



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

March 17, 2022

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

RE: **Notice of Exempt Modification for ATT
Crown#806368; ATT Site ID CTL01100
374 Three Mile Road, Glastonbury CT 06033
Latitude: 41° 41' 36.93" / Longitude: -72° 32' 50.11"**

Dear Ms. Bachman:

ATT currently maintains nine (9) antennas at the 140-foot mount on the existing 145-foot monopole tower located at 374 Three Mile Road, Glastonbury CT. The property is owned by John R. Flanagan and the tower is owned by Crown Castle. ATT now intends to add three (3) new antennas, replace nine (9) antennas and ancillary equipment at the 140ft 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:

- (2) CCI – OPA65R-BU8DA Antennas
- (6) Ericsson - AIR6449 N77D + AIR 6419 N77G Stacked Antennas
- (2) CCI – DMP65R-BU6DA Antennas
- (1) CCI – OPA65R-BU6DA Antennas
- (1) CCI – DMP65R-BU6DA Antennas
- (3) Ericsson – 4426 B65 RRU
- (3) Ericsson – 4449 B5/B12 RRU
- (3) Ericsson 4478 B14 RRU
- (3) Ericsson B32 B2 RRU
- (2) Fiber Cables
- (4) DC Cables
- (3) Y Cables
- (2) Ray Caps DC9-48-60-24-8C-EV

Remove:

- (4) Powerwave-7770 Antennas
- (2) CCI-HPA-65R-BUU-H8 Antennas
- (2) Powerwave-P65-17-XLH-RR Antennas
- (1) CCI-HPA-65R-BUU-H6 Antennas
- (3) Ericsson 11 B12 RRU
- (3) Ericsson 32 B2 RRU
- (3) Powerwave – TT19-088P111-001 TMAs
- (3) Comm Components DTMA8P7819VG12A
- (1) Ray Cap
- (1) Fiber Cable
- (6) Coax Cables

Ground:

Install New:

- (1.) 6648 W/XCEDE Cable
- 4-Way GPS Splitter
- (1) DC12-48-60-RM
- (3) Rectifier

Remove:

- (6) LGP21901 Diplexer
- (6) CM1007-DBPXCBC-003 Diplexers

The facility was approved by the Connecticut Siting Council on October 21, 1996. The Council's Decision and Order include Conditions which this proposed exempt modification complies with.

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 Richard Johnson - Town Manager, Town of Glastonbury, Rebecca Augur – Director of Planning and Land Use Town of Glastonbury. John R. Flanagan, Property Owner and 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.

Melanie A. Bachman

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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

cc:

Richard Johnson Town Manager
Town of Glastonbury
2155 Main Street, 2nd Floor
Glastonbury, CT 06033
860-652-7500

Rebecca Augur – Director of Planning and Land Use
Town of Glastonbury
2155 Main Street, 3rd Floor
Glastonbury, CT 06033
860-652-7510

John R. Flanagan – Property Owner
366 Three Mile Road
Glastonbury, CT 06033

Crown Castle, Tower Owner

DOCKET NO. 174 - An application of Celco Partnership d/b/a Bell Atlantic NYNEX Mobile for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a cellular telecommunications facility and associated equipment located within an approximately 30-acre parcel at 366 Three Mile Road, in the East Glastonbury section of the Town of Glastonbury, Connecticut. The proposed alternate one site is located within the same approximately 30-acre parcel at 366 Three Mile Road. The proposed alternate two site is located within an approximately 50-acre parcel at 1952 New London Turnpike, in the East Glastonbury section of the Town of Glastonbury, Connecticut.

Connecticut Siting Council

October 21, 1996

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 cellular telecommunications tower and equipment building at the proposed prime site in Glastonbury, Connecticut, 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 Bell Atlantic NYNEX Mobile (BANM) for the construction, operation, and maintenance of a cellular telecommunications tower, associated equipment, and building at the proposed prime site, located within a 30-acre parcel at Three Mile Road, Glastonbury, Connecticut. We find the effects on scenic resources and adjacent land uses of the first alternate site and second alternate site to be significant, and therefore deny certification of these sites.

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 communications service, sufficient to accommodate the antennas of Springwiche Cellular Limited Partnership and the Town of Glastonbury, and not to exceed a height of 150 feet above ground level (AGL).
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 submitted to and approved by the Council prior to the commencement of facility construction and shall include relocation of the tower within the leased parcel to prevent the fall zone of the tower from crossing the nearby Connecticut Light and Power Company transmission lines; plans for the tower foundation; specifications for the placement of all antennas to be attached to this tower; plans for the equipment building and security fence; plans for the access road and utility line installation from Three Mile Road; plans for site clearing and tree trimming; plans for water drainage and erosion and sedimentation controls consistent with the Connecticut Guidelines for Soil Erosion and Sedimentation Control, as amended, and plans for the

construction of an architecturally treated gate at the entrance to the access road from Three Mile Road; and plans for the installation of a propane tank to fuel the emergency generator.

3. 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.

4. The Certificate Holder shall provide the Council a recalculated report of electromagnetic radio frequency power density if and when circumstances in operation cause a change in power density above the levels originally calculated and provided in the application.

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. If the facility does not initially provide, or permanently ceases to provide cellular services following completion of construction, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapplication for any continued or new use shall be made to the Council before any such use is made.

7. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the effective date of this Decision and Order or within three years after all appeals to this Decision and Order have been resolved.

8. The Certificate Holder shall notify the Council upon completion of construction and provide the final cost to construct the facility.

Pursuant to General Statutes § 16-50p, we hereby direct 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 Hartford Courant and The Glastonbury Citizen.

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

Bell Atlantic NYNEX Mobile

ITS REPRESENTATIVE

Kenneth C. Baldwin, Esq.

Brian C. S. Freeman, Esq.

Robinson & Cole

One Commercial Plaza

Hartford, CT 06103-3597

Mr. David S. Malko, P.E.

Sandy M. Ranciato, Manager - Real Estate/Zoning

Bell Atlantic NYNEX Mobile

PARTY

Town of Glastonbury

20 Alexander Drive
Wallingford, CT 06492

ITS REPRESENTATIVE

William S. Fish, Jr., Esq.

Kevin S. Murphy, Esq.

Tyler, Cooper & Alcorn

CityPlace - 35th Floor

Hartford, CT 06103-3488

ITS REPRESENTATIVE

Peter J. Tyrrell, Esq.

INTERVENOR

Springwich Cellular Limited Partnership

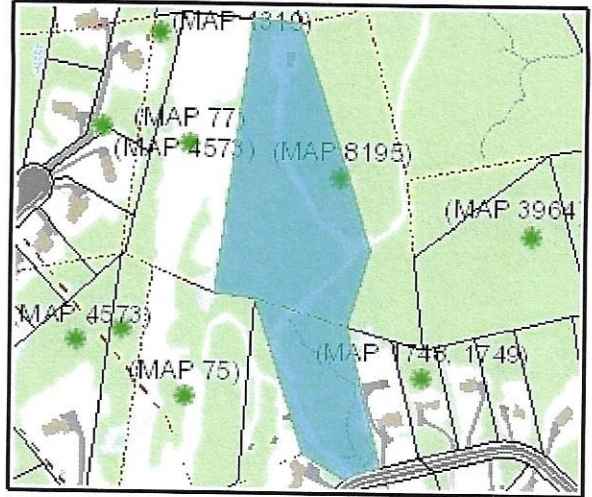
Springwich Cellular Limited Partnership

500 Enterprise Drive

Rocky Hill, CT 06067-3900

Owner of Record
GIS ID: 70600374
Owner: FLANAGAN JOHN R
Co-Owner:
Address: 366 THREE MILE RD
City, State ZIP: GLASTONBURY, CT 06033-3837

Account Number: 70600374
Property Address: 374 THREE MILE RD



Property highlighted in blue

Parcel Information
Map/Street/Lot I8 / 7060 / S0035 **Property ID:** 13664
Developer Lot ID: 72 **Water:** Well
Parcel Acreage: 9.08 **Sewer:** Septic
Zoning Code: RR **Census:** 5204

Valuation Summary

Item	Appraised Value	Assessed Value
Buildings	0	0
Land	1044200	684200
Appurtenances	173300	121300
Total	1217500	805500

Owner of Record	Deed / Page	Sale Date	Sale Price
FLANAGAN JOHN R	3772/0193	2022-02-07	0
FLANAGAN JOSEPHINE I+JOHN R	2725/0212	2009-12-31	0
FLANAGAN JOSEPHINE I TRUSTEE	2725/0205	2009-12-31	0
FLANAGAN JOSEPHINE I TRUSTEE	2725/0210	2009-12-31	0
FLANAGAN JOSEPHINE I TRUSTEE	1884/0085	2003-07-30	0
FLANAGAN JOSEPHINE I TR+JOSEPHINE I	1828/0149	2003-06-02	0
FLANAGAN JOSEPHINE I TR+JAMES F	1828/0145	2003-06-02	0
FLANAGAN JOSEPHINE+JAMES F	0251/1107	1980-12-31	0

**Building
Picture
Not
Applicable**

Building ID 0

Building Information

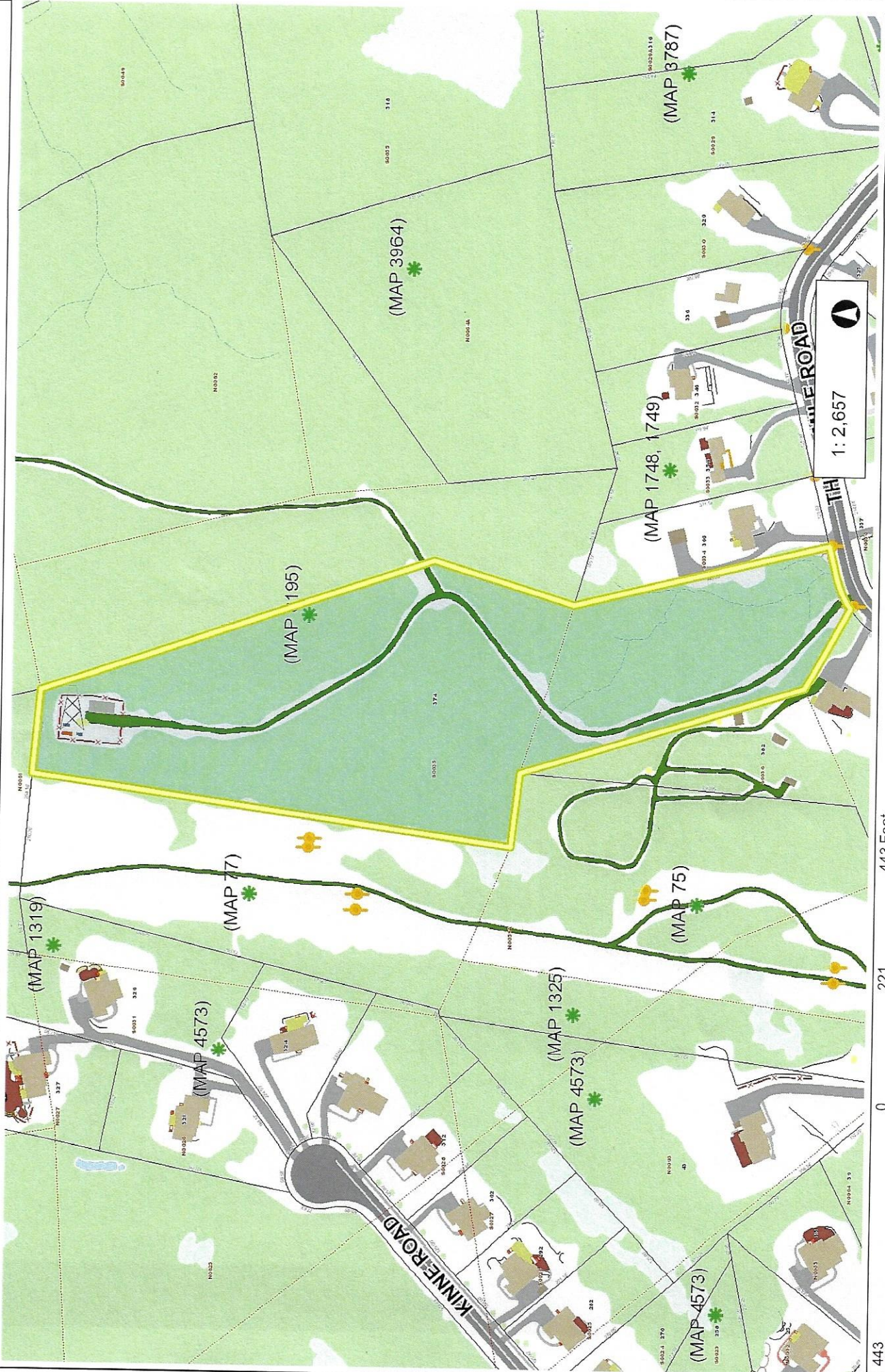
Year Constructed :	Number of Rooms :
Building Type :	Number of Bedrooms :
Style :	Number of Bathrooms :
Occupany :	Number of Half-Baths :
Stories :	Exterior Wall :
Building Zone :	Interior Wall :
Roof Type :	Interior Floor :
Roof Material :	Interior Floor #2 :
Est. Gross S.F. :	Air Conditioning Type :
Est. Living S.F. :	Heat Type :
	Fuel Type :

**Building
Sketch
Not
Applicable**

Subarea Type	Est. Gross S.F.	Est. Living S.F.	Outbuilding Type	Est. Gross S.F.	Comments
			Cell Shed	924.00	



Town of Glastonbury GIS



1:2,657

443 0 221 443 Feet

This map is a user generated static output from an Internet mapping site and is for reference only. Property boundaries and other data layers that appear on this map may not be accurate, current, or otherwise reliable. The Town of Glastonbury and the mapping companies assume no legal responsibility for the information contained in this data.

THIS MAP DOES NOT REPRESENT A LEGAL BOUNDARY DETERMINATION.

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Sent: Friday, March 18, 2022 10:19 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 776325221455: Your package has been delivered

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Hi. Your package was
delivered Fri, 03/18/2022 at
10:16am.



Delivered to 2155 MAIN ST, GLASTONBURY, CT 06033

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER [776325221455](#)

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

TO Town of Glastonbury
Richard Johnson Town Manager
2155 Main Street
2nd Floor
GLASTONBURY, CT, US, 06033

REFERENCE 799001.7680

SHIPPER REFERENCE 799001.7680

SHIP DATE Thu 3/17/2022 05:30 PM

PACKAGING TYPE FedEx Envelope

ORIGIN WESTBOROUGH, MA, US, 01581

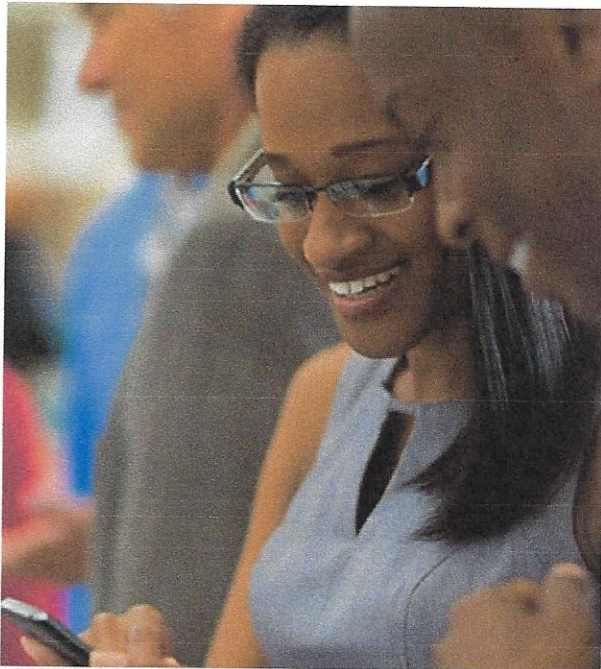
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SPECIAL HANDLING Deliver Weekday

NUMBER OF PIECES 1

TOTAL SHIPMENT WEIGHT 1.00 LB

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TRACKING NUMBER [776325258809](#)
FROM Jeff Barbadora
1800 W. Park Drive
WESTBOROUGH, MA, US, 01581

TO Town of Glastonbury
Rebecca Augur
2155 Main Street
3rd Floor
GLASTONBURY, CT, US, 06033

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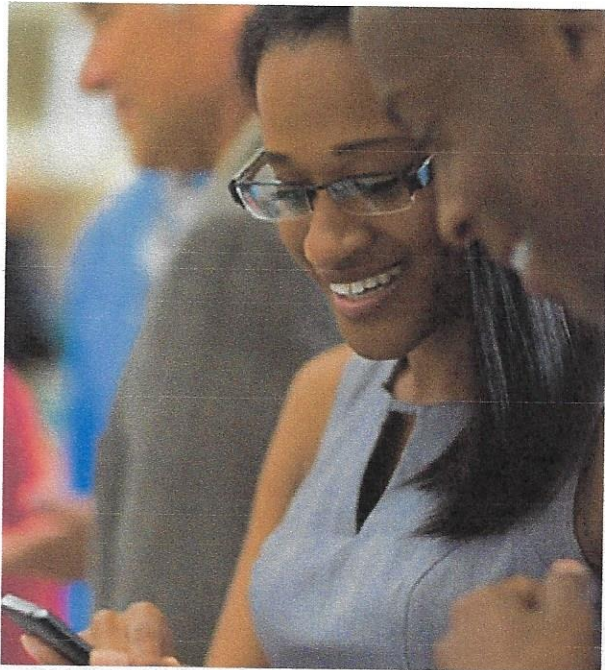
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10:29am.



Delivered to 366 THREE MILE RD, GLASTONBURY, CT 06033

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER [776325373488](#)

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

TO Property Owner
John R Flanagan
366 Three Mile Road
GLASTONBURY, CT, US, 06033

REFERENCE 799001.7680

SHIPPER REFERENCE 799001.7680

SHIP DATE Thu 3/17/2022 05:30 PM

DELIVERED TO Residence

PACKAGING TYPE FedEx Envelope

ORIGIN WESTBOROUGH, MA, US, 01581

DESTINATION GLASTONBURY, CT, US, 06033

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Date: January 18, 2022

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Subject: Structural Analysis Report

Carrier Designation: AT&T Mobility Co-Locate
Site Number: CTL01100
Site Name: GLASTONBURY THREE MILE
FA: 10035094

Crown Castle Designation: BU Number: 806368
Site Name: HRT 049B 943215
JDE Job Number: 686190
Work Order Number: 2061262
Order Number: 586239 Rev. 0

Engineering Firm Designation: B+T Group Project Number: 83033.007.01

Site Data: 374 Three Mile Rd., GLASTONBURY, Hartford County, CT
Latitude 41° 41' 36.93", Longitude -72° 32' 50.11"
145 Foot - Monopole Tower

B+T Group is pleased to submit this “Structural Analysis Report” to determine the structural integrity of the above-mentioned tower.

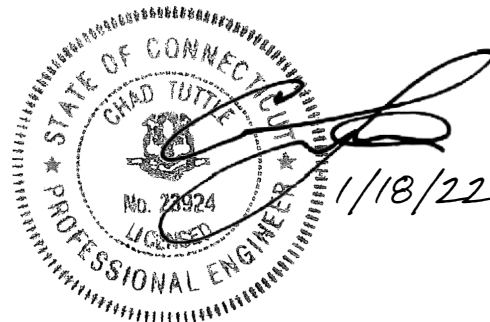
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration **Sufficient Capacity-85%**

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

Structural analysis prepared by: Massood Sattari

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564; Expires: 02/10/2022



Chad E. Tuttle, P.E.

This submission contains confidential, proprietary, or trade secret information that is exempt from disclosure under applicable laws. Please make sure these pages are not disclosed. If any request is made for this information, please contact the sender in addition to any legal notice requirements under applicable law.

Disclaimer provided by AT&T. This statement does not constitute engineering analysis or design

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 EXEMPT FROM DISCLOSURE UNDER APPLICABLE LAW.

 Disclaimer provided by AT&T. This statement does not constitute engineering analysis or design

1) INTRODUCTION

This tower is a 145 ft. Monopole tower designed by Engineered Endeavors, Inc.

The tower has been modified per reinforcement drawings prepared by GPD Associates, in March of 2005. Reinforcement consists of addition of base plate stiffeners. However, we didn't include this modification since the Anchor rod and Base plate are passing without the modification at a lower rate.

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
Risk Category: II
Wind Speed: 119 mph
Exposure Category: B
Topographic Factor: 1
Ice Thickness: 1.5 in
Wind Speed with Ice: 50 mph
Service Wind Speed: 60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
137.0	142.0	3	Ericsson	AIR 6419 B77G_CCIV2	6 4 2 2	1-1/4 7/8 13/16 3/8
	140.0	1	CCI Antennas	DMP65R-BU6D		
		2	CCI Antennas	DMP65R-BU8D		
		1	CCI Antennas	OPA65R-BU6D		
		2	CCI Antennas	OPA65R-BU8D		
		3	Ericsson	RRUS 32 B2_CCIV2		
		3	Ericsson	RRUS 4426 B66		
		3	Ericsson	RRUS 4449 B5/B12		
		3	Ericsson	RRUS 4478 B14_CCIV2		
	2	Raycap	DC9-48-60-24-8C-EV_CCIV2			
	138.0	3	Ericsson	AIR 6449 B77D		
		1	--	Platform Mount [LP 1002-1] (16' FW)		

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)
147.0	148.0	6	Andrew	SBNHH-1D65B	7	1-5/8
		2	ANTEL	LPA-80063/6CF		
		1	RFS Celwave	DB-T1-6Z-8AB-0Z		
		3	Samsung Telecom	MT6407-77A		
		3	Samsung Telecom	RFV01U-D1A		
		3	Samsung Telecom	RFV01U-D2A		
		4	SWEDCOM	SC-E 6014 REV2		
	147.0	1	Site Pro 1	PRK-SFS-L Handrail Reinforcement Kit		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	--	186" Long, P2.5 Std. Face Horizontal		
		1	--	Platform Mount [LP 1001-1] (15.8' FW)		
		3	Commscope	BASMNT-SBS-1-2 Antenna Mounting Kit		
129.0	132.0	2	GPS	GPS_A	--	--
	130.0	12	Decibel	DB844G65ZAXY		
	129.0	1	--	Platform Mount [LP 601-1]		
		1	--	Side Arm Mount [SO 701-3]		
127.0	127.0	1	Sigfox	CAVITY FILTER	1	1/2
		1	Sigfox	CXL 900-3LW		
		1	Sigfox	LNA		
		1	--	Side Arm Mount [SO 306-1]		
114.0	116.0	3	Commscope	SDX1926Q-43	10	1-5/8
		3	Ericsson	AIR -32 B2A/B66AA		
		3	Ericsson	AIR6449 B41_T-MOBILE		
		3	Ericsson	KRY 112 144/1		
		3	Ericsson	RADIO 4449 B71/B85A		
		3	Ericsson	RRUS 4415 B25_CCIV2		
	3	RFS Celwave	APXVAARR24_43-U-NA20			
114.0	1	--	Platform Mount [LP 602-1]			
95.0	97.0	1	1Commscope	HT65A-F-2X2	1	1-1/8
		1	1Nokia	FWHR		
	96.0	1	Repeater Tech.	DA1900-39	2	1-1/4
	95.0	2	--	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Tower Manufacturer Drawing	262188	CCI Sites
Mount Analysis	10138123	CCI Sites
Foundation Drawing	974245	CCI Sites
Geotech Report	262197	CCI Sites
Crown CAD Package	Date: 12/30/2021	CCI Sites

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. B+T Group should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	145 - 92.5208	Pole	TP35.675x20.5x0.344	1	-25.590	2304.687	46.9	Pass
L2	92.5208 - 44.7083	Pole	TP48.658x33.554x0.438	2	-39.641	4009.582	49.9	Pass
L3	44.7083 - 0	Pole	TP60.5x45.899x0.469	3	-60.974	5565.703	54.2	Pass
							Summary	
						Pole (L3)	54.2	Pass
						Rating =	54.2	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	Base	49.8	Pass
1,2	Base Plate	Base	55.6	Pass
1,2,3	Base Foundation (Compared w/ Design Loads)	Base	85.0	Pass

Structure Rating (max from all components) =	85.0%
---	--------------

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Rating per TIA-222-H Section 15.5.
- 3) Foundation capacity determined by comparing analysis reactions to original design reactions.

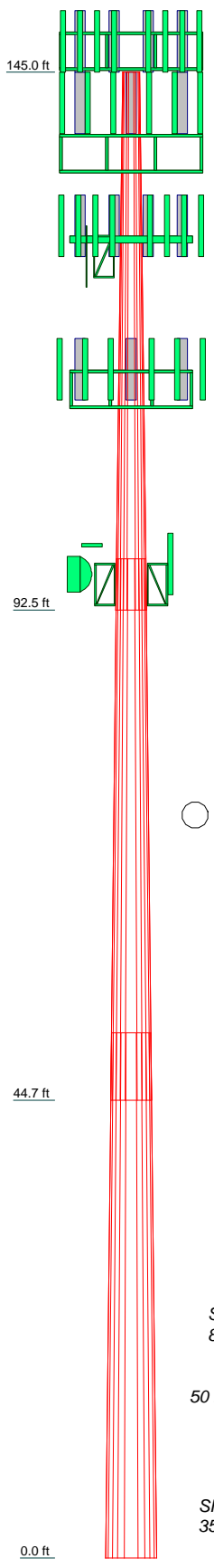
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	29.7
Length (ft)	52.479	52.771	51.292	
Number of Sides	12	12	12	
Thickness (in)	0.344	0.438	0.469	
Socket Length (ft)	4.958	6.583		
Top Dia (in)	20.500	33.554	45.899	
Bot Dia (in)	35.675	48.658	60.500	
Grade		A572-65		
Weight (K)	5.5	10.3	13.9	



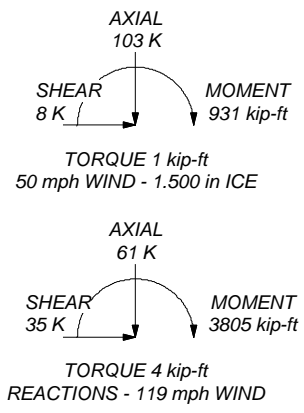
MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 119 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TIA-222-H Annex S
9. TOWER RATING: 54.2%

ALL REACTIONS ARE FACTORED



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Phone: (918) 587-4630
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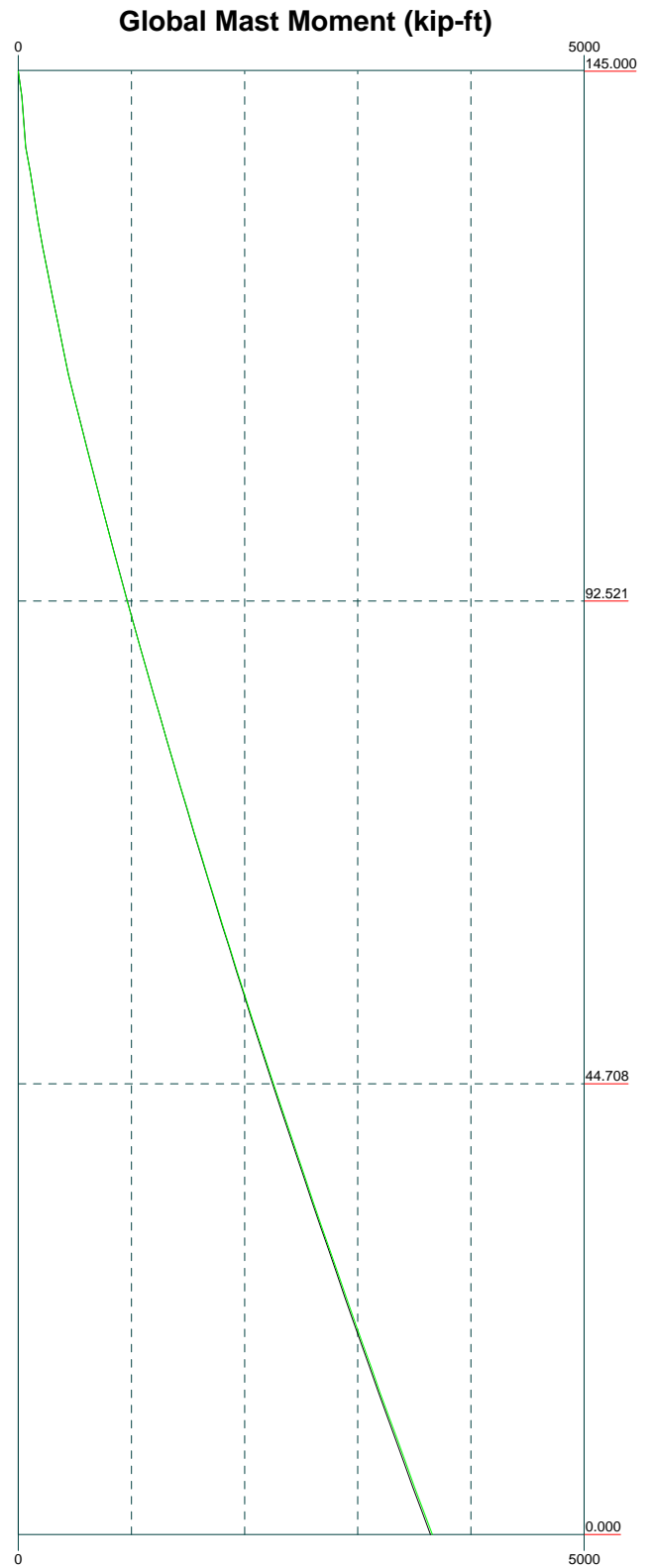
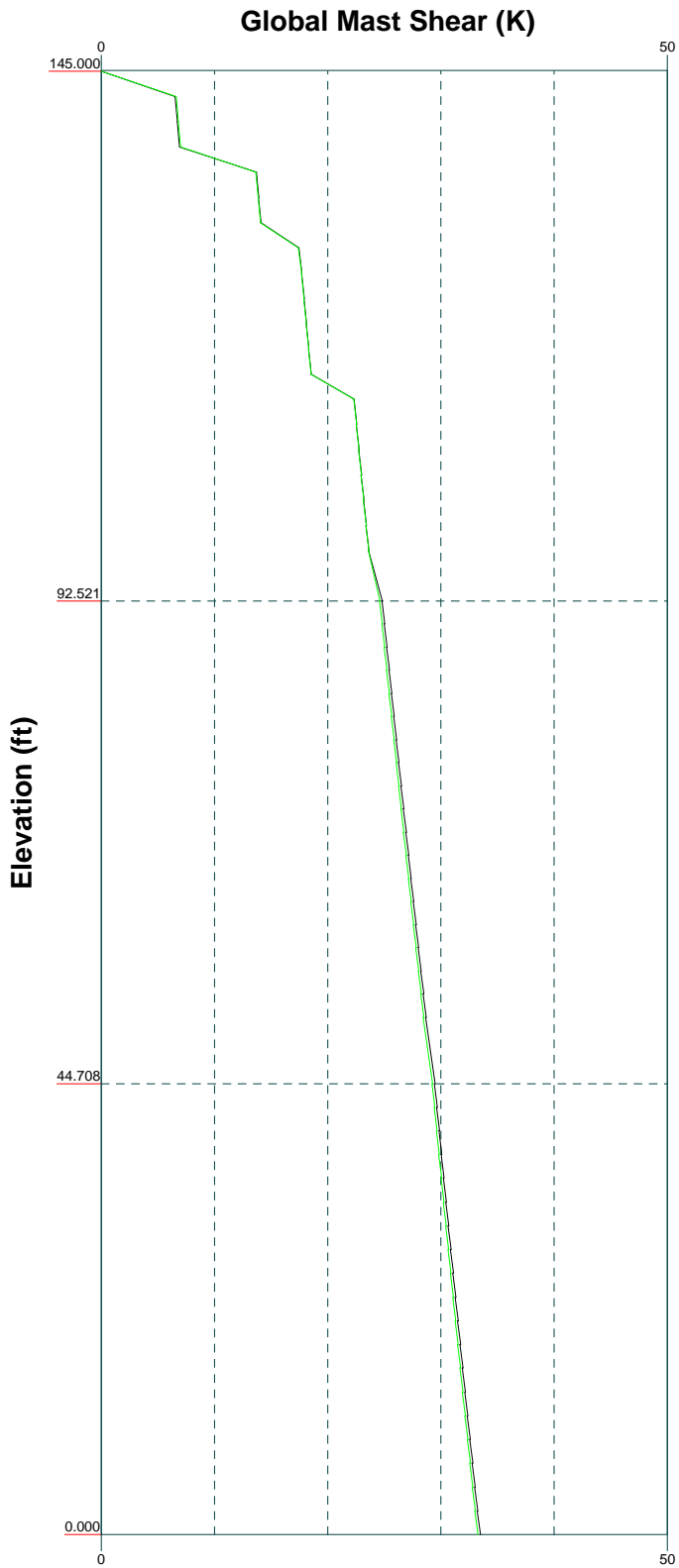
Job:	83033.007.01 - HRT 049B 943215, CT (BU# 80636)		
Project:			
Client:	Crown Castle	Drawn by:	SACHIN
Code:	TIA-222-H	Date:	01/18/22
Path:		Scale:	NTS
		Dwg No.	E-1

Vx

Vz

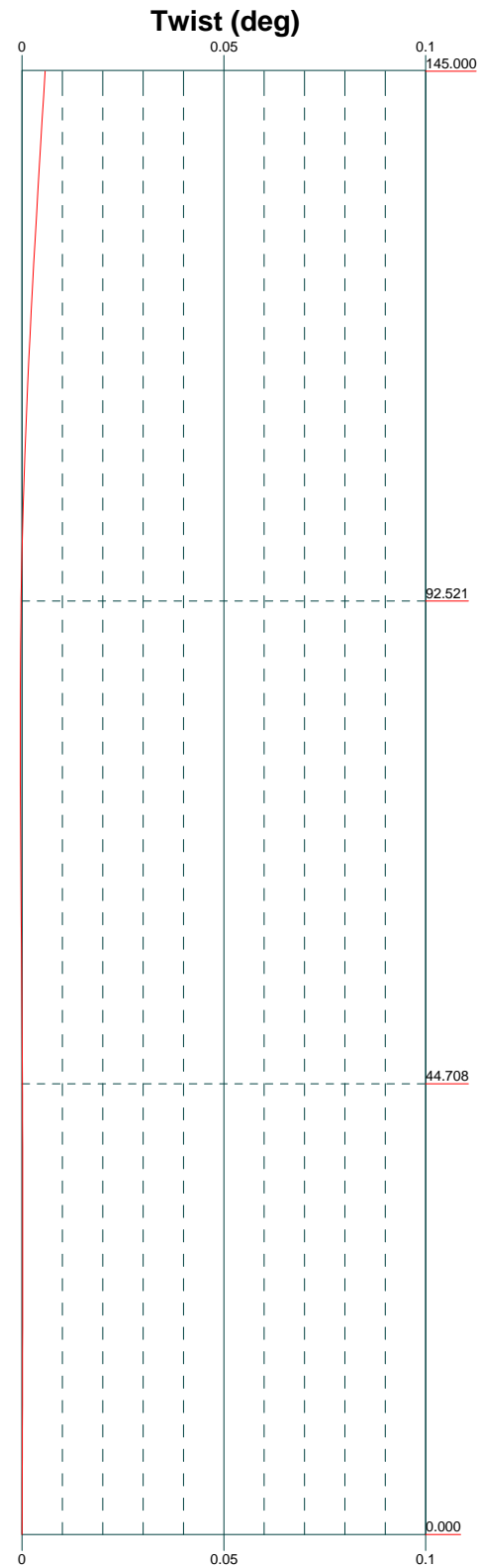
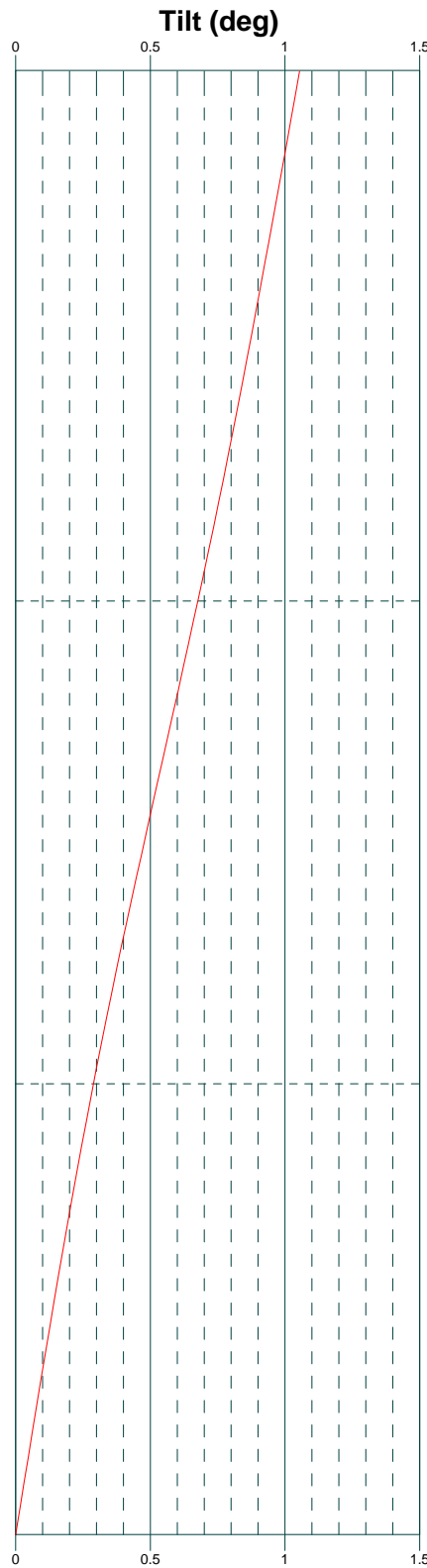
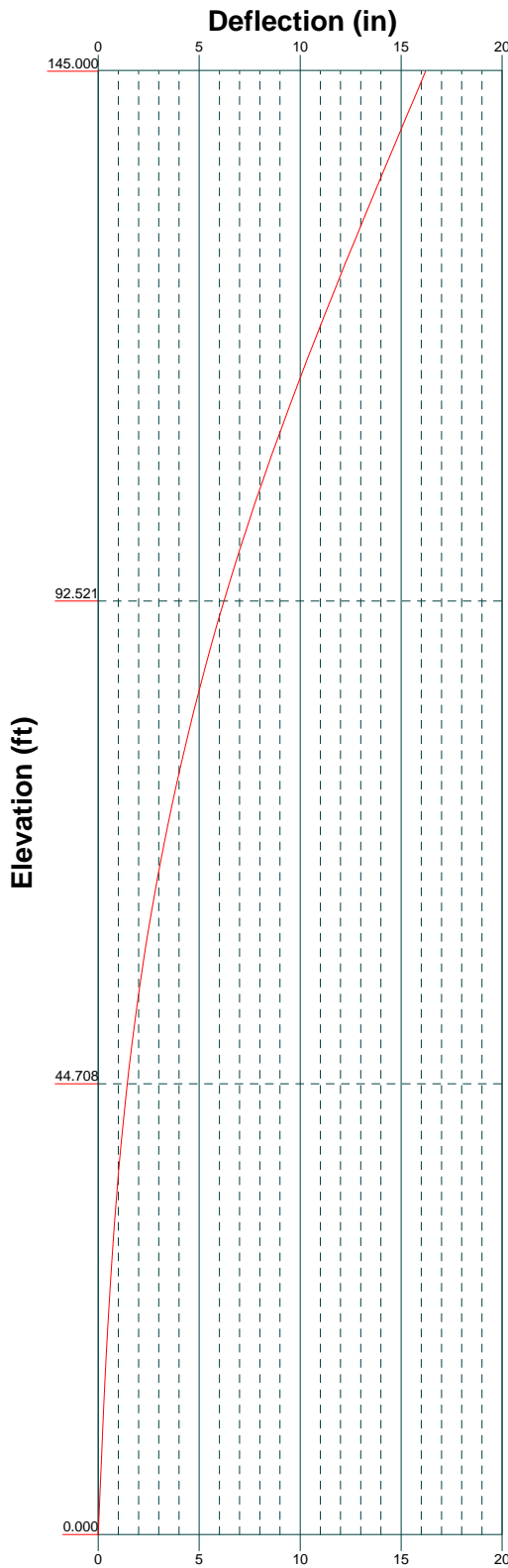
Mx

Mz



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Job: 83033.007.01 - HRT 049B 943215, CT (BU# 80636)		
Project:		
Client: Crown Castle	Drawn by: SACHIN	App'd:
Code: TIA-222-H	Date: 01/18/22	Scale: NTS
Path:	Dwg No. E-4	



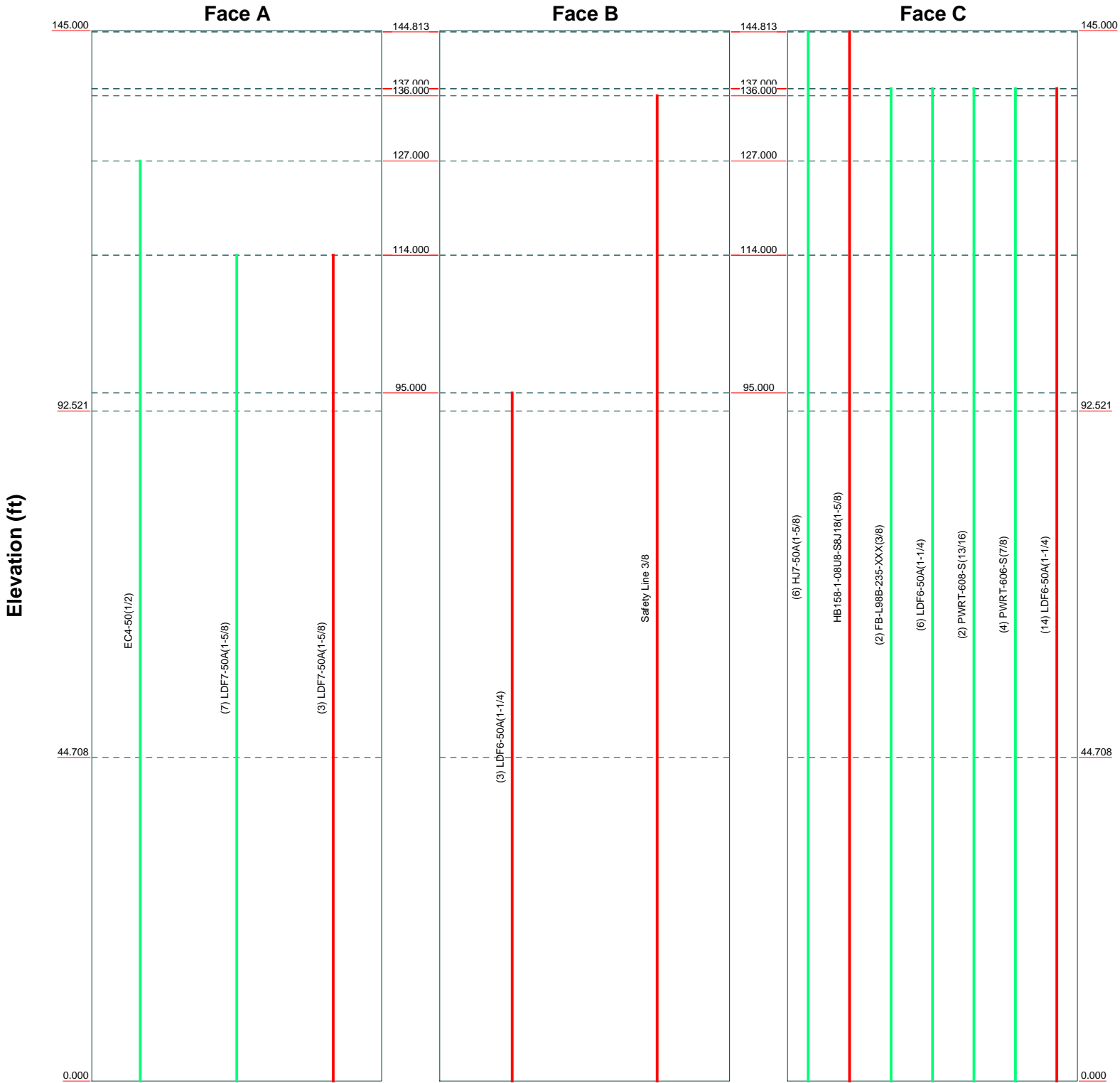
B+T Group
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 Tulsa, OK 74119
 Phone: (918) 587-4630
 FAX: (555) 295-0265

Job: 83033.007.01 - HRT 049B 943215, CT (BU# 80636)		
Project:		
Client: Crown Castle	Drawn by: SACHIN	App'd:
Code: TIA-222-H	Date: 01/18/22	Scale: NTS
Path:	Dwg No. E-5	

Feed Line Distribution Chart

0' - 145'

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



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 FAX: (555) 295-0265

Job: 83033.007.01 - HRT 049B 943215, CT (BU# 80636)		
Project:		
Client: Crown Castle	Drawn by: SACHIN	App'd:
Code: TIA-222-H	Date: 01/18/22	Scale: NTS
Path:	Dwg No. E-7	

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	Client Crown Castle	Designed by SACHIN

Tower Input Data

The tower is a monopole.

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

The following design criteria apply:

- Tower is located in Hartford County, Connecticut.
- Tower base elevation above sea level: 467.000 ft.
- Basic wind speed of 119 mph.
- Risk Category II.
- Exposure Category B.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.000 ft.
- Nominal ice thickness of 1.500 in.
- Ice thickness is considered to increase with height.
- Ice density of 56.000 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50.000 °F.
- Deflections calculated using a wind speed of 60 mph.
- TIA-222-H Annex S.
- 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"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs | <ul style="list-style-type: none"> Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <li style="text-align: center;">Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known |
|--|---|---|

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Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	145.000-92.521	52.479	4.958	12	20.500	35.675	0.344	1.375	A572-65 (65 ksi)
L2	92.521-44.708	52.771	6.583	12	33.554	48.658	0.438	1.750	A572-65 (65 ksi)
L3	44.708-0.000	51.292		12	45.899	60.500	0.469	1.875	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L1	21.102	22.310	1156.948	7.216	10.619	108.951	2344.290	10.981	4.573	13.303
	36.812	39.107	6231.054	12.649	18.480	337.185	12625.805	19.247	8.640	25.134
L2	36.052	46.652	6530.446	11.856	17.381	375.727	13232.454	22.961	7.820	17.874
	50.220	67.931	20161.136	17.263	25.205	799.891	40851.928	33.433	11.868	27.127
L3	49.293	68.571	18063.825	16.264	23.776	759.766	36602.206	33.748	11.045	23.562
	62.469	90.610	41678.805	21.491	31.339	1329.934	84452.559	44.595	14.958	31.91

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
145.000-92.52				1	1	1			
92.521-44.708				1	1	1			
44.708-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
HB158-1-08U8-S8J18(1-5/8)	C	No	Surface Ar (CaAa)	144.813 - 0.000	1	1	0.100 - 0.150	1.980		0.001
LDF6-50A(1-1/4)	C	No	Surface Ar (CaAa)	137.000 - 0.000	14	5	-0.500 - -0.300	1.550		0.001
LDF7-50A(1-5/8)	A	No	Surface Ar (CaAa)	114.000 - 0.000	3	3	0.200 - 0.275	1.980		0.001
* LDF6-50A(1-1/4)	B	No	Surface Ar (CaAa)	95.000 - 0.000	3	3	0.150 - 0.250	1.550		0.001
* Safety Line 3/8	B	No	Surface Ar (CaAa)	136.000 - 0.000	1	1	0.100 - 0.110	0.375		0.000

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Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
*										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight klf
HJ7-50A(1-5/8)	C	No	No	Inside Pole	144.813 - 0.000	6	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001
*									
FB-L98B-235-XXX(3/8)	C	No	No	Inside Pole	137.000 - 0.000	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000
LDF6-50A(1-1/4)	C	No	No	Inside Pole	137.000 - 0.000	6	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001
PWRT-608-S(13/16)	C	No	No	Inside Pole	137.000 - 0.000	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001
PWRT-606-S(7/8)	C	No	No	Inside Pole	137.000 - 0.000	4	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001
*									
EC4-50(1/2)	A	No	No	Inside Pole	127.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000
*									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	114.000 - 0.000	7	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001
*									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	145.000-92.521	A	0.000	0.000	12.759	0.000	0.182
		B	0.000	0.000	2.783	0.000	0.014
		C	0.000	0.000	44.825	0.000	1.147
L2	92.521-44.708	A	0.000	0.000	28.401	0.000	0.400
		B	0.000	0.000	24.026	0.000	0.097

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	Client Crown Castle	Designed by SACHIN

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L3	44.708-0.000	C	0.000	0.000	46.522	0.000	1.169
		A	0.000	0.000	26.557	0.000	0.374
		B	0.000	0.000	22.466	0.000	0.090
		C	0.000	0.000	43.501	0.000	1.094

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	145.000-92.521	A	1.447	0.000	0.000	23.717	0.000	0.422
		B		0.000	0.000	16.549	0.000	0.177
		C		0.000	0.000	84.662	0.000	2.263
L2	92.521-44.708	A	1.370	0.000	0.000	52.794	0.000	0.934
		B		0.000	0.000	60.712	0.000	0.690
		C		0.000	0.000	86.914	0.000	2.318
L3	44.708-0.000	A	1.222	0.000	0.000	48.513	0.000	0.843
		B		0.000	0.000	55.234	0.000	0.605
		C		0.000	0.000	79.734	0.000	2.106

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	145.000-92.521	1.787	1.904	2.043	1.885
L2	92.521-44.708	2.962	0.703	3.285	0.588
L3	44.708-0.000	3.178	0.730	3.707	0.638

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L1	2	HB158-1-08U8-S8J18(1-5/8)	92.52 - 144.81	1.0000	1.0000
L1	14	LDF6-50A(1-1/4)	92.52 - 137.00	1.0000	1.0000
L1	21	LDF7-50A(1-5/8)	92.52 - 114.00	1.0000	1.0000
L1	23	LDF6-50A(1-1/4)	92.52 - 95.00	1.0000	1.0000
L1	25	Safety Line 3/8	92.52 - 136.00	1.0000	1.0000
L2	2	HB158-1-08U8-S8J18(1-5/8)	44.71 - 92.52	1.0000	1.0000
L2	14	LDF6-50A(1-1/4)	44.71 - 92.52	1.0000	1.0000
L2	21	LDF7-50A(1-5/8)	44.71 - 92.52	1.0000	1.0000
L2	23	LDF6-50A(1-1/4)	44.71 - 92.52	1.0000	1.0000
L2	25	Safety Line 3/8	44.71 - 92.52	1.0000	1.0000
L3	2	HB158-1-08U8-S8J18(1-5/8)	0.00 - 44.71	1.0000	1.0000
L3	14	LDF6-50A(1-1/4)	0.00 - 44.71	1.0000	1.0000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L3	21	LDF7-50A(1-5/8)	0.00 - 44.71	1.0000	1.0000
L3	23	LDF6-50A(1-1/4)	0.00 - 44.71	1.0000	1.0000
L3	25	Safety Line 3/8	0.00 - 44.71	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
(2) SC-E 6014 REV2 w/ Mount Pipe	A	From Leg	4.000	0.000	147.000	No Ice	3.564	4.223	0.032
			0.000			1/2" Ice	3.905	4.780	0.071
			1.000			1" Ice	4.256	5.353	0.116
						2" Ice	4.984	6.548	0.225
(2) SC-E 6014 REV2 w/ Mount Pipe	B	From Leg	4.000	0.000	147.000	No Ice	3.564	4.223	0.032
			0.000			1/2" Ice	3.905	4.780	0.071
			1.000			1" Ice	4.256	5.353	0.116
						2" Ice	4.984	6.548	0.225
(2) LPA-80063/6CF w/ Mount Pipe	C	From Leg	4.000	0.000	147.000	No Ice	9.831	10.215	0.052
			0.000			1/2" Ice	10.400	11.384	0.145
			1.000			1" Ice	10.933	12.269	0.246
						2" Ice	12.026	14.086	0.476
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.000	0.000	147.000	No Ice	4.090	3.300	0.066
			0.000			1/2" Ice	4.490	3.680	0.130
			1.000			1" Ice	4.890	4.070	0.204
						2" Ice	5.720	4.870	0.386
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.000	0.000	147.000	No Ice	4.090	3.300	0.066
			0.000			1/2" Ice	4.490	3.680	0.130
			1.000			1" Ice	4.890	4.070	0.204
						2" Ice	5.720	4.870	0.386
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.000	0.000	147.000	No Ice	4.090	3.300	0.066
			0.000			1/2" Ice	4.490	3.680	0.130
			1.000			1" Ice	4.890	4.070	0.204
						2" Ice	5.720	4.870	0.386
DB-T1-6Z-8AB-0Z	A	From Leg	4.000	0.000	147.000	No Ice	4.800	2.000	0.044
			0.000			1/2" Ice	5.070	2.193	0.080
			1.000			1" Ice	5.348	2.393	0.120
						2" Ice	5.926	2.815	0.213
MT6407-77A w/ Mount Pipe	A	From Leg	4.000	0.000	147.000	No Ice	4.907	2.682	0.096
			0.000			1/2" Ice	5.256	3.145	0.136
			1.000			1" Ice	5.615	3.624	0.180
						2" Ice	6.362	4.631	0.288
MT6407-77A w/ Mount Pipe	B	From Leg	4.000	0.000	147.000	No Ice	4.907	2.682	0.096
			0.000			1/2" Ice	5.256	3.145	0.136
			1.000			1" Ice	5.615	3.624	0.180
						2" Ice	6.362	4.631	0.288
MT6407-77A w/ Mount Pipe	C	From Leg	4.000	0.000	147.000	No Ice	4.907	2.682	0.096
			0.000			1/2" Ice	5.256	3.145	0.136
			1.000			1" Ice	5.615	3.624	0.180
						2" Ice	6.362	4.631	0.288
RFV01U-D1A	A	From Leg	4.000	0.000	147.000	No Ice	1.875	1.250	0.084
			0.000			1/2" Ice	2.045	1.393	0.103

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
			1.000						
						1" Ice	2.223	1.543	0.124
						2" Ice	2.601	1.865	0.175
RFV01U-D1A	B	From Leg	4.000	0.000	147.000	No Ice	1.875	1.250	0.084
			0.000			1/2" Ice	2.045	1.393	0.103
			1.000			1" Ice	2.223	1.543	0.124
						2" Ice	2.601	1.865	0.175
RFV01U-D1A	C	From Leg	4.000	0.000	147.000	No Ice	1.875	1.250	0.084
			0.000			1/2" Ice	2.045	1.393	0.103
			1.000			1" Ice	2.223	1.543	0.124
						2" Ice	2.601	1.865	0.175
RFV01U-D2A	A	From Leg	4.000	0.000	147.000	No Ice	1.875	1.013	0.070
			0.000			1/2" Ice	2.045	1.145	0.087
			1.000			1" Ice	2.223	1.284	0.106
						2" Ice	2.601	1.585	0.153
RFV01U-D2A	B	From Leg	4.000	0.000	147.000	No Ice	1.875	1.013	0.070
			0.000			1/2" Ice	2.045	1.145	0.087
			1.000			1" Ice	2.223	1.284	0.106
						2" Ice	2.601	1.585	0.153
RFV01U-D2A	C	From Leg	4.000	0.000	147.000	No Ice	1.875	1.013	0.070
			0.000			1/2" Ice	2.045	1.145	0.087
			1.000			1" Ice	2.223	1.284	0.106
						2" Ice	2.601	1.585	0.153
(2) 4' x 2" Pipe Mount	A	From Leg	4.000	0.000	147.000	No Ice	0.785	0.785	0.029
			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
4' x 2" Pipe Mount	C	From Leg	4.000	0.000	147.000	No Ice	0.785	0.785	0.029
			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
(2) L 2.5x2.5x3/16x6'	A	From Leg	2.000	0.000	147.000	No Ice	1.500	0.005	0.025
			0.000			1/2" Ice	1.918	0.024	0.034
			0.000			1" Ice	2.343	0.049	0.048
						2" Ice	3.215	0.123	0.091
(2) L 2.5x2.5x3/16x6'	B	From Leg	2.000	0.000	147.000	No Ice	1.500	0.005	0.025
			0.000			1/2" Ice	1.918	0.024	0.034
			0.000			1" Ice	2.343	0.049	0.048
						2" Ice	3.215	0.123	0.091
(2) L 2.5x2.5x3/16x6'	C	From Leg	2.000	0.000	147.000	No Ice	1.500	0.005	0.025
			0.000			1/2" Ice	1.918	0.024	0.034
			0.000			1" Ice	2.343	0.049	0.048
						2" Ice	3.215	0.123	0.091
15.5' x Pipe 2.5 STD horizontal mount pipe	A	From Leg	4.000	0.000	147.000	No Ice	5.600	0.030	0.121
			0.000			1/2" Ice	7.240	0.080	0.161
			0.000			1" Ice	8.890	0.150	0.210
						2" Ice	12.250	0.320	0.341
15.5' x Pipe 2.5 STD horizontal mount pipe	B	From Leg	4.000	0.000	147.000	No Ice	5.600	0.030	0.121
			0.000			1/2" Ice	7.240	0.080	0.161
			0.000			1" Ice	8.890	0.150	0.210
						2" Ice	12.250	0.320	0.341
15.5' x Pipe 2.5 STD horizontal mount pipe	C	From Leg	4.000	0.000	147.000	No Ice	5.600	0.030	0.121
			0.000			1/2" Ice	7.240	0.080	0.161
			0.000			1" Ice	8.890	0.150	0.210
						2" Ice	12.250	0.320	0.341
Side Arm Mount [SO 102-3]	C	None		0.000	147.000	No Ice	3.600	3.600	0.075
						1/2" Ice	4.180	4.180	0.105
						1" Ice	4.750	4.750	0.135

