

Centerline Communications  
Mark Appleby  
750 West Center Street, Floor 3  
West Bridgewater, MA 02379  
860-209-4694  
[mappleby@clinellc.com](mailto:mappleby@clinellc.com)

January 12, 2021

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

Notice of Exempt Modification  
228 Lovely St, Avon, Connecticut 06001  
Latitude: 41°47'58.20" N  
Longitude: 72°53'18.24" W  
T-Mobile Site#: CTHA514A\_L600

Dear Ms. Bachman:

T-Mobile currently maintains Three (3) antennas at the 75-foot level of the existing 109-foot Flagpole tower at 228 Lovely Street, Avon, Connecticut 06001. The 109-foot Flagpole tower is owned by Blue Sky Towers and property is owned by the St Matthews Lutheran Church. T-Mobile now intends to replace three (3) of its existing antennas with three (3) new 2500 MHz antennas. The new antennas would be installed at the 75-foot level of the Flagpole tower. The proposed upgrades will make the site available for 5G deployment in the future.

**Planned Modifications:**

Remove and Replace:

(3) APX16DWV-16DWV Antennas (**Remove**) - (3) RFAPXVAR18\_43-C-NA20 Antennas (**Replace**)

Install New:

(3) TMA Antenna Level  
(3) RRU 4415 B25 Radios Ground Level  
(3) RRU 4415 B66A Radios Ground Level  
(3) RRU 4449 B71 B12 Radios Ground Level  
(3) Diplexer Ground Level

Existing to Remain:

(12) 7/8" Coax

Ground:

(2) New Cabinets

This facility was approved by the CT Siting Council filing Docket NO.373A on October 7, 2010 with conditions. 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 the Avon Town Manager, Brandon Robertson, Director of Planning and Community Development, Hiram Peck, St Matthews Lutheran Church, the property owner and Blue Sky Towers, the tower owner.

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](mailto:mappleby@clinellc.com)

Attachments

cc: Town of Avon Town Manager, Brandon Robertson  
Town of Avon Director of Planning and Community Development, Hiram Peck  
St. Matthews Lutheran Church, Property Owner  
Blue Sky Towers, Tower Owner

# Exhibit A

Original Facility Approval

<b>DOCKET NO. 373A</b> - New Cingular Wireless PCS, LLC } Certificate of Environmental Compatibility and Public Need for } the construction, maintenance and operation of a } telecommunications facility located at the St. Matthew Lutheran } Church, 224 Lovely Street, Avon, Connecticut. }	Connecticut  Siting  Council  October 7, 2010
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**Decision and Order**

In response to the Connecticut Siting Council’s (Council) reopening of the record in this docket on May 27, 2010 to consider a new proposed location for the approved facility, the Council hereby rescinds the Decision and Order issued on October 8, 2009 and issues this new Decision and Order for the construction, maintenance and operation of a telecommunications facility located at the St. Matthew Lutheran Church, 224 Lovely Street, Avon, Connecticut.

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

1. The tower shall be constructed as a 110-foot tall monopole with interior flush-mount antennas, no taller than necessary to provide the proposed telecommunications services and sufficient to accommodate the antennas of New Cingular Wireless PCS, LLC and other entities, but such tower shall not exceed a height of 110 feet above ground level. The tower site shall be located at the new proposed location, approximately 71 feet north of the Option 3 tower site.
  
2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be served on the Town of Avon for comment, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction. The Certificate Holder shall discuss tower color options with the Town of Avon prior to submission to the Council. The D&M Plan shall include:
  - a) a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment compound, radio equipment, site access, utility line, and landscaping; and
  - b) construction plans for site clearing, grading, landscaping, water drainage, and erosion and sedimentation controls consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.
  - c) specifications for the architectural treatment of equipment shelter(s) or other structures used to house radio equipment that exceed the height of the compound fence.
  - d) details for the installation of architecturally-treated fencing around the compound;
  - e) a landscape plan that enhances visual mitigation of the facility; and
  - f) provisions for the avoidance of the sandpit area by construction vehicles to the greatest extent possible and an examination of the immediate work area by properly informed personnel prior to daily construction activities within the work zone for the presence of eastern box turtles. Any turtles within the work zone shall be relocated away from the construction area. Turtle sweeps shall be conducted during April through October.
  
3. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case modeling of the electromagnetic radio frequency power density of all proposed entities’ antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of the electromagnetic radio frequency power density be

submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

4. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.
5. The Certificate Holder shall perform a daily examination of the work area by properly informed personnel prior to daily construction activities for the presence of eastern box turtles. Any turtles within the work zone shall be safely relocated to an environmentally suitable area.
6. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
7. The Certificate Holder shall provide reasonable space on the tower for no compensation for any Town of Avon public safety services (police, fire and medical services), provided such use can be accommodated and is compatible with the structural integrity of the tower.
8. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed and providing wireless services within eighteen months from the date of the mailing of the Council's Findings of Fact, Opinion, and Decision and Order (collectively called "Final Decision"), this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's Final Decision shall not be counted in calculating this deadline.
9. At least one wireless telecommunications carrier shall install their equipment and shall become operational not later than 120 days after the tower is erected. Authority to monitor and modify this schedule, as necessary, is delegated to the Executive Director. The Certificate Holder shall provide written notice to the Executive Director of any schedule changes as soon as is practicable.
10. Any request for extension of the time period referred to in Condition 8 shall be filed with the Council not later than 60 days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list, and the Town of Avon. Any proposed modifications to this Decision and Order shall likewise be so served.
11. If the facility ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.
12. The Certificate Holder shall remove any nonfunctioning antenna, and associated antenna mounting equipment, within 60 days of the date the antenna ceased to function.
13. In accordance with Section 16-50j-77 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of tower erection, commencement of site operation, and the completion of site construction.
14. The Certificate Holder shall remit timely payments associated with annual assessments and invoices submitted by the Council for expenses attributable to the facility under Conn. Gen. Stat. §16-50v.

15. This Certificate may be transferred in accordance with Conn. Gen. Stat. §16-50k(b), provided both the Certificate Holder/transferor and the transferee are current with payments to the Council for their respective annual assessments and invoices under Conn. Gen. Stat. §16-50v. In addition, both the Certificate Holder/transferor and the transferee shall provide the Council a written agreement as to the entity responsible for any quarterly assessment charges under Conn. Gen. Stat. §16-50v(b)(2) that may be associated with this facility.

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

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

The parties and intervenors to this proceeding are:

**Applicant:**

New Cingular Wireless PCS, LLC

**Its Representative(s):**

Christopher B. Fisher, Esq.  
Cuddy & Feder LLP  
445 Hamilton Avenue, 14<sup>th</sup> Floor  
White Plains, NY 10601

**Party:**

Patricia & Thomas McMahon  
21 Greenwood Drive  
Avon, CT 06001

Sheridan & Mark Toomey  
9 Greenwood Drive  
Avon, CT 06001

Jane Garrett  
15 Greenwood Drive  
Avon, CT 06001

Peter Emmett Wiese  
240 Lovely Street  
Avon, CT 06001

Town of Avon

Andrew W. Lord  
Loni S. Gardner  
Murtha Cullina LLP  
185 Asylum Street  
Hartford, Connecticut 06103

**Intervenor:**

Juan Fernandez  
246 Lovely Street  
Avon, CT 06001

David Lampert  
4 Clearwater Court  
Avon, CT 06001

Michael Pastore  
80 Wildwood Drive  
Avon, CT 06001

Stuart Noyes  
3 Clearwater Court  
Avon, CT 06001

Mary Ann Keenan  
24 Quail Ridge Drive  
Avon, CT 06001

Youghioghny Communications-Northeast, LLC  
(Pocket)

Carrie L. Larson, Esq.  
Pullman & Comley, LLC  
90 State House Square  
Hartford, CT 06103-3702

# Exhibit B

Property Card



### Property at 00224 LOVELY STREET Prop ID 3060224

-----Administrative Information-----						
HAAX	Owner name:		ST MATTHEWS LUTHERAN CHURCH			
	Second name:		OF COLLINSVILLE			
	Address:		224 LOVELY STREET			
	City/state:		AVON CT		Zip: 06001	
-----Location Information-----						
	Map: 011	Clerk map:				
	Lot: 3060228	Neigh.:	Zone: R30	Vol: 137	Page: 194	
-----Assessments-----		-----Exemptions-----		-----Last sale-----		
Assmt category	Qty	Amount	Exempt	Cat	Amount	Sale date: 25-Apr-1963
Commerc Land	5.24	293,610				Sale price:
Commerc Building	2.00	1,593,420				Sale valid:
Commerc Outbldg	3.00	2,520				-----Values-----
Resident Dwelling	1.00	173,430				Mkt value :
						Cost value: 2,947,114
-----Summary-----		-----Utilities-----		-----Sales ratios-----		
Total assessments	2,062,980	Water	Avon	Cost/sale :		
Total exemptions		Sewer	Public sewer	Mkt/sale :		
Net assessment	2,062,980	Gas	CNG	Assmt/sale:		

Card 01 of 02 cards [Street Card](#) [Sales History](#) [Home Page](#)



1/6/2021 10:41:04 AM

Scale: 1"=200'

Scale is approximate

The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.



# Exhibit C

Construction Drawings

# SITE NAME: AT&T AVON FLAGPOLE

228 LOVELY STREET  
 AVON, CT 06001  
 HARTFORD COUNTY

**SITE NUMBER: CTHA514A**

**PROJECT: T-MOBILE L600**

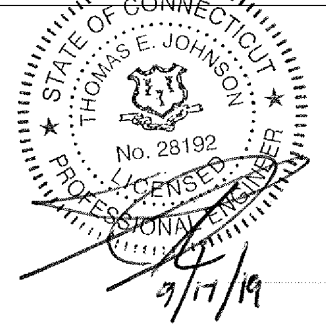
**CONFIGURATION: 67D97C4L2**

**CONSTRUCTION**

**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 Boy 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
O 09/17/19	FOR CONSTRUCTION
A 06/07/19	ISSUED FOR REVIEW

**SITE NUMBER: CTHA514A**  
**SITE NAME:**  
**AT&T AVON FLAGPOLE**

228 LOVELY STREET  
 AVON, CT 06001  
 HARTFORD COUNTY

SHEET TITLE

TITLE SHEET

SHEET NUMBER

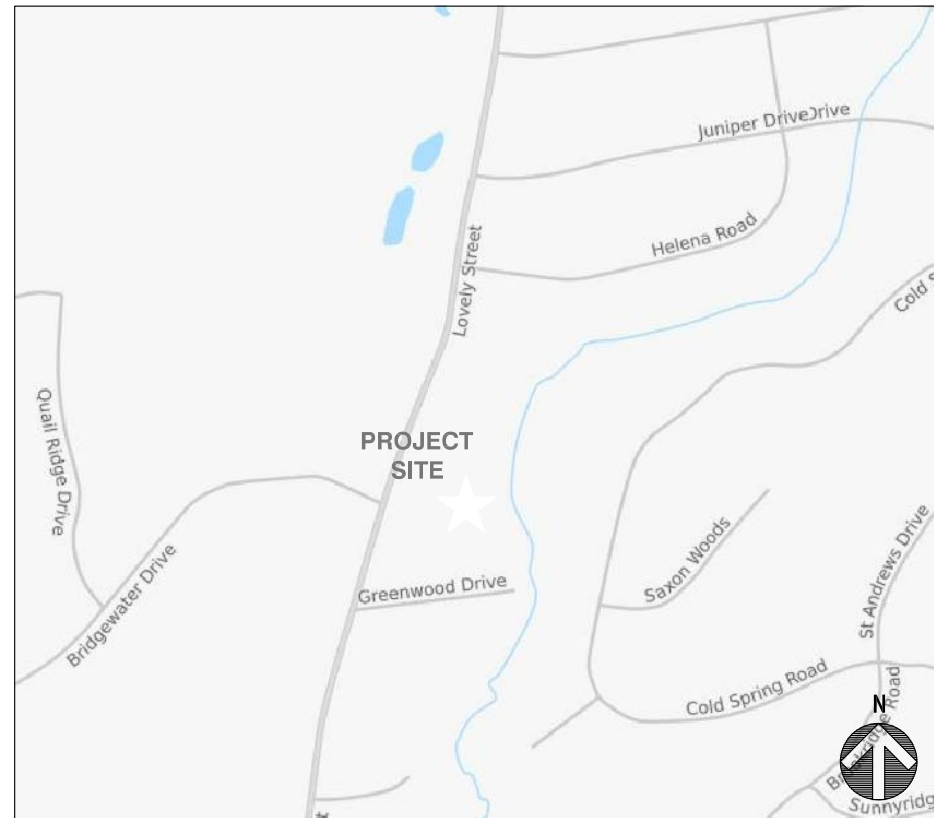
T-1

**GENERAL NOTES**

- 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.
- 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.
- 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.

**SPECIAL CONSTRUCTION NOTES**

- ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE GLOBAL TOWER STRUCTURAL ANALYSIS PREPARED BY B+T GROUP DATED 07/23/19.
- PROTERRA DESIGN GROUP ASSUMES THAT THE FLAG POLE 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.
- ANY REQUIRED ANTENNA MOUNT WORK SHALL BE COMPLETED PRIOR TO THE INSTALLATION OF ANY EQUIPMENT IN ACCORDANCE WITH THE ANTENNA MOUNT STRUCTURAL ANALYSIS, (MSA) PREPARED BY PROTERRA DESIGN GROUP, LLC DATED 07/03/19.



**T-MOBILE TECHNICIAN SITE SAFETY NOTES**

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

DIG SAFE SYSTEM  
 (MA, ME, NH, RI, VT):  
 1-888-344-7233

CALL BEFORE YOU DIG  
 (CT): 1-800-922-4455

**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: 228 LOVELY STREET  
 AVON, CT 06001

LATITUDE: 41° 47' 58.20" N (FROM RFDS: 41.799500)

LONGITUDE: 72° 53' 18.24" W (FROM RFDS: -72.888400)

GROUND ELEVATION: 286'± (FROM GOOGLE EARTH)

JURISDICTION: CONNECTICUT SITING COUNCIL / TOWN OF AVON

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: AT&T

TOWER OWNER SITE ID: CT1257

TOWER OWNER SITE NAME: AVON LOVELY ST

**DRAWING INDEX**

SHEET NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
GN-1	GENERAL NOTES	0
A-1	COMPOUND & EQUIPMENT PLANS	0
A-2	ELEVATION & ANTENNA PLANS	0
A-3 & A-4	DETAILS	0
S-1	ANTENNA MOUNTING DETAILS	0
E-1	ONE-LINE DIAGRAM & GROUNDING DETAILS	0

## 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 LTE OR 700 MHz 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 SURCITS 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 AWG 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



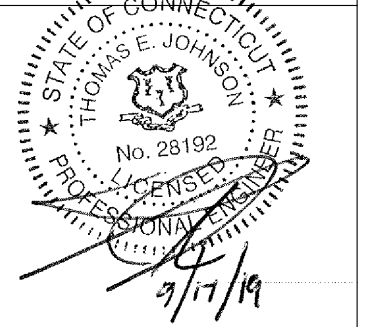
**T-MOBILE NORTHEAST LLC**  
 35 Griffin Road South  
 Bloomfield, CT 06002  
 Office: (860) 648-1116



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

0	09/17/19	FOR CONSTRUCTION
A	06/07/19	ISSUED FOR REVIEW

**SITE NUMBER: CTHA514A**  
**SITE NAME:**  
**AT&T AVON FLAGPOLE**

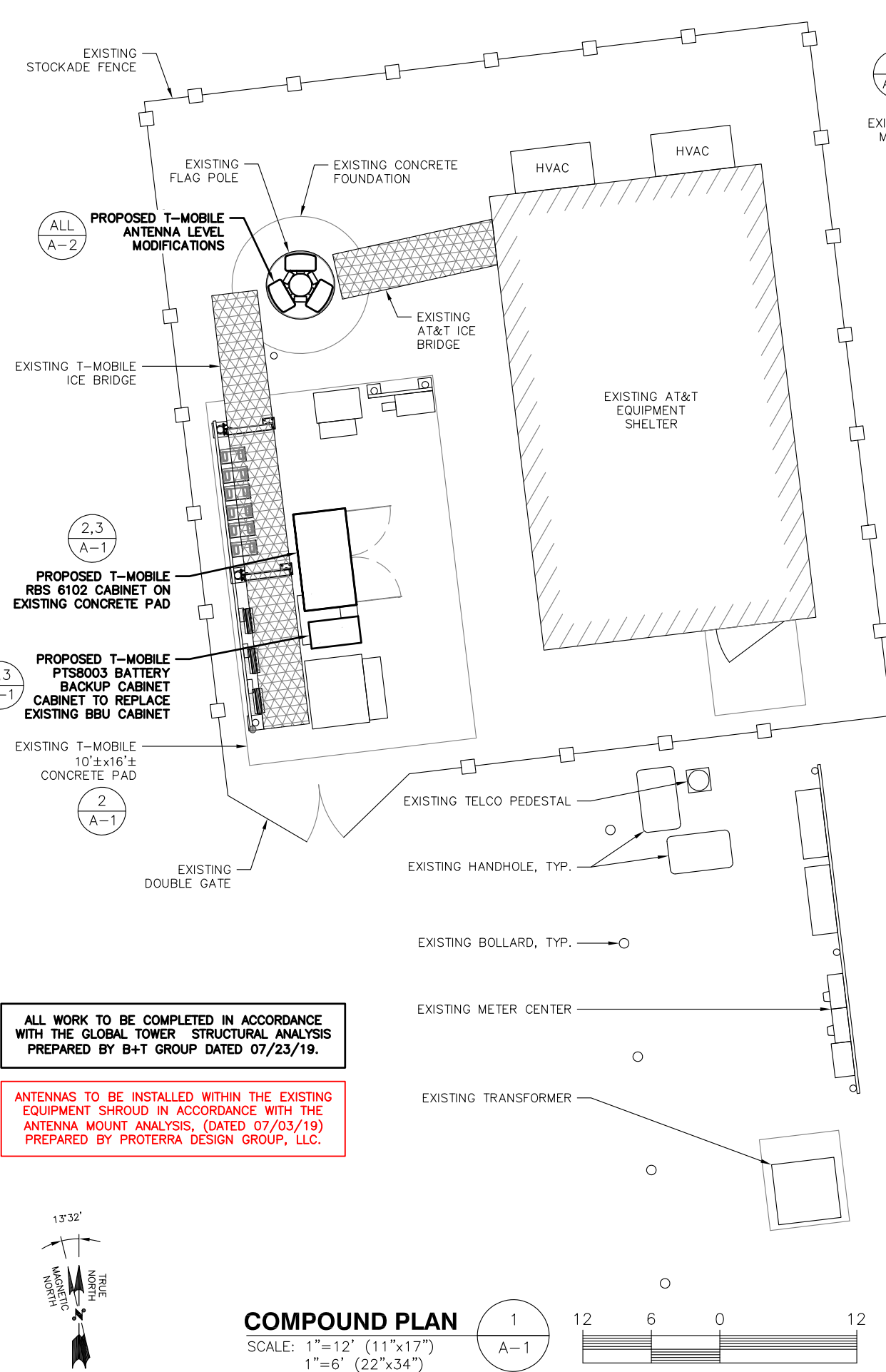
228 LOVELY STREET  
 AVON, CT 06001  
 HARTFORD COUNTY

SHEET TITLE

GENERAL NOTES

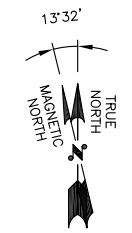
SHEET NUMBER

GN-1

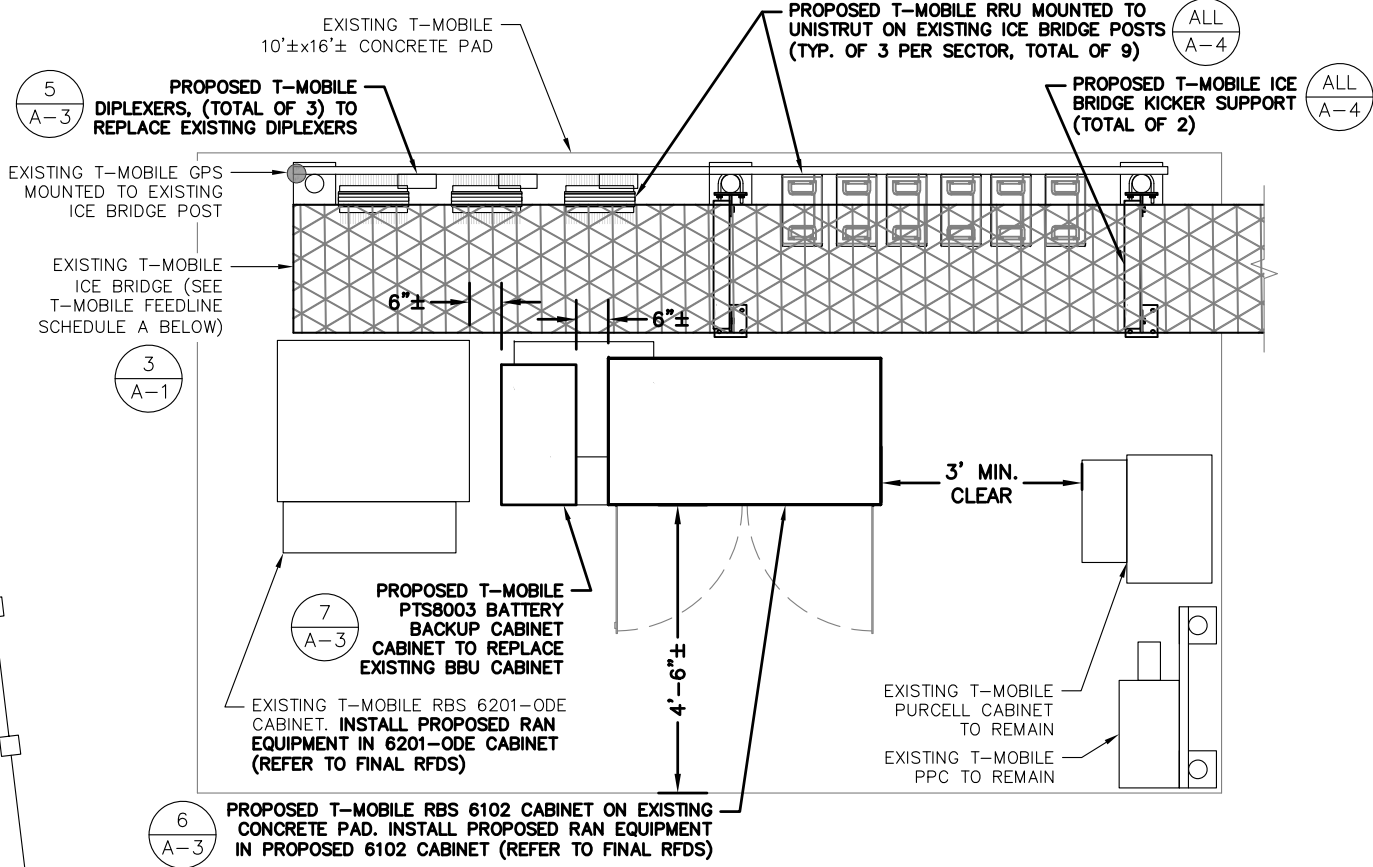
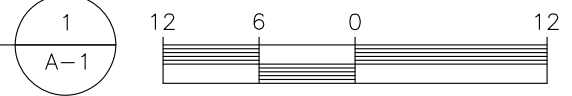


ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE GLOBAL TOWER STRUCTURAL ANALYSIS PREPARED BY B+T GROUP DATED 07/23/19.

