



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

January 25, 2021

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

RE: **Notice of Exempt Modification for T-Mobile:
845993 - T-Mobile Site ID: CTHA509A
12 Nepaug Road, Burlington, CT 06013
Latitude: 41° 46' 56.86" / Longitude: -72° 59' 22.68"**

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 88-foot mount on the existing 120-foot Monopole Tower, located at 12 Nepaug Road, Burlington, CT. The tower is owned by Crown Castle and the property is owned by Regional School District #10. T-Mobile now intends to replace six (6) existing antennas with three (3) new 1900/2100 MHz antennas and three (3) new 600/700 MHz antennas. The new antennas will be installed at the 88-ft level of the tower. Some of the proposed antennas will be capable of providing 5G services. T-Mobile is also proposing tower mount modification as shown on the enclosed Mount Analysis.

Planned Modifications:

Tower:

Remove and Replace:

(3) LNX 6515DS-A1M Antenna (**REMOVE**) - (3) RFS-APXVAARR24_43-U-NA20 Antenna 600/700 MHz (**REPLACE**)

(3) AIR21 KRC118023-1_B2P_B4A Antenna (**REMOVE**) – (3) AIR32_B66A_B2A Antenna 1900/2100 MHz (**REPLACE**)

Install New:

(1) 1 5/8" Hybrid Fiber Line

(3) Radio 4449 B71/B12

Existing to Remain:

(3) AIR21 KRC118023-1_B2P_B4A Antenna 1900/2100 MHz

Ground:

Replace existing ground cabinet.

Upgrade to existing ground cabinet. (Internally)

Upgrade existing breakers.

The facility was approved by the Connecticut Siting Council on February 18, 2004 in Docket No. 268. The decision limited the height of the structure to 120'. No extension is proposed as part of this exempt modification and therefore this modification complies with the aforementioned approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Theodore Shafer, First Selectman for the Town of Burlington, Jerry Burns, Zoning Enforcement Officer, Crown Castle as the tower owner, and Regional School District #10, the property owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: 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

cc:

Theodore Shafer, First Selectman
Town of Burlington
Office of the First Selectman

Melanie A. Bachman

Page 3

200 Spielman Highway
Burlington, CT 06013
860-673-6789

Jerry Burns, Zoning Enforcement Officer
Town of Burlington
Zoning Office
200 Spielman Highway
Burlington, CT 06013
860-673-6789

Regional School District #10, Property Owner
24 Lyon Road
Burlington, CT 06013

Crown Castle, Tower Owner

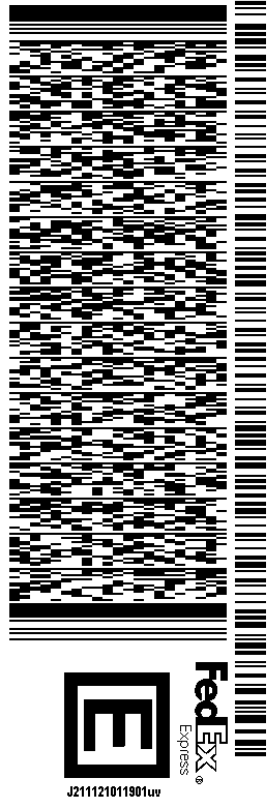
ORIGIN ID: SCHA (201) 236-9224
ANNE MARIE ZSAMBRA
CROWN CASTLE
21 HEATHER DRIVE
GANSEVOORT, NY 12831
UNITED STATES US

SHIP DATE: 25 JAN 21
ACTWGT: 0.50 LB
CAD: 104924194INNET4340

BILL SENDER

TO **FIRST SELECTMAN SHAFER**
TOWN OF BURLINGTON
OFFICE OF THE FIRST SELECTMAN
200 SPIELMAN HWY
BURLINGTON CT 06013
(860) 673-6789 REF: 1734.7890
INV: DEPT:
PO:

56DJ11136/FE4A



TRK# 7727 1664 7402
0201
TUE - 26 JAN 10:30A
PRIORITY OVERNIGHT



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 Service Guide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

ORIGIN ID: SCHA (201) 236-9224
ANNE MARIE ZSAMBRA
CROWN CASTLE
21 HEATHER DRIVE
GANSEVOORT, NY 12831
UNITED STATES US

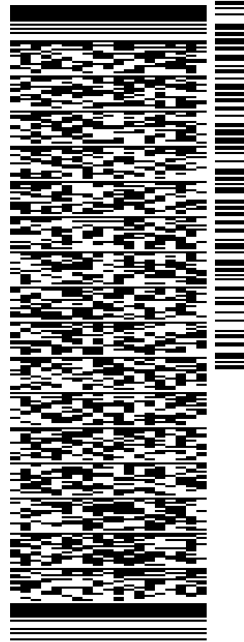
SHIP DATE: 25 JAN 21
ACTWGT: 0.50 LB
CAD: 104924194IN/ET4340
BILL SENDER

TO REGIONAL SCHOOL DISTRICT #10

24 LYON ROAD

BURLINGTON CT 06013

(201) 236-9224 REF: 1734.7890
INV: DEPT:
PO:



J211121011901uv

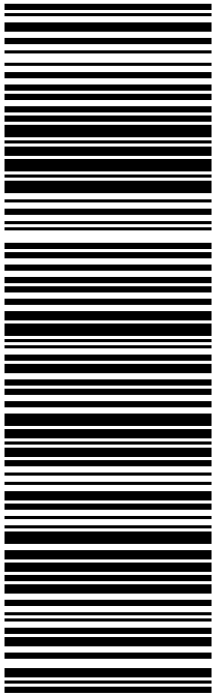
56DJ11136/FE4A

TRK# 7727 1681 4829
0201

TUE - 26 JAN 10:30A
PRIORITY OVERNIGHT

EB HFDA

06013
CT-US BDL



After printing this label:

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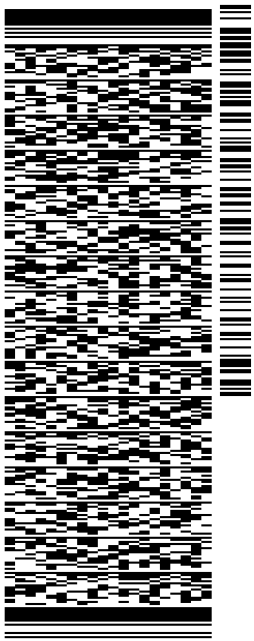
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CROWN CASTLE
21 HEATHER DRIVE
GANSEVOORT, NY 12831
UNITED STATES US

SHIP DATE: 25 JAN 21
ACTWGT: 0.50 LB
CAD: 104924194IN/ET4340

BILL SENDER

TO **JERRY BURNS, ZEO**
TOWN OF BURLINGTON
ZONING OFFICE
200 SPIELMAN HWY
BURLINGTON CT 06013
(860) 673-6789 REF: 1734.7890
INV:
PO: DEPT:

56DJ11136/FE4A



J211121011901uv

TRK# 7727 1667 1863
0201
TUE - 26 JAN 10:30A
PRIORITY OVERNIGHT

EB HFDA
06013
CT-US BDL

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Exhibit A

Original Facility Approval

DOCKET NO. 268 - AT&T Wireless PCS, LLC d/b/a AT&T Wireless application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a wireless telecommunications facility located near Lyon and Nepaug Roads in Burlington, Connecticut.	} } } }	Connecticut Siting Council February 18, 2004
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**Decision and Order:
Burlington Site CT-828**

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the proposed site, located at the intersection of Lyon and Nepaug Roads, Burlington, Connecticut.

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

1. The tower shall be constructed no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of AT&T Wireless and other entities, both public and private, but such tower shall not exceed a height of 120 feet above ground level.
2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include:
 - a) a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment building, access road, utility line, and landscaping; and
 - b) construction plans for site clearing, water drainage, and erosion and sedimentation control consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.
3. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case modeling of electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of electromagnetic radio frequency power density is submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

4. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.
5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
6. The Certificate Holder shall provide reasonable space on the tower for no compensation for any municipal antennas, provided such antennas are compatible with the structural integrity of the tower.
7. If the facility does not initially provide wireless services within one year of completion of construction or ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.
8. Any antenna that becomes obsolete and ceases to function shall be removed within 60 days after such antennas become obsolete and cease to function.
9. Unless otherwise approved by the Council, this Decision and Order shall be void if the facility authorized herein is not operational within one year of the effective date of this Decision and Order or within one year after all appeals to this Decision and Order have been resolved.

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.

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

AT&T Wireless PCS, LLC
d/b/a AT&T Wireless

Intervenor

Sprint Spectrum, L.P.
d/b/a Sprint PCS

Its Representative

Christopher B. Fisher, Esq.
Cuddy & Feder LLP
90 Maple Avenue
White Plains, New York 10601

Its Representative

Thomas J. Regan, Esq.
Brown Rudnick Berlack Israels
CityPlace 1
185 Asylum Street
Hartford, CT 06103

Exhibit B

Property Card

12 NEPAUG RD

Location 12 NEPAUG RD

Mblu 5/11 / 17/A /

Acct# 30303110

Owner REGIONAL SCHOOL DISTRICT #10

PBN

Assessment \$94,850

Appraisal \$135,500

PID 2391

Building Count 1

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2018	\$0	\$135,500	\$135,500

Assessment			
Valuation Year	Improvements	Land	Total
2018	\$0	\$94,850	\$94,850

Owner of Record

Owner REGIONAL SCHOOL DISTRICT #10
Co-Owner
Address 24 LYON ROAD
BURLINGTON, CT 06013

Sale Price \$0
Certificate
Book & Page 0360/0463
Sale Date 09/11/2019

Ownership History

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
REGIONAL SCHOOL DISTRICT #10	\$0		0360/0463	09/11/2019
WEAVER AUDREY S TR AND HERBERT F EST OF	\$0		0345/0798	11/10/2016
WEAVER AUDREY S TR AND HERBERT F EST OF	\$0		0345/0797	11/10/2016
WEAVER TRUSTEE AUDREY S OF THE AUDREY S	\$0		0280/0489	08/07/2008
WEAVER AUDREY S AND	\$0		0274/0105	10/22/2007

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: \$0
Building Percent Good:
Replacement Cost
Less Depreciation: \$0

Building Attributes	
Field	Description
Style	Vacant Land
Model	
Grade:	
Stories:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Num Kitchens	
Cndtn	
Usrflid 103	
Usrflid 104	
Usrflid 105	
Usrflid 106	
Usrflid 107	
Num Park	
Fireplaces	

Building Photo



(<http://images.vgsi.com/photos/BurlingtonCTPhotos//00\00\93\56.jpg>)

Building Layout

(ParcelSketch.ashx?pid=2391&bid=2353)

Building Sub-Areas (sq ft)	<u>Legend</u>
No Data for Building Sub-Areas	

Usrflid 108	
Usrflid 101	
Usrflid 102	
Usrflid 100	
Usrflid 300	
Usrflid 301	

Extra Features

Extra Features	<u>Legend</u>
No Data for Extra Features	

Land

Land Use

Use Code 9030
Description Municipal Mdl-00
Zone R44
Neighborhood 3000
Alt Land Appr No
Category

Land Line Valuation

Size (Acres) 6.94
Frontage
Depth
Assessed Value \$94,850
Appraised Value \$135,500

Outbuildings

Outbuildings	<u>Legend</u>
No Data for Outbuildings	

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2019	\$0	\$135,500	\$135,500
2018	\$0	\$125,600	\$125,600
2017	\$0	\$269,100	\$269,100

Assessment			
Valuation Year	Improvements	Land	Total
2019	\$0	\$94,850	\$94,850
2018	\$0	\$87,920	\$87,920
2017	\$0	\$188,370	\$188,370

Exhibit C

Construction Drawings

T-Mobile

T-MOBILE SITE NAME:
AT&T BURLINGTON MONOPOLE

T-MOBILE SITE NUMBER:
CTHA509A

CROWN BU: 845993 / APP#: 482076
67D95ADB V3 CONFIGURATION

12 NEPAUG ROAD
BURLINGTON, CT 06013
EXISTING 119'-6" MONOPOLE



PROJECT SUMMARY

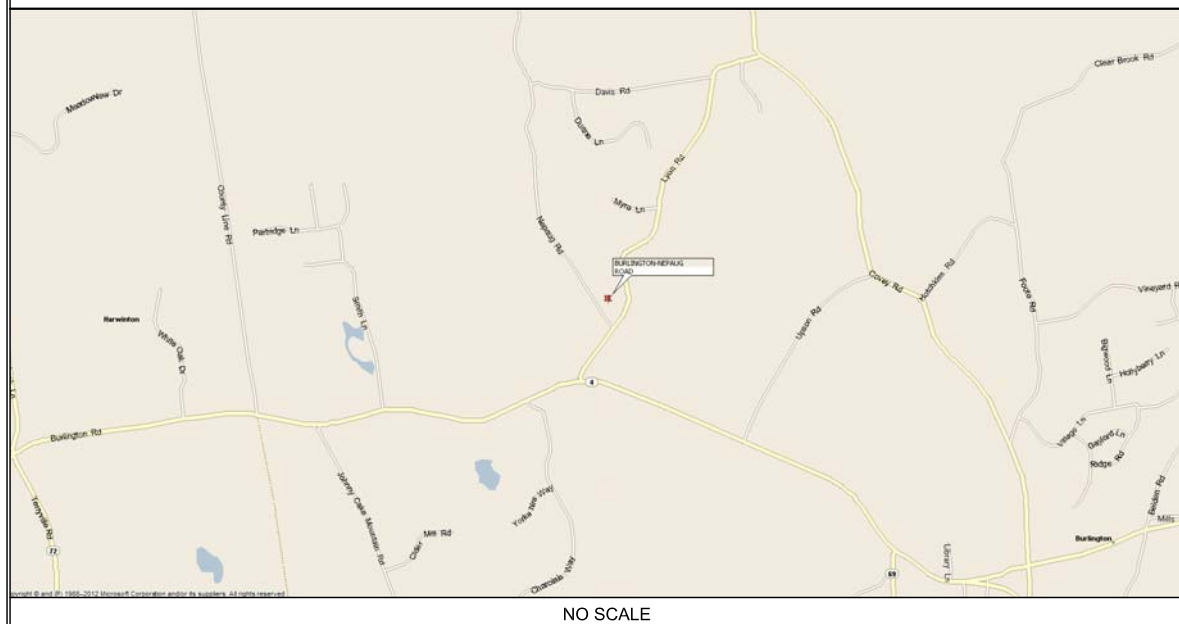
SITE TYPE: EXISTING EQUIPMENT UPGRADE
SITE ADDRESS: 12 NEPAUG ROAD
BURLINGTON, CT 06013
JURISDICTION: HARTFORD COUNTY

NAD83
LATITUDE: 41.782500° N
LONGITUDE: 72.989600° W
TOWER OWNER: CROWN CASTLE
3200 HORIZON DRIVE, SUITE 150
KING OF PRUSSIA, PA 19406
JASON SMITH
(610) 635-3225

CUSTOMER/APPLICANT: T-MOBILE
4 SYLVAN WAY
PARSIPPANY, NJ 07054
(973) 397-4800

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

LOCATION MAP



DRAWING INDEX

SHEET #	SHEET DESCRIPTION	REV. #
T-1	TITLE SHEET	2
A-1	OVERALL SITE PLAN	2
A-2	ANTENNA/CABLE SCHEDULE AND AZIMUTH PLANS	2
A-3	TOWER ELEVATION	2
A-4	ANTENNA AND RRU DETAILS	2
E-1	PANEL SCHEDULE AND ONE-LINE DIAGRAM	2
-	MOUNT MOD DETAILS	-

CTHA509A
BU #: 845993
AT&T BURLINGTON
MONOPOLE
12 NEPAUG ROAD
BURLINGTON, CT 06013
EXISTING 119'-6" MONOPOLE

PROJECT NO: 137121.001.01
CHECKED BY: GEH

ISSUED FOR:			
REV	DATE	DRWN	DESCRIPTION
0	8/1/19	JDP	CONSTRUCTION
1	8/24/20	MLC	CONSTRUCTION
2	1/11/21	JJD	CONSTRUCTION

CONTACT INFORMATION

A&E FIRM: B+T GROUP
1717 S. BOULDER, STE. 300
TULSA, OK 74119
CONTACT: MIKE OAKES
PHONE: (918) 587-4630

ELECTRIC PROVIDER: CONNECTICUT LIGHT & POWER
(860) 947-2000

TELCO PROVIDER: PIONEER TELEPHONE
(800) 808-9000

DRIVING DIRECTIONS

DEPART BRADLEY INTERNATIONAL AIRPORT ON TERMINAL RD. ROAD NAME CHANGES TO BRADLEY FIELD CONNECTOR. ROAD NAME CHANGES TO CT-20. TAKE RAMP ONTO I-91. AT EXIT 32A-32B, TURN RIGHT ONTO RAMP. TAKE RAMP ONTO I-84. AT EXIT 39, TURN RIGHT ONTO RAMP. KEEP STRAIGHT ONTO CT-4. BEAR RIGHT ONTO CT-4. BEAR LEFT ONTO CT-4. ROAD NAME CHANGES TO CT-179. TURN LEFT ONTO CT-4. TURN RIGHT ONTO LYON RD. TURN LEFT ONTO NEPAUG RD. TURN RIGHT ONTO ACCESS ROAD. ARRIVE BURLINGTON-NEPAUG ROAD.

A/E DOCUMENT REVIEW STATUS

TITLE	SIGNATURE	DATE
T-MOBILE PROP:		
T-MOBILE R.F. MGR.:		
T-MOBILE NetOps:		
T-MOBILE CONST. MGR.:		
INTERCONNECT:		
T-MOBILE SITE DEV. MGR.:		
PROPERTY OWNER:		
PLANNING:		

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

CODE COMPLIANCE

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

CODE TYPE	CODE
BUILDING/DWELLING	2018 CONNECTICUT STATE BUILDING CODE
STRUCTURAL	2018 CONNECTICUT STATE BUILDING CODE
MECHANICAL	2018 CONNECTICUT STATE BUILDING CODE
ELECTRICAL	NEC 2017

PROJECT DESCRIPTION

- THE PROPOSED PROJECT INCLUDES:
- MODIFY MOUNT PER RECOMMENDATIONS IN MOUNT ANALYSIS REPORT BY POWER OF DESIGN GROUP DATED 11/12/20.
 - REMOVE (6) EXISTING ANTENNAS AT 90'-0".
 - REMOVE (1) EXISTING 6201 ODE CABINET.
 - REMOVE (1) DUS41 AND (1) XMU.
 - INSTALL (6) NEW ANTENNAS AT 90'-0".
 - INSTALL (3) NEW RRUS AT 90'-0".
 - INSTALL (1) NEW 6x12 HCS FIBER.
 - INSTALL (1) NEW RBS 6102 CABINET.
 - INSTALL (2) NEW BB6630.
 - UPGRADE EXISTING BREAKER FROM 100A TO 125A.

DO NOT SCALE DRAWINGS

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



CALL CONNECTICUT ONE CALL
(800) 922-4455
CALL 3 WORKING DAYS
BEFORE YOU DIG!



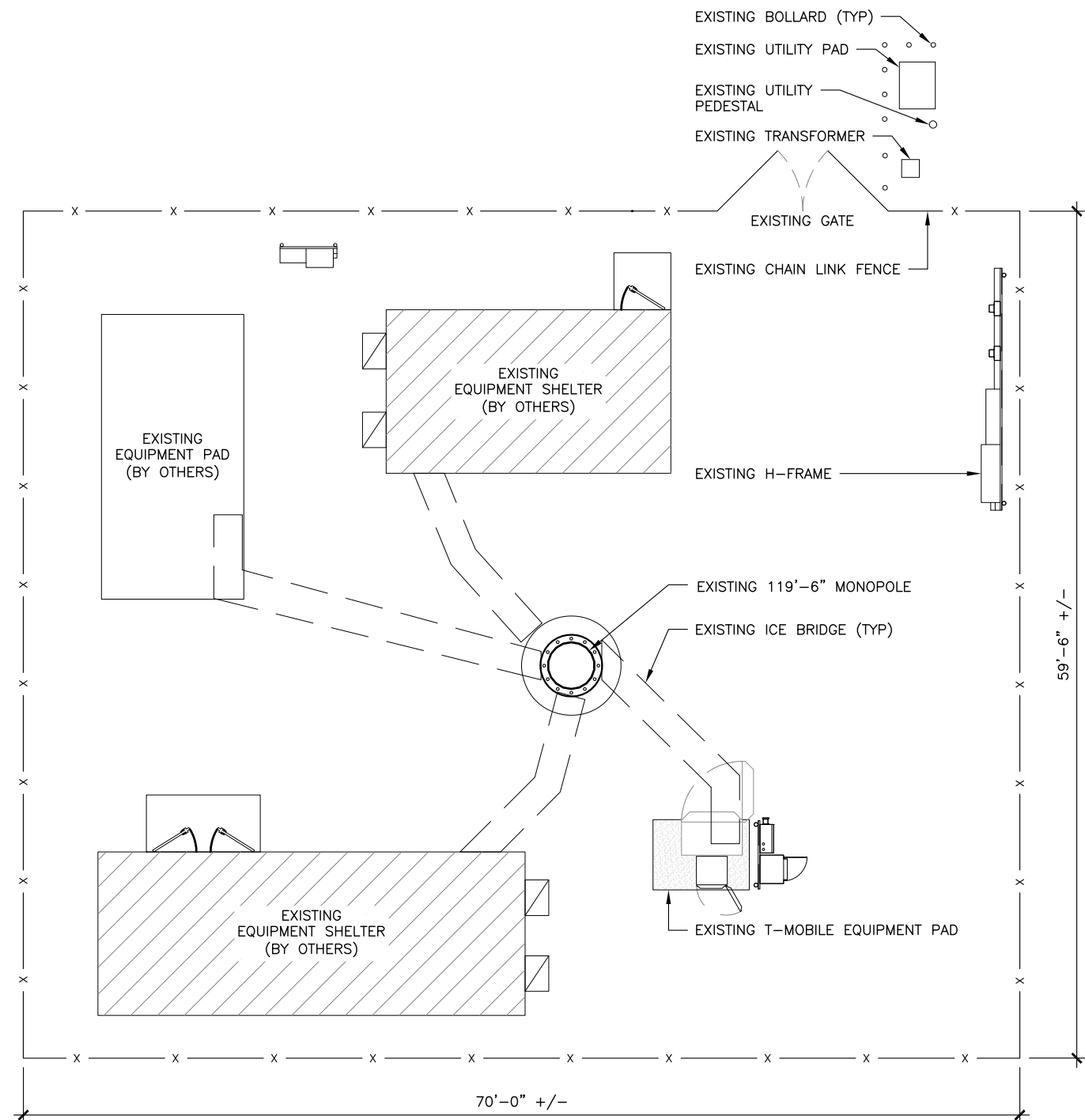
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21



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

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

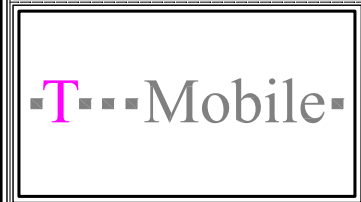
137121_845993_Burlington-Nepaug Road.dwg - Sheet:A-1 - User: jdubar - Jan 11, 2021 - 11:35am



1 OVERALL SITE PLAN
 SCALE: 0' 4' 8' 16' 32'



- GENERAL NOTES:**
- SUBJECT PROPERTY IS SITUATED AT 12 NEPAUG ROAD, BURLINGTON, CT 06013.
 - APPLICANT: T-MOBILE A DELAWARE LIMITED LIABILITY COMPANY 4 SYLVAN WAY PARSIPPANY, NEW JERSEY 07054 (973) 397-4800
 TOWER OWNER: CROWN CASTLE INTERNATIONAL
 - THE APPLICANT IS TO UPDATE THEIR NETWORK BY INSTALLING SIX (6) NEW PANEL ANTENNAS, THREE (3) RRUS, AND ONE (1) ADDITIONAL CABLE MOUNTED ON AN EXISTING MONOPOLE.
 - THIS FACILITY SHALL BE VISITED ON THE AVERAGE OF ONCE A MONTH FOR MAINTENANCE AND SHALL BE MONITORED FROM A REMOTE FACILITY.
 - THE EXISTING SITE IS LOCATED AT LATITUDE OF 41.782500' N± AND LONGITUDE OF 72.989600' W±. THE HORIZONTAL DATUM ARE IN TERMS OF NORTH AMERICAN DATUM OF 1983 (NAD 83).
 - THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSES OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OF APPROVAL HAVE BEEN SATISFIED AND EACH OF THE DRAWINGS HAVE BEEN REVISED TO INDICATED "ISSUED FOR CONSTRUCTION"
 - ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:
 - CURRENT PREVAILING MUNICIPAL AND/OR COUNTY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
 - CURRENT PREVAILING UTILITY COMPANY AUTHORITY SPECIFICATIONS, STANDARDS AND REQUIREMENTS.
 - THE CONTRACTOR SHALL NOTIFY B+T GROUP, P.A. IMMEDIATELY IF ANY FIELD-CONDITIONS ENCOUNTERED DIFFER FROM THOSE REPRESENTED HEREON, AND/OR IF SUCH CONDITIONS WOULD OR COULD RENDER THE DESIGNS SHOWN HEREON INAPPROPRIATE AND/OR INEFFECTIVE.
 - THE CONTRACTOR IS RESPONSIBLE TO PROTECT, REPAIR AND/OR REPLACE ANY DAMAGED STRUCTURES, UTILITIES OR LANDSCAPED AREA WHICH MAY BE DISTURBED DURING THE CONSTRUCTION OF THIS FACILITY.
 - THE CONSTRUCTION CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ALL CONSTRUCTION MEANS AND METHODS. THE CONSTRUCTION CONTRACTOR IS ALSO RESPONSIBLE FOR ALL JOB SITE SAFETY.
 - SITE INFORMATION SHOWN TAKEN FROM CROWN SITE PLANS AND FROM CROWN INSPECTION PHOTOS.
 - NO GUARANTEE IS MADE NOR SHOULD BE ASSUMED AS TO THE COMPLETENESS OR ACCURACY OF THE HORIZONTAL OR VERTICAL LOCATIONS. ALL PARTIES UTILIZING THIS INFORMATION SHALL FIELD VERIFY THE ACCURACY AND COMPLETENESS OF THE INFORMATION SHOWN PRIOR TO CONSTRUCTION ACTIVITIES.
 - ALL IMPROVEMENTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY THE TOWNSHIP ENGINEER WHO WILL BE GIVEN PROPER NOTIFICATION PRIOR TO THE START OF ANY CONSTRUCTION.