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Description	Face or Leg	O T			<i>J^r</i> <i>ft</i>				
Platform Mount [LP 1001-1]	C	None	0.000	147.000	2" Ice	5.900	5.900	0.195	
					No Ice	50.658	50.658	3.409	
					1/2" Ice	56.884	56.884	4.467	
					1" Ice	63.110	63.110	5.525	
					2" Ice	75.562	73.470	7.641	
* RRUS 32 B2_CCIV2	A	From Leg	4.000 0.000 3.000	0.000 137.000	No Ice	2.864	1.782	0.055	
					1/2" Ice	3.090	1.973	0.077	
					1" Ice	3.323	2.171	0.103	
					2" Ice	3.813	2.589	0.165	
RRUS 32 B2_CCIV2	B	From Leg	4.000 0.000 3.000	0.000 137.000	No Ice	2.864	1.782	0.055	
					1/2" Ice	3.090	1.973	0.077	
					1" Ice	3.323	2.171	0.103	
					2" Ice	3.813	2.589	0.165	
RRUS 32 B2_CCIV2	C	From Leg	4.000 0.000 3.000	0.000 137.000	No Ice	2.864	1.782	0.055	
					1/2" Ice	3.090	1.973	0.077	
					1" Ice	3.323	2.171	0.103	
					2" Ice	3.813	2.589	0.165	
AIR 6419 B77G_CCIV2	A	From Leg	4.000 0.000 5.000	0.000 137.000	No Ice	3.797	1.938	0.066	
					1/2" Ice	4.047	2.135	0.094	
					1" Ice	4.305	2.340	0.125	
					2" Ice	4.843	2.770	0.200	
AIR 6419 B77G_CCIV2	B	From Leg	4.000 0.000 5.000	0.000 137.000	No Ice	3.797	1.938	0.066	
					1/2" Ice	4.047	2.135	0.094	
					1" Ice	4.305	2.340	0.125	
					2" Ice	4.843	2.770	0.200	
AIR 6419 B77G_CCIV2	C	From Leg	4.000 0.000 5.000	0.000 137.000	No Ice	3.797	1.938	0.066	
					1/2" Ice	4.047	2.135	0.094	
					1" Ice	4.305	2.340	0.125	
					2" Ice	4.843	2.770	0.200	
AIR 6449 B77D	A	From Leg	4.000 0.000 1.000	0.000 137.000	No Ice	3.640	1.720	0.082	
					1/2" Ice	4.000	2.020	0.111	
					1" Ice	4.370	2.330	0.145	
					2" Ice	5.160	2.990	0.223	
AIR 6449 B77D	B	From Leg	4.000 0.000 1.000	0.000 137.000	No Ice	3.640	1.720	0.082	
					1/2" Ice	4.000	2.020	0.111	
					1" Ice	4.370	2.330	0.145	
					2" Ice	5.160	2.990	0.223	
AIR 6449 B77D	C	From Leg	4.000 0.000 1.000	0.000 137.000	No Ice	3.640	1.720	0.082	
					1/2" Ice	4.000	2.020	0.111	
					1" Ice	4.370	2.330	0.145	
					2" Ice	5.160	2.990	0.223	
OPA65R-BU6D w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000 137.000	No Ice	12.250	6.050	0.089	
					1/2" Ice	13.000	6.710	0.176	
					1" Ice	13.760	7.390	0.275	
					2" Ice	15.340	8.790	0.508	
OPA65R-BU8D w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000 137.000	No Ice	17.460	8.580	0.109	
					1/2" Ice	18.460	9.490	0.224	
					1" Ice	19.480	10.420	0.353	
					2" Ice	21.580	12.330	0.656	
OPA65R-BU8D w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000 137.000	No Ice	17.460	8.580	0.109	
					1/2" Ice	18.460	9.490	0.224	
					1" Ice	19.480	10.420	0.353	
					2" Ice	21.580	12.330	0.656	
DMP65R-BU6D w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000 137.000	No Ice	11.960	5.970	0.115	
					1/2" Ice	12.700	6.630	0.201	
					1" Ice	13.460	7.300	0.298	

tnxTower B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (555) 295-0265	Job		83033.007.01 - HRT 049B 943215, CT (BU# 806368)		Page		8 of 20	
	Project				Date		15:35:56 01/18/22	
	Client		Crown Castle		Designed by		SACHIN	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight		
			Horz	Lateral						Vert	°
DMP65R-BU8D w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	137.000	2" Ice	15.020	8.690	0.529	
			0.000					No Ice	15.890	7.890	0.139
			3.000					1/2" Ice	16.810	8.740	0.252
								1" Ice	17.760	9.600	0.380
DMP65R-BU8D w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	137.000	2" Ice	19.700	11.370	0.679	
			0.000					No Ice	15.890	7.890	0.139
			3.000					1/2" Ice	16.810	8.740	0.252
								1" Ice	17.760	9.600	0.380
RRUS 4478 B14_CCIV2	A	From Leg	4.000	0.000	0.000	137.000	2" Ice	19.700	11.370	0.679	
			0.000					No Ice	2.021	1.246	0.059
			3.000					1/2" Ice	2.200	1.396	0.077
								1" Ice	2.386	1.554	0.097
RRUS 4478 B14_CCIV2	B	From Leg	4.000	0.000	0.000	137.000	2" Ice	2.780	1.891	0.147	
			0.000					No Ice	2.021	1.246	0.059
			3.000					1/2" Ice	2.200	1.396	0.077
								1" Ice	2.386	1.554	0.097
RRUS 4478 B14_CCIV2	C	From Leg	4.000	0.000	0.000	137.000	2" Ice	2.780	1.891	0.147	
			0.000					No Ice	2.021	1.246	0.059
			3.000					1/2" Ice	2.200	1.396	0.077
								1" Ice	2.386	1.554	0.097
RRUS 4426 B66	A	From Leg	4.000	0.000	0.000	137.000	2" Ice	2.780	1.891	0.147	
			0.000					No Ice	1.644	0.725	0.048
			3.000					1/2" Ice	1.804	0.842	0.061
								1" Ice	1.972	0.969	0.076
RRUS 4426 B66	B	From Leg	4.000	0.000	0.000	137.000	2" Ice	2.329	1.244	0.115	
			0.000					No Ice	1.644	0.725	0.048
			3.000					1/2" Ice	1.804	0.842	0.061
								1" Ice	1.972	0.969	0.076
RRUS 4426 B66	C	From Leg	4.000	0.000	0.000	137.000	2" Ice	2.329	1.244	0.115	
			0.000					No Ice	1.644	0.725	0.048
			3.000					1/2" Ice	1.804	0.842	0.061
								1" Ice	1.972	0.969	0.076
DC9-48-60-24-8C-EV_CCIV 2	A	From Leg	4.000	0.000	0.000	137.000	2" Ice	2.329	1.244	0.115	
			0.000					No Ice	2.736	2.736	0.016
			3.000					1/2" Ice	2.962	2.962	0.042
								1" Ice	3.195	3.195	0.071
DC9-48-60-24-8C-EV_CCIV 2	B	From Leg	4.000	1/18/2137.0	0.000	137.000	2" Ice	3.683	3.683	0.142	
			0.000					No Ice	2.736	2.736	0.016
			3.000					1/2" Ice	2.962	2.962	0.042
								1" Ice	3.195	3.195	0.071
RRUS 4449 B5/B12	A	From Leg	4.000	0.000	0.000	137.000	2" Ice	3.683	3.683	0.142	
			0.000					No Ice	1.968	1.408	0.071
			3.000					1/2" Ice	2.144	1.564	0.090
								1" Ice	2.328	1.727	0.111
RRUS 4449 B5/B12	B	From Leg	4.000	0.000	0.000	137.000	2" Ice	2.718	2.075	0.163	
			0.000					No Ice	1.968	1.408	0.071
			3.000					1/2" Ice	2.144	1.564	0.090
								1" Ice	2.328	1.727	0.111
RRUS 4449 B5/B12	C	From Leg	4.000	0.000	0.000	137.000	2" Ice	2.718	2.075	0.163	
			0.000					No Ice	1.968	1.408	0.071
			3.000					1/2" Ice	2.144	1.564	0.090
								1" Ice	2.328	1.727	0.111
(3) 3' x 2" Pipe Mount	A	From Leg	4.000	0.000	0.000	137.000	2" Ice	2.718	2.075	0.163	
			0.000					No Ice	0.583	0.583	0.011
			0.000					1/2" Ice	0.770	0.770	0.017
								1" Ice	0.967	0.967	0.024
						2" Ice	1.388	1.388	0.047		

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	Client	Crown Castle		Designed by

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						°
(2) 3' x 2" Pipe Mount	B	From Leg	4.000	0.000	0.000	137.000	No Ice	0.583	0.583	0.011
			0.000	0.000			1/2" Ice	0.770	0.770	0.017
			0.000	0.000			1" Ice	0.967	0.967	0.024
							2" Ice	1.388	1.388	0.047
							No Ice	0.583	0.583	0.011
(2) 3' x 2" Pipe Mount	C	From Leg	4.000	0.000	0.000	137.000	1/2" Ice	0.770	0.770	0.017
			0.000	0.000			1" Ice	0.967	0.967	0.024
			0.000	0.000			2" Ice	1.388	1.388	0.047
							No Ice	0.583	0.583	0.011
							1/2" Ice	0.770	0.770	0.017
8' x 2.375" Mount Pipe	A	From Leg	4.000	0.000	0.000	137.000	1" Ice	0.967	0.967	0.024
			0.000	0.000			2" Ice	1.388	1.388	0.047
			0.000	0.000			No Ice	1.900	1.900	0.061
							1/2" Ice	2.728	2.728	0.075
							1" Ice	3.401	3.401	0.095
8' x 2.375" Mount Pipe	B	From Leg	4.000	0.000	0.000	137.000	2" Ice	4.396	4.396	0.150
			0.000	0.000			No Ice	1.900	1.900	0.061
			0.000	0.000			1/2" Ice	2.728	2.728	0.075
							1" Ice	3.401	3.401	0.095
							2" Ice	4.396	4.396	0.150
8' x 2.375" Mount Pipe	C	From Leg	4.000	0.000	0.000	137.000	No Ice	1.900	1.900	0.061
			0.000	0.000			1/2" Ice	2.728	2.728	0.075
			0.000	0.000			1" Ice	3.401	3.401	0.095
							2" Ice	4.396	4.396	0.150
							No Ice	1.900	1.900	0.061
Platform Mount [LP 1002-1]	C	None			0.000	137.000	1/2" Ice	2.728	2.728	0.075
							1" Ice	3.401	3.401	0.095
							2" Ice	4.396	4.396	0.150
							No Ice	61.792	61.792	3.240
							1/2" Ice	68.592	68.592	4.521
		1" Ice	75.392	75.392	5.802					
		2" Ice	88.992	88.992	8.364					
* (4) DB844G65ZAXY w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	129.000	No Ice	4.230	4.510	0.034
			0.000	0.000			1/2" Ice	4.710	5.000	0.076
			1.000	0.000			1" Ice	5.210	5.500	0.126
							2" Ice	6.260	6.570	0.250
							No Ice	4.230	4.510	0.034
(4) DB844G65ZAXY w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	129.000	1/2" Ice	4.710	5.000	0.076
			0.000	0.000			1" Ice	5.210	5.500	0.126
			1.000	0.000			2" Ice	6.260	6.570	0.250
							No Ice	4.230	4.510	0.034
							1/2" Ice	4.710	5.000	0.076
(4) DB844G65ZAXY w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	129.000	1" Ice	5.210	5.500	0.126
			0.000	0.000			2" Ice	6.260	6.570	0.250
			1.000	0.000			No Ice	4.230	4.510	0.034
							1/2" Ice	4.710	5.000	0.076
							1" Ice	5.210	5.500	0.126
GPS_A	A	From Leg	4.000	0.000	0.000	129.000	2" Ice	6.260	6.570	0.250
			0.000	0.000			No Ice	0.255	0.255	0.001
			3.000	0.000			1/2" Ice	0.320	0.320	0.005
							1" Ice	0.393	0.393	0.010
							2" Ice	0.561	0.561	0.025
GPS_A	B	From Leg	4.000	0.000	0.000	129.000	No Ice	0.255	0.255	0.001
			0.000	0.000			1/2" Ice	0.320	0.320	0.005
			3.000	0.000			1" Ice	0.393	0.393	0.010
							2" Ice	0.561	0.561	0.025
							No Ice	3.020	3.020	0.195
Side Arm Mount [SO 701-3]	C	None			0.000	129.000	1/2" Ice	4.180	4.180	0.237
							1" Ice	5.330	5.330	0.279
							2" Ice	7.630	7.630	0.363
							No Ice	28.500	28.500	1.122
							1/2" Ice	31.690	31.690	1.676
Platform Mount [LP 601-1]	C	None			0.000	129.000	1" Ice	34.870	34.870	2.282
							2" Ice	41.230	41.230	3.653
							No Ice	6.000	6.000	0.160
							1/2" Ice	8.000	8.000	0.240
							1" Ice	10.000	10.000	0.320
Transition Ladder	C	From Face	2.000	0.000	0.000	129.000	2" Ice	14.000	14.000	0.480
			0.000	0.000			No Ice	6.000	6.000	0.160
			-2.000	0.000			1/2" Ice	8.000	8.000	0.240

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	Project		Date
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Client	Crown Castle	Designed by	
		SACHIN	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz Lateral	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
*									
CXL 900-3LW	C	From Leg	4.000	0.000	0.000	127.000	No Ice 0.145	0.145	0.001
			0.000				1/2" Ice 0.334	0.334	0.003
			0.000				1" Ice 0.483	0.483	0.006
							2" Ice 0.808	0.808	0.018
LNA	C	From Leg	4.000	0.000	0.000	127.000	No Ice 0.142	0.054	0.002
			0.000				1/2" Ice 0.192	0.090	0.003
			0.000				1" Ice 0.250	0.133	0.005
							2" Ice 0.386	0.244	0.012
CAVITY FILTER	C	From Leg	4.000	0.000	0.000	127.000	No Ice 0.195	0.084	0.002
			0.000				1/2" Ice 0.253	0.124	0.004
			0.000				1" Ice 0.319	0.171	0.007
							2" Ice 0.473	0.287	0.016
Side Arm Mount [SO 306-1]	C	From Leg	2.000	0.000	0.000	127.000	No Ice 0.410	2.260	0.042
			0.000				1/2" Ice 0.810	3.830	0.062
			0.000				1" Ice 1.230	5.480	0.094
							2" Ice 2.080	9.370	0.187
*									
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	114.000	No Ice 3.760	3.150	0.194
			0.000				1/2" Ice 4.120	3.490	0.252
			2.000				1" Ice 4.480	3.840	0.320
							2" Ice 5.240	4.580	0.485
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	114.000	No Ice 3.760	3.150	0.194
			0.000				1/2" Ice 4.120	3.490	0.252
			2.000				1" Ice 4.480	3.840	0.320
							2" Ice 5.240	4.580	0.485
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	114.000	No Ice 3.760	3.150	0.194
			0.000				1/2" Ice 4.120	3.490	0.252
			2.000				1" Ice 4.480	3.840	0.320
							2" Ice 5.240	4.580	0.485
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	114.000	No Ice 14.690	6.870	0.186
			0.000				1/2" Ice 15.460	7.550	0.315
			2.000				1" Ice 16.230	8.250	0.458
							2" Ice 17.820	9.670	0.788
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	114.000	No Ice 14.690	6.870	0.186
			0.000				1/2" Ice 15.460	7.550	0.315
			2.000				1" Ice 16.230	8.250	0.458
							2" Ice 17.820	9.670	0.788
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	114.000	No Ice 14.690	6.870	0.186
			0.000				1/2" Ice 15.460	7.550	0.315
			2.000				1" Ice 16.230	8.250	0.458
							2" Ice 17.820	9.670	0.788
KRY 112 144/1	A	From Leg	4.000	0.000	0.000	114.000	No Ice 0.350	0.175	0.011
			0.000				1/2" Ice 0.426	0.234	0.014
			2.000				1" Ice 0.509	0.301	0.019
							2" Ice 0.698	0.456	0.032
KRY 112 144/1	B	From Leg	4.000	0.000	0.000	114.000	No Ice 0.350	0.175	0.011
			0.000				1/2" Ice 0.426	0.234	0.014
			2.000				1" Ice 0.509	0.301	0.019
							2" Ice 0.698	0.456	0.032
KRY 112 144/1	C	From Leg	4.000	0.000	0.000	114.000	No Ice 0.350	0.175	0.011
			0.000				1/2" Ice 0.426	0.234	0.014
			2.000				1" Ice 0.509	0.301	0.019
							2" Ice 0.698	0.456	0.032
RADIO 4449 B71/B85A	A	From Leg	4.000	0.000	0.000	114.000	No Ice 1.644	1.310	0.075
			0.000				1/2" Ice 1.804	1.455	0.092
			2.000				1" Ice 1.972	1.608	0.112

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight					
			Horz Lateral ft	Vert ft						°	ft	ft ²	ft ²	K
RADIO 4449 B71/B85A	B	From Leg	4.000	0.000	0.000	114.000	2" Ice	2.329	1.936	0.161				
											No Ice	1.644	1.310	0.075
											1/2" Ice	1.804	1.455	0.092
											1" Ice	1.972	1.608	0.112
RADIO 4449 B71/B85A	C	From Leg	4.000	0.000	0.000	114.000	2" Ice	2.329	1.936	0.161				
											No Ice	1.644	1.310	0.075
											1/2" Ice	1.804	1.455	0.092
											1" Ice	1.972	1.608	0.112
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	114.000	2" Ice	2.329	1.936	0.161				
											No Ice	5.190	2.710	0.128
											1/2" Ice	5.590	3.040	0.174
											1" Ice	6.020	3.380	0.227
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	114.000	2" Ice	6.900	4.120	0.354				
											No Ice	5.190	2.710	0.128
											1/2" Ice	5.590	3.040	0.174
											1" Ice	6.020	3.380	0.227
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	114.000	2" Ice	6.900	4.120	0.354				
											No Ice	5.190	2.710	0.128
											1/2" Ice	5.590	3.040	0.174
											1" Ice	6.020	3.380	0.227
RRUS 4415 B25_CCIV2	A	From Leg	4.000	0.000	0.000	114.000	2" Ice	6.900	4.120	0.354				
											No Ice	1.843	0.820	0.046
											1/2" Ice	2.012	0.943	0.060
											1" Ice	2.190	1.075	0.077
RRUS 4415 B25_CCIV2	B	From Leg	4.000	0.000	0.000	114.000	2" Ice	2.566	1.368	0.118				
											No Ice	1.843	0.820	0.046
											1/2" Ice	2.012	0.943	0.060
											1" Ice	2.190	1.075	0.077
RRUS 4415 B25_CCIV2	C	From Leg	4.000	0.000	0.000	114.000	2" Ice	2.566	1.368	0.118				
											No Ice	1.843	0.820	0.046
											1/2" Ice	2.012	0.943	0.060
											1" Ice	2.190	1.075	0.077
SDX1926Q-43	A	From Leg	4.000	0.000	0.000	114.000	2" Ice	2.566	1.368	0.118				
											No Ice	0.241	0.101	0.006
											1/2" Ice	0.306	0.144	0.009
											1" Ice	0.379	0.195	0.012
SDX1926Q-43	B	From Leg	4.000	0.000	0.000	114.000	2" Ice	0.547	0.318	0.023				
											No Ice	0.241	0.101	0.006
											1/2" Ice	0.306	0.144	0.009
											1" Ice	0.379	0.195	0.012
SDX1926Q-43	B	From Leg	4.000	0.000	0.000	114.000	2" Ice	0.547	0.318	0.023				
											No Ice	0.241	0.101	0.006
											1/2" Ice	0.306	0.144	0.009
											1" Ice	0.379	0.195	0.012
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	0.000	114.000	2" Ice	0.547	0.318	0.023				
											No Ice	1.425	1.425	0.022
											1/2" Ice	1.925	1.925	0.033
											1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	0.000	114.000	2" Ice	3.060	3.060	0.090				
											No Ice	1.425	1.425	0.022
											1/2" Ice	1.925	1.925	0.033
											1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	0.000	114.000	2" Ice	3.060	3.060	0.090				
											No Ice	1.425	1.425	0.022
											1/2" Ice	1.925	1.925	0.033
											1" Ice	2.294	2.294	0.048
							2" Ice	3.060	3.060	0.090				

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz Lateral	Vert					
Platform Mount [LP 602-1]	C	None			0.000	114.000	No Ice 31.070 1/2" Ice 34.820 1" Ice 38.480 2" Ice 45.600	31.070 34.820 38.480 45.600	1.343 1.967 2.669 4.314
Transition Ladder	C	From Face	2.000 0.000 -4.000		0.000	114.000	No Ice 6.000 1/2" Ice 8.000 1" Ice 10.000 2" Ice 14.000	6.000 8.000 10.000 14.000	0.160 0.240 0.320 0.480
* HT65A-F-2X2 w/ Mount Pipe	B	From Leg	3.000 0.000 2.000		0.000	95.000	No Ice 1.980 1/2" Ice 2.290 1" Ice 2.620 2" Ice 3.300	1.930 2.240 2.560 3.240	0.045 0.077 0.117 0.224
FWHR	B	From Leg	3.000 0.000 2.000		0.000	95.000	No Ice 1.035 1/2" Ice 1.164 1" Ice 1.300 2" Ice 1.594	0.508 0.601 0.701 0.923	0.026 0.036 0.048 0.078
2' Ice Shield	C	From Leg	3.000 0.000 4.000		0.000	95.000	No Ice 0.400 1/2" Ice 0.548 1" Ice 0.704 2" Ice 1.037	0.400 0.548 0.704 1.037	0.020 0.043 0.070 0.135
Side Arm Mount [SO 701-1]	B	From Leg	1.500 0.000 0.000		0.000	95.000	No Ice 0.850 1/2" Ice 1.140 1" Ice 1.430 2" Ice 2.010	1.670 2.340 3.010 4.350	0.065 0.079 0.093 0.121
Side Arm Mount [SO 701-1]	C	From Leg	1.500 0.000 0.000		0.000	95.000	No Ice 0.850 1/2" Ice 1.140 1" Ice 1.430 2" Ice 2.010	1.670 2.340 3.010 4.350	0.065 0.079 0.093 0.121

*

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight
				Horz Lateral	Vert						
repeater technologies DA1900-39	C	Paraboloid w/Shroud (HP)	From Leg	3.000 0.000 1.000		30.000		95.000	3.542	No Ice 9.860 1/2" Ice 10.320 1" Ice 10.770 2" Ice 11.680	0.050 0.100 0.150 0.260

*

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Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

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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	145 - 92.5208	Pole	Max Tension	26	0.000	-0.000	0.000
			Max. Compression	26	-55.179	2.095	-5.665
			Max. Mx	20	-25.665	842.173	-1.312
			Max. My	14	-25.667	0.008	-843.144
			Max. Vy	8	23.652	-841.383	-2.164
			Max. Vx	14	23.634	0.008	-843.144
			Max. Torque	11			-3.051
L2	92.5208 - 44.7083	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-74.959	2.477	-9.622
			Max. Mx	8	-39.699	-2063.747	-5.052
			Max. My	14	-39.707	0.373	-2057.153
			Max. Vy	8	28.710	-2063.747	-5.052
			Max. Vx	14	28.493	0.373	-2057.153
			Max. Torque	11			-4.404
L3	44.7083 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-102.706	2.442	-12.194
			Max. Mx	8	-60.976	-3659.390	-7.742
			Max. My	14	-60.976	0.828	-3642.880
			Max. Vy	8	33.487	-3659.390	-7.742
			Max. Vx	14	33.274	0.828	-3642.880
			Max. Torque	11			-4.396

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	102.706	-0.013	-8.002
	Max. H _x	20	60.993	33.372	0.030
	Max. H _z	2	60.993	0.067	33.242
	Max. M _x	2	3634.140	0.067	33.242
	Max. M _z	8	3659.390	-33.456	-0.030
	Max. Torsion	23	4.238	28.942	16.600
	Min. Vert	25	45.745	16.781	28.768
	Min. H _x	8	60.993	-33.456	-0.030
	Min. H _z	14	60.993	0.008	-33.242
	Min. M _x	14	-3642.880	0.008	-33.242
	Min. M _z	20	-3652.184	33.372	0.030
	Min. Torsion	11		-4.394	-29.029

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	50.827	0.000	0.000	3.501	0.430	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	60.993	-0.067	-33.242	-3634.140	7.600	-2.707
0.9 Dead+1.0 Wind 0 deg - No Ice	45.745	-0.067	-33.242	-3598.387	7.402	-2.699

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Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Ice						
1.2 Dead+1.0 Wind 30 deg - No Ice	60.993	17.106	-29.229	-3196.107	-1870.021	0.123
0.9 Dead+1.0 Wind 30 deg - No Ice	45.745	17.106	-29.229	-3164.823	-1851.268	0.141
1.2 Dead+1.0 Wind 60 deg - No Ice	60.993	30.558	-17.469	-1886.456	-3304.961	2.165
0.9 Dead+1.0 Wind 60 deg - No Ice	45.745	30.558	-17.469	-1868.565	-3271.905	2.188
1.2 Dead+1.0 Wind 90 deg - No Ice	60.993	33.456	0.030	7.742	-3659.390	3.676
0.9 Dead+1.0 Wind 90 deg - No Ice	45.745	33.456	0.030	6.579	-3622.475	3.697
1.2 Dead+1.0 Wind 120 deg - No Ice	60.993	29.029	16.620	1823.902	-3174.760	4.380
0.9 Dead+1.0 Wind 120 deg - No Ice	45.745	29.029	16.620	1804.315	-3142.749	4.394
1.2 Dead+1.0 Wind 150 deg - No Ice	60.993	16.861	28.744	3151.231	-1842.997	4.033
0.9 Dead+1.0 Wind 150 deg - No Ice	45.745	16.861	28.744	3118.171	-1824.490	4.037
1.2 Dead+1.0 Wind 180 deg - No Ice	60.993	-0.008	33.242	3642.880	0.828	2.549
0.9 Dead+1.0 Wind 180 deg - No Ice	45.745	-0.008	33.242	3604.855	0.691	2.542
1.2 Dead+1.0 Wind 210 deg - No Ice	60.993	-17.027	29.253	3207.225	1863.192	0.252
0.9 Dead+1.0 Wind 210 deg - No Ice	45.745	-17.027	29.253	3173.649	1844.217	0.235
1.2 Dead+1.0 Wind 240 deg - No Ice	60.993	-30.471	17.449	1893.213	3297.495	-1.946
0.9 Dead+1.0 Wind 240 deg - No Ice	45.745	-30.471	17.449	1873.068	3264.220	-1.969
1.2 Dead+1.0 Wind 270 deg - No Ice	60.993	-33.372	-0.030	0.969	3652.184	-3.498
0.9 Dead+1.0 Wind 270 deg - No Ice	45.745	-33.372	-0.030	-0.133	3615.047	-3.519
1.2 Dead+1.0 Wind 300 deg - No Ice	60.993	-28.942	-16.600	-1813.227	3167.269	-4.224
0.9 Dead+1.0 Wind 300 deg - No Ice	45.745	-28.942	-16.600	-1795.918	3135.044	-4.238
1.2 Dead+1.0 Wind 330 deg - No Ice	60.993	-16.781	-28.768	-3144.886	1836.140	-4.048
0.9 Dead+1.0 Wind 330 deg - No Ice	45.745	-16.781	-28.768	-3114.074	1817.418	-4.052
1.2 Dead+1.0 Ice+1.0 Temp	102.706	-0.000	0.000	12.194	2.442	0.001
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	102.706	-0.028	-8.002	-906.598	6.021	-0.694
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	102.706	4.014	-6.908	-780.877	-457.368	0.028
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	102.706	6.944	-3.978	-444.149	-793.814	0.589
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	102.706	8.020	0.020	15.184	-917.654	1.000
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	102.706	6.964	4.013	473.774	-796.588	1.180
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	102.706	4.049	6.928	808.473	-462.173	1.069
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	102.706	0.013	8.002	931.423	0.475	0.663
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	102.706	-3.998	6.913	806.192	460.716	0.054

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Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 240	102.706	-6.926	3.974	468.565	797.029	-0.538
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 270	102.706	-8.004	-0.020	9.637	920.923	-0.961
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	102.706	-6.947	-4.009	-448.546	799.800	-1.150
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	102.706	-4.033	-6.933	-784.141	465.518	-1.075
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	50.827	-0.016	-7.959	-862.248	2.132	-0.651
Dead+Wind 30 deg - Service	50.827	4.096	-6.998	-758.026	-444.714	0.035
Dead+Wind 60 deg - Service	50.827	7.316	-4.183	-446.383	-786.253	0.528
Dead+Wind 90 deg - Service	50.827	8.010	0.007	4.428	-870.532	0.889
Dead+Wind 120 deg - Service	50.827	6.950	3.979	436.627	-755.197	1.054
Dead+Wind 150 deg - Service	50.827	4.037	6.882	752.492	-438.268	0.968
Dead+Wind 180 deg - Service	50.827	-0.002	7.959	869.493	0.520	0.612
Dead+Wind 210 deg - Service	50.827	-4.077	7.004	765.837	443.726	0.061
Dead+Wind 240 deg - Service	50.827	-7.296	4.178	453.157	785.109	-0.469
Dead+Wind 270 deg - Service	50.827	-7.990	-0.007	2.815	869.450	-0.845
Dead+Wind 300 deg - Service	50.827	-6.930	-3.975	-428.913	754.051	-1.021
Dead+Wind 330 deg - Service	50.827	-4.018	-6.888	-745.813	437.279	-0.978

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	0.000	-50.827	0.000	0.000	50.827	0.000	0.000%
2	-0.067	-60.993	-33.242	0.067	60.993	33.242	0.000%
3	-0.067	-45.745	-33.242	0.067	45.745	33.242	0.000%
4	17.106	-60.993	-29.229	-17.106	60.993	29.229	0.000%
5	17.106	-45.745	-29.229	-17.106	45.745	29.229	0.000%
6	30.558	-60.993	-17.469	-30.558	60.993	17.469	0.000%
7	30.558	-45.745	-17.469	-30.558	45.745	17.469	0.000%
8	33.456	-60.993	0.030	-33.456	60.993	-0.030	0.000%
9	33.456	-45.745	0.030	-33.456	45.745	-0.030	0.000%
10	29.029	-60.993	16.620	-29.029	60.993	-16.620	0.000%
11	29.029	-45.745	16.620	-29.029	45.745	-16.620	0.000%
12	16.861	-60.993	28.744	-16.861	60.993	-28.744	0.000%
13	16.861	-45.745	28.744	-16.861	45.745	-28.744	0.000%
14	-0.008	-60.993	33.242	0.008	60.993	-33.242	0.000%
15	-0.008	-45.745	33.242	0.008	45.745	-33.242	0.000%
16	-17.027	-60.993	29.253	17.027	60.993	-29.253	0.000%
17	-17.027	-45.745	29.253	17.027	45.745	-29.253	0.000%
18	-30.471	-60.993	17.449	30.471	60.993	-17.449	0.000%
19	-30.471	-45.745	17.449	30.471	45.745	-17.449	0.000%
20	-33.372	-60.993	-0.030	33.372	60.993	0.030	0.000%
21	-33.372	-45.745	-0.030	33.372	45.745	0.030	0.000%
22	-28.942	-60.993	-16.600	28.942	60.993	16.600	0.000%
23	-28.942	-45.745	-16.600	28.942	45.745	16.600	0.000%
24	-16.781	-60.993	-28.768	16.781	60.993	28.768	0.000%
25	-16.781	-45.745	-28.768	16.781	45.745	28.768	0.000%
26	0.000	-102.706	0.000	0.000	102.706	-0.000	0.000%
27	-0.028	-102.706	-8.002	0.028	102.706	8.002	0.000%
28	4.014	-102.706	-6.908	-4.014	102.706	6.908	0.000%
29	6.944	-102.706	-3.978	-6.944	102.706	3.978	0.000%
30	8.020	-102.706	0.020	-8.020	102.706	-0.020	0.000%
31	6.964	-102.706	4.013	-6.964	102.706	-4.013	0.000%

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			SACHIN

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
32	4.049	-102.706	6.928	-4.049	102.706	-6.928	0.000%
33	0.013	-102.706	8.002	-0.013	102.706	-8.002	0.000%
34	-3.998	-102.706	6.913	3.998	102.706	-6.913	0.000%
35	-6.926	-102.706	3.974	6.926	102.706	-3.974	0.000%
36	-8.003	-102.706	-0.020	8.004	102.706	0.020	0.000%
37	-6.947	-102.706	-4.009	6.947	102.706	4.009	0.000%
38	-4.033	-102.706	-6.933	4.033	102.706	6.933	0.000%
39	-0.016	-50.827	-7.959	0.016	50.827	7.959	0.000%
40	4.096	-50.827	-6.998	-4.096	50.827	6.998	0.000%
41	7.316	-50.827	-4.183	-7.316	50.827	4.183	0.000%
42	8.010	-50.827	0.007	-8.010	50.827	-0.007	0.000%
43	6.950	-50.827	3.979	-6.950	50.827	-3.979	0.000%
44	4.037	-50.827	6.882	-4.037	50.827	-6.882	0.000%
45	-0.002	-50.827	7.959	0.002	50.827	-7.959	0.000%
46	-4.077	-50.827	7.004	4.077	50.827	-7.004	0.000%
47	-7.296	-50.827	4.178	7.296	50.827	-4.178	0.000%
48	-7.990	-50.827	-0.007	7.990	50.827	0.007	0.000%
49	-6.930	-50.827	-3.975	6.930	50.827	3.975	0.000%
50	-4.018	-50.827	-6.888	4.018	50.827	6.888	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00058265
3	Yes	4	0.00000001	0.00037463
4	Yes	5	0.00000001	0.00028946
5	Yes	5	0.00000001	0.00013675
6	Yes	5	0.00000001	0.00028967
7	Yes	5	0.00000001	0.00013576
8	Yes	4	0.00000001	0.00072014
9	Yes	4	0.00000001	0.00047039
10	Yes	5	0.00000001	0.00030645
11	Yes	5	0.00000001	0.00014587
12	Yes	5	0.00000001	0.00026487
13	Yes	5	0.00000001	0.00012482
14	Yes	4	0.00000001	0.00054283
15	Yes	4	0.00000001	0.00034648
16	Yes	5	0.00000001	0.00029399
17	Yes	5	0.00000001	0.00013863
18	Yes	5	0.00000001	0.00031004
19	Yes	5	0.00000001	0.00014582
20	Yes	4	0.00000001	0.00067366
21	Yes	4	0.00000001	0.00043871
22	Yes	5	0.00000001	0.00026081
23	Yes	5	0.00000001	0.00012306
24	Yes	5	0.00000001	0.00030328
25	Yes	5	0.00000001	0.00014457
26	Yes	4	0.00000001	0.00003514
27	Yes	5	0.00000001	0.00016913
28	Yes	5	0.00000001	0.00018578
29	Yes	5	0.00000001	0.00018583
30	Yes	5	0.00000001	0.00017183
31	Yes	5	0.00000001	0.00019525
32	Yes	5	0.00000001	0.00019383

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		SACHIN	

33	Yes	5	0.00000001	0.00017608
34	Yes	5	0.00000001	0.00019490
35	Yes	5	0.00000001	0.00019473
36	Yes	5	0.00000001	0.00017373
37	Yes	5	0.00000001	0.00018900
38	Yes	5	0.00000001	0.00019042
39	Yes	4	0.00000001	0.00003823
40	Yes	4	0.00000001	0.00009261
41	Yes	4	0.00000001	0.00008913
42	Yes	4	0.00000001	0.00004632
43	Yes	4	0.00000001	0.00012108
44	Yes	4	0.00000001	0.00008299
45	Yes	4	0.00000001	0.00003730
46	Yes	4	0.00000001	0.00009790
47	Yes	4	0.00000001	0.00010969
48	Yes	4	0.00000001	0.00004466
49	Yes	4	0.00000001	0.00008069
50	Yes	4	0.00000001	0.00011695

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	145 - 92.5208	16.210	47	1.057	0.006
L2	97.4792 - 44.7083	6.989	47	0.717	0.002
L3	51.2917 - 0	1.843	47	0.336	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.000	(2) SC-E 6014 REV2 w/ Mount Pipe	47	16.210	1.057	0.006	51816
137.000	RRUS 32 B2_CCIIV2	47	14.522	1.003	0.005	32385
129.000	(4) DB844G65ZAXY w/ Mount Pipe	47	12.858	0.948	0.004	16192
127.000	CXL 900-3LW	47	12.449	0.934	0.004	14393
114.000	AIR -32 B2A/B66AA w/ Mount Pipe	47	9.884	0.842	0.003	8357
96.000	repeater technologies DA1900-39	47	6.756	0.705	0.002	5523
95.000	HT65A-F-2X2 w/ Mount Pipe	47	6.601	0.697	0.002	5519

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	145 - 92.5208	68.011	18	4.436	0.024
L2	97.4792 - 44.7083	29.342	6	3.012	0.009
L3	51.2917 - 0	7.741	6	1.411	0.003

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
-------------	-----------------	------------------------	-----------------	-----------	------------

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.000	(2) SC-E 6014 REV2 w/ Mount Pipe	18	68.011	4.436	0.025	12473
137.000	RRUS 32 B2_CCIV2	18	60.933	4.210	0.022	7795
129.000	(4) DB844G65ZAXY w/ Mount Pipe	18	53.954	3.981	0.019	3896
127.000	CXL 900-3LW	18	52.236	3.924	0.018	3463
114.000	AIR -32 B2A/B66AA w/ Mount Pipe	18	41.482	3.538	0.013	2009
96.000	repeater technologies DA1900-39	6	28.365	2.963	0.009	1325
95.000	HT65A-F-2X2 w/ Mount Pipe	6	27.715	2.929	0.008	1324

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
L1	145 - 92.5208 (1)	TP35.675x20.5x0.344	52.479	0.000	0.0	37.520	-25.590	2194.940	0.012
L2	92.5208 - 44.7083 (2)	TP48.658x33.554x0.438	52.771	0.000	0.0	65.276	-39.641	3818.650	0.010
L3	44.7083 - 0 (3)	TP60.5x45.899x0.469	51.292	0.000	0.0	90.610	-60.974	5300.670	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{ux} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M _{uy} kip-ft	φM _{uy} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L1	145 - 92.5208 (1)	TP35.675x20.5x0.344	859.517	1793.083	0.479	0.000	1793.083	0.000
L2	92.5208 - 44.7083 (2)	TP48.658x33.554x0.438	2127.450	4149.033	0.513	0.000	4149.033	0.000
L3	44.7083 - 0 (3)	TP60.5x45.899x0.469	3805.450	6827.617	0.557	0.000	6827.617	0.000

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Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	145 - 92.5208 (1)	TP35.675x20.5x0.344	24.370	658.481	0.037	1.070	1963.408	0.001
L2	92.5208 - 44.7083 (2)	TP48.658x33.554x0.438	30.047	1145.600	0.026	1.948	4669.300	0.000
L3	44.7083 - 0 (3)	TP60.5x45.899x0.469	35.231	1590.200	0.022	2.165	8397.083	0.000

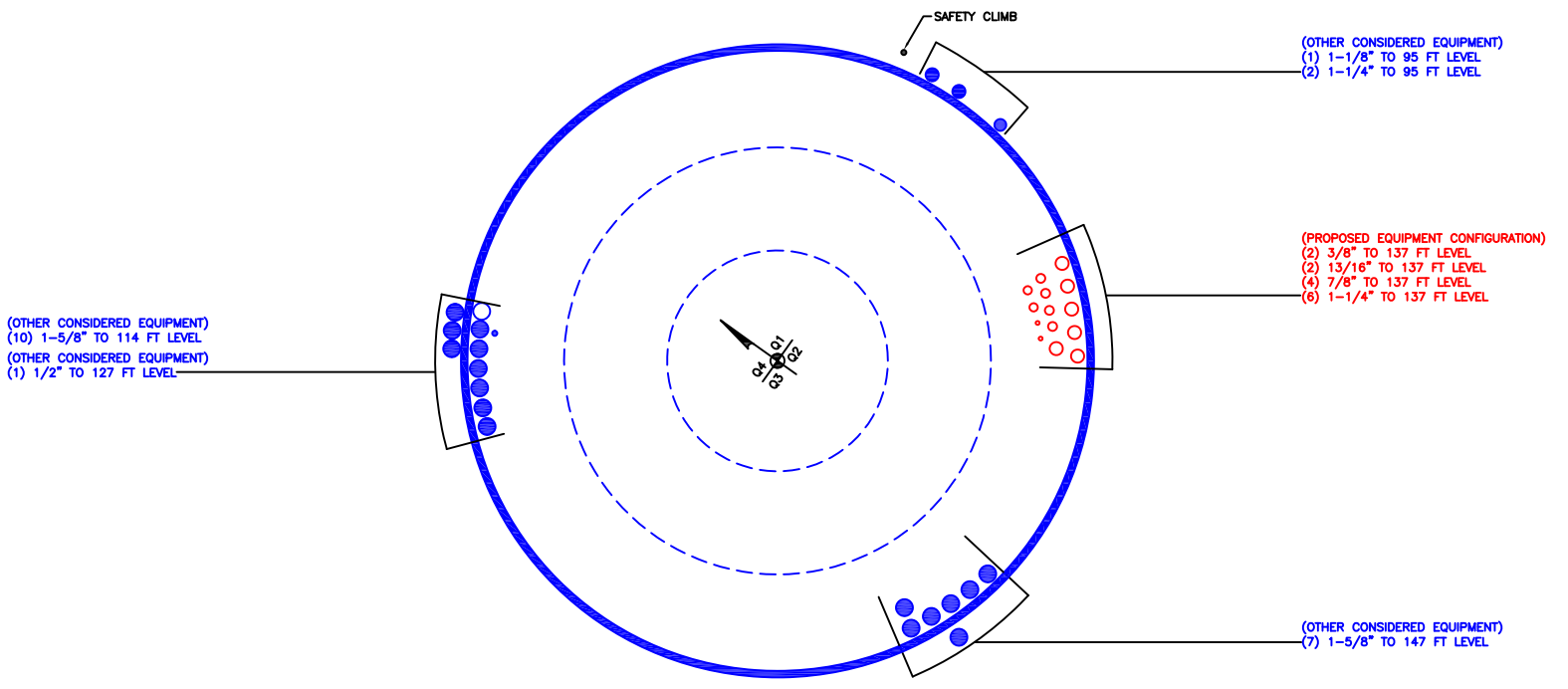
Pole Interaction Design Data

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
		ϕP_n	ϕM_{nx}	ϕM_{ny}	ϕV_n	ϕT_n			
L1	145 - 92.5208 (1)	0.012	0.479	0.000	0.037	0.001	0.492	1.050	4.8.2 ✓
L2	92.5208 - 44.7083 (2)	0.010	0.513	0.000	0.026	0.000	0.524	1.050	4.8.2 ✓
L3	44.7083 - 0 (3)	0.012	0.557	0.000	0.022	0.000	0.569	1.050	4.8.2 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail	
L1	145 - 92.5208	Pole	TP35.675x20.5x0.344	1	-25.590	2304.687	46.9	Pass	
L2	92.5208 - 44.7083	Pole	TP48.658x33.554x0.438	2	-39.641	4009.582	49.9	Pass	
L3	44.7083 - 0	Pole	TP60.5x45.899x0.469	3	-60.974	5565.703	54.2	Pass	
							Summary		
							Pole (L3)	54.2	Pass
							RATING =	54.2	Pass

APPENDIX B
BASE LEVEL DRAWING



BUSINESS UNIT:806368

APPENDIX C
ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

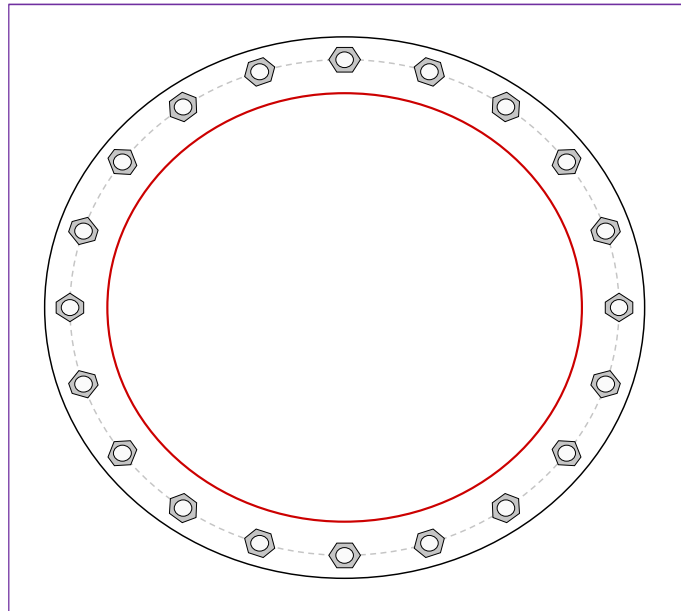


Site Info	
BU #	806368
Site Name	HRT 049B 943215, CT
Order #	586239, Rev# 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.75

Applied Loads	
Moment (kip-ft)	3805.45
Axial Force (kips)	60.97
Shear Force (kips)	35.23

*TIA-222-H Section 15.5 Applied



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

Anchor Rod Data
(20) 2-1/4" ϕ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 70" BC
Base Plate Data
76.5" OD x 2.25" Plate (A817 Gr. 60; $F_y=60$ ksi, $F_u=75$ ksi)
Stiffener Data
N/A
Pole Data
60.5" x 0.46875" 12-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)

Anchor Rod Summary		<i>(units of kips, kip-in)</i>
$Pu_t = 127.37$	$\phi Pn_t = 243.75$	Stress Rating
$Vu = 1.76$	$\phi Vn = 149.1$	49.8%
$Mu = n/a$	$\phi Mn = n/a$	Pass
Base Plate Summary		
Max Stress (ksi):	31.55	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	55.6%	Pass

PROJECT	83033.007.01 - HRT 049B 943215, CT
SUBJECT	Foundation Reaction Comparison
DATE	01/18/22



v1.3.2

TIA Rev. H - Monopole

Base Reaction Type	Unfactored Original Design Reactions		Factored Reactions		Rating % with TIA-222-H Seciton 15.5 applied	
	Value	Unit	Value	Unit	Rating %	Pass/Fail
MP Overturning Moment	5001.4	kip-ft	3805	kip-ft	53.7%	Pass
MP Compression	50.6	kips	61	kips	85.0%	Pass
MP Base Shear	44.6	kips	35	kips	55.4%	Pass

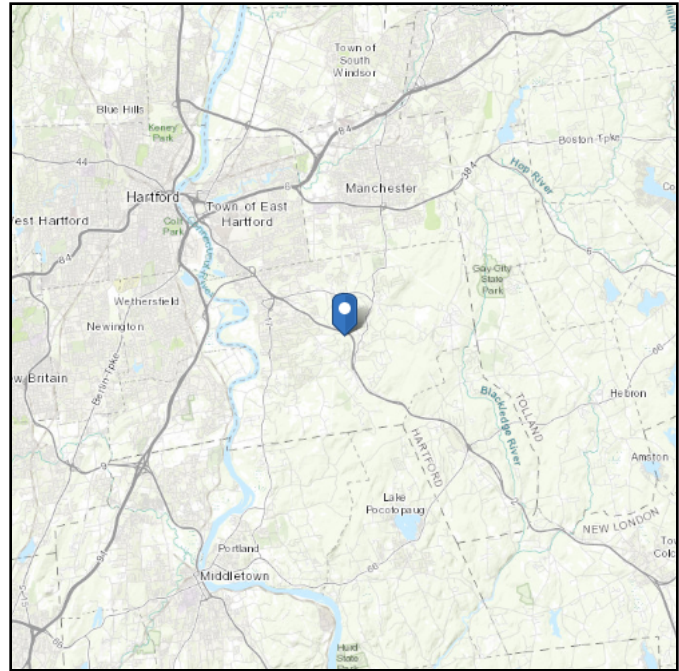
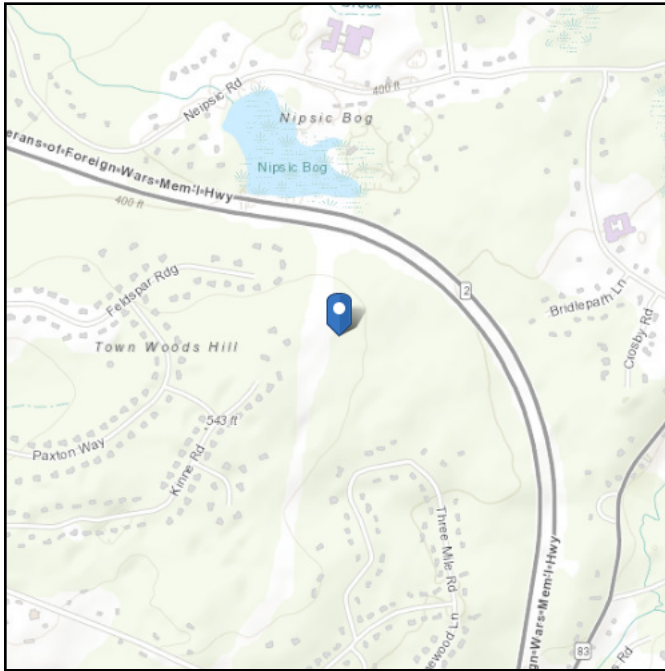
Unfactored original design reactions referred from CCI_974245 (p-3/5)

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 467.15 ft (NAVD 88)
Latitude: 41.693592
Longitude: -72.547253



Wind

Results:

Wind Speed	119 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	98 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Mon Jan 17 2022

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

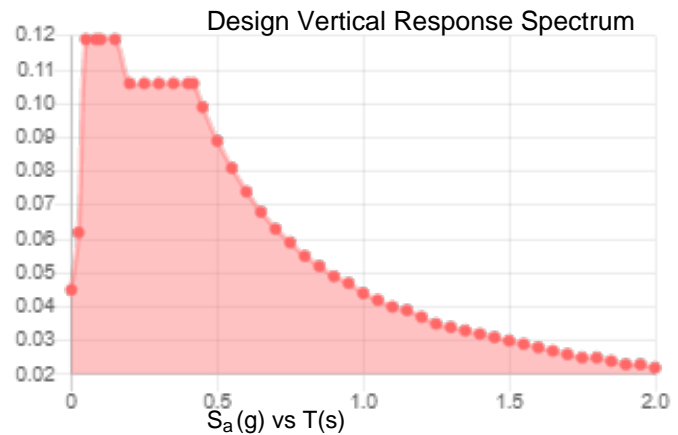
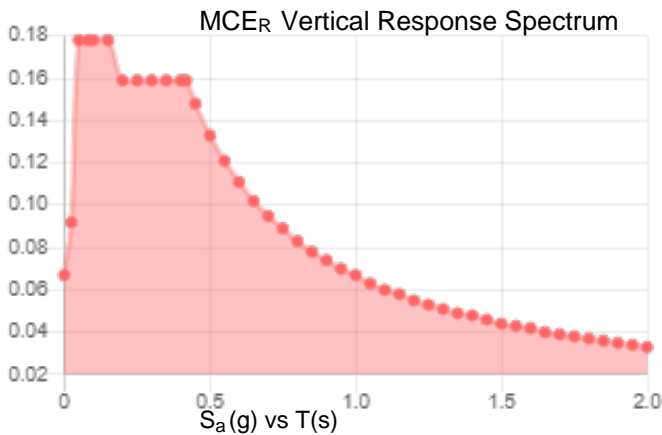
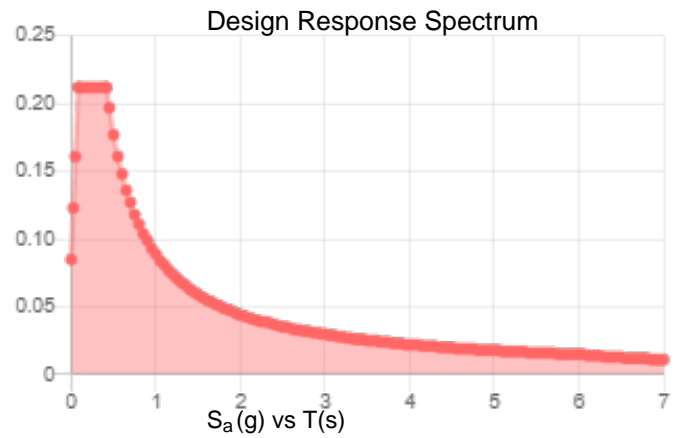
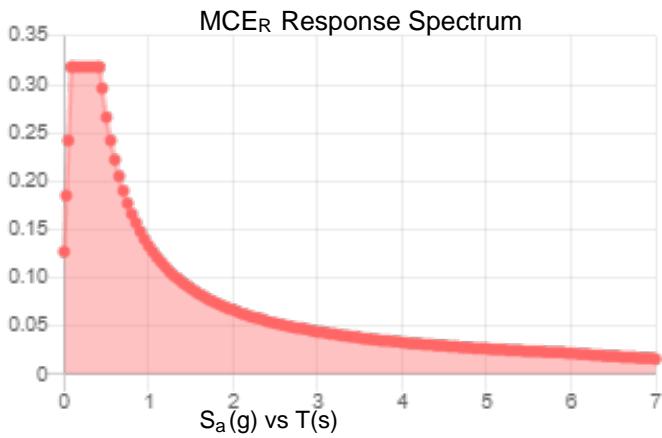
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

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

Results:

S_s :	0.199	S_{D1} :	0.089
S_1 :	0.055	T_L :	6
F_a :	1.6	PGA :	0.109
F_v :	2.4	PGA _M :	0.172
S_{MS} :	0.318	F_{PGA} :	1.582
S_{M1} :	0.133	I_e :	1
S_{DS} :	0.212	C_v :	0.7

Seismic Design Category B



Data Accessed: Mon Jan 17 2022

Date Source:

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

Ice

Results:

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

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

Date Accessed: Mon Jan 17 2022

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

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

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January 7, 2022

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Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351
CrownMA@tepgroup.net

Subject: Mount Analysis

Carrier Designation: AT&T Mobility Reconfiguration
Client Site Number: CTL01100
Client Site Name: Glastonbury Three Mile
FA Location Code: 10035094

Crown Castle Designation: **Crown Castle BU Number:** 806368
Crown Castle Site Name: HRT 049B 943215
Crown Castle JDE Job Number: 686190
Crown Castle Order Number: 586239 Rev. 0

Engineering Firm Designation: **TEP Project Number:** 217455.638743

Site Data: 374 Three Mile Rd, Glastonbury, Hartford County, CT 06033
Latitude 41° 41' 36.93", Longitude -72° 32' 50.11"

Structure Information: **Tower Height & Type:** 145.0± ft Monopole
Mount Elevation: 137.0 ft
Mount Width & Type: 16.0 ft High Profile Platform

Tower Engineering Professionals is pleased to submit this "Mount Analysis" to determine the structural integrity of AT&T Mobility's antenna mounting system with proposed appurtenance and equipment addition on the above mentioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

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

High Profile Platform Mount

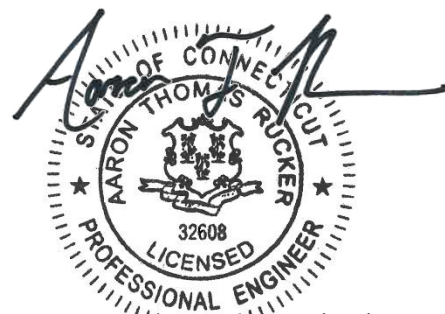
Sufficient Capacity

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

Structural analysis prepared by: Jordan Marks / WHW

Respectfully submitted by:

Aaron T. Rucker, P.E.
Structural Division Manager
919-661-6351
arucker@tepgroup.net



Electronic Copy

01/07/2022

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Software Analysis Output

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Additional Calculations

16.0 ft High Profile Platform Mount Analysis
Order Number 586239, Revision 0**1) INTRODUCTION**

The mount is an existing 16.0-ft 3-sector High Profile Platform mount, designed by Engineered Endeavors and mapped by Tower Engineering Professionals. The mount is installed at the 137.0 ft elevation on the 145.0± ft Monopole.