ANTENNAS TO BE INSTALLED WITHIN THE EXISTING EQUIPMENT SHROUD IN ACCORDANCE WITH THE ANTENNA MOUNT ANALYSIS, (DATED 07/03/19) PREPARED BY PROTERRA DESIGN GROUP, LLC.



**COMPOUND PLAN**  
SCALE: 1"=12' (11"x17")  
1"=6' (22"x34")

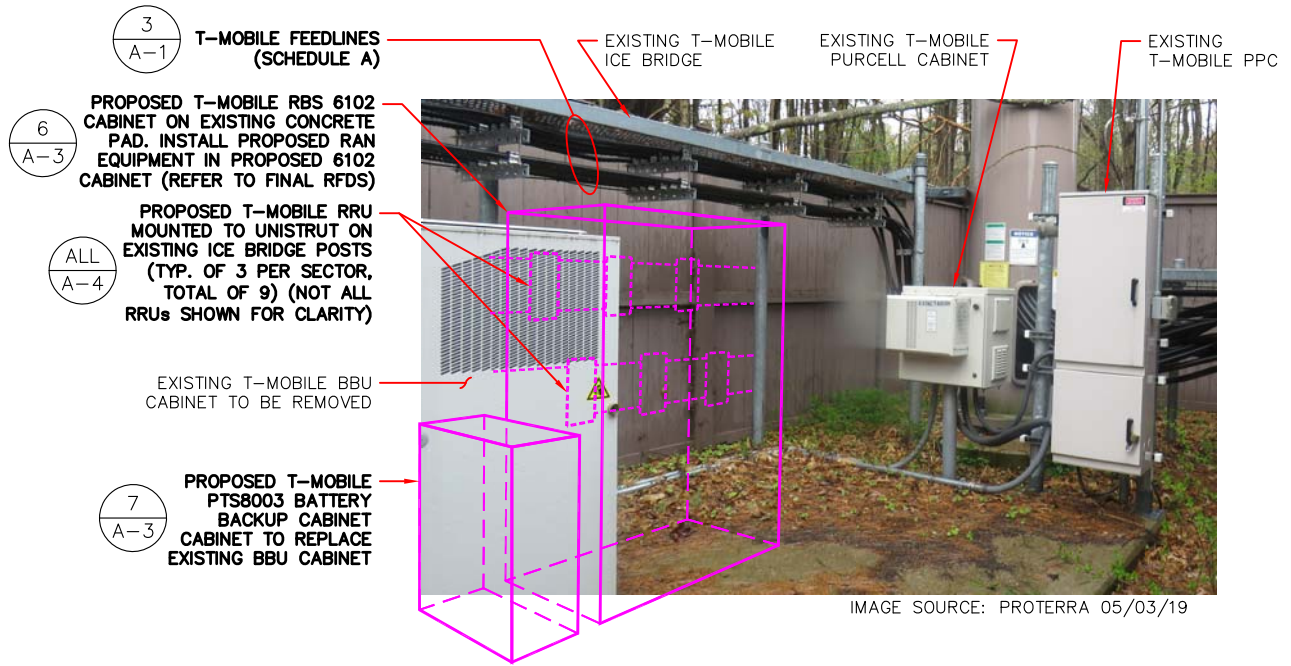


**EQUIPMENT LAYOUT**

SCALE: 1"=3' (11"x17")  
1"=1.5' (22"x34")

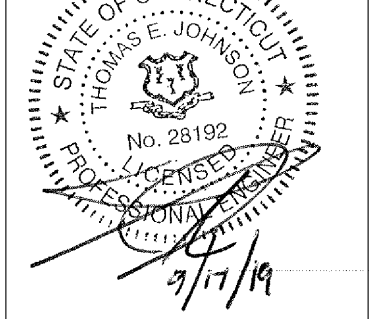
FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO REMAIN: (12) 3/8" COAX TO 75' RAD	UP FLAG POLE TO RAD

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.



APPROVALS

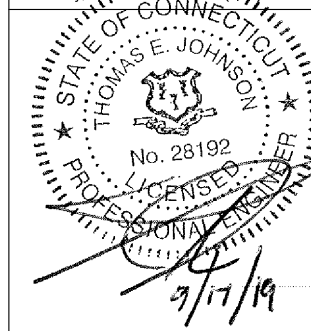
CONSTRUCTION	DATE
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PROJECT NO:	19-023
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CHECKED BY:	TEJ/JMM

0 09/17/19 FOR CONSTRUCTION  
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SITE NAME:  
AT&T AVON FLAGPOLE  
228 LOVELY STREET  
AVON, CT 06001  
HARTFORD COUNTY

SHEET TITLE  
COMPOUND &  
EQUIPMENT PLANS

SHEET NUMBER  
A-1



APPROVALS

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

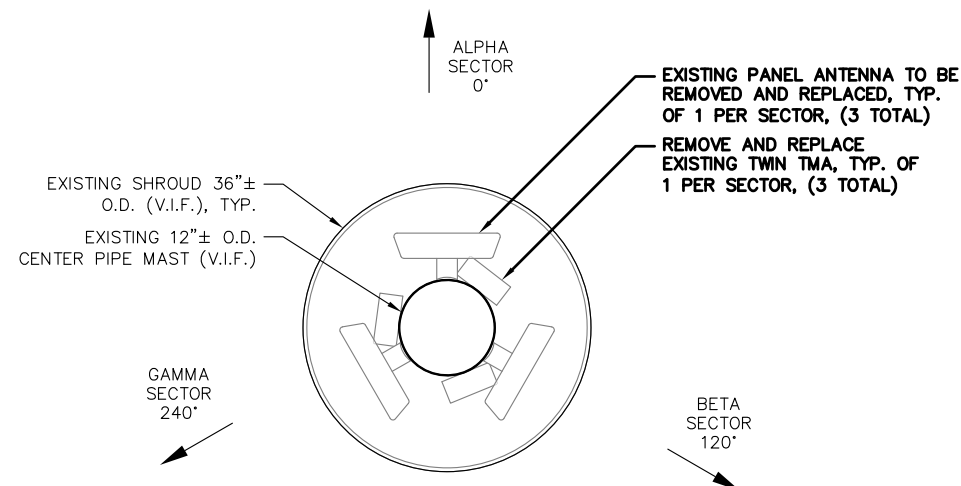
O 09/17/19 FOR CONSTRUCTION  
 A 06/07/19 ISSUED FOR REVIEW

SITE NUMBER: CTHA514A  
 SITE NAME:  
**AT&T AVON FLAGPOLE**  
 228 LOVELY STREET  
 AVON, CT 06001  
 HARTFORD COUNTY

SHEET TITLE  
**ELEVATION &  
 ANTENNA PLANS**

SHEET NUMBER

A-2



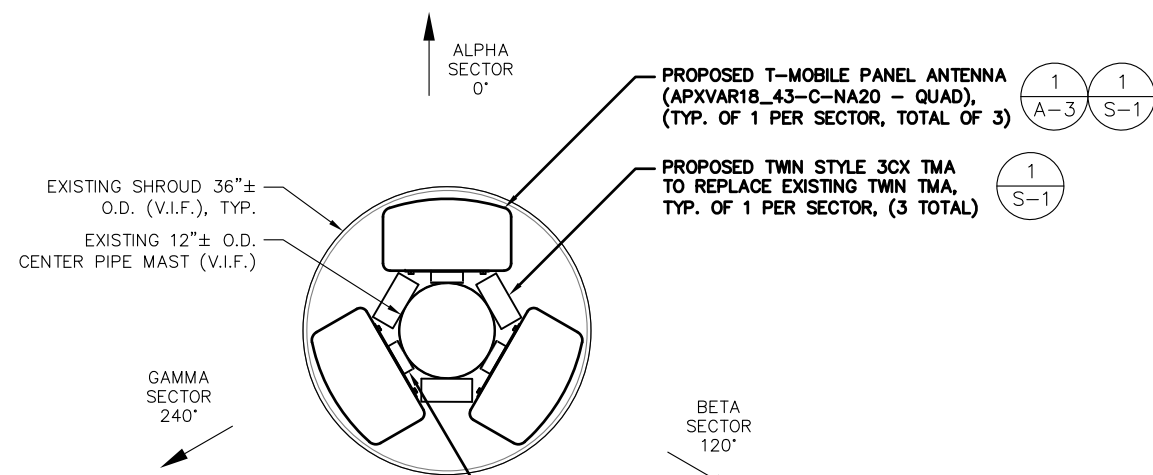
**EXISTING ANTENNA PLAN**

SCALE: N.T.S.

1  
A-2

**SPECIAL DESIGN NOTE:**

PROPOSED REPLACEMENT ANTENNAS INSTALLED WITH CUSTOM BAND MOUNT DESIGNED TO FIT WITHIN THE EXISTING 36" ANTENNA SHROUD (WITH MAX. 3/8" WALL THICKNESS) FOR PIPE MAST DIAMETER OF 12" O.D. CONTRACTOR SHALL VERIFY FITMENT OF ANTENNAS UTILIZING THIS BRACKET AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION.



**PROPOSED ANTENNA PLAN**

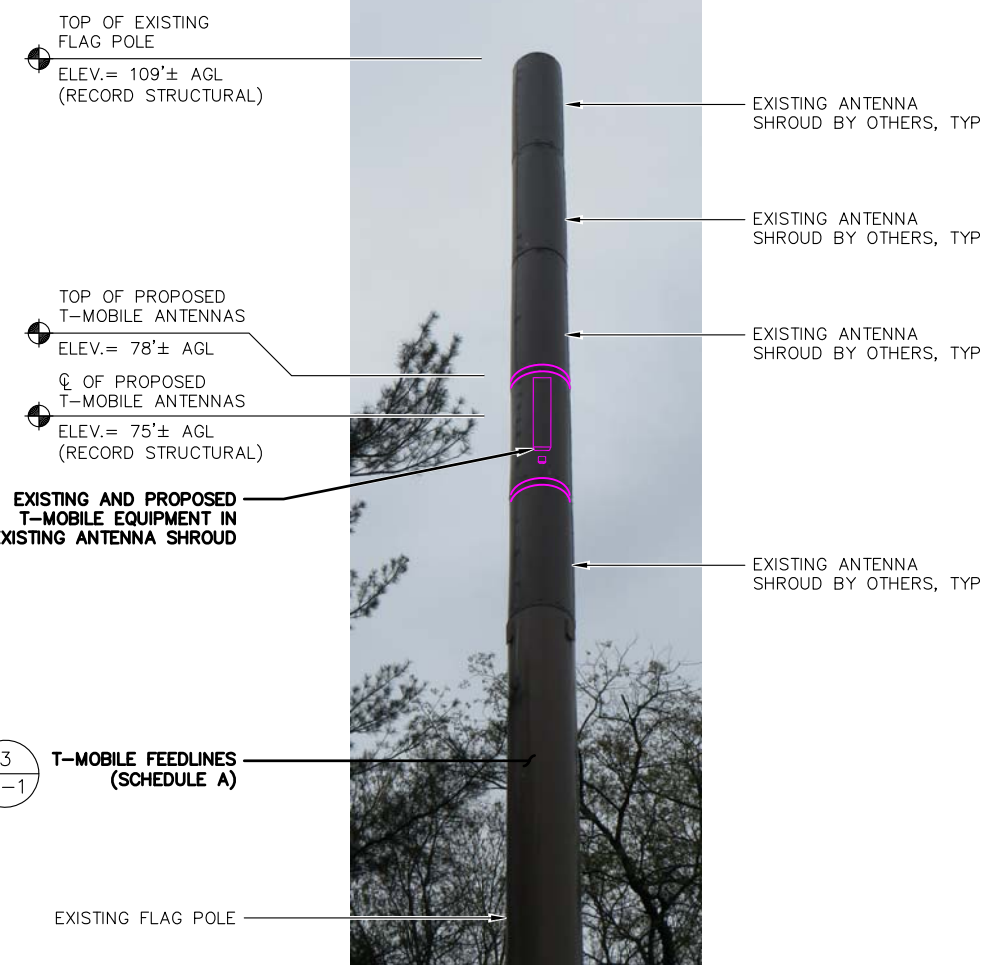
SCALE: N.T.S.

2  
A-2

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

ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE GLOBAL TOWER STRUCTURAL ANALYSIS PREPARED BY B+T GROUP DATED 07/23/19.

ANTENNAS TO BE INSTALLED WITHIN THE EXISTING EQUIPMENT SHROUD IN ACCORDANCE WITH THE ANTENNA MOUNT ANALYSIS, (DATED 07/03/19) PREPARED BY PROTERRA DESIGN GROUP, LLC.



**PARTIAL ELEVATION PHOTO DETAIL**

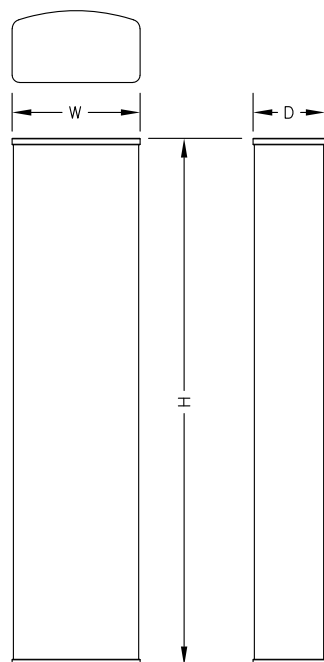
SCALE: N.T.S.

3  
A-2



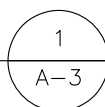
### APXVAR18\_43-C-NA20 ANTENNA SPECIFICATIONS

MANUF.	RFS
MODEL #	APXVAR18_43-C-NA20
HEIGHT	68"
WIDTH	16"
DEPTH	9"
WEIGHT	48.4± LBS.



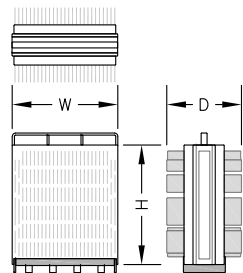
### ANTENNA DETAIL

SCALE: N.T.S.



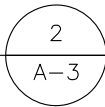
### 4449 B71+B12 SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	4449 B71+B12
HEIGHT	14.9"
WIDTH	13.2"
DEPTH	9.2"
WEIGHT	74± LBS.



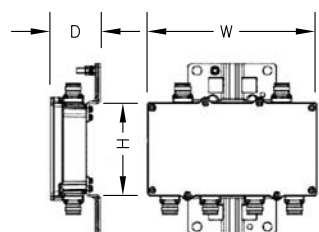
### REMOTE RADIO UNIT (RRU) DETAIL

SCALE: N.T.S.



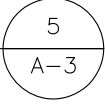
### DIPLEXER SPECIFICATIONS

MANUF.	COMMSCOPE
MODEL #	CBC1923T-43
HEIGHT	4.6"
WIDTH	8.3"
DEPTH	1.8"
WEIGHT	4.4± LBS.



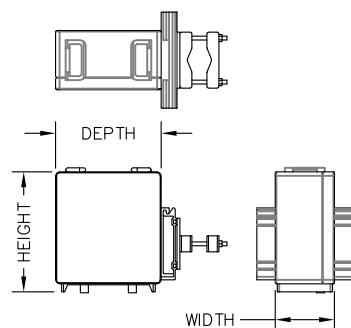
### DIPLEXER DETAIL

SCALE: N.T.S.



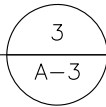
### 4415 B25 SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	4415 B25
HEIGHT	14.96"
WIDTH	13.19"
DEPTH	5.39"
WEIGHT	44± LBS.



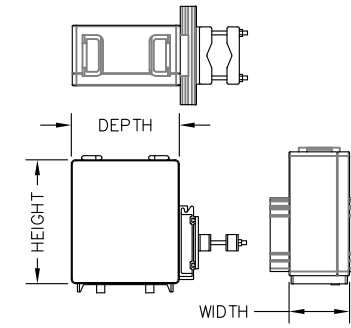
### REMOTE RADIO UNIT (RRU) DETAIL

SCALE: N.T.S.



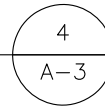
### 4415 B66A SPECIFICATIONS

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



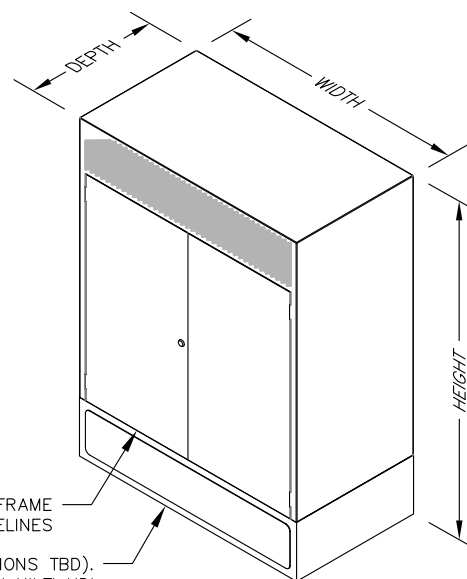
### REMOTE RADIO UNIT (RRU) DETAIL

SCALE: N.T.S.



### RBS SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	RBS 6102
HEIGHT	57.1"
WIDTH	51.2"
DEPTH	27.6"
WEIGHT	728± LBS. W/O BATTERIES
MAX WEIGHT	~1600 LBS.

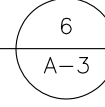


ATTACH RBS CABINET TO BASE FRAME PER MANUFACTURER'S GUIDELINES

RBS BASE FRAME (DIMENSIONS TBD). ANCHOR TO CONCRETE PAD WITH HILTI HDI 3/2" SS 303 DROP-IN ANCHORS (TYP. OF 8) OR EQUAL PER MANUFACTURER'S GUIDELINES

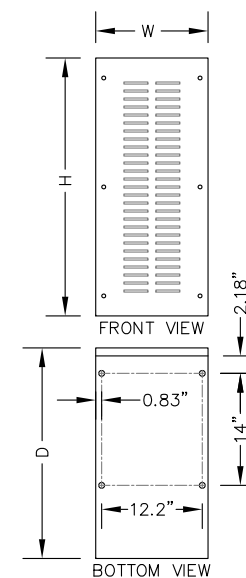
### RBS 6102

SCALE: N.T.S.



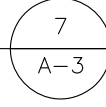
### BBU SPECIFICATIONS

MANUF.	PTS
MODEL #	PTS8003
HEIGHT	32.3"
WIDTH	14.0"
DEPTH	26.3"
WEIGHT WITHOUT BATTERIES	60 LBS.
MOUNT BASE WITH (4) 1/2" DROP-IN ANCHORS WITH 2" MINIMUM EMBEDMENT (INSTALL PER MANUFACTURER'S INSTALLATION GUIDELINES)	



### BATTERY BACKUP UNIT CABINET (BBU)

SCALE: N.T.S.