CTHA509A
 BU #: 845993
 AT&T BURLINGTON MONOPOLE
 12 NEPAUG ROAD
 BURLINGTON, CT 06013
 EXISTING 119'-6" MONOPOLE

PROJECT NO: 137121.001.01
 CHECKED BY: GEH

ISSUED FOR:

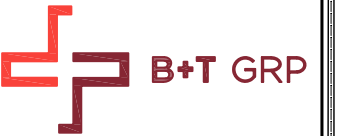
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0	8/1/19	JDP	CONSTRUCTION
1	8/24/20	MLC	CONSTRUCTION
2	1/11/21	JJD	CONSTRUCTION

B&T ENGINEERING, INC.
 PEC.0001564
 Expires 2/10/21



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

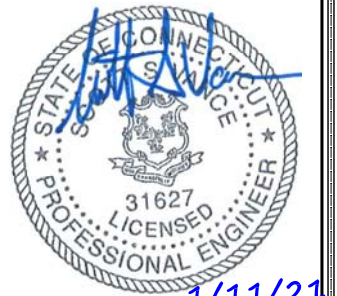


CTHA509A
 BU #: 845993
 AT&T BURLINGTON
 MONOPOLE
 12 NEPAUG ROAD
 BURLINGTON, CT 06013
 EXISTING 119'-6" MONOPOLE

PROJECT NO: 137121.001.01
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B&T ENGINEERING, INC.
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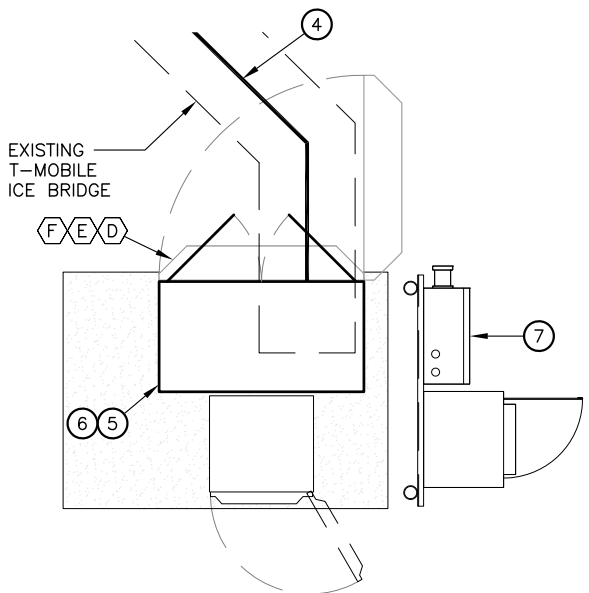


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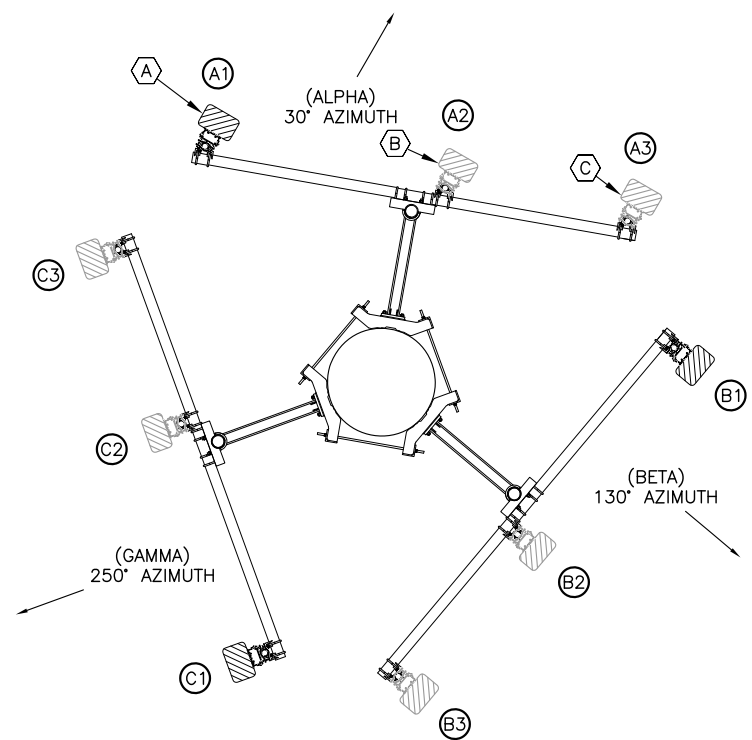
SHEET NUMBER: **A-2** REVISION: **2**

ANTENNA AND CABLE SCHEDULE											
SECTOR	POSITION	EXISTING ANTENNAS	PROPOSED ANTENNA CONFIGURATION			ANTENNA CENTERLINE	TMA/RRU	CABLES	JUMPER TYPE	CABLE LENGTH	
			E-TILT	M-TILT							
30° - ALPHA	A1	ERICSSON AIR21 KRC118023-1_B2P_B4A	UMTS	-	2'	0'	90'-0"	0/0	(2) 1 5/8" COAX	DC/FIBER & 1/2" COAX	140'-0"
	A2	RFS APXVAARR24_43-U-NA20	LTE	B71 B12	2'/2'	0'	90'-0"	0/1	(1) 6x12 HCS FIBER	DC/FIBER	140'-0"
	A3	ERICSSON AIR32 KRD901146-1_B66A_B2A	LTE	-	2'/2'	0'	90'-0"	0/0	(1) 9X18 HCS FIBER	DC/FIBER	140'-0"
130° - BETA	B1	ERICSSON AIR21 KRC118023-1_B2P_B4A	UMTS	-	2'	0'	90'-0"	0/0	(2) 1 5/8" COAX	DC/FIBER & 1/2" COAX	140'-0"
	B2	RFS APXVAARR24_43-U-NA20	LTE	B71 B12	2'/2'	0'	90'-0"	0/1	SHARED FIBER	DC/FIBER	140'-0"
	B3	ERICSSON AIR32 KRD901146-1_B66A_B2A	LTE	-	2'/2'	0'	90'-0"	0/0	SHARED FIBER	DC/FIBER	140'-0"
250° - GAMMA	C1	ERICSSON AIR21 KRC118023-1_B2P_B4A	UMTS	-	2'	0'	90'-0"	0/0	(2) 1 5/8" COAX	DC/FIBER & 1/2" COAX	140'-0"
	C2	RFS APXVAARR24_43-U-NA20	LTE	B71 B12	2'/2'	0'	90'-0"	0/1	SHARED FIBER	DC/FIBER	140'-0"
	C3	ERICSSON AIR32 KRD901146-1_B66A_B2A	LTE	-	2'/2'	0'	90'-0"	0/0	SHARED FIBER	DC/FIBER	140'-0"

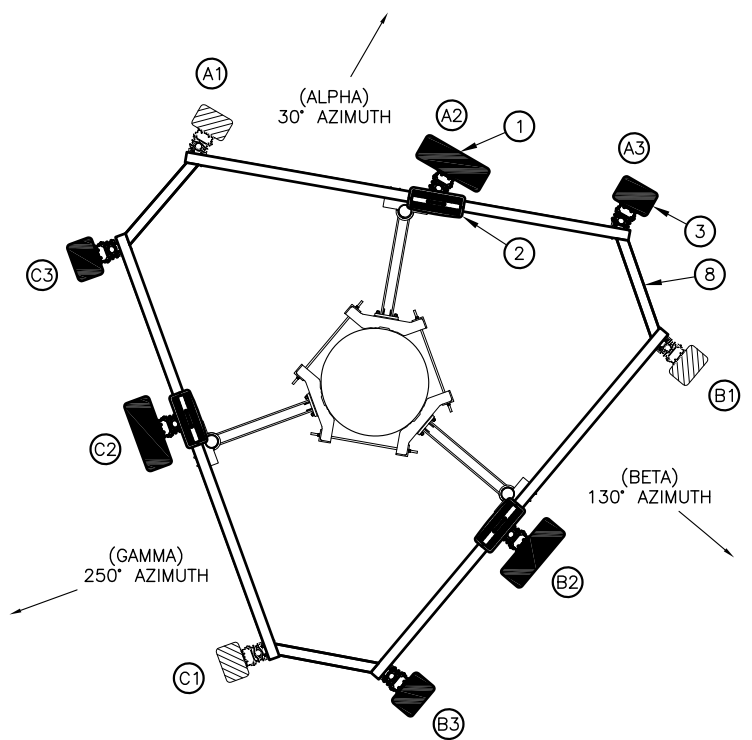
LEGEND	
EXISTING/DEMOLITION NOTES	INSTALLATION NOTES
(A) EXISTING ERICSSON AIR21 KRC118023-1_B2P_B4A ANTENNA TO REMAIN (TOTAL OF 3)	(1) INSTALL RFS APXVAARR24_43-U-NA20 (8 FT) ANTENNAS ON EXISTING MOUNT. (TYP. OF 1 PER SECTOR, TOTAL OF 3)
(B) EXISTING ANDREW LNX-6515DS-A1M ANTENNA TO BE REMOVED (TOTAL OF 3)	(2) INSTALL RADIO 4449 B12/B71 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
(C) EXISTING ERICSSON AIR21 KRC118023-1_B2P_B4A ANTENNA TO BE REMOVED (TOTAL OF 3)	(3) INSTALL ERICSSON AIR32 KRD901146-1_B66A_B2A (5 FT) ANTENNAS ON EXISTING MOUNT. (TYP. OF 1 PER SECTOR, TOTAL OF 3)
(D) EXISTING 6201 ODE CABINET TO BE REMOVED.	(4) INSTALL (1) 6x12 HCS FIBER. RUN FROM EQUIPMENT TO ANTENNAS FOLLOWING EXISTING ROUTING
(E) REMOVE (1) EXISTING DUS41	(5) INSTALL (1) NEW RBS 6102 MU AC
(F) REMOVE (1) EXISTING XMU	(6) INSTALL (2) NEW BB6630 IN NEW RBS 6102
	(7) UPGRADE EXISTING 100A BREAKER TO 125A.
	(8) MODIFY MOUNT PER RECOMMENDATIONS IN MOUNT ANALYSIS REPORT BY POWER OF DESIGN GROUP DATED 11/12/20.



1 ENLARGED AREA PLAN
 SCALE: 0' 1' 2' 4' 10'



2 EXISTING ANTENNA ORIENTATION
 SCALE: 0' 1' 4' 8' 16'



3 PROPOSED ANTENNA ORIENTATION
 SCALE: 0' 1' 4' 8' 16'



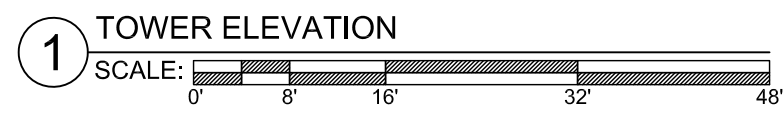
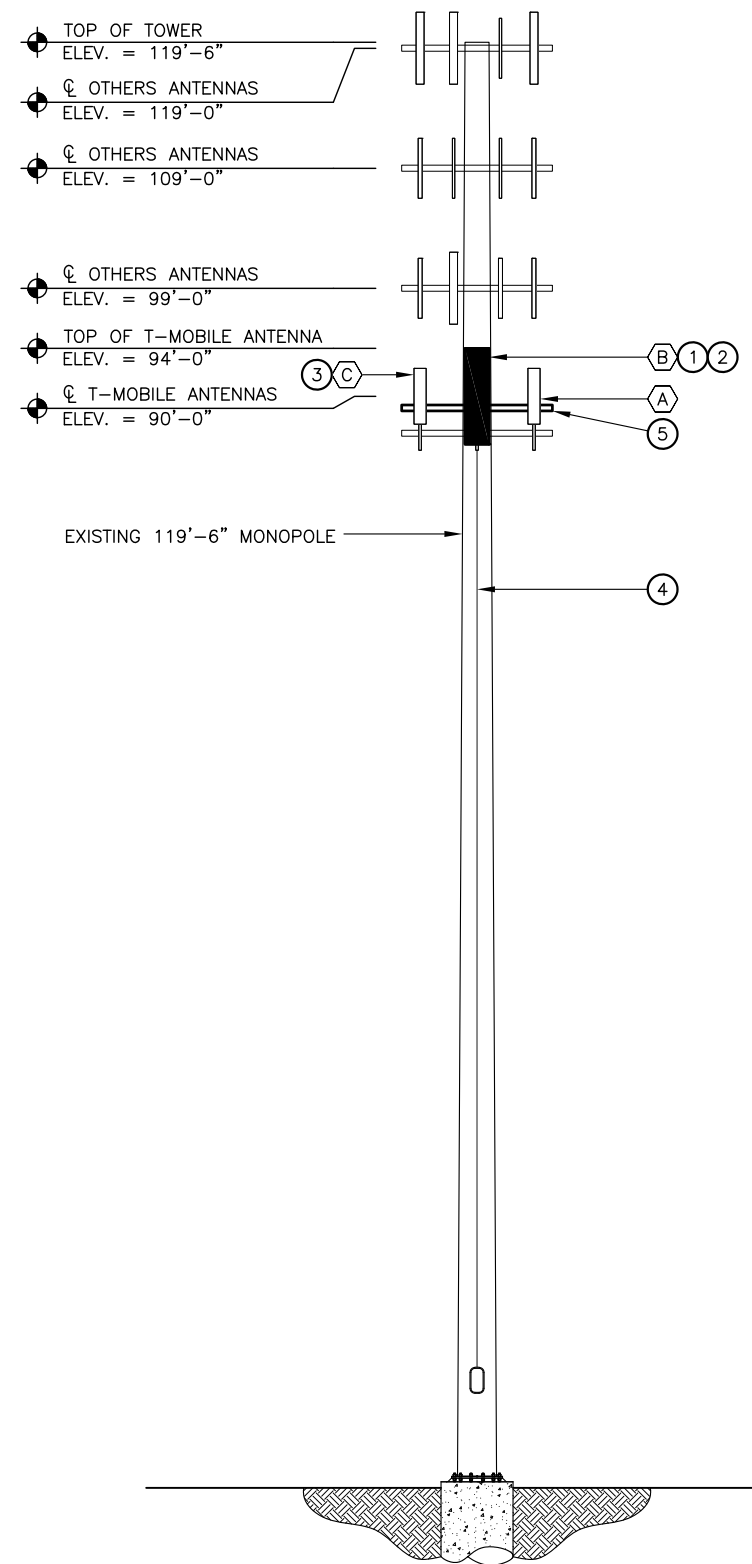
137121_845993_Burlington-Nepaug_Road.dwg - Sheet: A-2 - User: jdubar - Jan 11, 2021 - 11:35am

137121_845993_Burlington-Nepaug Road.dwg - Sheet:A-3 - User: jdubar - Jan 11, 2021 - 11:35am

LEGEND	
EXISTING/DEMOLITION NOTES	INSTALLATION NOTES
(A) EXISTING ERICSSON AIR21 KRC118023-1_B2P_B4A ANTENNA TO REMAIN (TOTAL OF 3)	(1) INSTALL RFS APXVAARR24_43-U-NA20 (8 FT) ANTENNAS ON EXISTING MOUNT. (TYP. OF 1 PER SECTOR, TOTAL OF 3)
(B) EXISTING ANDREW LNX-6515DS-A1M ANTENNA TO BE REMOVED (TOTAL OF 3)	(2) INSTALL RADIO 4449 B12/B71 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
(C) EXISTING ERICSSON AIR21 KRC118023-1_B2P_B4A ANTENNA TO BE REMOVED (TOTAL OF 3)	(3) INSTALL ERICSSON AIR32 KRD901146-1_B66A_B2A (5 FT) ANTENNAS ON EXISTING MOUNT. (TYP. OF 1 PER SECTOR, TOTAL OF 3)
	(4) INSTALL (1) 6x12 HCS FIBER. RUN FROM EQUIPMENT TO ANTENNAS FOLLOWING EXISTING ROUTING
	(5) MODIFY MOUNT PER RECOMMENDATIONS IN MOUNT ANALYSIS REPORT BY POWER OF DESIGN GROUP DATED 11/12/20.

EXISTING MONOPOLE IS SUFFICIENT PER STRUCTURAL ANALYSIS BY CROWN CASTLE DATED 12/24/20.

LEGEND:
 NEW
 EXISTING
 FUTURE



CTHA509A
 BU #: 845993
 AT&T BURLINGTON
 MONOPOLE
 12 NEPAUG ROAD
 BURLINGTON, CT 06013
 EXISTING 119'-6" MONOPOLE

PROJECT NO: 137121.001.01
 CHECKED BY: GEH

ISSUED FOR:

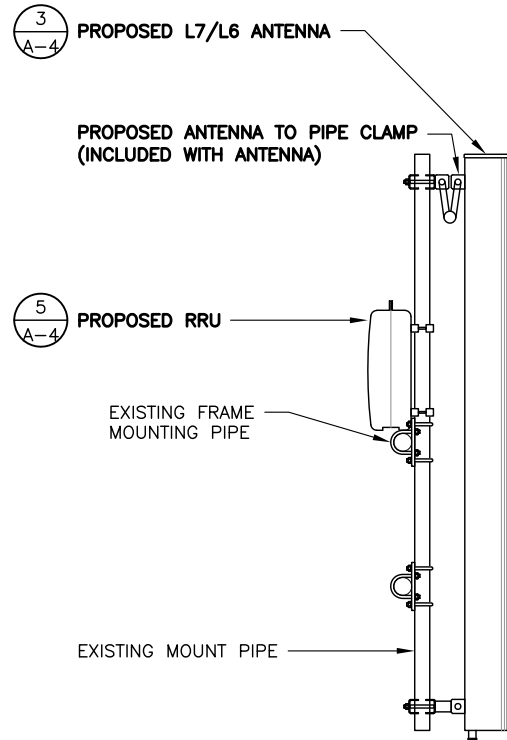
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0	8/1/19	JDP	CONSTRUCTION
1	8/24/20	MLC	CONSTRUCTION
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B&T ENGINEERING, INC.
 PEC.0001564
 Expires 2/10/21

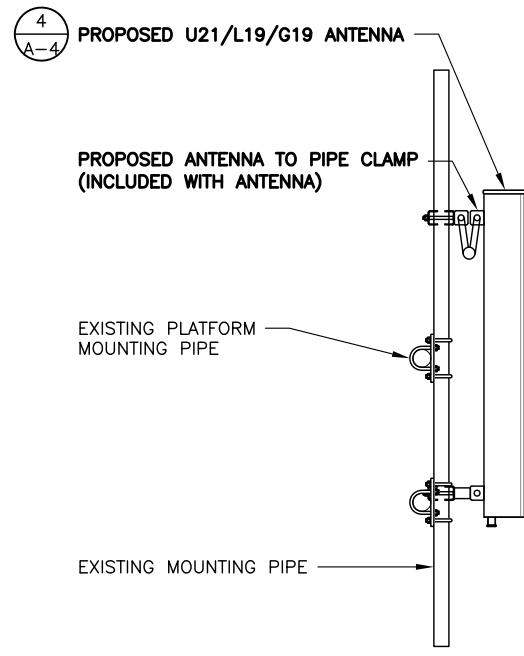


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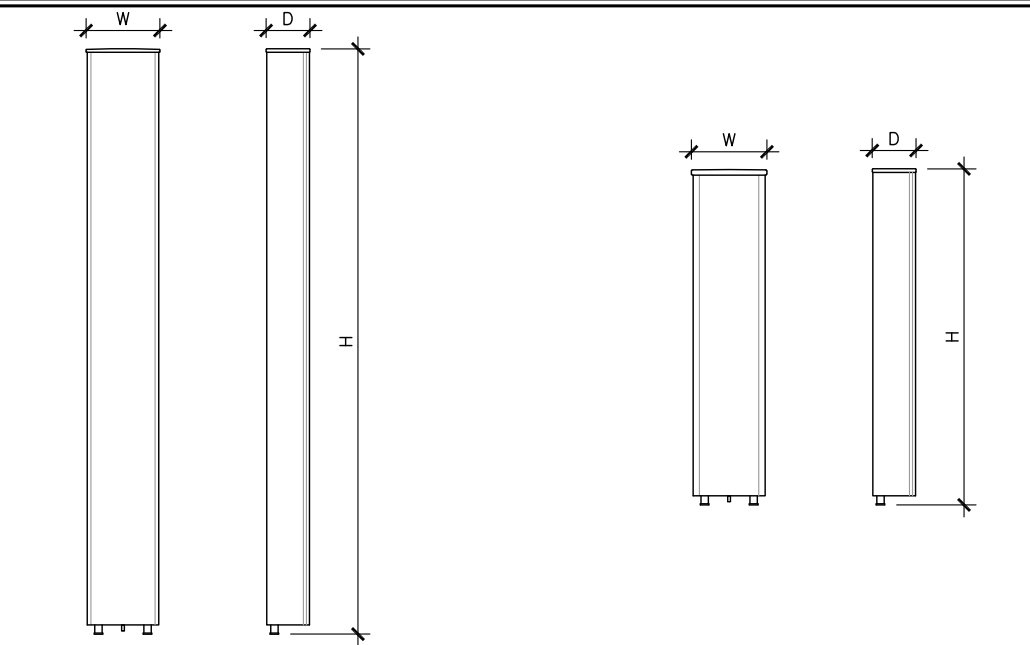
SHEET NUMBER: **A-3** REVISION: **2**



1 PROPOSED L7/L6 ANTENNA & RRU MOUNTING DETAIL
SCALE: 3/8" = 1'-0"



2 PROPOSED L7/L6 ANTENNA & RRU MOUNTING DETAIL
SCALE: 3/8" = 1'-0"



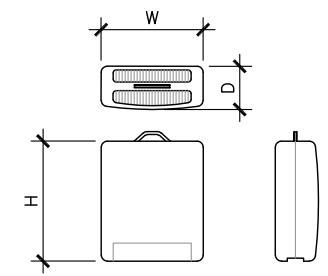
ANTENNA SPECS	
MANUFACTURER	RFS
MODEL #	APXVAARR24_43-U-NA20
WIDTH	24.0"
DEPTH	8.7"
HEIGHT	95.9"
WEIGHT	128.0 LBS

ANTENNA SPECS	
MANUFACTURER	ERICSSON
MODEL #	AIR32 B66A/B2P
WIDTH	12.90"
DEPTH	8.70"
HEIGHT	56.60"
WEIGHT	132.20 LBS

3 L7/L6 ANTENNA DETAIL
SCALE: 3/8" = 1'-0"

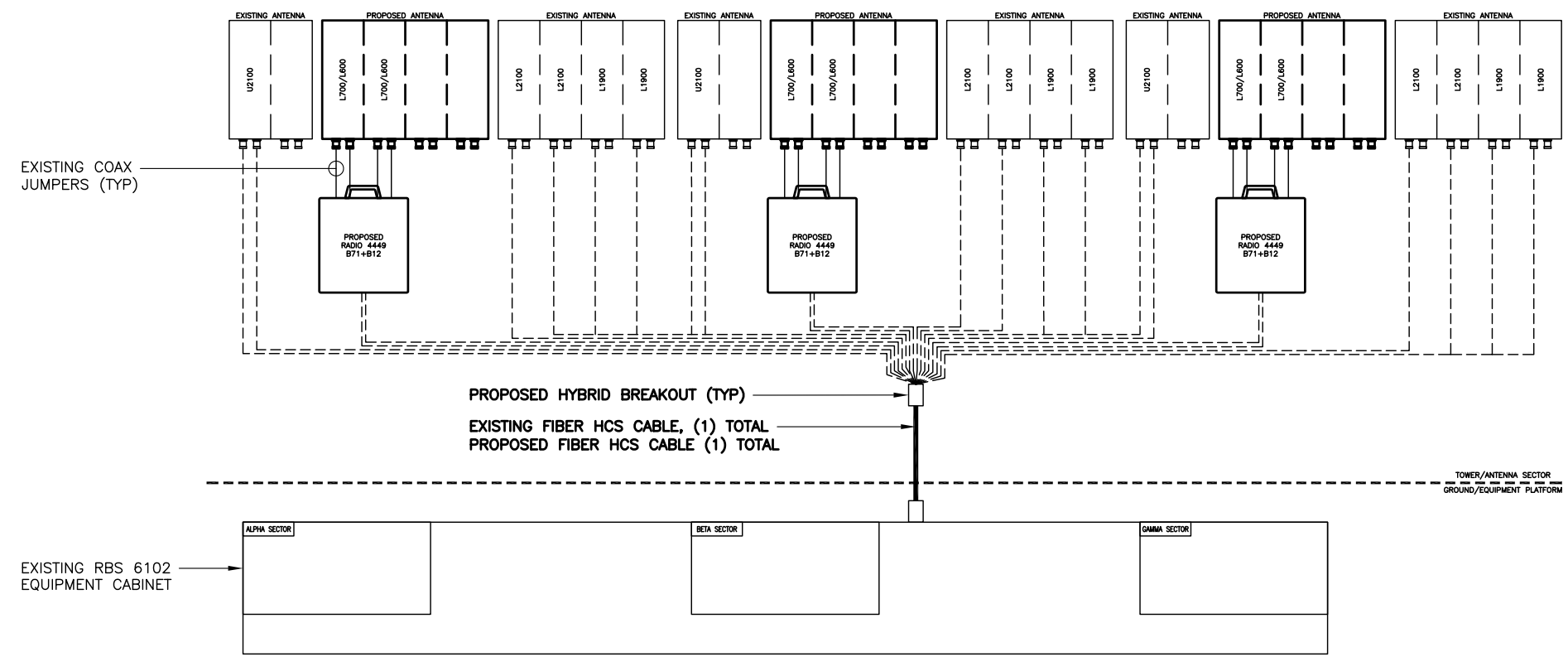
4 L19/L21 ANTENNA DETAIL
SCALE: 3/8" = 1'-0"

- NOTES:**
1. TAG ALL EXISTING AND PROPOSED CABLES/JUMPERS PER T-MOBILE SPECIFICATIONS.
 2. SEE RF SCHEDULE FOR CABLE AND JUMPER LENGTHS.
 3. REFER TO ANTENNA ORIENTATION ON SHEET A-2 FOR EXACT ANTENNA POSITIONING.



