

Centerline Communications
Mark Appleby
750 West Center Street, Floor 3
West Bridgewater, MA 02379
860-209-4694
mappleby@clinellc.com

February 12, 2021

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Notice of Exempt Modification
22 Welsh Rd, Hartland Connecticut 06067
Latitude: 41°59'50.90" N
Longitude: 72°53'15.5" W
T-Mobile Site#: CTHA164A_Anchor

Dear Ms. Bachman:

T-Mobile currently maintains Six (6) antennas at the 147-foot level of the existing 180-foot Lattice Tower at 22 Welsh Rd, Avon, Connecticut 06051. The 180-foot tower and property are owned by The Town of Hartland. The Tower is managed by SBA who acquired it from Mariner Tower. T-Mobile now intends to replace Three (3) of its existing Six (6) antennas with three (3) new 2500 MHz antennas and add Three (3) new 600MHz antennas. The new antennas would be installed at the 147-foot level of the Lattice Tower. The proposed upgrades will make the site available for 5G deployment in the future.

Planned Modifications:

Remove and Replace:

(3) LNX-651DS-A1M Antennas **(Remove)** - (3) RFAPXVAR18_43-C-NA20 Antennas **(Replace)**

All existing Coax **(Remove)** – (3) Hybrid Lines **Replace**

Remove

(3) TMA's

(3) Bias T- Units

(1) Cabinet

Install New:

(3) Air 6649-B41 Antennas

(3) RRU 4415 Radios

(3) RRU 4424 Radios

(3) RRU 4449 Radios

(3) New Cabinets

Existing to Remain:

(3) APX16DWV-16DWVS Antennas

(2) Cabinets

This facility was approved by The Town of Hartland Planning and Zoning Commission on December 19, 2005. Please see attached.

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 Wade e. Cole, Hartland First Selectman Scott Eisenlohr, Hartland Zoning Enforcement Officer SBA The Tower Manager.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modifications 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 Communications 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 referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Mobile: 860-209-4694
Fax: 508-819-3017
Office: 750 W. Center Street Suite 301
West Bridgewater, MA 02379
Email: mappleby@clinellc.com

Attachments

cc: Town of Hartland First Selectman, Magi Winslow
Town of Hartland Zoning Enforcement Officer, Scott Eisenlohr
SBA Tower Manager

Exhibit A

Original Facility Approval

**HARTLAND PLANNING & ZONING COMMISSION
LEGAL NOTICE OF DECISIONS**

Notice is hereby given that at their Regular Meeting of December 19, 2005, the Planning & Zoning Commission took the following action:

Applicant: Town of Hartland
Location: Center Hill Road
Proposal: Cell Tower
DECISION: APPROVED with conditions

Applicant: Town of Hartland
Location: Welch Road
Proposal: Cell Tower
DECISION: APPROVED with conditions

Dated in Hartland this 19th day of December, 2005
Warren Haag, Chairman

NOTICE TO REGISTER CITIZEN:
Please publish under Legal Notices. PLEASE ADDRESS ALL INQUIRIES TO THE
PLANNING & ZONING OFFICE @ 633-6800.

at Town Clerk, Riser, book

Exhibit B

Property Card

ADMINISTRATIVE INFORMATION

OWNERSHIP

PARCEL NUMBER

17-16-048

Parent Parcel Number

Property Address

WELSH RD

Neighborhood

1 East Hartland

Property Class

901 Exempt BAAX Municipal

TAXING DISTRICT INFORMATION

Jurisdiction

065

Area

065

Routing Number

98100966

OWNERSHIP

TOWN OF HARTLAND

SOUTH RD

EAST HARTLAND, CT 06027

Census Tract:

3301

TRANSFER OF OWNERSHIP

Tax ID

17-16-048

Printed

02/12/2020

Card No.

1

of

2

EXEMPT

VALUATION RECORD

Assessment Year	10/01/2003	10/01/2005	10/01/2006	10/01/2008	10/01/2011	10/01/2015
Reason for Change	Survey	2005	2006	Partial	2011 Reval	2015 Reval
VALUATION	I 51130	51130	51130	51130	46020	128510
Market Value	P 508000	530660	630660	930660	1033470	942540
	T 559130	581790	681790	981790	1079490	1071050
VALUATION	I 35791	35790	35790	35790	32210	89960
70% Assessed/Use	B 355600	371470	441470	651470	723430	659780
T	391391	407260	477260	687260	755640	749740

LAND DATA AND CALCULATIONS

Rating	Measured	Table	Prod. Factor	Base	Adjusted	Extended	Influence	Value
Soil ID	Acres	Depth	Factor	Rate	Rate	Value	Factor	
-or-	-or-	-or-	-or-					
Actual	Effective	Effective	Depth	Square Feet	Rate	Value		
Frontage	Frontage	Depth						
Land Type								
1 Primary Commercial	1.0000		1.00	90000.00	90000.00	90000		90000
2 Res Excess Acres	16.0440		1.00	2400.00	2400.00	38510		38510
Zoning:								
R-1								
Legal Acres:								
17.0440								

G: GENERAL NOTES
INCLUDES TOWN GARAGE AND SAND & SALT SHED
ADDED CELL TOWER - 12/08
L: LAND NOTES
SEE MAP T28

Permit Number	FilingDate	Est. Cost	Field Visit
Type		Est.	SqPt

Supplemental Cards
TRUE TAX VALUE
128510

Supplemental Cards
TOTAL LAND VALDE
128510

Date

VALUATION RECORD

Assessment Year
Reason for Change
VALUATION

Site Description

LAND DATA AND CALCULATIONS

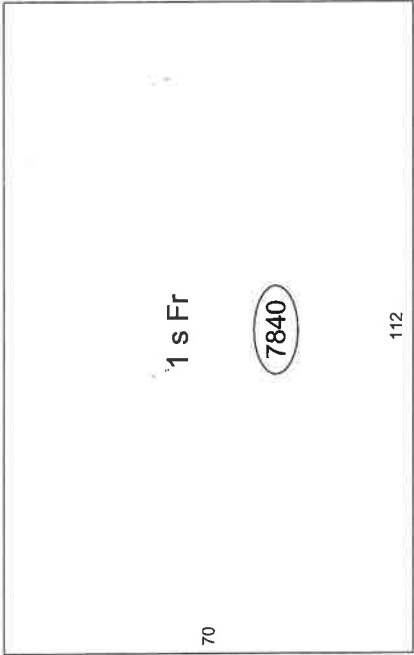
Rating	Measured	Table	Prod. Factor	Land Type	Base	Adjusted	Extended	Influence
Soil ID	Acreage				Rate	Rate	Value	Factor
-or-	-or-		-or-					
Actual	Effective	Effective	Depth					
Frontage	Frontage	Depth	Square Feet					Value

IMPROVEMENT DATA

PHYSICAL CHARACTERISTICS

ROOFING			
Shingle			
Insulation			
WALLS			
Frame	B	1	2
Brick		Yes	
Metal			
Guard			
FRAMING			
Wd Jst	B	1	2
		7840	0
			0
HEATING AND AIR CONDITIONING			
	B	1	2
			U

01



SPECIAL FEATURES

SUMMARY OF IMPROVEMENTS

Description		Value																			
ID	Use	Stry Hgt	Const Type	Grade	Year Eff	Const	Year	Eff	Base Rate	Feat- ures	Adj Rate	Size or Area	Computed Value	PhysObsol	Market %	Depr	Depr Adj	Comp	Value		
C	SERVGAR	0.00			Avg	2001	2001	AV	0.00	N	0.00	7840	1	0	0	0	0	100	100	337840	
01	TOWER	200.00			Avg	2008	2008	AV	0.00	N	0.00			0	0	SV	100	100	300000		
Data Collector/Date		Appraiser/Date				Neighborhood				Supplemental Cards											
01/01/1900		01/01/1900				Neigh 1 AV				TOTAL IMPROVEMENT VALUE											
										637840											

(LCM: 100.00)

Google Maps 22 Welsh Rd



Map data ©2020 200 ft



22 Welsh Rd

East Hartland, CT 06027



Directions



Save



Nearby

Send to your
phone

Share

Exhibit C

Construction Drawings

SITE NAME: EAST HARTLAND_RT20

22 WELSH ROAD
HARTLAND, CT 06027
HARTFORD COUNTY

SITE NUMBER: CTHA164A

PROJECT: T-MOBILE L600 ANCHOR

CONFIGURATION: 67D04G (L600) & 67D5A998C (ANCHOR)

CONSTRUCTION

GENERAL NOTES
<div><div>1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T-MOBILE NORTHEAST, LLC. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.</div><div>2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.</div><div>3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE T-MOBILE NORTHEAST, LLC REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.</div></div>
SPECIAL CONSTRUCTION NOTES
<div><div>1. ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE GLOBAL TOWER STRUCTURAL ANALYSIS PREPARED BY ALL-POINTS TECHNOLOGY CORPORATION DATED 11/06/2020.</div><div>2. PROTERRA DESIGN GROUP ASSUMES THAT THE SELF SUPPORT TOWER IS PROPERLY CONSTRUCTED AND MAINTAINED. ALL STRUCTURAL MEMBERS AND THEIR CONNECTION ARE ASSUMED TO BE IN GOOD CONDITION AND ARE FREE FROM DEFECTS WITH NO DETERIORATION TO ITS MEMBER CAPACITIES.</div><div>3. ALL TOWER TOP EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE ANTENNA MOUNT STRUCTURAL ANALYSIS (MSA) REPORT PREPARED BY ALL-POINTS TECHNOLOGY CORPORATION DATED 02/02/2021.</div></div>

T-MOBILE TECHNICIAN SITE SAFETY NOTES
<div><div>LOCATION</div><div>SPECIAL RESTRICTIONS</div></div> <div><div>SECTOR A:</div><div>ACCESS NOT PERMITTED</div></div> <div><div>SECTOR B:</div><div>ACCESS NOT PERMITTED</div></div> <div><div>SECTOR C:</div><div>ACCESS NOT PERMITTED</div></div> <div><div>GPS/LMU:</div><div>UNRESTRICTED*</div></div> <div><div>(*CAUTION: OSHA-APPROVED PORTABLE 8' STEP-LADDER REQUIRED)</div></div> <div><div>RADIO CABINETS:</div><div>UNRESTRICTED</div></div> <div><div>PPC DISCONNECT:</div><div>UNRESTRICTED</div></div> <div><div>MAIN CIRCUIT D/C:</div><div>UNRESTRICTED</div></div> <div><div>NIU/T DEMARC:</div><div>UNRESTRICTED</div></div> <div><div>OTHER/SPECIAL:</div><div>NONE</div></div>



PROJECT INFORMATION	
SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY T-MOBILE EQUIPMENT ALTERATION
ZONING JURISDICTION:	SPECIAL ZONING NOTE (ELIGIBLE FACILITY REQUEST): BASED ON INFORMATION PROVIDED BY T-MOBILE REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409(A), AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW AND LIMITED/PARTIAL ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW OR ADMINISTRATIVE REVIEW).
SITE ADDRESS:	22 WELSH ROAD HARTLAND, CT 06027
LATITUDE:	41° 59' 50.90" N (FROM RFDS: 41.9974722)
LONGITUDE:	72° 53' 15.51" W (FROM RFDS: -72.88764170)
GROUND ELEVATION:	1080'± (FROM GOOGLE EARTH)
JURISDICTION:	CONNECTICUT SITING COUNCIL / TOWN OF HARTLAND
BUILDING CODE:	2018 CONNECTICUT STATE BUILDING CODE WITH AMENDMENTS (IBC 2015 BASED)
ELECTRICAL CODE:	2017 NATIONAL ELECTRICAL CODE AND AMENDMENTS
CURRENT/ PROPOSED USE:	TELECOMMUNICATIONS FACILITY
TOWER OWNER:	MARINER TOWER (NAVIGATOR PROPERTIES, LLC)
TOWER OWNER SITE ID:	NAV-19
TOWER OWNER SITE NAME:	EAST HARTLAND

DRAWING INDEX		
SHEET NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	2
GN-1	GENERAL NOTES	2
A-1	COMPOUND & EQUIPMENT PLANS	2
A-2	ELEVATION & ANTENNA PLANS	2
A-3	DETAILS	2
A-4	DETAILS	2
E-1	ONE-LINE DIAGRAM & GROUNDING DETAILS	2

DIG SAFE SYSTEM
(MA, ME, NH, RI, VT):
1-888-344-7233
CALL BEFORE YOU DIG
(CT): 1-800-922-4455

T-MOBILE NORTHEAST LLC
35 Griffin Road South
Bloomfield, CT 06002
Office: (860) 648-1116

CENTERLINE COMMUNICATIONS
750 West Center St. Suite 301
West Bridgewater, MA 02379

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 | Ph: (413) 320-4918

2/3/21

APPROVALS

CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE
PROJECT NO:	19-023
DRAWN BY:	SH/PN
CHECKED BY:	TEJ/JMM
2	02/03/21 CONSTRUCTION REVISED
1	01/05/21 CONSTRUCTION REVISED
0	12/10/20 FOR CONSTRUCTION
A	12/02/20 ISSUED FOR REVIEW

SITE NUMBER: CTHA164A
SITE NAME:
EAST HARTLAND_RT20
22 WELSH ROAD
HARTLAND, CT 06027
HARTFORD COUNTY

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

GENERAL NOTES

1.

FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

CONTRACTOR – CENTERLINE COMMUNICATIONS

SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)

OWNER – T–MOBILE
2.

PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3.

ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4.

DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5.

UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6.

"KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7.

THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER’S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8.

IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9.

SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10.

THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR’S EXPENSE TO THE SATISFACTION OF THE OWNER.
11.

SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER’S DESIGNATED LOCATION.
12.

SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13.

ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
14.

ANY NEW CONCRETE NEEDED FOR CONSTRUCTION SHALL BE AIR–ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15.

ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 35 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16.

CONSTRUCTION SHALL COMPLY WITH THE LATEST APPROVED LTE AND/OR 600/700MHZ SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF T–MOBILE SITES."
17.

SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18.

THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19.

SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20.

APPLICABLE BUILDING CODES:

SUBCONTRACTOR’S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE: 2018 CONNECTICUT STATE BUILDING CODE, (IBC 2015) WITH AMENDMENTS

ELECTRICAL CODE: NEC 2017 AND AMENDMENTS

SUBCONTRACTOR’S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, 14TH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222–G, STRUCTURAL STANDARDS FOR STEEL

ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.
- GROUNDING NOTES
1.

THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE–SPECIFIC (UL, LPI, OR NFPA) LIGHTNING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2.

ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES’S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3.

THE SUBCONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

4.

METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5.

EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6.

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

7.

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

8.

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

9.

ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10.

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

11.

METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12.

ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50
- ABBREVIATIONS
- | | | | | | |
|----------|-------------------------------|----------|--------------------------------|------|----------------------------|
| AGL | ABOVE GRADE LEVEL | EQ | EQUAL | RAN | RADIO ACCESS NETWORK |
| AWG | AMERICAN WIRE GAUGE | G.C. | GENERAL CONTRACTOR | REF | REFERENCE |
| BTCW | BARE TINNED SOLID COPPER WIRE | GRC | GALVANIZED RIGID CONDUIT | REQ | REQUIRED |
| BGR | BURIED GROUND RING | MSA | MOUNT STRUCTURAL ANALYSIS | RF | RADIO FREQUENCY |
| BTS | BASE TRANSCEIVER STATION | MGB | MASTER GROUND BAR | TBD | TO BE DETERMINED |
| EXISTING | EXISTING OR (E) | MIN | MINIMUM | TBR | TO BE REMOVED |
| EGB | EQUIPMENT GROUND BAR | PROPOSED | NEW OR (P) | TBRR | TO BE REMOVED AND REPLACED |
| EGR | EQUIPMENT GROUND RING | N.T.S. | NOT TO SCALE | TYP | TYPICAL |
| | | RAD | RADIATION CENTERLINE (ANTENNA) | VIF | VERIFY IN FIELD |
- T

