN CASTLE USA INC.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- 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.
- 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.
- 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.
- 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.
- CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

**CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:**

- 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.
- UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
- 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° AT TIME OF PLACEMENT.
- 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 0.46.
- 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
- 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"
- 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.

**ELECTRICAL INSTALLATION NOTES:**

- ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
- CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
- WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
- 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. VERIFY 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.
- 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.
- 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).
- PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
- ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
- 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.
- 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.
- POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI-CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
- 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.
- 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).
- RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEC AND NEC.
- ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
- ELECTRICAL METALLIC TUBING (EMT) OR METAL-CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
- SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
- LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
- CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SNEW FITTINGS ARE NOT ACCEPTABLE.
- CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEC AND THE NEC.
- WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREFOLD SPECMATE WIREWAY).
- SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "AT&T".
- 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
120/208V, 3Ø	GROUND	GREEN
	A PHASE	BLACK
	B PHASE	RED
277/480V, 3Ø	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
DC VOLTAGE	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
	GROUND	GREEN
	POS (+)	RED**
	NEG (-)	BLACK**

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

**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
RE	REMOTE ELECTRIC TILT
RFD	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRIU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

**APWA UNIFORM COLOR CODE:**

<span style="background-color: white; border: 1px solid black; padding: 2px;">WHITE</span>	PROPOSED EXCAVATION
<span style="background-color: pink; border: 1px solid black; padding: 2px;">PINK</span>	TEMPORARY SURVEY MARKINGS
<span style="background-color: red; border: 1px solid black; padding: 2px;">RED</span>	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
<span style="background-color: yellow; border: 1px solid black; padding: 2px;">YELLOW</span>	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
<span style="background-color: orange; border: 1px solid black; padding: 2px;">ORANGE</span>	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
<span style="background-color: blue; border: 1px solid black; padding: 2px;">BLUE</span>	POTABLE WATER
<span style="background-color: purple; border: 1px solid black; padding: 2px;">PURPLE</span>	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
<span style="background-color: green; border: 1px solid black; padding: 2px;">GREEN</span>	SEWERS AND DRAIN LINES



575 MOROSGO DRIVE  
ATLANTA, GA 30324-3300



1200 MACARTHUR BLVD, SUITE 200  
MAHWAH, NJ 07430



TOWER  
ENGINEERING  
PROFESSIONALS

326 TRYON RD  
RALEIGH, NC 27603  
(919) 661-6351

TEP JOB #: 575426.80750

AT&T SITE NUMBER:  
**CTL02158**

BU #: 876343  
**GUILFORD WEST STONE  
PROPERTY**

1919 BOSTON POST ROAD  
GUILFORD, CT 06437  
(NEW HAVEN COUNTY)

EXISTING 149' MONOPOLE

**ISSUED FOR:**

REV	DATE	DRWN	DESCRIPTION	DES/QA
0	08/05/21	SPK	CONSTRUCTION	BSE
1	09/14/21	EDR	CONSTRUCTION	JTC



09/14/21

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SHEET NUMBER: **T-2** REVISION: **1**



575 MOROSGO DRIVE  
ATLANTA, GA 30324-3300



1200 MACARTHUR BLVD, SUITE 200  
MAHWAH, NJ 07430



TOWER  
ENGINEERING  
PROFESSIONALS

326 TRYON RD  
RALEIGH, NC 27603  
(919) 661-6351

TEP JOB #: 575426.80750

AT&T SITE NUMBER:  
**CTL02158**

BU #: 876343  
**GUILFORD WEST STONE  
PROPERTY**

1919 BOSTON POST ROAD  
GUILFORD, CT 06437  
(NEW HAVEN COUNTY)

EXISTING 149' MONOPOLE

**ISSUED FOR:**

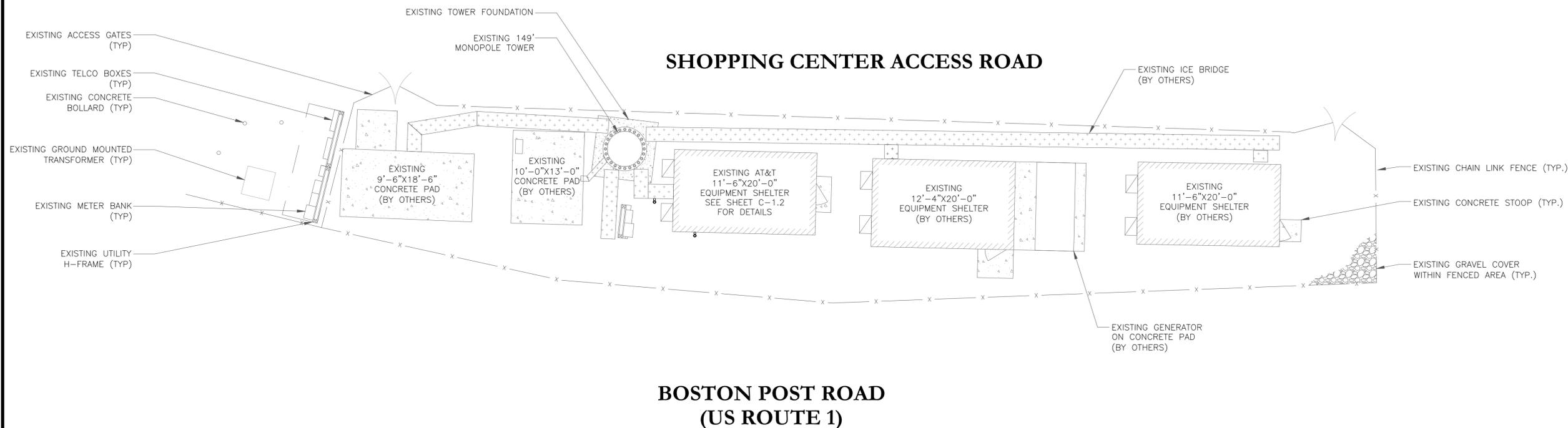
REV	DATE	DRWN	DESCRIPTION	DES/QA
0	08/05/21	SPK	CONSTRUCTION	BSE
1	09/14/21	EDR	CONSTRUCTION	JTC



09/14/21

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SHEET NUMBER: **C-1.1** REVISION: **1**



1 COMPOUND AREA  
SCALE: 1/8"=1'-0" (FULL SIZE)  
1/16"=1'-0" (11x17)





575 MOROSGO DRIVE  
ATLANTA, GA 30324-3300



1200 MACARTHUR BLVD, SUITE 200  
MAHWAH, NJ 07430



TOWER  
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PROFESSIONALS

326 TRYON RD  
RALEIGH, NC 27603  
(919) 661-6351

TEP JOB #: 575426.80750

AT&T SITE NUMBER:  
**CTL02158**

BU #: 876343  
**GUILFORD WEST STONE  
PROPERTY**

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(NEW HAVEN COUNTY)

EXISTING 149' MONOPOLE

**ISSUED FOR:**

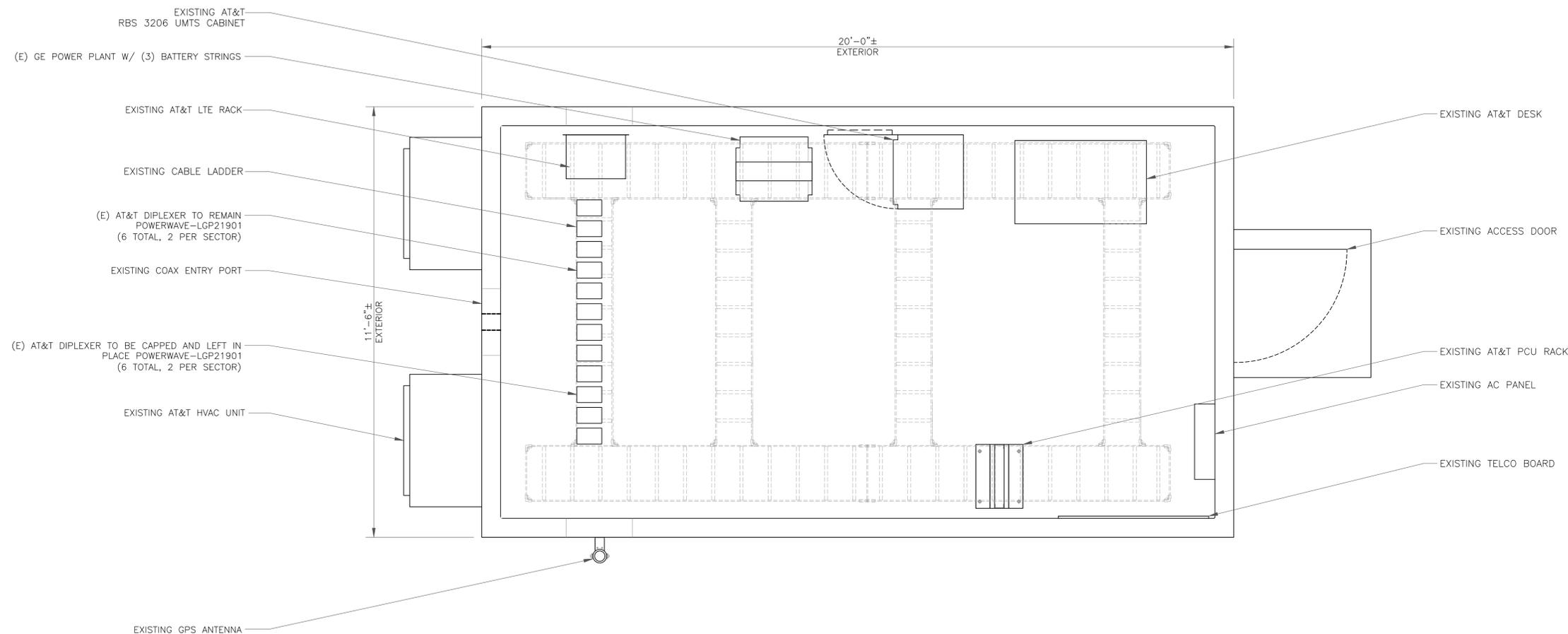
REV	DATE	DRWN	DESCRIPTION	DES/QA
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1	09/14/21	EDR	CONSTRUCTION	JTC



09/14/21

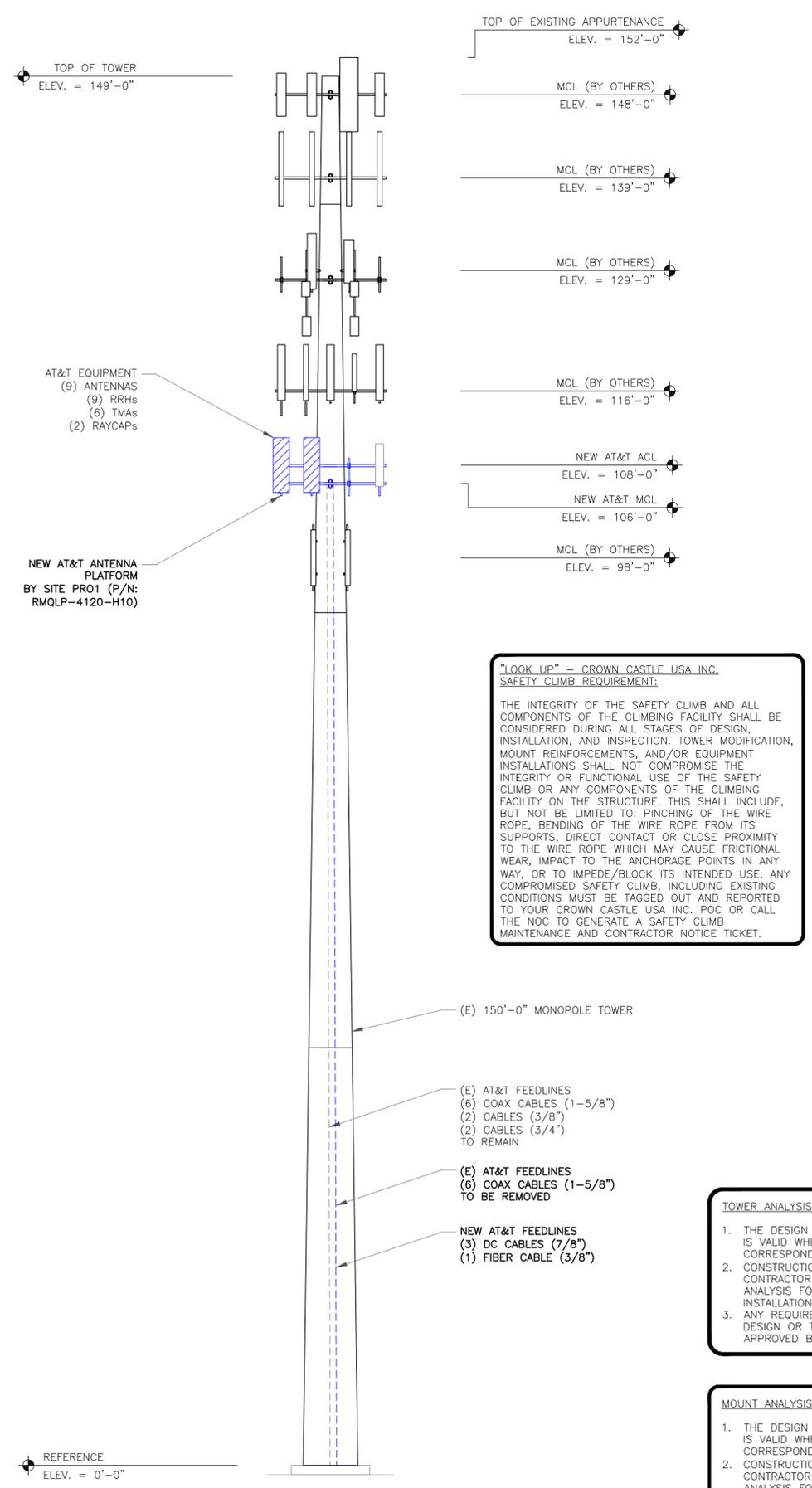
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SHEET NUMBER: **C-1.2** REVISION: **1**