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4449
WIDTH	13.2"
DEPTH	10.4"
HEIGHT	14.9"
WEIGHT	74 LBS

5 REMOTE RADIO UNIT (RRU)
SCALE: 3/8" = 1'-0"



6 ANTENNA & CABLING SCHEMATIC
SCALE: N.T.S.



CTHA509A
BU #: 845993
AT&T BURLINGTON
MONOPOLE
12 NEPAUG ROAD
BURLINGTON, CT 06013
EXISTING 119'-6" MONOPOLE

PROJECT NO: 137121.001.01
CHECKED BY: GEH

ISSUED FOR:			
REV	DATE	DRWN	DESCRIPTION
0	8/1/19	JDP	CONSTRUCTION
1	8/24/20	MLC	CONSTRUCTION
2	1/11/21	JJD	CONSTRUCTION

B&T ENGINEERING, INC.
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Expires 2/10/21



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SHEET NUMBER: **A-4** REVISION: **2**



FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS		AMPS	POLES	LOAD
			L1	L2			
SURGE PROTECTION	2	30A	1	2	125A	2	RBS 6102
			3	4			
			5	6			
			7	8	15A	1	LIGHT

RATED VOLTAGE: 120/240 _____ 1 PHASE, 3 WIRE
 BRANCH POLES: 12 24 30 42 APPROVED MF'RS
 RATED AMPS: 100 200 400 _____
 CABINET: SURFACE FLUSH NEMA 1 3R 4X
 MAIN LUGS ONLY MAIN 200 AMPS BREAKER FUSED SWITCH HINGED DOOR KEYED DOOR LATCH
 FUSED CIRCUIT BREAKER BRANCH DEVICES _____ TO BE GFCI BREAKERS FULL NEUTRAL BUS GROUND BAR
 ALL BREAKERS MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF 10,000 AMPS SYMMETRICAL

EXISTING 100A BREAKER PANEL TO BE REPLACED W/ NEW 200A BREAKER PANEL. SQUARE D P/N: Q012040M200RB (OR APPROVED EQUAL)
 REPLACE EXISTING BREAKERS IN POSITION 2 AND 4 WITH NEW 2P 125A BREAKER.
 REPLACE EXISTING WIRES FOR PROPOSED 6102 CABINET WITH (3) 1/0 AWG THWN (COPPER) AND (1) #6G AWG. MINIMUM CONDUIT SIZE TO BE 2"
 UPGRADE FEEDER WIRES TO MEET AMPACITY.
 FINAL PANEL DESIGN AND CALCULATIONS FOR WIRE SIZE WERE BASED OFF OF EXISTING PHOTOS

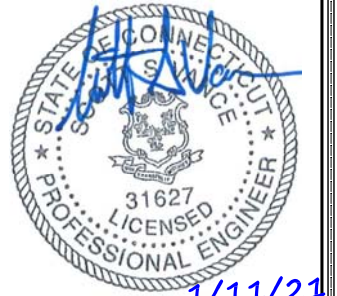
1 FINAL T-MOBILE PANEL DETAIL
SCALE: N.T.S.

CTHA509A
 BU #: 845993
 AT&T BURLINGTON
 MONOPOLE
 12 NEPAUG ROAD
 BURLINGTON, CT 06013
 EXISTING 119'-6" MONOPOLE

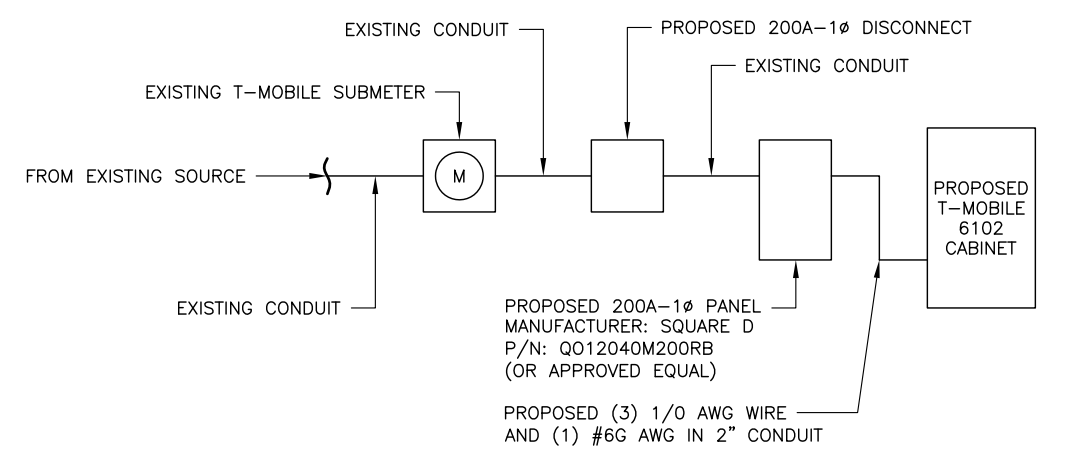
PROJECT NO: 137121.001.01
 CHECKED BY: GEH

ISSUED FOR:			
REV	DATE	DRWN	DESCRIPTION
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1	8/24/20	MLC	CONSTRUCTION
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B&T ENGINEERING, INC.
 PEC.0001564
 Expires 2/10/21



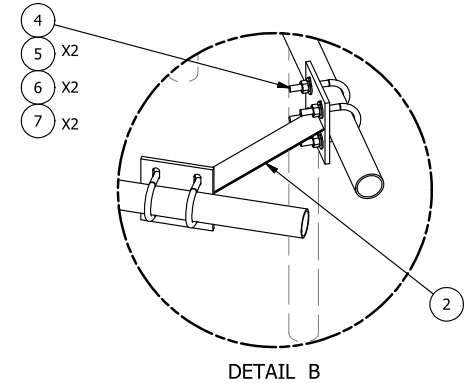
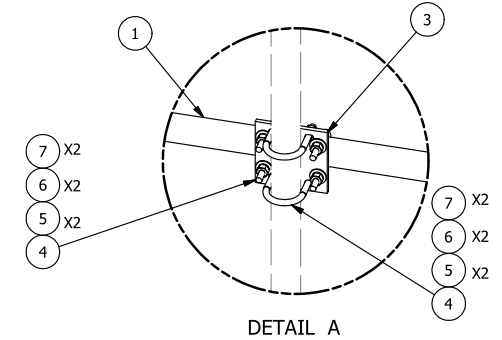
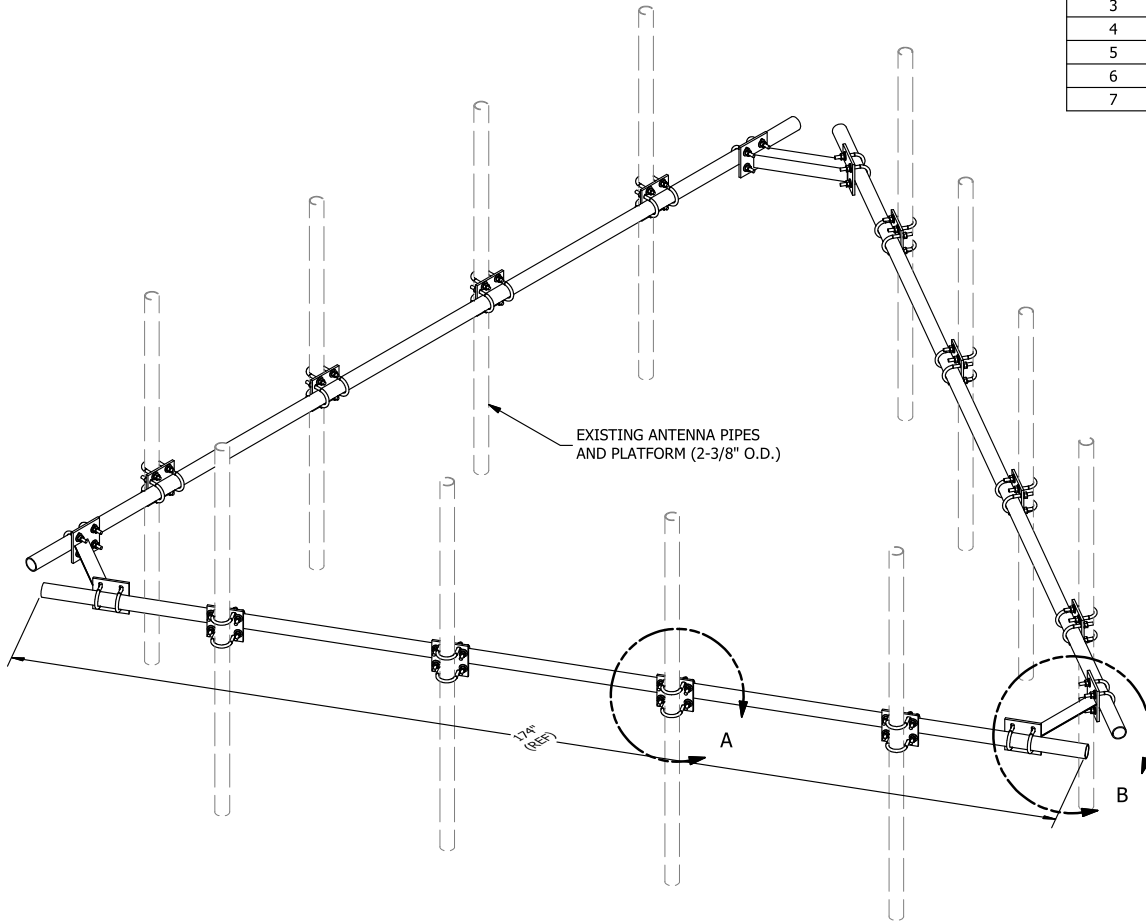
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2 ONE-LINE DIAGRAM
SCALE: N.T.S.

SHEET NUMBER: E-1
 REVISION: 2

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	P2174	2-3/8" OD X 174" SCH 40 GALVANIZED PIPE	174 in	55.75	167.24
2	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
3	12	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"	6 in	3.71	44.50
4	60	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.63	37.51
5	120	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	4.09
6	120	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	1.67
7	120	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	8.60
TOTAL WT. #						302.36



TOLERANCE NOTES

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

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

DESCRIPTION
HANDRAIL KIT FOR 14'-6" FACE

SITE PRO 1
 Engineering Support Team:
 1-888-753-7446

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

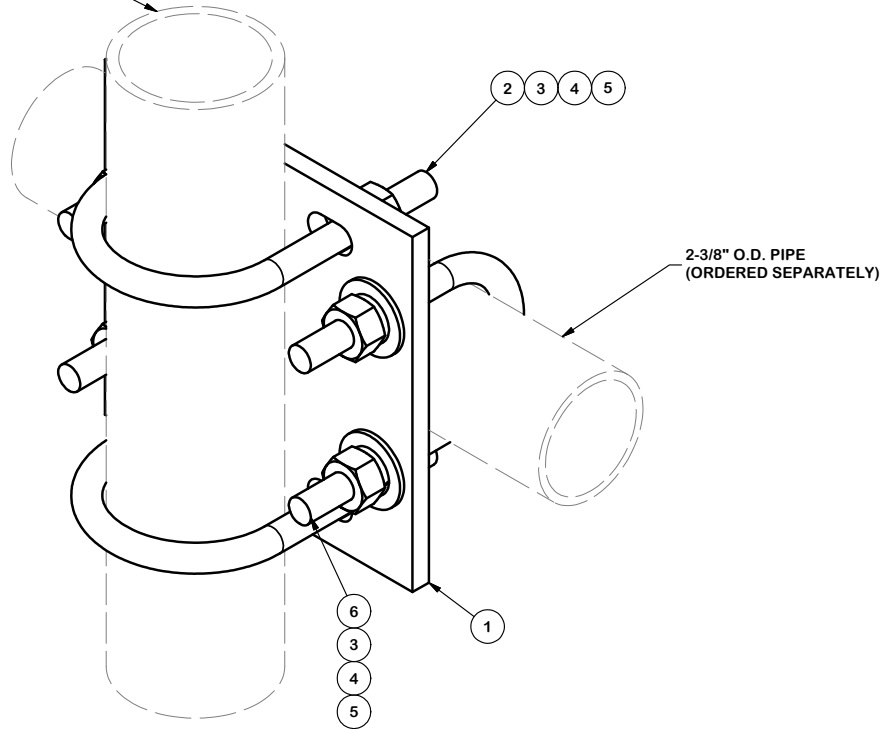
REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	REPLACED HCP WITH X-AHCP	CEK		7/11/2014
REVISION HISTORY				

CPD NO.	DRAWN BY	ENG. APPROVAL
	KC8 5/30/2012	
CLASS	SUB	DRAWING USAGE
81	01	CUSTOMER
		CHECKED BY
		BMC 7/13/2014

PART NO.	HRK14
DWG. NO.	HRK14

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	SCX2	CROSSOVER PLATE	7 in	4.80	4.80
2	2	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.66	1.31
3	8	G12FW	1/2" HDG USS FLATWASHER		0.03	0.27
4	8	G12LW	1/2" HDG LOCKWASHER		0.01	0.11
5	8	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	0.57
6	2	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.63	1.25
					TOTAL WT. #	8.39

2-7/8" O.D. ANTENNA PIPE
(ORDERED SEPARATELY)



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

TOLERANCE NOTES

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

PROPRIETARY NOTE:
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DESCRIPTION		CROSSOVER PLATE KIT	
-------------	--	---------------------	--

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

CPD NO.	DRAWN BY CEK 6/30/2011	ENG. APPROVAL
CLASS	DRAWING USAGE SHOP	CHECKED BY BMC 7/1/2011

PART NO.	SCX2-K	PAGE 1 OF 1
DWG. NO.	SCX2-K	

Exhibit D

Structural Analysis Report



Date: **December 24, 2020**

Angela Harris
Crown Castle
8000 Avalon Blvd
Alpharetta, GA 30009

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: **Structural Analysis Report**

Carrier Designation: **Metro PCS Co-Locate**
Carrier Site Number: CTHA509A
Carrier Site Name: AT&T Burlington Monopole

Crown Castle Designation: **Crown Castle BU Number:** 845993
Crown Castle Site Name: BURLINGTON-NEPAUG ROAD
Crown Castle JDE Job Number: 561002
Crown Castle Work Order Number: 1901155
Crown Castle Order Number: 482076 Rev. 1

Engineering Firm Designation: **Crown Castle Project Number:** 1901155

Site Data: **12 NEPAUG ROAD, BURLINGTON, Hartford County, CT**
Latitude 41° 46' 56.86", Longitude -72° 59' 22.68"
120 Foot - Monopole Tower

Dear Angela Harris,

Crown Castle 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 - 53.3%**

This analysis utilizes an ultimate 3-second gust wind speed of 120 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: Daniel Chen

Respectfully submitted by:

Barimani Digitally signed by Maham Barimani
Date: 2020.12.24 14:51:23

Maham Barimani, P.E.
Senior Project Engineer

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2) ANALYSIS CRITERIA

Table 1 - Proposed Equipment Configuration

Table 2 - Other Considered Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Table 5 - Tower Component Stresses vs. Capacity – LC7

4.1) Recommendations

5) APPENDIX A

tnxTower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 120 ft Monopole tower designed by EEI in 2004 and mapped by FDH in 2016.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic Ss:	0.182
Seismic S1:	0.064
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
88.0	90.0	3	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe	8	1-5/8
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe		
		3	ericsson	RADIO 4449 B12/B71		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
	88.0	1	site pro 1	HRK14		
		1	site pro 1	SCX2-K		
		1	tower mounts	T-Arm Mount [TA 602-3]		

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)
119.0	119.0	3	cci antennas	HPA65R-BU6A	12	3/8 1/2 3/4 7/8 1-5/8 2
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 8843 B2/B66A		
		1	gps	GPS_A		
		3	kathrein	80010965K		
		3	powerwave technologies	7770.00		
		6	powerwave technologies	LGP13519		
		6	powerwave technologies	LGP21401		
		2	raycap	DC6-48-60-18-8F		
		1	tower mounts	Platform Mount [LP 1201-1_HR-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
109.0	111.0	1	lucent	KS24019-L112A	1 3	7/8 1-1/4
	110.0	3	alcatel lucent	PCS 1900MHZ 4X45W 65MHZ		
		6	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8X20-25		
	3	kmw communications	ETCR-654L12H6 w/ Mount Pipe			
109.0	1	tower mounts	Platform Mount [LP 1201-1_KCKR]			
99.0	101.0	1	lucent	KS24019-L112A	1 8	1/2 1-5/8
	99.0	3	alcatel lucent	B13 RRH 4X30		
		3	alcatel lucent	RRH4X45-AWS4 B66		
		6	antel	LPA-80080/4CF w/ Mount Pipe		
		6	commscope	JAHH-65B-R3B w/ Mount Pipe		
		3	nokia	AHCA		
		2	raycap	RRFDC-3315-PF-48		
1	tower mounts	Platform Mount [LP 602-1_KCKR]				

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Jaworski Geotech, Inc.	4551029	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FDH (Mapped)	5072131	CCISITES
4-TOWER MANUFACTURER DRAWINGS	FDH (Mapped)	5117503	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.7.5), 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. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	120 - 97	Pole	TP28.93x22.69x0.1875	1	-10.13	1014.80	17.7	Pass
L2	97 - 48	Pole	TP39.7x27.5729x0.25	2	-23.72	1867.11	52.3	Pass
L3	48 - 0	Pole	TP51.04x38.0569x0.3125	3	-36.29	3090.62	53.3	Pass
							Summary	
						Pole (L3)	53.3	Pass
						Rating =	53.3	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	46.4	Pass
1	Base Plate	0	35.9	Pass
1	Base Foundation Structure	0	43.8	Pass
1	Base Foundation Soil Interaction	0	40.1	Pass

Structure Rating (max from all components) =	53.3%
---	--------------

Notes:

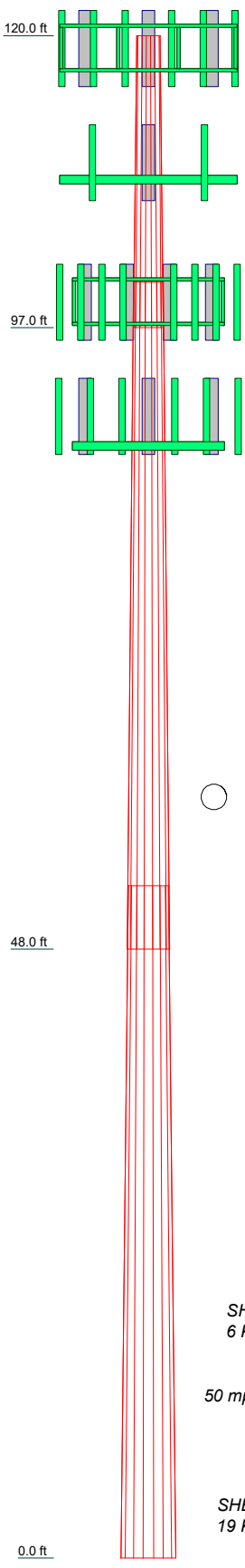
- 1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

Section	1	2	3
Length (ft)	23.00	52.62	52.96
Number of Sides	18	18	18
Thickness (in)	0.1875	0.2500	0.3125
Socket Length (ft)	3.62	4.96	
Top Dia (in)	22.6900	27.5729	38.0569
Bot Dia (in)	28.9300	39.7000	51.0400
Grade		A572-65	
Weight (K)	1.2	4.7	7.9



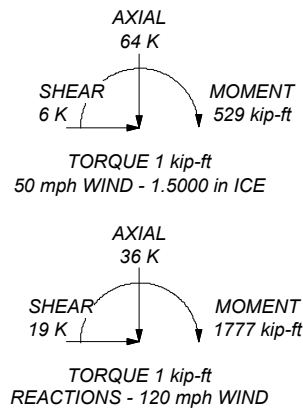
MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 53.3%

ALL REACTIONS ARE FACTORED



CROWN CASTLE
 The Pathway to Possible
 2000 Corporate Drive
 Canonsburg, PA 15317
 Phone: (724) 416-2000
 FAX:

Job:	BU# 845993		
Project:			
Client:	Crown Castle	Drawn by:	Daniel Chen
Code:	TIA-222-H	Date:	12/24/20
Path:			Scale: NTS
			Dwg No. E-1

C:\Users\dchen\Documents\Work Area - DChen\845993\WO 1901155 - SAIProd\845993.dwg

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: 826.00 ft.
- 3) Basic wind speed of 120 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 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 <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets ✓ Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
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Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	120.00-97.00	23.00	3.62	18	22.6900	28.9300	0.1875	0.7500	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L2	97.00-48.00	52.62	4.96	18	27.5729	39.7000	0.2500	1.0000	A572-65 (65 ksi)
L3	48.00-0.00	52.96		18	38.0569	51.0400	0.3125	1.2500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L1	23.0111	13.3918	856.7181	7.9884	11.5265	74.3258	1714.5635	6.6972	3.6634	19.538
	29.3474	17.1054	1785.3331	10.2036	14.6964	121.4807	3573.0155	8.5543	4.7617	25.396
L2	28.8068	21.6807	2044.8607	9.6996	14.0070	145.9883	4092.4120	10.8424	4.4128	17.651
	40.2739	31.3036	6154.9624	14.0048	20.1676	305.1906	12318.0236	15.6548	6.5472	26.189
L3	39.8305	37.4377	6738.3192	13.3993	19.3329	348.5416	13485.5048	18.7224	6.1480	19.674
	51.7792	50.3153	16357.7954	18.0083	25.9283	630.8853	32737.1149	25.1625	8.4330	26.986

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
L1 120.00-97.00				1	1	1			
L2 97.00-48.00				1	1	1			
L3 48.00-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight plf	

5/8 rod/step	C	No	No	CaAa (Out Of Face)	120.00 - 8.00	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.02 0.12 0.22 0.42	0.27 0.70 1.74 5.65
Safety Line (3/8")	C	No	No	CaAa (Out Of Face)	120.00 - 8.00	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.04 0.14 0.24 0.44	0.22 0.75 1.28 2.34
****119****									
LDF4-50A(1/2)	A	No	No	Inside Pole	119.00 - 4.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.15 0.15 0.15

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
LDF5-50A(7/8)	A	No	No	Inside Pole	119.00 - 4.00	2	2" Ice	0.00	0.15
							No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
LDF7-50A(1-5/8)	A	No	No	Inside Pole	119.00 - 4.00	12	2" Ice	0.00	0.33
							No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
FIBER-GUARD/FLEX 2' (2)	A	No	No	Inside Pole	119.00 - 4.00	1	2" Ice	0.00	0.82
							No Ice	0.00	0.22
							1/2" Ice	0.00	0.22
							1" Ice	0.00	0.22
FB-L98B-034-XXX(3/8)	A	No	No	Inside Pole	119.00 - 4.00	1	2" Ice	0.00	0.22
							No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	A	No	No	Inside Pole	119.00 - 4.00	2	2" Ice	0.00	0.06
							No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
109 P HB114-08U3M12-XXXF(7/8)	C	No	No	Inside Pole	109.00 - 4.00	1	2" Ice	0.00	0.58
							No Ice	0.00	0.68
							1/2" Ice	0.00	0.68
							1" Ice	0.00	0.68
HB114-1-08U4-M5F(1-1/4)	C	No	No	Inside Pole	109.00 - 4.00	3	2" Ice	0.00	0.68
							No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
99 R LDF7-50A(1-5/8)	C	No	No	Inside Pole	99.00 - 4.00	6	2" Ice	0.00	1.30
							No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
HB158-1-08U8-S8J18(1-5/8)	C	No	No	Inside Pole	99.00 - 4.00	2	2" Ice	0.00	0.82
							No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
LDF4-50A(1/2)	C	No	No	Inside Pole	99.00 - 4.00	1	2" Ice	0.00	1.30
							No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
88 R LDF7-50A(1-5/8)	B	No	No	Inside Pole	88.00 - 4.00	6	2" Ice	0.00	0.15
							No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
MLE HYBRID 9POWER/18FIBER RL 2(1-5/8)	B	No	No	Inside Pole	88.00 - 4.00	1	2" Ice	0.00	0.82
							No Ice	0.00	1.07
							1/2" Ice	0.00	1.07
							1" Ice	0.00	1.07
HCS 6X12 4AWG(1-5/8)	B	No	No	Inside Pole	88.00 - 4.00	1	2" Ice	0.00	1.07
							No Ice	0.00	2.40
							1/2" Ice	0.00	2.40
							1" Ice	0.00	2.40
****							2" Ice	0.00	2.40

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	120.00-97.00	A	0.000	0.000	0.000	0.000	0.27
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.783	0.09
L2	97.00-48.00	A	0.000	0.000	0.000	0.000	0.60
		B	0.000	0.000	0.000	0.000	0.34
		C	0.000	0.000	0.000	3.797	0.64
L3	48.00-0.00	A	0.000	0.000	0.000	0.000	0.54
		B	0.000	0.000	0.000	0.000	0.37
		C	0.000	0.000	0.000	3.100	0.57

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	120.00-97.00	A	1.436	0.000	0.000	0.000	0.000	0.27
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	21.593	0.27
L2	97.00-48.00	A	1.378	0.000	0.000	0.000	0.000	0.60
		B		0.000	0.000	0.000	0.000	0.34
		C		0.000	0.000	0.000	46.002	1.02
L3	48.00-0.00	A	1.231	0.000	0.000	0.000	0.000	0.54
		B		0.000	0.000	0.000	0.000	0.37
		C		0.000	0.000	0.000	36.171	0.86

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L1	120.00-97.00	-0.5966	0.3444	-2.9131	1.6819
L2	97.00-48.00	-0.6044	0.3489	-3.1768	1.8341
L3	48.00-0.00	-0.5003	0.2888	-2.7838	1.6072

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

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
119P 7770.00	A	From Leg	4.00 0.00 0.00	0.0000	119.00	No Ice 1/2" Ice 1" 2" Ice	5.51 5.87 6.23 6.99 4.35	2.93 3.27 3.63 4.35	0.04 0.07 0.11 0.20
7770.00	B	From Leg	4.00 0.00 0.00	0.0000	119.00	No Ice 1/2" Ice 1" 2" Ice	5.51 5.87 6.23 6.99 4.35	2.93 3.27 3.63 4.35	0.04 0.07 0.11 0.20

