Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

June 4, 2019

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

RE: Notice of Exempt Modification
27 Maynard Road, Salem, CT 06420
Latitude: 41.4630305600
Longitude: -72.2465972300
T-Mobile Site#: CT11451G – L600

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 82-foot level of the existing 100-foot lattice tower at 27 Maynard Road, Salem, CT. The 100-foot lattice tower and property are owned by Salem Telecom LLC. T-Mobile now intends to replace three (3) of its existing antennas with three (3) new 600/700 MHz antennas. The new antennas will be installed at the same 82-foot level of the tower.

Planned Modifications:
Tower:

Remove
N/A

Remove and Replace:
(3) LNX-6515DS (Remove) - APXVAARR24_43-U-NA20 Antenna (Replace) 600/700 MHz
(3) RRUS11B12 (Remove) - Radio 4449 B71+B12 (Replace)

Install New:
(1) 1-3/8" Hybrid Cables

Existing to Remain:
(3) RFS APX16DWV-16DWV-S—E-A20 Antenna 1900/2100 MHz
(3) RRUS11B2
(3) RRUS11B4
(1) 1-3/8" Hybrid Cable

Ground:

Install New: Equipment inside existing 6102 cabinet

This facility was approved by the CSC for T-Mobile use in TS-T-Mobile-121-160721 dated September 6, 2016. This modification complies with this approval. Please see the enclosed.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to First Selectman -Kevin T. Lyden, Elected Official, and Matt Allen, Zoning Enforcement Officer for the Town of Salem, as well as the 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,

Kyle Richers
Transcend Wireless
Cell: 908-447-4716
Email: krichers@transcendwireless.com

Attachments
cc: Kevin T. Lyden – Town of Salem First Selectman
Matt Allen– Town of Salem Zoning Enforcement Officer
Salem Telecom LLC – tower/property owner

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Thursday, June 6, 2019 4:21 PM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Reference Number 1: CT11451G CSC owner

A signature is required for package delivery

You have a package coming.

Scheduled Delivery Date: Friday, 06/07/2019

Sign Now

Change Delivery | Manage Preferences | View Delivery Planner

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424291261486
Ship To:	Salem Telecom LLC 226 Lambtown Road LEDYARD, CT 063391928 US

UPS Service:	UPS GROUND
Number of Packages:	1
Package Weight:	1.0 LBS
Scheduled Delivery:	06/07/2019
Signature Required:	A signature is required for package delivery
Reference Number 1:	CT11451G CSC owner

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UPS Privacy Notice

Help and Support Center

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Thursday, June 6, 2019 4:23 PM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Reference Number 1: CT11451G CSC EO

You have a package coming.

Scheduled Delivery Date: Friday, 06/07/2019

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Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424290859495
Ship To:	Kevin T. Lyden Town of Salem 270 Hartford Road SALEM, CT 064203804 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	06/07/2019
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CT11451G CSC EO

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Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Thursday, June 6, 2019 4:24 PM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Reference Number 1: CT11451G CSC ZO

You have a package coming.

Scheduled Delivery Date: Friday, 06/07/2019

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Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424294661502
Ship To:	Matt Allen Town of Salem 270 Hartford Road SALEM, CT 064203804 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	06/07/2019
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CT11451G CSC ZO

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27 MAYNARD RD

Location	27 MAYNARD RD	**Mblu**	17/ / 007/ 050/
Acct#	587	**Owner**	SALEM TELECOM LLC
Assessment	$239,800	**Appraisal**	$342,600
PID	559	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$90,100	$252,500	$342,600
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$63,100	$176,700	$239,800

Owner of Record

Owner	SALEM TELECOM LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	226 LAMBTOWN RD LEDYARD, CT 06339-0000	**Book & Page**	0140/0183
		Sale Date	08/29/2002
		Instrument	1N

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
SALEM TELECOM LLC	$0		0140/0183	1N	08/29/2002
SPIEGEL JOHN M & NANCY	$75,000		66/ 240		06/08/1990

Building Information

Building 1 : Section 1

Year Built:	2004
Living Area:	1,334
Replacement Cost:	$158,872
Building Percent Good:	56
Replacement Cost Less Depreciation:	$89,000

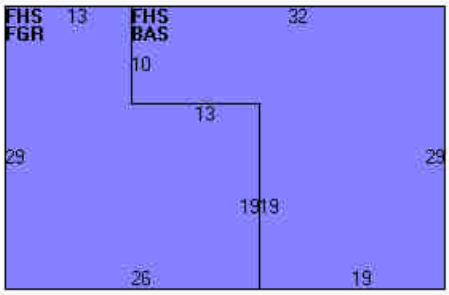
Building Attributes

Field	Description
Style	Cape Cod
Model	Residential
Grade:	C+
Stories:	1.5
Occupancy	1
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure:	Gable Or Hip
Roof Cover	Asphalt Shingl
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Flr 1	Quarry Tile
Interior Flr 2	Carpet
Heat Fuel	Gas
Heat Type:	Forced Air
AC Type:	Central
Total Bedrooms:	2 Bedrooms
Total Bthrms:	2
Total Half Baths:	1
Total Xtra Fixtrs:	
Total Rooms:	4
Bath Style:	Modern
Kitchen Style:	Modern

Building Photo

(http://images.vgsi.com/photos/SalemCTPhotos//\00\00\12/54.j

Building Layout



(http://images.vgsi.com/photos/SalemCTPhotos//Sketches/559_

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	681	681
FHS	Finished Half Story	1,305	653
FGR	Attached Garage	624	0
		2,610	1,334