1 EQUIPMENT LAYOUT  
SCALE: 3/4"=1'-0" (FULL SIZE)  
3/8"=1'-0" (11x17)





1 FINAL ELEVATION  
SCALE: NOT TO SCALE

**"LOOK UP" - CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:**

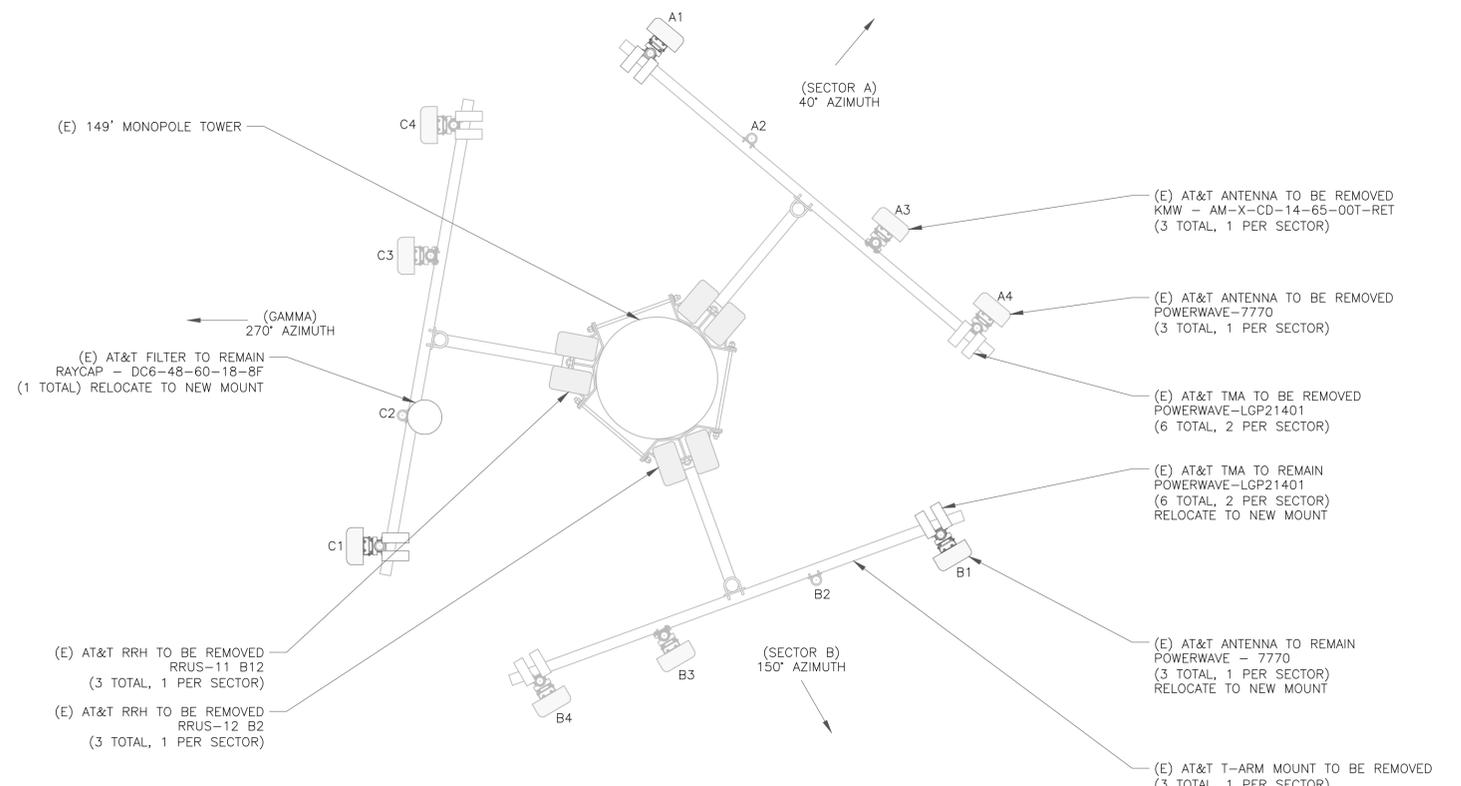
THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB 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.

**TOWER ANALYSIS NOTES:**

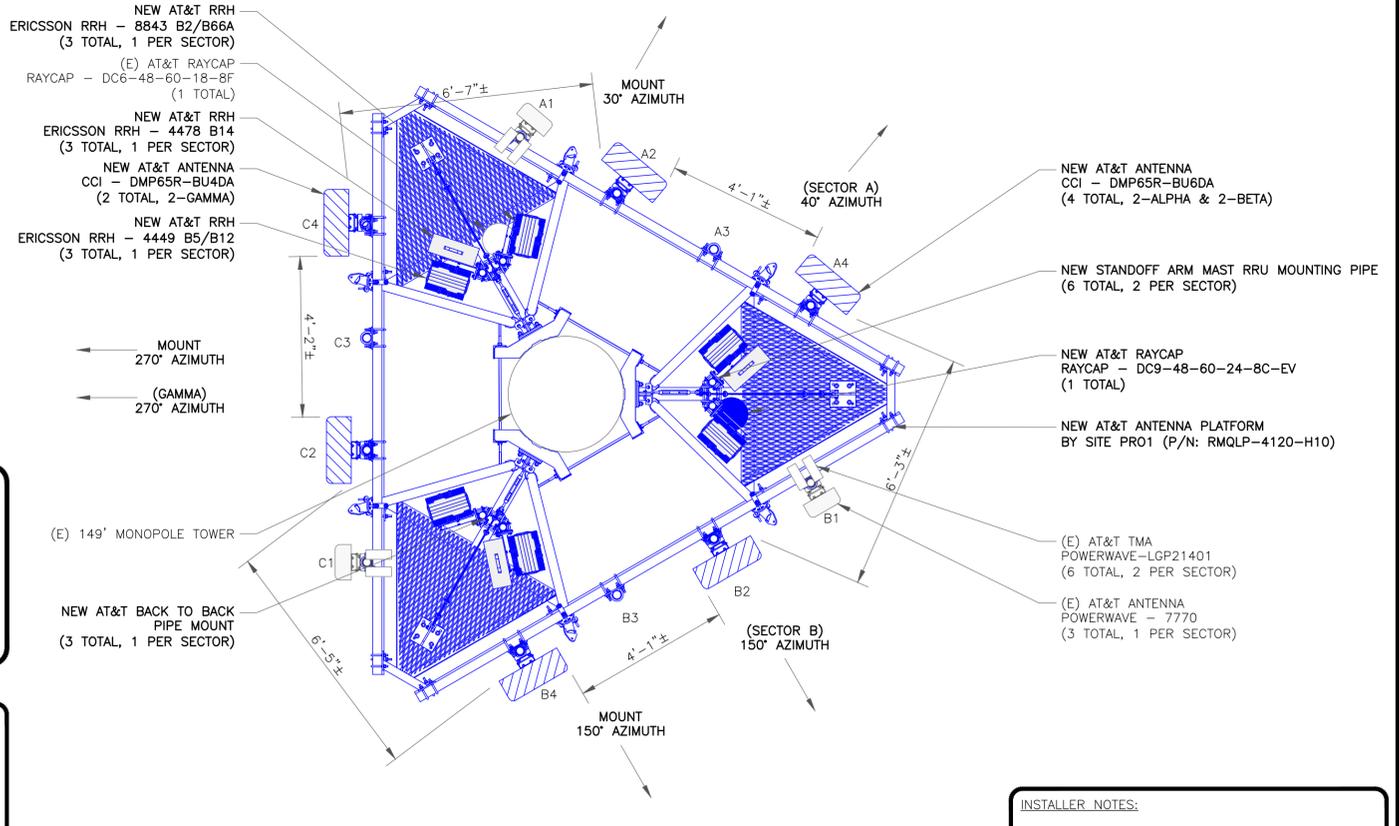
1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING TOWER ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE TOWER ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED TOWER MODIFICATION DESIGN OR TOWER REPLACEMENT SHALL BE APPROVED BY EOR.

**MOUNT ANALYSIS NOTES:**

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING MOUNT ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE MOUNT ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED MOUNT MODIFICATION DESIGN OR MOUNT REPLACEMENT SHALL BE APPROVED BY EOR.



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



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

**INSTALLER NOTES:**

1. REFERENCE C-3 FOR FINAL EQUIPMENT SCHEDULE.
2. REFERENCE C-4 FOR NEW EQUIPMENT SPECIFICATIONS.
3. CONTRACTOR TO VERIFY FILTER LOCATION PRIOR TO INSTALLATION.

575 MOROSGO DRIVE  
ATLANTA, GA 30324-3300

1200 MACARTHUR BLVD, SUITE 200  
MAHWAH, NJ 07430

TOWER ENGINEERING PROFESSIONALS  
326 TRYON RD  
RALEIGH, NC 27603  
(919) 661-6351  
TEP JOB #: 575426.80750

AT&T SITE NUMBER:  
**CTL02158**

BU #: 876343  
**GUILFORD WEST STONE PROPERTY**

1919 BOSTON POST ROAD  
GUILFORD, CT 06437  
(NEW HAVEN COUNTY)

EXISTING 149' MONOPOLE

**ISSUED FOR:**

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	08/05/21	SPK	CONSTRUCTION	BSE
1	09/14/21	EDR	CONSTRUCTION	JTC

09/14/21

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SHEET NUMBER: **C-2** REVISION: **1**

**NOTES**

1. SEE FINAL ANTENNA SCHEDULE FOR MODEL NUMBERS AND AZIMUTHS.
2. PROPOSED EQUIPMENT MOUNTED TO THE TOWER TO BE INSTALLED IN A MANNER THAT DOES NOT INTERFERE WITH CLIMBING APPARATUS.

EXISTING ANTENNA SCHEDULE														
SECTOR	ANTENNA				TMA	RRH	RAYCAP	DIPLEXER	TRANSMISSION LINE					
	POS.	TECHNOLOGY	AZIMUTH	MODEL NO.	RAD CL.	MODEL NO.	MODEL NO.	MODEL NO.	MODEL NO.	DC POWER	FIBER	COAX		
A	A1	UMTS 850	40°	POWERWAVE 7770	108'-0"	(2) POWERWAVE - LGP21401	-	-	(2) POWERWAVE-LGP21901 (GROUND MOUNTED)	(2) EXISTING	(1) EXISTING	2		
	A2	-	-	-	-	-	-	-	-			-		
	A3	LTE 700 LTE 1900	40°	*KMW AM-X-CD-16-65-00T-RET	108'-0"	-	*(1) RRUS-11 B12 *(1) RRUS-12 B12	(1) RAYCAP DC6-48-60-18-8F	-			-		
	A4	GSM 850	40°	*POWERWAVE 7770	108'-0"	(2) POWERWAVE - LGP21401	-	-	*(2) POWERWAVE-LGP21901 (GROUND MOUNTED)			**2		
B	B1	UMTS 850	150°	POWERWAVE 7770	108'-0"	(2) POWERWAVE - LGP21401	-	-	(2) POWERWAVE-LGP21901 (GROUND MOUNTED)			-	-	2
	B2	-	-	-	-	-	-	-	-			-	-	
	B3	LTE 700 LTE 1900	150°	*KMW AM-X-CD-16-65-00T-RET	108'-0"	-	*(1) RRUS-11 B12 *(1) RRUS-12 B12	-	-			-		
	B4	GSM 850	150°	*POWERWAVE 7770	108'-0"	(2) POWERWAVE - LGP21401	-	-	*(2) POWERWAVE-LGP21901 (GROUND MOUNTED)			**2		
C	C1	UMTS 850	270	POWERWAVE 7770	108'-0"	(2) POWERWAVE - LGP21401	-	-	(2) POWERWAVE-LGP21901 (GROUND MOUNTED)			-	-	2
	C2	-	-	-	-	-	-	-	-			-	-	
	C3	LTE 700 LTE 1900	270	*KMW AM-X-CD-16-65-00T-RET	108'-0"	-	*(1) RRUS-11 B12 *(1) RRUS-12 B12	-	-			-		
	C4	GSM 850	270	*POWERWAVE 7770	108'-0"	(2) POWERWAVE - LGP21401	-	-	*(2) POWERWAVE-LGP21901 (GROUND MOUNTED)			**2		

\*ANTENNA/TOWER MOUNTED EQUIPMENT TO BE REMOVED  
\*\*COAX TO BE REMOVED

1 EXISTING EQUIPMENT SCHEDULE  
SCALE: NOT TO SCALE

FINAL ANTENNA SCHEDULE														
SECTOR	ANTENNA				TMA	RRH	RAYCAP	DIPLEXER	TRANSMISSION LINE					
	POS.	TECHNOLOGY	AZIMUTH	MODEL NO.	RAD CL.	MODEL NO.	MODEL NO.	MODEL NO.	MODEL NO.	DC POWER	FIBER	COAX		
A	A1	UMTS 850	40°	POWERWAVE 7770	108'-0"	(2) POWERWAVE-LGP21401	-	-	(2) POWERWAVE-LGP21901 (GROUND-MOUNTED)	(2) EXISTING (3) PROPOSED	(1) EXISTING (1) PROPOSED	2		
	A2	LTE 700 LTE AWS	40°	CCI DMP65R-BU6DA	108'-0"	-	(1) RRH 4478 B14	(1) RAYCAP DC6-48-60-18-8F	-			-		
	A3	-	-	-	-	-	-	-	-			-		
	A4	LTE 700, LTE 850, LTE 1900, 5G 850	40°	CCI DMP65R-BU6DA	108'-0"	-	(1) RRH 4449 B5/B12 (1) RRH 8843 B2/B66A	(1) RAYCAP DC9-48-60-24-8C-EV	-			-		
B	B1	UMTS 850	150	POWERWAVE 7770	108'-0"	(2) POWERWAVE-LGP21401	-	-	(2) POWERWAVE-LGP21901 (GROUND-MOUNTED)			-	-	2
	B2	LTE 700 LTE AWS	150	CCI DMP65R-BU6DA	108'-0"	-	(1) RRH 4478 B14	-	-			-	-	
	B3	-	-	-	108'-0"	-	-	-	-			-	-	
	B4	LTE 700, LTE 850, LTE 1900, 5G 850	150	CCI DMP65R-BU6DA	108'-0"	-	(1) RRH 4449 B5/B12 (1) RRH 8843 B2/B66A	-	-			-		
C	C1	UMTS 850	270	POWERWAVE 7770	108'-0"	(2) POWERWAVE-LGP21401	-	-	(2) POWERWAVE-LGP21901 (GROUND-MOUNTED)			-	-	2
	C2	LTE 700 LTE AWS	270	CCI DMP65R-BU4DA	-	-	(1) RRH 4478 B14	-	-			-	-	
	C3	-	-	-	108'-0"	-	-	-	-			-	-	
	C4	LTE 700, LTE 850, LTE 1900, 5G 850	270	CCI DMP65R-BU4DA	108'-0"	-	(1) RRH 4449 B5/B12 (1) RRH 8843 B2/B66A	-	-			-		

NEW ANTENNA/TOWER MOUNTED EQUIPMENT IN BOLD.

2 FINAL EQUIPMENT SCHEDULE  
SCALE: NOT TO SCALE



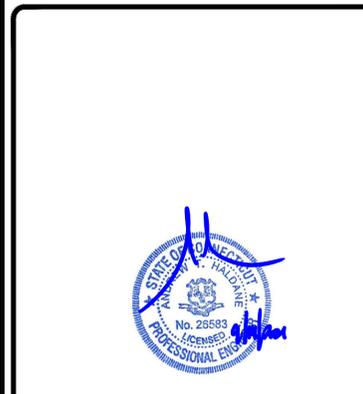
AT&T SITE NUMBER:  
**CTL02158**

BU #: 876343  
**GUILFORD WEST STONE  
PROPERTY**

1919 BOSTON POST ROAD  
GUILFORD, CT 06437  
(NEW HAVEN COUNTY)

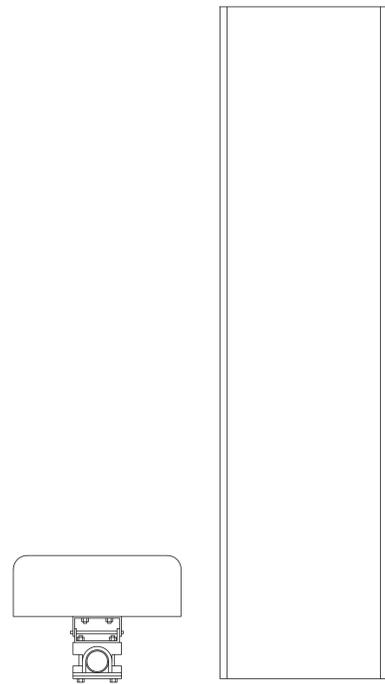
EXISTING 149' MONOPOLE

ISSUED FOR:				
REV	DATE	DRWN	DESCRIPTION	DES/QA
0	08/05/21	SPK	CONSTRUCTION	BSE
1	09/14/21	EDR	CONSTRUCTION	JTC



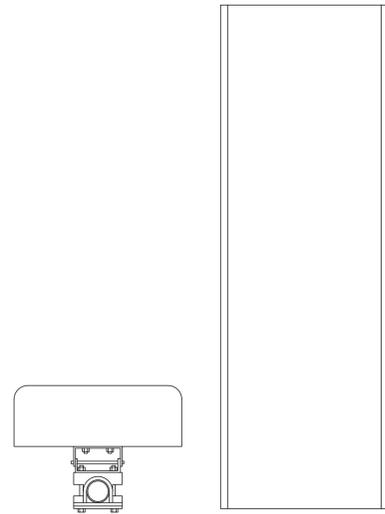
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SHEET NUMBER: **C-3** REVISION: **1**



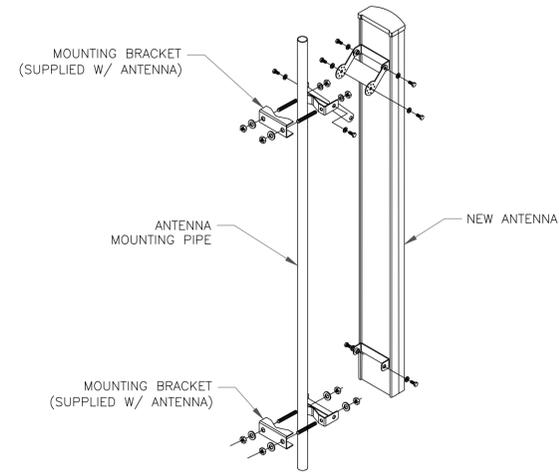
CCI - DMP65R-BU6DA  
WEIGHT (WITHOUT MOUNTING HARDWARE): 96.0 LBS  
SIZE (HxWxD): 71.2x20.7x7.7 IN.