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight
			Horz	Lateral			Front	Side	
			ft	ft	°	ft	ft ²	ft ²	K
7770.00	C	From Leg	4.00	0.0000	119.00	No Ice	5.51	2.93	0.04
			0.00			1/2"	5.87	3.27	0.07
			0.00			Ice	6.23	3.63	0.11
						1" Ice	6.99	4.35	0.20
						2" Ice			
GPS_A	A	From Leg	4.00	0.0000	119.00	No Ice	0.26	0.26	0.00
			0.00			1/2"	0.32	0.32	0.00
			0.00			Ice	0.39	0.39	0.01
						1" Ice	0.56	0.56	0.02
						2" Ice			
80010965K	A	From Leg	4.00	0.0000	119.00	No Ice	12.23	4.21	0.13
			0.00			1/2"	13.00	4.88	0.21
			0.00			Ice	13.79	5.57	0.29
						1" Ice	15.41	6.99	0.48
						2" Ice			
80010965K	B	From Leg	4.00	0.0000	119.00	No Ice	12.23	4.21	0.13
			0.00			1/2"	13.00	4.88	0.21
			0.00			Ice	13.79	5.57	0.29
						1" Ice	15.41	6.99	0.48
						2" Ice			
80010965K	C	From Leg	4.00	0.0000	119.00	No Ice	12.23	4.21	0.13
			0.00			1/2"	13.00	4.88	0.21
			0.00			Ice	13.79	5.57	0.29
						1" Ice	15.41	6.99	0.48
						2" Ice			
HPA65R-BU6A	A	From Leg	4.00	0.0000	119.00	No Ice	5.88	3.82	0.05
			0.00			1/2"	6.47	4.39	0.10
			0.00			Ice	7.07	4.96	0.16
						1" Ice	8.32	6.15	0.29
						2" Ice			
HPA65R-BU6A	B	From Leg	4.00	0.0000	119.00	No Ice	5.88	3.82	0.05
			0.00			1/2"	6.47	4.39	0.10
			0.00			Ice	7.07	4.96	0.16
						1" Ice	8.32	6.15	0.29
						2" Ice			
HPA65R-BU6A	C	From Leg	4.00	0.0000	119.00	No Ice	5.88	3.82	0.05
			0.00			1/2"	6.47	4.39	0.10
			0.00			Ice	7.07	4.96	0.16
						1" Ice	8.32	6.15	0.29
						2" Ice			
DC6-48-60-18-8F	A	From Leg	1.00	0.0000	119.00	No Ice	1.21	1.21	0.02
			0.00			1/2"	1.89	1.89	0.04
			0.00			Ice	2.11	2.11	0.07
						1" Ice	2.57	2.57	0.13
						2" Ice			
(2) LGP21401	A	From Leg	4.00	0.0000	119.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			0.00			Ice	1.38	0.35	0.03
						1" Ice	1.69	0.52	0.05
						2" Ice			
(2) LGP21401	B	From Leg	4.00	0.0000	119.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			0.00			Ice	1.38	0.35	0.03
						1" Ice	1.69	0.52	0.05
						2" Ice			
(2) LGP21401	C	From Leg	4.00	0.0000	119.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			0.00			Ice	1.38	0.35	0.03
						1" Ice	1.69	0.52	0.05
						2" Ice			
(2) LGP13519	A	From Leg	4.00	0.0000	119.00	No Ice	0.29	0.18	0.01
			0.00			1/2"	0.36	0.24	0.01
			0.00			Ice	0.44	0.31	0.01
						1" Ice	0.62	0.47	0.02
						2" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight
			Horz	Lateral			Front	Side	
			ft	ft	°	ft	ft ²	ft ²	K
(2) LGP13519	B	From Leg	4.00	0.0000	119.00	No Ice	0.29	0.18	0.01
			0.00			1/2"	0.36	0.24	0.01
			0.00			Ice	0.44	0.31	0.01
						1" Ice	0.62	0.47	0.02
						2" Ice			
(2) LGP13519	C	From Leg	4.00	0.0000	119.00	No Ice	0.29	0.18	0.01
			0.00			1/2"	0.36	0.24	0.01
			0.00			Ice	0.44	0.31	0.01
						1" Ice	0.62	0.47	0.02
						2" Ice			
DC6-48-60-18-8F	A	From Leg	1.00	0.0000	119.00	No Ice	1.21	1.21	0.02
			0.00			1/2"	1.89	1.89	0.04
			0.00			Ice	2.11	2.11	0.07
						1" Ice	2.57	2.57	0.13
						2" Ice			
RRUS 8843 B2/B66A	A	From Leg	4.00	0.0000	119.00	No Ice	1.64	1.35	0.07
			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			
RRUS 8843 B2/B66A	B	From Leg	4.00	0.0000	119.00	No Ice	1.64	1.35	0.07
			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			
RRUS 8843 B2/B66A	C	From Leg	4.00	0.0000	119.00	No Ice	1.64	1.35	0.07
			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			
RRUS 4449 B5/B12	B	From Leg	4.00	0.0000	119.00	No Ice	1.97	1.41	0.07
			0.00			1/2"	2.14	1.56	0.09
			0.00			Ice	2.33	1.73	0.11
						1" Ice	2.72	2.07	0.16
						2" Ice			
(2) RRUS 4449 B5/B12	C	From Leg	4.00	0.0000	119.00	No Ice	1.97	1.41	0.07
			0.00			1/2"	2.14	1.56	0.09
			0.00			Ice	2.33	1.73	0.11
						1" Ice	2.72	2.07	0.16
						2" Ice			
4' x 3" Pipe Mount	A	From Leg	0.50	0.0000	119.00	No Ice	1.00	1.00	0.03
			0.00			1/2"	1.25	1.25	0.04
			0.00			Ice	1.50	1.50	0.05
						1" Ice	2.05	2.05	0.08
						2" Ice			
4' x 3" Pipe Mount	B	From Leg	0.50	0.0000	119.00	No Ice	1.00	1.00	0.03
			0.00			1/2"	1.25	1.25	0.04
			0.00			Ice	1.50	1.50	0.05
						1" Ice	2.05	2.05	0.08
						2" Ice			
4' x 3" Pipe Mount	C	From Leg	0.50	0.0000	119.00	No Ice	1.00	1.00	0.03
			0.00			1/2"	1.25	1.25	0.04
			0.00			Ice	1.50	1.50	0.05
						1" Ice	2.05	2.05	0.08
						2" Ice			
Platform Mount [LP 1201-1_HR-3]	B	None		0.0000	119.00	No Ice	29.96	29.96	2.62
						1/2"	36.80	36.80	3.38
						Ice	43.24	43.24	4.28
						1" Ice	55.52	55.52	6.43
						2" Ice			
*** 109 R *** ETCR-654L12H6 w/ Mount Pipe	A	From Leg	4.00	0.0000	109.00	No Ice	10.90	4.61	0.10
			0.00			1/2"	11.57	5.18	0.19
			1.00			Ice	12.24	5.77	0.28
						1" Ice	13.64	7.00	0.51

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight
			Horz	Lateral	Vert					
			ft	ft	ft	°	ft	ft ²	ft ²	K
ETCR-654L12H6 w/ Mount Pipe	B	From Leg	4.00	0.0000	109.00	2" Ice				
			0.00			No Ice	10.90	4.61	0.10	
			1.00			1/2"	11.57	5.18	0.19	
						Ice	12.24	5.77	0.28	
ETCR-654L12H6 w/ Mount Pipe	C	From Leg	4.00	0.0000	109.00	2" Ice				
			0.00			No Ice	10.90	4.61	0.10	
			1.00			1/2"	11.57	5.18	0.19	
						Ice	12.24	5.77	0.28	
KS24019-L112A	B	From Leg	4.00	0.0000	109.00	2" Ice				
			0.00			No Ice	0.10	0.10	0.01	
			2.00			1/2"	0.18	0.18	0.01	
						Ice	0.26	0.26	0.01	
TD-RRH8X20-25	A	From Leg	4.00	0.0000	109.00	2" Ice				
			0.00			No Ice	4.05	1.53	0.07	
			1.00			1/2"	4.30	1.71	0.10	
						Ice	4.56	1.90	0.13	
TD-RRH8X20-25	B	From Leg	4.00	0.0000	109.00	2" Ice				
			0.00			No Ice	4.05	1.53	0.07	
			1.00			1/2"	4.30	1.71	0.10	
						Ice	4.56	1.90	0.13	
TD-RRH8X20-25	C	From Leg	4.00	0.0000	109.00	2" Ice				
			0.00			No Ice	4.05	1.53	0.07	
			1.00			1/2"	4.30	1.71	0.10	
						Ice	4.56	1.90	0.13	
PCS 1900MHZ 4X45W 65MHZ	A	From Leg	4.00	0.0000	109.00	2" Ice				
			0.00			No Ice	2.31	2.23	0.06	
			1.00			1/2"	2.52	2.43	0.08	
						Ice	2.73	2.64	0.11	
PCS 1900MHZ 4X45W 65MHZ	B	From Leg	4.00	0.0000	109.00	2" Ice				
			0.00			No Ice	2.31	2.23	0.06	
			1.00			1/2"	2.52	2.43	0.08	
						Ice	2.73	2.64	0.11	
PCS 1900MHZ 4X45W 65MHZ	C	From Leg	4.00	0.0000	109.00	2" Ice				
			0.00			No Ice	2.31	2.23	0.06	
			1.00			1/2"	2.52	2.43	0.08	
						Ice	2.73	2.64	0.11	
(2) RRH2X50-800	A	From Leg	4.00	0.0000	109.00	2" Ice				
			0.00			No Ice	1.70	1.28	0.05	
			1.00			1/2"	1.86	1.43	0.07	
						Ice	2.03	1.58	0.09	
(2) RRH2X50-800	B	From Leg	4.00	0.0000	109.00	2" Ice				
			0.00			No Ice	1.70	1.28	0.05	
			1.00			1/2"	1.86	1.43	0.07	
						Ice	2.03	1.58	0.09	
(2) RRH2X50-800	C	From Leg	4.00	0.0000	109.00	2" Ice				
			0.00			No Ice	1.70	1.28	0.05	
			1.00			1/2"	1.86	1.43	0.07	
						Ice	2.03	1.58	0.09	
(3) 6' x 2" Mount Pipe	A	From Leg	4.00	0.0000	109.00	2" Ice				
			0.00			No Ice	1.43	1.43	0.02	
			0.00			1/2"	1.92	1.92	0.03	
						Ice	2.29	2.29	0.05	
			1" Ice	3.06	3.06	0.09				

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA}		Weight	
			Horz	Lateral	Vert			Front	Side		
			ft	ft	ft	°	ft	ft ²	ft ²	K	
(3) 6' x 2" Mount Pipe	B	From Leg	4.00	0.00	0.00	0.0000	109.00	2" Ice			
								No Ice	1.43	1.43	0.02
								1/2"	1.92	1.92	0.03
								Ice	2.29	2.29	0.05
								1" Ice	3.06	3.06	0.09
(3) 6' x 2" Mount Pipe	C	From Leg	4.00	0.00	0.00	0.0000	109.00	2" Ice			
								No Ice	1.43	1.43	0.02
								1/2"	1.92	1.92	0.03
								Ice	2.29	2.29	0.05
								1" Ice	3.06	3.06	0.09
Platform Mount [LP 1201-1_KCKR]	C	None			0.0000	109.00	2" Ice				
							No Ice	29.60	29.60	2.38	
							1/2"	36.33	36.33	3.07	
							Ice	43.26	43.26	3.86	
							1" Ice	57.72	57.72	5.75	
*** 99 R ***											
(2) LPA-80080/4CF w/ Mount Pipe	A	From Leg	4.00	0.00	0.00	0.0000	99.00	No Ice	2.86	6.57	0.03
								1/2"	3.22	7.19	0.08
								Ice	3.59	7.84	0.13
								1" Ice	4.34	9.17	0.25
								2" Ice			
(2) LPA-80080/4CF w/ Mount Pipe	B	From Leg	4.00	0.00	0.00	0.0000	99.00	No Ice	2.86	6.57	0.03
								1/2"	3.22	7.19	0.08
								Ice	3.59	7.84	0.13
								1" Ice	4.34	9.17	0.25
								2" Ice			
(2) LPA-80080/4CF w/ Mount Pipe	C	From Leg	4.00	0.00	0.00	0.0000	99.00	No Ice	2.86	6.57	0.03
								1/2"	3.22	7.19	0.08
								Ice	3.59	7.84	0.13
								1" Ice	4.34	9.17	0.25
								2" Ice			
(2) JAHH-65B-R3B w/ Mount Pipe	A	From Leg	4.00	0.00	0.00	0.0000	99.00	No Ice	5.50	4.38	0.10
								1/2"	5.97	4.84	0.17
								Ice	6.45	5.30	0.25
								1" Ice	7.44	6.26	0.46
								2" Ice			
(2) JAHH-65B-R3B w/ Mount Pipe	B	From Leg	4.00	0.00	0.00	0.0000	99.00	No Ice	5.50	4.38	0.10
								1/2"	5.97	4.84	0.17
								Ice	6.45	5.30	0.25
								1" Ice	7.44	6.26	0.46
								2" Ice			
(2) JAHH-65B-R3B w/ Mount Pipe	C	From Leg	4.00	0.00	0.00	0.0000	99.00	No Ice	5.50	4.38	0.10
								1/2"	5.97	4.84	0.17
								Ice	6.45	5.30	0.25
								1" Ice	7.44	6.26	0.46
								2" Ice			
KS24019-L112A	B	From Leg	4.00	0.00	2.00	0.0000	99.00	No Ice	0.10	0.10	0.01
								1/2"	0.18	0.18	0.01
								Ice	0.26	0.26	0.01
								1" Ice	0.42	0.42	0.01
								2" Ice			
RRH4X45-AWS4 B66	A	From Leg	4.00	0.00	0.00	0.0000	99.00	No Ice	2.66	1.59	0.06
								1/2"	2.88	1.77	0.08
								Ice	3.10	1.96	0.11
								1" Ice	3.58	2.36	0.17
								2" Ice			
RRH4X45-AWS4 B66	B	From Leg	4.00	0.00	0.00	0.0000	99.00	No Ice	2.66	1.59	0.06
								1/2"	2.88	1.77	0.08
								Ice	3.10	1.96	0.11
								1" Ice	3.58	2.36	0.17
								2" Ice			
RRH4X45-AWS4 B66	C	From Leg	4.00	0.00	0.00	0.0000	99.00	No Ice	2.66	1.59	0.06
								1/2"	2.88	1.77	0.08
								Ice	3.10	1.96	0.11

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft ²	ft ²	K	
AHCA	A	From Leg	4.00	0.00	0.0000	99.00	1" Ice	3.58	2.36	0.17
							2" Ice			
							No Ice	1.29	0.72	0.04
							1/2" Ice	1.43	0.83	0.05
							Ice	1.58	0.96	0.06
AHCA	B	From Leg	4.00	0.00	0.0000	99.00	1" Ice	1.90	1.22	0.09
							2" Ice			
							No Ice	1.29	0.72	0.04
							1/2" Ice	1.43	0.83	0.05
							Ice	1.58	0.96	0.06
AHCA	C	From Leg	4.00	0.00	0.0000	99.00	1" Ice	1.90	1.22	0.09
							2" Ice			
							No Ice	1.29	0.72	0.04
							1/2" Ice	1.43	0.83	0.05
							Ice	1.58	0.96	0.06
B13 RRH 4X30	A	From Leg	4.00	0.00	0.0000	99.00	1" Ice	1.90	1.22	0.09
							2" Ice			
							No Ice	2.06	1.32	0.06
							1/2" Ice	2.24	1.48	0.07
							Ice	2.43	1.64	0.09
B13 RRH 4X30	B	From Leg	4.00	0.00	0.0000	99.00	1" Ice	2.84	2.00	0.14
							2" Ice			
							No Ice	2.06	1.32	0.06
							1/2" Ice	2.24	1.48	0.07
							Ice	2.43	1.64	0.09
B13 RRH 4X30	C	From Leg	4.00	0.00	0.0000	99.00	1" Ice	2.84	2.00	0.14
							2" Ice			
							No Ice	2.06	1.32	0.06
							1/2" Ice	2.24	1.48	0.07
							Ice	2.43	1.64	0.09
(2) RRFDC-3315-PF-48	B	From Leg	4.00	0.00	0.0000	99.00	1" Ice	4.34	3.05	0.17
							2" Ice			
							No Ice	3.36	2.19	0.03
							1/2" Ice	3.60	2.39	0.06
							Ice	3.84	2.61	0.09
Platform Mount [LP 602-1_KCKR]	C	None			0.0000	99.00	1" Ice	69.85	69.85	5.40
							2" Ice			
							No Ice	42.30	42.30	1.62
							1/2" Ice	49.04	49.04	2.38
							Ice	55.87	55.87	3.27
88 R APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	88.00	1" Ice	17.82	9.67	0.79
							2" Ice			
							No Ice	14.69	6.87	0.19
							1/2" Ice	15.46	7.55	0.31
							Ice	16.23	8.25	0.46
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	88.00	1" Ice	17.82	9.67	0.79
							2" Ice			
							No Ice	14.69	6.87	0.19
							1/2" Ice	15.46	7.55	0.31
							Ice	16.23	8.25	0.46
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	88.00	1" Ice	17.82	9.67	0.79
							2" Ice			
							No Ice	14.69	6.87	0.19
							1/2" Ice	15.46	7.55	0.31
							Ice	16.23	8.25	0.46
AIR 32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	88.00	1" Ice	8.57	9.06	0.44
							2" Ice			
							No Ice	6.75	6.07	0.15
							1/2" Ice	7.20	6.87	0.21
							Ice	7.65	7.58	0.28
AIR 32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	88.00	1" Ice	8.57	9.06	0.44
							2" Ice			
							No Ice	6.75	6.07	0.15
							1/2" Ice	7.20	6.87	0.21

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			2.00			Ice 7.65	7.58	0.28
						1" Ice 8.57	9.06	0.44
						2" Ice		
AIR 32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.00	0.0000	88.00	No Ice 6.75	6.07	0.15
			0.00			1/2" 7.20	6.87	0.21
			2.00			Ice 7.65	7.58	0.28
						1" Ice 8.57	9.06	0.44
						2" Ice		
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00	0.0000	88.00	No Ice 3.14	2.59	0.11
			0.00			1/2" 3.45	2.88	0.16
			2.00			Ice 3.77	3.19	0.22
						1" Ice 4.43	3.84	0.37
						2" Ice		
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00	0.0000	88.00	No Ice 3.14	2.59	0.11
			0.00			1/2" 3.45	2.88	0.16
			2.00			Ice 3.77	3.19	0.22
						1" Ice 4.43	3.84	0.37
						2" Ice		
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Face	4.00	0.0000	88.00	No Ice 3.14	2.59	0.11
			0.00			1/2" 3.45	2.88	0.16
			2.00			Ice 3.77	3.19	0.22
						1" Ice 4.43	3.84	0.37
						2" Ice		
RADIO 4449 B12/B71	A	From Leg	4.00	0.0000	88.00	No Ice 1.65	1.16	0.07
			0.00			1/2" 1.81	1.30	0.09
			2.00			Ice 1.98	1.45	0.11
						1" Ice 2.34	1.76	0.16
						2" Ice		
RADIO 4449 B12/B71	B	From Leg	4.00	0.0000	88.00	No Ice 1.65	1.16	0.07
			0.00			1/2" 1.81	1.30	0.09
			2.00			Ice 1.98	1.45	0.11
						1" Ice 2.34	1.76	0.16
						2" Ice		
RADIO 4449 B12/B71	C	From Leg	4.00	0.0000	88.00	No Ice 1.65	1.16	0.07
			0.00			1/2" 1.81	1.30	0.09
			2.00			Ice 1.98	1.45	0.11
						1" Ice 2.34	1.76	0.16
						2" Ice		
T-Arm Mount [TA 602-3]	B	None		0.0000	88.00	No Ice 13.40	13.40	0.77
						1/2" 16.44	16.44	1.00
						Ice 19.70	19.70	1.29
						1" Ice 25.86	25.86	2.05
						2" Ice		
Miscellaneous [NA 507-1]	C	None		0.0000	88.00	No Ice 4.56	4.56	0.25
						1/2" 6.39	6.39	0.31
						Ice 8.18	8.18	0.40
						1" Ice 11.66	11.66	0.66
						2" Ice		

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice

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

Maximum Member Forces

Sectio n No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	120 - 97	Pole	Max Tension	2	0.00	0.00	-0.00
			Max. Compression	26	-21.15	0.72	-0.83
			Max. Mx	20	-10.13	105.89	-0.69
			Max. My	14	-10.14	0.45	-105.63
			Max. Vy	8	7.84	-105.19	-0.44
			Max. Vx	14	7.81	0.45	-105.63
			Max. Torque	7			-0.40
L2	97 - 48	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47.43	-1.52	-2.87
			Max. Mx	8	-23.72	-812.96	-2.34
			Max. My	14	-23.73	-1.72	-811.13
			Max. Vy	8	16.85	-812.96	-2.34
			Max. Vx	14	16.81	-1.72	-811.13
			Max. Torque	7			-0.90
L3	48 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-63.87	-0.94	-3.21

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-36.29	-1775.54	-3.90
			Max. My	14	-36.29	-3.17	-1771.91
			Max. Vy	8	19.49	-1775.54	-3.90
			Max. Vx	14	19.45	-3.17	-1771.91
			Max. Torque	7			-0.90

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	32	63.87	-2.91	-5.03
	Max. H _x	20	36.30	19.46	0.03
	Max. H _z	2	36.30	0.03	19.43
	Max. M _x	2	1769.39	0.03	19.43
	Max. M _z	8	1775.54	-19.46	-0.03
	Max. Torsion	19	0.90	16.84	-9.69
	Min. Vert	5	27.23	-9.71	16.81
	Min. H _x	8	36.30	-19.46	-0.03
	Min. H _z	14	36.30	-0.03	-19.43
	Min. M _x	14	-1771.91	-0.03	-19.43
	Min. M _z	20	-1774.49	19.46	0.03
	Min. Torsion	7	-0.90	-16.84	9.69

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	30.25	0.00	0.00	0.98	-0.41	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	36.30	-0.03	-19.43	-1769.39	2.12	0.35
0.9 Dead+1.0 Wind 0 deg - No Ice	27.23	-0.03	-19.43	-1751.38	2.23	0.36
1.2 Dead+1.0 Wind 30 deg - No Ice	36.30	9.71	-16.81	-1530.86	-885.75	0.72
0.9 Dead+1.0 Wind 30 deg - No Ice	27.23	9.71	-16.81	-1515.31	-876.43	0.73
1.2 Dead+1.0 Wind 60 deg - No Ice	36.30	16.84	-9.69	-881.78	-1536.42	0.90
0.9 Dead+1.0 Wind 60 deg - No Ice	27.23	16.84	-9.69	-872.96	-1520.36	0.90
1.2 Dead+1.0 Wind 90 deg - No Ice	36.30	19.46	0.03	3.90	-1775.54	0.84
0.9 Dead+1.0 Wind 90 deg - No Ice	27.23	19.46	0.03	3.54	-1757.00	0.83
1.2 Dead+1.0 Wind 120 deg - No Ice	36.30	16.87	9.74	888.87	-1539.06	0.55
0.9 Dead+1.0 Wind 120 deg - No Ice	27.23	16.87	9.74	879.34	-1522.97	0.54
1.2 Dead+1.0 Wind 150 deg - No Ice	36.30	9.76	16.84	1536.01	-890.33	0.12
0.9 Dead+1.0 Wind 150 deg - No Ice	27.23	9.76	16.84	1519.77	-880.96	0.11
1.2 Dead+1.0 Wind 180 deg - No Ice	36.30	0.03	19.43	1771.91	-3.17	-0.35
0.9 Dead+1.0 Wind 180 deg - No Ice	27.23	0.03	19.43	1753.23	-3.00	-0.36
1.2 Dead+1.0 Wind 210 deg - No Ice	36.30	-9.71	16.81	1533.37	884.70	-0.72
0.9 Dead+1.0 Wind 210 deg - No Ice	27.23	-9.71	16.81	1517.16	875.66	-0.73

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
- No Ice						
1.2 Dead+1.0 Wind 240 deg	36.30	-16.84	9.69	884.30	1535.37	-0.90
- No Ice						
0.9 Dead+1.0 Wind 240 deg	27.23	-16.84	9.69	874.81	1519.59	-0.90
- No Ice						
1.2 Dead+1.0 Wind 270 deg	36.30	-19.46	-0.03	-1.39	1774.49	-0.84
- No Ice						
0.9 Dead+1.0 Wind 270 deg	27.23	-19.46	-0.03	-1.69	1756.23	-0.83
- No Ice						
1.2 Dead+1.0 Wind 300 deg	36.30	-16.87	-9.74	-886.36	1538.01	-0.55
- No Ice						
0.9 Dead+1.0 Wind 300 deg	27.23	-16.87	-9.74	-877.49	1522.20	-0.54
- No Ice						
1.2 Dead+1.0 Wind 330 deg	36.30	-9.76	-16.84	-1533.50	889.28	-0.12
- No Ice						
0.9 Dead+1.0 Wind 330 deg	27.23	-9.76	-16.84	-1517.92	880.19	-0.11
- No Ice						
1.2 Dead+1.0 Ice+1.0 Temp	63.87	0.00	0.00	3.21	-0.94	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	63.87	-0.01	-5.81	-521.76	-0.48	-0.55
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	63.87	2.90	-5.03	-451.16	-263.54	-0.21
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	63.87	5.03	-2.90	-258.77	-456.24	0.18
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	63.87	5.81	0.01	3.84	-526.96	0.53
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	63.87	5.04	2.91	266.32	-456.75	0.73
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	63.87	2.91	5.03	458.34	-264.41	0.74
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	63.87	0.01	5.81	528.43	-1.49	0.55
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	63.87	-2.90	5.03	457.83	261.56	0.21
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	63.87	-5.03	2.90	265.45	454.27	-0.18
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	63.87	-5.81	-0.01	2.83	524.99	-0.53
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	63.87	-5.04	-2.91	-259.65	454.78	-0.73
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	63.87	-2.91	-5.03	-451.66	262.44	-0.74
Dead+Wind 0 deg - Service	30.25	-0.01	-4.57	-413.20	0.18	0.08
Dead+Wind 30 deg - Service	30.25	2.29	-3.96	-357.39	-207.53	0.17
Dead+Wind 60 deg - Service	30.25	3.97	-2.28	-205.55	-359.75	0.21
Dead+Wind 90 deg - Service	30.25	4.58	0.01	1.66	-415.69	0.20
Dead+Wind 120 deg - Service	30.25	3.97	2.29	208.69	-360.37	0.13
Dead+Wind 150 deg - Service	30.25	2.30	3.96	360.09	-208.60	0.03
Dead+Wind 180 deg - Service	30.25	0.01	4.57	415.28	-1.05	-0.08
Dead+Wind 210 deg - Service	30.25	-2.29	3.96	359.47	206.66	-0.17
Dead+Wind 240 deg - Service	30.25	-3.97	2.28	207.62	358.88	-0.21
Dead+Wind 270 deg - Service	30.25	-4.58	-0.01	0.42	414.82	-0.20
Dead+Wind 300 deg - Service	30.25	-3.97	-2.29	-206.62	359.50	-0.13
Dead+Wind 330 deg - Service	30.25	-2.30	-3.96	-358.01	207.73	-0.03