ANTENNA CONFIGURATION								
SECTOR	BAND	ANTENNA MODEL	ANTENNA RAD (RFDS)	AZIMUTH	DOWNTILT MECH./ELEC.		RADIOS	CABLE FEED LINES (APPROX. CABLE LENGTH 115')
ALPHA	L600 L700 L1900 L2100 U2100	(1) RFS - APXVAR18_43-C-NA20 (QUAD)	75'±	0°	0°	-2'	PROPOSED (GROUND LEVEL) (1) 4449 B71+B12 RRU, (1) 4415 B25 RRU, (1) 4415 B66A RRU, (1) CBC1923T-43 DIPLEXER PROPOSED (ANTENNA LEVEL) (1) TWIN STYLE 3CX TMA	EXISTING (4) 7/8" COAX TO REMAIN
BETA	L600 L700 L1900 L2100 U2100	(1) RFS - APXVAR18_43-C-NA20 (QUAD)	75'±	120°	0°	-2'	PROPOSED (GROUND LEVEL) (1) 4449 B71+B12 RRU, (1) 4415 B25 RRU, (1) 4415 B66A RRU, (1) CBC1923T-43 DIPLEXER PROPOSED (ANTENNA LEVEL) (1) TWIN STYLE 3CX TMA	EXISTING (4) 7/8" COAX TO REMAIN
GAMMA	L600 L700 L1900 L2100 U2100	(1) RFS - APXVAR18_43-C-NA20 (QUAD)	75'±	240°	0°	-2'	PROPOSED (GROUND LEVEL) (1) 4449 B71+B12 RRU, (1) 4415 B25 RRU, (1) 4415 B66A RRU, (1) CBC1923T-43 DIPLEXER PROPOSED (ANTENNA LEVEL) (1) TWIN STYLE 3CX TMA	EXISTING (4) 7/8" COAX TO REMAIN

BASED ON RFDS DATED 08/20/19. REFER TO FINAL RFDS FOR FINAL ANTENNA SETTINGS, CONFIGURATION, QUANTITIES AND RAN WIRING.



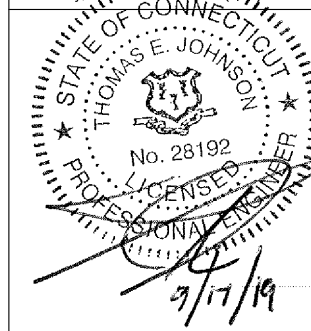
T-MOBILE NORTHEAST LLC  
35 Griffin Road South  
Bloomfield, CT 06002  
Office: (860) 648-1116



750 West Center St. Suite 301  
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4 Bay Road, Building A  
Suite 200  
Hadley, MA 01035  
Phone: (417) 320-4918



### APPROVALS

CONSTRUCTION	DATE
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AT&T AVON FLAGPOLE

228 LOVELY STREET  
AVON, CT 06001  
HARTFORD COUNTY

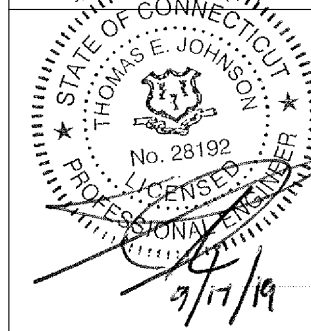
SHEET TITLE

DETAILS

SHEET NUMBER

A-3





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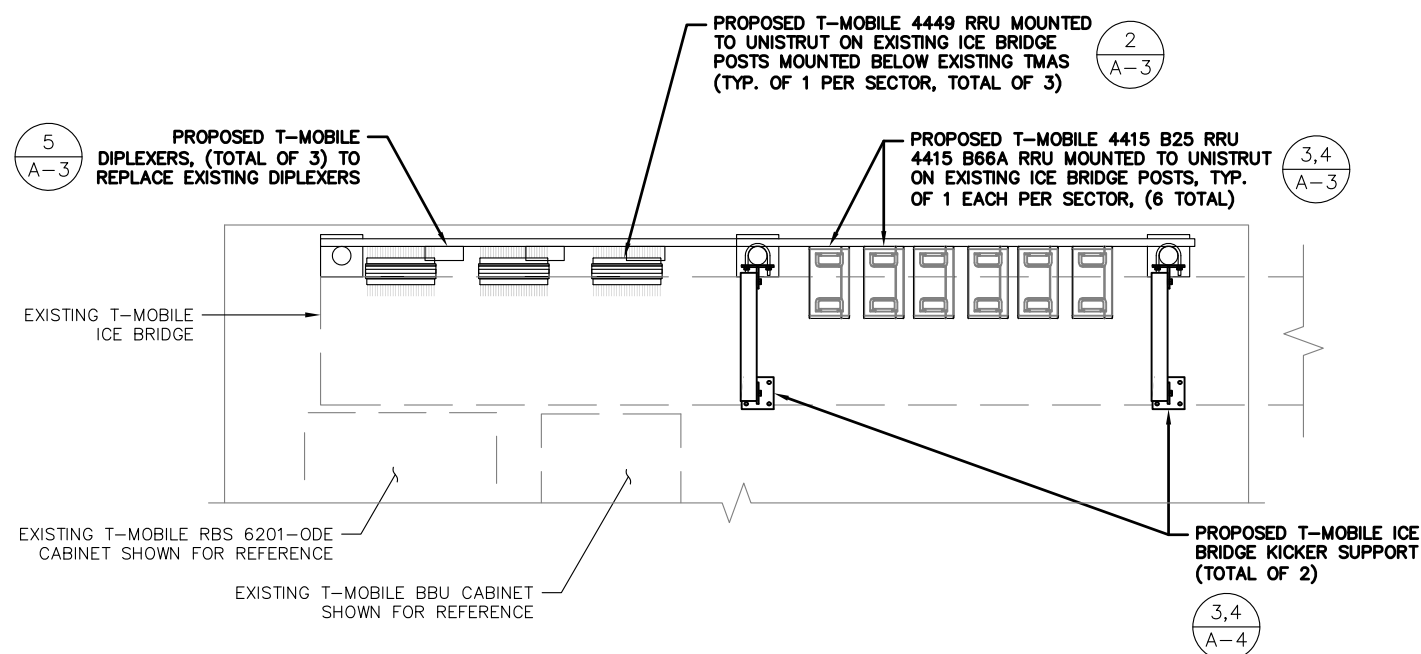
**SITE NUMBER: CTHA514A**  
**SITE NAME:**  
**AT&T AVON FLAGPOLE**  
 228 LOVELY STREET  
 AVON, CT 06001  
 HARTFORD COUNTY

SHEET TITLE

DETAILS

SHEET NUMBER

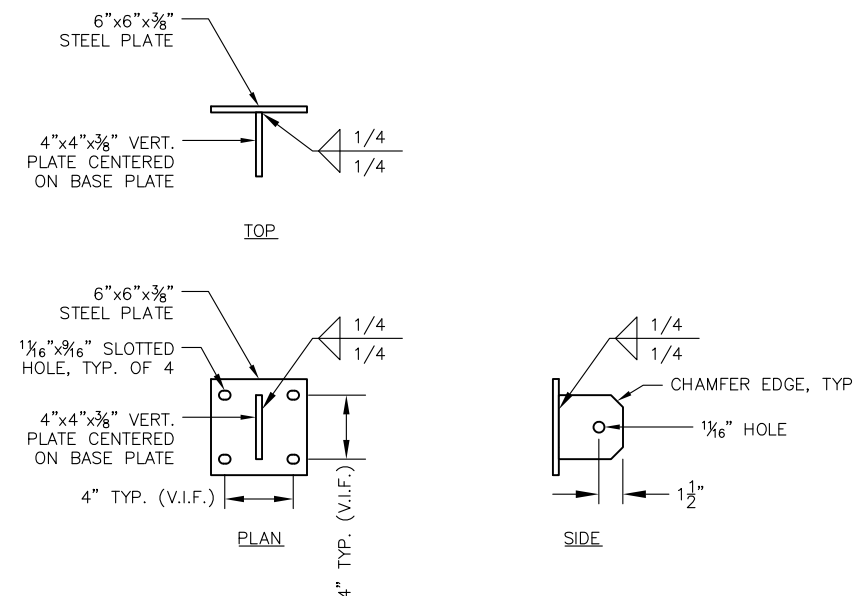
A-4



**RRU PLAN**

SCALE: N.T.S.

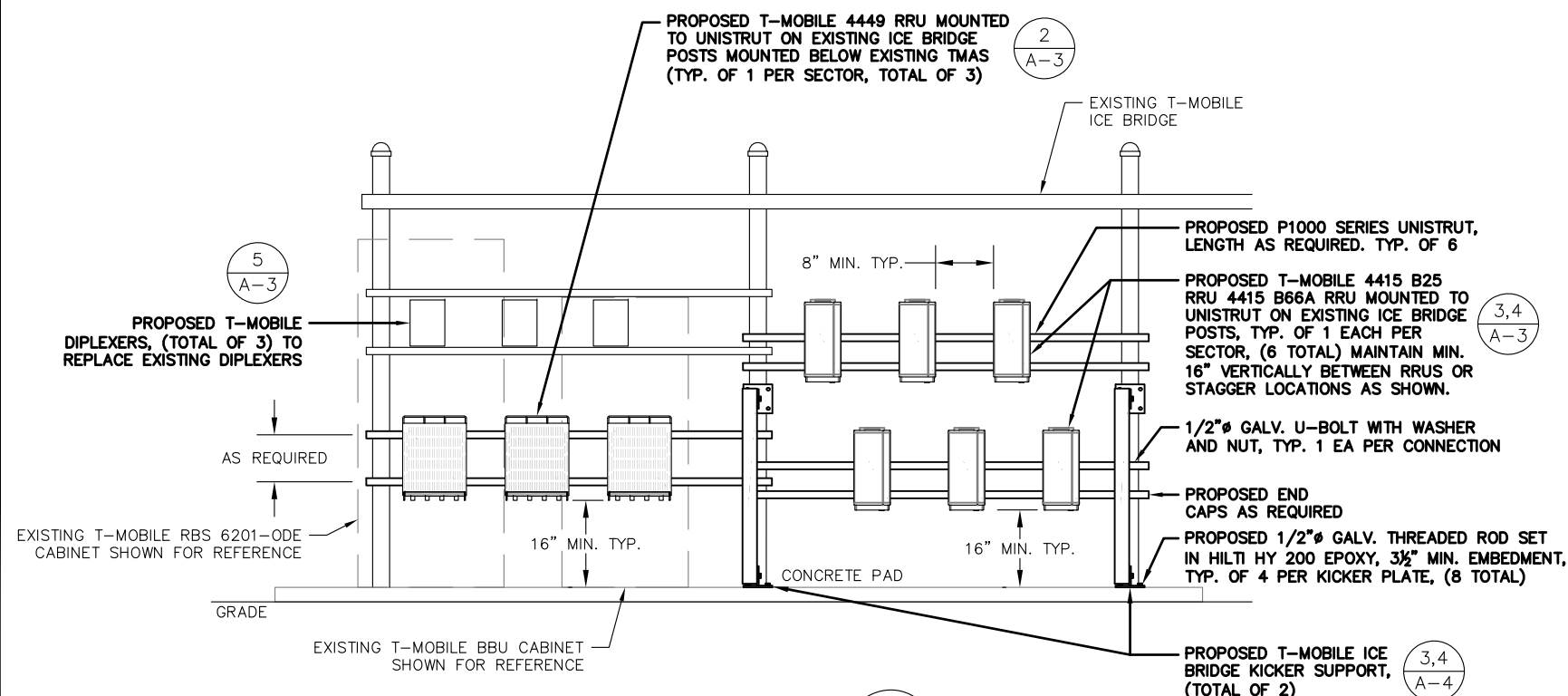
1  
A-4



**KICKER PLATE DETAIL**

SCALE: N.T.S.

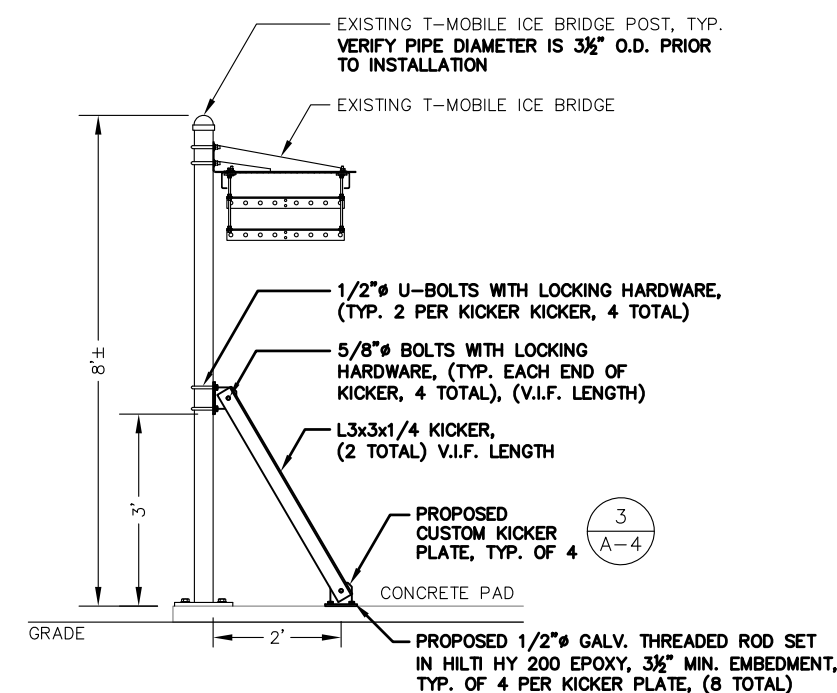
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A-4



**RRU ELEVATION**

SCALE: N.T.S.

2  
A-4



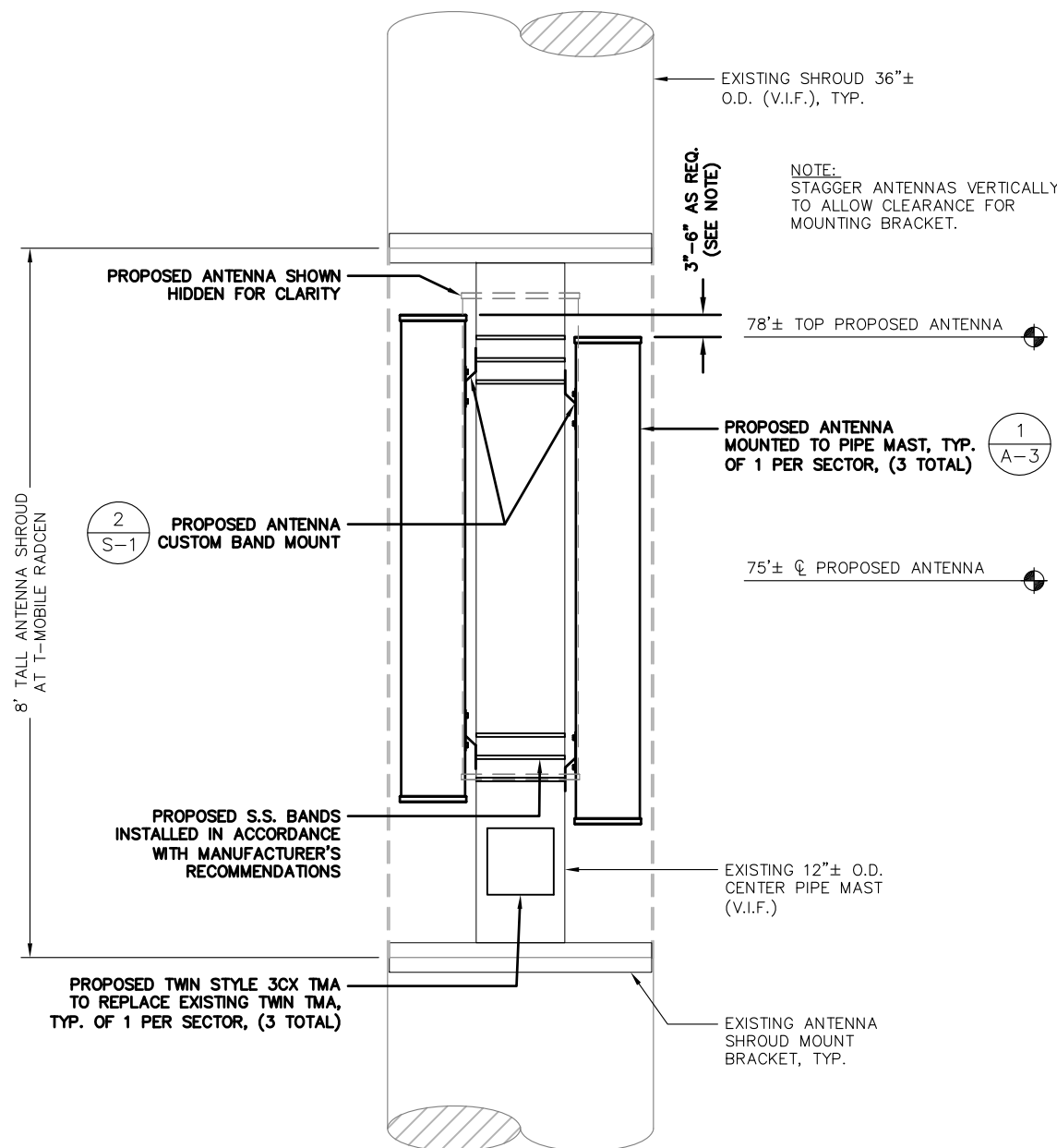
**KICKER DETAIL**

SCALE: N.T.S.

4  
A-4

ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE GLOBAL TOWER STRUCTURAL ANALYSIS PREPARED BY B+T GROUP DATED 07/23/19.

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**PROPOSED ANTENNA MOUNTING DETAIL**

SCALE: N.T.S.

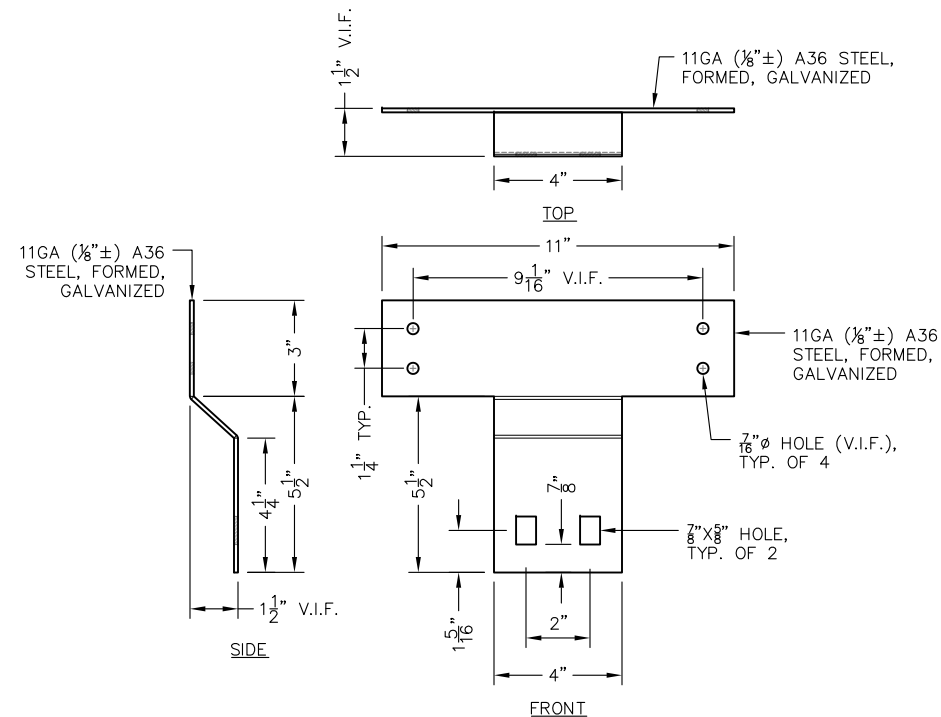
1  
S-1

**SPECIAL DESIGN NOTE:**

PROPOSED REPLACEMENT ANTENNAS INSTALLED WITH CUSTOM BAND MOUNT DESIGNED TO FIT WITHIN THE EXISTING 36" ANTENNA SHROUD (WITH MAX. 3/8" WALL THICKNESS) FOR PIPE MAST DIAMETER OF 12" O.D. CONTRACTOR SHALL VERIFY FITMENT OF ANTENNAS UTILIZING THIS BRACKET AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION.

**NOTE:**

- CONTRACTOR IS TO V.I.F. DIMENSION OF BOLT SPACING ON BACK OF ANTENNA AND VERIFY OFFSETS REQUIRED. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION. ADJUST ANTENNA BANDING MOUNT AS REQUIRED PRIOR TO FABRICATION.
- AFTER BANDING 2 OF THE 3 SECTORS IF IT IS FOUND THAT TOOL CLEARANCE IS AN ISSUE, CONTRACTOR MAY INSTALL THE THIRD SECTOR ANTENNA UTILIZING A STAINLESS STEEL T-BOLT OR BOLTED BANDING AS NEEDED.



NO STANDARD HOSE CLAMPS ALLOWED. S.S. T-BOLT CLAMPS OR CUSTOM FABRICATED BANDING MAY BE USED.

**ANTENNA BANDING MOUNT DETAIL**

SCALE: N.T.S.

