Crown Castle



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

July 28, 2020

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

RE: Notice of Exempt Modification for Crown Site BU: 806366

AT&T Site ID: 10035085

73 North Main Street, Marlborough, CT 06447

Latitude: 41° 37′ 47.30″/ Longitude: -72° 27′ 59.40″

Dear Ms. Bachman:

AT&T currently maintains (9) antennas at the 144-foot level of the existing 155.5-foot monopole at 73 North Main Street in Marlborough, Connecticut. The tower is owned by Crown Castle. The property is owned by Advantage Properties LLC, C/O Crown Atlantic Co. AT&T intends to replace three (3) existing antennas with six (6) new antennas for a final antenna inventory of twelve (12) total antennas.

The facility was approved by the Connecticut Siting Council in Docket No. 169 on October 25, 1995. This approval included the following conditions: The tower shall be constructed as a monopole, no taller than necessary to provide the proposed communication service, sufficient to accommodate the antennas of Springwich Cellular Limited Partnership and the Town of Marlborough, and not to exceed the total height of 160 feet above ground level (AGL). AT&T's proposed modifications will comply with these conditions.

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.S.C.A. § 16-50j-73, a copy of this letter is being sent to First Selectman Gregory Lowrey for the Town of Marlborough, Peter Hughes, Director of Planning, Advantage Properties, LLC, the 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.

- 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, AT&T 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: Anne Marie Zsamba.

Sincerely,

Anne Marie Zsamba Site Acquisition Specialist 3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065 (201) 236-9224 annemarie.zsamba@crowncastle.com

Attachments:

Exhibit-A: Compound Plan and Elevation Depicting the Planned Changes

Exhibit-B: Structural Modification Report

Exhibit-C: General Power Density Table Report (RF Emissions Analysis Report)

cc: Gregory Lowrey, First Selectman (via email only to firstselectman@marlboroughct.net)
Town of Marlborough
26 North Main Street
Marlborough, CT 06447

Peter Hughes, Director of Planning (via email only to planner@marlboroughct.net)
Town of Marlborough
26 North Main Street
Marlborough, CT 06447

Advantage Properties LLC C/O Kevin MacGranor 219 South Road Marlborough, CT 06447



After printing this label:

- 1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
- 2. Fold the printed page along the horizontal line.
- 3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.

Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of \$100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of \$100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is \$1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

From: Zsamba, Anne Marie
To: planner@marlboroughct.net

Subject: Notice of Exempt Modification - AT&T - 73 North Main Street

Date: Tuesday, July 28, 2020 10:45:00 AM

Attachments: EM-AT&T-73 NO MAIN ST MARLBOROUGH-806366 notice.pdf

Dear Planning Director Hughes:

Attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council, today July 28, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,

Anne Marie Zsamba

ANNE MARIE ZSAMBA

Site Acquisition Specialist

T: (201) 236-9224 M: (518) 350-3639 F: (724) 416-6112

CROWN CASTLE

3 Corporate Park Drive, Suite 101 Clifton Park, NY 12065 CrownCastle.com From: Zsamba, Anne Marie

To: "firstselectman@marlboroughct.net"

Subject: Notice of Exempt Modification - AT&T - 73 North Main Street

Date: Tuesday, July 28, 2020 10:45:00 AM

Attachments: EM-AT&T-73 NO MAIN ST MARLBOROUGH-806366 notice.pdf

Dear First Selectman Lowrey:

Attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council, today July 28, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,

Anne Marie Zsamba

ANNE MARIE ZSAMBA

Site Acquisition Specialist

T: (201) 236-9224 M: (518) 350-3639 F: (724) 416-6112

CROWN CASTLE

3 Corporate Park Drive, Suite 101 Clifton Park, NY 12065 CrownCastle.com

Exhibit A

Original Facility Approval









CONNECTICUT SITING COUNCIL

Home

About Us

Pending Matters

Decisions

Forms

Contact Us

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Meetings & Minutes

Public Participation

Audio Link to New Britain Hearing Rooms

Programs & Service

Telecommunications Database

Dublications

Other Resources

Statutes & Regulations

Electric Transmission Upgrade Projects

Frequently Asked Questions











Melanie Bachman,

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posted on this site.

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DOCKET NO. 169 - An application of Bell Atlantic NYNEX Mobile, for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a telecommunications tower and associated equipment located within a 56+/- acre parcel at 56 East Hampton Road, in Marlborough, Connecticut. The proposed alternatives are located within a 21.7+/- acre parcel at North Main Street and within a 2.5+/- acre parcel at 9-11 South Main Street, in Marlborough, Connecticut.

Connecticut Siting Council

October 25, 1995

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 first alternate site in Marlborough, 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, Inc. (BANM) for the construction, operation, and maintenance of a cellular telecommunications tower, associated equipment, and building at the proposed first alternate site, located within a 21.7+/- acre parcel at North Main Street, Marlborough, Connecticut. We find the effects on scenic resources and adjacent land uses of the prime site and second alternate site to be significant, and therefore deny certification of these sites.

The facility shall be constructed, operated, and maintained as a monopole 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 Springwich Cellular Limited Partnership and the Town of Marlborough, and not to exceed a total height of 160 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 placement of utilities underground, relocation of the tower within the leased parcel to provide the maximum practicable buffer of the tower from adjacent land owners; 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 North Main Street; plans for site clearing and tree trimming; and plans for water drainage and erosion and sedimentation controls consistent with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.
- 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 Middletown Press.

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 ITS REPRESENTATIVE

Bell Atlantic NYNEX Mobile, Inc.
Brian C. S. Freeman, Esq.
Kenneth C. Baldwin, Esq.

Robinson & Cole One Commercial Plaza Hartford, CT 06103-3597

David S. Malko

General Manager - Engineering

Sandy M. Ranciato Regulatory Services

Bell Atlantic NYNEX Mobile, Inc.

20 Alexander Drive Wallingford, CT 06492

<u>INTERVENOR</u> <u>ITS REPRESENTATIVE</u>

<u>Springwich Cellular Limited Partnership</u> <u>Peter J. Tyrrell, Esq.</u>

Springwich Cellular Limited Partnership

227 Church Street New Haven, CT 06510

PARTY <u>ITS REPRESENTATIVE</u>

Town of Marlborough William S. Fish, Jr.

Tyler, Cooper & Alcorn CityPlace, 35th Floor Hartford, CT 06103-3488

<u>PARTY</u> <u>ITS REPRESENTATIVE</u>

Neighbors Endorsing an Appropriate Tower Barry S. Zitser

(NEAT) Perakos, Kindl & Zitser

207 Main Street Hartford, CT 06106

Content Last Modified on 8/9/2002 11:28:31 AM

Ten Franklin Square New Britain, CT 06051 / 860- 827-2935

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Exhibit B

Property Card

Property Location: 73 NO	MAIN ST		MAP ID: 6/2	26/65T//		Bld	g Name:				Stat	te Use: 200	
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Exhibit C

Construction Drawings



59364F AT&T SITE NUMBER: AT&T SITE NAME: CTL01073 10035085 **AT&T FA CODE:**

MRCTB047152, MRCTB047154, MRCTB047151 AT&T PACE NUMBER:

LTE 5C, 6C, 4T4R AT&T PROJECT:

BUSINESS UNIT #: 806366

73 NORTH MAIN STREET **SITE ADDRESS:** MARLBOROUGH, CT 06447

COUNTY: HARTFORD **MONOPOLE** SITE TYPE:

155'-6" **TOWER HEIGHT:**

LOCATION MAP

NO SCALE

ATLANTA, GA 30324-3300



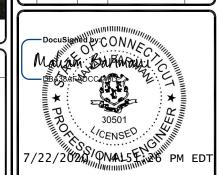
AT&T SITE NUMBER: **59364F**

BU #: **806366** HRT 107(C) 943204

73 NORTH MAIN STREET MARLBOROUGH, CT 06447

EXISTING 155'-6" MONOPOLE

		ISSU	ED FOR:	-
REV	DATE	DRWN	DESCRIPTION	DES./QA
Α	06/30/20	CJ	PRELIMINARY	RO
0	07/22/20	CJ	CONSTRUCTION	MB



Crown Castle USA Inc. Certificate of Registration #PEC.0001101

IT IS A VIOLATION OF LAW FOR ANY PERSON JNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER,

SHEET NUMBER:

REVISION:

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:

HRT 107(C) 943204

SITE ADDRESS: 73 NORTH MAIN STREET MARLBOROUGH, CT 06447

COUNTY: HARTFORD MAP/PARCEL #: 000008-000026-000056CD

AREA OF CONSTRUCTION: EXISTING LATITUDE: 41° 37' 47.30'

LONGITUDE: -72° 27' 59.40" NAD83 LAT/LONG TYPE: GROUND ELEVATION: 581 FT.

CURRENT ZONING: COMMERCIAL MIXED USE TOWN OF MARLBOROUGH IURISDICTION:

OCCUPANCY CLASSIFICATION: U TYPE OF CONSTRUCTION:

A&E FIRM:

CONTACTS:

CROWN CASTLE

USA INC. DISTRICT

FACILITY IS UNMANNED AND NOT FOR A.D.A. COMPLIANCE: HUMAN HABITATION

PROPERTY OWNER: GLOBAL SIGNAL ACQUISITIONS IV LLC

PO BOX 277455 ATLANTA, GA 30384-7455

TOWER OWNER: CROWN ATLANTIC COMPANY LLC

 $2000\ CORPORATE\ DRIVE$ CANONSBURG, PA 15317

CARRIER/APPLICANT: AT&T TOWER ASSET GROUP

575 MOROSGO DRIVE

(845) 458-7720

PROJECT TEAM

CROWNAE.APPROVAL@CROWNCASTLE.COM

3 CORPORATE PARK DRIVE, SUITE 101

VERONICA DELIA - PROJECT MANAGER

JASON D'AMICO - CONSTRUCTION MANAGER

CROWN CASTLE USA INC.

2000 CORPORATE DRIVE

CANONSBURG PA 15317

CLIFTON PARK, NY 12065

ATLANTA, GA 30324-3300 ELECTRIC PROVIDER: CONNECTICUT LIGHT & POWER CO

(800) 922-4455 TELCO PROVIDER: LIGHTOWER

DRAWING INDEX

l	SHEET#	SHEET DESCRIPTION
ı	T-1	TITLE SHEET
ı	T-2	GENERAL NOTES
ı	C-1.1	SITE PLAN
l	C-1.2	EXISTING & FINAL EQUIPMENT PLANS
l	C-2	FINAL ELEVATION & ANTENNA PLANS
	C-3	FINAL EQUIPMENT SCHEDULE
	C-4	EQUIPMENT SPECS
	G-1	GROUNDING SCHEMATIC
	G-2	GROUNDING DETAILS
l	ATTACHED	PLUMBING DIAGRAM
l		

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 1X17. 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



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

TOWER SCOPE OF WORK:

- REMOVE (3) ERICSSON RRUS 12 B5 RRHs
- INSTALL (3) CCI ANTENNAS HPA65R-BU6A ANTENNAS
- INSTALL (3) ERICSSON RADIO 4478 B14 RRHs
- INSTALL (3) ERICSSON RADIO 8843 B2/B66A RRHs
- INSTALL (2) #8AWG DC CABLES (3/4")
- INSTALL (1) 2" INNERDUCT
- INSTALL (1) XMU03
- INSTALL (1) IDLe

PROJECT DESCRIPTION

- REMOVE (3) KMW AM-X-CD-16-65-00T-RET ANTENNAS
- INSTALL (3) CCI ANTENNAS OPA65R-BU6DA ANTENNAS

- INSTALL (1) RAYCAP DC6-48-60-18-8F SQUID
- INSTALL (1) 2-1/2" SCH 40 x 6'-0" LONG PIPE W/ ASSOCIATED HARDWARE
- INSTALL (3) BACK TO BACK RRH MOUNTS

GROUND SCOPE OF WORK:

- INSTALL (1) LTE BBU
- INSTALL (1) 6601

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

2018 CT STATE BUILDING CODE/2015 IBC W/ CT AMENDMENTS MECHANICAL 2018 CT STATE BUILDING CODE/2015 IMC W/ CT AMENDMENTS ELECTRICAL 2018 CT STATE BUILDING CODE/2017 NEC W/ CT AMENDMENTS

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS: BLACK & VEATCH DATED: IUNE 10, 2020

MOUNT ANALYSIS: JACOBS TELECOMMUNICATIONS, INC. DATED: JUNE 03, 2020

RFDS REVISION: FINAL DATED: 05/26/2020

ORDER ID: 517064

SITE PHOTO

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

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

- NOTICE TO PROCEED- NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800-788-7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
- "LOOK UP" CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT: THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR REINFUNCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE HE INTEGRIT OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING HE 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 CLIM MAINTENANCE AND CONTRACTOR NOTICE TICKET.
- PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPELETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS
- ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED—STD—10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION. TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA-322
- ALL SITE WORK TO COMPLY WITH DAS-STD-10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE" AND LATEST VERSION OF ANSI/TIA-1019-A-2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
- IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
- PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
 ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE
 CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND
 COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC
 AUTHORITY REGARDING THE PERFORMANCE OF THE WORK, ALL WORK CARRIED OUT SHALL COMPLY WIT
 ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- 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 SAFFTY PROCEDURES
- CONSTRUCTION SAFETY PROCEDURES.
 ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT
 SPECIFICATIONS, LATEST APPROVED REVISION.
 CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT
 THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER
 REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
 ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE
- EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
- THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
- THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT
- THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
- THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
- CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION FROSION CONTRO SURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES. EROSION AND SEDIMENT CONTROL.
- THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION
- 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.

 CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED.
- FROM SITE ON A DAILY BASIS.
- 22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

- 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.
- TOWER OWNER: CROWN CASTLE USA INC.

 THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEGE 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.
- MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
 THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF
 CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS,
 TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR
 PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED
 TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HE SEPRESENTATIVE WILL NOT INCLUDE
 INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
- INSPECTION OF THESE TIEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.

 NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL

 DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT,

 AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCES COCUR BETWEEN PLANS, DETAILS,

 GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER

 CLAFIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD,

 SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO
- ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS.
- CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.

 PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL WIST THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CROWN CASTLE.

 ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES. RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

 UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

- THE CONTRACTOR SHALL INSTALLAL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.

 CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN PROMISED.
- THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEM<mark>ENTS, PAVEMENTS, CURBS, LAND</mark>SCAPING AND STRUCTURES, ANY
- DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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

GREENFIELD GROUNDING NOTES:

- ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC
- THE CONTRACTOR SHALL PERFORM IEEE FALL—OF—POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

 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
- METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT
- WETAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
- EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
- CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
- ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
 ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

 USE OF 90' BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45' BENDS CAN BE ADEQUATELY SUPPORTED.

 EXCITERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

- ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.

 COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.

 ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.

- ICE BRIDGE BONDING CONDUCTORS SHALL BE EXCHERMICALLY BONDED OR BULLED TO THE BRIDGE AND THE TOWER GROUND BAR.

 APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

 ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.

 MISCELLANGOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

 BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLD TINNED COPPER GROUND CONDUCTORS.

 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 COPE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE
- METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO THE GROUND CONDUCTORS SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.

 ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON-METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).

 BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLE THAN 2/O COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LAND MATER TABLE AND AND AND THE PROPERTY OF THE METALL BOLD FROM THE BUILDING STEEL COLUMNS, LAND MATER TABLE AND THE PROPERTY OF THE METALL BUILDING STEEL COLUMNS, LAND MATER TOWERS OF THE PROPERTY OF THE METALL BUILDING STEEL COLUMNS, LAND MATER TABLE AND THE PROPERTY OF THE METALL BUILDING STEEL COLUMNS, LAND MATER THE BUILDING STEEL COLUMNS, LAND MATER THE METALL BUILDING STEEL COLUMNS, LAND MATER TOWERS AND MATER THE METALL BUILDING STEEL COLUMNS. LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ELECTRICAL INSTALLATION NOTES:

- ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE
- FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
 CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED
- AND TRIP HAZARDS ARE FLIMINATED WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC
- WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.

 ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY OF THE NEC.

 ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.

 ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY PARE SUBJECTED, 22,000 AIC MINIMUM. VERYIPY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADDRETED. CODE DEET THE COVERED THE CONTROL OF THE MOST CURRENT ADDRETED.
- ADOPTED CODE PRE THE GOVERNING JURISDICTION.
 EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV
- PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.

 ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CIRCUIT ID'S).

- PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
 ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
 ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER)
 WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, FHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
- SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.

 POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI-CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS
- OTHERWISE SPECIFIED.
- POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75 C (90° C IF AVAILABLE).
- RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL. ANSI/JEEE
- 15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
- ELECTRICAL METALLIC TUBING (EMT) OR METAL—CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.

 SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE
- GRADE PVC CONDUIT. 18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION
- COURS OF FLEXIBLEY IS NEEDED.

 COURS OF FLEXIBLEY IS NEEDED.

 CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION—TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
- 20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND
- WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS
- (WIREMOLD SPECMATE WIREWAY).
 SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
- . SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).

 CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e., POWDER-ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED, CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS, ENDS OF CONDUITS SHALL BE REMPORARILY CAPPED FLUSH TO FINISH RADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING, CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.

 EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY—COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
- BETTER) FOR EXTERIOR LOCATIONS.
- METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY—COATED OR NON—CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS
- NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
- 27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC.
- BEFORE COMMENCING SHALL NOTIFY AND OBTAIN NECESSARY AND INCLUDENCE THE CARRIER AND/OR CROWN CASTLE USA INC.
 BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.

 THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE
 WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.

 INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "AT&T".
- ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

COND	UCTOR COL	OR CODE				
SYSTEM	CONDUCTOR	COLOR				
	A PHASE	BLACK				
120/240V, 1Ø	B PHASE	RED				
120/2404, 180	NEUTRAL	WHITE				
	GROUND	GREEN				
	A PHASE	BLACK				
	B PHASE	RED				
120/208V, 3Ø	C PHASE	BLUE				
	NEUTRAL	WHITE				
	GROUND	GREEN				
	A PHASE	BROWN				
	B PHASE	ORANGE OR PURPLE				
277/480V, 3Ø	C PHASE	YELLOW				
	NEUTRAL	GREY				
	GROUND	GREEN				
DC_VOLTAGE	POS (+)	RED**				
DC VOLIAGE	NEG (-)	BLACK**				

SEE NEC 210.5(C)(1) AND (2)

ABBREVIATIONS

ANTENNA EXISTING FACILITY INTERFACE FRAME GENERATOR GLOBAL POSITIONING SYSTEM GLOBAL SYSTEM FOR MOBILE LONG TERM EVOLUTION MASTER GROUND BAR MICROWAVE GENERATOR (N) NEC NEW NATIONAL ELECTRIC CODE (P) PROPOSED POWER PLANT QTY RECT RECTIFIER RADIO BASE STATION RADIO BASE STATION
REMOTE ELECTRIC TILT
RADIO FREQUENCY DATA SHEET
REMOTE RADIO HEAD
REMOTE RADIO UNIT
SMART INTEGRATED DEVICE
TOWER AUGUSTED TOWER MOUNTED AMPLIFIER

UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM

UMTS W.P.

APWA UNIFORM COLOR CODE:

WHITE PROPOSED EXCAVATION TEMPORARY SURVEY MARKINGS ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES

GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS

POTABLE WATER RECLAIMED WATER, IRRIGATION, AND SLURRY LINES

SEWERS AND DRAIN LINES





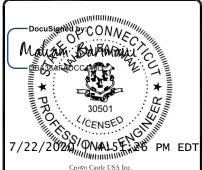
AT&T SITE NUMBER: 59364F

BU #: 806366 HRT 107(C) 943204

73 NORTH MAIN STREET MARLBOROUGH, CT 06447

EXISTING 155'-6" MONOPOLE

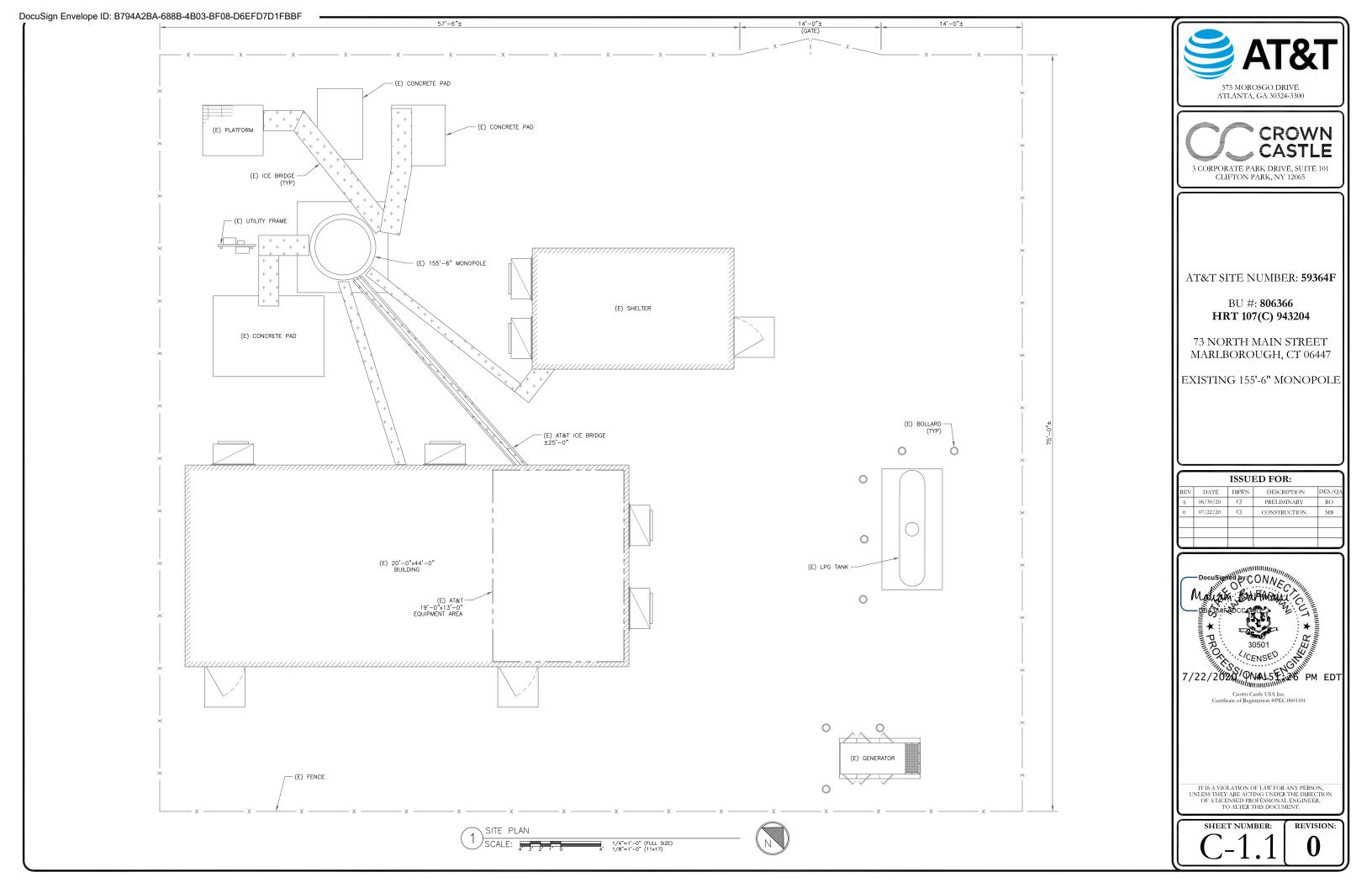
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Ш	REV	DATE	DRWN	DESCRIPTION	DES./Q.
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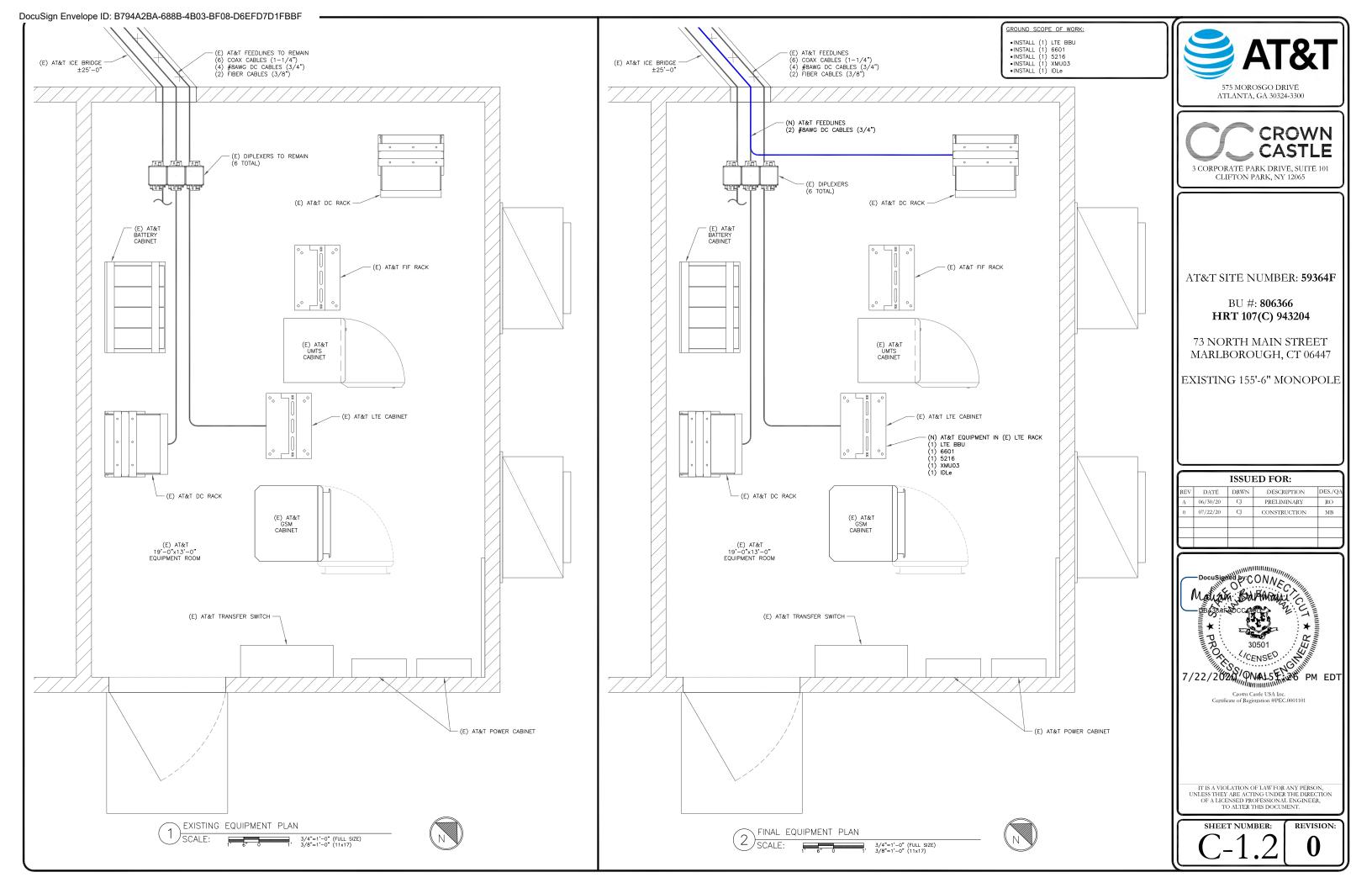


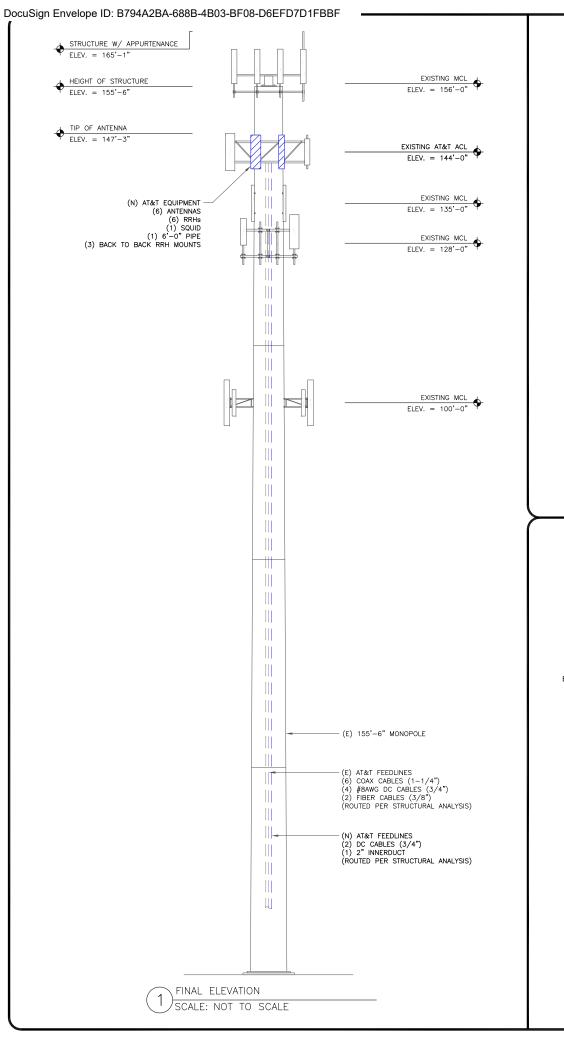
Certificate of Registration #PEC.0001101

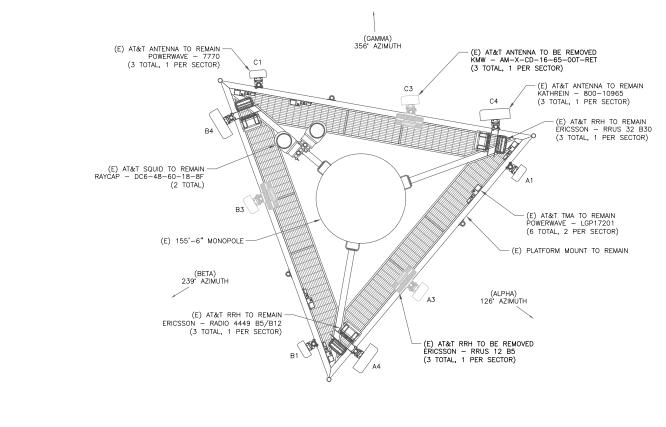
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SHEET NUMBER:



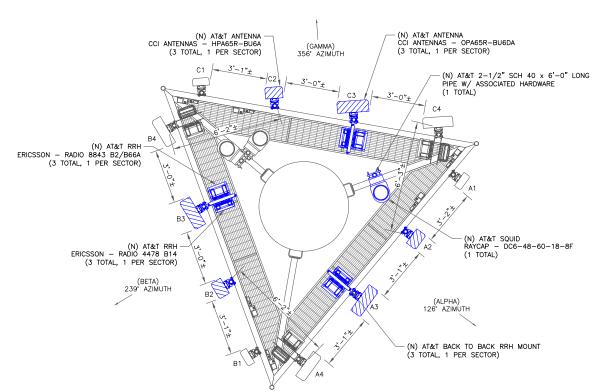






EXISTING ANTENNA PLAN

(2) SCALE:



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

SAFELY CLIMB PRODIFEMENT:

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 WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY 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:

Ν

- REFERENCE C-3 FOR FINAL EQUIPMENT
- 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
- 8" MINIMUM DISTANCE REQUIRED BETWEEN ANTENNA & RADIO. SEE GENERIC EXAMPLE DETAIL ON SHEET C-4.





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BU #: **806366** HRT 107(C) 943204

73 NORTH MAIN STREET MARLBOROUGH, CT 06447

EXISTING 155'-6" MONOPOLE

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	ISSUED FOR:												
REV	DATE	DRWN	DESCRIPTION	DES./QA									
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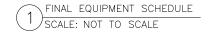
SHEET NUMBER:



FINAL EQUIPMENT SCHEDULE (VERIFY WITH CURRENT RFDS)

ALPHA						(VERIFT WI	11 CC	ואר	IVEIVI K	DSJ								
		ANTENNA				RADIO			DIPLEXER	_		TMA		SURGE PROTECTION		CABLI	ES	
POSITION	TECH.	STATUS/MANUFACTURER MODEL	AZIMUTH	RAD CENTER	QTY.	STATUS/MODEL	LOCATION	QTY.	STATUS	LOCATION	QTY.	STATUS	QTY.	STATUS/MODEL	QTY.	STATUS/TYPE	SIZE	LENGTH
A1	UMTS	(E) POWERWAVE 7770	126*	144'-0"	-	-	-	2	(E)	GROUND	2	(E) LGP 21903	-	=	2	(E) COAX	1-1/4"	194'-0"
A2	LTE	(N) CCI ANTENNAS HPA65R-BU6A	126*	144'-0"	_	-	-	_	-	-	-	-	_	-	_	-	_	-
		(N) CCI ANTENNAS			1	(N) RADIO 4478 B14	TOWER											
A3	LTE	OPA65R-BU6DA	126*	144'-0"	1	(N) RADIO 8843 B2/B66A	TOWER	-	_	_	-	_	1	(N) DC6-48-60-18-8F	2	(N) #8AWG DC	3/4"	194'-0"
	. TE (5.0	(E) KATHREIN			1	(E) RRUS 32 B30	TOWER											
A4	LTE/5G	800-10965	126*	144'-0"	1	(E) RADIO 4449 B5/B12	TOWER	-	-	-	-	_	-	_	-	_	-	=
A5	-	-	-	-	-	-	-	_	-	-	-	-	-	-	-	-	-	-
BETA					1										1			
B1	UMTS	(E) POWERWAVE 7770	239°	144'-0"	-	-	-	2	(E)	GROUND	2	(E) LGP 21903	-	-	2	(E) COAX	1-1/4"	194'-0"
B2	LTE	(N) CCI ANTENNAS HPA65R-BU6A	239°	144'-0"	-	-	-	_	-	-	-	_	-	-	-	-	_	-
D.7	1.75	(N) CCI ANTENNAS	239*	0"	1	(N) RADIO 4478 B14	TOWER		_			_				_	_	_
B3	LTE	(N) CCI ANTENNAS OPA65R-BU6DA	239	144'-0"	1	(N) RADIO 8843 B2/B66A	TOWER	_	_	-	-	_	_	_	_	_		
B4	LTE/5G	(E) KATHREIN	239*	144'-0"	1	(E) RRUS 32 B30	TOWER		_	_	_	_		_	_	_	_	
	2.2,00	800-10965	200	144 0	1	(E) RADIO 4449 B5/B12	TOWER											
B5	-	-	_	_	-	-	-	-	-	-	-	-	_	-	-	-	_	-
GAMMA				•	•					•	•				•			
C1	UMTS	(E) POWERWAVE 7770	356*	144'-0"	-	-	-	2	(E)	GROUND	2	(E) LGP 21903	_	-	2	(E) COAX	1-1/4"	194'-0"
C2	LTE	(N) CCI ANTENNAS HPA65R-BU6A	356*	144'-0"	-	-	-	_	-	-	-	_	-	-	-	_	_	-
C3	LTE	(N) CCI ANTENNAS	356*	144'-0"	1	(N) RADIO 4478 B14	TOWER		_	_	_	_	1	(E) DC6-48-60-18-8F	2	(E) #8AWG DC	3/4"	194'-0"
	LIE	`ÓPA65R−BU6DA	330	144 -0	1	(N) RADIO 8843 B2/B66A	TOWER							(E) 500 40-00-10-or	1	(E) FIBER	3/8"	194'-0"
C4	LTE/5G	(E) KATHREIN	356°	144'-0"	1	(E) RRUS 32 B30	TOWER		=	_	_		1	(E) DC6-48-60-18-8F	2	(E) #8AWG DC	3/4"	194'-0"
	2.2,00	800-10965	330	177 -0	1	(E) RADIO 4449 B5/B12	TOWER						Ľ	(=, 555 .5 .5 .6 .6 .6	1	(E) FIBER	3/8"	194'-0"
C5	-	-	-	-	-	-	_	_	_	-	-	_	_	_	_	_	-	-

NOTE: (E) - EXISTING (N) - NEW







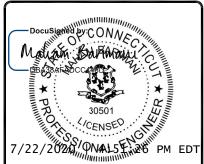
AT&T SITE NUMBER: **59364F**

BU #: **806366 HRT 107(C) 943204**

73 NORTH MAIN STREET MARLBOROUGH, CT 06447

EXISTING 155'-6" MONOPOLE

	ISSUED FOR:												
REV	DATE	DRWN	DESCRIPTION	DES./QA									
Α	06/30/20	CJ	PRELIMINARY	RO									
0	07/22/20	CJ	CONSTRUCTION	MB									

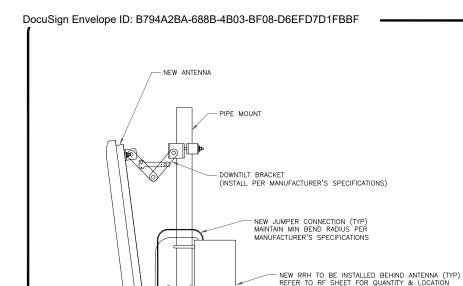


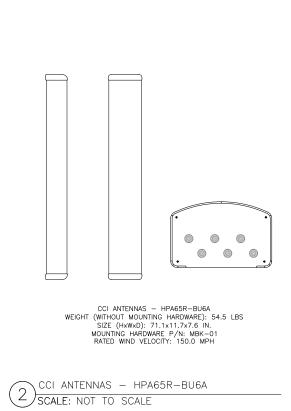
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SHEET NUMBER:

C-3





CCI ANTENNAS - OPA65R-BU6DA WEIGHT (WITHOUT MOUNTING HARDWARE): 60.2 LBS SIZE (HAWAD): 71.2×21.0×7.8 IN. MOUNTING HARDWARE P/N: MBK-01 RATED WIND VELOCITY: 150.0 MPH

CCI ANTENNAS - OPA65R-BU6DA

SCALE: NOT TO SCALE





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73 NORTH MAIN STREET MARLBOROUGH, CT 06447

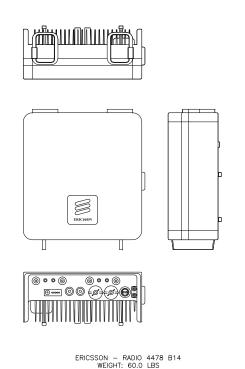
ISSUED FOR: DATE DRWN DESCRIPTION 06/30/20 CJ PRELIMINARY RO CJ CONSTRUCTION

- Docusioned by CONNEC

7/22/2020 PNALSE PM EDT Crown Castle USA Inc. Certificate of Registration #PEC.0001101

MB

EXISTING 155'-6" MONOPOLE



SIZE (HxWxD): 15.0x13.0x8.0 IN.

ERICSSON - RADIO 4478 B14

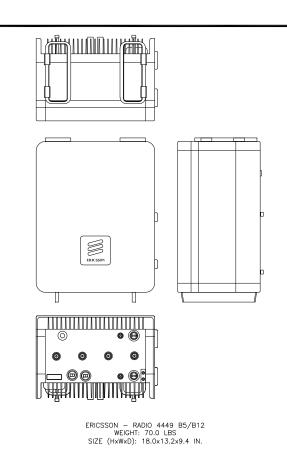
(4) SCALE: NOT TO SCALE

- CONTROL CABLE FROM RRH TO ANTENNA

GENERIC ANTENNA MOUNTING ELEVATION

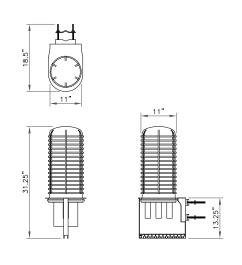
SCALE: NOT TO SCALE

- NEW JUMPER FROM RAYCAP MAINTAIN MIN BEND RADIUS PER MANUFACTURER'S SPECIFICATIONS



ERICSSON - RADIO 4449 B5/B12

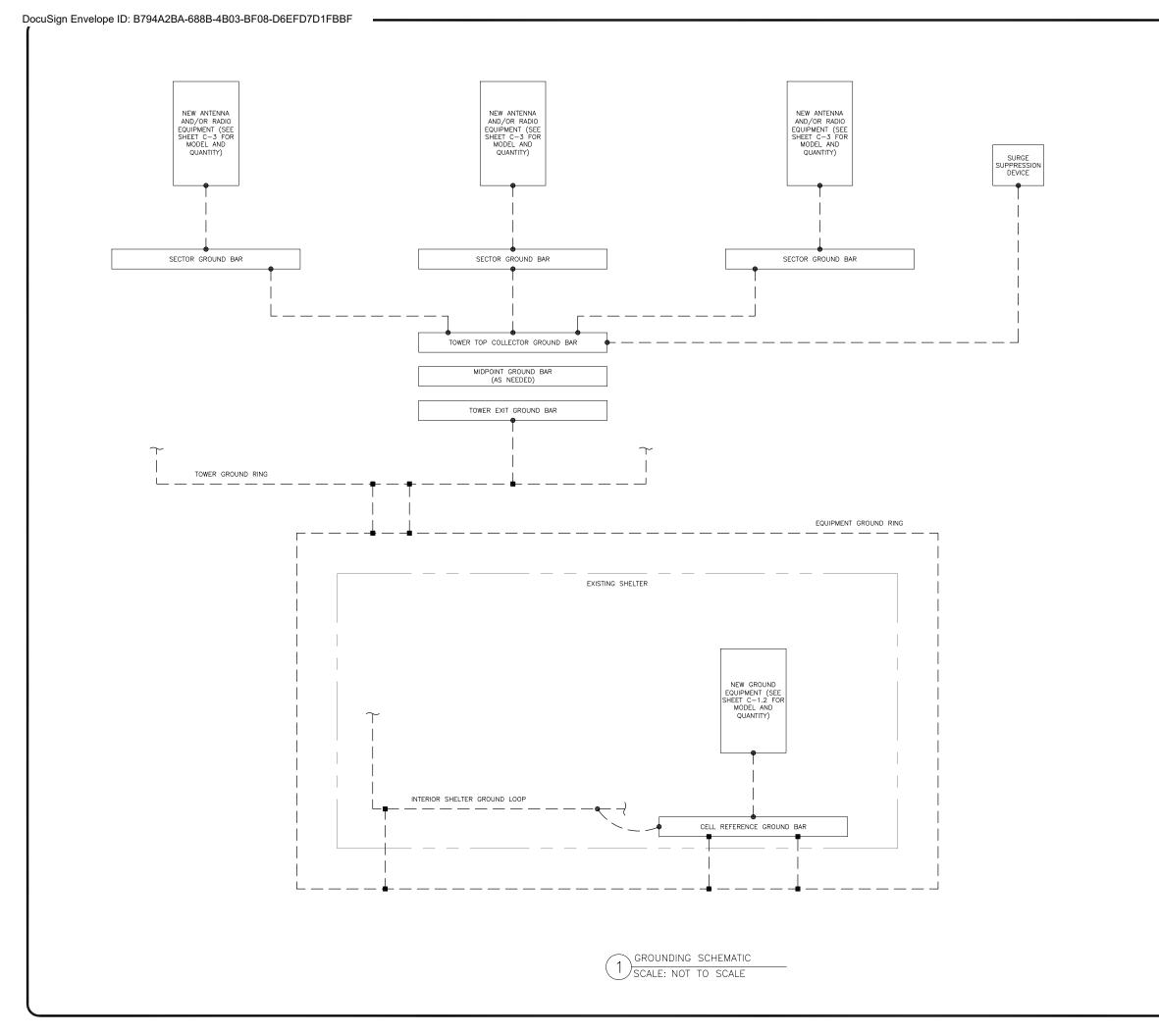
SCALE: NOT TO SCALE



RAYCAP - DC6-48-60-18-8F WEIGHT (WITHOUT MOUNTING HARDWARE): 20.0 LBS SIZE (HxWxD): 31.25x11.0x11.0 IN.