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-30.25	0.00	0.00	30.25	0.00	0.000%
2	-0.03	-36.30	-19.43	0.03	36.30	19.43	0.000%
3	-0.03	-27.23	-19.43	0.03	27.23	19.43	0.000%
4	9.71	-36.30	-16.81	-9.71	36.30	16.81	0.000%
5	9.71	-27.23	-16.81	-9.71	27.23	16.81	0.000%
6	16.84	-36.30	-9.69	-16.84	36.30	9.69	0.000%
7	16.84	-27.23	-9.69	-16.84	27.23	9.69	0.000%
8	19.46	-36.30	0.03	-19.46	36.30	-0.03	0.000%
9	19.46	-27.23	0.03	-19.46	27.23	-0.03	0.000%
10	16.87	-36.30	9.74	-16.87	36.30	-9.74	0.000%
11	16.87	-27.23	9.74	-16.87	27.23	-9.74	0.000%
12	9.76	-36.30	16.84	-9.76	36.30	-16.84	0.000%
13	9.76	-27.23	16.84	-9.76	27.23	-16.84	0.000%
14	0.03	-36.30	19.43	-0.03	36.30	-19.43	0.000%
15	0.03	-27.23	19.43	-0.03	27.23	-19.43	0.000%
16	-9.71	-36.30	16.81	9.71	36.30	-16.81	0.000%
17	-9.71	-27.23	16.81	9.71	27.23	-16.81	0.000%
18	-16.84	-36.30	9.69	16.84	36.30	-9.69	0.000%
19	-16.84	-27.23	9.69	16.84	27.23	-9.69	0.000%
20	-19.46	-36.30	-0.03	19.46	36.30	0.03	0.000%
21	-19.46	-27.23	-0.03	19.46	27.23	0.03	0.000%
22	-16.87	-36.30	-9.74	16.87	36.30	9.74	0.000%
23	-16.87	-27.23	-9.74	16.87	27.23	9.74	0.000%
24	-9.76	-36.30	-16.84	9.76	36.30	16.84	0.000%
25	-9.76	-27.23	-16.84	9.76	27.23	16.84	0.000%
26	0.00	-63.87	0.00	-0.00	63.87	-0.00	0.000%
27	-0.01	-63.87	-5.81	0.01	63.87	5.81	0.000%
28	2.90	-63.87	-5.03	-2.90	63.87	5.03	0.000%
29	5.03	-63.87	-2.90	-5.03	63.87	2.90	0.000%
30	5.81	-63.87	0.01	-5.81	63.87	-0.01	0.000%
31	5.04	-63.87	2.91	-5.04	63.87	-2.91	0.000%
32	2.91	-63.87	5.03	-2.91	63.87	-5.03	0.000%
33	0.01	-63.87	5.81	-0.01	63.87	-5.81	0.000%
34	-2.90	-63.87	5.03	2.90	63.87	-5.03	0.000%
35	-5.03	-63.87	2.90	5.03	63.87	-2.90	0.000%
36	-5.81	-63.87	-0.01	5.81	63.87	0.01	0.000%
37	-5.04	-63.87	-2.91	5.04	63.87	2.91	0.000%
38	-2.91	-63.87	-5.03	2.91	63.87	5.03	0.000%
39	-0.01	-30.25	-4.57	0.01	30.25	4.57	0.000%
40	2.29	-30.25	-3.96	-2.29	30.25	3.96	0.000%
41	3.97	-30.25	-2.28	-3.97	30.25	2.28	0.000%
42	4.58	-30.25	0.01	-4.58	30.25	-0.01	0.000%
43	3.97	-30.25	2.29	-3.97	30.25	-2.29	0.000%
44	2.30	-30.25	3.96	-2.30	30.25	-3.96	0.000%
45	0.01	-30.25	4.57	-0.01	30.25	-4.57	0.000%
46	-2.29	-30.25	3.96	2.29	30.25	-3.96	0.000%
47	-3.97	-30.25	2.28	3.97	30.25	-2.28	0.000%
48	-4.58	-30.25	-0.01	4.58	30.25	0.01	0.000%
49	-3.97	-30.25	-2.29	3.97	30.25	2.29	0.000%
50	-2.30	-30.25	-3.96	2.30	30.25	3.96	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00047923
3	Yes	4	0.00000001	0.00031071
4	Yes	5	0.00000001	0.00075658
5	Yes	5	0.00000001	0.00036652
6	Yes	5	0.00000001	0.00070849
7	Yes	5	0.00000001	0.00034167
8	Yes	4	0.00000001	0.00099591
9	Yes	4	0.00000001	0.00065404
10	Yes	5	0.00000001	0.00075938

11	Yes	5	0.00000001	0.00036636
12	Yes	5	0.00000001	0.00074221
13	Yes	5	0.00000001	0.00035799
14	Yes	4	0.00000001	0.00056385
15	Yes	4	0.00000001	0.00036987
16	Yes	5	0.00000001	0.00071555
17	Yes	5	0.00000001	0.00034467
18	Yes	5	0.00000001	0.00076641
19	Yes	5	0.00000001	0.00037078
20	Yes	4	0.00000001	0.00090385
21	Yes	4	0.00000001	0.00059236
22	Yes	5	0.00000001	0.00072347
23	Yes	5	0.00000001	0.00034939
24	Yes	5	0.00000001	0.00073785
25	Yes	5	0.00000001	0.00035648
26	Yes	4	0.00000001	0.00003224
27	Yes	5	0.00000001	0.00029048
28	Yes	5	0.00000001	0.00037244
29	Yes	5	0.00000001	0.00037084
30	Yes	5	0.00000001	0.00029721
31	Yes	5	0.00000001	0.00039015
32	Yes	5	0.00000001	0.00038079
33	Yes	5	0.00000001	0.00029732
34	Yes	5	0.00000001	0.00037846
35	Yes	5	0.00000001	0.00038093
36	Yes	5	0.00000001	0.00029395
37	Yes	5	0.00000001	0.00036648
38	Yes	5	0.00000001	0.00037440
39	Yes	4	0.00000001	0.00004238
40	Yes	4	0.00000001	0.00023474
41	Yes	4	0.00000001	0.00019244
42	Yes	4	0.00000001	0.00006192
43	Yes	4	0.00000001	0.00023266
44	Yes	4	0.00000001	0.00021691
45	Yes	4	0.00000001	0.00004357
46	Yes	4	0.00000001	0.00019815
47	Yes	4	0.00000001	0.00024409
48	Yes	4	0.00000001	0.00006061
49	Yes	4	0.00000001	0.00019958
50	Yes	4	0.00000001	0.00021174

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 97	11.323	43	0.7853	0.0013
L2	100.62 - 48	8.191	43	0.7445	0.0013
L3	52.96 - 0	2.235	43	0.3940	0.0004

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
119.00	7770.00	43	11.159	0.7840	0.0013	55064
109.00	ETCR-654L12H6 w/ Mount Pipe	43	9.526	0.7682	0.0013	25029
99.00	(2) LPA-80080/4CF w/ Mount Pipe	43	7.939	0.7382	0.0013	13498
88.00	APXVAARR24_43-U-NA20 w/ Mount Pipe	43	6.296	0.6792	0.0011	9843

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 97	48.329	10	3.3503	0.0055
L2	100.62 - 48	34.964	10	3.1787	0.0054
L3	52.96 - 0	9.542	10	1.6831	0.0016

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
119.00	7770.00	10	47.628	3.3450	0.0055	13135
109.00	ETCR-654L12H6 w/ Mount Pipe	10	40.658	3.2793	0.0055	5970
99.00	(2) LPA-80080/4CF w/ Mount Pipe	10	33.889	3.1515	0.0053	3213
88.00	APXVAARR24_43-U-NA20 w/ Mount Pipe	10	26.876	2.8998	0.0047	2329

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
L1	120 - 97 (1)	TP28.93x22.69x0.1875	23.00	0.00	0.0	16.520 9	-10.13	966.47	0.010
L2	97 - 48 (2)	TP39.7x27.5729x0.25	52.62	0.00	0.0	30.396 5	-23.72	1778.20	0.013
L3	48 - 0 (3)	TP51.04x38.0569x0.3125	52.96	0.00	0.0	50.315 3	-36.29	2943.45	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{nx} kip-ft	Ratio M _{ux} / φM _{nx}	M _{uy} kip-ft	φM _{ny} kip-ft	Ratio M _{uy} / φM _{ny}
L1	120 - 97 (1)	TP28.93x22.69x0.1875	106.11	608.22	0.174	0.00	608.22	0.000
L2	97 - 48 (2)	TP39.7x27.5729x0.25	813.86	1521.46	0.535	0.00	1521.46	0.000
L3	48 - 0 (3)	TP51.04x38.0569x0.3125	1777.31	3247.13	0.547	0.00	3247.13	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V _u K	φV _n K	Ratio V _u / φV _n	Actual T _u kip-ft	φT _n kip-ft	Ratio T _u / φT _n
L1	120 - 97 (1)	TP28.93x22.69x0.1875	7.84	289.94	0.027	0.04	704.88	0.000
L2	97 - 48 (2)	TP39.7x27.5729x0.25	16.86	533.46	0.032	0.41	1789.61	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L3	48 - 0 (3)	TP51.04x38.0569x0.3125	19.50	883.03	0.022	0.55	3922.84	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	120 - 97 (1)	0.010	0.174	0.000	0.027	0.000	0.186	1.050	4.8.2
L2	97 - 48 (2)	0.013	0.535	0.000	0.032	0.000	0.549	1.050	4.8.2
L3	48 - 0 (3)	0.012	0.547	0.000	0.022	0.000	0.560	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	120 - 97	Pole	TP28.93x22.69x0.1875	1	-10.13	1014.80	17.7	Pass
L2	97 - 48	Pole	TP39.7x27.5729x0.25	2	-23.72	1867.11	52.3	Pass
L3	48 - 0	Pole	TP51.04x38.0569x0.3125	3	-36.29	3090.62	53.3	Pass
Summary								
Pole (L3)							53.3	Pass
RATING =							53.3	Pass

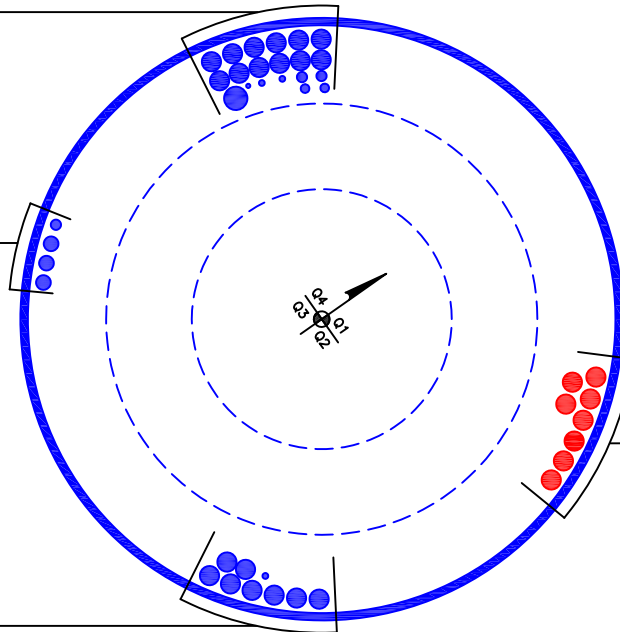
APPENDIX B
BASE LEVEL DRAWING



- (OTHER CONSIDERED EQUIPMENT)
- (1) 3/8" TO 119 FT LEVEL
 - (2) 1/2" TO 119 FT LEVEL
 - (2) 3/4" TO 119 FT LEVEL
 - (2) 7/8" TO 119 FT LEVEL
 - (12) 1-5/8" TO 119 FT LEVEL
 - (1) 2" TO 119 FT LEVEL

- (OTHER CONSIDERED EQUIPMENT)
- (1) 7/8" TO 109 FT LEVEL
 - (3) 1-1/4" TO 109 FT LEVEL

- (OTHER CONSIDERED EQUIPMENT)
- (1) 1/2" TO 99 FT LEVEL
 - (8) 1-5/8" TO 99 FT LEVEL



- (PROPOSED EQUIPMENT CONFIGURATION)
- (8) 1-5/8" TO 88 FT LEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

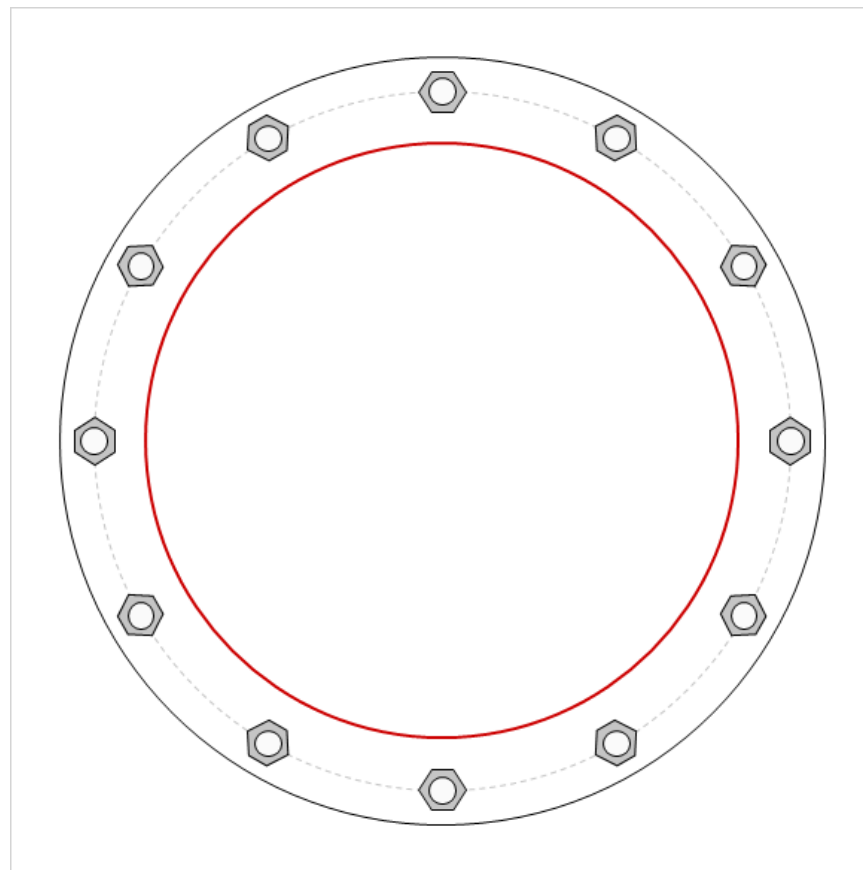


Site Info	
BU #	845993
Site Name	RLINGTON-NEPAUG RC
Order #	482076 Rev 1

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	4.125

Applied Loads	
Moment (kip-ft)	1777.31
Axial Force (kips)	36.29
Shear Force (kips)	19.50

*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
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Anchor Rod Data
(12) 2-1/4" ϕ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 60" BC
Base Plate Data
66" OD x 2.25" Plate (A572-60; $F_y=60$ ksi, $F_u=75$ ksi)
Stiffener Data
N/A
Pole Data
51.04" x 0.3125" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)

Anchor Rod Summary (units of kips, kip-in)		
$P_{u_c} = 121.44$	$\phi P_{n_c} = 268.39$	Stress Rating
$V_u = 1.63$	$\phi V_n = 120.77$	46.4%
$M_u = 4.36$	$\phi M_n = 128.14$	Pass
Base Plate Summary		
Max Stress (ksi):	20.34	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	35.9%	Pass

Pier and Pad Foundation



BU #: 845993
 Site Name: BURLINGTON-NEP
 App. Number: 482076 Rev 1

TIA-222 Revision: H
 Tower Type: Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp} :	36	kips
Base Shear, Vu_{comp} :	19	kips
Moment, M_u :	1777	ft-kips
Tower Height, H :	120	ft
BP Dist. Above Fdn, bp_{dist} :	6.25	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	155.14	19.00	11.7%	Pass
<i>Bearing Pressure (ksf)</i>	12.40	1.34	10.3%	Pass
<i>Overturning (kip*ft)</i>	4733.27	1899.00	40.1%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	3981.76	1832.10	43.8%	Pass
<i>Pier Compression (kip)</i>	31187.52	61.58	0.2%	Pass
<i>Pad Flexure (kip*ft)</i>	3178.02	638.03	19.1%	Pass
<i>Pad Shear - 1-way (kips)</i>	896.51	98.69	10.5%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.190	0.019	9.6%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	3527.78	1099.26	29.7%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$:	7	ft
Ext. Above Grade, E :	0.9	ft
Pier Rebar Size, Sc :	8	
Pier Rebar Quantity, mc :	30	
Pier Tie/Spiral Size, St :	4	
Pier Tie/Spiral Quantity, mt :	4	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	3	in

*Rating per TIA-222-H Section 15.5

Soil Rating*:	40.1%
Structural Rating*:	43.8%

Pad Properties		
Depth, D :	5	ft
Pad Width, W_1 :	25	ft
Pad Thickness, T :	3	ft
Pad Rebar Size (Top dir.2), Sp_{top2} :	8	
Pad Rebar Quantity (Top dir. 2), mp_{top2} :	22	
Pad Rebar Size (Bottom dir. 2), Sp_2 :	8	
Pad Rebar Quantity (Bottom dir. 2), mp_2 :	29	
Pad Clear Cover, cc_{pad} :	3	in

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

Soil Properties		
Total Soil Unit Weight, γ :	120	pcf
Ultimate Net Bearing, Q_{net} :	16.000	ksf
Cohesion, C_u :	0.000	ksf
Friction Angle, ϕ :	30	degrees
SPT Blow Count, N_{blows} :	27	
Base Friction, μ :	0.45	
Neglected Depth, N :	4.17	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw :	4	ft

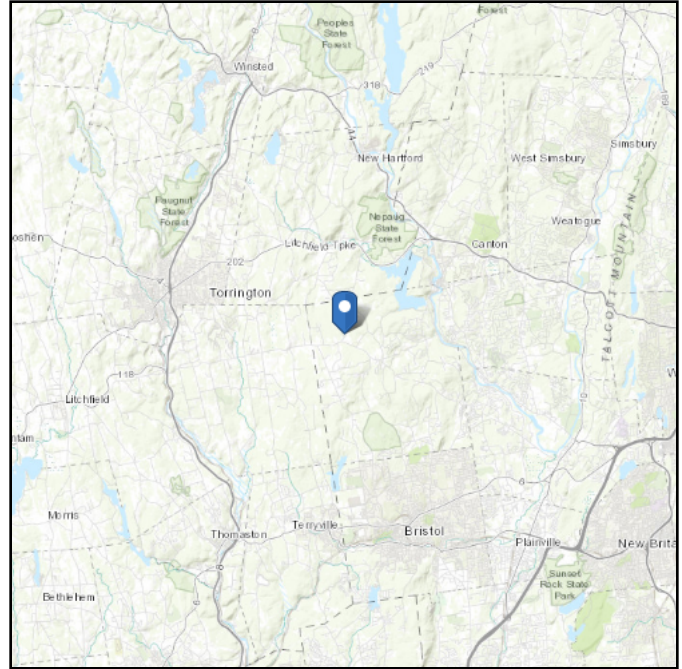
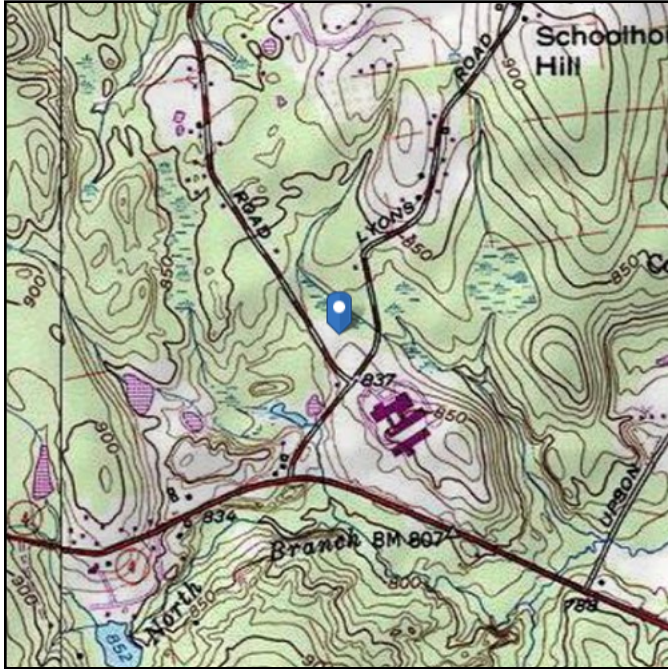
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ASCE 7 Hazards Report

Address:
No Address at This
Location

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

Elevation: 826.42 ft (NAVD 88)
Latitude: 41.782461
Longitude: -72.989633

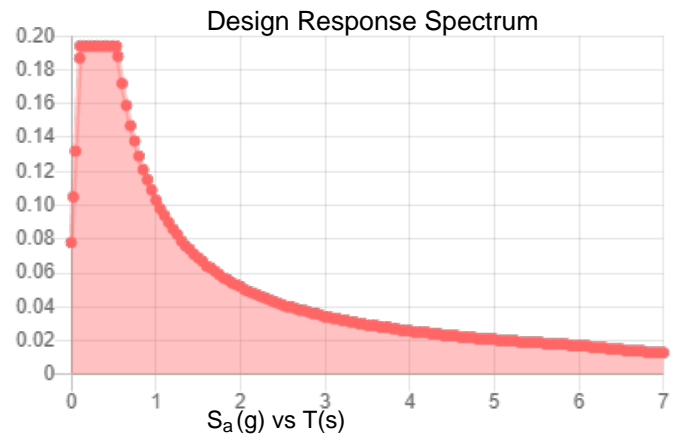
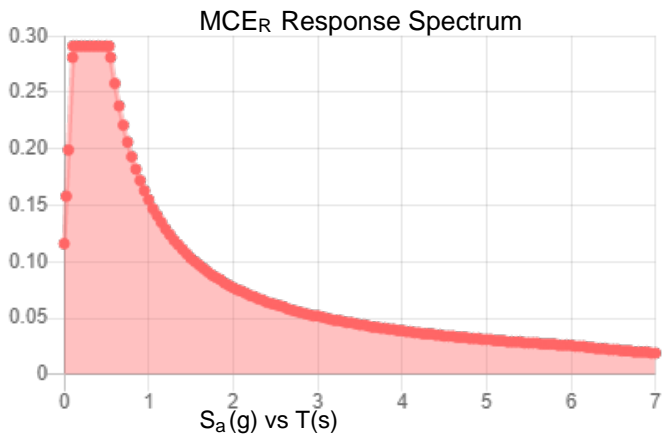


Site Soil Class: D - Stiff Soil

Results:

S_s :	0.182	S_{DS} :	0.194
S_1 :	0.064	S_{D1} :	0.103
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.092
S_{MS} :	0.291	PGA _M :	0.147
S_{M1} :	0.155	F _{PGA} :	1.6
		I_e :	1

Seismic Design Category B



Data Accessed:

Tue Nov 17 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: 5 F
Gust Speed: 50 mph

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

Date Accessed: Tue Nov 17 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.

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Exhibit E

Mount Analysis



Date: **November 12, 2020**

Darcy Tarr
Crown Castle
6325 Ardrey Kell Rd, Suite 600
Charlotte, NC 28277
(704) 405-6589

POD Group
1033 E Turkeyfoot Lake Rd. Suite 206
Akron, OH 44312
(330) 961.7432
mhoudeshell@podgrp.com

Subject: **Mount Analysis Report**

Carrier Designation: **Metro PCS**
Carrier Site Number: **CTHA509A**
Carrier Site Name: **AT&T Burlington Monopole**

Crown Castle Designation: **Crown Castle BU Number: 845993**
Crown Castle Site Name: BURLINGTON-NEPAUG ROAD
Crown Castle JDE Job Number: 561002
Crown Castle Order Number: 482076 Rev. 1

Engineering Firm Designation: **POD Report Designation: 20-71442**

Site Data: **12 Nepaug Road, Burlington, Hartford County, CT 06013**
Latitude 41°46'56.86" Longitude -72° 59' 22.68"

Structure Information: **Tower Height & Type: 119.5 ft Monopole**
Mount Elevation: 90.5 ft
Mount Type: 12.5 T-Arm

Dear Darcy Tarr,

POD Group is pleased to submit this "Mount Analysis Report" to determine the structural integrity of Metro PCS'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:

12.5 T-Arm (Multiple Sector) Sufficient*
***See Section 4.1 of this report for the loading and structural modifications required in order for the mount to support the loading listed in Table 1.**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount structural analysis prepared by: Logan Traphagen

Respectfully submitted by:

Jason Cheronis, PE
Connecticut PE#: 0032793



11/12/2020

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- 2) **ANALYSIS CRITERIA**
 - Table 1 – Proposed Equipment Configuration
- 3) **ANALYSIS PROCEDURE**
 - Table 2 – Documents Provided
 - 3.1) Analysis Method
 - 3.2) Assumptions
- 4) **ANALYSIS RESULTS**
 - Table 3 - Mount Component Stresses vs. Capacity
 - 4.1) Recommendations
- 5) **APPENDIX A**
 - Wire Frame and Rendered Models
- 6) **APPENDIX B**
 - Software Input Calculations
- 7) **APPENDIX C**
 - Software Analysis Output
- 8) **APPENDIX D**
 - Additional Calculations
- 9) **APPENDIX E**
 - Mount Modification Specification Sheets

1) INTRODUCTION

This mount is an existing 12.5 T-Arm mapped by Pier Structural engineering Corp. with proposed SitePro1 support rail kit (P/N: HRK14). This mount is installed at the 90.5 ft elevation on (3) sectors of the 119.5 ft Monopole.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC & 2018 CBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	120 mph
Exposure Category:	B
Topographic Factor at Base:	1.000
Topographic Factor at Mount:	1.000
Ice Thickness:	1.0 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.182
Seismic S₁:	0.064
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details	Note
90.5	90	3	ERICSSON	AIR 32 B2A/B66AA	12.5 T-Arm	1
		3	ERICSSON	ERICSSON AIR 21 B4A		
		3	RFS/CELWAVE	APXVAARR24_43-U-NA20		
		3	ERICSSON	RADIO 4449 B12/B71		

Notes:

- 1) Mount Centerline based on mount with proposed support rail kit installed

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	-	Crown Castle App 482076 Rev. 1 Dated: 5/7/2019	Crown Castle
Structural Analysis	-	Crown Castle Report #: 1787732 Dated: 9/10/2019	Crown Castle
Mount Mapping Report	-	Pier Structural Engineering Corp. Site #: 845993 Dated: 3/18/2019	Crown Castle
Previous Mount Analysis	-	Mastec Network Solutions. Project #: 18754-MNT1 Dated: 5/15/2019	Crown Castle
Construction Drawings	-	B+T GRP Project #: 137121.001.01 Dated: 8/1/2019	Crown Castle
Exposure & Topo Documentation	-	Crown Castle Site #: 845993 Dated: 2/8/2017	Crown Castle
Support Rail Specification Sheets	-	SitePro1 Part #: HRK14 Dated: 7/3/2014	SitePro1
Crossover Kit Specification Sheets	-	SitePro1 Part #: SCX2-K Dated: 7/1/2011	SitePro1

3.1) Analysis Method

RISA-3D (Version 17.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases. Selected output from the analysis are included in the Appendices.