Mobile

T-MOBILE NORTHEAST LLC

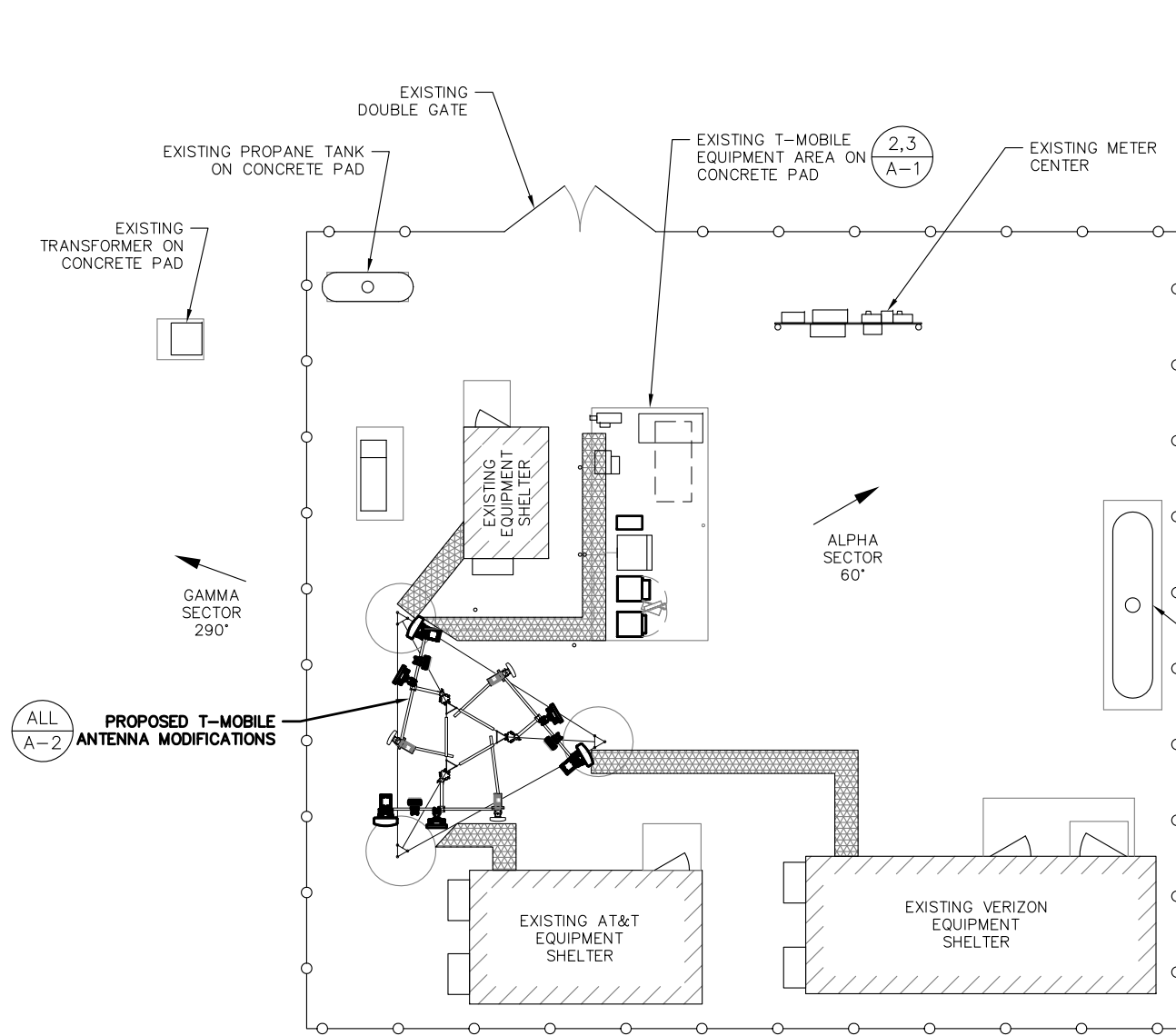
35 Griffin Road South
Bloomfield, CT 06002
Office: (860) 648–1116
- CENTERLINE

COMMUNICATIONS

750 West Center St. Suite 301
West Bridgewater, MA 02379
- ProTerra

DESIGN GROUP, LLC

4 Bay Road, Building A
Suite 200
Hadley, MA 01035
Phone: (413) 320–4918
-
- | APPROVALS | | |
|------------------|----------|----------------------|
| CONSTRUCTION | | DATE |
| RF ENGINEERING | | DATE |
| ZONING/SITE ACQ. | | DATE |
| OPERATIONS | | DATE |
| TOWER OWNER | | DATE |
| PROJECT NO: | 19–023 | |
| DRAWN BY: | SH/PN | |
| CHECKED BY: | TEJ/JMM | |
| | | |
| | | |
| 2 | 02/03/21 | CONSTRUCTION REVISED |
| 1 | 01/05/21 | CONSTRUCTION REVISED |
| 0 | 12/10/20 | FOR CONSTRUCTION |
| A | 12/02/20 | ISSUED FOR REVIEW |
- SITE NUMBER: CTHA164A
SITE NAME:
EAST HARTLAND_RT20
- 22 WELSH ROAD
HARTLAND, CT 06027
HARTFORD COUNTY
- SHEET TITLE
- GENERAL NOTES
- SHEET NUMBER
- GN–1



COMPOUND PLAN

SCALE: 1"=15' (11"x17")
1"=7.5' (22"x34")

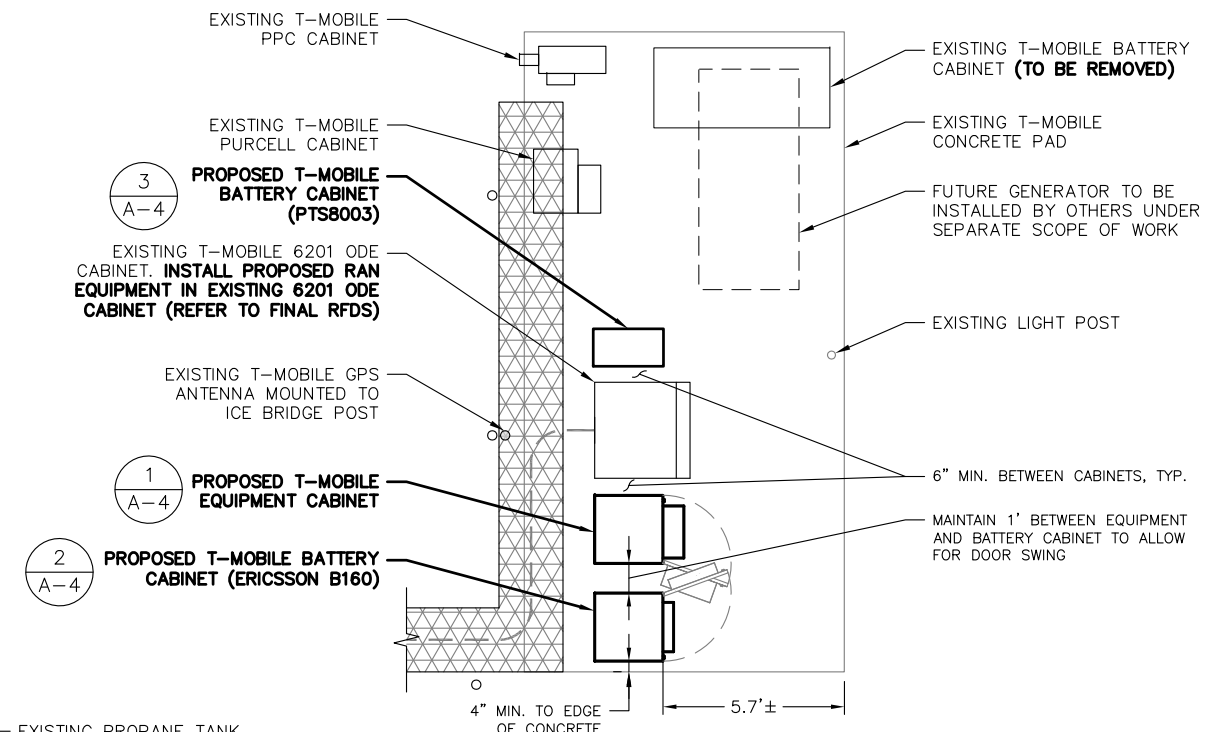
1
A-1



NOTE:
REFER TO THE FINAL RF DATA SHEET
FOR FINAL ANTENNA SETTINGS.

TOWER TOP EQUIPMENT TO BE INSTALLED IN
ACCORDANCE WITH THE MOUNT STRUCTURAL
ANALYSIS REPORT PREPARED BY ALL-POINTS
TECHNOLOGY CORPORATION DATED 02/02/2021.

ALL WORK TO BE COMPLETED IN ACCORDANCE
WITH THE GLOBAL TOWER STRUCTURAL ANALYSIS
PREPARED BY ALL-POINTS TECHNOLOGY
CORPORATION DATED 11/06/2020.



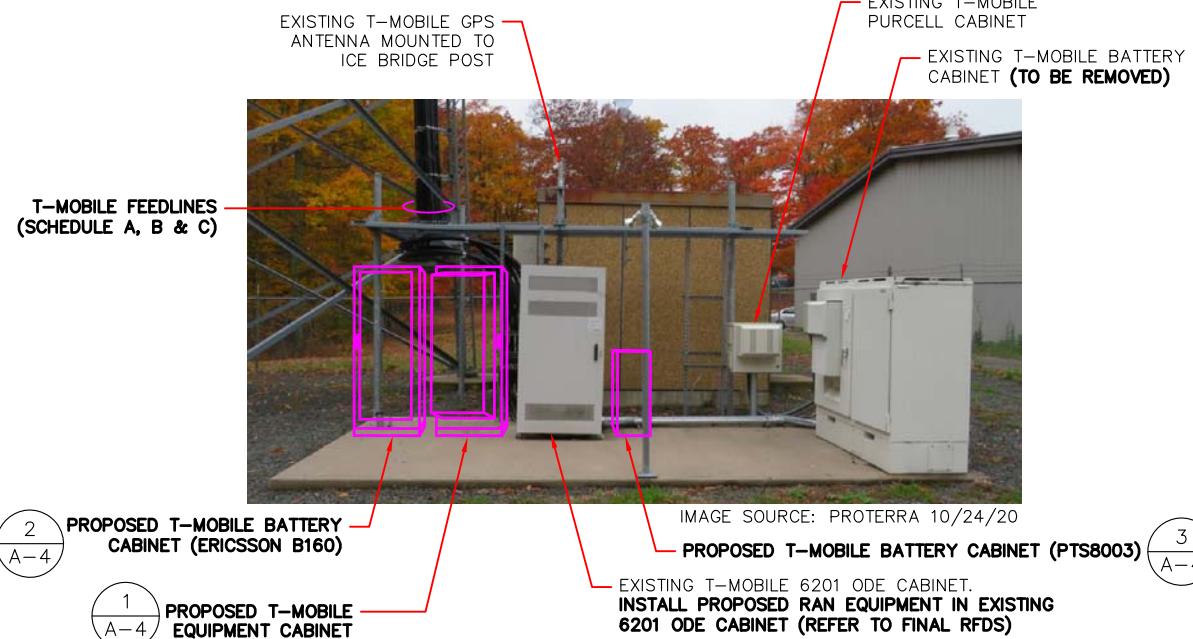
EQUIPMENT LAYOUT

SCALE: 1"=6' (11"x17")
1"=3' (22"x34")

2
A-1

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING CABLING: (12) 18" COAX TO 147' RAD	UP SELF SUPPORT TOWER TO RAD
B	EXISTING TO BE REMOVED: (12) 18" COAX TO 147' RAD PROPOSED: (3) 6x12 HYBRID TO 147' RAD	UP SELF SUPPORT TOWER TO RAD
C	FINAL CONFIGURATION: PROPOSED: (3) 6x12 HYBRID TO 147' RAD	UP SELF SUPPORT TOWER TO RAD

NOTE: EXISTING T-MOBILE EQUIPMENT FEEDLINE LEASING ENTITLEMENTS BASED
ON T-MOBILE RFDS. OBSERVED FIELD CONDITIONS MAY DIFFER.



GROUND EQUIPMENT PHOTO DETAIL

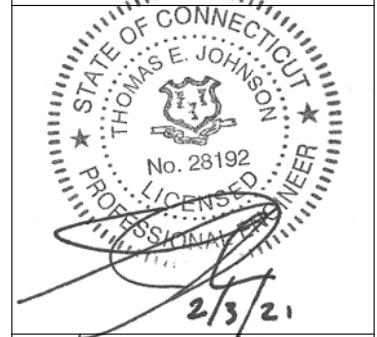
SCALE: N.T.S.

3
A-1

T-Mobile
T-MOBILE NORTHEAST LLC
35 Griffin Road South
Bloomfield, CT 06002
Office: (860) 648-1116

CENTERLINE
COMMUNICATIONS
750 West Center St. Suite 301
West Bridgewater, MA 02379

ProTerra
DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035
Phone: (413) 320-4918



APPROVALS

CONSTRUCTION		DATE
RF ENGINEERING		DATE
ZONING/SITE ACQ.		DATE
OPERATIONS		DATE
TOWER OWNER		DATE
PROJECT NO:		19-023
DRAWN BY:		SH/PN
CHECKED BY:		TEJ/JMM
2	02/03/21	CONSTRUCTION REVISED
1	01/05/21	CONSTRUCTION REVISED
0	12/10/20	FOR CONSTRUCTION
A	12/02/20	ISSUED FOR REVIEW

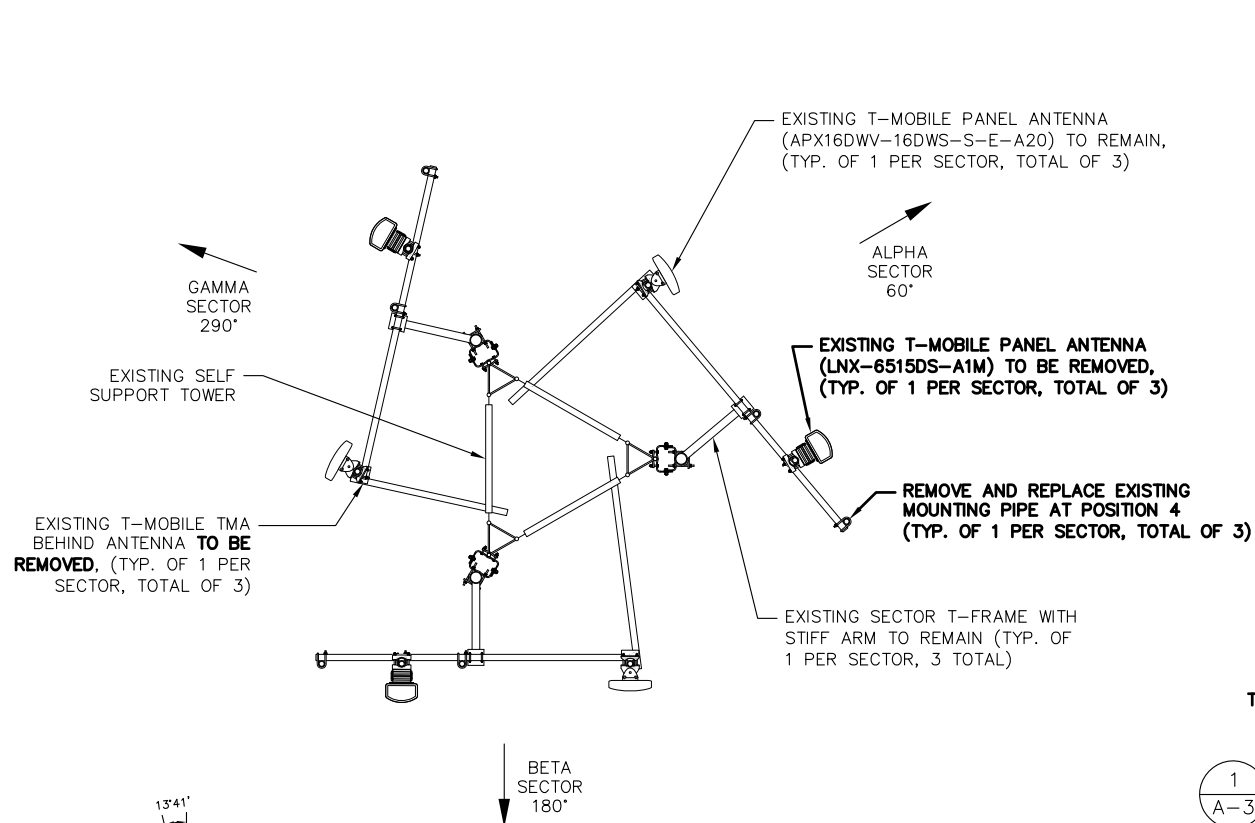
SITE NUMBER: CTHA164A
SITE NAME:
EAST HARTLAND_RT20

22 WELSH ROAD
HARTLAND, CT 06027
HARTFORD COUNTY

SHEET TITLE
COMPOUND &
EQUIPMENT PLANS

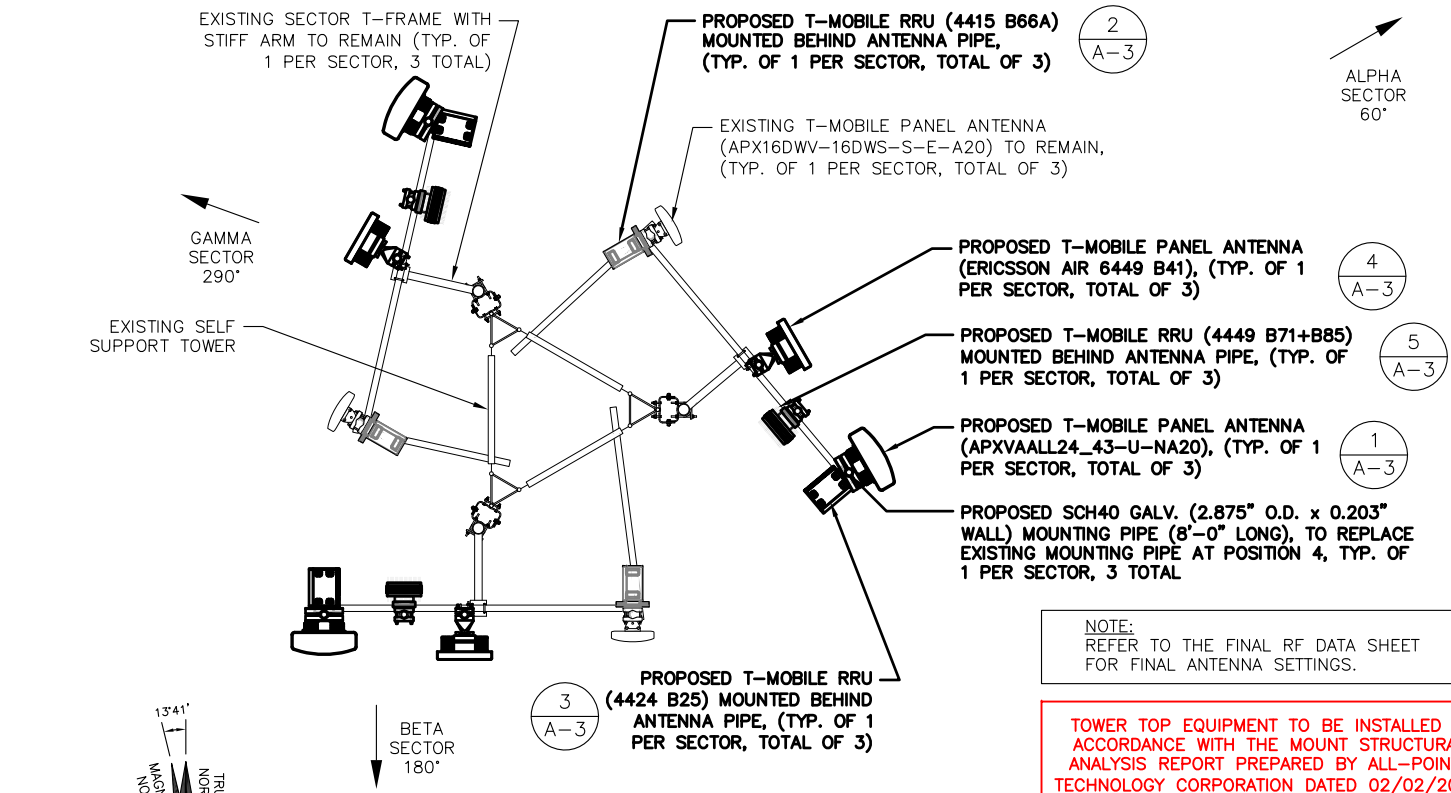
SHEET NUMBER

A-1



EXISTING ANTENNA PLAN
SCALE: N.T.S.