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
GNR	Generator	1 UNITS	$0	1

Land

Land Use

Land Line Valuation

Use Code	101	**Size (Acres)**	2.29
Description	Single Family	**Frontage**	
Zone	RA	**Depth**	
Neighborhood	1105	**Assessed Value**	$176,700
Alt Land Appr	No	**Appraised Value**	$252,500
Category			

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
SHD1	Shed Frame			117 S.F.	$1,100	1

Valuation History

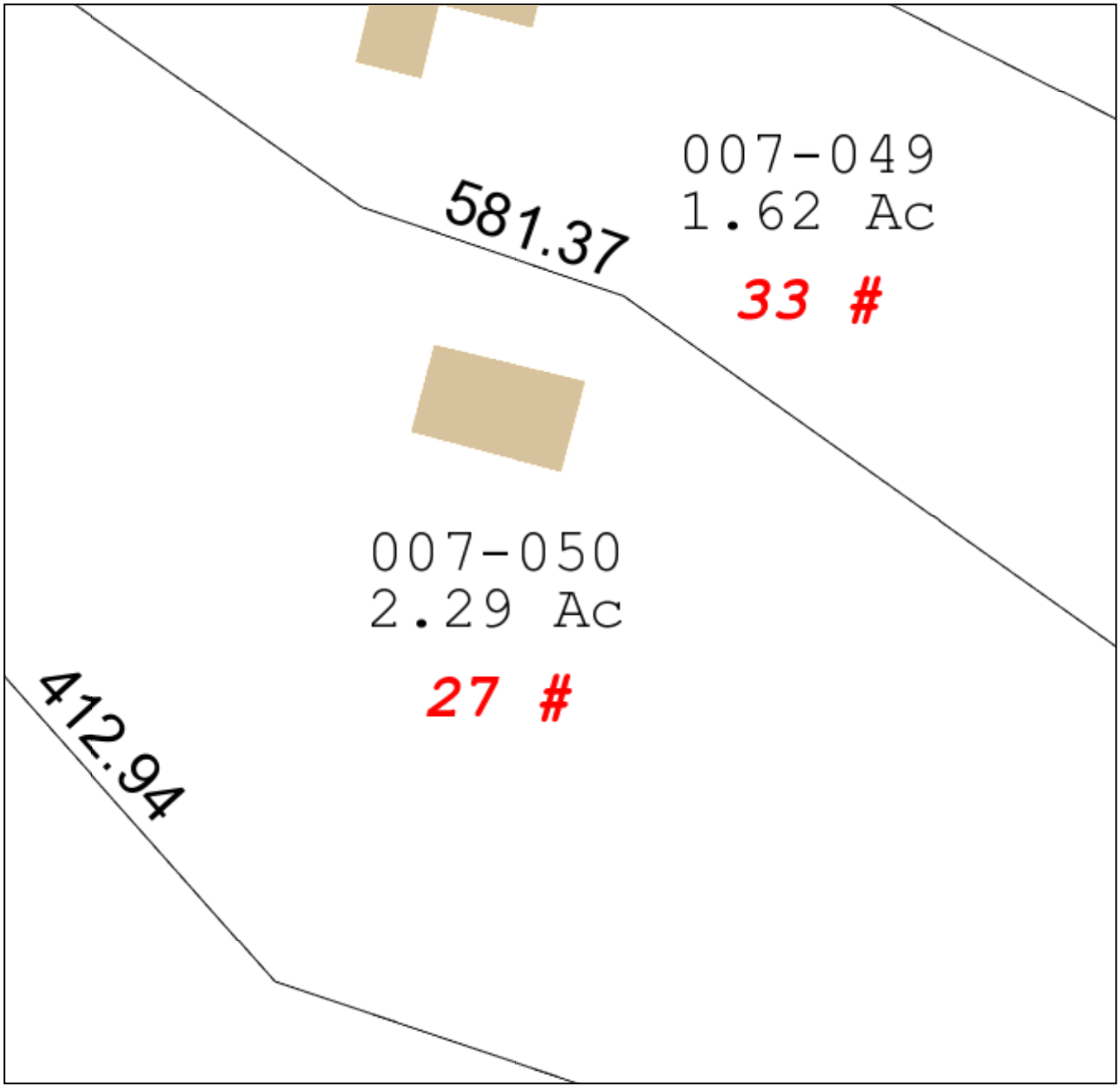
Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$144,500	$317,200	$461,700
2017	$78,200	$63,800	$142,000
2016	$78,200	$63,800	$142,000

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$101,200	$222,000	$323,200
2017	$54,800	$44,600	$99,400
2016	$54,800	$44,600	$99,400

Town of Salem

Geographic Information System (GIS)

Date Printed: 6/3/2019



MAP DISCLAIMER - NOTICE OF LIABILITY

This map is for assessment purposes only. It is not for legal description or conveyances. All information is subject to verification by any user. The Town of Salem and its mapping contractors assume no legal responsibility for the information contained herein.

Approximate Scale: 1 inch = 50 feet

0 50 Feet

N W E S

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

September 6, 2016

Kyle Richers
Real Estate Consultant
Transcend Wireless
10 Industrial Avenue, Suite 3
Mahwah, NJ 07430

RE: **TS-T-MOBILE-121-160721** - T-Mobile Northeast LLC request for an order to approve tower sharing at an existing telecommunications facility located at 27 Maynard Road, Salem, Connecticut.