2) ANALYSIS CRITERIA

Building Code:	2018 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	119 mph
Exposure Category:	B
Topographic Category at Base:	1.0
Topographic Category at Mount:	1.0
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic Design Category:	B
Seismic S_s:	0.199
Seismic S₁:	0.055
Live Loading Wind Speed:	30 mph
Live Loading at Mid/End-Points:	250 lb
Man Live Loading 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
137.0	142.0	3	Ericsson	AIR 6419 B77G_CCIV2	High Profile Platform Mount
	140.0	1	CCI Antennas	DMP65R-BU6D	
		2	CCI Antennas	DMP65R-BU8D	
		1	CCI Antennas	OPA65R-BU6D	
		2	CCI Antennas	OPA65R-BU8D	
		3	Ericsson	RRUS 32 B2_CCIV2	
		3	Ericsson	RRUS 4426 B66	
		3	Ericsson	RRUS 4449 B5/B12	
		3	Ericsson	RRUS 4478 B14_CCIV2	
		2	Raycap	DC9-48-60-24-8C-EV-CCIV2	
	138.0	3	Ericsson	AIR 6449 B77D	

3) ANALYSIS PROCEDURE**Table 2 - Documents Provided**

Document	Remarks	Reference	Source
Mount Mapping	Tower Engineering Professionals	10051116	CCIsites
Loading Application	AT&T Mobility	Order 586239 Rev. 0	CCIsites
RFDS	AT&T Mobility	RFDS ID: 4767152	CCIsites

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 mount and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A and Appendix C.

TEP Mount Analysis Tool, a tool internally developed by TEP using Microsoft Excel, was used to calculate member loading for various load cases. Selected output from the analysis is included in Appendix B.

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

In addition, this analysis is in accordance with AT&T's *Mount Technical Guidance – Revision 16*.

3.2) Assumptions

- 1) The mount was built in accordance with the manufacturer's specifications.
- 2) The mount has been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, mounts and other appurtenances are as specified in Table 1. All mount components have been assumed to be in sufficient condition to carry their full design capacity for this analysis. Refer to the issued mapping for any structural and/or maintenance issues found during our site visit if applicable.
- 4) All mount components are in sufficient condition to carry their full design capacity.
- 5) TEP did not analyze the plate connection to the pole and assumes it to have sufficient structural capacity to transfer the applied forces from the mount to the tower.
- 6) All material grades used for this analysis, unless verified by mount manufacturer design, were assumed per AISC Table 2-4, 15th Edition. See RISA-3D output for confirmation on grades used in this analysis.

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 antenna mounting system.

4) ANALYSIS RESULTS**Table 3 - Mount Component Stresses vs. Capacity (High Profile Platform Mount)**

Notes	Component	Critical Member	Mount Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontals	SF1-BH	137.0	486	Pass
1	Support Horizontals	SA3	137.0	72.4	Pass
1	Internals	INT3	137.0	79.9	Pass
1	Face Bracing	SF2-V3	137.0	45.1	Pass
1	Mount Pipes	MP-7	137.0	28.1	Pass
2	Connection Bolts	-	137.0	62.4	Pass

Structure Rating (max from all components) =	79.9%
---	--------------

Notes:

- 1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity listed.
- 2) See additional documentation in "Appendix D - Additional Calculations" for calculations supporting the % capacity listed.

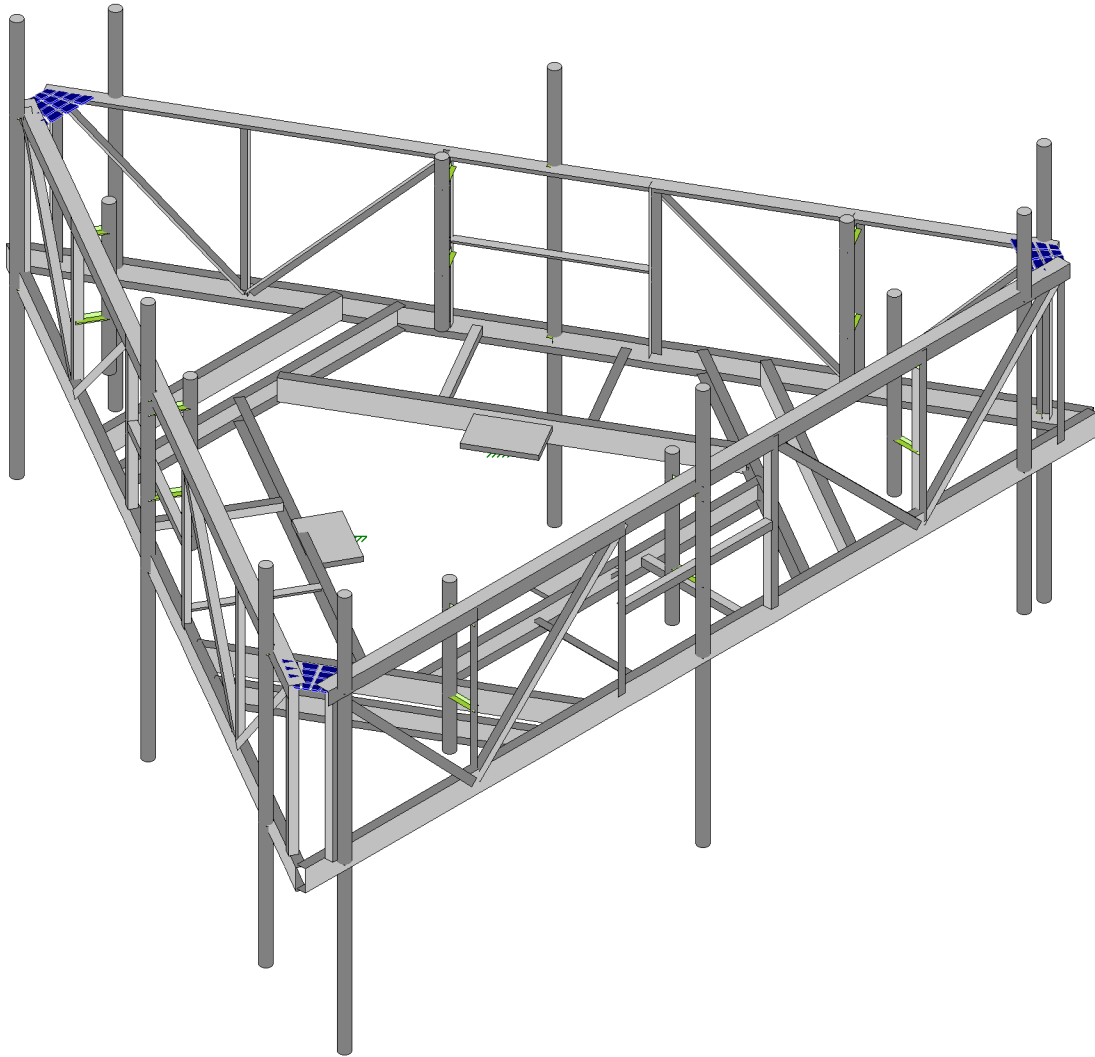
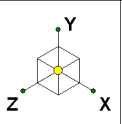
4.1) Recommendations

- 1) If the load differs from that described in Table 1 of this report or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
- 2) The mount and its connection have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

*16.0 ft High Profile Platform Mount Analysis
Order Number 586239, Revision 0*

*January 7, 2022
CCI BU No 806368
Page 6*

APPENDIX A
WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

Tower Engineering Profess...

JCM

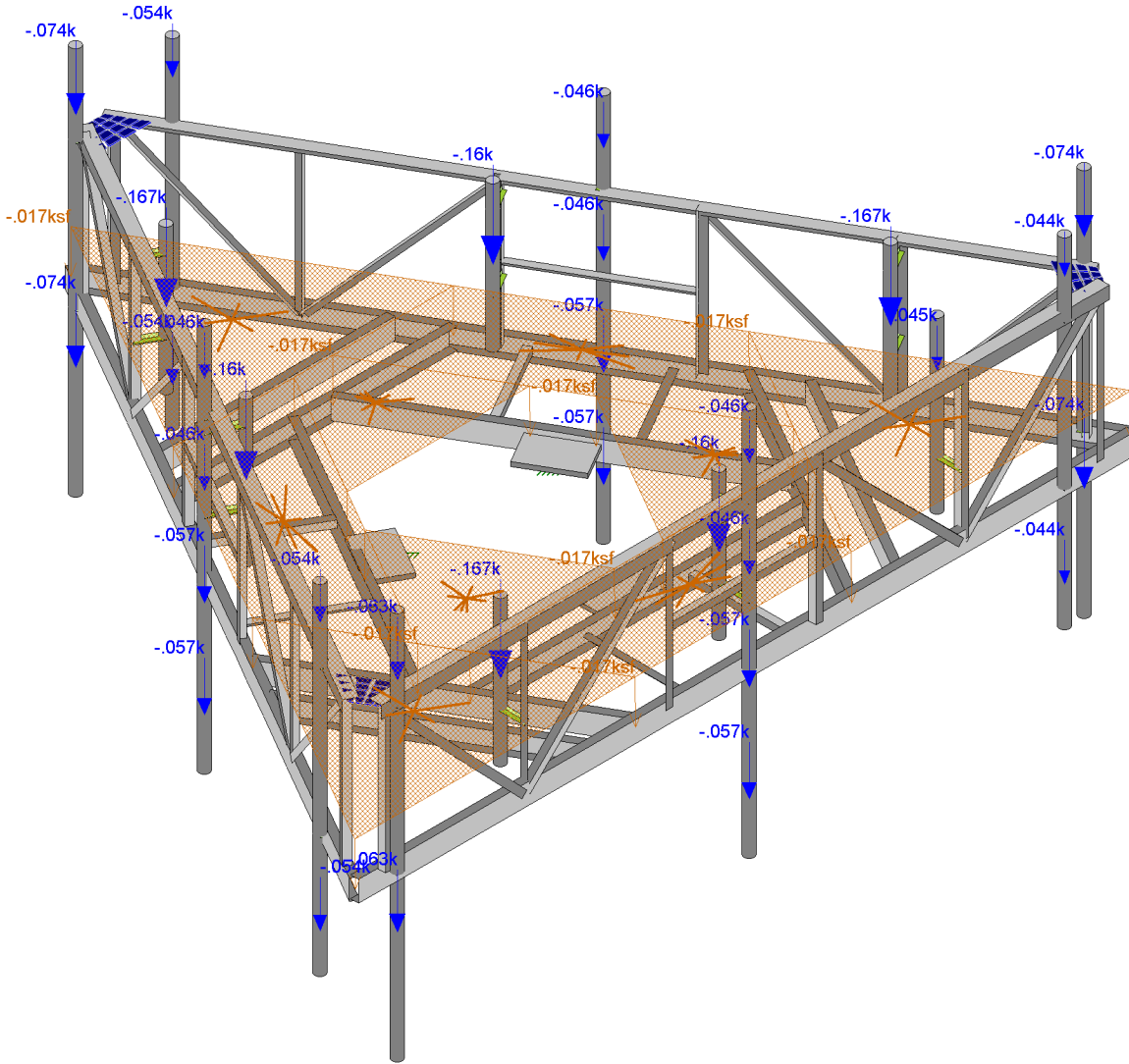
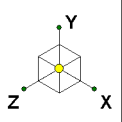
TEP No. 217455.638743

CCI BU No. 806368

SK - 1

Jan 7, 2022 at 10:15 AM

Mount Rev H.R3D



Loads: LC 1, 1.4D
Envelope Only Solution

Tower Engineering Profess...

JCM

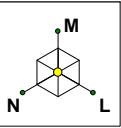
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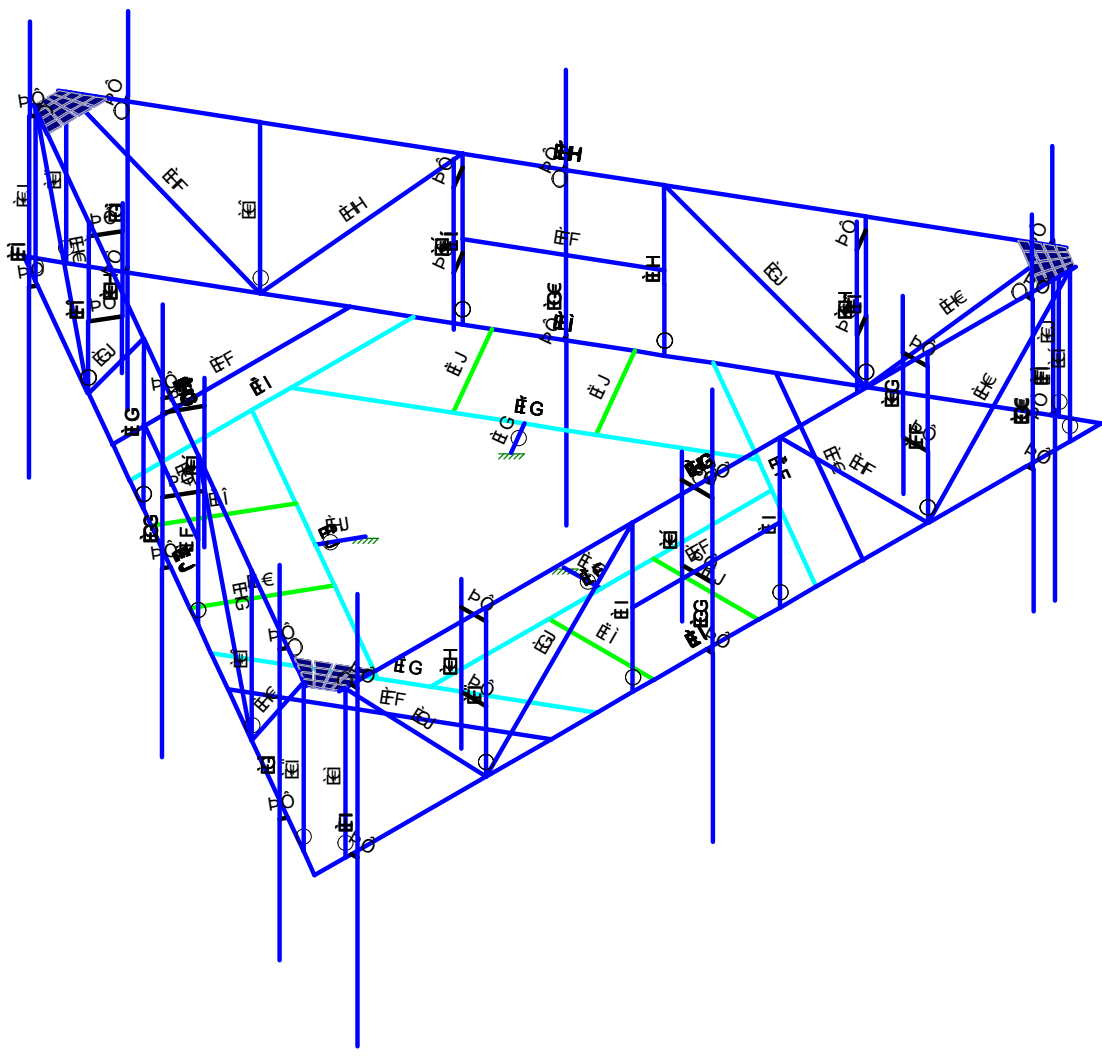
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Mount Rev H.R3D



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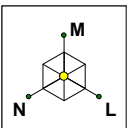


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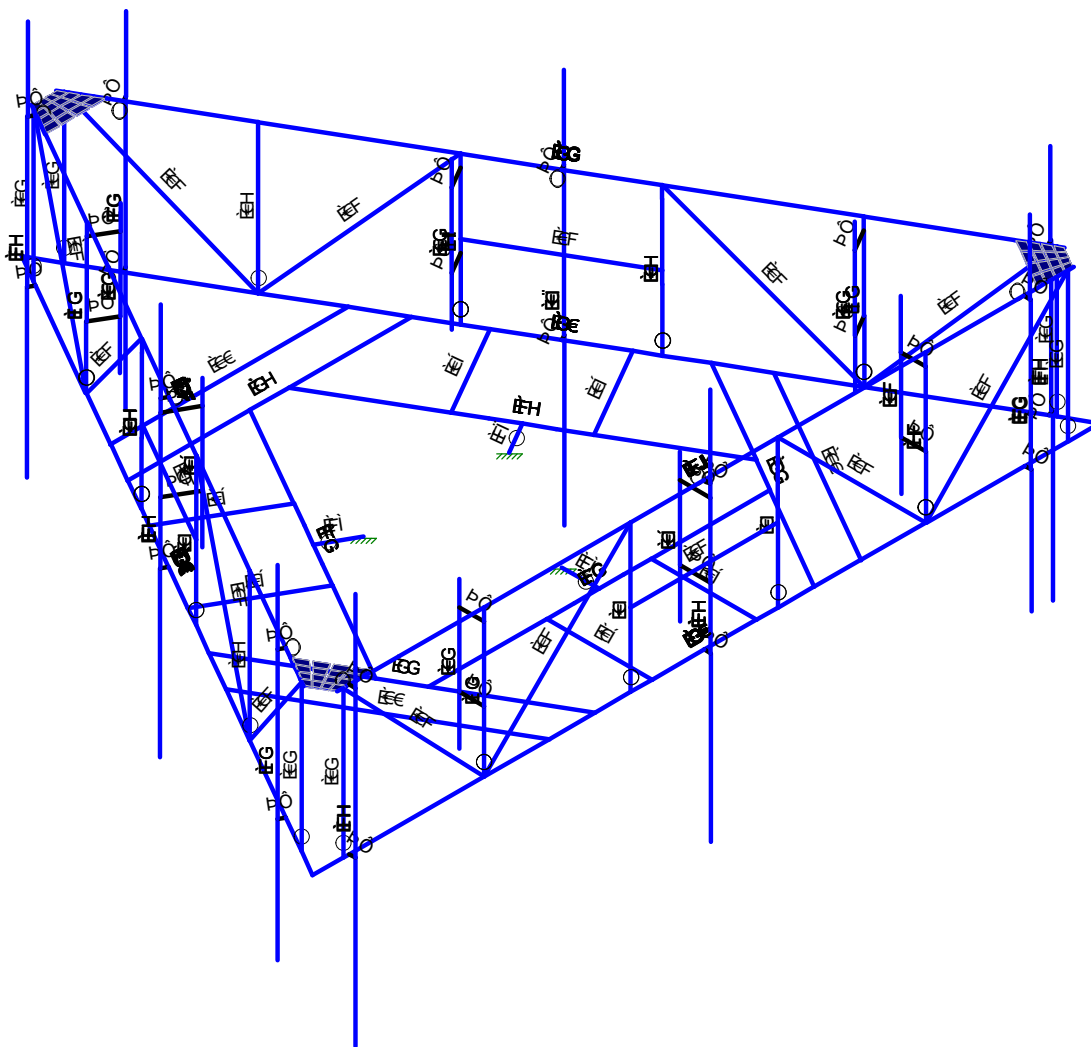
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APPENDIX B
SOFTWARE INPUT CALCULATIONS



CCI BU No. 806368

TEP No. 217455.638743

Analysis By: JCM 1/7/2022

Checked By: WHW 1/7/2022

Code Revisions:	TIA-222-H	IBC 2018
Tower Type:	Monopole	

Wind Inputs:		
Ult. Wind Velocity:	119.0	mph
Live Load Velocity:	30.0	mph
Ice Wind Velocity:	50.0	mph
Base Ice Thickness:	1.50	inches
Mount Centerline:	137.0	ft
Antenna Centerline:	140.0	ft
Exposure Category:	B	
Topo Category:	1	
Risk Category:	II	
Ground Elevation:	467	ft

Wind Calculations:		
K_{zt} :	1.000	Section 2.6.6
K_d :	0.950	
$K_{z-Mount}$:	1.081	Section 2.6.5.2
$K_{z-Antenna}$:	1.088	Section 2.6.5.2
K_{iz} :	1.154	Section 2.6.10
Ice Thickness:	1.731	inches - Section 2.6.10

Without Ice - (psf)	With Ice - (psf)
$(q_z G_h)_{Mount}$: 36.61	$(q_z G_h)_{Mount}$: 6.46
$(q_z G_h)_{Antenna}$: 36.84	$(q_z G_h)_{Antenna}$: 6.50

Seismic Code Revisions:	TIA-222-H
Seismic Risk Category:	II

Seismic Input		
S_{DS} :	0.212	Design Short Period Spectral Accel.
I_p :	1.0	Importance Factor
R_p :	2.0	Response Modification Factor
ρ :	1.0	
A_s :	1.0	Applification Factor - TIA-222-H Section 2.7.8.1
S_1 :	0.055	Spectral Acceleration at a Period of 1 Second

Seismic Design Force			
Cs:	0.106	kips/kip	TIA-H Sec 2.7.7.1.1
Cs-min:	0.030	kips/kip	TIA-H Sec 2.7.7.1.1



CCI BU No. 806368

TEP No. 217455.638743
 Analysis By: JCM 1/7/2022
 Checked By: WHW 1/7/2022

Antenna Loads are Calculated in Accordance with TIA-222-H

Azimuth is the absolute angle measured clockwise from RISA-3D global X-axis.

MFR	Model	Height (in)	Width (in)	Depth (in)	Wt. (lbs)	Azimuth°	Qty	Shape	Member Label	Distance from start node of the member		
										Location #1 (ft,%)	Location #2 (ft,%)	Location #3 (ft,%)
CCI ANTENNAS	OPA65R-BU6D	71.20	21.00	7.80	63.50	0.00	1	Flat	MP-1	0.75	6.25	
ERICSSON	AIR 6419 B77G_CCIV2	28.30	15.87	8.07	66.10	0.00	1	Flat	MP-2	1.00	3.00	
ERICSSON	AIR 6449 B77D	30.39	15.87	8.07	81.60	0.00	1	Flat	MP-2	5.00	7.00	
CCI ANTENNAS	DMP65R-BU6D	71.20	20.70	7.70	89.30	0.00	1	Flat	MP-3	1.25	5.75	
ERICSSON	RRUS 4478 B14_CCIV2	18.10	13.40	8.26	59.40	90.00	1	Flat	RMP-2	1.50		
ERICSSON	RRUS 32 B2_CCIV2	27.60	12.45	7.41	55.12	90.00	1	Flat	RMP-2	1.50		
ERICSSON	RRUS 4449 B5/B12	17.90	13.19	9.44	71.00	90.00	1	Flat	RMP-3	1.50		
ERICSSON	RRUS 4426 B66	14.96	13.19	5.80	48.40	90.00	1	Flat	RMP-3	1.50		
CCI ANTENNAS	OPA65R-BU8D	96.00	21.00	7.80	76.50	120.00	1	Flat	MP-4	0.75	6.25	
ERICSSON	AIR 6419 B77G_CCIV2	28.30	15.87	8.07	66.10	120.00	1	Flat	MP-5	1.00	3.00	
ERICSSON	AIR 6449 B77D	30.39	15.87	8.07	81.60	120.00	1	Flat	MP-5	5.00	7.00	
CCI ANTENNAS	DMP65R-BU8D	96.00	20.70	7.70	105.60	120.00	1	Flat	MP-6	1.25	5.75	
ERICSSON	RRUS 4478 B14_CCIV2	18.10	13.40	8.26	59.40	210.00	1	Flat	RMP-4	1.50		
ERICSSON	RRUS 32 B2_CCIV2	27.60	12.45	7.41	55.12	210.00	1	Flat	RMP-4	1.50		
ERICSSON	RRUS 4449 B5/B12	17.90	13.19	9.44	71.00	210.00	1	Flat	RMP-5	1.50		
ERICSSON	RRUS 4426 B66	14.96	13.19	5.80	48.40	210.00	1	Flat	RMP-5	1.50		
CCI ANTENNAS	OPA65R-BU8D	96.00	21.00	7.80	76.50	240.00	1	Flat	MP-7	0.75	6.25	
ERICSSON	AIR 6419 B77G_CCIV2	28.30	15.87	8.07	66.10	240.00	1	Flat	MP-8	1.00	3.00	
ERICSSON	AIR 6449 B77D	30.39	15.87	8.07	81.60	240.00	1	Flat	MP-8	5.00	7.00	
CCI ANTENNAS	DMP65R-BU8D	96.00	20.70	7.70	105.60	240.00	1	Flat	MP-9	1.25	5.75	
ERICSSON	RRUS 4478 B14_CCIV2	18.10	13.40	8.26	59.40	330.00	1	Flat	RMP-6	1.50		
ERICSSON	RRUS 32 B2_CCIV2	27.60	12.45	7.41	55.12	330.00	1	Flat	RMP-6	1.50		
ERICSSON	RRUS 4449 B5/B12	17.90	13.19	9.44	71.00	330.00	1	Flat	RMP-7	1.50		
ERICSSON	RRUS 4426 B66	14.96	13.19	5.80	48.40	330.00	1	Flat	RMP-7	1.50		
RAYCAP	DC9-48-60-24-8C-EV_CCIV2	31.40	10.24	10.24	16.00	0.00	2	Round	RMP-1	1.00		



CCI BU No. 806368
 TEP No. 217455.638743
 Analysis By: JCM 1/7/2022
 Checked By: WHW 1/7/2022

Member Forces are Calculated in Accordance with TIA-222-H

Member Name	Wind Proj. (in)	Length (in)	Shape	θ (°)	Perimeter (in)
FF-D1	1.750	49.86	Flat		7.00
FF-D2	1.750	50.91	Flat		7.00
FF-D3	1.750	50.91	Flat		7.00
FF-D4	1.750	49.86	Flat		7.00
SF1-D1	1.750	49.86	Flat		7.00
SF1-D2	1.750	50.91	Flat		7.00
SF1-D3	1.750	50.91	Flat		7.00
SF1-D4	1.750	49.86	Flat		7.00
SF2-D1	1.750	49.86	Flat		7.00
SF2-D2	1.750	50.91	Flat		7.00
SF2-D3	1.750	50.91	Flat		7.00
SF2-D4	1.750	49.86	Flat		7.00
FF-BH	5.000	192.00	Flat	90.00	17.56
SF1-BH	5.000	192.00	Flat	-30.00	17.56
SF2-BH	5.000	192.00	Flat	30.00	17.56
FF-TH	3.000	180.00	Flat	90.00	12.00
SF1-TH	3.000	180.00	Flat	-30.00	12.00
SF2-TH	3.000	180.00	Flat	30.00	12.00
GSI1	5.000	69.25	Flat	-30.00	17.56
GSI2	5.000	69.25	Flat	30.00	17.56
GSI3	5.000	69.25	Flat	90.00	17.56
GSI4	5.000	57.99	Flat	-30.00	17.56
GSI5	5.000	57.99	Flat	30.00	17.56
GSI6	5.000	57.99	Flat	90.00	17.56
INT1	1.750	25.87	Flat	0.00	7.00
INT2	1.750	25.87	Flat	0.00	7.00
INT3	1.750	25.87	Flat	60.00	7.00
INT4	1.750	25.87	Flat	60.00	7.00
INT5	1.750	25.87	Flat	-60.00	7.00
INT6	1.750	25.87	Flat	-60.00	7.00
MP-1	2.375	84.00	Round		7.46
MP-2	2.375	96.00	Round		7.46
MP-3	2.375	96.00	Round		7.46
MP-4	2.375	84.00	Round		7.46
MP-5	2.375	96.00	Round		7.46
MP-6	2.375	96.00	Round		7.46
MP-7	2.375	84.00	Round		7.46
MP-8	2.375	96.00	Round		7.46
MP-9	2.375	96.00	Round		7.46
M82	1.000	9.06	Flat	0.00	30.00
M83	1.000	9.06	Flat	-60.00	30.00
M84	1.000	9.06	Flat	60.00	30.00
SA1	5.000	83.38	Flat	90.00	20.00
SA2	5.000	83.37	Flat	-30.00	20.00
SA3	5.000	83.37	Flat	30.00	20.00
FF-H	1.750	36.00	Flat	90.00	7.00
FF-V1	1.750	36.00	Flat		7.00
FF-V2	1.750	36.00	Flat		7.00
FF-V3	1.750	36.00	Flat		7.00
FF-V4	1.750	36.00	Flat		7.00
FF-V5	1.750	36.00	Flat		7.00
FF-V6	1.750	36.00	Flat		7.00
SF1-H	1.750	36.00	Flat	-30.00	7.00
SF1-V1	1.750	36.00	Flat		7.00
SF1-V2	1.750	36.00	Flat		7.00
SF1-V3	1.750	36.00	Flat		7.00
SF1-V4	1.750	36.00	Flat		7.00
SF1-V5	1.750	36.00	Flat		7.00
SF1-V6	1.750	36.00	Flat		7.00
SF2-H	1.750	36.00	Flat	30.00	7.00
SF2-V1	1.750	36.00	Flat		7.00
SF2-V2	1.750	36.00	Flat		7.00
SF2-V3	1.750	36.00	Flat		7.00
SF2-V4	1.750	36.00	Flat		7.00
SF2-V5	1.750	36.00	Flat		7.00
SF2-V6	1.750	36.00	Flat		7.00
RMP-3	2.375	36.00	Round		7.46
RMP-1	2.375	42.00	Round		7.46
RMP-2	2.375	36.00	Round		7.46
RMP-7	2.375	36.00	Round		7.46
RMP-6	2.375	36.00	Round		7.46
RMP-5	2.375	36.00	Round		7.46
RMP-4	2.375	36.00	Round		7.46

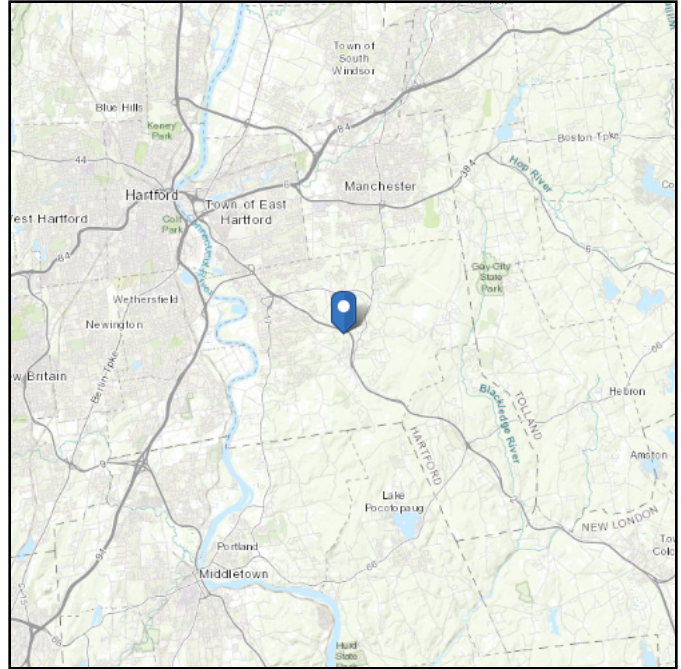
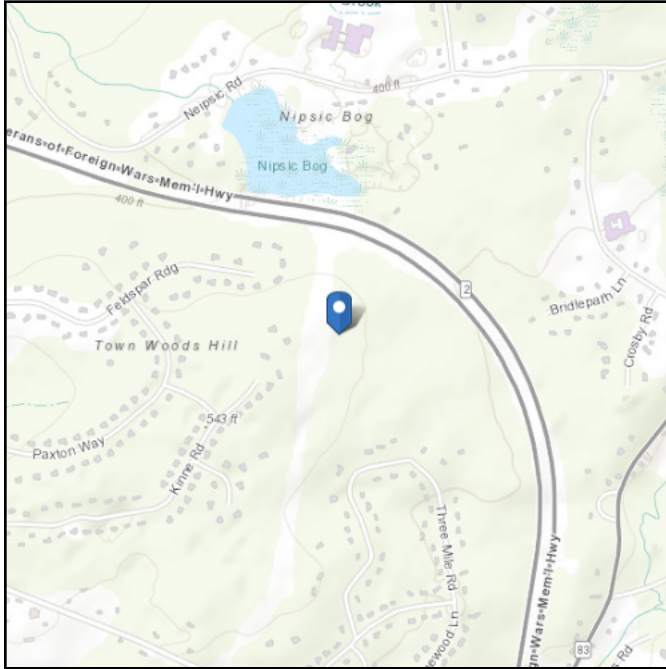


ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 467.15 ft (NAVD 88)
Latitude: 41.693592
Longitude: -72.547253



Wind

Results:

Wind Speed	119 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	98 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Wed Jan 05 2022

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

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

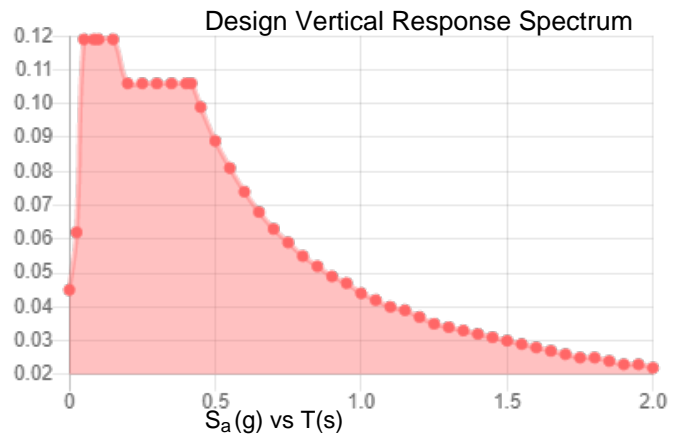
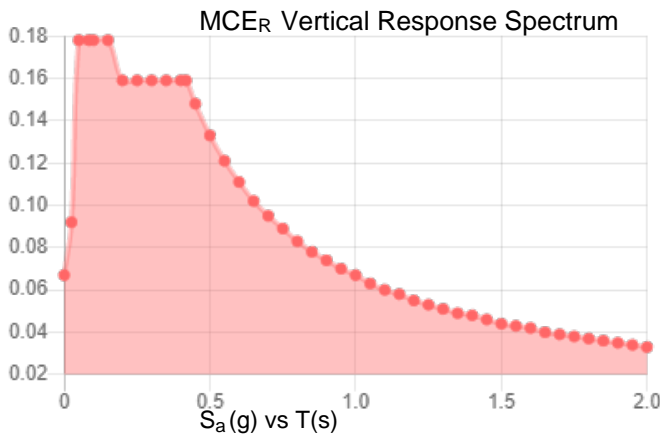
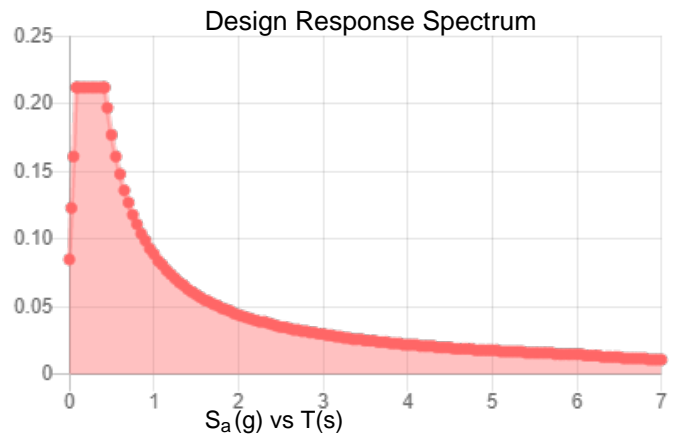
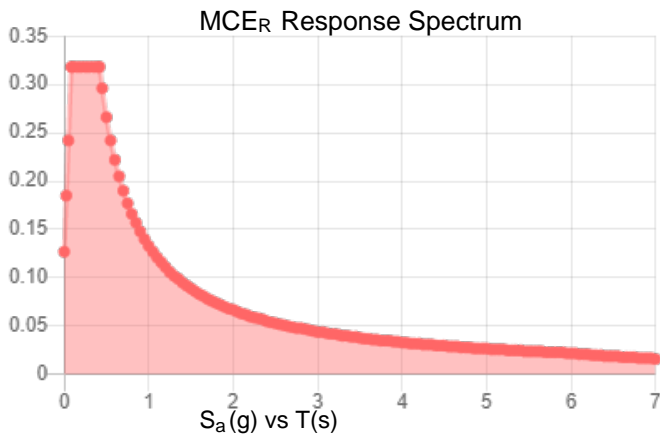


Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_s :	0.199	S_{D1} :	0.089
S_1 :	0.055	T_L :	6
F_a :	1.6	PGA :	0.109
F_v :	2.4	PGA _M :	0.172
S_{MS} :	0.318	F_{PGA} :	1.582
S_{M1} :	0.133	I_e :	1
S_{DS} :	0.212	C_v :	0.7

Seismic Design Category B



Data Accessed: Wed Jan 05 2022

Date Source:

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



Ice

Results:

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

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

Date Accessed: Wed Jan 05 2022

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

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

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

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.

16.0 ft High Profile Platform Mount Analysis
Order Number 586239, Revision 0

January 7, 2022
CCI BU No 806368
Page 8

APPENDIX C
SOFTWARE ANALYSIS OUTPUT



Q([a^ K V[, ^/A) * a^i a^ * AU[- . . a^] a^ E Q & E
O . a) ^ : K ROT
R a A^ (a^ : K VOUA [E F I I I E H I I H
T [a^ / a^ a^ ^ K OOCOW [E E I H I

Ra A E Q E G G
F E F I A E
O @ & ^ a A O ^ K Y P Y



Q([a^ K V[, ^/A) * a^i a^ * AU[- . . a^] a^ E Q & E
O . a) ^ : K ROT
R a A^ (a^ : K VOUA [E F I I I E H I I H
T [a^ / a^ a^ ^ K OOCOW [E E I H I

Ra A E Q E G G
F E F I A E
O @ & ^ a A O ^ K Y P Y

fl `cVUL'A cXY`GYHjbl`g

Table with 2 columns: Input string and Output string. Includes rows like 'Oa [a^ A^ & a^] . A^ : A^ ^ (a^ / A^ a^ & e', 'T a^ A^ Q^ : a^ A^ & a^] . A^ : A^ ^ (a^ / A^ a^ & e', etc.

Table with 2 columns: Input string and Output string. Includes rows like 'P [a^ U [] ^ a^ A^ c^ ^ / A^ [a^', 'O a b . o A c a . ^ . . N', 'U O C E D [] ^ & a^] A^ [a^', etc.

Table with 2 columns: Input string and Output string. Includes rows like 'P { a^ / A^ - A^ @ a^ A^ ^ a^ } .', 'U^ a^ a^] A^] a^ a^ * A^ & ^ (^) a^ D', 'O a a^ a^ / A^ [] ^ { } A^ ^ c^ a^ a^', etc.

fl `cVUL'A cXY`GYHjbl`gz7`cbjbi`YX

Table with 2 columns: Input string and Output string. Includes rows like 'U^ a^ (a^ / A^ [a^', 'U^ a^ (a^ / A^ a^ ^ A^) ^ c^ a^ a^] A^ c^ D', 'O a a^ A^ O a a^ ^ A^ ^ a^ @ N', etc.

<chFc`YX`GHY`DfcdYfjYg

Table with 11 columns: Saa^, O a . a , O a . a , P^, V @ : (A P O E E ^) . a^ Z E a H E , Y a j a z . a , U^, o z . a , U c. Includes rows for F, G, H, I, J, K, L.

7c`X`cfa`YX`GHY`DfcdYfjYg

Table with 10 columns: Saa^, O a . a , O a . a , P^, V @ : (A P O I A O D O ^) . a^ Z E a H E , Y a j a z . a , o z . a. Includes rows for F, G.

<chFc`YX`GHY`GYWjcb`GYHj

Table with 10 columns: Saa^, U a^ ^, V] ^, O . a) A E, T a a^ i a a^, O . a) A E, O a G a Q^ a Q^ i a Q^ i a Q^ i a R a i a. Includes rows for F, G, H, I, J, K, L.

U O C E H O A ^ . a^] A^] E E A A A A O I A M ^ . a^ a^ . a^ [& { ^) o a O [,] a^ O a ^ a j a ^ . a^ e I H I a t [^] a^ U ^ c^ A^ P E U H O a U a e ^ A^ F

U O C E H O A ^ . a^] A^] E E A A A A O I A M ^ . a^ a^ . a^ [& { ^) o a O [,] a^ O a ^ a j a ^ . a^ e I H I a t [^] a^ U ^ c^ A^ P E U H O a U a e ^ A^ G



Q() a^ K V(^ / A) * a^ i a^ * A() (- . . a) a^ e Q & E
O^ a) ^ K ROT
R a A^ (a^ K VOUA^ [E F I I I I E H I I H
T [a^ / a^ a^ K OOO^ W b [E e H I

Ra A EGCG
Fe H A E
O @ & ^ a A O^ K Y PY



Q() a^ K V(^ / A) * a^ i a^ * A() (- . . a) a^ e Q & E
O^ a) ^ K ROT
R a A^ (a^ K VOUA^ [E F I I I I E H I I H
T [a^ / a^ a^ K OOO^ W b [E e H I

Ra A EGCG
Fe H A E
O @ & ^ a A O^ K Y PY

< chFc ``YX'GhY'8 YgJ] b'DUFUa Yhfg'f7 cbh]bi YXL

Table with columns for character sets and mappings. Headers include Saa^, U@^, S^)*, etc. Rows list characters like IG, IH, II, IJ, IE, IF, IG, IH with their corresponding mappings.

7c'X': cfa YX'GhY'8 YgJ] b'DUFUa Yhfg

Table with columns for character sets and mappings. Headers include Saa^, U@^, S^)*, etc. Row lists character 'I' with its mappings.

6 UjW@ UX'7 UgYg

Large table with columns for character sets and mappings. Headers include OSO^, Oae^, YA, YA, ZA, Ra c, Uja c, Oad a^, etc. Rows list characters from F to HE with their corresponding mappings.

U Q O E O A ^ a) A I E E A A A A O A A ^ a) a) a) [^) a) [, } a t O A U a j a ^ a e H I a t [^) a) c P E U H O A U a e A I

6 UjW@ UX'7 UgYg'f7 cbh]bi YXL

Table with columns for character sets and mappings. Headers include OSO^, Oae^, YA, YA, ZA, Ra c, Uja c, Oad a^, etc. Rows list characters from HF to IE with their corresponding mappings.

@ UX'7 ca VjbUjcbg

Large table with columns for character sets and mappings. Headers include O^ & a c), U[c^, UO, etc. Rows list characters from F to HI with their corresponding mappings.

U Q O E O A ^ a) A I E E A A A A O A A ^ a) a) a) [^) a) [, } a t O A U a j a ^ a e H I a t [^) a) c P E U H O A U a e A I



Q((] a^ O^ a) ^ R [a b { a ^ T [a] a a ^ K V [, ^ / A) * a ^ i a * A U [- . * a } a b e Q & E K R O T K V O U A b [e a f i i i e H i i H K O O C O W b [e e i H i

R a b A e G G F e H A b O @ & ^ a A O ^ K Y P Y



Q((] a^ O^ a) ^ R [a b { a ^ T [a] a a ^ K V [, ^ / A) * a ^ i a * A U [- . * a } a b e Q & E K R O T K V O U A b [e a f i i i e H i i H K O O C O W b [e e i H i

R a b A e G G F e H A b O @ & ^ a A O ^ K Y P Y

A Ya Vyf'Dc]bhi@UXg'f6 @ '&: '\$K]bX!'Bc'WYL

Table with 4 columns: T ^ (a ^ / A e a ^) , O a ^ & a ^) , T a e } a e a ^ z e e a , S } & a e } z e a a . Rows include letters F through H with various combinations of U, T, and E.

A Ya Vyf'Dc]bhi@UXg'f6 @ ' ' : ' '\$K]bX!'Bc'WYL

Table with 4 columns: T ^ (a ^ / A e a ^) , O a ^ & a ^) , T a e } a e a ^ z e e a , S } & a e } z e a a . Rows include letters F through FF with various combinations of U, T, and E.

U O C E H O A ^ i a } A i e e W W O K e a a e a . a O [& { ^ } a O [, } a t O a U a j a ^ a e i H i a [^ } a U ^ c P E U H O A U a e ^ A H

A Ya Vyf'Dc]bhi@UXg'f6 @ ' ' : ' '\$K]bX!'Bc'WYL'f'c]b]bi YXL

Table with 4 columns: T ^ (a ^ / A e a ^) , O a ^ & a ^) , T a e } a e a ^ z e e a , S } & a e } z e a a . Rows include letters FG through IH with various combinations of U, T, and E.

U O C E H O A ^ i a } A i e e W W O K e a a e a . a O [& { ^ } a O [, } a t O a U a j a ^ a e i H i a [^ } a U ^ c P E U H O A U a e ^ A H



Ó((]æˆ K V[, ^!Á) *ã^!ã *ÁU[(-••ã) æÞ ÈQ&È
 Ô••ã) ^! K RÖT
 R[ãÞˆ(àˆ! K VOÜÁÞ[ÈÆFIIIEHIIH
 T[àˆ!Þæ ˆ K ÖÖQWÞ[ÈÆEHI

Ræ Á ÈCGG
 FÈFI ÁÆ
 Ô@&^áÁÖˆK PY



Ó((]æˆ K V[, ^!Á) *ã^!ã *ÁU[(-••ã) æÞ ÈQ&È
 Ô••ã) ^! K RÖT
 R[ãÞˆ(àˆ! K VOÜÁÞ[ÈÆFIIIEHIIH
 T[àˆ!Þæ ˆ K ÖÖQWÞ[ÈÆEHI

Ræ Á ÈCGG
 FÈFI ÁÆ
 Ô@&^áÁÖˆK PY

A Ya Vyf'Dc]bhi@Uxg'f6 @ ') : * \$'K]bX!' Bc ÷WŁ'f' c b]h]bi YXL

	T^(àˆ!Þæ ˆ)	Öá^&ç)	Tæ) æ á^Z ÈÈcá	Š &ç) Žcã á
FG	T ÜÈ	Y	ÈÈ	FÈG
FH	ÚT ÜÈ	Y	ÈÈH	FÈÈ
FI	ÚT ÜÈ	Y	ÈÈH	FÈÈ
FÍ	ÚT ÜÈ	Y	ÈÈH	FÈÈ
FĪ	ÚT ÜÈ	Y	ÈÈCH	FÈÈ
FĬ	T ÜÈ	Y	ÈÈI	ÈÈ
FÌ	T ÜÈ	Y	ÈÈF	F
FJ	T ÜÈ	Y	ÈÈH	Í
GE	T ÜÈ	Y	ÈÈF	FÈG
GF	ÚT ÜÈ	Y	ÈÈGF	FÈÈ
GG	ÚT ÜÈ	Y	ÈÈH	FÈÈ
GH	ÚT ÜÈ	Y	ÈÈCH	FÈÈ
G	ÚT ÜÈ	Y	ÈÈG	FÈÈ
G	ÚT ÜÈ	Y	ÈÈI	F
G	T ÜÈ	Y	ÈÈI	ÍÈ
G	T ÜÈ	Y	ÈÈG	H
G	T ÜÈ	Y	ÈÈF	I
GJ	T ÜÈH	Y	ÈÈH	ÍÈ
HE	T ÜÈ	Y	ÈÈI	ÍÈ
HF	T ÜÈ	Y	ÈÈG	H
HG	T ÜÈ	Y	ÈÈF	Í
HH	T ÜÈ	Y	ÈÈ	ÍÈ
HI	T ÜÈ	Y	ÈÈI	ÍÈ
HÍ	T ÜÈ	Y	ÈÈF	H
HÌ	T ÜÈ	Y	ÈÈH	I
HĪ	T ÜÈ	Y	ÈÈF	ÍÈ
HĬ	T ÜÈ	Z	ÈÈH	ÈÈ
HJ	T ÜÈ	Z	ÈÈH	F
I€	T ÜÈ	Z	ÈÈG	Í
IF	T ÜÈH	Z	ÈÈF	FÈG
IG	ÚT ÜÈ	Z	ÈÈG	FÈÈ
IH	ÚT ÜÈ	Z	ÈÈI	FÈÈ
II	ÚT ÜÈH	Z	ÈÈG	FÈÈ
IĪ	ÚT ÜÈH	Z	ÈÈF	FÈÈ
IĬ	T ÜÈ	Z	ÈÈG	ÈÈ
IĪ	T ÜÈ	Z	ÈÈH	F
IĪ	T ÜÈ	Z	ÈÈG	Í
IJ	T ÜÈ	Z	ÈÈGF	FÈG
Í€	ÚT ÜÈ	Z	ÈÈG	FÈÈ
ÍF	ÚT ÜÈ	Z	ÈÈI	FÈÈ
ÍG	ÚT ÜÈ	Z	ÈÈG	FÈÈ
ÍH	ÚT ÜÈ	Z	ÈÈF	FÈÈ
ÍI	T ÜÈ	Z	ÈÈ	ÈÈ
ÍĪ	T ÜÈ	Z	ÈÈI	F
ÍĪ	T ÜÈ	Z	ÈÈG	Í
ÍĪ	T ÜÈ	Z	ÈÈG	FÈG
ÍĪ	T ÜÈ	Z	ÈÈI	FÈÈ
ÍĪ	ÚT ÜÈ	Z	ÈÈH	FÈÈ
ÍJ	ÚT ÜÈ	Z	ÈÈF	FÈÈ
Í€	ÚT ÜÈ	Z	ÈÈ	FÈÈ
ÍF	ÚT ÜÈ	Z	ÈÈGF	FÈÈ
ÍG	ÚT ÜÈ	Z	ÈÈI	F
ÍH	T ÜÈ	Z	ÈÈH	ÍÈ

ÜQÜÈ-ÖA^!•ã) ÁÈ ÈÈ WWWÖKÈÈ æ•áÖ & { ^}•áÖ[,)at Öá^!ã ^•á ÈÈÍ at [ˆ]•Ü^çPÈÜHÖÁ Üæ^ÁÈ

A Ya Vyf'Dc]bhi@Uxg'f6 @ ') : * \$'K]bX!' Bc ÷WŁ'f' c b]h]bi YXL

	T^(àˆ!Þæ ˆ)	Öá^&ç)	Tæ) æ á^Z ÈÈcá	Š &ç) Žcã á
ÍI	T ÜÈ	Z	ÈÈI	H
ÍĪ	T ÜÈ	Z	ÈÈH	I
ÍĪ	T ÜÈH	Z	ÈÈJ	ÍÈ
ÍĪ	T ÜÈ	Z	ÈÈH	ÍÈ
ÍĪ	T ÜÈ	Z	ÈÈH	H
ÍJ	T ÜÈ	Z	ÈÈH	I
Í€	T ÜÈ	Z	ÈÈGF	ÍÈ
ÍF	T ÜÈ	Z	ÈÈ	ÍÈ
ÍG	T ÜÈ	Z	ÈÈI	H
ÍH	T ÜÈ	Z	ÈÈG	I
ÍI	T ÜÈ	Z	ÈÈG	ÍÈ

A Ya Vyf'Dc]bhi@Uxg'f6 @ ') : * \$'K]bX!' Bc ÷WŁ

	T^(àˆ!Þæ ˆ)	Öá^&ç)	Tæ) æ á^Z ÈÈcá	Š &ç) Žcã á
F	T ÜÈ	Z	ÈÈI	ÈÈ
G	T ÜÈ	Z	ÈÈH	F
H	T ÜÈ	Z	ÈÈJ	I
I	T ÜÈH	Z	ÈÈI	FÈG
Í	ÚT ÜÈ	Z	ÈÈI	FÈÈ
Ī	ÚT ÜÈ	Z	ÈÈJ	FÈÈ
Ĭ	ÚT ÜÈH	Z	ÈÈI	FÈÈ
J	T ÜÈ	Z	ÈÈH	ÈÈ
F€	T ÜÈ	Z	ÈÈI	F
FF	T ÜÈ	Z	ÈÈG	Í
FG	T ÜÈ	Z	ÈÈGG	FÈG
FH	ÚT ÜÈ	Z	ÈÈI	FÈÈ
FI	ÚT ÜÈ	Z	ÈÈI	FÈÈ
FÍ	ÚT ÜÈ	Z	ÈÈF	FÈÈ
FĪ	ÚT ÜÈ	Z	ÈÈH	FÈÈ
FĬ	T ÜÈ	Z	ÈÈH	ÈÈ
FÌ	T ÜÈ	Z	ÈÈI	F
FJ	T ÜÈ	Z	ÈÈG	Í
GE	T ÜÈ	Z	ÈÈGG	FÈG
GF	ÚT ÜÈ	Z	ÈÈI	FÈÈ
GG	ÚT ÜÈ	Z	ÈÈI	FÈÈ
GH	ÚT ÜÈ	Z	ÈÈF	FÈÈ
G	ÚT ÜÈ	Z	ÈÈG	FÈÈ
G	ÚT ÜÈ	Z	ÈÈI	F
G	T ÜÈ	Z	ÈÈI	ÍÈ
G	T ÜÈ	Z	ÈÈH	H
GJ	T ÜÈH	Z	ÈÈI	ÍÈ
HE	T ÜÈ	Z	ÈÈH	ÍÈ
HF	T ÜÈ	Z	ÈÈI	H
HG	T ÜÈ	Z	ÈÈG	I
HH	T ÜÈ	Z	ÈÈGG	ÍÈ
H	T ÜÈ	Z	ÈÈH	ÍÈ
HÍ	T ÜÈ	Z	ÈÈI	H
HÌ	T ÜÈ	Z	ÈÈG	I
HĪ	T ÜÈ	Z	ÈÈGG	ÍÈ

ÜQÜÈ-ÖA^!•ã) ÁÈ ÈÈ WWWÖKÈÈ æ•áÖ & { ^}•áÖ[,)at Öá^!ã ^•á ÈÈÍ at [ˆ]•Ü^çPÈÜHÖÁ Üæ^ÁÈ



Ó([] a) K V(, ^ /) * a ^ i a * Á U(- * * a) a p É Q & É
Ó * a) ^ : K R Ö T
R á a p { a ^ : K V Ö U Á p [É a F i i i i É H i i H
T [a ^ / a p a ^ ^ K Ö Ö G Ö W p [É a é H i i

R a p Á É G G G
F e H i Á Ö F
Ö @ & ^ a Á Ö K V P Y



Ó([] a) K V(, ^ /) * a ^ i a * Á U(- * * a) a p É Q & É
Ó * a) ^ : K R Ö T
R á a p { a ^ : K V Ö U Á p [É a F i i i i É H i i H
T [a ^ / a p a ^ ^ K Ö Ö G Ö W p [É a é H i i

R a p Á É G G G
F e H i Á Ö F
Ö @ & ^ a Á Ö K V P Y

A Ya Vyf'Dc]bhi@UXg'f6 @' +: '%&\$'K]bX!'Bc'WZL

Table with 4 columns: T ^ (a ^ / a p a ^ ^), Ö a ^ & a ^ i a , T a e) a e a ^ z é É c a , and Š (& a p) Z e F a á. Rows include characters F through G.