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

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

3.2) Assumptions

- 1) The antenna mounting system was properly fabricated, installed, and maintained in good condition in accordance with its original design, TIA Standards, and/or manufacturer's specifications. This is not a condition assessment of the mount, structure, or foundation.
- 2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
- 3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
- 4) The weight of the mount was increased 10% in the analysis to account for connections, coax, and jumpers.
- 5) The purpose of this report is to assess the feasibility of adding appurtenances usually accompanied by transmission lines to the structure. POD Group does not analyze the fabrication of the mount or structure (including welding).
- 6) 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.
- 7) Proposed support rail kit connected 2'-0" above existing face member.
- 8) Steel grades have been assumed as follows, unless noted otherwise:
 - a. Angle, Plate ASTM A36 (GR 36)
 - b. HSS (Rectangular) ASTM 500 (GR B-46)
 - c. Pipe ASTM A53 (GR 35)
 - d. Connection Bolts ASTM A325

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and POD Group should be allowed to review any new information to determine its effect on the structural integrity of the mount.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (12.5 T-Arm)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1	Face	FACE3	90.5	35.2	Pass
	Rail	RAIL3		35.9	Pass
	Standoff	SO3		48.3	Pass
	Mount Pipe	MP GAMMA1		75.3	Pass
	Connection	CON1		38.9	Pass
	Flange Plate Bolts	-		7.1	Pass
	Flange Plate	-		28.6	Pass

Structure Rating (max from all components) =	75.3%
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Notes:

- 1) See additional documentation in "Appendix C – Software Analysis Output" and "Appendix D – Additional Calculations" for calculations supporting the % capacity

4.1) Recommendations

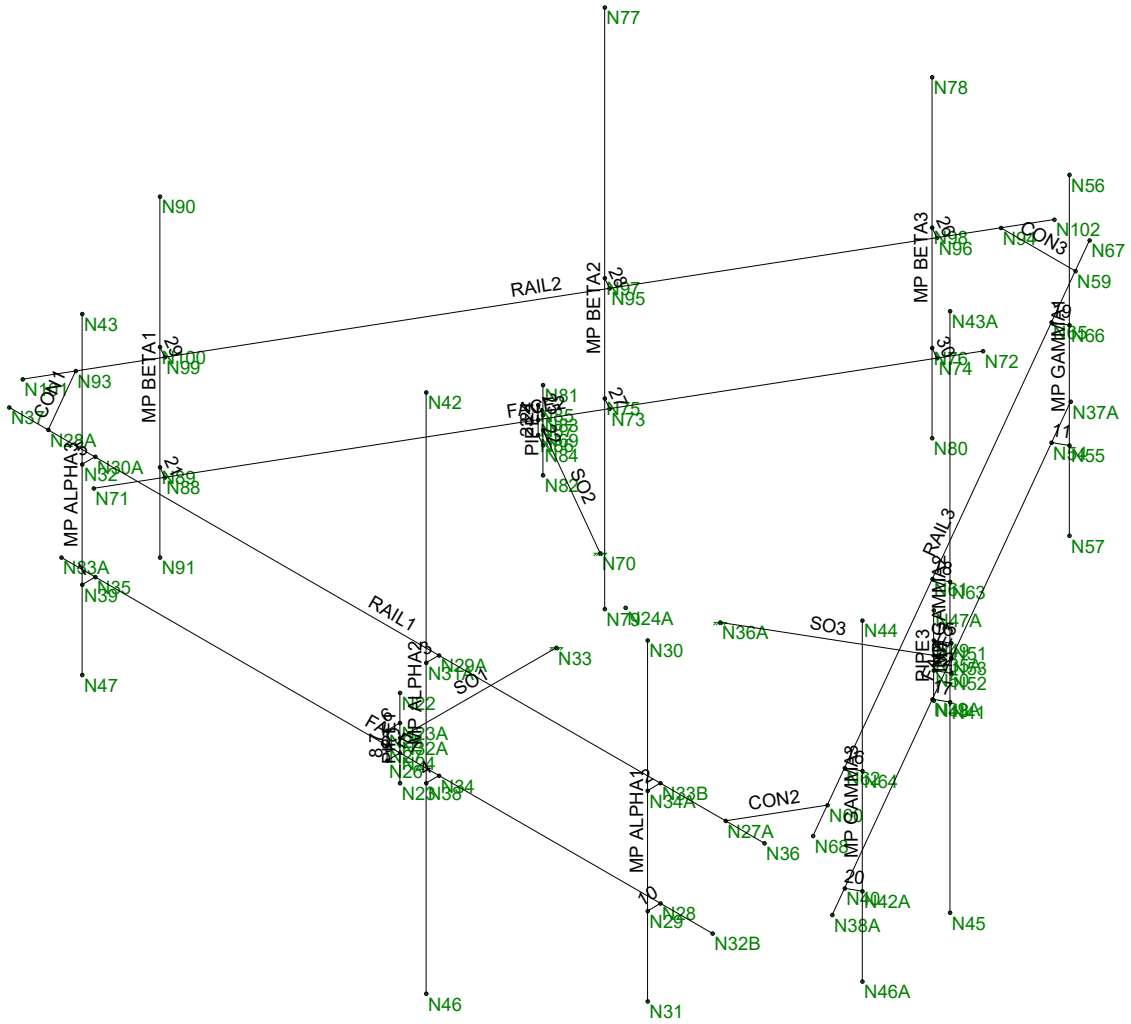
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the loading modification listed below must be completed.

1. Install SitePro1 support rail kit (P/N: HRK14) 2'-0" above existing face member with (3) additional SitePro1 crossover plates (P/N: SCX2-K).
 - o All critical measurements and manufacturer specifications for the above specified modification part shall be field verified prior to material ordering.
 - o The contractor shall provide shop drawings to POD Group prior to material ordering and/or fabrication of the above specified modification part.
 - o Any substitutes, additions, or alterations shall be approved by POD Group prior to material ordering and/or fabrication.

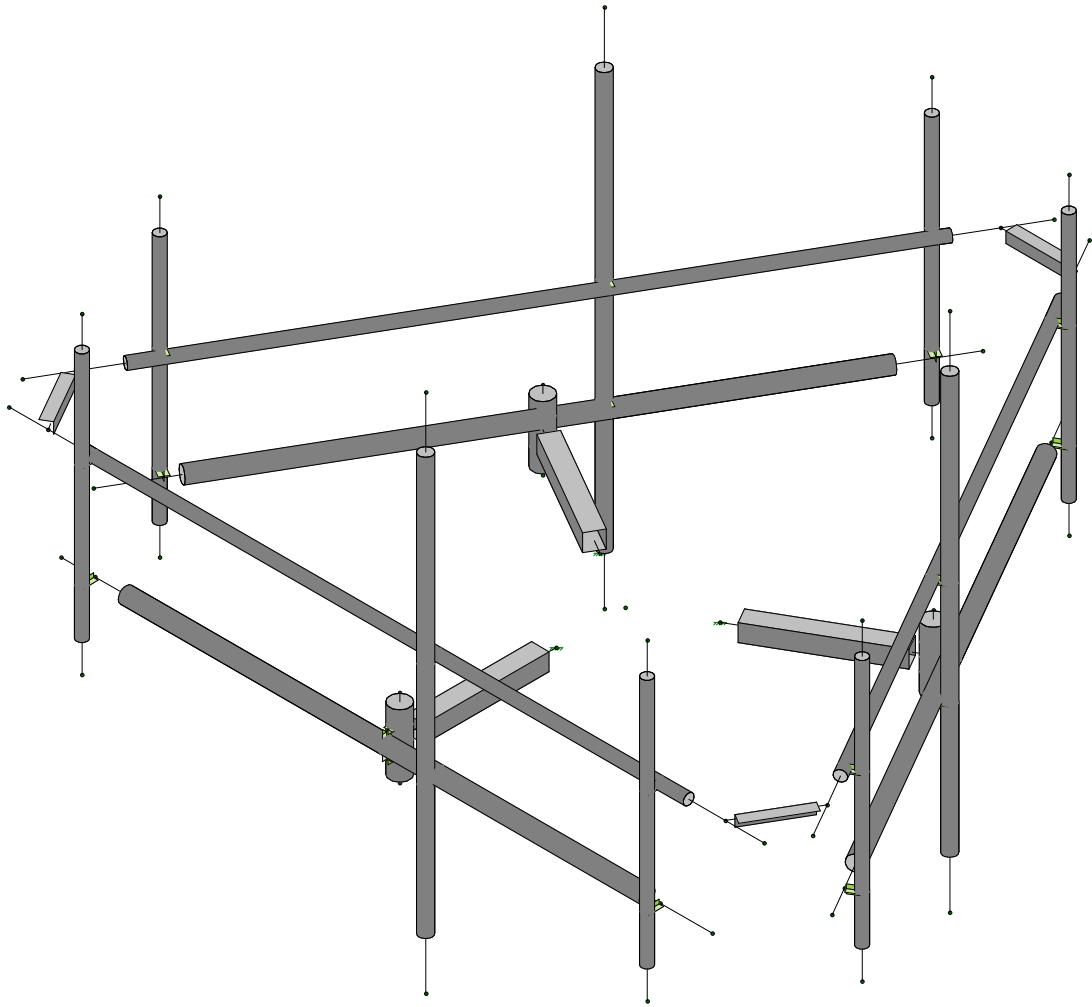
If any of these guidelines are not met, POD Group shall not be held liable.

APPENDIX A

Wire Frame and Rendered Models



POD		
LT	845993	Nov 12, 2020 at 9:31 AM
20-71442		845993 TEST.r3d



POD

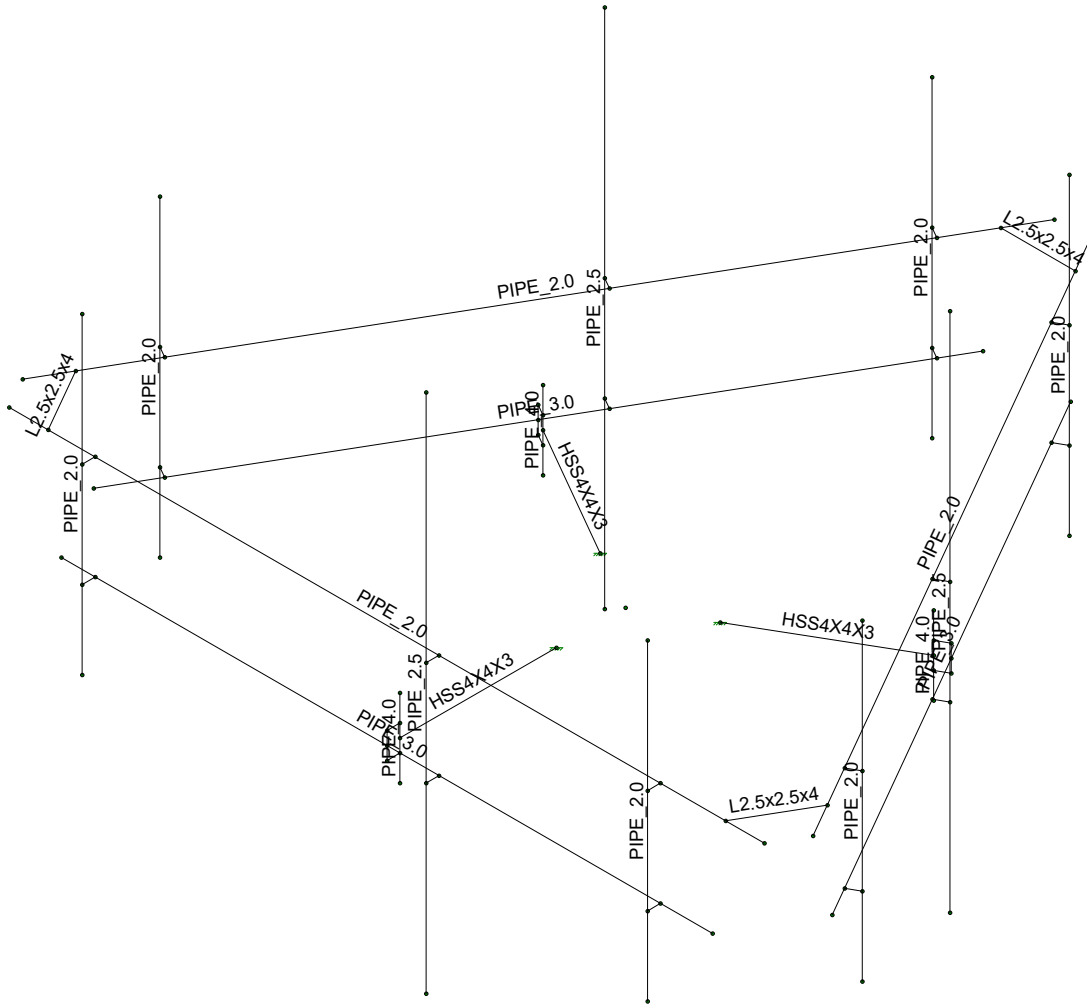
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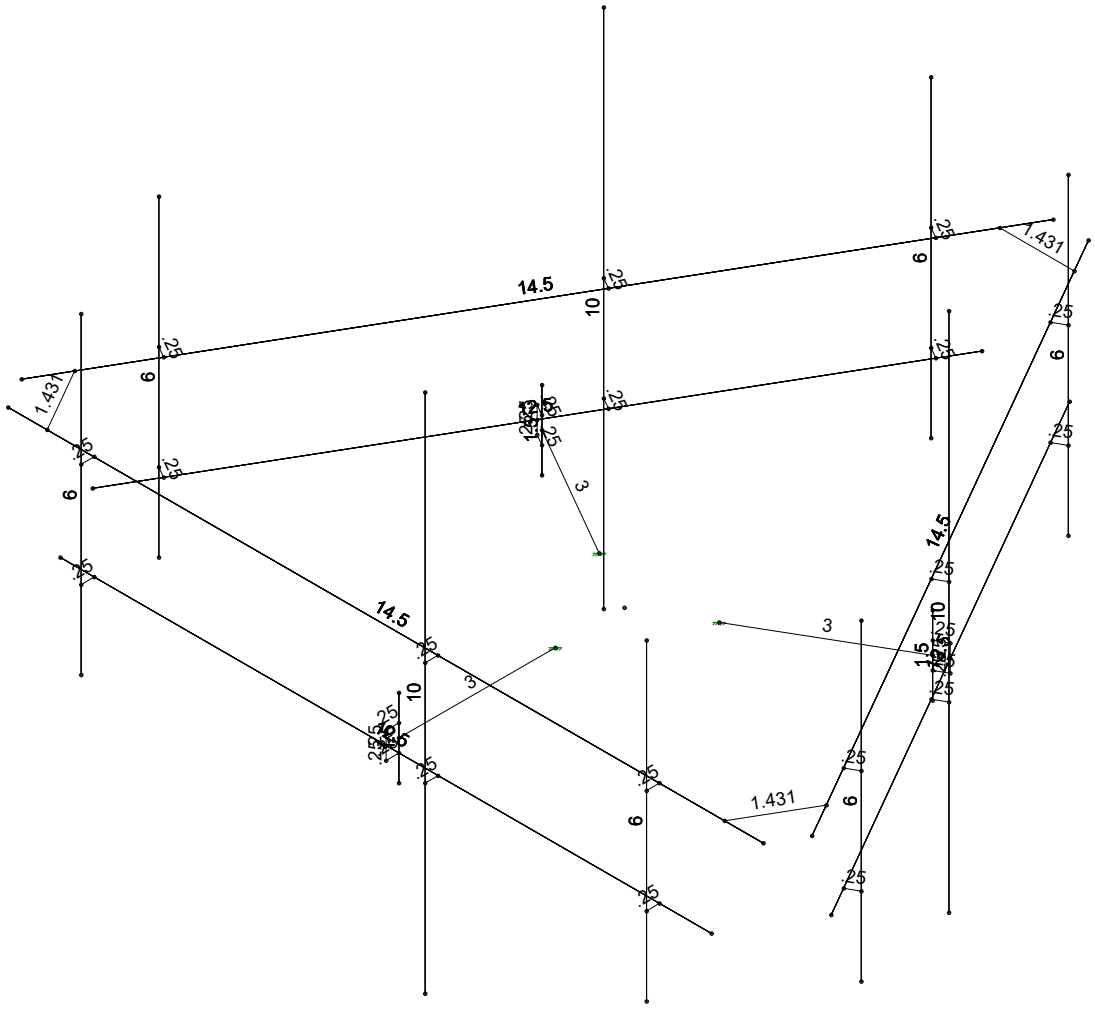
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845993 TEST.r3d



Member Length (ft) Displayed

POD

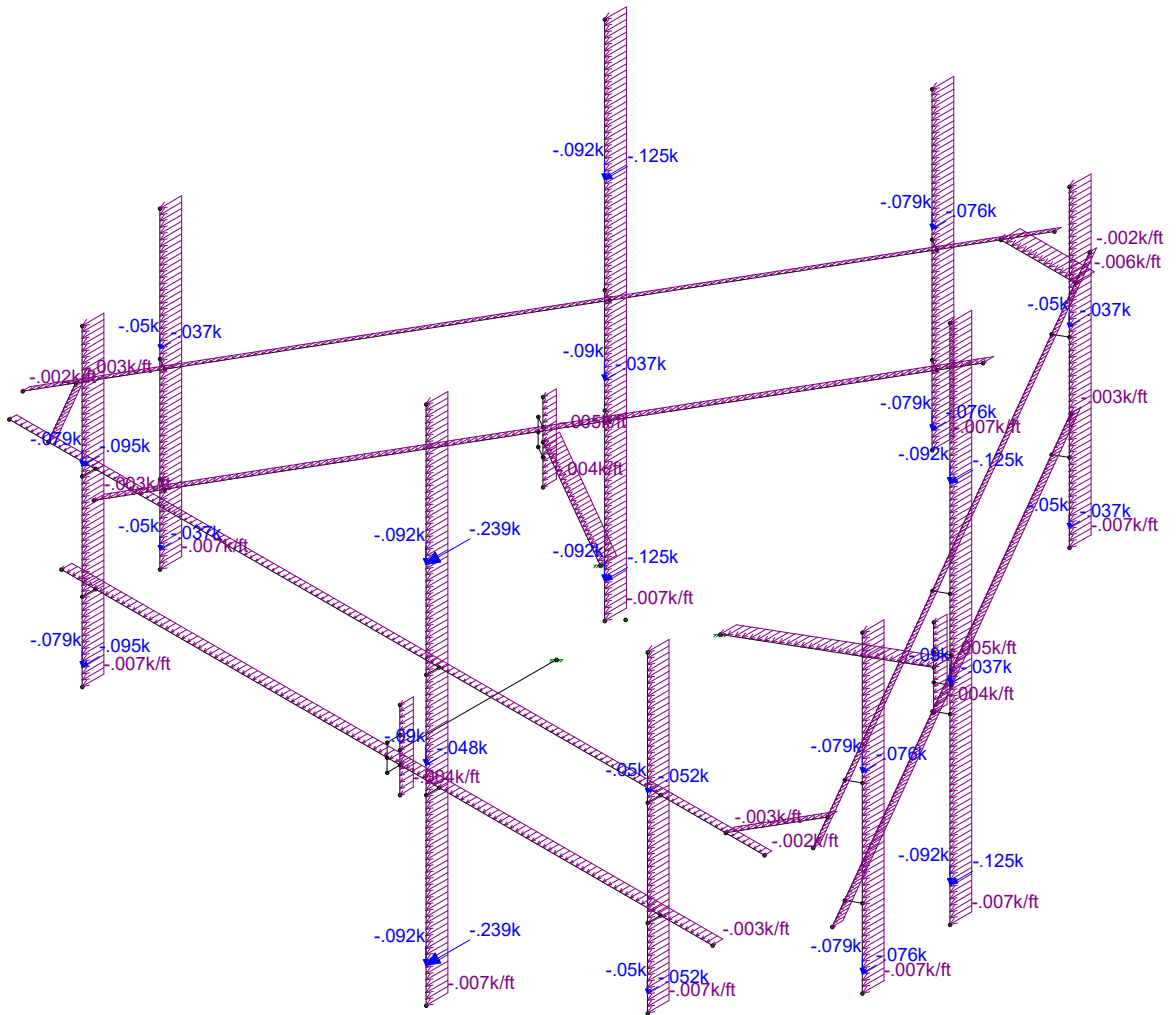
LT

20-71442

845993

Nov 12, 2020 at 9:32 AM

845993 TEST.r3d



Loads: LC 2, 1.2D + 1.0W(0)

POD

LT

20-71442

845993

Nov 12, 2020 at 12:45 PM

845993 TEST.r3d

APPENDIX B
Software Input Calculations



POD Job # 20-71442
 Site Number 845993
 Site Name 845993

General Site Information

Mount Type	SFP	Risk Category	II	I (seismic)	1
V (Wind Speed)	120	I (ice)	1	Sms	0.291
Zs	826	Ss	0.182	Sm1	0.154
ti	1	S1	0.064	Sds	0.194
Vi	50	Sail Site Class	D (assumed)	Sd1	0.102
Kd1	1	Fa	1.600	Seismic Design Category	B
Exposure	B	Fv	2.400	Seismic Analysis Not Required	
zg	1200	Tower Type	Monopole	R	2 TIA-222-H 16.7
α	7	Tower Height	119.5	As	1 TIA-222-H 16.7
kmin	0.7			Cs, Min	0.03 TIA-222-H 2.7.7.1.1
G _z	1			Cs	0.09706667 TIA-222-H 2.7.7.1.1
Ke	0.97				
K _o	0.95				
K _w	0.9				

Appurtenance Information

Model	Shielded	% Shielded	Centerline	Centerline on MP	Spacing (in)	Azimuth	Sector	Quantity	MP #
AIR 32 B2A/B66AA			90	2	40		A/B/C	1	3
ERICSSON AIR 21 B4A			90	2	40		A/B/C	1	1
APXIA/BR24_43-U/NA20			90	4	80		A/B/C	1	2
RADIO 4449 B12/B71			90	4			A/B/C	1	2

Mount Information

Elevation (ft)	90.5	Grating Thickness (in)	0
K _w	0.96	Grating Ice Weight (K/ft ²)	0.010
K _{iz}	1.11		
t _{iz}	1.11		

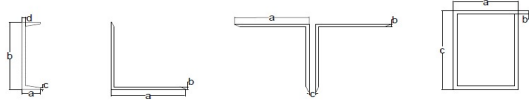
Mount Pipes	Length (ft)	Width (in)	Centerline
	6	2.375	90

Round Members

Member	Length (ft)	Width (in)	Frame Member	# of Members
RAIL ON	14.5	2.375	Yes	2
RAIL OFF	14.5	2.375	No	1
PIPE	1.5	4.5	No	3
FACE ON	12.5	3.5	Yes	2
FACE OFF	12.5	3.5	No	1

Flat Members

Member	Length (ft)	Width (in)	Shape	A	B	C	D	Frame Member	# of Members
SO	3	4	Square HSS		4	0.25	4	No	3
CON	1.43	2.5	Angle		2.5	0.25		No	3



Appurtenance Wind Calculations

Model	Height	Width	Depth	Weight (lbs)	Kz	qz (lb/ft ²)	(EPA) _w (ft ²)	(EPA) _r (ft ²)	Front	Side	Wind Force (Kips)			Gamma
											Front	Beta	Gamma	
AIR 32 82A/B66AA	56.6	12.9	8.7	132.2	0.96	32.59	5.86	4.24	0.191	0.138	0.454	0.178	0.138	
ERICSSON AIR 21 84A	55.0	12.0	7.9	83.0	0.96	32.59	3.19	1.98	0.104	0.065	0.494	0.094	0.065	
APKVAARR24_43-U-NA20	95.9	24.0	8.7	153.3	0.96	32.59	14.67	5.32	0.478	0.173	0.213	0.402	0.173	
RADIO 4449 812/871	15.0	13.2	9.3	75.0	0.96	32.59	1.48	1.04	0.048	0.034	0.030	0.045	0.034	

Appurtenance Ice Calculations

Model	tiz (in)	Height	Width	Depth	Weight (lbs)	Kiz	qz (lb/ft ²)	(EPA) _w (ft ²)	(EPA) _r (ft ²)	Front	Side	Wind Force (Kips)			Gamma
												Alpha	Beta	Gamma	
AIR 32 82A/B66AA	1.11	58.81	15.11	10.91	108.38	1.11	5.66	4.06	3.07	0.023	0.017	0.022	0.022	0.017	
ERICSSON AIR 21 84A	1.11	57.21	14.21	10.11	97.44	1.11	5.66	3.53	2.38	0.020	0.013	0.018	0.018	0.013	
APKVAARR24_43-U-NA20	1.11	98.11	25.21	10.91	260.39	1.11	5.66	14.74	6.14	0.083	0.035	0.071	0.071	0.035	
RADIO 4449 812/871	1.11	17.16	15.40	11.46	39.06	1.11	5.66	1.16	0.86	0.007	0.005	0.006	0.006	0.005	

Round Members

Member	q _w (lb/ft ²)	Ar	C	Wind Calculations				Width (in)	Weight (k/ft)	q _w (lb/ft ²)	Arice	Ice Calculations			EPA (ft ²)	Load (k/ft)
				Rr	Cf	EPA (ft ²)	Load (k/ft)					qz (lb/ft ²)	Cf	EPA (ft ²)		
RAIL ON	32.64	5.74		22.69	0.66	1.20	2.04	0.005	4.59	0.00	5.67	11.09	2.70	1.20	4.93	0.002
RAIL OFF	32.64	2.87		22.69	0.66	1.20	2.04	0.002	4.59	0.00	5.67	5.54	2.70	1.20	4.93	0.001
PIPE	32.64	1.69		42.98	0.65	1.20	0.40	0.004	6.71	0.01	5.67	2.52		1.20	0.75	0.001
FACE ON	32.64	7.29		33.43	0.66	1.20	2.59	0.007	5.71	0.01	5.67	11.90		1.20	5.29	0.002
FACE OFF	32.64	3.65		33.43	0.66	1.20	2.59	0.003	5.71	0.01	5.67	5.95		1.20	5.29	0.001

Flat Members

Member	q _w (lb/ft ²)	Af	Cf	Wind Calculations		Width (in)	Weight (k/ft)	q _w (lb/ft ²)	Arice	Ice Calculations			EPA	Load (k/ft)		
				EPA	Load (k/ft)					qz (lb/ft ²)	Cf	EPA			Load (k/ft)	
SD	32.64	3.00		1.25	1.13	0.006			6.21	0.01	5.67	4.66	2.70	1.25	1.44	0.001
CON	32.64	0.89		2.00	0.54	0.006			4.71	0.01	5.67	1.68	2.70	2.00	0.83	0.002

Appurtenance Seismic Calculations

Model	Weight	Sds	ρ	Cs	As	Ev	Eh
AIR 32 82A/B66AA	132.2	0.194	1.000	0.097	1.000	0.005	0.013
ERICSSON AIR 21 84A	83.0	0.194	1.000	0.097	1.000	0.003	0.008
APKVAARR24_43-U-NA20	153.3	0.194	1.000	0.097	1.000	0.006	0.015
RADIO 4449 812/871	75.0	0.194	1.000	0.097	1.000	0.003	0.007