(6) SCALE: NOT TO SCALE

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CAP - DC6-48-60-18-8F	SHEET NUMBER: REVISION:



GROUNDING PLAN LEGEND:

--- GROUND WIRE

© COPPER GROUND ROD

■ EXOTHERMIC WELD

MECHANICAL CONNECTION

⊗ GROUND ROD W/ TEST WELL

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

HATCH PLATE GROUND BAR: BOND TO THE INTERIOR GROUND RING WITH (2) #2 STRANDED GREEN INSULATED COPPER CONDUCTORS. WHEN A CHAICH-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 WILD 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.





CLIFTON PARK, NY 12065

ATLANTA, GA 30324-3300

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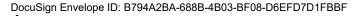


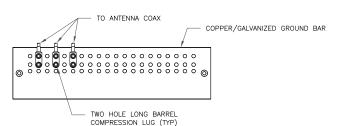
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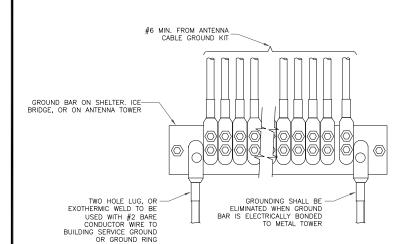
SHEET NUMBER:

G-1

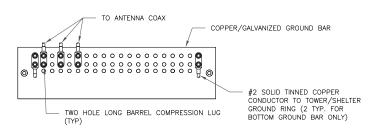




- DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
 EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
 GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO ANTENNA MOUNT STEEL.
- ANTENNA SECTOR GROUND BAR DETAIL SCALE: NOT TO SCALE

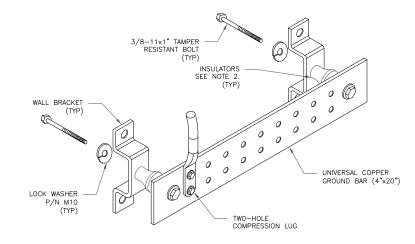


GROUNDWIRE INSTALLATION 4) SCALE: NOT TO SCALE

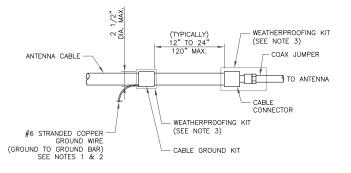


- EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
 GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
 GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

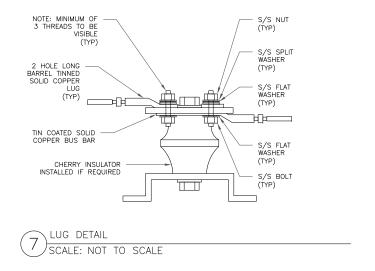
TOWER/SHELTER GROUND BAR DETAIL (2) SCALE: NOT TO SCALE



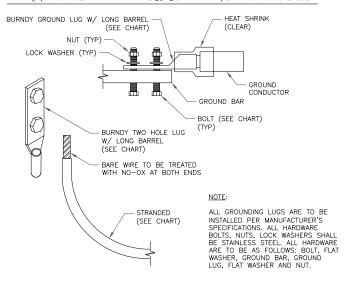
- 1. DOWN LEAD (HOME RUN) CONDUCTORS ARE <u>NOT</u> TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
- 2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.
- GROUND BAR DETAIL 5 SCALE: NOT TO SCALE



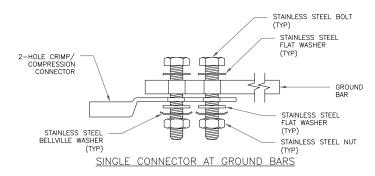
- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
 GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
- 3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE
- CABLE GROUND KIT CONNECTION (6) SCALE: NOT TO SCALE

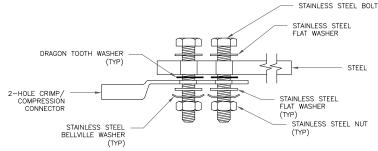


WIRE SIZE BURNDY LUG BOLT SIZE #6 GREEN INSULATED YA6C-2TC38 3/8" - 16 NC SS 2 BOLT 3/8" - 16 NC SS 2 BOLT #2 SOLID TINNED YA3C-2TC38 #2 STRANDED YA2C-2TC38 3/8" - 16 NC SS 2 BOLT #2/0 STRANDED YA26-2TC38 3/8" - 16 NC SS 2 BOLT #4/0 STRANDED YA28-2N 1/2" - 16 NC SS 2 BOLT

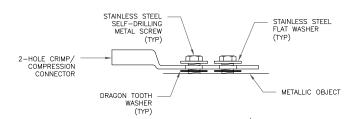


MECHANICAL LUG CONNECTION SCALE: NOT TO SCALE





SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

HARDWARE DETAIL FOR EXTERIOR CONNECTIONS SCALE: NOT TO SCALE





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Α	06/30/20	CJ	PRELIMINARY	RO									
0	07/22/20	CJ	CONSTRUCTION	MB									



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SHEET NUMBER:

Atoll Site Name -

CTL01073

Location Name -

MARLBOROUGH-COUNTRY BARN

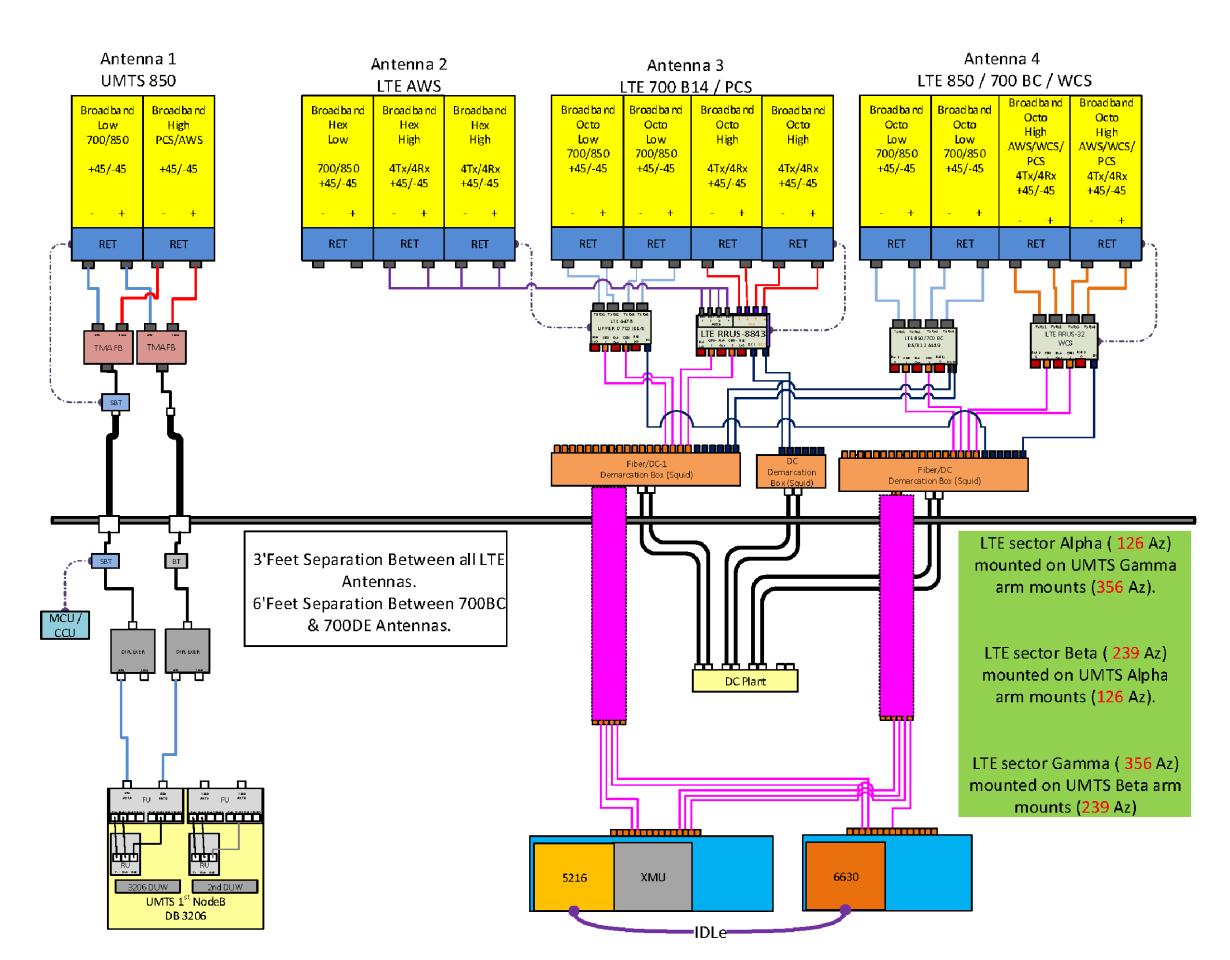
Market -

CONNECTICUT

Market Cluster -

NEW ENGLAND

Comments: Important Note: For detailed radio to antenna wiring refer to the latest field notice - Antenna_Radio Connection Drawings Playbook v6.0_Ericsson



Atoll Site Name -

CTL01073 Location Name -

MARLBOROUGH-COUNTRY BARN

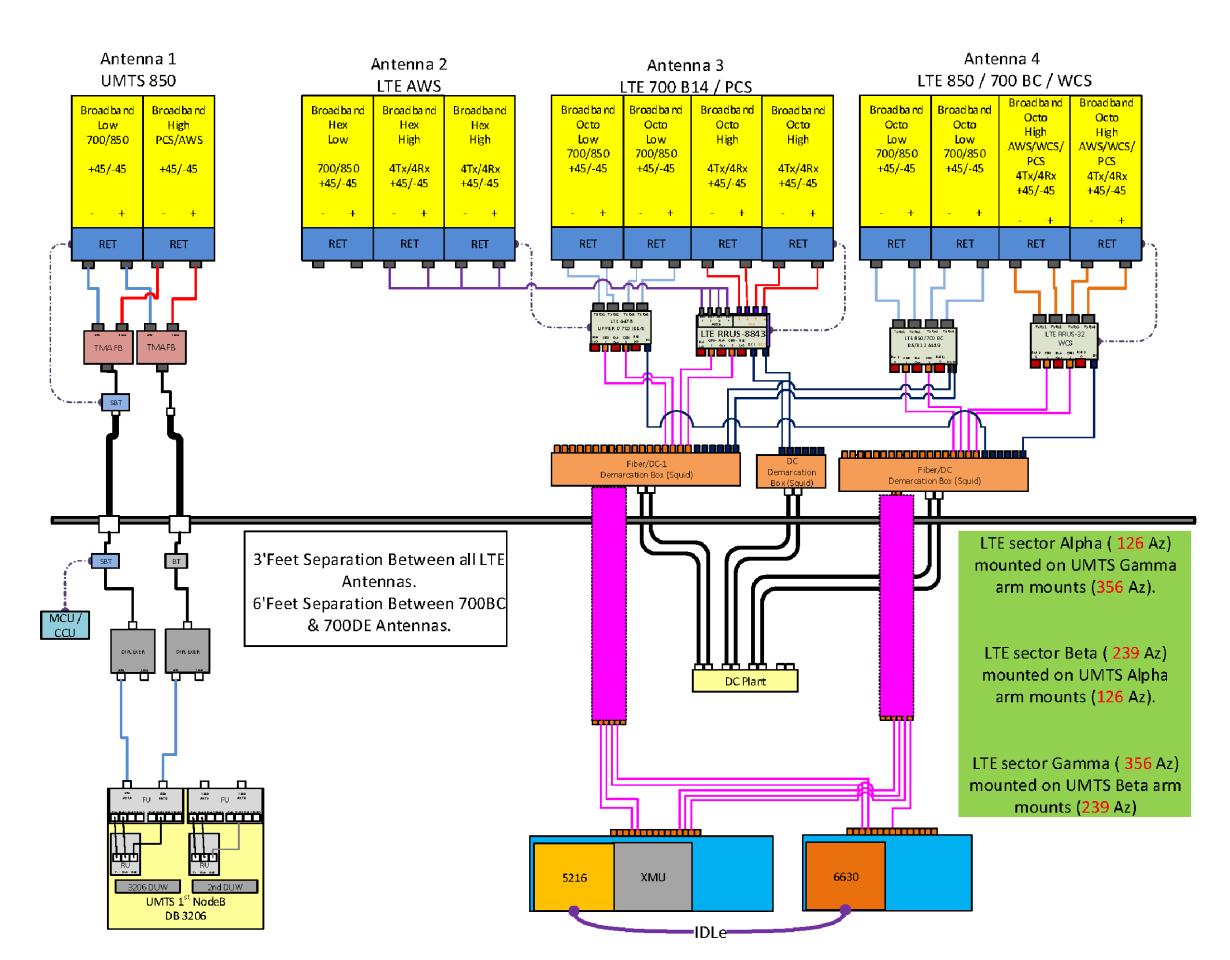
Market -

CONNECTICUT

Market Cluster -

NEW ENGLAND

Comments: Important Note: For detailed radio to antenna wiring refer to the latest field notice - Antenna_Radio Connection Drawings Playbook v6.0_Ericsson



Atoll Site Name -

CTL01073 Location Name -

MARLBOROUGH-COUNTRY BARN

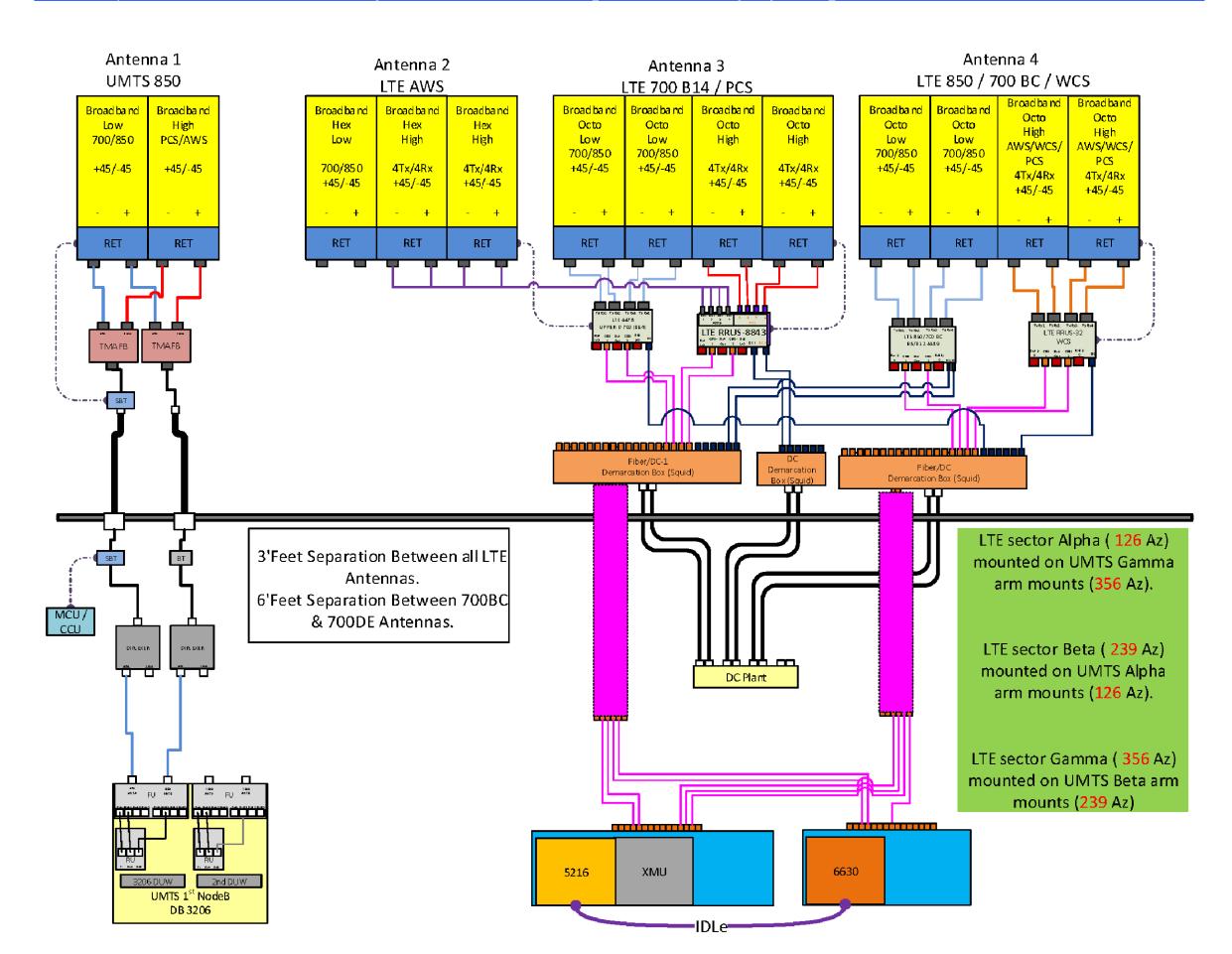
Market -

CONNECTICUT

Market Cluster -

NEW ENGLAND

Comments: Important Note: For detailed radio to antenna wiring refer to the latest field notice - Antenna_Radio Connection Drawings Playbook v6.0_Ericsson





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Notary Events		
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Envelope Summary Events Envelope Sent Certified Delivered Signing Complete	Status Hashed/Encrypted Security Checked Security Checked	Timestamps 7/22/2020 3:24:13 PM 7/22/2020 4:51:09 PM 7/22/2020 4:51:26 PM

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To contact us by email, send messages to: esignature@CrownCastle.com

To contact us by paper mail, send correspondence to

Crown Castle

2000 Corporate Drive

Canonsburg, PA 15317

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Mobile Signing:	Apple iOS 7.0 or above; Android 4.0 or above
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Exhibit D

Structural Analysis Report

Date: June 10, 2020

Amanda D Brown Crown Castle 6325 Ardrey Kell RddSuite 600 Charlotte, NC 28277



Black & Veatch Corp. 6800 W. 115th St., Suite 2292 Overland Park, KS 66211 (913) 458-6909

Subject: Structural Analysis Report

Carrier Designation: AT&T Mobility Co-Locate

Carrier Site Number:59364FCarrier Site Name:CTL01073

Crown Castle Designation: Crown Castle BU Number: 806366

Crown Castle Site Name: HRT 107(C) 943204

Crown Castle JDE Job Number:605362Crown Castle Work Order Number:1856209Crown Castle Order Number:517064 Rev. 0

Engineering Firm Designation: Black & Veatch Corp. Project Number: 400087

Site Data: 73 North Main Street, Marlborough, Hartford County, CT

Latitude 41° 37' 47.3", Longitude -72° 27' 59.4"

155.5 Foot - Monopole Tower

Dear Amanda D Brown,

Black & Veatch Corp. 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 – 51.2%

This analysis utilizes an ultimate 3-second gust wind speed of 130 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: Passapong Phiwphong

Respectfully submitted by:

Joshua J. Riley, P.E. Professional Engineer

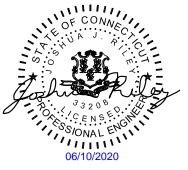


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Additional Calculations

1) INTRODUCTION

This tower is a 155.5 ft Monopole tower designed by Fort Worth Tower, Inc.

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H

Risk Category:

Wind Speed: 130 mph

Exposure Category: B **Topographic Factor**: 1

Ice Thickness:1.500 inWind Speed with Ice:50 mphService Wind Speed:60 mph

Table 1 - Proposed Equipment Configuration

<u>Table 1 - P</u>									
Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Model Manufacturer		Number of Feed Lines	Feed Line Size (in)			
		3	cci antennas	HPA65R-BU6A w/ Mount Pipe					
		3	cci antennas	OPA65R-BU6D w/ Mount Pipe					
		1	cci tower mounts (v2.1)	Platform Mount [LP 1002-1]					
	144.0		3	ericsson	RRUS 32 B30				
		3	ericsson	RRUS 4449 B5/B12					
					3	ericsson	RRUS 4478 B14	6	1-1/4
144.0		3	ericsson	RRUS 8843 B2/B66A	2	3/8			
		3	kathrein	80010965 w/ Mount Pipe	6	3/4 2" conduit			
		powerwave 1001940 technologies	1001940	I	Z CONQUIL				
	powerwave technologies 7770.00 w/ Mount Pipe								
		6	powerwave technologies	LGP 17201					
		3	raycap	DC6-48-60-18-8F					

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)			
		3	alcatel lucent	B13 RRH 4x30					
		6	andrew	SBNHH-1D65B w/ Mount Pipe					
						3	commscope	LNX-6514DS-A1M w/ Mount Pipe	
156.0	159.0	159.0 2 commscope LNX-6514DS-AIM w/ Mount Pipe	LNX-6514DS-AIM w/ Mount Pipe	17	1-5/8				
	1 cc	commscope	LNX-8513DS-VTM w/ Mount Pipe						
		3	decibel	DB809K-Y					

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		2	raycap	RRFDC-3315-PF-48		
	156.0	1	cci tower mounts (v2.1)	Platform Mount [16' LP 603-1]		
135.0	135.0	3	kathrein	742 213 w/ Mount Pipe	6	1-1/4
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz		
		6	alcatel lucent	RRH2X50-800		
	130.0	3	alcatel lucent	TD-RRH8x20-25		
128.0		3	commscope	NNVV-65B-R4 w/ Mount Pipe	3 1	1-1/4
.20.0		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe	1	7/8
	128.0	2	cci tower mounts (v2.1)	T-Arm Mount [TA 602-3]		
		1	cci tower mounts (v2.1)	Side Arm Mount [SO 901-3]		
		3	ems wireless	RV90-17-00DP w/ Mount Pipe		
100.0	100.0	3	ericsson	KRY 112 144/1	12	1-1/4
100.0	100.0	3	ericsson	KRY 112 489/2	1	1-5/8
		3	ericsson	RADIO 4449 B12/B71		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Engineering, Inc.	2208816	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Fort Worth Tower, Inc.	823125	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Fort Worth Tower, Inc.	823125	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary) (Monopole Tower)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	155.5 - 110	Pole	TP64.606x58.6x0.375	1	-27.54	4083.22	13.2	Pass
L2	110 - 72.5	Pole	TP68.805x62.8x0.4375	2	-47.15	5456.99	25.5	Pass
L3	72.5 - 36	Pole	TP72.748x66.8082x0.5	3	-68.80	6956.40	33.9	Pass
L4	36 - 0	Pole	TP76.5x70.56x0.5	4	-97.52	7106.06	51.2	Pass
							Summary	
						Pole (L4)	51.2	Pass
						Rating =	51.2	Pass

Table 5 - Tower Component Stresses vs. Capacity (Monopole Tower) - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	47.4	Pass
'	Base Plate		22.7	Pass
	Base Foundation		29.1	Pass
1	Base Foundation Soil Interaction	0	31.9	Pass

Structure Rating (max from all components) =	51.2%
--	-------

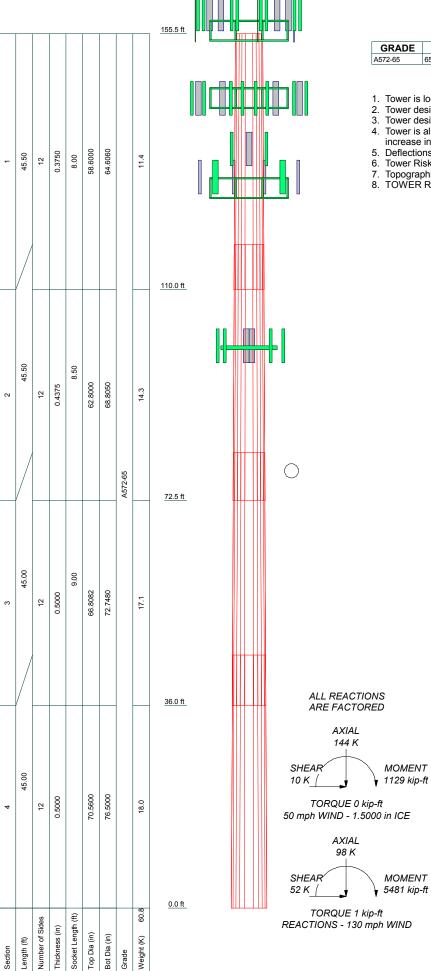
Notes:

4.1) Recommendations

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

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

APPENDIX A TNXTOWER OUTPUT

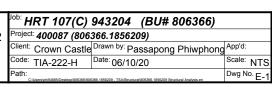


MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A E 70 C E	CE kei	OO kai			

TOWER DESIGN NOTES

- 1. Tower is located in Hartford County, Connecticut.
- Tower designed for Exposure B to the TIA-222-H Standard.
- Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
- Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
- Deflections are based upon a 60 mph wind.
- Tower Risk Category II.
- Topographic Category 1 with Crest Height of 0.00 ft TOWER RATING: 51.2%



FAX: (913) 458-8136

Tower Input Data

The tower is a monopole.

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

The following design criteria apply:

- 1) Tower is located in Hartford County, Connecticut.
- 2) Tower base elevation above sea level: 578.00 ft.
- 3) Basic wind speed of 130 mph.
- 4) Risk Category II.
- 5) Exposure Category B.
- 6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- 7) Topographic Category: 1.
- 8) Crest Height: 0.00 ft.
- 9) Nominal ice thickness of 1.5000 in.
- 10) Ice thickness is considered to increase with height.
- 11) Ice density of 56 pcf.
- 12) A wind speed of 50 mph is used in combination with ice.
- 13) Temperature drop of 50 °F.
- 14) Deflections calculated using a wind speed of 60 mph.
- 15) A non-linear (P-delta) analysis was used.
- 16) Pressures are calculated at each section.
- 17) Stress ratio used in pole design is 1.05.
- 18) Tower analysis based on target reliabilities in accordance with Annex S.
- 19) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- 20) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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 Distribute Leg Loads As Uniform Assume Legs Pinned

- √ Assume Rigid Index Plate

 √ Use Clear Spans For Wind

 ✓ Use Clear Spans For Win
- 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 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

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

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	155.50-110.00	45.50	8.00	12	58.6000	64.6060	0.3750	1.5000	A572-65 (65 ksi)
L2	110.00-72.50	45.50	8.50	12	62.8000	68.8050	0.4375	1.7500	A572-65 (65 ksi)
L3	72.50-36.00	45.00	9.00	12	66.8082	72.7480	0.5000	2.0000	À572-65 (65 ksi)
L4	36.00-0.00	45.00		12	70.5600	76.5000	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in²	I in⁴	r in	C in	I/C in³	J in⁴	It/Q in²	w in	w/t
L1	60.5349	70.3067	30422.968	20.8446	30.3548	1002.2457	61645.181	34.6028	14.6998	39.199
	66.7528	77.5589	40842.013	22.9947	33.4659	1220.4065	82756.991 3	38.1721	16.3094	43.492
L2	65.9541	87.8532	43610.436 1	22.3258	32.5304	1340.6056	88366.567 0	43.2387	15.6579	35.789
	71.0778	96.3127	57460.444 0	24.4756	35.6410	1612.2011	116430.43 78	47.4022	17.2672	39.468
L3	70.1501	106.7562	59911.926 8	23.7383	34.6066	1731.2263		52.5421	16.5646	33.129
	75.1379	116.3193	77497.789 3	25.8648	37.6835	2056.5463		57.2488	18.1565	36.313
L4	74.1026	112.7967	70668.018	25.0815	36.5501	1933.4563		55.5151	17.5701	35.14
	79.0222	122.3600	90209.568	27.2080	39.6270	2276.4673	182789.04 18	60.2219	19.1620	38.324

Tower	Gusset	Gusset	Gusset Grade Adjust. Factor	Adjust.	Weight Mult.	Double Angle	Double Angle	Double Angle
Elevation	Area (per face)	Thickness	A_f	Factor A _r		Stitch Bolt Spacing Diagonals	Stitch Bolt Spacing Horizontals	Stitch Bolt Spacing Redundants
ft	ft²	in				in	in	in
L1 155.50-			1	1	1			
110.00								
L2 110.00-			1	1	1			
72.50								
L3 72.50-			1	1	1			
36.00			4	1	4			
L4 36.00-0.00			1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From	Componen t	Placement	Total Number	Number Per Row	Start/En d	Width or Diamete	Perimete r	Weight
		Torque	Туре	ft			Position	r		plf
		Calculation						in	in	
Safety Line 3/8	В	No	Surface Ar	155.50 -	1	1	-0.500	0.3750		0.22
***			(CaAa)	8.00			-0.490			
(3) HB114-1-08U4- M5F(1-1/4) + (1) HB114-08U3M12- xxxF(7/8) ***	С	No	Surface Ar (CaAa)	128.00 - 8.00	4	4	0.400 0.486	1.5400		1.30

Feed Line/Linear Appurtenances - Entered As Area

Description	Face	Allow	Exclude	Componen	Placement	Total		$C_A A_A$	Weight
	or Leg	Shield	From Torque Calculation	t Type	ft	Number		ft²/ft	plf
*** HB158-1-08U8- S8J18(1-5/8)	С	No	No	Inside Pole	155.50 - 0.00	2	No Ice 1/2" Ice	0.00 0.00	1.30 1.30
561(1-5/8)	С	No	No	Inside Pole	155.50 - 0.00	12	1" Ice 2" Ice No Ice 1/2" Ice	0.00 0.00 0.00 0.00	1.30 1.30 1.35 1.35
LDF7-50A(1-5/8)	С	No	No	Inside Pole	155.50 - 0.00	3	1" Ice 2" Ice No Ice	0.00 0.00 0.00	1.35 1.35 0.82
***							1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00	0.82 0.82 0.82
UCF114-50JA(1- 1/4)	С	No	No	Inside Pole	144.00 - 0.00	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.55 0.55 0.55
FB-L98B-002- 75000(3/8)	С	No	No	Inside Pole	144.00 - 0.00	1	2" Ice No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00 0.00	0.55 0.06 0.06 0.06
WR-VG86ST- BRD(3/4)	С	No	No	Inside Pole	144.00 - 0.00	4	2" Ice No Ice 1/2" Ice	0.00 0.00 0.00	0.06 0.58 0.58
WR-VG86ST- BRD(3/4)	С	No	No	Inside Pole	144.00 - 0.00	2	1" Ice 2" Ice No Ice 1/2" Ice	0.00 0.00 0.00 0.00	0.58 0.58 0.58 0.58
2" innerduct	С	No	No	Inside Pole	144.00 - 0.00	1	1" Ice 2" Ice No Ice	0.00 0.00 0.00	0.58 0.58 0.20
conduit FB-L98B-034-	С	No	No	Inside Pole	144.00 - 0.00	1	1/2" Ice 1" Ice 2" Ice No Ice	0.00 0.00 0.00 0.00	0.20 0.20 0.20 0.06
XXX(3/8)	Ü	110	140	moide i die	144.00 0.00	·	1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00	0.06 0.06 0.06
*** AVA6-50(1-1/4)	С	No	No	Inside Pole	135.00 - 0.00	6	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.46 0.46 0.46 0.46
*** LDF6-50A(1-1/4)	С	No	No	Inside Pole	100.00 - 0.00	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.60 0.60 0.60
AVA6-50(1-1/4)	С	No	No	Inside Pole	100.00 - 0.00	6	2" Ice No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00 0.00	0.60 0.46 0.46 0.46
HCS 6X12 4AWG(1-5/8)	С	No	No	Inside Pole	100.00 - 0.00	1	2" Ice No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00 0.00 0.00	0.46 2.40 2.40 2.40
***							2" Ice	0.00	2.40

Feed Line/Linear Appurtenances Section Areas

Tower Sectio	Tower Elevation	Face	A_R	A_F	C _A A _A In Face	C _A A _A Out Face	Weight
n	ft		ft ²	ft²	ft ²	ft ²	K
L1	155.50-110.00	Α	0.000	0.000	0.000	0.000	0.00
		В	0.000	0.000	1.706	0.000	0.01
		С	0.000	0.000	11.088	0.000	1.37
L2	110.00-72.50	Α	0.000	0.000	0.000	0.000	0.00
		В	0.000	0.000	1.406	0.000	0.01
		С	0.000	0.000	23.100	0.000	1.60
L3	72.50-36.00	Α	0.000	0.000	0.000	0.000	0.00
		В	0.000	0.000	1.369	0.000	0.01
		С	0.000	0.000	22.484	0.000	1.65
L4	36.00-0.00	Α	0.000	0.000	0.000	0.000	0.00
		В	0.000	0.000	1.050	0.000	0.01
		С	0.000	0.000	17.248	0.000	1.58

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower	Tower	Face	Ice	A_R	A_F	$C_A A_A$	$C_A A_A$	Weight
Sectio	Elevation	or	Thickness		_	In Face	Out Face	
n	ft	Leg	in	ft ²	ft ²	ft ²	ft ²	K
L1	155.50-110.00	Α	1.465	0.000	0.000	0.000	0.000	0.00
		В		0.000	0.000	15.041	0.000	0.16
		С		0.000	0.000	20.454	0.000	1.57
L2	110.00-72.50	Α	1.412	0.000	0.000	0.000	0.000	0.00
		В		0.000	0.000	12.396	0.000	0.13
		С		0.000	0.000	42.612	0.000	2.03
L3	72.50-36.00	Α	1.341	0.000	0.000	0.000	0.000	0.00
		В		0.000	0.000	11.673	0.000	0.12
		С		0.000	0.000	40.986	0.000	2.04
L4	36.00-0.00	Α	1.199	0.000	0.000	0.000	0.000	0.00
		В		0.000	0.000	8.557	0.000	0.08
		С		0.000	0.000	30.944	0.000	1.87

Feed Line Center of Pressure

Section	Elevation	CP _X	CPz	CP _X	CPz
	ft	in	in	Ice in	Ice in
L1	155.50-110.00	-1.1885	0.6737	-1.5117	-0.1944
L2	110.00-72.50	-2.7505	1.8565	-3.3527	1.3191
L3	72.50-36.00	-2.7643	1.8656	-3.3749	1.3519
L4	36.00-0.00	-2.1910	1.4786	-2.7302	1.1207

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	K _a No Ice	K _a Ice
			Ĕlev.		
L1	1	Safety Line 3/8	110.00 -	1.0000	1.0000
			155.50		
L1	16	(3) HB114-1-08U4-M5F(1-	110.00 -	1.0000	1.0000
		1/4) + (1) HB114-	128.00		

Tower	Feed Line	Description	Feed Line	Ka	K_a
Section	Record No.		Segment	No Ice	Ice
			Elev.		
		08U3M12-xxxF(7/8)			
L2	1	Safety Line 3/8	72.50 -	1.0000	1.0000
			110.00		
L2	16	(3) HB114-1-08U4-M5F(1-	72.50 -	1.0000	1.0000
		1/4) + (1) HB114-	110.00		
		08U3M12-xxxF(7/8)			
L3	1	Safety Line 3/8	36.00 -	1.0000	1.0000
			72.50		
L3	16	(3) HB114-1-08U4-M5F(1-	36.00 -	1.0000	1.0000
		1/4) + (1) HB114-	72.50		
		08U3M12-xxxF(7/8)			