A Ya Vyf'Dc]bhi@UXg'f6 @' +: '%&\$'K]bX!'Bc'WZL'f'cb]bi YXL

Table with 4 columns: T ^ (a ^ / a p a ^ ^), Ö a ^ & a ^ i a , T a e) a e a ^ z é É c a , and Š (& a p) Z e F a á. Rows include characters Í H through Í I.

A Ya Vyf'Dc]bhi@UXg'f6 @' , : %) 'K]bX!'Bc'WZL

Table with 4 columns: T ^ (a ^ / a p a ^ ^), Ö a ^ & a ^ i a , T a e) a e a ^ z é É c a , and Š (& a p) Z e F a á. Rows include characters F through G.

Ü Ö Ö É Ö Á ^ i a) Á i É É W W Ö Ö É a a ^ a Ö { ^ } a Ö i [,) a t Ö a U a p a ^ a é H i i a t [^] Ö U ^ c P E U H Ö Á U a e ^ A F J

Ü Ö Ö É Ö Á ^ i a) Á i É É W W Ö Ö É a a ^ a Ö { ^ } a Ö i [,) a t Ö a U a p a ^ a é H i i a t [^] Ö U ^ c P E U H Ö Á U a e ^ A G E



Ó((]æ^ K V[(^!Á) *ã^!ã *ÁU[(^..ã) æ^É&É
 Ó^..ã) ^! K RÖT
 R[ã^P^ (^! K VOÜÁ^ [É&F I I I É H I H
 T[^!^Pæ ^ K ÖÖ&ÖW^ [É é H I

Ræ Á É&GG
 FÉH Á&F
 Ö@&^áÁÖ^ PY



Ó((]æ^ K V[(^!Á) *ã^!ã *ÁU[(^..ã) æ^É&É
 Ó^..ã) ^! K RÖT
 R[ã^P^ (^! K VOÜÁ^ [É&F I I I É H I H
 T[^!^Pæ ^ K ÖÖ&ÖW^ [É é H I

Ræ Á É&GG
 FÉH Á&F
 Ö@&^áÁÖ^ PY

A Ya Vyf'Dc]bhi@UXg'f6 @ ; : %) ' K]bX'! 'Bc'WZL'f' c b]bi YXL

	T ^ (^!^Pæ ^)	Öá^&ç)	T æ) æ á^Z É É&á	Û &æ) Z&á á
G	T ÜÉ	Y	ÉH	H
G	T ÜÉ	Y	ÉH F	I
GJ	T ÜÉH	Y	ÉJ I	I É I
HÉ	T ÜÉ	Y	ÉJ I	I É
HF	T ÜÉ	Y	É G	H
HG	T ÜÉ	Y	É F	I
HH	T ÜÉ	Y	É I	I É I
HI	T ÜÉ	Y	É I	I É
HÍ	T ÜÉ	Y	É G	H
HÏ	T ÜÉ	Y	ÉGG	I
HÏ	T ÜÉ	Y	É I	I É I
HÏ	T ÜÉ	Z	ÉJ I	É I
HU	T ÜÉ	Z	ÉH	F
I €	T ÜÉ	Z	ÉH F	I
IF	T ÜÉH	Z	ÉJ I	FÉ
IG	ÜT ÜÉ	Z	ÉH	FÉ
I H	ÜT ÜÉ	Z	É I	FÉ
II	ÜT ÜÉH	Z	É	FÉ
IÍ	ÜT ÜÉH	Z	É G	FÉ
IÏ	T ÜÉ	Z	ÉJ I	É I
IÏ	T ÜÉ	Z	É G	F
IÏ	T ÜÉ	Z	É F	I
IJ	T ÜÉ	Z	É I	FÉ
I €	ÜT ÜÉ	Z	ÉH	FÉ
I F	ÜT ÜÉ	Z	ÉH H	FÉ
I G	ÜT ÜÉ	Z	ÉH	FÉ
I H	ÜT ÜÉ	Z	É F	FÉ
I I	T ÜÉ	Z	É I	É I
I Í	T ÜÉ	Z	É G	F
I Ï	T ÜÉ	Z	ÉGG	I
I Ï	T ÜÉ	Z	É I	FÉ
I Ï	ÜT ÜÉ	Z	É I	FÉ
I J	ÜT ÜÉ	Z	É I	FÉ
I €	ÜT ÜÉ	Z	É I	FÉ
I F	ÜT ÜÉ	Z	ÉH	FÉ
I G	ÜT ÜÉ	Z	É I	F
I H	T ÜÉ	Z	ÉJ I	I É
I I	T ÜÉ	Z	ÉH	H
I Í	T ÜÉ	Z	ÉH F	I
I Ï	T ÜÉH	Z	ÉJ I	I É I
I Ï	T ÜÉ	Z	ÉJ I	I É
I Ï	T ÜÉ	Z	É G	H
I J	T ÜÉ	Z	É F	I
I €	T ÜÉ	Z	É I	I É I
I F	T ÜÉ	Z	É I	I É
I G	T ÜÉ	Z	É I	H
I H	T ÜÉ	Z	ÉGG	I
I I	T ÜÉ	Z	É I	I É I

A Ya Vyf'Dc]bhi@UXg'f6 @ ; : %) ' K]bX'! 'Bc'WZL

	T ^ (^!^Pæ ^)	Öá^&ç)	T æ) æ á^Z É É&á	Û &æ) Z&á á
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ÜÖ&ÖW^ [É é H I at [^) ÖÜ^ç PÉÜHÖÁ Üæ^Á&F

A Ya Vyf'Dc]bhi@UXg'f6 @ ; : %) ' K]bX'! 'Bc'WZL'f' c b]bi YXL

	T ^ (^!^Pæ ^)	Öá^&ç)	T æ) æ á^Z É É&á	Û &æ) Z&á á
F	T ÜÉ	Y	É I	É I
G	T ÜÉ	Y	É I	F
H	T ÜÉ	Y	É I	I
I	T ÜÉH	Y	É I	FÉ
I	ÜT ÜÉ	Y	É F	FÉ
I	ÜT ÜÉ	Y	É J	FÉ
I	ÜT ÜÉH	Y	É I	FÉ
I	ÜT ÜÉH	Y	É G	FÉ
J	T ÜÉ	Y	ÉFF	É I
F €	T ÜÉ	Y	É I	F
FF	T ÜÉ	Y	É I	I
FG	T ÜÉ	Y	ÉJ G	FÉ
FH	ÜT ÜÉ	Y	É F	FÉ
FI	ÜT ÜÉ	Y	É J	FÉ
FÍ	ÜT ÜÉ	Y	É I	FÉ
FÏ	ÜT ÜÉ	Y	É G	FÉ
FÏ	T ÜÉ	Y	ÉJ H	É I
FÏ	T ÜÉ	Y	É G	F
FJ	T ÜÉ	Y	É G	I
G €	T ÜÉ	Y	É I	FÉ
G F	ÜT ÜÉ	Y	É I	FÉ
GG	ÜT ÜÉ	Y	É G	FÉ
GH	ÜT ÜÉ	Y	É I	FÉ
G	ÜT ÜÉ	Y	É I	FÉ
G	ÜT ÜÉ	Y	É I	F
G	T ÜÉ	Y	É I	I É
G	T ÜÉ	Y	É I	I
GJ	T ÜÉH	Y	É I	I É I
H €	T ÜÉ	Y	ÉFF	I É
HF	T ÜÉ	Y	É I	H
HG	T ÜÉ	Y	É I	I
HH	T ÜÉ	Y	ÉJ G	I É I
H	T ÜÉ	Y	ÉJ H	I É
H	T ÜÉ	Y	É G	H
H	T ÜÉ	Y	É G	I
H	T ÜÉ	Y	É I	I É I
H	T ÜÉ	Z	É I	É I
HU	T ÜÉ	Z	É G	F
I €	T ÜÉ	Z	É G	I
I F	T ÜÉH	Z	ÉH	FÉ
I G	ÜT ÜÉ	Z	É G	FÉ
I H	ÜT ÜÉ	Z	ÉH	FÉ
II	ÜT ÜÉH	Z	É G	FÉ
IÍ	ÜT ÜÉH	Z	É F	FÉ
IÏ	T ÜÉ	Z	ÉGG	É I
IÏ	T ÜÉ	Z	É G	F
IÏ	T ÜÉ	Z	É G	I
I J	T ÜÉ	Z	ÉFF	FÉ
I €	ÜT ÜÉ	Z	É G	FÉ
I F	ÜT ÜÉ	Z	ÉH	FÉ
I G	ÜT ÜÉ	Z	É G	FÉ

ÜÖ&ÖW^ [É é H I at [^) ÖÜ^ç PÉÜHÖÁ Üæ^Á&G



Ô([]æ^ K V[,^!À) *ã^!ã *ÁU[-..ã) æÞ È¸ÈÉ
Ô^*ã)Á: K RÖT
R[ãÞ^ (ã^! K VOÜÁ[ÈãF[íííÈHíH
T[ã^!Þæ^ Á K ÖÖÖWÞ[ÈãÈíHí

Ræ Á È¸ÈGG
FèFè ÁÈÞ
Ö@&^áÁÖ^Hé PY



Ô([]æ^ K V[,^!À) *ã^!ã *ÁU[-..ã) æÞ È¸ÈÉ
Ô^*ã)Á: K RÖT
R[ãÞ^ (ã^! K VOÜÁ[ÈãF[íííÈHíH
T[ã^!Þæ^ Á K ÖÖÖWÞ[ÈãÈíHí

Ræ Á È¸ÈGG
FèFè ÁÈÞ
Ö@&^áÁÖ^Hé PY

A Ya Vyf'Dc]bhi@UXg f6 @ - : %\$ 'K jx!' Bc :WLFff cbi]bi YXL

	T ^\ (ã^!Þæ^)	Öá^&ã)	T æ} æ á^Ž ÈÈá	Š &æ} ŽãF á
í H	ÚT ÚÈ	Z	ÈÈÍ	FÈ
í I	T ÚÈ	Z	ÈÈ I	ÈÍ
í Í	T ÚÈ	Z	ÈÈÍ	F
í Î	T ÚÈ	Z	ÈÈÍ	Í
í Î	T ÚÈ	Z	ÈÈ J	FÈG
í Î	ÚT ÚÈ	Z	ÈÈ-H	FÈ
í J	ÚT ÚÈ	Z	ÈÈ I	FÈ
í €	ÚT ÚÈ	Z	ÈÈ-H	FÈ
í F	ÚT ÚÈ	Z	ÈÈG	FÈ
í G	ÚT ÚÈ	Z	ÈÈ-H	F
í H	T ÚÈ	Z	ÈÈ Í	Í È
í I	T ÚÈ	Z	ÈÈG	H
í Í	T ÚÈ	Z	ÈÈG	Í
í Î	T ÚÈ	Z	ÈÈ H	Í È
í Î	T ÚÈ	Z	ÈÈGG	Í È
í Î	T ÚÈ	Z	ÈÈG	H
í J	T ÚÈ	Z	ÈÈG	Í
í €	T ÚÈ	Z	ÈÈFF	Í È
í F	T ÚÈ	Z	ÈÈ I	Í È
í G	T ÚÈ	Z	ÈÈF	H
í H	T ÚÈ	Z	ÈÈF	Í
í I	T ÚÈ	Z	ÈÈ J	Í È

A Ya Vyf'Dc]bhi@UXg f6 @ %\$ 'K jx!' Bc :WLFff cbi]bi YXL

	T ^\ (ã^!Þæ^)	Öá^&ã)	T æ} æ á^Ž ÈÈá	Š &æ} ŽãF á
G	T ÚÈ	Y	ÈÈ G	H
G	T ÚÈ	Y	ÈÈ	Í
GJ	T ÚÈ	Y	ÈÈ J	Í È
HE	T ÚÈ	Y	ÈÈ H	Í È
HF	T ÚÈ	Y	ÈÈ	H
HG	T ÚÈ	Y	ÈÈ-H	Í
HH	T ÚÈ	Y	ÈÈ I	Í È
HI	T ÚÈ	Y	ÈÈ H	Í È
HÍ	T ÚÈ	Y	ÈÈ	H
HÎ	T ÚÈ	Y	ÈÈ-H	Í
HÏ	T ÚÈ	Y	ÈÈ	Í È

A Ya Vyf'Dc]bhi@UXg f6 @ %\$ '%&'K jx!' Bc :WLF

	T ^\ (ã^!Þæ^)	Öá^&ã)	T æ} æ á^Ž ÈÈá	Š &æ} ŽãF á
F	T ÚÈ	Y	ÈÈ Í	ÈÍ
G	T ÚÈ	Y	ÈÈ Í	F
H	T ÚÈ	Y	ÈÈ Í	Í
I	T ÚÈ	Y	ÈÈ Í	FÈG
í	ÚT ÚÈ	Y	ÈÈ F	FÈ
í	ÚT ÚÈ	Y	ÈÈ J	FÈ
í	ÚT ÚÈ	Y	ÈÈ I	FÈ
í	ÚT ÚÈ	Y	ÈÈG	FÈ
J	T ÚÈ	Y	ÈÈ J	ÈÍ
FÈ	T ÚÈ	Y	ÈÈG	F
FF	T ÚÈ	Y	ÈÈG	Í
FG	T ÚÈ	Y	ÈÈ Í	FÈG
FH	ÚT ÚÈ	Y	ÈÈ Í	FÈ
FI	ÚT ÚÈ	Y	ÈÈ G	FÈ
FÍ	ÚT ÚÈ	Y	ÈÈ Í	FÈ
FÏ	ÚT ÚÈ	Y	ÈÈ Í	FÈ
Fi	T ÚÈ	Y	ÈÈFF	ÈÍ
Fi	T ÚÈ	Y	ÈÈ Í	F
FJ	T ÚÈ	Y	ÈÈ Í	Í
GÈ	T ÚÈ	Y	ÈÈ J	FÈG
GF	ÚT ÚÈ	Y	ÈÈ F	FÈ
GG	ÚT ÚÈ	Y	ÈÈ J	FÈ
GH	ÚT ÚÈ	Y	ÈÈ I	FÈ
G	ÚT ÚÈ	Y	ÈÈG	FÈ
G	ÚT ÚÈ	Y	ÈÈ Í	F
G	T ÚÈ	Y	ÈÈ Í	Í È
G	T ÚÈ	Y	ÈÈ Í	H
G	T ÚÈ	Y	ÈÈ Í	Í
GJ	T ÚÈ	Y	ÈÈ Í	Í È
HE	T ÚÈ	Y	ÈÈ J	Í È
HF	T ÚÈ	Y	ÈÈG	H
HG	T ÚÈ	Y	ÈÈG	Í
HH	T ÚÈ	Y	ÈÈ I	Í È
H	T ÚÈ	Y	ÈÈFF	Í È
H	T ÚÈ	Y	ÈÈ Í	H
HÍ	T ÚÈ	Y	ÈÈ Í	Í
HÎ	T ÚÈ	Y	ÈÈ J	Í È

A Ya Vyf'Dc]bhi@UXg f6 @ %\$ '%&'K jx!' Bc :WLF

	T ^\ (ã^!Þæ^)	Öá^&ã)	T æ} æ á^Ž ÈÈá	Š &æ} ŽãF á
F	T ÚÈ	Y	ÈÈH	ÈÍ
G	T ÚÈ	Y	ÈÈ G	F
H	T ÚÈ	Y	ÈÈ	Í
I	T ÚÈ	Y	ÈÈ J	FÈG
í	ÚT ÚÈ	Y	ÈÈ F	FÈ
í	ÚT ÚÈ	Y	ÈÈ J	FÈ
í	ÚT ÚÈ	Y	ÈÈ I	FÈ
í	ÚT ÚÈ	Y	ÈÈG	FÈ
J	T ÚÈ	Y	ÈÈ H	ÈÍ
FÈ	T ÚÈ	Y	ÈÈ	F
FF	T ÚÈ	Y	ÈÈ-H	Í
FG	T ÚÈ	Y	ÈÈ	FÈG
FH	ÚT ÚÈ	Y	ÈÈ F	FÈ
FI	ÚT ÚÈ	Y	ÈÈ Í	FÈ
FÍ	ÚT ÚÈ	Y	ÈÈ F	FÈ
FÏ	ÚT ÚÈ	Y	ÈÈ Í	FÈ
Fi	T ÚÈ	Y	ÈÈ H	ÈÍ
Fi	T ÚÈ	Y	ÈÈ	F
FJ	T ÚÈ	Y	ÈÈ-H	Í
GÈ	T ÚÈ	Y	ÈÈ	FÈG
GF	ÚT ÚÈ	Y	ÈÈ F	FÈ
GG	ÚT ÚÈ	Y	ÈÈ Í	FÈ
GH	ÚT ÚÈ	Y	ÈÈ F	FÈ
G	ÚT ÚÈ	Y	ÈÈ Í	FÈ
G	ÚT ÚÈ	Y	ÈÈ Í	F
G	T ÚÈ	Y	ÈÈH	Í È



Ó((]æ´ K V[(^!Á) *ã^!ã *ÁU[(^*ã) æþ ÈQ&È
 Ó*ã) ^! K RÖT
 R[ãþ´ (à^! K VOÜÁþ[ÈFÍ IÍIÈHÍH
 T[à^!þæ ^ K ÖÖÖWþ[ÈÈÍHÍ

Ræ Á ÈGEGG
 FÈFI ÁÈ
 Ö@& ^áÁÖ´KÝ PY



Ó((]æ´ K V[(^!Á) *ã^!ã *ÁU[(^*ã) æþ ÈQ&È
 Ó*ã) ^! K RÖT
 R[ãþ´ (à^! K VOÜÁþ[ÈFÍ IÍIÈHÍH
 T[à^!þæ ^ K ÖÖÖWþ[ÈÈÍHÍ

Ræ Á ÈGEGG
 FÈFI ÁÈ
 Ö@& ^áÁÖ´KÝ PY

A Ya Vyf'Dc]bhi@UXg f6 @ '%& '\$ K jX'! Bc :WLFf7 cb]bi YXL

	T^(à^!Áæá^)	Öá^&á)	T æ) æ á^Z ÈÈá	Š &æ) ŽèÁ á
H	T ÜÈ	Z	ÈÈ I	È I
HU	T ÜÈG	Z	ÈÈG	F
I €	T ÜÈG	Z	ÈÈG	Í
IF	T ÜÈH	Z	ÈÈ H	FÈG
IG	ÜT ÜÈG	Z	ÈÈG	FÈÈ
IH	ÜT ÜÈG	Z	ÈÈH	FÈÈ
II	ÜT ÜÈH	Z	ÈÈG	FÈÈ
IÍ	ÜT ÜÈH	Z	ÈÈFÍ	FÈÈ
IÌ	T ÜÈ	Z	ÈÈ I	È I
IÏ	T ÜÈ	Z	ÈÈFÍ	F
IÌ	T ÜÈ	Z	ÈÈFÍ	Í
IJ	T ÜÈ	Z	ÈÈ J	FÈG
Í €	ÜT ÜÈ	Z	ÈÈH	FÈÈ
ÍF	ÜT ÜÈ	Z	ÈÈ I	FÈÈ
ÍG	ÜT ÜÈ	Z	ÈÈH	FÈÈ
ÍH	ÜT ÜÈ	Z	ÈÈG	FÈÈ
IÌ	T ÜÈ	Z	ÈÈGG	È I
IÏ	T ÜÈ	Z	ÈÈG	F
IÌ	T ÜÈ	Z	ÈÈG	Í
IÏ	T ÜÈ	Z	ÈÈFF	FÈG
IÌ	ÜT ÜÈ	Z	ÈÈG	FÈÈ
IJ	ÜT ÜÈ	Z	ÈÈH	FÈÈ
Í €	ÜT ÜÈ	Z	ÈÈG	FÈÈ
ÍF	ÜT ÜÈ	Z	ÈÈFÍ	FÈÈ
ÍG	ÜT ÜÈ	Z	ÈÈH	F
ÍH	T ÜÈ	Z	ÈÈ I	Í È
IÌ	T ÜÈG	Z	ÈÈG	H
IÏ	T ÜÈG	Z	ÈÈG	Í
IÌ	T ÜÈH	Z	ÈÈ H	Í È I
IÏ	T ÜÈ	Z	ÈÈ I	Í È
IÌ	T ÜÈ	Z	ÈÈFÍ	H
IJ	T ÜÈ	Z	ÈÈFÍ	Í
Í €	T ÜÈ	Z	ÈÈ J	Í È I
ÍF	T ÜÈ	Z	ÈÈGG	Í È
ÍG	T ÜÈ	Z	ÈÈG	H
ÍH	T ÜÈ	Z	ÈÈG	Í
IÌ	T ÜÈ	Z	ÈÈFF	Í È I

A Ya Vyf'Dc]bhi@UXg f6 @ '%& '\$ && K jX'! Bc :WLF

	T^(à^!Áæá^)	Öá^&á)	T æ) æ á^Z ÈÈá	Š &æ) ŽèÁ á
F	T ÜÈ	Y	ÈÈJ	È I
G	T ÜÈG	Y	ÈÈH	F
H	T ÜÈG	Y	ÈÈF	Í
I	T ÜÈH	Y	ÈÈJ	FÈG
Í	ÜT ÜÈG	Y	ÈÈH	FÈÈ
Í	ÜT ÜÈG	Y	ÈÈ I	FÈÈ
Ì	ÜT ÜÈH	Y	ÈÈ	FÈÈ
Ì	ÜT ÜÈH	Y	ÈÈG	FÈÈ
J	T ÜÈ	Y	ÈÈ I	È I
F €	T ÜÈ	Y	ÈÈG	F
FF	T ÜÈ	Y	ÈÈGG	Í

ÜÖÈÈÖÁ^!ã) ÁÍ ÈÈ WWWÖKèèæ æ^áÖ & { ^}öáÖ[, }at ÖáÜáã^á È ÈÍ at [^ }ÖÜ^çPÈÜHÖÁ Üæ^ÁG

A Ya Vyf'Dc]bhi@UXg f6 @ '%& '\$ && K jX'! Bc :WLFf7 cb]bi YXL

	T^(à^!Áæá^)	Öá^&á)	T æ) æ á^Z ÈÈá	Š &æ) ŽèÁ á
FG	T ÜÈ	Y	ÈÈ I	FÈG
FH	ÜT ÜÈ	Y	ÈÈ I	FÈÈ
FI	ÜT ÜÈ	Y	ÈÈ I	FÈÈ
FÍ	ÜT ÜÈ	Y	ÈÈ I	FÈÈ
FÏ	ÜT ÜÈ	Y	ÈÈH	FÈÈ
FÌ	T ÜÈ	Y	ÈÈJ	È I
FÍ	T ÜÈ	Y	ÈÈ G	F
FJ	T ÜÈ	Y	ÈÈ F	Í
G €	T ÜÈ	Y	ÈÈ I	FÈG
G €	ÜT ÜÈ	Y	ÈÈH	FÈÈ
GG	ÜT ÜÈ	Y	ÈÈ H	FÈÈ
GH	ÜT ÜÈ	Y	ÈÈH	FÈÈ
G	ÜT ÜÈ	Y	ÈÈFÍ	FÈÈ
G	ÜT ÜÈ	Y	ÈÈ I	F
G	T ÜÈ	Y	ÈÈJ	Í È
G	T ÜÈG	Y	ÈÈH	H
G	T ÜÈG	Y	ÈÈF	Í
GJ	T ÜÈH	Y	ÈÈJ	Í È I
H €	T ÜÈ	Y	ÈÈ I	Í È
HF	T ÜÈ	Y	ÈÈG	H
HG	T ÜÈ	Y	ÈÈGG	Í
HH	T ÜÈ	Y	ÈÈ I	Í È I
H	T ÜÈ	Y	ÈÈJ	Í È
H	T ÜÈ	Y	ÈÈ G	H
H	T ÜÈ	Y	ÈÈ F	Í
H	T ÜÈ	Y	ÈÈ I	Í È I
H	T ÜÈ	Z	ÈÈJ	È I
HU	T ÜÈG	Z	ÈÈH	F
I €	T ÜÈG	Z	ÈÈF	Í
IF	T ÜÈH	Z	ÈÈJ	FÈG
IG	ÜT ÜÈG	Z	ÈÈH	FÈÈ
IH	ÜT ÜÈG	Z	ÈÈ I	FÈÈ
II	ÜT ÜÈH	Z	ÈÈ	FÈÈ
IÍ	ÜT ÜÈH	Z	ÈÈG	FÈÈ
IÌ	T ÜÈ	Z	ÈÈ I	È I
IÏ	T ÜÈ	Z	ÈÈG	F
IÌ	T ÜÈ	Z	ÈÈGG	Í
IJ	T ÜÈ	Z	ÈÈ I	FÈG
Í €	ÜT ÜÈ	Z	ÈÈ I	FÈÈ
ÍF	ÜT ÜÈ	Z	ÈÈ I	FÈÈ
ÍG	ÜT ÜÈ	Z	ÈÈH	FÈÈ
ÍH	ÜT ÜÈ	Z	ÈÈH	FÈÈ
IÌ	ÜT ÜÈ	Z	ÈÈH	FÈÈ
IÏ	ÜT ÜÈ	Z	ÈÈH	FÈÈ
IJ	ÜT ÜÈ	Z	ÈÈ H	FÈÈ
Í €	ÜT ÜÈ	Z	ÈÈH	FÈÈ
ÍF	ÜT ÜÈ	Z	ÈÈFÍ	FÈÈ
ÍG	ÜT ÜÈ	Z	ÈÈ I	F
ÍH	T ÜÈ	Z	ÈÈJ	Í È

ÜÖÈÈÖÁ^!ã) ÁÍ ÈÈ WWWÖKèèæ æ^áÖ & { ^}öáÖ[, }at ÖáÜáã^á È ÈÍ at [^ }ÖÜ^çPÈÜHÖÁ Üæ^ÁG



Ó((] æ ^ K V[(^ / Å) * ä ^ ä * Å | (- * * ä) æ Þ Æ Ø Æ
 Ö * a) ^ K RÖT
 R ä Å Þ { ä ^ K VOÜ Å Þ [Æ F I I I I I H H I I H
 T [ä ^ Å Þ æ ^ K Ö Ö Ö W Þ [Æ é H í

Ræ Å Æ ÖGG
 Fæ H Å Þ
 Ö @ & ^ ä Å Ö ^ K Y PY



Ó((] æ ^ K V[(^ / Å) * ä ^ ä * Å | (- * * ä) æ Þ Æ Ø Æ
 Ö * a) ^ K RÖT
 R ä Å Þ { ä ^ K VOÜ Å Þ [Æ F I I I I I H H I I H
 T [ä ^ Å Þ æ ^ K Ö Ö Ö W Þ [Æ é H í

Ræ Å Æ ÖGG
 Fæ H Å Þ
 Ö @ & ^ ä Å Ö ^ K Y PY

A Ya Vyf'Dc]bhi@UXg'f6 @ '%&.' &&) 'K jX!'Bc :=WL'f7 cb]bi YXL

	T ^ (ä ^ / Å æ ^)	Ö ä ^ & ä)	T æ) æ ä ^ Å Æ É c á	Š & æ) Ž c Ä á
Í	T Ü Æ	Z	Æ H	H
Î	T Ü Æ	Z	Æ F	I
Ï	T Ü Æ	Z	Æ J	I È I
Ï	T Ü Æ	Z	Æ I	I È
Ï	T Ü Æ	Z	Æ G	H
Ï J	T Ü Æ	Z	Æ GG	I
Ï €	T Ü Æ	Z	Æ I	I È I
Ï F	T Ü Æ	Z	Æ J	I È
Ï G	T Ü Æ	Z	Æ G	H
Ï H	T Ü Æ	Z	Æ F	I
Ï I	T Ü Æ	Z	Æ I	I È I

A Ya Vyf'Dc]bhi@UXg'f6 @ '%&.' & \$ 'K jX!'Bc :=WL

	T ^ (ä ^ / Å æ ^)	Ö ä ^ & ä)	T æ) æ ä ^ Å Æ É c á	Š & æ) Ž c Ä á
F	T Ü Æ	Y	Æ I	È I
G	T Ü Æ	Y	Æ G	F
H	T Ü Æ	Y	Æ F	I
I	T Ü Æ	Y	Æ H	F È
Í	Ü T Ü Æ	Y	Æ H	F È
Î	Ü T Ü Æ	Y	Æ H	F È
Ï	Ü T Ü Æ	Y	Æ H	F È
Ï	Ü T Ü Æ	Y	Æ H	F È
J	T Ü Æ	Y	Æ I	È I
€	T Ü Æ	Y	Æ G	F
FF	T Ü Æ	Y	Æ F	I
FG	T Ü Æ	Y	Æ I	F È
FH	Ü T Ü Æ	Y	Æ H	F È
FI	Ü T Ü Æ	Y	Æ H	F È
FÍ	Ü T Ü Æ	Y	Æ H	F È
FÎ	Ü T Ü Æ	Y	Æ H	F È
FÏ	T Ü Æ	Y	Æ I	È I
FÍ	T Ü Æ	Y	Æ F	F
FJ	T Ü Æ	Y	Æ H	I
€	T Ü Æ	Y	Æ F	F È
GF	Ü T Ü Æ	Y	Æ G	F È
GG	Ü T Ü Æ	Y	Æ H	F È
GH	Ü T Ü Æ	Y	Æ H	F È
G	Ü T Ü Æ	Y	Æ FG	F È
G	Ü T Ü Æ	Y	Æ H	F
G	T Ü Æ	Y	Æ I	I È
G	T Ü Æ	Y	Æ G	H
G	T Ü Æ	Y	Æ F	I
GJ	T Ü Æ	Y	Æ H	I È I
H€	T Ü Æ	Y	Æ I	I È
HF	T Ü Æ	Y	Æ G	H
HG	T Ü Æ	Y	Æ F	I
HH	T Ü Æ	Y	Æ I	I È I
HI	T Ü Æ	Y	Æ I	I È
HÍ	T Ü Æ	Y	Æ F	H
HÎ	T Ü Æ	Y	Æ H	I
HÏ	T Ü Æ	Y	Æ F	I È I

Ü Ö Ö È Ö Å ^ (ä) Ä I È È WWW Ö K æ æ ä ^ & { ^ } ö ä I [, } at Ö ä U ä j ä ^ ä é H í at [^] ö Å ç P È Ü Ö Å Ü æ ^ Å G

A Ya Vyf'Dc]bhi@UXg'f6 @ '%&.' & \$ 'K jX!'Bc :=WL'f7 cb]bi YXL

	T ^ (ä ^ / Å æ ^)	Ö ä ^ & ä)	T æ) æ ä ^ Å Æ É c á	Š & æ) Ž c Ä á
H	T Ü Æ	Z	Æ J	È I
HU	T Ü Æ	Z	Æ H	F
I€	T Ü Æ	Z	Æ G	I
IF	T Ü Æ	Z	Æ F	F È
IG	Ü T Ü Æ	Z	Æ G	F È
IH	Ü T Ü Æ	Z	Æ I	F È
II	Ü T Ü Æ	Z	Æ G	F È
IÍ	Ü T Ü Æ	Z	Æ F	F È
IÏ	T Ü Æ	Z	Æ H	È I
IÏ	T Ü Æ	Z	Æ H	F
IÏ	T Ü Æ	Z	Æ G	I
IJ	T Ü Æ	Z	Æ G	F È
I€	Ü T Ü Æ	Z	Æ G	F È
IF	Ü T Ü Æ	Z	Æ I	F È
IG	Ü T Ü Æ	Z	Æ G	F È
IH	Ü T Ü Æ	Z	Æ F	F È
II	T Ü Æ	Z	Æ	È I
IÍ	T Ü Æ	Z	Æ I	F
IÏ	T Ü Æ	Z	Æ G	I
IÏ	T Ü Æ	Z	Æ G	F È
IÏ	Ü T Ü Æ	Z	Æ H	F È
IJ	Ü T Ü Æ	Z	Æ F	F È
I€	Ü T Ü Æ	Z	Æ	F È
IF	Ü T Ü Æ	Z	Æ G	F
IG	Ü T Ü Æ	Z	Æ I	F
IH	T Ü Æ	Z	Æ J	I È
II	T Ü Æ	Z	Æ H	H
IÍ	T Ü Æ	Z	Æ H	I
IÏ	T Ü Æ	Z	Æ F	I È I
IÏ	T Ü Æ	Z	Æ H	I È
IÏ	T Ü Æ	Z	Æ H	H
IJ	T Ü Æ	Z	Æ G	I
I€	T Ü Æ	Z	Æ G	I È I
IF	T Ü Æ	Z	Æ	I È
IG	T Ü Æ	Z	Æ I	H
IH	T Ü Æ	Z	Æ G	I
II	T Ü Æ	Z	Æ G	I È I

A Ya Vyf'Dc]bhi@UXg'f6 @ '%&.' & \$ 'K jX!'Bc :=WL

	T ^ (ä ^ / Å æ ^)	Ö ä ^ & ä)	T æ) æ ä ^ Å Æ É c á	Š & æ) Ž c Ä á
F	T Ü Æ	Z	Æ I	È I
G	T Ü Æ	Z	Æ H	F
H	T Ü Æ	Z	Æ J	I
I	T Ü Æ	Z	Æ I	F È
Í	Ü T Ü Æ	Z	Æ I	F È
Î	Ü T Ü Æ	Z	Æ J	F È
Ï	Ü T Ü Æ	Z	Æ I	F È
Ï	Ü T Ü Æ	Z	Æ I	F È
J	T Ü Æ	Z	Æ H	È I
€	T Ü Æ	Z	Æ I	F
FF	T Ü Æ	Z	Æ G	I

Ü Ö Ö È Ö Å ^ (ä) Ä I È È WWW Ö K æ æ ä ^ & { ^ } ö ä I [, } at Ö ä U ä j ä ^ ä é H í at [^] ö Å ç P È Ü Ö Å Ü æ ^ Å G



Ó((]æˆ K V[, ^!Á) *ã^!ã *ÁU[-••ã) æÞ ÈQ&È
 Ó••ã) ^! K RÖT
 R[ã^•{ ã^! K VOÜÁ [ÈF I I I È H I H
 T[ã^! Áæ ^ K ÖÖÖWÁ [È È I H I

Ræ Á ÈGGG
 FÈFI ÁÈ
 Ö@&^ãÁÖ^K^ PY



Ó((]æˆ K V[, ^!Á) *ã^!ã *ÁU[-••ã) æÞ ÈQ&È
 Ó••ã) ^! K RÖT
 R[ã^•{ ã^! K VOÜÁ [ÈF I I I È H I H
 T[ã^! Áæ ^ K ÖÖÖWÁ [È È I H I

Ræ Á ÈGGG
 FÈFI ÁÈ
 Ö@&^ãÁÖ^K^ PY

A Ya Vyf'Dc]bh@UXg f6 @ '% : '& \$ 'K jX!' Bc :=WLf7 cb]bi YXL

	T ^ (ã^! Áæ ^)	Öã^&ã)	T æ) æ ã^ Á È Ècá	Š &ã) Žcã á
FG	T ÜÈ	Z	ÈGGG	FÈG
FH	ÜT ÜÈ	Z	ÈÈ I	FÈÈ
FI	ÜT ÜÈ	Z	ÈÈ I	FÈÈ
FÍ	ÜT ÜÈ	Z	ÈÈ F	FÈÈ
FÌ	ÜT ÜÈ	Z	ÈÈG	FÈÈ
FÌ	T ÜÈ	Z	ÈÈ H	ÈÈ I
FÌ	T ÜÈ	Z	ÈÈ I	F
FJ	T ÜÈ	Z	ÈÈ G	Í
œ	T ÜÈ	Z	ÈGGG	FÈG
GF	ÜT ÜÈ	Z	ÈÈ I	FÈÈ
GG	ÜT ÜÈ	Z	ÈÈ I	FÈÈ
GH	ÜT ÜÈ	Z	ÈÈ F	FÈÈ
G	ÜT ÜÈ	Z	ÈÈG	FÈÈ
G	ÜT ÜÈ	Z	ÈÈ I	F
G	T ÜÈ	Z	ÈÈ I	Í ÈÈ
G	T ÜÈ	Z	ÈÈH	H
G	T ÜÈ	Z	ÈÈJ	Í
GJ	T ÜÈ	Z	ÈÈ I	Í ÈÈ
HE	T ÜÈ	Z	ÈÈ H	Í ÈÈ
HF	T ÜÈ	Z	ÈÈ I	H
HG	T ÜÈ	Z	ÈÈ G	Í
HH	T ÜÈ	Z	ÈGGG	Í ÈÈ
HI	T ÜÈ	Z	ÈÈ H	Í ÈÈ
HÍ	T ÜÈ	Z	ÈÈ I	H
HÌ	T ÜÈ	Z	ÈÈ G	Í
HÌ	T ÜÈ	Z	ÈGGG	Í ÈÈ

A Ya Vyf'Dc]bh@UXg f6 @ '% : ' \$ \$ 'K jX!' Bc :=WL

	T ^ (ã^! Áæ ^)	Öã^&ã)	T æ) æ ã^ Á È Ècá	Š &ã) Žcã á
F	T ÜÈ	Y	ÈÈ I	ÈÈ I
G	T ÜÈ	Y	ÈÈG	F
H	T ÜÈ	Y	ÈÈF	Í
I	T ÜÈ	Y	ÈÈ H	FÈG
Í	ÜT ÜÈ	Y	ÈÈH	FÈÈ
Ì	ÜT ÜÈ	Y	ÈÈ H	FÈÈ
Ì	ÜT ÜÈ	Y	ÈÈH	FÈÈ
Ì	ÜT ÜÈ	Y	ÈÈGH	FÈÈ
J	T ÜÈ	Y	ÈÈ I	ÈÈ I
œ	T ÜÈ	Y	ÈÈF	F
FF	T ÜÈ	Y	ÈÈH	Í
FG	T ÜÈ	Y	ÈÈF	FÈG
FH	ÜT ÜÈ	Y	ÈÈGF	FÈÈ
FI	ÜT ÜÈ	Y	ÈÈH	FÈÈ
FÍ	ÜT ÜÈ	Y	ÈÈGH	FÈÈ
FÌ	ÜT ÜÈ	Y	ÈÈFG	FÈÈ
FÌ	T ÜÈ	Y	ÈÈ I	ÈÈ I
FÌ	T ÜÈ	Y	ÈÈG	F
FJ	T ÜÈ	Y	ÈÈF	Í
œ	T ÜÈ	Y	ÈÈ	FÈG
GF	ÜT ÜÈ	Y	ÈÈH	FÈÈ
GG	ÜT ÜÈ	Y	ÈÈ H	FÈÈ

ÜÖÈÈÖÁ^!ã) ÁÈ ÈÈ WWWÖÈÈÈ æ•ãÖ { ^}ãÖ[, }at Öã^ãã^ã È È I È È [^ } ÖÜ^çPÈÜHÖÁ Üæ^ÁGJ

A Ya Vyf'Dc]bh@UXg f6 @ '% : ' \$ \$ 'K jX!' Bc :=WLf7 cb]bi YXL

	T ^ (ã^! Áæ ^)	Öã^&ã)	T æ) æ ã^ Á È Ècá	Š &ã) Žcã á
GH	ÜT ÜÈ	Y	ÈÈH	FÈÈ
G	ÜT ÜÈ	Y	ÈÈGH	FÈÈ
G	ÜT ÜÈ	Y	ÈÈH	F
G	T ÜÈ	Y	ÈÈ I	Í ÈÈ
G	T ÜÈ	Y	ÈÈG	H
G	T ÜÈ	Y	ÈÈF	Í
GJ	T ÜÈ	Y	ÈÈ H	Í ÈÈ
HE	T ÜÈ	Y	ÈÈ I	Í ÈÈ
HF	T ÜÈ	Y	ÈÈF	H
HG	T ÜÈ	Y	ÈÈH	Í
HH	T ÜÈ	Y	ÈÈF	Í ÈÈ
H	T ÜÈ	Y	ÈÈ I	Í ÈÈ
H	T ÜÈ	Y	ÈÈG	H
H	T ÜÈ	Y	ÈÈF	Í
H	T ÜÈ	Y	ÈÈ	Í ÈÈ
H	T ÜÈ	Z	ÈÈH	ÈÈ I
HJ	T ÜÈ	Z	ÈÈH	F
I€	T ÜÈ	Z	ÈÈG	Í
IF	T ÜÈ	Z	ÈÈF	FÈG
IG	ÜT ÜÈ	Z	ÈÈ G	FÈÈ
IH	ÜT ÜÈ	Z	ÈÈ I	FÈÈ
II	ÜT ÜÈ	Z	ÈÈ G	FÈÈ
IÍ	ÜT ÜÈ	Z	ÈÈ F	FÈÈ
IÌ	T ÜÈ	Z	ÈÈ	ÈÈ I
IÌ	T ÜÈ	Z	ÈÈ I	F
IÌ	T ÜÈ	Z	ÈÈ G	Í
IJ	T ÜÈ	Z	ÈÈG	FÈG
I€	ÜT ÜÈ	Z	ÈÈH	FÈÈ
IF	ÜT ÜÈ	Z	ÈÈ F	FÈÈ
IG	ÜT ÜÈ	Z	ÈÈ	FÈÈ
IH	ÜT ÜÈ	Z	ÈÈGF	FÈÈ
II	T ÜÈ	Z	ÈÈGH	ÈÈ I
IÍ	T ÜÈ	Z	ÈÈH	F
IÌ	T ÜÈ	Z	ÈÈG	Í
IÌ	T ÜÈ	Z	ÈÈGF	FÈG
IÌ	ÜT ÜÈ	Z	ÈÈ G	FÈÈ
IJ	ÜT ÜÈ	Z	ÈÈ I	FÈÈ
I€	ÜT ÜÈ	Z	ÈÈ G	FÈÈ
IF	ÜT ÜÈ	Z	ÈÈ F	FÈÈ
IG	ÜT ÜÈ	Z	ÈÈ I	F
IH	T ÜÈ	Z	ÈÈH	Í ÈÈ
IÌ	T ÜÈ	Z	ÈÈH	H
IÌ	T ÜÈ	Z	ÈÈG	Í
IÌ	T ÜÈ	Z	ÈÈF	Í ÈÈ
IÌ	T ÜÈ	Z	ÈÈ	Í ÈÈ
IÌ	T ÜÈ	Z	ÈÈ I	H
IJ	T ÜÈ	Z	ÈÈ G	Í
I€	T ÜÈ	Z	ÈÈG	Í ÈÈ
IF	T ÜÈ	Z	ÈÈGH	Í ÈÈ
IG	T ÜÈ	Z	ÈÈH	H
IH	T ÜÈ	Z	ÈÈG	Í
IÌ	T ÜÈ	Z	ÈÈF	Í ÈÈ

ÜÖÈÈÖÁ^!ã) ÁÈ ÈÈ WWWÖÈÈÈ æ•ãÖ { ^}ãÖ[, }at Öã^ãã^ã È È I È È [^ } ÖÜ^çPÈÜHÖÁ Üæ^ÁÈE



Q([] a^ K V[, ^/A) * a^i a * A[[- . . a] a^ e Q & E
O^ a) ^ K ROT
R[a^ ^ { a^ K VOUA [e f i i i e H I H
T [a^ / a^ a^ K OOO W b [e e i H i

Ra^ A e GGG
FeH A e
O @ & ^ a A O ^ K Y PY



Q([] a^ K V[, ^/A) * a^i a * A[[- . . a] a^ e Q & E
O^ a) ^ K ROT
R[a^ ^ { a^ K VOUA [e f i i i e H I H
T [a^ / a^ a^ K OOO W b [e e i H i

Ra^ A e GGG
FeH A e
O @ & ^ a A O ^ K Y PY

A Ya Vyf'Dc]bhi@UXg'f6 @ '% : ' ' \$ 'K jX!' Bc : WYLF'f7 cb]bi YXL

Table with 4 columns: T ^ (a^ / A e a^), O a^ & a^), T a^) a^ a^ z e e a^, S (& a^) z e a^ a^

A Ya Vyf'Dc]bhi@UXg'f6 @ '% : WY'K YJ [\ H

Table with 4 columns: T ^ (a^ / A e a^), O a^ & a^), T a^) a^ a^ z e e a^, S (& a^) z e a^ a^

U O e H O A ^ i . a] A i e e W W W O k e a a a e . a O & { ^ } o a O [, } a t O e U a j a ^ . a e H i a t [^ } o U ^ c P e U H O A U a e ^ A H

A Ya Vyf'Dc]bhi@UXg'f6 @ '% : WY'K YJ [\ H'f7 cb]bi YXL

Table with 4 columns: T ^ (a^ / A e a^), O a^ & a^), T a^) a^ a^ z e e a^, S (& a^) z e a^ a^

A Ya Vyf'Dc]bhi@UXg'f6 @ '% : \$ 'K jX!' WYLF

Table with 4 columns: T ^ (a^ / A e a^), O a^ & a^), T a^) a^ a^ z e e a^, S (& a^) z e a^ a^

U O e H O A ^ i . a] A i e e W W W O k e a a a e . a O & { ^ } o a O [, } a t O e U a j a ^ . a e H i a t [^ } o U ^ c P e U H O A U a e ^ A H



Ó((]æˆ K V[, ^!Á) *ã^!ã *ÁU[-••ã) æÞ ÈQ&È
 Ô••ã) ^! K RÔT
 R[ã^Pˆ(ã^! K VOÚ^P[ÈFÍ IÍÈ HÍH
 T[ã^!Pæ^ K ÓÓQW^P[ÈÈÈ HÍ

Ræ Á ÈCGG
 FÈFI ÁÈ
 Ó@&^áÁÓ^K^ PY



Ó((]æˆ K V[, ^!Á) *ã^!ã *ÁU[-••ã) æÞ ÈQ&È
 Ô••ã) ^! K RÔT
 R[ã^Pˆ(ã^! K VOÚ^P[ÈFÍ IÍÈ HÍH
 T[ã^!Pæ^ K ÓÓQW^P[ÈÈÈ HÍ

Ræ Á ÈCGG
 FÈFI ÁÈ
 Ó@&^áÁÓ^K^ PY

A Ya Vyf'Dc]bh@UXg'f6 @ '% : '\$'K]bX!' =WYLF' c]h]bi YXL

	T ^ (ã^!Pæ^)	Ôá^&ç)	T æ) æ á^Z ÈÈçá	Š &ç) ŽçÁ á
FG	T ÚÈ	Y	ÈÈÍ	FÈG
FH	ÚT ÚÈ	Y	ÈÈFÍ	FÈÈ
FI	ÚT ÚÈ	Y	ÈÈG	FÈÈ
FÍ	ÚT ÚÈ	Y	ÈÈFÍ	FÈÈ
FÌ	ÚT ÚÈ	Y	ÈÈFÍ	FÈÈ
FÌ	T ÚÈ	Y	ÈÈ	ÈÈ
FÌ	T ÚÈ	Y	ÈÈFÍ	F
FJ	T ÚÈ	Y	ÈÈFÍ	Í
GE	T ÚÈ	Y	ÈÈÍ	FÈG
GF	ÚT ÚÈ	Y	ÈÈFÍ	FÈÈ
GG	ÚT ÚÈ	Y	ÈÈG	FÈÈ
GH	ÚT ÚÈ	Y	ÈÈFÍ	FÈÈ
G	ÚT ÚÈ	Y	ÈÈFÍ	FÈÈ
G	ÚT ÚÈ	Y	ÈÈFJ	F
G	T ÚÈ	Y	ÈÈH	Í ÈG
G	T ÚÈG	Y	ÈÈFÍ	H
G	T ÚÈG	Y	ÈÈFÍ	Í
GJ	T ÚÈH	Y	ÈÈG	Í ÈÍ
HE	T ÚÈ	Y	ÈÈ	Í ÈG
HF	T ÚÈ	Y	ÈÈFÍ	H
HG	T ÚÈ	Y	ÈÈFÍ	Í
HH	T ÚÈ	Y	ÈÈÍ	Í ÈÍ
HI	T ÚÈ	Y	ÈÈ	Í ÈG
HÍ	T ÚÈ	Y	ÈÈFÍ	H
HÌ	T ÚÈ	Y	ÈÈFÍ	Í
HÌ	T ÚÈ	Y	ÈÈÍ	Í ÈÍ

A Ya Vyf'Dc]bh@UXg'f6 @ '&\$: '\$'K]bX!' =WYLF

	T ^ (ã^!Pæ^)	Ôá^&ç)	T æ) æ á^Z ÈÈçá	Š &ç) ŽçÁ á
F	T ÚÈ	Y	ÈÈHG	ÈÈ
G	T ÚÈG	Y	ÈÈFG	F
H	T ÚÈG	Y	ÈÈFF	Í
I	T ÚÈH	Y	ÈÈHF	FÈG
Í	ÚT ÚÈG	Y	ÈÈFG	FÈÈ
Ì	ÚT ÚÈG	Y	ÈÈFÍ	FÈÈ
Ì	ÚT ÚÈH	Y	ÈÈFG	FÈÈ
Ì	ÚT ÚÈH	Y	ÈÈG	FÈÈ
J	T ÚÈ	Y	ÈÈGH	ÈÈ
F€	T ÚÈ	Y	ÈÈG	F
FF	T ÚÈ	Y	ÈÈG	Í
FG	T ÚÈ	Y	ÈÈGG	FÈG
FH	ÚT ÚÈ	Y	ÈÈFÍ	FÈÈ
FI	ÚT ÚÈ	Y	ÈÈGF	FÈÈ
FÍ	ÚT ÚÈ	Y	ÈÈFÍ	FÈÈ
FÌ	ÚT ÚÈ	Y	ÈÈFH	FÈÈ
FÌ	T ÚÈ	Y	ÈÈÍ	ÈÈ
FÌ	T ÚÈ	Y	ÈÈFG	F
FJ	T ÚÈ	Y	ÈÈFF	Í
GE	T ÚÈ	Y	ÈÈF	FÈG
GF	ÚT ÚÈ	Y	ÈÈFG	FÈÈ
GG	ÚT ÚÈ	Y	ÈÈFÍ	FÈÈ

ÚQÈÈÒÀ^!•ã) ÁÍ ÈÈ WWWÒÈÈÈ æ•áÓ & { ^}•áÓ[, }at ÚáUáã^•á È HÍ at [ˆ]•Á^çPÈUÓÁ Úæ^ÁÍ

A Ya Vyf'Dc]bh@UXg'f6 @ '&\$: '\$'K]bX!' =WYLF' c]h]bi YXL

	T ^ (ã^!Pæ^)	Ôá^&ç)	T æ) æ á^Z ÈÈçá	Š &ç) ŽçÁ á
GH	ÚT ÚÈ	Y	ÈÈFG	FÈÈ
G	ÚT ÚÈ	Y	ÈÈG	FÈÈ
G	ÚT ÚÈ	Y	ÈÈFÍ	F
G	T ÚÈ	Y	ÈÈHG	Í ÈG
G	T ÚÈG	Y	ÈÈFG	H
G	T ÚÈG	Y	ÈÈFF	Í
GJ	T ÚÈH	Y	ÈÈHF	Í ÈÍ
HE	T ÚÈ	Y	ÈÈGH	Í ÈG
HF	T ÚÈ	Y	ÈÈG	H
HG	T ÚÈ	Y	ÈÈG	Í
HH	T ÚÈ	Y	ÈÈGG	Í ÈÍ
H	T ÚÈ	Y	ÈÈÍ	Í ÈG
H	T ÚÈ	Y	ÈÈFG	H
H	T ÚÈ	Y	ÈÈFF	Í
H	T ÚÈ	Y	ÈÈF	Í ÈÍ
H	T ÚÈ	Z	ÈÈFÍ	ÈÈ
HJ	T ÚÈG	Z	ÈÈG	F
I€	T ÚÈG	Z	ÈÈG	Í
IF	T ÚÈH	Z	ÈÈFÍ	FÈG
IG	ÚT ÚÈG	Z	ÈÈG	FÈÈ
IH	ÚT ÚÈG	Z	ÈÈG	FÈÈ
II	ÚT ÚÈH	Z	ÈÈG	FÈÈ
IÍ	ÚT ÚÈH	Z	ÈÈG	FÈÈ
IÌ	T ÚÈ	Z	ÈÈFÍ	ÈÈ
IÌ	T ÚÈ	Z	ÈÈG	F
IÌ	T ÚÈ	Z	ÈÈG	Í
IJ	T ÚÈ	Z	ÈÈFG	FÈG
I€	ÚT ÚÈ	Z	ÈÈG	FÈÈ
IF	ÚT ÚÈ	Z	ÈÈFG	FÈÈ
IG	ÚT ÚÈ	Z	ÈÈG	FÈÈ
IH	ÚT ÚÈ	Z	ÈÈG	FÈÈ
II	T ÚÈ	Z	ÈÈG	ÈÈ
IÍ	T ÚÈ	Z	ÈÈG	F
IÌ	T ÚÈ	Z	ÈÈG	Í
IÌ	T ÚÈ	Z	ÈÈG	FÈG
IÌ	ÚT ÚÈ	Z	ÈÈG	FÈÈ
IJ	ÚT ÚÈ	Z	ÈÈG	FÈÈ
I€	ÚT ÚÈ	Z	ÈÈG	FÈÈ
IF	ÚT ÚÈ	Z	ÈÈG	FÈÈ
IG	ÚT ÚÈ	Z	ÈÈ	F
IH	T ÚÈ	Z	ÈÈFÍ	Í ÈG
IÍ	T ÚÈG	Z	ÈÈG	H
IÍ	T ÚÈG	Z	ÈÈG	Í
IÍ	T ÚÈH	Z	ÈÈFÍ	Í ÈÍ
IÌ	T ÚÈ	Z	ÈÈFÍ	Í ÈG
IÌ	T ÚÈ	Z	ÈÈG	H
IJ	T ÚÈ	Z	ÈÈG	Í
I€	T ÚÈ	Z	ÈÈFG	Í ÈÍ
IF	T ÚÈ	Z	ÈÈG	Í ÈG
IG	T ÚÈ	Z	ÈÈG	H
IH	T ÚÈ	Z	ÈÈG	Í
IÌ	T ÚÈ	Z	ÈÈG	Í ÈÍ

ÚQÈÈÒÀ^!•ã) ÁÍ ÈÈ WWWÒÈÈÈ æ•áÓ & { ^}•áÓ[, }at ÚáUáã^•á È HÍ at [ˆ]•Á^çPÈUÓÁ Úæ^ÁÍ



Q([a^ K V[, ^!A) * a^!a * AU[-..a) a^ E@&E
 O^ a) ^! K ROT
 R a^ ^ (a^! K VOUA^ [EAFI i i i E H I H
 T [a^! a^ a^ ^ K OOO^ W^ [E e i H i

Ra^ A ECGG
 FEFI AEF
 O@&^ a^ A^ PY



Q([a^ K V[, ^!A) * a^!a * AU[-..a) a^ E@&E
 O^ a) ^! K ROT
 R a^ ^ (a^! K VOUA^ [EAFI i i i E H I H
 T [a^! a^ a^ ^ K OOO^ W^ [E e i H i