2  
S-1



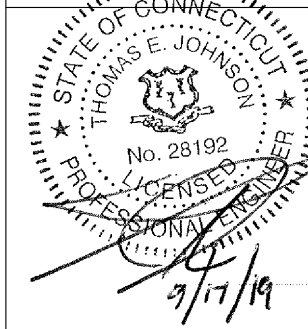
T-MOBILE NORTHEAST LLC  
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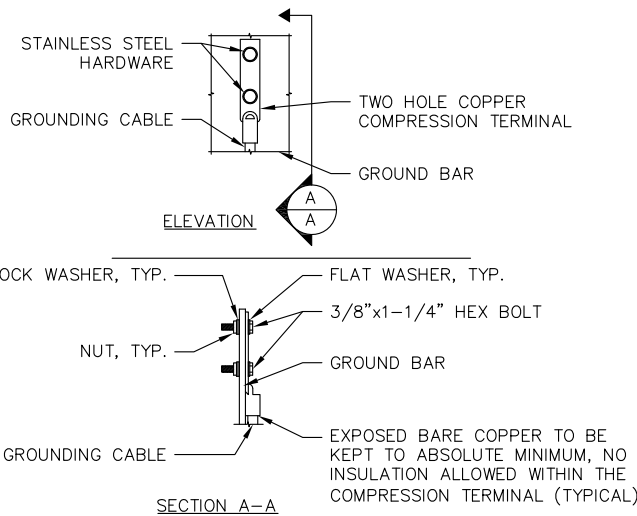
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AT&T AVON FLAGPOLE

228 LOVELY STREET  
AVON, CT 06001  
HARTFORD COUNTY

SHEET TITLE  
ANTENNA  
MOUNTING  
DETAILS

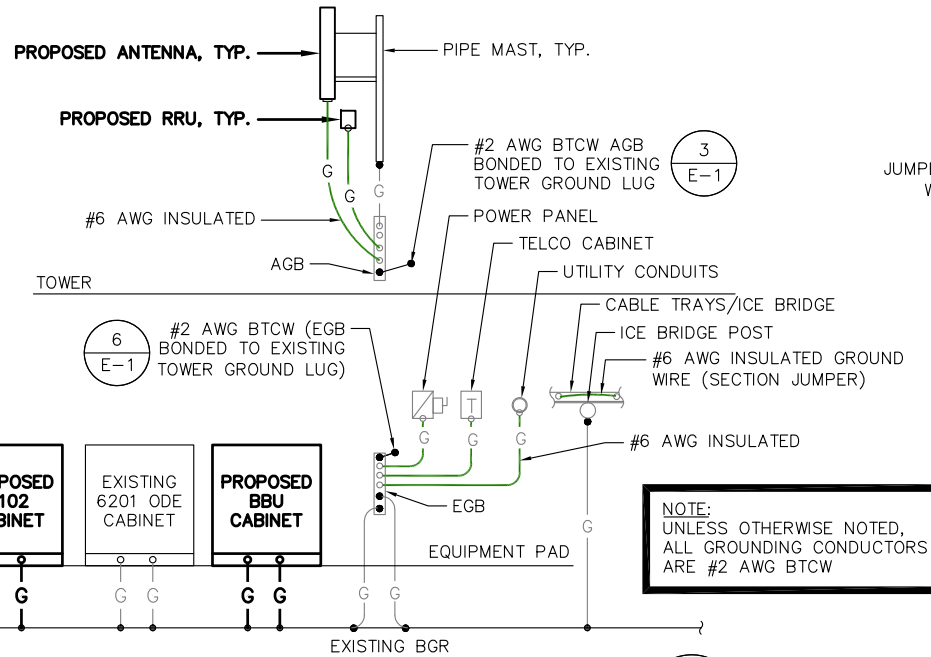
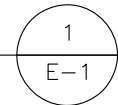
SHEET NUMBER

S-1



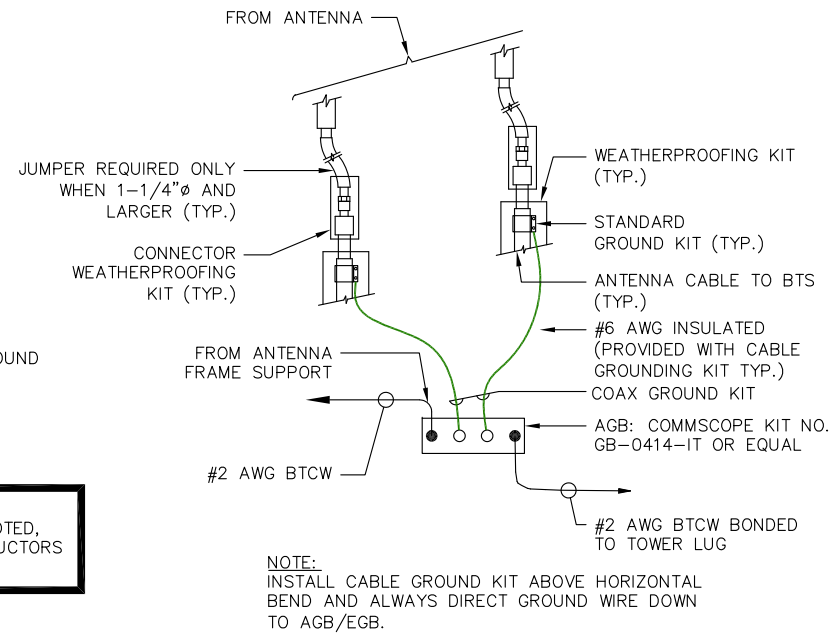
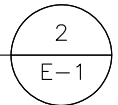
### TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



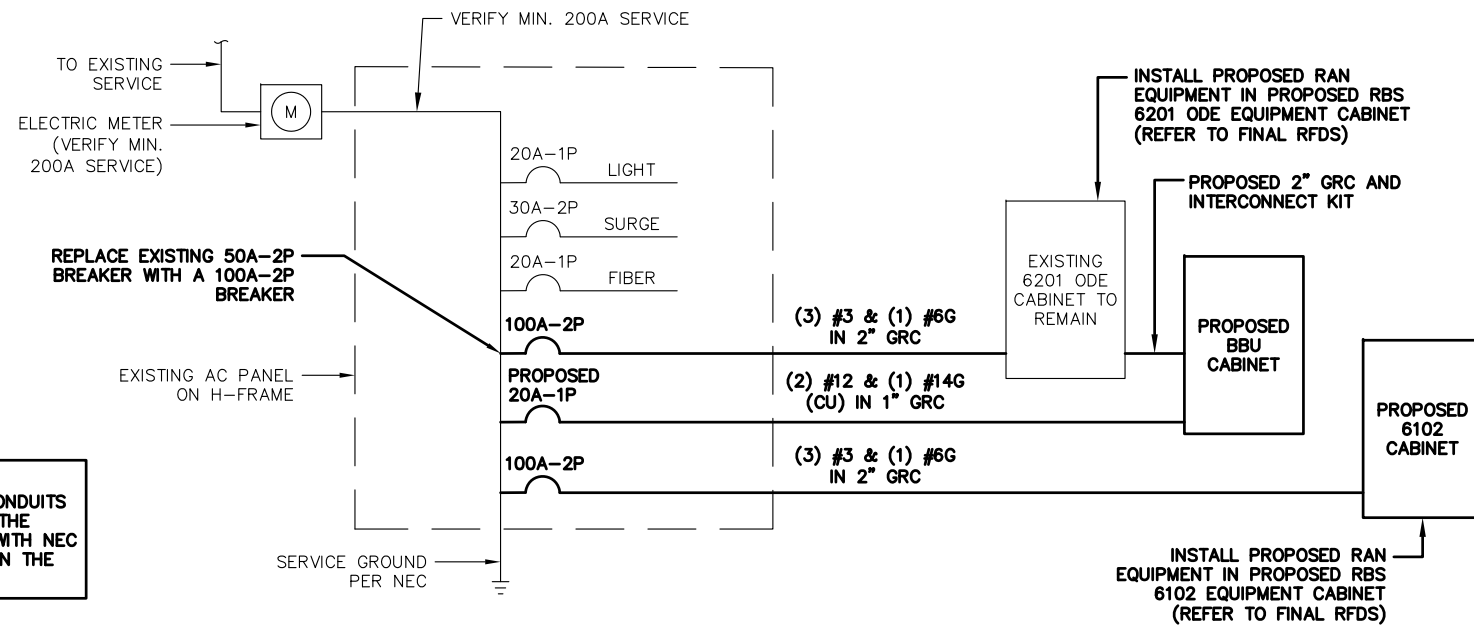
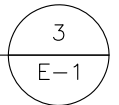
### TYPICAL GROUNDING RISER DIAGRAM

SCALE: N.T.S.



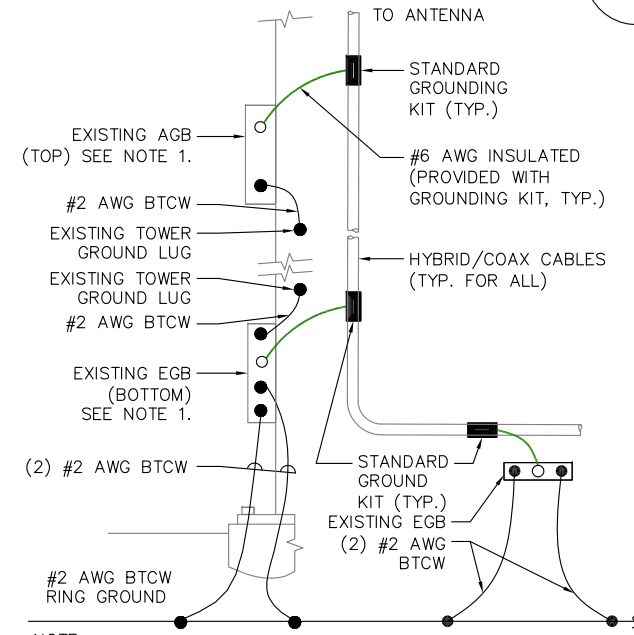
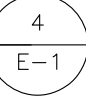
### TOWER TOP CABLE GROUNDING DETAIL

SCALE: N.T.S.



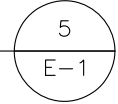
### ONE LINE POWER SCHEMATIC

SCALE: N.T.S.



### TOWER BOTTOM CABLE GROUNDING DETAIL

SCALE: N.T.S.



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

**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 LEGEND	
A	AMPERE
V	VOLT
KWH	KILOWATT - HOUR
C	CONDUIT
GRC	GALVANIZED RIGID CONDUIT
BTCW	BARE TINNED (SOLID) COPPER WIRE (#2 AWG, UNLESS NOTES OTHERWISE)
G	GROUND
⊕	GROUND
MGB	MASTER GROUND BAR
AGB/EGB	EQUIPMENT GROUND BAR/ANTENNA GROUND BAR
G	GROUND COPPER WIRE, SIZE AS NOTED
---	EXPOSED WIRING
---	INSULATED GROUNDING CONDUCTOR (#6 AWG STRANDED, UNLESS NOTED OTHERWISE)
○	5/8"x10" COPPER CLAD STAINLESS STEEL GROUND ROD
●	EXOTHERMIC (CAD WELD) OR MECHANICAL CONNECTION
○	MECHANICAL (COMPRESSION TYPE) CONNECTION
PPC	POWER PROTECTION CABINET
⊗	OMNI-DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALL

### ELECTRICAL & GROUNDING NOTES:

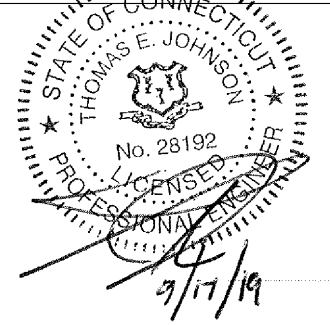
- ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) 2017 AS WELL AS APPLICABLE STATE AND LOCAL CODES.
- ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
- THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
- GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
- 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.
- RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
- ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THHN INSULATION AS REQUIRED BY NEC.
- 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.
- 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.
- ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
- GROUNDING SHALL COMPLY WITH NEC ART. 250.
- GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.

- 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.
- 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.
- 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.
- 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).
- CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LYGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
- APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
- BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
- BOND ANTENNA EGB'S AND MGB TO WATER MAIN/GROUND RING.
- TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
- BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
- VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

**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

0	09/17/19	FOR CONSTRUCTION
A	06/07/19	ISSUED FOR REVIEW

SITE NUMBER: CTHA514A  
SITE NAME:  
AT&T AVON FLAGPOLE  
228 LOVELY STREET  
AVON, CT 06001  
HARTFORD COUNTY

SHEET TITLE  
ONE LINE DIAGRAM &  
GROUNDING DETAILS

SHEET NUMBER

E-1

# Exhibit D

Structural Analysis Report



Date: July 23, 2019

Alison Skipper  
AT&T Mobility  
607 N Miller Blvd  
Oklahoma City, OK 73107  
(470) 413-6770

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

**Subject:** Structural Analysis Report

**Carrier Designation:** T-Mobile Co-Locate  
**Site Number:** CTHA514A  
**Site Name:** AT&T Avon Flagpole

**AT&T Mobility Designation:** **Site Number:** 97421  
**Site Name:** Avon Lovely ST

**Engineering Firm Designation:** **B+T Group Project Number:** 137284.001.01

**Site Data:** 224 Lovely Street, Avon, Hartford County, CT  
Latitude 41° 47' 56.04", Longitude -72° 53' 17.88"  
109 Foot - Flagpole Tower

Dear Alison Skipper,

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

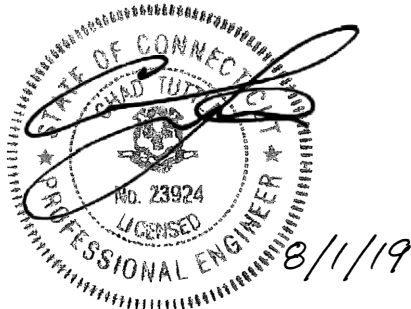
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

Proposed Equipment Configuration	<b>Sufficient Capacity</b>
	Tower: 46.0%
	Foundation: 20.4%

The analysis has been performed in accordance with the TIA-222-G Standard. This analysis utilizes an ultimate 3-second gust wind speed of 125 mph converted to an equivalent 97 mph nominal 3-second gust wind speed per Section 1609.3.1 for use with TIA-222 G as required by the 2015 International Building Code. Exposure Category B and Risk Category II were used in this analysis.

Structural analysis prepared by: Abigail Enriquez

Respectfully submitted by: B+T Engineering, Inc.  
COA: PEC.0001564; Expires: 02/10/2020



Chad Tuttle, P.E.

## TABLE OF CONTENTS

### 1) INTRODUCTION

### 2) ANALYSIS CRITERIA

Table 1 - Proposed Equipment Configuration

Table 2 - Other Considered Equipment

### 3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

### 4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Table 5 – Tower Component Stresses vs. Capacity

4.1) Recommendations

### 5) APPENDIX A

tnxTower Output

### 6) APPENDIX B

Base Level Drawing

### 7) APPENDIX C

Additional Calculations

## 1) INTRODUCTION

This tower is a 110 ft. Flagpole designed by EEI in January of 2011. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-G
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	97 mph
<b>Exposure Category:</b>	B
<b>Topographic Factor:</b>	1
<b>Ice Thickness:</b>	1.00 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Service Wind Speed:</b>	60 mph

**Table 1 - Proposed Equipment Configuration**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
75.0	75.0	3	RFS	APXVAR18	12	7/8
		3	Generic	3CX PCS AWS		

**Table 2 - Other Considered Equipment**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
107.0	107.0	3	Powerwave Tech.	P65-16-XLH-RR	6	1-5/8
		3	Powerwave Tech.	TT19-08BP111-001		
99.0	99.0	3	Powerwave Tech.	P65-16-XLH-RR	6	1-5/8
		3	Powerwave Tech.	TTAW-07BP111-001		
91.0	91.0	3	Powerwave Tech.	P65-16-XLH-RR	6	1-5/8
		3	Powerwave Tech.	TT19-08BP111-001		

## 3) ANALYSIS PROCEDURE

**Table 2 - Documents Provided**

Document	Remarks	Reference	Source
Tower Data	Tower Manufacturer Drawing By EEI, Project No. 16537	Date: 01/11/2011	AT&T Mobility
	Previous SA by GPD, Project No: 2017723.01.97421.01	Date: 06/21/2017	AT&T Mobility
Foundation Data	Foundation Drawing By EEI, Project No. 16537	Date: 01/10/2011	AT&T Mobility
Soil Properties	Foundation Drawing By EEI, Project No. 16537	Date: 01/10/2011	AT&T Mobility
Existing Loading	RFDS Spreadsheet	Date: 03/27/2014	AT&T Mobility
	Previous SA from GPD, Project No: 2017723.01.97421.01	Date: 06/21/2017	AT&T Mobility
Proposed Loading	Tower Application Form	Date: 05/15/2019	AT&T Mobility

### 3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

### 3.2) Assumptions

- 1) The tower and structures were built and have been maintained in accordance with the manufacturer's specification.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 3) Mount areas and weights are assumed based on photographs provided.

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

## 4) ANALYSIS RESULTS

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

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	109 - 89	Pole	TP10.392x10.392x0.375	1	-2.655	690.379	9.1	Pass
L2	89 - 63.5	Pole	TP12x10.392x0.375	2	-5.920	801.180	33.3	Pass
L3	63.5 - 63	Pole	TP36x12x0.375	3	-5.957	801.180	33.3	Pass
L4	63 - 40	Pole	TP36x36x0.375	4	-11.129	1318.370	15.9	Pass
L5	40 - 0	Pole	TP36x36x0.375	5	-18.920	1318.370	36.4	Pass
							Summary	
						Pole (L5)	36.4	Pass
						<b>RATING =</b>	<b>36.4</b>	<b>Pass</b>

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

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Connection	40	37.8	Pass
1	Anchor Rods	Base	46.0	Pass
1	Base Plate	Base	30.4	Pass
1	Base Foundation (Soil Interaction)	Base	20.4	Pass
1	Base Foundation (Structure)	Base	19.5	Pass

<b>Structure Rating (max from all components) =</b>	<b>46.0%</b>
---	--------------

Notes:

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

### 4.1) Recommendations

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



# Tower Analysis Summary Form

### General Info

Site Name	Avon Lovely ST
Site Number	97421
FA Number	10117744
Date of Analysis	7/23/2019
Company Performing Analysis	B+T Group

The information contained in this summary report is not to be used independently from the PE stamped tower analysis.

Tower Info	Description	Date
Tower Type (G, SST, MP)	MP	
Tower Height (top of steel AGL)	109	
Tower Manufacturer	EEI	1/11/2011
Tower Model	N/A	
Tower Design	N/A	
Foundation Design	EEI	1/10/2011
Geotech Report	N/A	
Tower Mapping	N/A	
Previous Structural Analysis	GPD Group Project #2017723.01.97421.0	6/21/2017
Foundation Mapping	N/A	

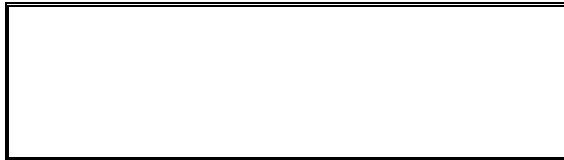
Design Parameters	
Design Code Used	TIA-222-G 2015 IBC
Location of Tower (County, State)	Hartford, CT
Basic Wind Speed (mph)	125mph
Ice Thickness (in)	1
Structure Classification (I, II, III)	II
Exposure Category (B, C, D)	B
Topographic Category (1 to 5)	1

Analysis Results (% Maximum Usage)	
Existing/Reserved + Future + Proposed Condition	
Tower (%)	N/A
Base Plate (%)	N/A
Foundation (%)	N/A
Foundation Adequate?	