Dear Mr. Richers:

At a public meeting held on September 1, 2016, the Connecticut Siting Council (Council) ruled that the shared use of this existing tower site is technically, legally, environmentally, and economically feasible and meets public safety concerns, and therefore, in compliance with General Statutes § 16-50aa, the Council has ordered the shared use of this facility to avoid the unnecessary proliferation of tower structures with the following conditions:

1. Any deviation from the proposed installation as specified in the original tower share request and supporting materials with the Council shall render this decision invalid;
2. Any material changes to the proposed installation as specified in the original tower share request and supporting materials filed with the Council shall require an explicit request for modification to the Council pursuant to Connecticut General Statutes § 16-50aa, including all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65;
3. Not less than 45 days after completion of the proposed installation, the Council shall be notified in writing that the installation has been completed;
4. Any nonfunctioning antenna and associated antenna mounting equipment on this facility owned and operated by T-Mobile Northeast LLC shall be removed within 60 days of the date the antenna ceased to function;
5. The validity of this action shall expire one year from the date of this letter; and
6. The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

This decision is under the exclusive jurisdiction of the Council and applies only to this request for tower sharing dated July 8, 2016. This facility has been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower. Any deviation from the approved tower sharing request is enforceable under the provisions of Connecticut General Statutes § 16-50u.

The proposed shared use is to be implemented as specified in your letter dated July 8, 2016, including the placement of all necessary equipment and shelters within the tower compound.

Please be advised that the validity of this action shall expire one year from the date of this letter.

Thank you for your attention and cooperation.

Very truly yours,

Robert Stein

Robert Stein
Chairman

RS/FOC/lm

c: The Honorable Kevin T. Lyden, First Selectman, Town of Salem
Richard Serra, Town Planner, Town of Salem
Salem Telecom LLC

SITE NAME: CT11451G

27 MAYNARD ROAD
SALEM, CT 06420
NEW LONDON COUNTY

SITE NUMBER: CT11451G

RF DESIGN GUIDELINE: 67D07C 6102 MUAC

TOWER RATING POST INSTALL: 85.8%

T-MOBILE TECHNICIAN SITE SAFETY NOTES

LOCATION	SPECIAL RESTRICTIONS
SECTOR A: ANTENNA/RRUS/RADIO	ACCESS NOT PERMITTED
SECTOR B: ANTENNA/RRUS/RADIO	ACCESS NOT PERMITTED
SECTOR C: ANTENNA/RRUS/RADIO	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

GENERAL NOTES

THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T-MOBILE. 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.

PROJECT SUMMARY

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY T-MOBILE EQUIPMENT MODERNIZATION
ZONING JURISDICTION:	BASED ON INFORMATION PROVIDED BY T-MOBILE, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS AN ELIGIBLE FACILITY UNDER THE TAX RELIEF ACT OF 2012, 47 USC 1455(A), AND IS SUBJECT TO AN EXPEDITED ELIGIBLE FACILITIES REQUEST/REVIEW AND ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW).
SITE ADDRESS:	27 MAYNARD ROAD SALEM, CT 06420
LATITUDE:	41° 27' 46.90" N
LONGITUDE:	72° 14' 47.74" W
JURISDICTION:	TOWN OF SALEM, CT
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

APPROVALS

PROJECT MANAGER	DATE
CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING / SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE

72 HOURS

CALL
BEFORE YOU DIG
CALL TOLL FREE 1-800-922-4455
OR CALL 811

UNDERGROUND SERVICE ALERT

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
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A-2	ANTENNA LAYOUTS & ELEVATION	1
A-3	DETAILS	1
E-1	ONE-LINE DIAGRAM AND GROUNDING DETAILS	1

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 648-1116

Transcend Wireless
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH, NJ 07430
TEL: (201) 684-0055
FAX:(201) 684-0066

HDG HUDSON Design Group LLC
29 HAMM ROAD
HUDSON, NY 12534
TEL: (978) 557-5553
FAX: (978) 336-5586

STATE OF CONNECTICUT
DEREK J. CREASER
No. 28554
LICENSED
PROFESSIONAL ENGINEER

CHECKED BY: RP

APPROVED BY: DJC

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	06/04/19	ISSUED FOR CONSTRUCTION	VP
0	05/08/19	ISSUED FOR REVIEW	AM

SITE NUMBER:
CT11451G

SITE NAME:
CT11451G

SITE ADDRESS:
27 MAYNARD ROAD
SALEM, CT 06420
NEW LONDON COUNTY

SHEET TITLE
TITLE SHEET
(L600)

SHEET NUMBER
T-1

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) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

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

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

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

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

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

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

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO 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

GENERAL NOTES

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

   CONTRACTOR – TRANSCEND WIRELESS
   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 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 THE 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 = 36 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 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: IBC 2015 WITH 2018 CT STATE BUILDING CODE AMENDMENTS
    ELECTRICAL CODE: 2017 NATIONAL ELECTRIC CODE (NFPA 70)
    LIGHTENING CODE: REFER TO ELECTRICAL DRAWINGS

    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, ASD, FOURTEENTH EDITION;

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

    EQUIPMENT 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.