Ra^ A ECGG
 FEFI AEF
 O@&^ a^ A^ PY

A Ya Vyf'Dc]bhi@UXg'f6 @ ' &% ' () 'K]bX!' =WZ

	T ^ (a^! a^ a^ ^)	O a^ & a^)	T a^) a^ a^ E e a^	S (& a^) Z e A a
F	T U E F	Y	E E G G	E I
G	T U E G	Y	E E G I	F
H	T U E H	Y	E E G I	I
I	T U E H	Y	E E G F	F E G I
I	U T U E G	Y	E E F F	F E E
I	U T U E G	Y	E E F I	F E E
I	U T U E H	Y	E E F F	F E E
I	U T U E H	Y	E E E I	F E E
J	T U E H	Y	E E G F	E I
F E	T U E H	Y	E E E I	F
FF	T U E H	Y	E E E I	I
FG	T U E H	Y	E E F J	F E G I
FH	U T U E H	Y	E E F G	F E E
FI	U T U E H	Y	E E F I	F E E
F I	U T U E H	Y	E E F G	F E E
F I	U T U E H	Y	E E F	F E E
F I	T U E H	Y	E E F	E I
F I	T U E H	Y	E E F	F
FJ	T U E H	Y	E E F	I
G E	T U E H	Y	E E H I	F E G I
G F	U T U E H	Y	E E E J	F E E
G G	U T U E H	Y	E E F G	F E E
G H	U T U E H	Y	E E F	F E E
G	U T U E H	Y	E E E I	F E E
G	U T U E F	Y	E E F I	F
G	T U E F	Y	E E G G	I E G I
G	T U E G	Y	E E E I	H
G	T U E G	Y	E E E I	I
GJ	T U E H	Y	E E G F	I E I
H E	T U E H	Y	E E G F	I E G I
H F	T U E H	Y	E E E I	H
H G	T U E H	Y	E E E I	I
H H	T U E H	Y	E E F J	I E I
H I	T U E H	Y	E E F	I E G I
H	T U E H	Y	E E F	H
H	T U E H	Y	E E F	I
H	T U E H	Y	E E H I	I E I
H	T U E F	Z	E E G G	E I
HU	T U E G	Z	E E E I	F
I E	T U E G	Z	E E E I	I
I F	T U E H	Z	E E G F	F E G I
I G	U T U E G	Z	E E F F	F E E
I H	U T U E G	Z	E E F I	F E E
I I	U T U E H	Z	E E F F	F E E
I I	U T U E H	Z	E E E I	F E E
I I	T U E H	Z	E E G F	E I
I I	T U E H	Z	E E E I	F
I I	T U E H	Z	E E E I	I
I J	T U E H	Z	E E F J	F E G I
I E	U T U E H	Z	E E F G	F E E
I F	U T U E H	Z	E E F I	F E E
I G	U T U E H	Z	E E F G	F E E

A Ya Vyf'Dc]bhi@UXg'f6 @ ' &% ' () 'K]bX!' =WZ:ff cb]bi YXZ

	T ^ (a^! a^ a^ ^)	O a^ & a^)	T a^) a^ a^ E e a^	S (& a^) Z e A a
I H	U T U E H	Z	E E F	F E E
I I	T U E H	Z	E E F	E I
I I	T U E H	Z	E E F	F
I I	T U E H	Z	E E F	I
I I	T U E H	Z	E E F	F E G I
I I	U T U E H	Z	E E E J	F E E
I J	U T U E H	Z	E E F G	F E E
I E	U T U E H	Z	E E F	F E E
I F	U T U E H	Z	E E E I	F E E
I G	U T U E F	Z	E E F I	F
I H	T U E F	Z	E E G G	I E G I
I I	T U E G	Z	E E E I	H
I I	T U E G	Z	E E E I	I
I I	T U E H	Z	E E G F	I E I
I I	T U E H	Z	E E G F	I E G I
I I	T U E H	Z	E E E I	H
I J	T U E H	Z	E E E I	I
I E	T U E H	Z	E E F J	I E I
I F	T U E H	Z	E E F	I E G I
I G	T U E H	Z	E E F	H
I H	T U E H	Z	E E F	I
I I	T U E H	Z	E E H I	I E I

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	T ^ (a^! a^ a^ ^)	O a^ & a^)	T a^) a^ a^ E e a^	S (& a^) Z e A a
F	T U E F	Y	E E F H	E I
G	T U E G	Y	E E E I	F
H	T U E G	Y	E E E I	I
I	T U E H	Y	E E F G	F E G I
I	U T U E G	Y	E E E I	F E E
I	U T U E G	Y	E E F F	F E E
I	U T U E H	Y	E E E I	F E E
I	U T U E H	Y	E E E I	F E E
J	T U E H	Y	E E F I	E I
F E	T U E H	Y	E E E I	F
FF	T U E H	Y	E E E I	I
FG	T U E H	Y	E E F I	F E G I
FH	U T U E H	Y	E E E I	F E E
FI	U T U E H	Y	E E F F	F E E
F I	U T U E H	Y	E E E I	F E E
F I	U T U E H	Y	E E E I	F E E
F I	T U E H	Y	E E H I	E I
F I	T U E H	Y	E E E I	F
FJ	T U E H	Y	E E E I	I
G E	T U E H	Y	E E G	F E G I
G F	U T U E H	Y	E E E I	F E E
G G	U T U E H	Y	E E E I	F E E
G H	U T U E H	Y	E E E I	F E E
G	U T U E H	Y	E E E I	F E E
G	U T U E F	Y	E E F	F
G	T U E F	Y	E E F H	I E G I

U O O E H O A ^ ! . a) A I E E W W O K a a a a . a O { ^ } o a O [, } a T O a U a a a ^ . a e H i a T [^ } o U a c P E U H O A U a e A A i

U O O E H O A ^ ! . a) A I E E W W O K a a a a . a O { ^ } o a O [, } a T O a U a a a ^ . a e H i a T [^ } o U a c P E U H O A U a e A A i



Ö((] æ ^ Ö * a) ^ K V [, ^ / Å) * ä ^ i ä * Å [(- * * ä) æ Þ Æ & Æ
 R [ä Å ^ { ä ^ K V O U Å Þ [Æ F I I I I I H H I I H
 T [ä ^ Å æ ^ K Ö Ö Ö W Å Þ [Æ é H í

Ræ Å Æ ÖGG
 Fæ H Å Æ
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Ö((] æ ^ Ö * a) ^ K V [, ^ / Å) * ä ^ i ä * Å [(- * * ä) æ Þ Æ & Æ
 R [ä Å ^ { ä ^ K V O U Å Þ [Æ F I I I I I H H I I H
 T [ä ^ Å æ ^ K Ö Ö Ö W Å Þ [Æ é H í

Ræ Å Æ ÖGG
 Fæ H Å Æ
 Ö @ & ^ ä Å ^ K V PY

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	T ^ (ä ^ / Å æ ^)	Ö ä ^ & ä)	T æ) æ ä ^ Å Æ É cä	Š & æ) Ž c Ä ä
I	T Ü Æ	Z	Æ Æ I	H
I	T Ü Æ	Z	Æ Æ I	I
I	T Ü Æ H	Z	Æ Æ I	I Æ I
I	T Ü Æ	Z	Æ Æ G	I Æ G
I	T Ü Æ	Z	Æ Æ I	H
I J	T Ü Æ	Z	Æ Æ I	I
I €	T Ü Æ	Z	Æ Æ G	I Æ I
I F	T Ü Æ	Z	Æ Æ I	I Æ I
I G	T Ü Æ	Z	Æ Æ I	H
I H	T Ü Æ	Z	Æ Æ I	I
I I	T Ü Æ	Z	Æ Æ G	I Æ I

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	T ^ (ä ^ / Å æ ^)	Ö ä ^ & ä)	T æ) æ ä ^ Å Æ É cä	Š & æ) Ž c Ä ä
F	T Ü Æ	Y	Æ I H	Æ I
G	T Ü Æ	Y	Æ F I	F
H	T Ü Æ	Y	Æ F I	I
I	T Ü Æ H	Y	Æ I G	F Æ G
I	Ü T Ü Æ	Y	Æ F I	F Æ
I	Ü T Ü Æ	Y	Æ G	F Æ
I	Ü T Ü Æ H	Y	Æ F I	F Æ
I	Ü T Ü Æ H	Y	Æ F I	F Æ
J	T Ü Æ	Y	Æ I	Æ I
F €	T Ü Æ	Y	Æ F I	F
FF	T Ü Æ	Y	Æ F I	I
FG	T Ü Æ	Y	Æ I	F Æ G
FH	Ü T Ü Æ	Y	Æ F I	F Æ
FI	Ü T Ü Æ	Y	Æ G	F Æ
F I	Ü T Ü Æ	Y	Æ F I	F Æ
F I	Ü T Ü Æ	Y	Æ F I	F Æ
F I	T Ü Æ	Y	Æ I	Æ I
F I	T Ü Æ	Y	Æ F I	F
F J	T Ü Æ	Y	Æ F I	I
G €	T Ü Æ	Y	Æ I	F Æ G
GF	Ü T Ü Æ	Y	Æ F I	F Æ
GG	Ü T Ü Æ	Y	Æ G	F Æ
GH	Ü T Ü Æ	Y	Æ F I	F Æ
G	Ü T Ü Æ	Y	Æ F I	F Æ
G	Ü T Ü Æ	Y	Æ F J	F
G	T Ü Æ	Y	Æ I H	I Æ G
G	T Ü Æ	Y	Æ F I	H
G	T Ü Æ	Y	Æ F I	I
G J	T Ü Æ H	Y	Æ I G	I Æ I
H €	T Ü Æ	Y	Æ I	I Æ G
HF	T Ü Æ	Y	Æ F I	H
HG	T Ü Æ	Y	Æ F I	I
HH	T Ü Æ	Y	Æ I	I Æ I
H I	T Ü Æ	Y	Æ I	I Æ G
H I	T Ü Æ	Y	Æ F I	H
H I	T Ü Æ	Y	Æ F I	I
H I	T Ü Æ	Y	Æ I	I Æ I

Ü Ö Ö H Ö Å ^ { ä ^ } Ä I Æ Æ Å Å Å Ö Å æ ä ^ ä Ö { ^ } ö ä I [, } at Ö ä Å ä ä ^ ä é H í at [^ } ö Å ç Å Þ Æ H Ö Å Ü æ ^ Ä I

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	T ^ (ä ^ / Å æ ^)	Ö ä ^ & ä)	T æ) æ ä ^ Å Æ É cä	Š & æ) Ž c Ä ä
F	T Ü Æ	Y	Æ H G	Æ I
G	T Ü Æ	Y	Æ F G	F
H	T Ü Æ	Y	Æ F F	I
I	T Ü Æ H	Y	Æ H F	F Æ G
I	Ü T Ü Æ	Y	Æ F G	F Æ
I	Ü T Ü Æ	Y	Æ F I	F Æ
I	Ü T Ü Æ H	Y	Æ F G	F Æ
I	Ü T Ü Æ H	Y	Æ G	F Æ
J	T Ü Æ	Y	Æ H	Æ I
F €	T Ü Æ	Y	Æ I	F
FF	T Ü Æ	Y	Æ I	I
FG	T Ü Æ	Y	Æ G G	F Æ G
FH	Ü T Ü Æ	Y	Æ F I	F Æ
FI	Ü T Ü Æ	Y	Æ G F	F Æ
F I	Ü T Ü Æ	Y	Æ F I	F Æ
F I	Ü T Ü Æ	Y	Æ F H	F Æ
F I	T Ü Æ	Y	Æ I	Æ I
F I	T Ü Æ	Y	Æ F G	F
F J	T Ü Æ	Y	Æ F F	I
G €	T Ü Æ	Y	Æ F	F Æ G
GF	Ü T Ü Æ	Y	Æ F G	F Æ
GG	Ü T Ü Æ	Y	Æ F I	F Æ
GH	Ü T Ü Æ	Y	Æ F G	F Æ
G	Ü T Ü Æ	Y	Æ G	F Æ
G	Ü T Ü Æ	Y	Æ F I	F
G	T Ü Æ	Y	Æ H G	I Æ G
G	T Ü Æ	Y	Æ F G	H
G	T Ü Æ	Y	Æ F F	I
G J	T Ü Æ H	Y	Æ H F	I Æ I
H €	T Ü Æ	Y	Æ H	I Æ G
HF	T Ü Æ	Y	Æ I	H
HG	T Ü Æ	Y	Æ I	I
HH	T Ü Æ	Y	Æ G G	I Æ I
H	T Ü Æ	Y	Æ I	I Æ G
H	T Ü Æ	Y	Æ F G	H
H	T Ü Æ	Y	Æ F F	I
H	T Ü Æ	Y	Æ F	I Æ I
H	T Ü Æ	Z	Æ F I	Æ I
H U	T Ü Æ	Z	Æ I	F
I €	T Ü Æ	Z	Æ I	I
I F	T Ü Æ H	Z	Æ F I	F Æ G
I G	Ü T Ü Æ	Z	Æ I	F Æ
I H	Ü T Ü Æ	Z	Æ G	F Æ
I I	Ü T Ü Æ H	Z	Æ I	F Æ
I I	Ü T Ü Æ H	Z	Æ I	F Æ
I I	T Ü Æ	Z	Æ F I	Æ I
I I	T Ü Æ	Z	Æ I	F
I I	T Ü Æ	Z	Æ I	I
I J	T Ü Æ	Z	Æ F G	F Æ G
I €	Ü T Ü Æ	Z	Æ G	F Æ
I F	Ü T Ü Æ	Z	Æ F G	F Æ
I G	Ü T Ü Æ	Z	Æ G	F Æ

Ü Ö Ö H Ö Å ^ { ä ^ } Ä I Æ Æ Å Å Å Ö Å æ ä ^ ä Ö { ^ } ö ä I [, } at Ö ä Å ä ä ^ ä é H í at [^ } ö Å ç Å Þ Æ H Ö Å Ü æ ^ Ä I



Q([] a^ K V[, ^/A) * a^ a^ a^ A[[- . . a] a^ e Q & E
 O * a) ^ K R O T
 R a A b { a ^ K V O U A b [e a f i i i e H i H
 T [a ^ A b a ^ K O O C O W b [e e i H i

R a A e G G
 F e H A b
 O @ & ^ a A O K Y P Y



Q([] a^ K V[, ^/A) * a^ a^ a^ A[[- . . a] a^ e Q & E
 O * a) ^ K R O T
 R a A b { a ^ K V O U A b [e a f i i i e H i H
 T [a ^ A b a ^ K O O C O W b [e e i H i

R a A e G G
 F e H A b
 O @ & ^ a A O K Y P Y

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	T ^ (a ^ / A b a ^)	O a ^ & a ^	T a e } a ^ a ^ e e a	S } & a ^ } Z e A a
F	T U E	Y	E F H	E I
G	T U E G	Y	E E I	F
H	T U E G	Y	E E I	I
I	T U E H	Y	E E F G	F E G
I	U T U E G	Y	E E I	F E
I	U T U E H	Y	E E F F	F E
I	U T U E H	Y	E E I	F E
J	T U E	Y	E F I	E I
F E	T U E	Y	E E I	F
FF	T U E	Y	E E I	I
FG	T U E	Y	E F I	F E G
FH	U T U E	Y	E E I	F E
FI	U T U E	Y	E E F F	F E
FI	U T U E	Y	E E I	F E
FI	U T U E	Y	E E I	F E
FI	T U E	Y	E H	E I
FI	T U E	Y	E E I	F
FJ	T U E	Y	E E I	I
G E	T U E	Y	E G	F E G
GF	U T U E	Y	E E I	F E
GG	U T U E	Y	E E I	F E
GH	U T U E	Y	E E I	F E
G	U T U E	Y	E E I	F E
G	U T U E	Y	E F	F
G	T U E	Y	E F H	I E I
G	T U E G	Y	E E I	H
G	T U E G	Y	E E I	I
GJ	T U E H	Y	E E F G	I E I
H E	T U E	Y	E F I	I E I
HF	T U E	Y	E E I	H
HG	T U E	Y	E E I	I
HH	T U E	Y	E F I	I E I
HI	T U E	Y	E E I	H
HI	T U E	Y	E E I	I
HI	T U E	Y	E G	I E I
HI	T U E	Z	E G G	E I
HJ	T U E G	Z	E E J	F
I E	T U E G	Z	E E I	I
IF	T U E H	Z	E G F	F E G
IG	U T U E G	Z	E F I	F E
I H	U T U E G	Z	E F J	F E
II	U T U E H	Z	E F I	F E
II	U T U E H	Z	E F G	F E
II	T U E	Z	E H F	E I
II	T U E	Z	E E J	F
II	T U E	Z	E E I	I
I J	T U E	Z	E G	F E G
I E	U T U E	Z	E F I	F E
I F	U T U E	Z	E F J	F E
I G	U T U E	Z	E F I	F E

U O e H O A ^ . a } A i E e W W O k e a a . a O { ^ } a O [, } a T O a U a a a ^ . a e H i a [^ } a U a c P E U H O A U a e A J

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	T ^ (a ^ / A b a ^)	O a ^ & a ^	T a e } a ^ a ^ e e a	S } & a ^ } Z e A a
I H	U T U E	Z	E F G	F E
II	T U E	Z	E G	E I
II	T U E	Z	E F H	F
II	T U E	Z	E F G	I
II	T U E	Z	E I	F E G
II	U T U E	Z	E F F	F E
I J	U T U E	Z	E F I	F E
I E	U T U E	Z	E F G	F E
I F	U T U E	Z	E E I	F E
I G	U T U E	Z	E F I	F
I H	T U E	Z	E G G	I E I
II	T U E G	Z	E E J	H
II	T U E G	Z	E E I	I
II	T U E H	Z	E G F	I E I
II	T U E	Z	E E J	H
I J	T U E	Z	E E I	I
I E	T U E	Z	E G	I E I
I F	T U E	Z	E G	I E I
I G	T U E	Z	E F H	H
I H	T U E	Z	E F G	I
II	T U E	Z	E I	I E I

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	T ^ (a ^ / A b a ^)	O a ^ & a ^	T a e } a ^ a ^ e e a	S } & a ^ } Z e A a
F	T U E	Z	E F J	E I
G	T U E G	Z	E E J	F
H	T U E G	Z	E E I	I
I	T U E H	Z	E F J	F E G
I	U T U E G	Z	E F G	F E
I	U T U E G	Z	E F I	F E
I	U T U E H	Z	E F H	F E
I	U T U E H	Z	E E I	F E
J	T U E	Z	E G	E I
F E	T U E	Z	E E J	F
FF	T U E	Z	E E I	I
FG	T U E	Z	E G	F E G
FH	U T U E	Z	E F G	F E
FI	U T U E	Z	E F I	F E
FI	U T U E	Z	E F H	F E
FI	U T U E	Z	E E I	F E
FI	T U E	Z	E G	E I
FI	T U E	Z	E E J	F
FJ	T U E	Z	E E I	I
G E	T U E	Z	E G	F E G
GF	U T U E	Z	E F G	F E
GG	U T U E	Z	E F I	F E
GH	U T U E	Z	E F H	F E
G	U T U E	Z	E E I	F E
G	U T U E	Z	E F J	F
G	T U E	Z	E F J	I E I

U O e H O A ^ . a } A i E e W W O k e a a . a O { ^ } a O [, } a T O a U a a a ^ . a e H i a [^ } a U a c P E U H O A U a e A E



Ó((] æ ^ K V[(^ / Å) * ä ^ ä * Å | (- * * ä) æ Þ Æ & Æ
 Ö * a) ^ K RÖT
 R[ä Å ^ (ä ^ K VOÜ Å [Æ F I I I I H H I H
 T[ä ^ Å æ ^ K ÖÖ Ö W Å [Æ é H I

Ræ Å Æ ÖGG
 Fæ F I Å F
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Ó((] æ ^ K V[(^ / Å) * ä ^ ä * Å | (- * * ä) æ Þ Æ & Æ
 Ö * a) ^ K RÖT
 R[ä Å ^ (ä ^ K VOÜ Å [Æ F I I I I H H I H
 T[ä ^ Å æ ^ K ÖÖ Ö W Å [Æ é H I

Ræ Å Æ ÖGG
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 Ö @ & ^ ä Å ^ K V PY

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	T ^ (ä ^ / Å æ ^)	Ö ä ^ & ä)	T æ) æ ä ^ Å Æ É c á	Š & æ) Ž c Ā á
G	T Ü Æ	Z	Æ E J	H
G	T Ü Æ	Z	Æ E I	I
GJ	T Ü Æ H	Z	Æ E F J	I È I
HÆ	T Ü Æ	Z	Æ E G	I È I
HF	T Ü Æ	Z	Æ E J	H
HG	T Ü Æ	Z	Æ E I	I
HH	T Ü Æ	Z	Æ E G	I È I
HI	T Ü Æ	Z	Æ E J	I È I
HÍ	T Ü Æ	Z	Æ E J	H
HĪ	T Ü Æ	Z	Æ E I	I
HĪ	T Ü Æ	Z	Æ E G	I È I

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	T ^ (ä ^ / Å æ ^)	Ö ä ^ & ä)	T æ) æ ä ^ Å Æ É c á	Š & æ) Ž c Ā á
F	T Ü Æ	Y	Æ F H	È I
G	T Ü Æ	Y	Æ E I	F
H	T Ü Æ	Y	Æ E I	I
I	T Ü Æ H	Y	Æ F G	F È I
Í	Ü T Ü Æ	Y	Æ E I	F È
Ī	Ü T Ü Æ	Y	Æ F F	F È
Ī	Ü T Ü Æ H	Y	Æ E I	F È
Ī	Ü T Ü Æ	Y	Æ E I	F È
J	T Ü Æ	Y	Æ H	È I
Æ	T Ü Æ	Y	Æ E I	F
FF	T Ü Æ	Y	Æ E I	I
FG	T Ü Æ	Y	Æ E I	F È I
FH	Ü T Ü Æ	Y	Æ E I	F È
FI	Ü T Ü Æ	Y	Æ E I	F È
FÍ	Ü T Ü Æ	Y	Æ E I	F È
FĪ	T Ü Æ	Y	Æ F I	È I
FĪ	T Ü Æ	Y	Æ E I	F
FJ	T Ü Æ	Y	Æ E I	I
Æ	T Ü Æ	Y	Æ F I	F È I
GF	Ü T Ü Æ	Y	Æ E I	F È
GG	Ü T Ü Æ	Y	Æ F F	F È
GH	Ü T Ü Æ	Y	Æ E I	F È
GĪ	Ü T Ü Æ	Y	Æ E I	F È
GĪ	Ü T Ü Æ	Y	Æ F	F
GĪ	T Ü Æ	Y	Æ F H	I È I
GĪ	T Ü Æ	Y	Æ E I	H
GĪ	T Ü Æ	Y	Æ E I	I
GJ	T Ü Æ H	Y	Æ F G	I È I
HÆ	T Ü Æ	Y	Æ H	I È I
HF	T Ü Æ	Y	Æ E I	H
HG	T Ü Æ	Y	Æ E I	I
HH	T Ü Æ	Y	Æ E G	I È I
HI	T Ü Æ	Y	Æ F I	I È I
HÍ	T Ü Æ	Y	Æ E I	H
HĪ	T Ü Æ	Y	Æ E I	I
HĪ	T Ü Æ	Y	Æ F I	I È I

Ü Ö Ö H Ö Å ^ (ä ^) F I È È WWW Ö K æ ä * ä Ö { ^ } ö ä Ö [,] æ Ö Å Å æ ^ ä é H I æ [^] ö Å ^ Ç P È Ü H Ö Å Ü æ ^ Å F

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	T ^ (ä ^ / Å æ ^)	Ö ä ^ & ä)	T æ) æ ä ^ Å Æ É c á	Š & æ) Ž c Ā á
H	T Ü Æ	Z	Æ E G	È I
HJ	T Ü Æ	Z	Æ E J	F
I €	T Ü Æ	Z	Æ E I	I
IF	T Ü Æ H	Z	Æ E F	F È I
IG	Ü T Ü Æ	Z	Æ F I	F È
IH	Ü T Ü Æ	Z	Æ F J	F È
II	Ü T Ü Æ H	Z	Æ F I	F È
IÍ	Ü T Ü Æ	Z	Æ F G	F È
IĪ	T Ü Æ	Z	Æ G	È I
IĪ	T Ü Æ	Z	Æ F H	F
IĪ	T Ü Æ	Z	Æ F G	I
IJ	T Ü Æ	Z	Æ I	F È I
I €	Ü T Ü Æ	Z	Æ F F	F È
IF	Ü T Ü Æ	Z	Æ F I	F È
IG	Ü T Ü Æ	Z	Æ F G	F È
IH	Ü T Ü Æ	Z	Æ E I	F È
II	T Ü Æ	Z	Æ H F	È I
IÍ	T Ü Æ	Z	Æ E J	F
IĪ	T Ü Æ	Z	Æ E I	I
IĪ	T Ü Æ	Z	Æ G	F È I
IĪ	T Ü Æ	Z	Æ F I	F È
IJ	T Ü Æ	Z	Æ F J	F È
I €	Ü T Ü Æ	Z	Æ F I	F È
IF	Ü T Ü Æ	Z	Æ F G	F È
IG	Ü T Ü Æ	Z	Æ F I	F
IH	T Ü Æ	Z	Æ E G	I È I
II	T Ü Æ	Z	Æ E J	H
IÍ	T Ü Æ	Z	Æ E I	I
IĪ	T Ü Æ H	Z	Æ E F	I È I
IĪ	T Ü Æ	Z	Æ G	I È I
IĪ	T Ü Æ	Z	Æ F H	H
IJ	T Ü Æ	Z	Æ F G	I
I €	T Ü Æ	Z	Æ I	I È I
IF	T Ü Æ	Z	Æ H F	I È I
IG	T Ü Æ	Z	Æ E J	H
IH	T Ü Æ	Z	Æ E I	I
II	T Ü Æ	Z	Æ E I	I È I

A Ya Vyf'Dc]bhi@UXg'f6 @ ' ' . ' '\$ \$ 'K jX'! =ML

	T ^ (ä ^ / Å æ ^)	Ö ä ^ & ä)	T æ) æ ä ^ Å Æ É c á	Š & æ) Ž c Ā á
F	T Ü Æ	Y	Æ E G	È I
G	T Ü Æ	Y	Æ E I	F
H	T Ü Æ	Y	Æ E I	I
I	T Ü Æ H	Y	Æ E F	F È I
Í	Ü T Ü Æ	Y	Æ F F	F È
Ī	Ü T Ü Æ	Y	Æ F I	F È
Ī	Ü T Ü Æ H	Y	Æ F F	F È
Ī	Ü T Ü Æ	Y	Æ E I	F È
J	T Ü Æ	Y	Æ H F	È I
Æ	T Ü Æ	Y	Æ F	F
FF	T Ü Æ	Y	Æ F	I

Ü Ö Ö H Ö Å ^ (ä ^) F I È È WWW Ö K æ ä * ä Ö { ^ } ö ä Ö [,] æ Ö Å Å æ ^ ä é H I æ [^] ö Å ^ Ç P È Ü H Ö Å Ü æ ^ Å G



Q((] a^ O^ a) ^ R[a^ b^ { a^ T[a^ b^ a^ K V[(^ / A) * a^ a^ i^ a^ A U[(^ . . a^) a^ b^ c^ d^ e^ K R O T K V O U A P [b^ a^ f^ i^ i^ i^ e^ H I H K O O C O W P [b^ a^ e^ i^ H I

Ra^ A^ E^ G G F e H A B O @ & ^ a^ A O ^ K Y P Y



Q((] a^ O^ a) ^ R[a^ b^ { a^ T[a^ b^ a^ K V[(^ / A) * a^ a^ i^ a^ A U[(^ . . a^) a^ b^ c^ d^ e^ K R O T K V O U A P [b^ a^ f^ i^ i^ i^ e^ H I H K O O C O W P [b^ a^ e^ i^ H I

Ra^ A^ E^ G G F e H A B O @ & ^ a^ A O ^ K Y P Y

A Ya Vyf'Dc]bhi@UXg'f6 @' (: ' ' \$ ' K jX' ! =ML'f7 cb]bi YXL

Table with 4 columns: T^(a^ / A a^ ^), Oa^&a^), T a^) a^ a^ z^ e^ e^ a^, S' & a^) z^ e^ a^ a^

A Ya Vyf'Dc]bhi@UXg'f6 @' + : ' GY]ga JW@UK'Lt

Table with 4 columns: T^(a^ / A a^ ^), Oa^&a^), T a^) a^ a^ z^ e^ e^ a^, S' & a^) z^ e^ a^ a^

U^ O^ e^ H^ O^ A^ ^ . a^) A^ i^ e^ e^ W^ W^ O^ k^ e^ a^ a^ . a^ O^ & { ^ } . a^ O^ [,] a^ t^ O^ a^ U^ a^ j^ a^ ^ . a^ e^ H^ i^ a^ t^ [^] . a^ U^ a^ c^ P^ E^ U^ H^ O^ A^ U^ a^ e^ A^ i^

A Ya Vyf'Dc]bhi@UXg'f6 @' + : ' GY]ga JW@UK'Lt'f7 cb]bi YXL

Table with 4 columns: T^(a^ / A a^ ^), Oa^&a^), T a^) a^ a^ z^ e^ e^ a^, S' & a^) z^ e^ a^ a^

A Ya Vyf'Dc]bhi@UXg'f6 @' , : ' GY]ga JW@UK'Nt

Table with 4 columns: T^(a^ / A a^ ^), Oa^&a^), T a^) a^ a^ z^ e^ e^ a^, S' & a^) z^ e^ a^ a^

U^ O^ e^ H^ O^ A^ ^ . a^) A^ i^ e^ e^ W^ W^ O^ k^ e^ a^ a^ . a^ O^ & { ^ } . a^ O^ [,] a^ t^ O^ a^ U^ a^ j^ a^ ^ . a^ e^ H^ i^ a^ t^ [^] . a^ U^ a^ c^ P^ E^ U^ H^ O^ A^ U^ a^ e^ A^ i^



Ó((] aþ ' K V[(^!Á) * á ^!á * ÁU[(- * á) aþ ÆQ&É
Ó * a) ^! K RÖT
R[á Áþ ' (á ^! K VÖUÁþ [ÆF[i i i i Æ H I H
T [á ^! Áþ aþ ^ K ÖÖQÖWþ [Æ é H í

Rþ Á ÆGEGG
FæH ÁÐ
Ö @ & ^ á ÁÖ ^ K V PY



Ó((] aþ ' K V[(^!Á) * á ^!á * ÁU[(- * á) aþ ÆQ&É
Ó * a) ^! K RÖT
R[á Áþ ' (á ^! K VÖUÁþ [ÆF[i i i i Æ H I H
T [á ^! Áþ aþ ^ K ÖÖQÖWþ [Æ é H í

Rþ Á ÆGEGG
FæH ÁÐ
Ö @ & ^ á ÁÖ ^ K V PY

A Ya Vyf'8 Jgh]Vi hyX' @ Uxg f6 @ '+' : %&\$ 'K jbx'! Bc =WLF'f' cb]bi YXL

Table with 7 columns: T^ (á ^! Áþ aþ ^), Öá ^ & á), Úcáö Á áþ á ^ Áþ ÆF[i i i i Æ H I H, Ö á Áþ ÆF[i i i i Æ H I H, Úcáö Á áþ á ^ Áþ ÆF[i i i i Æ H I H, Ö á Áþ ÆF[i i i i Æ H I H, Ö á Áþ ÆF[i i i i Æ H I H. Rows include letters F through G.

ÚÖQÖH Ö Á ^! Áþ) Á í Æ é WWW Ö K áþ á ^ á Ö & { ^ } ö á Ö [,] aþ Ö Á U áþ á ^ á é H í aþ [^] Ö Á ^ Áþ ÆF[i i i i Æ H I H Ú á Áþ Á J

A Ya Vyf'8 Jgh]Vi hyX' @ Uxg f6 @ '+' : %&\$ 'K jbx'! Bc =WLF'f' cb]bi YXL

Table with 7 columns: T^ (á ^! Áþ aþ ^), Öá ^ & á), Úcáö Á áþ á ^ Áþ ÆF[i i i i Æ H I H, Ö á Áþ ÆF[i i i i Æ H I H, Úcáö Á áþ á ^ Áþ ÆF[i i i i Æ H I H, Ö á Áþ ÆF[i i i i Æ H I H, Ö á Áþ ÆF[i i i i Æ H I H. Rows include letters I through G.

ÚÖQÖH Ö Á ^! Áþ) Á í Æ é WWW Ö K áþ á ^ á Ö & { ^ } ö á Ö [,] aþ Ö Á U áþ á ^ á é H í aþ [^] Ö Á ^ Áþ ÆF[i i i i Æ H I H Ú á Áþ Á É



Q([a^ O* a) ^: R aA* { a^: T [a^/ a^ ^ K V[, ^/ A) * a^/ a^ * A[(- * a) a^ eQ&E K ROT K VOUp[eFf i i i e H i i H K OOOwB[e e i H i

Ra A eGEGG Fehi Aft O@a^ aAO^ kY PY



Q([a^ O* a) ^: R aA* { a^: T [a^/ a^ ^ K V[, ^/ A) * a^/ a^ * A[(- * a) a^ eQ&E K ROT K VOUp[eFf i i i e H i i H K OOOwB[e e i H i

Ra A eGEGG Fehi Aft O@a^ aAO^ kY PY

A Ya Vyf'8 Jgf]Vi HYX' @ UXg f6 @ - : % \$ ' K jX'! Bc =WLFf' cb]bi YXL

Table with 7 columns: T^ (a^/ a^ ^), Oa^&a), Ucabo^ a^ a^ a^ Z B f f i i e O) a^ a^ a^ a^ Z B f f i i e Ucabo^ (e a^ a^) Z e a^ a^ O) a^ a^ (e a^ a^) Z e a^ a^ a

UOOeHOA^ a^ a^ A i e e A W W O k a a a a^ a^ O { ^ } a^ O i [,) a t O a U a j a^ a^ d e H i a t [^ } O U ^ c P E U H O a U a e A i

A Ya Vyf'8 Jgf]Vi HYX' @ UXg f6 @ - : % \$ ' K jX'! Bc =WLFf' cb]bi YXL

Table with 7 columns: T^ (a^/ a^ ^), Oa^&a), Ucabo^ a^ a^ a^ Z B f f i i e O) a^ a^ a^ a^ Z B f f i i e Ucabo^ (e a^ a^) Z e a^ a^ O) a^ a^ (e a^ a^) Z e a^ a^ a

UOOeHOA^ a^ a^ A i e e A W W O k a a a a^ a^ O { ^ } a^ O i [,) a t O a U a j a^ a^ d e H i a t [^ } O U ^ c P E U H O a U a e A i



Ó{ } ã´ K V[, ^!Á) * ã^!ã * ÁU[-..ã) ã ÞÉÑ&É
Ó^ã) ^! K RÖT
R àÁ´ { ã! K VOÚÁ [ËFÍ IÍÉ HÍH
T[á^!Á ã^ Á K ÓÓÓWÁ [ÈÉ É HÍ

Rå Á ÉGEGG
FÉFI ÁÖF
Ó@&^áÁÖ^ÁV PY



Ó{ } ã´ K V[, ^!Á) * ã^!ã * ÁU[-..ã) ã ÞÉÑ&É
Ó^ã) ^! K RÖT
R àÁ´ { ã! K VOÚÁ [ËFÍ IÍÉ HÍH
T[á^!Á ã^ Á K ÓÓÓWÁ [ÈÉ É HÍ

Rå Á ÉGEGG
FÉFI ÁÖF
Ó@&^áÁÖ^ÁV PY

A Ya VYf 8 JghfVI hYX' @ UXg f6 @ '%. % \$ K JbX'! Bc ÷MLf7 cbHbi YXL

Table with 7 columns: T^ (á^!Á ã^), Öá^&ã), ÚcãóÁ ã) ã á^Z ÉFÍÉ Ö) áÁ ã) ã á^Z ÉFÍÉ, ÚcãóÁ ã) ã á^Z ÉFÍÉ, ÚcãóÁ ã) ã á^Z ÉFÍÉ, ÚcãóÁ ã) ã á^Z ÉFÍÉ, ÚcãóÁ ã) ã á^Z ÉFÍÉ. Rows include IF, IG, IH.

A Ya VYf 8 JghfVI hYX' @ UXg f6 @ '%. &\$ K JbX'! Bc ÷ML

Large table with 7 columns and many rows, including F, G, H, I, J, etc. Columns represent various character combinations and their corresponding values.

ÚÖÉÉÖÁ^!ã) ÁÍ ÈÈ ÁÁÁÁÖKááá ã^ãÖ { ^}ãÖI, } áÖÁ^áã^ã Ë HÍ á [^ } ÖÁ^çÁPEÜHÖÁ Úá^ÁJ

A Ya VYf 8 JghfVI hYX' @ UXg f6 @ '%. &\$ K JbX'! Bc ÷MLf7 cbHbi YXL

Large table with 7 columns and many rows, including I, IG, IH, etc. Columns represent various character combinations and their corresponding values.

ÚÖÉÉÖÁ^!ã) ÁÍ ÈÈ ÁÁÁÁÖKááá ã^ãÖ { ^}ãÖI, } áÖÁ^áã^ã Ë HÍ á [^ } ÖÁ^çÁPEÜHÖÁ Úá^ÁÉ



Ó({]æ^ K V[, ^!Á) *ã^!ã *ÁU[(-..ã) æþ ÊÐ&Ë
Ó^ a } ^! K RÖT
R áÄþ^ { ä^! K VOÜÁþ [ÊÆFI íííÊ HíH
T [ä^! Áþæ ^ K ÖÖQÖWþ [ÊÆ í Hí

Rþ Á ÊÖEGG
FÈFI ÁÖF
Ö@& ^ áÄÖ^ K V PY



Ó({]æ^ K V[, ^!Á) *ã^!ã *ÁU[(-..ã) æþ ÊÐ&Ë
Ó^ a } ^! K RÖT
R áÄþ^ { ä^! K VOÜÁþ [ÊÆFI íííÊ HíH
T [ä^! Áþæ ^ K ÖÖQÖWþ [ÊÆ í Hí

Rþ Á ÊÖEGG
FÈFI ÁÖF
Ö@& ^ áÄÖ^ K V PY

A Ya VYf'8 Jgh]Vi hYX' @ UXg'f6 @ '%. '&\$' K JbX'! Bc :=ML'f7 cbHbi YXL

Table with 7 columns: T^ (ä^! Áþæ ^), Öá^&ö, ÜcöbÖÄ æþ æ á^Z ÐÊÊÖ, Ö) áÄþ æþ æ á^Z ÐÊÊÖ, ÜcöbÖÄ &ö, ŽcÄ á, Ö) áÄþ &ö, ŽcÄ á. Rows include letters J through I with corresponding symbols and values.

A Ya VYf'8 Jgh]Vi hYX' @ UXg'f6 @ '%. '&)' K JbX'! Bc :=ML

T^ (ä^! Áþæ ^) Öá^&ö ÜcöbÖÄ æþ æ á^Z ÐÊÊÖ Ö) áÄþ æþ æ á^Z ÐÊÊÖ ÜcöbÖÄ &ö ŽcÄ á Ö) áÄþ &ö ŽcÄ á
ÜÖÊÊÖ Á^!ã) Áí ÊÊ ÁÁÁÖÖÊÊÊ æ^ aÖ { ^ } aÖ [,) at ÖÁÜ áã ^ aÖ Ê H í at [^] ÖÜ^ç PÊÜHÖÁ Üæ^ Á F

A Ya VYf'8 Jgh]Vi hYX' @ UXg'f6 @ '%. '&)' K JbX'! Bc :=ML'f7 cbHbi YXL

Table with 7 columns: T^ (ä^! Áþæ ^), Öá^&ö, ÜcöbÖÄ æþ æ á^Z ÐÊÊÖ, Ö) áÄþ æþ æ á^Z ÐÊÊÖ, ÜcöbÖÄ &ö, ŽcÄ á, Ö) áÄþ &ö, ŽcÄ á. Rows include letters F through G with corresponding symbols and values.

ÜÖÊÊÖ Á^!ã) Áí ÊÊ ÁÁÁÖÖÊÊÊ æ^ aÖ { ^ } aÖ [,) at ÖÁÜ áã ^ aÖ Ê H í at [^] ÖÜ^ç PÊÜHÖÁ Üæ^ Á G



Ó((] æ ^ Ó * a) ^ ! R á a b ^ { a ^ ! T [a ^ | a b æ ^

Rø Á È Ö G G F E H I Á F Ö @ & ^ á Á Ö K V PY



Ó((] æ ^ Ó * a) ^ ! R á a b ^ { a ^ ! T [a ^ | a b æ ^

Rø Á È Ö G G F E H I Á F Ö @ & ^ á Á Ö K V PY

A Ya Vyf'8 Jgh]Vi HYX' @ UXg f6 @ '% : & \$ K JbX'! Bc =ML'f7 cbHbi YXL

Table with 7 columns: T^ (a ^ | a b æ ^), Ö á ^ & a ^ (), Ú c a b o Á æ (), æ á ^ z B æ f f E Ö á Á æ (), æ á ^ z B æ f f E Ú c a b o Á æ (), Z æ f f á (), Ö á ^ Á æ () Z æ f f á (). Rows include letters I, J, FE, FF, FG, FH, FI, FJ, GE, GF, GG, GH, GI, GJ, HE, HF, HG, HH, HI, HJ, HU, I E, I F, I G, I H, I I, I J, I K, I L, I M, I N, I O, I P, I Q, I R, I S, I T, I U, I V, I W, I X, I Y, I Z.

Ü Ö Ö H Ö Á ^ ! a ^ Á F I È È WWW Ö K a b æ æ * a Ö { ^ } o a Ö [,] a t Ö a U a j a ^ a d È H I a t [^ } Ö Á ç P E U H Ö Á U æ ^ Á I

A Ya Vyf'8 Jgh]Vi HYX' @ UXg f6 @ '% : & \$ K JbX'! Bc =ML'f7 cbHbi YXL

Table with 7 columns: T^ (a ^ | a b æ ^), Ö á ^ & a ^ (), Ú c a b o Á æ (), æ á ^ z B æ f f E Ö á Á æ (), æ á ^ z B æ f f E Ú c a b o Á æ (), Z æ f f á (), Ö á ^ Á æ () Z æ f f á (). Rows include letters I, I E, I F, I G, I H, I I, I J, I K, I L, I M, I N, I O, I P, I Q, I R, I S, I T, I U, I V, I W, I X, I Y, I Z, J E, J F, J G, J H, J I, J J, J K, J L, J M, J N, J O, J P, J Q, J R, J S, J T, J U, J V, J W, J X, J Y, J Z.

Ü Ö Ö H Ö Á ^ ! a ^ Á F I È È WWW Ö K a b æ æ * a Ö { ^ } o a Ö [,] a t Ö a U a j a ^ a d È H I a t [^ } Ö Á ç P E U H Ö Á U æ ^ Á I



Ó((] æ ^ Ó•• a) ^! R á a b ^ { a ^! T [a ^! a b æ ^ K V [, ^! / Á) * á ^! a * Á U [(- • • á) æ Þ É Ø & É K R Ö T K V Ö U Á Þ [É æ F I I I I É H I I H K Ö Ö Ö Ö W Þ [É æ É H I

Ræ Á É Ø G G F æ F I Á Ö F Ö @ & ^ a Á Ö K V PY



Ó((] æ ^ Ó•• a) ^! R á a b ^ { a ^! T [a ^! a b æ ^ K V [, ^! / Á) * á ^! a * Á U [(- • • á) æ Þ É Ø & É K R Ö T K V Ö U Á Þ [É æ F I I I I É H I I H K Ö Ö Ö Ö W Þ [É æ É H I

Ræ Á É Ø G G F æ F I Á Ö F Ö @ & ^ a Á Ö K V PY

A Ya Vyf'8 Jgh]Vi hyX' @ UXg f6 @ '% : ' '\$\$ K JbX'! Bc =ML'f7 cb]bi YXL

Table with 7 columns: T ^ (a ^! a b æ ^, Ö a ^ & c ä, Ú c a b o A æ) æ a ^ Z É æ F I I I I É H I I H, Ö) a ^ Á Ö K V, Ú c a b o F I I I I É H I I H, Ú c a b o F I I I I É H I I H, Ú c a b o F I I I I É H I I H, Ú c a b o F I I I I É H I I H. Rows include codes like JG, JH, JI, etc.

Ú Ö Ö É Ö Á ^! a * á) Á F I I I I É H I I H æ a • a Ö { ^ } a Ö I [,) a t Ö a U a] a æ a • a É H I I a t [^] Ö U ^ c P É U H Ö Á Ú a • a Á F

A Ya Vyf'8 Jgh]Vi hyX' @ UXg f6 @ '% : ' '\$\$ K JbX'! Bc =ML'f7 cb]bi YXL

Table with 7 columns: T ^ (a ^! a b æ ^, Ö a ^ & c ä, Ú c a b o A æ) æ a ^ Z É æ F I I I I É H I I H, Ö) a ^ Á Ö K V, Ú c a b o F I I I I É H I I H, Ú c a b o F I I I I É H I I H, Ú c a b o F I I I I É H I I H, Ú c a b o F I I I I É H I I H, Ú c a b o F I I I I É H I I H. Rows include codes like FI I, FI I, FI I.

A Ya Vyf'8 Jgh]Vi hyX' @ UXg f6 @ '% : ' '% K JbX'! Bc =ML

Table with 7 columns: T ^ (a ^! a b æ ^, Ö a ^ & c ä, Ú c a b o A æ) æ a ^ Z É æ F I I I I É H I I H, Ö) a ^ Á Ö K V, Ú c a b o F I I I I É H I I H, Ú c a b o F I I I I É H I I H, Ú c a b o F I I I I É H I I H, Ú c a b o F I I I I É H I I H, Ú c a b o F I I I I É H I I H. Rows include codes like F, G, H, I, etc.

Ú Ö Ö É Ö Á ^! a * á) Á F I I I I É H I I H æ a • a Ö { ^ } a Ö I [,) a t Ö a U a] a æ a • a É H I I a t [^] Ö U ^ c P É U H Ö Á Ú a • a Á G



Ó () ã } K V [, () * ä Å ï * Á [(* * *) ã } ð Ò & Ë
 Ò * ä } Á : K R Ö T
 R ä Å } (ä : K V Ö U Å P [ä Å F i i i i i H I H
 T [ä Å } ä Å ^ K Ö Ö Ö W Å P [ä Å é H i

Re Å E G G
 Fe Fi Å F
 Ö @ & ^ ä Å Ö P Y



Ó () ã } K V [, () * ä Å ï * Á [(* * *) ã } ð Ò & Ë
 Ò * ä } Á : K R Ö T
 R ä Å } (ä : K V Ö U Å P [ä Å F i i i i i H I H
 T [ä Å } ä Å ^ K Ö Ö Ö W Å P [ä Å é H i

Re Å E G G
 Fe Fi Å F
 Ö @ & ^ ä Å Ö P Y

A Ya Vyf 8 Jgh I Vi nyx @ Uxg r6 @ '% : ' ' \$ K JbX! Bc =MLFf cbljbi YXL

T^ (a n S a a n)	Oä ^ & a j)	U c a o t a e s } ä a ^ z ð e f f e Ö) a Å e s } ä a ^ z ð e f f e U c a o t e j & e e j) Z e f Ä á	Ö) a Å e s } ä a ^ z ð e f f e U c a o t e j & e e j) Z e f Ä á	U c a o t e j & e e j) Z e f Ä á	U c a o t e j & e e j) Z e f Ä á	U c a o t e j & e e j) Z e f Ä á	U c a o t e j & e e j) Z e f Ä á
Fé	T ÜÉ	Z	€	€	€	€	€
Fé	T ÜH	Z	€	€	€	€	€
Fé	T ÜE	Z	€	€	€	€	€
Fé	T ÜÉ	Z	€	€	€	€	€
FEJ	T ÜE	Z	€	€	€	€	€
FFE	T ÜE	Z	€	€	€	€	€
FFF	T ÜE	Z	€	€	€	€	€
FFG	T ÜE	Z	€	€	€	€	€
FFH	T I G	Z	€	€	€	€	€
FFI	T I H	Z	€	€	€	€	€
FFI	T I I	Z	€	€	€	€	€
FFI	Ü Ö F	Z	€	€	€	€	€
FFI	Ü Ö G	Z	€	€	€	€	€
FFI	Ü Ö H	Z	€	€	€	€	€
FFJ	Ü Ö P	Z	€	€	€	€	€
FOE	Ü Ö X F	Z	€	€	€	€	€
FOF	Ü Ö X G	Z	€	€	€	€	€
FOG	Ü Ö X H	Z	€	€	€	€	€
FOH	Ü Ö X I	Z	€	€	€	€	€
FOI	Ü Ö X J	Z	€	€	€	€	€
FOJ	Ü Ö P P	Z	€	€	€	€	€
FOJ	Ü Ö X F	Z	€	€	€	€	€
FOJ	Ü Ö X G	Z	€	€	€	€	€
FOJ	Ü Ö X H	Z	€	€	€	€	€
FHE	Ü Ö X I	Z	€	€	€	€	€
FHF	Ü Ö X J	Z	€	€	€	€	€
FHG	Ü Ö X I	Z	€	€	€	€	€
FHH	Ü Ö P	Z	€	€	€	€	€
FH	Ü Ö X F	Z	€	€	€	€	€
FH	Ü Ö X G	Z	€	€	€	€	€
FH	Ü Ö X H	Z	€	€	€	€	€
FH	Ü Ö X I	Z	€	€	€	€	€
FH	Ü Ö X J	Z	€	€	€	€	€
FHJ	Ü Ö X I	Z	€	€	€	€	€
FI	Ü T Ü H	Z	€	€	€	€	€
FI	Ü T Ü E	Z	€	€	€	€	€
FI	Ü T Ü G	Z	€	€	€	€	€
FI	Ü T Ü H	Z	€	€	€	€	€
FI	Ü T Ü E	Z	€	€	€	€	€
FI	Ü T Ü H	Z	€	€	€	€	€

A Ya Vyf 8 Jgh I Vi nyx @ Uxg r6 @ '% : =W K Y J | H

T^ (a n S a a n)	Oä ^ & a j)	U c a o t a e s } ä a ^ z ð e f f e Ö) a Å e s } ä a ^ z ð e f f e U c a o t e j & e e j) Z e f Ä á	Ö) a Å e s } ä a ^ z ð e f f e U c a o t e j & e e j) Z e f Ä á	U c a o t e j & e e j) Z e f Ä á	U c a o t e j & e e j) Z e f Ä á	U c a o t e j & e e j) Z e f Ä á	U c a o t e j & e e j) Z e f Ä á
F	Ü Ö F	Y	€	€	€	€	€
G	Ü Ö G	Y	€	€	€	€	€
H	Ü Ö H	Y	€	€	€	€	€
I	Ü Ö I	Y	€	€	€	€	€
I	Ü Ö F	Y	€	€	€	€	€
I	Ü Ö G	Y	€	€	€	€	€

Ü Ö Ö H Ö Å ^ (ä) Å i E E A W W Ö O K e e e ä * ä Ö { ^ } ö ä Ö [,] a t O ä U ä j ä ^ * ä é H i a t [^ } ö Å ^ ç P E U H Ö Ä U ä ^ Å I

A Ya Vyf 8 Jgh I Vi nyx @ Uxg r6 @ '% : =W K Y J | H

T^ (a n S a a n)	Oä ^ & a j)	U c a o t a e s } ä a ^ z ð e f f e Ö) a Å e s } ä a ^ z ð e f f e U c a o t e j & e e j) Z e f Ä á	Ö) a Å e s } ä a ^ z ð e f f e U c a o t e j & e e j) Z e f Ä á	U c a o t e j & e e j) Z e f Ä á	U c a o t e j & e e j) Z e f Ä á	U c a o t e j & e e j) Z e f Ä á	U c a o t e j & e e j) Z e f Ä á
I	Ü Ö F E H	Y	€	€	€	€	€
I	Ü Ö F E I	Y	€	€	€	€	€
J	Ü Ö G E F	Y	€	€	€	€	€
FE	Ü Ö G E G	Y	€	€	€	€	€
FF	Ü Ö G E H	Y	€	€	€	€	€
FG	Ü Ö G E I	Y	€	€	€	€	€
FH	Ü Ö F E P	Y	€	€	€	€	€
FI	Ü Ö F E Q	Y	€	€	€	€	€
FI	Ü Ö F E R	Y	€	€	€	€	€
FI	Ü Ö F E S	Y	€	€	€	€	€
FI	Ü Ö F E T	Y	€	€	€	€	€
FI	Ü Ö F E U	Y	€	€	€	€	€
FI	Ü Ö F E V	Y	€	€	€	€	€
FI	Ü Ö F E W	Y	€	€	€	€	€
FJ	Ü Ö F E X	Y	€	€	€	€	€
GE	Ü Ö G E P	Y	€	€	€	€	€
GF	Ü Ö G E Q	Y	€	€	€	€	€
GG	Ü Ö G E R	Y	€	€	€	€	€
GH	Ü Ö G E S	Y	€	€	€	€	€
G	Ü Ö V F	Y	€	€	€	€	€
G	Ü Ö V G	Y	€	€	€	€	€
G	Ü Ö V H	Y	€	€	€	€	€
G	Ü Ö V I	Y	€	€	€	€	€
GJ	Ü Ö V J	Y	€	€	€	€	€
HE	Ü Ö H E	Y	€	€	€	€	€
HF	Ü Ö H F	Y	€	€	€	€	€
HG	Ü Ö H G	Y	€	€	€	€	€
HH	Ü Ö H H	Y	€	€	€	€	€
HI	Ü Ö H I	Y	€	€	€	€	€
HI	Ü Ö H J	Y	€	€	€	€	€
HI	Ü Ö H K	Y	€	€	€	€	€
HI	Ü Ö H L	Y	€	€	€	€	€
HJ	Ü Ö H M	Y	€	€	€	€	€
I	Ü Ö F E	Y	€	€	€	€	€
I	Ü Ö G E	Y	€	€	€	€	€
I	Ü Ö H E	Y	€	€	€	€	€
I	Ü Ö H F	Y	€	€	€	€	€
I	Ü Ö H G	Y	€	€	€	€	€
I	Ü Ö H H	Y	€	€	€	€	€
I	Ü Ö H I	Y	€	€	€	€	€
I	Ü Ö H J	Y	€	€	€	€	€
I	Ü Ö H K	Y	€	€	€	€	€
I	Ü Ö H L	Y	€	€	€	€	€
I	Ü Ö H M	Y	€	€	€	€	€
I	Ü Ö H N	Y	€	€	€	€	€
I	Ü Ö H O	Y	€	€	€	€	€
I	Ü Ö H P	Y	€	€	€	€	€
I	Ü Ö H Q	Y	€	€	€	€	€
I	Ü Ö H R	Y	€	€	€	€	€
I	Ü Ö H S	Y	€	€	€	€	€
I	Ü Ö H T	Y	€	€	€	€	€
I	Ü Ö H U	Y	€	€	€	€	€
I	Ü Ö H V	Y	€	€	€	€	€
I	Ü Ö H W	Y	€	€	€	€	€
I	Ü Ö H X	Y	€	€	€	€	€
I	Ü Ö H Y	Y	€	€	€	€	€
I	Ü Ö H Z	Y	€	€	€	€	€

Ü Ö Ö H Ö Å ^ (ä) Å i E E A W W Ö O K e e e ä * ä Ö { ^ } ö ä Ö [,] a t O ä U ä j ä ^ * ä é H i a t [^ } ö Å ^ ç P E U H Ö Ä U ä ^ Å I



Ó((] æ ^ Ó * a) ^ : R á Á b ^ { á : T [á \ Á æ ^ K V [, ^ (Á) * á ^ Á : (- * á) æ Þ É Ø & É K R Ö T K V Ö Ú Á Þ [É Á F I I I I É H I I H K Ö Ö Ö W Á Þ [É Á É H I I

Ræ Á É Ø G G F E H I Á Ö T Ö @ & ^ á Á Ö K V PY



Ó((] æ ^ Ó * a) ^ : R á Á b ^ { á : T [á \ Á æ ^ K V [, ^ (Á) * á ^ Á : (- * á) æ Þ É Ø & É K R Ö T K V Ö Ú Á Þ [É Á F I I I I É H I I H K Ö Ö Ö W Á Þ [É Á É H I I

Ræ Á É Ø G G F E H I Á Ö T Ö @ & ^ á Á Ö K V PY

A Ya VYf'8 Jgh]Vi HYX' @ UXg'f6 @ ' % : ' \$ WK YJ \ H:ff' c bh]bi YXL

Table with 7 columns: T^ (á \ Á æ ^), Ö á ^ & á , Ú c a b Á æ Þ [É Á F I I I I É H I I Ö á Á b ^ { á : T [á \ Á æ ^ , Ö á Á b ^ { á : T [á \ Á æ ^ , Ú c a b Á æ Þ [É Á F I I I I É H I I , Ú c a b Á æ Þ [É Á F I I I I É H I I , Ö á Á b ^ { á : T [á \ Á æ ^ . Rows include letters I, J, E, F, G, H, I, L, O, P, Q, R, S, T, U, V, W, X, Y, Z.