Analysis Results (% Maximum Usage)	
Existing/Reserved	
Tower (%)	36.3%
Base Plate (%)	46.0%
Foundation (%)	20.4%
Foundation Adequate?	Yes

Analysis Results (% Maximum Usage)	
Existing/Reserved + Proposed Condition	
Tower (%)	36.4%
Base Plate (%)	46.0%
Foundation (%)	20.4%
Foundation Adequate?	Yes

Steel Yield Strength (ksi)	
Pole	
Base Plate	
Anchor Rods	



### Existing / Reserved Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Leg/Face
AT&T	107	107	3	Panel	Powerwave	P65-16-XLH-RR		3	-	Pipe Mount	6	-	1-5/8"	Inside Pole
AT&T	107	107	3	TMA	Powerwave	TT19-08BP111-001								
AT&T	99	99	3	Panel	Powerwave	P65-16-XLH-RR		3	-	Pipe Mount	6	-	1-5/8"	Inside Pole
AT&T	99	99	3	TMA	Powerwave	TT19-08BP111-001								
AT&T	91	91	3	Panel	Powerwave	P65-16-XLH-RR		3	-	Pipe Mount	6	-	1-5/8"	Inside Pole
AT&T	91	91	3	TMA	Powerwave	TT19-08BP111-001								
T-Mobile	75	75	3*	Panel	RFS	APX16DWV		3	-	Pipe Mount	12	-	7/8"	Inside Pole
T-Mobile	75	75	3*	TMA	Ericsson	KRY 112 144								

\*Equipment to be Removed

### Proposed Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Leg/Face
T-Mobile	75	75	3	Panel	RFS	APXVAR18		3	-	Pipe Mount				
T-Mobile	75	75	3	TME	-	3CX PCS AWS								

### Future Loading

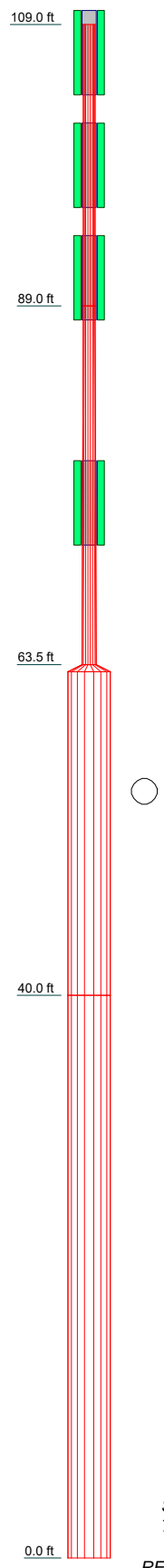
Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Leg/Face
						None								

**NOTE: THIS FORM MUST BE SAVED AS EXCEL 97-2003 TO UPLOAD IN SITERRA**

**APPENDIX A**

**TNXTOWER OUTPUT**

Section	5	4	3	2	1
Length (ft)	40.000	23.000	0.500	25.500	20.000
Number of Sides	0	0	0	0	0
Thickness (in)	0.375	0.375	0.375	0.375	0.375
Top Dia (in)	36.000	36.000	12.000	10.392	10.392
Bot Dia (in)	36.000	36.000	36.000	12.000	10.392
Grade	A53-B-35			A572-65	
Weight (K)	5.7	3.3	0.0	1.1	0.8



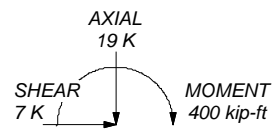
**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	A53-B-35	35 ksi	63 ksi

**TOWER DESIGN NOTES**

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.000 ft
7. TOWER RATING: 36.4%

ALL REACTIONS  
ARE FACTORED



REACTIONS - 97 mph WIND

**B+T Group**  
 1717 S. Boulder, Suite 300  
 Tulsa, OK 74119  
 Phone: 9185874630  
 FAX: 9182950265

Job: <b>137284.001.01 - Avon Lovely ST, CT (Site# 9742)</b>		
Project:		
Client: AT&T Mobility	Drawn by: acontreras	App'd:
Code: TIA-222-G	Date: 07/23/19	Scale: NTS
Path:	Dwg No: E-1	

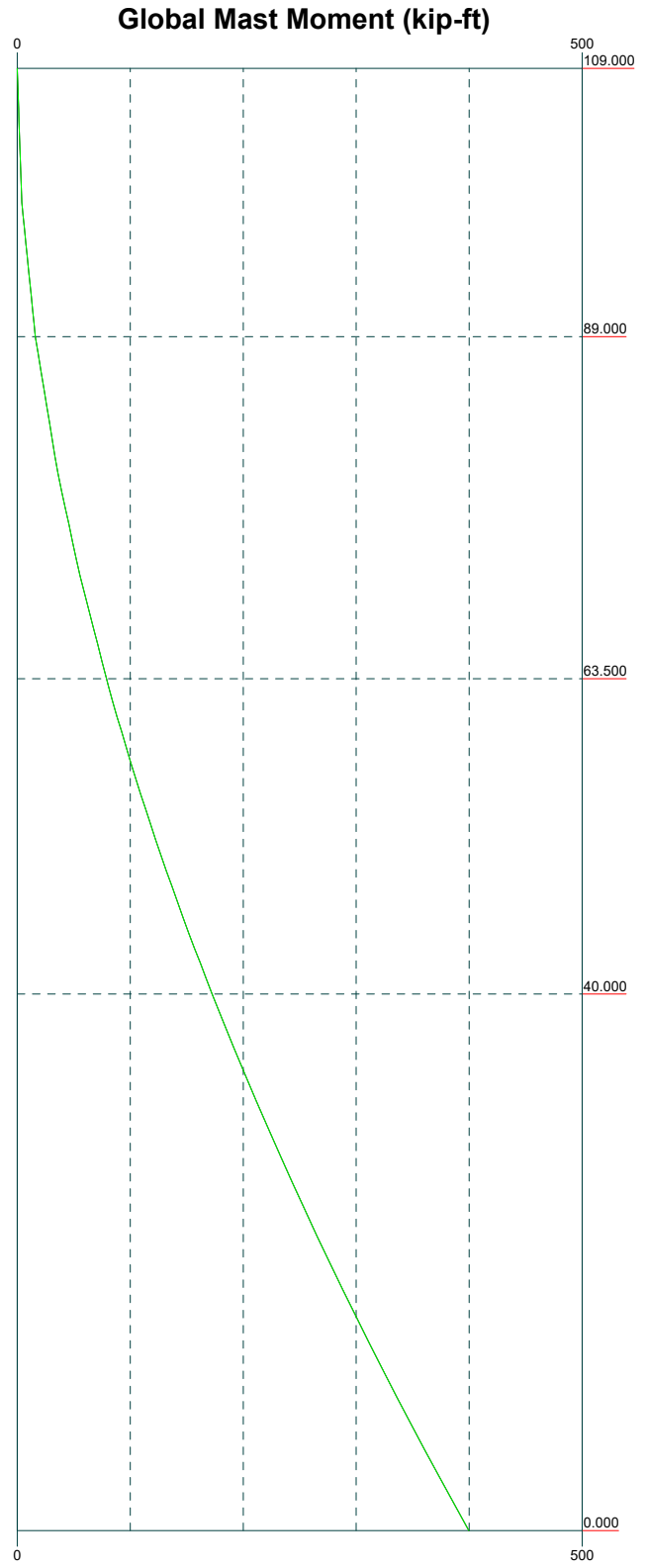
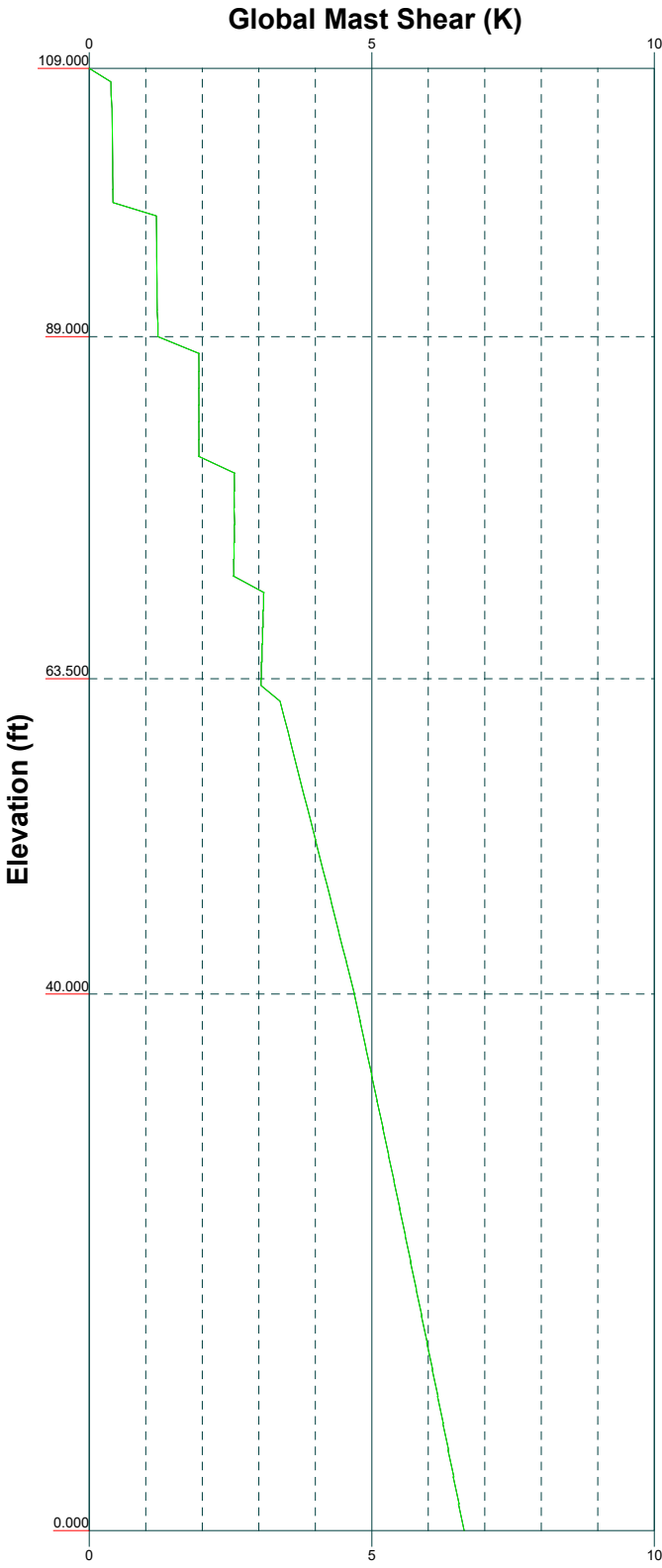
©\Projects\AT&T Mobility\137284\_9742\ Avon Lovely ST\Engineers\gms\Tower\001\137284\_001\_01 Avon Lovely ST, CT, W. Garcia.dwg

Vx

Vz

Mx

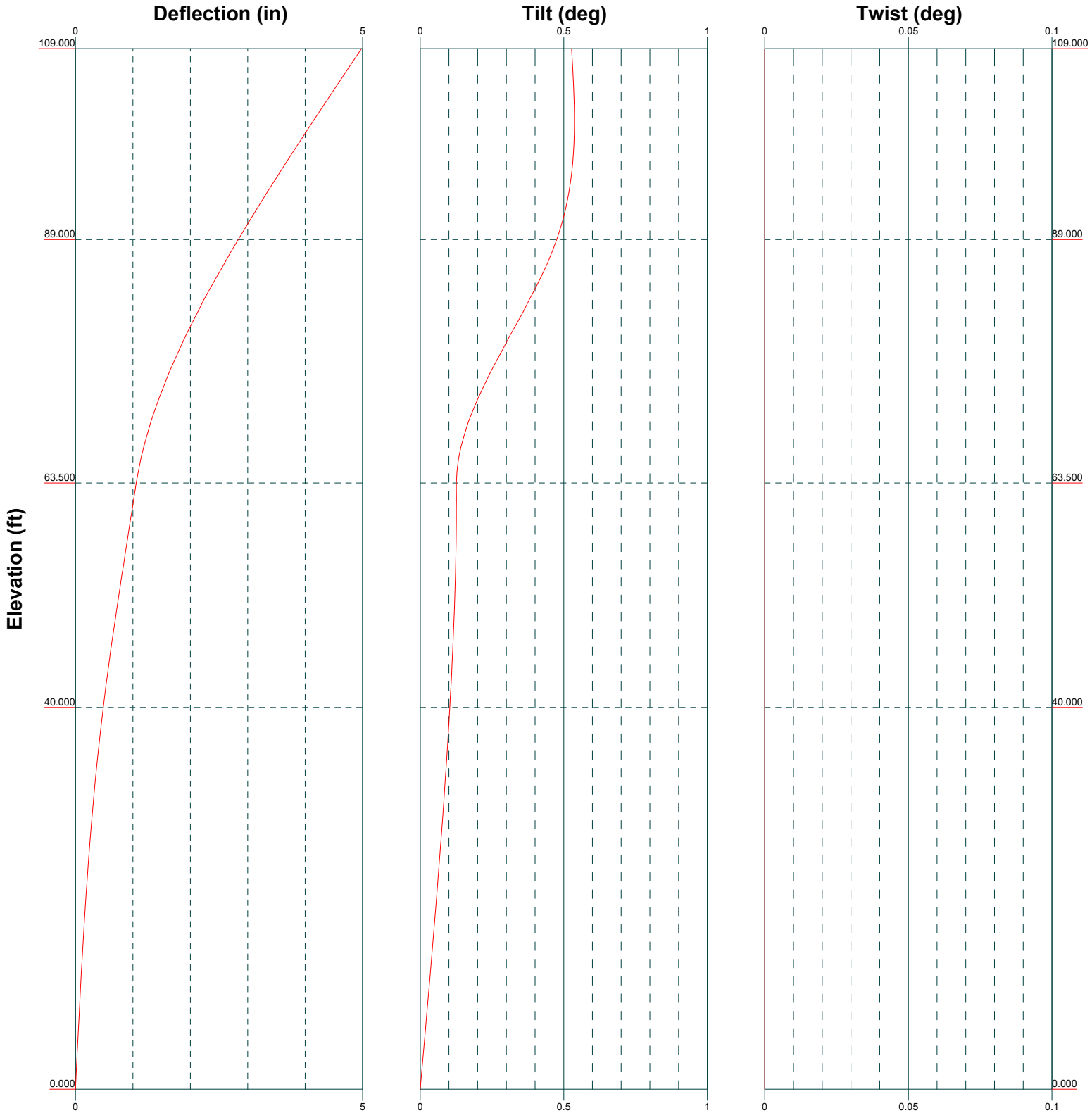
Mz



**B+T Group**  
 1717 S. Boulder, Suite 300  
 Tulsa, OK 74119  
 Phone: 9185874630  
 FAX: 9182950265

Job: <b>137284.001.01 - Avon Lovely ST, CT (Site# 9742)</b>		
Project:		
Client: AT&T Mobility	Drawn by: acontreras	App'd:
Code: TIA-222-G	Date: 07/23/19	Scale: NTS
Path:	Dwg No: E-4	

©/Project/AT&T Mobility/137284\_9742/Avon Lovely ST/Engineer/3/2019/001/137284\_001\_01\_Avon Lovely ST, CT, W. Gansel.dwg



**B+T Group**  
 1717 S. Boulder, Suite 300  
 Tulsa, OK 74119  
 Phone: 9185874630  
 FAX: 9182950265

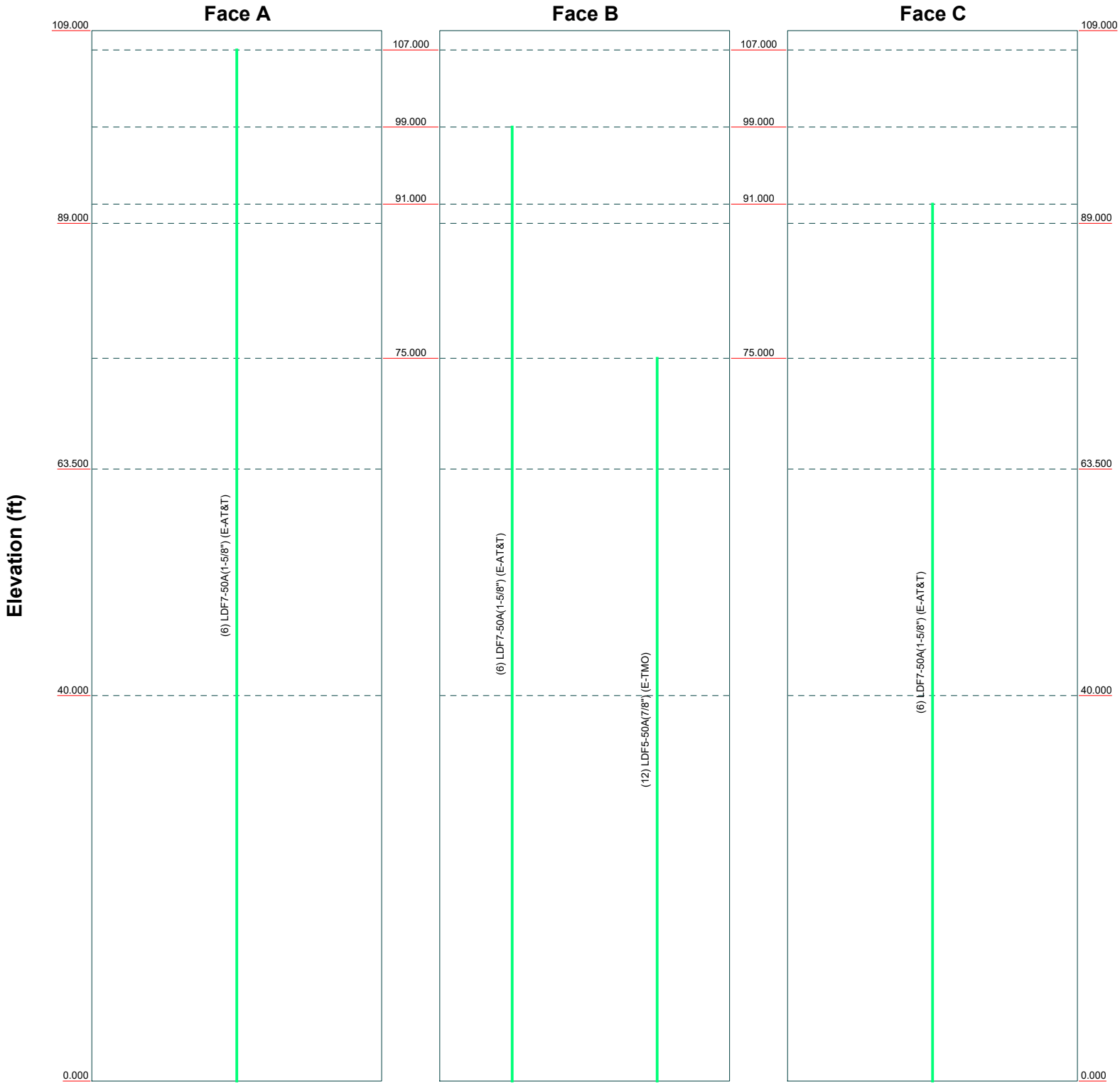
Job: <b>137284.001.01 - Avon Lovely ST, CT (Site# 9742)</b>		
Project:		
Client: AT&T Mobility	Drawn by: acontreras	App'd:
Code: TIA-222-G	Date: 07/23/19	Scale: NTS
Path:	Dwg No: E-5	


©\Projects\AT&T Mobility\137284\_9742\Avon Lovely ST\Engineering\Site\Tower\00\137284\_001\_01\_Avon Lovely ST\_CT\_W\_Garland.dwg

# Feed Line Distribution Chart

## 0' - 109'

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




**B+T Group**  
 1717 S. Boulder, Suite 300  
 Tulsa, OK 74119  
 Phone: 9185874630  
 FAX: 9182950265

Job: <b>137284.001.01 - Avon Lovely ST, CT (Site# 9742)</b>		
Project:		
Client: AT&T Mobility	Drawn by: acontreras	App'd:
Code: TIA-222-G	Date: 07/23/19	Scale: NTS
Path:	Dwg No: E-7	

S:\Projects\AT&T Mobility\137284\_9742\Avon Lovely ST\Engineering\Drawings\001\137284\_001\_01\_Avon Lovely ST, CT, W. Gansler.dwg

<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: 9185874630 FAX: 9182950265	<b>Job</b> 137284.001.01 - Avon Lovely ST, CT (Site# 97421)	<b>Page</b> 1 of 12
	<b>Project</b>	<b>Date</b> 16:24:11 07/23/19
	<b>Client</b> AT&T Mobility	<b>Designed by</b> acontreras

## Tower Input Data

The tower is a monopole.

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

The following design criteria apply:

Tower is located in Hartford County, Connecticut.

Basic wind speed of 97 mph.

Structure Class II.

Exposure Category B.

Topographic Category 1.

Crest Height 0.000 ft.

Deflections calculated using a wind speed of 60 mph.