1
A-2



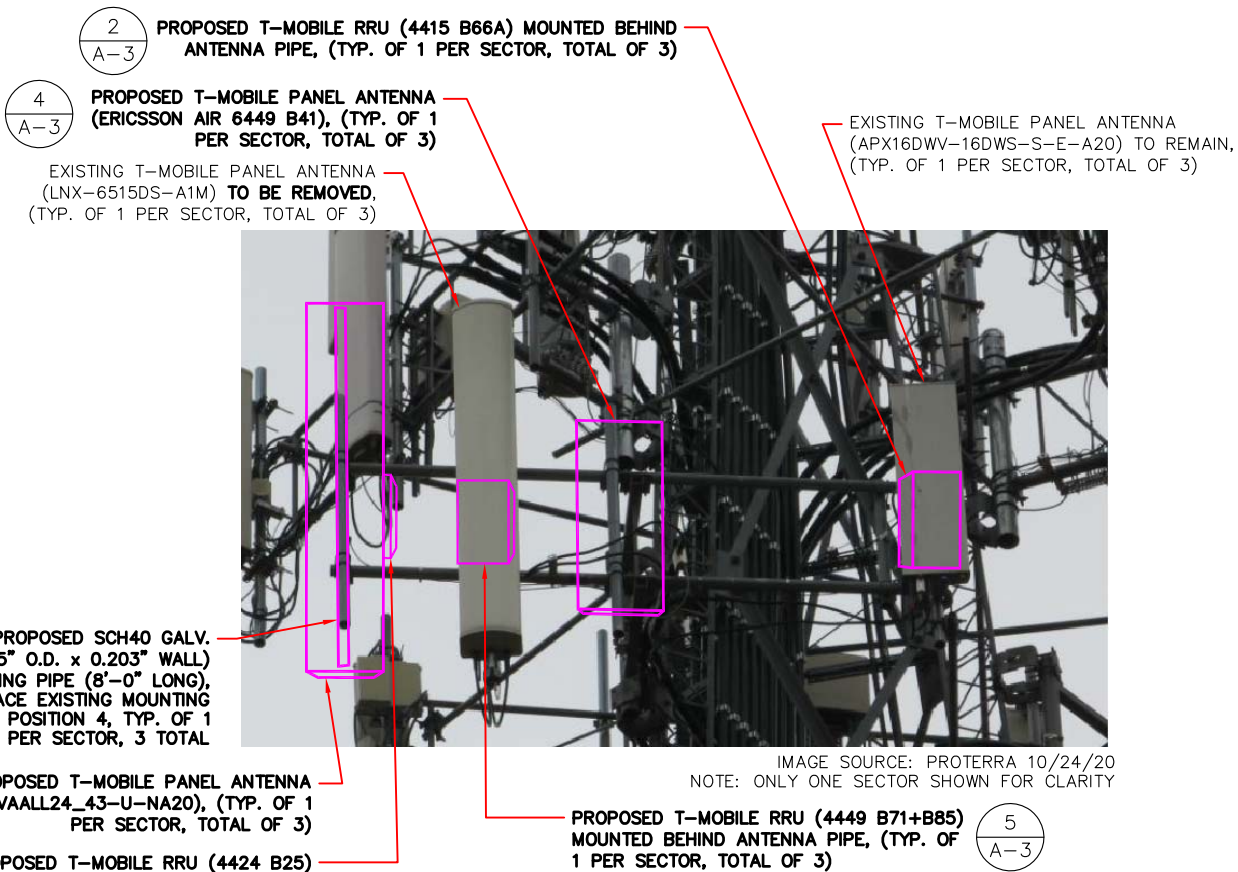
PROPOSED ANTENNA PLAN
SCALE: N.T.S.

2
A-2

NOTE:
REFER TO THE FINAL RF DATA SHEET
FOR FINAL ANTENNA SETTINGS.

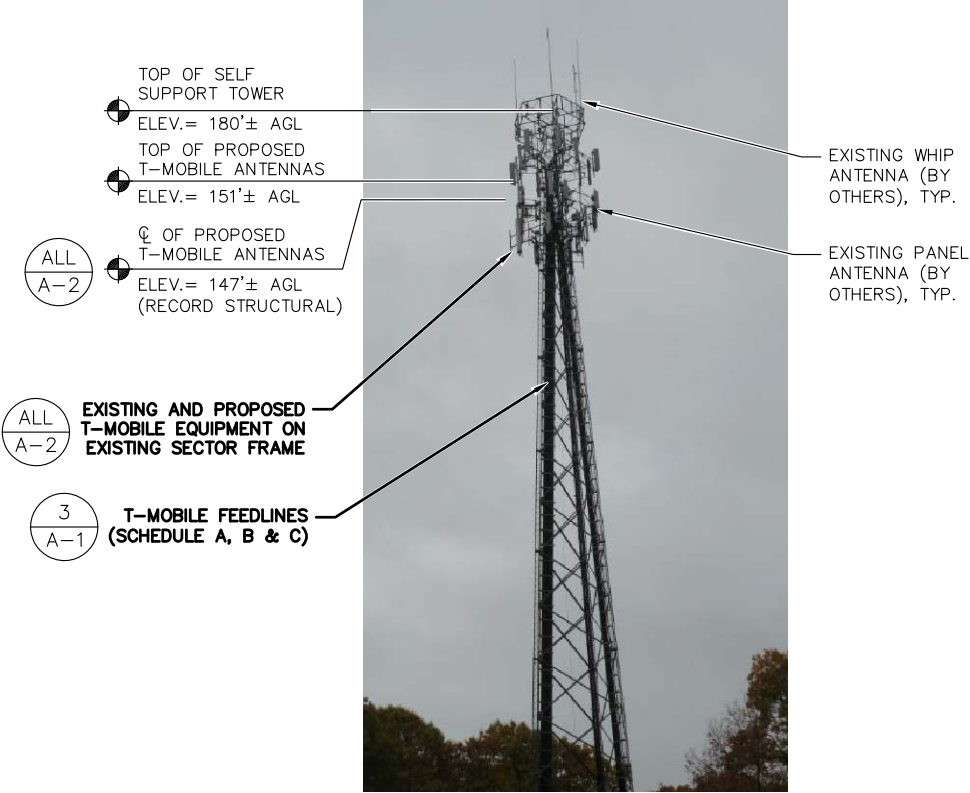
**TOWER TOP EQUIPMENT TO BE INSTALLED IN
ACCORDANCE WITH THE MOUNT STRUCTURAL
ANALYSIS REPORT PREPARED BY ALL-POINTS
TECHNOLOGY CORPORATION DATED 02/02/2021.**

**ALL WORK TO BE COMPLETED IN ACCORDANCE
WITH THE GLOBAL TOWER STRUCTURAL ANALYSIS
PREPARED BY ALL-POINTS TECHNOLOGY
CORPORATION DATED 11/06/2020.**



ANTENNA PHOTO DETAIL
SCALE: N.T.S.

3
A-2



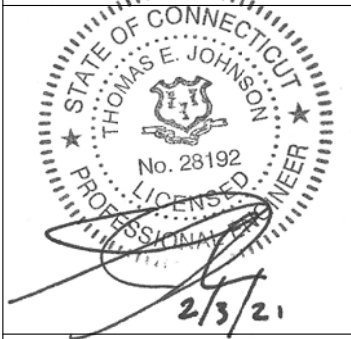
PARTIAL ELEVATION PHOTO DETAIL
SCALE: N.T.S.

4
A-2

T-Mobile
T-MOBILE NORTHEAST LLC
35 Griffin Road South
Bloomfield, CT 06002
Office: (860) 648-1116

CENTERLINE
COMMUNICATIONS
750 West Center St. Suite 301
West Bridgewater, MA 02379

ProTerra
DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035
Phone: (413) 320-4918

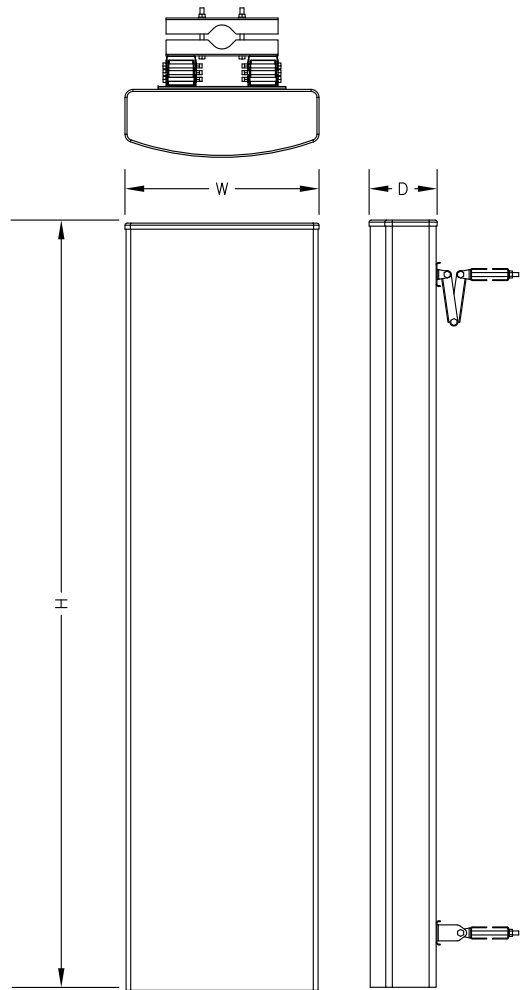


APPROVALS		
CONSTRUCTION	DATE	
RF ENGINEERING	DATE	
ZONING/SITE ACQ.	DATE	
OPERATIONS	DATE	
TOWER OWNER	DATE	
PROJECT NO:	19-023	
DRAWN BY:	SH/PN	
CHECKED BY:	TEJ/JMM	
2	02/03/21	CONSTRUCTION REVISED
1	01/05/21	CONSTRUCTION REVISED
0	12/10/20	FOR CONSTRUCTION
A	12/02/20	ISSUED FOR REVIEW

SITE NUMBER: CTHA164A
SITE NAME:
EAST HARTLAND_RT20
22 WELSH ROAD
HARTLAND, CT 06027
HARTFORD COUNTY

SHEET TITLE
**ELEVATION &
ANTENNA PLANS**

SHEET NUMBER
A-2



APXVAALL24_43-U-NA20 (OCTO) ANTENNA SPECIFICATIONS

MANUF.	RFS
MODEL #	APXVAALL24_43-U-NA20
HEIGHT	95.9"
WIDTH	24"
DEPTH	8.5"
WEIGHT	123± LBS.

L600, L700, N600, L1900, AND G1900 ANTENNA DETAIL

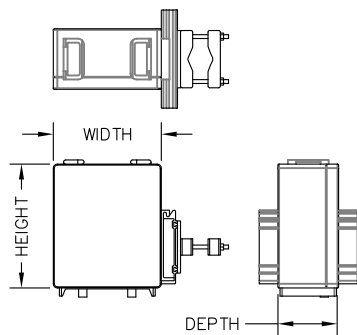
SCALE: N.T.S.

1
A-3

FINAL ANTENNA CONFIGURATION								
SECTOR	BAND	ANTENNA MODEL	ANTENNA RAD (RECORD STRUCTURAL)	AZIMUTH	DOWNTILT MECH./ELEC.		RADIOS	CABLE FEED LINES (APPROX. CABLE LENGTH 220'±)
ALPHA	L2100	EXISTING (1) RFS – APX16DWV-16DWV-S-E-A20 (QUAD)	147'±	60°	0°	0°	PROPOSED (1) 4415 B66A RRU	PROPOSED (3) SHARED 6x12 HYBRID CABLE TRUNK
	L2500 N2500	PROPOSED (1) ERICSSON – AIR 6449 B41	147'±	60°	0°	0°	N/A	
	L600 L700 N600 L1900 G1900	PROPOSED (1) RFS – APXVAALL24_43-U-NA20	147'±	60°	0°	0°	PROPOSED (1) 4449 B71+B85 RRU (1) 4424 B25 RRU	
BETA	L2100	EXISTING (1) RFS – APX16DWV-16DWV-S-E-A20 (QUAD)	147'±	180°	0°	0°	PROPOSED (1) 4415 B66A RRU	
	L2500 N2500	PROPOSED (1) ERICSSON – AIR 6449 B41	147'±	180°	0°	0°	N/A	
	L600 L700 N600 L1900 G1900	PROPOSED (1) RFS – APXVAALL24_43-U-NA20	147'±	180°	0°	0°	PROPOSED (1) 4449 B71+B85 RRU (1) 4424 B25 RRU	
GAMMA	L2100	EXISTING (1) RFS – APX16DWV-16DWV-S-E-A20 (QUAD)	147'±	290°	0°	0°	PROPOSED (1) 4415 B66A RRU	
	L2500 N2500	PROPOSED (1) ERICSSON – AIR 6449 B41	147'±	290°	0°	0°	N/A	
	L600 L700 N600 L1900 G1900	PROPOSED (1) RFS – APXVAALL24_43-U-NA20	147'±	290°	0°	0°	PROPOSED (1) 4449 B71+B85 RRU (1) 4424 B25 RRU	
BASED ON RFDS DATED 10/12/20. REFER TO FINAL RFDS FOR FINAL ANTENNA SETTINGS, CONFIGURATION, QUANTITIES AND RAN WIRING.								

4415 B66A SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	4415 B66A (WITH FAN)
HEIGHT	16.5"
WIDTH	13.5"
DEPTH	6.3"
WEIGHT	50± LBS.



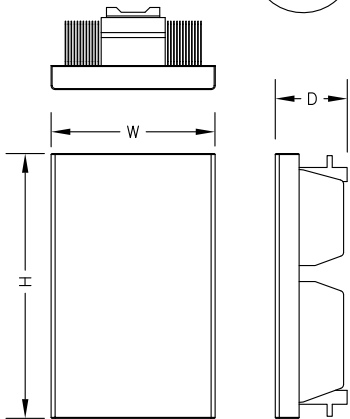
REMOTE RADIO UNIT (RRU) DETAIL

SCALE: N.T.S.

2
A-3

AIR 6449 B41 SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	AIR 6449 B41
HEIGHT	33.1"
WIDTH	20.5"
DEPTH	8.5"
WEIGHT	102± LBS.



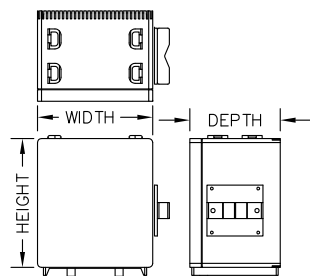
L2500 AND N2500 ANTENNA DETAIL

SCALE: N.T.S.

4
A-3

4424 B25 SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	4424 B25
HEIGHT	17.1"
WIDTH	14.4"
DEPTH	11.3"
WEIGHT	86± LBS.



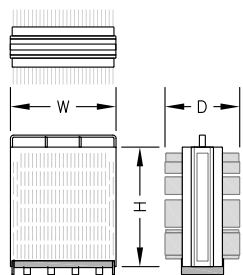
REMOTE RADIO UNIT (RRU) DETAIL

SCALE: N.T.S.

3
A-3

4449 B71 + B85 SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	4449 B71+B85
HEIGHT	14.9"
WIDTH	13.2"
DEPTH	9.2"
WEIGHT	74± LBS.



REMOTE RADIO UNIT (RRU) DETAIL

SCALE: N.T.S.