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	EQ	EQUAL	REQ	REQUIRED
AWG	AMERICAN WIRE GAUGE	GC	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
BBU	BATTERY BACKUP UNIT	GRC	GALVANIZED RIGID CONDUIT	TBD	TO BE DETERMINED
BTCW	BARE TINNED SOLID COPPER WIRE	MGB	MASTER GROUND BAR	TBR	TO BE REMOVED
BGR	BURIED GROUND RING	MIN	MINIMUM	TBRR	TO BE REMOVED AND REPLACED
BTS	BASE TRANSCEIVER STATION	P	PROPOSED	TYP	TYPICAL
E	EXISTING	NTS	NOT TO SCALE	UG	UNDER GROUND
EGB	EQUIPMENT GROUND BAR	RAD	RADIATION CENTER LINE (ANTENNA)	VIF	VERIFY IN FIELD
EGR	EQUIPMENT GROUND RING	REF	REFERENCE		

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STATE OF CONNECTICUT
DEREK J. CREASER
No. 28554
LICENSED
PROFESSIONAL ENGINEER

CHECKED BY: RP

APPROVED BY: DJC

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	06/04/19	ISSUED FOR CONSTRUCTION	VP
0	05/08/19	ISSUED FOR REVIEW	AM

SITE NUMBER:
CT11451G

SITE NAME:
CT11451G

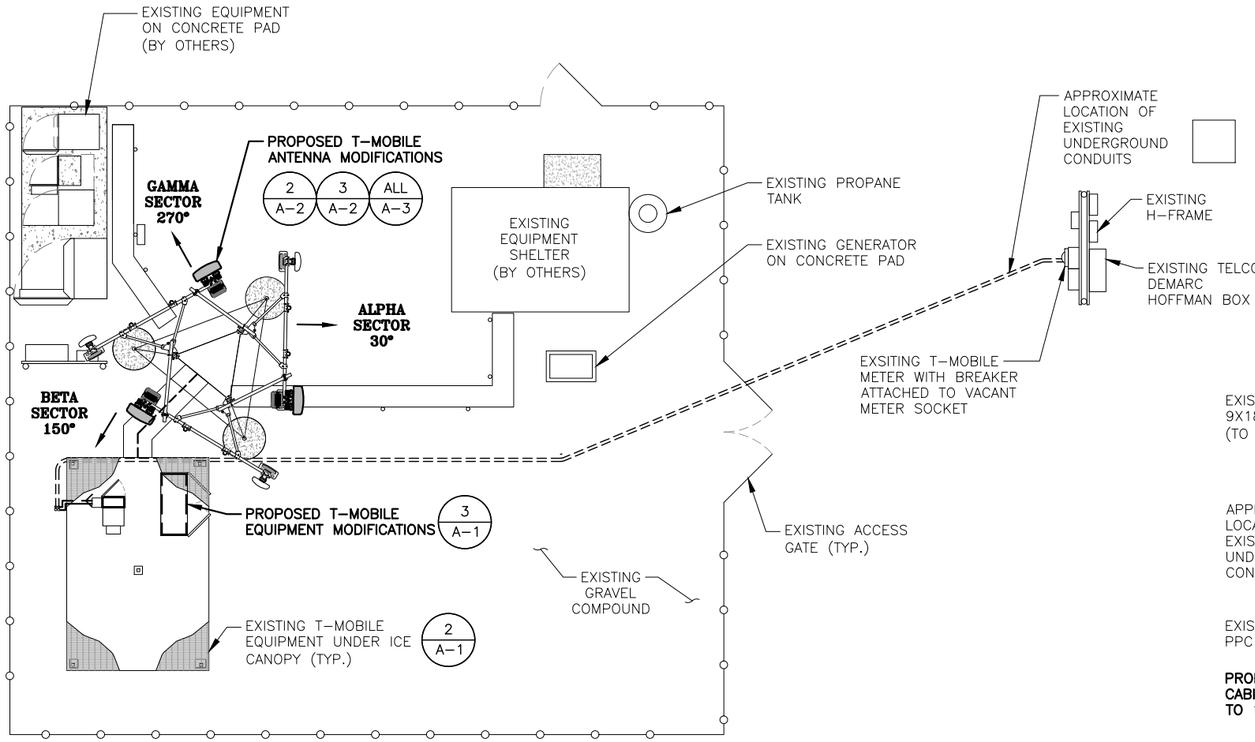
SITE ADDRESS:
27 MAYNARD ROAD
SALEM, CT 06420
NEW LONDON COUNTY

SHEET TITLE
GENERAL NOTES
(L600)

SHEET NUMBER
GN-1

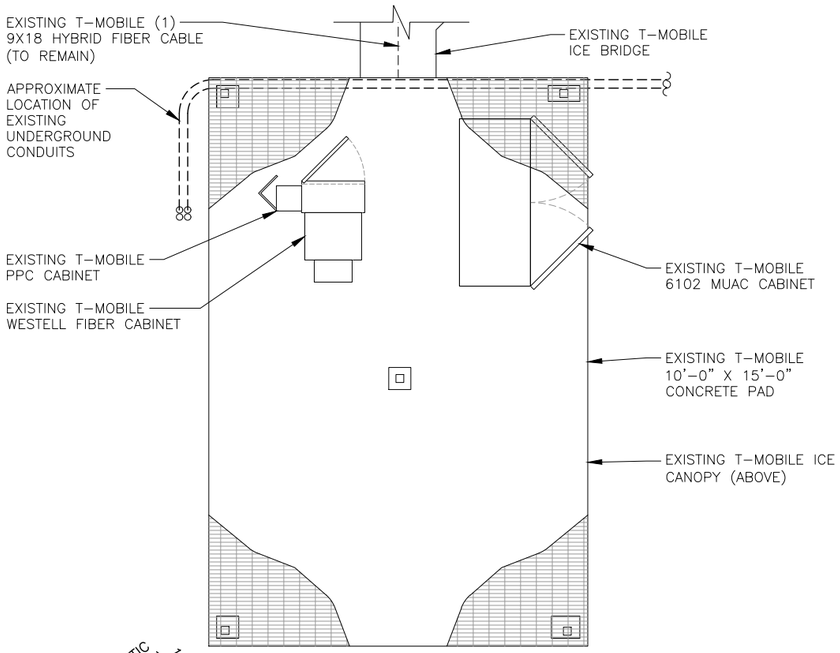
STRUCTURAL NOTES:
PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO STRUCTURAL ANALYSIS PROVIDED BY HDG, DATED: MAY 21, 2019 TO DETERMINE IF THERE ANY SUPPLEMENTAL OR SPECIAL INSTALLATION REQUIREMENTS, OR RELOCATION ARRANGEMENTS.