A Ya VYf'8 Jgh]Vi HYX' @ UXg'f6 @ ' % : ' \$ K]bX'! =WZ

Table with 7 columns: T^ (á \ Á æ ^), Ö á ^ & á , Ú c a b Á æ Þ [É Á F I I I I É H I I Ö á Á b ^ { á : T [á \ Á æ ^ , Ö á Á b ^ { á : T [á \ Á æ ^ , Ú c a b Á æ Þ [É Á F I I I I É H I I , Ú c a b Á æ Þ [É Á F I I I I É H I I , Ö á Á b ^ { á : T [á \ Á æ ^ . Rows include letters F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z.

Ú Ö Ö É Ö Á ^ (á) Á F I I I I É H I I Ö á Á b ^ { á : T [á \ Á æ ^ , Ö á Á b ^ { á : T [á \ Á æ ^ , Ú c a b Á æ Þ [É Á F I I I I É H I I Ö á Á b ^ { á : T [á \ Á æ ^ , Ö á Á b ^ { á : T [á \ Á æ ^ , Ú c a b Á æ Þ [É Á F I I I I É H I I , Ú c a b Á æ Þ [É Á F I I I I É H I I , Ö á Á b ^ { á : T [á \ Á æ ^

A Ya VYf'8 Jgh]Vi HYX' @ UXg'f6 @ ' % : ' \$ K]bX'! =WZ

Table with 7 columns: T^ (á \ Á æ ^), Ö á ^ & á , Ú c a b Á æ Þ [É Á F I I I I É H I I Ö á Á b ^ { á : T [á \ Á æ ^ , Ö á Á b ^ { á : T [á \ Á æ ^ , Ú c a b Á æ Þ [É Á F I I I I É H I I , Ú c a b Á æ Þ [É Á F I I I I É H I I , Ö á Á b ^ { á : T [á \ Á æ ^ . Rows include letters H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z.

A Ya VYf'8 Jgh]Vi HYX' @ UXg'f6 @ ' & \$: ' \$ K]bX'! =WZ

Table with 7 columns: T^ (á \ Á æ ^), Ö á ^ & á , Ú c a b Á æ Þ [É Á F I I I I É H I I Ö á Á b ^ { á : T [á \ Á æ ^ , Ö á Á b ^ { á : T [á \ Á æ ^ , Ú c a b Á æ Þ [É Á F I I I I É H I I , Ú c a b Á æ Þ [É Á F I I I I É H I I , Ö á Á b ^ { á : T [á \ Á æ ^ . Rows include letters F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z.

Ú Ö Ö É Ö Á ^ (á) Á F I I I I É H I I Ö á Á b ^ { á : T [á \ Á æ ^ , Ö á Á b ^ { á : T [á \ Á æ ^ , Ú c a b Á æ Þ [É Á F I I I I É H I I Ö á Á b ^ { á : T [á \ Á æ ^ , Ö á Á b ^ { á : T [á \ Á æ ^ , Ú c a b Á æ Þ [É Á F I I I I É H I I , Ú c a b Á æ Þ [É Á F I I I I É H I I , Ö á Á b ^ { á : T [á \ Á æ ^



Ó((] aþ´ K V[, ^! /Á) * á ^! a * ÁU[(- * . á) aþ ÆQ&É
Ó * . a) ^! K RÖT
R[á Áþ´ (á ^! K VÖUÁþ[ÆF[i i i i i H I I H
T[á ^! Áþ aþ ^ K ÖÖQÖWþ[Æ é H I i

Rþ Á ÆQ&É
F&F Á ÁF
Ö @ & ^ á Á Ö Þ Y



Ó((] aþ´ K V[, ^! /Á) * á ^! a * ÁU[(- * . á) aþ ÆQ&É
Ó * . a) ^! K RÖT
R[á Áþ´ (á ^! K VÖUÁþ[ÆF[i i i i i H I I H
T[á ^! Áþ aþ ^ K ÖÖQÖWþ[Æ é H I i

Rþ Á ÆQ&É
F&F Á ÁF
Ö @ & ^ á Á Ö Þ Y

A Ya VYf'8 Jgh]Vi hYX' @ UXg f6 @ ' & \$. ' \$ ' K j b X' ! =ML' f' cbh]bi YXL

Table with 7 columns: T^ (á ^! Áþ aþ ^), Öá ^ & á), Úcabo Á aþ) aþ á ^ Z ÆF[i i i i i Ö) á ÁF aþ) aþ á ^ Z ÆF[i i i i i Úcabo Á aþ) aþ á ^ Z ÆF[i i i i i Z&Fá á Ö) á ÁF aþ) aþ á ^ Z ÆF[i i i i i Z&Fá á

A Ya VYf'8 Jgh]Vi hYX' @ UXg f6 @ ' & % . () ' K j b X' ! =ML' f' cbh]bi YXL

Table with 7 columns: T^ (á ^! Áþ aþ ^), Öá ^ & á), Úcabo Á aþ) aþ á ^ Z ÆF[i i i i i Ö) á ÁF aþ) aþ á ^ Z ÆF[i i i i i Úcabo Á aþ) aþ á ^ Z ÆF[i i i i i Z&Fá á Ö) á ÁF aþ) aþ á ^ Z ÆF[i i i i i Z&Fá á

ÚÖQ&É Ö Á ^! . á) ÁF i i i i i Ö Á Áþ aþ ^ á) aþ á ^ Z ÆF[i i i i i Ö) á ÁF aþ) aþ á ^ Z ÆF[i i i i i Úcabo Á aþ) aþ á ^ Z ÆF[i i i i i Z&Fá á Ö) á ÁF aþ) aþ á ^ Z ÆF[i i i i i Z&Fá á

A Ya VYf'8 Jgh]Vi hYX' @ UXg f6 @ ' & % . () ' K j b X' ! =ML' f' cbh]bi YXL

Table with 7 columns: T^ (á ^! Áþ aþ ^), Öá ^ & á), Úcabo Á aþ) aþ á ^ Z ÆF[i i i i i Ö) á ÁF aþ) aþ á ^ Z ÆF[i i i i i Úcabo Á aþ) aþ á ^ Z ÆF[i i i i i Z&Fá á Ö) á ÁF aþ) aþ á ^ Z ÆF[i i i i i Z&Fá á

ÚÖQ&É Ö Á ^! . á) ÁF i i i i i Ö Á Áþ aþ ^ á) aþ á ^ Z ÆF[i i i i i Ö) á ÁF aþ) aþ á ^ Z ÆF[i i i i i Úcabo Á aþ) aþ á ^ Z ÆF[i i i i i Z&Fá á Ö) á ÁF aþ) aþ á ^ Z ÆF[i i i i i Z&Fá á



Q([] a ^ K V [, ^ / A) * a ^ i a * A U [(- . * a) a p e Q & E
O * a) ^ : K R O T
R a A p { a ^ : K V O U A p [e a f i i i e H i i H
T [a ^ / a a e ^ K O O Q O W b [e a e i H i

R a ^ A e G E G G
F e H i A T
O @ & ^ a A O ^ K V P Y



Q([] a ^ K V [, ^ / A) * a ^ i a * A U [(- . * a) a p e Q & E
O * a) ^ : K R O T
R a A p { a ^ : K V O U A p [e a f i i i e H i i H
T [a ^ / a a e ^ K O O Q O W b [e a e i H i

R a ^ A e G E G G
F e H i A T
O @ & ^ a A O ^ K V P Y

A Ya Vyf'8 Jgh]Vi HYX' @ UXg'f6 @ ' & : '% \$ ' K JbX' ! =WL'f' cbh]bi YXL

Table with 7 columns: T ^ (a ^ / a a e ^) , O a ^ & a) , U c a b o A e s) a e a ^ z B e f f e O) a A e s) a e a ^ z B e f f e U c a b o A e s) a e a ^ z B e f f e) Z e f A a , O) a A e s) a e a ^ z B e f f e) Z e f A a. Rows include codes like FEI, FEJ, FFE, FFG, FFH, etc.

A Ya Vyf'8 Jgh]Vi HYX' @ UXg'f6 @ ' & : '%) ' K JbX' ! =WL

Table with 7 columns: T ^ (a ^ / a a e ^) , O a ^ & a) , U c a b o A e s) a e a ^ z B e f f e O) a A e s) a e a ^ z B e f f e U c a b o A e s) a e a ^ z B e f f e) Z e f A a , O) a A e s) a e a ^ z B e f f e) Z e f A a. Rows include codes like F, G, H, I, J, etc.

U O Q E H O A ^ : a) A i e e A W W O K e a a a e a O & { ^ } a O [, } a t O e U a j a ^ a e i H i a t [^ } a U ^ c P E U H O A U a e A F H

A Ya Vyf'8 Jgh]Vi HYX' @ UXg'f6 @ ' & : '%) ' K JbX' ! =WL'f' cbh]bi YXL

Table with 7 columns: T ^ (a ^ / a a e ^) , O a ^ & a) , U c a b o A e s) a e a ^ z B e f f e O) a A e s) a e a ^ z B e f f e U c a b o A e s) a e a ^ z B e f f e) Z e f A a , O) a A e s) a e a ^ z B e f f e) Z e f A a. Rows include codes like I, J, FE, FF, FG, FH, FI, FJ, etc.

U O Q E H O A ^ : a) A i e e A W W O K e a a a e a O & { ^ } a O [, } a t O e U a j a ^ a e i H i a t [^ } a U ^ c P E U H O A U a e A F I



Ó((]æ´ K V[(^/Á) * á^/á * ÁU[(- * * á) æþ ÆQ&É
Ó^ * á) ^/ K RÖT
R á^ * (á^/ K VÖUÁþ [ÆF I I I I Æ H I I H
T [á^/ á^ æ ^ K ÖÖQÖWþ [Æ é H í

Ræ Á ÆGEGG
FæFI ÁÆP
Ö @ & ^ á^ Ö K Y PY



Ó((]æ´ K V[(^/Á) * á^/á * ÁU[(- * * á) æþ ÆQ&É
Ó^ * á) ^/ K RÖT
R á^ * (á^/ K VÖUÁþ [ÆF I I I I Æ H I I H
T [á^/ á^ æ ^ K ÖÖQÖWþ [Æ é H í

Ræ Á ÆGEGG
FæFI ÁÆP
Ö @ & ^ á^ Ö K Y PY

A Ya VYf'8 Jgh]Vi HYX' @ UXg'f6 @' & : %) 'K JbX'!' =WZ'f7 cbh]bi YXL

Table with 7 columns: T^ (á^/ á^ æ ^), Öá^ & á), ÚcáöÁ æ) æ á^ Z Æ F I I, Ö á^ Á æ) æ á^ Z Æ F I I, ÚcáöÁ æ) æ á^ Z Æ F I I, ÚcáöÁ æ) æ á^ Z Æ F I I, ÚcáöÁ æ) æ á^ Z Æ F I I, ÚcáöÁ æ) æ á^ Z Æ F I I. Rows include codes like ÍÉ, ÍF, ÍG, ÍH, ÍI, ÍJ, etc.

A Ya VYf'8 Jgh]Vi HYX' @ UXg'f6 @' & : %) 'K JbX'!' =WZ'f7 cbh]bi YXL

Table with 7 columns: T^ (á^/ á^ æ ^), Öá^ & á), ÚcáöÁ æ) æ á^ Z Æ F I I, Ö á^ Á æ) æ á^ Z Æ F I I, ÚcáöÁ æ) æ á^ Z Æ F I I, ÚcáöÁ æ) æ á^ Z Æ F I I, ÚcáöÁ æ) æ á^ Z Æ F I I. Rows include codes like FFG, FFH, FFJ, FFI, etc.

A Ya VYf'8 Jgh]Vi HYX' @ UXg'f6 @' & : %) 'K JbX'!' =WZ

Table with 7 columns: T^ (á^/ á^ æ ^), Öá^ & á), ÚcáöÁ æ) æ á^ Z Æ F I I, Ö á^ Á æ) æ á^ Z Æ F I I, ÚcáöÁ æ) æ á^ Z Æ F I I, ÚcáöÁ æ) æ á^ Z Æ F I I, ÚcáöÁ æ) æ á^ Z Æ F I I. Rows include codes like F, G, H, I, J, etc.

ÚÖQ&HÖÁ^/á) ÁF I Æ Æ WWWÖK&áæ á^ * á^ & { ^ } * á^ Ö I [,] at Öá^/á^ á^ * á^ é H í at [^] Ö Á^ ç P Æ U H Ö Á Ú æ ^ Á F I

ÚÖQ&HÖÁ^/á) ÁF I Æ Æ WWWÖK&áæ á^ * á^ & { ^ } * á^ Ö I [,] at Öá^/á^ á^ * á^ é H í at [^] Ö Á^ ç P Æ U H Ö Á Ú æ ^ Á F I



Ó([æ ^ Ö * a) ^ K V [^ (/ Ö) * ä ^ (ä * Ä U [(- * * ä) æ Þ Æ Ö & Æ
Ö * a) ^ K R Ö T
R ä Ä Þ { ä ^ K V Ö U Ä Þ [Æ F I I I I I H I I H
T [ä ^ (/ ä æ ^ K Ö Ö Ö W Þ [Æ é H I I

Rä Ä Ö Ö G G
F e H I Ä Ö F
Ö @ & ^ ä Ä Ö H V P Y



Ó([æ ^ Ö * a) ^ K V [^ (/ Ö) * ä ^ (ä * Ä U [(- * * ä) æ Þ Æ Ö & Æ
Ö * a) ^ K R Ö T
R ä Ä Þ { ä ^ K V Ö U Ä Þ [Æ F I I I I I H I I H
T [ä ^ (/ ä æ ^ K Ö Ö Ö W Þ [Æ é H I I

Rä Ä Ö Ö G G
F e H I Ä Ö F
Ö @ & ^ ä Ä Ö H V P Y

A Ya VYf'8 Jgh]Vi HYX' @ UXg f6 @ ' & * . % \$ K JbX' I =WZ'ff cbh]bi YXL

Table with 7 columns: T^ (ä ^ (/ ä æ ^), Ö ä ^ & ä), Ü c a b o Ä æ) æ ä ^ Z B ä ä Ö) ä Ä æ) æ ä ^ Z B ä ä Ö Ü c a b o Ä æ) Z ä Ä ä Ö) ä Ä æ) Z ä Ä ä. Rows include codes like FF, FG, FH, FI, etc. with values in € and 'Ä FEE'.

A Ya VYf'8 Jgh]Vi HYX' @ UXg f6 @ ' & * . % \$ K JbX' I =WZ

Table with 7 columns: T^ (ä ^ (/ ä æ ^), Ö ä ^ & ä), Ü c a b o Ä æ) æ ä ^ Z B ä ä Ö) ä Ä æ) æ ä ^ Z B ä ä Ö Ü c a b o Ä æ) Z ä Ä ä Ö) ä Ä æ) Z ä Ä ä. Rows include codes like F, G, H, I, J, etc. with values in € and 'Ä FEE'.

Ü Ö Ö H Ö Ä ^ (ä) Ä I Æ Æ WWW Ö Ö ä ä ä ä & { ^) ö ä Ö [,] æ Ö Ä U ä ä ä ä ä ä ä ä ä ä H I ä [^) Ö U ^ ç P E U H Ö Ä U ä ä Ä F J

A Ya VYf'8 Jgh]Vi HYX' @ UXg f6 @ ' & * . % \$ K JbX' I =WZ'ff cbh]bi YXL

Table with 7 columns: T^ (ä ^ (/ ä æ ^), Ö ä ^ & ä), Ü c a b o Ä æ) æ ä ^ Z B ä ä Ö) ä Ä æ) æ ä ^ Z B ä ä Ö Ü c a b o Ä æ) Z ä Ä ä Ö) ä Ä æ) Z ä Ä ä. Rows include codes like GE, GF, GG, GH, GI, etc. with values in € and 'Ä FEE'.

Ü Ö Ö H Ö Ä ^ (ä) Ä I Æ Æ WWW Ö Ö ä ä ä ä & { ^) ö ä Ö [,] æ Ö Ä U ä ä ä ä ä ä ä ä ä ä H I ä [^) Ö U ^ ç P E U H Ö Ä U ä ä Ä F G E



Ó((]æ´ K V[(^/Á) *ã^/ã *ÁU[(-••ã) æþ ÆQ&É
 Ó••ã) ^/ K RÖT
 R áÄ´(ä^/ K VOÜÄ[ÆF I I I I I H I I H
 T[ä^/Äæ ^ K ÖÖQÖWþ[Æ é H I

Rþ Á ÆGEGG
 FEFÄ ÄF
 Ö@&^áÄ´ÄV PY



Ó((]æ´ K V[(^/Á) *ã^/ã *ÁU[(-••ã) æþ ÆQ&É
 Ó••ã) ^/ K RÖT
 R áÄ´(ä^/ K VOÜÄ[ÆF I I I I I H I I H
 T[ä^/Äæ ^ K ÖÖQÖWþ[Æ é H I

Rþ Á ÆGEGG
 FEFÄ ÄF
 Ö@&^áÄ´ÄV PY

A Ya VYf'8 Jgh]Vi HYX' @ UXg f6 @ ' &+ : % \$ 'K JbX'! =WZ'f7 cbh]bi YXL

T^(ä^/Äæ ^)	Öá^&ä)	ÜcöbÄ æ) æ ä^Z ÆfH Ö) äÄ æ) æ ä^Z ÆfH ÜcöbÄ (&æ) ZcÄ á	Ö) äÄ (&æ) ZcÄ á
IG	ÜT ÜË	ÆEG	Ä FEE
IH	ÜT ÜË	ÆEG	Ä FEE

A Ya VYf'8 Jgh]Vi HYX' @ UXg f6 @ ' & : % \$ 'K JbX'! =WZ

T^(ä^/Äæ ^)	Öá^&ä)	ÜcöbÄ æ) æ ä^Z ÆfH Ö) äÄ æ) æ ä^Z ÆfH ÜcöbÄ (&æ) ZcÄ á	Ö) äÄ (&æ) ZcÄ á
F	ÖÖÖF	ÆEH	Ä FEE
G	ÖÖÖG	ÆEH	Ä FEE
H	ÖÖÖH	ÆEH	Ä FEE
I	ÖÖÖI	ÆEH	Ä FEE
Í	ÜÖFÖF	ÆEH	Ä FEE
Î	ÜÖFÖG	ÆEH	Ä FEE
Ï	ÜÖFÖH	ÆEH	Ä FEE
Ì	ÜÖFÖI	ÆEH	Ä FEE
J	ÜÖGÖF	ÆEH	Ä FEE
KE	ÜÖGÖG	ÆEH	Ä FEE
FF	ÜÖGÖH	ÆEH	Ä FEE
FG	ÜÖGÖI	ÆEH	Ä FEE
FH	ÖÖÖP	ÆEÍ	Ä FEE
FI	ÜÖFÖP	ÆEÍ	Ä FEE
FÍ	ÜÖGÖP	ÆEÍ	Ä FEE
FÏ	ÖÖÖP	ÆEÍ	Ä FEE
FÌ	ÜÖFÖP	ÆEÍ	Ä FEE
FJ	ÖÜÖ	ÆEÍ	Ä FEE
GE	ÖÜÖ	ÆEÍ	Ä FEE
GF	ÖÜÖ	ÆEÍ	Ä FEE
GG	ÖÜÖ	ÆEÍ	Ä FEE
GH	ÖÜÖ	ÆEÍ	Ä FEE
GI	ÖÜÖ	ÆEÍ	Ä FEE
GÍ	ÖVF	ÆEF	Ä FEE
GÏ	ÖVG	ÆEF	Ä FEE
GÌ	ÖVH	ÆEH	Ä FEE
GÍ	ÖVI	ÆEH	Ä FEE
GJ	ÖVÍ	ÆEG	Ä FEE
HE	ÖVÍ	ÆEG	Ä FEE
HF	T ÜË	ÆEG	Ä FEE
HG	T ÜË	ÆEG	Ä FEE
HH	T ÜË	ÆEG	Ä FEE
HI	T ÜË	ÆEG	Ä FEE
HÍ	T ÜË	ÆEG	Ä FEE
HÏ	T ÜË	ÆEG	Ä FEE
HÌ	T ÜË	ÆEG	Ä FEE
HJ	T ÜË	ÆEG	Ä FEE
I€	T I G	ÆEG	Ä FEE
IF	T I H	ÆEG	Ä FEE
IG	T I I	ÆEH	Ä FEE
IH	ÜÖF	ÆEÍ	Ä FEE
II	ÜÖG	ÆEÍ	Ä FEE
IÍ	ÜÖH	ÆEÍ	Ä FEE
IÏ	ÖÖP	ÆEH	Ä FEE

A Ya VYf'8 Jgh]Vi HYX' @ UXg f6 @ ' & : % \$ 'K JbX'! =WZ'f7 cbh]bi YXL

T^(ä^/Äæ ^)	Öá^&ä)	ÜcöbÄ æ) æ ä^Z ÆfH Ö) äÄ æ) æ ä^Z ÆfH ÜcöbÄ (&æ) ZcÄ á	Ö) äÄ (&æ) ZcÄ á
IÍ	ÖÖXF	ÆEH	Ä FEE
IÏ	ÖÖXG	ÆEH	Ä FEE
IJ	ÖÖXH	ÆEH	Ä FEE
I€	ÖÖXI	ÆEH	Ä FEE
ÍF	ÖÖXI	ÆEH	Ä FEE
ÍG	ÖÖXI	ÆEH	Ä FEE
ÍH	ÜÖFÖP	ÆEÍ	Ä FEE
ÍI	ÜÖFÖF	ÆEH	Ä FEE
ÍÍ	ÜÖFÖG	ÆEH	Ä FEE
ÍÏ	ÜÖFÖH	ÆEH	Ä FEE
ÍÌ	ÜÖFÖI	ÆEH	Ä FEE
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JH	ÖÜÖ	ÆEH	Ä FEE
JI	ÖÜÖ	ÆEG	Ä FEE
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9bj YcdY>cjbhFYUMfcbg

Table with 14 columns and 10 rows, containing alphanumeric characters and symbols.

9bj YcdY5-G7 %a H fl * \$!%L @: 8 GHY7cXY7\ YWg f c b h j i Y X L

Large table with 14 columns and 40 rows, containing alphanumeric characters and symbols.

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9bj YcdY5-G7 %a H fl * \$!%L @: 8 GHY7cXY7\ YWg f c b h j i Y X L

Table with 14 columns and 40 rows, containing alphanumeric characters and symbols.

9bj YcdYBcbY7cX: cfa YXGHY7cXY7\ YWg

Table with 14 columns and 1 row, containing alphanumeric characters and symbols.

U Q O e H O A ^ i . a } A i e e A W W O K e e a . a O { ^ } a O i [, } a t O a U a j a . a d e H i a [^ } a U ^ c P E U H O A U a e ^ A i e

APPENDIX D
ADDITIONAL CALCULATIONS

Moment Bolt Group - Connection Angle

RISA 3D Results

$F_x =$	2.789	kip
$F_y =$	2.579	kip
$F_z =$	0.673	kip
$M_x =$	0.016	kip*ft
$M_y =$	0.252	kip*ft
$M_z =$	8.359	kip*ft

Code Checks Per ANSI/TIA-222-H		
Tension Capacity=	2.9%	PASS
Shear Capacity=	62.4%	PASS

Tension

$$T_{Total} = \frac{F_z}{3 \text{ bolts}} + \frac{M_y}{0.375 \text{ ft}} \frac{1}{1 \text{ bolt}}$$

$$T_{Total} = 0.90 \text{ kip}$$

$$\phi T = \phi F_{ub} A_{nt}$$

$$\phi T = (0.75)(120 \text{ ksi})(0.344 \text{ in}^2)$$

$$\phi T = 30.96 \text{ kip}$$

Shear

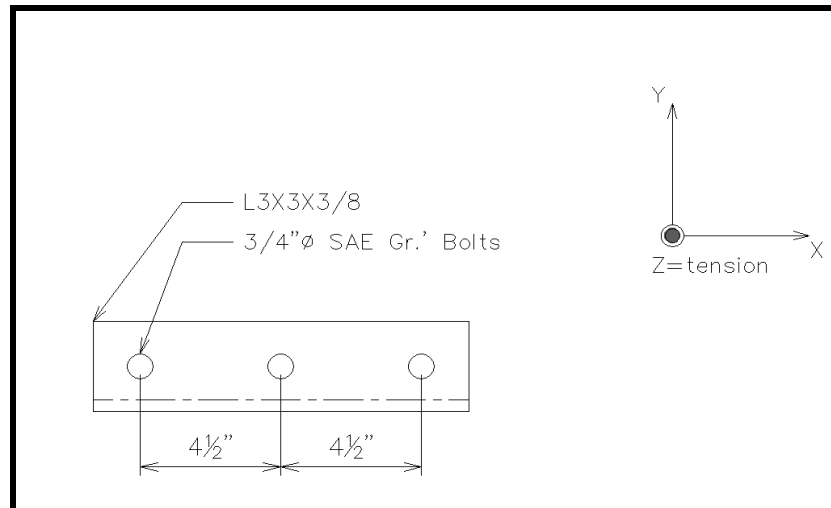
$$V_{Total} = \frac{\sqrt{F_x^2 + F_y^2}}{3 \text{ bolts}} + \frac{M_z}{0.375 \text{ ft}} \frac{1}{2 \text{ bolts}}$$

$$V_{Total} = 12.41 \text{ kip}$$

$$\phi V = \phi(0.625)R_b F_{ub}(0.8)A_b$$

$$\phi V = (0.75)(0.625)(1.0)(120 \text{ ksi})(0.8) \left(\frac{\pi}{4} \cdot 0.75 \text{ in}^2 \right)$$

$$\phi V = 19.88 \text{ kip}$$



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

AT&T Existing Facility

Site ID: CTL01100

806368

374 Three Mile Road
Glastonbury, Connecticut 06033

March 10, 2022

EBI Project Number: 6222001779

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	53.54%

March 10, 2022

AT&T

Emissions Analysis for Site: CTL01100 - 806368

EBI Consulting was directed to analyze the proposed AT&T facility located at **374 Three Mile Road in Glastonbury, Connecticut** for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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

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

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

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

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at 374 Three Mile Road in Glastonbury, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower. For power density calculations, the broadcast footprint of the AIR6449 antenna has been considered. Due to the beamforming nature of this antenna, the actual beam locations vary depending on demand and are narrow in nature. Using the broadcast footprint accounts for the potential location of beams at any given time.

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

- 1) 4 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 2) 4 LTE FN channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 3) 4 5G channels (850 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 4) 4 LTE / 5G channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 5) 4 LTE / 5G channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 6) 2 C-Band Channels (3700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 144.58 Watts per Channel.

- 7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 8) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antennas used in this modeling are the CCI OPA65R-BU6DA for the 700 MHz / 1900 MHz channel(s), the Ericsson AIR 6419 for the 3700 MHz channel(s), the Ericsson AIR 6449 for the 3700 MHz channel(s), the CCI DMP65R-BU6DA for the 700 MHz / 850 MHz / 2100 MHz channel(s) in Sector A, the CCI OPA65R-BU8DA for the 700 MHz / 1900 MHz channel(s), the Ericsson AIR 6419 for the 3700 MHz channel(s), the Ericsson AIR 6449 for the 3700 MHz channel(s), the CCI DMP65R-BU6DA for the 700 MHz / 850 MHz / 2100 MHz channel(s) in Sector B, the CCI OPA65R-BU8DA for the 700 MHz / 1900 MHz channel(s), the Ericsson AIR 6419 for the 3700 MHz channel(s), the Ericsson AIR 6449 for the 3700 MHz channel(s), the CCI DMP65R-BU8DA for the 700 MHz / 850 MHz / 2100 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 10) The antenna mounting height centerlines of the proposed antennas are 138, 140, and 142 feet above ground level (AGL).
- 11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 12) All calculations were done with respect to uncontrolled / general population threshold limits.

AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	CCI OPA65R-BU6DA	Make / Model:	CCI OPA65R-BU8DA	Make / Model:	CCI OPA65R-BU8DA
Frequency Bands:	700 MHz / 1900 MHz	Frequency Bands:	700 MHz / 1900 MHz	Frequency Bands:	700 MHz / 1900 MHz
Gain:	12.15 dBd / 15.95 dBd	Gain:	13.55 dBd / 15.75 dBd	Gain:	13.55 dBd / 15.75 dBd
Height (AGL):	140 feet	Height (AGL):	140 feet	Height (AGL):	140 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	320.00 Watts	Total TX Power (W):	320.00 Watts	Total TX Power (W):	320.00 Watts
ERP (W):	8,921.74	ERP (W):	9,636.83	ERP (W):	9,636.83
Antenna A1 MPE %:	2.39%	Antenna B1 MPE %:	2.76%	Antenna C1 MPE %:	2.76%
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR 6419	Make / Model:	Ericsson AIR 6419	Make / Model:	Ericsson AIR 6419
Frequency Bands:	3700 MHz	Frequency Bands:	3700 MHz	Frequency Bands:	3700 MHz
Gain:	23.45 dBd	Gain:	23.45 dBd	Gain:	23.45 dBd
Height (AGL):	142 feet	Height (AGL):	142 feet	Height (AGL):	142 feet
Channel Count:	1	Channel Count:	1	Channel Count:	1
Total TX Power (W):	144.58 Watts	Total TX Power (W):	144.58 Watts	Total TX Power (W):	144.58 Watts
ERP (W):	31,996.92	ERP (W):	31,996.92	ERP (W):	31,996.92
Antenna A2 MPE %:	6.22%	Antenna B2 MPE %:	6.22%	Antenna C2 MPE %:	6.22%
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	3700 MHz	Frequency Bands:	3700 MHz	Frequency Bands:	3700 MHz
Gain:	23.45 dBd	Gain:	23.45 dBd	Gain:	23.45 dBd
Height (AGL):	138 feet	Height (AGL):	138 feet	Height (AGL):	138 feet
Channel Count:	1	Channel Count:	1	Channel Count:	1
Total TX Power (W):	144.58 Watts	Total TX Power (W):	144.58 Watts	Total TX Power (W):	144.58 Watts
ERP (W):	31,996.92	ERP (W):	31,996.92	ERP (W):	31,996.92
Antenna A3 MPE %:	6.60%	Antenna B3 MPE %:	6.60%	Antenna C3 MPE %:	6.60%
Antenna #:	4	Antenna #:	4	Antenna #:	4
Make / Model:	CCI DMP65R-BU6DA	Make / Model:	CCI DMP65R-BU6DA	Make / Model:	CCI DMP65R-BU8DA
Frequency Bands:	700 MHz / 850 MHz / 2100 MHz	Frequency Bands:	700 MHz / 850 MHz / 2100 MHz	Frequency Bands:	700 MHz / 850 MHz / 2100 MHz
Gain:	11.85 dBd / 12.45 dBd / 15.95 dBd	Gain:	11.85 dBd / 12.45 dBd / 16.05 dBd	Gain:	11.85 dBd / 12.45 dBd / 16.05 dBd
Height (AGL):	140 feet	Height (AGL):	140 feet	Height (AGL):	140 feet
Channel Count:	12	Channel Count:	12	Channel Count:	12
Total TX Power (W):	560.00 Watts	Total TX Power (W):	560.00 Watts	Total TX Power (W):	560.00 Watts
ERP (W):	14,707.62	ERP (W):	14,927.63	ERP (W):	14,927.63
Antenna A4 MPE %:	3.93%	Antenna B4 MPE %:	3.98%	Antenna C4 MPE %:	3.98%

- An adjusted power reduction factor of 0.32 was applied to the AIR 6449 antennas per guidance from AT&T.
- Specifications were not available for the Ericsson AIR 6419 antenna. Per AT&T, specifications for the AIR 6449 antenna were used to model the 6419 due to its similarity.

Site Composite MPE %	
Carrier	MPE %
AT&T (Max at Sector B):	19.56%
SIGFOX	0.03%
Nextel	0.4%
T-Mobile	19.85%
Verizon	9.26%
Sprint	0.65%
XM Sat Radio	3.79%
Site Total MPE % :	53.54%

AT&T MPE % Per Sector	
AT&T Sector A Total:	19.14%
AT&T Sector B Total:	19.56%
AT&T Sector C Total:	19.56%
Site Total MPE % :	53.54%

AT&T Maximum MPE Power Values (Sector B)							
AT&T Frequency Band / Technology (Sector B)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
AT&T 700 MHz LTE FN	4	905.86	140.0	7.25	700 MHz LTE FN	467	1.55%
AT&T 1900 MHz LTE/5G	4	1503.35	140.0	12.04	1900 MHz LTE/5G	1000	1.20%
AT&T 3700 MHz C-Band	1	31996.92	142.0	62.19	3700 MHz C-Band	1000	6.22%
AT&T 3700 MHz C-Band	1	31996.92	138.0	66.02	3700 MHz C-Band	1000	6.60%
AT&T 700 MHz LTE	4	612.43	140.0	4.90	700 MHz LTE	467	1.05%
AT&T 850 MHz 5G	4	703.17	140.0	5.63	850 MHz 5G	567	0.99%
AT&T 2100 MHz LTE/5G	4	2416.30	140.0	19.35	2100 MHz LTE/5G	1000	1.94%
						Total:	19.56%

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

Summary

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

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

AT&T Sector	Power Density Value (%)
Sector A:	19.14%
Sector B:	19.56%
Sector C:	19.56%
AT&T Maximum MPE % (Sector B):	19.56%
Site Total:	53.54%
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **53.54%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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



AT&T SITE NUMBER: CTL01100
AT&T SITE NAME: GLASTONBURY THREE MILE
AT&T FA CODE: 10035094
AT&T PACE NUMBER: MRCTB055013, MRCTB055840, MRCTB055847,
AT&T PROJECT: MRCTB053815, MRCTB054856, MRCTB054562,
 MRCTB054435, MRCTB054297
**5G NR 1SR CBAND, 5G NR 1DR-1, 5G NR SOFTWARE
 RADIO, 5G NR ACTIVATION, CELL SITE RF
 MODIFICATIONS, 5G NR SOFTWARE UPGRADE, 5G
 NR 1DR-1, ANTENNA MODIFICATIONSM 4TX4RX
 SOFTWARE RETROFIT, LTE NEXT CARRIER, LTE 3C**

BUSINESS UNIT #: 806368
SITE ADDRESS: 374 THREE MILE RD.
 GLASTONBURY, CT 06033
COUNTY: HARTFORD
SITE TYPE: MONOPOLE
TOWER HEIGHT: 145'-0"

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 THE SENDER IN ADDITION TO ANY LEGAL NOTICE
 REQUIREMENTS UNDER APPLICABLE LAW.
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 OR DESIGN.



AT&T SITE NUMBER:
CTL01100

BU #: 806368
HRT 049B 943215

 374 THREE MILE RD.
 GLASTONBURY, CT 06033

EXISTING
145'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	1/14/21	RPA	PRELIMINARY REVIEW	AY
B	1/25/21	FWP	PRELIMINARY REVIEW	MTJ
0	2/21/22	FWP	CONSTRUCTION	MTJ

B&T ENGINEERING, INC.
 PEC.0001564
 Expires 2/1/23



PROFESSIONAL CERTIFICATION:
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE
 PREPARED OR APPROVED BY ME, THAT I AM A DULY
 LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS
 OF THE STATE OF MARYLAND, LICENSE NO.: 29495,
 EXPIRATION DATE: 9/15/23.
 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: T-1
REVISION: 0

SITE INFORMATION

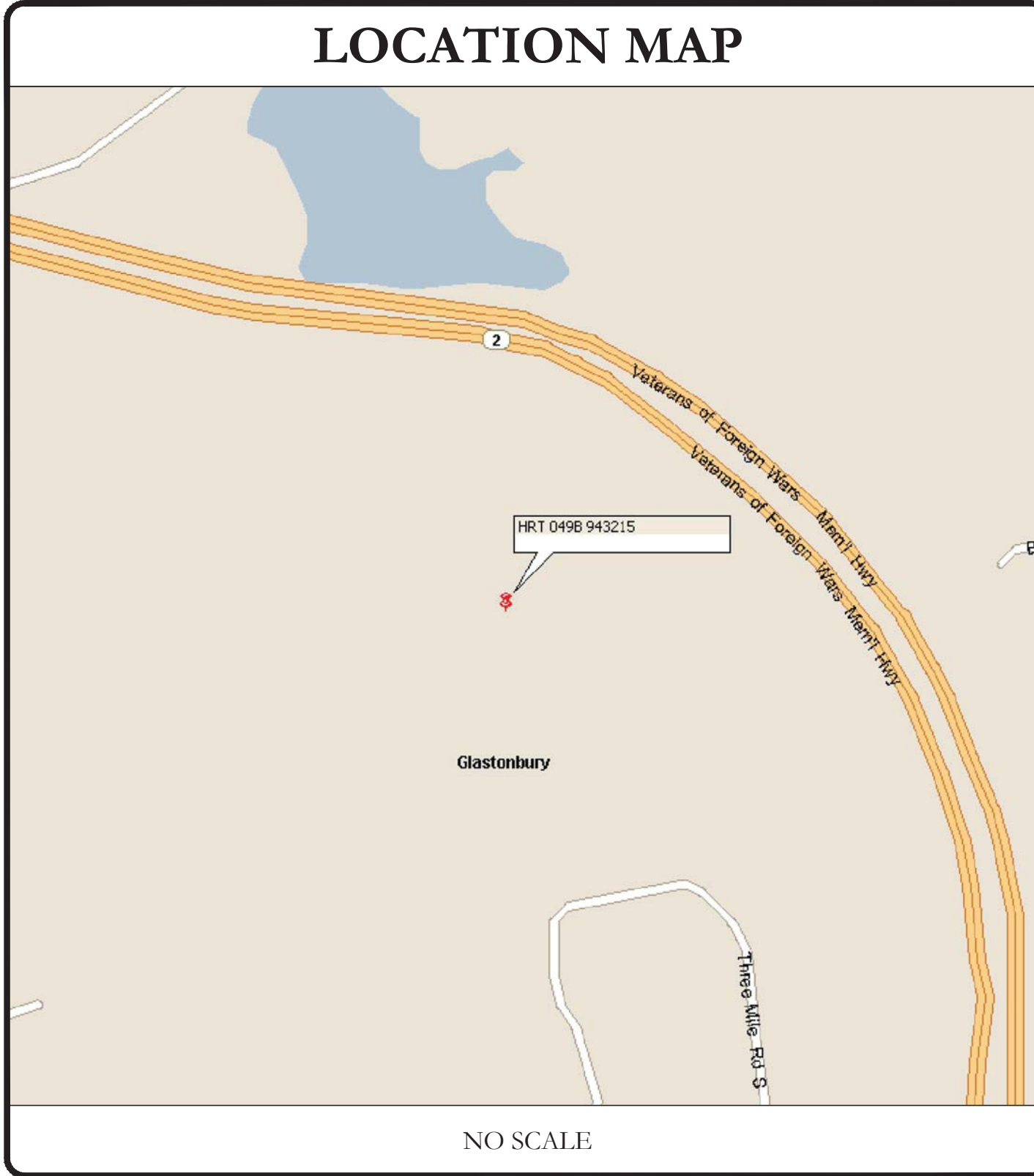
CROWN CASTLE USA INC.	HRT 049B 943215
SITE NAME:	
SITE ADDRESS:	374 THREE MILE RD. GLASTONBURY, CT 06033
COUNTY:	HARTFORD
MAP/PARCEL #:	70600374
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.693564°
LONGITUDE:	-72.547418°
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	534'
CURRENT ZONING:	RR - RURAL RESIDENCE
JURISDICTION:	CONNECTICUT SITING COUNCIL
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	FLANAGAN JOSEPHINE I + JOHN R 366 THREE MILE RD GLASTONBURY, CT 06033
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 & POWER CO (800) 286-2000
TELCO PROVIDER:	ATT (866) 852-2721

DRAWING INDEX

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C-2	FINAL ELEVATION & ANTENNA PLANS
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G-1	GROUNDING SCHEMATIC
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ATTACHED	PLUMBING DIAGRAM

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

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



PROJECT TEAM

A&E FIRM:	B+T GROUP 1717 S. BOULDER AVE. TULSA, OK 74119 MARVIN PHILLIPS marvin.phillips@btgrp.com
CROWN CASTLE USA INC. DISTRICT CONTACTS:	1505 WESTLAKE AVENUE NORTH, SUITE 800 SEATTLE, WA 98109 PAUL PEDICONE - PROJECT MANAGER PAUL.PEDICONE@CROWNCastle.COM JASON D'AMICO - CONSTRUCTION MANAGER JASON.DAMICO@CROWNCastle.COM

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 (4) POWERWAVE - 7770 ANTENNAS
- REMOVE (1) CCI - HPA-65R-BUU-H6 ANTENNAS
- REMOVE (2) CCI - HPA-65R-BUU-H8 ANTENNAS
- REMOVE (2) POWERWAVE - P65-17-XLH-RR ANTENNAS
- REMOVE (3) POWERWAVE - TT19-08BP111-001 TMAs
- REMOVE (3) COMM COMPONENTS INC - DTMABP7819VG12A TMAs
- REMOVE (1) RAYCAP - DC6-48-60-18F
- REMOVE (3) ERICSSON - RRU5-11 B12 RADIOS
- REMOVE (1) FIBER CABLE
- REMOVE (6) COAX CABLES
- INSTALL (1) CCI - OPA65R-BU6DA ANTENNA
- INSTALL (2) CCI - OPA65R-BU8DA ANTENNAS
- INSTALL (6) ERICSSON - AIR6449 B77D+ AIR6419 B77G STACKED ANTENNAS
- INSTALL (1) CCI - DMP65R-BU6DA ANTENNA
- INSTALL (2) CCI - DMP65R-BU8DA ANTENNAS
- INSTALL (2) RAYCAP - DC9-48-60-24-8C-EV
- INSTALL (3) ERICSSON - 4478 B14 RADIOS
- INSTALL (3) ERICSSON - 4449 B5/B12 RADIOS
- INSTALL (3) ERICSSON - 4426 B66 RADIOS
- INSTALL (2) FIBER CABLE
- INSTALL (4) DC CABLE
- INSTALL (3) Y CABLES

GROUND SCOPE OF WORK:

- REMOVE (6) LGP21901 DIPLEXER
- REMOVE (6) CM1007-DBPXBC-003 DIPLEXER
- INSTALL (3) RECTIFIERS IN EXISTING POWER PLANT
- INSTALL (1) DC12-48-60-RM IN HIF RACK
- INSTALL 4 WAY GPS SPLITTER FOR BBU CONFIGURATION
- INSTALL 6648 WITH XCEDE CABLE, ADD 6630 WITH IDLc

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	2015 IBC
MECHANICAL	2015 IMC
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS: BY OTHERS
DATED:

MOUNT ANALYSIS: TOWER ENGINEERING PROFESSIONALS
DATED: 1/7/22

RFDS REVISION: FINAL
DATED: 2/14/22

ORDER ID: 586239
REVISION: 0

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CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

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

GREENFIELD GROUNDING NOTES:

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

GENERAL NOTES:

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

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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

ELECTRICAL INSTALLATION NOTES:

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

Table with columns: SYSTEM, CONDUCTOR, COLOR. Lists color codes for 120/240V, 10, 120/208V, 30, 277/480V, 30, and DC VOLTAGE.

APWA UNIFORM COLOR CODE:

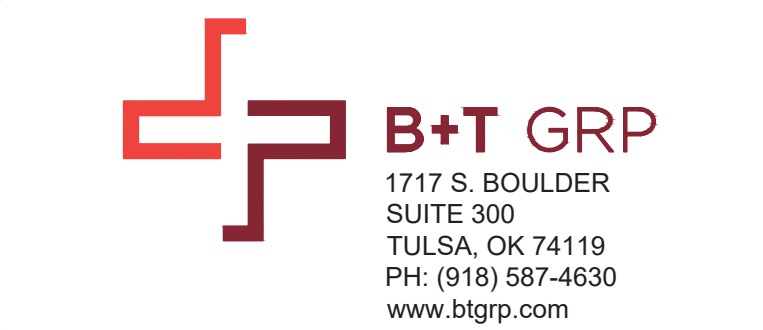
- WHITE PROPOSED EXCAVATION
PINK TEMPORARY SURVEY MARKINGS
RED ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE POTABLE WATER
PURPLE RECLAIMED WATER,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

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

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AT&T SITE NUMBER: CTL01100

BU #: 806368 HRT 049B 943215

374 THREE MILE RD. GLASTONBURY, CT 06033

EXISTING 145'-0" MONOPOLE

ISSUED FOR:

Table with columns: REV, DATE, DRWN, DESCRIPTION, DES./QA. Shows revision history for preliminary review and construction.

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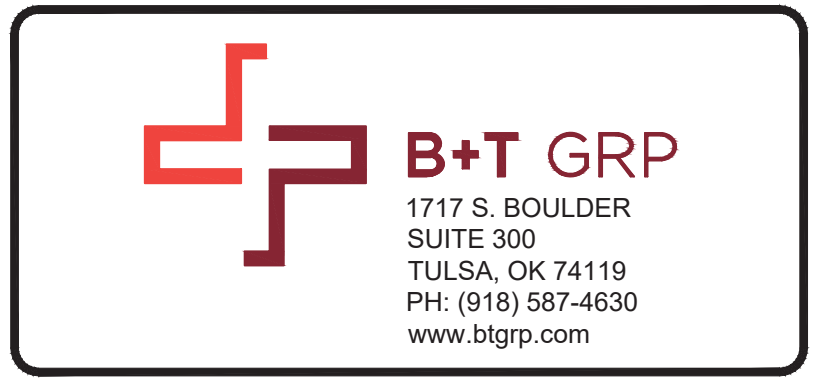


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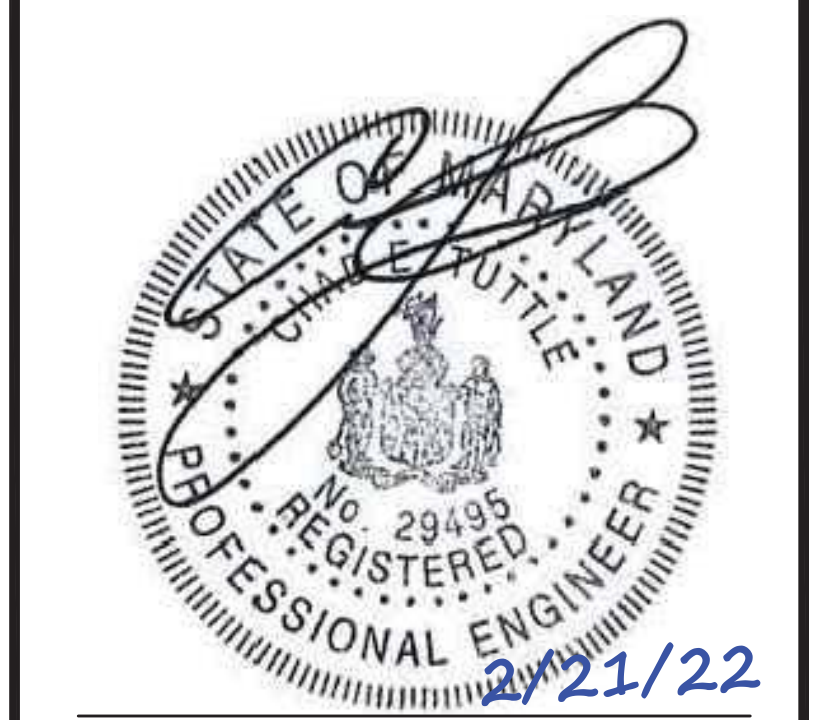
374 THREE MILE RD.
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EXISTING
 145'-0" MONOPOLE

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A	1/14/21	RPA	PRELIMINARY REVIEW	AY
B	1/25/21	FWP	PRELIMINARY REVIEW	MTJ
0	2/21/22	FWP	CONSTRUCTION	MTJ

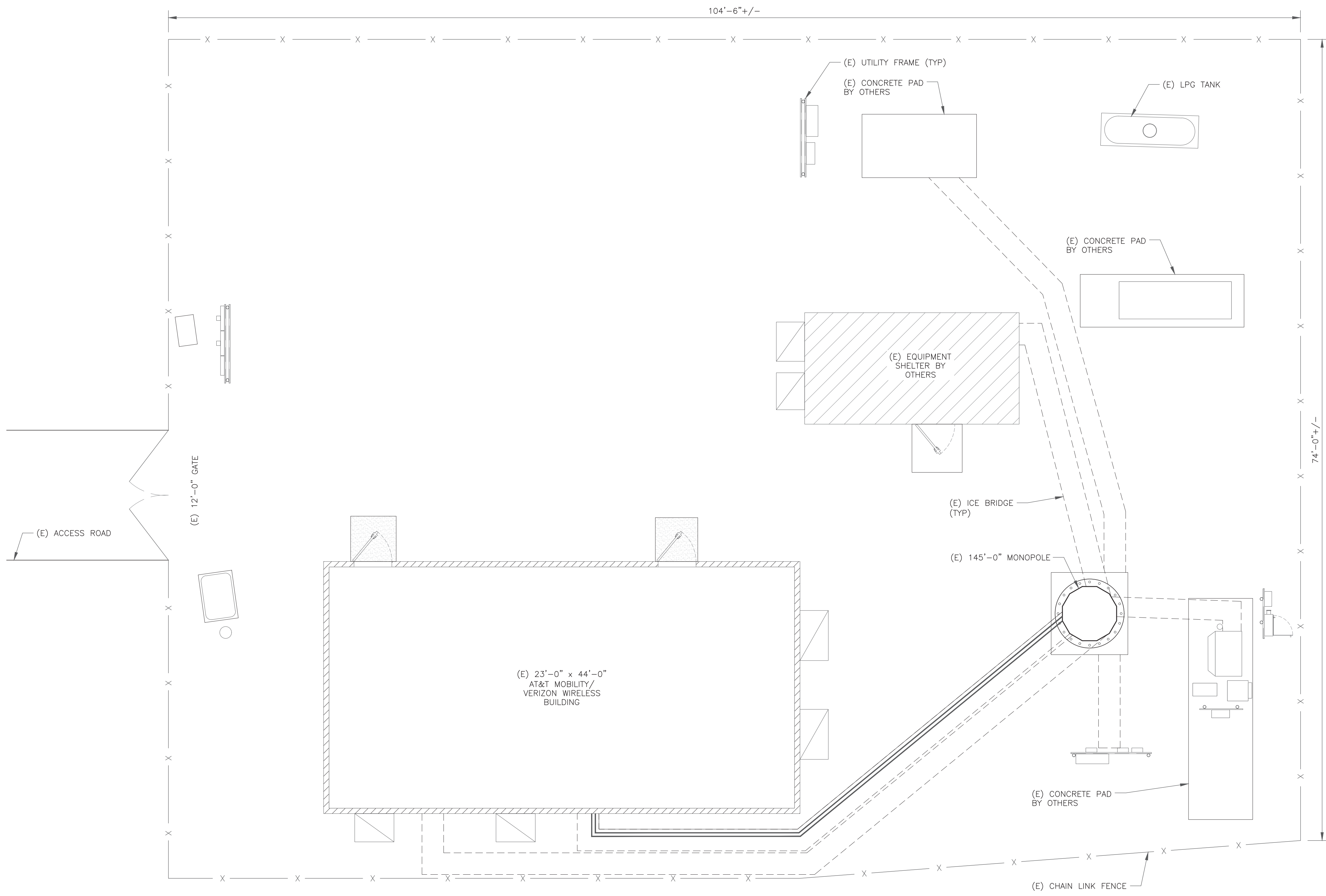
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1 SITE PLAN
 SCALE: 3/16"=1'-0" (FULL SIZE)
 3/32"=1'-0" (11x17)

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 3530 TORINGDON WAY, SUITE 300
 CHARLOTTE, NC 28277



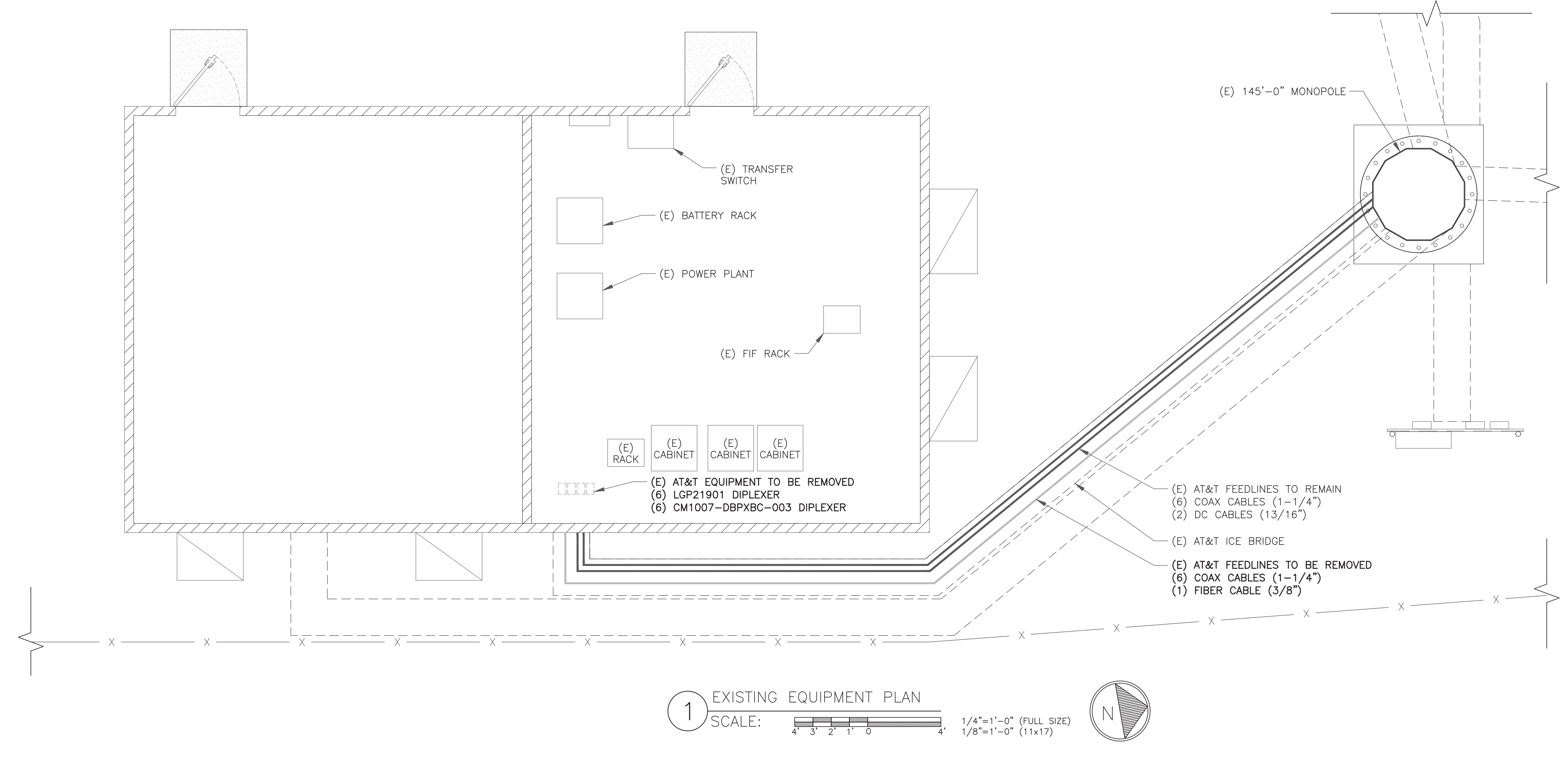
B+T GRP
 1717 S. BOULDER
 SUITE 300
 TULSA, OK 74119
 PH: (918) 587-4630
 www.btgrp.com

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374 THREE MILE RD.
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EXISTING
 145'-0" MONOPOLE



- GROUND SCOPE OF WORK:
- INSTALL (3) RECTIFIERS IN EXISTING POWER PLANT
 - INSTALL (1) DC12-48-60-RM IN FIF RACK
 - INSTALL 4 WAY GPS SPLITTER FOR BBU CONFIGURATION

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.