1 CCI - DMP65R-BU6DA  
SCALE: NOT TO SCALE

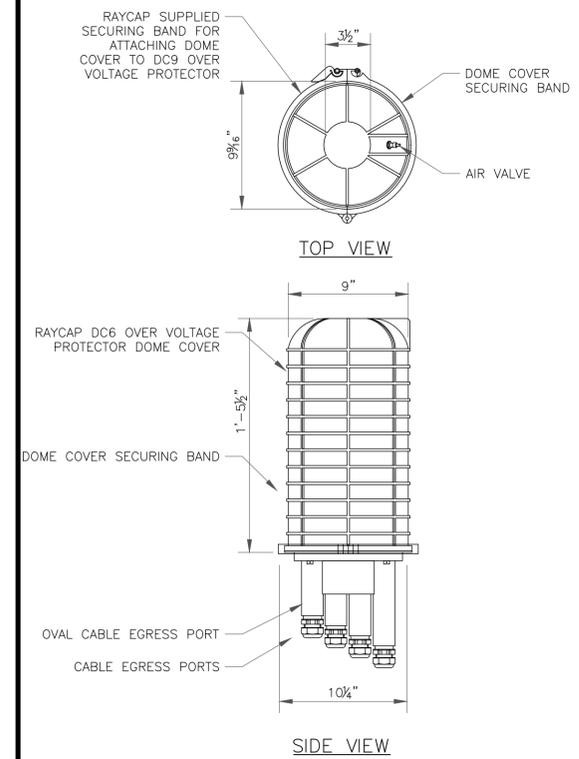


CCI - DMP65R-BU4DA  
WEIGHT (WITHOUT MOUNTING HARDWARE): 67.9 LBS  
SIZE (HxWxD): 48.0x20.7x7.7 IN.

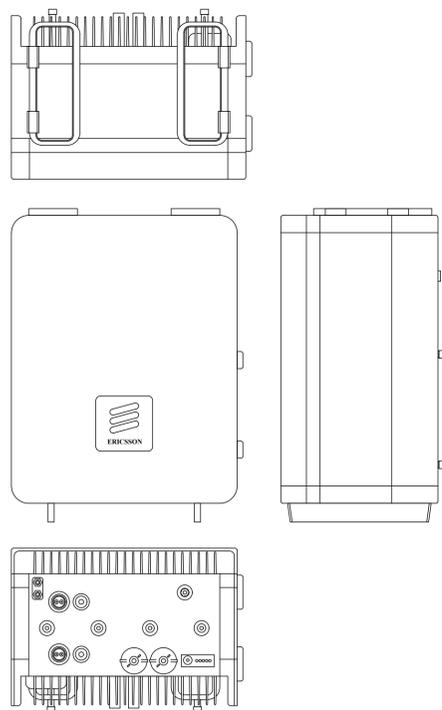
2 CCI - DMP65R-BU4DA  
SCALE: NOT TO SCALE



3 ANTENNA MOUNTING DETAIL  
SCALE: NOT TO SCALE

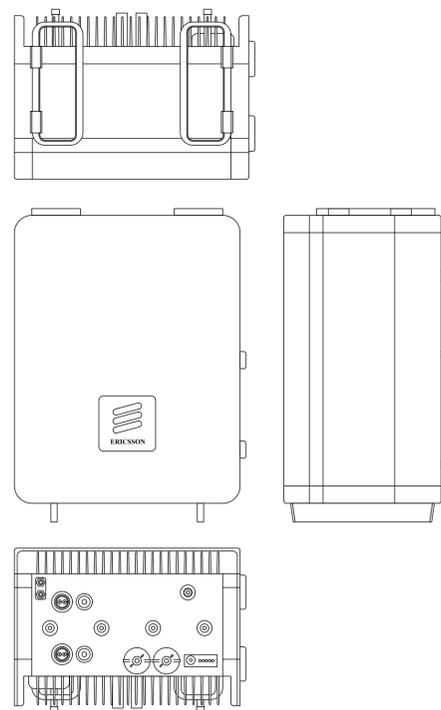


4 RAYCAP-DC9-48-60-24-8C-EV  
SCALE: NOT TO SCALE



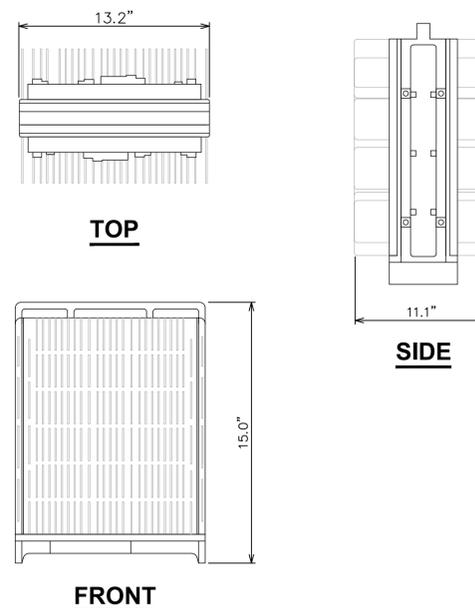
ERICSSON - RADIO 4449 B5+B12  
WEIGHT: 75.0 LBS  
SIZE (HxWxD): 15x13.2x10.2 IN.

5 ERICSSON - RADIO 4449 B5+B12  
SCALE: NOT TO SCALE



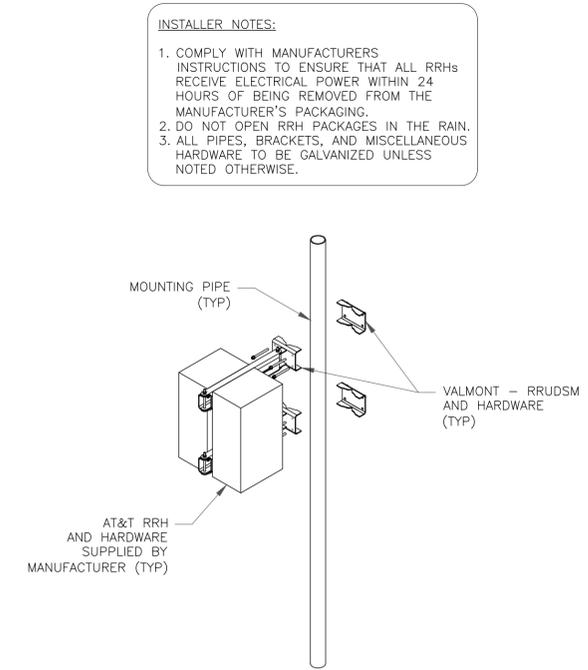
ERICSSON - RADIO 4478 B14  
WEIGHT: 59.9 LBS  
SIZE (HxWxD): 16.5x13.4x7.7 IN.

6 ERICSSON - RADIO 4478 B14  
SCALE: NOT TO SCALE



ERICSSON - RADIO 8843 B2/B66A  
WEIGHT: 75 LBS  
SIZE (HxWxD): 15x13.2x11.1 IN.

7 ERICSSON - RADIO 8843 B2+B66A  
SCALE: NOT TO SCALE



8 RRHs MOUNTING DETAIL  
SCALE: NOT TO SCALE



AT&T SITE NUMBER:  
**CTL02158**

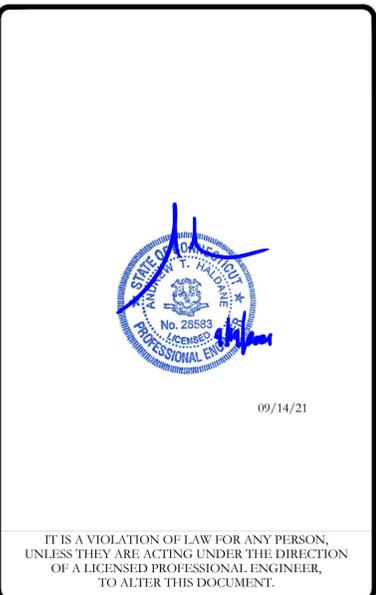
BU #: 876343  
**GUILFORD WEST STONE PROPERTY**

1919 BOSTON POST ROAD  
GUILFORD, CT 06437  
(NEW HAVEN COUNTY)

EXISTING 149' MONOPOLE

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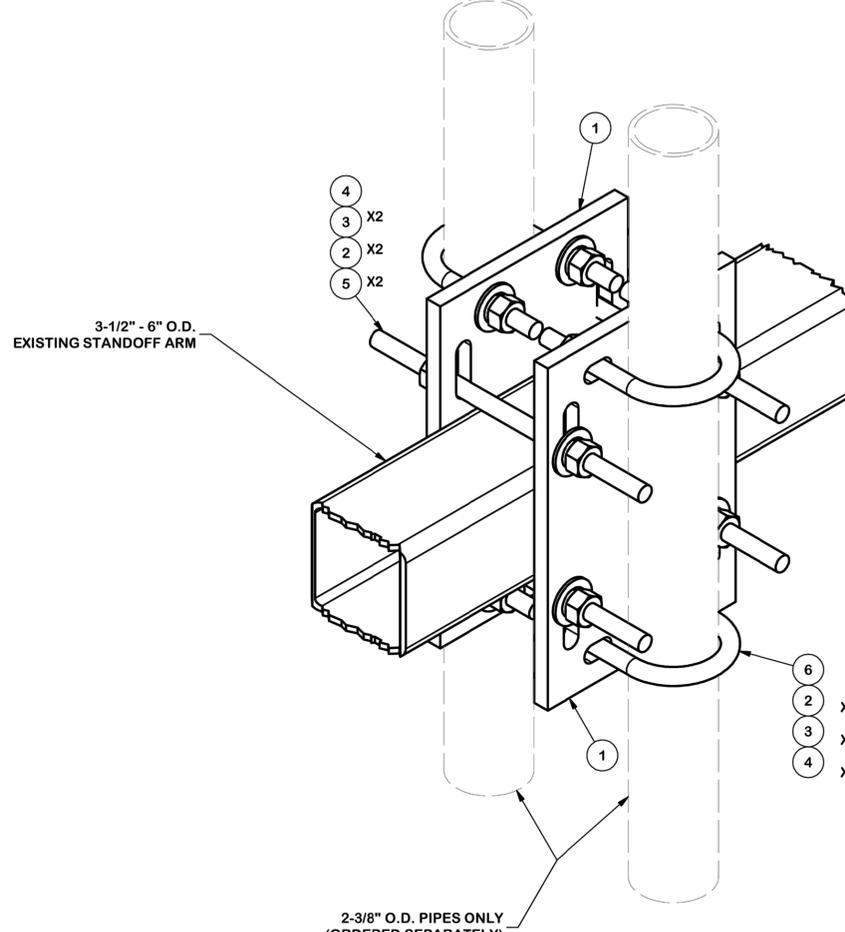
SHEET NUMBER: **C-4** REVISION: **1**

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES/QA
0	08/05/21	SPK	CONSTRUCTION	BSE
1	09/14/21	EDR	CONSTRUCTION	JTC

FOR REFERENCE ONLY

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3-1/2" - 6" O.D.  
EXISTING STANDOFF ARM

2-3/8" O.D. PIPES ONLY  
(ORDERED SEPARATELY)

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	2	SCX6	CROSSOVER PLATE	11 in	10.62	21.23
2	16	G12FW	1/2" HDG USS FLATWASHER		0.03	0.54
3	16	G12LW	1/2" HDG LOCKWASHER		0.01	0.22
4	16	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.14
5	4	G12R-10	1/2" x 10" THREADED ROD (HDG.)		3.23	12.91
6	4	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.66	2.63
					TOTAL WT. #	38.67

**TOLERANCE NOTES**

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

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

DESCRIPTION		BACK TO BACK PIPE MOUNT 2-3/8" PIPES	
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	CEK 4/26/2013		BBPM-K3
CLASS	SUB	DRAWING USAGE	CHECKED BY
81	03	CUSTOMER	BMC 4/26/2013
		DWG. NO.	BBPM-K3

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

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

PAGE  
1 OF 1

1 BACK TO BACK PIPE MOUNT  
SCALE: NOT TO SCALE



**Table 1: E. PA/S. NJ/DE Coax Trunk/Jumper Color Code Definition**

Sector	Alpha	Green
	Beta	Blue
	Gamma	White
	Delta	Orange
	Epsilon	Brown
	Psi	Violet
Frequency Band	700 (B/C)	Violet
	850	Yellow
	850 - 2nd Block	Yellow
	1900	Red
	1900 - 2nd Block	Red
	2100 (AWS)	Orange
	2100 (AWS) - 2nd Block	Orange
	2300 (WCS)	Brown
	2300 (WCS) - 2nd Block	Brown
	700 (D/E)	Slate
	700 - FIRSTNET	Violet/ Blue