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



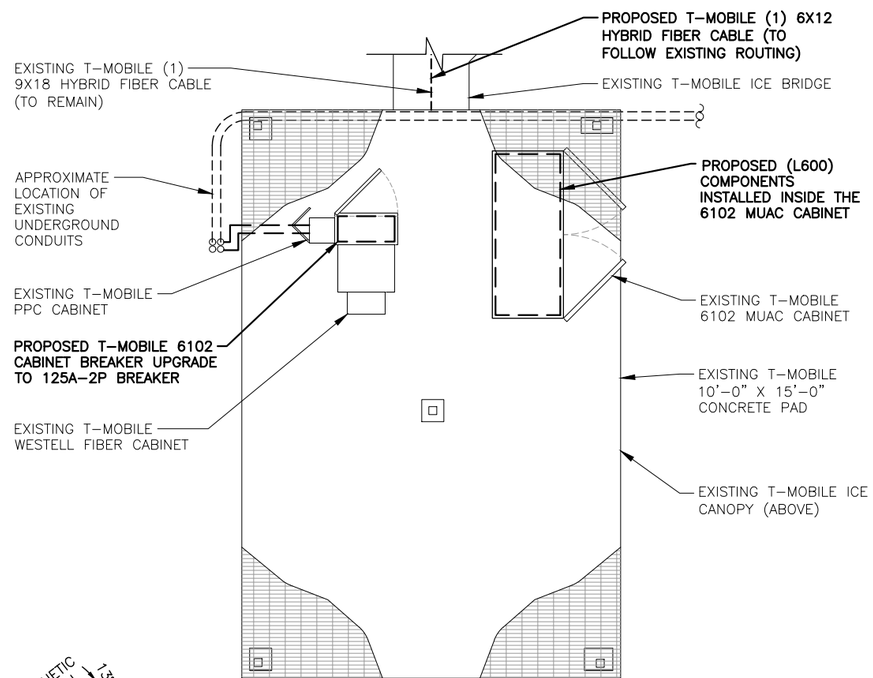
MAGNETIC NORTH 13°76' TRUE NORTH

COMPOUND PLAN 1 A-1
22x34 SCALE: 3/16"=1'-0"
11x17 SCALE: 3/32"=1'-0"
0 2'-8" 5'-4" 10'-8" 16'-0"



MAGNETIC NORTH 13°76' TRUE NORTH

EXISTING EQUIPMENT PLAN 2 A-1
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"
0 1'-0" 2'-0" 4'-0" 6'-0"



MAGNETIC NORTH 13°76' TRUE NORTH

PROPOSED EQUIPMENT PLAN 3 A-1
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"
0 1'-0" 2'-0" 4'-0" 6'-0"

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SHEET TITLE
COMPOUND & EQUIPMENT PLANS
(L600)