5
A-3

T-Mobile

T-MOBILE NORTHEAST LLC

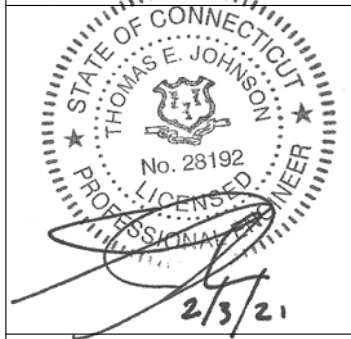
35 Griffin Road South
Bloomfield, CT 06002
Office: (860) 648-1116



750 West Center St. Suite 301
West Bridgewater, MA 02379

ProTerra
DESIGN GROUP, LLC

4 Bay Road, Building A
Suite 200
Hadley, MA 01035 | Phone: (413) 320-4918



APPROVALS

CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE
PROJECT NO:	19-023
DRAWN BY:	SH/PN
CHECKED BY:	TEJ/JMM

2	02/03/21	CONSTRUCTION REVISED
1	01/05/21	CONSTRUCTION REVISED
0	12/10/20	FOR CONSTRUCTION
A	12/02/20	ISSUED FOR REVIEW

SITE NUMBER: CTHA164A

SITE NAME:
EAST HARTLAND_RT20

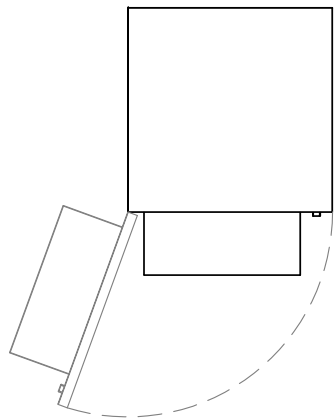
22 WELSH ROAD
HARTLAND, CT 06027
HARTFORD COUNTY

SHEET TITLE

DETAILS

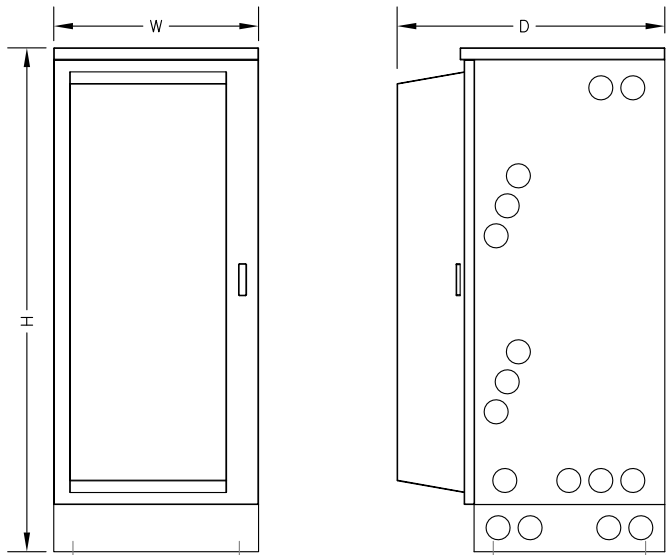
SHEET NUMBER

A-3



6160 CABINET
SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	ENCLOSURE 6160
HEIGHT	63.0" (WITH BASE)
WIDTH	25.6"
DEPTH	33.5"
WEIGHT	373± LBS. (EMPTY)



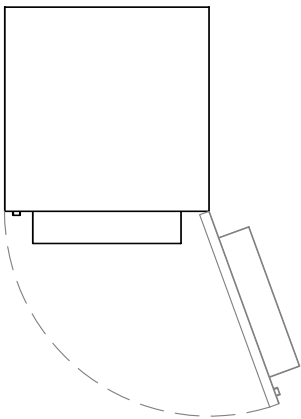
ANCHOR TO CONCRETE PAD WITH (4) SS HILTI-KWIK BOLT 3 WEDGE ANCHORS SIZED PER MANUFACTURER'S RECOMMENDATIONS (CONFIRM SIZE PRIOR TO INSTALLATION) WITH 3½" MIN. EMBEDMENT. MAINTAIN 4" MIN. EDGE DISTANCE FROM ANCHOR TO EDGE OF SLAB

EQUIPMENT CABINET DETAIL

SCALE: N.T.S.

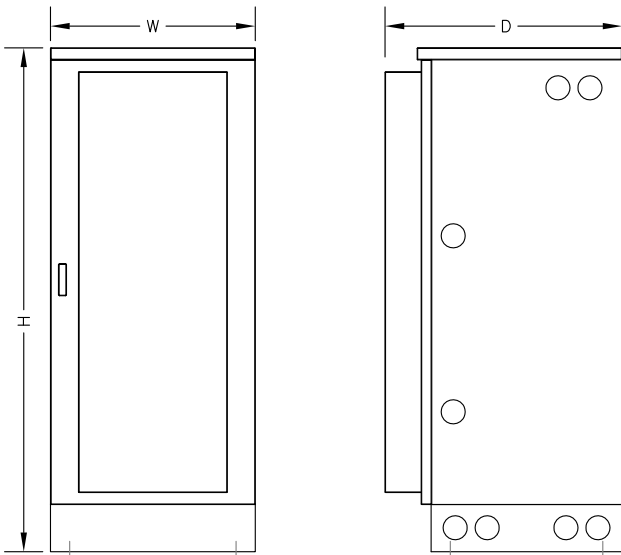
1

A-4



B160 CABINET
SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	ENCLOSURE B160
HEIGHT	63.0" (WITH BASE)
WIDTH	25.6"
DEPTH	29.6"
WEIGHT	430± LBS. (EMPTY)



ANCHOR TO CONCRETE PAD WITH (4) SS HILTI-KWIK BOLT 3 WEDGE ANCHORS SIZED PER MANUFACTURER'S RECOMMENDATIONS (CONFIRM SIZE PRIOR TO INSTALLATION) WITH 3½" MIN. EMBEDMENT. MAINTAIN 4" MIN. EDGE DISTANCE FROM ANCHOR TO EDGE OF SLAB

BATTERY CABINET DETAIL

SCALE: N.T.S.

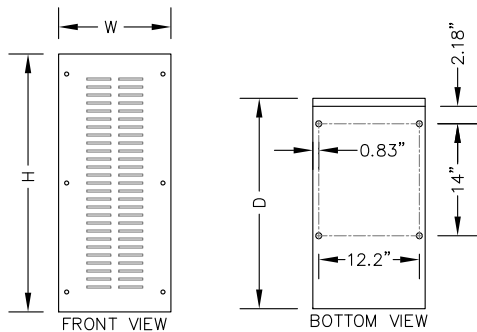
2

A-4

BBU SPECIFICATIONS

MANUF.	PTS
MODEL #	PTS8003
HEIGHT	32.3"
WIDTH	14.0"
DEPTH	26.3"
WEIGHT WITHOUT BATTERIES	60 LBS.

MOUNT BASE WITH (4) ½" DROP-IN ANCHORS WITH 2" MINIMUM EMBEDMENT (INSTALL PER MANUFACTURER'S INSTALLATION GUIDELINES)



BATTERY BACKUP UNIT (BBU)

SCALE: N.T.S.

3

A-4



T-MOBILE NORTHEAST LLC

35 Griffin Road South
Bloomfield, CT 06002
Office: (860) 648-1116

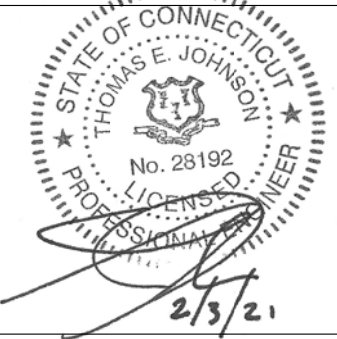


750 West Center St. Suite 301
West Bridgewater, MA 02379



DESIGN GROUP, LLC

4 Bay Road, Building A
Suite 200
Hadley, MA 01035 | Ph: (413) 320-4918



APPROVALS

CONSTRUCTION DATE

RF ENGINEERING DATE

ZONING/SITE ACQ. DATE

OPERATIONS DATE

TOWER OWNER DATE

PROJECT NO: 19-023

DRAWN BY: SH/PN

CHECKED BY: TEJ/JMM

2 02/03/21 CONSTRUCTION REVISED

1 01/05/21 CONSTRUCTION REVISED

0 12/10/20 FOR CONSTRUCTION

A 12/02/20 ISSUED FOR REVIEW

SITE NUMBER: CTHA164A

SITE NAME:
EAST HARTLAND_RT20

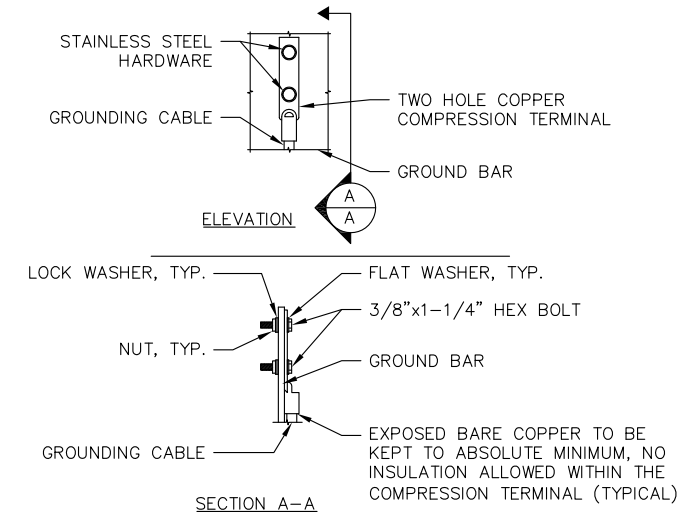
22 WELSH ROAD
HARTLAND, CT 06027
HARTFORD COUNTY

SHEET TITLE

DETAILS

SHEET NUMBER

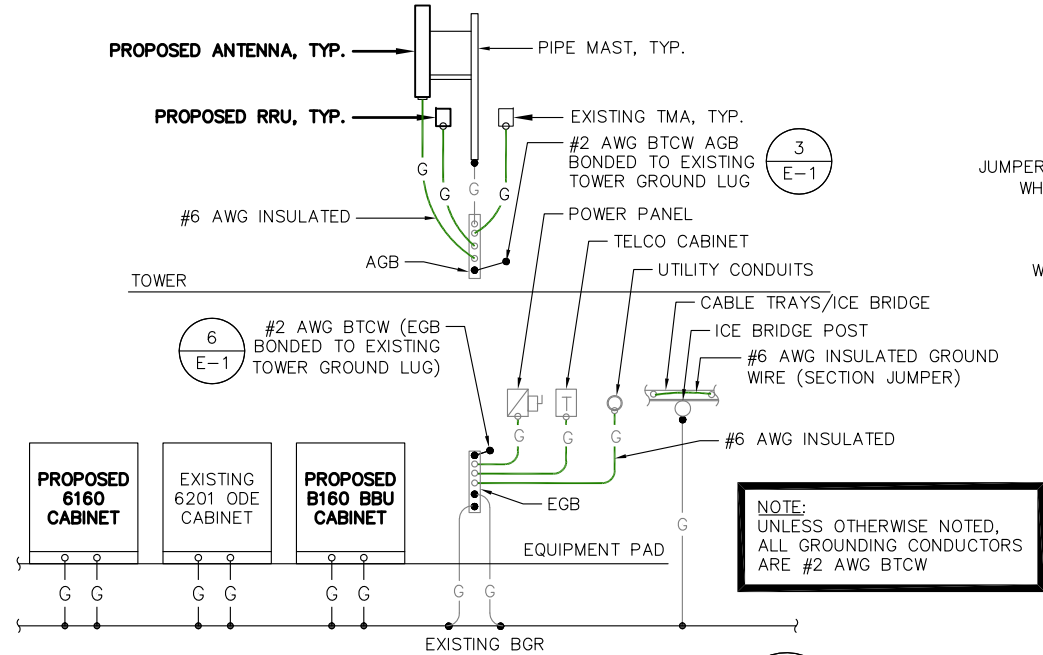
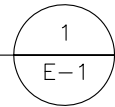
A-4



- NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
 2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
 3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

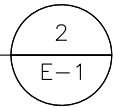
TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.

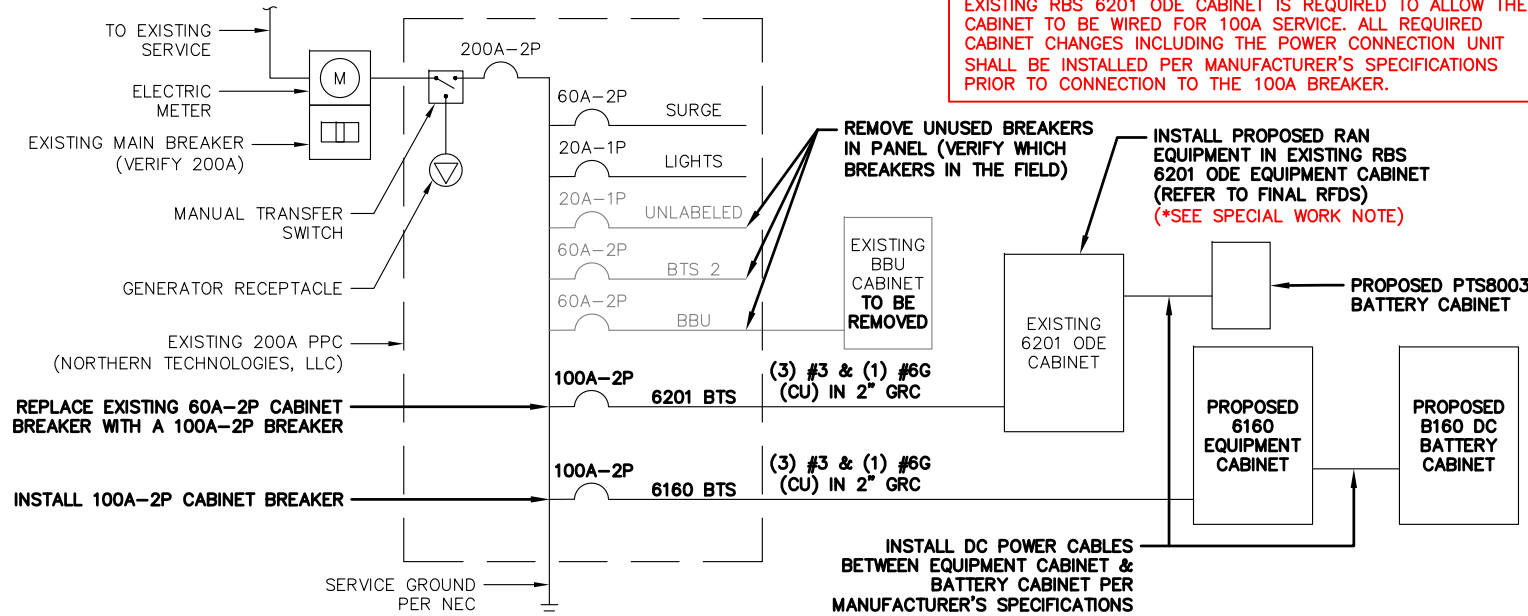


TYPICAL GROUNDING RISER DIAGRAM

SCALE: N.T.S.

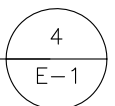


***SPECIAL WORK NOTE:**
AN INTERNAL EQUIPMENT CABINET UPGRADE WITHIN THE EXISTING RBS 6201 ODE CABINET IS REQUIRED TO ALLOW THE CABINET TO BE WIRED FOR 100A SERVICE. ALL REQUIRED CABINET CHANGES INCLUDING THE POWER CONNECTION UNIT SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS PRIOR TO CONNECTION TO THE 100A BREAKER.



ONE LINE POWER SCHEMATIC

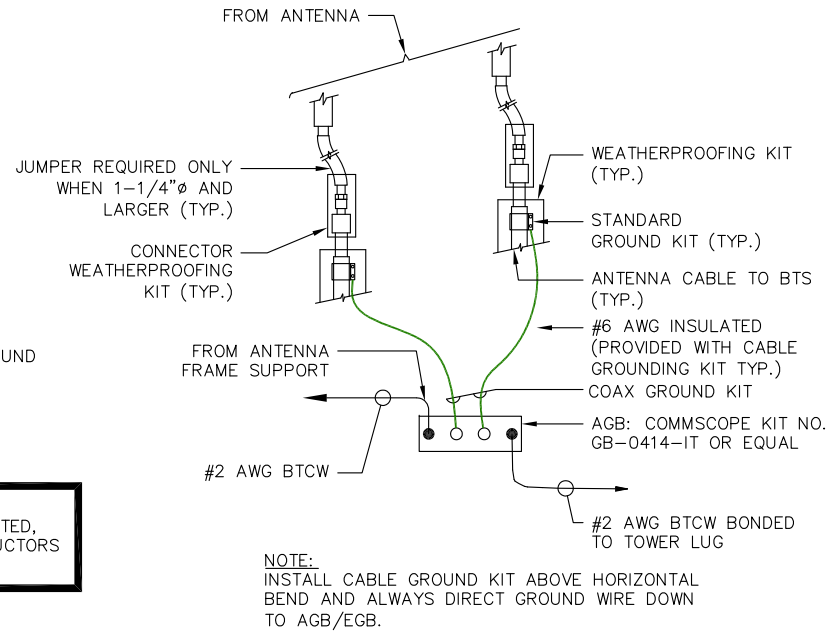
SCALE: N.T.S.



CONTRACTOR NOTE:
G.C. TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSED LOADING IN ACCORDANCE WITH NEC AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

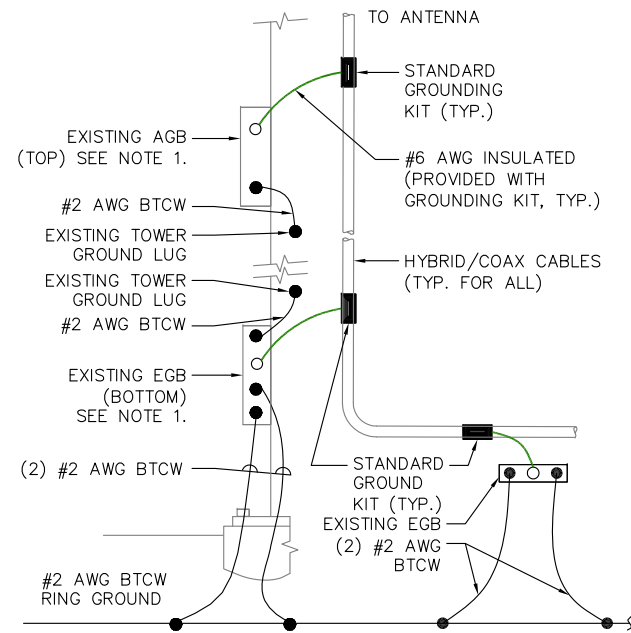
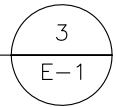
ELECTRICAL & GROUNDING NOTES:

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) 2017 AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THHN INSULATION AS REQUIRED BY NEC.
8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE POWER PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON DRAWING A-1. PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
13. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
14. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
15. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
16. CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PRODUCERS (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN BTS UNIT).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LYGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20. BOND ANTENNA EGB'S AND MGB TO WATER MAIN/GROUND RING.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.