**Table 2 E. PA/S. NJ/DE Coax Trunk/Jumper Color Code Standard**

Sector	Technology	Frequency Band	Color Code - Additional Stripe for Sector Split	Color Code - Sector (Amount of Stripes based on Antenna Position)	BOTTOM - Code Code - Frequency Band (RRH JUMPERS ONLY)	45+ Coax	45- Coax	TOP - Low Port (ANTENNA JUMPERS ONLY)	TOP - High Port (ANTENNA JUMPERS ONLY)
A	LTE	700 B/C	Blank	GREEN	VIOLET	YELLOW	Blank	Blank	RED
A	LTE	850	Blank	GREEN	YELLOW	YELLOW	Blank	Blank	RED
A	LTE	850 - 2nd Block	Blank	GREEN	YELLOW	YELLOW	Blank	Blank	RED
A	LTE	1900	Blank	GREEN	RED	YELLOW	Blank	Blank	RED
A	LTE	1900 - 2nd Block	Blank	GREEN	RED	YELLOW	Blank	Blank	RED
A	LTE	2100	Blank	GREEN	ORANGE	YELLOW	Blank	Blank	RED
A	LTE	2100 - 2nd Block	Blank	GREEN	ORANGE	YELLOW	Blank	Blank	RED
A	LTE	700 D/E	Blank	GREEN	SLATE	YELLOW	Blank	Blank	RED
A	LTE	2300	Blank	GREEN	BROWN	YELLOW	Blank	Blank	RED
A	LTE	2300 - 2nd Block	Blank	GREEN	BROWN	YELLOW	Blank	Blank	RED
A	LTE FirstNet	700 - FirstNet	Blank	GREEN	VIOLET	BLUE	YELLOW	Blank	RED
A	UMTS	850	Blank	GREEN	YELLOW	YELLOW	Blank	Blank	RED
A	UMTS	1900	Blank	GREEN	RED	YELLOW	Blank	Blank	RED
B	LTE	700 B/C	Blank	BLUE	VIOLET	YELLOW	Blank	Blank	RED
B	LTE	850	Blank	BLUE	YELLOW	YELLOW	Blank	Blank	RED
B	LTE	850 - 2nd Block	Blank	BLUE	YELLOW	YELLOW	Blank	Blank	RED
B	LTE	1900	Blank	BLUE	RED	YELLOW	Blank	Blank	RED
B	LTE	1900 - 2nd Block	Blank	BLUE	RED	YELLOW	Blank	Blank	RED
B	LTE	2100	Blank	BLUE	ORANGE	YELLOW	Blank	Blank	RED
B	LTE	2100 - 2nd Block	Blank	BLUE	ORANGE	YELLOW	Blank	Blank	RED
B	LTE	700 D/E	Blank	BLUE	SLATE	YELLOW	Blank	Blank	RED
B	LTE	2300	Blank	BLUE	BROWN	YELLOW	Blank	Blank	RED
B	LTE	2300 - 2nd Block	Blank	BLUE	BROWN	YELLOW	Blank	Blank	RED
B	LTE FirstNet	700 - FirstNet	Blank	BLUE	VIOLET	BLUE	YELLOW	Blank	RED
B	UMTS	850	Blank	BLUE	YELLOW	YELLOW	Blank	Blank	RED
B	UMTS	1900	Blank	BLUE	RED	YELLOW	Blank	Blank	RED
C	LTE	700 B/C	Blank	WHITE	VIOLET	YELLOW	Blank	Blank	RED
C	LTE	850	Blank	WHITE	YELLOW	YELLOW	Blank	Blank	RED
C	LTE	850 - 2nd Block	Blank	WHITE	YELLOW	YELLOW	Blank	Blank	RED
C	LTE	1900	Blank	WHITE	RED	YELLOW	Blank	Blank	RED
C	LTE	1900 - 2nd Block	Blank	WHITE	RED	YELLOW	Blank	Blank	RED
C	LTE	2100	Blank	WHITE	ORANGE	YELLOW	Blank	Blank	RED
C	LTE	2100 - 2nd Block	Blank	WHITE	ORANGE	YELLOW	Blank	Blank	RED
C	LTE	700 D/E	Blank	WHITE	SLATE	YELLOW	Blank	Blank	RED
C	LTE	2300	Blank	WHITE	BROWN	YELLOW	Blank	Blank	RED
C	LTE	2300 - 2nd Block	Blank	WHITE	BROWN	YELLOW	Blank	Blank	RED
C	LTE FirstNet	700 - FirstNet	Blank	WHITE	VIOLET	BLUE	YELLOW	Blank	RED
C	UMTS	850	Blank	WHITE	YELLOW	YELLOW	Blank	Blank	RED
C	UMTS	1900	Blank	WHITE	RED	YELLOW	Blank	Blank	RED
D	LTE	700 B/C	Blank	ORANGE	VIOLET	YELLOW	Blank	Blank	RED
D	LTE	850	Blank	ORANGE	YELLOW	YELLOW	Blank	Blank	RED
D	LTE	850 - 2nd Block	Blank	ORANGE	YELLOW	YELLOW	Blank	Blank	RED
D	LTE	1900	Blank	ORANGE	RED	YELLOW	Blank	Blank	RED
D	LTE	1900 - 2nd Block	Blank	ORANGE	RED	YELLOW	Blank	Blank	RED
D	LTE	2100	Blank	ORANGE	ORANGE	YELLOW	Blank	Blank	RED
D	LTE	2100 - 2nd Block	Blank	ORANGE	ORANGE	YELLOW	Blank	Blank	RED
D	LTE	700 D/E	Blank	ORANGE	SLATE	YELLOW	Blank	Blank	RED
D	LTE	2300	Blank	ORANGE	BROWN	YELLOW	Blank	Blank	RED
D	LTE	2300 - 2nd Block	Blank	ORANGE	BROWN	YELLOW	Blank	Blank	RED
D	LTE FirstNet	700 - FirstNet	Blank	ORANGE	VIOLET	BLUE	YELLOW	Blank	RED
D	UMTS	850	Blank	ORANGE	YELLOW	YELLOW	Blank	Blank	RED
D	UMTS	1900	Blank	ORANGE	RED	YELLOW	Blank	Blank	RED

AT&T SITE NUMBER:  
**CTL02158**

BU #: 876343  
**GUILFORD WEST STONE PROPERTY**

1919 BOSTON POST ROAD  
GUILFORD, CT 06437  
(NEW HAVEN COUNTY)

EXISTING 149' MONOPOLE

**ISSUED FOR:**

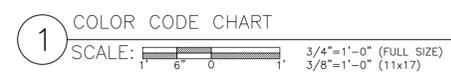
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	08/05/21	SPK	CONSTRUCTION	BSE
1	09/14/21	EDR	CONSTRUCTION	JTC

09/14/21

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SHEET NUMBER: **C-6** REVISION: **1**

**COAX COLOR CODE**





### 3. ATT Naming Convention for "RET NAME"

ATT-002-290-125 (Issue 8, 02/03/14)  
Antenna Remote Electrical Tilt (RET) Guidelines

Usage: [USID][CellId1][CellId2][CellId3][AntPos][FrequencyBand][Tech]

USID						CellId 1	CellId 2	CellId 3	AntPos	Freq	Tech
1	2	3	4	5	6	7	8	9	10	11	12

Field	Length	Description
USID	6	Six characters that define the sites USID. USID's less than 6 characters in length are preceded with 0's (zeros) (example: 003831)
CellId1	1	Allowed Value
		Description
		A Alpha
CellId2	1	B Beta
		C Gamma
CellId3	1	D Delta
		E Epsilon
AntPos	1	F Zeta
		- No Transmitter connected to this port
		Allowed Value
		Description
		1 Antenna Position 1 on this face
		2 Antenna Position 2 on this face
FreqBand	1	3 Antenna Position 3 on this face
		4 Antenna Position 4 on this face
		5 Antenna Position 5 on this face
		Allowed Value
		Description
		2 2100 MHz (AWS)
7 700 MHz		
8 850 MHz		
9 1900 MHz		
Q 700 MHz D & E Band Only		
W 2300 MHz (WCS)		

Field	Length	Description				
		Allowed Value	GSM	UMTS	LTE	Split Sector
Tech	1	G	GSM			
		J	GSM	UMTS		
		K	GSM		LTE	
		L			LTE	
		N				
		U		UMTS		
		V		UMTS	LTE	
		Y	GSM	UMTS	LTE	
		H	GSM			Split
		M	GSM	UMTS		Split
		P	GSM		LTE	Split
		Q			LTE	Split
		R				Split
		S		UMTS		Split
		T		UMTS	LTE	Split

AT&T SITE NUMBER:  
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SHEET NUMBER: <b>E-1</b>	REVISION: <b>1</b>
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**SCOPE:**

1. PROVIDE LABOR, MATERIALS, INSPECTION, AND TESTING TO PROVIDE CODE COMPLIANCE FOR ELECTRIC, TELEPHONE, AND GROUNDING/LIGHTNING SYSTEMS.

**CODES:**

1. THE INSTALLATION SHALL COMPLY WITH APPLICABLE LAWS AND CODES. THESE INCLUDE BUT ARE NOT LIMITED TO THE LATEST ADOPTED EDITIONS OF:
  - A. THE NATIONAL ELECTRICAL SAFETY CODE
  - B. THE NATIONAL ELECTRIC CODE – NFPA-70
  - C. REGULATIONS OF THE SERVING UTILITY COMPANY
  - D. LOCAL AND STATE AMENDMENTS
  - E. THE INTERNATIONAL ELECTRIC CODE – IEC (WHERE APPLICABLE)
2. PERMITS REQUIRED SHALL BE OBTAINED BY THE CONTRACTOR.
3. AFTER COMPLETION AND FINAL INSPECTION OF THE WORK, THE OWNER SHALL BE FURNISHED A CERTIFICATE OF COMPLETION AND APPROVAL.

**TESTING:**

1. UPON COMPLETION OF THE INSTALLATION, OPERATE AND ADJUST THE EQUIPMENT AND SYSTEMS TO MEET SPECIFIED PERFORMANCE REQUIREMENTS. THE TESTING SHALL BE DONE BY QUALIFIED PERSONNEL.

**GUARANTEE:**

1. IN ADDITION TO THE GUARANTEE OF THE EQUIPMENT BY THE MANUFACTURER, EACH PIECE OF EQUIPMENT SPECIFIED HEREIN SHALL ALSO BE GUARANTEED FOR DEFECTS OF MATERIAL OR WORKMANSHIP OCCURRING DURING A PERIOD OF ONE (1) YEAR FROM FINAL ACCEPTANCE OF THE WORK BY THE OWNER AND WITHOUT EXPENSE TO THE OWNER.
2. THE WARRANTY CERTIFICATES & GUARANTEES FURNISHED BY THE MANUFACTURERS SHALL BE TURNED OVER TO THE OWNER.

**UTILITY CO-ORDINATION:**

1. CONTRACTOR SHALL COORDINATE WORK WITH THE POWER AND TELEPHONE COMPANIES AND SHALL COMPLY WITH THE SERVICE REQUIREMENTS OF EACH UTILITY COMPANY.

**EXAMINATION OF SITE:**

1. PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL VISIT THE SITE OF THE JOB AND SHALL FAMILIARIZE HIMSELF WITH THE CONDITIONS AFFECTING THE PROPOSED ELECTRICAL INSTALLATION AND SHALL MAKE PROVISIONS AS TO THE COST THEREOF. FAILURE TO COMPLY WITH THE INTENT OF THIS SECTION WILL IN NO WAY RELIEVE THE CONTRACTOR OF PERFORMING THE WORK NECESSARY FOR A COMPLETE AND WORKING SYSTEM OR SYSTEMS.

**CUTTING, PATCHING AND EXCAVATION:**

1. COORDINATION OF SLEEVES, CHASES, ETC., BETWEEN SUBCONTRACTORS WILL BE REQUIRED PRIOR TO THE CONSTRUCTION OF ANY PORTION OF THE WORK. CUTTING AND PATCHING OF WALLS, PARTITIONS, FLOORS, AND CHASES IN CONCRETE, WOOD, STEEL OR MASONRY SHALL BE DONE AS PROVIDED ON THE DRAWINGS.
2. NECESSARY EXCAVATIONS AND BACKFILLING INCIDENTAL TO THE ELECTRICAL WORK SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR UNLESS SPECIFICALLY NOTED OTHERWISE ON THE DRAWING.
3. SEAL PENETRATIONS THROUGH RATED WALLS, FLOORS, ETC., WITH APPROVED METHOD AS LISTED BY UL.

**RACEWAYS / CONDUITS GENERAL:**

1. CONDUCTORS SHALL BE INSTALLED IN LISTED RACEWAYS. CONDUIT SHALL BE RIGID STEEL, EMT, SCH40 PVC, OR SCH80PVC AS INDICATED ON THE DRAWINGS. THE RACEWAY SYSTEM SHALL BE COMPLETE COMPLETE BEFORE INSTALLING CONDUCTORS.
2. EXTERIOR RACEWAYS AND GROUNDING SLEEVES SHALL BE SEALED AT POINTS OF ENTRANCE AND EXIT. THE RACEWAY SYSTEM SHALL BE BONDED PER NEC.

**EXTERIOR CONDUIT:**

1. EXPOSED CONDUIT SHALL BE NEATLY INSTALLED AND RUN PARALLEL OR PERPENDICULAR TO STRUCTURAL ELEMENTS. SUPPORTS AND MOUNTING HARDWARE SHALL BE HOT DIPPED GALVANIZED STEEL.
2. THE CONDUIT SHALL BE RIGID STEEL AT GRADE TRANSITIONS OR WHERE EXPOSED TO DAMAGE.
3. UNDERGROUND CONDUITS SHALL BE RIGID STEEL, SCH40 PVC, OR SCH80 PVC AS INDICATED ON THE DRAWINGS.
4. BURIAL DEPTH OF CONDUITS SHALL BE AS REQUIRED BY CODE FOR EACH SPECIFIC CONDUIT TYPE AND APPLICATION, BUT SHALL NOT BE LESS THAN THE FROST DEPTH AT THE SITE.
5. CONDUIT ROUTES ARE SCHEMATIC. CONTRACTOR SHALL FIELD VERIFY ROUTES BEFORE BID. COORDINATE ROUTE WITH WIRELESS CARRIER AND/OR BUILDING OWNER.

**INTERIOR CONDUIT:**

1. CONCEALED CONDUIT IN WALLS OR INTERIOR SPACES ABOVE GRADE MAY BE EMT OR PVC.
2. CONDUIT RUNS SHALL USE APPROVED COUPLINGS AND CONNECTORS. PROVIDE INSULATED BUSHING FOR ALL CONDUIT TERMINATIONS. CONDUIT RUNS IN A WET LOCATION SHALL HAVE WATERPROOF FITTINGS.
3. PROVIDE SUPPORTS FOR CONDUITS IN ACCORDANCE WITH NEC REQUIREMENTS. CONDUITS SHALL BE SIZED AS REQUIRED BY NEC.

**EQUIPMENT:**

1. DISCONNECT SWITCHES SHALL BE SERVICE ENTRANCE RATED, HEAVY DUTY TYPE.
2. CONTRACTOR SHALL VERIFY MAXIMUM AVAILABLE FAULT CURRENT AND COORDINATE INSTALLATION WITH THE LOCAL UTILITY BEFORE STARTING WORK. CONTRACTOR WILL VERIFY THAT EXISTING CIRCUIT BREAKERS ARE RATED FOR MORE THAN AVAILABLE FAULT CURRENT AND REPLACE AS NECESSARY.
3. NEW CIRCUIT BREAKERS SHALL BE RATED TO WITHSTAND THE MAXIMUM AVAILABLE FAULT CURRENT AS DETERMINED BY THE LOCAL UTILITY.

**CONDUCTORS:**

1. FURNISH AND INSTALL CONDUCTORS SPECIFIED IN THE DRAWINGS. CONDUCTORS SHALL BE COPPER AND SHALL HAVE TYPE THWN (MIN) (75° C) INSULATION, RATED FOR 600 VOLTS.
2. THE USE OF ALUMINUM CONDUCTORS SHALL BE LIMITED TO THE SERVICE FEEDERS INSTALLED BY THE UTILITY.
3. CONDUCTORS SHALL BE PROVIDED AND INSTALLED AS FOLLOWS:
  - A. MINIMUM WIRE SIZE SHALL BE #12 AWG.
  - B. CONDUCTORS SIZE #8 AND LARGER SHALL BE STRANDED. CONDUCTORS SIZED #10 AND #12 MAY BE SOLID OR STRANDED.
  - C. CONNECTION FOR #10 AWG #12 AWG SHALL BE BY TWISTING TIGHT AND INSTALLING INSULATED PRESSURE OR WIRE NUT CONNECTIONS.
  - D. CONNECTION FOR #8 AWG AND LARGER SHALL BE BY USE OF STEEL CRIMP-ON SLEEVES WITH NYLON INSULATOR.
3. CONDUCTORS SHALL BE COLOR CODED IN ACCORDANCE WITH NEC STANDARDS.