SHEET NUMBER
A-1

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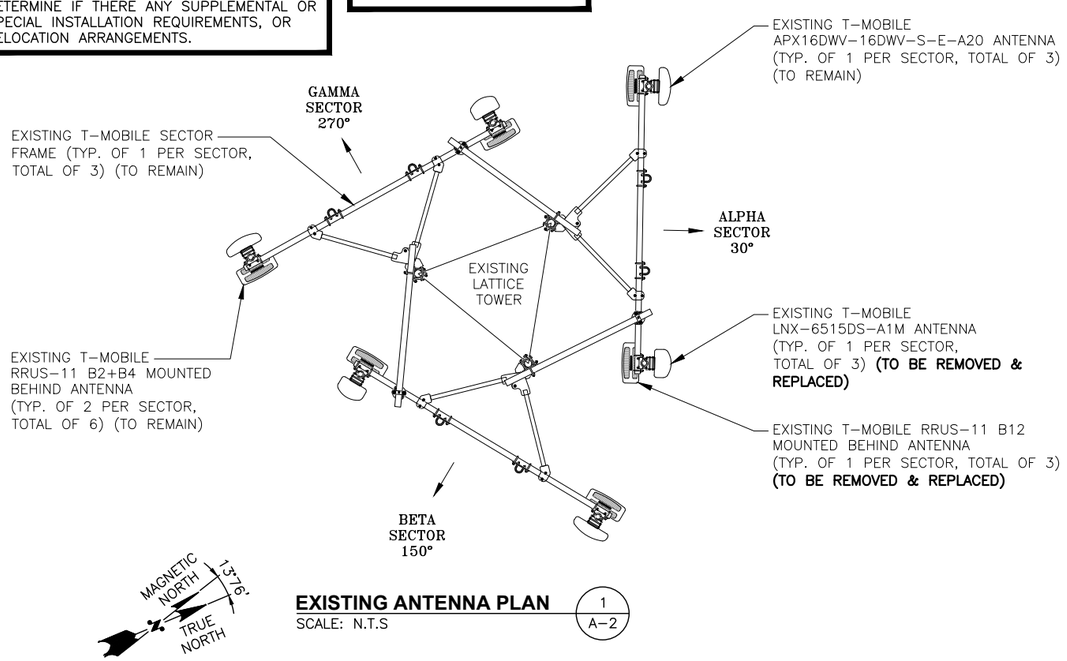
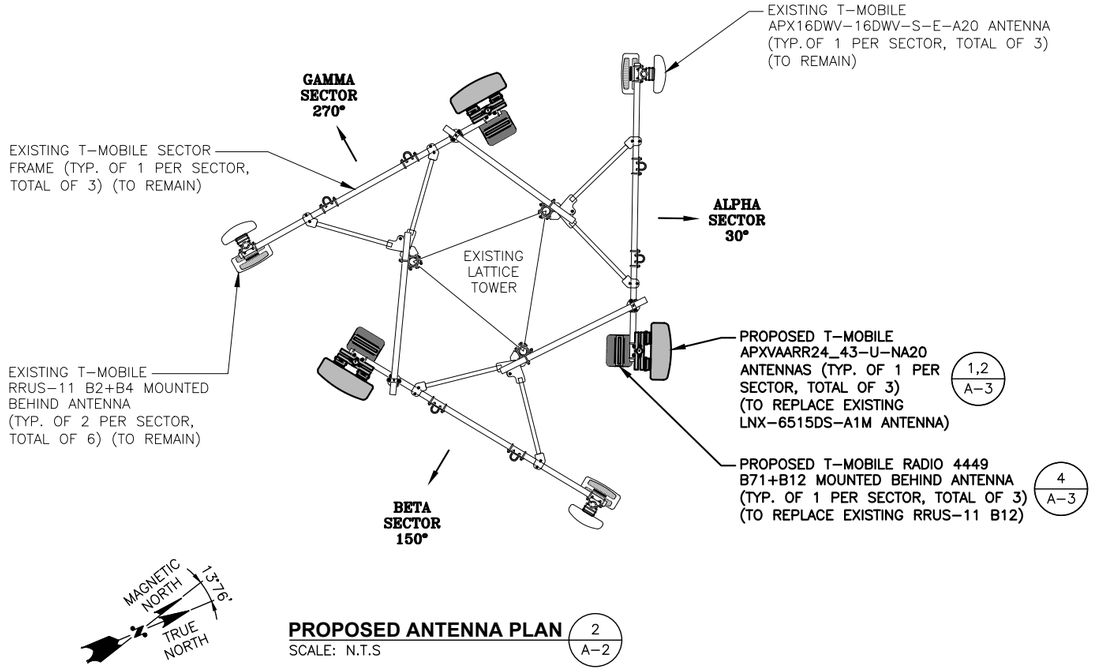
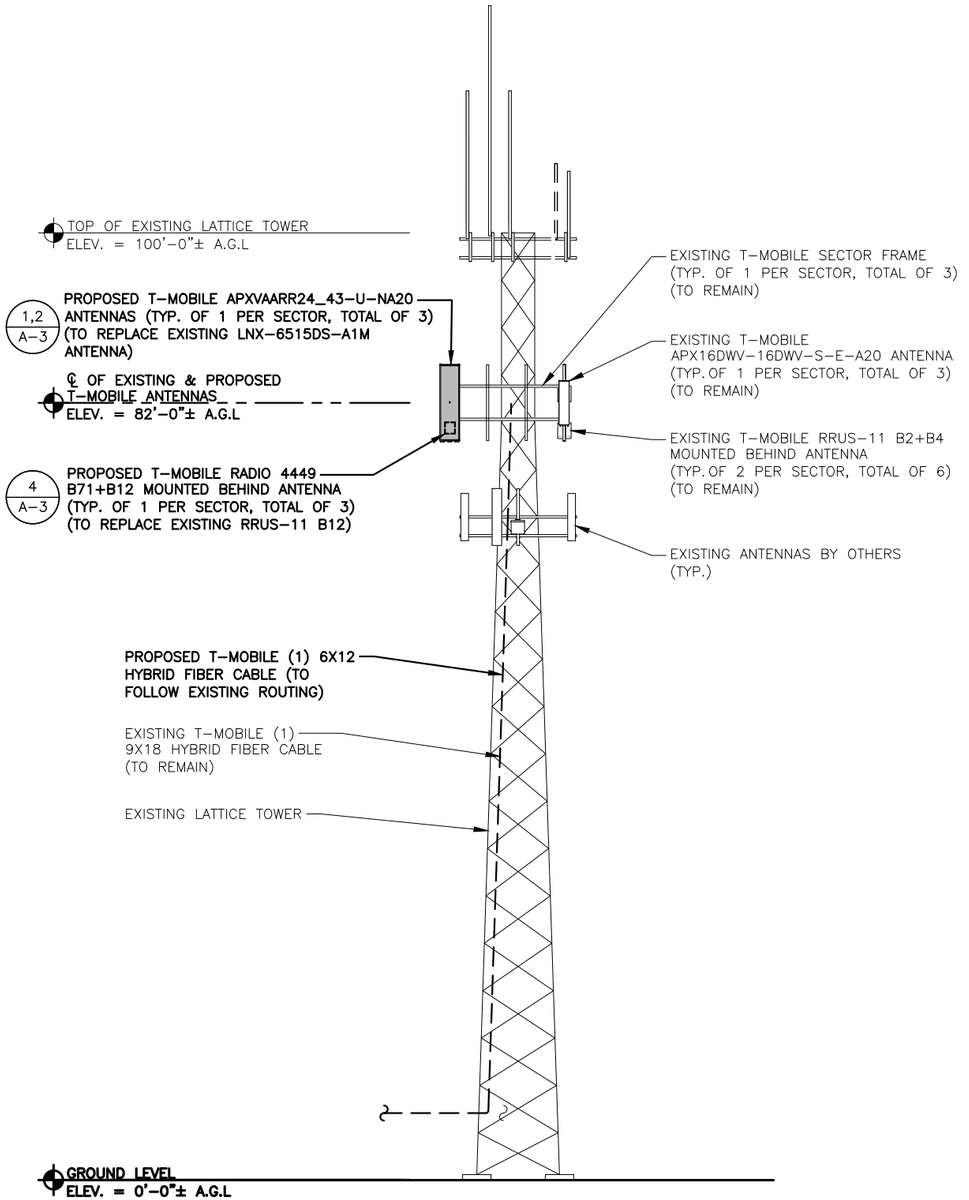