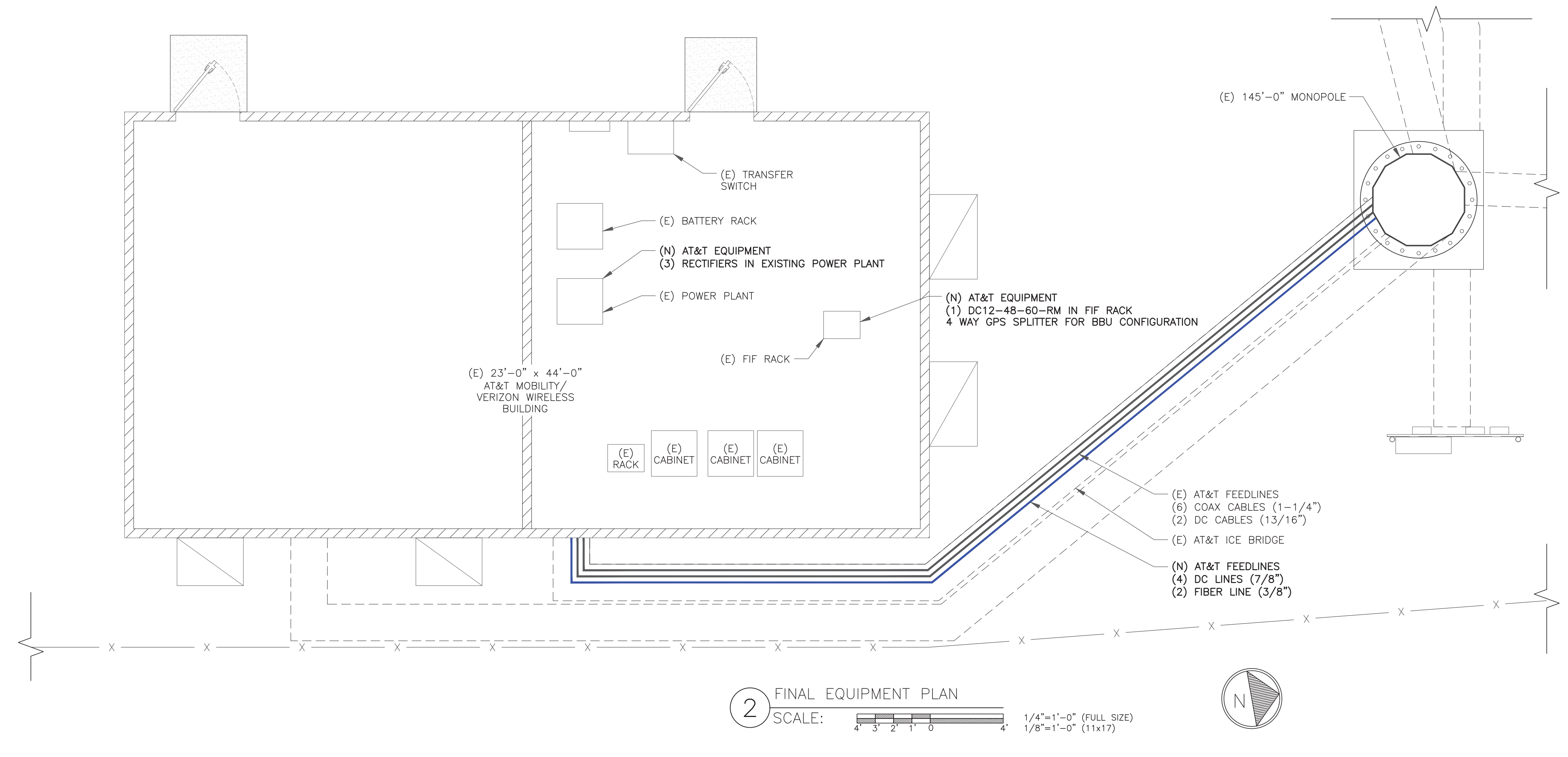
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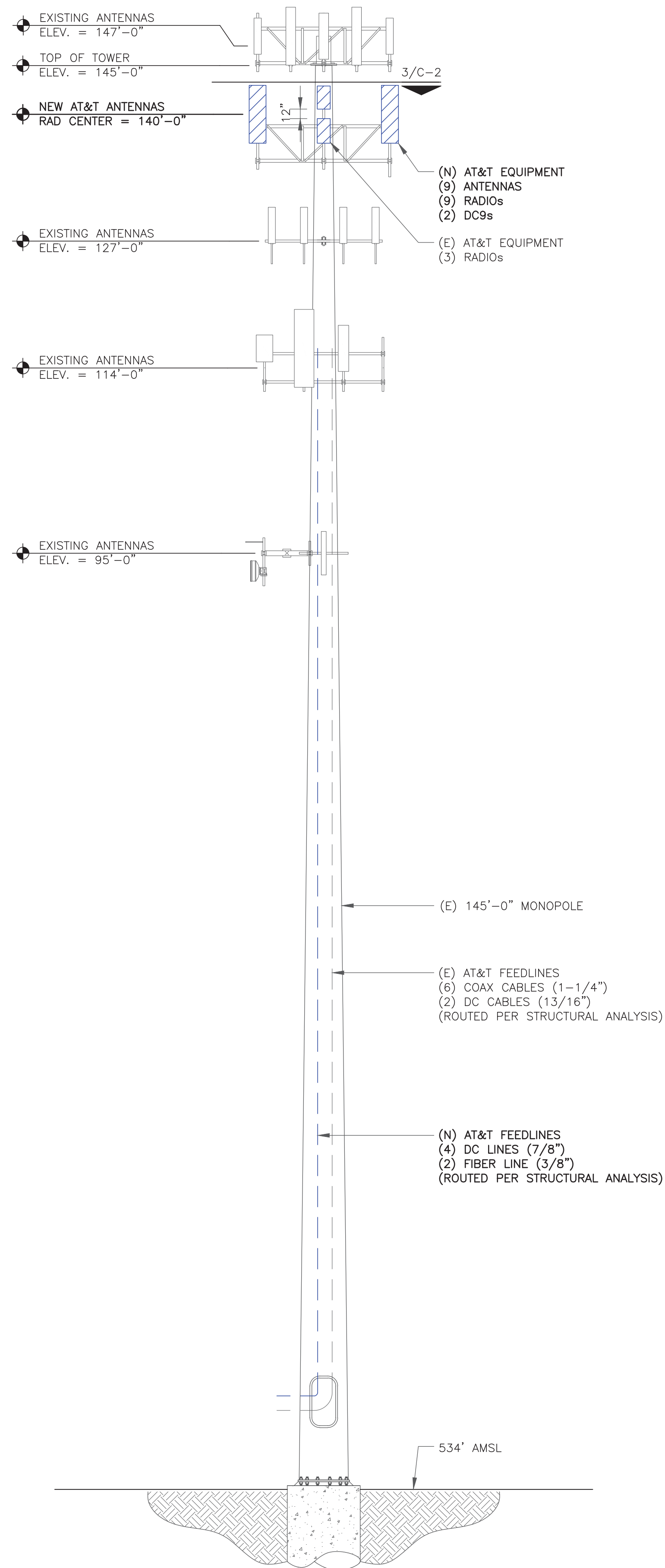
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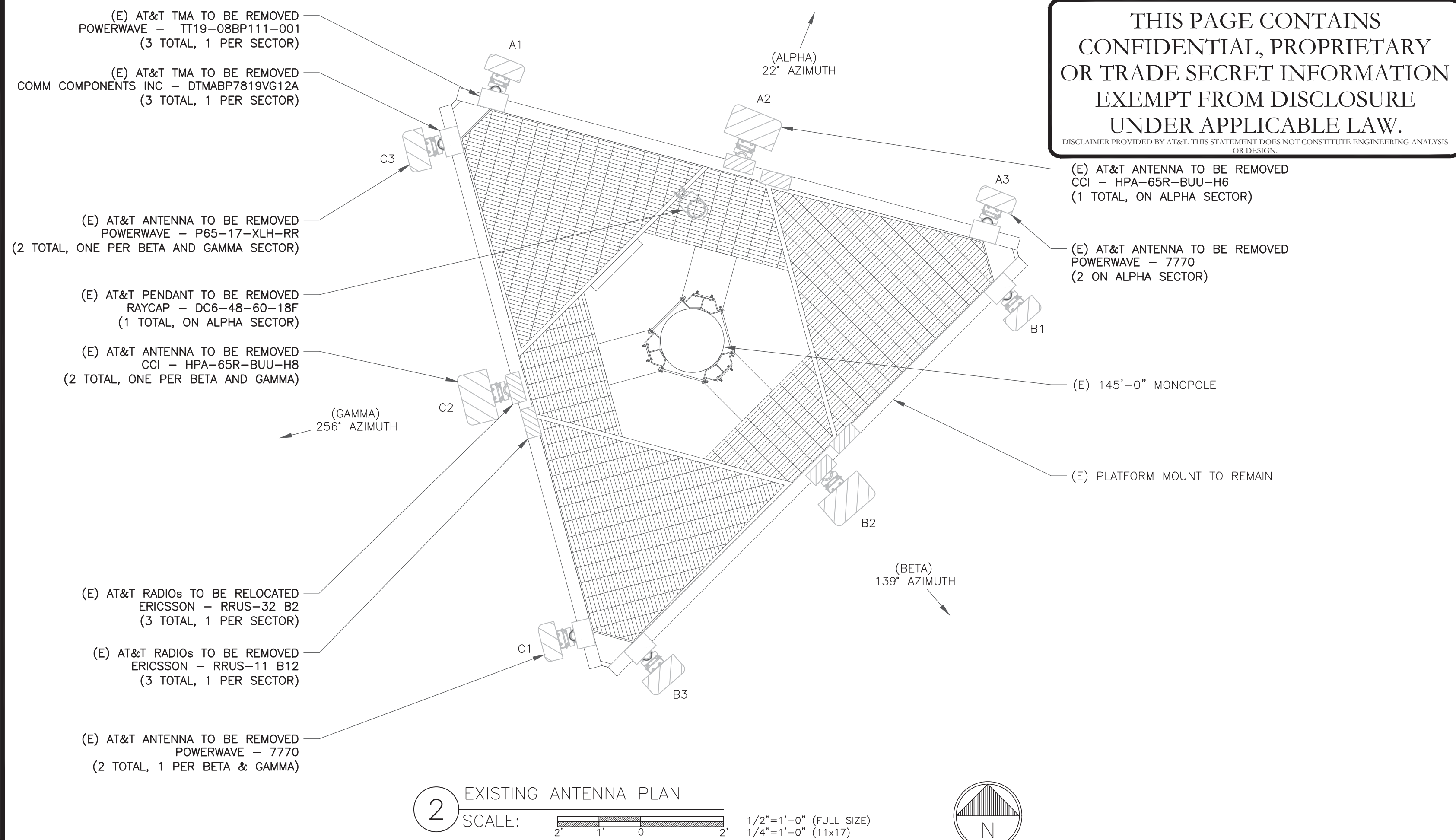


SHEET NUMBER: **C-1.2** REVISION: **0**

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1 FINAL ELEVATION
SCALE: NOT TO SCALE



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

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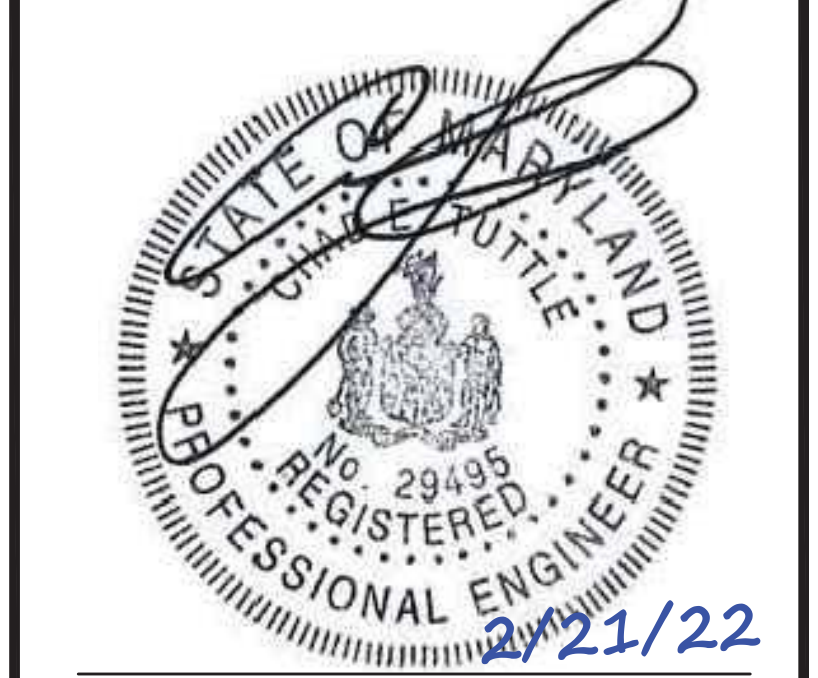
374 THREE MILE RD.
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EXISTING
145'-0" MONOPOLE

ISSUED FOR:

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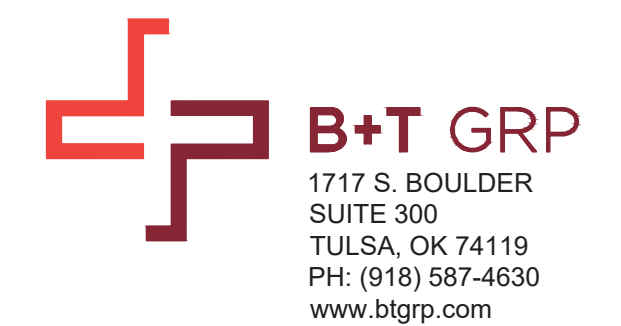
"LOOK UP" - CROWN CASTLE USA INC.
SAFETY CLIMB REQUIREMENT:

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.

- INSTALLER NOTES:
- REFERENCE C-3 FOR FINAL EQUIPMENT SCHEDULE.
 - REFERENCE C-4 FOR NEW EQUIPMENT SPECIFICATIONS.
 - CONTRACTOR TO VERIFY ALL ANTENNA TIP HEIGHTS DO NOT EXCEED BEACON BASE HEIGHT.
 - 3'-0" MINIMUM DISTANCE REQUIRED BETWEEN LTE ANTENNAS ON SAME SECTOR.
 - 6'-0" MINIMUM DISTANCE REQUIRED BETWEEN 700BC & 700DE ANTENNAS ON SAME SECTOR.
 - 4'-0" MINIMUM DISTANCE REQUIRED BETWEEN LTE 700 ANTENNAS ON OPPOSING SECTORS.
 - ALL ANTENNA MEASUREMENT DISTANCES MUST BE EDGE TO EDGE (RELOCATE ANTENNAS AS NEEDED).
 - 8" MINIMUM DISTANCE REQUIRED BETWEEN ANTENNA & RADIO. SEE GENERIC EXAMPLE DETAIL ON SHEET C-4.

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FINAL ANTENNA AND FEEDLINE SCHEDULE

POS.	TECH	STATUS	AZIMUTH	ANTENNA TYPE	ANTENNA RAD CENTER	MECHANICAL DOWNTILT	ELECTRICAL DOWNTILT	MAIN COAX SIZE	MAIN COAX LENGTH	COAX QTY	TMA QTY AND MODEL	SURGE PROTECTION	DC/FIBER CABLES	RRHS QTY & MODEL ON TOWER	LOCATION	DIPLEXER ON TOWER	DIPLEXER ON GROUND	RET CABLE
ALPHA SECTOR																		
A1	LTE 700/LTE 1900/5G 1900	NEW	22°	CCI - OPA65R-BU6DA	140'-0"	0°	6°/6°/6°/6°	1-1/4"	190'-0"	2	-	(1) DC9-48-60-24-8C -EV	(2) 13/16" DC (1) 7/8" DC LINES (1) FIBER (3/8")	(1) ERICSSON - 4478 B14 (1) ERICSSON - RRUS-32 B2	TOWER	N	N	N
A2	5G CBAND	NEW	22°	ERICSSON - AIR6449 B77D+AIR6419 B77G STACKED	138'-0" 142'-0"	0°	0°	-	-	-	-			INTEGRATED WITHIN	TOWER	N	N	N
A3	LTE 700/5G 850/LTE AWS/5G AWS	NEW	22°	CCI - DMP65R-BU6DA	140'-0"	0°	6°/6°/6°/6°	-	-	-	-			(1) ERICSSON - 4449 B5/B12 (1) ERICSSON - 4426 B66	TOWER	N	N	N
BETA SECTOR																		
B1	LTE 700/LTE 1900/5G 1900	NEW	139°	CCI - OPA65R-BU8DA	140'-0"	0°	2°/2°/2°/2°	1-1/4"	190'-0"	2	-	(1) DC9-48-60-24-8C -EV	(2) 7/8" DC LINES (1) FIBER (3/8")	(1) ERICSSON - 4478 B14 (1) ERICSSON - RRUS-32 B2	TOWER	N	N	N
B2	5G CBAND	NEW	139°	ERICSSON - AIR6449 B77D+AIR6419 B77G STACKED	138'-0" 142'-0"	0°	0°	-	-	-	-			INTEGRATED WITHIN	TOWER	N	N	N
B3	LTE 700/5G 850/LTE AWS/5G AWS	NEW	139°	CCI - DMP65R-BU8DA	140'-0"	0°	2°/2°/2°/2°	-	-	-	-			(1) ERICSSON - 4449 B5/B12 (1) ERICSSON - 4426 B66	TOWER	N	N	N
GAMMA SECTOR																		
C1	LTE 700/LTE 1900/5G 1900	NEW	256°	CCI - OPA65R-BU8DA	140'-0"	0°	7°/7°/7°/7°	1-1/4"	190'-0"	2	-	-	-	(1) ERICSSON - 4478 B14 (1) ERICSSON - RRUS-32 B2	TOWER	N	N	N
C2	5G CBAND	NEW	256°	ERICSSON - AIR6449 B77D+AIR6419 B77G STACKED	138'-0" 142'-0"	0°	0°	-	-	-	-			INTEGRATED WITHIN	TOWER	N	N	N
C3	LTE 700/5G 850/LTE AWS/5G AWS	NEW	256°	CCI - DMP65R-BU8DA	140'-0"	0°	5°/5°/5°/5°	-	-	-	-			(1) ERICSSON - 4449 B5/B12 (1) ERICSSON - 4426 B66	TOWER	N	N	N

NOTE: BOLD DENOTES NEW EQUIPMENT

AT&T SITE NUMBER:
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BU #: **806368**
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374 THREE MILE RD.
 GLASTONBURY, CT 06033

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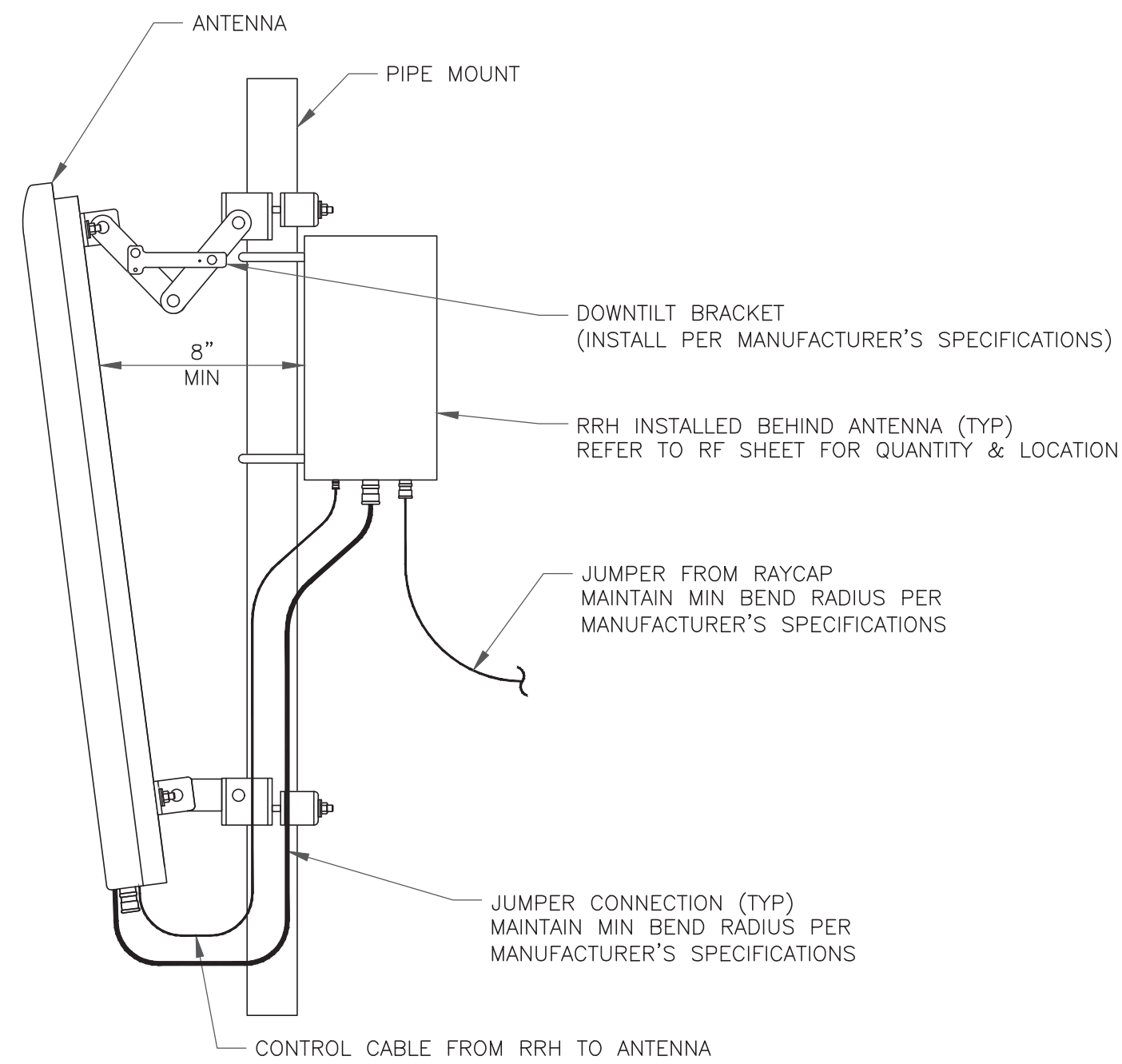
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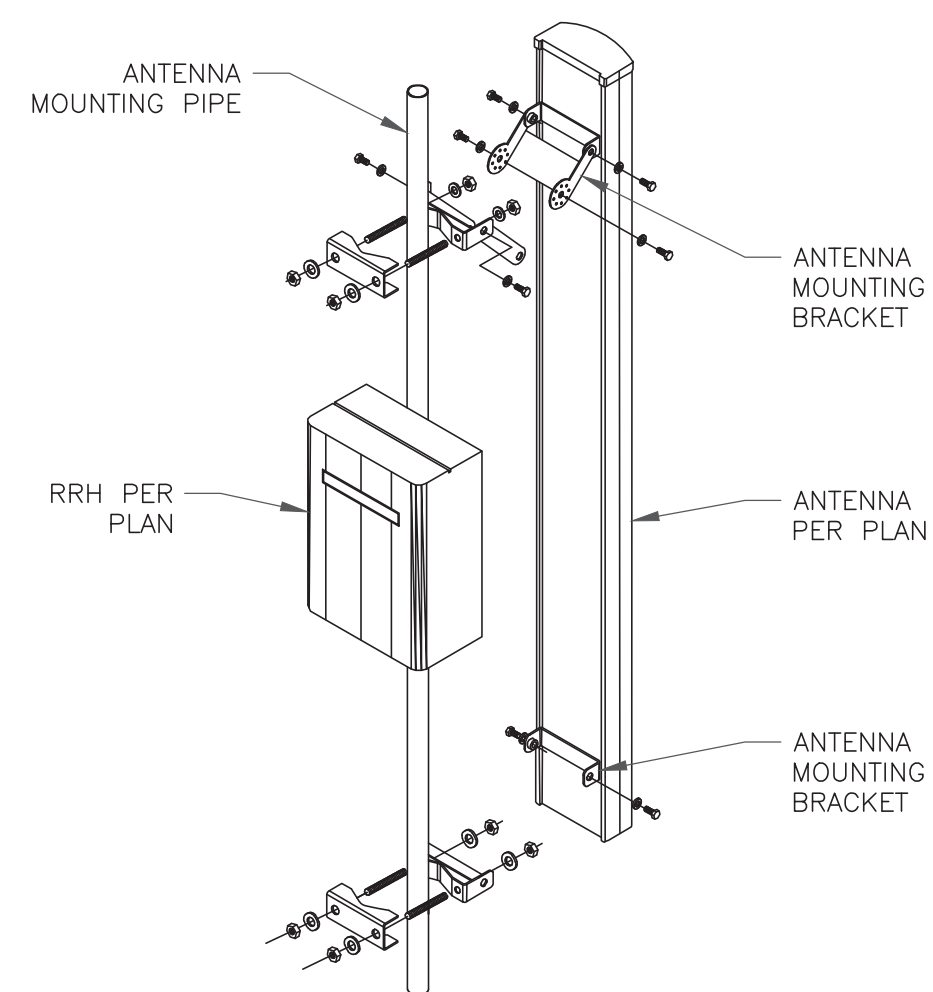
SHEET NUMBER: **C-3** REVISION: **0**



1 GENERIC ANTENNA MOUNTING ELEVATION
SCALE: NOT TO SCALE

INSTALLER NOTES:

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



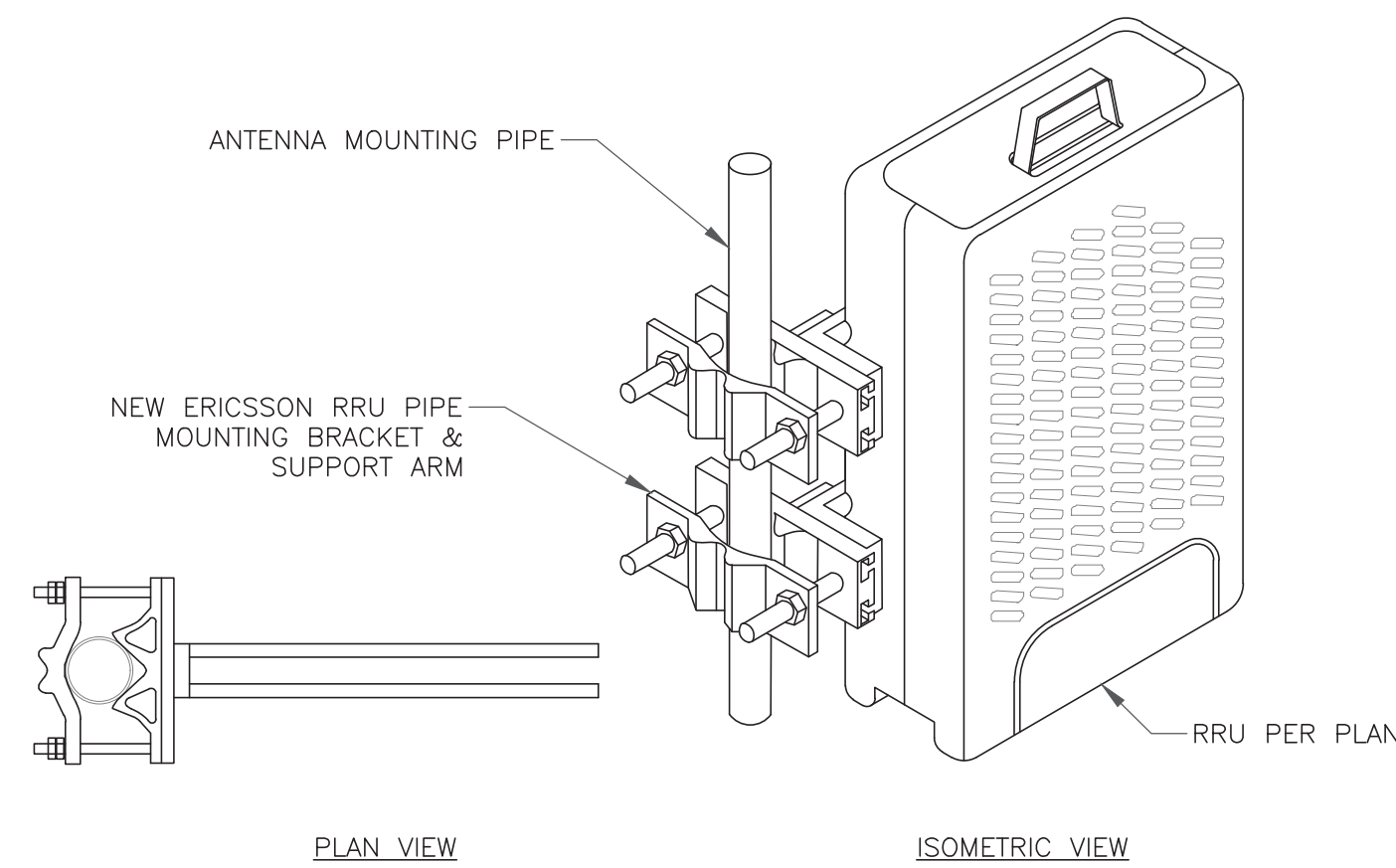
4 ANTENNA WITH RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

ERICSSON RRU MOUNTING KIT:

SXK 107 2839/1: SINGLE RRU SUPPORT KIT (PART # 5335) (OR ENGINEER APPROVED EQUIVALENT)
SXK 107 2839/2: EXPANSION KIT (PART # 5336) (OR ENGINEER APPROVED EQUIVALENT)

MOUNTING NOTES:

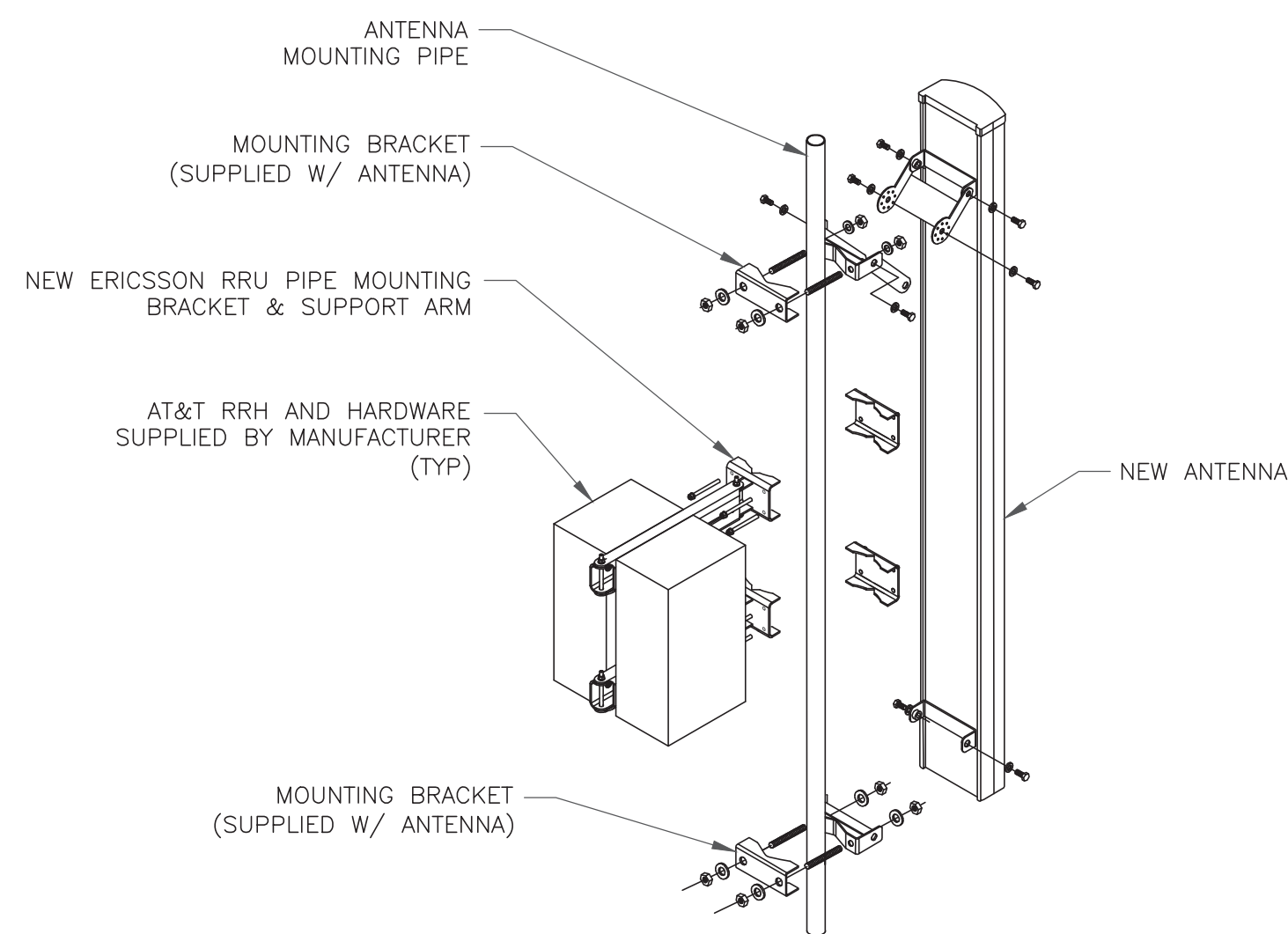
REFER TO PRODUCT SPECS FOR BOLT SIZE & PIPE DIAMETER TOLERANCES. THE PART NO. SXK107-2839/2 IS REQUIRED FOR (2) RRUS.



2 ERICSSON - SXK 107 2839
SCALE: NOT TO SCALE

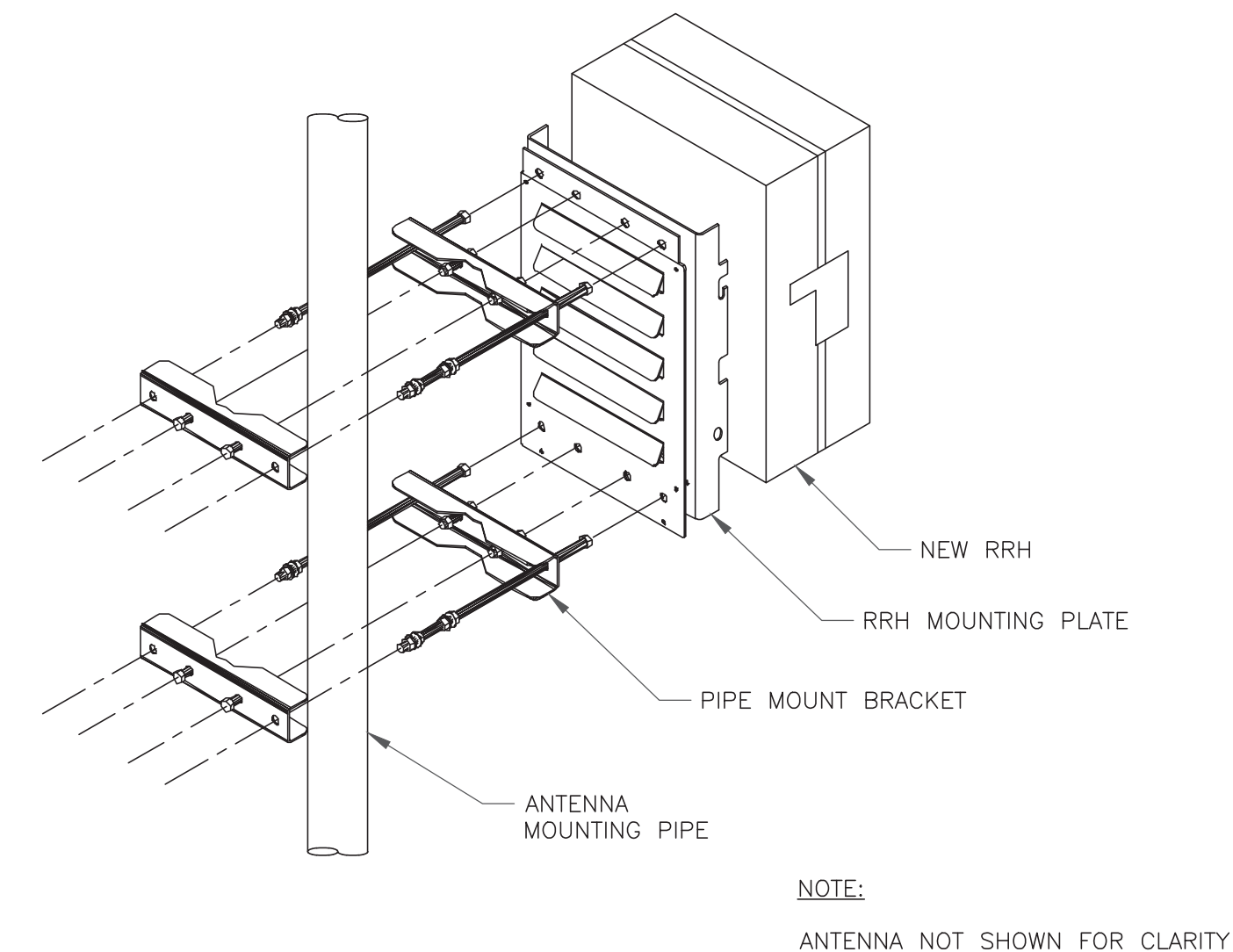
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5 ANTENNA WITH DUAL RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

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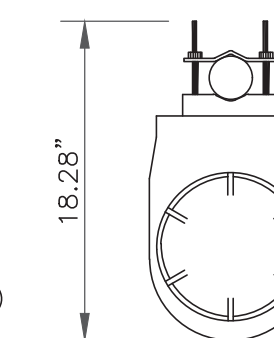


3 SINGLE RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

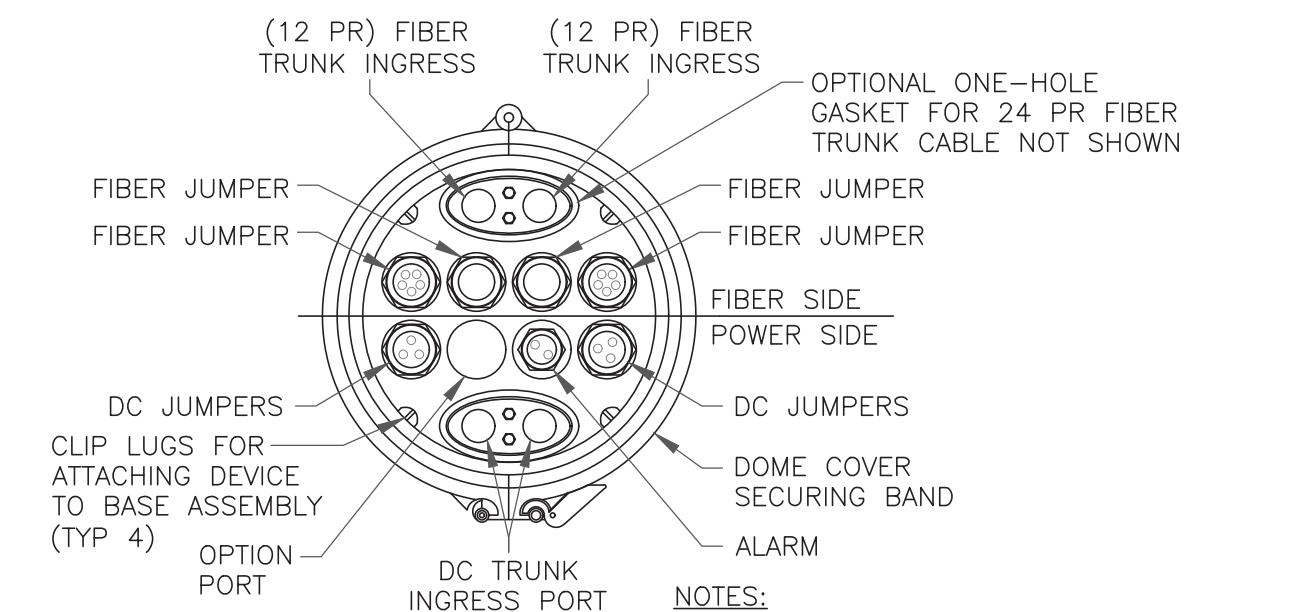
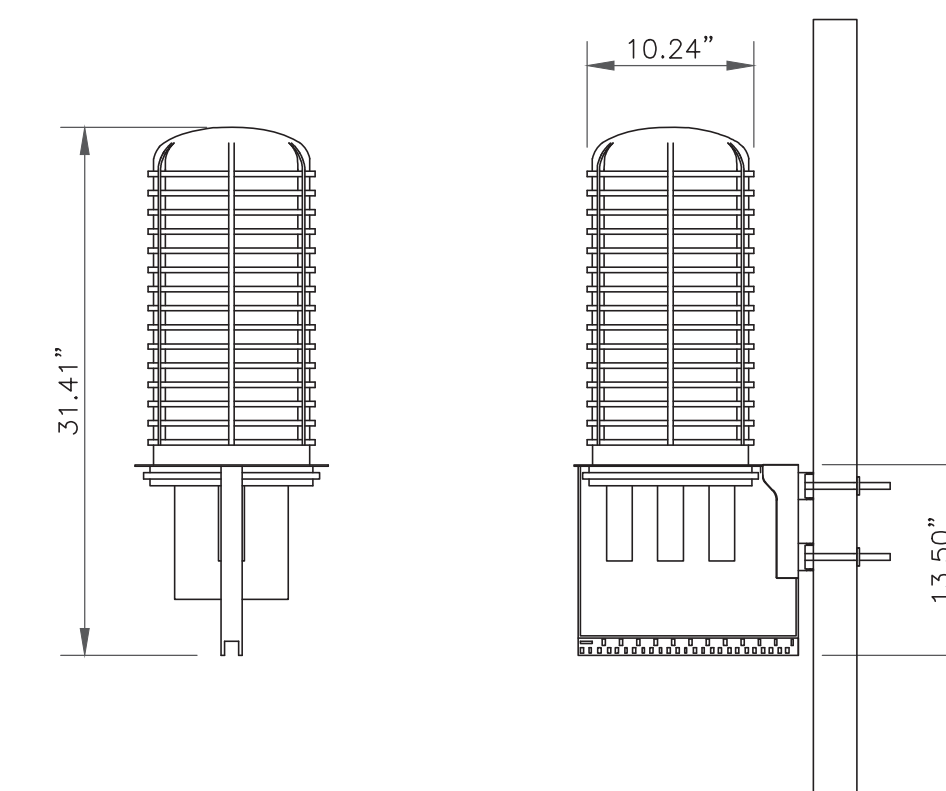
RAYCAP

DC9-48-60-24-8C-EV

RAYCAP - DC9-48-60-24-8C-EV
SIZE: 10.24x31.40 IN.
WEIGHT: 26.2 LBS
NOMINAL OPERATING VOLTAGE: 48 VDC
VOLTAGE PROTECTION RATING: 330 V
WIND LOADING: 150 MPH SUSTAINED (105.7 LBS)
WIND LOADING: 195 MPH GUST (213.6 LBS)



CONTRACTOR TO USE "THREAD LUBRICANT" ON MOUNTING BOLTS DURING INSTALLATION



6 SQUID MOUNTING DETAIL
SCALE: NOT TO SCALE

- NOTES:**
1. REMOVE CABLE SEALING GLAND AND INSTALL M32x1.5 METRIC-TO-1" NPT ADAPTER (COOPER CROUSE-HINES P/N CAP 740 994 OR EQUIVALENT MFR) WHEN CONNECTING CONDUIT TO OVP.

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AT&T SITE NUMBER:
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BU #: 806368
HRT 049B 943215

374 THREE MILE RD.
GLASTONBURY, CT 06033

EXISTING
145'-0" MONOPOLE

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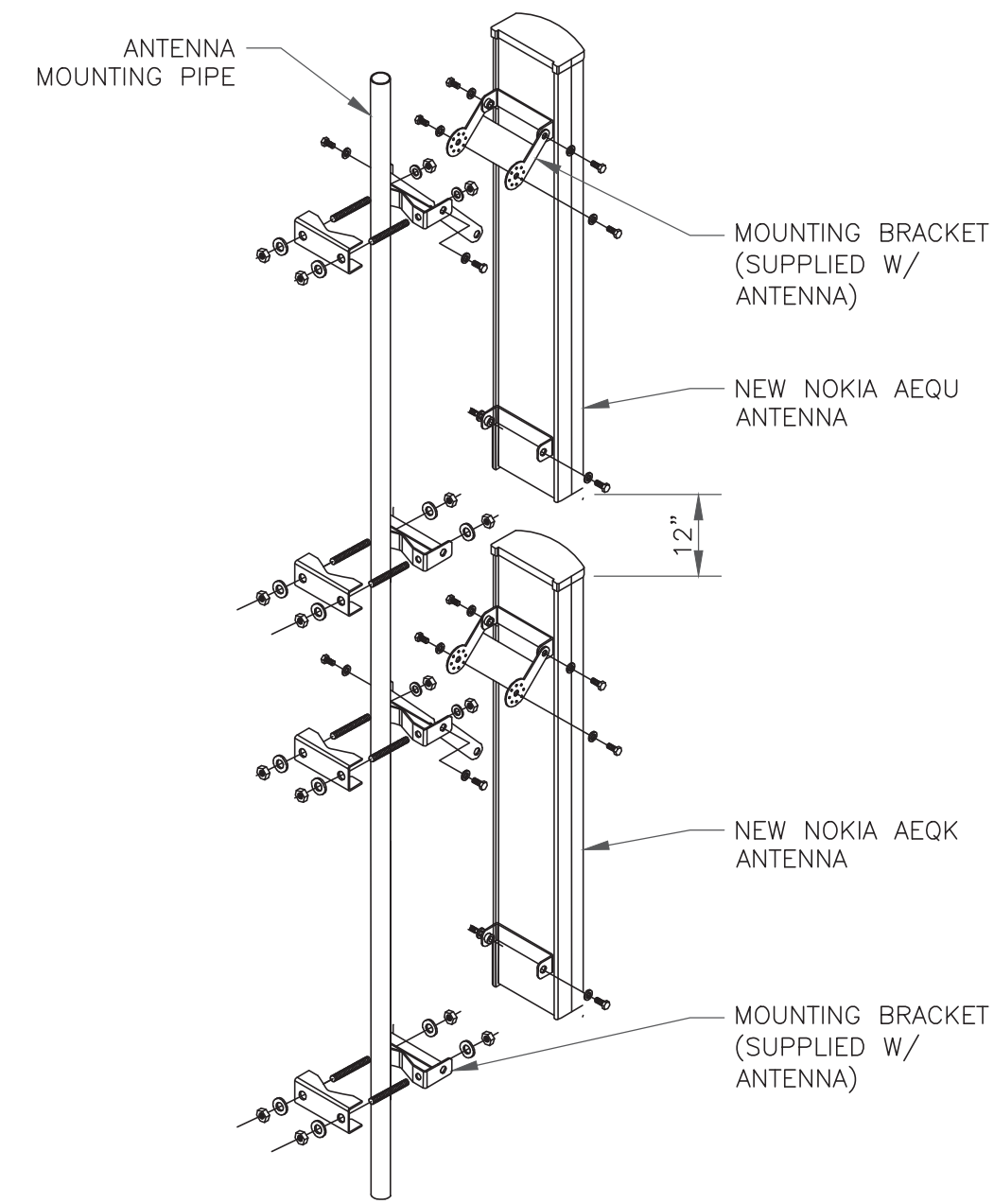
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SHEET NUMBER:
C-4

REVISION:
0

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1 ANTENNA MOUNTING DETAIL
SCALE: NOT TO SCALE

2 NOT USED
SCALE: NOT TO SCALE

3 NOT USED
SCALE: NOT TO SCALE

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5 NOT USED
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

4 NOT USED
SCALE: NOT TO SCALE



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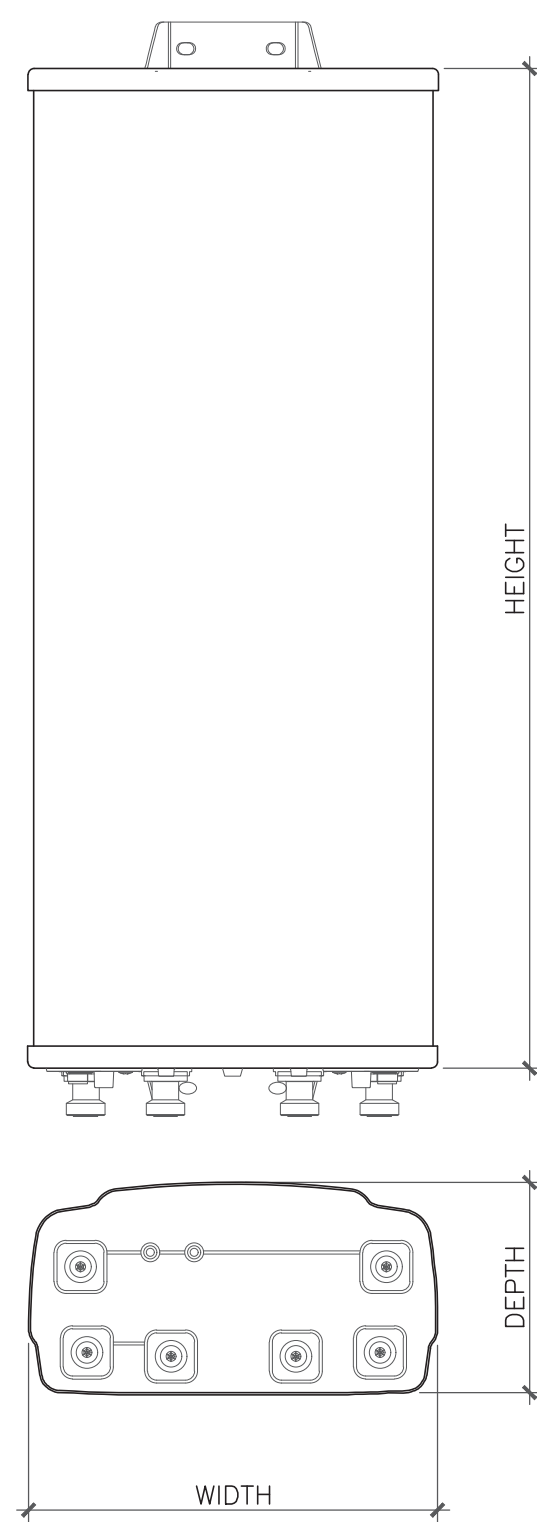
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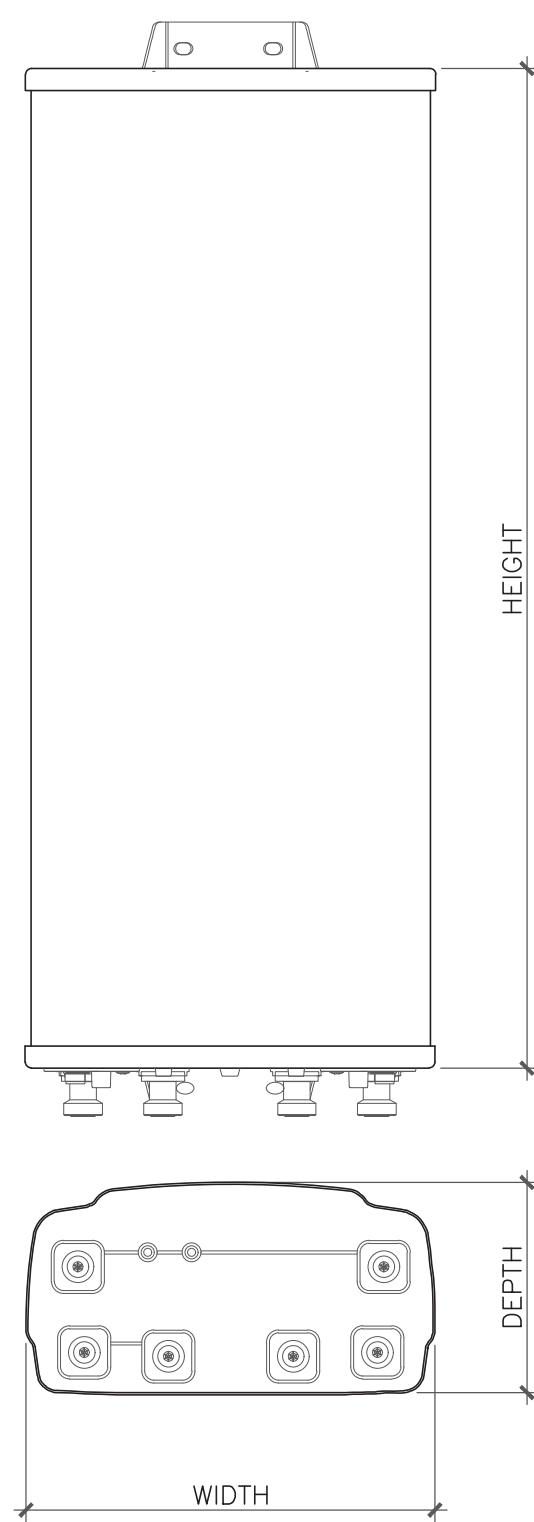
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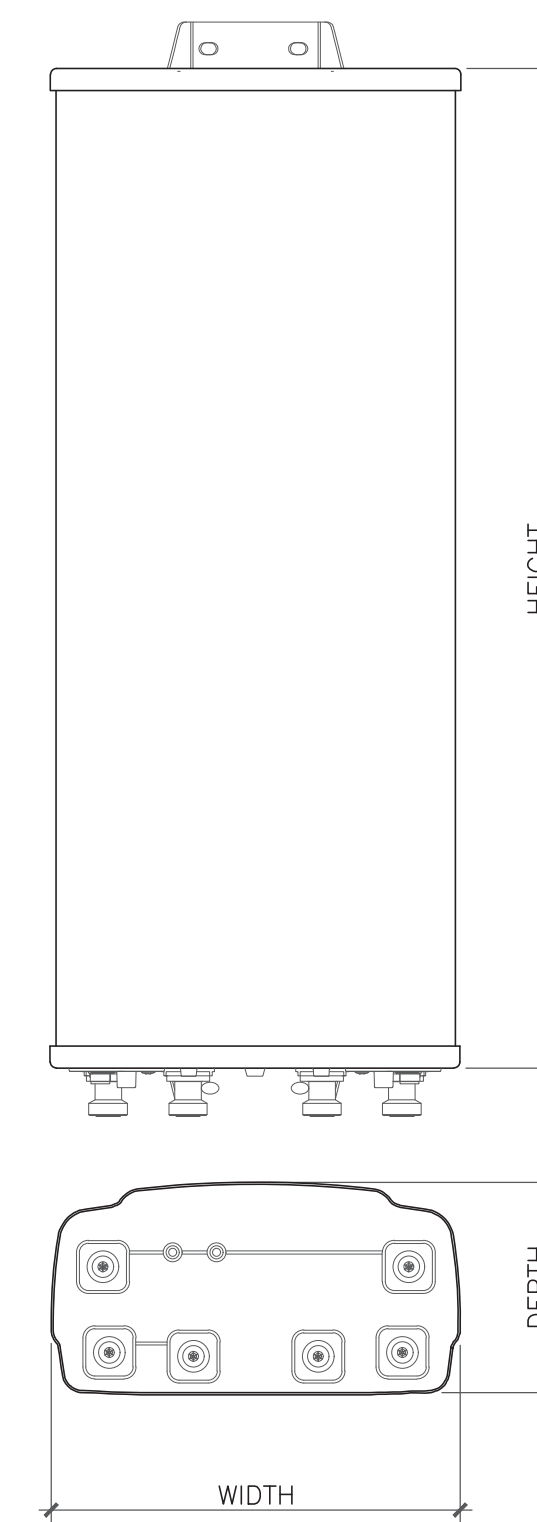
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
OPA65R-BU6D	71.2"	21.0"	7.8"	60.2 lbs