			Disc	rete Tov	ver Loa	ds			
Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustmen t	Placement		C _A A _A Front	C _A A _A Side	Weight
			ft ft ft	۰	ft		ft²	ft²	K
Platform Mount [16' LP 603-1]	С	None		0.0000	156.00	No Ice 1/2" Ice 1" Ice	46.42 54.03 62.40 82.16	46.42 54.03 62.40 82.16	2.35 3.19 4.17 6.59
6'x2" Mount Pipe	А	From Leg	4.00 8.00 0.00	0.0000	156.00	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	В	From Leg	4.00 8.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	С	From Leg	4.00 8.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	Α	From Leg	4.00 8.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	В	From Leg	4.00 8.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	С	From Leg	4.00 8.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
DB809K-Y	Α	From Leg	4.00 8.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	2.85 4.03 5.21 7.17	2.85 4.03 5.21 7.17	0.03 0.05 0.08 0.16
DB809K-Y	В	From Leg	4.00	0.0000	156.00	2" Ice No Ice	2.85	2.85	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustmen t	Placement		$C_A A_A$ Front	C₄A₄ Side	Weight
			Vert ft ft	۰	ft		ft²	ft²	K
			ft						
			8.00			1/2"	4.03	4.03	0.05
			3.00			Ice	5.21	5.21	0.08
						1" Ice	7.17	7.17	0.16
DB809K-Y	С	From Leg	4.00	0.0000	156.00	2" Ice No Ice	2.85	2.85	0.03
DB009K-1	C	i ioni Leg	8.00	0.0000	130.00	1/2"	4.03	4.03	0.05
			3.00			Ice	5.21	5.21	0.08
			0.00			1" Ice	7.17	7.17	0.16
						2" Ice			
SBNHH-1D65B w/ Mount	Α	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.07
Pipe			-7.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
SBNHH-1D65B w/ Mount	В	From Log	4.00	0.0000	156.00	2" Ice	4.00	2 20	0.07
	ь	From Leg	4.00 -7.00	0.0000	156.00	No Ice 1/2"	4.09 4.49	3.30 3.68	0.07 0.13
Pipe			3.00			I/2	4.49	3.00 4.07	0.13
			0.00			1" Ice	5.72	4.87	0.39
						2" lce	· · · -		0.00
SBNHH-1D65B w/ Mount	С	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.07
Pipe			-7.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
CDNIIII ADCED/ Marriet		Г I	4.00	0.0000	450.00	2" Ice	4.00	2.20	0.07
SBNHH-1D65B w/ Mount	Α	From Leg	4.00 7.00	0.0000	156.00	No Ice 1/2"	4.09 4.49	3.30 3.68	0.07 0.13
Pipe			3.00			lce	4.49	3.06 4.07	0.13
			3.00			1" Ice	5.72	4.87	0.20
						2" Ice	· · · -		0.00
SBNHH-1D65B w/ Mount	В	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.07
Pipe			7.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
ODNIIII ADOED/ Marriet	0	E	4.00	0.0000	450.00	2" Ice	4.00	0.00	0.07
SBNHH-1D65B w/ Mount	С	From Leg	4.00 7.00	0.0000	156.00	No Ice 1/2"	4.09	3.30	0.07 0.13
Pipe			3.00			lce	4.49 4.89	3.68 4.07	0.13
			5.00			1" Ice	5.72	4.87	0.39
						2" Ice	0.72	1.07	0.00
LNX-6514DS-A1M w/	Α	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.06
Mount Pipe		-	-5.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.06	0.20
						1" Ice	5.71	4.87	0.38
LNX-6514DS-A1M w/	В	From Log	4.00	0.0000	156.00	2" Ice	4.00	2 20	0.06
Mount Pipe	ь	From Leg	4.00 -5.00	0.0000	156.00	No Ice 1/2"	4.09 4.49	3.30 3.68	0.06 0.13
Mount Fipe			3.00			Ice	4.89	4.06	0.13
			0.00			1" Ice	5.71	4.87	0.38
						2" Ice	•		0.00
LNX-6514DS-A1M w/	С	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.06
Mount Pipe		-	-5.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.06	0.20
						1" Ice	5.71	4.87	0.38
LNX-8513DS-VTM w/	Α	From Leg	4.00	0.0000	156.00	2" Ice No Ice	4.09	3.30	0.07
Mount Pipe	A	i ioni Leg	5.00	0.0000	150.00	1/2"	4.09	3.68	0.07
mount i po			3.00			Ice	4.89	4.06	0.13
			3.00			1" Ice	5.71	4.87	0.38
						2" Ice	•		
LNX-6514DS-AIM w/	В	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.06
Mount Pipe			5.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.06	0.20
						1" Ice	5.71	4.87	0.38
INV 6514DC AIM/	_	Erom Loc	4.00	0.0000	156.00	2" Ice	4.00	2 20	0.06
LNX-6514DS-AIM w/	С	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustmen t	Placement		C _A A _A Front	C _A A _A Side	Weight
			Vert ft ft ft	۰	ft		ft²	ft²	K
Mount Pipe			5.00			1/2"	4.49	3.68	0.13
			3.00			Ice 1" Ice 2" Ice	4.89 5.71	4.06 4.87	0.20 0.38
RRFDC-3315-PF-48	Α	From Leg	4.00	0.0000	156.00	No Ice	3.71	2.19	0.02
			0.00			1/2"	3.95	2.39	0.05
			3.00			Ice 1" Ice	4.20	2.61	0.09
						2" Ice	4.72	3.05	0.17
RRFDC-3315-PF-48	В	From Leg	4.00	0.0000	156.00	No Ice	3.71	2.19	0.02
		3	0.00			1/2"	3.95	2.39	0.05
			3.00			Ice	4.20	2.61	0.09
						1" Ice	4.72	3.05	0.17
D12 DDU 4v20	Α	From Log	4.00	0.0000	156.00	2" Ice	2.06	1 20	0.06
B13 RRH 4x30	А	From Leg	4.00 0.00	0.0000	156.00	No Ice 1/2"	2.06 2.24	1.32 1.48	0.06 0.07
			3.00			Ice	2.43	1.64	0.07
			0.00			1" Ice	2.84	2.00	0.14
						2" Ice			
B13 RRH 4x30	В	From Leg	4.00	0.0000	156.00	No Ice	2.06	1.32	0.06
			0.00			1/2"	2.24	1.48	0.07
			3.00			Ice 1" Ice	2.43 2.84	1.64 2.00	0.09 0.14
						2" Ice	2.04	2.00	0.14
B13 RRH 4x30	С	From Leg	4.00	0.0000	156.00	No Ice	2.06	1.32	0.06
		ū	0.00			1/2"	2.24	1.48	0.07
			3.00			Ice	2.43	1.64	0.09
						1" Ice 2" Ice	2.84	2.00	0.14
***						2 100			
Platform Mount [LP 1002-	С	None		0.0000	144.00	No Ice	77.24	77.24	4.05
1]						1/2"	85.74	85.74	5.65
						Ice	94.79	94.79	7.48
						1" Ice 2" Ice	115.77	115.77	11.81
6'x2" Mount Pipe	Α	From Leg	4.00	0.0000	144.00	No Ice	1.43	1.43	0.02
6 % <u>1</u> 66		g	9.50	0.000		1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
6'x2" Mount Pipe	В	From Leg	4.00	0.0000	144.00	2" Ice No Ice	1.43	1.43	0.02
0 XZ WOUTH FIPE	ь	i ioni Leg	9.50	0.0000	144.00	1/2"	1.43	1.43	0.02
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
0.00.00	_				444.00	2" Ice	4 40		
6'x2" Mount Pipe	С	From Leg	4.00 9.50	0.0000	144.00	No Ice 1/2"	1.43 1.92	1.43 1.92	0.02 0.03
			0.00			Ice	2.29	2.29	0.05
			0.00			1" Ice	3.06	3.06	0.09
						2" Ice			
7770.00 w/ Mount Pipe	Α	From Leg	4.00	0.0000	144.00	No Ice	5.75	4.25	0.06
			-9.00			1/2"	6.18	5.01	0.10
			0.00			Ice 1" Ice	6.61 7.49	5.71 7.16	0.16 0.29
						2" Ice	7.40	7.10	0.20
7770.00 w/ Mount Pipe	В	From Leg	4.00	0.0000	144.00	No Ice	5.75	4.25	0.06
			-9.00			1/2"	6.18	5.01	0.10
			0.00			Ice	6.61	5.71	0.16
						1" Ice 2" Ice	7.49	7.16	0.29
7770.00 w/ Mount Pipe	С	From Leg	4.00	0.0000	144.00	No Ice	5.75	4.25	0.06
	-	3	-9.00			1/2"	6.18	5.01	0.10
			0.00			Ice	6.61	5.71	0.16
						1" Ice	7.49	7.16	0.29
						2" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustmen t	Placement		C _A A _A Front	C _A A _A Side	Weight
			ft ft ft	۰	ft		ft²	ft²	K
80010965 w/ Mount Pipe	Α	From Leg	4.00	0.0000	144.00	No Ice	12.26	5.79	0.14
			9.00			1/2"	13.03	6.47	0.23
			0.00			Ice	13.80	7.17	0.33
						1" Ice 2" Ice	15.41	8.60	0.57
80010965 w/ Mount Pipe	В	From Leg	4.00	0.0000	144.00	No Ice	12.26	5.79	0.14
·		-	9.00			1/2"	13.03	6.47	0.23
			0.00			Ice	13.80	7.17	0.33
						1" Ice 2" Ice	15.41	8.60	0.57
80010965 w/ Mount Pipe	С	From Leg	4.00	0.0000	144.00	No Ice	12.26	5.79	0.14
			9.00			1/2"	13.03	6.47	0.23
			0.00			Ice	13.80	7.17	0.33
						1" Ice 2" Ice	15.41	8.60	0.57
HPA65R-BU6A w/ Mount	Α	From Leg	4.00	0.0000	144.00	No Ice	8.09	7.19	0.08
Pipe			-4.75			1/2"	8.64	8.36	0.15
			0.00			Ice	9.16	9.24	0.22
						1" Ice 2" Ice	10.22	11.05	0.41
HPA65R-BU6A w/ Mount	В	From Leg	4.00	0.0000	144.00	No Ice	8.09	7.19	0.08
Pipe		Ü	-4.75			1/2"	8.64	8.36	0.15
			0.00			Ice	9.16	9.24	0.22
						1" Ice 2" Ice	10.22	11.05	0.41
HPA65R-BU6A w/ Mount	С	From Leg	4.00	0.0000	144.00	No Ice	8.09	7.19	0.08
Pipe	O	r rom Log	-4.75	0.0000	144.00	1/2"	8.64	8.36	0.15
			0.00			Ice	9.16	9.24	0.22
						1" Ice	10.22	11.05	0.41
ODACED DUCD/ Marriet	^		4.00	0.0000	111.00	2" Ice	40.05	C 0F	0.09
OPA65R-BU6D w/ Mount Pipe	Α	From Leg	4.00 4.75	0.0000	144.00	No Ice 1/2"	12.25 13.00	6.05 6.71	0.09
i ipe			0.00			Ice	13.76	7.39	0.10
						1" Ice	15.34	8.79	0.51
ODAGED BLIGD (M.)			4.00	0.0000	444.00	2" Ice	40.05	0.05	0.00
OPA65R-BU6D w/ Mount	В	From Leg	4.00	0.0000	144.00	No Ice 1/2"	12.25 13.00	6.05 6.71	0.09
Pipe			4.75 0.00			lce	13.76	7.39	0.18 0.27
			0.00			1" Ice	15.76	8.79	0.51
						2" Ice	10.01	0.70	0.01
OPA65R-BU6D w/ Mount	С	From Leg	4.00	0.0000	144.00	No Ice	12.25	6.05	0.09
Pipe			4.75			1/2"	13.00	6.71	0.18
			0.00			Ice	13.76	7.39	0.27
						1" Ice 2" Ice	15.34	8.79	0.51
RRUS 4478 B14	Α	From Leg	4.00	0.0000	144.00	No Ice	1.84	1.06	0.06
		Ü	0.00			1/2"	2.01	1.20	0.08
			0.00			Ice	2.19	1.34	0.09
						1" Ice 2" Ice	2.57	1.66	0.14
RRUS 4478 B14	В	From Leg	4.00	0.0000	144.00	No Ice	1.84	1.06	0.06
		-	0.00			1/2"	2.01	1.20	0.08
			0.00			Ice	2.19	1.34	0.09
						1" Ice 2" Ice	2.57	1.66	0.14
RRUS 4478 B14	С	From Leg	4.00	0.0000	144.00	No Ice	1.84	1.06	0.06
		•	0.00			1/2"	2.01	1.20	0.08
			0.00			Ice	2.19	1.34	0.09
						1" Ice 2" Ice	2.57	1.66	0.14
RRUS 8843 B2/B66A	Α	From Leg	4.00	0.0000	144.00	No Ice	1.64	1.35	0.07
	-	3	0.00			1/2"	1.80	1.50	0.09
			0.00			Ice	1.97	1.65	0.11
						1" Ice	2.32	1.99	0.16
						2" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustmen t	Placement		$C_A A_A$ Front	C _A A _A Side	Weight
			vert ft ft ft	0	ft		ft²	ft²	K
RRUS 8843 B2/B66A	В	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice	1.64 1.80 1.97	1.35 1.50 1.65	0.07 0.09 0.11
						1" Ice 2" Ice	2.32	1.99	0.16
RRUS 8843 B2/B66A	С	From Leg	4.00 0.00	0.0000	144.00	No Ice 1/2"	1.64 1.80	1.35 1.50	0.07 0.09
			0.00			Ice 1" Ice 2" Ice	1.97 2.32	1.65 1.99	0.11 0.16
RRUS 32 B30	Α	From Leg	4.00 0.00	0.0000	144.00	No Ice 1/2"	2.69 2.91	1.57 1.76	0.06 0.08
			0.00			Ice 1" Ice	3.14 3.61	1.95 2.35	0.10 0.16
RRUS 32 B30	В	From Leg	4.00	0.0000	144.00	2" Ice No Ice	2.69	1.57	0.06
			0.00 0.00			1/2" Ice	2.91 3.14	1.76 1.95	0.08 0.10
						1" Ice 2" Ice	3.61	2.35	0.16
RRUS 32 B30	С	From Leg	4.00 0.00	0.0000	144.00	No Ice 1/2"	2.69 2.91	1.57 1.76	0.06 0.08
			0.00			Ice 1" Ice	3.14 3.61	1.95 2.35	0.10 0.16
DC6-48-60-18-8F	С	From Leg	4.00	0.0000	144.00	2" Ice No Ice	0.92	0.92	0.02
			0.00 0.00			1/2" Ice	1.46 1.64	1.46 1.64	0.04 0.06
			0.00			1" Ice 2" Ice	2.04	2.04	0.11
(2) LGP 17201	Α	From Leg	4.00 0.00	0.0000	144.00	No Ice 1/2"	1.67 1.83	0.47 0.57	0.03 0.04
			0.00			Ice 1" Ice	2.00 2.36	0.68 0.91	0.06 0.09
(2) LGP 17201	В	From Leg	4.00	0.0000	144.00	2" Ice No Ice	1.67	0.47	0.03
			0.00 0.00			1/2" Ice	1.83 2.00	0.57 0.68	0.04 0.06
						1" Ice 2" Ice	2.36	0.91	0.09
(2) LGP 17201	С	From Leg	4.00 0.00	0.0000	144.00	No Ice 1/2"	1.67 1.83	0.47 0.57	0.03 0.04
			0.00			Ice 1" Ice	2.00 2.36	0.68 0.91	0.06 0.09
1001940	Α	From Leg	4.00	0.0000	144.00	2" Ice No Ice	0.18	0.08	0.00
			0.00 0.00			1/2" Ice	0.23 0.30	0.13 0.18	0.00 0.01
						1" Ice 2" Ice	0.44	0.30	0.01
1001940	В	From Leg	4.00 0.00	0.0000	144.00	No Ice 1/2"	0.18 0.23	0.08 0.13	0.00 0.00
			0.00			Ice 1" Ice	0.30 0.44	0.18 0.30	0.01 0.01
1001940	С	From Leg	4.00	0.0000	144.00	2" Ice No Ice	0.18	0.08	0.00
			0.00 0.00			1/2" Ice	0.23 0.30	0.13 0.18	0.00 0.01
						1" Ice 2" Ice	0.44	0.30	0.01
RRUS 4449 B5/B12	Α	From Leg	4.00 0.00	0.0000	144.00	No Ice 1/2"	1.97 2.14	1.41 1.56	0.07 0.09
			0.00			Ice	2.33	1.73	0.11
						1" Ice 2" Ice	2.72	2.07	0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustmen t	Placement		C _A A _A Front	C _A A _A Side	Weight
			Vert ft ft ft	۰	ft		ft²	ft²	K
RRUS 4449 B5/B12	В	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	С	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
DC6-48-60-18-8F	Α	From Leg	1.00 0.00 0.00	0.0000	144.00	2" Ice No Ice 1/2" Ice 1" Ice	0.92 1.46 1.64 2.04	0.92 1.46 1.64 2.04	0.02 0.04 0.06 0.11
DC6-48-60-18-8F	В	From Leg	1.00 0.00 0.00	0.0000	144.00	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.92 1.46 1.64 2.04	0.92 1.46 1.64 2.04	0.02 0.04 0.06 0.11
*** 742 213 w/ Mount Pipe	Α	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.54 4.13 4.74 6.01	2.98 3.57 4.17 5.42	0.05 0.09 0.14 0.27
742 213 w/ Mount Pipe	В	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.54 4.13 4.74 6.01	2.98 3.57 4.17 5.42	0.05 0.09 0.14 0.27
742 213 w/ Mount Pipe	С	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.54 4.13 4.74 6.01	2.98 3.57 4.17 5.42	0.05 0.09 0.14 0.27
(2) T-Arm Mount [TA 602- 3]	С	None		0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	13.40 16.44 19.70 25.86	13.40 16.44 19.70 25.86	0.77 1.00 1.29 2.05
6'x2" Mount Pipe	Α	From Face	4.00 -6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	В	From Face	4.00 -6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	С	From Face	4.00 -6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	Α	From Face	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	В	From Face	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05

Description	Face or	Offset Type	Offsets: Horz	Azimuth Adjustmen	Placement		C _A A _A Front	C _A A _A Side	Weight
	Leg		Lateral Vert ft	t	ft		ft²	ft²	K
			ft ft	۰					
						1" Ice 2" Ice	3.06	3.06	0.09
6'x2" Mount Pipe	С	From Face	4.00	0.0000	128.00	No Ice	1.43	1.43	0.02
•			0.00			1/2"	1.92	1.92	0.03
			2.00			Ice	2.29	2.29	0.05
						1" Ice 2" Ice	3.06	3.06	0.09
6'x2" Mount Pipe	Α	From Face	4.00	0.0000	128.00	No Ice	1.43	1.43	0.02
			6.00			1/2"	1.92	1.92	0.03
			2.00			Ice 1" Ice	2.29 3.06	2.29	0.05
						2" Ice	3.00	3.06	0.09
6'x2" Mount Pipe	В	From Face	4.00	0.0000	128.00	No Ice	1.43	1.43	0.02
0 % <u>=</u> 0apo	_		6.00	0.000	0.00	1/2"	1.92	1.92	0.03
			2.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
0.00.1	_				400.00	2" Ice			
6'x2" Mount Pipe	С	From Face	4.00	0.0000	128.00	No Ice	1.43	1.43	0.02
			6.00 2.00			1/2" Ice	1.92 2.29	1.92 2.29	0.03 0.05
			2.00			1" Ice	3.06	3.06	0.03
						2" Ice	0.00	0.00	0.00
NNVV-65B-R4 w/ Mount	Α	From Face	4.00	0.0000	128.00	No Ice	7.55	4.23	0.11
Pipe			-6.00			1/2"	8.04	4.67	0.20
			2.00			Ice	8.53	5.12	0.30
						1" Ice 2" Ice	9.56	6.05	0.53
NNVV-65B-R4 w/ Mount	В	From Face	4.00	0.0000	128.00	No Ice	7.55	4.23	0.11
Pipe		1 10111 1 400	-6.00	0.0000	120.00	1/2"	8.04	4.67	0.20
P -			2.00			Ice	8.53	5.12	0.30
						1" Ice	9.56	6.05	0.53
NIND OF DAILY Manual	0	F F	4.00	0.0000	400.00	2" Ice	7.55	4.00	0.44
NNVV-65B-R4 w/ Mount	С	From Face	4.00 -6.00	0.0000	128.00	No Ice 1/2"	7.55 8.04	4.23 4.67	0.11 0.20
Pipe			2.00			lce	8.53	5.12	0.20
			2.00			1" Ice	9.56	6.05	0.53
						2" Ice			
APXVTM14-ALU-I20 w/	Α	From Face	4.00	0.0000	128.00	No Ice	4.09	2.86	0.08
Mount Pipe			6.00			1/2"	4.48	3.23	0.13
			2.00			Ice 1" Ice	4.88	3.61	0.19
						2" Ice	5.71	4.40	0.33
APXVTM14-ALU-I20 w/	В	From Face	4.00	0.0000	128.00	No Ice	4.09	2.86	0.08
Mount Pipe			6.00			1/2"	4.48	3.23	0.13
			2.00			Ice	4.88	3.61	0.19
						1" Ice	5.71	4.40	0.33
APXVTM14-ALU-I20 w/	С	From Face	4.00	0.0000	128.00	2" Ice No Ice	4.09	2.86	0.08
Mount Pipe	C	FIUIII Face	6.00	0.0000	120.00	1/2"	4.48	3.23	0.08
Would Tipe			2.00			Ice	4.88	3.61	0.19
						1" Ice	5.71	4.40	0.33
						2" Ice			
(2) RRH2X50-800	Α	From Face	4.00	0.0000	128.00	No Ice	1.70	1.28	0.05
			0.00			1/2"	1.86	1.43	0.07
			2.00			lce 1" lce	2.03 2.40	1.58 1.91	0.09 0.14
						2" Ice	2.40	1.01	0.14
(2) RRH2X50-800	В	From Face	4.00	0.0000	128.00	No Ice	1.70	1.28	0.05
• •			0.00			1/2"	1.86	1.43	0.07
			2.00			Ice	2.03	1.58	0.09
						1" Ice	2.40	1.91	0.14
(2) RRH2X50-800	С	From Face	4.00	0.0000	128.00	2" Ice No Ice	1.70	1.28	0.05
(Z) MM (Z/300-000	C	i ioni i ace	0.00	0.0000	120.00	1/2"	1.76	1.43	0.03
			2.00			Ice	2.03	1.58	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustmen t	Placement		C _A A _A Front	C _A A _A Side	Weight
			Vert ft ft ft	۰	ft		ft²	ft²	К
						1" Ice 2" Ice	2.40	1.91	0.14
TD-RRH8x20-25	Α	From Face	4.00	0.0000	128.00	No Ice	4.05	1.53	0.07
15 144 16,25 25	,,	1 101111 400	0.00	0.0000	120.00	1/2"	4.30	1.71	0.10
			2.00			Ice	4.56	1.90	0.13
						1" Ice 2" Ice	5.10	2.30	0.20
TD-RRH8x20-25	В	From Face	4.00	0.0000	128.00	No Ice	4.05	1.53	0.07
			0.00 2.00			1/2"	4.30 4.56	1.71 1.90	0.10 0.13
			2.00			Ice 1" Ice	5.10	2.30	0.13
						2" Ice	0.10	2.00	0.20
TD-RRH8x20-25	С	From Face	4.00	0.0000	128.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			2.00			Ice	4.56	1.90	0.13
						1" Ice	5.10	2.30	0.20
DOC 4000MH= 4::45W	^	Г Г	4.00	0.0000	400.00	2" Ice	0.00	0.04	0.00
PCS 1900MHz 4x45W- 65MHz	Α	From Face	4.00 0.00	0.0000	128.00	No Ice 1/2"	2.32 2.53	2.24 2.44	0.06 0.08
ODIVITZ			2.00			lce	2.53 2.74	2.44	0.06
			2.00			1" Ice	3.19	3.09	0.17
						2" Ice	00	0.00	•
PCS 1900MHz 4x45W-	В	From Face	4.00	0.0000	128.00	No Ice	2.32	2.24	0.06
65MHz			0.00			1/2"	2.53	2.44	0.08
			2.00			Ice	2.74	2.65	0.11
						1" Ice	3.19	3.09	0.17
PCS 1900MHz 4x45W-	С	From Face	4.00	0.0000	128.00	2" Ice No Ice	2.32	2.24	0.06
65MHz	O	1 TOTT T doc	0.00	0.0000	120.00	1/2"	2.53	2.44	0.08
			2.00			Ice	2.74	2.65	0.11
						1" Ice 2" Ice	3.19	3.09	0.17
***	_	Nama		0.0000	100.00	Na laa	4 4 4	4.44	0.00
Side Arm Mount [SO 901- 3]	С	None		0.0000	100.00	No Ice 1/2"	1.14 1.49	1.14 1.49	0.32 0.34
3]						Ice	1.91	1.91	0.37
						1" Ice	2.93	2.93	0.46
						2" Ice			
RV90-17-00DP w/ Mount	Α	From Leg	2.00	0.0000	100.00	No Ice	4.47	2.92	0.04
Pipe			0.50			1/2"	5.08	3.50	0.07
			0.00			Ice	5.70	4.10	0.11
						1" Ice 2" Ice	7.01	5.35	0.22
RV90-17-00DP w/ Mount	В	From Leg	2.00	0.0000	100.00	No Ice	4.47	2.92	0.04
Pipe			0.50			1/2"	5.08	3.50	0.07
·			0.00			Ice	5.70	4.10	0.11
						1" Ice	7.01	5.35	0.22
DV00 47 00DD/ Massat	0		0.00	0.0000	400.00	2" Ice	4 47	0.00	0.04
RV90-17-00DP w/ Mount Pipe	С	From Leg	2.00 0.50	0.0000	100.00	No Ice 1/2"	4.47 5.08	2.92 3.50	0.04 0.07
Fipe			0.00			Ice	5.70	4.10	0.07
			0.00			1" Ice	7.01	5.35	0.22
						2" Ice			
APXVAARR24_43-U-NA20	Α	From Leg	4.00	0.0000	100.00	No Ice	14.69	6.87	0.19
w/ Mount Pipe		-	-0.50			1/2"	15.46	7.55	0.31
			0.00			Ice	16.23	8.25	0.46
						1" Ice	17.82	9.67	0.79
APXVAARR24_43-U-NA20	В	From Leg	4.00	0.0000	100.00	2" Ice No Ice	14.69	6.87	0.19
w/ Mount Pipe	ט	i ioni Leg	-0.50	0.0000	100.00	1/2"	15.46	7.55	0.19
			0.00			Ice	16.23	8.25	0.46
						1" Ice	17.82	9.67	0.79
						2" Ice			
APXVAARR24_43-U-NA20	С	From Leg	4.00	0.0000	100.00	No Ice	14.69	6.87	0.19
w/ Mount Pipe			-0.50			1/2"	15.46	7.55	0.31

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustmen t	Placement		C _A A _A Front	C _A A _A Side	Weight
			ft ft ft	0	ft		ft²	ft²	K
			0.00			Ice 1" Ice 2" Ice	16.23 17.82	8.25 9.67	0.46 0.79
RADIO 4449 B12/B71	Α	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	1.65 1.81 1.98	1.30 1.44 1.60	0.08 0.09 0.11
DADIO 4440 D40/D74	Б			0.0000	400.00	1" Ice 2" Ice	2.34	1.92	0.16
RADIO 4449 B12/B71	В	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98 2.34	1.30 1.44 1.60 1.92	0.08 0.09 0.11 0.16
RADIO 4449 B12/B71	С	From Leg	4.00 0.00	0.0000	100.00	2" Ice No Ice 1/2"	1.65 1.81	1.30 1.44	0.08 0.09
			0.00			Ice 1" Ice 2" Ice	1.98 2.34	1.60 1.92	0.11 0.16
KRY 112 489/2	Α	From Leg	2.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.56 0.66 0.76 1.00	0.37 0.45 0.54 0.75	0.02 0.02 0.03 0.05
KRY 112 489/2	В	From Leg	2.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	0.56 0.66 0.76 1.00	0.37 0.45 0.54 0.75	0.02 0.02 0.03 0.05
KRY 112 489/2	С	From Leg	2.00 0.00 0.00	0.0000	100.00	2" Ice No Ice 1/2" Ice 1" Ice	0.56 0.66 0.76 1.00	0.37 0.45 0.54 0.75	0.02 0.02 0.03 0.05
KRY 112 144/1	Α	From Leg	2.00 0.00 0.00	0.0000	100.00	2" Ice No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
KRY 112 144/1	В	From Leg	2.00 0.00 0.00	0.0000	100.00	2" Ice No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
KRY 112 144/1	С	From Leg	2.00 0.00 0.00	0.0000	100.00	2" Ice No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
***						2" Ice			

Load Combinations

Comb.		Description
No.		
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	

Comb.	Description
No.	
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 25	1.2 Dead+1.0 Wind 330 deg - No Ice 0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
20 27	1.2 Dead+1.0 Nind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 50 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Sectio n	Elevation ft	Component Type	Condition	Gov. Load	Axial	Major Axis Moment	Minor Axis Moment
No.				Comb.	K	kip-ft	kip-ft
L1	155.5 - 110	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.14	-0.80	-0.24
			Max. Mx	8	-27.54	-654.93	-1.50
			Max. My	14	-27.54	-1.38	-656.52
			Max. Vy	8	26.80	-654.93	-1.50
			Max. Vx	14	26.84	-1.38	-656.52
			Max. Torque	12			0.67
L2	110 - 72.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-81.59	-1.12	-1.64
			Max. Mx	8	-47.15	-1837.82	-3.24
			Max. My	14	-47.15	-2.59	-1841.32
			Max. Vy	8	36.94	-1837.82	-3.24
			Max. Vx	14	36.98	-2.59	-1841.32
			Max. Torque	12			0.57
L3	72.5 - 36	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-108.95	-1.42	-3.28

Sectio	Elevation	Component	Condition	Gov.	Axial	Major Axis	Minor Axis
n	ft	Type		Load		Moment	Moment
No.				Comb.	K	kip-ft	kip-ft
			Max. Mx	8	-68.80	-3304.69	-5.05
			Max. My	14	-68.80	-3.78	-3310.16
			Max. Vy	8	44.29	-3304.69	-5.05
			Max. Vx	14	44.33	-3.78	-3310.16
			Max. Torque	12			0.57
L4	36 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-143.85	-1.73	-5.00
			Max. Mx	8	-97.52	-5470.94	-7.19
			Max. My	14	-97.51	-5.23	-5478.73
			Max. Vy	8	51.72	-5470.94	-7.19
			Max. Vx	14	51.76	-5.23	-5478.73
			Max. Torque	12			0.57

R4 - 1	D 1'
Mavimiim	Reactions
IVIAAIIIIUIII	11CaCuons

Location	Condition	Gov.	Vertical	Horizontal, X	Horizontal, 2
		Load	K	K	K
		Comb.			
Pole	Max. Vert	26	143.85	0.00	0.00
	Max. H _x	20	97.53	51.69	0.03
	Max. H _z	2	97.53	0.03	51.73
	$Max. M_x$	2	5474.46	0.03	51.73
	Max. M _z	8	5470.94	-51.69	-0.03
	Max. Torsion	12	0.57	-25.87	-44.82
	Min. Vert	7	73.15	-44.75	25.84
	Min. H _x	8	97.53	-51.69	-0.03
	Min. H _z	14	97.53	-0.03	-51.73
	Min. M _x	14	-5478.73	-0.03	-51.73
	Min. M _z	20	-5470.59	51.69	0.03
	Min. Torsion	24	-0.57	25.87	44.82

Tower Mast Reaction Summary

Load Combination	Vertical	Shear _x	Shearz	Overturning Moment, M _x	Overturning Moment, M ₂	Torque
	K	K	K	kip-ft ^	kip-ft	kip-ft
Dead Only	81.27	0.00	0.00	1.75	-0.14	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	97.53	-0.03	-51.73	-5474.46	4.88	0.49
0.9 Dead+1.0 Wind 0 deg - No Ice	73.15	-0.03	-51.73	-5450.83	4.90	0.49
1.2 Dead+1.0 Wind 30 deg - No Ice	97.53	25.82	-44.78	-4738.21	-2731.18	0.28
0.9 Dead+1.0 Wind 30 deg - No Ice	73.15	25.82	-44.78	-4717.83	-2719.08	0.28
1.2 Dead+1.0 Wind 60 deg - No Ice	97.53	44.75	-25.84	-2731.79	-4735.47	-0.00
0.9 Dead+1.0 Wind 60 deg - No Ice	73.15	44.75	-25.84	-2720.26	-4714.53	-0.00
1.2 Dead+1.0 Wind 90 deg - No Ice	97.53	51.69	0.03	7.19	-5470.94	-0.28
0.9 Dead+1.0 Wind 90 deg - No Ice	73.15	51.69	0.03	6.62	-5446.75	-0.28
1.2 Dead+1.0 Wind 120 deg - No Ice	97.53	44.78	25.89	2744.81	-4740.52	-0.49
0.9 Dead+1.0 Wind 120 deg - No Ice	73.15	44.78	25.89	2732.16	-4719.55	-0.49
1.2 Dead+1.0 Wind 150 deg - No Ice	97.53	25.87	44.82	4747.53	-2739.93	-0.57
0.9 Dead+1.0 Wind 150 deg - No Ice	73.15	25.87	44.82	4726.04	-2727.79	-0.57

Load Combination	Vertical	Shear _x	Shear _z	Overturning Moment, M _x	Overturning Moment, Mz	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 180 deg - No Ice	97.53	0.03	51.73	5478.73	-5.23	-0.50
0.9 Dead+1.0 Wind 180 deg	73.15	0.03	51.73	5454.01	-5.16	-0.50
- No Ice	07.50	05.00	44.70	1710.10	0700.00	0.00
1.2 Dead+1.0 Wind 210 deg - No Ice	97.53	-25.82	44.78	4742.48	2730.83	-0.29
0.9 Dead+1.0 Wind 210 deg	73.15	-25.82	44.78	4721.02	2718.83	-0.29
- No Ice	07.50	44.75	05.04	0700.00	4705.40	0.00
1.2 Dead+1.0 Wind 240 deg - No Ice	97.53	-44.75	25.84	2736.06	4735.12	0.00
0.9 Dead+1.0 Wind 240 deg	73.15	-44.75	25.84	2723.45	4714.27	0.00
- No Ice	07.52	E1 60	0.03	2.02	5470 F0	0.20
1.2 Dead+1.0 Wind 270 deg - No Ice	97.53	-51.69	-0.03	-2.92	5470.59	0.29
0.9 Dead+1.0 Wind 270 deg	73.15	-51.69	-0.03	-3.43	5446.49	0.29
- No Ice 1.2 Dead+1.0 Wind 300 deg	97.53	-44.78	-25.89	-2740.54	4740.17	0.50
- No Ice	97.55	-44.70	-25.69	-2740.54	4740.17	0.50
0.9 Dead+1.0 Wind 300 deg	73.15	-44.78	-25.89	-2728.97	4719.29	0.50
 No Ice 1.2 Dead+1.0 Wind 330 deg 	97.53	-25.87	-44.82	-4743.26	2739.58	0.57
- No Ice	07.00	20.07	11.02	4740.20	2700.00	0.07
0.9 Dead+1.0 Wind 330 deg	73.15	-25.87	-44.82	-4722.86	2727.53	0.57
- No Ice 1.2 Dead+1.0 Ice+1.0 Temp	143.85	0.00	0.00	5.00	-1.73	0.00
1.2 Dead+1.0 Wind 0	143.85	-0.00	-10.35	-1118.43	-0.98	0.09
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 30	143.85	5.17	-8.96	-967.49	-562.41	0.05
deg+1.0 lce+1.0 Temp	143.03	5.17	-0.90	-907.49	-302.41	0.03
1.2 Dead+1.0 Wind 60	143.85	8.96	-5.17	-555.93	-973.63	-0.00
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 90	143.85	10.35	0.00	5.97	-1124.44	-0.05
deg+1.0 Ice+1.0 Temp	140.00	10.00	0.00	0.07	1124.44	0.00
1.2 Dead+1.0 Wind 120	143.85	8.96	5.18	567.66	-974.45	-0.09
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 150	143.85	5.18	8.97	978.62	-563.83	-0.10
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	143.85	0.00	10.35	1128.74	-2.62	-0.09
1.2 Dead+1.0 Wind 210	143.85	-5.17	8.96	977.80	558.81	-0.05
deg+1.0 lce+1.0 Temp	440.0=					
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	143.85	-8.96	5.17	566.24	970.03	0.00
1.2 Dead+1.0 Wind 270	143.85	-10.35	-0.00	4.34	1120.84	0.05
deg+1.0 Ice+1.0 Temp	142.05	9.06	E 10	EE7.2E	970.84	0.00
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	143.85	-8.96	-5.18	-557.35	970.04	0.09
1.2 Dead+1.0 Wind 330	143.85	-5.18	-8.97	-968.31	560.23	0.10
deg+1.0 Ice+1.0 Temp Dead+Wind 0 deg - Service	81.27	-0.01	-10.38	-1093.84	0.87	0.10
Dead+Wind 30 deg - Service	81.27	5.18	-8.98	-946.55	-546.49	0.06
Dead+Wind 60 deg - Service	81.27	8.98	-5.18	-545.16	-947.46	-0.00
Dead+Wind 90 deg - Service	81.27	10.37	0.01	2.78	-1094.59	-0.06
Dead+Wind 120 deg -	81.27	8.98	5.19	550.46	-948.47	-0.10
Service Dead+Wind 150 deg -	81.27	5.19	8.99	951.11	-548.24	-0.11
Service	01.27	0.10	0.00	001.11	040.24	0.11
Dead+Wind 180 deg -	81.27	0.01	10.38	1097.39	-1.15	-0.10
Service Dead+Wind 210 deg -	81.27	-5.18	8.98	950.10	546.20	-0.06
Service						
Dead+Wind 240 deg -	81.27	-8.98	5.18	548.71	947.17	0.00
Service Dead+Wind 270 deg -	81.27	-10.37	-0.01	0.76	1094.30	0.06
Service						
Dead+Wind 300 deg - Service	81.27	-8.98	-5.19	-546.91	948.18	0.10
				-947.56	547.96	0.11

Solution :	Summary
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	C	on of Americal Force			Come of Pagatia		
Load	PX	n of Applied Force PY	es PZ	PX	Sum of Reaction PY	ns PZ	% Error
Comb.	K	K	K	K	K	K	% E1101
1	0.00	-81.27	0.00	0.00	81.27	0.00	0.000%
2	-0.03	-01.27 -97.53	-51.73	0.00	97.53	51.73	0.000%
3	-0.03	-97.55 -73.15	-51.73 -51.73	0.03	73.15	51.73	0.000%
3 4			-51.73 -44.78				
4 5	25.82	-97.53	-44.78 -44.78	-25.82	97.53 72.45	44.78 44.78	0.000%
5	25.82	-73.15		-25.82	73.15		0.000%
6 7	44.75 44.75	-97.53 -73.15	-25.84 -25.84	-44.75 -44.75	97.53 73.15	25.84 25.84	0.000% 0.000%
	51.69		-25.64 0.03	-44.75 -51.69	73.15 97.53	-0.03	
8 9		-97.53	0.03			-0.03 -0.03	0.000%
	51.69	-73.15		-51.69	73.15		0.000%
10 11	44.78 44.78	-97.53 -73.15	25.89 25.89	-44.78 -44.78	97.53 73.15	-25.89 -25.89	0.000%
							0.000%
12	25.87	-97.53	44.82	-25.87	97.53	-44.82	0.000%
13	25.87	-73.15	44.82	-25.87	73.15	-44.82	0.000%
14	0.03	-97.53	51.73	-0.03	97.53	-51.73	0.000%
15	0.03	-73.15	51.73	-0.03	73.15	-51.73	0.000%
16	-25.82	-97.53	44.78	25.82	97.53	-44.78	0.000%
17	-25.82	-73.15	44.78	25.82	73.15	-44.78	0.000%
18	-44.75	-97.53	25.84	44.75	97.53	-25.84	0.000%
19	-44.75	-73.15	25.84	44.75	73.15	-25.84	0.000%
20	-51.69	-97.53	-0.03	51.69	97.53	0.03	0.000%
21	-51.69	-73.15	-0.03	51.69	73.15	0.03	0.000%
22	-44.78	-97.53	-25.89	44.78	97.53	25.89	0.000%
23	-44.78	-73.15	-25.89	44.78	73.15	25.89	0.000%
24	-25.87	-97.53	-44.82	25.87	97.53	44.82	0.000%
25	-25.87	-73.15	-44.82	25.87	73.15	44.82	0.000%
26	0.00	-143.85	0.00	0.00	143.85	0.00	0.000%
27	-0.00	-143.85	-10.35	0.00	143.85	10.35	0.000%
28	5.17	-143.85	-8.96	-5.17	143.85	8.96	0.000%
29	8.96	-143.85	-5.17	-8.96	143.85	5.17	0.000%
30	10.35	-143.85	0.00	-10.35	143.85	-0.00	0.000%
31	8.96	-143.85	5.18	-8.96	143.85	-5.18	0.000%
32	5.18	-143.85	8.97	-5.18	143.85	-8.97	0.000%
33	0.00	-143.85	10.35	-0.00	143.85	-10.35	0.000%
34	-5.17	-143.85	8.96	5.17	143.85	-8.96	0.000%
35	-8.96	-143.85	5.17	8.96	143.85	-5.17	0.000%
36	-10.35	-143.85	-0.00	10.35	143.85	0.00	0.000%
37	-8.96	-143.85	-5.18	8.96	143.85	5.18	0.000%
38	-5.18	-143.85	-8.97	5.18	143.85	8.97	0.000%
39	-0.01	-81.27	-10.38	0.01	81.27	10.38	0.000%
40	5.18	-81.27	-8.98	-5.18	81.27	8.98	0.000%
41	8.98	-81.27	-5.18	-8.98	81.27	5.18	0.000%
42	10.37	-81.27	0.01	-10.37	81.27	-0.01	0.000%
43	8.98	-81.27	5.19	-8.98	81.27	-5.19	0.000%
44 45	5.19	-81.27	8.99	-5.19	81.27	-8.99 10.39	0.000%
45	0.01	-81.27	10.38	-0.01	81.27	-10.38	0.000%
46 47	-5.18	-81.27	8.98	5.18	81.27	-8.98 5.40	0.000%
47	-8.98	-81.27	5.18	8.98	81.27	-5.18 0.01	0.000%
48	-10.37	-81.27	-0.01	10.37	81.27	0.01	0.000%
49	-8.98	-81.27	-5.19	8.98	81.27	5.19	0.000%
50	-5.19	-81.27	-8.99	5.19	81.27	8.99	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.0000001	0.0000001
2	Yes	4	0.0000001	0.00006699
3	Yes	4	0.0000001	0.00003462
4	Yes	4	0.0000001	0.00061735

5 Yes 4 0.00000001 0.00040578 6 Yes 4 0.00000001 0.0004224 7 Yes 4 0.00000001 0.0004224 8 Yes 4 0.00000001 0.0006582 9 Yes 4 0.00000001 0.00061075 10 Yes 4 0.00000001 0.00061075 11 Yes 4 0.00000001 0.00040083 12 Yes 4 0.00000001 0.0004166 14 Yes 4 0.00000001 0.0004166 14 Yes 4 0.00000001 0.0006770 15 Yes 4 0.00000001 0.0006986 17					
6 Yes 4 0.0000001 0.00061274 7 Yes 4 0.0000001 0.00006582 9 Yes 4 0.00000001 0.00006582 9 Yes 4 0.00000001 0.00003360 10 Yes 4 0.00000001 0.00061075 11 Yes 4 0.00000001 0.00061075 11 Yes 4 0.00000001 0.00062639 13 Yes 4 0.00000001 0.00067634 14 Yes 4 0.00000001 0.000067634 15 Yes 4 0.00000001 0.00006770 15 Yes 4 0.00000001 0.00006770 16 Yes 4 0.00000001 0.00067670 17 Yes 4 0.00000001 0.0006096 17 Yes 4 0.00000001 0.0006381 19 Yes 4 0.00000001 0.0006381 20 Yes 4 0.00000001 0.00062372 21 Yes 4 0.00000001 0.00062372 22 Yes 4 0.00000001 0.00062372 23 Yes 4 0.00000001 0.00062372 24 Yes 4 0.00000001 0.00062372 25 Yes 4 0.00000001 0.0006381 26 Yes 4 0.00000001 0.0006381 27 Yes 4 0.00000001 0.0006381 28 Yes 4 0.00000001 0.0006381 30 Yes 4 0.00000001 0.00068284 31 Yes 4 0.00000001 0.00068284 32 Yes 4 0.00000001 0.00067894 33 Yes 4 0.00000001 0.00068264 34 Yes 4 0.00000001 0.00068264 35 Yes 4 0.00000001 0.00068264 36 Yes 4 0.00000001 0.00068264 37 Yes 4 0.00000001 0.00068264 39 Yes 4 0.00000001 0.00068264 30 Yes 4 0.00000001 0.00067897 31 Yes 4 0.00000001 0.00067897 32 Yes 4 0.00000001 0.00067897 33 Yes 4 0.00000001 0.00067897 34 Yes 4 0.00000001 0.00067897 35 Yes 4 0.00000001 0.00067897 36 Yes 4 0.00000001 0.00067897 37 Yes 4 0.00000001 0.00067897 38 Yes 4 0.00000001 0.00067897 39 Yes 4 0.00000001 0.00067897 40 Yes 4 0.00000001 0.00067897 40 Yes 4 0.00000001 0.00001447 41 Yes 4 0.00000001 0.00001447 42 Yes 4 0.00000001 0.00001447 44 Yes 4 0.00000001 0.00001442 44 Yes 4 0.00000001 0.00001442 45 Yes 4 0.00000001 0.00001442 46 Yes 4 0.00000001 0.00001442 47 Yes 4 0.00000001 0.00001462 48 Yes 4 0.00000001 0.000001462	5	Yes	4	0.0000001	0.00040578
7 Yes 4 0.0000001 0.00040264 8 Yes 4 0.0000001 0.0000582 9 Yes 4 0.0000001 0.00003360 10 Yes 4 0.0000001 0.00061075 11 Yes 4 0.00000001 0.00062639 12 Yes 4 0.00000001 0.00062639 13 Yes 4 0.00000001 0.00062639 13 Yes 4 0.00000001 0.0006770 15 Yes 4 0.00000001 0.00003521 16 Yes 4 0.00000001 0.00003521 16 Yes 4 0.00000001 0.00003521 18 Yes 4 0.00000001 0.0006383 18 Yes 4 0.00000001 0.0006383 19 Yes 4 0.00000001 0.0006331 20 Yes 4 0.00000001 0.0006331 21 Yes 4 0.00000001 0.0006331 22 Yes 4 0.00000001 0.0006337 23 Yes 4 0.00000001 0.0006337 24 Yes 4 0.00000001 0.0006372 25 Yes 4 0.00000001 0.0006876 26 Yes 4 0.00000001 0.0006876 27 Yes 4 0.00000001 0.0006732 28 Yes 4 0.00000001 0.0006732 29 Yes 4 0.00000001 0.0006732 30 Yes 4 0.00000001 0.0006734 31 Yes 4 0.00000001 0.0006738 33 Yes 4 0.00000001 0.0006738 34 Yes 4 0.00000001 0.0006738 35 Yes 4 0.00000001 0.0006738 36 Yes 4 0.00000001 0.0006738 37 Yes 4 0.00000001 0.0006738 38 Yes 4 0.00000001 0.0006738 39 Yes 4 0.00000001 0.0006738 30 Yes 4 0.00000001 0.0006738 31 Yes 4 0.00000001 0.0006738 32 Yes 4 0.00000001 0.0006738 33 Yes 4 0.00000001 0.0006738 34 Yes 4 0.00000001 0.0006738 35 Yes 4 0.00000001 0.0006738 36 Yes 4 0.00000001 0.00067635 39 Yes 4 0.00000001 0.0006747 40 Yes 4 0.00000001 0.0006747 41 Yes 4 0.00000001 0.00001447 42 Yes 4 0.00000001 0.00001447 44 Yes 4 0.00000001 0.00001447 45 Yes 4 0.00000001 0.00001447 46 Yes 4 0.00000001 0.00001452 48 Yes 4 0.00000001 0.00001452		Yes	4	0.0000001	0.00061274
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41 Yes 4 0.00000001 0.00001447 42 Yes 4 0.00000001 0.00001096 43 Yes 4 0.00000001 0.00001449 44 Yes 4 0.00000001 0.00001471 45 Yes 4 0.00000001 0.00001101 46 Yes 4 0.00000001 0.00001447 47 Yes 4 0.00000001 0.00001452 48 Yes 4 0.00000001 0.00001096 49 Yes 4 0.00000001 0.00001462		Yes	4	0.0000001	0.00001097
41 Yes 4 0.00000001 0.00001447 42 Yes 4 0.00000001 0.00001096 43 Yes 4 0.00000001 0.00001449 44 Yes 4 0.00000001 0.00001471 45 Yes 4 0.00000001 0.00001101 46 Yes 4 0.00000001 0.00001447 47 Yes 4 0.00000001 0.00001452 48 Yes 4 0.00000001 0.00001096 49 Yes 4 0.00000001 0.00001462	40	Yes	4	0.0000001	0.00001454
42 Yes 4 0.00000001 0.00001096 43 Yes 4 0.00000001 0.00001449 44 Yes 4 0.00000001 0.00001471 45 Yes 4 0.00000001 0.00001101 46 Yes 4 0.00000001 0.00001447 47 Yes 4 0.00000001 0.00001452 48 Yes 4 0.00000001 0.00001096 49 Yes 4 0.00000001 0.00001462					
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46 Yes 4 0.00000001 0.00001447 47 Yes 4 0.00000001 0.00001452 48 Yes 4 0.00000001 0.00001096 49 Yes 4 0.00000001 0.00001462					
47 Yes 4 0.00000001 0.00001452 48 Yes 4 0.00000001 0.00001096 49 Yes 4 0.00000001 0.00001462					
48 Yes 4 0.00000001 0.00001096 49 Yes 4 0.00000001 0.00001462					
49 Yes 4 0.00000001 0.00001462					
50 165 4 0.0000001 0.00001445					
	50	1 69	+	0.0000001	0.00001443

Maximum Tower Deflections - Service Wind

Section No.	Elevation	Horz. Deflection	Gov. Load	Tilt	Twist
	ft	in	Comb.	0	•
L1	155.5 - 110	5.682	44	0.2600	0.0001
L2	118 - 72.5	3.676	44	0.2447	0.0001
L3	81 - 36	1.929	44	0.1969	0.0000
L4	45 - 0	0.671	44	0.1263	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	۰	۰	ft
156.00	Platform Mount [16' LP 603-1]	44	5.682	0.2600	0.0001	501182
144.00	Platform Mount [LP 1002-1]	44	5.055	0.2574	0.0001	217905

Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	۰	۰	ft
135.00	742 213 w/ Mount Pipe	44	4.570	0.2546	0.0001	122239
128.00	(2) T-Arm Mount [TA 602-3]	44	4.197	0.2514	0.0001	91124
100.00	Side Arm Mount [SO 901-3]	44	2.786	0.2253	0.0001	51202

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load	Tilt	Twist
	ft	in	Comb.	•	•
L1	155.5 - 110	28.382	12	1.2986	0.0006
L2	118 - 72.5	18.363	12	1.2226	0.0003
L3	81 - 36	9.635	12	0.9834	0.0002
L4	45 - 0	3.351	12	0.6308	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	۰	۰	ft
156.00	Platform Mount [16' LP 603-1]	12	28.382	1.2986	0.0006	100444
144.00	Platform Mount [LP 1002-1]	12	25.251	1.2859	0.0005	43671
135.00	742 213 w/ Mount Pipe	12	22.824	1.2717	0.0004	24498
128.00	(2) T-Arm Mount [TA 602-3]	12	20.963	1.2558	0.0004	18262
100.00	Side Arm Mount [SO 901-3]	12	13.916	1.1254	0.0003	10257

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	Lu	KI/r	Α	P_u	ϕP_n	Ratio P _u
	ft		ft	ft		in²	K	K	$\overline{\phi P_n}$
L1	155.5 - 110 (1)	TP64.606x58.6x0.375	45.50	0.00	0.0	76.283 8	-27.54	3888.78	0.007
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	45.50	0.00	0.0	94.732 4	-47.15	5197.13	0.009
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	45.00	0.00	0.0	114.40 70	-68.80	6625.14	0.010
L4	36 - 0 (4)	TP76.5x70.56x0.5	45.00	0.00	0.0	122.36 00	-97.52	6767.68	0.014

Pole Bending Design Data

Section	Elevation	Size	M _{ux}	φ M _{nx}	Ratio	M _{uy}	ϕM_{ny}	Ratio
No.	r.		Later #4		M _{ux}	1.5. 6		M_{uy}
	π		kip-ft	kip-ft	ϕM_{nx}	kip-ft	kip-ft	ϕM_{ny}
L1	155.5 - 110	TP64.606x58.6x0.375	657.29	5014.91	0.131	0.00	5014.91	0.000
	(1)							
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	1842.70	7129.95	0.258	0.00	7129.95	0.000
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	3312.14	9599.50	0.345	0.00	9599.50	0.000

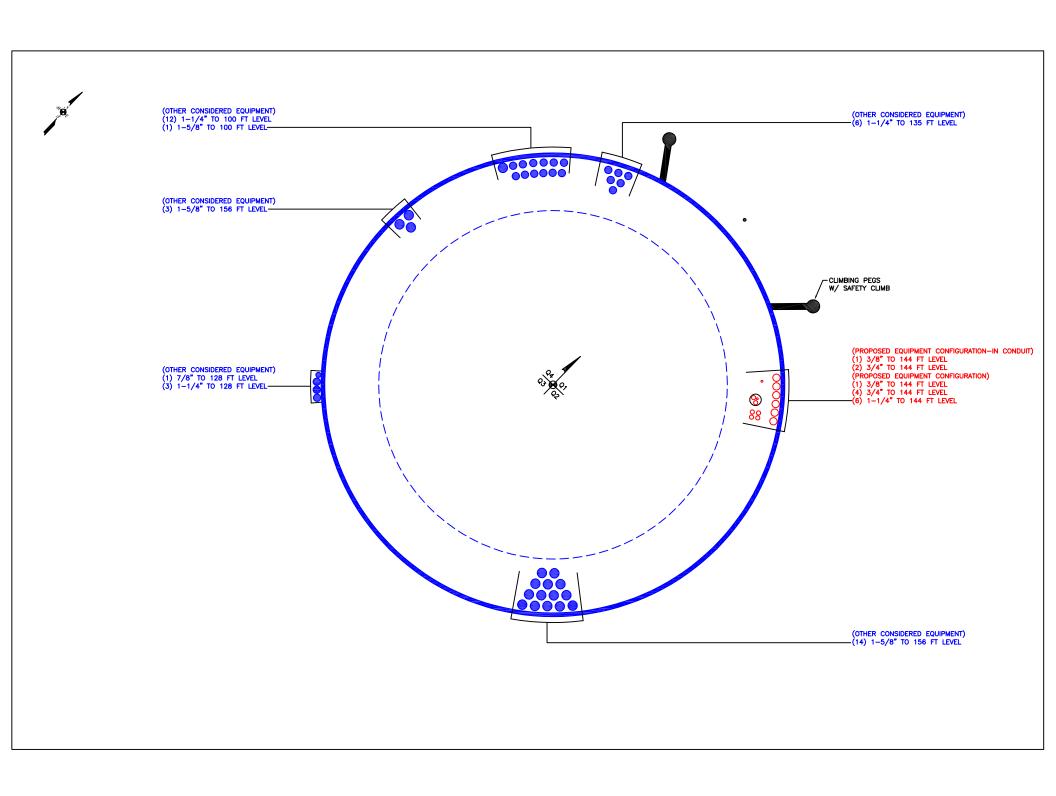
Section No.	Elevation	Size	M_{ux}	ϕM_{nx}	Ratio M _{ux}	M_{uy}	ϕM_{ny}	Ratio M _{uy}
	ft		kip-ft	kip-ft	ϕM_{nx}	kip-ft	kip-ft	ϕM_{ny}
L4	36 - 0 (4)	TP76.5x70.56x0.5	5481.45	10492.50	0.522	0.00	10492.50	0.000

		Po	le Shea	r Desig	n Data			
Section No.	Elevation	Size	Actual V _u	φV _n	Ratio V _u	Actual T _u	φ <i>T</i> _n	Ratio T _u
	ft		K	K	$\frac{1}{\phi V_n}$	kip-ft	kip-ft	ϕT_n
L1	155.5 - 110 (1)	TP64.606x58.6x0.375	26.86	1338.78	0.020	0.57	7439.68	0.000
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	37.00	1662.55	0.022	0.57	9834.25	0.000
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	44.35	2007.84	0.022	0.57	12550.25	0.000
L4	36 - 0 (4)	TP76.5x70.56x0.5	51.78	2147.42	0.024	0.57	14355.92	0.000

			Pol	e Inter	action	Desig	n Data		
Section No.	Elevation	Ratio P _u	Ratio M _{ux}	Ratio M _{uy}	Ratio V _u	Ratio T _u	Comb. Stress	Allow. Stress	Criteria
	ft	ϕP_n	φ <i>M</i> _{nx}	ϕM_{ny}	ϕV_n	$\overline{\phi T_n}$	Ratio	Ratio	
L1	155.5 - 110 (1)	0.007	0.131	0.000	0.020	0.000	0.139	1.050	4.8.2
L2	110 - 72.5 (2)	0.009	0.258	0.000	0.022	0.000	0.268	1.050	4.8.2
L3	72.5 - 36 (3)	0.010	0.345	0.000	0.022	0.000	0.356	1.050	4.8.2
L4	36 - 0 (4)	0.014	0.522	0.000	0.024	0.000	0.537	1.050	4.8.2

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	øP _{allow} K	% Capacity	Pass Fail
L1	155.5 - 110	Pole	TP64.606x58.6x0.375	1	-27.54	4083.22	13.2	Pass
L2	110 - 72.5	Pole	TP68.805x62.8x0.4375	2	-47.15	5456.99	25.5	Pass
L3	72.5 - 36	Pole	TP72.748x66.8082x0.5	3	-68.80	6956.40	33.9	Pass
L4	36 - 0	Pole	TP76.5x70.56x0.5	4	-97.52	7106.06	51.2	Pass
							Summary	
						Pole (L4)	51.2	Pass
						RATING =	51.2	Pass

APPENDIX B BASE LEVEL DRAWING



APPENDIX C ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

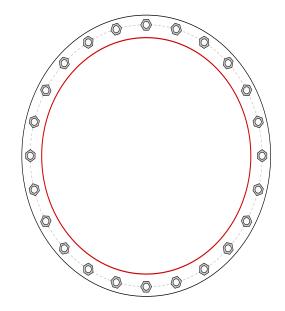


Site Info		
	BU#	806366
Sit	e Name	HRT 107(C) 943204
	Order#	517064 Rev.0

Analysis Considerations	
TIA-222 Revision	Н
Grout Considered:	No
I _{ar} (in)	1.9375

Applied Loads	
Moment (kip-ft)	5481.45
Axial Force (kips)	97.51
Shear Force (kips)	51.78

^{*}TIA-222-H Section 15.5 Applied



Analysis Results Connection Properties Anchor Rod Summary Anchor Rod Data (units of kips, kip-in) (24) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 84.75" BC Pu_c = 133.38 ϕ Pn_c = 268.39 **Stress Rating** Vu = 2.16 φVn = 120.77 47.4% Mu = n/a ϕ Mn = n/a Pass 91" OD x 3.25" Plate (A633 GR.E; Fy=60 ksi, Fu=808 ksi) **Base Plate Summary** Stiffener Data 12.89 Max Stress (ksi): (Flexural) N/A Allowable Stress (ksi): 54 Stress Rating: 22.7% Pass Pole Data

76.5" x 0.5" 12-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

CCIplate - version 3.6.1 Analysis Date: 6/10/2020

Pier and Pad Foundation

BU #: 806366 Site Name: HRT 107(C) 94320 **App. Number:** 517064 Rev.0



TIA-222 Revision: Tower Type: Monopole

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

Superstructure Analysis Reactions					
Compression, P _{comp} :	97.51	kips			
Base Shear, Vu_comp:	51.78	kips			
Moment, M _u :	5481.45	ft-kips			
Tower Height, H :	155.5	ft			
BP Dist. Above Fdn, bp _{dist} :	7.375	in			

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	611.16	51.78	8.1%	Pass
Bearing Pressure (ksf)	15.75	2.06	12.4%	Pass
Overturning (kip*ft)	18587.67	5927.51	31.9%	Pass
Pier Flexure (Comp.) (kip*ft)	18532.32	5662.68	29.1%	Pass
Pier Compression (kip)	51554.88	148.54	0.3%	Pass
Pad Flexure (kip*ft)	8427.96	2034.40	23.0%	Pass
Pad Shear - 1-way (kips)	1850.42	223.08	11.5%	Pass
Pad Shear - 2-way (Comp) (ksi)	0.190	0.021	10.5%	Pass
Flexural 2-way (Comp) (kip*ft)	11161.59	3397.61	29.0%	Pass

Pier Properties			
Pier Shape:	Square		
Pier Diameter, dpier :	9	ft	
Ext. Above Grade, E :	0.5	ft	
Pier Rebar Size, Sc :	11		
Pier Rebar Quantity, mc :	59		
Pier Tie/Spiral Size, St :	5		
Pier Tie/Spiral Quantity, mt :	7		
Pier Reinforcement Type:	Tie		
Pier Clear Cover, cc _{pier} :	3	in	

*Rating per TIA-222-H Section 15.5

Pad Properties			
Depth, D :	7.5	ft	
Pad Width, W :	33.25	ft	
Pad Thickness, T :	4.5	ft	
Pad Rebar Size (Bottom), Sp :	11		
Pad Rebar Quantity (Bottom), mp:	25		
Pad Clear Cover, cc_{pad}:	3	in	

Soil Rating*:	31.9%
Structural Rating*:	29.1%

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

Material Properties			
60	ksi		
4	ksi		
150	pcf		
	60 4		

Soil Properties				
Total Soil Unit Weight, γ :	130	pcf		
Ultimate Gross Bearing, Qult:	21.000	ksf		
Cohesion, Cu :	0.000	ksf		
Friction Angle, $oldsymbol{arphi}$:	40	degrees		
SPT Blow Count, N _{blows} :				
Base Friction, μ :	0.4			
Neglected Depth, N:	4.50	ft		
Foundation Bearing on Rock?	No			
Groundwater Depth, gw :	14.5	ft		

<--Toggle between Gross and Net



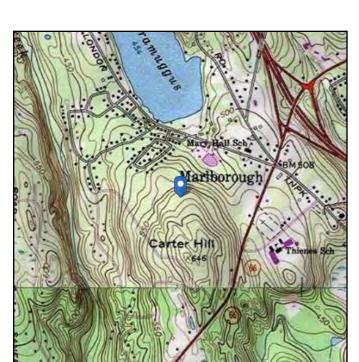
Address:

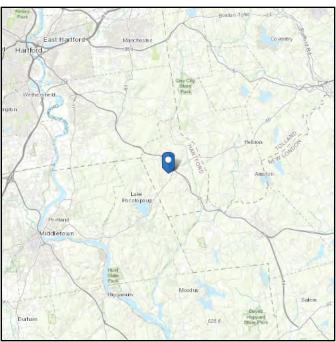
No Address at This Location

ASCE 7 Hazards Report

Standard: ASCE/SEI 7-10 Elevation: 577.55 ft (NAVD 88)

Risk Category: || Latitude: 41.629806 Soil Class: D - Stiff Soil Longitude: -72.4665





Wind

Results:

Wind Speed: 130 Vmph per town of Marlborough wind speed

 10-year MRI
 78 Vmph

 25-year MRI
 87 Vmph

 50-year MRI
 95 Vmph

 100-year MRI
 103 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of

March 12, 2014

Date Accessed: Wed Jun 10 2020

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

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

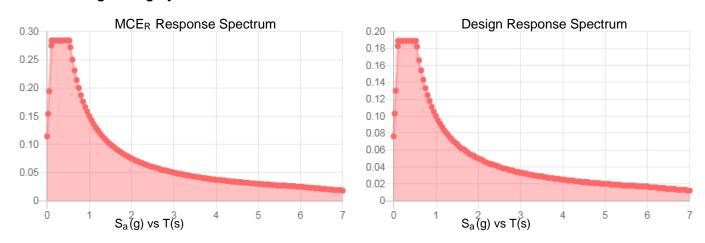
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.



Seismic

Site Soil Class: Results:	D - Stiff Soil		
S _s :	0.177	S _{DS} :	0.189
S ₁ :	0.062	S _{D1} :	0.1
F _a :	1.6	T _L :	6
F _v :	2.4	PGA:	0.09
S _{MS} :	0.284	PGA _M :	0.143
S _{M1} :	0.15	F _{PGA} :	1.6
		1 .	1

Seismic Design Category B



Data Accessed: Wed Jun 10 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating

Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with

ASCE/SEI 7-10 Ch. 21 are available from USGS.



Ice

Results:

Ice Thickness: 0.75 in.

Concurrent Temperature: 15 F

Gust Speed: 50 mph

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

Date Accessed: Wed Jun 10 2020

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

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

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

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.

Exhibit E

Mount Analysis

Date: June 2, 2020

Darcy Tarr Crown Castle 1001 Corporate Drive Canonsburg, PA 15317 704-405-6589



Subject: Mount Analysis Report

Carrier Designation: AT&T Mobility Equipment Change-Out

Carrier Site Number:59364FCarrier Site Name:CTL01073FA Location Number:10035085

Crown Castle BU Number: 806366

Crown Castle Site Name: HRT 107(C) 943204

Crown Castle JDE Job Number: 605362 Crown Castle PO Number: 1532509

Crown Castle Application Number: 517064 Revision 0

Engineering Firm Designation: Jacobs Telecommunications, Inc. Designation: ERCC0303

Site Data: 73 North Main Street

Marlborough, Hartford County, CT, 06447 Latitude 41°37'47.30" Longitude -72°27'59.40"

Structure Information: Tower Height & Type: 155.5 ft Monopole

Mount Elevation: 144 ft

Mount Type: 19 ft Platform

Dear Darcy Tarr,

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

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

Platform (single) Sufficient

The analysis has been performed in accordance with the TIA-222-H Standard based upon an ultimate 3-second gust wind speed of 120 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

We at Jacobs Telecommunications, Inc. appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this, please give us a call.

Mount analysis prepared by: Justin Gray, EIT

Engineer of Record:

2138 = 06.03.2020 07:34:07-04:00

Earl Stande, PE PE No. 34052

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- 3.2) Assumptions

4) ANALYSIS RESULTS

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Additional Calculations

1) INTRODUCTION

This is an existing 3 sector 19 ft Platform mount, mapped by Hightower Solutions, Inc.

2) ANALYSIS CRITERIA

Building Code: 2018 IBC **TIA-222 Revision:** TIA-222-H

Risk Category:

Ultimate Wind Speed: 120 mph

Exposure Category:

Topographic Factor:

Crest Height:

Ice Thickness:

Wind Speed with Ice:

Live Loading Wind Speed:

Man Live Load at Mid/End-Points:

Man Live Load at Mount Pipes:

500 lb

Table 1 - Proposed Equipment Configuration Information

Mount	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details	
		3	CCI ANTENNAS	HPA65R-BU6A		
		3	CCI ANTENNAS	OPA65R-BU6D		
		3	KATHREIN	80010965		
144.0	144.0	3	POWERWAVE TECHNOLOGIES	7770.00		
		144.0	3	ERICSSON	RRUS 32 B30	
			3	ERICSSON	RRUS 4449 B5/B12	Platform
144.0			3	ERICSSON	RRUS 4478 B14	ladom
1		3	ERICSSON	RRUS 8843 B2/B66A		
		3	POWERWAVE TECHNOLOGIES	1001940		
		6	POWERWAVE TECHNOLOGIES	LGP 17201		
		3	RAYCAP	DC6-48-60-18-8F		

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
4-MOUNT ANALYSIS	Jacobs Telecommunications, Inc.	ERCC0303 (02/26/19)	CCISITES
4-MOUNT MAPPING	Hightower Solutions, Inc.	02/20/19	CCISITES
4-TOWER STRUCTURAL ANALYSIS	FDH	19BKFC1400 (05/02/19)	CCISITES
MOUNT PHOTOS	AT&T Mobility	05/13/2020	CCISITES
APPLICATION	AT&T Mobility	517064 Revision 0	CCISITES

3.1) Analysis Method

RISA-3D (Version 17.0.1), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

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

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

3.2) Assumptions

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

Channel, Solid Round, Angle, Plate

HSS (Rectangular)

Pipe

ASTM A36 (GR 36)

ASTM 500 (GR B-46)

ASTM A53 (GR 35)

Connection Bolts

U-Bolts

ASTM A325

ASTM A307

6) Antenna pipes to be implemented vertically on/between the face members and equally spaced horizontally along the mount face.

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

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform)

Notes	Component	Critical Member	Mount Centerline (ft)	% Capacity	Pass / Fail
1	Antenna Pipe Members	3	144.0	19.8	Pass
1	Brace Members	17	144.0	98.8	Pass
1	Diagonal Members	21	144.0	26.0	Pass
1	End Pipe Members	33	144.0	16.6	Pass
1	End Plate Members	36	144.0	86.8	Pass
1	Horizontal Members	42	144.0	50.2	Pass
1	Inner Bracing Members	51	144.0	53.3	Pass
1	Standoff Members	87	144.0	77.1	Pass
1	Vertical Members	90	144.0	55.2	Pass
2	Mount-to-Tower Connection	-	144.0	18.0	Pass

Structure Rating (max from all components) =	98.8%
--	-------

Notes:

- 1) See additional documentation in "Appendix C Analysis Output" for calculations supporting the % capacity consumed.
- 2) See additional documentation in "Appendix D Analysis Output" for calculations supporting the % capacity consumed.
- 3) Rating per TIA-222-H, Section 15.5.

4.1) Recommendations

The mount has sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

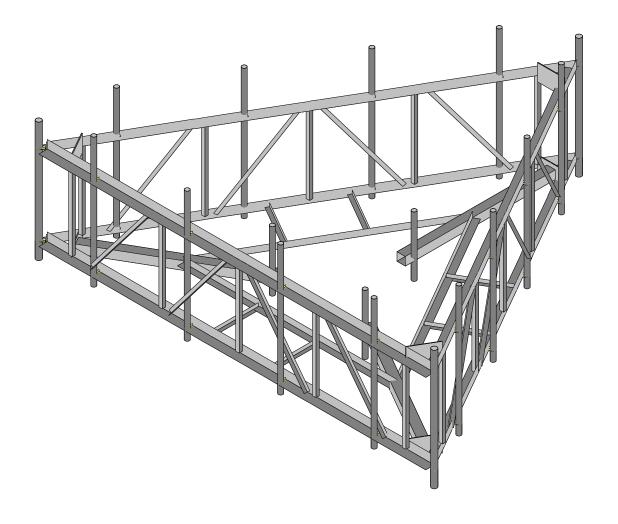
This analysis considered a worse case equipment implementation to give the contractor additional installation options if obstructions occur in the field that require adjustments. Installation adjustment approvals for contractor (as needed, but not required) are below:

- Spare antenna/equipment mount pipes can be removed to reduce mount congestion.
- RRHs can be installed back to back on dual RRH brackets implemented behind the antennas to meet PIM requirements. Verify that the dual RRH brackets utilized are valid for the specific units being installed.
- RRHs can be implemented to the mount standoff arms if other positions are not available.
 This is a better placement than considered in this analysis output as it is closer to the mount attachment connection and will provide a lesser overall impact on the mount because it is not face mounted.

Contact the EOR for additional approvals, questions, or requests.

APPENDIX A WIRE FRAME AND RENDERED MODELS



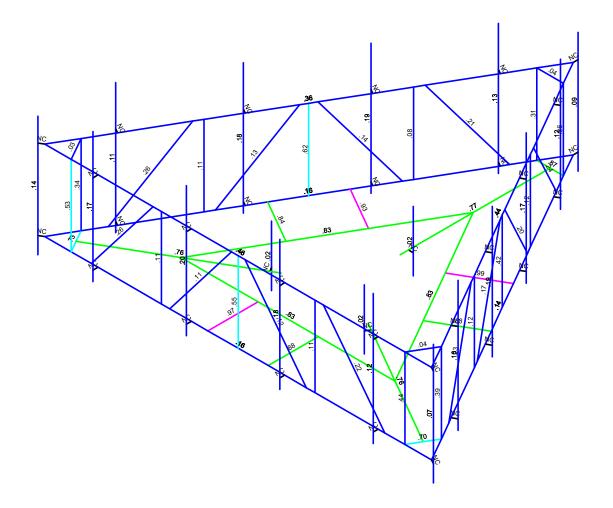


Envelope Only Solution

Jacobs Telecommunication		Page 1
J. Gray	Mapped Mount	May 28, 2020 at 5:03 PM
ERCC0303 - BU806366 A		806366 Mount Frame - ATT.r3d





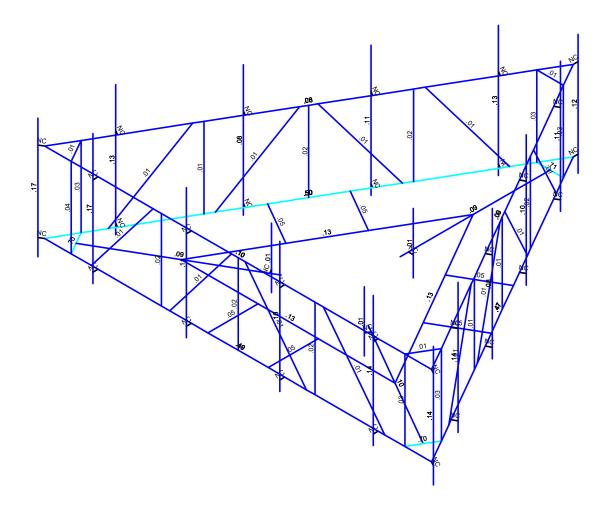


Member Code Checks Displayed (Enveloped) Envelope Only Solution

Jacobs Telecommunication		Page 2
J. Gray	Mapped Mount	May 28, 2020 at 5:04 PM
ERCC0303 - BU806366 A		806366 Mount Frame - ATT.r3d







Member Shear Checks Displayed (Enveloped) Envelope Only Solution

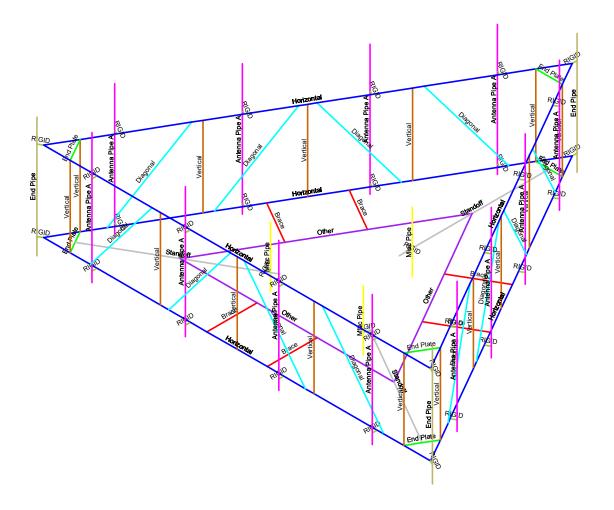
Jacobs Telecommunication.	∤.
J. Gray	
ERCC0303 - BU806366 A	

Mapped Mount

Page 3
May 28, 2020 at 5:04 PM
806366 Mount Frame - ATT.r3d



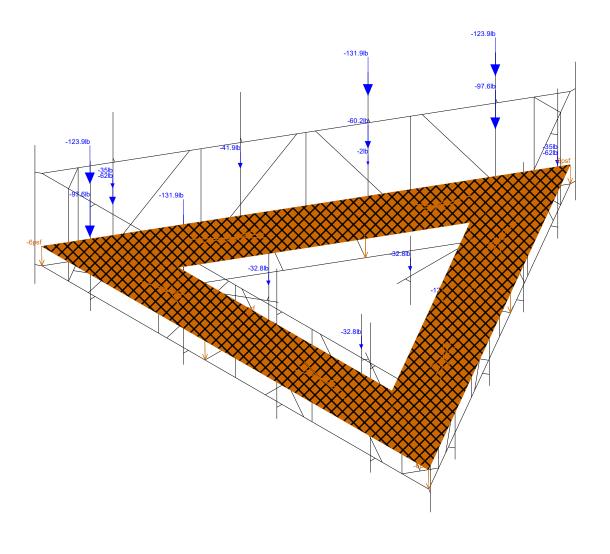




Envelope Only Solution

Jacobs Telecommunication	F	Page 4
J. Gray	Mapped Mount	May 28, 2020 at 5:04 PM
ERCC0303 - BU806366 A		806366 Mount Frame - ATT.r3d





Loads: BLC 1, DEAD LOAD Envelope Only Solution

Jacobs Telecommunication		Page 5
J. Gray	Mapped Mount	May 28, 2020 at 5:04 PM
ERCC0303 - BU806366 A		806366 Mount Frame - ATT.r3d

APPENDIX B SOFTWARE INPUT CALCULATIONS

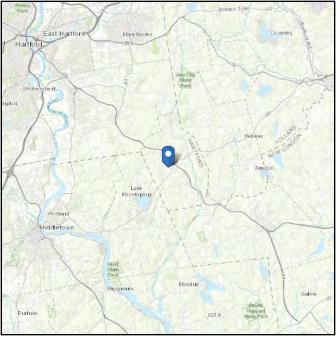
ASCE 7 Hazards Report

ASCE/SEI 7-16 Address: Standard: **Elevation:** 577.55 ft (NAVD 88)

No Address at This 41.629806 Risk Category: || Latitude: Location

D - Stiff Soil Soil Class: Longitude: -72.4665





Thu May 28 2020

Wind

Results:

Wind Speed: 120 Vmph 10-year MRI 75 Vmph 25-year MRI 84 Vmph 50-year MRI 92 Vmph 100-year MRI 99 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1-CC.2-4

Date Accessed: Thu May 28 2020

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).

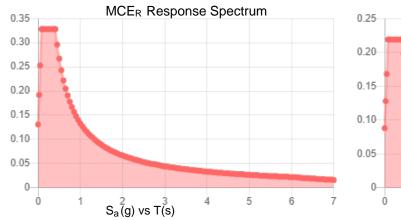
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

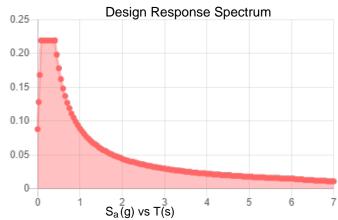
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

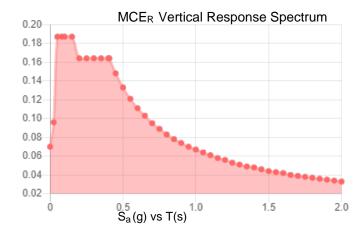
Seismic

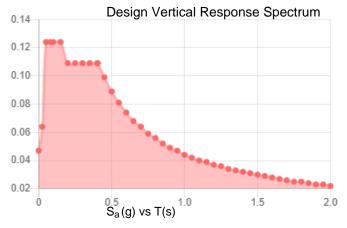
Site Soil Class: Results:	D - Stiff Soil			
S _s :	0.205	S _{D1} :	0.089	
S_1 :	0.056	T_L :	6	
F _a :	1.6	PGA:	0.113	
F _v :	2.4	PGA _M :	0.178	
S _{MS} :	0.328	F _{PGA} :	1.573	
S _{M1} :	0.133	l _e :	1	
S _{DS} :	0.219	C_v :	0.71	

Seismic Design Category B









Data Accessed:

Thu May 28 2020

Date Source:

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

Ice

Results:

Ice Thickness: 1.00 in.

Concurrent Temperature: 15 F

Gust Speed: 50 mph

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

Date Accessed: Thu May 28 2020

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.

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ANSI/TIA-222-H w/ CFD CaAa Considerations

_			
-	rn	n	t

Manufacturer	POWERWAVE	TECHN	IOLOGIES
Model #	7770		
Longth		lin	
Length Width	55 11	in	
Depth		in	
Weight		lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	M		M, B)
Structure Height (h)	155.5	ft	WI, D)
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	4	(w/o ice)
Basic Wind Speed (V _i)			(w/ ice)
Basic Wind Speed (V _s)	30		(service)
Risk Category	II		III, IV)
Exposure Category	В	(B, C	
Topographic Category	1		3 or 4)
Crest Height (H)	0	ft	.,
Shape	F	(R / F	/S)
Length / Width	5.000	1,,,,,	(w/o ice)
Length / Width	4.304	1	(w/ ice)
Ca	1.311		(w/o ice)
Ca	1.280	1	(w/ ice)
Ca	1.311		(service)
(EPA) _A		ft ²	(w/o ice)
(EPA) _A		ft ²	(w/ ice)
		4	,
(EPA) _A	4.958	ft ²	(service)
$F_A = q_z G_h (EPA)_A$	190.417	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	40.726	lb	(w/ice)
$F_A = q_z G_h(EPA)_A$	11.901	lb	(service)
Ice Weight	85.919	lb	
Total Weight	120.919	lb	(w/ice)
Equations	1 007		1/ . 1/ . 0.01
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	115.198		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	47.999		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	28.800		(service)
$G_h = (V_z N_z N_e)$	1.00		(23.1.00)
K _d =	0.95		
	1.00		
$K_s =$			
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00	_	
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
	1	Х	1
Position	5	Х	1
	9	X	1
i		Х	

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

Input Data

Side			
Manufacturer	POWERWAVE	TECHN	OLOGIES
Model #	7770		
		_	
Length	55	in	
Width	11	in	
Depth	5	in	
Weight	35	lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	M	(S, G,	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V _i)	50	mph	(w/ ice)
Basic Wind Speed (V _s)	30	-	(service)
Risk Category		- '	II, IV)
Exposure Category	В	(B, C	
	1		3 or 4)
Topographic Category		-1'''	J J1 7)
Crest Height (H)	0	ft	(0)
Shape	F 11.000	(R / F	,
Length / Width	11.000		(w/o ice)
Length / Width	7.833		(w/ ice)
Ca	1.533		(w/o ice)
Ca	1.428		(w/ ice)
Ca	1.533		(service)
(EPA) _A	2.635	ft^2	(w/o ice)
(EPA) _A	3.743	ft ²	(w/ ice)
(EPA) _A	2.635	-	(service)
(LFA)A	2.033	ft ²	(service)
$F_A = q_z G_h (EPA)_A$	101.223	lb	(w/o ice)
$F_A = q_z G_h(EPA)_A$	24.957	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	6.326	lb	(service)
Ice Weight	85.919	lb	(0011100)
Total Weight	120.919	lb	(w/ice)
Total Weight	120.717	Tin	(₩/ ١٥٥)
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_{h} = e^{[(f)(z)/H]}$			172111111 = 172 = 2.01
	1.000		
$K_{zt} = [1 + (K_c K_t) / K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \leq 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{7}K_{7}K_{e})^{0.5}(V)(D)$	52.363		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	21.818		(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	13.091		(service)
G _h =	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$			
$q_z = 0.00256K_zK_zK_sK_eK_dV_s^2$	2.401	psf	(service)
	1	X	1
Position	5 9	X	1 1
	7	X	1
Ī	l .	^	Ī



ANSI/TIA-222-H w/ CFD CaAa Considerations

F	rc	٦r	١t	

Manufacturer	CCI ANTENNAS	;	
Model #	HPA65R-BU6A		
	T	7	
Length	71.1	in	
Width	11.7	in	
Depth	7.6	in	
Weight	41.9	lb :	
Design Ice Thickness (t _i)	1	in	1.4. D)
Structure Type Structure Height (h)	M 1EE E	(S, G,	M, B)
Antenna Centerline (z)	155.5 144	ft	
Basic Wind Speed (V)	120	4	(w/o ice)
Basic Wind Speed (V _i)	50	-1 '	(w/ ice)
Basic Wind Speed (V _s)		-	(service)
	30	-	
Risk Category Exposure Category	II B	(I, II, (B, C	
Topographic Category	1	 -	3 or 4)
		+ '	3014)
Crest Height (H)	0 F	ft (R / F	(2)
Shape Length / Width	6.077	(1.7.1	(w/o ice)
Length / Width	5.238	1	(w/ ice)
C _a	1.359	1	(w/o ice)
C _a	1.322	1	(w/ ice)
C _a	1.359	1	(service)
		ft ²	,
(EPA) _A	5.880	+	(w/o ice)
(EPA) _A	7.070	ft ²	(w/ ice)
(EPA) _A	5.880	ft ²	(service)
$F_A = q_z G_h (EPA)_A$	225.844	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	47.144	lb	(w/ice)
$F_A = q_z G_h(EPA)_A$	14.115	lb	(service)
Ice Weight	119.280	lb	,
Total Weight	161.180	lb	(w/ ice)
-		_	
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t) / K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{i7} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ice)
$C = (K_{7}K_{7}K_{e})^{0.5}(V)(D)$	122.529		(w/o ice)
$C = (K_z t K_z K_e)^{0.5} (V_i)(D)$	51.054		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	30.632		(service)
G _h =	1.00		
K _d =	0.95		
K _s =	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
15	2	Х	1
Docition	6	Х	1
Position	10	Х	1
		Х	

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

Input Data

Side			
Manufacturer	CCI ANTENNAS		
Model #	HPA65R-BU6A		
Longth	71 1	in	
Length Width	71.1 11.7	in	
Depth	7.6	in	
Weight	41.9	lb	
Design Ice Thickness (t _i)	1	in	
Structure Type			M, B)
Structure Height (h)	155.5	ft	, ,
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V _i)	50	mph	(w/ ice)
Basic Wind Speed (V _s)	30	mph	(service)
Risk Category	II	(1, 11, 1	II, IV)
Exposure Category	В	(B, C	or D)
Topographic Category	1	(1, 2,	3 or 4)
Crest Height (H)	0	ft	
Shape	F	(R / F	/ S)
Length / Width	9.355		(w/o ice)
Length / Width	7.403		(w/ ice)
C_a	1.479		(w/o ice)
C_a	1.413		(w/ ice)
Ca	1.479		(service)
(EPA) _A	3.820	ft^2	(w/o ice)
(EPA) _A	4.960	ft ²	(w/ ice)
(EPA) _A	3.820	ft ²	(service)
, ,,,,			, ,
$F_A = q_z G_h (EPA)_A$	146.722	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	33.074	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	9.170	lb	(service)
Ice Weight	119.280	lb	
Total Weight	161.180	lb	(w/ ice)
Equations			
$K_z = 2.01[z/z_q]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{i7} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	79.591		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	33.163		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$ $C = (K_{zt}K_zK_e)^{0.5}(V)(D)$			(service)
	19.898		(service)
G _h =	1.00		
$K_d =$	0.95		
K _s =	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
	2	Х	1
Position	6	Х	1
. 55.11011	10	Х	1
		Χ	



Manufacturer

 $C = (K_{zt}K_zK_e)^{0.5}(V)(D)$

 $K_e = e^{-0.0000362zs}$

 $q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$

 $q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$

 $q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$

G_h =

K_d =

K_s =

K_a =

Position

ANSI/TIA-222-H w/ CFD CaAa Considerations

CCI ANTENNAS

Manuracturer	CCLAINTEININA	3	
Model #	OPA65R-BU6D)	
Length	71.2	in	
Width	21	in	
Depth	7.8	in	
Weight	60.2	lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	М	(S, G	6, M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	n (w/o ice)
Basic Wind Speed (V _i)	50	mph	(w/ice)
Basic Wind Speed (V _s)	30	_	(service)
Risk Category	II		, III, IV)
Exposure Category	В		or D)
Topographic Category	1		2, 3 or 4)
Crest Height (H)	0	ft	,
Shape	F		F / S)
Length / Width	3.390	1,,	(w/o ice)
Length / Width	3.153	1	(w/ ice)
C_a	1.240	1	(w/o ice)
Ca	1.229	†	(w/ ice)
C _a	1.240	1	(service)
(EPA) _A	12.219	ft ²	(w/o ice)
(EPA) _A	13.754	ft ²	(w/ ice)
(EPA) _A	12.219	ft ²	(service)
$F_A = q_z G_h (EPA)_A$	469.335	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	91.712	lb	(w/ ice)
$F_A = q_z G_h(EPA)_A$	29.333	lb	(service)
Ice Weight	160.046	lb	, ,
Total Weight	220.246	lb	(w/ ice)
Total Troignt	220.2.10	~	(11, 100)
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_z = 2.01[272g]$ $K_h = e^{[(f)(z)/H]}$	1.000		Nzmin = Nz = 2.01
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \leq 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	219.924		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	91.635		(w/ ice)
C (K K K)0.5(A)(D)	F 4 001		(00m/loo)

54.981

1.00

0.95

1.00

0.90

1.00

38.41

6.67

2.40

3

7

11

psf

psf

psf

Χ

Χ

Χ

Х

(service)

(w/o ice)

(w/ice)

(service)

1

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Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

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Side			
Manufacturer	CCI ANTENNAS		
Model #	OPA65R-BU6D		
		-	
Length	71.2	in	
Width	21	in	
Depth	7.8	in	
Weight	60.2	lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	M	(S, G,	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V _i)	50	mph	(w/ ice)
Basic Wind Speed (V _s)	30	mph	(service)
Risk Category	II	(1, 11, 1	III, IV)
Exposure Category	В	(B, C	or D)
Topographic Category	1	(1, 2,	3 or 4)
Crest Height (H)	0	ft	
Shape	F	(R / F	/ S)
Length / Width	9.128	1	(w/o ice)
Length / Width	7.266		(w/ ice)
Ca	1.471		(w/o ice)
Ca	1.409		(w/ ice)
Ca	1.471		(service)
(EPA) _A	4.543	ft ²	(w/o ice)
			,
(EPA) _A	5.861	ft ²	(w/ ice)
(EPA) _A	4.543	ft ²	(service)
$F_A = q_z G_h(EPA)_A$	174.480	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	39.084	lb	(w/ ice)
$F_A = q_z G_h(EPA)_A$	10.905	lb	(service)
Ice Weight	160.046	lb	
Total Weight	220.246	lb	(w/ ice)
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{i7} \le 1.4$
$t_{i7} = (t_i)(I)(K_{i7})(K_{7t})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_{z}K_{z})^{0.5}(V)(D)$	81.686		(w/o ice)
			` ,
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	34.036		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	20.421		(service)
G _h =	1.00		
K _d =	0.95		
$K_s =$	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$,
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
	3	X	1
Position	7	X	1
	11	X	1
		Х	



ANSI/TIA-222-H w/ CFD CaAa Considerations

Front

Manufacturer	KATHREIN		
Model #	80010965		
Length	78.7	in	
Width	20	in	
Depth	6.9	in	
Weight	97.6	lb :	
Design Ice Thickness (t _i)	1	in	M D)
Structure Type Structure Height (h)	M 155.5	(5, G	, M, B)
Antenna Centerline (z)	133.3	ft	
Basic Wind Speed (V)	120	_	(w/o ice)
Basic Wind Speed (V _i)	50	_ '	(w/ ice)
Basic Wind Speed (V _s)	30		(service)
Risk Category	II	→ '	III, IV)
Exposure Category	В		or D)
Topographic Category	1	→ ' '	3 or 4)
Crest Height (H)	0	ft	,
Shape	F	(R / I	= / S)
Length / Width	3.935	1,,	(w/o ice)
Length / Width	3.630	1	(w/ ice)
Ca	1.264		(w/o ice)
Ca	1.250		(w/ ice)
Ca	1.264		(service)
(EPA) _A	12.231	ft ²	(w/o ice)
(EPA) _A	13.790	ft ²	(w/ice)
(EPA) _A	12.231	ft ²	(service)
(E179A	12.201	_ ''՝	(301 1100)
$F_A = q_z G_h(EPA)_A$	469.769	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	91.957	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	29.361	lb	(service)
Ice Weight	171.108	lb	
Total Weight	268.708	lb	(w/ice)
Equations			
$K_z = 2.01[z/z_q]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{71}K_7K_9)^{0.5}(V)(D)$	209.451		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	87.271		(w/ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	52.363		(service)
$G_h = \frac{(V_{Z}(V_{Z}(V_{Q}) - V_{Z}(V_{Q}))}{(V_{Z}(V_{Z}(V_{Q}) - V_{Z}(V_{Q}))}$	1.00		\ · · · /
K _d =	0.95		
$K_{d} = K_{s} =$	1.00		
$K_a =$	0.90		
$K_a = K_e = e^{-0.0000362zs}$			
	1.00	nef	(w/o ice)
$q_z = 0.00256K_zK_zK_sK_eK_dV^2$	38.41	psf	, ,
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
	4	X	1
Position	8 12	X	1
	12	X	
		Х	

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

Input Data

Side			
Manufacturer	KATHREIN		
Model #	80010965		
		-	
Length	78.7	in	
Width	20	in	
Depth	6.9	in	
Weight	97.6	lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	M	(S, G,	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V _i)	50	mph	(w/ ice)
Basic Wind Speed (V _s)	30	mph	(service)
Risk Category	II		III, IV)
Exposure Category	В	(B, C	
Topographic Category	1	4 '	3 or 4)
1 0 1		ft ft	J J1 7)
Crest Height (H)	0 F		/ c)
Shape	-	(R / F	,
Length / Width	11.406	1	(w/o ice)
Length / Width	8.790	-	(w/ ice)
C _a	1.547	-	(w/o ice)
Ca	1.460		(w/ ice)
Ca	1.547		(service)
(EPA) _A	4.214	ft ²	(w/o ice)
(EPA) _A	5.570	ft^2	(w/ ice)
(EPA) _A	4.214	ft ²	(service)
(=: - 7/4		1.,	()
$F_A = q_z G_h (EPA)_A$	161.865	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	37.143	lb	(w/ ice)
$F_A = q_z G_h(EPA)_A$	10.117	lb	(service)
Ice Weight	171.108	lb	(55, 1,55)
Total Weight	268.708	lb	(w/ ice)
Total Weight	200.700	Inc	(W/ ICC)
Equations			
	1 007		V /V/201
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \leq 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	72.261		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	30.109		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$ $C = (K_{zt}K_zK_e)^{0.5}(V)(D)$			` ,
	18.065		(service)
G _h =	1.00		
$K_d =$	0.95		
K _s =	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV$ $q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
			` ,
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
	4	X	1
Position	8 12	X	1
	12	X	<u>'</u>
1	L	Х	l