EXISTING ANTENNA PLAN (1 / A-2)
SCALE: N.T.S



PROPOSED ANTENNA PLAN (2 / A-2)
SCALE: N.T.S



TOWER ELEVATION (3 / A-2)
22x34 SCALE: 3/16"=1'-0"
11x17 SCALE: 3/32"=1'-0"
0 2'-8" 5'-4" 10'-8" 16'-0"

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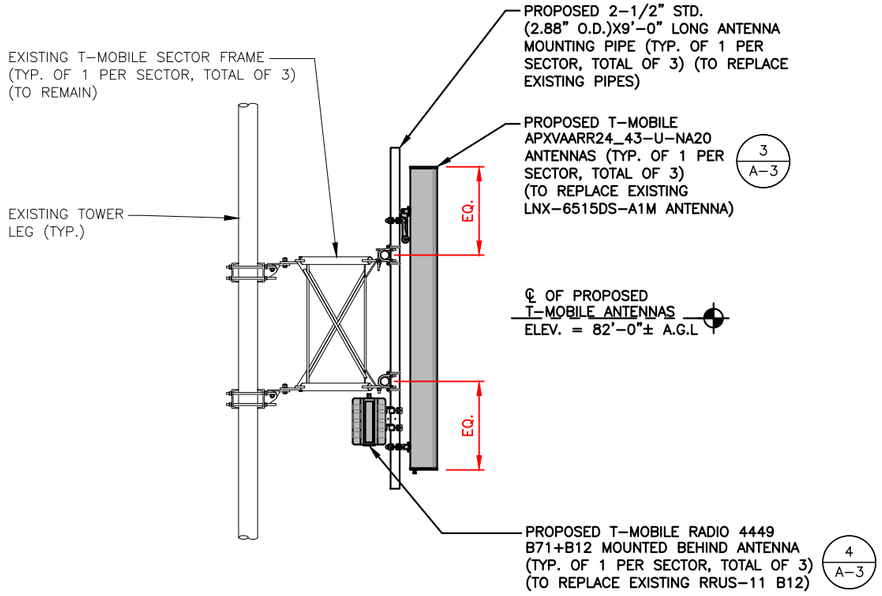
SHEET TITLE
ANTENNA LAYOUTS & ELEVATION
(L600)

SHEET NUMBER
A-2



L600+L700 ANTENNA MOUNTING DETAIL 1 A-3
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"

0 1'-0" 2'-0" 4'-0" 6'-0"

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

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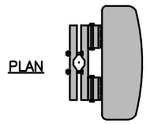
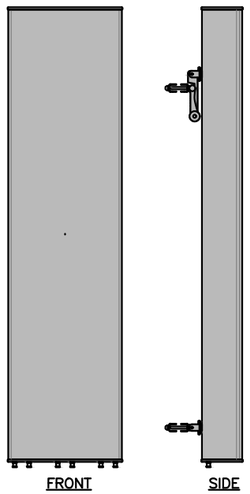
T-MOBILE ELEVATION PHOTO DETAIL 2 A-3
SCALE: N.T.S

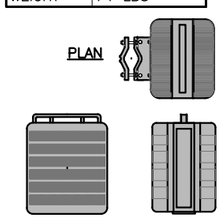




L600+L700 ANTENNA DETAIL 3 A-3
SCALE: N.T.S

L600+L700 ANTENNA DIMENSIONS	
MODEL #	**APXVAARR24_43-U-NA20 (OCTA)**
MANUF.	RFS
HEIGHT	95.9"
WIDTH	24"
DEPTH	8.7"
WEIGHT	128 LBS

RADIO DIMENSIONS	
MODEL #	**RADIO 4449 B71+B12 (WITH FILTER)**
MANUF.	ERICSSON
HEIGHT	14.9"
WIDTH	13.1"
DEPTH	9.2"
WEIGHT	74 LBS



RADIO DETAIL 4 A-3
SCALE: N.T.S

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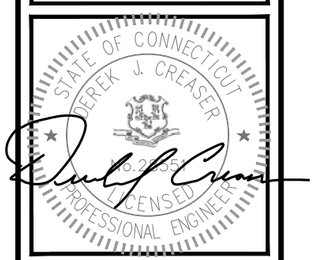