APPENDIX C
Software Analysis Output

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F	ÚUH	PŮUÍ YÍ ĚĚ H		Sá^				Šaa\ aš
G	ÚUG	PŮUÍ YÍ ĚĚ H		Sá^				Šaa\ aš
H	ÚUF	PŮUÍ YÍ ĚĚ H		Sá^				Šaa\ aš
I	ÚOISH	ÚOÍŮ ĞĚ FI ĚĚ		Sá^				Šaa\ aš
Í	ÚOISG	ÚOÍŮ ĞĚ FI ĚĚ		Sá^				Šaa\ aš
Ī	ÚOISF	ÚOÍŮ ĞĚ FI ĚĚ		Sá^				Šaa\ aš
Ī	ÚQŮH	ÚQŮŮ ĪĚ FĚĚ		Sá^				Šaa\ aš
Ī	ÚQŮG	ÚQŮŮ ĪĚ FĚĚ		Sá^				Šaa\ aš
J	ÚQŮF	ÚQŮŮ ĪĚ FĚĚ		Sá^				Šaa\ aš
F€	T ÚÁŮŮT T ŮH	ÚQŮŮ ĞĚ Ī		Sá^				Šaa\ aš
FF	T ÚÁŮŮT T ŮG	ÚQŮŮ ĞĚ F€		Sá^				Šaa\ aš
FG	T ÚÁŮŮT T ŮF	ÚQŮŮ ĞĚ Ī		Sá^				Šaa\ aš
FH	T ÚÁŮŮŮŮH	ÚQŮŮ ĞĚ Ī		Sá^				Šaa\ aš
FI	T ÚÁŮŮŮŮG	ÚQŮŮ ĞĚ F€		Sá^				Šaa\ aš
FÍ	T ÚÁŮŮŮŮF	ÚQŮŮ ĞĚ Ī		Sá^				Šaa\ aš
FĪ	T ÚÁŮŮŮŮH	ÚQŮŮ ĞĚ Ī		Sá^				Šaa\ aš
FĪ	T ÚÁŮŮŮŮG	ÚQŮŮ ĞĚ F€		Sá^				Šaa\ aš
FĪ	T ÚÁŮŮŮŮF	ÚQŮŮ ĞĚ Ī		Sá^				Šaa\ aš
FJ	ØŮŮŮH	ÚQŮŮ ĤĚ FGĚ		Sá^				Šaa\ aš
Ğ	ØŮŮŮG	ÚQŮŮ ĤĚ FGĚ		Sá^				Šaa\ aš
GF	ØŮŮŮF	ÚQŮŮ ĤĚ FGĚ		Sá^				Šaa\ aš
GG	ŮUŮH	ŠĚĚ ĞĚ ĺ FĚĚ HF		Sá^				Šaa\ aš
GH	ŮUŮG	ŠĚĚ ĞĚ ĺ FĚĚ HF		Sá^				Šaa\ aš
G	ŮUŮF	ŠĚĚ ĞĚ ĺ FĚĚ HF		Sá^				Šaa\ aš

A Ya Vy' Df ja Ufm8 UU

Šaa\)	ŮŮ ġ c RŮ ġ c SŮ ġ c ŮĤ[c aĚĚ Ú•ã)^\	ŮŮ ġ c RŮ ġ c SŮ ġ c ŮĤ[c aĚĚ Ú•ã)^\	V] ^	Ů•ã)^\ Áš c	T aĚĚ ġ c	Ů•ã)^\ ÁŮ ġ c
F	ÚUH	ŮĤ ĞĚ ŮĤ ĞĚ	FI €	PŮUÍ YÍ YĤ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
G	ÚUG	ŮĪ J ŮĪ €		PŮUÍ YÍ YĤ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
H	ÚUF	ŮĤ ĞĚ ŮĤ ĤĚ		PŮUÍ YÍ YĤ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
I	ÚOISH	ŮĪ Ī ŮĪ Ī	FI €	ÚQŮŮ ĞĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
Í	ÚOISG	ŮFĚF ŮFĚG	FI €	ÚQŮŮ ĞĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
Ī	ÚOISF	ŮĤ ĤĚ		ÚQŮŮ ĞĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
Ī	ÚQŮH	ŮĪ Ī ŮĪ Ī ĞĚ	FG€	ÚQŮŮ ĪĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
Ī	ÚQŮG	ŮĪ G ŮĪ F	GI €	ÚQŮŮ ĪĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
J	ÚQŮF	ŮĤ ĤĚ		ÚQŮŮ ĪĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
F€	T ÚÁŮŮT T ŮH	ŮĪ Ī ĞĚ	FG€	ÚQŮŮ ĞĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
FF	T ÚÁŮŮT T ŮG	ŮĪ Ī ŮĤ ĞĚ	FG€	ÚQŮŮ ĞĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
FG	T ÚÁŮŮT T ŮF	ŮĪ Ī	FG€	ÚQŮŮ ĞĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
FH	T ÚÁŮŮŮŮH	ŮĪ € ŮĪ Ī	GI €	ÚQŮŮ ĞĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
FI	T ÚÁŮŮŮŮG	ŮĪ J ŮĪ Ī	GI €	ÚQŮŮ ĞĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
FÍ	T ÚÁŮŮŮŮF	ŮJF ŮJE	GI €	ÚQŮŮ ĞĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
FĪ	T ÚÁŮŮŮŮH	ŮĪ Ī ŮĤ ĤĚ		ÚQŮŮ ĞĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
FĪ	T ÚÁŮŮŮŮG	ŮĪ Ī ŮĪ G		ÚQŮŮ ĞĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
FĪ	T ÚÁŮŮŮŮF	ŮĤF ŮĤĚ		ÚQŮŮ ĞĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
FJ	ØŮŮŮH	ŮĤ ĞĚ ŮĤ ĞĚ	FI €	ÚQŮŮ ĤĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
Ğ	ØŮŮŮG	ŮĪ F ŮĪ G	FI €	ÚQŮŮ ĤĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
GF	ØŮŮŮF	ŮĤ ĞĚ ŮĤ ĞĚ		ÚQŮŮ ĤĚ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c
GG	ŮUŮH	ŮĪ J ŮĪ Ī	HĪ €	ŠĚĚ ĞĚ ĺ	Ů•ã)^\	Ů•ã)^\ ÁŮ ġ c

A Ya Vyf'Dfja Ufm8 UU'f7 cbjbi YXL

	Šaa^	QI a c Rã a c Sã a c U caãÈ Ù^&ç} ÙJca^	V ^	Ô•ã} Aã c	Tæ ã	Ô•ã} ÁÛ ^•		
GH	ÓUPG	BG OE BÍE	FÍE	SGE cGE cl	Ó^æ	Uã * ^AE * ^	OEÍ ÁÓ:EHÍ	V ^ Aæ
G	ÓUPF	BJH BG OE	FÍE	SGE cGE cl	Ó^æ	Uã * ^AE * ^	OEÍ ÁÓ:EHÍ	V ^ Aæ
Ğ	HE	BÍI BÍI		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
Ġ	GJ	BJJ BFEE		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
Ģ	G	BJÍ BJI		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
Ĥ	G	BÍH BÍI		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
GJ	G	BJI BJI		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
HE	G	BÍH BÍI		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
HF	G	BÍI BÍI	FGÉ	ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
HG	GH	BÍI BÍI	FGÉ	ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
HH	GG	BÍI BÍI		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
HI	GF	BÍI BÍJ		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
HÍ	GE	BÍE BÍGE	FÍE	ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
HĪ	FJ	BÍI BÍI	FÍE	ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
HĴ	Fİ	BÍF BÍH	FÍE	ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
HĶ	Fİ	BHUOE BIF	FÍE	ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
HJ	Fİ	BÍG BÍI	FÍE	ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
IÉ	FÍ	BÍJ BÍF	FÍE	ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
IF	FI	BÍF BÍH	GE	ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
IG	FH	BÍH BÍG	GE	ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
IH	FG	BÍG BÍE	FÍE	ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
II	FF	BÍI BÍI	FÍE	ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
IÍ	FE	BĞ BĞ		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
IĪ	J	BĞ BĞ		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
IĴ	İ	BĞ BĞ		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
IĶ	İ	BĞ BĞ		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
IJ	Ī	BGHOE BĞ		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
IÉ	Í	BHEOE BHG		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
IF	I	BH BH		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
IG	H	BGJCE BHOE		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
IH	G	BHO BH OE		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ
II	F	BH BH		ÜÖÖ	P ^ ^	P ^ ^	ÜÖÖ	V ^ Aæ

A Ya Vyf'5 Xj UbWX'8 UHU

	Šaa^	QI a c Rã a c Sã a c U caãÈ Ù^&ç} ÙJca^	V ^	Ô•ã} Aã c	Tæ ã	Ô•ã} ÁÛ ^•
F	ÚUH			Ÿ•	Ó^æ c	P ^ ^
G	ÚUG			Ÿ•	Ó^æ c	P ^ ^
H	ÚUF			Ÿ•	Ó^æ c	P ^ ^
I	ÚUŠH			Ÿ•		P ^ ^
Í	ÚUŠG			Ÿ•		P ^ ^
Ī	ÚUŠF			Ÿ•		P ^ ^
İ	ÚUJÖH			Ÿ•		P ^ ^
Ĵ	ÚUJÖG			Ÿ•		P ^ ^
J	ÚUJÖF			Ÿ•		P ^ ^
FE	T ÚÁOE T OH			Ÿ•		P ^ ^
FF	T ÚÁOE T OEG			Ÿ•		P ^ ^
FG	T ÚÁOE T OEF			Ÿ•		P ^ ^
FH	T ÚÁOÖV OEH			Ÿ•		P ^ ^
FI	T ÚÁOÖV OEG			Ÿ•		P ^ ^
Fİ	T ÚÁOÖV OEF			Ÿ•		P ^ ^

A Ya Vyf'Dc]bh@UXg'f6 @ '%: 'AUjblLbYbW'f' \$Ĥ'f'7 cb]jbi YXL

	T^{\ â^!AœĚ^}	Ōă^&ă}	T æ) æ â^Ž Ě Ěcá	Ŧ &œĚ} ŽĚĀ á
Ī	T ŪĂŌŌVŌĚH	Ÿ	ĚĚĚĚ	ĤĚĪĪ
Ĭ	T ŪĂŌŌVŌĚH	Ÿ	ĚĚĚĚ	ĚĤĤĤ
J	T ŪĂŌŌĚ T ŌĚH	Ÿ	ĚĚĚĤ	ĤĚĪĪ
FĚ	T ŪĂŌŌĚ T ŌĚH	Ÿ	ĚĚĚĤ	ĚĤĤĤ
FF	T ŪĂŌŌĚ T ŌĚH	Ÿ	ĚĚĚĚ	ĤĚĪĪ
FG	T ŪĂŌŌĚ T ŌĚH	Ÿ	ĚĚĚĚ	ĚĤĤĤ
FH	T ŪĂŌŠŪP ŌĚ	Ÿ	ĚĚĚF	ĤĚĪĪ
FI	T ŪĂŌŠŪP ŌĚ	Ÿ	ĚĚĚF	ĚĤĤĤ
FĪ	T ŪĂŌŠŪP ŌĚ	Ÿ	ĚĚĚĜ	ĤĚĪĪ
FĬ	T ŪĂŌŠŪP ŌĚ	Ÿ	ĚĚĚĜ	ĚĤĤĤ
FĪ	T ŪĂŌŌVŌĚ	Ÿ	ĚĚĚF	ĤĚĪĪ
FĬ	T ŪĂŌŌVŌĚ	Ÿ	ĚĚĚF	ĚĤĤĤ
FJ	T ŪĂŌŌVŌĚ	Ÿ	ĚĚĚĜ	ĤĚĪĪ
ĜĚ	T ŪĂŌŌVŌĚ	Ÿ	ĚĚĚĜ	ĚĤĤĤ
ĜF	T ŪĂŌŌĚ T ŌĚ	Ÿ	ĚĚĚĜ	ĤĚĪĪ
ĜĜ	T ŪĂŌŌĚ T ŌĚ	Ÿ	ĚĚĚĜ	ĚĤĤĤ
ĜH	T ŪĂŌŌĚ T ŌĚ	Ÿ	ĚĚĚĤ	ĤĚĪĪ
Ĝ	T ŪĂŌŌĚ T ŌĚ	Ÿ	ĚĚĚĤ	ĚĤĤĤ
Ĝ	T ŪĂŌŠŪP ŌĚĜ	Ÿ	ĚĚĚĚ	ĪĚĤĤĤ
Ĝ	T ŪĂŌŠŪP ŌĚĜ	Ÿ	ĚĚĚĚ	ĚĪĪĪ
Ĝ	T ŪĂŌŠŪP ŌĚĜ	Ÿ	ĚĚĚĚ	ĪĚĤĤĤ
Ĝ	T ŪĂŌŠŪP ŌĚĜ	Ÿ	ĚĚĚĚ	ĚĪĪĪ
ĜJ	T ŪĂŌŌVŌĚĜ	Ÿ	ĚĚĚĚ	ĪĚĤĤĤ
ĤĚ	T ŪĂŌŌVŌĚĜ	Ÿ	ĚĚĚĚ	ĚĪĪĪ
ĤF	T ŪĂŌŌVŌĚĜ	Ÿ	ĚĚĚĚ	ĪĚĤĤĤ
ĤĜ	T ŪĂŌŌVŌĚĜ	Ÿ	ĚĚĚĚ	ĚĪĪĪ
ĤĤ	T ŪĂŌŌĚ T ŌĚĜ	Ÿ	ĚĚĚĚ	ĪĚĤĤĤ
ĤĪ	T ŪĂŌŌĚ T ŌĚĜ	Ÿ	ĚĚĚĚ	ĚĪĪĪ
ĤĪ	T ŪĂŌŌĚ T ŌĚĜ	Ÿ	ĚĚĚĤ	ĪĚĤĤĤ
ĤĪ	T ŪĂŌŌĚ T ŌĚĜ	Ÿ	ĚĚĚĤ	ĚĪĪĪ
ĤĪ	T ŪĂŌŠŪP ŌĚĜ	Ÿ	ĚĚĚF	
ĤĪ	T ŪĂŌŠŪP ŌĚĜ	Ÿ	ĚĚĚĜ	
ĤJ	T ŪĂŌŌVŌĚĜ	Ÿ	ĚĚĚF	
ĪĚ	T ŪĂŌŌVŌĚĜ	Ÿ	ĚĚĚĜ	
ĪF	T ŪĂŌŌĚ T ŌĚĜ	Ÿ	ĚĚĚĜ	
ĪĜ	T ŪĂŌŌĚ T ŌĚĜ	Ÿ	ĚĚĚĤ	

A Ya Vyf'Dc]bh@UXg'f6 @ '%: 'AUjblLbYbW'f' \$Ĥ

	T^{\ â^!AœĚ^}	Ōă^&ă}	T æ) æ â^Ž Ě Ěcá	Ŧ &œĚ} ŽĚĀ á
F	T ŪĂŌŠŪP ŌĚH	Ÿ	ĚĚĚĚ	ĤĚĪĪ
G	T ŪĂŌŠŪP ŌĚH	Ÿ	ĚĚĚĚ	ĚĤĤĤ
H	T ŪĂŌŌVŌĚH	Ÿ	ĚĚĚĚ	ĤĚĪĪ
I	T ŪĂŌŌVŌĚH	Ÿ	ĚĚĚĚ	ĚĤĤĤ
Ī	T ŪĂŌŌĚ T ŌĚH	Ÿ	ĚĚĚĚ	ĤĚĪĪ
Ĭ	T ŪĂŌŌĚ T ŌĚH	Ÿ	ĚĚĚĚ	ĚĤĤĤ
Ī	T ŪĂŌŠŪP ŌĚF	Ÿ	ĚĚĚĜ	ĤĚĪĪ
Ĭ	T ŪĂŌŠŪP ŌĚF	Ÿ	ĚĚĚĜ	ĚĤĤĤ
J	T ŪĂŌŌVŌĚF	Ÿ	ĚĚĚĤ	ĤĚĪĪ
FĚ	T ŪĂŌŌVŌĚF	Ÿ	ĚĚĚĤ	ĚĤĤĤ
FF	T ŪĂŌŌĚ T ŌĚF	Ÿ	ĚĚĚĤ	ĤĚĪĪ
FG	T ŪĂŌŌĚ T ŌĚF	Ÿ	ĚĚĚĤ	ĚĤĤĤ

A Ya Vyf'Dc]bh@UXg f6 @ ' & : 'WYK]bX'@UX'f'/\$\$f'f' cb]bi YXL

	T { á^/Aæ^	Ŏá^&ć	T æ } á^ á^ Ž Ě ěá	Š &ć } Ž ěá á
FJ	T ÚÁÖŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
Ě	T ÚÁÖŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
GF	T ÚÁÖŎŎ T ŎĚ	Ÿ	ĚĚ	ĚĚĚ
GG	T ÚÁÖŎŎ T ŎĚ	Ÿ	ĚĚ	ĚĚĚ
GH	T ÚÁÖŎŎ T ŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
G	T ÚÁÖŎŎ T ŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
Ĝ	T ÚÁÖŠŦP ŎĚ	Ÿ	ĚĚFG	ĚĚĚĚ
Ĝ	T ÚÁÖŠŦP ŎĚ	Ÿ	ĚĚFG	ĚĚĚ
Ĝ	T ÚÁÖŠŦP ŎĚ	Ÿ	ĚĚĚ	ĚĚĚĚ
Ĝ	T ÚÁÖŠŦP ŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
GJ	T ÚÁÖŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚĚ
ĤĚ	T ÚÁÖŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
HF	T ÚÁÖŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚĚ
HG	T ÚÁÖŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
HH	T ÚÁÖŎŎ T ŎĚ	Ÿ	ĚĚFG	ĚĚĚĚ
HI	T ÚÁÖŎŎ T ŎĚ	Ÿ	ĚĚFG	ĚĚĚ
HÍ	T ÚÁÖŎŎ T ŎĚ	Ÿ	ĚĚĚ	ĚĚĚĚ
HĚ	T ÚÁÖŎŎ T ŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
Hİ	T ÚÁÖŠŦP ŎĚ	Ÿ	ĚĚĚ	
Hİ	T ÚÁÖŠŦP ŎĚ	Ÿ	ĚĚĚ	
HJ	T ÚÁÖŎŎŎĚ	Ÿ	ĚĚĚ	
I €	T ÚÁÖŎŎŎĚ	Ÿ	ĚĚĚ	
I F	T ÚÁÖŎŎŎ T ŎĚ	Ÿ	ĚĚĚ	
I G	T ÚÁÖŎŎŎ T ŎĚ	Ÿ	ĚĚĚ	

A Ya Vyf'Dc]bh@UXg f6 @ ' ' ' : 'WYK]bX'@UX'f'/\$\$

	T { á^/Aæ^	Ŏá^&ć	T æ } á^ á^ Ž Ě ěá	Š &ć } Ž ěá á
F	T ÚÁÖŠŦP ŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
G	T ÚÁÖŠŦP ŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
H	T ÚÁÖŠŦP ŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
I	T ÚÁÖŠŦP ŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
Í	T ÚÁÖŎŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
Ī	T ÚÁÖŎŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
İ	T ÚÁÖŎŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
J	T ÚÁÖŎŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
ĤĚ	T ÚÁÖŎŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
FF	T ÚÁÖŎŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
FG	T ÚÁÖŎŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
FH	T ÚÁÖŠŦP ŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
FI	T ÚÁÖŠŦP ŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
FÍ	T ÚÁÖŠŦP ŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
FĚ	T ÚÁÖŎŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
Fİ	T ÚÁÖŎŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
FJ	T ÚÁÖŎŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
Ě	T ÚÁÖŎŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
GF	T ÚÁÖŎŎŎ T ŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
GG	T ÚÁÖŎŎŎ T ŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
GH	T ÚÁÖŎŎŎ T ŎĚ	Ÿ	ĚĚĚ	ĚĚĚ
G	T ÚÁÖŎŎŎŎĚ	Ÿ	ĚĚĚ	ĚĚĚ



Ó({]æˆ K ÚÚÖ
 Ô•ã}ˆ! K ŠV
 Řáâ~{ àˆ! K œĚFIIG
 T[âˆ|Apæˆ K İİİJJH

Þ[çĀĚŒŒŒŒ
 FGKĪĪT
 Ô@&ˆāĀKˆˆˆˆ

A Ya Vyf'Dc]bh@cUXg'f6 @') : 'W'K]bX' @UX'fB;\$H'f7 cb]jbi YXL

	T \ (å \ Åœå \	Öå^&çĀ)	T æ) å å Ź Ę Ęcá	Š &œĀ) ŽēĀ á
İ	T ÚÁÖÖVÖH	ÿ	ĚĚ	HĚİİ
Ì	T ÚÁÖÖVÖH	ÿ	ĚĚ	ĚHH
J	T ÚÁÖĚ T ÖH	ÿ	ĚĚJ	HĚİİ
F€	T ÚÁÖĚ T ÖH	ÿ	ĚĚJ	ĚHH
FF	T ÚÁÖĚ T ÖH	ÿ	ĚĚ	HĚİİ
FG	T ÚÁÖĚ T ÖH	ÿ	ĚĚ	ĚHH
FH	T ÚÁÖŠUP ÖF	ÿ	ĚĚ	HĚİİ
FI	T ÚÁÖŠUP ÖF	ÿ	ĚĚ	ĚHH
FÍ	T ÚÁÖŠUP ÖF	ÿ	ĚĚ	HĚİİ
FÎ	T ÚÁÖŠUP ÖF	ÿ	ĚĚ	ĚHH
FĪ	T ÚÁÖÖVÖF	ÿ	ĚĚ	HĚİİ
FÌ	T ÚÁÖÖVÖF	ÿ	ĚĚ	ĚHH
FJ	T ÚÁÖÖVÖF	ÿ	ĚĚH	HĚİİ
ĞĚ	T ÚÁÖÖVÖF	ÿ	ĚĚH	ĚHH
ĞF	T ÚÁÖĚ T ÖF	ÿ	ĚĚ	HĚİİ
ĞG	T ÚÁÖĚ T ÖF	ÿ	ĚĚ	ĚHH
ĞH	T ÚÁÖĚ T ÖF	ÿ	ĚĚ	HĚİİ
Ğ	T ÚÁÖĚ T ÖF	ÿ	ĚĚ	ĚHH
ĞĪ	T ÚÁÖŠUP ÖĞ	ÿ	ĚĚF	İĚHH
ĞÌ	T ÚÁÖŠUP ÖĞ	ÿ	ĚĚF	Ěİİ
ĞÍ	T ÚÁÖŠUP ÖĞ	ÿ	ĚĚF	İĚHH
ĞÎ	T ÚÁÖŠUP ÖĞ	ÿ	ĚĚF	Ěİİ
ĞJ	T ÚÁÖÖVÖĞ	ÿ	ĚĚF	İĚHH
HĚ	T ÚÁÖÖVÖĞ	ÿ	ĚĚF	Ěİİ
HF	T ÚÁÖÖVÖĞ	ÿ	ĚĚJ	İĚHH
HG	T ÚÁÖÖVÖĞ	ÿ	ĚĚJ	Ěİİ
HH	T ÚÁÖĚ T ÖĞ	ÿ	ĚĚF	İĚHH
Hİ	T ÚÁÖĚ T ÖĞ	ÿ	ĚĚF	Ěİİ
HÍ	T ÚÁÖĚ T ÖĞ	ÿ	ĚĚF	İĚHH
HÎ	T ÚÁÖĚ T ÖĞ	ÿ	ĚĚF	Ěİİ
HĪ	T ÚÁÖŠUP ÖH	ÿ	ĚĚ	I
HÌ	T ÚÁÖŠUP ÖH	ÿ	ĚĚH	I
HJ	T ÚÁÖÖVÖH	ÿ	ĚĚ	I
I €	T ÚÁÖÖVÖH	ÿ	ĚĚG	I
IF	T ÚÁÖĚ T ÖH	ÿ	ĚĚ	I
IG	T ÚÁÖĚ T ÖH	ÿ	ĚĚH	I

A Ya Vyf'Dc]bh@cUXg'f6 @' " * : 'W'K]bX' @UX'fB(\$H

	T \ (å \ Åœå \	Öå^&çĀ)	T æ) å å Ź Ę Ęcá	Š &œĀ) ŽēĀ á
F	T ÚÁÖŠUP ÖH	ÿ	ĚĚ	HĚİİ
G	T ÚÁÖŠUP ÖH	ÿ	ĚĚ	ĚHH
H	T ÚÁÖŠUP ÖH	ÿ	ĚĚ	HĚİİ
I	T ÚÁÖŠUP ÖH	ÿ	ĚĚ	ĚHH
Í	T ÚÁÖÖVÖH	ÿ	ĚĚ	HĚİİ
Î	T ÚÁÖÖVÖH	ÿ	ĚĚ	ĚHH
Ī	T ÚÁÖÖVÖH	ÿ	ĚĚ	HĚİİ
Ì	T ÚÁÖÖVÖH	ÿ	ĚĚ	ĚHH
J	T ÚÁÖĚ T ÖH	ÿ	ĚĚ	HĚİİ
F€	T ÚÁÖĚ T ÖH	ÿ	ĚĚ	ĚHH
FF	T ÚÁÖĚ T ÖH	ÿ	ĚĚ	HĚİİ
FG	T ÚÁÖĚ T ÖH	ÿ	ĚĚ	ĚHH



Ó{| }æ^ K ÚUÖ
 Ó•ā) ^! K ŠV
 R àÁ~{ à^! K ĞĚ FI G
 T[à^!Áæ ^ K İİJJH

Đ| çÁĜĚĜĚ
 FGK Í ÁŮ
 Ô@&^áÁ'K''''

A Ya Vyf'8 jgfiVi hYX' @ UXg'f6 @') : 'K jbx' @ UX'f' \$ŁŁ'f' cbjbi YXL

	T ^{ à^!Áæ ^}	Öā^&ā}	ÚcáoÁ æ} æ à^Ž ĐđĐĐ • -á	Ò) áÁ æ} æ à^Ž ĐđĐĐ • -á	ÚcáoÁ} &æā} ŽčĚĚ) áÁ} &æā} ŽčĚĚ		
J	ÚQJÓF	ÚÝ	ĚĚĚG	ĚĚĚG	€	€	
F€	T ÚÁÓĈĚ T QĚH	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
FF	T ÚÁÓĈĚ T QĚG	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
FG	T ÚÁÓĈĚ T QĚF	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
FH	T ÚÁÓÓVQĚH	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
FI	T ÚÁÓÓVQĚG	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
FÍ	T ÚÁÓÓVQĚF	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
FĪ	T ÚÁÓĚSÚP QĚH	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
FĪ	T ÚÁÓĚSÚP QĚG	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
FĪ	T ÚÁÓĚSÚP QĚF	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
FJ	ØQØÓH	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
ĞĚ	ØQØÓG	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
ĞF	ØQØÓF	ÚÝ	ĚĚĚG	ĚĚĚG	€	€	
ĞG	ÖUǾH	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
ĞH	ÖUǾG	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
Ğ	ÖUǾF	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
Ğ	ÚUH	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
Ğ	ÚUG	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
Ğ	ÚUF	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
Ğ	ÚQŠH	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
ĞJ	ÚQŠG	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
ĤĚ	ÚQŠF	ÚÝ	ĚĚĚG	ĚĚĚG	€	€	
HF	ÚQJÓH	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
HG	ÚQJÓG	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
HH	ÚQJÓF	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
H	T ÚÁÓĈĚ T QĚH	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
H	T ÚÁÓĈĚ T QĚG	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
H	T ÚÁÓĈĚ T QĚF	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
H	T ÚÁÓÓVQĚH	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
H	T ÚÁÓÓVQĚG	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
HJ	T ÚÁÓÓVQĚF	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
I €	T ÚÁÓĚSÚP QĚH	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
I F	T ÚÁÓĚSÚP QĚG	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
I G	T ÚÁÓĚSÚP QĚF	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
I H	ØQØÓH	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
I	ØQØÓG	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
I	ØQØÓF	ÚÝ	ĚĚĚH	ĚĚĚH	€	€	
I	ÖUǾH	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
I	ÖUǾG	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
I	ÖUǾF	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	