ANSI/TIA-222-H w/ CFD CaAa Considerations

Front			
Manufacturer	POWERWAVE	TECHN	IOLOGIES
Model #	LGP 17201		
		7.	
Length	14.4	in	
Width	13.9	in	
Depth	3.7	in	
Weight		lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	M	+ ' ' '	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	(v./o.ioo)
Basic Wind Speed (V)	120	+ '	(w/o ice)
Basic Wind Speed (V _i)	50	-	(w/ ice)
Basic Wind Speed (V _s)	30	ս ՝	(service)
Risk Category	ll n		III, IV)
Exposure Category	B 1	(B, C	•
Topographic Category	1	+ ` ` `	3 or 4)
Crest Height (H)	0	ft	. (0)
Shape	F	(R / F	•
Length / Width	1.036	<u> </u>	(w/o ice)
Length / Width	1.031	4	(w/ ice)
Ca	1.200	<u> </u>	(w/o ice)
Ca	1.200	1	(w/ ice)
Ca	1.200	<u> </u>	(service)
(EPA) _A	1.501	ft ²	(w/o ice)
(EPA) _A	2.033	ft ²	(w/ ice)
(EPA) _A	1.501	ft ²	(service)
	•	-	
$F_A = q_z G_h(EPA)_A$	57.659	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	13.559	lb	(w/ ice)
$F_A = q_z G_h(EPA)_A$	3.604	lb	(service)
Ice Weight	26.404	lb	
Total Weight	57.404	lb	(w/ice)
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	145.568		(w/o ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V_{i})(D)$	60.654		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$ $C = (K_{zt}K_zK_e)^{0.5}(V)(D)$			(service)
	36.392		(service)
G _h =	1.00		
K _d =	0.95		
K _s =	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
1- 2 2L 3 C U 3	1	Х	2
Position	5	Х	2
I OSITIOH	9	Х	2
		Х	

Project Number:	ERCC0303	
Site Name:	BU806366 APP517064	
Engineer:	J. Gray	
Date:	05/28/2020	
Carrier:	AT&T Mobility	
Reviewed By:	B. Bartlett	

Input Data

Side			
Manufacturer	POWERWAVE	rechn	OLOGIES
Model #	LGP 17201		
		-	
Length	14.4	in	
Width	13.9	in	
Depth	3.7	in	
Weight	31	lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	M	(S, G,	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V _i)	50	mph	(w/ ice)
Basic Wind Speed (V _s)	30	- '	(service)
Risk Category	II		III, IV)
Exposure Category	В	(B, C	
Topographic Category	1	4 '	3 or 4)
1 0 1		ft ft	J J1 7)
Crest Height (H)	0 F	1	/ c)
Shape	-	(R / F	,
Length / Width	3.892	-	(w/o ice)
Length / Width	2.778	-	(w/ ice)
Ca	1.262	1	(w/o ice)
Ca	1.212		(w/ ice)
C_{a}	1.262		(service)
(EPA) _A	0.420	ft^2	(w/o ice)
(EPA) _A	0.762	ft ²	(w/ ice)
(EPA) _A	0.420	ft ²	(service)
(El 79A	0.120	1,,,	(301 1100)
$F_A = q_z G_h (EPA)_A$	16.139	lb	(w/o ice)
$F_A = q_z G_h(EPA)_A$	5.083	lb	(w/ ice)
$F_A = q_z G_h(EPA)_A$	1.009	lb	(service)
Ice Weight	26.404	lb	()
Total Weight	57.404	lb	(w/ ice)
Total Worght	67.101].~	(11/100)
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_z = 2.0 \text{ T}[27 Z_g]$ $K_h = e^{[(f)(z)/H]}$			Nzmin = Nz = 2.01
	1.000		
$K_{zt} = [1 + (K_c K_t) / K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \leq 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	38.748		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	16.145		(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	9.687		(service)
			(sei vice)
G _h =	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_gK_dV_i^2$	6.668	psf	(w/ ice)
	2.401	psf	(service)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$		i 	·
	1 5	X	2 2
Position	9	X	2
	·	X	
I	l	_ ^	1



ANSI/TIA-222-H w/ CFD CaAa Considerations

_		
H	r∩nt	

Front			
Manufacturer	POWERWAVE	ΓECHN	IOLOGIES
Model #	1001940		
Longth	E 7	lin	
Length Width	5.7 3.7	in	
Depth		in	
Weight		lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	М	(S, G,	M, B)
Structure Height (h)		ft	, ,
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V _i)	50	mph	(w/ ice)
Basic Wind Speed (V _s)	30	mph	(service)
Risk Category	II	(1, 11, 1	II, IV)
Exposure Category	В	(B, C	or D)
Topographic Category	1	(1, 2,	3 or 4)
Crest Height (H)	0	ft	
Shape	F	(R / F	/ S)
Length / Width	1.541		(w/o ice)
Length / Width	1.332		(w/ ice)
Ca	1.200		(w/o ice)
Ca	1.200		(w/ ice)
Ca	1.200		(service)
(EPA) _A	0.158	ft ²	(w/o ice)
(EPA) _A	0.362	ft ²	(w/ ice)
(EPA) _A	0.158	ft ²	(service)
$F_A = q_z G_h(EPA)_A$	6.075	lb	(w/o ice)
$F_A = q_z G_h(EPA)_A$	2.413	lb	(w/ ice)
$F_A = q_z G_h(EPA)_A$	0.380	lb	(service)
Ice Weight	3.517	lb	(SCI VICC)
Total Weight	5.517	lb	(w/ ice)
Total Wolgitt	0.017	1.~	(117 100)
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t) / K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{7}K_{7}K_{9})^{0.5}(V)(D)$	38.748		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	16.145		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$ $C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	9.687		(service)
$G_{h} = (N_{zt}N_{z}N_{e}) (V)(D)$	1.007		(service)
$K_d =$	0.95		
K _s =	1.00		
$K_a = K_e = e^{-0.0000362zs}$	0.90 1.00		
=		nef	(w/o ice)
$q_z = 0.00256K_zK_ztK_sK_eK_dV^2$	38.41	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	` '
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
	7	X	1
Position	11	X	1
	- 11	\ \ \	1

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

Input Data

Side			
Manufacturer	POWERWAVE 1	rechn	OLOGIES
Model #	1001940		
	1	7	
Length	5.7	in	
Width	3.7	in	
Depth	1.7	in	
Weight	2	lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	М	- 1	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	٠.	(w/o ice)
Basic Wind Speed (V _i)	50	- '	(w/ ice)
Basic Wind Speed (V _s)	30		(service)
Risk Category	II		II, IV)
Exposure Category	В	(B, C	•
Topographic Category	1	(1, 2,	3 or 4)
Crest Height (H)	0	ft	
Shape	F	(R / F	,
Length / Width	3.353		(w/o ice)
Length / Width	1.996		(w/ ice)
Ca	1.238		(w/o ice)
Ca	1.200		(w/ ice)
Ca	1.238		(service)
(EPA) _A	0.075	ft ²	(w/o ice)
(EPA) _A	0.242	ft ²	(w/ ice)
(EPA) _A	0.075	ft ²	(service)
(2179)	0.070	1,,,	(3011100)
$F_A = q_z G_h (EPA)_A$	2.880	lb	(w/o ice)
$F_A = q_z G_h(EPA)_A$	1.611	lb	(w/ ice)
$F_A = q_z G_h(EPA)_A$	0.180	lb	(service)
Ice Weight	3.517	lb	(
Total Weight	5.517	lb	(w/ ice)
rotal troight	0.017].~	(117 100)
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		11/2/11/11 = 11/2 = 2.10 1
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		14 . 4 4
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	17.803		(w/o ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V_{i})(D)$	7.418		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	4.451		(service)
G _h =	1.00		•
K _d =	0.95		
K _s =	1.00		
K _a =	0.90		
$K_a = K_e = e^{-0.0000362zs}$			
_	1.00		(/- !)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
	3	Х	1
Position	7	Х	1
	11	Х	1
		Χ	



ANSI/TIA-222-H w/ CFD CaAa Considerations

Front	
Manufacturer	ERICSSON

Front Manufacturer	ERICSSON		
Model #	RRUS 4478 B14		
Wodel π	1110014		
Length	16.5	in	
Width	13.4	in	
Depth	7.7	in	
Weight	59.9	lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	М	(S, G,	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V _i)	50	mph	(w/ ice)
Basic Wind Speed (V _s)	30	mph	(service)
Risk Category	II	(1, 11, 1	II, IV)
Exposure Category	В	(B, C	
Topographic Category	1	(1, 2,	3 or 4)
Crest Height (H)	0	ft	
Shape	F	(R / F	/ S)
Length / Width	1.231		(w/o ice)
Length / Width	1.197		(w/ ice)
C_a	1.200		(w/o ice)
C_a	1.200		(w/ ice)
C_a	1.200		(service)
(EPA) _A	1.658	ft ²	(w/o ice)
(EPA) _A	2.218	ft ²	(w/ ice)
(EPA) _A	1.658	ft ²	(service)
(=: : ///		1	(/
$F_A = q_z G_h(EPA)_A$	63.691	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	14.792	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	3.981	lb	(service)
Ice Weight	32.339	lb	
Total Weight	92.239	lb	(w/ ice)
V	•	.	
Equations			
$K_z = 2.01[z/z_0]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{i7} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
		1111	, ,
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	140.332		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	58.472		(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	35.083		(service)
G _h =	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
	2.40	psf	(service)
$q_z = 0.00256K_zK_ztK_sK_eK_dV_s^2$	3	<u> </u>	(Service)
	7	X	1
Position	11	X	1
	- '	<u> </u>	'

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

Input Data

Side			
Manufacturer	ERICSSON		
Model #	RRUS 4478 B14		
Length	16.5	in	
Width	13.4	in	
Depth	7.7	in	
Weight	59.9	lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	M	(S, G,	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V _i)	50	mph	(w/ ice)
Basic Wind Speed (V _s)	30	mph	(service)
Risk Category	II		II, IV)
Exposure Category	В	(B, C	
Topographic Category	1	4 ` '	3 or 4)
Crest Height (H)	0	ft	0 0,
Shape	F	(R / F	(2)
Length / Width	2.143	(IX / F	(w/o ice)
Length / Width	1.878		(w/ ice)
	1.200		(w/o ice)
C _a			'
Ca	1.200		(w/ ice)
Ca	1.200		(service)
(EPA) _A	0.953	ft ²	(w/o ice)
(EPA) _A	1.414	ft ²	(w/ ice)
(EPA) _A	0.953	ft ²	(service)
$F_A = q_z G_h(EPA)_A$	36.599	lb	(w/o ice)
$F_A = q_z G_h(EPA)_A$	9.427	lb	(w/ ice)
$F_A = q_z G_h(EPA)_A$	2.287	lb	(service)
Ice Weight	32.339	lb	()
Total Weight	92.239	lb	(w/ ice)
Total Weight	72.237	IID	(W/ ICC)
Equations			
	1 007		V -V - 2.01
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t) / K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{i7} = (t_i)(I)(K_{i7})(K_{7t})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{71}K_7K_9)^{0.5}(V)(D)$	80.639		(w/o ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V_{i})(D)$ $C = (K_{zt}K_{z}K_{e})^{0.5}(V_{i})(D)$	33.599		(w/ ice)
$C = (K_{zt}K_{z}K_{e}) (V_{i})(D)$			` '
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	20.160		(service)
G _h =	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
			(w/ ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	` '
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
	3	Х	1
Position	7	Х	1
	11	Х	1
		Х	



ANSI/TIA-222-H w/ CFD CaAa Considerations

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Front	ERICSSON		
Manufacturer Model #	RRUS 8843 B2/	/B66A	
Model #	KKO3 0043 B27	DOUA	
Length	14.9	in	
Width	13.2	in	
Depth		in	
Weight		lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	М	(S, G,	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V _i)	50	mph	(w/ ice)
Basic Wind Speed (V _s)	30	mph	(service)
Risk Category	II	(1, 11, 1	III, IV)
Exposure Category	В	(B, C	or D)
Topographic Category	1	(1, 2,	3 or 4)
Crest Height (H)	0	ft	
Shape	F	(R / F	/ S)
Length / Width	1.129	1	(w/o ice)
Length / Width	1.110	Ĭ	(w/ ice)
Ca	1.200	Ī	(w/o ice)
Ca	1.200	Ī	(w/ ice)
Ca	1.200	Ì	(service)
(EPA) _A		ft ²	(w/o ice)
(EPA) _A	2.004	ft ²	(w/ ice)
		+ -	(service)
(EPA) _A	1.475	ft ²	(service)
$F_A = q_z G_h(EPA)_A$	56.657	lb	(w/o ice)
$F_A = q_z G_h(EPA)_A$	13.362	lb	(w/ ice)
$F_A = q_z G_h(EPA)_A$	3.541	lb	(service)
Ice Weight	32.128	lb	,
Total Weight	104.128	lb	(w/ice)
	•	_	
Equations			
$K_z = 2.01[z/z_q]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{zt} = [z/33]^{(0.10)}$	1.159		$K_{i7} \le 1.4$
			=
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	138.238		(w/o ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V_{i})(D)$	57.599		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	34.559		(service)
G _h =	1.00		
$K_d =$	0.95		
K _s =	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
			(w/ ice)
$q_z = 0.00256K_zK_zt_eK_dV_i^2$	6.67	psf	, ,
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
	3	X	1
Position	7 11	X	1
	- 11	X	

Project Number:	ERCC0303	
Site Name:	BU806366 APP517064	
Engineer:	J. Gray	
Date:	05/28/2020	
Carrier:	AT&T Mobility	
Reviewed By:	B. Bartlett	

Input Data

Side			
Manufacturer	ERICSSON		
Model #	RRUS 8843 B2/	B66A	
Longth	14.9	in	
Length Width	13.2	in	
Depth	10.9	in	
Weight	72	lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	М	(S, G,	M, B)
Structure Height (h)	155.5	ft	. ,
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V _i)	50	mph	(w/ ice)
Basic Wind Speed (V _s)	30	mph	(service)
Risk Category	II	(1, 11, 1	
Exposure Category	В	(B, C	or D)
Topographic Category	1	(1, 2,	3 or 4)
Crest Height (H)	0	ft	
Shape	F	(R / F	/ S)
Length / Width	1.367	1	(w/o ice)
Length / Width	1.303		(w/ ice)
Ca	1.200		(w/o ice)
Ca	1.200		(w/ ice)
Ca	1.200		(service)
(EPA) _A	1.218	ft ²	(w/o ice)
(EPA) _A	1.707	ft ²	(w/ ice)
(EPA) _A	1.218	ft ²	(service)
(=: : 7/1		1.,	(
$F_A = q_z G_h(EPA)_A$	46.785	lb	(w/o ice)
$F_A = q_z G_h(EPA)_A$	11.381	lb	(w/ ice)
$F_A = q_z G_h(EPA)_A$	2.924	lb	(service)
Ice Weight	32.128	lb	
Total Weight	104.128	lb	(w/ ice)
•	•	-	
Equations			
$K_z = 2.01[z/z_0]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{i7} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$t_{iz} = (t_i)(t)(\kappa_{iz})(\kappa_{zt})$ $C = (K_{zt}K_zK_e)^{0.5}(V)(D)$		111	, ,
	114.151		(w/o ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V_{i})(D)$	47.563		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	28.538		(service)
G _h =	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_s^2$	2.401	psf	(service)
AT 0.005001/Zi/Zii/Zii/Gi/d & S	3	Х	1
D!#!	7	Х	1
Position	11	Х	1
		Х	



ANSI/TIA-222-H w/ CFD CaAa Considerations

Front	
Manufacturer	ERICSSON
Model #	DDI IC 4440 DE /D12

Manufacturer	ERICSSON		
Model #	RRUS 4449 B5/B12		
Length	17.9	in	
Width	13.19	in	
Depth	9.44	in	
Weight	71	lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	М	(S, G,	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V _i)	50	mph	(w/ ice)
Basic Wind Speed (V _s)	30	mph	(service)
Risk Category	II	(1, 11, 1	III, IV)
Exposure Category	В	(B, C	or D)
Topographic Category	1	(1, 2,	3 or 4)
Crest Height (H)	0	ft	
Shape	F	(R / F	/ S)
Length / Width	1.357		(w/o ice)
Length / Width	1.304		(w/ ice)
Ca	1.200		(w/o ice)
Ca	1.200	Ĩ	(w/ ice)
Ca	1.200	1	(service)
(EPA) _A	1.771	ft ²	(w/o ice)
(EPA) _A	2.351	ft ²	(w/ ice)
(EPA) _A	1.771	ft ²	(service)
(LI 71)A	1.771	Į''	(SCI VICC)
$F_A = q_z G_h (EPA)_A$	68.013	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	15.680	lb	(w/ ice)
$F_A = q_z G_h(EPA)_A$	4.251	lb	(service)
Ice Weight	36.699	lb	(55. 1.55)
Total Weight	107.699	lb	(w/ ice)
Total Wolgitt	107.077	1	(117 100)
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_z = 2.01[2/2_g]$ $K_h = e^{[(f)(z)/H]}$	1.000		Nzmin = Nz = 2.01
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \leq 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	138.133		(w/o ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V_{i})(D)$	57.555		(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	34.533		(service)
G _h =	1.00		,
K _d =	0.95		
K _s =	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$			
-	1.00	nef	(w/o.ico)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_zK_sK_eK_dV_s^2$	2.40	psf	(service)
	4	Х	1
Position	8	Х	1
	12	Х	1

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

Side			
Manufacturer	ERICSSON		
Model #	RRUS 4449 B5/	B12	
Longth	17.9	in	
Length Width	13.19	in	
Depth		in	
Weight		lb	
Design Ice Thickness (t _i)	1	in	
Structure Type		-	M, B)
Structure Height (h)	155.5	ft	. ,
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V _i)	50	mph	(w/ ice)
Basic Wind Speed (V _s)	30	mph	(service)
Risk Category	II	(1, 11, 1	
Exposure Category	В	(B, C	
Topographic Category	1	(1, 2,	3 or 4)
Crest Height (H)	0	ft	
Shape	F	(R / F	/ S)
Length / Width	1.896	1	(w/o ice)
Length / Width	1.720		(w/ ice)
C _a	1.200		(w/o ice)
Ca	1.200		(w/ ice)
Ca	1.200		(service)
(EPA) _A	1.267	ft ²	(w/o ice)
(EPA) _A	1.783	ft ²	(w/ ice)
(EPA) _A	1.267	ft ²	(service)
(El 71)A	1.207	Ji c	(SCI VICC)
$F_A = q_z G_h(EPA)_A$	48.676	lb	(w/o ice)
$F_A = q_z G_h(EPA)_A$	11.888	lb	(w/ ice)
$F_A = q_z G_h(EPA)_A$	3.042	lb	(service)
Ice Weight	36.699	lb	,
Total Weight	107.699	lb	(w/ ice)
·		_	
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{i7} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	98.861		(w/o ice)
			,
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	41.192		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	24.715		(service)
G _h =	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
-17 0.00500.17.1XI.1XI.1XI.1XI.1XI	4	Х	1
Desition	8	Х	1
Position	12	Х	1
		Х	



ANSI/TIA-222-H w/ CFD CaAa Considerations

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Manufacturer	ERICSSON		
Model #	RRUS 32 B30		
		т.	
Length	27.2	in	
Width	12.05	in	
Depth	7	in	
Weight Design Ice Thickness (t _i)	52.9 1	lb in	
	M	4	M D)
Structure Type Structure Height (h)	155.5	ft	M, B)
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	4	(w/o ice)
Basic Wind Speed (V _i)	50		(w/ ice)
Basic Wind Speed (V _s)	30	-	(service)
Risk Category	II		III, IV)
Exposure Category	В	(B, C	
Topographic Category	1	7	3 or 4)
Crest Height (H)	0	ft	,
Shape	F	(R / F	/ S)
Length / Width	2.257	1	(w/o ice)
Length / Width	2.054	Ī	(w/ice)
Ca	1.200	Ī	(w/o ice)
Ca	1.200	Ī	(w/ ice)
Ca	1.200	Ī	(service)
(EPA) _A	2.458	ft ²	(w/o ice)
(EPA) _A	3.181	ft ²	(w/ ice)
(EPA) _A	2.458	ft ²	(service)
(=: - 7/1		1.,,	(
$F_A = q_z G_h (EPA)_A$	94.417	lb	(w/o ice)
$F_A = q_z G_h(EPA)_A$	21.209	lb	(w/ice)
$F_A = q_z G_h(EPA)_A$	5.901	lb	(service)
Ice Weight	48.435	lb	
Total Weight	101.335	lb	(w/ ice)
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t) / K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	126.194		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	52.581		(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	31.549		(service)
$G_h =$	1.00		
K _d =	0.95		
$K_s =$	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
_	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$			
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
	8	X	1
Position	12	X	1 1
	12	X	1
		_ ^	

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

Input Data

Side			
Manufacturer	ERICSSON		
Model #	RRUS 32 B30		
		1.	
Length		in	
Width	12.05	in	
Depth	7	in	
Weight Design Ice Thickness (t _i)		lb :	
	1	in	M D
Structure Type Structure Height (h)	M 155.5	(S, G,	M, B)
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	4	(w/o ice)
Basic Wind Speed (V _i)	50	4 '	(w/ ice)
Basic Wind Speed (V _s) Basic Wind Speed (V _s)	30	4 '	, ,
1 13			(service)
Risk Category Exposure Category	II B	(I, II, (B, C	III, IV)
Topographic Category	1	4 '	3 or 4)
		1	3 01 4)
Crest Height (H)	0 F	ft /D / F	(0)
Shape	-	(R / F	•
Length / Width	3.886		(w/o ice)
Length / Width	3.168		(w/ ice)
C _a	1.262		(w/o ice)
C _a	1.230		(w/ ice)
Ca	1.262	,	(service)
(EPA) _A	1.501	ft ²	(w/o ice)
(EPA) _A	2.114	ft ²	(w/ ice)
(EPA) _A	1.501	ft ²	(service)
$F_A = q_z G_h(EPA)_A$	57.663	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	14.095	lb	(w/ ice)
$F_A = q_z G_h(EPA)_A$	3.604	lb	(service)
Ice Weight	48.435	lb	
Total Weight	101.335	lb	(w/ ice)
Faustions			
Equations	1.007		V - V - 2.01
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \leq 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	73.308		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	30.545		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	18.327		(service)
$G_h =$	1.00		(55.7.55)
$K_d =$	0.95		
$K_{d} = K_{s} =$	1.00		
$K_a = -0.000036275$	0.90		
$K_e = e^{-0.0000362zs}$	1.00	_	
$q_z = 0.00256K_zK_ztK_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
	4	Х	1
Position	8	Х	1
	12	Х	1
		Х	



ANSI/TIA-222-H w/ CFD CaAa Considerations

Manufacturer	RAYCAP			
Model #	DC6-48-60-18-8F			
Model # DC0-40-00-10-01				
Length	31.25	Tin		
Width	11	in		
Depth	11	in		
Weight		lb		
Design Ice Thickness (t _i)	1	in		
Structure Type	М	(S. G.	M, B)	
Structure Height (h)	155.5	ft	, ,	
Antenna Centerline (z)	144	ft		
Basic Wind Speed (V)	120	mph	(w/o ice)	
Basic Wind Speed (V _i)	50	→ '	(w/ ice)	
Basic Wind Speed (V _s)	30	_	(service)	
Risk Category	II		III, IV)	
Exposure Category	В	(B, C		
Topographic Category	1	→ ' '	3 or 4)	
Crest Height (H)	0	ft	.,	
Shape	R	(R / F	/ S)	
Length / Width	2.841	┤```	(w/o ice)	
Length / Width	2.521	1	(w/ ice)	
C _a	0.508	1	(w/o ice)	
C _a	0.700	1	(w/ ice)	
C _a	0.708	+	(service)	
(EPA) _A	1.090	ft ²	(w/o ice)	
		_	,	
(EPA) _A	1.957	ft ²	(w/ ice)	
(EPA) _A	1.520	ft ²	(service)	
		_		
$F_A = q_z G_h(EPA)_A$	41.885	lb	(w/o ice)	
$F_A = q_z G_h (EPA)_A$	13.050	lb	(w/ ice)	
$F_A = q_z G_h(EPA)_A$	3.649	lb	(service)	
Ice Weight	61.622	lb		
Total Weight	94.422	lb	(w/ ice)	
Equations				
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$	
$K_h = e^{[(f)(z)/H]}$	1.000			
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000			
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$	
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)	
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	115.198		(w/o ice)	
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	47.999		(w/ ice)	
$C = (K_{zt}K_zK_e) (V_iJ(D)$ $C = (K_{zt}K_zK_e)^{0.5}(V)(D)$				
	28.800		(service)	
G _h =	1.00			
K _d =	0.95			
$K_s =$	1.00			
K _a =	0.90			
$K_e = e^{-0.0000362zs}$	1.00			
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)	
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)	
$q_z = 0.00256K_zK_{zt}K_eK_dV_1^2$ $q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)	
YZ 0.002001\Zi\Zt\\S\\el\d\vs	13	Х	1	
	14	X	1	
Position	15	X	1	
	10	X	·	
1				

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

Input Data

Side			
Manufacturer	RAYCAP		
Model #	DC6-48-60-18-8	BF .	
		,	
Length		in	
Width	11	in	
Depth	11	in	
Weight	32.8	lb	
Design Ice Thickness (t _i)	1	in	
Structure Type	M	(S, G,	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V _i)	50	mph	(w/ ice)
Basic Wind Speed (V _s)	30	mph	(service)
Risk Category	II		III, IV)
Exposure Category	В	(B, C	
Topographic Category	1	- '	3 or 4)
Crest Height (H)	0	ft	- 5,
9	R	(R / F	(2)
Shape Longth / Width	2.841	(K / F	/ 5) (w/o ice)
Length / Width		4	, ,
Length / Width	2.521	4	(w/ ice)
Ca	0.508	4	(w/o ice)
Ca	0.700	1	(w/ ice)
Ca	0.708	<u> </u>	(service)
(EPA) _A	1.090	ft ²	(w/o ice)
(EPA) _A	1.957	ft ²	(w/ ice)
(EPA) _A	1.520	ft ²	(service)
, , , , , , , , , , , , , , , , , , ,		1	` '
$F_A = q_z G_h(EPA)_A$	41.885	lb	(w/o ice)
$F_A = q_z G_h(EPA)_A$	13.050	lb	(w/ ice)
$F_A = q_z G_h(EPA)_A$	3.649	lb	(service)
Ice Weight	61.622	lb	(55.7.55)
Total Weight	94.422	lb	(w/ ice)
Total Weight	74.422	Tin	(W/ ICC)
Equations			
	1 007		V -V - 2.01
$K_z = 2.01[z/z_0]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \leq 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	115.198		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	47.999		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$ $C = (K_{zt}K_zK_e)^{0.5}(V)(D)$			` ,
	28.800		(service)
G _h =	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
		psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	•	,
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
	13	Х	1
Position	14	Х	1
	15	X	1
		Х	



ANSI/TIA-222-H w/ CFD CaAa Considerations

Front
Mombor

Front			
Member	Antenna Pipe A	4	
Size	Pipe 2.0		
Longth	70	T:	
Length		in	
Width Depth		in in	
Weight		lb/ft	
Design Ice Thickness (t _i)		in	
Structure Type		1	M, B)
Structure Height (h)	155.5	ft	IVI, D)
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	1	(w/o ice)
Basic Wind Speed (V _i)		+ '	(w/ ice)
Basic Wind Speed (V _s)	30	• •	(service)
Risk Category			III, IV)
Exposure Category	В	(B, C	
Topographic Category	1		3 or 4)
Crest Height (H)	0	ft	0 0,
Shape	R	(R / F	/S)
Length / Width	32.773	((w/o ice)
Length / Width	17.098	1	(w/ ice)
Ca		†	(w/o ice)
Ca		Ì	(w/ ice)
Ca		†	(service)
(EPA) _A		ft ²	(w/o ice)
(EPA) _A		ft ²	(w/ ice)
(EPA) _A		ft ²	(service)
, , , ,	l .	1	,
$F_A = q_z G_h (EPA)_A$	0.686	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.207	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.043	lb/in	(service)
Ice Weight	0.534	lb/in	
Weight	0.534	lb/in	(w/ ice)
Equations			
$K_z = 2.01[z/z_0]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	24.925		(w/o ice)
$C = (K_{7t}K_{7}K_{e})^{0.5}(V_{i})(D)$	10.385		(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	6.231		(service)
$G_h = (N_{z1}N_{z1}N_{e})$	1.00		(20.1.00)
$K_d =$	0.95		
$K_s =$	1.00		
$K_a = K_e = e^{-0.0000362zs}$	0.90		
	1.00	m o f	(/a iaa)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
Quantity	12		(18 max)

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

d

Member	Antenna Pipe	A	
Size	Pipe 2.0		
	•		
Length		in	
Width		in	
Depth		in	
Weight		lb/ft	
Design Ice Thickness (t _i)		in	1.4. D)
Structure Type		-1 '	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	(/a iaa)
Basic Wind Speed (V)	120	mph	,
Basic Wind Speed (V _i)	50	mph	
Basic Wind Speed (V _s)	30	mph	, ,
Risk Category	ll D	(1, 11, 1	•
Exposure Category	В	(B, C)	
Topographic Category	1	-	3 or 4)
Crest Height (H)	0	ft	(()
Shape Langth / Width	R	(R / F	,
Length / Width Length / Width	32.773 17.098	1	(w/o ice) (w/ ice)
C _a	1.200	┪	(w/o ice)
		┧	
C _a		-	(w/ ice)
Ca	1	- 2 - 2	(service)
(EPA) _A	1	ft ²	(w/o ice)
(EPA) _A	1	ft ²	(w/ ice)
(EPA) _A	1.392	ft ²	(service)
$F_A = q_z G_h (EPA)_A$	0.686	lb/in	(w/o ice)
$F_A = q_z G_h(EPA)_A$	0.000	lb/in	,
$F_A = q_z G_h(EPA)_A$	0.207	lb/in	` '
		lb/in	(service)
Ice Weight Weight	0.534	lb/in	(w/ ice)
Weight	0.334		(W/ ICE)
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		2111111 2
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{i7} \le 1.4$
		in	12
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	24.925		(w/o ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V_{i})(D)$	10.385		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	6.231		(service)
G _h =	1.00		
K _d =	0.95		
K _s =	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i$ $q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
$\frac{q_z = 0.00256 K_z K_z t K_s K_e K_d V_s}{Quantity}$	12	Pai	(18 max)
Quantity	12	1	(10 παλ)



ANSI/TIA-222-H w/ CFD CaAa Considerations

Front

Member Size	Diagonal L2x2		
Length	61	in	
Width	2	in	
Depth	2	in	
Weight	0	lb/ft	
Design Ice Thickness (t _i)	1	in	\
Structure Type	M	_	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	(w/o ioo)
Basic Wind Speed (V) Basic Wind Speed (Vi)	120	mph	,
, , , ,	50	mph	
Basic Wind Speed (V _s) Risk Category	30 II	mph (I, II, I	
Exposure Category	В	(B, C)	•
Topographic Category	1		3 or 4)
Crest Height (H)	0	ft	3 01 4)
Shape	F	(R / F	/ \$)
Length / Width	30.500	(10.7.1	(w/o ice)
Length / Width	14.665	Ť	(w/ ice)
Ca	2.000	Ī	(w/o ice)
C _a	1.656	1	(w/ice)
Ca	2.000	Ī	(service)
(EPA) _A	1.525	ft ²	(w/o ice)
(EPA) _A	2.829	ft ²	(w/ ice)
(EPA) _A	1.525	ft ²	(service)
$F_A = q_z G_h (EPA)_A$	0.960	lb/in	(w/o ice)
$F_A = q_z G_h(EPA)_A$	0.309	lb/in	,
$F_A = q_z G_h(EPA)_A$	0.060	lb/in	
Ice Weight	0.470	lb/in	(SCI VICC)
Weight	0.470	lb/in	(w/ice)
			,
Equations $K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_z = 2.01[2/2_g]$ $K_h = e^{[(f)(z)/H]}$	1.000		Nzmin = Nz = 2.01
_	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$			V ~ 1 /
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \leq 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	20.945		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	8.727		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	5.236		(service)
G _h =	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$			(/:00)
	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	6.67 2.40	pst psf	(w/ ice) (service)

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

Member	Diagonal		
Size	L2x2		
		٦.	
Length	61	in	
Width	2	in	
Depth	0	in lb/ft	
Weight Design Ice Thickness (t _i)	1	in	
Structure Type	M	(S, G,	M B)
Structure Height (h)	155.5	ft	IVI, D)
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120		(w/o ice)
Basic Wind Speed (V _i)	50	mph	,
Basic Wind Speed (V _s)	30		(service)
Risk Category	II	(1, 11, 1	
Exposure Category	В	(B, C	•
Topographic Category	1		3 or 4)
Crest Height (H)	0	ft	
Shape	F	(R / F	/ S)
Length / Width	30.500]	(w/o ice)
Length / Width	14.665		(w/ice)
Ca	2.000		(w/o ice)
Ca	1.656		(w/ ice)
C _a	2.000		(service)
(EPA) _A	1.525	ft ²	(w/o ice)
(EPA) _A	2.829	ft^2	(w/ice)
(EPA) _A	1.525	ft ²	(service)
$F_A = q_z G_h (EPA)_A$	0.960	-	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.309	lb/in	,
$F_A = q_z G_h (EPA)_A$	0.060	lb/in	(service)
Ice Weight	0.470	lb/in	
Weight	0.470	lb/in	(w/ ice)
Fauntions			
Equations $K_z = 2.01[z/z_q]^{(2/\alpha)}$	1 007		$K_{zmin} \le K_z \le 2.01$
$K_z = 2.01[2/Z_q]^{-1}$ $K_h = e^{[(f)(z)/H]}$	1.097		$N_{zmin} \leq N_z \leq 2.01$
	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \leq 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	20.945		(w/o ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V_{i})(D)$	8.727		(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	5.236		(service)
G _h =	1.00		
K _d =	0.95		
$K_s =$	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_1$ $q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
Quantity	12	F-51	(12 max)
	1 '-		, · = · · · = //



ANSI/TIA-222-H w/ CFD CaAa Considerations

Front	
Member	End Pipe
Size	Pipe 2.5

Size	Pipe 2.5		
Longth	72	Tin.	
Length Width	72 2.88	in in	
Depth	2.88	in	
Weight	0	lb/ft	
Design Ice Thickness (t _i)	1	in	
Structure Type	M	4	M, B)
Structure Height (h)	155.5	ft	111, 2)
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	1	(w/o ice)
Basic Wind Speed (V _i)	50		(w/ ice)
Basic Wind Speed (V _s)	30	+ '	(service)
Risk Category	II	(1, 11, 1	
Exposure Category	В	(B, C	•
Topographic Category	1	+	3 or 4)
Crest Height (H)	0	ft	,
Shape	R	(R / F	/ S)
Length / Width	25.000	 `	(w/o ice)
Length / Width	14.299		(w/ ice)
Ca	1.200		(w/o ice)
C_a	0.962	Ī	(w/ ice)
Ca	1.200		(service)
(EPA) _A	1.555	ft ²	(w/o ice)
(EPA) _A	2.323	ft ²	(w/ ice)
(EPA) _A	1.555	ft ²	(service)
$F_A = q_z G_h (EPA)_A$	0.830	lh/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.215		(w/ ice)
$F_A = q_z G_h(EPA)_A$	0.052	lb/in	
Ice Weight	0.617	lb/in	(3011100)
Weight	0.617	lb/in	(w/ice)
		1	()
Equations	1 007		V -V - 2.01
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t) / K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	30.161		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	12.567		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	7.540		(service)
G _h =	1.00		,
K _d =	0.95		
K _s =	1.00		
K _a =	0.90		
$K_a = K_e = e^{-0.0000362zs}$	1.00		
-		ncf	(w/o.ico)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
Quantity	3		(18 max)

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

Member	End Pipe	
Size	Pipe 2.5	
		
Length	72	in
Width	2.88	in
Depth	2.88	in
Weight	0	_lb/ft
Design Ice Thickness (t _i)	1	_in
Structure Type	M	(S, G, M, B)
Structure Height (h)	155.5	ft
Antenna Centerline (z)	144	ft (/- i)
Basic Wind Speed (V)	120	mph (w/o ice)
Basic Wind Speed (V _i)	50	mph (w/ ice)
Basic Wind Speed (V _s)	30	mph (service)
Risk Category	II B	(I, II, III, IV)
Exposure Category	1	(B, C or D)
Topographic Category		(1, 2, 3 or 4)
Crest Height (H)	0	ft (R / F / S)
Shape Length / Width	R 25.000	(W/o ice)
Length / Width	14.299	(w/oice) (w/ice)
C _a		(w/o ice)
C _a	0.962	(w/ ice)
C _a	1.200	(service)
(EPA) _A		ft ² (w/o ice)
(EPA) _A		ft ² (w/ ice)
(EPA) _A	1.555	ft ² (service)
$F_A = q_z G_h (EPA)_A$	0.830	lb/in (w/o ice)
$F_A = q_z G_h(EPA)_A$	0.215	lb/in (w/ice)
$F_A = q_z G_h (EPA)_A$	0.052	lb/in (service)
Ice Weight	0.617	lb/in
Weight	0.617	lb/in (w/ice)
· · · · · · · · · · · · · · · · · · ·	0.017	1.0, (, .00)
Equations		
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097	$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000	211111
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000	
$K_{iz} = [z/33]^{(0.10)}$	1.159	$K_{i7} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in (w/ice)
$t_{iz} = (t_i)(t)(K_{iz})(K_{zt})$ $C = (K_{zt}K_zK_e)^{0.5}(V)(D)$		` '
	30.161	(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	12.567	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	7.540	(service)
G _h =	1.00	
$K_d =$	0.95	
$K_s =$	1.00	
K _a =	0.90	
$K_e = e^{-0.0000362zs}$	1.00	
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf (w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf (w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf (service)
Quantity	3	(18 max)



ANSI/TIA-222-H w/ CFD CaAa Considerations

ŀ	r	0	n	t

Member	Horizontal		
Size	L5x5		
Length	232	in	
Width	5	in	
Depth	5	lin	
Weight	0	lb/ft	
Design Ice Thickness (t _i)	1	in	
Structure Type	М	(S, G,	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	, ,
Basic Wind Speed (V _i)	50	mph	
Basic Wind Speed (V _s)	30	mph	, ,
Risk Category	II -	(1, 11, 1	•
Exposure Category	В	(B, C	
Topographic Category	1	1	3 or 4)
Crest Height (H)	0	ft	(0)
Shape	F 47.400	(R / F	
Length / Width Length / Width	46.400 32.022	<u> </u>	(w/o ice) (w/ ice)
C _a	2.000	1	(w/o ice)
C _a	2.000	1	(w/ ice)
C _a	2.000	1	(service)
	14.500	ft ²	(w/o ice)
(EPA) _A		ft ²	,
(EPA) _A	21.433	+ -	(w/ ice)
(EPA) _A	14.500	ft ²	(service)
$F_A = q_z G_h (EPA)_A$	2.401	lb/in	(w/o ice)
$F_A = q_z G_h(EPA)_A$	0.616	lb/in	(w/ ice)
$F_A = q_z G_h(EPA)_A$	0.150	lb/in	(service)
Ice Weight	0.971	lb/in	
Weight	0.971	lb/in	(w/ ice)
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{i7} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	52.363		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	21.818		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	13.091		(service)
$G_{h} = (N_{zt}N_{z}N_{e}) (V)(D)$	1.00		(331 1100)
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_a = K_e = e^{-0.0000362zs}$	1.00		
$R_e = e$ $q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV$ $q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_ztK_eK_dV_i$ $q_z = 0.00256K_zK_ztK_sK_eK_dV_s^2$	2.40	psf	(service)
$q_z = 0.00256 K_z K_z t K_s K_e K_d V_s$ Quantity	6	μσι	(18 max)
Quantity	0		(101110A)

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

Input Data

Member	Horizontal		
Size	L5x5		
OILO	20/10		
Length	232	in	
Width		in	
Depth	5	in	
Weight	0	lb/ft	
Design Ice Thickness (t _i)	1	in	
Structure Type		(S, G,	M, B)
Structure Height (h)		ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120		(w/o ice)
Basic Wind Speed (V _i)	50		(w/ ice)
Basic Wind Speed (V _s)	30	⊣ .	(service)
Risk Category	II	(1, 11, 1	•
Exposure Category	В	(B, C	
Topographic Category	1	-	3 or 4)
Crest Height (H)	0	ft	
Shape	F	(R / F	
Length / Width	46.400	_	(w/o ice)
Length / Width	32.022	1	(w/ ice)
C _a	2.000	1	(w/o ice)
C_a	2.000	_	(w/ ice)
C_a	2.000		(service)
(EPA) _A	14.500	ft ²	(w/o ice)
(EPA) _A	21.433	ft^2	(w/ ice)
(EPA) _A	14.500	ft ²	(service)
$F_A = q_z G_h (EPA)_A$	2.401	lb/in	(w/o ice)
$F_A = q_z G_h(EPA)_A$	0.616	lb/in	
$F_A = q_z G_h (EPA)_A$	0.150	lb/in	
Ice Weight	0.971	lb/in	(
Weight	0.971	lb/in	(w/ice)
		1	
Equations $K_z = 2.01[z/z_q]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_z = 2.01[2/2_q]$ $K_h = e^{[(f)(z)/H]}$			$N_{zmin} \leq N_z \leq 2.01$
	1.000		
$K_{zt} = [1 + (K_c K_t) / K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \leq 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	52.363		(w/o ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V_{i})(D)$	21.818		(w/ ice)
$C = (K_{7}K_{7}K_{e})^{0.5}(V)(D)$	13.091		(service)
G _h =	1.00		(
K _d =	0.95		
K _s =	1.00		
$K_a = \frac{1}{10000000000000000000000000000000000$	0.90		
$K_e = e^{-0.0000362zs}$	1.00	_	
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
Quantity	6		(18 max)