**UL COMPLIANCE:**

1. ELECTRICAL MATERIALS, DEVICES, CONDUCTORS, APPLIANCES, AND EQUIPMENT SHALL BE LABELED/LISTED BY UL OR ACCEPTED BY JURISDICTION (I.E., LOCAL COUNTY OR STATE) APPROVED THIRD PARTY TESTING AGENCY.

**GROUNDING:**

1. ELECTRICAL NEUTRALS, RACEWAYS AND NON-CURRENT CARRYING PARTS OF ELECTRICAL EQUIPMENT AND ASSOCIATED ENCLOSURES SHALL BE GROUNDED IN ACCORDANCE WITH NEC ARTICLE 250. THIS SHALL INCLUDE NEUTRAL CONDUCTORS, CONDUITS, SUPPORTS, CABINETS, BOXES, GROUND BUSES, ETC. THE NEUTRAL CONDUCTOR FOR EACH SYSTEM SHALL BE GROUNDED AT A SINGLE POINT.
2. PROVIDE GROUND CONDUCTOR IN RACEWAYS PER NEC.
3. PROVIDE BONDING AND GROUND TO MEET NFPA 780 – "LIGHTNING PROTECTION" AS A MINIMUM.
4. PROVIDE GROUNDING SYSTEM AS INDICATED ON THE DRAWINGS, AS REQUIRED BY THE NATIONAL ELECTRIC CODE, RADIO EQUIPMENT MANUFACTURERS, AND MOTOROLA R56 (AS APPLICABLE).

ABBREVIATIONS AND LEGEND			
A	– AMPERE	PNLBD	– PANELBOARD
AFG	– ABOVE FINISHED GRADE	PVC	– RIGID NON-METALLIC CONDUIT
ATS	– AUTOMATIC TRANSFER SWITCH	RGS	– RIGID GALVANIZED STEEL CONDUIT
AWG	– AMERICAN WIRE GAUGE	SW	– SWITCH
BCW	– BARE COPPER WIRE	TGB	– TOWER GROUND BAR
BFG	– BELOW FINISHED GRADE	UL	– UNDERWRITERS LABORATORIES
BKR	– BREAKER	V	– VOLTAGE
C	– CONDUIT	W	– WATTS
CKT	– CIRCUIT	XFMR	– TRANSFORMER
DISC	– DISCONNECT	XMTR	– TRANSMITTER
EGR	– EXTERNAL GROUND RING		
EMT	– ELECTRIC METALLIC TUBING		
FSC	– FLEXIBLE STEEL CONDUIT		
GEN	– GENERATOR		
GPS	– GLOBAL POSITIONING SYSTEM		
GRD	– GROUND		
IGB	– ISOLATED GROUND BAR		
IGR	– INTERIOR GROUND RING (HALO)		
KW	– KILOWATTS		
NEC	– NATIONAL ELECTRIC CODE		
PCS	– PERSONAL COMMUNICATION SYSTEM		
PH	– PHASE		
PNL	– PANEL		

— E —	UNDERGROUND ELECTRICAL CONDUIT
— T —	UNDERGROUND TELEPHONE CONDUIT
	KILOWATT-HOUR METER
	UNDERGROUND BONDING AND GROUNDING CONDUCTOR.
⊘	GROUND ROD
●	CADWELD
⊗	GROUND ROD WITH INSPECTION WELL

1 ELECTRICAL NOTES  
SCALE: NOT TO SCALE

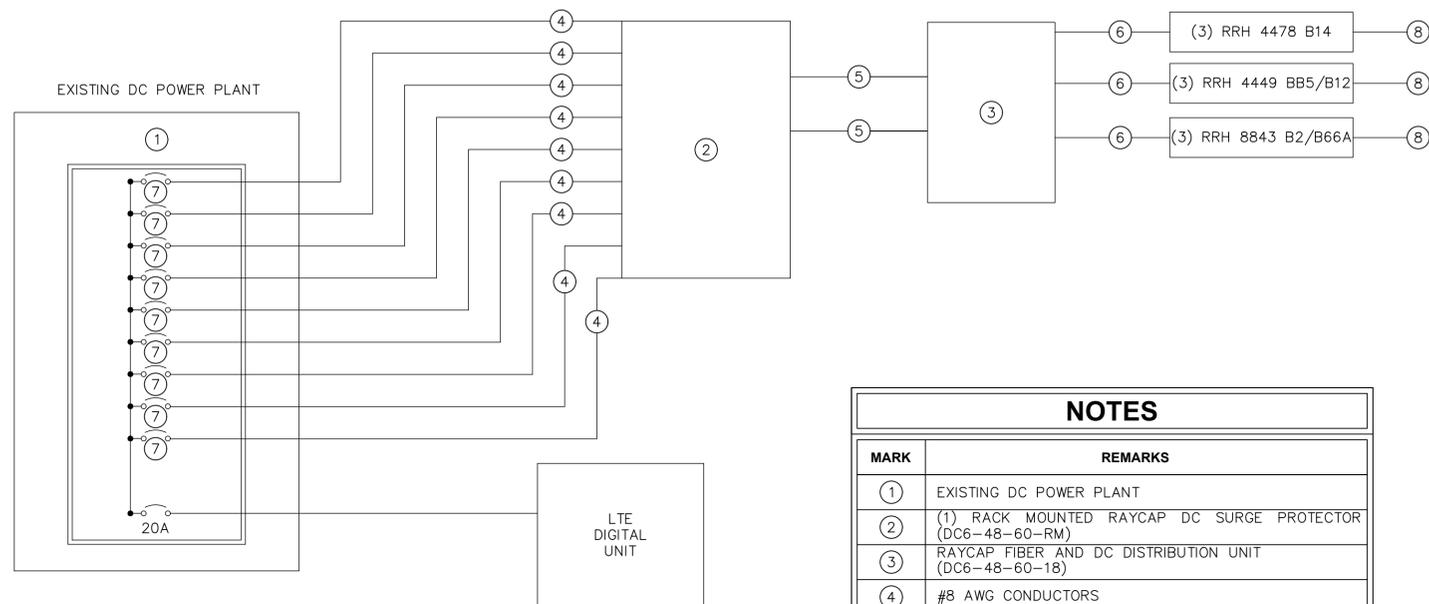
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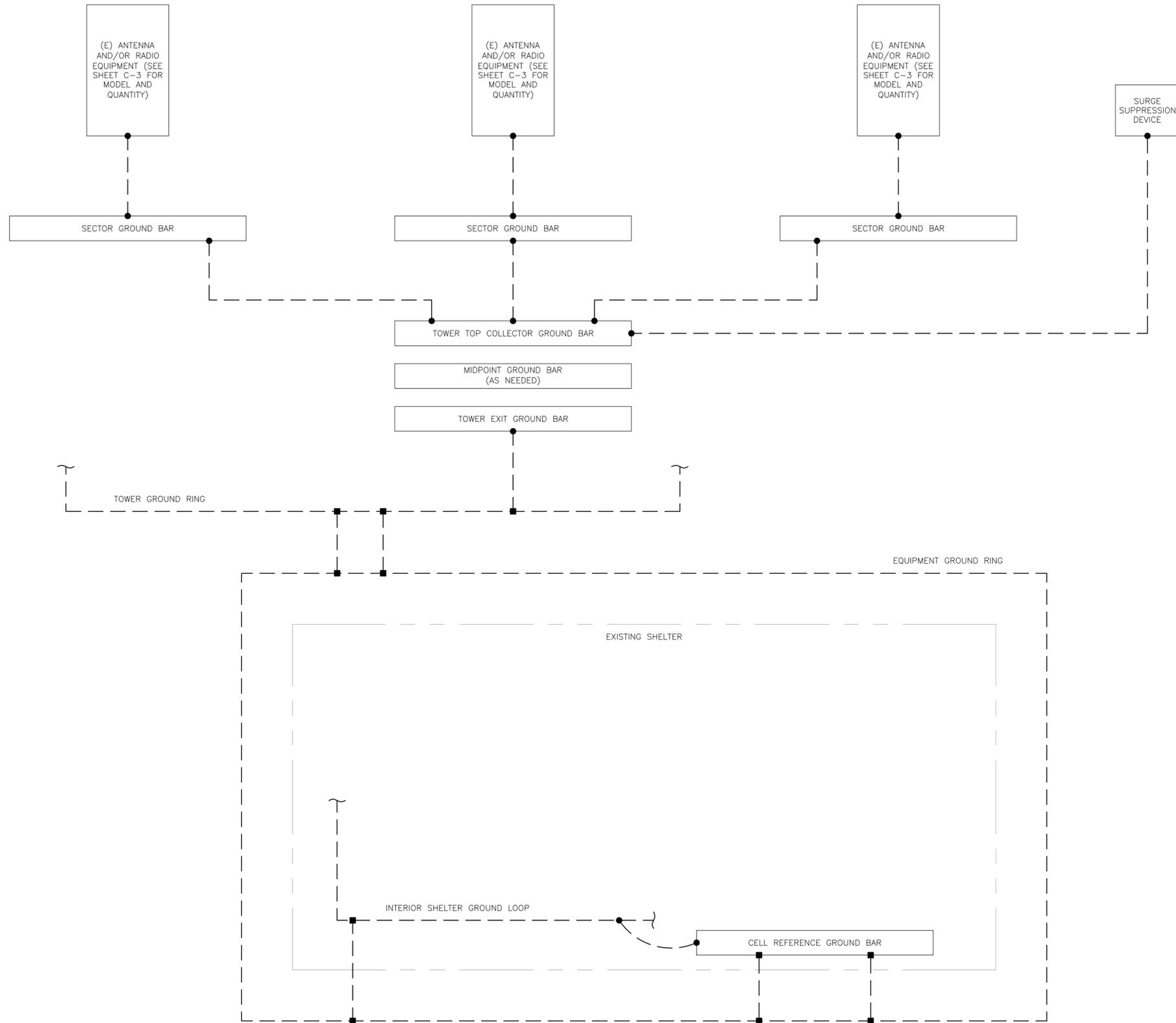
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NOTES	
MARK	REMARKS
①	EXISTING DC POWER PLANT
②	(1) RACK MOUNTED RAYCAP DC SURGE PROTECTOR (DC6-48-60-RM)
③	RAYCAP FIBER AND DC DISTRIBUTION UNIT (DC6-48-60-18)
④	#8 AWG CONDUCTORS
⑤	PROVIDE (2) 6-CONDUCTOR #8 AWG BUNDLES FOR DC POWER FROM RACK MOUNTED RAYCAP SURGE PROTECTION UNIT TO THE RAYCAP FIBER AND DISTRIBUTION UNIT ON TOWER
⑥	EXISTING FIBER AND DC CABLE ROUTED TO EXISTING RRH UNITS
⑦	REFER TO BREAKER SCHEDULE FOR BREAKER SIZES
⑧	REFER TO LATEST RFDS FOR RRH TECHNOLOGIES AND QUANTITIES

RRUS BREAKER SCHEDULE		
RRU MODEL	BREAKER SIZE	TECHNOLOGY
RRUS 32 B66	30A	AWS (2100)
RRUS 32 B30	20A	WCS (2300)
RRUS 32 B2	30A	PCS (1900)
RRUS 11	25A	VARIOUS BANDS (700 [B12], 850 [B5], 1900 [B2], 2100 [B4])
RRUS 12	25A	VARIOUS BANDS (850 [B5], 1900 [B2], 2100 [B4])
RRUS 4415 B25	25A	1900
RRUS 4426 B66	30A	2100
RRUS 4478 B14	25A	700
RRUS 4478 B5	25A	850
RRUS E2 B29	25A	700
RRUS 4449 B5/B12	(2) 25A	700/850
RRUS 8843 B2/B66	(2) 30A	1900/2100
RRUS 2203 B5	10A	850
RRUS 2205 B46	10A	5 GHz

① EQUIPMENT ONE-LINE DIAGRAM  
SCALE: NOT TO SCALE



**GROUNDING PLAN LEGEND:**

- GROUND WIRE
- EXOTHERMIC WELD
- MECHANICAL CONNECTION
- COPPER GROUND ROD
- ⊗ GROUND ROD W/ TEST WELL

**CELL REFERENCE GROUND BAR:** POINT OF GROUND REFERENCE FOR ALL COMMUNICATIONS EQUIPMENT FRAMES. ALL BONDS ARE MADE WITH #2 STRANDED GREEN INSULATED COPPER CONDUCTORS. BOND TO GROUND RING WITH (2) #2 SOLID TINNED COPPER CONDUITS (ATT-TP-76416 7.6.7).

**HATCH PLATE GROUND BAR:** BOND TO THE INTERIOR GROUND RING WITH (2) #2 STRANDED GREEN INSULATED COPPER CONDUCTORS. WHEN A HATCH-PLATE AND A CELL REFERENCE GROUND BAR ARE BOTH PRESENT, THE CELL SITE REFERENCE GROUND BAR MUST BE CONNECTED TO THE HATCH-PLATE AND TO THE INTERIOR GROUND RING USING (2) #2 STRANDED GREEN INSULATED COPPER CONDUCTORS.

**EXTERIOR CABLE ENTRY PORT GROUND BARS:** LOCATED AT THE ENTRANCE TO THE CELL SITE BUILDING. BOND TO GROUND RING WITH A #2 SOLID TINNED COPPER CONDUCTORS WITH AN EXOTHERMIC WELD AND INSPECTION SLEEVE (ATT-TP-76416 7.6.7.2).

**DURING ALL DC POWER SYSTEM CHANGES** INCLUDING DC SYSTEM CHANGE OUTS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OR CHANGES TO DC CONVERTER SYSTEMS IT SHALL BE REQUIRED THAT SERVICES CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH MASTER DC SYSTEM RETURN GROUND CONDUCTOR FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR PER TP76300 SECTION H 6 AND TP76416 FIGURE 7-11 REQUIREMENTS.