1 ANTENNA DETAIL
SCALE: NOT TO SCALE



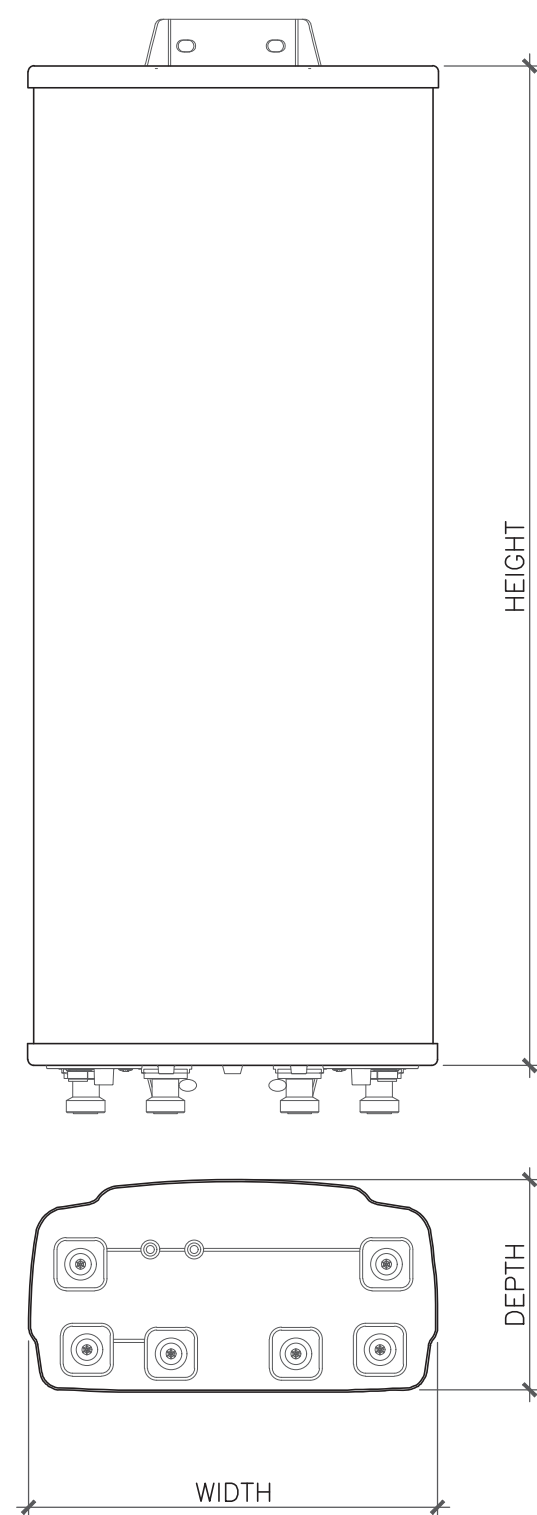
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
AIR 6419 B77G	28.3"	16.1"	7.9"	66.1 lbs

2 ANTENNA DETAIL
SCALE: NOT TO SCALE



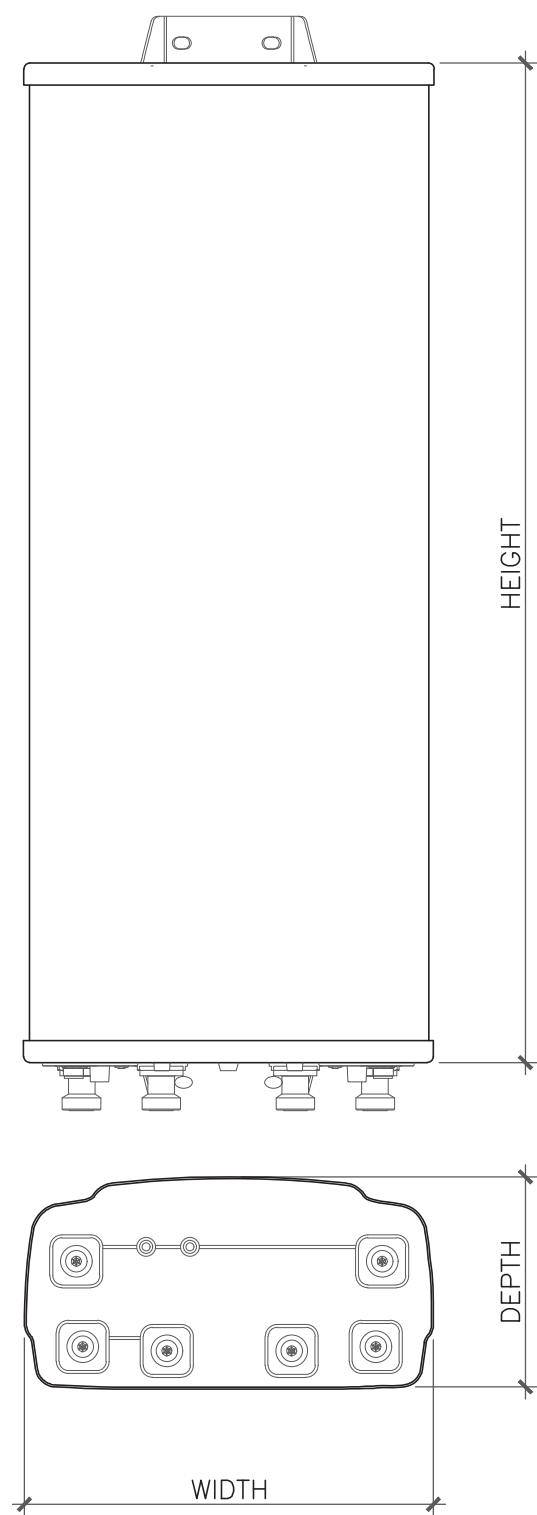
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
AIR 6449 B77D	30.39"	15.87"	8.07"	81.6 lbs

3 ANTENNA DETAIL
SCALE: NOT TO SCALE



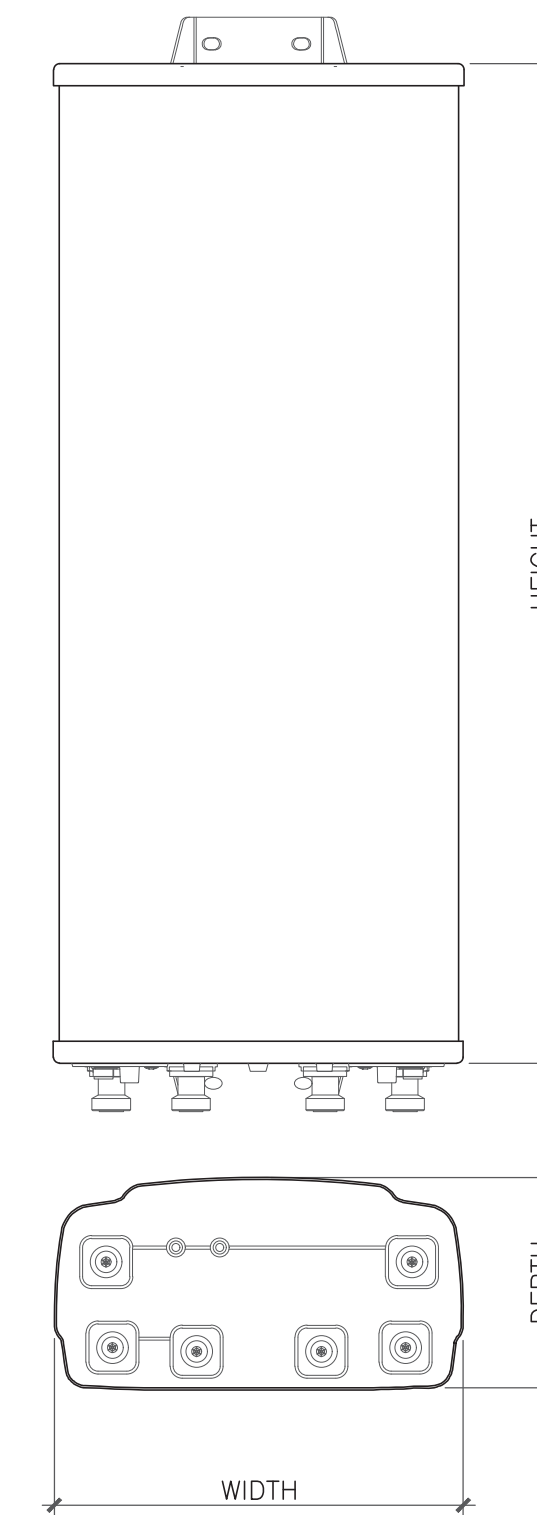
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
DMP65R-BU6DA	71.2"	20.7"	7.7"	79.4 lbs

4 ANTENNA DETAIL
SCALE: NOT TO SCALE



ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
DMP65R-BU8DA	96.0"	20.7"	7.7"	95.7 lbs

5 ANTENNA DETAIL
SCALE: NOT TO SCALE



ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
OPA65R-BU8D	96.0"	21.0"	7.8"	76.5 lbs

6 ANTENNA DETAIL
SCALE: NOT TO SCALE

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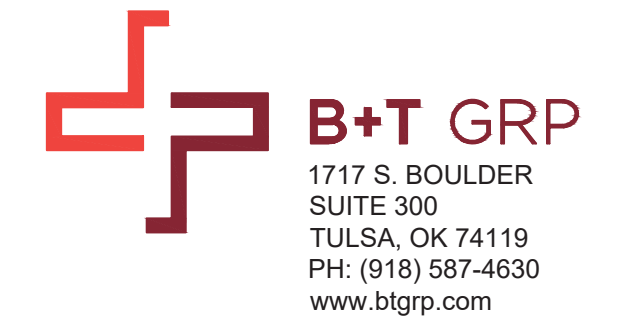
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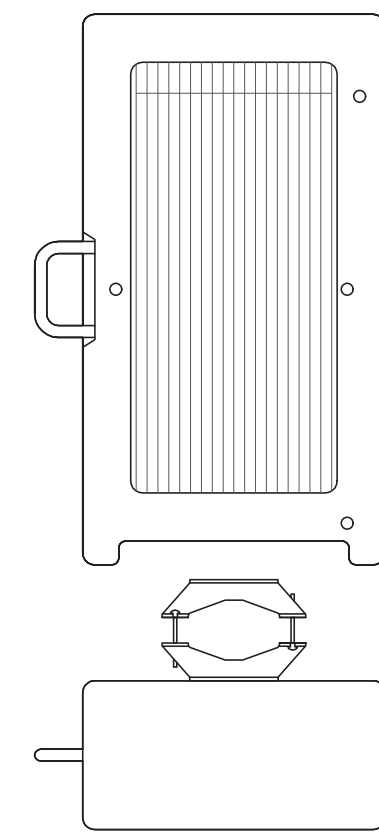
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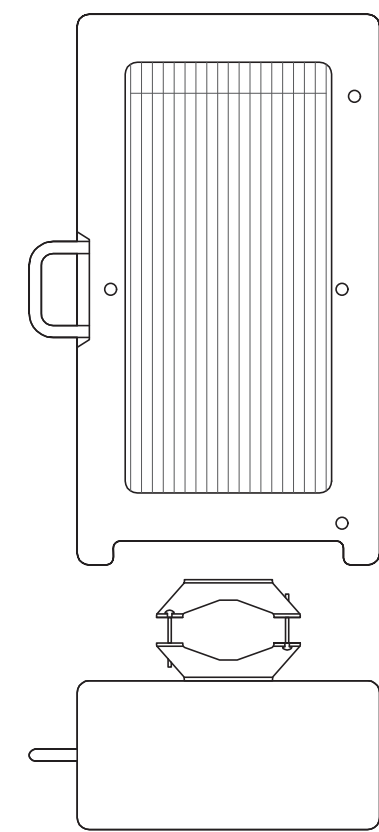
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SHEET NUMBER: **C-5.1** REVISION: **0**



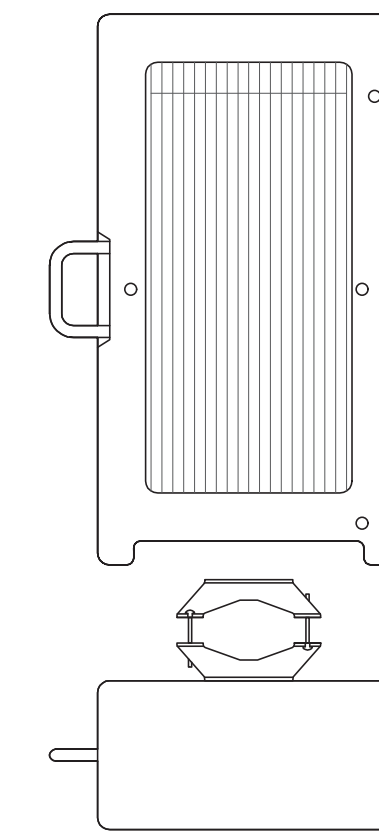
ERICSSON - 4449 B5/B12
 WEIGHT (FULLY EQUIPPED): 71 LBS
 SIZE (HxWxD): 17.91x13.19x9.44 IN.
 CONNECTOR TYPE: 4.3-10 FEMALE (4 TOTAL PORTS)

① ERICSSON - 4449 B5/B12
 SCALE: NOT TO SCALE



ERICSSON - RRUS 4426 B66
 WEIGHT (FULLY EQUIPPED): 48.4 LBS
 SIZE (HxWxD): 14.96x13.19x5.8 IN.
 CONNECTOR TYPE: 4.3-10 FEMALE (4 TOTAL PORTS)

② ERICSSON - RRUS 4426 B66
 SCALE: NOT TO SCALE



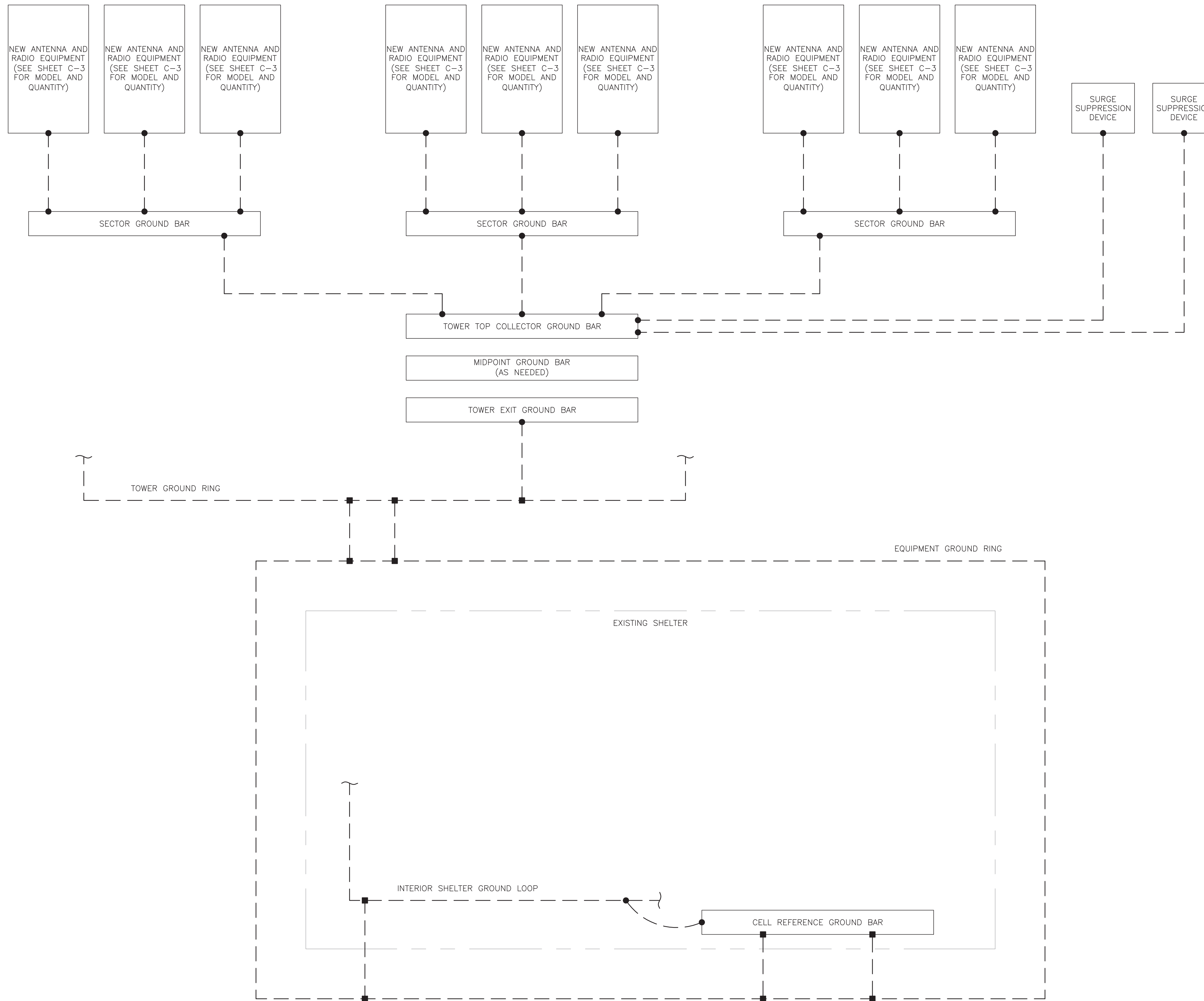
ERICSSON - RRUS 4478 B14
 WEIGHT (FULLY EQUIPPED): 59.4 LBS
 SIZE (HxWxD): 18.1x13.4x8.26 IN.
 CONNECTOR TYPE: 4.3-10 FEMALE (4 TOTAL PORTS)

③ ERICSSON - RRUS 4478 B14
 SCALE: NOT TO SCALE

④ NOT USED
 SCALE: NOT TO SCALE

⑤ NOT USED
 SCALE: NOT TO SCALE

⑥ NOT USED
 SCALE: NOT TO SCALE



GROUNDING PLAN LEGEND:

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

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.

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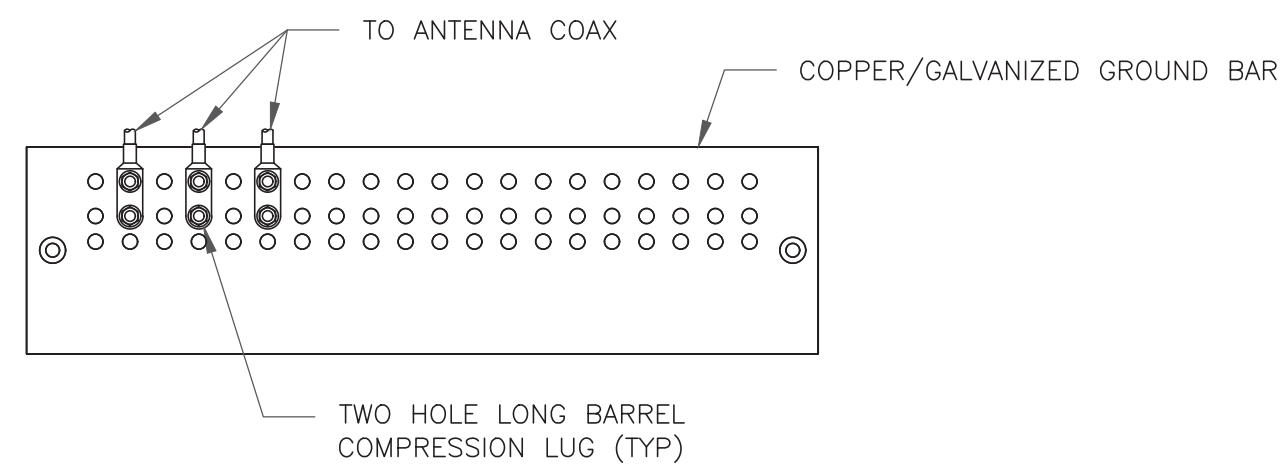
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SHEET NUMBER: **G-1** REVISION: **0**

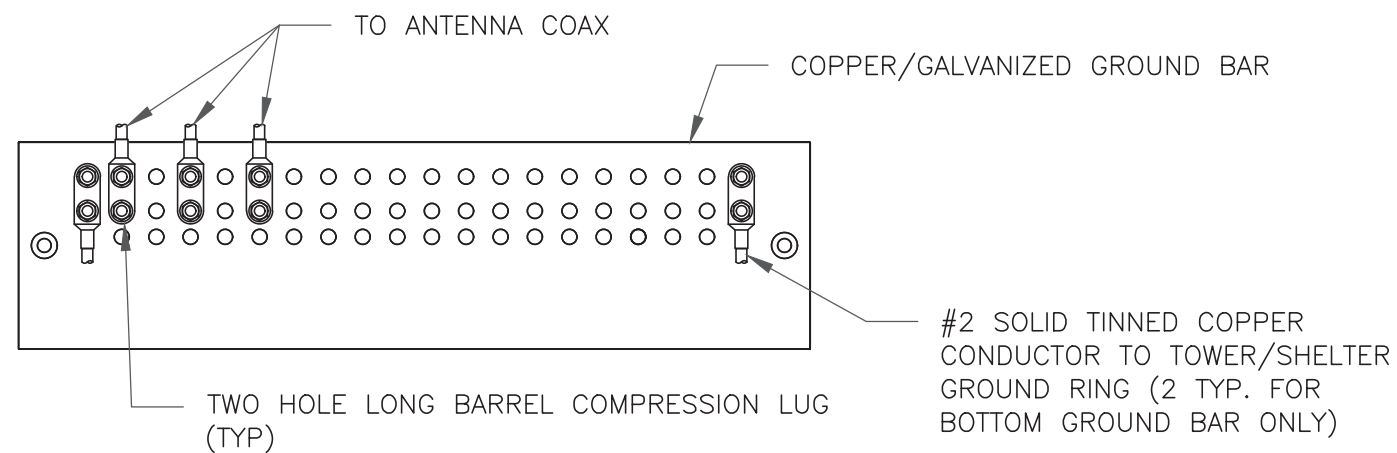
1 GROUNDING SCHEMATIC
SCALE: NOT TO SCALE



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

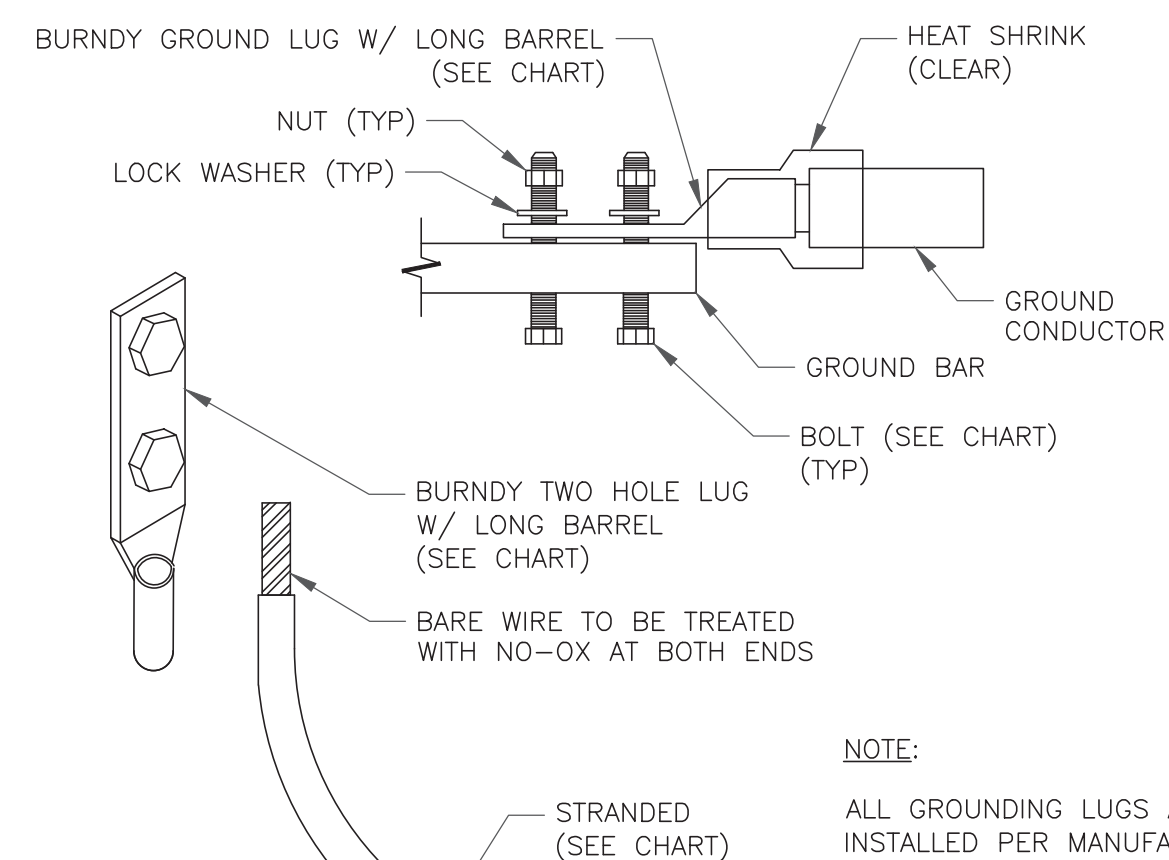


NOTES:

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

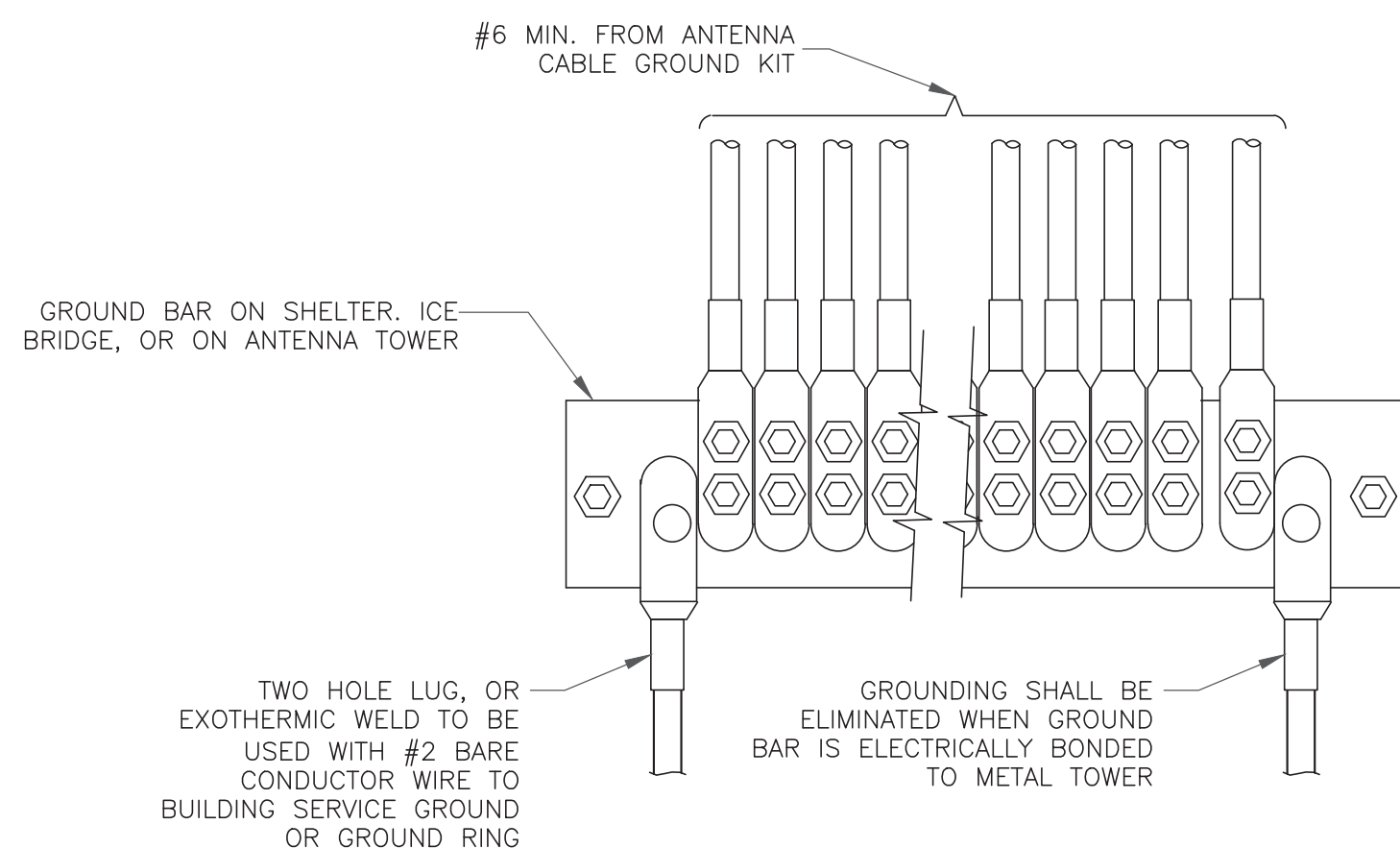
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC SS 2 BOLT
#2 SOLID TINNED	YA3C-2TC38	3/8" - 16 NC SS 2 BOLT
#2 STRANDED	YA2C-2TC38	3/8" - 16 NC SS 2 BOLT
#2/0 STRANDED	YA26-2TC38	3/8" - 16 NC SS 2 BOLT
#4/0 STRANDED	YA28-2N	1/2" - 16 NC SS 2 BOLT



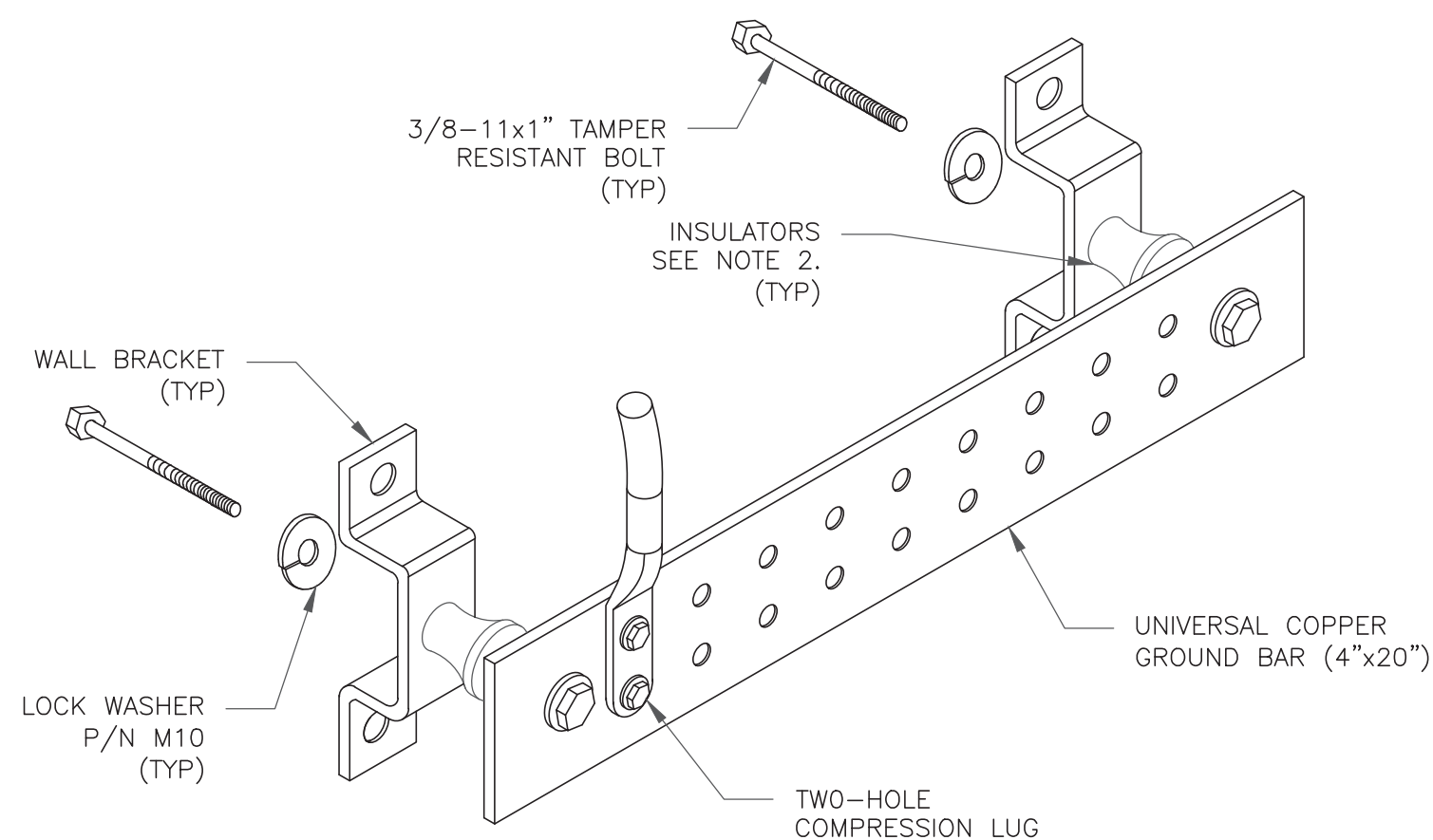
NOTE:

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



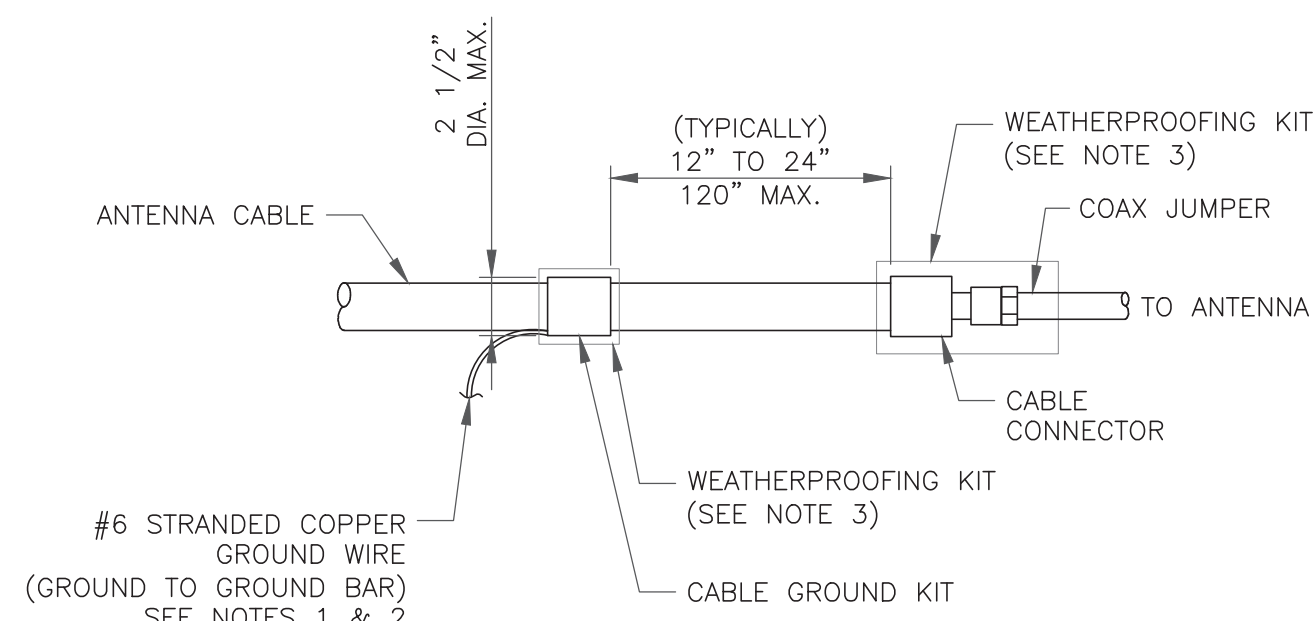
NOTES:

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

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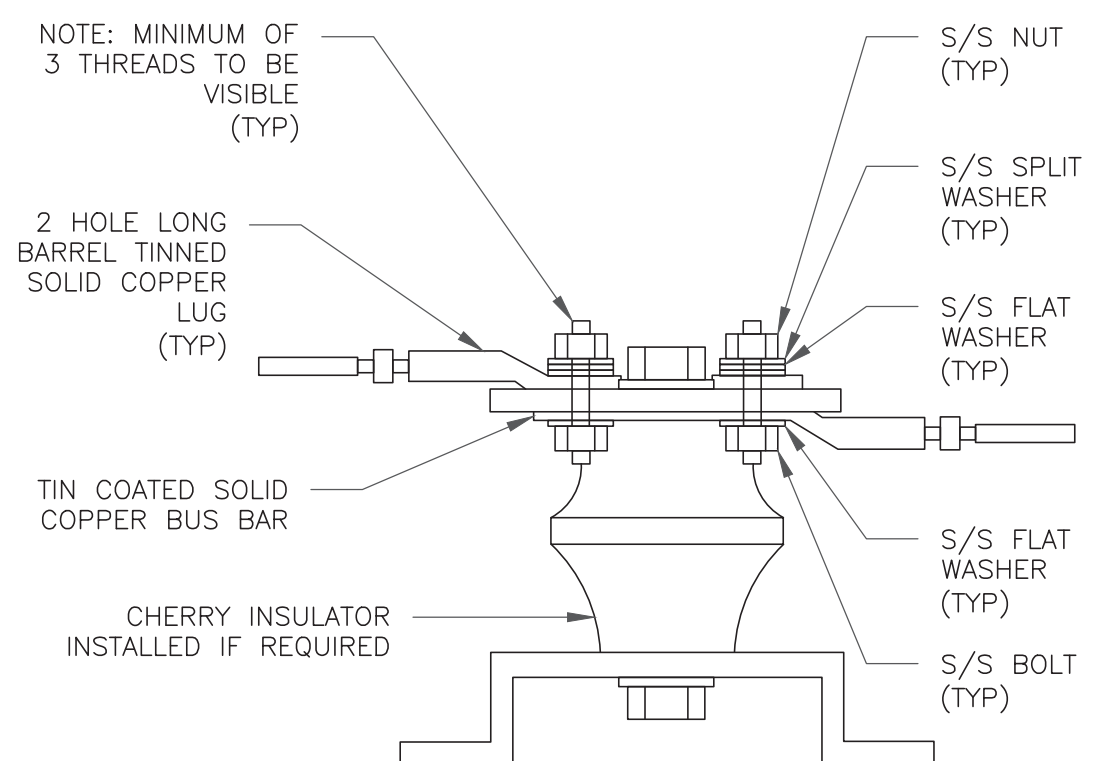
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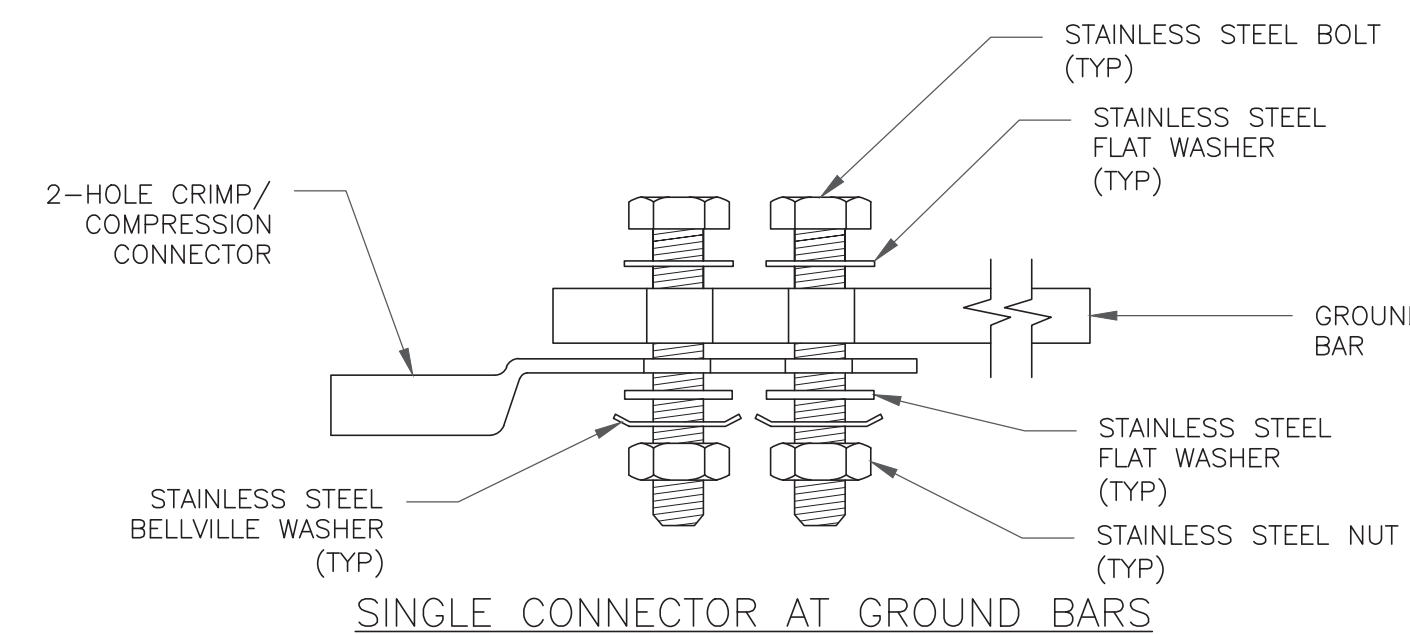
NOTES:

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.

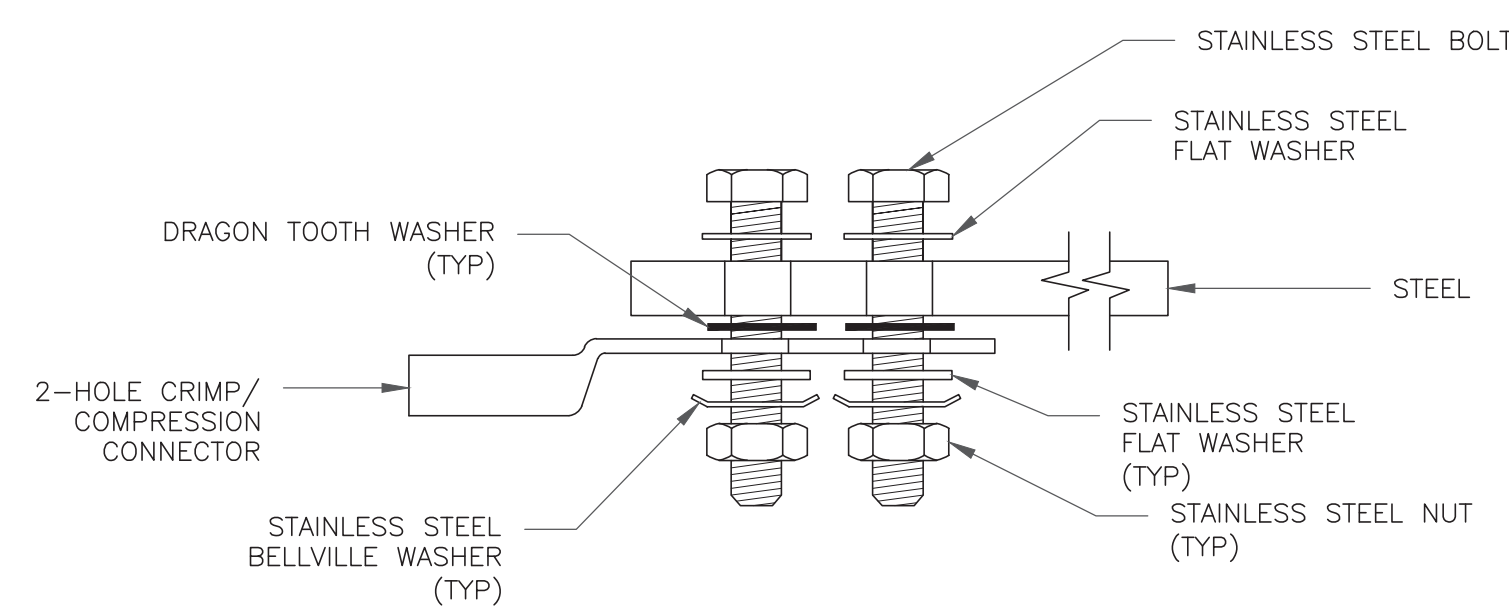
6 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



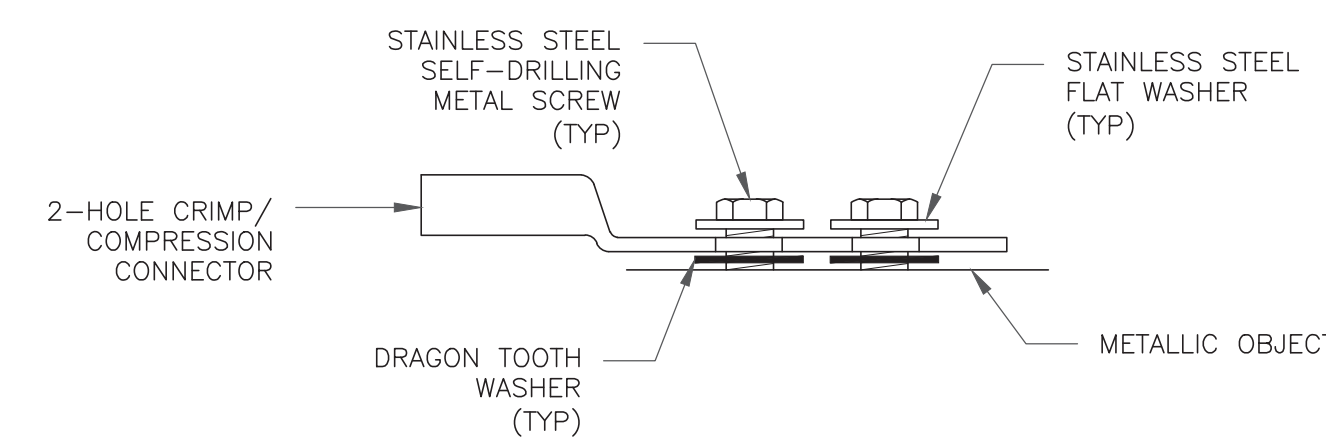
7 LUG DETAIL
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

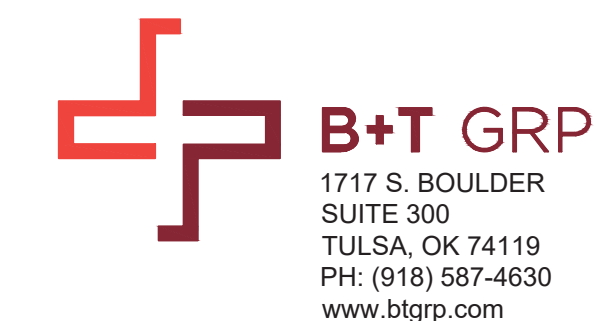


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

8 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



AT&T SITE NUMBER:
CTL01100

BU #: **806368**
HRT **049B 943215**

374 THREE MILE RD.
GLASTONBURY, CT 06033

EXISTING
145'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	1/14/21	RPA	PRELIMINARY REVIEW	AY
B	1/25/21	FWP	PRELIMINARY REVIEW	MTJ
0	2/21/22	FWP	CONSTRUCTION	MTJ

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/1/23

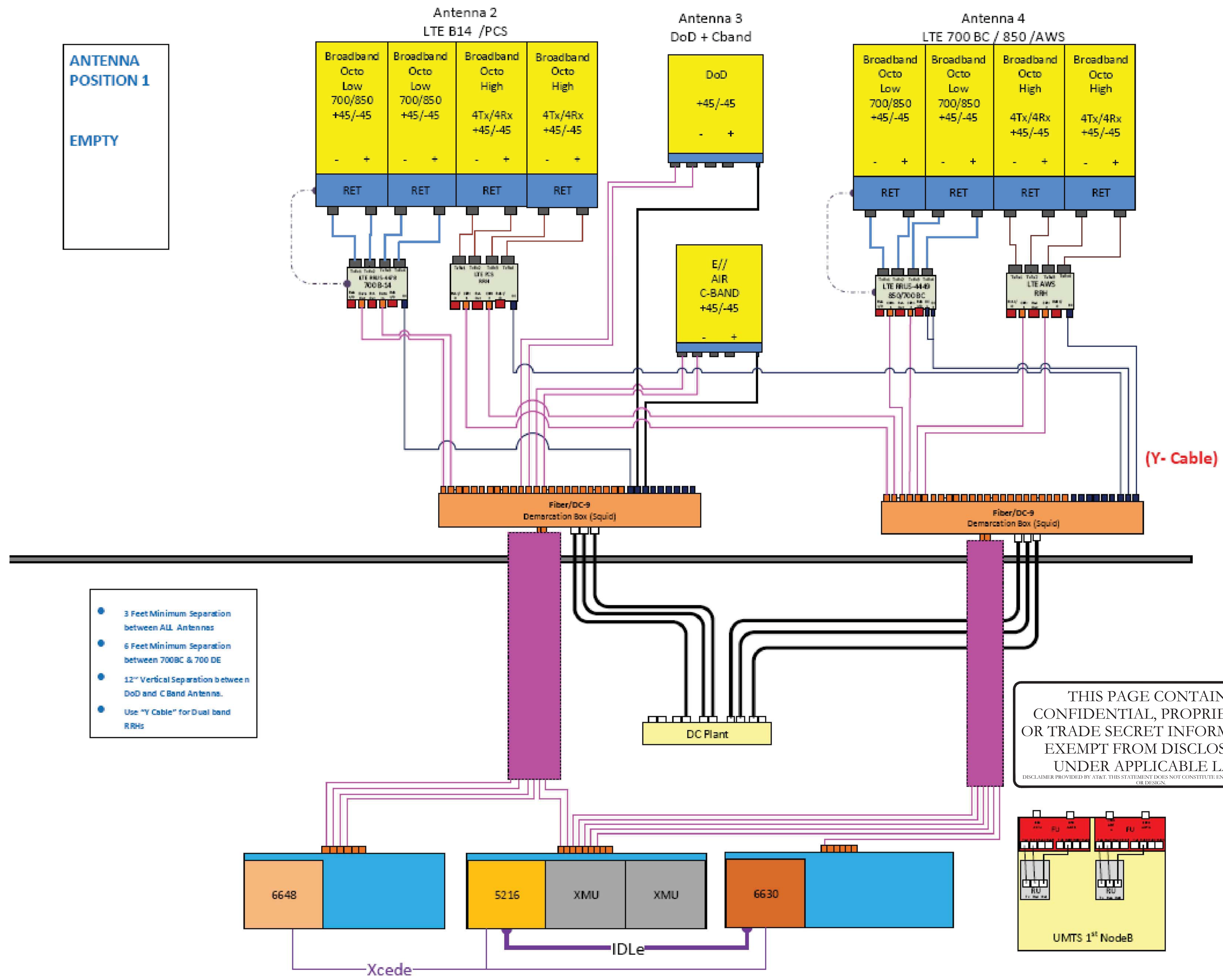


PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO.: 29495, EXPIRATION DATE: 9/15/23.

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.

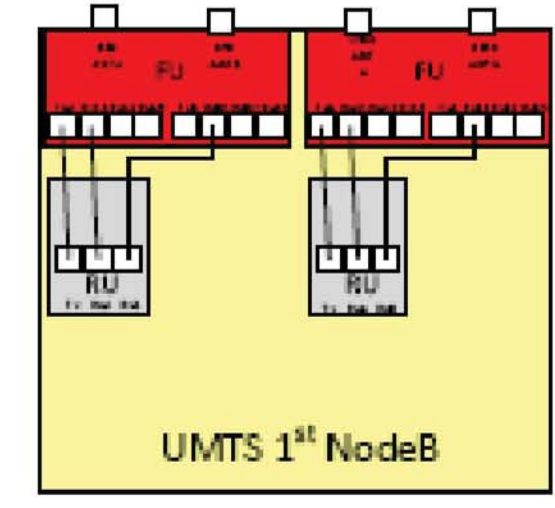
SHEET NUMBER: **G-2** REVISION: **0**

ANTENNA POSITION 1
EMPTY

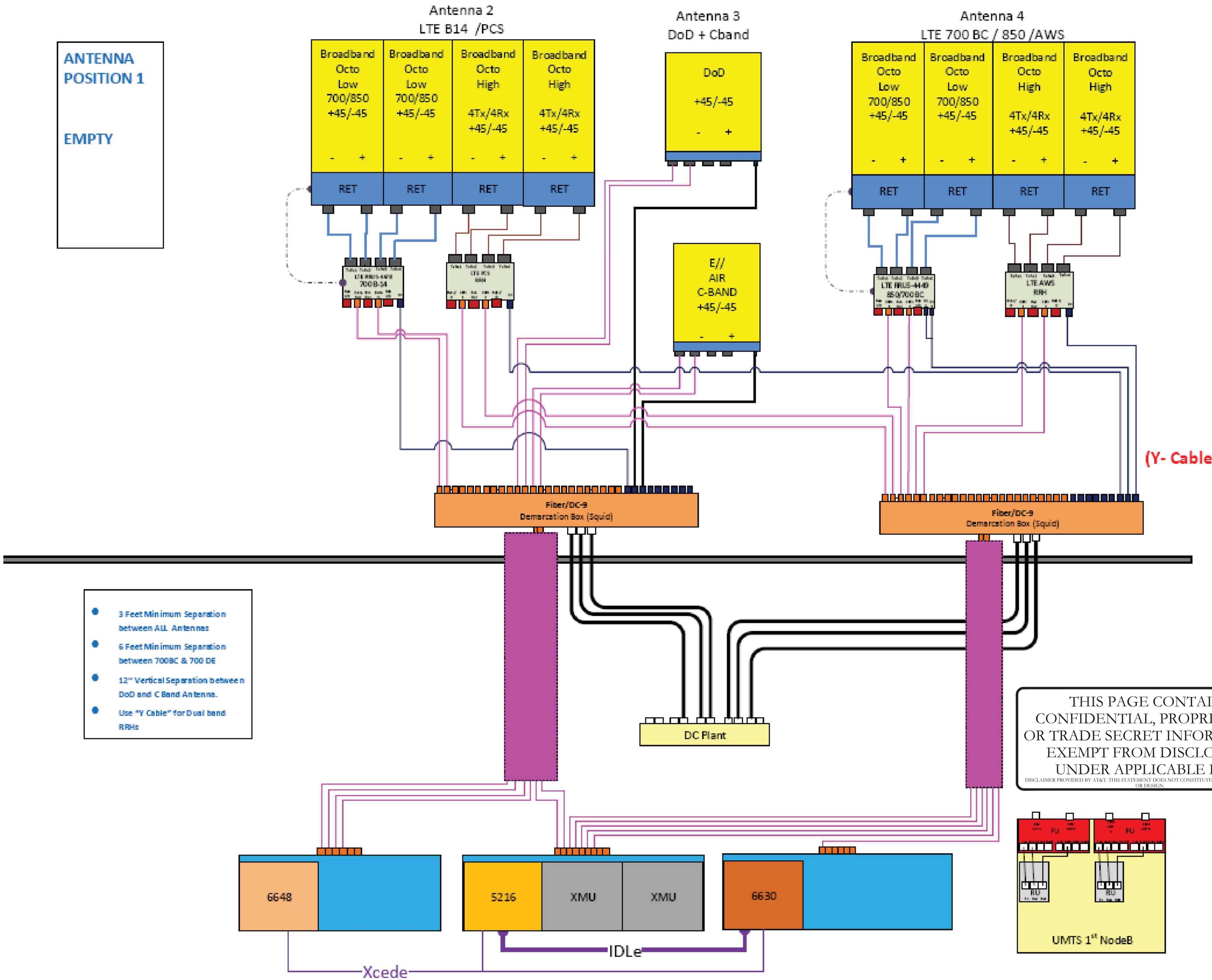


- 3 Feet Minimum Separation between ALL Antennas
- 6 Feet Minimum Separation between 700BC & 700 DE
- 12" Vertical Separation between DoD and C Band Antennas.
- Use "Y Cable" for Dual band RRHs

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ANTENNA POSITION 1
 EMPTY



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ANTENNA POSITION 1
 EMPTY