ANSI/TIA-222-H w/ CFD CaAa Considerations

|--|

Member	Misc Pipe		
Size	Pipe 2.0		
	0.1	т.	
Length		lin :	
Width		lin	
Depth		in lb/ft	
Weight Design Ice Thickness (t _i)		in	
Structure Type		(S, G, M, B)	
Structure Height (h)		ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph (w/o ice)	
Basic Wind Speed (V _i)		mph (w/ice)	
Basic Wind Speed (V _s)	30	mph (service)	
Risk Category		(I, II, III, IV)	
Exposure Category	В	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	R	(R / F / S)	
Length / Width	15.126	(w/o ice)	
Length / Width	8.157	(w/ ice)	
Ca		(w/o ice)	
C _a	0.826	(w/ ice)	
C _a	0.981	(service)	
(EPA) _A	0.525	ft ² (w/o ice)	
(EPA) _A	0.929	ft ² (w/ ice)	
(EPA) _A	0.525	ft ² (service)	
- (1)		T	
$F_A = q_z G_h (EPA)_A$	0.560	lb/in (w/o ice)	
$F_A = q_z G_h (EPA)_A$	0.172	lb/in (w/ ice)	
$F_A = q_z G_h (EPA)_A$	0.035	lb/in (service)	
Ice Weight	0.534	lb/in	
Weight	0.534	lb/in (w/ ice)	
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097	$K_{zmin} \le K_z \le 2.0$)1
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159	$K_{17} \le 1.4$	
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in (w/ice)	
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$		(w/o ice)	
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$ $C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	24.925	(w/ ice)	
	10.385	` '	
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	6.231	(service)	
G _h =	1.00		
$K_d =$	0.95		
K _s =	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf (w/o ice)	
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf (w/ice)	
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf (service)	
Quantity	3	(12 max)	

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

Side			
Member	Misc Pipe		
Size	Pipe 2.0		
	•		
Length	36	in	
Width	2.38	in	
Depth	2.38	in	
Weight	0	lb/ft	
Design Ice Thickness (t _i)	1	in	
Structure Type	M	(S, G,	M, B)
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V _i)	50	mph	
Basic Wind Speed (V _s)	30	mph	
Risk Category	II	(1, 11, 1	
Exposure Category	В	(B, C	
Topographic Category	1	 ' ' '	3 or 4)
		→ ````	3 01 4)
Crest Height (H)	0	ft	(()
Shape	R 45.407	(R / F	•
Length / Width	15.126	-	(w/o ice)
Length / Width	8.157	-	(w/ ice)
Ca	0.981	_	(w/o ice)
Ca	0.826	1	(w/ ice)
C_a	0.981		(service)
(EPA) _A	0.525	ft^2	(w/o ice)
(EPA) _A	0.929	ft ²	(w/ ice)
(EPA) _A	0.525	ft ²	(service)
	•	_	
$F_A = q_z G_h (EPA)_A$	0.560	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.172	lb/in	(w/ice)
$F_A = q_z G_h (EPA)_A$	0.035	lb/in	(service)
Ice Weight	0.534	lb/in	,
Weight	0.534	lb/in	(w/ice)
TT Org. II	0.001	1.~,	(, 100)
Equations			
$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1 + (K_c K_t) / K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$			V ~ 1 /
	1.159		$K_{iz} \leq 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	24.925		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	10.385		(w/ ice)
$C = (K_{zt}K_{z}K_{e})^{0.5}(V)(D)$	6.231		(service)
G _h =	1.00		•
K _d =	0.95		
$K_s =$	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
Quantity	3	Ī	(12 max)
· · · · · · · · · · · · · · · · · · ·			. ,



Front Member

Size

 $F_A = q_z G_h (EPA)_A$

 $F_A = q_z G_h (EPA)_A$

Ice Weight

Equations $K_z = 2.01[z/z_q]^{(2/\alpha)}$

 $K_h = e^{[(f)(z)/H]}$

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

 $t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$

 $C = (K_{zt}K_zK_e)^{0.5}(V)(D)$

 $C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$

 $C = (K_{zt}K_zK_e)^{0.5}(V)(D)$

G_h =

K_d =

K_s =

K_a =

 $K_e = e^{-0.0000362zs}$

Quantity

 $q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$

 $q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$

 $q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$

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

Weight

ANSI/TIA-222-H w/ CFD CaAa Considerations

Length	48	in
Width	2	in
Depth	2	in
Weight	0	lb/ft
Design Ice Thickness (t _i)	1	in
Structure Type	М	(S, G, M, B)
Structure Height (h)	155.5	ft
Antenna Centerline (z)	144	ft
Basic Wind Speed (V)	120	mph (w/o ice)
Basic Wind Speed (V _i)	50	mph (w/ice)
Basic Wind Speed (V _s)	30	mph (service)
Risk Category	II	(I, II, III, IV)
Exposure Category	В	(B, C or D)
Topographic Category	1	(1, 2, 3 or 4)
Crest Height (H)	0	ft
Shape	F	(R / F / S)
Length / Width	24.000	(w/o ice)
Length / Width	11.654	(w/ ice)
C_a	1.967	(w/o ice)
C_a	1.555	(w/ ice)
Ca	1.967	(service)
(EPA) _A	1.180	ft ² (w/o ice)
(EPA) _A	2.112	ft ² (w/ ice)
(EPA) _A	1.180	ft ² (service)
(LFA)A	1.100	Tir (service)
$_{a} = q_{z}G_{h}(EPA)_{A}$	0.944	lb/in (w/o ice)
(- YZOn(LI A)A	0.744	TID/III (W/OICE)

0.293

0.059

0.470

0.470

1.097

1.000

1.000

1.159

1.159

20.945

8.727

5.236

1.00

0.95

1.00

0.90

1.00

38.41

6.67

2.40

15

lb/in (w/ice)

lb/in (service)

lb/in (w/ice)

 $K_{zmin} \le K_z \le 2.01$

 $K_{iz} \le 1.4$

(w/ice)

(w/o ice)

(w/ice)

(service)

(w/o ice)

(w/ice)

(service)

(18 max)

Quantity

psf

psf

psf

lb/in

Vert

L2x2

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	05/28/2020
Carrier:	AT&T Mobility
Reviewed Rv.	R Bartlett

Input Data

Member	Vert		
Size	L2x2		
Length	48	in	
Width	2	in	
Depth Weight	0	in Ib/ft	
Design Ice Thickness (t _i)	1	in	Į.
Structure Type	M		S, M, B)
Structure Height (h)	155.		,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Antenna Centerline (z)	144		
Basic Wind Speed (V)	120	mph	n (w/o ice)
Basic Wind Speed (V _i)	50		n (w/ice)
Basic Wind Speed (V _s)	30	mph	n (service)
Risk Category	II	(1, 11,	, III, IV)
Exposure Category	В		C or D)
Topographic Category	1	(1, 2	2, 3 or 4)
Crest Height (H)	0	ft	
Shape	F	(R /	F / S)
Length / Width	24.00	-	(w/o ice)
Length / Width	11.65		(w/ ice)
Ca	1.96		(w/o ice)
Ca	1.55		(w/ ice)
Ca	1.96		(service)
(EPA) _A	1.18		(w/o ice)
(EPA) _A	2.11	─ ─────────────────────────────	(w/ ice)
(EPA) _A	1.18	0 ft ²	(service)
$F_A = q_z G_h (EPA)_A$	0.94	4 lb/ir	n (w/o ice)
$F_A = q_z G_h (EPA)_A$	0.29	3 lb/ir	n (w/ice)
$F_A = q_z G_h (EPA)_A$	0.05	9 lb/ir	n (service)
Ice Weight	0.47	0 lb/ir	า
Weight	0.47	0 lb/ir	n (w/ice)
Equations			
$K_z = 2.01[z/z_q]^{(2/\alpha)}$	1.09	7	$K_{zmin} \le K_z \le 2.01$
$K_b = e^{[(f)(z)/H]}$	1.00		211111 2 = 2.0
$K_{rt} = [1 + (K_c K_t) / K_h]^2$	1.00		
$K_{zt} = [z/33]^{(0.10)}$	1.15		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.15		(w/ ice)
$c_{iz} = (c_i)(1)(\kappa_{iz})(\kappa_{zt})$ $C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	20.94		(w/o ice)
$C = (K_{zt}K_zK_e) (V)(D)$ $C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	8.72		(w/o ice) (w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	5.23		(service)
G _h =	1.00		
K _d =	0.95		
K _s =	1.00		
K _a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.40	-	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.66	8 psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	1 psf	(service)

15

(18 max)

POSITION	MODEL	QUANTITY	DEAD LOAD	DEAD LOAD (ICE)	(NO ICE)	WIND LOAD (NO ICE) SIDE	WIND LOAD (ICE) FRONT	WIND LOAD (ICE) SIDE	(SERVICE)	(SERVICE)
1	7770	1	-35	-85.9	190.4	101.2	40.7	25.0	11.9	6.3
1	LGP 17201	2	-62	-52.8	115.3	32.3	27.1	10.2	7.2	2.0
2	HPA65R-BU6A	1	-41.9	-119.3	225.8	146.7	47.1	33.1	14.1	9.2
3	1001940	1	-2	-3.5	6.1	2.9	2.4	1.6	0.4	0.2
3	OPA65R-BU6D	1	-60.2	-160.0	469.3	174.5	91.7	39.1	29.3	10.9
3	RRUS 4478 B14	1	-59.9	-32.3	63.7	36.6	14.8	9.4	4.0	2.3
3	RRUS 8843 B2/B66A	1	-72	-32.1	56.7	46.8	13.4	11.4	3.5	2.9
4	80010965	1	-97.6	-171.1	469.8	161.9	92.0	37.1	29.4	10.1
4	RRUS 32 B30	1	-52.9	-48.4	94.4	57.7	21.2	14.1	5.9	3.6
4	RRUS 4449 B5/B12	1	-71	-36.7	68.0	48.7	15.7	11.9	4.3	3.0
5	7770	1	-35	-85.9	190.4	101.2	40.7	25.0	11.9	6.3
5	LGP 17201	2	-62	-52.8	115.3	32.3	27.1	10.2	7.2	2.0
6	HPA65R-BU6A	1	-41.9	-119.3	225.8	146.7	47.1	33.1	14.1	9.2
7	1001940	1	-2	-3.5	6.1	2.9	2.4	1.6	0.4	0.2
7	OPA65R-BU6D	1	-60.2	-160.0	469.3	174.5	91.7	39.1	29.3	10.9
7	RRUS 4478 B14	1	-59.9	-32.3	63.7	36.6	14.8	9.4	4.0	2.3
7	RRUS 8843 B2/B66A	1	-72	-32.1	56.7	46.8	13.4	11.4	3.5	2.9
8	80010965	1	-97.6	-171.1	469.8	161.9	92.0	37.1	29.4	10.1
8	RRUS 32 B30	1	-52.9	-48.4	94.4	57.7	21.2	14.1	5.9	3.6
8	RRUS 4449 B5/B12	1	-71	-36.7	68.0	48.7	15.7	11.9	4.3	3.0
9	7770	1	-35	-85.9	190.4	101.2	40.7	25.0	11.9	6.3
9	LGP 17201	2	-62	-52.8	115.3	32.3	27.1	10.2	7.2	2.0
10	HPA65R-BU6A	1	-41.9	-119.3	225.8	146.7	47.1	33.1	14.1	9.2
11	1001940	1	-2	-3.5	6.1	2.9	2.4	1.6	0.4	0.2
11	OPA65R-BU6D	1	-60.2	-160.0	469.3	174.5	91.7	39.1	29.3	10.9
11	RRUS 4478 B14	1	-59.9	-32.3	63.7	36.6	14.8	9.4	4.0	2.3
11	RRUS 8843 B2/B66A	1	-72	-32.1	56.7	46.8	13.4	11.4	3.5	2.9
12	80010965	1	-97.6	-171.1	469.8	161.9	92.0	37.1	29.4	10.1
12	RRUS 32 B30	1	-52.9	-48.4	94.4	57.7	21.2	14.1	5.9	3.6
12	RRUS 4449 B5/B12	1	-71	-36.7	68.0	48.7	15.7	11.9	4.3	3.0
13	DC6-48-60-18-8F	1	-32.8	-61.6	41.9	41.9	13.0	13.0	3.6	3.6
14	DC6-48-60-18-8F	1	-32.8	-61.6	41.9	41.9	13.0	13.0	3.6	3.6
15	DC6-48-60-18-8F	1	-32.8	-61.6	41.9	41.9	13.0	13.0	3.6	3.6

TYPE	QUANTITY	MEMBER	DEAD LOAD (ICE)	WIND LOAD (NO ICE)	WIND LOAD (NO ICE)	WIND LOAD (ICE)	WIND LOAD (ICE)	WIND LOAD	WIND LOAD
TIPE	QUANTITY	IVIEIVIDER	DEAD LOAD (ICE)	FRONT	SIDE	FRONT	SIDE	(SERVICE) FRONT	(SERVICE) SIDE
Antenna Pipe A	1	1	-0.534	0.686	0.686	0.207	0.207	0.043	0.043
Antenna Pipe A	1	2	-0.534	0.686	0.686	0.207	0.207	0.043	0.043
Antenna Pipe A	1	3	-0.534	0.686	0.686	0.207	0.207	0.043	0.043
Antenna Pipe A	1	4	-0.534	0.686	0.686	0.207	0.207	0.043	0.043
Antenna Pipe A	1	5	-0.534	0.686	0.686	0.207	0.207	0.043	0.043
Antenna Pipe A	1	6	-0.534	0.686	0.686	0.207	0.207	0.043	0.043
Antenna Pipe A	1	7	-0.534	0.686	0.686	0.207	0.207	0.043	0.043
Antenna Pipe A	1	8	-0.534	0.686	0.686	0.207	0.207	0.043	0.043
Antenna Pipe A	1	9	-0.534	0.686	0.686	0.207	0.207	0.043	0.043
Antenna Pipe A	1	10	-0.534	0.686	0.686	0.207	0.207	0.043	0.043
Antenna Pipe A	1	11	-0.534	0.686	0.686	0.207	0.207	0.043	0.043
Antenna Pipe A	1	12	-0.534	0.686	0.686	0.207	0.207	0.043	0.043
Diagonal	1	1	-0.470	0.960	0.960	0.309	0.309	0.060	0.060
Diagonal	1	2	-0.470	0.960	0.960	0.309	0.309	0.060	0.060
Diagonal	1	3	-0.470	0.960	0.960	0.309	0.309	0.060	0.060
Diagonal	1	4	-0.470	0.960	0.960	0.309	0.309	0.060	0.060
Diagonal	1	5	-0.470	0.960	0.960	0.309	0.309	0.060	0.060
Diagonal	1	6	-0.470	0.960	0.960	0.309	0.309	0.060	0.060
Diagonal	1	7	-0.470	0.960	0.960	0.309	0.309	0.060	0.060
Diagonal	1	8	-0.470	0.960	0.960	0.309	0.309	0.060	0.060
Diagonal	1	9	-0.470	0.960	0.960	0.309	0.309	0.060	0.060
Diagonal	1	10	-0.470	0.960	0.960	0.309	0.309	0.060	0.060
Diagonal	1	11	-0.470	0.960	0.960	0.309	0.309	0.060	0.060
Diagonal	1	12	-0.470	0.960	0.960	0.309	0.309	0.060	0.060
End Pipe	1	1	-0.617	0.830	0.830	0.215	0.215	0.052	0.052
End Pipe	1	2	-0.617	0.830	0.830	0.215	0.215	0.052	0.052
End Pipe	1	3	-0.617	0.830	0.830	0.215	0.215	0.052	0.052
Horizontal	1	1	-0.971	2.401	2.401	0.616	0.616	0.150	0.150
Horizontal	1	2	-0.971	2.401	2.401	0.616	0.616	0.150	0.150
Horizontal	1	3	-0.971	2.401	2.401	0.616	0.616	0.150	0.150
Horizontal	1	4	-0.971	2.401	2.401	0.616	0.616	0.150	0.150
Horizontal	1	5	-0.971	2.401	2.401	0.616	0.616	0.150	0.150
Horizontal	1	6	-0.971	2.401	2.401	0.616	0.616	0.150	0.150
Misc Pipe	1	1	-0.534	0.560	0.560	0.172	0.172	0.035	0.035
Misc Pipe	1	2	-0.534	0.560	0.560	0.172	0.172	0.035	0.035
Misc Pipe	1	3	-0.534	0.560	0.560	0.172	0.172	0.035	0.035
Vert	1	1	-0.470	0.944	0.944	0.293	0.172	0.059	0.059
Vert	1	2	-0.470	0.944	0.944	0.293	0.293	0.059	0.059
Vert	1	3	-0.470	0.944	0.944	0.293	0.293	0.059	0.059
Vert	1	4	-0.470	0.944	0.944	0.293	0.293	0.059	0.059
Vert	1	5	-0.470	0.944	0.944	0.293	0.293	0.059	0.059
Vert	1	6	-0.470	0.944	0.944	0.293	0.293	0.059	0.059
Vert	1	7	-0.470	0.944	0.944	0.293	0.293	0.059	0.059
Vert	1	8	-0.470	0.944	0.944	0.293	0.293	0.059	0.059
Vert	1	9	-0.470	0.944	0.944	0.293	0.293	0.059	0.059
Vert	1	10	-0.470	0.944	0.944	0.293	0.293	0.059	0.059
Vert	1	11	-0.470	0.944	0.944	0.293	0.293	0.059	0.059
Vert	1	12	-0.470	0.944	0.944	0.293	0.293	0.059	0.059
Vert	1	13	-0.470	0.944	0.944	0.293	0.293	0.059	0.059
Vert	1	13		0.944					
	1	15	-0.470		0.944	0.293	0.293	0.059	0.059
Vert		15	-0.470	0.944	0.944	0.293	0.293	0.059	0.059

APPENDIX C SOFTWARE ANALYSIS OUTPUT

TæÎÁGJÊÄG€G€ fklí áút Ô@^&\^åÁÓ^KÁÓÈÓæ+d^cc

6 Ug]W@UX'7 UgYg

	ÓŠÔÁÖ^◆&¦₫;₫{}	Ôæ c^ *[¦^	ÝÁŐ¦æçãcî	ŸÁÕ¦æçãcî		R[ã]c	Ú[ặc	Öãrd ân ĭd£i	Ë0.E^æQT^E	£0,√8æ¦,(£
F	ÖDUÄÄÖDÖÖ	Þ[}^			Ë		HH		Î	
G	CÓŒDÁĞUŒDÁŒDÓD	Þ[}^					HH	ĺÍF	Î	
Н	Y OÞÖÁŠUOTÖÁÇÞUÁQÔÓDÁØÜUÞV	Þ[}^					HH	ĺÍF		
1	Y OÞÖÁŠU OÐÖÁÇÞUÁ ÓÐÔDÁÙ OÖÖÒ	Þ[}^					HH	ĺÍF		
ĺ	YOÞÖÁĞUOÐÖÁQQÓÒDÁØÜUÞV	Þ[}^					HH	ĺÍF		
Î	Y OÞÖÆSU OÆÖÁQQÓÓDÁÚQÖÓ	Þ[}^					HH	ĺÍF		
Ï	ŠOXÒÁŠUOEÖÁQTOEÞD	Þ[}^							Î	
Ì	Y OÞÖÁŠU OÐÁQÙÓÜ X OÐÓDÁØÜU ÞV	Þ[}^					HH	ĺÍF		
J	Y OÞÖÆSUOÆÖÁÇÙÒÜXOÓÒDÁÙOÖÒ	Þ[}^					HH	ĺÍF		
F€	ŠOXÒÁŠU OEÖÁQÙÒÜ XOÔÒD	Þ[}^					Н			
FF	ÙÒÒUT CÔÁŠU CEÖÁÇŠŐE/ÒÜCEŠDÁØÜU ÈÈÈ	Þ[}^								
FG	ÚÒ CÓ CÁ	Þ[}^								
FH	ÓŠÔÁFÁ/¦æ);•ã/}æÁŒ^æÁŠ[æå•	Þ[}^						ÎН		
FI	ÓŠÔÁGÁ/¦æ)•æ}•æ}¢Œ^^æé§ ææ••	Þ[}^						ÎΗ		
FÍ	Ó Ś Ô Á Í Á I; æ) • æ) • ó Ó Œ^æ Á ĕ[æ å•	Þ[}^						ÎН		

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	Ö^• &¦ā; cā;}	ÙŒÚÖÈ	EÙ È BÉÓ ŠĆ	ØæEÈ	ĎĤ	ØæĐÈ	ΉÓΉ	ÒœÈ	ŤĎĖ	<u> </u>	ΪĎÈ	ÈØæÈ	Œ	IÌØæ€	ĦŎĦ	ÌØæ tì	ĦŎĦ	ÌØæ ! Ì	ΪÓΪ	ÈØæ₽Ì	ĤŎĤ	ÌØæ i ÌÌÌ
F	ÖÒŒÖÆŠUŒÖ	ŸĔŸ	F	FÈ																		
G	ÖÒOTÖÄĞU OTÖÁÉÁY OR ÖÄĞU OTÖÁQÞU ÁQÓÒDÁE		F	FÈ			Н	F	1													
Н	ÖÒCEÖÁĞU CEÖÁÉÁY QQ ÖÁĞU CEÖÁQP UÁQÓÒDÁH		F	FÈ			Η	Èîî	1	Ě												
1	ÖÒOTÖÁĞU OTÖÁÉÁY OR ÖÁĞU OTÖÁQÞU ÁQÓÒDÁ		F	FÈ			Η	Ě	T	Èîî												
ĺ	ÖÒOTÖÁĞU OTÖÁÉÁY QQ ÖÁĞU OTÖÁQP UÁQÓÒDÁJ		F	FÈ			Η		1	F												
Î	ÖÒŒÖÁŠUŒÖÆÁY Q ÖÁŠUŒÖÁÇÞUÁQÔÒDÆ		F	FÈG				Η̈́		Èîî												
Ï	ÖÒŒÖÁŠUŒÖÆÁY Q ÖÁŠUŒÖÁÇÞUÁQÔÒDÁF		F	FÈG			Н	ĖÈÈ	Ĥ	Ě												
ì	ÖÒŒÖÁŠUŒÖÆÁY QPÖÁŠUŒÖÁQPUÁQÔÒDÁF		F	FÈG			Н	Ë	I													
J	ÖÒŒÖÁŠUŒÖÆÁY QPÖÁŠUŒÖÁQPUÁQÕÒDÁG		F	FÈG			Н	ĖÈÈ		ËΪ												
F€	ÖÒŒÖÁŠUŒÖÆÁY QPÖÁŠUŒÖÁQPUÁQÕÒDÁG		F	FÈG			Н	Ħ	I	EÈ È	È											
FF	ÖÒŒÖÁŠUŒÖÆÁY QPÖÁŠUŒÖÁQPUÁQÕÒDÁG		F	FÈG			Н		I	Ë												
FG	ÖÒŒÖÁĞUŒÖÆÁY QÇÖÁĞUŒÖÁQÞUÁQÔÒDÁH		F	FÈG			Н	Ě		ĦÈÈ	È											
FH	ÖÒŒÖÁŠUŒÖÆÉÁY QQÖÁŠUŒÖÁQDUÁQÔÒDÁH	H€ÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌÌ	F	FÈ			Н	Èîî	I	ËΪ												
FI	ÖÒŒÖÁĞU ŒÖÆÉÁÖ ÒŒÖÆĞU ŒÖÁÇÇÔÒDÆÉÁY (I		F	FÈG	G	F					ĺ	F	Î									
FÍ	ÖÒŒÖÁŠUŒÖÆÁÖÒŒÖÁŠUŒÖÁÇØÔÒDÆÁYŒ	ÞЩŸЩ̈̈Ϋ́	F	FÈ	G	F					ĺ	Èîî	Î	Ě								
FÎ	ÖÒŒÖÁĞU ŒÖÆÉÁÖ ÒŒÖÆĞU ŒÖÁÇÇÔÒDÆÉÁY (I		F	FÈG	G	F					ĺ	Ě	Î	ÈÎÎ								
FΪ	ÖÒŒÖÁŠUŒÖÆÁÖÒŒÖÁŠUŒÖÁÇØÔÒDÆÁYŒ		F	FÈ	G	F					ĺ		Î	F								
FÌ	ÖÒŒÖÁĞU ŒÖÆÉÁÖ ÒŒÖÆĞU ŒÖÁÇÇÔÒDÆÉÁY (I		F	FÈG	G	F					ĺ	Ħ	Î	ÈÎÎ								
FJ	ÖÒŒÖÁŠUŒÖÆÁÖÒŒÖÁŠUŒÖÁÇØÔÒDÆÁYŒ	ÞЩŸЩ̈̈Ϋ́	F	FÈ	G	F					ĺ	ËÈÈ	ĦĨ	Ě								
G€	ÖÒŒÖÁĞU ŒÖÆÁÖ ÒŒÖÁĞU ŒÖÁÇÇÔÒDÆÁY (F	FÈG	G	F					ĺ	Ë	Î									
GF	ÖÒŒÖÁŠUŒÖÆÁÖÒŒÖÁŠUŒÖÁǮҌÆÁYŒ		F	FÈG	G	F					ĺ	ËÈÈ	ĦĨ	Η̈́								
GG	ÖÒCEÖÁŠU CEÖÁÉÁÖ ÒCCEÖÁŠU CEÖÁÇQÔÒDÁÉÁY (ÞŒŸŒŸ	F	FÈ	G	F					ĺ	Ħ	Î	E E	È							
GH	ÖÒŒÖÁŠUŒÖÆÁÖÒŒÖÁŠUŒÖÁÇØÔÒDÆÁYŒ		F	FÈG	G	F					ĺ		Î	Ë								
G	ÖÒŒÖÁŠUŒÖÆÁÖÒŒÖÆŠUŒÖÁÇØÔÒDÆÁYŒ		F	FÈG	G	F					ĺ	Ě	Î	⊞ÈÈ	È							
GÍ	ÖÒŒÖÁŠUŒÖÆÁÖÒŒÖÁŠUŒÖÁÇØÔÒDÆÁYŒ	ÞЩŸЩ̈́Ϋ́	F	FÈG	G	F					ĺ	Èîî	Î	Η̈́								
Ĝ	ÖÒOÐÁŠU OÐÁÉÆŠOX ÒÁŠU OÐÁT OÐ	ÞDŸĔΫ	F	FÈ											Ϊ	FĚ						
ĞÏ	ÖÖCEÖÁĞU CEÖÁÉÁĞOX ÖÁĞU CEÖÁÇÜÖÜ XOÓÓDÁ	AH Ÿ H Ÿ	F	FÈG													ì	F	J		F€	FĚ
GÌ	ÖÒŒÖÁŠUŒÖÆÆÁŠŒÒÆŠUŒŐÁÇJÒÜXŒÔÒŒ		F	FÈG													ì	Èîî	J	Ě	F€	FĚ
GJ	ÖÖCEÖÁĞU CEÖÁÉÁĞOX ÖÁĞU CEÖÁÇÜÖÜ XOÓÖDÁ		F	FÈG													ì	Ě	J	Èîî	F€	FĚ
H€	ÖÒŒÖÁŠUŒÖÆÆÁŠŒÒÆSUŒÖÁÇÜÒÜXŒÔÒDÆ		F	FÈ													ì		J	F	F€	FĚ
HF	ÖÒŒÖÁŠUŒÖÆÆÁŠŒÒÁŠUŒÖÁÇÙÒÜXÔÓÒÆ	ÁH Ÿ H Ÿ	F	FÈ													ì	ËΪ	J	Èîî	F€	FĚ

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	Šæà^	OÁR[ãjc	RÁR[ã}c	SÁR[ãjc	Ü[œæ^Çå^*D	Ù^&cã[}Ðù@æ}^	V^]^	Ö^∙ãt}ÁŠãc	Tæe^\¦ãæ¢ (Ö^• ã} Áܡ 誰
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Í€ TÍ€ ÞJ€ ÞÌÌ U@º¹ Ó^æ Ùã* MÆ;* MÆ;* MÆ;* MÆ;	ΙÌ	TIÌ	ÞFÏÏ	ÞFÌ€			Tã&ÁÚã^	Ô[{ }			V^]	ã8æ
ÍF TÍF ÞÌÌ Uœ¹ Ó^æ Ùạ* r/AG* r/ ŒH ÂÖHH V^] 38æ ÍG TÍG ÞIÎ ÜŒÖ Þ[}^ Þ[}^ ÜŒÖ V^] 38æ ÍH TÍH ÞFG ÞFG ÜŒÖ Þ[}^ Þ[}^ ÜŒÖ V^] 38æ ÍI TÍI ÞIÌ ÞIJ ÜŒÖ Þ[}^ Þ[}^ ÜŒÖ V^] 38æ ÍÎ TÍÎ ÞFGJ ÞFH€ ÜŒÖ Þ[}^ Þ[}^ ÜŒÖ V^] 38æ ÍÎ TÍÎ ÞÍE ÞÍF ÜŒÖ Þ[}^ Þ[}^ ÜŒÖ V^] 38æ ÍÏ TÍÏ ÞHF ÞHG ÜŒÖ Þ[}^ Þ[}^ ÜŒÖ V^] 38æ	IJ	TIJ	ÞÌJ	ÞJ€			U@\	Ó^æ	Ùā;* ^ÁOĘ* ^	OHÎ ÁÕ¦ ÈHÎ	V^]	ã8æ
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	Šæà^	OÁR[ãjc	RÁR[ã}c	SÁR[ã]c	Ü[ææ^ @å^* D	Ù^&ca[}	V^]^	Ö^∙ãt}ÁŠãc	Tæe^∖ãæe	Ö^• ã} Áܡ∣ÈÈ
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ÎF	TÎF	ÞFHÍ	ÞFHÎ			ÜÕÖÖ	Þ[}^	Þ[}^	ÜÕÖÜ	V^]
ÎG	ΤÎG	ÞÍÎ	ÞÍÏ			ÜÕÖÖ	þ[}^	Þ[}^	ÜÕÖ	V^]
îн	ΤÎΗ	ÞFHÏ	ÞFHÌ			ÜÕÖÖ	Þ[}^	Þ[}^	ÜÕÖ	V^]
Îl	ΤÎΙ	ÞÍÌ	ÞÍJ			ÜÕÖÖ	þ[}^	Þ[}^	ÜÕÖ	V^]
îí	ΤÎÍ	ÞFHJ	ÞFI€			ÜÕÖÖ	Þ[}^	Þ[}^	ÜÕÖ	V^]
ÎÎ	ΤÎÎ	Þ΀	ÞÎF			ÜÕÖÖ	Þ[}^	Þ[}^	ÜÕÖ	V^]
ÎΪ	ΤÎΪ	ÞFIF	ÞFIG			ÜÕÖÖ	Þ[}^	Þ[}^	ÜÕÖÜ	V^]
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ÎJ	ΤÎJ	ÞFIH	ÞFII			ÜÕÖÖ	Þ[}^	Þ[}^	ÜÕÖ	V^]
Ï€	TÏ€	ÞÎI	ÞÎÍ			ÜÕÖ	Þ[}^	Þ[}^	ÜÕÖÜ	V^1
ΪF	ΤΪF	ÞFIÍ	ÞFIÎ			ÜÕÖÖ	Þ[}^	Þ[}^	ÜÕÖÜ	V^]
ΪG	ΤΪG	ÞÎÎ	ÞÎÏ			ÜÕÖÖ	Þ[}^	Þ[}^	ÜÕÖÜ	V^1
ΪH	ΤΪΗ	ÞFIÏ	ÞFIÌ			ÜÕÖÖ	Þ[}^	Þ[}^	ÜÕÖ	V^]
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ΪÎ	ΤΪÎ	ÞF€Í	ÞFÍF			ÜÕÖÖ	Þ[}^	Þ[}^	ÜÕÖÜ	V^1
ΪΪ	ΤΪΪ	ÞG	ÞÏ€			ÜÕÖÖ	Þ[}^	Þ[}^	ÜÕÖÜ	V^]
ΪÌ	ΤΪÌ	ÞF€H	ÞFÍG			ÜÕÖÖ	Þ[}^	Þ[}^	ÜÕÖÜ	V^] ã&æ
ΪJ	ΤΪJ	ÞŒ	ÞÏF			ÜÕÖÖ	Þ[}^	Þ[}^	ÜÕÖÜ	V^]
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JF	TJF	ÞĞ	ÞF€Ì			X^¦a®æ	Ô[ັ { }		OHÎÁÕ¦ÈHÎ	V^]
JG	TJG	ÞFÏ	ÞÏÎ			X^¦a®æ	Ô[OHÎ ÁÕ¦ ÈHÎ	V^]
JH	TJH	ÞŒ	ÞÌF			X^¦a®æ	Ô[ັ { }	, ,	OHÎÁÕ¦ÈHÎ	V^]
JI	TJI	ÞĠ	ÞF€J			X^¦a®æ	Ô[~ { }	,	OHÎ ÁÕI ÈHÎ	V^]
JÍ	ΤJĺ	ÞGJ	ÞFF€			X^¦a®æ	Ô[Ùaj * ^ÁOĘ * ^		V^]ã&æ
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ÎÎ TIÎ Tât 8ÂĴa HÎ Ù^*{^}c Ú^*{^}c Šà^^ GÊF GÊF GÊF Sœc^!at II II TIÎ Tãt 8ÂĴa HÎ Ú^*{^}c Ú^*{^}c Šà^^ GÊF GÊF GÊF Sœc^!at II TIÎ TIÎ Tât 8ÂĴa HÎ Ú^*{^}c Ú^*{^}c Sà^^ GÊF GÊF GÊF Sœc^!at II TIÎ TÎ <td< td=""><td>,</td><td></td><td></td><td></td><td></td><td>{ ^} c</td><td>Ú^*</td><td></td><td>Şà^^</td><td></td><td></td><td></td><td></td><td></td><td>-</td></td<>	,					{ ^} c	Ú^*		Şà^^						-
IÏ TIÏ Tã &ÁJã ^ HÎ Ù^*{ ^}c Ù^*{ ^}c Šà^^ GÊ GÊ GÊ Šœc¹aḍ IÌ TIÌ Tã &ÁJã ^ HÎ Ù^*{ ^}c Ú^*{ ^}c Šà^^ GÊ GÊ GÊ Šœc¹aḍ IJ TIJ U c@¹ FG Ê Î G Û^* { ^}c Ú^*{ ^}c Šà^^ Ê Î Ê Î Ê Î Šœc¹aḍ I € TÍ € U c@² FG Ê Î G Û^* { ^}c Û^* { ^}c Šà^^ Ê Î Ê Î Šœc¹aḍ I F TÎ F U c@² FG Ê Î G Û^* { ^}c Û^* { ^}c Šà^^ Ê Î Ê Î Šœc¹aḍ I G TÌ Î Û caḍ â [~ J € Û^* { ^}c Û^* { ^}c Šà^^ Ê Î Ê Î Šœc¹aḥ I H TÌ Î Û caḍ â [~ J € Û^* { ^}c Û^* { ^}c Šâ^^ Ê Î Ê Î Šœc¹aḥ I I TÌ Î Û caḍ â [~ J € Û^* { ^}c Ñ Î Ê Î Î Ê Î Šœc¹aḥ I I TÌ Î Û caḍ â [~ J € Û^* { ^}c Ñ Î Î Ê Î Î Ê Î Î Ê Î Î Ê Î Î Ê Î Î Î Î Î Î Î	_														
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IJ TIJ Uc@¹ FGÌ ÈTG Ù^*{ ^} c Šà^^ ĒÍ ĒÍ ĒÍ Šæc¹aæ¹ ̀ TÍ€ Uc@¹ FGÌ ÈTG Ù^*{ ^} c Šà^^ ĒÍ ĒÍ ĒÍ Šæc¹aæ¹ ÍF TÍF Uc@¹ FGÌ ÈTG Ù^*{ ^} c Ù^*{ ^} c Šà^^ ĒÍ ĒÍ Šæc²aæ¹aæ¹ ÍG TÌÍ Ùcæa² å[~~ J€ Ù^*{ ^} c Ù^*{ ^} c Šà^^ ĒÍ ĒÍ Šæc²aæ¹aæ¹ ÍH TÌÏ Ùcæa² å[~~ J€ Ù^*{ ^} c Ù^*{ ^} c Šá^^ ĒÍ ĒÍ Šæc²aæ¹aæ¹ ÍI TÌÏ Ùcæa² å[~~ J€ Ù^*{ ^} c Ù^*{ ^} c Šáa^^ ĒÍ ĒÍ Šæc²a²aæ¹															
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$ \begin{array}{cccccccccccccccccccccccccccccccccccc$															
Í G Tì Í Ùcæð å[~ J€ Ù^*{ ^} c Ú^*{ ^} c Šà^^ ĒÍ ĒÍ ĒÍ Šæc^!að Í H Tì Î Ùcæð å[~ J€ Ù^*{ ^} c Ú^*{ ^} c Šà^^ ĒÍ ĒÍ ĒÍ Šæc^!að Í I Tì Ï Ùcæð å[~ J€ Ù^*{ ^} c Ú^* { ^} c Šà^^ ĒÍ ĒÍ Šæc^!að															
ÍH TìÎ Ùcæ} å[~ J€ Ù^*{ ^}c Ŭ^*{ ^}c Šà^^ ĒÍ ĒÍ ĒÍ ĒÍ Šœc^!æ ÍI TìÏ Ùcæ} å[~ J€ Ù^*{ ^}c Č/*{ ^}c Šà^^ ĒÍ ĒÍ Šœc^!æ															
ÍH TìÎ Ùcæ) å[~ J€ Ù^*{ ^}c Šà^^ ĒÍ ĒÍ ĒÍ Šæc^/aḥ ÍI TÌÏ Ùcæ) å[~ J€ Ù^*{ ^}c Šà^^ ĒÍ ĒÍ Šæc/aḥ	ÍG		Ùœ) å[~-						Šà^^						
<u>Í</u> ŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢ	ĺΗ		Ùœ) å[~~	J€	Ù^*.				Šà^^						
			Ùœ) å[~~												-
	ĺĺ	TÌÌ		ΙÌ	Ù^*.	{ ^} c	Ù^*{	^} c	Šà^^			Êĺ	Êĺ		Šæe^læ¢

<chFc``YX'GhYY'8 Yg][b'DUfUa YhYfg'f7 cbh]bi YXŁ</pre>

	Šæà^	Ù@ 4 ^	Š^}*c@Žajá	Šà^^Žajá	Šà::Žājá	Š&[{]Á[]ŽÆ	EŠ&[{]Áa[cŽAHEŠ	Ëq¦ĭĭ⊞ES^^	S::	Ôà	Ø" } &call
ĺÎ	ΤÌJ	X^¦a®æ	l lì	Ù^*{ ^}c	Ù^*{ ^}c	Šà^^		ĒÍ	Ēί		Šæe^læ
ĺÏ	TJ€	X^¦a®æ	ΙÌ	Ù^*{ ^}c	Ù^*{ ^}c	Šà^^		ĒÍ	ĒΙ		Šæe^læ
ĺÌ	TJF	X^¦da&æ	l lì	Ù^*{ ^}c	Ù^*{ ^}c	Šà^^		ĒÍ	Ēί		Šæe^læ
ĺJ	TJG	X^¦da&æ	l lì	Ù^*{ ^}c	Ù^*{ ^}c	Šà^^		ĒÍ	Ēί		Šæe^læ¢
΀	TJH	X^¦da&æ	IÌ	Ù^*{ ^}c	Ù^*{ ^}c	Šà^^		ĒÍ	Ēί		Šæe^læ
ÎF	TJI	X^¦da&æ	l lì	Ù^*{ ^}c	Ù^*{ ^}c	Šà^^		ĒÍ	ĒΙ		Šæe^læ¢
ÎG	TJÍ	X^¦da&æ	IÌ	Ù^*{ ^}c	Ù^*{ ^}c	Šà^^		ĒÍ	Ēί		Šæe^læ
ÎН	TJÎ	X^¦da&æ	l lì	Ù^*{ ^}c	Ù^*{ ^}c			ĒÍ	ĒΙ		Šæe^læ¢
Îl	ΤJΪ	X^¦da&æ	IÌ	Ù^*{ ^}c	Ù^*{ ^}c	Šà^^		ĒÍ	Ēί		Šæe^læ
ÎÍ	ΤJÌ	X^¦da&æ	l lì	Ù^*{ ^}c	Ù^*{ ^}c	Šà^^		ĒÍ	ĒΙ		Šæe^læ¢
ÎÎ	TJJ	X^¦da&æ	l lì	Ù^*{ ^}c	Ù^*{ ^}c	Šà^^		ĒÍ	Ēί		Šæe^læ
ÎÏ	T F€€	X^¦a®ae	l lì	Ù^*{ ^}c				ĒÍ	ĒÍ		Šæe^læ¢
ÎÌ	TF€F	X^¦a®æ	l lì	Ù^*{ ^}c	Ù^*{ ^}c	Šà^^		Èí	Ēί		Šæe^læ¢
ÎJ	TF€G	X^¦da&æ	l lì	Ù^*{ ^}c	Ù^*{ ^}c	Šà^^		ĒÍ	Ēί		Šæe^læ¢

D'UHY'Df]a Ufmi8 UHJ

Šæà^	OEÁR[ãjc	ÓÁR[ãjc_	ÔÁR[ã]c	ÖÁR[ã]c	Tæe^∖ãæ¢	V@2&\}^••Žajá
	<u>.</u>	Þ[ÁÖæga	eÁ(ÁÚ¦ã, cÁÉÉ	-	·	

_A Ya VYf Dc]bh@cUXg f6 @7 % 8958 @58Ł

	::: 20 2:: 3 :0 3 /d			
	T^{ à^¦Æsæà^	Öã^&cã[}	Tæ*}æ* à* Žàtàlàjá 进间 进 G 进 FtJ	Š[&andaj}ŽŽjÆĀá
F	TF	Z	ËHÍ	HJĚ
G	TF	Z	Ĥ G	lì .
Н	TG	Z	ËFÈ	HJĚ
1	TH	Z	ËG	ΙÌ
ĺ	TH	Z	ËEG	HJĚ
Î	TH	Z	Ĕ JÈJ	FG
Ï	TH	Z	ËG	FG
Ì	TI	Z	ËÏË	HJĚ
J	TI	Z	É Œ	FG
F€	TI	Z		FG
FF	ΤÏ	Z	ËHÍ	HJĚ
FG	ΤÏ	Z	Ё́G	ΙÌ
FH	ΤÎ	Z	ËFÈ	HJĚ
FI	ΤÌ	Z	ËG	ΙÌ
FÍ	ΤÌ	Z	ËÊ€Ğ	HJĚ
FÎ	ΤÌ	Z	É JÈ	FG
FΪ	ΤÌ	Z	ËG	FG
FÌ	Τĺ	Z Z	ËÏË	HJĚ
FJ	ΤÍ	Z	É Œ	FG
G€	Τĺ	Z	ËF	FG
GF	T FG	Z	Η̈́	HJĚ
Œ	T FG	Z	Ё́G	ΙÌ
GH	T FF	Ζ	ËFÈ	ЫĔ
G	TF€	Z	ËG	
GÍ	TF€	Z	Ë €G Ë JÈ	HJĚ
GÎ	T F€	Z	Ű JÈ	FG
GÏ	TF€	Z	Ĥ̈́G	FG
Ġ	TJ	Z	ËÏË	HJĚ

Ô[{]æ}^ Ö^•ãt}^¦

A Ya VYf Dc]bh@cUXg'f6 @ % 8958 @58L'ff cbljbi YXL

	T^{à^¦ÁĞæà^	Öã^&cã[}	Tæ*}ããå^ŽjàЁjàËjjá	Š[&æqā[}Žā]£Āá
GJ	TJ	Z	É Œ	FG
H€	TJ	Z	ËΕ	FG
HF	TIÎ	Z	ËHGË	ÃÍ€
HG	TIÏ	Z	ËHGË	ÃÍ€
HH	TIÌ	Z	ËHGË	ÃÍ€