575 MOROSGO DRIVE  
ATLANTA, GA 30324-3300

1200 MACARTHUR BLVD, SUITE 200  
MAHWAH, NJ 07430

TOWER ENGINEERING PROFESSIONALS  
326 TRYON RD  
RALEIGH, NC 27603  
(919) 661-6351  
TEP JOB #: 575426.80750

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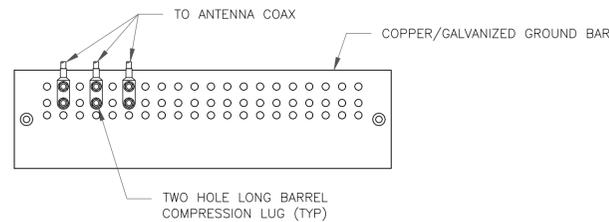
09/14/21

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1 GROUNDING SCHEMATIC  
SCALE: NOT TO SCALE

**SHEET NUMBER:**  
**G-1**

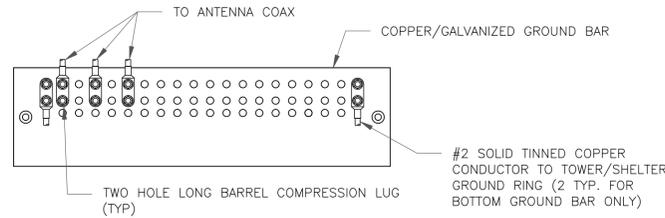
**REVISION:**  
**1**



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

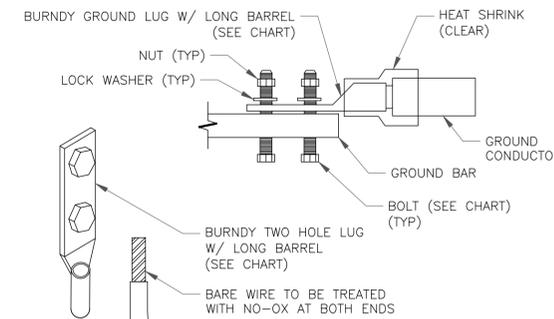


NOTES:

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

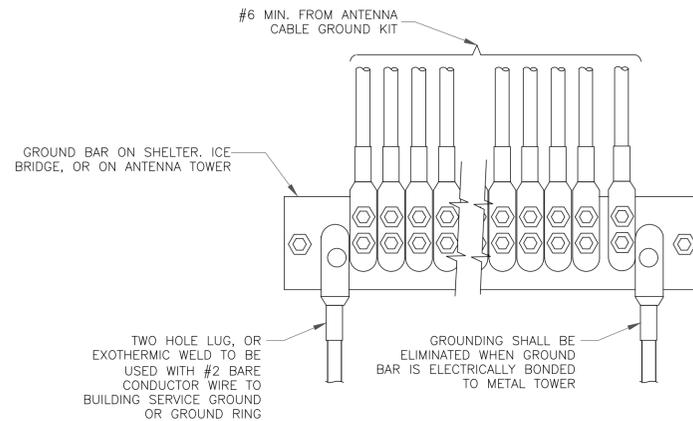
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC SS 2 BOLT
#2 SOLID TINNED	YA3C-2TC38	3/8" - 16 NC SS 2 BOLT
#2 STRANDED	YA2C-2TC38	3/8" - 16 NC SS 2 BOLT
#2/0 STRANDED	YA26-2TC38	3/8" - 16 NC SS 2 BOLT
#4/0 STRANDED	YA28-2N	1/2" - 16 NC SS 2 BOLT



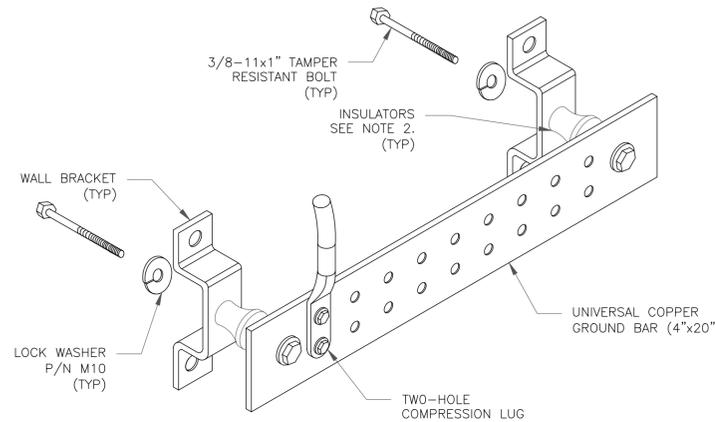
NOTE:

ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER, GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

3 MECHANICAL LUG CONNECTION  
SCALE: NOT TO SCALE



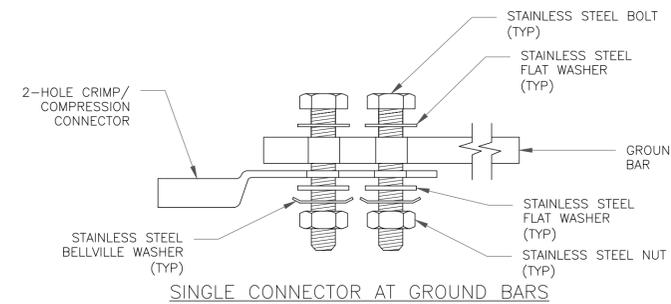
4 GROUNDWIRE INSTALLATION  
SCALE: NOT TO SCALE



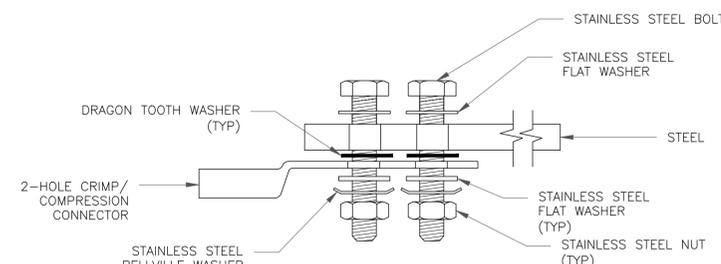
NOTES:

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.

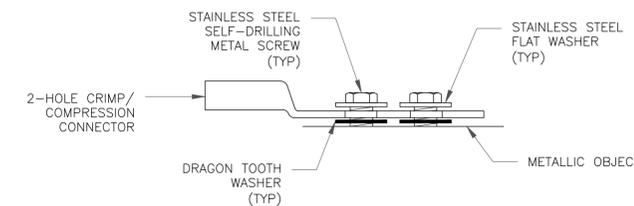
5 GROUND BAR DETAIL  
SCALE: NOT TO SCALE



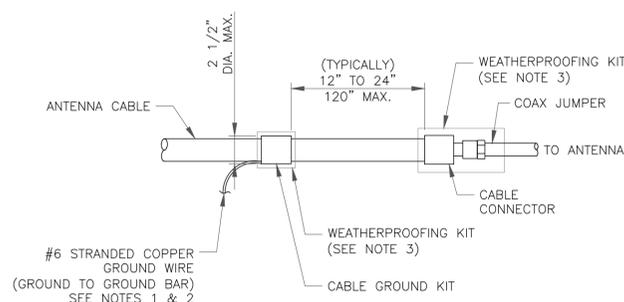
SINGLE CONNECTOR AT GROUND BARS



SINGLE CONNECTOR AT STEEL OBJECTS



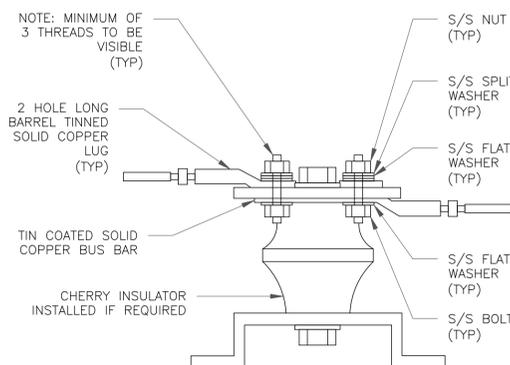
SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS



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.

6 CABLE GROUND KIT CONNECTION  
SCALE: NOT TO SCALE



7 LUG DETAIL  
SCALE: NOT TO SCALE

8 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS  
SCALE: NOT TO SCALE



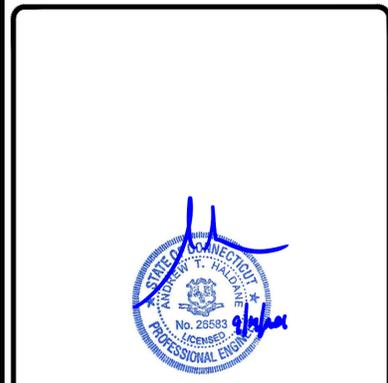
AT&T SITE NUMBER:  
**CTL02158**

BU #: 876343  
**GUILFORD WEST STONE PROPERTY**

1919 BOSTON POST ROAD  
GUILFORD, CT 06437  
(NEW HAVEN COUNTY)

EXISTING 149' MONOPOLE

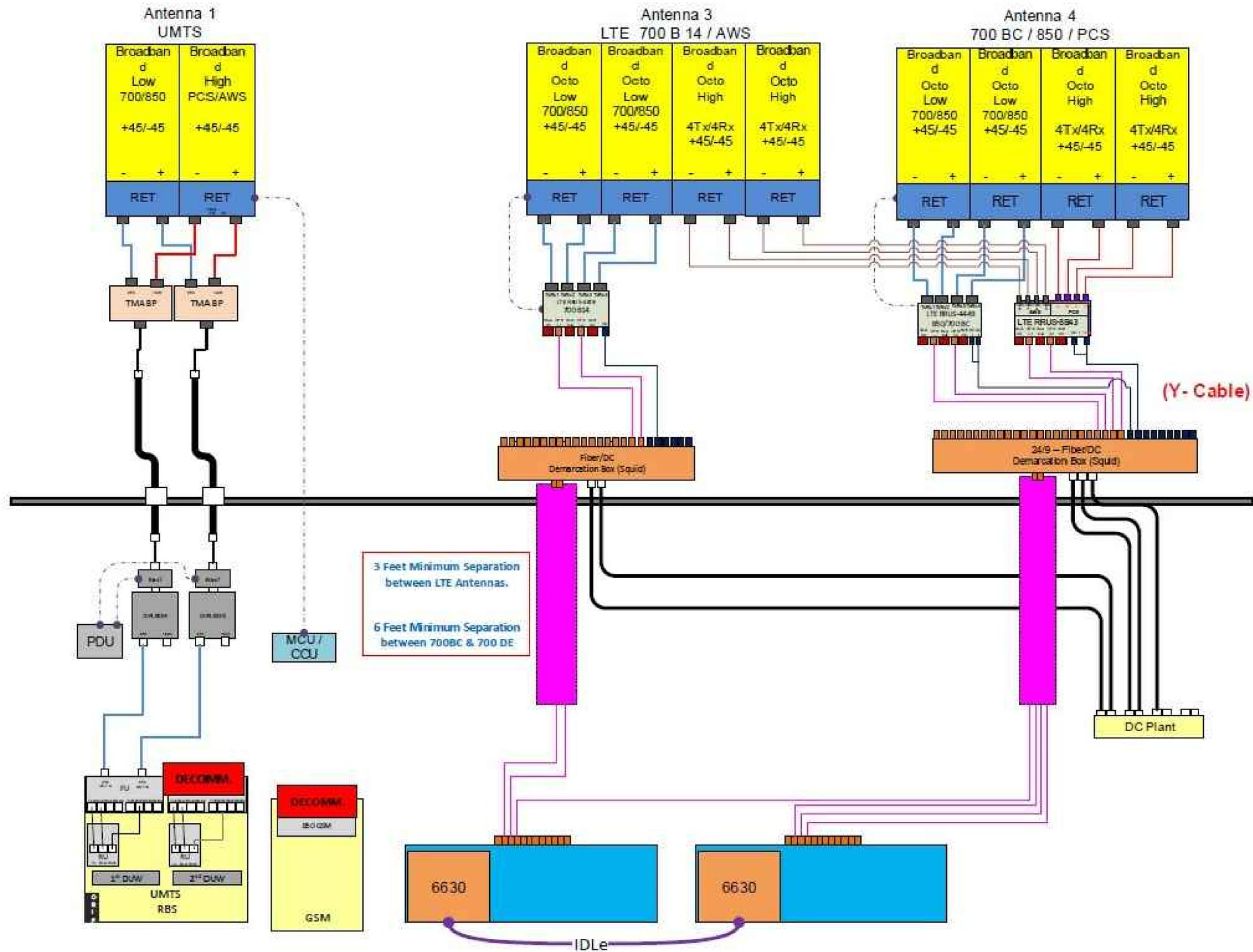
ISSUED FOR:				
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	08/05/21	SPK	CONSTRUCTION	BSE
1	09/14/21	EDR	CONSTRUCTION	JTC