TOWER TOP CABLE GROUNDING DETAIL

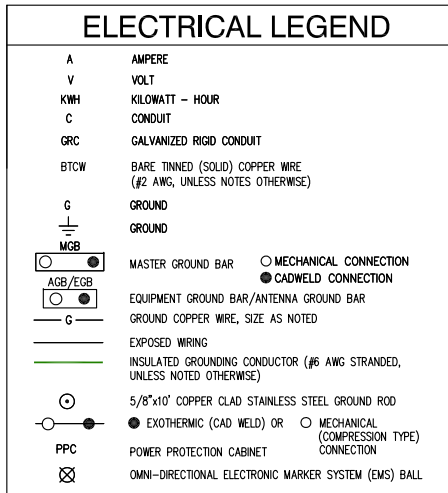
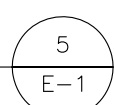
SCALE: N.T.S.



- NOTE:
1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION, AND CONNECTION ORIENTATION. PROVIDE ADDITIONAL AGB/EGB AS REQUIRED.
 2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED

TOWER BOTTOM CABLE GROUNDING DETAIL

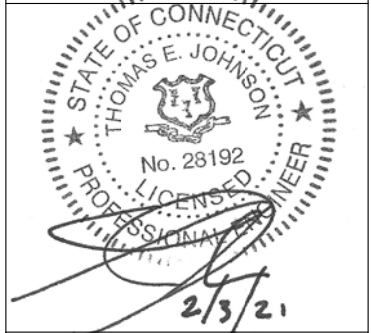
SCALE: N.T.S.



T-Mobile
T-MOBILE NORTHEAST LLC
35 Griffin Road South
Bloomfield, CT 06002
Office: (860) 648-1116

CENTERLINE
COMMUNICATIONS
750 West Center St. Suite 301
West Bridgewater, MA 02379

ProTerra
DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035
Phone: (413) 320-4918



APPROVALS

CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE
PROJECT NO:	19-023
DRAWN BY:	SH/PN
CHECKED BY:	TEJ/JMM
2	02/03/21 CONSTRUCTION REVISED
1	01/05/21 CONSTRUCTION REVISED
0	12/10/20 FOR CONSTRUCTION
A	12/02/20 ISSUED FOR REVIEW

SITE NUMBER: CTHA164A
SITE NAME:
EAST HARTLAND_RT20

22 WELSH ROAD
HARTLAND, CT 06027
HARTFORD COUNTY

SHEET TITLE

ONE LINE DIAGRAM &
GROUNDING DETAILS

SHEET NUMBER

E-1

Exhibit D

Structural & Mount Analysis Report



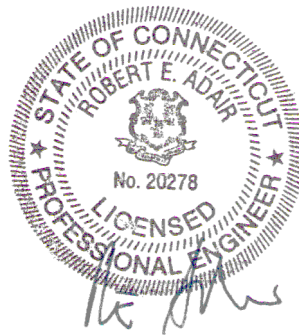
**STRUCTURAL ANALYSIS REPORT
180' SELF-SUPPORTING TOWER & ANTENNA MOUNTS
EAST HARTLAND, CONNECTICUT**

Prepared for
ProTerra Design Group, LLC

T-Mobile Site: #CTHA164A East Hartland

November 6, 2020

Tower Usage – 72%



APT Project #CT329631

**STRUCTURAL ANALYSIS REPORT
180' SELF-SUPPORTING TOWER & ANTENNA MOUNTS
EAST HARTLAND, CONNECTICUT**

**prepared for
ProTerra Design Group, LLC**

EXECUTIVE SUMMARY:

All-Points Technology Corporation, P.C. (APT) performed a structural analysis of this 180-foot self-supporting tower. The analysis was performed for T-Mobile's proposed removal of three panel antennas, three Bias-T units, three twin tower mounted amplifiers (TMAs), and three remote radio heads (RRHs), and installation of six new panel antennas, and nine new RRHs at 147' as detailed below. All existing T-Mobile feed lines will be removed, and three hybrid lines will be installed. All other existing equipment on the tower will remain.

APT's analysis indicates the tower meets the requirements of the 2018 Connecticut State Building Code, International Building Code 2015 (IBC 2015), and TIA-222 with T-Mobile's proposed equipment changes. Evaluation of the existing base foundation was performed from original manufacturer's drawings and found to be adequately sized with the proposed equipment. Usage values are as follows:

Legs	63%
Bracing	72%
Foundation	45%

T-Mobile's antenna mounts were also evaluated under the proposed equipment loading and found to be adequately sized.

INTRODUCTION:

A structural analysis was performed on the above-mentioned communications tower by APT for ProTerra Design Group, LLC. The tower is located in East Hartland, Connecticut.

APT previously visited the tower site on December 15, 2015 and June 27, 2019. The structure was climbed in its entirety on both occasions to record information regarding physical and dimensional properties of the structure and its appurtenances to perform the corresponding analyses.

A site was not performed for this analysis. Instead, this analysis utilized the information previous compiled and provided by others. This includes Valmont tower and foundation drawings (Eng. File #A-121935 Rev. A, dated April 12, 2006) previously provided by Mariner Tower. This analysis also utilized information provided by ProTerra Design Group, which included a Structural Analysis from Paul J. Ford (PJF Project #A42919-0009.003.8700 dated January 24, 2020), an equipment inventory

All-Points Technology Corporation

116 Grandview Road
Conway, NH 03818
(603) 496-5853

567 Vauxhall St. Ext., Suite 311
Waterford, CT 06385
(860) 663-1697

and proposed T-Mobile equipment loading provided by Peter Nute in the form of an email on November 4, 2020.

The structure is a 180-foot, three-legged, galvanized steel self-supporting tower manufactured by Valmont. The tower features truss leg members with angle steel bracing members in the bottom 160', and solid rod legs and bracing in the top 20' section. Bracing members are arranged in an X-braced configuration.

The analysis was performed in accordance with 2018 Connecticut State Building Code, IBC 2015, and TIA-222 using the following antenna inventory (proposed equipment shown in **bold** text):

Carrier	Antenna	Elev.	Mount	Coax.
	(3) 20' omnidirectional whips, 20' 4-bay dipole	179'	6' sided "halo" mount	(3) 7/8", 1-5/8"
Verizon	(6) LPA-80080/6, (6) NHH-65B-R4 panels, (3) B2/B66A RRH-BR049 RRHs, (3) B5/B13 RRH-BR04C RRHs, RVZDC-6627-PF-48 D-Box	168'	(3) 12' sector mounts (VFA12-HD)	(6) 1-5/8", 1/2", Hybrid
AT&T	(3) AM-X-CD-16-65, (6) 7770.00 panels, (6) LGP2140X TMAs, (3) RRUS-11 RRHs, DC6-48 surge suppressor	156'	(3) 12' sector mounts	(12) 1-5/8", (2) 3/4" power, 5/16" fiber
T-Mobile	(3) AIR6449 B41, (3) APXVAALL24_43-U-NA20, (3) APX16DWV-16DWVS panels, (3) Radio 4415 RRHs, (3) Radio 4424 RRHs, (3) Radio 4449 RRHs ¹	147'	(3) 10' sector mounts	(3) 6x12 hybrid

¹ Three APXVAARR24_43-U-NA20 & three APX16DWV-16DWVS, three twin TMAs and three Radio 4449 B71/B12 RRHs currently installed, fed by twelve 1-5/8" lines and three 6x12 hybrid cables.

STRUCTURAL ANALYSIS:

Methodology:

The structural analysis was done in accordance with the 2018 Connecticut State Building Code, IBC 2015, and TIA-222, Revision G (TIA), Structural Standard for Antenna Supporting Structures and Antennas.

The analysis was conducted using a 3-second gust Ultimate wind speed of 120 miles per hour with no ice and 50-mph with 1" radial ice in accordance with the TIA-222-G standard for Hartford County, Connecticut. The following additional design criteria were used:

Structure Class: II
Topographic Category: 1
Exposure Category: B

All-Points Technology Corporation

116 Grandview Road
Conway, NH 03818
(603) 496-5853

567 Vauxhall St. Ext., Suite 311
Waterford, CT 06385
(860) 663-1697

Analysis Results:

Analysis of the tower was conducted in accordance with the criteria outlined herein with antenna changes as previously described.

The following table summarizes the results of the analysis based on stresses of individual leg and bracing members:

Elevation	Legs	Bracing
160'-180'	46%	31%
140'-160'	36%	57%
120'-140'	63%	62%
100'-120'	56%	72%
80'-100'	49%	51%
60'-80'	58%	65%
40'-60'	50%	52%
20'-40'	56%	66%
0'-20'	48%	56%

Bracing, Splice and Anchor Bolts:

Connection bolts were evaluated under the proposed loading. All bolts were found to be adequately sized to support the proposed equipment changes.

Base Foundation:

Evaluation of the base foundations was performed from original Valmont design drawings. The foundations were determined to be adequately sized under the proposed loading. Factored base reactions imposed with the equipment changes were calculated as follows:

Reactions	Calculated
Compression (kips)	250.4
Uplift (kips)	-217.6
Shear (kips)	24.8
Overturning Moment (ft-kips)	4069

Antenna Mounts:

Critical members and connections were evaluated for structural adequacy under existing and proposed equipment loads, and a maintenance load consisting of two 250 lb. men. APT's evaluation found the mounts meet the requirements of the 2018 Connecticut State Building Code, IBC 2015, and TIA-222 with the proposed equipment.

All-Points Technology Corporation

116 Grandview Road
Conway, NH 03818
(603) 496-5853

567 Vauxhall St. Ext., Suite 311
Waterford, CT 06385
(860) 663-1697

CONCLUSIONS AND RECOMMENDATIONS:

APT's structural analysis indicates that this 180-foot self-supporting tower located in East Hartland, Connecticut meets the requirements of the 2018 Connecticut State Building Code, IBC 2015, and TIA-222 with T-Mobile's proposed equipment changes. Evaluation of the existing base foundation was performed from the original Valmont drawings provided to APT and were found to be adequately sized with the proposed equipment.

T-Mobile's antenna mounts were also evaluated and determined to be adequately sized to support the proposed equipment loading.

LIMITATIONS:

This report is based on the following:

1. Tower is properly installed and maintained.
2. All members are in an undeteriorated condition.
3. All required members are in place.
4. All bolts are in place and are properly tightened.
5. Tower is in plumb condition.
6. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.

All-Points Technology Corporation, P.C. (APT) is not responsible for modifications completed prior to or hereafter which APT is not or was not directly involved. Modifications include but are not limited to:

1. Replacing or strengthening bracing members.
2. Reinforcing vertical members in any manner.
3. Adding or relocating torque arms or guys.
4. Installing antenna mounting gates or side arms.

APT hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon the information contained and set forth herein. If you are aware of any information which is contrary to that which is contained herein, or you are aware of any defects arising from the original design, material, fabrication and erection deficiencies, you should disregard this report and immediately contact APT. APT disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

All-Points Technology Corporation

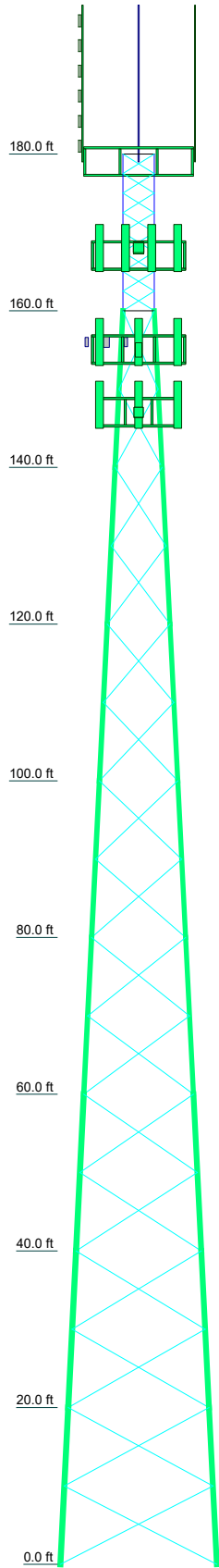
116 Grandview Road
Conway, NH 03818
(603) 496-5853

567 Vauxhall St. Ext., Suite 311
Waterford, CT 06385
(860) 663-1697

Appendix A

Tower Schematic

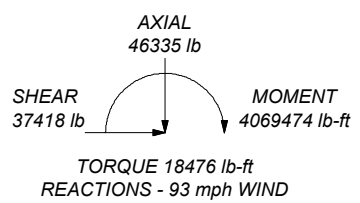
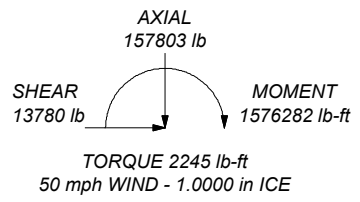
Section	T1	T2	T3	T4	T5	T6	T7	T8	T9
Legs	SR 1 1/2	Pirol 105216	Pirol 105217	Pirol 105218	Pirol 105219	Pirol 105220			
Leg Grade	SR 3/4	L2 1/2x2 1/2x3/16	A572-50	A572-50	L3x3x5/16	L3x3x5/16	L3x3x5/16	L3x3x5/16	L3 1/2x3 1/2x5/16
Diagonals	SR 3/4	L2 1/2x2 1/2x3/16	A572-50	A572-50	N.A.	N.A.	N.A.	N.A.	N.A.
Top Girts	SR 3/4	L2 1/2x2 1/2x3/16	A572-50	A572-50	N.A.	N.A.	N.A.	N.A.	N.A.
Face Width (ft)	4	6	8	10	12	14	16	18	20
# Panels @ (ft)	8 @ 2.5	16 @ 10	16 @ 10	16 @ 10	16 @ 10	16 @ 10	16 @ 10	16 @ 10	16 @ 10
Weight (lb)	719.2	1801.4	1802.3	2175.2	2728.6	2786.9	4417.5	4540.7	5446.6



ALL REACTIONS
ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 250396 lb
SHEAR: 24776 lb

UPLIFT: -217599 lb
SHEAR: 21839 lb



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) 8"x2 3/8" Pipe Mount	180 - 178	(2) LGP2140X TMA (ATI)	156
(2) 8"x2 3/8" Pipe Mount	180 - 178	Ericsson RRUS-11 (ATI)	156
(2) 8"x2 3/8" Pipe Mount	180 - 178	Ericsson RRUS-11 (ATI)	156
(2) 20' x 3" omni whip	179	Ericsson RRUS-11 (ATI)	156
20' x 3" omni whip	179	Raycap DC6-48-60-18-8F surge suppressor (ATI)	155
20' 4-Bay Dipole	179	12' T-frame sector mnt (ATI)	155
(2) 6' sidearm	179	12' T-frame sector mnt (ATI)	155
(2) 6' sidearm	179	12' T-frame sector mnt (ATI)	155
(2) 6' sidearm	179	APX16DWV-16DWVS (ATI)	148
(2) LPA-80080/6 (VzW)	168	APX16DWV-16DWVS (ATI)	148
(2) LPA-80080/6 (VzW)	168	APX16DWV-16DWVS (ATI)	148
(2) LPA-80080/6 (VzW)	168	APX16DWV-16DWVS (ATI)	148
(2) NNHH-65B-R4 (VzW)	168	AIR 6449 B41 (T-Mobile)	148
(2) NNHH-65B-R4 (VzW)	168	AIR 6449 B41 (T-Mobile)	148
(2) NNHH-65B-R4 (VzW)	168	AIR 6449 B41 (T-Mobile)	148
B2/B66A RRHBR049 (VzW)	168	APXVAALL24_43-U-NA20 (T-Mobile)	148
B2/B66A RRHBR049 (VzW)	168	APXVAALL24_43-U-NA20 (T-Mobile)	148
B2/B66A RRHBR049 (VzW)	168	APXVAALL24_43-U-NA20 (T-Mobile)	148
B5/B13 RRHBR04C (VzW)	168	Ericsson Radio 4415 (T-Mobile)	147
B5/B13 RRHBR04C (VzW)	168	Ericsson Radio 4415 (T-Mobile)	147
B5/B13 RRHBR04C (VzW)	168	Ericsson Radio 4415 (T-Mobile)	147
Raycap RVZDC-6627-PF-48 (VzW)	168	Ericsson Radio 4424 (T-Mobile)	147
SitePro VFA12-HD (VzW)	167	Ericsson Radio 4424 (T-Mobile)	147
SitePro VFA12-HD (VzW)	167	Ericsson Radio 4424 (T-Mobile)	147
SitePro VFA12-HD (VzW)	167	Ericsson Radio 4449 (T-Mobile)	147
AM-X-CD-16-65 (ATI)	156	Ericsson Radio 4449 (T-Mobile)	147
AM-X-CD-16-65 (ATI)	156	Valmont 10' KD sector mount (T-Mobile)	147
AM-X-CD-16-65 (ATI)	156	Valmont 10' KD sector mount (T-Mobile)	147
(2) 7770.00 (ATI)	156	Valmont 10' KD sector mount (T-Mobile)	147
(2) 7770.00 (ATI)	156	Valmont 10' KD sector mount (T-Mobile)	147
(2) 7770.00 (ATI)	156	Valmont 10' KD sector mount (T-Mobile)	147
(2) LGP2140X TMA (ATI)	156	Valmont 10' KD sector mount (T-Mobile)	147
(2) LGP2140X TMA (ATI)	156	Valmont 10' KD sector mount (T-Mobile)	147

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

All-Points Technology Corp.
116 Grandview Road
Conway, NH 03818
Phone: (860) 663-1697
FAX: (603) 447-2124

Job: 180' Self-Supporting Tower		
Project: CT329631 East Hartland		
Client: ProTerra Design Group, LLC	Drawn by: M. Larson	App'd:
Code: TIA-222-G	Date: 11/06/20	Scale: NTS
Path: C:\Users\APT User\Desktop\Work\Jobs\T-Mobile\CT329631 East Hartland\CT329631 East Hartland.dwg	Dwg No. E-1	

Appendix B

Calculations

<i>tnxTower</i> <i>All-Points Technology Corp.</i> 116 Grandview Road Conway, NH 03818 Phone: (860) 663-1697 FAX: (603) 447-2124	Job	180' Self-Supporting Tower	Page	1 of 7
	Project	CT329631 East Hartland	Date	10:41:23 11/06/20
	Client	ProTerra Design Group, LLC	Designed by	M. Larson

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.