A Ya Vyf'8 jgfiVi hYX' @ UXg'f6 @' * : 'K jbx' @ UX'f' \$ŁŁ

	T ^{ à^!Áæ ^}	Öā^&ā}	ÚcáoÁ æ} æ à^Ž ĐđĐĐ • -á	Ò) áÁ æ} æ à^Ž ĐđĐĐ • -á	ÚcáoÁ} &æā} ŽčĚĚ) áÁ} &æā} ŽčĚĚ		
F	ÚUH	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
G	ÚUG	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
H	ÚUF	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
I	ÚQŠH	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
Í	ÚQŠF	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
Ī	ÚQŠG	ÚÝ	ĚĚĚG	ĚĚĚG	€	€	
Ī	ÚQJÓH	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	
Ī	ÚQJÓG	ÚÝ	ĚĚĚÍ	ĚĚĚÍ	€	€	

ÚQJÓH-ÓÁ^!•ā} ÁĪ ĚĚ ĀÁÁÁ/ĪĪĪĪQĚĚ FI IG Ā [^ } QĚ æ • ā Á ^ d [ÁÓUáÚQJÓĪ ĪĪ JĪHÁÓUVEHáÁ Úæ ^ ÁĪ

A Ya Vyf 8]gfl]Vi hYX' @ UXg'f6 @ '%\$.'K]bX' @ UX'fB;\$L'f' cb]bi YXL

	T ^{ à\Āæ ^}	Öā^&ā}	ÚcáoĀ æ} ā ā'Ž ĐđĐĀ •-á	Ò) āĀ æ} ā ā'Ž ĐđĐĀ •-á	ÚcáoĀ} &ā} ŽčĪĪ) āĀ} &ā} ŽčĪĪ	ÚcáoĀ} &ā} ŽčĪĪ) āĀ} &ā} ŽčĪĪ
Ā	ÚĀĪSH	ÚŸ	ĚĚG	ĚĚG	€	€
Ī	ÚĀĪOH	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
Ĭ	ÚĀĪOG	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
J	ÚĀĪOF	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
F€	T ÚĀĪCE T ŌH	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
FF	T ÚĀĪCE T ŌG	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
FG	T ÚĀĪCE T ŌF	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
FH	T ÚĀĪŌVŌH	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
FI	T ÚĀĪŌVŌG	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
FĪ	T ÚĀĪŌVŌF	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
FĬ	T ÚĀĪSŪP ŌH	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
FĪ	T ÚĀĪSŪP ŌG	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
FĬ	T ÚĀĪSŪP ŌF	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
FJ	ŌŌŌOF	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
GE	ŌŌŌOG	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
GF	ŌŌŌOH	ÚŸ	ĚĚH	ĚĚH	€	€
GG	ŌŪP H	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
GH	ŌŪP G	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
G	ŌŪP F	ÚŸ	ĚĚĪ	ĚĚĪ	€	€
G	ŪUH	ÚŸ	ĚĚH	ĚĚH	€	€
G	ŪUG	ÚŸ	ĚĚH	ĚĚH	€	€
G	ŪUF	ÚŸ	ĚĚH	ĚĚH	€	€
G	ŪĪSF	ÚŸ	ĚĚG	ĚĚG	€	€
GJ	ŪĪSG	ÚŸ	ĚĚG	ĚĚG	€	€
H€	ÚĀĪSH	ÚŸ	ĚĚF	ĚĚF	€	€
HF	ÚĀĪOH	ÚŸ	ĚĚG	ĚĚG	€	€
HG	ÚĀĪOG	ÚŸ	ĚĚG	ĚĚG	€	€
HH	ÚĀĪOF	ÚŸ	ĚĚG	ĚĚG	€	€
HI	T ÚĀĪCE T ŌH	ÚŸ	ĚĚH	ĚĚH	€	€
HĪ	T ÚĀĪCE T ŌG	ÚŸ	ĚĚH	ĚĚH	€	€
HĬ	T ÚĀĪCE T ŌF	ÚŸ	ĚĚH	ĚĚH	€	€
HĪ	T ÚĀĪŌVŌH	ÚŸ	ĚĚH	ĚĚH	€	€
HĪ	T ÚĀĪŌVŌG	ÚŸ	ĚĚH	ĚĚH	€	€
HJ	T ÚĀĪŌVŌF	ÚŸ	ĚĚH	ĚĚH	€	€
I €	T ÚĀĪSŪP ŌH	ÚŸ	ĚĚH	ĚĚH	€	€
I F	T ÚĀĪSŪP ŌG	ÚŸ	ĚĚH	ĚĚH	€	€
I G	T ÚĀĪSŪP ŌF	ÚŸ	ĚĚH	ĚĚH	€	€
I H	ŌŌŌOF	ÚŸ	ĚĚH	ĚĚH	€	€
I I	ŌŌŌOG	ÚŸ	ĚĚH	ĚĚH	€	€
I Ī	ŌŌŌOH	ÚŸ	ĚĚG	ĚĚG	€	€
I Ī	ŌŪP H	ÚŸ	ĚĚH	ĚĚH	€	€
I Ī	ŌŪP G	ÚŸ	ĚĚH	ĚĚH	€	€
I Ī	ŌŪP F	ÚŸ	ĚĚH	ĚĚH	€	€

A Ya Vyf 8]gfl]Vi hYX' @ UXg'f6 @ '%\$. 'K]bX' @ UX'fB(\$L

	T ^{ à\Āæ ^}	Öā^&ā}	ÚcáoĀ æ} ā ā'Ž ĐđĐĀ •-á	Ò) āĀ æ} ā ā'Ž ĐđĐĀ •-á	ÚcáoĀ} &ā} ŽčĪĪ) āĀ} &ā} ŽčĪĪ	ÚcáoĀ} &ā} ŽčĪĪ) āĀ} &ā} ŽčĪĪ
F	ŪUH	ÚŸ	ĚĚH	ĚĚH	€	€
G	ŪUG	ÚŸ	ĚĚH	ĚĚH	€	€
H	ŪUF	ÚŸ	ĚĚH	ĚĚH	€	€
I	ŪĪSF	ÚŸ	ĚĚG	ĚĚG	€	€
Ī	ŪĪSG	ÚŸ	ĚĚG	ĚĚG	€	€

A Ya Vyf'8]g]f]Vi hYX' @ UXg'f6 @ '%. 'K]bX' @ UX'fB(\$H'f7 cb]bi YXL

	T ^ (à^!Āā^)	Ōā^Ā{ }	ÚcāoĀ'æ } ā'ā'Ž ĐdĀĀ'•-á	Ò) ā'Ā'æ } ā'ā'Ž ĐdĀĀ'•-á	ÚcāoĀ'Ā' } ŽāĪĪĐ) ā'Ā'Ā' } ŽāĪĪĐ	€	€
Ī	ŪŪĚSH	ŪŪŸ	ĚĚF	ĚĚF		€	€
Ī	ŪŪŌH	ŪŪŸ	ĚĚG	ĚĚG		€	€
Ī	ŪŪŌĜ	ŪŪŸ	ĚĚG	ĚĚG		€	€
J	ŪŪŌF	ŪŪŸ	ĚĚG	ĚĚG		€	€
F€	T ŪĀŌĀĚ T ŌH	ŪŪŸ	ĚĚH	ĚĚH		€	€
FF	T ŪĀŌĀĚ T ŌĜ	ŪŪŸ	ĚĚH	ĚĚH		€	€
FG	T ŪĀŌĀĚ T ŌF	ŪŪŸ	ĚĚH	ĚĚH		€	€
FH	T ŪĀŌŌVĀĚ	ŪŪŸ	ĚĚH	ĚĚH		€	€
FI	T ŪĀŌŌVĀĜ	ŪŪŸ	ĚĚH	ĚĚH		€	€
FĪ	T ŪĀŌŌVĀF	ŪŪŸ	ĚĚH	ĚĚH		€	€
FĪ	T ŪĀŌĚŠŪP ŌH	ŪŪŸ	ĚĚH	ĚĚH		€	€
FĪ	T ŪĀŌĚŠŪP ŌĜ	ŪŪŸ	ĚĚH	ĚĚH		€	€
FĪ	T ŪĀŌĚŠŪP ŌF	ŪŪŸ	ĚĚH	ĚĚH		€	€
FJ	ŌŌŌŌF	ŪŪŸ	ĚĚH	ĚĚH		€	€
Ĝ€	ŌŌŌŌĜ	ŪŪŸ	ĚĚH	ĚĚH		€	€
ĜF	ŌŌŌŌH	ŪŪŸ	ĚĚG	ĚĚG		€	€
ĜĜ	ŌŪP H	ŪŪŸ	ĚĚH	ĚĚH		€	€
ĜH	ŌŪP G	ŪŪŸ	ĚĚH	ĚĚH		€	€
Ĝ	ŌŪP F	ŪŪŸ	ĚĚH	ĚĚH		€	€
Ĝ	ŪŪH	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
Ĝ	ŪŪG	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
Ĝ	ŪŪF	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
Ĝ	ŪŪŠF	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
ĜJ	ŪŪŠG	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
H€	ŪŪSH	ŪŪŸ	ĚĚG	ĚĚG		€	€
HF	ŪŪŌH	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
HG	ŪŪŌĜ	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
HH	ŪŪŌF	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
HĪ	T ŪĀŌĀĚ T ŌH	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
HĪ	T ŪĀŌĀĚ T ŌĜ	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
HĪ	T ŪĀŌĀĚ T ŌF	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
HĪ	T ŪĀŌŌVĀĚ	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
HĪ	T ŪĀŌŌVĀĜ	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
HJ	T ŪĀŌŌVĀF	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
I€	T ŪĀŌĚŠŪP ŌH	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
IF	T ŪĀŌĚŠŪP ŌĜ	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
IG	T ŪĀŌĚŠŪP ŌF	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
IH	ŌŌŌŌF	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
IĪ	ŌŌŌŌĜ	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
IĪ	ŌŌŌŌH	ŪŪŸ	ĚĚH	ĚĚH		€	€
IĪ	ŌŪP H	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
IĪ	ŌŪP G	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
IĪ	ŌŪP F	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€

A Ya Vyf'8]g]f]Vi hYX' @ UXg'f6 @ '%. 'K]bX' @ UX'fB+\$H

	T ^ (à^!Āā^)	Ōā^Ā{ }	ÚcāoĀ'æ } ā'ā'Ž ĐdĀĀ'•-á	Ò) ā'Ā'æ } ā'ā'Ž ĐdĀĀ'•-á	ÚcāoĀ'Ā' } ŽāĪĪĐ) ā'Ā'Ā' } ŽāĪĪĐ	€	€
F	ŪŪH	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
G	ŪŪG	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
H	ŪŪF	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
I	ŪŪŠF	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€
Ī	ŪŪŠG	ŪŪŸ	ĚĚĪ	ĚĚĪ		€	€

APPENDIX D
Additional Calculations

POD Job # 20-71442
Site Number 845993
Site Name BURLINGTON-NEPAUG ROAD

Calculations Based on TIA-222-H

Reactions from RISA-3D

Moment 5.39 ft-kip
 Axial 0 kips
 Shear 1.741 kips

Bolt Information

Grade A325
 Threads in Shear Plane Included
 Diameter 0.625 in.
 Bolt Spacing 6 in.
 Number of Rods 4

Flange Plate Information

Width 8.25 in.
 Thickness 0.75 in.
 Grade A36

Standoff Information

Standoff Member HSS
 Flat-Flat 4 in.
 Thickness 0.1875 in.

Bolt Calculations

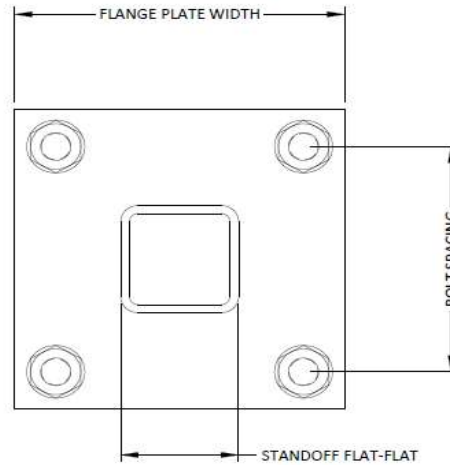
ϕ 0.75
 A_{nt} 0.226 in²
 A_b 0.307 in²
 F_u 120 ksi
 ϕR_{nv} 13.81 kips
 ϕR_{nt} 20.34 kips
 V 0.44 kips
 F 5.38 kips
 Capacity 7.1%

Flange Plate Calculations

ϕ 0.9
 F_y 36 ksi
 t_{min} 0.22 in
 Z 1.2 in³
 ϕM_n 37.6 in-kip
 M_u 10.8 in-kip
 Capacity 28.6%

Capacities

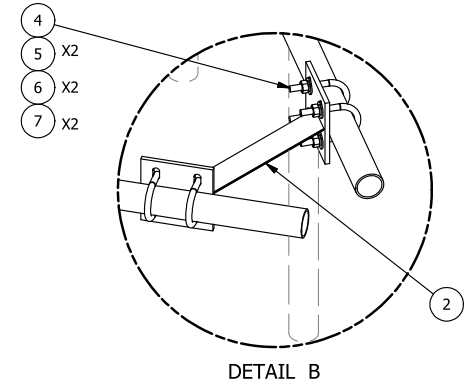
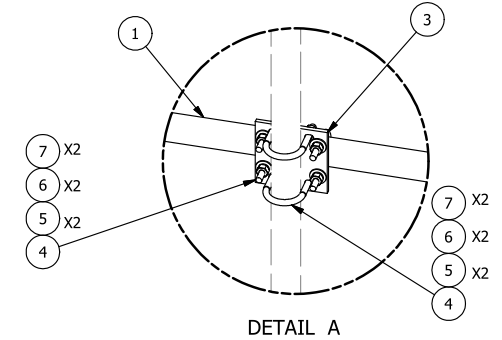
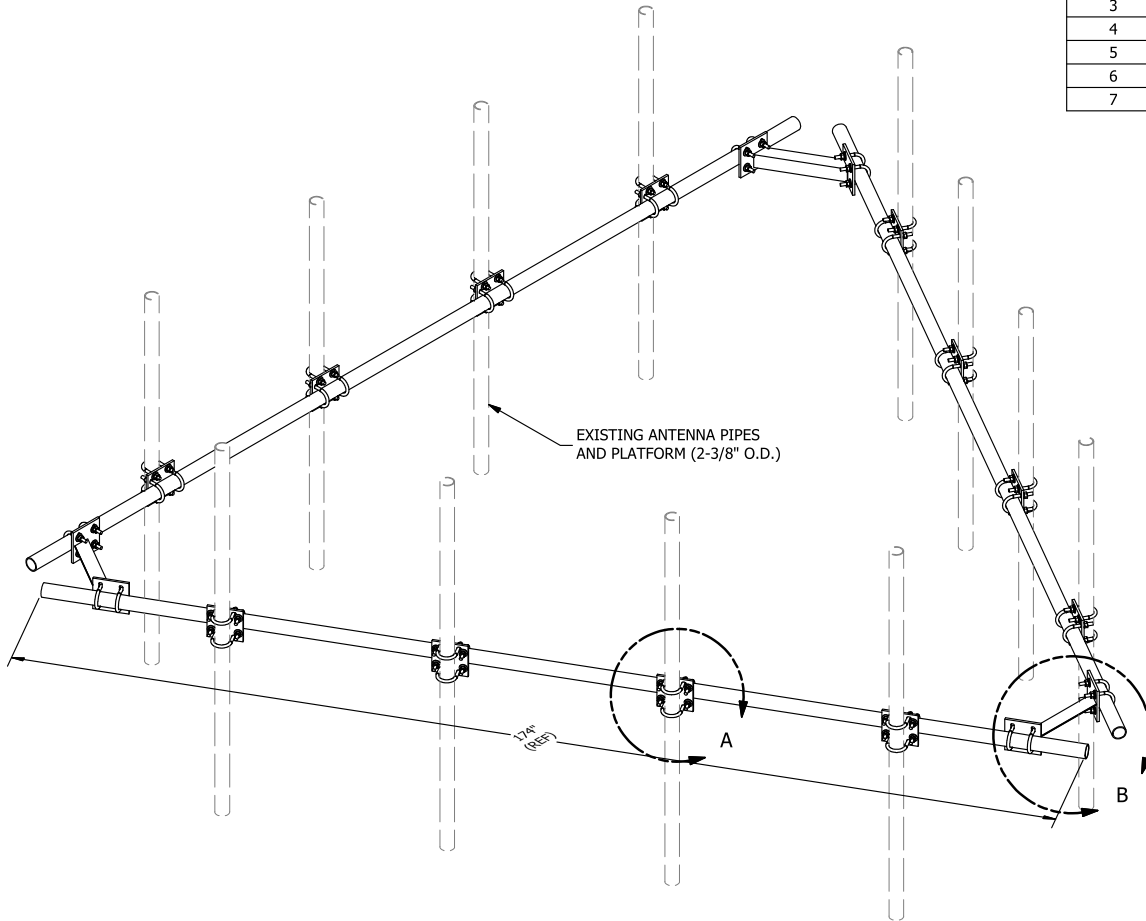
Bolts	7.1%
Flange Plate	28.6%



APPENDIX E

Mount Modification Specification Sheets

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	P2174	2-3/8" OD X 174" SCH 40 GALVANIZED PIPE	174 in	55.75	167.24
2	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
3	12	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"	6 in	3.71	44.50
4	60	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.63	37.51
5	120	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	4.09
6	120	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	1.67
7	120	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	8.60
TOTAL WT. #						302.36



REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	REPLACED HCP WITH X-AHCP		CEK	7/11/2014
REVISION HISTORY				

TOLERANCE NOTES

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

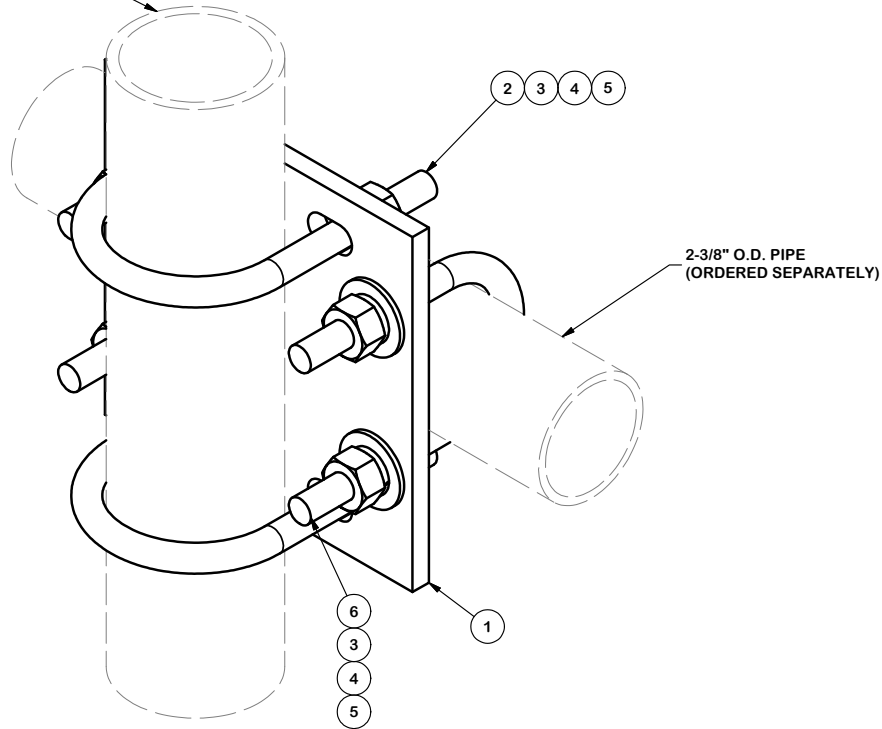
PROPRIETARY NOTE:
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION			
HANDRAIL KIT FOR 14'-6" FACE			
CPD NO.	DRAWN BY	ENG. APPROVAL	
	KC8 5/30/2012		
CLASS	SUB	DRAWING USAGE	CHECKED BY
81	01	CUSTOMER	BMC 7/13/2014

SITE PRO 1 A valmont COMPANY	Locations: New York, NY Atlanta, GA Los Angeles, CA Plymouth, IN Salem, OR Dallas, TX	
	Engineering Support Team: 1-888-753-7446	
PART NO.	HRK14	
DWG. NO.	HRK14	

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	SCX2	CROSSOVER PLATE	7 in	4.80	4.80
2	2	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.66	1.31
3	8	G12FW	1/2" HDG USS FLATWASHER		0.03	0.27
4	8	G12LW	1/2" HDG LOCKWASHER		0.01	0.11
5	8	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	0.57
6	2	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.63	1.25
					TOTAL WT. #	8.39

2-7/8" O.D. ANTENNA PIPE
(ORDERED SEPARATELY)



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

TOLERANCE NOTES

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

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

DESCRIPTION		CROSSOVER PLATE KIT	
-------------	--	---------------------	--

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

CPD NO.	DRAWN BY CEK 6/30/2011	ENG. APPROVAL
CLASS	DRAWING USAGE SHOP	CHECKED BY BMC 7/1/2011

PART NO.	SCX2-K	PAGE	1 OF 1
DWG. NO.	SCX2-K		

Exhibit F

Power Density/RF Emissions Report

Transcom Engineering, Inc.

Wireless Network Design and Deployment

Radio Frequency Emissions Analysis Report

T-MOBILE Existing Facility

Site ID: CTHA509A

AT&T Burlington Monopole
12 Nepaug Road
Burlington, CT 06013

May 18, 2019

Transcom Engineering Project Number: 737001-0022

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	24.15 %

Transcom Engineering, Inc.

Wireless Network Design and Deployment

May 18, 2019

T-MOBILE

Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 6009

Emissions Analysis for Site: **CTHA509A – AT&T Burlington Monopole**

Transcom Engineering, Inc (“Transcom”) was directed to analyze the proposed upgrades to the T-MOBILE facility located at **12 Nepaug Road, Burlington, CT**, for the purpose of determining whether the emissions from the Proposed T-MOBILE Antenna Installation located on this property are within specified federal limits.

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

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

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

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

Transcom Engineering, Inc.

Wireless Network Design and Deployment

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.

Transcom Engineering, Inc.

Wireless Network Design and Deployment

CALCULATIONS

Calculations were performed for the proposed upgrades to the T-MOBILE antenna facility located at **12 Nepaug Road, Burlington, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-MOBILE is proposing highly focused directional panel 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	2100 MHz (AWS)	2	60
UMTS	2100 MHz (AWS)	1	40
LTE / 5G NR	600 MHz	2	30
LTE	700 MHz	2	60

Table 1: Channel Data Table

Transcom Engineering, Inc.

Wireless Network Design and Deployment

The following antennas listed in *Table 2* were used in the modeling for transmission in the 600, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) 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.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Ericsson AIR32 B66A / B2A	90
A	2	Ericsson AIR21 B2A/B4P	90
A	3	RFS APXVAARR24_43-U-NA20	90
B	1	Ericsson AIR32 B66A / B2A	90
B	2	Ericsson AIR21 B2A/B4P	90
B	3	RFS APXVAARR24_43-U-NA20	90
C	1	Ericsson AIR32 B66A / B2A	90
C	2	Ericsson AIR21 B2A/B4P	90
C	3	RFS APXVAARR24_43-U-NA20	90

Table 2: Antenna Data

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

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Wireless Network Design and Deployment

RESULTS

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

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Ericsson AIR32 B66A / B2A	1900 MHz (PCS) / 2100 MHz (AWS)	15.85	6	280	10,768.57	5.49
Antenna A2	Ericsson AIR21 B2A/B4P	2100 MHz (AWS)	15.9	1	40	1,556.18	0.79
Antenna A3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	2.95
Sector A Composite MPE%							9.23
Antenna B1	Ericsson AIR32 B66A / B2A	1900 MHz (PCS) / 2100 MHz (AWS)	15.85	6	280	10,768.57	5.49
Antenna B2	Ericsson AIR21 B2A/B4P	2100 MHz (AWS)	15.9	1	40	1,556.18	0.79
Antenna B3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	2.95
Sector B Composite MPE%							9.23
Antenna C1	Ericsson AIR32 B66A / B2A	1900 MHz (PCS) / 2100 MHz (AWS)	15.85	6	280	10,768.57	5.49
Antenna C2	Ericsson AIR21 B2A/B4P	2100 MHz (AWS)	15.9	1	40	1,556.18	0.79
Antenna C3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	2.95
Sector C Composite MPE%							9.23

Table 3: T-MOBILE Emissions Levels

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Wireless Network Design and Deployment

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

Site Composite MPE%	
Carrier	MPE%
T-MOBILE – Max Per Sector Value	9.23 %
Sprint	4.25 %
AT&T	2.52 %
Verizon Wireless	8.15 %
Site Total MPE %:	24.15 %

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	9.23 %
T-MOBILE Sector B Total:	9.23 %
T-MOBILE Sector C Total:	9.23 %
Site Total:	24.15 %

Table 5: Site MPE Summary

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Wireless Network Design and Deployment

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

T-MOBILE _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile 1900 MHz (PCS) LTE	4	1,538.37	90	31.35	1900 MHz (PCS)	1000	3.14%
T-Mobile 2100 MHz (AWS) LTE	2	2,307.55	90	23.51	2100 MHz (AWS)	1000	2.35%
T-Mobile 2100 MHz (AWS) UMTS	1	1,556.18	90	7.93	2100 MHz (AWS)	1000	0.79%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	90	8.04	600 MHz	400	2.01%
T-Mobile 700 MHz LTE	2	432.54	90	4.41	700 MHz	467	0.94%
						Total:	9.23%

Table 6: T-MOBILE Maximum Sector MPE Power Values

Transcom Engineering, Inc.

Wireless Network Design and Deployment

Summary

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

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

T-MOBILE Sector	Power Density Value (%)
Sector A:	9.23 %
Sector B:	9.23 %
Sector C:	9.23 %
T-MOBILE Maximum Total (per sector):	9.23 %
Site Total:	24.15 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **24.15 %** 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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