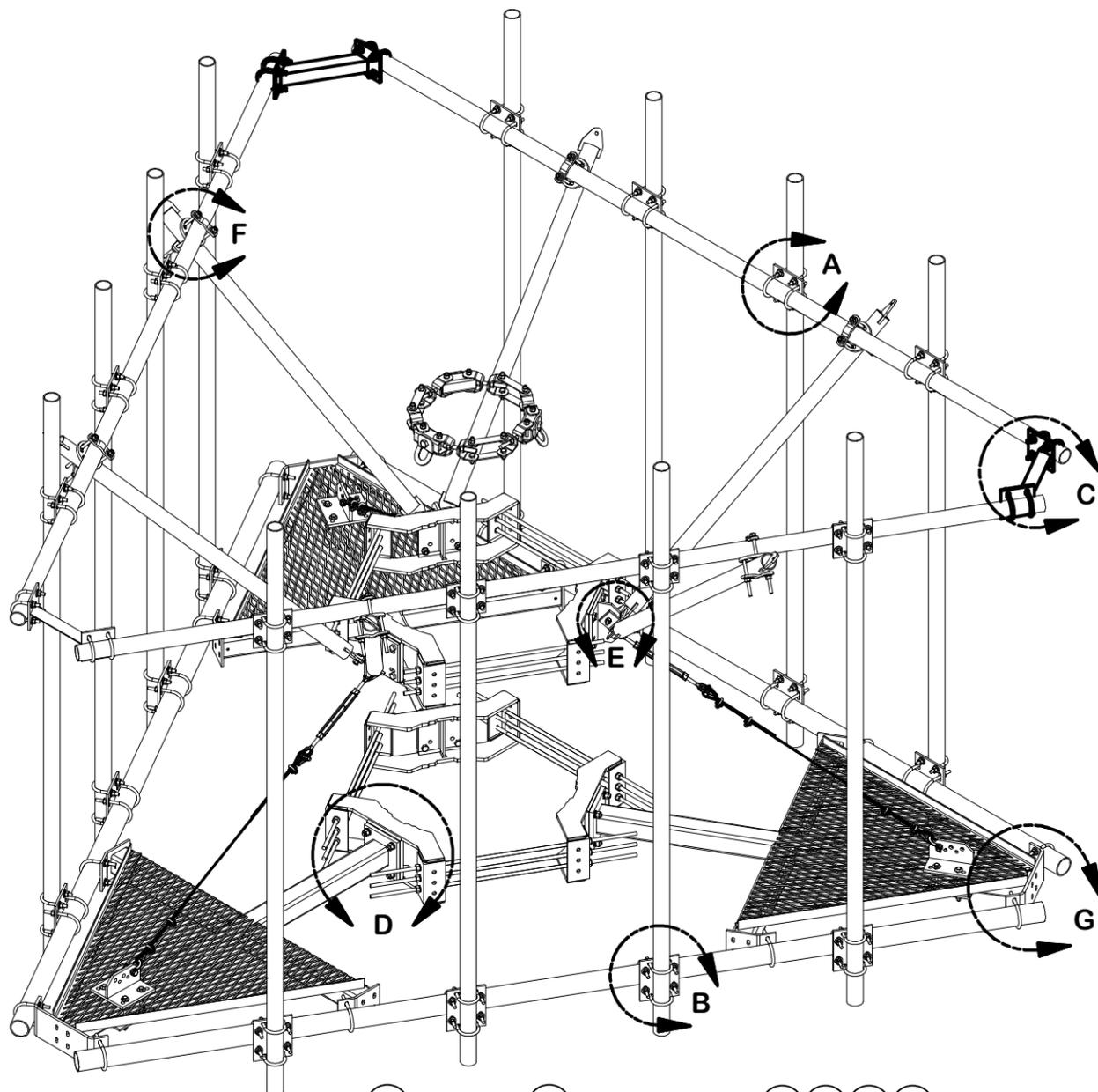
09/14/21

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

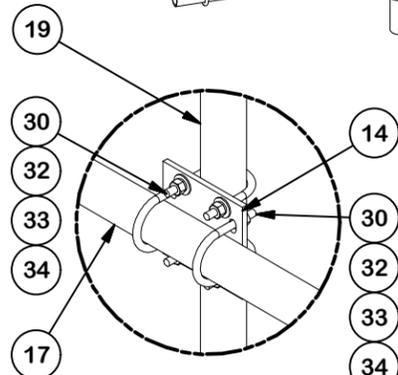
SHEET NUMBER: **G-2** REVISION: **1**



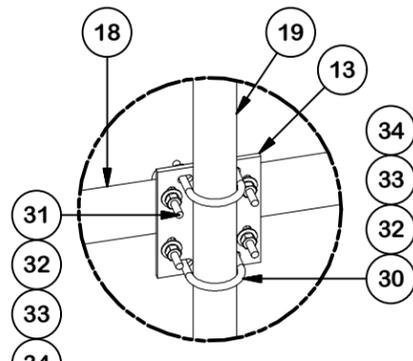
SECTOR A, B AND C  
PLUMBING DIAGRAM



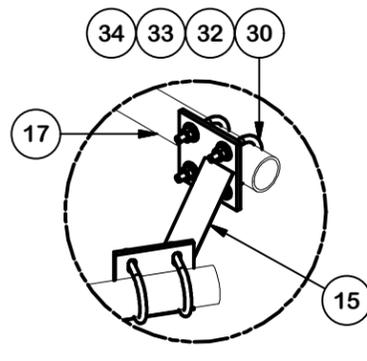
PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X-LWRM	RING MOUNT WELDMENT		68.81	412.85
2	3	X-SV196L	LONG PLATFORM WELDMENT		230.94	692.81
3	6	X-TBW	T-BRACKET WELDMENT		13.60	81.60
4	6	SHCM-T	CHAIN MOUNT TIGHTENER BRACKET	3 in	1.86	11.15
5	6	X-VSKL	LONG SUPPORT WELDMENT FOR VSK REINFORCEMENTS		37.05	222.33
6	6	X-127594	FLAT DISK CLAMP PLATE 4" CENTERS (GALV.)		2.51	15.04
7	12	X-100064	CLAMP (4" V-CLAMP) GALVANIZED		0.92	11.06
8	3	320751-I	1/2" CHAIN SHACKLE		0.76	2.29
9	3	320601-I	5/8" TURNBUCKLE		2.63	7.89
10	6	320777-I	5/16" THIMBLE		0.06	0.36
11	12	320152-I	5/16" WIRE ROPE CLIP		1.32	15.78
12	3	AC516-10	5/16" AIRECRAFT CABLE		1.25	3.76
13	15	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	90.32
14	12	SCX2	CROSSOVER PLATE	7 in	4.80	57.56
15	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
17	3	P30174	2-7/8" O.D. x 174" SCH. 40 PIPE	174 in	84.20	252.59
18	3	P3174	3-1/2" X 174" SCH 40 GALVANIZED PIPE	174 in	109.97	329.90
19	12	P30120	2-7/8" x 120" (2-1/2" SCH. 40) GALVANIZED PIPE	120 in	58.07	696.79
20	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)		4.18	75.27
20	18	G58R-24	5/8" x 24" THREADED ROD (HDG.)		2.09	37.63
21	12	A582114	5/8" x 2-1/4" HDG A325 HEX BOLT	2 1/4 in	0.31	3.75
22	12	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	4.27
23	12	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.41
24	60	G58LW	5/8" HDG LOCKWASHER		0.03	1.57
25	60	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	7.79
26	6	G12112	1/2" x 1-1/2" HDG HEX BOLT GR5	1/2 in	0.15	0.89
27	3	G12212	1/2" x 2-1/2" HDG HEX BOLT GR5	2 1/2 in	0.20	0.61
28	12	G1204	1/2" x 4" HDG HEX BOLT GR5 FULL THREAD	4 in	0.27	3.24
29	24	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	5 1/2 in	0.41	9.83
30	84	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.67	56.19
31	36	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.83	29.82
32	288	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	9.82
33	285	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	3.96
34	285	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	20.41
35	1	HALO40	5,000 LB. MAINTENANCE TIE-OFF POINT		41.12	41.12
					TOTAL WT. #	3249.41



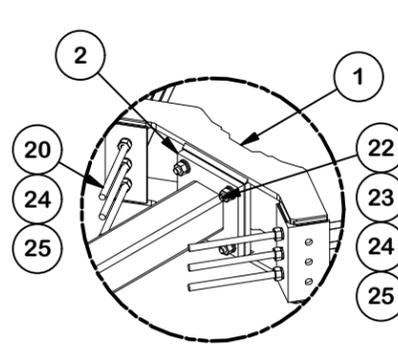
DETAIL A



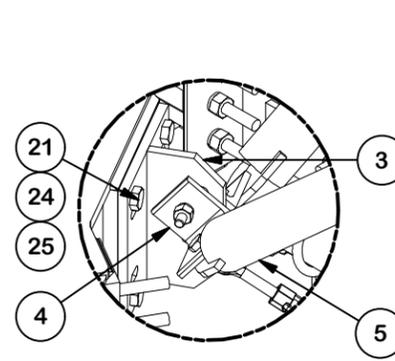
DETAIL B



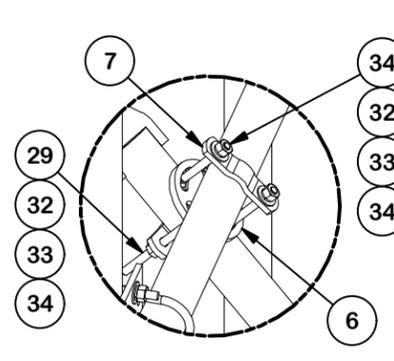
DETAIL C



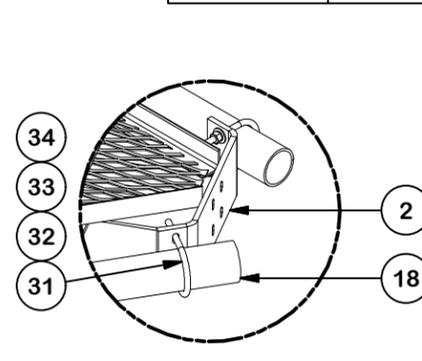
DETAIL D



DETAIL E



DETAIL F



DETAIL G

**TOLERANCE NOTES**

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

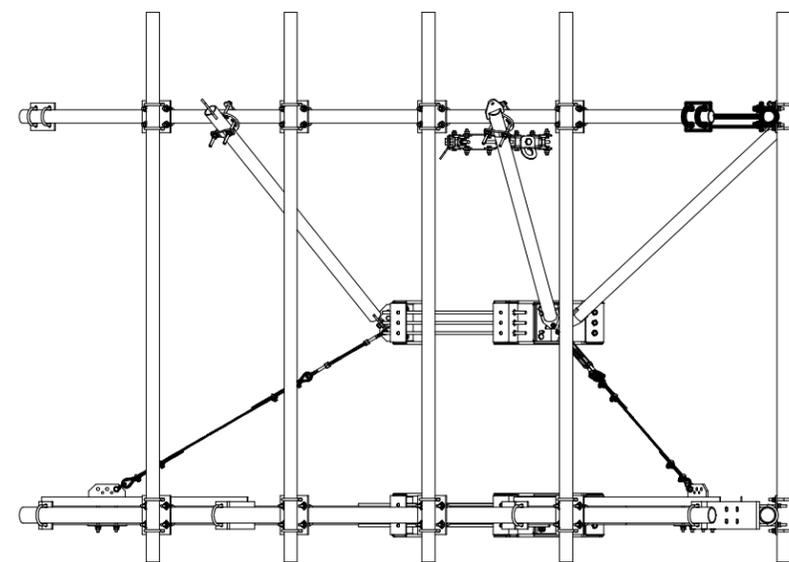
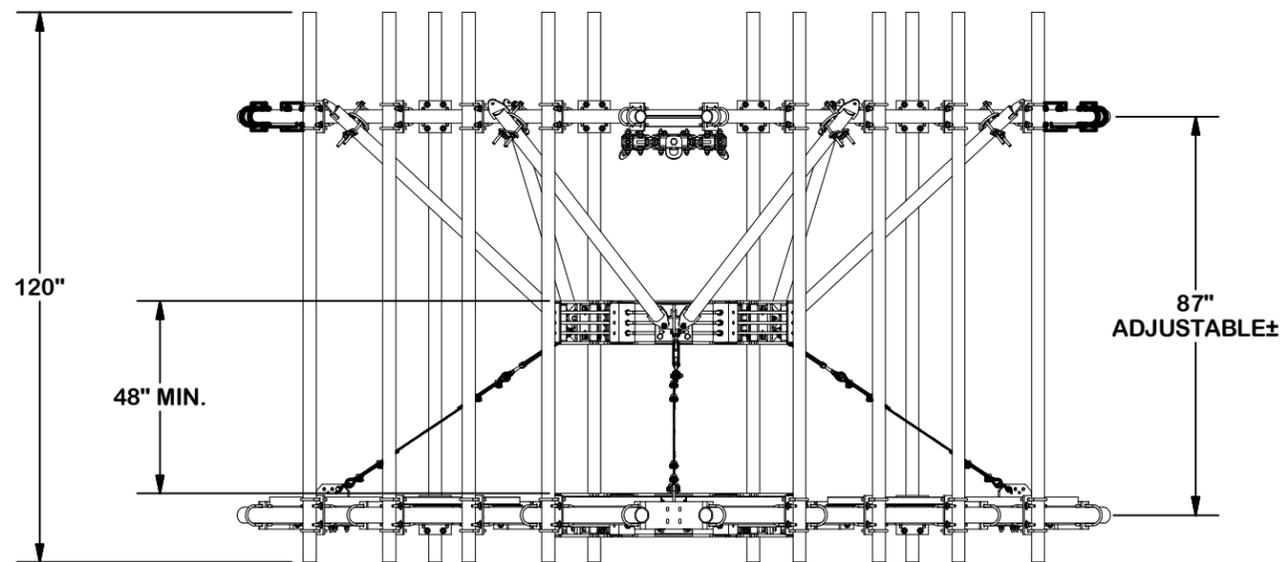
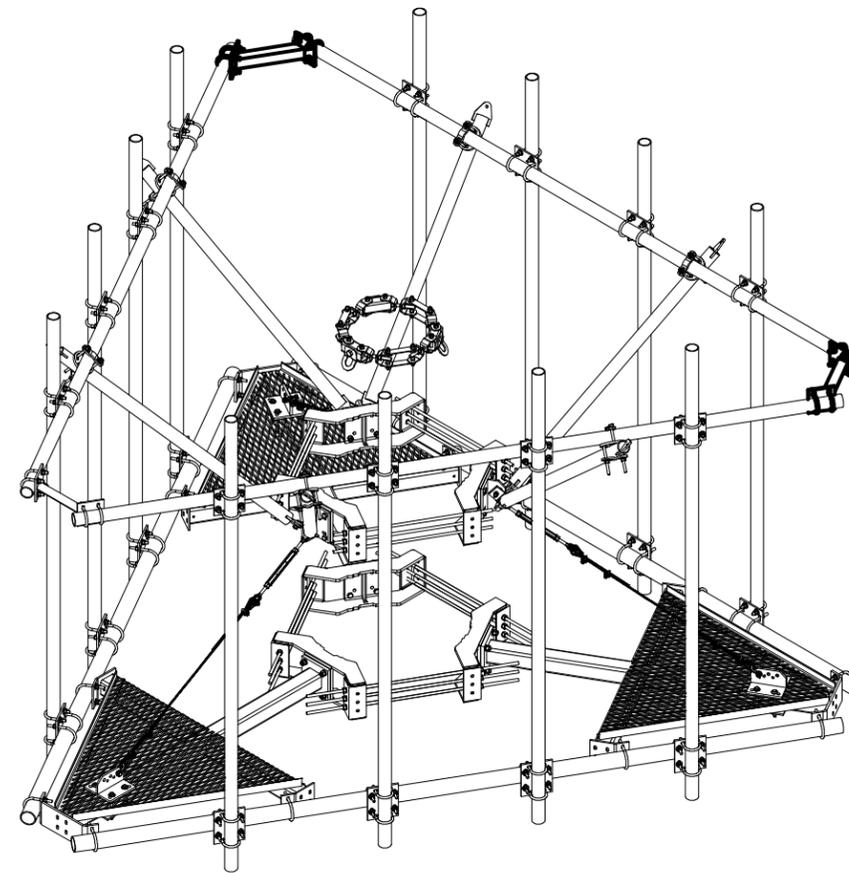
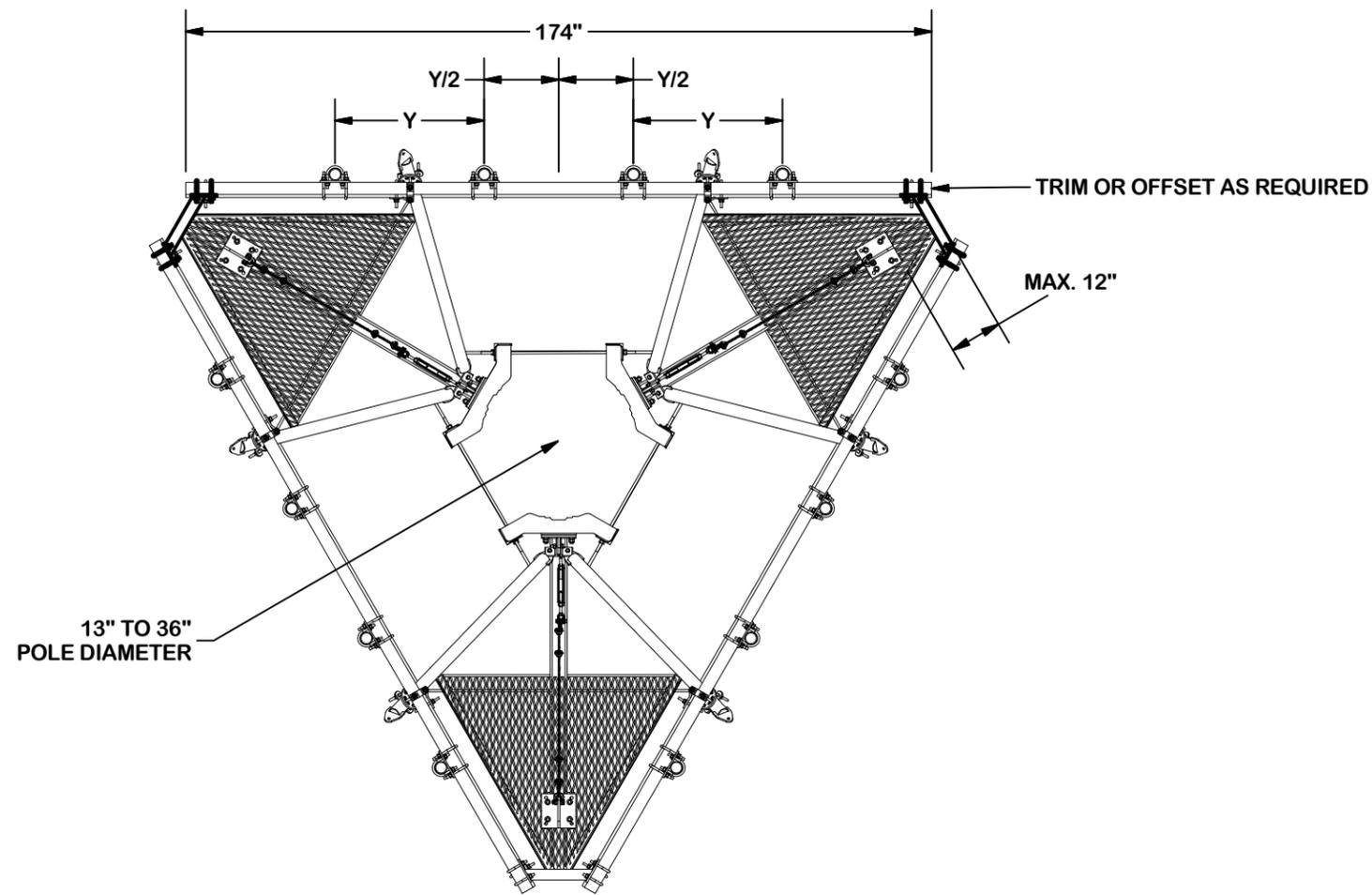
PROPRIETARY NOTE:  
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION  
**14' 6" LOW PROFILE PLATFORM  
 WITH TWELVE 2-7/8" ANTENNA MOUTING  
 PIPES, REINFORCED HANDRAIL, AND CABLE**