The base of the tower is set at an elevation of 0.00 ft above the ground line.

The face width of the tower is 4.00 ft at the top and 20.00 ft at the base.

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

The following design criteria apply:

ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).

Basic wind speed of 93 mph.

Ultimate wind speed of 120 mph.

Structure Class II.

Exposure Category B.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 1.0000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

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

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

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

Pressures are calculated at each section.

Stress ratio used in tower member design is 1.

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

Feed Line/Linear Appurtenances

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
7/8	C	No	No	Ar (CaAa)	179.00 - 8.00	-6.0000	0.5	3	2	1.1100	1.1100		0.54
1 5/8	C	No	No	Ar (CaAa)	179.00 - 8.00	-6.0000	0.45	1	1	0.5000	1.9800		1.04
1 5/8	A	No	No	Ar (CaAa)	168.00 - 8.00	-12.000 0	0.5	6	6	0.5000	1.9800		1.04
1/2	A	No	No	Ar (CaAa)	168.00 - 8.00	-12.000 0	0.45	1	1	0.5800	0.5800		0.25
1-1/4" Hybrid fiber-power cable	A	No	No	Ar (CaAa)	168.00 - 8.00	-12.000 0	0.4	1	1	0.7500	1.2500		1.30
1 5/8	B	No	No	Ar (CaAa)	156.00 - 8.00	-9.0000	0.5	12	6	0.5000	1.9800		1.04
3/4" power	B	No	No	Ar (CaAa)	156.00 - 8.00	-12.000 0	0.4	2	2	0.7950	0.7950		0.58
5/16" Fiber optic cable	B	No	No	Ar (CaAa)	156.00 - 8.00	-12.000 0	0.38	1	1	0.3125	0.3125		0.25
1.57" Hybrid fiber-power cable	C	No	No	Ar (CaAa)	148.00 - 8.00	-9.0000	0.4	3	3	0.5000	1.5700		1.50
3/8" safety cable	A	No	No	Ar (CaAa)	180.00 - 0.00	4.0000	0.38	1	1	0.3750	0.3750		0.22

<i>tnxTower</i> <i>All-Points Technology Corp.</i> 116 Grandview Road Conway, NH 03818 Phone: (860) 663-1697 FAX: (603) 447-2124	Job	180' Self-Supporting Tower	Page	2 of 7
	Project	CT329631 East Hartland	Date	10:41:23 11/06/20
	Client	ProTerra Design Group, LLC	Designed by	M. Larson

Discrete Tower Loads

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>		<i>C_AA_A Front ft²</i>	<i>C_AA_A Side ft²</i>	<i>Weight lb</i>
(2) 20' x 3" omni whip	A	From Leg	6.00 0.00 10.00	0.0000	179.00	No Ice 1/2" Ice 1" Ice	6.00 8.03 10.08	6.00 8.03 10.08	50.00 93.17 149.01
20' x 3" omni whip	B	From Leg	6.00 0.00 10.00	0.0000	179.00	No Ice 1/2" Ice 1" Ice	6.00 8.03 10.08	6.00 8.03 10.08	50.00 93.17 149.01
20' 4-Bay Dipole	C	From Leg	6.00 0.00 10.00	0.0000	179.00	No Ice 1/2" Ice 1" Ice	4.00 6.00 8.00	4.00 6.00 8.00	55.00 100.00 145.00
(2) 8'x2 3/8" Pipe Mount	A	From Leg	6.00 0.00 0.00	0.0000	180.00 - 178.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	29.20 43.54 63.16
(2) 8'x2 3/8" Pipe Mount	B	From Leg	6.00 0.00 0.00	0.0000	180.00 - 178.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	29.20 43.54 63.16
(2) 8'x2 3/8" Pipe Mount	C	From Leg	6.00 0.00 0.00	0.0000	180.00 - 178.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	29.20 43.54 63.16
(2) 6' sidearm	A	None		0.0000	179.00	No Ice 1/2" Ice 1" Ice	4.17 6.17 8.17	2.09 3.09 4.09	75.00 125.00 200.00
(2) 6' sidearm	B	None		0.0000	179.00	No Ice 1/2" Ice 1" Ice	4.17 6.17 8.17	2.09 3.09 4.09	75.00 125.00 200.00
(2) 6' sidearm	C	None		0.0000	179.00	No Ice 1/2" Ice 1" Ice	4.17 6.17 8.17	2.09 3.09 4.09	75.00 125.00 200.00
(2) LPA-80080/6 (VzW)	A	From Face	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.32 4.76 5.21	8.63 9.08 9.55	25.00 73.26 127.51
(2) LPA-80080/6 (VzW)	B	From Face	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.32 4.76 5.21	8.63 9.08 9.55	25.00 73.26 127.51
(2) LPA-80080/6 (VzW)	C	From Face	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.32 4.76 5.21	8.63 9.08 9.55	25.00 73.26 127.51
(2) NNHH-65B-R4 (VzW)	A	From Face	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	12.27 12.77 13.27	5.75 6.21 6.67	80.00 152.14 230.92
(2) NNHH-65B-R4 (VzW)	B	From Face	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	12.27 12.77 13.27	5.75 6.21 6.67	80.00 152.14 230.92
(2) NNHH-65B-R4 (VzW)	C	From Face	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	12.27 12.77 13.27	5.75 6.21 6.67	80.00 152.14 230.92
B2/B66A RRHBR049 (VzW)	A	From Face	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	85.00 103.34 124.47
B2/B66A RRHBR049 (VzW)	B	From Face	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	85.00 103.34 124.47
B2/B66A RRHBR049 (VzW)	C	From Face	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	85.00 103.34 124.47

<i>tnxTower</i> <i>All-Points Technology Corp.</i> 116 Grandview Road Conway, NH 03818 Phone: (860) 663-1697 FAX: (603) 447-2124	Job	180' Self-Supporting Tower	Page	3 of 7
	Project	CT329631 East Hartland	Date	10:41:23 11/06/20
	Client	ProTerra Design Group, LLC	Designed by	M. Larson

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>		<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight lb</i>
B5/B13 RRHBR04C (VzW)	A	From Face	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	100.00 116.43 135.53
B5/B13 RRHBR04C (VzW)	B	From Face	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	100.00 116.43 135.53
B5/B13 RRHBR04C (VzW)	C	From Face	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	100.00 116.43 135.53
Raycap RVZDC-6627-PF-48 (VzW)	C	From Face	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	2.53 2.73 2.93	0.94 1.08 1.22	20.00 37.79 58.42
SitePro VFA12-HD (VzW)	A	None		0.0000	167.00	No Ice 1/2" Ice 1" Ice	13.20 19.50 25.80	9.20 14.60 19.50	650.00 800.00 950.00
SitePro VFA12-HD (VzW)	B	None		0.0000	167.00	No Ice 1/2" Ice 1" Ice	13.20 19.50 25.80	9.20 14.60 19.50	650.00 800.00 950.00
SitePro VFA12-HD (VzW)	C	None		0.0000	167.00	No Ice 1/2" Ice 1" Ice	13.20 19.50 25.80	9.20 14.60 19.50	650.00 800.00 950.00
AM-X-CD-16-65 (AT&T)	A	From Face	4.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	6.04 6.41 6.77	4.11 4.45 4.80	35.00 76.48 122.98
AM-X-CD-16-65 (AT&T)	B	From Face	4.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	6.04 6.41 6.77	4.11 4.45 4.80	35.00 76.48 122.98
AM-X-CD-16-65 (AT&T)	C	From Face	4.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	6.04 6.41 6.77	4.11 4.45 4.80	35.00 76.48 122.98
(2) 7770.00 (AT&T)	A	From Face	4.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	5.51 5.87 6.23	2.93 3.27 3.63	35.00 67.63 105.06
(2) 7770.00 (AT&T)	B	From Face	4.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	5.51 5.87 6.23	2.93 3.27 3.63	35.00 67.63 105.06
(2) 7770.00 (AT&T)	C	From Face	4.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	5.51 5.87 6.23	2.93 3.27 3.63	35.00 67.63 105.06
(2) LGP2140X TMA (AT&T)	A	From Face	3.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	1.08 1.21 1.35	0.36 0.45 0.56	20.00 27.13 36.14
(2) LGP2140X TMA (AT&T)	B	From Face	3.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	1.08 1.21 1.35	0.36 0.45 0.56	20.00 27.13 36.14
(2) LGP2140X TMA (AT&T)	C	From Face	3.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	1.08 1.21 1.35	0.36 0.45 0.56	20.00 27.13 36.14
Ericsson RRUS-11 (AT&T)	A	From Face	3.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.02 1.16 1.30	55.00 75.86 99.77
Ericsson RRUS-11 (AT&T)	B	From Face	3.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.02 1.16 1.30	55.00 75.86 99.77
Ericsson RRUS-11 (AT&T)	C	From Face	3.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.02 1.16 1.30	55.00 75.86 99.77

<i>tnxTower</i> <i>All-Points Technology Corp.</i> 116 Grandview Road Conway, NH 03818 Phone: (860) 663-1697 FAX: (603) 447-2124	Job	180' Self-Supporting Tower	Page	4 of 7
	Project	CT329631 East Hartland	Date	10:41:23 11/06/20
	Client	ProTerra Design Group, LLC	Designed by	M. Larson

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>		<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight lb</i>
Raycap DC6-48-60-18-8F surge suppressor (AT&T)	C	From Face	3.50 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	0.74 1.20 1.37	0.74 1.20 1.37	30.00 44.34 60.93
12' T-frame sector mnt (AT&T)	A	None		0.0000	155.00	No Ice 1/2" Ice 1" Ice	10.20 13.80 17.40	5.10 6.90 8.70	465.00 600.00 735.00
12' T-frame sector mnt (AT&T)	B	None		0.0000	155.00	No Ice 1/2" Ice 1" Ice	10.20 13.80 17.40	5.10 6.90 8.70	465.00 600.00 735.00
12' T-frame sector mnt (AT&T)	C	None		0.0000	155.00	No Ice 1/2" Ice 1" Ice	10.20 13.80 17.40	5.10 6.90 8.70	465.00 600.00 735.00
APX16DWV-16DWVS (AT&T)	A	From Face	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	6.08 6.44 6.80	2.00 2.33 2.66	25.00 56.34 92.36
APX16DWV-16DWVS (AT&T)	B	From Face	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	6.08 6.44 6.80	2.00 2.33 2.66	25.00 56.34 92.36
APX16DWV-16DWVS (AT&T)	C	From Face	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	6.08 6.44 6.80	2.00 2.33 2.66	25.00 56.34 92.36
AIR 6449 B41 (T-Mobile)	A	From Face	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	5.68 5.98 6.29	2.49 2.72 2.95	110.00 149.12 192.46
AIR 6449 B41 (T-Mobile)	B	From Face	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	5.68 5.98 6.29	2.49 2.72 2.95	110.00 149.12 192.46
AIR 6449 B41 (T-Mobile)	C	From Face	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	5.68 5.98 6.29	2.49 2.72 2.95	110.00 149.12 192.46
APXVAALL24_43-U-NA20 (T-Mobile)	A	From Face	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	20.24 20.89 21.54	8.73 9.33 9.93	65.00 176.81 297.14
APXVAALL24_43-U-NA20 (T-Mobile)	B	From Face	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	20.24 20.89 21.54	8.73 9.33 9.93	65.00 176.81 297.14
APXVAALL24_43-U-NA20 (T-Mobile)	C	From Face	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	20.24 20.89 21.54	8.73 9.33 9.93	65.00 176.81 297.14
Ericsson Radio 4415 (T-Mobile)	A	From Face	3.50 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	1.84 2.01 2.19	0.82 0.94 1.07	50.00 64.07 80.66
Ericsson Radio 4415 (T-Mobile)	B	From Face	3.50 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	1.84 2.01 2.19	0.82 0.94 1.07	50.00 64.07 80.66
Ericsson Radio 4415 (T-Mobile)	C	From Face	3.50 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	1.84 2.01 2.19	0.82 0.94 1.07	50.00 64.07 80.66
Ericsson Radio 4424 (T-Mobile)	A	From Face	3.50 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	1.84 2.01 2.19	0.82 0.94 1.07	50.00 64.07 80.66
Ericsson Radio 4424 (T-Mobile)	B	From Face	3.50 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	1.84 2.01 2.19	0.82 0.94 1.07	50.00 64.07 80.66
Ericsson Radio 4424 (T-Mobile)	C	From Face	3.50 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	1.84 2.01 2.19	0.82 0.94 1.07	50.00 64.07 80.66

<i>tnxTower</i> <i>All-Points Technology Corp.</i> 116 Grandview Road Conway, NH 03818 Phone: (860) 663-1697 FAX: (603) 447-2124	Job	180' Self-Supporting Tower	Page	5 of 7
	Project	CT329631 East Hartland	Date	10:41:23 11/06/20
	Client	ProTerra Design Group, LLC	Designed by	M. Larson

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight lb</i>
Ericsson Radio 4449 (T-Mobile)	A	From Face	3.50 0.00 0.00	0.0000	147.00	No Ice 1.65 1/2" Ice 1.81 1" Ice 1.98	0.93 1.05 1.19	60.00 74.37 91.23
Ericsson Radio 4449 (T-Mobile)	B	From Face	3.50 0.00 0.00	0.0000	147.00	No Ice 1.65 1/2" Ice 1.81 1" Ice 1.98	0.93 1.05 1.19	60.00 74.37 91.23
Ericsson Radio 4449 (T-Mobile)	C	From Face	3.50 0.00 0.00	0.0000	147.00	No Ice 1.65 1/2" Ice 1.81 1" Ice 1.98	0.93 1.05 1.19	60.00 74.37 91.23
Valmont 10' KD sector mount (T-Mobile)	A	None		0.0000	147.00	No Ice 9.65 1/2" Ice 13.50 1" Ice 17.35	4.83 6.75 8.67	222.00 314.00 406.00
Valmont 10' KD sector mount (T-Mobile)	B	None		0.0000	147.00	No Ice 9.65 1/2" Ice 13.50 1" Ice 17.35	4.83 6.75 8.67	222.00 314.00 406.00
Valmont 10' KD sector mount (T-Mobile)	C	None		0.0000	147.00	No Ice 9.65 1/2" Ice 13.50 1" Ice 17.35	4.83 6.75 8.67	222.00 314.00 406.00

Solution Summary

Maximum Tower Deflections - Service Wind

<i>Section No.</i>	<i>Elevation ft</i>	<i>Horz. Deflection in</i>	<i>Gov. Load Comb.</i>	<i>Tilt °</i>	<i>Twist °</i>
T1	180 - 160	4.731	43	0.2669	0.0323
T2	160 - 140	3.630	43	0.2437	0.0234
T3	140 - 120	2.640	43	0.2101	0.0175
T4	120 - 100	1.835	43	0.1597	0.0136
T5	100 - 80	1.222	43	0.1210	0.0100
T6	80 - 60	0.757	43	0.0917	0.0072
T7	60 - 40	0.413	43	0.0622	0.0046
T8	40 - 20	0.185	43	0.0396	0.0029
T9	20 - 0	0.050	43	0.0173	0.0013

Maximum Tower Deflections - Design Wind

<i>Section No.</i>	<i>Elevation ft</i>	<i>Horz. Deflection in</i>	<i>Gov. Load Comb.</i>	<i>Tilt °</i>	<i>Twist °</i>
T1	180 - 160	18.142	2	1.0246	0.1242
T2	160 - 140	13.910	10	0.9353	0.0900
T3	140 - 120	10.116	10	0.8052	0.0674
T4	120 - 100	7.029	10	0.6120	0.0524
T5	100 - 80	4.684	10	0.4633	0.0387
T6	80 - 60	2.900	10	0.3510	0.0278
T7	60 - 40	1.584	10	0.2382	0.0176
T8	40 - 20	0.711	10	0.1518	0.0112
T9	20 - 0	0.193	2	0.0663	0.0051

<i>tnxTower</i> <i>All-Points Technology Corp.</i> 116 Grandview Road Conway, NH 03818 Phone: (860) 663-1697 FAX: (603) 447-2124	Job	180' Self-Supporting Tower	Page	6 of 7
	Project	CT329631 East Hartland	Date	10:41:23 11/06/20
	Client	ProTerra Design Group, LLC	Designed by	M. Larson