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

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

## Options

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

## Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	109.000-89.000	20.000	0.000	Round	10.392	10.392	0.375		A572-65 (65 ksi)
L2	89.000-63.500	25.500	0.000	Round	10.392	12.000	0.375		A572-65 (65 ksi)
L3	63.500-63.000	0.500	0.000	Round	12.000	36.000	0.375		A572-65 (65 ksi)
L4	63.000-40.000	23.000	0.000	Round	36.000	36.000	0.375		A53-B-35

<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: 9185874630 FAX: 9182950265	<b>Job</b> 137284.001.01 - Avon Lovely ST, CT (Site# 97421)	<b>Page</b> 2 of 12
	<b>Project</b>	<b>Date</b> 16:24:11 07/23/19
	<b>Client</b> AT&T Mobility	<b>Designed by</b> acontreras

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L5	40.000-0.000	40.000		Round	36.000	36.000	0.375		(35 ksi) A53-B-35 (35 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	10.392	11.801	148.235	3.544	5.196	28.528	296.470	5.897	0.000	0
	10.392	11.801	148.235	3.544	5.196	28.528	296.470	5.897	0.000	0
L2	10.392	11.801	148.235	3.544	5.196	28.528	296.470	5.897	0.000	0
	12.000	13.695	231.591	4.112	6.000	38.599	463.182	6.844	0.000	0
L3	12.000	13.695	231.591	4.112	6.000	38.599	463.182	6.844	0.000	0
	36.000	41.970	6658.921	12.596	18.000	369.940	13317.843	20.972	0.000	0
L4	36.000	41.970	6658.921	12.596	18.000	369.940	13317.843	20.972	0.000	0
	36.000	41.970	6658.921	12.596	18.000	369.940	13317.843	20.972	0.000	0
L5	36.000	41.970	6658.921	12.596	18.000	369.940	13317.843	20.972	0.000	0
	36.000	41.970	6658.921	12.596	18.000	369.940	13317.843	20.972	0.000	0

Tower Elevation ft	Gusset Area ft <sup>2</sup> (per face)	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 109.000-89.000				1	0	1			
L2 89.000-63.500				1	0	1			
L3 63.500-63.000				1	0	1			
L4 63.000-40.000				1	1	1			
L5 40.000-0.000				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

### Feed Line/Linear Appurtenances - Entered As Area



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	<b>Project</b>	<b>Date</b> 16:24:11 07/23/19
	<b>Client</b> AT&T Mobility	<b>Designed by</b> acontreras

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	No Ice	C <sub>AA</sub> ft <sup>2</sup> /ft	Weight klf
LDF7-50A(1-5/8") (E-AT&T)	A	No	No	Inside Pole	107.000 - 0.000	6	No Ice	0.000	0.001
LDF7-50A(1-5/8") (E-AT&T)	B	No	No	Inside Pole	99.000 - 0.000	6	No Ice	0.000	0.001
LDF7-50A(1-5/8") (E-AT&T) *SRI*	C	No	No	Inside Pole	91.000 - 0.000	6	No Ice	0.000	0.001
LDF5-50A(7/8") (E-TMO) *SRI*	B	No	No	Inside Pole	75.000 - 0.000	12	No Ice	0.000	0.000

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	109.000-89.000	A	0.000	0.000	0.000	0.000	0.089
		B	0.000	0.000	0.000	0.000	0.049
		C	0.000	0.000	0.000	0.000	0.010
L2	89.000-63.500	A	0.000	0.000	0.000	0.000	0.125
		B	0.000	0.000	0.000	0.000	0.171
		C	0.000	0.000	0.000	0.000	0.125
L3	63.500-63.000	A	0.000	0.000	0.000	0.000	0.002
		B	0.000	0.000	0.000	0.000	0.004
		C	0.000	0.000	0.000	0.000	0.002
L4	63.000-40.000	A	0.000	0.000	0.000	0.000	0.113
		B	0.000	0.000	0.000	0.000	0.204
		C	0.000	0.000	0.000	0.000	0.113
L5	40.000-0.000	A	0.000	0.000	0.000	0.000	0.197
		B	0.000	0.000	0.000	0.000	0.355
		C	0.000	0.000	0.000	0.000	0.197

### Feed Line Center of Pressure

Section	Elevation ft	CP <sub>X</sub> in	CP <sub>Z</sub> in	CP <sub>X</sub> Ice in	CP <sub>Z</sub> Ice in
L1	109.000-89.000	0.000	0.000	0.000	0.000
L2	89.000-63.500	0.000	0.000	0.000	0.000
L3	63.500-63.000	0.000	0.000	0.000	0.000
L4	63.000-40.000	0.000	0.000	0.000	0.000
L5	40.000-0.000	0.000	0.000	0.000	0.000

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

<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: 9185874630 FAX: 9182950265	<b>Job</b> 137284.001.01 - Avon Lovely ST, CT (Site# 97421)	<b>Page</b> 4 of 12
	<b>Project</b>	<b>Date</b> 16:24:11 07/23/19
	<b>Client</b> AT&T Mobility	<b>Designed by</b> acontreras

## Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
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## Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K	
*SRI*									
P65-16-XLH-RR w/ Mount Pipe (AT&T-E(Inside Shroud))	A	From Leg	0.500 0.000 0.000	0.000	107.000	No Ice 8.371	6.362	0.079	
P65-16-XLH-RR w/ Mount Pipe (AT&T-E(Inside Shroud))	B	From Leg	0.500 0.000 0.000	0.000	107.000	No Ice 8.371	6.362	0.079	
P65-16-XLH-RR w/ Mount Pipe (AT&T-E(Inside Shroud))	C	From Leg	0.500 0.000 0.000	0.000	107.000	No Ice 8.371	6.362	0.079	
TT19-08BP111-001 (AT&T-E(Inside Shroud))	A	From Leg	0.500 0.000 0.000	0.000	107.000	No Ice 0.545	0.442	0.016	
TT19-08BP111-001 (AT&T-E(Inside Shroud))	B	From Leg	0.500 0.000 0.000	0.000	107.000	No Ice 0.545	0.442	0.016	
TT19-08BP111-001 (AT&T-E(Inside Shroud))	C	From Leg	0.500 0.000 0.000	0.000	107.000	No Ice 0.545	0.442	0.016	
*SRI*									
P65-16-XLH-RR w/ Mount Pipe (E-CL Per Previous SA)	A	From Leg	0.500 0.000 0.000	0.000	99.000	No Ice 8.371	6.362	0.079	
P65-16-XLH-RR w/ Mount Pipe (E-CL Per Previous SA)	B	From Leg	0.500 0.000 0.000	0.000	99.000	No Ice 8.371	6.362	0.079	
P65-16-XLH-RR w/ Mount Pipe (E-CL Per Previous SA)	C	From Leg	0.500 0.000 0.000	0.000	99.000	No Ice 8.371	6.362	0.079	
TTAW-07BP111-001 (E-CL Per Previous SA)	A	From Leg	0.500 0.000 0.000	0.000	99.000	No Ice 0.553	0.446	0.018	
TTAW-07BP111-001 (E-CL Per Previous SA)	B	From Leg	0.500 0.000 0.000	0.000	99.000	No Ice 0.553	0.446	0.018	
TTAW-07BP111-001 (E-CL Per Previous SA)	C	From Leg	0.500 0.000 0.000	0.000	99.000	No Ice 0.553	0.446	0.018	
*SRI*									
P65-16-XLH-RR w/ Mount Pipe (AT&T-E(Inside Shroud))	A	From Leg	0.500 0.000 0.000	0.000	91.000	No Ice 8.371	6.362	0.079	
P65-16-XLH-RR w/ Mount Pipe (AT&T-E(Inside Shroud))	B	From Leg	0.500 0.000 0.000	0.000	91.000	No Ice 8.371	6.362	0.079	
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	0.500 0.000	0.000	91.000	No Ice 8.371	6.362	0.079	

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	<b>Project</b>	<b>Date</b> 16:24:11 07/23/19
	<b>Client</b> AT&T Mobility	<b>Designed by</b> acontreras

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	CAAA Front	CAAA Side	Weight	
			ft ft ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
(AT&T-E(Inside Shroud))			0.000						
TT19-08BP111-001	A	From Leg	0.500	0.000	91.000	No Ice	0.545	0.442	0.016
(AT&T-E(Inside Shroud))			0.000						
TT19-08BP111-001	B	From Leg	0.500	0.000	91.000	No Ice	0.545	0.442	0.016
(AT&T-E(Inside Shroud))			0.000						
TT19-08BP111-001	C	From Leg	0.500	0.000	91.000	No Ice	0.545	0.442	0.016
(AT&T-E(Inside Shroud))			0.000						
*SRI*			0.000						
APXVAR18 w/ Mount Pipe (P-TMO)	A	From Leg	0.500	0.000	75.000	No Ice	12.563	7.821	0.099
			0.000						
APXVAR18 w/ Mount Pipe (P-TMO)	B	From Leg	0.500	0.000	75.000	No Ice	12.563	7.821	0.099
			0.000						
APXVAR18 w/ Mount Pipe (P-TMO)	C	From Leg	0.500	0.000	75.000	No Ice	12.563	7.821	0.099
			0.000						
3CX PCS AWS (P-TMO)	A	From Leg	0.500	0.000	75.000	No Ice	0.352	0.142	0.015
			0.000						
3CX PCS AWS (P-TMO)	B	From Leg	0.500	0.000	75.000	No Ice	0.352	0.142	0.015
			0.000						
3CX PCS AWS (P-TMO)	C	From Leg	0.500	0.000	75.000	No Ice	0.352	0.142	0.015
			0.000						
*SRI*			0.000						
Canister Load1	C	None		0.000	109.000	No Ice	9.250	9.250	0.097
Canister Load2	C	None		0.000	99.000	No Ice	18.500	18.500	0.342
Canister Load3	C	None		0.000	89.000	No Ice	18.500	18.500	0.214
Canister Load4	C	None		0.000	79.000	No Ice	16.650	16.650	0.323
Canister Load5	C	None		0.000	71.000	No Ice	14.800	14.800	0.304
Canister Load6	C	None		0.000	63.000	No Ice	7.400	7.400	0.573

## Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice

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	<b>Project</b>	<b>Date</b> 16:24:11 07/23/19
	<b>Client</b> AT&T Mobility	<b>Designed by</b> acontreras

Comb. No.	Description
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	Dead+Wind 0 deg - Service
27	Dead+Wind 30 deg - Service
28	Dead+Wind 60 deg - Service
29	Dead+Wind 90 deg - Service
30	Dead+Wind 120 deg - Service
31	Dead+Wind 150 deg - Service
32	Dead+Wind 180 deg - Service
33	Dead+Wind 210 deg - Service
34	Dead+Wind 240 deg - Service
35	Dead+Wind 270 deg - Service
36	Dead+Wind 300 deg - Service
37	Dead+Wind 330 deg - Service

### Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	109 - 89	Pole	Max Tension	2	0.000	0.000	-0.000
			Max. Compression	2	-2.655	0.000	16.047
			Max. Mx	8	-2.655	-16.047	0.000
			Max. My	2	-2.655	0.000	16.047
			Max. Vy	8	1.217	-16.047	0.000
			Max. Vx	2	-1.217	0.000	16.047
			Max. Torque	4			-0.000
L2	89 - 63.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	8	-5.920	-78.982	0.000
			Max. Mx	8	-5.920	-78.982	0.000
			Max. My	2	-5.920	0.000	78.982
			Max. Vy	8	3.094	-59.437	0.000
			Max. Vx	2	-3.094	0.000	59.437
			Max. Torque	12			0.000
L3	63.5 - 63	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	8	-5.991	-80.501	0.000
			Max. Mx	8	-5.991	-80.501	0.000
			Max. My	2	-5.991	0.000	80.501
			Max. Vy	8	3.040	-80.501	0.000
			Max. Vx	2	-3.040	0.000	80.501
			Max. Torque	4			-0.000
L4	63 - 40	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	8	-11.129	-172.530	0.000
			Max. Mx	8	-11.129	-172.530	0.000
			Max. My	2	-11.129	0.000	172.530
			Max. Vy	8	4.692	-172.530	0.000

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	<b>Project</b>	<b>Date</b> 16:24:11 07/23/19
	<b>Client</b> AT&T Mobility	<b>Designed by</b> acontreras

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L5	40 - 0	Pole	Max. Vx	2	-4.692	0.000	172.530
			Max. Torque	12			0.000
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	2	-18.920	0.000	399.726
			Max. Mx	8	-18.920	-399.726	0.000
			Max. My	2	-18.920	0.000	399.726
			Max. Vy	8	6.635	-399.726	0.000
			Max. Vx	2	-6.635	0.000	399.726
			Max. Torque	12			0.000

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	2	18.922	0.000	6.629
	Max. H <sub>x</sub>	20	18.922	6.629	0.000
	Max. H <sub>z</sub>	2	18.922	0.000	6.629
	Max. M <sub>x</sub>	2	399.726	0.000	6.629
	Max. M <sub>z</sub>	8	399.726	-6.629	0.000
	Max. Torsion	12	0.000	-3.315	-5.741
	Min. Vert	7	14.192	-5.741	3.315
	Min. H <sub>x</sub>	8	18.922	-6.629	0.000
	Min. H <sub>z</sub>	14	18.922	0.000	-6.629
	Min. M <sub>x</sub>	14	-399.726	0.000	-6.629
	Min. M <sub>z</sub>	20	-399.726	6.629	0.000
	Min. Torsion	16	-0.000	3.315	-5.741

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	15.768	0.000	0.000	0.000	0.000	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	18.922	0.000	-6.629	-399.726	0.000	0.000
0.9 Dead+1.6 Wind 0 deg - No Ice	14.192	0.000	-6.629	-397.509	0.000	0.000
1.2 Dead+1.6 Wind 30 deg - No Ice	18.922	3.315	-5.741	-346.173	-199.863	0.000
0.9 Dead+1.6 Wind 30 deg - No Ice	14.192	3.315	-5.741	-344.253	-198.755	0.000
1.2 Dead+1.6 Wind 60 deg - No Ice	18.922	5.741	-3.315	-199.863	-346.173	-0.000
0.9 Dead+1.6 Wind 60 deg - No Ice	14.192	5.741	-3.315	-198.755	-344.253	-0.000
1.2 Dead+1.6 Wind 90 deg - No Ice	18.922	6.629	0.000	0.000	-399.726	0.000
0.9 Dead+1.6 Wind 90 deg - No Ice	14.192	6.629	0.000	0.000	-397.509	0.000
1.2 Dead+1.6 Wind 120 deg - No Ice	18.922	5.741	3.315	199.863	-346.173	0.000
0.9 Dead+1.6 Wind 120 deg - No Ice	14.192	5.741	3.315	198.755	-344.253	0.000

<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: 9185874630 FAX: 9182950265	<b>Job</b> 137284.001.01 - Avon Lovely ST, CT (Site# 97421)	<b>Page</b> 8 of 12
	<b>Project</b>	<b>Date</b> 16:24:11 07/23/19
	<b>Client</b> AT&T Mobility	<b>Designed by</b> acontreras

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
No Ice						
1.2 Dead+1.6 Wind 150 deg - No Ice	18.922	3.315	5.741	346.173	-199.863	-0.000
0.9 Dead+1.6 Wind 150 deg - No Ice	14.192	3.315	5.741	344.253	-198.755	-0.000
1.2 Dead+1.6 Wind 180 deg - No Ice	18.922	0.000	6.629	399.726	0.000	0.000
0.9 Dead+1.6 Wind 180 deg - No Ice	14.192	0.000	6.629	397.509	0.000	0.000
1.2 Dead+1.6 Wind 210 deg - No Ice	18.922	-3.315	5.741	346.173	199.863	0.000
0.9 Dead+1.6 Wind 210 deg - No Ice	14.192	-3.315	5.741	344.253	198.755	0.000
1.2 Dead+1.6 Wind 240 deg - No Ice	18.922	-5.741	3.315	199.863	346.173	-0.000
0.9 Dead+1.6 Wind 240 deg - No Ice	14.192	-5.741	3.315	198.755	344.253	-0.000
1.2 Dead+1.6 Wind 270 deg - No Ice	18.922	-6.629	0.000	0.000	399.726	0.000
0.9 Dead+1.6 Wind 270 deg - No Ice	14.192	-6.629	0.000	0.000	397.509	0.000
1.2 Dead+1.6 Wind 300 deg - No Ice	18.922	-5.741	-3.315	-199.863	346.173	0.000
0.9 Dead+1.6 Wind 300 deg - No Ice	14.192	-5.741	-3.315	-198.755	344.253	0.000
1.2 Dead+1.6 Wind 330 deg - No Ice	18.922	-3.315	-5.741	-346.173	199.863	-0.000
0.9 Dead+1.6 Wind 330 deg - No Ice	14.192	-3.315	-5.741	-344.253	198.755	-0.000
Dead+Wind 0 deg - Service	15.768	0.000	-1.418	-85.216	0.000	0.000
Dead+Wind 30 deg - Service	15.768	0.709	-1.228	-73.799	-42.608	0.000
Dead+Wind 60 deg - Service	15.768	1.228	-0.709	-42.608	-73.799	0.000
Dead+Wind 90 deg - Service	15.768	1.418	0.000	0.000	-85.216	0.000
Dead+Wind 120 deg - Service	15.768	1.228	0.709	42.608	-73.799	0.000
Dead+Wind 150 deg - Service	15.768	0.709	1.228	73.799	-42.608	0.000
Dead+Wind 180 deg - Service	15.768	0.000	1.418	85.216	0.000	0.000
Dead+Wind 210 deg - Service	15.768	-0.709	1.228	73.799	42.608	0.000
Dead+Wind 240 deg - Service	15.768	-1.228	0.709	42.608	73.799	0.000
Dead+Wind 270 deg - Service	15.768	-1.418	0.000	0.000	85.216	0.000
Dead+Wind 300 deg - Service	15.768	-1.228	-0.709	-42.608	73.799	0.000
Dead+Wind 330 deg - Service	15.768	-0.709	-1.228	-73.799	42.608	0.000

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-15.768	0.000	0.000	15.768	0.000	0.000%
2	0.000	-18.922	-6.629	0.000	18.922	6.629	0.000%
3	0.000	-14.192	-6.629	0.000	14.192	6.629	0.000%
4	3.315	-18.922	-5.741	-3.315	18.922	5.741	0.000%
5	3.315	-14.192	-5.741	-3.315	14.192	5.741	0.000%
6	5.741	-18.922	-3.315	-5.741	18.922	3.315	0.000%
7	5.741	-14.192	-3.315	-5.741	14.192	3.315	0.000%
8	6.629	-18.922	0.000	-6.629	18.922	0.000	0.000%
9	6.629	-14.192	0.000	-6.629	14.192	0.000	0.000%
10	5.741	-18.922	3.315	-5.741	18.922	-3.315	0.000%
11	5.741	-14.192	3.315	-5.741	14.192	-3.315	0.000%

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	137284.001.01 - Avon Lovely ST, CT (Site# 97421)		9 of 12
	<b>Project</b>	<b>Date</b>	16:24:11 07/23/19
<b>Client</b>	AT&T Mobility		<b>Designed by</b> acontreras

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
12	3.315	-18.922	5.741	-3.315	18.922	-5.741	0.000%
13	3.315	-14.192	5.741	-3.315	14.192	-5.741	0.000%
14	0.000	-18.922	6.629	0.000	18.922	-6.629	0.000%
15	0.000	-14.192	6.629	0.000	14.192	-6.629	0.000%
16	-3.315	-18.922	5.741	3.315	18.922	-5.741	0.000%
17	-3.315	-14.192	5.741	3.315	14.192	-5.741	0.000%
18	-5.741	-18.922	3.315	5.741	18.922	-3.315	0.000%
19	-5.741	-14.192	3.315	5.741	14.192	-3.315	0.000%
20	-6.629	-18.922	0.000	6.629	18.922	0.000	0.000%
21	-6.629	-14.192	0.000	6.629	14.192	0.000	0.000%
22	-5.741	-18.922	-3.315	5.741	18.922	3.315	0.000%
23	-5.741	-14.192	-3.315	5.741	14.192	3.315	0.000%
24	-3.315	-18.922	-5.741	3.315	18.922	5.741	0.000%
25	-3.315	-14.192	-5.741	3.315	14.192	5.741	0.000%
26	0.000	-15.768	-1.418	0.000	15.768	1.418	0.000%
27	0.709	-15.768	-1.228	-0.709	15.768	1.228	0.000%
28	1.228	-15.768	-0.709	-1.228	15.768	0.709	0.000%
29	1.418	-15.768	0.000	-1.418	15.768	0.000	0.000%
30	1.228	-15.768	0.709	-1.228	15.768	-0.709	0.000%
31	0.709	-15.768	1.228	-0.709	15.768	-1.228	0.000%
32	0.000	-15.768	1.418	0.000	15.768	-1.418	0.000%
33	-0.709	-15.768	1.228	0.709	15.768	-1.228	0.000%
34	-1.228	-15.768	0.709	1.228	15.768	-0.709	0.000%
35	-1.418	-15.768	0.000	1.418	15.768	0.000	0.000%
36	-1.228	-15.768	-0.709	1.228	15.768	0.709	0.000%
37	-0.709	-15.768	-1.228	0.709	15.768	1.228	0.000%

## Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.0000001	0.0000001
2	Yes	4	0.0000001	0.00011406
3	Yes	4	0.0000001	0.00004803
4	Yes	5	0.0000001	0.00007174
5	Yes	5	0.0000001	0.00003696
6	Yes	5	0.0000001	0.00007174
7	Yes	5	0.0000001	0.00003696
8	Yes	4	0.0000001	0.00011406
9	Yes	4	0.0000001	0.00004803
10	Yes	5	0.0000001	0.00007174
11	Yes	5	0.0000001	0.00003696
12	Yes	5	0.0000001	0.00007174
13	Yes	5	0.0000001	0.00003696
14	Yes	4	0.0000001	0.00011406
15	Yes	4	0.0000001	0.00004803
16	Yes	5	0.0000001	0.00007174
17	Yes	5	0.0000001	0.00003696
18	Yes	5	0.0000001	0.00007174
19	Yes	5	0.0000001	0.00003696
20	Yes	4	0.0000001	0.00011406
21	Yes	4	0.0000001	0.00004803
22	Yes	5	0.0000001	0.00007174
23	Yes	5	0.0000001	0.00003696
24	Yes	5	0.0000001	0.00007174
25	Yes	5	0.0000001	0.00003696

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	<b>Project</b>	<b>Date</b> 16:24:11 07/23/19
	<b>Client</b> AT&T Mobility	<b>Designed by</b> acontreras

26	Yes	4	0.0000001	0.0000001
27	Yes	4	0.0000001	0.00001818
28	Yes	4	0.0000001	0.00001818
29	Yes	4	0.0000001	0.00000001
30	Yes	4	0.0000001	0.00001818
31	Yes	4	0.0000001	0.00001818
32	Yes	4	0.0000001	0.00000001
33	Yes	4	0.0000001	0.00001818
34	Yes	4	0.0000001	0.00001818
35	Yes	4	0.0000001	0.00000001
36	Yes	4	0.0000001	0.00001818
37	Yes	4	0.0000001	0.00001818

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	109 - 89	4.980	29	0.526	0.000
L2	89 - 63.5	2.834	29	0.477	0.000
L3	63.5 - 63	1.058	26	0.128	0.000
L4	63 - 40	1.045	26	0.128	0.000
L5	40 - 0	0.484	26	0.102	0.000