CPD NO.	DRAWN BY	ENG. APPROVAL
	CSL 10/17/2019	10/18/2019
CLASS	DRAWING USAGE	CHECKED BY
87	CUSTOMER	BMC 10/18/2019

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

PART NO.	RMQLP-4120-H10
DWG. NO.	RMQLP-4120-H10



**TOLERANCE NOTES**

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:  
 SAWED, SHEARED AND GAS CUT EDGES ( $\pm 0.030''$ )  
 DRILLED AND GAS CUT HOLES ( $\pm 0.030''$ ) - NO CONING OF HOLES  
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DESCRIPTION  
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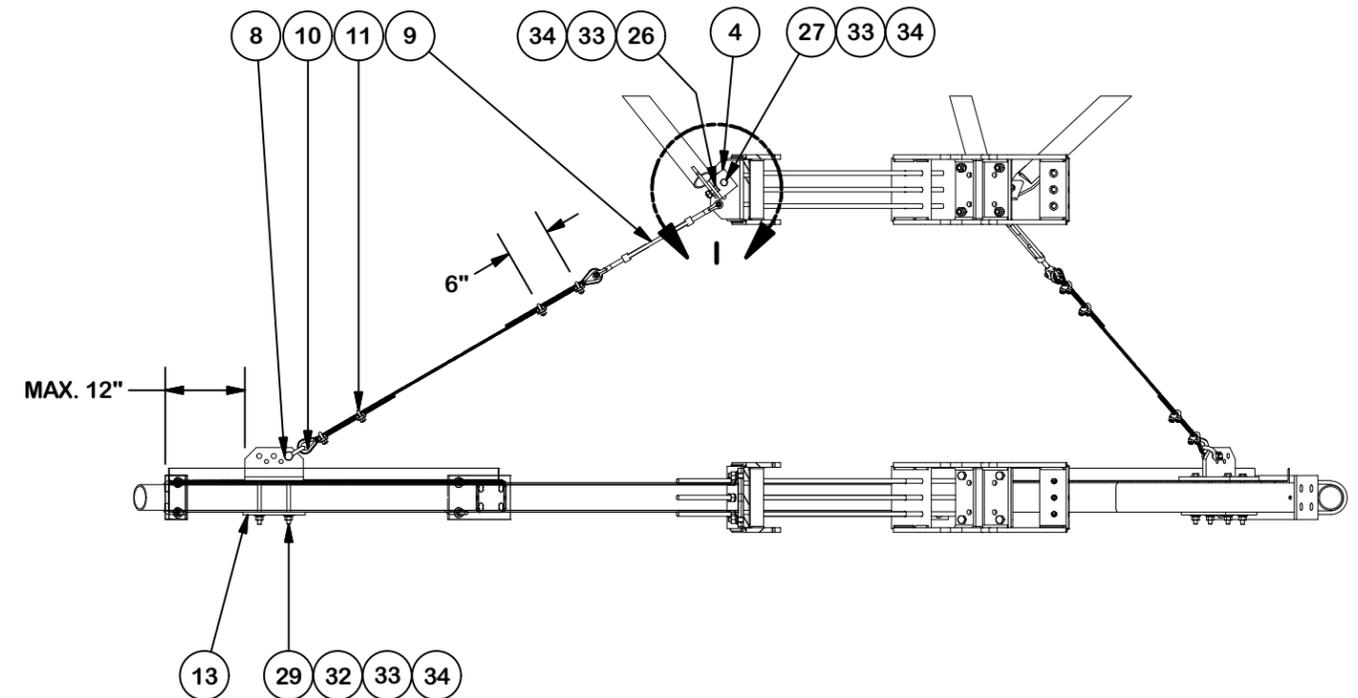
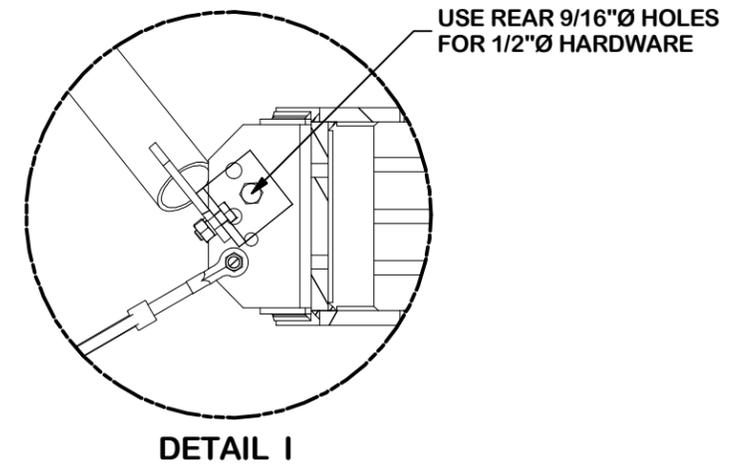
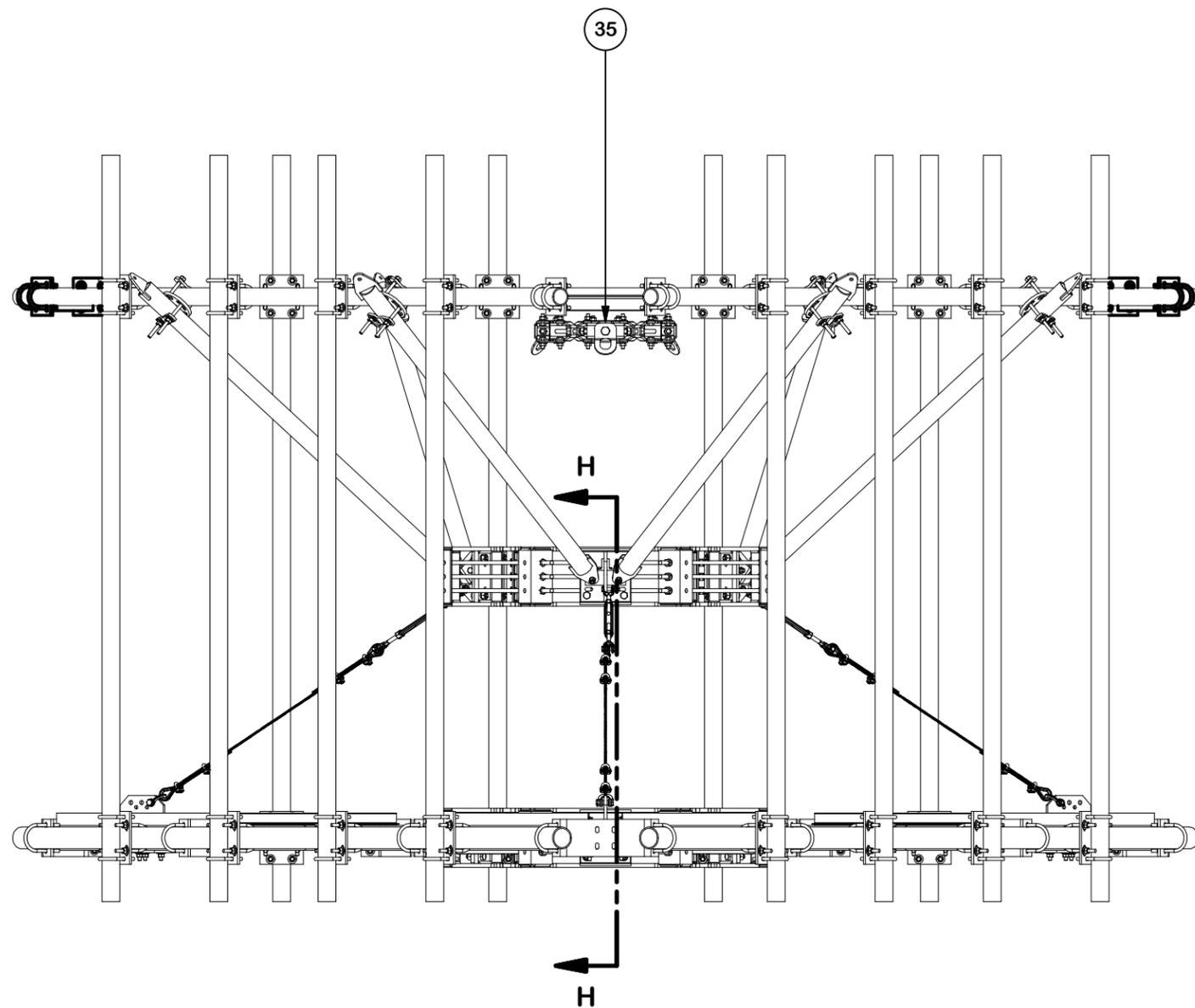
CPD NO.	DRAWN BY CSL 10/17/2019	ENG. APPROVAL 10/18/2019
CLASS 87	SUB 02	DRAWING USAGE CUSTOMER
	CHECKED BY BMC 10/18/2019	



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

Engineering  
 Support Team:  
 1-888-753-7446

PART NO.	<b>RMQLP-4120-H10</b>
DWG. NO.	<b>RMQLP-4120-H10</b>



SECTION H-H

**NOTE:**  
SOME OBJECTS ARE TRANSPARENT FOR CLARITY

**TOLERANCE NOTES**

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PROPRIETARY NOTE:  
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DESCRIPTION  
**14' 6" LOW PROFILE PLATFORM  
 WITH TWELVE 2-7/8" ANTENNA MOUTING  
 PIPES, REINFORCED HANDRAIL, AND CABLE**

CPD NO.	DRAWN BY CSL 10/17/2019	ENG. APPROVAL 10/18/2019
CLASS 87	SUB 02	DRAWING USAGE CUSTOMER
	CHECKED BY BMC 10/18/2019	



Engineering  
 Support Team:  
 1-888-753-7446

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

PART NO.	<b>RMQLP-4120-H10</b>
DWG. NO.	<b>RMQLP-4120-H10</b>

**Barbadora, Jeff**

---

**From:** TrackingUpdates@fedex.com  
**Sent:** Wednesday, October 27, 2021 10:54 AM  
**To:** Barbadora, Jeff  
**Subject:** FedEx Shipment 775032393730: Your package has been delivered

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



Hi. Your package was  
delivered Wed, 10/27/2021 at  
10:52am.



Delivered to 50 BOSTON ST, GUILFORD, CT 06437  
Received by D.PIOMBONO

**OBTAIN PROOF OF DELIVERY**

TRACKING NUMBER [775032393730](#)

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

**TO** Town of Guilford  
George Kral, Town Planner  
50 Boston Street  
GUILFORD, CT, US, 06437

**REFERENCE** 799001.7680

**SHIPPER REFERENCE** 799001.7680

**SHIP DATE** Tue 10/26/2021 06:14 PM

**DELIVERED TO** Receptionist/Front Desk

**PACKAGING TYPE** FedEx Envelope

**ORIGIN** WESTBOROUGH, MA, US, 01581

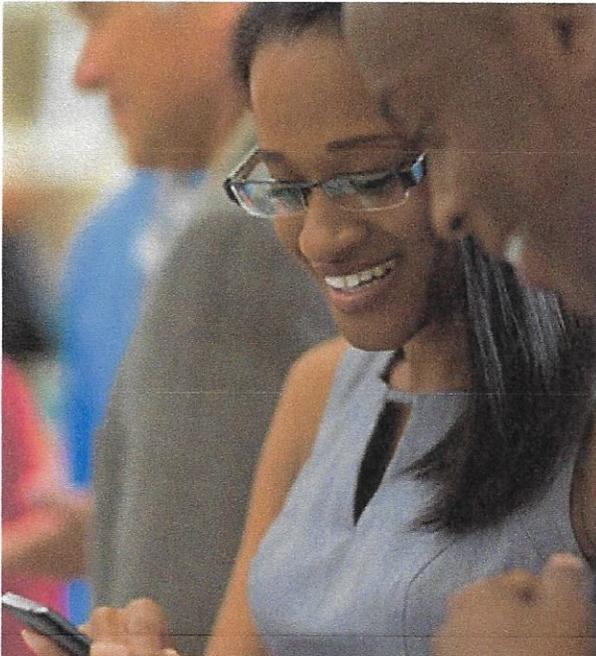
**DESTINATION** GUILFORD, CT, US, 06437

**SPECIAL HANDLING** Deliver Weekday

**NUMBER OF PIECES** 1

**TOTAL SHIPMENT WEIGHT** 1.00 LB

**SERVICE TYPE** FedEx Priority Overnight



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**Barbadora, Jeff**

---

**From:** TrackingUpdates@fedex.com  
**Sent:** Wednesday, October 27, 2021 11:00 AM  
**To:** Barbadora, Jeff  
**Subject:** FedEx Shipment 775032254487: Your package has been delivered

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



Hi. Your package was  
delivered Wed, 10/27/2021 at  
10:59am.



Delivered to 31 PARK ST, GUILFORD, CT 06437  
Received by K.QUERCIA

**OBTAIN PROOF OF DELIVERY**

TRACKING NUMBER [775032254487](#)

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

**TO** Town of Guilford  
Matthew Hoey III, First Selectman  
31 Park Street  
GUILFORD, CT, US, 06437

**REFERENCE** 799001.7680

**SHIPPER REFERENCE** 799001.7680

**SHIP DATE** Tue 10/26/2021 06:14 PM

**DELIVERED TO** Receptionist/Front Desk

**PACKAGING TYPE** FedEx Envelope

**ORIGIN** WESTBOROUGH, MA, US, 01581

**DESTINATION** GUILFORD, CT, US, 06437

**SPECIAL HANDLING** Deliver Weekday

**NUMBER OF PIECES** 1

**TOTAL SHIPMENT WEIGHT** 1.00 LB

**SERVICE TYPE** FedEx Priority Overnight



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**Barbadora, Jeff**

---

**From:** TrackingUpdates@fedex.com  
**Sent:** Wednesday, October 27, 2021 9:21 AM  
**To:** Barbadora, Jeff  
**Subject:** FedEx Shipment 775032520215: Your package has been delivered

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



Hi. Your package was  
delivered Wed, 10/27/2021 at  
9:19am.



Delivered to 3300 ENTERPRISE PKWY, BEACHWOOD, OH 44122  
Received by A.FARONE

**OBTAIN PROOF OF DELIVERY**

TRACKING NUMBER [775032520215](#)

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

**TO** DDR Guilford LLC  
DDR Guilford LLC  
3300 Enterprise Pkwy  
BEACHWOOD, OH, US, 44122

**REFERENCE** 799001.7680

**SHIPPER REFERENCE** 799001.7680

**SHIP DATE** Tue 10/26/2021 06:14 PM

**DELIVERED TO** Mailroom

**PACKAGING TYPE** FedEx Envelope

**ORIGIN** WESTBOROUGH, MA, US, 01581

**DESTINATION** BEACHWOOD, OH, US, 44122

**SPECIAL HANDLING** Deliver Weekday

**NUMBER OF PIECES** 1

**TOTAL SHIPMENT WEIGHT** 1.00 LB

**SERVICE TYPE** FedEx Priority Overnight



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