A Ya VYf 'Dc]bh@cUXg'f6 @ '&. '8958 '@ 58'f#79#L

	T^{ à^¦Æsæà^	Öā^&dī}	Tæ*}ããå^ŽjàÉpàÄjá	Šį & anedij} Žoj LÉA á
F	TF	Z	Tæ*}ããå^ŽjàÉpàjá ÈLÍÈU	HJĚ
G	TF	Z	HÍ GHÌ	l Ì
Н	TG	Z	ËFJÈH	HJĚ
1	TH	Z	ËILĚ	lì.
ĺ	TH	Z	Ë <u>HĚ</u> ËF΀	HJĚ
Î	TH	Z	ËHQËH	FG
Ϊ	TH	Z	ËHQÈ	FG
ì	TI	Z	ËÏFÈ	HJĚ
J	TI	Z	ËÌÀ	FG
F€	TI	Z	进) 社 进) 社 进) 社	FG
FF	ΤÏ	Z	ĤÍÈ	HJĚ
FG	ΤÏ	Z	H GH	l)
FH	ΤÎ	Z	ËFJÈH	HJĚ
FI	ΤÌ	Z	ËLĚ	ΙÌ
FÍ	ΤÌ	Z	ËF΀	HJĚ
FÎ	ΤÌ	Z	ËHGËH	FG
FΪ	ΤÌ	Z	ËHGËF	FG
FÌ	Τĺ	Z	ËÏFÈ	HJĚ
FJ	Τĺ	Z	Ë Ì È ËIÎ Ë	FG
G€	ΤÍ	Z	ËHÎË	FG
GF	T FG	Z	ĖÍÈ	HJĚ
GG	T FG	Z	Ĕ Œ	ΙÌ
GH	TFF	Z	ËFJÈH	HJĚ
G	T F€	Z	ËLĚ	ΙÌ
GÍ	TF€	Z	ËF΀	HJĚ
Ĝ	TF€	Z	ËHQËH	FG
GÏ	TF€	Z	ËHQË	FG
GÌ	TJ	Z	ËÏFÈ	HJĚ
GJ	TJ	Z	ËTFË ËÌÈ ËĤË	FG
H€	TJ	Z	ËĤĖ	FG
HF	TIÎ	Z	Ĥ Ĥ FĤ	ÃÍ€
HG	TIÏ	Z	Ë FË	ÃÍ€
HH	ΤΙÌ	Z	Ë FË	ÃÍ€

A Ya VYf 'Dc]bh'@:UXg'f6 @' ' . 'K =B8 '@C58 'fBC =79L': FCBHL

	T^{à^¦ÁŠæà^	Öã^&cã[}	Tæ*}ãc°å^ŽjàÉpäjá FJ€ÈL	Š[&æaā[}Žā]£Āá
F	TF	Ý	FJ€È	HJĚ
G	TF	Ý	FFÍ ÈH	lÌ.
Н	TG	Ý	GGÍ È	HJĚ
1	TH	Ý	ÎÈ	IÌ
ĺ	TH	Ý	ΙĴJÈΉ	HJĚ
Î	TH	Ý	ÎHË	FG
Ϊ	TH	Ý	ĺÎĖ̈́	FG



A Ya VYf 'Dc]bh'@:UXg'f6 @" ' . K +B8 '@C58 'fBC = 79L': FCBHL'f7 cbl]bi YXL

	T^{ à^¦ÁŠæà^	Öã^&cã[}	Tæ*}ããå^ŽjàÉpàËòjá	Šį & ænā[} ŽājEĀ á
Ì	TI	Ý	ΙĴJÈ	HJĚ
J	TI	Ý	JI È	FG
F€	TI	Ý	ÎÌ	FG
FF	ΤΪ	Ý	FJ€ÌÈ	HJĚ
FG	ΤΪ	Ý	FFÍ 🖭	lì.
FH	ΤÎ	Ý	΃	HJĚ
FI	ΤÌ	Ý	GGÉ ÎÈ	lì.
FÍ	ΤÌ	Ý	HÍJÍ	HJĚ
FÎ	ΤÌ	Ý	ÎĦÏ	FG
FΪ	ΤÌ	Ý	ĺÎĖ	FG
FÌ	ΤÍ	Ý	ÎHË ÍÎË IÎJÈ	HJĚ
FJ	ΤÍ	Ý	JIÈ	FG
G€	ΤÍ	Ý	îì	FG
GF	T FG	Ý	FJ€È	HJĚ
GG	T FG	Ý	FFÍ ÈH	lì .
GH	T FF	Ý	GGÍ È	HJĚ
G	T F€	Ý	ÎÈ	ΙÌ
GÍ	T F€	Ý	ΙĴJÈΉ	HJĚ
Ĝ	T F€	Ý	ÎĦÏ	FG
Ğ	T F€	Ý	IÎJÈH ÎHË ÍÎË	FG
GÌ	TJ	Ý	ΙΪJĖ	HJĚ
GJ	TJ	Ý	JIÈ	FG
H€	TJ	Ý	îì	FG
HF	TTÎ	Ý	l FÈ	ÃÍ€
HG	TIÏ	Ý	IÈ	ÃÍ€
HH	TIÌ	Ý	l FÈ	ÃÍ€

A Ya VYf 'Dc]bh@cUXg'f6 @ (. 'K = B8 @ C58 fBC = 79L'G=89L

	T^{à^¦ÆSæà^	Öã^&cã}}	Tæ*}ãcčå^ŽpàÉpàËajá	Š[&ænā]}Žā)ĒĀ á
F	TF	Ÿ	F€FÈG	HJĚ
G	TF	Ϋ	HŒH	ΙÌ
Н	TG	Ϋ	FIÎ∄	HJĚ
1	TH	Ϋ	GÀ	ΙÌ
ĺ	TH	Ϋ	FΪΙĚ	HJĚ
Î	TH	Ϋ	HÎ Ê LÎ Ê	FG
Ϊ	TH	Ϋ	ΙÎΒ̈̀	FG
Ì	TI	Ϋ	FÎ FÀ	HJĚ
J	TI	Ÿ	ÍÏË IÌË	FG
F€	TI	Ϋ	ΙÌË	FG
FF	ΤÏ	Ϋ	F€FÈG	HJĚ
FG	ΤÏ	Ϋ	HŒH	lì .
FH	ΤÎ	Ÿ	FIÎË	HJĚ
FI	ΤÌ	Ϋ	GÈ	lì .
FÍ	ΤÌ	Ϋ	FΪΙĚ	HJĚ
FÎ	ΤÌ	Ÿ	ΗÎĒ	FG
FΪ	ΤÌ	Ϋ	FÏIĚ HÎË IÎÈ	FG
FÌ	Τĺ	Ϋ	FÎ FÀ	HJĚ
FJ	Τĺ	Ϋ	ÍΪĖ̈́	FG
G€	Τĺ	Ϋ	ΙÌË	FG
GF	T FG	Ϋ	F€FÈ	HJĚ
Œ	T FG	Ϋ	HŒH	lì .

A Ya VYf 'Dc]bh'@cUXg'f6 @r'('.'K +B8 '@C58 'fBC +79L'G+89L'f7 cbhjbi YXL

	T^{ à^¦ÁŠæà^	Öã^&cã[}	Tæ*}ãćå^Ž(àÊàËàjá	Š[&æeā[}Žā]£Ãá
GH	T FF	Ϋ	FIÎË	HJĚ
G	T F€	Ϋ	Ð	ΙÌ
Ġ	T F€	Ϋ	FΪΙĚ	HJĚ
Ĝ	TF€	Ϋ	Η̈́Ē	FG
GÏ	T F€	Ϋ	ΙÎË	FG
Ġ	TJ	Ÿ	FÎ FÀ	HJĚ
GJ	TJ	Ϋ	ÍΪĖ̈́	FG
H€	TJ	Ϋ	ΙÌË	FG
HF	ΤΙÎ	Ϋ	Ė	ÃÍ€
HG	ΤΙΪ	Ϋ	ΙĖ	ÃÍ€
HH	ΤΙÌ	Ϋ	Ė	ÃÍ€

A Ya VYf Dc]bh@cUXg f6 @7) . K =B8 @C58 ff79£: FCBHŁ

	T^{ à^¦Æsæà^	Öã^&cã}	Tæ*}ããå^ŽإàÉjàËðjá	Š[&aneā]}ŽājEĀá
F	TF	Ý	I∰	HJĚ
G	TF	Ý	GË	l)
Н	TG	Ý	ΙΪÈ	HJĚ
1	TH	Ý	GÈ	ΙÌ
ĺ	TH	Ý	JF⊞̈́	HJĚ
Î	TH	Ý	FIÈ	FG
Ϊ	TH	Ý	FHÌ	FG
ì	TI	Ý	JG	HJĚ
J	TI	Ý	GFÈG	FG
F€	TI	Ý	FÍ Ë	FG
FF	ТΪ	Ý	l ∉i ï	HJĚ
FG	ΤÏ	Ý	GÜÈF	l Ì
FH	ΤÎ	Ý	ΙΪÈ	HJĚ
FI	ΤÌ	Ý	Œ	lì
FÍ	ΤÌ	Ý	JFË	HJĚ
FÎ	ΤÌ	Ý	FI∄	FG
FΪ	ΤÌ	Ý	FHÈ	FG
FÌ	ΤÍ	Ý	JG	HJĚ
FJ	ΤÍ	Ý	GFÈG	FG
G€	ΤÍ	Ý	FÍ 🛱	FG
GF	T FG	Ý	l€Ë	HJĚ
GG	T FG	Ý	GË	lì
GH	T FF	Ý	ΙΪĖΈ	HJĚ
G	TF€	Ý	GÈ	lì
GÍ	TF€	Ý	JFË	HJĚ
Ĝ	TF€	Ý	FI∄	FG
ĞÏ	TF€	Ý	FHÌ	FG
Ġ	TJ	Ý	JG	HJĚ
GJ	TJ	Ý	GFÈG	FG
H€	TJ	Ý	FÍ Ë	FG
HF	TIÎ	Ý	FH	ÃÍ€
HG	TIÏ	Ý	FH	ÃÍ€
HH	TIÌ	Ý	FH	ÃÍ€

A Ya VYf 'Dc]bh@cUXg f6 @7 * . K +B8 @C58 ff7 9 LG-8 9 L

	T^{à^¦AŠaœà^	Öã^&cã[}	Tæ*}ãcčå^ŽjàÉpàËòjá	Š[&anda]}ŽājEĀá
F	TF	Ϋ	GÍ	HJĚ

A Ya VYf 'Dc]bh@cUXg'f6 @ * . K = B8 @C58 ff 9 L'G=8 9 L'f7 cbh]bi YXL

	T^{ à^¦Æsæà^	Öã^&cã[}	Tæ*}ããå^ŽإàÉjàËðjá	Š[&eenaj[}ŽājEĀá
G	TF	Ϋ	F€ÈG	l Ì
Н	TG	Ϋ	HÈ	HJĚ
1	TH	Ϋ	FÈ	ΙÌ
ĺ	TH	Ϋ	HJÈ	HJĚ
Î	TH	Ϋ	JÈ	FG
Ϊ	TH	Ϋ	FFÈ	FG
ì	TI	Ϋ	Η̈Ē	HJĚ
J	ΤI	Ϋ	FIÈ	FG
F€	TI	Ϋ	FFÈ	FG
FF	ΤÏ	Ϋ	Ğ	HJĚ
FG	ΤÏ	Ϋ	F€G	l)
FH	ΤÎ	Ϋ	HÈ	HJĚ
FI	ΤÌ	Ϋ	FĒ	l)
FÍ	ΤÌ	Ϋ	HJÈ	HJĚ
FÎ	ΤÌ	Ϋ	JÈ	FG
FΪ	ΤÌ	Ϋ	FFÈ	FG
FÌ	Τĺ	Ϋ	HÏÈ	HJĚ
FJ	Τĺ	Ϋ	FIÈ	FG
G€	Τĺ	Ϋ	FFÈ	FG
Œ	T FG	Ϋ	Ğ	HJĚ
GG	T FG	Ϋ	F€ÈG	l Ì
GH	T FF	Ϋ	HÈ	HJĚ
G	TF€	Ϋ	FĒ	lì
GÍ	T F€	Ϋ	HJÈ	HJĚ
GÎ	TF€	Ϋ	JÈ	FG
GÏ	T F€	Ϋ	FFÀ	FG
GÌ	TJ	Ϋ	HÏÈ	HJĚ
GJ	TJ	Ϋ	FIÈ	FG
H€	TJ	Ϋ	FFÈ	FG
HF	TIÎ	Ϋ	FH	ÃÍ€
HG	TIÏ	Ϋ	FH	ÃÍ€
HH	ΤΙÌ	Ϋ	FH	ÃÍ€

A Ya VYf 'Dc]bh'@cUXg'f6 @r', : 'K +B8 '@C58'fG9FJ=79L': FCBHL

	T^{ à^¦ÁĞæà^	Öã^&cã[}	Tæ*}ããå^Ž∤àЁàËājá	Š[&aea]}ŽajEÃá
F	TF	Ý	FFÈ	HJĚ
G	TF	Ý	Ï ĒĢ FI ĒF	ΙÌ
Н	TG	Ý	FIÈ	HJĚ
1	TH	Ý	È	ΙÌ
ĺ	TH	Ý	GIÈH	HJĚ
Î	TH	Ý		FG
Ϊ	TH	Ý	HĚ	FG
Ì	TI	Ý	GIÈ	HJĚ
J	TI	Ý	ĺÙ	FG
F€	TI	Ý	ΙĖ	FG
FF	ΤÏ	Ý	FFÈ	HJĚ
FG	ΤÏ	Ý	Ï ĒĢ FI ĒF	ΙÌ
FH	ΤÎ	Ý	FIÈ	HJĚ
FI	ΤÌ	Ý	È	ΙÌ
FÍ	ΤÌ	Ý	GIÈH	HJĚ
FÎ	ΤÌ	Ý		FG

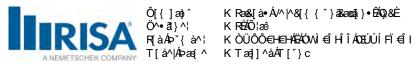


A Ya VYf 'Dc]bh'@cUXg'f6 @7', . 'K +B8' @C58' fG9FJ ≠ 9 £: FCBH£f7' cbhjbi YX£

	T^{ à^¦Æsæà^	Öã^&cã[}	Tæ*}ããå^ŽإàÉjàËðjá	Š[&æqā[}Žā]£Āá
FΪ	ΤÌ	Ý	HĚ	FG
FÌ	Τĺ	Ý	GJÈ	HJĚ
FJ	Τĺ	Ý	ĺÀ	FG
G€	Τĺ	Ý	ΙĖ	FG
GF	T FG	Ý	FFÈ	HJĚ
GG	T FG	Ý	Ï ĒĢ FI ĒF	l)
GH	T FF	Ý		HJĚ
G	T F€	Ý	È	l)
GÍ	T F€	Ý	GIÈH	HJĚ
GÎ GÏ	T F€	Ý		FG
GÏ	T F€	Ý	HĚ	FG
GÌ	TJ	Ý	GJÈ	HJĚ
GJ	TJ	Ý	ĺÀ	FG
H€	TJ	Ý	ΙÈΗ	FG
HF	TIÎ	Ý	HĒ	ÃÍ€
HG	ΤΙΪ	Ý	HÈ	ÃÍ€
HH	TIÌ	Ý	HĒ	ÃÍ€

A Ya VYf 'Dc]bh'@cUXg'f6 @7 - : 'K =B8 '@C58'fG9FJ=79L'G=89L

	T^{ à^¦Æœà^	Öã^&cã}	Tæ*}ããå^ŽإàÉjàËðjá	Š[&enená]}ŽājEÃá
F	TF	Ϋ	ÎÈ	HJĚ
G	TF	Ϋ	G	l Ì
Н	TG	Ϋ	JÈ	HJĚ
	TH	Ϋ	È	lì lì
ĺ	TH	Ϋ	F€È	HJĚ
Î	TH	Ϋ	GÈH	FG
Ϊ	TH	Ϋ	GÈ	FG
ì	TI	Ϋ	F €Ì	HJĚ
J	TI	Ϋ	HÈ	FG
F€	TI	Ϋ	Н	FG
FF	ΤÏ	Ϋ	ÎÈ	HJĚ
FG	ΤÏ	Ϋ	G	lì.
FH	ΤÎ	Ϋ	JÈ	HJĚ
FI	ΤÌ	Ϋ	È	lì.
FÍ	ΤÌ	Ϋ	F€Ù	HJĚ
FÎ	ΤÌ	Ϋ	GÈH	FG
FΪ	ΤÌ	Ϋ	GÈ	FG
FÌ	Τĺ	Ϋ	F €Ì	HJĚ
FJ	Τĺ	Ϋ	HÈ	FG
G€	Τĺ	Ϋ	Н	FG
GF	T FG	Ϋ	ÎÈ	HJĚ
GG	T FG	Ϋ	G	lì .
GH	T FF	Ϋ	JÈ	HJĚ
G	TF€	Ϋ	È	l Ì
GÍ	TF€	Ϋ	F€Ù	HJĚ
Ĝ	TF€	Ϋ	GÈH	FG
ĞÏ	TF€	Ϋ	GÈ	FG
GÌ	TJ	Ϋ	F ∰	HJĚ
GJ	TJ	Ϋ	HÈ	FG
H€	TJ	Ϋ	Н	FG
HF	ΤΙÎ	Ϋ	HĒ	ÃÍ€



A Ya VYf Dc]bh'@cUXg'f6 @ - . K +B8 @C58 fG9FJ = 79 L'G+8 9 L'f7 cbhjbi YXL

	T^{ à^¦ÁŠæà^	Öã^&cã[}	Tæ*}ãã å^ŽjàÉjàËajá	Š[&æqā[}Žā]ĒĀ á
HG	ΤΙΪ	Ÿ	HÈ	ÃÍ€
HH	TIÌ	Ÿ	HÈ	ÃÍ€

A Ya VYf 'Dc]bh'@cUXg 'f6 @ '%\$'. '@ 9 '@ 58 'fG9FJ=794Ł

	T^{à^¦ÁŠæà^∣	Öã^&cã[}	Tæ*}ãc°å^ŽjàÉpàËòjá	Š[&anda]}Žā]EĀá
F	Τĺ	Z	Ű€	€
G	TI	Z	É€	€
Н	TJ	Z	Ű€	€

A Ya VYf'8]gff]Vi hYX'@:UXg'f6@''&'.'8958'@C58'f#794L

	T^{à^¦ÆSæà^	Öã^&cã[}		EÖ}åÁTæ≛}ãc`å^ŽpàEpi⊞⊞	Ùcælo ÁŠ[&ænā[}Žā) ÉÃ á	Ò}åÆŠ[&ææā[}ŽājÆÄá
F	TF	Z	⊞H	⊞H	€	€
G	TG	Z	ЩН	⊞H	€	€
Н	TH	Z	Ш́Н	⊞H	€	€
	TI	Z	ЩН	⊞H	€	€
ĺĺ	Τĺ	Z	⊞H	⊞H	€	€
Î	ΤÎ	Z	⊞́H	⊞H	€	€
Ï	ΤÏ	Z	⊞H	⊞H	€	€
Ì	ΤÌ	Z	⊞H	⊞H	€	€
J	TJ	Z	⊞H	⊞H	€	€
F€	TF€	Z	⊞H	⊞H	€	€
FF	T FF	Z	Ш́Н	⊞H	€	€
FG	T FG	Z	Ш́Н	⊞H	€	€
FH	TFJ	Z	ËΪ	ËΪ	€	€
FI	TŒ	Z	ÜΪ	ËΪ	€	€
FÍ	T GF	Z	ËΪΪ	ĤΪ	€	€
FÎ	T Œ	Z	ËΪΪ	ËΪ	€	€
FΪ	T GH	Z	ËΪ	ËΪ	€	€
FÌ	TG	Z	ËΪ	ËΪ	€	€
FJ	ΤĠ	Z	ËΪ	ËΪ	€	€
G€	ΤĠ	Z	ËΪ	ËΪ	€	€
GF	ΤĠΪ	Z	ËΪΪ	ËΪ	€	€
Œ	ΤĠ	Z	ËΪ	ËΪ	€	€
GH	TGI	Z	ËΪ	ËΪ	€	€
G	TH€	Z	ËΪ	ËΪ	€	€
Ġ	THF	Z	ËΪFΪ	Η̈́FÏ	€	€
Ĝ	T HG	Z	⊞FÏ	⊞FÏ	€	€
Ğ	THH	Z	Η̈́FÏ	Η̈́FÏ	€	€
Ġ	THH TI€	Z	ΕÜΪF	ËΪF	€	€
GJ	TIF	Z	ΕÜΪF	ΕÜΪF	€	€
H€	TIG	Z	EÜ F	ΕÜΪF	€	€
HF	TIH	Z	ΕÜΪF	Ë F	€	€
HG	TII	Z	EÜ F	ΕÜΪF	€	€
HH	TIÍ	 Z	EJÏ F	E)Ï F	€	€
H	TIÎ	 Z	ШH	⊞H	€	€
HÍ	ΤΙΪ	 Z	<u> </u>	⊞ H	€	€
HÎ	TIÌ	Z	Ш̈́Н	Ш̈́Н	€	€
HÏ	Tìì	Z	ΞÏΪ	ĤΪ	€	€
HÌ	TÌJ	Z	ΞÏ	ΞÏ	€	€
HJ	TJ€	Z	ΞÏ	ΞÏ	€	€
			<u> </u>			



A Ya VYf 8]gff]Vi hYX @ UXg f6 @ '&. 8 958 @ 58 ff7 94L f7 cbhjbi YXL

	T^{à^¦ÆŠææà^	Öã^&cã[}	ÙcæloÁTæt³}ãccå^ŽjàÐājĒE	HÖ)}åÁTæ≛}ãc`å^Ž(àHā)£HH	ÈÙœdo ÁŠ[&æna[}Žāj£Ãá	Ò}å ÁŠ[&ænā[}Žā) ÉÃ á
I€	TJF	Z	ĤΪ	ËΪ	€	€
1 F	TJG	Z	ËΪ	ËΪ	€	€
IG	TJH	Z	ËΪ	ËΪ	€	€
ΙH	ILT	Z	ĤΪ	ĤΪ	€	€
11	ΤJĺ	Z	ĤΪ	ĤΪ	€	€
ΙÍ	ΤJÎ	Z	ĤΪ	ËΪ	€	€
ΙÎ	ΤJΪ	Z	ĤΪ	ĤΪ	€	€
ΙÏ	ÍLΤ	Z	ĤΪ	ĤΪ	€	€
ΙÌ	TJJ	Z	ËΪ	ËΪ	€	€
IJ	T F€€	Z	ËΪ	ËΪ	€	€
Í€	TF€F	Z	ĤΪ	ĤΪ	€	€
ĺF	T F€G	Z	ĤΪ	ĤΪ	€	€

A Ya VYf 8]glf]Vi hYX @ UXg f6 @ ' ' . K =B8 '@ 58 'fBC = 9 L': FCBHL

	T^{à^¦ÁŠæà^	Öã^&cã[}	ÙcæloÁTæt}ãc°å^ŽjàÐājĒE	HÖ)}åÁTæ≛}ãc`å^ŽjàÐa) ⊞⊞	ÈÙcæboÄŠ[&æna[]}ŽājÉÃá	Ò}åÆŠ[&ænaa[}ŽājÆÃ á
F	TF	ÚÝ	Ěìî	Ēìî	€	€
G	TG	ÚÝ	Ēìî	ĒÌÎ	€	€
Н	TH	ÚÝ	Ēìî	ĒÌÎ	€	€
1	TI	ÚÝ	Ēìî	Èìî	€	€
ĺ	Τĺ	ÚÝ	Ēìî	Èìî	€	€
Î	ΤÎ	ÚÝ	Ēìî	ĒÌÎ	€	€
Ϊ	ΤÏ	ÚÝ	Ēìî	ĒÌÎ	€	€
Ì	ΤÌ	ÚÝ	Èìî	Èìî	€	€
J	TJ	ÚÝ	Èìî	Èìî	€	€
F€	T F€	ÚÝ	Ēìî	ĒÌÎ	€	€
FF	T FF	ÚÝ	Èìî	Èìî	€	€
FG	T FG	ÚÝ	Ēìî	Ēìî	€	€
FH	T FJ	ÚÝ	ÌΪ	ÌÎ	€	€
FI	TG€	ÚÝ	ÌΪ	ÌΪ	€	€
FÍ	TGF	ÚÝ	ÌΪ	ÌÎ	€	€
FÎ	TŒ	ÚÝ	ÌΪ	ÌΪ	€	€
FΪ	T GH	ÚÝ	ÌΪ	ÌĴ	€	€
FÌ	TG	ÚÝ	ÌΪ	ÌÎ	€	€
FJ	ΤĠ	ÚÝ	ÈÎ	ÌÎ	€	€
G€	ΤĠ	ÚÝ	ÌΪ	ÌĴ	€	€
GF	ΤĠΪ	ÚÝ	ÈÎ	ÌÎ	€	€
GG	ΤĠ	ÚÝ	ÌΪ	ÌÎ	€	€
GH	TGJ	ÚÝ	ÌΪ	ÌÎ	€	€
G	TH€	ÚÝ	ÌΪ	ÌÎ	€	€
GÍ	THF	ÚÝ	ÈΗ	ÈН	€	€
Ĝ	THG	ÚÝ	ÈΗ	ÈΗ	€	€
ΘÏ	THH	ÚÝ	ÈΗ	ÈΗ	€	€
GÌ	TI€	ÚÝ	GÈ€F	GÈ€F	€	€
GJ	TIF	ÚÝ	GÈ€F	GÈ€F	€	€
H€	TIG	ÚÝ	ŒÌ€F	ŒÌ€F	€	€
HF	TIH	ÚÝ	ŒÌ€F	GÈ€F	€	€
HG	TII	ÚÝ	ŒÌ€F	GÈ€F	€	€
HH	TIÍ	ÚÝ	GÌ€F	GÈ€F	€	€
Н	TIÎ	ÚÝ	ĚÎ	ĚÎ	€	€
HÍ	ΤΙΪ	ÚÝ	ĚÎ	ĚÎ	€	€
HÎ	TIÌ	ÚÝ	ĚÎ	ĚÎ	€	€



A Ya VYf 8]glf]Vi hYX @ UXg f6 @ " . K =B8 @C58 fBC = 9 L: FCBHL ff cbh]bi YXL

	T^{ à^¦ÆSeeà^	Öã^&cã[}	ÙcæłoÁTæ*}ããå^ŽjàÐãjÉÉÉ	HÖ)}åÁTæ≛}ãc`å^Ž(à Hā)£HH	ËÙcæboÁŠ[&ænā[}ŽājÉÃá	Ò}åÆq̃&ænaã[}ŽājÆãá
HÏ	ΤÌÌ	ÚÝ	ÌΠ	ÌΠ	€	€
H	ΤÌJ	ÚÝ	ÌΠ	ÈП	€	€
Ш	TJ€	ÚÝ	ÈП	ÈП	€	€
I€	TJF	ÚÝ	ÌП	ÈП	€	€
1 F	TJG	ÚÝ	ÈΠ	ÈП	€	€
ΙG	TJH	ÚÝ	ÌП	ĖII ĖII	€	€
ΙH	TJI	ÚÝ	ÈΠ	ÌΠ	€	€
11	TJÍ	ÚÝ	ÈΠ	ÈП	€	€
ΙÍ	TJÎ	ÚÝ	ÌΠ	ÈП	€	€
ΙÎ	TJÏ	ÚÝ	ÌΠ	ÈП	€	€
ΙÏ	TJÌ	ÚÝ	ÈΠ	ÈП	€	€
ΙÌ	TJJ	ÚÝ	ÌП	ÈП	€	€
IJ	T F€€	ÚÝ	ÌΠ	ÈП	€	€
Í€	TF€F	ÚÝ	ÈΠ	ÈП	€	€
ĺF	T F€G	ÚÝ	ÌП	ÈΠ	€	€

A Ya VYf 8]glf]Vi hYX @ UXg f6 @ (. K = B8 @ 58 fBC = 79 L G= 89 L

	T^{ à^¦ÁŠæà^	Öã^&cã[}	ÙœadoÁTæt*}ããå^ŽjàÐājĒÐ	HÖ}åÁTæ≛}ãc`å^ŽàÐa)ÉHH	ËÙcæloÁŠ[&æca[}ŽājÉÃá	Ò}åÁŠ[&ænā[}ŽājEÃá
F	TF	ÚΫ	ĚÌÎ	Êìî	€	€
G	TG	ÚŸ	Ēìî	Ēìî	€	€
Н	TH	ÚΫ	Ēìî	ĒÌÎ	€	€
	TI	ÚΫ	Ēìî	Ēìî	€	€
ĺ	Τĺ	ÚΫ	Ēìî	ĒÌÎ	€	€
Î	ΤÎ	ÚΫ	Ēìî	Ēìî	€	€
Ϊ	ΤÏ	ÚΫ	Êìî	ĒÌÎ	€	€
Ì	ΤÌ	ÚΫ	Êìî	Ēìî	€	€
J	TJ	ÚΫ	Ēìî	ĒÌÎ	€	€
F€	T F€	ÚΫ	Ēìî	Ēìî	€	€
FF	T FF	ÚΫ	Ēìî	Ēìî	€	€
FG	T FG	ÚΫ	Ēìî	Ēìî	€	€
FH	T FJ	ÚΫ	ÈΪ	ÌΪ	€	€
FI	TG€	ÚΫ	ÌΪ	ÌĴ	€	€
FÍ	T GF	ÚΫ	ÌΪ	ÌÎ	€	€
FÎ	TGG	ÚΫ	ÌΪ	ÌÎ	€	€
FΪ	T GH	ÚΫ	ÌΪ	ÌÎ	€	€
FÌ	TG	ÚΫ	ÌÎ	ÌÎ	€	€
FJ	ΤĠĺ	ÚΫ	ÌΪ	ÈÎ	€	€
G€	ΤĠÎ	ÚΫ	ÈÎ	ÈÎ	€	€
Œ	ΤĠΪ	ÚΫ	ÈΪ	ÈÎ	€	€
GG	ΤĠ	ÚΫ	ÌΪ	ÌÎ	€	€
GH	TGJ	ÚΫ	ÌΪ	ÌÎ	€	€
G	TH€	ÚΫ	ÌÎ	ÌÎ	€	€
GÍ	THF	ÚΫ	ÈΗ	ÈΗ	€	€
Ĝ	THG	ÚΫ	ÈΗ	ÈΗ	€	€
ĞÏ	THH	ÚΫ	ÈΗ	ÈΗ	€	€
Ġ	TI€	ÚΫ	GÈ€F	ŒE	€	€
GJ	TIF	ÚΫ	GÈ€F	ŒE	€	€
H€	TIG	ÚΫ	GÈ€F	ŒE	€	€
HF	TIH	ÚΫ	GÈ€F	ŒE	€	€
HG	TII	ÚŸ	GÈ€F	ŒE	€	€
HH	TIÍ	ÚŸ	Œ	ŒE	€	€



A Ya VYf 8]glf]Vi hYX @ UXg f6 @ ('. K = B8 @ C58 fBC = 7 9 L'G=8 9 L'f7 cb/jbi YXL

	T^{ à^¦Æšæà^	Öã^&æ[} ÚŸ	ÙcækoÁTæt*}ãccå^ŽjàÐājÉÉÉ	ÉÒ}åÁTæ≛}ãc°å^Ž(àH3)ÉÉÉÉ	Ùcædo ÁŠ[&æna[}Žā)ÉÃá	Ò}åÆŠ[&ææā[}ŽājÆÃá
Н	TIÎ	ÚΫ	ĚÎ	ĚÎ	€	€
HÍ	ΤΙΪ	ÚΫ	ĚÎ	ĚÎ	€	€
HÎ	ΤΙÌ	ÚΫ	ĚÎ	ĚÎ	€	€
ΗÏ	ΤÌÌ	ÚΫ	ÈΠ	ΙΙĠ	€	€
HÌ	ΤÌJ	ÚΫ	ÌП	ШÉ	€	€
HJ	TJ€	ÚΫ	ÌП	ΙΙĠ	€	€
I€	TJF	ÚΫ	ÌП	ВП	€	€
1 F	TJG	ÚΫ	ÌП	ΙŒ	€	€
IG	TJH	ÚΫ	ÌΠ	ΙŒ	€	€
ΙH	ILT	ÚΫ	ÌП	ΞĘ	€	€
11	TJÍ	ÚΫ	ÈΠ	Ì	€	€
ΙÍ	ΤJÎ	ÚΫ	ÌΠ	ΠĘ	€	€
ΙÎ	ΤJΪ	ÚΫ	ÌП		€	€
ΙÏ	ΙUΤ	ÚΫ	ÌΠ	ΠĘ	€	€
ΤÌ	TJJ	ÚΫ	ÌП	HE	€	€
IJ	T F€€	ÚΫ	ÈП	<u>iii</u> iii	€	€
Í€	TF€F	ÚΫ	ÌП	ΞĘ	€	€
ĺF	T F€G	ÚΫ	ÌП	ĖΠ	€	€

A Ya VYf 8]glf]Vi hYX @ UXg f6 @ 7) . K =B8 @ 58 ff 9£: F CBHL

	T^{ à^¦ASãæà^	Öã^&cã}}	ÙœadoÁTæt*}ãã å^ŽàÐA) ÊÉÉ	BÖ}åÁTæ≛}ãc°å^ŽjàÐa;BEB	Ùcælo ÁŠ[&ænā[}ŽājĒĀá	Ò}åÆŠ[&ææā[}ŽājÆŠá
F	TF	ÚÝ	ÈGÎ	È€Î	€	€
G	TG	ÚÝ	ÈGÎ	È€Î	€	€
Н	H	ÚÝ	ÈGÎ	È€Î	€	€
1	ΤI	ÚÝ	ÈGÊÎ	È⊖€Î	€	€
ĺ	Τĺ	ÚÝ	ÌĐ€Î	È⊖€Î	€	€
Î	ΤÎ	ÚÝ	ÌĐ€Î	È€Î	€	€
Ï	ΤÏ	ÚÝ	ÌĐ€Î	È⊖€Î	€	€
Ì	ΤÌ	ÚÝ	ÌĐ€Î	È€Î	€	€
J	TJ	ÚÝ	ÌĐ€Î	È⊖€Î	€	€
F€	TF€	ÚÝ	ÌĐ€Î	È€Î	€	€
FF	TFF	ÚÝ	ÌĐ€Î	È⊖€Î	€	€
FG	T FG	ÚÝ	ÌĐ€Î	È€Î	€	€
FH	TFJ	ÚÝ	Ì `l €J	L €H £J	€	€
FI	TŒ	ÚÝ	Ì `l €J	L €H Í	€	€
FÍ	T GF	ÚÝ	Ì `l €J	L €H £J	€	€
FÎ	TŒ	ÚÝ	Ì `l €J	L €H Í	€	€
FΪ	T GH	ÚÝ	Ì `l €J	L €H £J	€	€
FÌ	TG	ÚÝ	Ì `l €J	L €H Í	€	€
FJ	ΤĠ	ÚÝ	Ì `l €J	L €H £J	€	€
G€	ΤĠ	ÚÝ	Ì `l €J	L €H Í	€	€
Œ	ΤĠΪ	ÚÝ	L ∋l Í	ÈH€J	€	€
Œ	ΤĠ	ÚÝ	L €H £J	ÈH€J	€	€
GH	ΤGJ	ÚÝ	L ∋l Í	ÈH€J	€	€
G	TH€	ÚÝ	L €H £J	ÈH€J	€	€
GÍ	THF	ÚÝ	ÈGFÍ	ÈFÍ	€	€
GÎ	THG	ÚÝ	ÈGFÍ	ÈFÍ	€	€
GÏ	THH	ÚÝ	ÈGFÍ	ÈFÍ	€	€
GÌ	TI€	ÚÝ	Ē FÎ	ĒFÎ	€	€
GJ	TIF	ÚÝ	ĒFÎ	ĒFÎ	€	€
H€	TIG	ÚÝ	ÊFÎ	ÊFÎ	€	€

A Ya VYf 8]gff]Vi hYX @ UXg f6 @) . K =B8 @ 58 ff7 9 L: F CBHLff7 cbf]bi YXL

	T^{à^¦AŠæà^	Öã^&cã[}	ÙcæboÁTæ*}ããå^ŽjàÐãjÉÉÉ	BÒ}åÁTæ≛}ãc°å^Ž(àB) B⊞E	Ù cælo ÁŠ[&ænā[}ŽājĒĀá	Ò}åÆŠ[&ææā[}ŽājÆÃá
HF	TIH	ÚÝ	ĒfÎ	ĒFÎ	€	€
HG	TII	ÚÝ	Ë FÎ Ë FÎ	ĒFÎ	€	€
HH	TIÍ	ÚÝ ÚÝ	ĒFÎ	ĒFÎ	€	€
Н	TIÎ	ÚÝ	ÈΪG	ÈΪG	€	€
HÍ	ΤΙΪ	ÚÝ	ÈÏ G	ÈΪG	€	€
HÎ	TIÌ	ÚÝ	ÈΪG	ÈΪG	€	€
ΗÏ	ΤÌÌ	ÚÝ	ЮĤ	HŒ	€	€
HÌ	ΤÌJ	ÚÝ	ЮĤ	HÆ	€	€
HJ	TJ€	ÚÝ	ЮĤ	HŒ	€	€
I€	TJF	ÚÝ	ЮĤ	HÆ	€	€
1 F	TJG	ÚÝ ÚÝ	ÌЭH	HŒ	€	€
IG	TJH	ÚÝ	ÌЭH	HÆ	€	€
ΙH	TJI	ÚÝ	ÌЭH	HŒ	€	€
11	TJÍ	ÚÝ	ЮĤ	HÆ	€	€
ΙÍ	TJÎ	ÚÝ	ÌЭH	HŒ	€	€
ΙÎ	ΤJΪ	ÚÝ	ÌЭH	HŒ	€	€
ΙÏ	TJÌ	ÚÝ	ÌЭH	HEE	€	€
ΤÌ	TJJ	ÚÝ	ÌЭH	H	€	€
IJ	T F€€	ÚÝ	ÌЭH	HEE	€	€
Í€	TF€F	ÚÝ	ÌЭH	H	€	€
ĺF	T F€G	ÚÝ	ÈЭH	HEE	€	€

A Ya VYf 8]glf]Vi hYX @ UXg f6 @ '* . K =B8 @ 58 ff7 9 L G=8 9 L

	T^{à^¦ÁŠaœà^	Öã^&dã}	Ù cæchoÁTæt}ãã å^ŽịàĐã) 🛗	BÒ}åÁTæ≛}ãc°å^ŽjàBaj£⊞	: Ùcælo 4Š[&ænā[}Žāj£Ãá	Ò}åÆŠ[&ææā[}ŽājÆÃá
F	TF	ÚΫ	È€Î	È€Î	€	€
G	TG	ÚΫ	È€Î	É€Î	€	€
Н	H	ÚΫ	È€Î	É€Î	€	€
	I	ÚΫ	È€Î	Ê€Î	€	€
ĺ	Τĺ	ÚΫ	È€Î	È€Î	€	€
Î	ΤÎ	ÚΫ	È€Î	Ê€Î	€	€
Ϊ	ΤÏ	ÚŸ	È€Î	É€Î	€	€
Ì	ΤÌ	ÚΫ	È€Î	È€Î	€	€
J	TJ	ÚΫ	È€Î	È€Î	€	€
F€	TF€	ÚΫ	ÌĐ€Î	È€Î	€	€
FF	TFF	ÚΫ	È€Î	É€Î	€	€
FG	TFG	ÚΫ	È€Î	É€Î	€	€
FH	TFJ	ÚΫ	L∋HÍ	Ľ ∋l ÍÍ	€	€
FI	TŒ	ÚΫ	L∋HÍ	Ľ ∋l ÍÍ	€	€
FÍ	T GF	ÚΫ	L∋HÍ	Ľ ∋l ÍÍ	€	€
FÎ	ΤŒ	ÚΫ	L∋HÍ	Ľ ∋l ÍÍ	€	€
FΪ	T GH	ÚΫ	L∋HÍ	Ľ ∋l ÍÍ	€	€
FÌ	TG	ÚΫ	L∋HÍ	Ľ ∋l ÍÍ	€	€
FJ	ΤĠ	ÚΫ	L∋HÍ	Ľ ∋l ÍÍ	€	€
G€	ΤĠ	ÚΫ	Ľ ∭	È l €J	€	€
GF	ΤĠ	ÚΫ	L∋HÍ	Ľ ∋l ÍÍ	€	€
GG	ΤĠ	ÚΫ	L∋HÍ	Ľ ∭ EJ	€	€
GH	TGJ	ÚΫ	L∌HÍ	L €HÉ J	€	€
G	TH€	ÚΫ	L∌HÍ	Ľ ∭	€	€
GÍ	THF	ÚΫ	ÈFÍ	ÈFÍ	€	€
Ĝ	THG	ÚΫ	ÈFÍ	ÈFÍ	€	€
ĞÏ	THH	ÚŸ	E FÍ	ÈFÍ	€	€



A Ya VYf 8]glf]Vi hYX @ UXg f6 @ * . K =B8 @ 58 ff 9 L G=8 9 L f7 cbh]bi YXL

	T^{à^¦ÆŠæà^	Öã^&cã[}	Ù cæloÁTæt³}ãã å^Ž(àHZ)Ē	BÖ}åÁTæ≛}ãc°å^ŽjàÐa, É⊞É	Ù cælo ÁŠ[&ænā[}Žā)ÉÃá	Ò}åÆŠ[&ææā[}ŽājÆÄá
Ġ	TI€	ÚŸ	Ē FÎ	ĒFÎ	€	€
GJ	TIF	ÚΫ	ÊFÎ	ĒFÎ	€	€
H€	TIG	ÚΫ	Ē FÎ	ĒFÎ	€	€
HF	HIT	ÚΫ	ΪĖFÎ	ĒFÎ	€	€
HG	TII	ÚΫ	ÊFÎ	ĒFÎ	€	€
HH	ΤΙÍ	ÚΫ	ÊFÎ	ĒFÎ	€	€
Н	ΤΙÎ	ÚΫ	ÈΪG	ÈΪG	€	€
HÍ	ΤΙΪ	ÚΫ	ÈΪG	ÈΪG	€	€
HÎ	ΤΙÌ	ÚΫ	ÈΪG	ÈΪG	€	€
HÏ	ΤÌÌ	ÚΫ	ЮĤ	HŒH	€	€
HÌ	ΤÌJ	ÚΫ	ЮĤ	HŒJH	€	€
HJ	TJ€	ÚΫ	ЮĤ	HŒH	€	€
I€	TJF	ÚΫ	ЮĤ	Ю́Н	€	€
1 F	TJG	ÚΫ	ÈЭH	ÈЭН	€	€
IG	TJH	ÚΫ	ÈЭH	ÈЭJН	€	€
ΙH	TJI	ÚΫ	ÈЭH	ÈЭJН	€	€
11	TJÍ	ÚΫ	ÈЭH	HUĐ	€	€
Ιĺ	ΤJÎ	ÚΫ	ÈЭH	ÈЭJН	€	€
ΙÎ	ΤJΪ	ÚΫ	ÈЭH	HLEE	€	€
ΙÏ	TJÌ	ÚΫ	ÈЭH	HUÐ	€	€
ΤÌ	TJJ	ÚΫ	ÈЭH	HUĐ	€	€
IJ	T F€€	ÚΫ	ÈЭH	HUÐ	€	€
Í€	T F€F	ÚΫ	ÈGIH	ÈЭH	€	€
ĺF	T F€G	ÚΫ	ÌЭH	ЮĤ	€	€