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
109.000	Canister Load1	29	4.980	0.526	0.000	37625
107.000	P65-16-XLH-RR w/ Mount Pipe	29	4.757	0.530	0.000	37625
99.000	P65-16-XLH-RR w/ Mount Pipe	29	3.875	0.535	0.000	18812
91.000	P65-16-XLH-RR w/ Mount Pipe	29	3.034	0.497	0.000	10361
89.000	Canister Load3	29	2.834	0.477	0.000	9077
79.000	Canister Load4	29	1.929	0.319	0.000	4860
75.000	APXVAR18 w/ Mount Pipe	29	1.630	0.248	0.000	4073
71.000	Canister Load5	26	1.377	0.187	0.000	3505
63.000	Canister Load6	26	1.045	0.128	0.000	6362

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	109 - 89	23.449	2	2.481	0.000
L2	89 - 63.5	13.330	2	2.250	0.000
L3	63.5 - 63	4.968	2	0.601	0.000
L4	63 - 40	4.905	2	0.600	0.000
L5	40 - 0	2.273	2	0.478	0.000



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	<b>Project</b>	<b>Date</b> 16:24:11 07/23/19
	<b>Client</b> AT&T Mobility	<b>Designed by</b> acontreras

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

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
109.000	Canister Load1	2	23.449	2.481	0.000	7980
107.000	P65-16-XLH-RR w/ Mount Pipe	2	22.398	2.500	0.000	7980
99.000	P65-16-XLH-RR w/ Mount Pipe	2	18.239	2.524	0.000	3990
91.000	P65-16-XLH-RR w/ Mount Pipe	2	14.273	2.345	0.000	2197
89.000	Canister Load3	2	13.330	2.250	0.000	1925
79.000	Canister Load4	2	9.067	1.501	0.000	1031
75.000	APXVAR18 w/ Mount Pipe	2	7.657	1.169	0.000	864
71.000	Canister Load5	2	6.470	0.880	0.000	743
63.000	Canister Load6	2	4.905	0.600	0.000	1349

### Compression Checks

### Pole Design Data

Section No.	Elevation	Size	L	L <sub>u</sub>	Kl/r	A	P <sub>u</sub>	φP <sub>n</sub>	Ratio P <sub>u</sub> / φP <sub>n</sub>
	ft		ft	ft		in <sup>2</sup>	K	K	
L1	109 - 89 (1)	TP10.392x10.392x0.375	20.000	0.000	0.0	11.801	-2.655	690.379	0.004
L2	89 - 63.5 (2)	TP12x10.392x0.375	25.500	0.000	0.0	13.695	-5.920	801.180	0.007
L3	63.5 - 63 (3)	TP36x12x0.375	0.500	0.000	0.0	13.695	-5.957	801.180	0.007
L4	63 - 40 (4)	TP36x36x0.375	23.000	0.000	0.0	41.970	-11.129	1318.370	0.008
L5	40 - 0 (5)	TP36x36x0.375	40.000	0.000	0.0	41.970	-18.920	1318.370	0.014

### Pole Bending Design Data

Section No.	Elevation	Size	M <sub>ux</sub>	φM <sub>ux</sub>	Ratio M <sub>ux</sub> / φM <sub>ux</sub>	M <sub>uy</sub>	φM <sub>uy</sub>	Ratio M <sub>uy</sub> / φM <sub>uy</sub>
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L1	109 - 89 (1)	TP10.392x10.392x0.375	16.047	183.532	0.087	0.000	183.532	0.000
L2	89 - 63.5 (2)	TP12x10.392x0.375	78.982	242.474	0.326	0.000	242.474	0.000
L3	63.5 - 63 (3)	TP36x12x0.375	78.981	242.474	0.326	0.000	242.474	0.000
L4	63 - 40 (4)	TP36x36x0.375	172.531	1144.592	0.151	0.000	1144.592	0.000
L5	40 - 0 (5)	TP36x36x0.375	399.727	1144.592	0.349	0.000	1144.592	0.000

### Pole Shear Design Data

Section No.	Elevation	Size	Actual V <sub>u</sub>	φV <sub>n</sub>	Ratio V <sub>u</sub> / φV <sub>n</sub>	Actual T <sub>u</sub>	φT <sub>n</sub>	Ratio T <sub>u</sub> / φT <sub>n</sub>
	ft		K	K		kip-ft	kip-ft	
L1	109 - 89 (1)	TP10.392x10.392x0.375	1.217	345.190	0.004	0.000	278.147	0.000
L2	89 - 63.5 (2)	TP12x10.392x0.375	3.046	400.590	0.008	0.000	376.336	0.000

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	<b>Project</b>	<b>Date</b> 16:24:11 07/23/19
	<b>Client</b> AT&T Mobility	<b>Designed by</b> acontreras

Section No.	Elevation ft	Size	Actual $V_u$ K	$\phi V_n$ K	Ratio $\frac{V_u}{\phi V_n}$	Actual $T_u$ kip-ft	$\phi T_n$ kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L3	63.5 - 63 (3)	TP36x12x0.375	3.040	1034.640	0.003	0.000	376.336	0.000
L4	63 - 40 (4)	TP36x36x0.375	4.692	656.911	0.007	0.000	1930.108	0.000
L5	40 - 0 (5)	TP36x36x0.375	6.635	656.911	0.010	0.000	1930.108	0.000

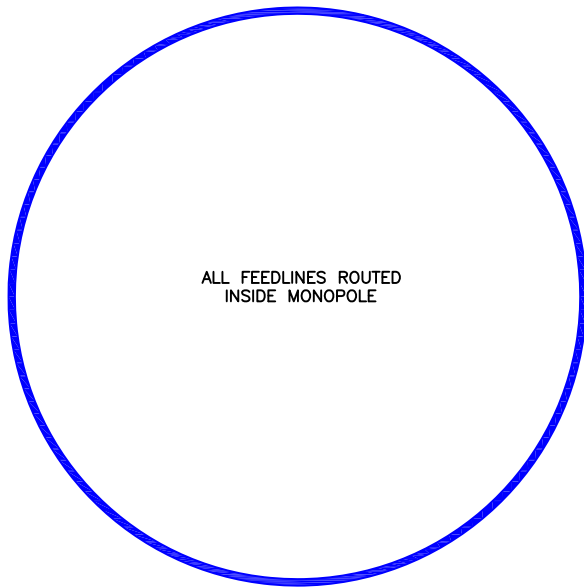
### Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	109 - 89 (1)	0.004	0.087	0.000	0.004	0.000	0.091	1.000	4.8.2 ✓
L2	89 - 63.5 (2)	0.007	0.326	0.000	0.008	0.000	0.333	1.000	4.8.2 ✓
L3	63.5 - 63 (3)	0.007	0.326	0.000	0.003	0.000	0.333	1.000	4.8.2 ✓
L4	63 - 40 (4)	0.008	0.151	0.000	0.007	0.000	0.159	1.000	4.8.2 ✓
L5	40 - 0 (5)	0.014	0.349	0.000	0.010	0.000	0.364	1.000	4.8.2 ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	109 - 89	Pole	TP10.392x10.392x0.375	1	-2.655	690.379	9.1	Pass
L2	89 - 63.5	Pole	TP12x10.392x0.375	2	-5.920	801.180	33.3	Pass
L3	63.5 - 63	Pole	TP36x12x0.375	3	-5.957	801.180	33.3	Pass
L4	63 - 40	Pole	TP36x36x0.375	4	-11.129	1318.370	15.9	Pass
L5	40 - 0	Pole	TP36x36x0.375	5	-18.920	1318.370	36.4	Pass
Summary								
Pole (L5)							36.4	Pass
<b>RATING =</b>							<b>36.4</b>	<b>Pass</b>

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



PROJECT NUMBER: 137284.001.01

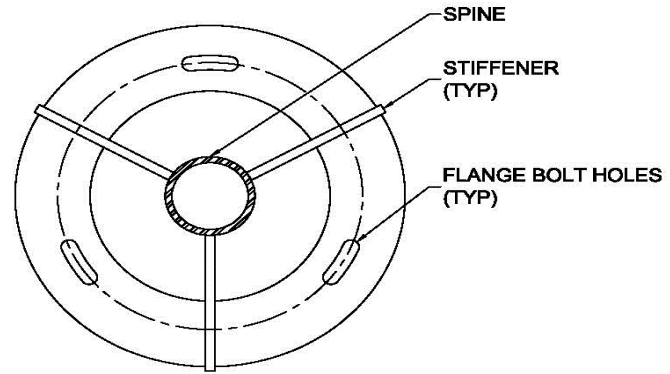
**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

# CCI Flagpole Tool

Site Data	
Site#:	97421
Site Name:	Avon Lovely ST, CT
B+T #:	137284.001.01

Code	
Code:	TIA-222-G
Ice Thickness:	1 in
Windspeed (V):	97 mph
Ice Wind Speed (V):	50 mph
Exposure Category:	B
Topographic Feature:	N/A
Structure Class:	II

Tower Information	
Total Tower Height:	109 ft
Base Tower Height:	63 ft
Total Canister Length:	46 ft
Number of Canister Assembly Sections:	5



**FLANGE PLATE**  
(TYPE 6: SOLIDITY RATIO 0.65)

Canister Section Number *:	Canister Assembly Length (ft):	Canister Assembly Diameter (in):	Number of Sides Canister Section	Plate Type:	Mating Flange Plate Thickness (in)**:	Mating Flange Plate Diameter (in):	Solidity Ratio	Plate Weight (Kip):	Canister Weight (Kip)
1	10	37	Round	6	0.38	37	0.65	0.149	0.194
2	10	37	Round	6	0.19	19.5	0.65	0.021	0.194
3	10	37	Round	6	0.38	37	0.65	0.149	0.194
4	8	37	Round	6	0.38	37	0.65	0.149	0.155
5	8	37	Round	6	1.25	37	0.65	0.495	0.155

\* Sections are numbered from the top of the tower down

\*\* Mating Flange Plate Thickness at the bottom of canister section

Flag on Tower:	No
----------------	----

Truck Ball on Tower:	No
----------------------	----

Geometry : Base Tower + Spine			
Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides
109	20	0	0
89	25.5	0	0
63.5	0.5	0	0
63	23	0	0
40	40	0	0

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Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
10.3923	10.3923	0.375	n/a	A572-65
10.3923	12	0.375	n/a	A572-65
12	36	0.375	n/a	A572-65
36	36	0.375	n/a	A53-B-35
36	36	0.375	n/a	A53-B-35

Delete  
[x]  
[x]  
[x]  
[x]  
[x]

Discrete Loads : $C_F A_F$ for Canister Assembly								
Canister Loading	Apply $C_F A_F$ at Elevation(z) (ft)	$C_F A_F$ No Ice (ft <sup>2</sup> )	$C_F A_F$ 1/2" Ice (ft <sup>2</sup> )	$C_F A_F$ 1" Ice (ft <sup>2</sup> )	$C_F A_F$ 2" Ice (ft <sup>2</sup> )	$C_F A_F$ 4" Ice (ft <sup>2</sup> )	Canister Assembly Weight No Ice (Kip)	Canister Assembly Weight 1/2" Ice (Kip)
Canister Load 1	109	9.250	19.000	19.500	20.500	22.500	0.097	0.211
Canister Load 2	99	18.500	38.000	39.000	41.000	45.000	0.342	0.571
Canister Load 3	89	18.500	38.000	39.000	41.000	45.000	0.214	0.443
Canister Load 4	79	16.650	34.200	35.100	36.900	40.500	0.323	0.529
Canister Load 5	71	14.800	30.400	31.200	32.800	36.000	0.304	0.487
Canister Load 6	63	7.400	15.200	15.600	16.400	18.000	0.573	0.665

Deflection Check Required:	Yes	<a href="#">Import Deflection Results</a>
3% Spine Deflection Check		
Allowable (3%) Horizontal Spine Deflection (inches)	Actual Deflection *** (inches)	Sufficient/ Insufficient
16.560		

\*\*\* Relative deflection under service level wind speed

# Monopole Flange Plate Connection

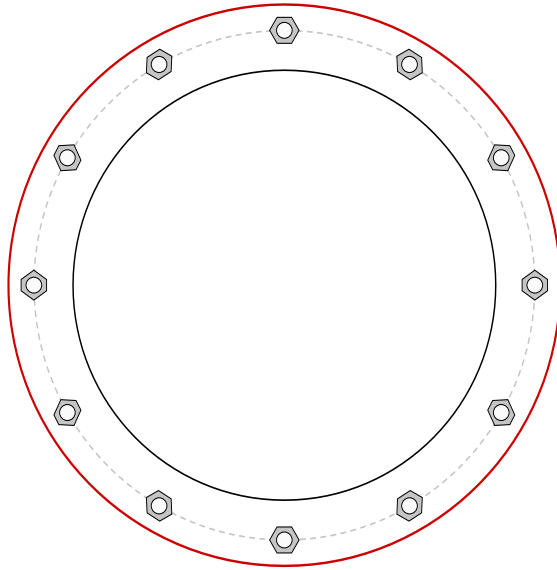
Elevation = 40 ft.

BU #	97421
Site Name	Avon Lovely ST, CT
Order #	137284.001.01

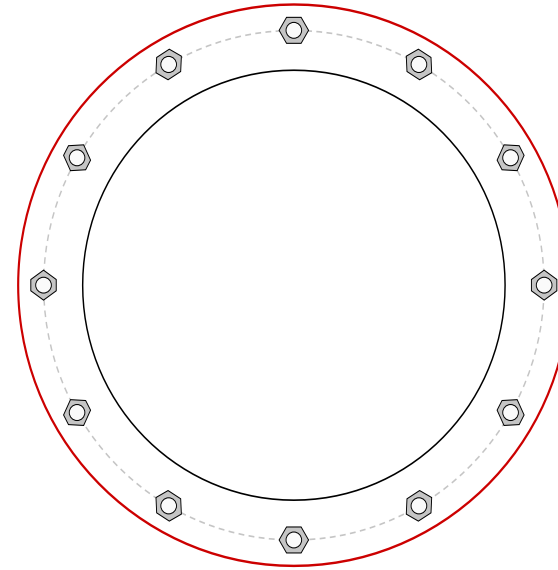
TIA-222 Revision	G
------------------	---

Applied Loads	
Moment (kip-ft)	172.53
Axial Force (kips)	11.13
Shear Force (kips)	4.69

Top Plate - Internal



Bottom Plate - Internal



## Connection Properties

### Bolt Data

(12) 1"  $\phi$  bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 32" BC

### Top Plate Data

27" ID x 1.25" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

### Top Stiffener Data

N/A

### Top Pole Data

36" x 0.375" round pole (A53-B-35; Fy=35 ksi, Fu=60 ksi)

### Bottom Plate Data

27" ID x 1.25" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

### Bottom Stiffener Data

N/A

### Bottom Pole Data

36" x 0.375" round pole (A53-B-35; Fy=35 ksi, Fu=60 ksi)

## Analysis Results

### Bolt Capacity

Max Load (kips)	20.63
Allowable (kips)	54.54
Stress Rating:	<b>37.8%</b> Pass

### Top Plate Capacity

Max Stress (ksi):	12.47	(Flexural)
Allowable Stress (ksi):	45.00	
Stress Rating:	<b>27.7%</b>	Pass
Tension Side Stress Rating:	<b>7.3%</b>	Pass

### Bottom Plate Capacity

Max Stress (ksi):	12.47	(Flexural)
Allowable Stress (ksi):	45.00	
Stress Rating:	<b>27.7%</b>	Pass
Tension Side Stress Rating:	<b>7.3%</b>	Pass

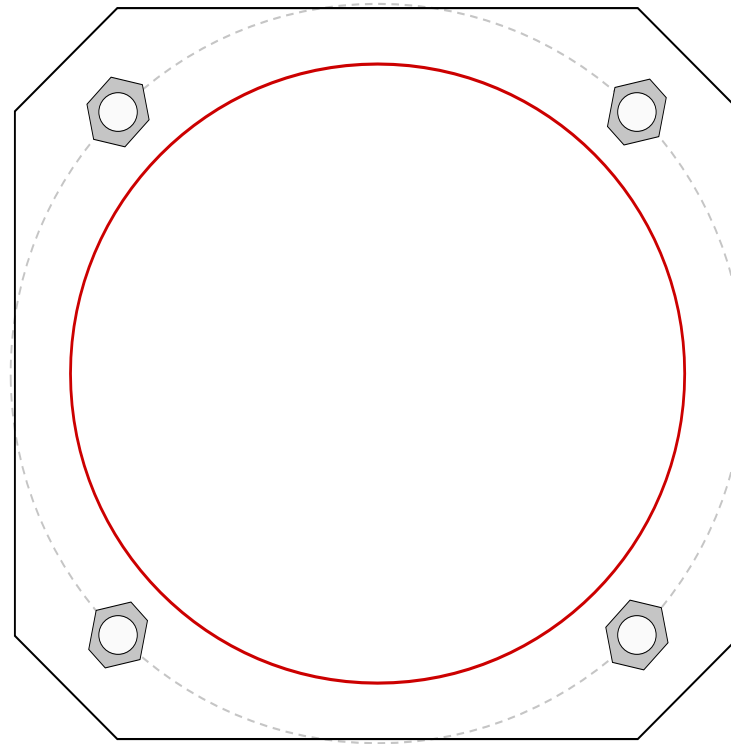


# Monopole Base Plate Connection

Site Info	
BU #	97421
Site Name	Avon Lovely ST, CT
Order #	137284.001.01

Analysis Considerations	
TIA-222 Revision	G
Grout Considered:	No
$l_{ar}$ (in)	0
Eta Factor, $\eta$	0.5

Applied Loads	
Moment (kip-ft)	399.73
Axial Force (kips)	18.92
Shear Force (kips)	6.63



Connection Properties		Analysis Results	
<b>Anchor Rod Data</b>		<b>Anchor Rod Summary</b>	<i>(units of kips, kip-in)</i>
(4) 2-1/4" $\phi$ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 43" BC		$Pu\_c = 116.16$	$\phi Pn\_t = 260$ <b>Stress Rating</b>
<b>Base Plate Data</b>		$Vu = 1.66$	$\phi Vn = n/a$ <b>46.0%</b>
42.5" OD x 2.25" Plate (A572-50; $F_y=50$ ksi, $F_u=65$ ksi)		$Mu = n/a$	$\phi Mn = n/a$ <b>Pass</b>
<b>Stiffener Data</b>		<b>Base Plate Summary</b>	
N/A		Max Stress (ksi):	13.66 (Flexural)
<b>Pole Data</b>		Allowable Stress (ksi):	45
36" x 0.375" round pole (A53-B-35; $F_y=35$ ksi, $F_u=60$ ksi)		Stress Rating:	<b>30.4%</b> <b>Pass</b>

## Drilled Pier Foundation

BU # :	97421
Site Name:	Avon Lovely ST
Order Number:	137284.001.01

TIA-222 Revison:	G
Tower Type:	Monopole

Applied Loads		
	Comp.	Uplift
Moment (kip-ft)	400	
Axial Force (kips)	19	
Shear Force (kips)	7	

Material Properties		
Concrete Strength, f <sub>c</sub> :	4	ksi
Rebar Strength, F <sub>y</sub> :	60	ksi

Pier Design Data		
Depth	20	ft
Ext. Above Grade	0.75	ft
Pier Section 1		
<i>From 0.75' above grade to 20' below grade</i>		
Pier Diameter	5.5	ft
Rebar Quantity	22	
Rebar Size	8	
Clear Cover to Ties	4	in
Tie Size	5	

Analysis Results		
Soil Lateral Capacity	Compression	Uplift
D <sub>v=0</sub> (ft from TOC)	5.99	-
Soil Safety Factor	7.74	-
Max Moment (kip-ft)	435.49	-
Rating	17.2%	-
Soil Vertical Capacity	Compression	Uplift
Skin Friction (kips)	0.00	-
End Bearing (kips)	431.39	-
Weight of Concrete (kips)	69.17	-
Total Capacity (kips)	431.39	-
Axial (kips)	88.17	-
Rating	20.4%	-
Reinforced Concrete Capacity	Compression	Uplift
Critical Depth (ft from TOC)	5.70	-
Critical Moment (kip-ft)	435.32	-
Critical Moment Capacity	2235.24	-
Rating	19.5%	-
<b>Soil Interaction Rating</b>		<b>20.4%</b>
<b>Structural Foundation Rating</b>		<b>19.5%</b>

Check Limitation	
N/A	<input checked="" type="checkbox"/>
Load Z Normalization:	<input type="checkbox"/>