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	1.0000	6	3267.30	53014.40	0.062 ✓	1	Bolt Tension
T2	160	Leg	A325N	1.0000	6	7406.31	53014.40	0.140 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	7103.97	14259.40	0.498 ✓	1	Member Bearing
T3	140	Leg	A325N	1.0000	6	13361.40	53014.40	0.252 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	6577.04	14259.40	0.461 ✓	1	Member Bearing
T4	120	Leg	A325N	1.0000	6	18072.40	53014.40	0.341 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	5780.32	14259.40	0.405 ✓	1	Member Bearing
T5	100	Leg	A325N	1.0000	6	22185.90	53014.40	0.418 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	5711.75	14259.40	0.401 ✓	1	Member Bearing
T6	80	Leg	A325N	1.0000	6	25891.30	53014.40	0.488 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	5789.09	14259.40	0.406 ✓	1	Member Bearing
T7	60	Leg	A325N	1.2500	6	29354.40	82835.00	0.354 ✓	1	Bolt Tension
		Diagonal	A325N	1.2500	1	6147.59	29859.40	0.206 ✓	1	Member Bearing
T8	40	Leg	A325N	1.2500	6	32548.20	82835.00	0.393 ✓	1	Bolt Tension
		Diagonal	A325N	1.2500	1	6349.47	29859.40	0.213 ✓	1	Member Bearing
T9	20	Leg	A325N	1.2500	6	35483.70	82835.00	0.428 ✓	1	Bolt Tension
		Diagonal	A325N	1.2500	1	7009.94	29859.40	0.235 ✓	1	Member Bearing

<i>tnxTower</i> <i>All-Points Technology Corp.</i> 116 Grandview Road Conway, NH 03818 Phone: (860) 663-1697 FAX: (603) 447-2124	Job	180' Self-Supporting Tower	Page	7 of 7
	Project	CT329631 East Hartland	Date	10:41:23 11/06/20
	Client	ProTerra Design Group, LLC	Designed by	M. Larson

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	180 - 160	Leg	1 1/2	3	-23035.80	49803.10	46.3	Pass
		Diagonal	3/4	10	-2905.45	9241.11	31.4	Pass
		Top Girt	3/4	4	-66.82	3311.71	2.0	Pass
T2	160 - 140	Leg	Pirod 105216	57	-51228.90	142493.00	36.0	Pass
		Diagonal	L2 1/2x2 1/2x3/16	64	-7266.87	12869.00	56.5	Pass
		Top Girt	L2 1/2x2 1/2x3/16	58	-559.91	22121.90	2.5	Pass
T3	140 - 120	Leg	Pirod 105216	75	-89226.60	142493.00	62.6	Pass
		Diagonal	L2 1/2x2 1/2x3/16	79	-6354.48	10182.10	62.4	Pass
T4	120 - 100	Leg	Pirod 105217	89	-119992.00	214859.00	55.8	Pass
		Diagonal	L2 1/2x2 1/2x3/16	94	-5853.00	8118.15	72.1	Pass
T5	100 - 80	Leg	Pirod 105218	104	-147724.00	300681.00	49.1	Pass
		Diagonal	L3x3x3/16	109	-5871.82	11429.60	51.4	Pass
T6	80 - 60	Leg	Pirod 105218	119	-173124.00	300681.00	57.6	Pass
		Diagonal	L3x3x3/16	124	-5993.66	9280.25	64.6	Pass
T7	60 - 40	Leg	Pirod 105219	134	-198126.00	399868.00	49.5	Pass
		Diagonal	L3x3x5/16	139	-6326.83	12157.80	52.0	Pass
T8	40 - 20	Leg	Pirod 105219	149	-221751.00	399868.00	55.5	Pass
		Diagonal	L3x3x5/16	154	-6647.17	10105.90	65.8	Pass
T9	20 - 0	Leg	Pirod 105220	164	-244239.00	512375.00	47.7	Pass
		Diagonal	L3 1/2x3 1/2x5/16	169	-7689.47	13692.90	56.2	Pass
Summary								
Leg (T3)							62.6	Pass
Diagonal (T4)							72.1	Pass
Top Girt (T2)							2.5	Pass
Bolt Checks							49.8	Pass
RATING =							72.1	Pass

tnxTower All-Points Technology Corp. 116 Grandview Road Conway, NH 03818 Phone: (860) 663-1697 FAX: (603) 447-2124	Job	180' Self-Supporting Tower	Page	1 of 4
	Project	CT329631 East Hartland	Date	09:22:30 11/05/20
	Client	ProTerra Design Group, LLC	Designed by	M. Larson

Discrete Appurtenance Vectors - No Ice

APX16DWV-16DWVS - Elevation 148 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	107.46	0.00	0.00	-107.46	-16078.82	0.00	0.00
30	93.06	17.71	17.71	-93.06	-13948.12	-2620.75	-123.99
60	53.73	30.67	30.67	-53.73	-8126.94	-4539.27	-214.76
90	0.00	35.42	35.42	0.00	-175.06	-5241.50	-247.99
120	53.73	30.67	30.67	53.73	7776.83	-4539.27	-214.76
150	93.06	17.71	17.71	93.06	13598.01	-2620.75	-123.99
180	107.46	0.00	0.00	107.46	15728.71	0.00	0.00
210	93.06	17.71	-17.71	93.06	13598.01	2620.75	123.99
240	53.73	30.67	-30.67	53.73	7776.83	4539.27	214.76
270	0.00	35.42	-35.42	0.00	-175.06	5241.50	247.99
300	53.73	30.67	-30.67	-53.73	-8126.94	4539.27	214.76
330	93.06	17.71	-17.71	-93.06	-13948.12	2620.75	123.99

AIR 6449 B41 - Elevation 148 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	100.48	0.00	0.00	-100.48	-15640.70	0.00	0.00
30	87.01	22.02	22.02	-87.01	-13648.43	-3259.09	-154.20
60	50.24	38.14	38.14	-50.24	-8205.47	-5644.92	-267.07
90	0.00	44.04	44.04	0.00	-770.24	-6518.19	-308.39
120	50.24	38.14	38.14	50.24	6664.98	-5644.92	-267.07
150	87.01	22.02	22.02	87.01	12107.94	-3259.09	-154.20
180	100.48	0.00	0.00	100.48	14100.21	0.00	0.00
210	87.01	22.02	-22.02	87.01	12107.94	3259.09	154.20
240	50.24	38.14	-38.14	50.24	6664.98	5644.92	267.07
270	0.00	44.04	-44.04	0.00	-770.24	6518.19	308.39
300	50.24	38.14	-38.14	-50.24	-8205.47	5644.92	267.07
330	87.01	22.02	-22.02	-87.01	-13648.43	3259.09	154.20

APXVAALL24 43-U-NA20 - Elevation 148 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	357.94	0.00	0.00	-357.94	-53430.81	0.00	0.00
30	309.99	77.21	77.21	-309.99	-46333.41	-11427.45	-540.66
60	178.97	133.74	133.74	-178.97	-26942.98	-19792.93	-936.45
90	0.00	154.43	154.43	0.00	-455.14	-22854.90	-1081.32
120	178.97	133.74	133.74	178.97	26032.69	-19792.93	-936.45
150	309.99	77.21	77.21	309.99	45423.12	-11427.45	-540.66
180	357.94	0.00	0.00	357.94	52520.52	0.00	0.00
210	309.99	77.21	-77.21	309.99	45423.12	11427.45	540.66
240	178.97	133.74	-133.74	178.97	26032.69	19792.93	936.45
270	0.00	154.43	-154.43	0.00	-455.14	22854.90	1081.32
300	178.97	133.74	-133.74	-178.97	-26942.98	19792.93	936.45
330	309.99	77.21	-77.21	-309.99	-46333.41	11427.45	540.66

<i>tnxTower</i> <i>All-Points Technology Corp.</i> 116 Grandview Road Conway, NH 03818 Phone: (860) 663-1697 FAX: (603) 447-2124	Job	180' Self-Supporting Tower	Page	2 of 4
	Project	CT329631 East Hartland	Date	09:22:30 11/05/20
	Client	ProTerra Design Group, LLC	Designed by	M. Larson

<i>Ericsson Radio 4415 - Elevation 147 - From Leg A</i>							
<i>Wind Azimuth</i> °	<i>F_a</i> lb	<i>F_s</i> lb	<i>V_x</i> lb	<i>V_z</i> lb	<i>OTM_x</i> lb-ft	<i>OTM_z</i> lb-ft	<i>Torque</i> lb-ft
0	32.52	0.00	0.00	-32.52	-5108.04	0.00	0.00
30	28.16	7.24	7.24	-28.16	-4467.64	-1063.88	-47.48
60	16.26	12.54	12.54	-16.26	-2718.02	-1842.70	-82.23
90	0.00	14.47	14.47	0.00	-328.00	-2127.77	-94.95
120	16.26	12.54	12.54	16.26	2062.03	-1842.70	-82.23
150	28.16	7.24	7.24	28.16	3811.64	-1063.88	-47.48
180	32.52	0.00	0.00	32.52	4452.05	0.00	0.00
210	28.16	7.24	-7.24	28.16	3811.64	1063.88	47.48
240	16.26	12.54	-12.54	16.26	2062.03	1842.70	82.23
270	0.00	14.47	-14.47	0.00	-328.00	2127.77	94.95
300	16.26	12.54	-12.54	-16.26	-2718.02	1842.70	82.23
330	28.16	7.24	-7.24	-28.16	-4467.64	1063.88	47.48

<i>Ericsson Radio 4424 - Elevation 147 - From Leg A</i>							
<i>Wind Azimuth</i> °	<i>F_a</i> lb	<i>F_s</i> lb	<i>V_x</i> lb	<i>V_z</i> lb	<i>OTM_x</i> lb-ft	<i>OTM_z</i> lb-ft	<i>Torque</i> lb-ft
0	32.52	0.00	0.00	-32.52	-5108.04	0.00	0.00
30	28.16	7.24	7.24	-28.16	-4467.64	-1063.88	-47.48
60	16.26	12.54	12.54	-16.26	-2718.02	-1842.70	-82.23
90	0.00	14.47	14.47	0.00	-328.00	-2127.77	-94.95
120	16.26	12.54	12.54	16.26	2062.03	-1842.70	-82.23
150	28.16	7.24	7.24	28.16	3811.64	-1063.88	-47.48
180	32.52	0.00	0.00	32.52	4452.05	0.00	0.00
210	28.16	7.24	-7.24	28.16	3811.64	1063.88	47.48
240	16.26	12.54	-12.54	16.26	2062.03	1842.70	82.23
270	0.00	14.47	-14.47	0.00	-328.00	2127.77	94.95
300	16.26	12.54	-12.54	-16.26	-2718.02	1842.70	82.23
330	28.16	7.24	-7.24	-28.16	-4467.64	1063.88	47.48

<i>Ericsson Radio 4449 - Elevation 147 - From Leg A</i>							
<i>Wind Azimuth</i> °	<i>F_a</i> lb	<i>F_s</i> lb	<i>V_x</i> lb	<i>V_z</i> lb	<i>OTM_x</i> lb-ft	<i>OTM_z</i> lb-ft	<i>Torque</i> lb-ft
0	29.12	0.00	0.00	-29.12	-4674.24	0.00	0.00
30	25.22	8.16	8.16	-25.22	-4100.74	-1199.88	-53.55
60	14.56	14.14	14.14	-14.56	-2533.92	-2078.25	-92.74
90	0.00	16.32	16.32	0.00	-393.60	-2399.75	-107.09
120	14.56	14.14	14.14	14.56	1746.72	-2078.25	-92.74
150	25.22	8.16	8.16	25.22	3313.54	-1199.88	-53.55
180	29.12	0.00	0.00	29.12	3887.04	0.00	0.00
210	25.22	8.16	-8.16	25.22	3313.54	1199.88	53.55
240	14.56	14.14	-14.14	14.56	1746.72	2078.25	92.74
270	0.00	16.32	-16.32	0.00	-393.60	2399.75	107.09
300	14.56	14.14	-14.14	-14.56	-2533.92	2078.25	92.74
330	25.22	8.16	-8.16	-25.22	-4100.74	1199.88	53.55

tnxTower All-Points Technology Corp. 116 Grandview Road Conway, NH 03818 Phone: (860) 663-1697 FAX: (603) 447-2124	Job	180' Self-Supporting Tower	Page	3 of 4
	Project	CT329631 East Hartland	Date	09:22:30 11/05/20
	Client	ProTerra Design Group, LLC	Designed by	M. Larson

Discrete Appurtenance Vectors - With Ice

APX16DWV-16DWVS - Elevation 148 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	39.91	0.00	0.00	-39.91	-7431.32	0.00	0.00
30	34.56	9.14	9.14	-34.56	-6640.02	-1352.42	-63.99
60	19.95	15.83	15.83	-19.95	-4478.16	-2342.47	-110.83
90	0.00	18.28	18.28	0.00	-1524.99	-2704.85	-127.97
120	19.95	15.83	15.83	19.95	1428.17	-2342.47	-110.83
150	34.56	9.14	9.14	34.56	3590.04	-1352.42	-63.99
180	39.91	0.00	0.00	39.91	4381.33	0.00	0.00
210	34.56	9.14	-9.14	34.56	3590.04	1352.42	63.99
240	19.95	15.83	-15.83	19.95	1428.17	2342.47	110.83
270	0.00	18.28	-18.28	0.00	-1524.99	2704.85	127.97
300	19.95	15.83	-15.83	-19.95	-4478.16	2342.47	110.83
330	34.56	9.14	-9.14	-34.56	-6640.02	1352.42	63.99

AIR 6449 B41 - Elevation 148 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	36.58	0.00	0.00	-36.58	-7757.29	0.00	0.00
30	31.68	9.24	9.24	-31.68	-7031.98	-1366.97	-64.67
60	18.29	16.00	16.00	-18.29	-5050.39	-2367.67	-112.02
90	0.00	18.47	18.47	0.00	-2343.50	-2733.95	-129.35
120	18.29	16.00	16.00	18.29	363.39	-2367.67	-112.02
150	31.68	9.24	9.24	31.68	2344.97	-1366.97	-64.67
180	36.58	0.00	0.00	36.58	3070.28	0.00	0.00
210	31.68	9.24	-9.24	31.68	2344.97	1366.97	64.67
240	18.29	16.00	-16.00	18.29	363.39	2367.67	112.02
270	0.00	18.47	-18.47	0.00	-2343.50	2733.95	129.35
300	18.29	16.00	-16.00	-18.29	-5050.39	2367.67	112.02
330	31.68	9.24	-9.24	-31.68	-7031.98	1366.97	64.67

APXVAALL24 43-U-NA20 - Elevation 148 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	119.18	0.00	0.00	-119.18	-22320.41	0.00	0.00
30	103.22	29.59	29.59	-103.22	-19957.18	-4379.69	-207.21
60	59.59	51.26	51.26	-59.59	-13500.73	-7585.85	-358.90
90	0.00	59.19	59.19	0.00	-4681.05	-8759.39	-414.43
120	59.59	51.26	51.26	59.59	4138.62	-7585.85	-358.90
150	103.22	29.59	29.59	103.22	10595.07	-4379.69	-207.21
180	119.18	0.00	0.00	119.18	12958.30	0.00	0.00
210	103.22	29.59	-29.59	103.22	10595.07	4379.69	207.21
240	59.59	51.26	-51.26	59.59	4138.62	7585.85	358.90
270	0.00	59.19	-59.19	0.00	-4681.05	8759.39	414.43
300	59.59	51.26	-51.26	-59.59	-13500.73	7585.85	358.90
330	103.22	29.59	-29.59	-103.22	-19957.18	4379.69	207.21

tnxTower All-Points Technology Corp. 116 Grandview Road Conway, NH 03818 Phone: (860) 663-1697 FAX: (603) 447-2124	Job	180' Self-Supporting Tower	Page	4 of 4
	Project	CT329631 East Hartland	Date	09:22:30 11/05/20
	Client	ProTerra Design Group, LLC	Designed by	M. Larson

Ericsson Radio 4415 - Elevation 147 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	13.78	0.00	0.00	-13.78	-2956.22	0.00	0.00
30	11.94	3.77	3.77	-11.94	-2684.77	-553.85	-24.72
60	6.89	6.53	6.53	-6.89	-1943.15	-959.29	-42.81
90	0.00	7.54	7.54	0.00	-930.08	-1107.69	-49.43
120	6.89	6.53	6.53	6.89	82.99	-959.29	-42.81
150	11.94	3.77	3.77	11.94	824.61	-553.85	-24.72
180	13.78	0.00	0.00	13.78	1096.06	0.00	0.00
210	11.94	3.77	-3.77	11.94	824.61	553.85	24.72
240	6.89	6.53	-6.53	6.89	82.99	959.29	42.81
270	0.00	7.54	-7.54	0.00	-930.08	1107.69	49.43
300	6.89	6.53	-6.53	-6.89	-1943.15	959.29	42.81
330	11.94	3.77	-3.77	-11.94	-2684.77	553.85	24.72