A Ya VYf'8]gHf]Vi hYX'@:UXg'f6@T', '. 'K=B8'@C58'fG9FJ=79L': FCBHL

	T^{ à^¦ÆŠæà^	Öã^&cã[}	ÙœdoÁTæ*}ããå^Ž(àHZ)EEE	EÒ}åÁTæ≛}ãc°å^ŽjàÐa, É⊞É	Ùcælo ÁŠ[&æna[}ŽājĒĀá	Ò}åÆS[&ænaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
F	TF	ÚÝ	ÈEI H	ÈΗ	€	€
G	TG	ÚÝ	ÈΗ	ÈΗ	€	€
H	TH	ÚÝ	ÈH	È∃H	€	€
	TI	ÚÝ	ÈΗ	ÈΗ	€	€
ĺ	ΤÍ	ÚÝ	ÈH	ÈΗ	€	€
Î	ΤÎ	ÚÝ	ÈΗ	ÈΗ	€	€
Ï	ΤÏ	ÚÝ	ÈH	ÈΗ	€	€
Ì	ΤÌ	ÚÝ	ÈΗ	ÈΗ	€	€
J	TJ	ÚÝ	ÈΗ	ÈΙΗ	€	€
F€	T F€	ÚÝ	ÈEIH	ÈΙΗ	€	€
FF	T FF	ÚÝ	ÈEI H	ÈΗ	€	€
FG	T FG	ÚÝ	È∃H	ÈΙΗ	€	€
FH	T FJ	ÚÝ	ÈÎ	ÈÎ	€	€
FI	TŒ	ÚÝ	ÈÎ	È	€	€
FÍ	T GF	ÚÝ	È	EÎ	€	€
FÎ	TŒ	ÚÝ	ÈÎ	È	€	€
FΪ	T GH	ÚÝ	ÈÎ	È	€	€
FÌ	TG	ÚÝ	ÈÍ	È	€	€
FJ	ΤĠ	ÚÝ			€	€
G€	ΤĠ	ÚÝ	ÈÎ	È	€	€
GF	ΤĠΪ	ÚÝ	ÈÎ	ÈÎ	€	€
GG	ΤĠ	ÚÝ	Ì€Î	ÈÎ	€	€
GH	TGI	ÚÝ	<u>`</u>	È	€	€
G	TH€	ÚÝ	ÈÎ	ÈÎ	€	€



A Ya VYf 8]gff]Vi hYX @ UXg f6 @ ', '. K =B8 @ 58 fG9FJ=79L': FCBHL'f7 cbh]bi YXL

	T^{à^¦ÆŠææà^	Öã^&cã[}	ÙœdoÁTæt}ããå^Ž(àB)iEE	BÒ}åÁTæ≛}ãc°å^ŽjàBajÊ⊞È	: Ùcælo ÁŠ[&ænā[}ŽājĒĀá	Ò}åÆŠ[&æsā[}ŽājÆŠá
GÍ	THF	ÚÝ	ÈÉÍG	ÈEÍ G	€	€
GÎ	THG	ÚÝ	ÈÉÍG	È€Í G	€	€
GÏ	THH	ÚÝ	È ÉÍ G	È ÉÍ G	€	€
GÌ	TI€	ÚÝ	Èĺ	Ę	€	€
GJ	TIF	ÚÝ	ÈÍ	Ħ	€	€
H€	TIG	ÚÝ	ÈÍ	ÈÍ	€	€
HF	TIH	ÚÝ	ÈÍ	ÈÍ	€	€
HG	TII	ÚÝ	ÈÍ	ÈÍ	€	€
HH	TIÍ	ÚÝ	ÈÍ	ÈÍ	€	€
Н	ΤΙÎ	ÚÝ ÚÝ	È€HÍ	È€HÍ	€	€
HÍ	ΤΙΪ	ÚÝ	È€HÍ	ÈEHÍ	€	€
HÎ	ΤΙÌ	ÚÝ	È€HÍ	ÈHÍ	€	€
ΗÏ	ΤÌÌ	ÚÝ	<u>E</u> Í J	EÍ J	€	€
HÌ	ΤÌJ	ÚÝ	EÍ J	ÈÍ J	€	€
HJ	TJ€	ÚÝ	È€ÍJ	Ì€Í.J	€	€
I€	TJF	ÚÝ	EÉÍ J	EÍ J	€	€
ΙF	TJG	ÚÝ	È€ÍJ	EÍ J	€	€
ΙG	TJH	ÚÝ	È€ÍJ	È€ÍJ	€	€
ΙH	TJI	ÚÝ	È€Í J	È J	€	€
11	TJÍ	ÚÝ	È€Í J	ΕÍJ	€	€
ΙÍ	TJÎ	ÚÝ	È€Í J	ÈÉÍJ	€	€
ΙÎ	ΤJΪ	ÚÝ	ÈÍJ	Εį́J	€	€
ΙÏ	TJÌ	ÚÝ	È€Í J	EÍ J	€	€
ΙÌ	TJJ	ÚÝ	È€ÍJ	ÈÉÍJ	€	€
١J	T F€€	ÚÝ	È€Í J	È€ÍJ	€	€
Í€	TF€F	ÚÝ	È€Í J	ÈÉÍJ	€	€
ĺF	T F€G	ÚÝ	EÍ J	EÍ J EÍ J	€	€

A Ya VYf 8]g/f]Vi hYX @ UXg f6 @ - . . K = B8 @ 58 fG9 F J = 7 9 L G= 8 9 L

	T^{ à^¦ÆSæà^	Öā^&cā[}	ÙœacÁTæt}ãcå^Žjà-Baje££	160}åÁTæ≛}ãc°å^ŽjàE3j£⊞	ÙcæloÁŠ[&æa¶[}ŽājÉÃá	Ò}åÆŠ[&æsa[}ŽājÆŠá
F	TF	ÚΫ	ÈEΙΗ	ÈΗ	€	€
G	TG	ÚΫ	ÈEΙΗ	ÈΗ	€	€
Н	TH	ÚŸ	ÈΕΙΗ	È∃H	€	€
1	TI	ÚΫ	ÈΗ	ÈΗ	€	€
ĺĺ	Τĺ	ÚŸ	ÈΕΙΗ	ÈΗ	€	€
Î	ΤÎ	ÚΫ	ÈΗ	ÈΗ	€	€
Ï	ΤÏ	ÚΫ	ÈΗ	ÈΗ	€	€
Ì	ΤÌ	ÚΫ	ÈΕΙΗ	ÈΗ	€	€
J	TJ	ÚΫ	ÈΕΙΗ	ÈΗ	€	€
F€	TF€	ÚΫ	ÈΕΙΗ	È∃H	€	€
FF	T FF	ÚŸ	ÈΕΙΗ	ÈΗ	€	€
FG	T FG	ÚΫ	ÈΕΙΗ	ÈΗ	€	€
FH	T FJ	ÚŸ	ÈÎ	ÈÎ	€	€
FI	TG€	ÚΫ	ÈÎ	È	€	€
FÍ	TGF	ÚΫ	ÈÉÎ	ÈÎ	€	€
FÎ	TŒ	ÚΫ	ÈÎ	È	€	€
FΪ	T GH	ÚŸ	ÈÊÎ	ÈÎ	€	€
FÌ	TG	ÚΫ	ÈÎ	ÈÎ	€	€
FJ	ΤĠ	ÚŸ	ÈÎ	EÎ	€	€
G€	ΤĠ	ÚΫ	ÈÎ	ÈÎ	€	€
GF	ΤĠΪ	ÚΫ	ÈÊÎ	ÈÎ	€	€

A Ya VYf 8]glf]Vi hYX @ UXg f6 @ - . K = B8 @ 58 fG9 F J = 7 9 L G= 8 9 L f7 c bhjbi YXL

	T^{à^¦ÁŠæà^	Öã^&cã[}	ÙœaboÁTæt*}ããå^ŽjàÐājÈÈÈ	EÒ}åÁTæ≛}ãc`å^ŽàÐai⊞	ÙcæloÁŠ[&anca∏i}ŽājÉÃá	Ò}å ÁŠÍ&ænaãi}ŽājEÃá
GG	TĠ	ÚΫ	ÈÎ	ÈÎ	€	€ .
GH	TGI	ÚΫ	È	ÈÎ	€	€
G	TH€	ÚΫ	ÈÎ	Ê	€	€
GÍ	THF	ÚΫ	È ÉÍ G	ÈEÍ G	€	€
GÎ	THG	ÚΫ	È ÉÍ G	ÈÉÍ G	€	€
GΪ	THH	ÚΫ	È ÉÍ G	ÈEÍ G	€	€
GÌ	TI€	ÚΫ	ÈÍ	ÈÍ	€	€
GJ	TIF	ÚΫ	ÈÍ	ÈÍ	€	€
H€	TIG	ÚΫ	ÈÍ	ÈÍ	€	€
HF	TIH	ÚΫ	ÈÍ	ÈÍ	€	€
HG	TII	ÚΫ	ÈÍ	ÈÍ	€	€
HH	TIÍ	ÚΫ	ÈÍ	ÈÍ	€	€
Н	TIÎ	ÚΫ	È€HÍ	ÈHÍ	€	€
HÍ	ΤΙΪ	ÚΫ	ÆHÍ	ÈHÍ	€	€
HÎ	TIÌ	ÚΫ	ÆHÍ	ÈH	€	€
ΗÏ	ΤÌÌ	ÚΫ	È €Í J	È€ÍJ	€	€
HÌ	ΤÌJ	ÚΫ	ÈÉÍJ	ÈÍJ	€	€
HJ	TJ€	ÚΫ	ÈÉÍJ	ÈÍJ	€	€
I€	TJF	ÚΫ	ÈÉÍJ	ÈÍJ	€	€
IF	TJG	ÚΫ	ÈÍJ	ÈÉÍJ	€	€
IG	TJH	ÚΫ	ÈÍJ	ÈÉÍJ	€	€
ΙH	TJI	ÚΫ	È€ÍJ	ÈÍJ	€	€
11	TJÍ	ÚŸ	ÈÉÍJ	ÈÍJ	€	€
Ιĺ	TJÎ	ÚΫ	ÈÉÍJ	ÈÍJ	€	€
ΙÎ	ΤJΪ	ÚŸ	ÈÍJ	ÈÍJ	€	€
ΙÏ	TJÌ	ÚΫ	ÈÉÍJ	ÈÍJ	€	€
ΙÌ	TJJ	ŲΫ	È€ÍJ	ÈÍJ	€	€
IJ	T F€€	ÚΫ	È€ÍJ	ÈÍJ	€	€
Í€	T F€F	ÚΫ	ÈÉÍJ	ÈÚJ	€	€
ĺF	TF€G	ÚŸ	ÈÉÍJ	ÈÉÍJ	€	€

A Ya VYf 8]glf]Vi hYX @ UXg f6 @ '% . '6 @ '%HfUbg]Ybh5 f YU @ UXgL

	T^{ à^¦ÆSæà^	Öã^&dã}	ÙœdoÁTæt³}ããå^ŽjàÐðj££	BÒ}åÁTæ≛}ãcčå^ŽpàEnj£⊞	È Ùcæbo 4Š[&ænā[}Žāj£Ãá	Ò}åÆŠ[&æaā[}Žā)ÆÃá
F	T FI	Z	ĦΪÎ	ĦΪÎ	ŒÌÌJ^ËĠ	H€
G	TH	Z	⊞ G	⊞ G	HÈJF	FÍ ÈJÍ H
Н	TI€	Z	⊞€GÎ	iii i	€	FÌĚÎ
1	TI€	Z	iii iii	⊞IF	FÌĚÎ	HÏ ÈFG
ĺĺ	TI€	Z	⊞IF	⊞FÍ	HÏ ÈFG	ÍÍÀÌ
Î	TI€	Z	⊞FÍ	— : · ∰ÏI	ĺĺĤÌ	ΪΙÈΘ
Ï	TI€	Z	ΞÏΪ	⊞G H	ΪΙÈĠ	JŒ
Ì	ΤĺF	Z	⊞ HI	ЩН	ĒIJΙ	HIÈH€Ì
J	ΤÌÍ	Z	ËÈG	⊞ H	ΙÍ	΀
F€	ΤÌÍ	Z	⊞H	ËF	΀	ΪÍ
FF	ΤÌÍ	Z	⊞F	⊞T J	ΪÍ	J€
FG	T FH	Z	Η̈́ÍΗ	Η̈́ÍΗ	€	H€
FH	TFI	Z	ËΉΪΪ	HH Ï	€	H€
FI	ΤHÍ	Z	⊞ G	⊞ G	€	FŒÏÎG
FÍ	TI€	Z	⊞EH	ËÈJÏ	JŒ <u></u>	FŒÎI
FÎ	TI€	Z	ËŒJÏ	⊞ G ⊞JÏ ⊞Í J	FŒÌI	FIÌ ÈÌ
FΪ	TI€	Z	⊞ÍJ	l⊞ĭJÎ	FIÌÈÌ	FÏÎ ÈHG
FÌ	TI€	Z	⊞ĭJÎ	⊞ I €H	FÏÎÈHG	G€IÈÈÎ



A Ya VYf 8]glf]Vi hYX @ UXg f6 @ '% . 6 @ '%Hf Ubg]Ybh5 f YU @ UXgLf7 c bh]bi YXL

	T^{ à^¦ÁŠæà^	Öā^&cā}}	ÙcæloÁTæt}ãciå^ŽàÐa)ÉE	1ÈÒ}åÁTæ≛}ãcčå^ŽjàÐa)Ê⊞È	EÙcælo ÁŠ[&æna[]}ŽājÉÃá	Ò}åÁŠ[&æa£[}ŽājÉÃá
FJ	TI€	Z	⊞HEH	È€Î	G€IÈÎ	GHG
G€	ΤĺF	Z	⊞îí	⊞iGH	Í FÈGÎ J	ÌJĖĠ
GF	ΤĺF	Z	⊞GH	⊞ÌG	ÌJËĞ	FĠ ÈÏ G
GG	ΤÌÎ	Z	ËÈF	ШН	ΙÍ	΀
GH	ΤÌÎ	Z	Ш̈́Н	ĤF	΀	ΪÍ
G	ΤÌΪ	Z	⊞F	⊞i J	ΪÍ	J€
GÍ	T FÏ	Z	ΞĤΪ	HH Ï	FÈI^Ë	GIÈÍ J
Ĝ	T FÌ	Z	ΞÍΗ	ΞÍΗ	FÈÍÍ^Ë	GIÈÍ J
Ğ	ΤΗ	Z	ЩЭНН	ËŒΗ	ÌÈÍG	FHÈÌ I
GÌ	TIF	Z	⊞EH	ΪĽΉ	JŒÎ	FŒÊI
GJ	TIF	Z	<u>⊞</u> JÏ	<u> </u>	FŒÎI	FIÌ ÈÌ
H€	TIF	Z	⊞í J	⊞JÎ	FIÌÈÌ	FÏÎ È G
HF	TIF	 Z	<u> </u>	III l €Í	FÏÎŒG	G€I ÈÎ
HG	TIF	Z	⊞ l €Í	È€Í	G€IÈÎ	GHG
HH	TIJ	Z	⊞ÌG	⊞ GH	€	HÌÈÍG
H	TIJ	Z	⊞ GH	ĦÎ I	HÌÈÍG	ÏÎÈ€H
HÍ	T FÏ	Z	<u> </u>	Ħïï	€	GIÈÍ J
HÎ	THÎ	Z	iii F	⊞G F	OÈ€U	ÏÈIÏ
HÏ	TIF	Z	iii€GÎ	⊞G J	€	FÌ Ě Î
HÌ	TIF	Z	iii J	⊞IH	FÌ Ě Î	HÏĒG
HJ	TIF	Z	<u>⊞</u> IH	⊞FI	HÏĒG	ĺĺĤÌ
I€	TIF	Z	⊞FI	Η̈́ΪΗ	ĺĺĤÌ	ÏIÈG
İF	TIF	Z	ΞÏΗ	EEG H	ÏIÈG	JŒ
IG	TIJ	Z	Ш́НН	Ш̈́НН	JHÌÏÎ	FĞÈ€Ï
ΙΗ	ΤÌΪ	Z Z	ËÈFÏ	⊞ HG	lĺ	î€
11	ΤÌΪ	Z	⊞HG	⊞ FÌ	΀	ΪÍ
ΙÍ	ΤÌΪ	Z Z	<u>⊞</u> FÌ	E i	ΪÍ	J€
l Î	T FÎ	Z	田门	ĦΪΪ	€	GIÈÍ J
ΙΪ	T HÎ	 Z	EEGHH	EEG-IH	ì ÈG	FHÈI F
ΙÌ	TIG	Z	⊞€GÎ	iii j	€	FÌΕ̈́Î
١J	TIG	Z	iii J	ËΙΗ	FÌΒ̈́Î	HÏ ÈG
Í€	TIG	Z	⊞IH	⊞FI	HÏÈFG	ÍÍÀÌ
ĺF	TIG	Z	⊞FI	ËΪH	ÍÍËÌ	ÏIÈG
ÍG	TIG	Z	ΞÏΗ	iii H	ÏIÈG	JŒÎ
ÍΗ	TÍ€	Z	⊞HH	Ш̈́НН	Ε̈́ÎΙ	HĖĠĴ
ÍI	T FÍ	Z	ΞÍΗ	ΞÍΗ	FÈÍÎ^Ë	GIÈÍ J
ÍÍ	T FÎ	Z	H Ï	ĦĤ Ï	ÌÈHŀË	GIÈÍ J
ÍÎ	TH	Z	⊞G F	⊞G F	GEFÍ	ΪĒÍJ
ÍΪ	TIG	Z	⊞EH	ΪΕΊ	JŒÎ	FŒÈI
Ĥ	TIG	Z	⊞JÏ	⊞Í J	FŒÎI	FIÌÈÌ
ÍJ	TIG	Z	⊞Í J	⊞JÎ	FIÌÈÌ	FÏÎ È G
΀	TIG	Z	⊞JÎ	III+ €Í	FÏÎŒG	G€ ÈÎ
ÎF	TIG	Z Z	—————————————————————————————————————	È€Í	G€IÈÎ	GHG
ÎG	TÍ€	Z	<u> </u>	⊞ GH	ÍFÈGÎJ	ÌJĖG
ÎН	TÍ€	Z	⊞GH	⊞ÎÌG	ÌJËĞ	FG ÈÏ G

A Ya VYf 8]glf]Vi hYX @ UXg f6 @ % . 6 @ & Hf Ubg]Ybh5 f YU @ UXgL

	T^{à^¦ÆŠæà^	Öã^&cã[}	ÙcæboÁTæt³}ãc°å^ŽjàÐã)ÉÉÉ	HÖ}åÁTæ≛}ãc`å^Ž(àHā)£HH	ÙcæboÁŠ[&æna[}ŽājÉÃá	Ò}åÆj&ænaj}žājÆjá
F	ΤFI	Z	⊞G	⊞G	GÈÌJ^ËFG	H€
O	TH	Z	⊞EGÌ	⊞EGÌ	HÈJF	FÍ ÈÍ H
Τ	TI€	Z	ËEG	⊞GHF	€	FÌĚÎ



A Ya VYf 8]g/f]Vi hYX @ UXg f6 @ % . 6 @ & Hf Ubg]Ybh5 f YU @ UXgŁf7 c bh]bi YXŁ

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GÌ TIF Z HÌIH HÌIÌ JƠI FŒÎI FŒÎI GJ TIF Z HÏIÌ HŒI FŒI FIÌ LÀI FUÌ LÀI H€ TIF Z HŒI HÏ HŒI FIÌ LÀIG FIÌ LÀIG HF TIF Z HÄHÎ HŒI FIÌ LÀIG GŒI LÀI	
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A Ya VYf 8]glf]Vi hYX @ UXg f6 @ '% . 6 @ & Hf Ubg]Ybh5 f YU @ UXgLf7 c bh]bi YXL

	T^{ à^¦ÆSæà^	Öã^&cã[}	ÙcæboÁTæ*}ããå^ŽjàÐãjÉÉÉ	HÖ}åÁTæ≛}ãc`å^Ž(àB) ⊞⊞	ËÙcæbo4Š[&æna[}Žāj£Ãá	Ò}åÆq[&ænaaaaaaa]}ŽājÆa
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ĺÌ	TIG	Z	iii ì	⊞HG	FŒÈl	FIÌÈÌ
ĺJ	TIG	Z	⊞G	⊞HÏ	FIÌÈÌ	FÏÎ È HG
΀	TIG	Z	ЩНÏ	⊞G Í	FÏÎ ÈHG	G€IÈÎ
ÎF	TIG	Z	iii í	È€Í	G€IÈÎ	GHG
ÎG	TÍ€	Z	i i	⊞ĤF	ÍFÈĠJ	ÌJËĞ
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A Ya VYf 8]glf]Vi hYX @ UXg f6 @ '% . 6 @ '+ Hf Ubg]Ybh5 f YU @ UXgL

	T^{à^¦AŠæà^	Öã^&cã;}	ÙcæboÁTæ*}ããå^ŽjàÐã)ĤÈ	BÉÒ}åÁTæ≛}ãčå^Ž(àBĐ)£EÉ	ÈÙcæboÁŠ[&ænā[}ŽājÉÃá	Ò}åÆŠ[&ænaã[}Žā)EÃá
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Î	TI€	Z	ËÈ€G	ËHÈĞ	ÍÍËÌ	ΪΪ́Ð
Ϊ	TI€	Z	ËHÈĞ	ËĖĠ	ΪΙÈG	JŒ <u></u>
ì	ΤÍF	Z	ËÈG	ËĖG	ËIJΙ	HIÈH€Ì
J	TÌÍ	Z	ËÈÏF	ĔĚÎ	ΙÍ	΀
F€	TÌÍ	Z	ĔĚÎ	ËŒH	΀	Ϊĺ
FF	TÌÍ	Z	ËŒH	⊞JÍ	ΪÍ	J€
FG	T FH	Z	ĔĒÌÏ	ĔĒÌÏ	€	H€
FH	T FI	Z	ËGIĚFG	ËGËFG	€	H€
FI	ΤHÍ	Z	ËΠÎ	ËΠÎ	€	FŒÏÎG
FÍ	TI€	Z	ËEGF	ËÈF	JŒ <u></u>	FŒÈl
FÎ	TI€	Z	ËÈF	ËGÈUI	FŒÈI	FIÌÈÌ
FΪ	TI€	Z	ËŒUI	ËHÈÏH	FIÌÈÌ	fîî è g
FÌ	TI€	Z	ËHÈÏH	ËGÈ€FÌ	FÏ Î È HG	G€IÈFÎ
FJ	TI€	Z	ËGÈ€FÌ	È	G€IÈFÎ	GHG
G€	ΤĺϜ	Z	ËÈJÏ	ËGÈ GH	ÍFÈĠJ	ÌJËĞ
GF	ΤĺF	Z	ËGIÈ GH	ËĚIJ	ÌJËG	FĠÌĒÏG
GG	ΤÌÎ	Z	ËÈÏF	ĔĚÎ	ΙÍ	΀
GH	TÌÎ	Z	ĔĚÎ	ËŒH	΀	Ϊĺ
G	ΤÌÎ	Z	ËŒH	⊞JÍ	ΪÍ	J€
GÍ	T FÏ	Z	ËGĚ FG	ËGĚ FG	FÈI^Ë	GIÈIÍ J
GÎ	T FÌ	Z	Η̈́ĒÌJ	Η̈́ĒÌJ	FÈÍÍ^Ë	GÈÍ J
GÏ	ΤHÍ	Z	ËĚÍÎ	ËĚÍÎ	ÌÈÍG	FHÈÌÌ I
GÌ	TIF	Z	ËÈFÌ	ËÈFÍ	JŒĬ	FŒÈl
GJ	TIF	Z	ËÈFÍ	ËŒÙÚ	FŒÈI	FIÌÈÌ
H€	TIF	Z	ËŒÙÚ	ÏĠĦ	FLÌÈÌ	FÏÎ ÈG
HF	TIF	Z	ËĖ	ËÇÆH	FÏ Î ÈHG	G€IÈÈÎ
HG	TIF	Z	ËGÈ€HH	ÈEHÎ	G€IÈÎ	GHG
HH	TIJ	Z	ËĚIÍ	ËĐÈG	€	ΗÌÈÍG
H	TIJ	Z	ËĐÈ G	ËÈJÍ	HÌÈÍG	ΪÎÈJ€H
HÍ	T FÏ	Z	ËHÈÏJ	ËHÈÏJ	€	GJÈIÍ J
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A Ya VYf 8]gff]Vi hYX @ UXg f6 @ '% . 6 @ '+ Hf Ubg]Ybh5 f YU @ UXgL f7 c bh]bi YXL

	T^{ à^¦ÁŠæà^	Öã^&cã[}	Ùca÷cÁTae*}ãr°å∧ŽàÐAAHH	EÒ}åÁTæ≛}ãc°å^ŽàÐa)ÉEÈ	: Lìcado (ŠT. ∧ T.) Žā (ŠŠ. á	Ò}åÆŠ[&ææā[}Žā)ÆÃá
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ΙH	ΤÌΪ	Z	ËJÈTÏ	ĔĚlÎ	ΙÍ	΀
11	ΤÌΪ	Z	ĔĚIÎ	ËŒĴ	΀	ΪÍ
ΙÍ	ΤÌΪ	Z	ËŒJ	萨萨 Ï ì	ΪÍ	J€
ΙÎ	T FÎ	Z	ËÆÏJ	ËHÈÏJ	€	GĖÍ J
ΙÏ	ΤHÎ	Z	ËĚÍI	ËĚÍI	DÉ (É	FHÈI F
ΙÌ	TIG	Z	⊞ i ï I	ËĒĞ	€ FÌ Ě Î	FÌĚÎ
IJ	TIG	Z	ËËĞ	ËGÈÍH	FÌ <u>Ĕ</u> Î	HÏ ÈG
Í€	TIG	Z	ËGÐÍH	ËÆJÎ	HÏ È G	ĺĺĤÌ
ĺF	TIG	Z	ËEĴ	ËHÈGH	ĺĺĤÌÌ	ΪΙÈĠ
ÍG	TIG	Z	ËHÈGH	ËÈG	ΪΙΈΘ	JŒÎ
ĺΗ	TÍ€	Z	Ë ÈGH	ËÈGH	ĔÎΙ	HEGIÎ
ÍI	T Fĺ	Z	Η̈́Ε̈́ÌJ	Ε̈́Ε̈́ÌJ	FÈÉÍÎ^ÉÎ	GIÈÍ J
ÍÍ	T FÎ	Z	ËGË FG	ËGËFG	ÌÈHMË	GIÈÍ J
ÍÎ	TH	Z	ËÈË€Ï	ËÌ€Ï	GÈEFÍ	ΪŒĺ́J
ÍΪ	TIG	Z	ËEFÌ	ËĦ	JŒ <u></u>	FŒÌI
ÍÌ	TIG	Z	ËÈFÍ	ËŒĻUÍ	FŒĒI	FIÌÈÌ
ĺJ	TIG	Z	ËŒŪ	ËĄĎÏ	FIÌÈÌ	FÏÎÈ G
΀	TIG	Z	ÏĠĦ	ËĢÈEH	FÏ Î È G	G€IÈÎ
ÎF	TĮG	Z	ËGÆH	ÈEHÎ	Ģ€ĮĖŤÎ	СHG
ÎG	TÍ€	Z	ËEJÍ	ËĐÈĢ	Í FĚĠ J	ÌJĖĞ
ÎΗ	TÍ€	Z	ˌ G	ËĚIÍ	ÌJËĞ	FĠ ÈÏ G

A Ya VYf 5 f YU @: UXg f6 @7 % 8958 @C58Ł

	F(ã) cÁCE	R[ãj α⁄Ó	R[ãjoÁÔ	R[ãj αÁÖ	Öã^&cã[}	Öãrdãač ca[a]}	Tæ*}ããå^Žj∙⊸á
F	ÞF€H	ÞÌÌ	ÞJH	ÞJÏ	Z	V,[ÁYæî	Ĥ
G	ÞJH	ÞJÏ	ÞF€l	ÞÌJ	Z	V, [ÁYæî	Ë
Н	ÞF€l	ÞÌJ	ÞJI	ÞF€€	Z	V. [Á/æî	Ĥ
1	ÞF€€	ÞJI	ÞJ€	ÞF€Í	Z	V, [ÁYæî	Ë
ĺ	ÞF€Í	ÞJ€	ÞJG	ÞF€F	Z	V, [Á/æî	Ĥ
Î	ÞJG	þÌÌ	ÞF€H	ÞF€F	Z	V Í ÁÝ æ	É

A Ya VYf 5f YU @ UXg f6 @ &. 8958 @ 58 ff 94L

	R[ãjoÁŒ	R[ãjoÁÓ	RjãoÁÔ	R[ãjoÁÖ	Öã^&cã[}	Öãidãa ĭca[i}	Tæ*}ãc°å^Žj∙~á
F	ÞF€H	ÞÌÌ	ÞJH	ÞJÏ	Z	V,[ÁYæî	ĔĖF
G	ÞJH	ÞJÏ	ÞF€l	ÞÌJ	Z	V, [ÁYæî	ĔÈF
Н	ÞF€l	ÞÌJ	ÞJI	ÞF€€	Z	V, [ÁYæî	ĔĖF
	ÞF€€	ÞJI	ÞJ€	ÞF€Í	Z	V, [ÁYæî	ĔĖF
ĺ	ÞF€Í	ÞJ€	ÞJG	ÞF€F	Z	V, [ÁYæî	ĔÈF
Î	ÞJG	ÞÌÌ	ÞF€H	ÞF€F	Z	V, [ÁYæî	ĔĖF

A Ya VYf 5 f YU @: UXg 'f6 @ '+'. '@ 9 ' @ 58 'fA 5 BLL

	R[ã]cÁCE	R[ã] cÁÓ	R[ã] cÁÔ	RĮ ãj cÁÖ	Öā^&cā[}	Öãrdaão ca[a}	Tæ*}ããå^Žj∙⊸á
F	ÞF€H	þÌÌ	ÞJH	ÞJÏ	Z	V, [ÁYæî	Ë€
G	ÞJH	ÞJÏ	ÞF€l	ÞÌJ	Z	V,[ÁYæî	Ë€
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ĺ	ÞF€Í	ÞJ€	ÞJG	ÞF€F	Z	V, [Á/æî	Ë€

A Ya VYf 5f YU @ UXg f6 @ +. @ 9 @ 58 fA 5 BŁŁ f7 c bhjbi YXŁ

	RĮ ãj cÁŒ	R[ã]oÁÓ	R[ãjơÔ	R[ãjoÁÖ	Öã^&cã[}	Öãrdaão ca[}	Tæ*}ãc°å^Žj∙~á
Î	ÞJG	ÞÌÌ	ÞF€H	ÞF€F	Z	V, [ÁYæî	Ë€

9bj YcdY>c]bhFYUMjcbg

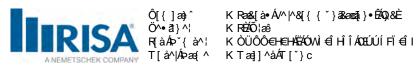
	R[ã]c		ŠÔ ŸÆjāá	ŠÔ	ZÆjaá		ΤΎΑξα̈́àËαjá	ŠÔ	ΤΫΑϔαΕΑja	ŠÔ	TZÁŽàË)já	ŠÔ
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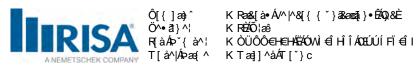


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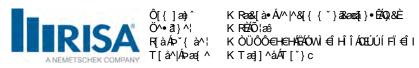


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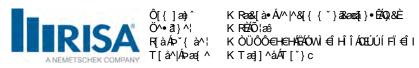
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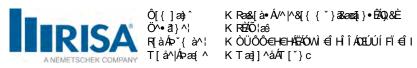
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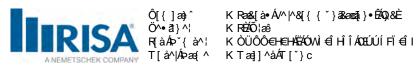
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APPENDIX D ADDITIONAL CALCUATIONS



CONNECTION CHECK ANTENNA MOUNTING SYSTEM ANSI/TIA-222-H

Type	Δ
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туре А			
Connection Type	Single Bolt or	Threaded	d Part
May Vertical V	44/7	—	
Max Vertical, V _{us}	4467	lb lb	
Max Normal	7124	lb	
Max Tangential Max Vertical Moment, T _{ur}	4525	lb k-ft	(ubolt)
	/250		(uboit)
V _{ub}	6358	_lb	
T _{ub}	7124	lb	
Bolt Size, d	0.5	lin	
No. of Bolts	4		
Bolt Grade	A325		
Bolt Spacing, L _b	6	in	
Threads in Shear Plane	Yes		
Clear Distance, L _c		in	(ubolt)
Thickness of Connected Part, t		in	(ubolt)
Tensile of Connected Part, F _u		ksi	(ubolt)
Diameter of Suport Member, D		in	(ubolt)
Slotted Holes			(ubolt)
		_	
n	13	per inc	ch
F _{ub}	120	ksi	
Pretension, T _p	4	kip	
ϕR_{nt}	13	kip	
φR _{nv}	9	kip	
ϕR_n	0	kip	
φR _{ns}	0	kip	
φR _{nr}	0	kip	
Total ¢ R _{nt}	51083	lb.	
Total ¢ R _{nv}	35343	lb	
Total φ R _n	0	lb	
Total φ R _{ns}	876	lb	
Total ф R _{nr}	0	lb	
Equations			
φ =	0.75		
$A_n = \pi/4(d - 0.9382/n)^2$	0.142	in ²	
R _b =	1		
$A_b = \pi d^2/4$	0.196	in ²	
$R_{nt} = F_{ub}A_n$	17.028	kip	
$R_{nv} = 0.625R_bF_{ub}A_b$	11.781	kip	
$\Phi = \frac{11100 - 0.0201001000100}{1000000000000000000000000$	0.8	КIР	
$R_n = 1.2(L_c + d/4)tF_u \le 2.4dtF_u$	N/A	kip	
$R_n = 1.0L_c tF_u \le 2.0 dtF_u$	N/A	kip	
$\phi_u = 1.0L_c H_u \le 2.00 H_u$	1.0	κiρ	
$R_{ns} = 0.30(2T_p - T_{ut}) \ge 0$	0.219	kip	
$R_{nr} = 0.50(2T_p T_{ut}) \ge 0$ $R_{nr} = 0.5(DR_{ns})$	0.000	•	
N _{nr} - 0.3(DN _{ns})	0.000	kip	

Combined Shear and Tension	0.052	5.2%
Shear	0.180	18.0%
Tension	0.139	13.9%
Bearing	0.000	0.0%
Torsion Transfer	0.000	0.0%
		18.0%

Project Number:	ERCC0303
Site Name:	BU806366 APP517064
Engineer:	J. Gray
Date:	5/29/2020
Carrier:	AT&T Mobility
Reviewed By:	B. Bartlett

Input Data

Type E	
--------	--

туре в				
Connection Type	Single Bolt or	Threadec	l Part	
May Ventical V	44/7	—		
Max Vertical, V _{us}	4467	lb		
Max Normal	7124	lb lb		
Max Tangential Max Vertical Moment, T _{ur}	4525	lb k-ft	(ubolt)	
	(250		(uboit)	
V _{ub}	6358	_lb		
T _{ub}	7124	lb		
Bolt Size, d	0.625	lin		
No. of Bolts	4			
Bolt Grade	A325			
Bolt Spacing, L _b	6	in		
Threads in Shear Plane	Yes			
Clear Distance, L _c		in	(ubolt)	
Thickness of Connected Part, t		in	(ubolt)	
Tensile of Connected Part, F _u		ksi	(ubolt)	
Diameter of Suport Member, D		in	(ubolt)	
Slotted Holes			(ubolt)	
			(
n	11	per inc	h	
F _{ub}	120	ksi		
Pretension, T _p	6	kip		
φR _{nt}	20	kip		
φR _{nv}	14	kip		
φR _n	0	kip		
φR _{ns}	2	kip		
φR _{nr}	0	kip		
Total ф R _{nt}	81361	lb		
Total φ R _{nv}	55223	lb		
Total ¢ R _n	0	lb		
Total ΦR_{ns}	6177	lb		
Total ¢ R _{nr}	0	-lb		
• 111				
Equations				
Φ =	0.75			
$A_n = \pi/4(d - 0.9382/n)^2$	0.226	in ²		
R _b =	1			
$A_b = \pi d^2/4$	0.307	in ²		
$R_{nt} = F_{ub}A_n$	27.120			
		kip kip		
$R_{nv} = 0.625R_bF_{ub}A_b$	18.408	kip		
$\phi = R_n = 1.2(L_c + d/4)tF_u \le 2.4dtF_u$	0.8	kin		
	N/A	kip		
$R_n = 1.0L_c tF_u \le 2.0dtF_u$	N/A	kip		
φ _u =	1.0	1.0		
$R_{ns} = 0.30(2T_p - T_{ut}) \ge 0$	1.544	kip		
$R_{nr} = 0.5(DR_{ns})$	0.000	kip		

Combined Shear and Tension	0.021	2.1%
Shear	0.115	11.5%
Tension	0.088	8.8%
Bearing	0.000	0.0%
Torsion Transfer	0.000	0.0%
		11.5%

Exhibit F

Power Density/RF Emissions Report

RF Engineering & Consultant Services

Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CTL01073

Project Type: AT&T LTE 5C

Crown Marlborough_North Main Street
73 North Main Street
Marlborough, CT 06447

July 7, 2020

Fullerton Project Number: 2020.0182.002

Site Compliance Summary				
Compliance Status:	COMPLIANT			
Site total MPE% of FCC general population allowable limit:	23.85 %			

RF Engineering & Consultant Services

July 7, 2020

Crown Castle on Behalf of AT&T Attn: Anne Marie Zsamba, Site Acquisition Specialist 3 Corporate Park Drive, Suite 101 Clifton Park, NY 12065

Emissions Analysis for Site: CTL01073 - Crown Marlborough North Main Street

Fullerton Engineering Consultants, LLC ("Fullerton") was directed to analyze the proposed upgrades to the AT&T facility located at 73 North Main Street, Marlborough, CT, 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 (µW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter (µW/cm²). The general population exposure limits for the 700 MHz band is approximately 467 μW/cm² respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is 1000 μW/cm². 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.

RF Engineering & Consultant Services

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.

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CALCULATIONS

Calculations were performed for the proposed upgrades to the AT&T antenna facility located at **73 North Main Street, Marlborough, CT**, 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 manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
LTE	1900 MHz (PCS)	4	40
LTE	700 MHz (Band 14)	4	40
LTE	1900 MHz (PCS)	4	40
LTE	700 MHz	4	40
LTE	2300 MHz (WCS)	4	25

Table 1: Channel Data Table

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The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 MHz, 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, 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.

			Antenna
	Antenna		Centerline
Sector	Number	Antenna Make / Model	(ft)
A	1	Powerwave 7770	144
A	2	CCI HPA65R-BU6A	144
A	3	CCI OPA65R-BU6D	144
В	1	Powerwave 7770	144
В	2	CCI HPA65R-BU6A	144
В	3	CCI OPA65R-BU6D	144
С	1	Powerwave 7770	144
С	2	CCI HPA65R-BU6A	144
С	3	CCI OPA65R-BU6D	144

Table 2: Antenna Data

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

Cable losses were factored in the calculations for this site. For each 700 MHz Remote Radio Unit (RRU) there was 0.18 dB of cable loss calculated into the system gains / losses for this site. For each 1900 MHz (PCS) Remote Radio Unit (RRU) there was 0.32 dB of cable loss calculated into the system gains / losses for this site. For each 2100 MHz (AWS) Remote Radio Unit (RRU) there was 0.34 dB of cable loss calculated into the system gains / losses for this site. For each 2300 MHz (WCS) Remote Radio Unit (RRU) there was 0.35 dB of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for 10 feet of 1/2" coax.

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RESULTS

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

					Total TX		
	Antenna Make /		Antenna Gain		Power		
Antenna ID	Model	Frequency Bands	(dBd)	Channel Count	(W)	ERP (W)	MPE %
	Powerwave						
Antenna A1	7770	1900 MHz (PCS)	13.4	4	160	3,251.77	0.61
	CCI	700 MHz / 2100 MHz					
Antenna A2	HPA65R-BU6A	(AWS)	12.45 / 16.55	8	320	9,383.77	2.35
	CCI	700 MHz / 2300 MHz					
Antenna A3	OPA65R-BU6D	(WCS)	12.15 / 15.95	8	260	6,149.15	1.71
				\$	Sector A Com	posite MPE%	4.67
	Powerwave						
Antenna B1	7770	1900 MHz (PCS)	13.4	4	160	3,251.77	0.61
	CCI	700 MHz / 2100 MHz					
Antenna B2	HPA65R-BU6A	(AWS)	12.45 / 16.55	8	320	9,383.77	2.35
	CCI	700 MHz / 2300 MHz					
Antenna B3	OPA65R-BU6D	(WCS)	12.15 / 15.95	8	260	6,149.15	1.71
				;	Sector B Com	posite MPE%	4.67
	Powerwave						
Antenna C1	7770	1900 MHz (PCS)	13.4	4	160	3,251.77	0.61
	CCI	700 MHz / 2100 MHz					
Antenna C2	HPA65R-BU6A	(AWS)	12.45 / 16.55	8	320	9,383.77	2.35
	CCI	700 MHz / 2300 MHz					
Antenna C3	OPA65R-BU6D	(WCS)	12.15 / 15.95	8	260	6,149.15	1.71
				1	Sector C Com	posite MPE%	4.67

Table 3: AT&T Emissions Levels

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The following table (*Table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum AT&T MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each AT&T Sector as well as the composite MPE value for the site.

Site Composite MPE%				
Carrier	MPE%			
AT&T – Max Per Sector Value	4.67 %			
MetroPCS	0.41 %			
Verizon Wireless	3.59 %			
T-Mobile	5.56 %			
Town	6.03 %			
Sprint	3.59 %			
Site Total MPE %:	23.85 %			

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	4.67 %
AT&T Sector B Total:	4.67 %
AT&T Sector C Total:	4.67 %
Site Total:	23.85 %

Table 5: Site MPE Summary

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FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

AT&T _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
AT&T 1900 MHz (PCS) LTE	4	812.94	144	6.14	1900 MHz (PCS)	1000	0.61%
AT&T 700 MHz LTE	4	674.62	144	5.09	700 MHz	467	1.09%
AT&T 2100 MHz (AWS) LTE	4	1,671.32	144	12.62	2100 MHz (AWS)	1000	1.26%
AT&T 700 MHz LTE	4	629.59	144	4.75	700 MHz	467	1.02%
AT&T 2300 MHz (WCS) LTE	4	907.70	144	6.85	2300 MHz (WCS)	1000	0.69%
						Total:	4.67%

Table 6: AT&T Maximum Sector MPE Power Values

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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:	4.67 %
Sector B:	4.67 %
Sector C:	4.67 %
AT&T Maximum Total (per sector):	4.67 %
Site Total:	23.85 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is 23.85 % 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.

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