Soil Profile			
Groundwater Depth	9	ft	# of Layers
			4

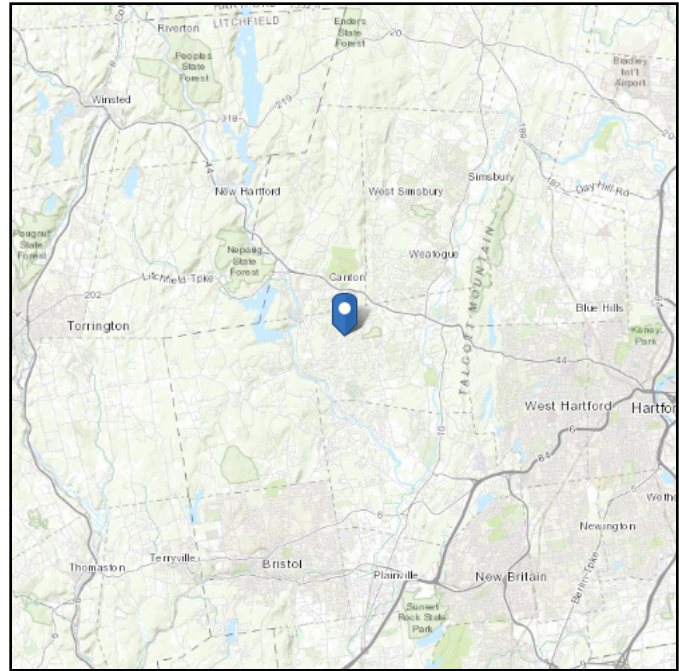
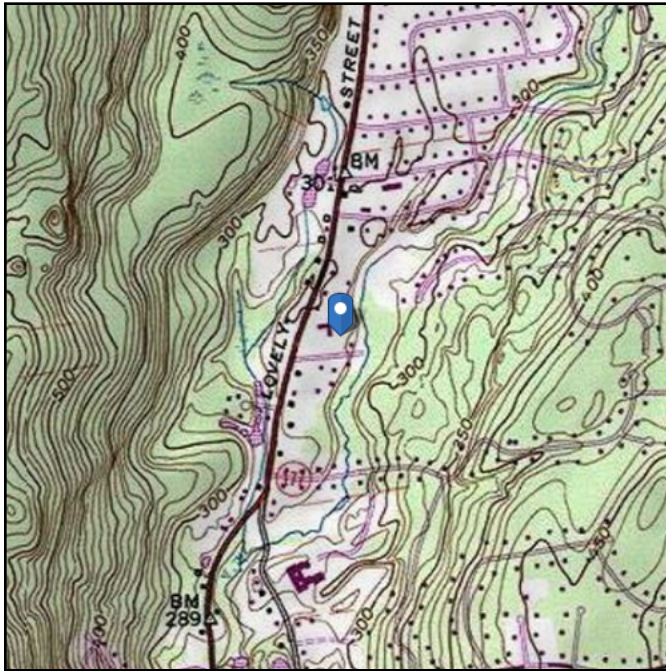
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ <sub>soil</sub> (pcf)	γ <sub>concrete</sub> (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3	3	110	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3	9	6	115	150	0	32	0.000	0.000	0.00	0.00			Cohesionless
3	9	18	9	55	87.6	0	32	0.000	0.000	0.00	0.00			Cohesionless
4	18	20	2	55	87.6	0	34	0.000	0.000	0.00	0.00	24.21		Cohesionless

# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

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

**Elevation:** 290.01 ft (NAVD 88)  
**Latitude:** 41.79898  
**Longitude:** -72.88837



## Wind

### Results:

Wind Speed:	Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	91 Vmph
100-year MRI	98 Vmph

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

**Date Accessed:** Sat Jul 20 2019

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

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

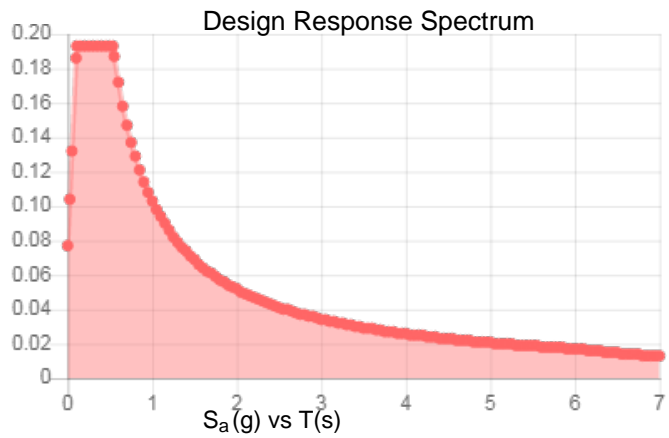
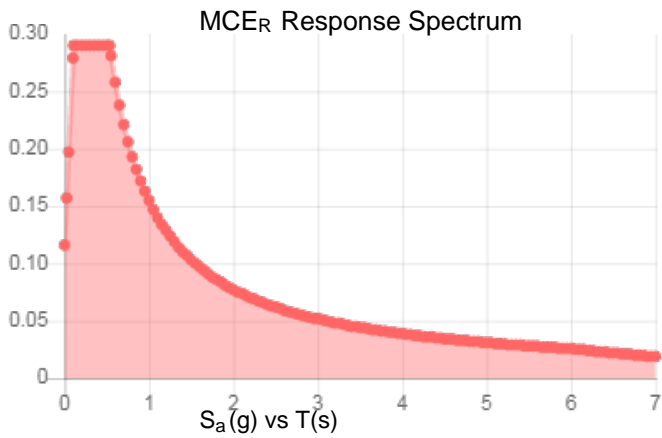
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

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

**Results:**

$S_S$ :	0.181	$S_{DS}$ :	0.193
$S_1$ :	0.064	$S_{D1}$ :	0.103
$F_a$ :	1.6	$T_L$ :	6
$F_v$ :	2.4	PGA :	0.091
$S_{MS}$ :	0.29	PGA <sub>M</sub> :	0.146
$S_{M1}$ :	0.155	F <sub>PGA</sub> :	1.6
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:**

Sat Jul 20 2019

**Date Source:**

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

## Ice

---

**Results:**

Ice Thickness: 1.00 in.

Concurrent Temperature: 5 F

Gust Speed: 50 mph

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

**Date Accessed:** Sat Jul 20 2019

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

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

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

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

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

# Exhibit E

Mount Analysis Report

June 04, 2019



Attn: Ms. Evelyn Radowicz  
Site Acquisition Project Manager  
Centerline Communications  
750 W. Center Street, Suite  
W. Bridgewater, MA 02379

RE: **T-Mobile L600 Project**  
**T-Mobile Site #:** CTHA514A  
**T-Mobile Site Name:** AT&T Avon Flagpole  
**Site Address:** 228 Lovely Street  
Avon, CT 06001

Ms. Radowicz:

The antenna mount structural assessment completed by ProTerra Design Group, LLC on behalf of T-Mobile was inclusive of the antenna level mounting system for the proposed T-Mobile L600 antennas and equipment listed in T-Mobile RFDS dated 04-29-19 Version 3.1 and configured as shown in the latest revision of L600 construction drawings by ProTerra Design Group, LLC for the above referenced site. The proposed antennas shall be mounted behind the existing RF transparent shroud and supported by the existing tower mast with custom mounting brackets and structural stainless steel banding - no standard hose clamps shall be used. The existing RF transparent shroud shall be removed during antenna installation and shall be reinstalled using original manufacturer supplied hardware and installed to meet original manufacturer specifications.

ProTerra Design Group, LLC visually inspected the antenna mounting system from ground level on 05-03-2019, reviewed field photographs, and record structural analysis by GPD Engineering and Architecture Professional Corporation dated 06-21-2017 to determine the suitability of the mounting system based on our experience with similar mounts.

Based upon the information available to us, in our opinion the proposed antenna mounts are designed to have **Sufficient Capacity to Support the Proposed Loading** that meets the requirements of the 2018 Connecticut State Building Code, (IBC 2015) with amendments and TIA-222 Rev G.

All details will be designed and furnished in ProTerra Design Group, LLC's construction drawings.

This determination was based on the following limitations and assumptions:

1. Equipment and locations shall not deviate from the construction drawings without written approval of the engineer.
2. ProTerra Design Group, LLC is not responsible for any modifications completed prior to and hereafter which ProTerra Design Group, LLC was not directly involved.
3. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
4. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer requirements.
5. All components supporting the T-Mobile equipment are assumed to be designed to all applicable codes and designed for loads identical to or larger than the currently proposed loads.
6. Completion of a passing global stability analysis of tower (by others.)

If you have any questions or need further information, please do not hesitate to call.

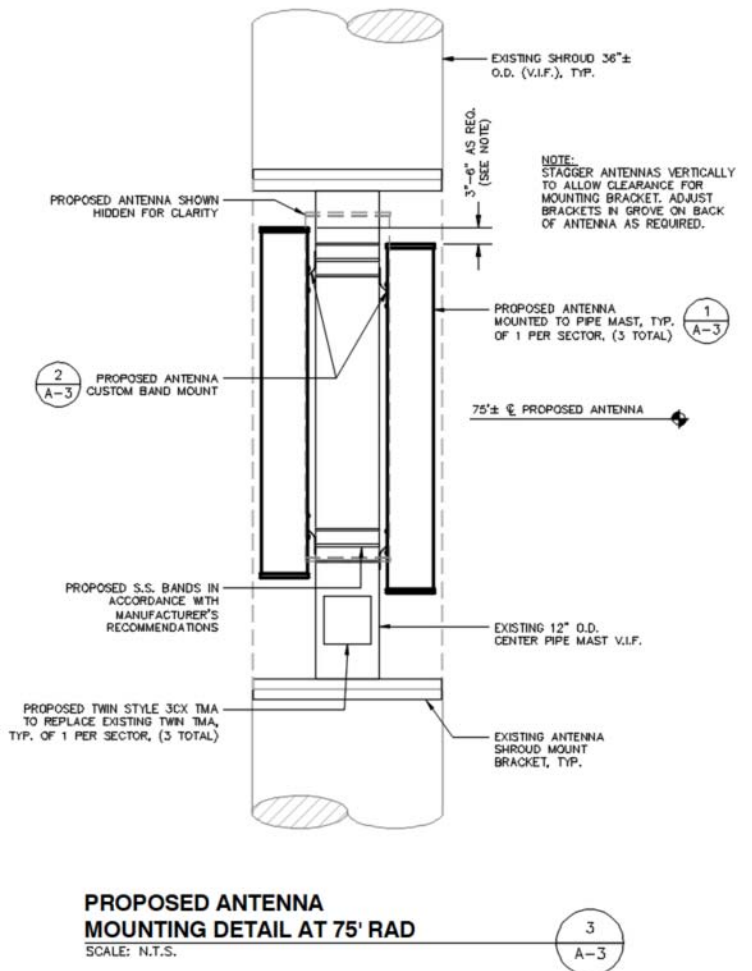
Sincerely,  
ProTerra Design Group, LLC



06-04-19  
Thomas Johnson, PE  
Managing Partner



**Exhibit A: Existing T-Mobile Mount  
(Behind Shroud)**  
Photo Date 05/03/2019



**Exhibit B: Excerpt from  
ProTerra Construction Drawings**

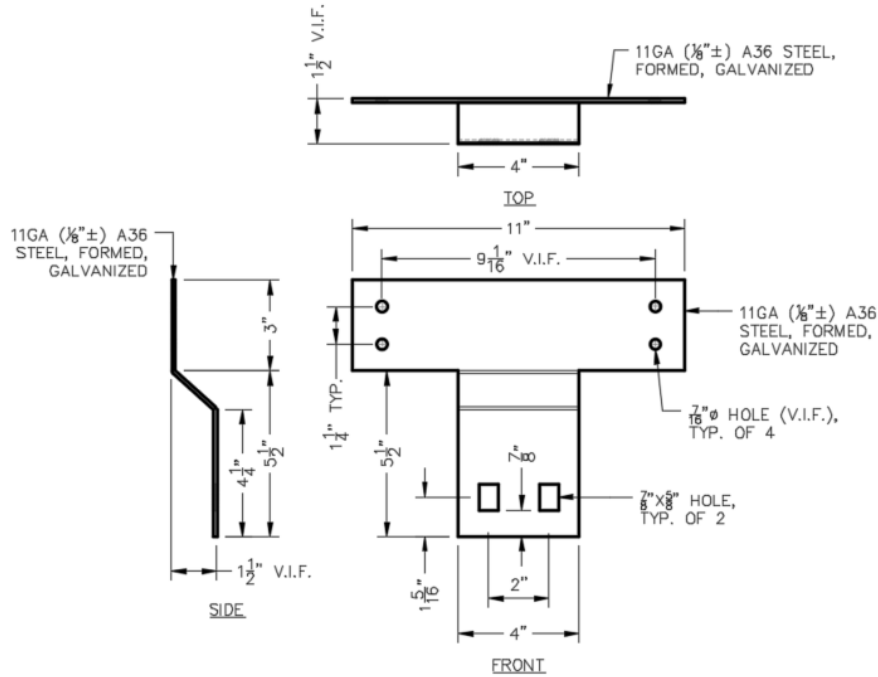


**SPECIAL DESIGN NOTE:**

PROPOSED REPLACEMENT ANTENNAS INSTALLED WITH CUSTOM BAND MOUNT DESIGNED TO FIT WITHIN THE EXISTING 36" ANTENNA SHROUD (WITH MAX. 3/8" WALL THICKNESS) FOR PIPE MAST DIAMETER OF 12" O.D. CONTRACTOR SHALL VERIFY FITMENT OF ANTENNAS UTILIZING THIS BRACKET AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION.

**NOTE:**

1. CONTRACTOR IS TO V.I.F. DIMENSION OF BOLT SPACING ON BACK OF ANTENNA AND VERIFY OFFSETS REQUIRED. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION. ADJUST ANTENNA BANDING MOUNT AS REQUIRED PRIOR TO FABRICATION.
2. AFTER BANDING 2 OF THE 3 SECTORS IF IT IS FOUND THAT TOOL CLEARANCE IS AN ISSUE, CONTRACTOR MAY INSTALL THE THIRD SECTOR ANTENNA UTILIZING A STAINLESS STEEL T-BOLT OR BOLTED BANDING AS NEEDED.



**NO STANDARD HOSE CLAMPS ALLOWED.  
S.S. T-BOLT CLAMPS OR CUSTOM  
FABRICATED BANDING MAY BE USED.**

**ANTENNA BANDING MOUNT DETAIL**

SCALE: N.T.S.

2

A-3

**Exhibit C: Excerpt from ProTerra Construction Drawings**

# Exhibit F

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: CTHA514A

AT&T Avon Flagpole  
228 Lovely Street  
Avon, Connecticut 06001

**November 30, 2020**

**EBI Project Number: 6220006112**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>18.90%</b>

November 30, 2020

T-Mobile

Attn: Jason Overbey, RF Manager  
35 Griffin Road South  
Bloomfield, Connecticut 06002

Emissions Analysis for Site: CTHA514A - AT&T Avon Flagpole

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **228 Lovely Street in Avon, 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 228 Lovely Street in Avon, 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) 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.
- 5) 2 UMTS channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 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) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 8) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antennas used in this modeling are the RFS APXVAR18\_43-C-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz / 2100 MHz channel(s) in Sector A, the RFS APXVAR18\_43-C-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz / 2100 MHz channel(s) in Sector B, the RFS APXVAR18\_43-C-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz / 2100 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 10) The antenna mounting height centerline of the proposed antennas is 75 feet above ground level (AGL).
- 11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 12) All calculations were done with respect to uncontrolled / general population threshold limits.

## T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	I	Antenna #:	I	Antenna #:	I
Make / Model:	RFS APXVAR18_43-C-NA20	Make / Model:	RFS APXVAR18_43-C-NA20	Make / Model:	RFS APXVAR18_43-C-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz / 2100 MHz
Gain:	12.55 dBd / 12.55 dBd / 12.85 dBd / 15.95 dBd / 16.75 dBd / 16.75 dBd	Gain:	12.55 dBd / 12.55 dBd / 12.85 dBd / 15.95 dBd / 16.75 dBd / 16.75 dBd	Gain:	12.55 dBd / 12.55 dBd / 12.85 dBd / 15.95 dBd / 16.75 dBd / 16.75 dBd
Height (AGL):	75 feet	Height (AGL):	75 feet	Height (AGL):	75 feet
Channel Count:	11	Channel Count:	11	Channel Count:	11
Total TX Power (W):	500 Watts	Total TX Power (W):	500 Watts	Total TX Power (W):	500 Watts
ERP (W):	16,914.26	ERP (W):	16,914.26	ERP (W):	16,914.26
Antenna AI MPE %:	<b>14.07%</b>	Antenna BI MPE %:	<b>14.07%</b>	Antenna CI MPE %:	<b>14.07%</b>

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	14.07%
AT&T	4.83%
<b>Site Total MPE % :</b>	<b>18.90%</b>

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	14.07%
T-Mobile Sector B Total:	14.07%
T-Mobile Sector C Total:	14.07%
<b>Site Total MPE % :</b>	<b>18.90%</b>

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 600 MHz LTE	2	539.66	75.0	6.90	600 MHz LTE	400	1.72%
T-Mobile 600 MHz NR	1	1439.10	75.0	9.20	600 MHz NR	400	2.30%
T-Mobile 700 MHz LTE	2	578.26	75.0	7.39	700 MHz LTE	467	1.58%
T-Mobile 1900 MHz LTE	2	2361.30	75.0	30.18	1900 MHz LTE	1000	3.02%
T-Mobile 2100 MHz UMTS	2	1419.45	75.0	18.14	2100 MHz UMTS	1000	1.81%
T-Mobile 2100 MHz LTE	2	2838.91	75.0	36.29	2100 MHz LTE	1000	3.63%
						<b>Total:</b>	<b>14.07%</b>

• 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:	14.07%
Sector B:	14.07%
Sector C:	14.07%
T-Mobile Maximum MPE % (Sector A):	14.07%
Site Total:	18.90%
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **18.90%** 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.

# Exhibit F

Mailing Receipts/ Proof Postage

MARK APPELBY  
8602094694  
CENTERLINE  
90 HAMILTON AVENUE  
SOUTHINGTON CT 06489-3883

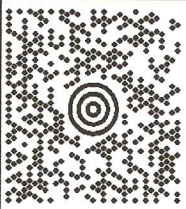
1 LBS

DWT: 11,8,1

1 OF 1

**SHIP TO:**

**PASTOR JULIE REUNING-SCHERER**  
**(860) 673-3301**  
**ST MATTHEWS LUTHERAN CHURCH**  
**224 LOVELY ST**  
**AVON CT 06001-4018**

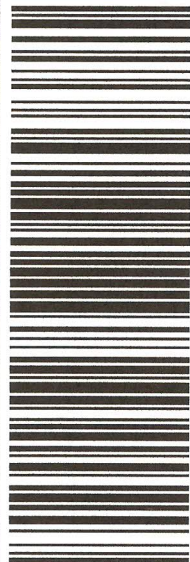


**CT 067 9-03**



**UPS GROUND**

TRACKING #: 1Z 9Y4 503 P2 0079 7873



BILLING: P/P

ATTENTION UPS DRIVER: SHIPPER RELEASE



TM

CS 22.0.12. WNTNV50 39.0A 11/2020\*

MARK APPELBY  
8602094694  
CENTERLINE  
90 HAMILTON AVENUE  
SOUTHINGTON CT 06489-3883

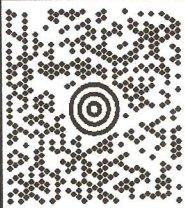
1 LBS

DWT: 11,8,1

1 OF 1

**SHIP TO:**

**MELANIE A. BACHMAN**  
**CONNECTICUT SITTING COUNCIL**  
**10 FRANKLIN SQUARE**  
**NEW BRITAIN CT 06051-2655**

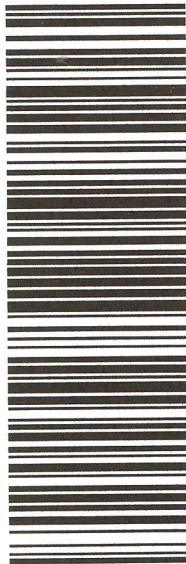


**CT 067 9-06**



**UPS GROUND**

TRACKING #: 1Z 9Y4 503 P2 0037 4883



BILLING: P/P

ATTENTION UPS DRIVER: SHIPPER RELEASE



TM

CS 22.0.12. WNTNV50 39.0A 11/2020\*

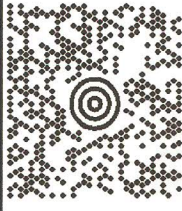
1 OF 1

1 LBS

DWT: 11,8,1

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

**SHIP TO:**  
TOWN MANAGER BRANDON ROBERTSON  
860-409-4300  
TOWN OF AVON  
60 WEST MAIN STREET  
AVON CT 06001-3719

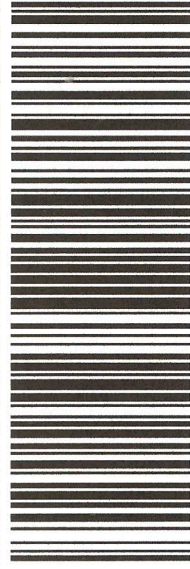


**CT 067 9-03**



**UPS GROUND**

TRACKING #: 1Z 9Y4 503 P2 0624 9856



BILLING: P/P  
ATTENTION UPS DRIVER: SHIPPER RELEASE



CS 22.0.12. WNTNV50 39.0A 11/2020\*

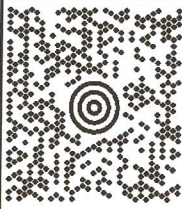
1 OF 1

1 LBS

DWT: 11,8,1

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

**SHIP TO:**  
HIRAM PECK III, DIR. PLANNING & CD  
TOWN OF AVON  
60 WEST MAIN STREET  
AVON CT 06001-3719

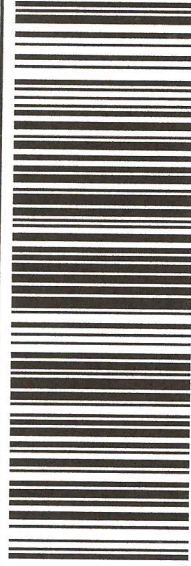


**CT 067 9-03**



**UPS GROUND**

TRACKING #: 1Z 9Y4 503 P2 1622 2865



BILLING: P/P  
ATTENTION UPS DRIVER: SHIPPER RELEASE



CS 22.0.12. WNTNV50 39.0A 11/2020\*