Ericsson Radio 4424 - Elevation 147 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	13.78	0.00	0.00	-13.78	-2956.22	0.00	0.00
30	11.94	3.77	3.77	-11.94	-2684.77	-553.85	-24.72
60	6.89	6.53	6.53	-6.89	-1943.15	-959.29	-42.81
90	0.00	7.54	7.54	0.00	-930.08	-1107.69	-49.43
120	6.89	6.53	6.53	6.89	82.99	-959.29	-42.81
150	11.94	3.77	3.77	11.94	824.61	-553.85	-24.72
180	13.78	0.00	0.00	13.78	1096.06	0.00	0.00
210	11.94	3.77	-3.77	11.94	824.61	553.85	24.72
240	6.89	6.53	-6.53	6.89	82.99	959.29	42.81
270	0.00	7.54	-7.54	0.00	-930.08	1107.69	49.43
300	6.89	6.53	-6.53	-6.89	-1943.15	959.29	42.81
330	11.94	3.77	-3.77	-11.94	-2684.77	553.85	24.72

Ericsson Radio 4449 - Elevation 147 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	12.58	0.00	0.00	-12.58	-2852.62	0.00	0.00
30	10.89	4.06	4.06	-10.89	-2604.91	-596.50	-26.62
60	6.29	7.03	7.03	-6.29	-1928.17	-1033.16	-46.11
90	0.00	8.12	8.12	0.00	-1003.72	-1192.99	-53.24
120	6.29	7.03	7.03	6.29	-79.28	-1033.16	-46.11
150	10.89	4.06	4.06	10.89	597.46	-596.50	-26.62
180	12.58	0.00	0.00	12.58	845.17	0.00	0.00
210	10.89	4.06	-4.06	10.89	597.46	596.50	26.62
240	6.29	7.03	-7.03	6.29	-79.28	1033.16	46.11
270	0.00	8.12	-8.12	0.00	-1003.72	1192.99	53.24
300	6.29	7.03	-7.03	-6.29	-1928.17	1033.16	46.11
330	10.89	4.06	-4.06	-10.89	-2604.91	596.50	26.62

Company/Project: APT / 10' sector mount

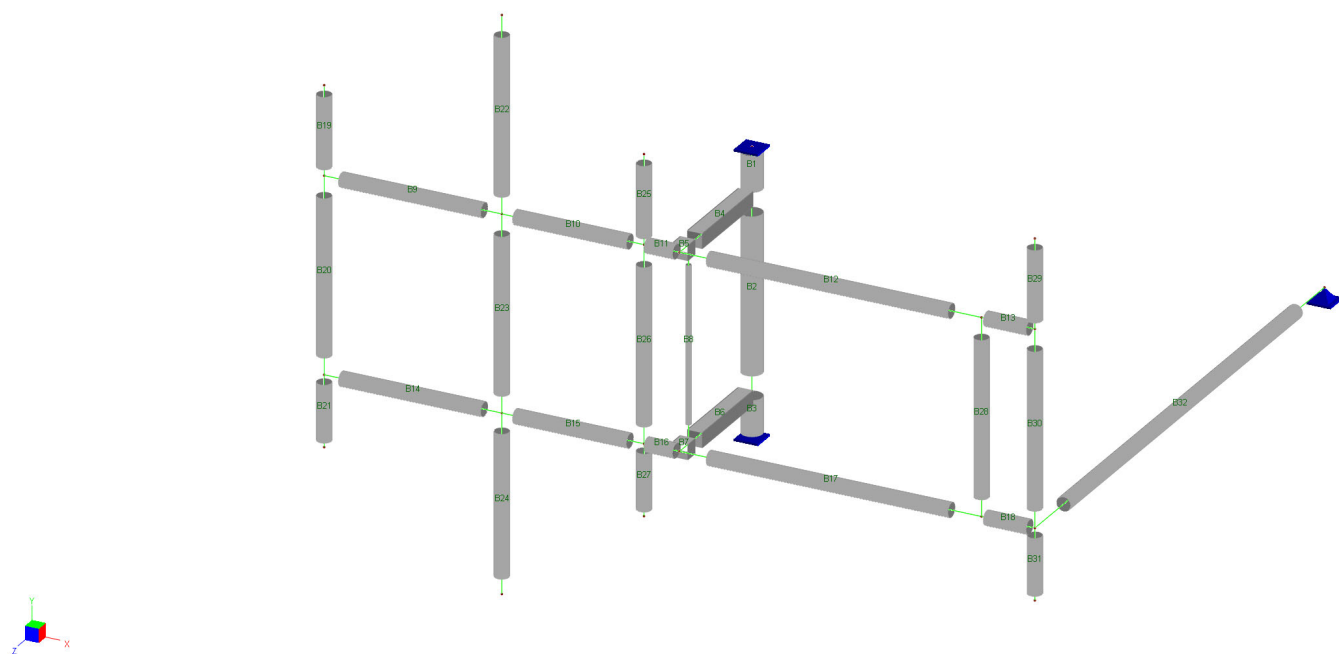
Engineer: M. Larson

Date/Time: 11/04/20 18:22:55

VersaFrame V8.13 (608.0)

(C) Digital Canal Corp.

LoadComb: [Default]



Note:

Steel Check Report

Project:: CT329631 East Hartland mount
Description: 10' Sector Mount
Date: 11/05/2020 08:51 AM

Company: APT
User: M. Larson
Software: Digital Canal VersaFrame

Code Check Results (LRFD14)

CRITICAL STRESS SUMMARY

ID	Section Name	Status	Governing Criteria	Stress Ratio	Load Combination	Distance (ft)
1	Pipe3STD	OK	Axial-Bending	0.1717	Wind ice 0	0.6250
2	Pipe3STD	OK	Axial-Bending	0.1306	Wind ice 90	2.7500
3	Pipe3STD	OK	Axial-Bending	0.1703	Wind ice 180	0.0000
4	HSS2-1/2X2-1/2X3/16	OK	Axial-Bending	0.7078	Wind ice 270	0.0000
5	HSS2-1/2X2-1/2X3/16	OK	Axial-Bending	0.3245	Wind ice 0	0.2500
6	HSS2-1/2X2-1/2X3/16	OK	Axial-Bending	0.6869	Wind ice 90	0.0000
7	HSS2-1/2X2-1/2X3/16	OK	Axial-Bending	0.3484	Wind ice 180	0.2500
8	Pipe1/2XS	OK	Axial-Bending	0.3002	Wind ice 270	2.7500
9	Pipe2STD	OK	Axial-Bending	0.2064	Wind ice 90	0.0000
10	Pipe2STD	OK	Live Deflection X	0.7097	Wind 0	1.1000
11	Pipe2STD	OK	Axial-Bending	0.8058	Wind 0	0.5000
12	Pipe2STD	OK	Live Deflection X	0.6565	Wind 180	1.7000
13	Pipe2STD	OK	Axial-Bending	0.1312	Wind ice 0	0.7500
14	Pipe2STD	OK	Axial-Bending	0.2080	Wind ice 270	0.0000
15	Pipe2STD	OK	Live Deflection X	0.7059	Wind 180	1.1000
16	Pipe2STD	OK	Axial-Bending	0.7879	Wind 180	0.5000
17	Pipe2STD	OK	Live Deflection X	0.6095	Wind 0	1.7000
18	Pipe2STD	OK	Axial-Bending	0.1545	Wind ice 0	0.7500
19	Pipe2STD	OK	Axial-Bending	0.0475	Wind 180	1.2500
20	Pipe2STD	OK	Axial-Bending	0.2194	Wind ice 180	2.7500
21	Pipe2STD	OK	Axial-Bending	0.0375	Wind 180	0.0000
22	Pipe2STD	OK	Live Deflection X	0.4765	Wind 180	1.5812
23	Pipe2STD	OK	Axial-Bending	0.5134	Wind ice 0	0.0000
24	Pipe2STD	OK	Live Deflection X	0.3926	Wind 180	1.0625
25	Pipe2STD	OK	Axial-Bending	0.0023	Wind 0	1.2500
26	Pipe2STD	OK	Axial-Bending	0.4369	Wind ice 0	0.0000
27	Pipe2STD	OK	Axial-Bending	0.0015	Wind 0	0.0000
28	Pipe2STD	OK	Axial-Bending	0.2670	Wind ice 0	0.0000
29	Pipe2STD	OK	Axial-Bending	0.0504	Wind 0	1.2500
30	Pipe2STD	OK	Axial-Bending	0.1679	Wind ice 0	2.7500
31	Pipe2STD	OK	Axial-Bending	0.0400	Wind 0	0.0000
32	Pipe2STD	OK	Live Deflection X	0.3165	Wind 0	4.6000

SELECTED LOAD COMBINATIONS

Load Combination	Code Check	Total	Live	Dependent	Conditional
Default	x	x	x	-	-
Wind 0	x	x	x	-	-
Wind 90	x	x	x	-	-
Maintenance	x	x	x	-	-
Wind 180	x	x	x	-	-
Wind 270	x	x	x	-	-
Wind ice 0	x	x	x	-	-
Wind ice 90	x	x	x	-	-
Wind ice 180	x	x	x	-	-
Wind ice 270	x	x	x	-	-

All-Points Technology Corp., P.C.

116 Grandview Road
Conway, NH 03818
(603) 496-5853

Client: **ProTerra Design Group, LLC**
Job: **East Hartland, CT**
Calculated By: **M. Larson**

Site No.: **CTHA164A**
Job No.: **CT329631**
Date: **06-Nov-20**

Program assumes:

Mat is square in plan view.
Water table is below bottom of mat.
Unit weight of concrete = 150 pcf
Unit weight of soil = 100 pcf
Self-supporting tower with 3 piers

Information to be provided:

Pier is round or square in plan dimension ("R" or "S")	Shape =	R
OTM = Overturning Moment to be resisted	OTM =	4069 ft-kips
H = Height from ground surface to top of mat (if buried)	H =	3.3 ft.
P _M = Projection of pier above mat	P _M =	3.8 ft.
y = Thickness of mat	y =	2.75 ft.
x = Width of mat	x =	28.50 ft.
d = Diameter of round pier	d =	5.0 ft.
S = Size of tension bars	S =	8
Mass of tower and appurtenances (below)		

Results:

<u>Component</u>	<u>Mass</u>	<u>Moment Arm</u>	<u>Moment Resist.</u>
Pier	11.0 kips	14.25 ft.	157.4 ft-kips
Overburden	294.6 kips	14.25 ft.	4198.4 ft-kips
Mat	335.1 kips	14.25 ft.	4774.5 ft-kips

Overturning Moment Resistance : 9130.29 ft-kips
Factor of Safety = 2.24 SATISFACTORY
Concrete Quantity = 90.9 c.y.

Exhibit E

Power Density/RF Emissions Report



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

T-Mobile Existing Facility

Site ID: CTHA164A

East Hartland_Rt20
22 Welsh Road
Hartland, Connecticut 06027

February 9, 2021

EBI Project Number: 6221000528

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	15.11%



February 9, 2021

T-Mobile

Attn: Jason Overbey, RF Manager

35 Griffin Road South

Bloomfield, Connecticut 06002

Emissions Analysis for Site: CTHA164A - East Hartland_Rt20

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **22 Welsh Road in Hartland, Connecticut** for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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



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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 22 Welsh Road in Hartland, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

- 1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.
- 3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 4) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 5) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 6) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.



- 7) 1 LTE channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.
- 8) 1 NR channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.
- 9) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 10) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 11) The antennas used in this modeling are the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s) in Sector A, the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s) in Sector B, the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 12) The antenna mounting height centerline of the proposed antennas is 147 feet above ground level (AGL).



EBI Consulting

environmental | engineering | due diligence

- 13) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 14) All calculations were done with respect to uncontrolled / general population threshold limits.



T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20
Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	147 feet	Height (AGL):	147 feet	Height (AGL):	147 feet
Channel Count:	2	Channel Count:	2	Channel Count:	2
Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna AI MPE %:	0.78%	Antenna BI MPE %:	0.78%	Antenna CI MPE %:	0.78%
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz
Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd
Height (AGL):	147 feet	Height (AGL):	147 feet	Height (AGL):	147 feet
Channel Count:	2	Channel Count:	2	Channel Count:	2
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	38,477.89	ERP (W):	38,477.89	ERP (W):	38,477.89
Antenna A2 MPE %:	6.40%	Antenna B2 MPE %:	6.40%	Antenna C2 MPE %:	6.40%
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd
Height (AGL):	147 feet	Height (AGL):	147 feet	Height (AGL):	147 feet
Channel Count:	11	Channel Count:	11	Channel Count:	11
Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts
ERP (W):	12,569.87	ERP (W):	12,569.87	ERP (W):	12,569.87
Antenna A3 MPE %:	3.04%	Antenna B3 MPE %:	3.04%	Antenna C3 MPE %:	3.04%



Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	10.22%
Verizon	2.93%
Town of Hartland	0.09%
AT&T	1.87%
Site Total MPE % :	15.11%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	10.22%
T-Mobile Sector B Total:	10.22%
T-Mobile Sector C Total:	10.22%
Site Total MPE % :	15.11%

T-Mobile Maximum MPE Power Values (Sector A)							
T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile 2100 MHz LTE	2	2334.27	147.0	7.77	2100 MHz LTE	1000	0.78%
T-Mobile 2500 MHz LTE	1	19238.94	147.0	32.01	2500 MHz LTE	1000	3.20%
T-Mobile 2500 MHz NR	1	19238.94	147.0	32.01	2500 MHz NR	1000	3.20%
T-Mobile 600 MHz LTE	2	591.73	147.0	1.97	600 MHz LTE	400	0.49%
T-Mobile 600 MHz NR	1	1577.94	147.0	2.63	600 MHz NR	400	0.66%
T-Mobile 700 MHz LTE	2	695.22	147.0	2.31	700 MHz LTE	467	0.50%
T-Mobile 1900 MHz GSM	4	1052.26	147.0	7.00	1900 MHz GSM	1000	0.70%
T-Mobile 1900 MHz LTE	2	2104.51	147.0	7.00	1900 MHz LTE	1000	0.70%
						Total:	10.22%

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

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	10.22%
Sector B:	10.22%
Sector C:	10.22%
T-Mobile Maximum MPE % (Sector A):	10.22%
Site Total:	15.11%
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **15.11%** 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.

UPS CampusShip: View/Print Label

- 1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.
- 2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
- 3. **GETTING YOUR SHIPMENT TO UPS**
Customers with a Daily Pickup
Your driver will pickup your shipment(s) as usual.

Customers without a Daily Pickup
Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
Hand the package to any UPS driver in your area.

UPS Access Point™
CVS STORE # 972
555 WASHINGTON ST
SOUTH EASTON ,MA 02375

UPS Access Point™
CVS STORE # 7232
689 DEPOT ST
NORTH EASTON ,MA 02356

UPS Access Point™
TOWN LINE GENERAL STORE
450 E CENTER ST
WEST BRIDGEWATER ,MA 02379

FOLD HERE

MARK APPLEBY
8602094694
CENTERLINE COMMUNICATIONS
90 HAMILTON AVENUE
SOUTHINGTON CT 06489-3883

SHIP TO:
CONNECTICUT SITTING COUNCIL
10 FRANKLIN SQUARE
NEW BRITAIN CT 06051-2655

1 LBS
DWT: 11.8,1

1 OF 1

CT 067 9-06

UPS GROUND

TRACKING #: 1Z 9Y4 503 P2 0963 1230

BILLING: P/P
ATTENTION UPS DRIVER: SHIPPER RELEASE

CS 22.0.12. WNTNV50 42.0A 01/2021*

UPS CampusShip: View/Print Label

- 1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.
- 2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
- 3. **GETTING YOUR SHIPMENT TO UPS**
Customers with a Daily Pickup
Your driver will pickup your shipment(s) as usual.

Customers without a Daily Pickup
Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
Hand the package to any UPS driver in your area.

UPS Access Point™
CVS STORE # 1060
326 MAIN ST
SOUTHINGTON ,CT 06489

UPS Access Point™
MICHAELS STORE # 1279
99 EXECUTIVE BLVD
SOUTHINGTON ,CT 06489

UPS Access Point™
ADVANCE AUTO PARTS STORE 8525
151 QUEEN ST
SOUTHINGTON ,CT 06489

FOLD HERE

MARK APPEBY
8602094694
CENTERLINE COMMUNICATIONS
90 HAMILTON AVENUE
SOUTHINGTON CT 06489-3883

SHIP TO:
FIRST SELECTMAN MAGI WINSLOW
860-653-6800
TOWN OF HARTLAND
22 SOUTH RD.
EAST HARTLAND CT 06027-1500

1 LBS
DWT: 11.8,1

1 OF 1

CT 067 9-02

UPS GROUND

TRACKING #: 1Z 9Y4 503 03 1588 0240

BILLING: P/P

CS 22.0.12. WNTNV50 42.0A 01/2021*

UPS CampusShip: View/Print Label

- 1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.
- 2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
- 3. **GETTING YOUR SHIPMENT TO UPS**
Customers with a Daily Pickup
Your driver will pickup your shipment(s) as usual.

Customers without a Daily Pickup
Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
Hand the package to any UPS driver in your area.

UPS Access Point™
CVS STORE # 1060
326 MAIN ST
SOUTHINGTON ,CT 06489

UPS Access Point™
MICHAELS STORE # 1279
99 EXECUTIVE BLVD
SOUTHINGTON ,CT 06489

UPS Access Point™
ADVANCE AUTO PARTS STORE 8525
151 QUEEN ST
SOUTHINGTON ,CT 06489

FOLD HERE

MARK APPEBY
8602094694
CENTERLINE COMMUNICATIONS
90 HAMILTON AVENUE
SOUTHINGTON CT 06489-3883

SHIP TO:
ZONING ENFORCEMENT OFFICER
8606536800
TOWN OF HARTLAND
22 SOUTH RD.
EAST HARTLAND CT 06027-1500

1 LBS
DWT: 11.8,1

1 OF 1

CT 067 9-02

UPS GROUND

TRACKING #: 1Z 9Y4 503 03 1193 1255

BILLING: P/P

CS 22.0.12. WNTNV50 42.0A 01/2021*