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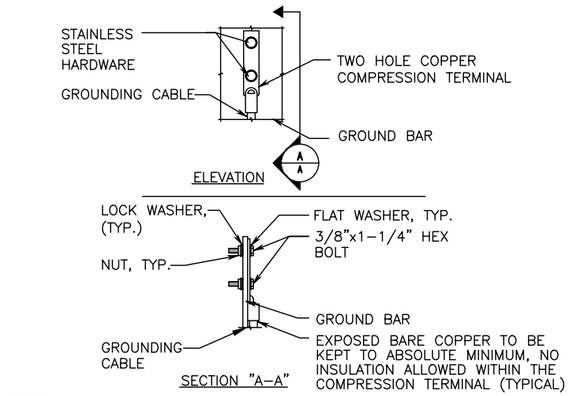
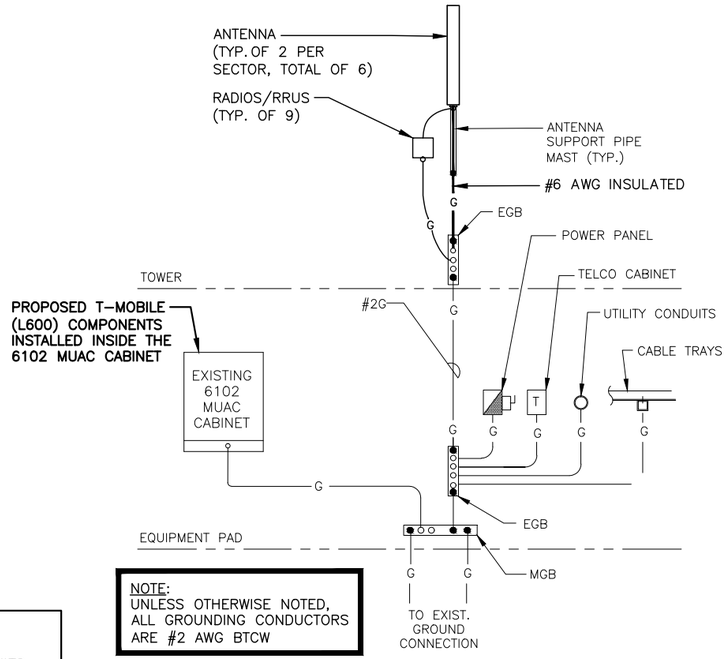
SHEET TITLE
DETAILS
(L600)

SHEET NUMBER
A-3



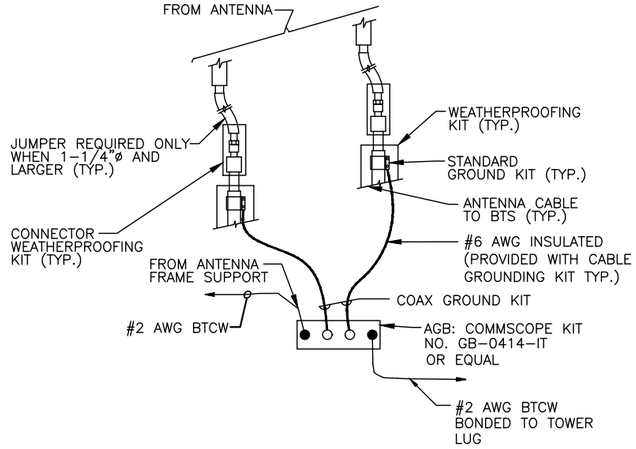
NOTE:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER AGB/EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL (1 / E-1)
SCALE: N.T.S



NOTE:
UNLESS OTHERWISE NOTED, ALL GROUNDING CONDUCTORS ARE #2 AWG BTCW

GROUNDING RISER DIAGRAM (2 / E-1)
SCALE: N.T.S

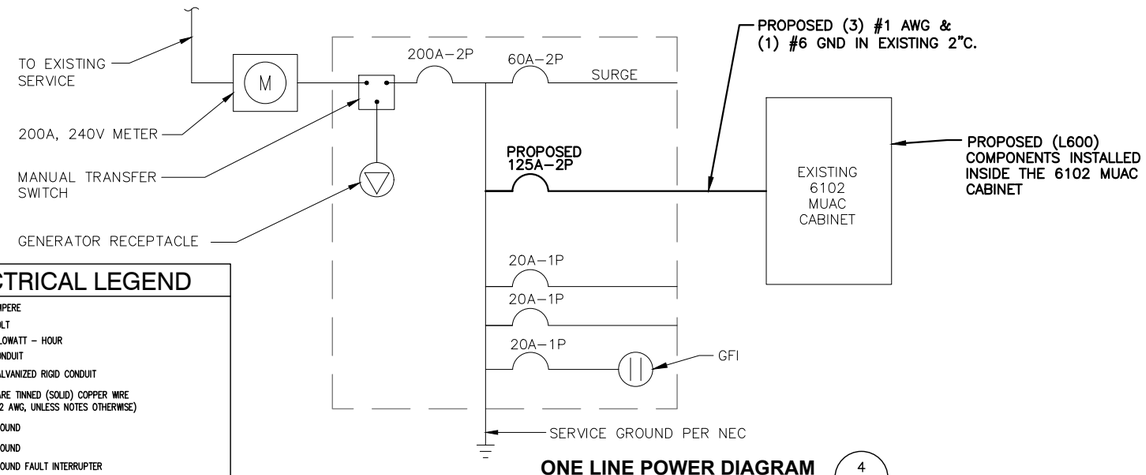


NOTE:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB.

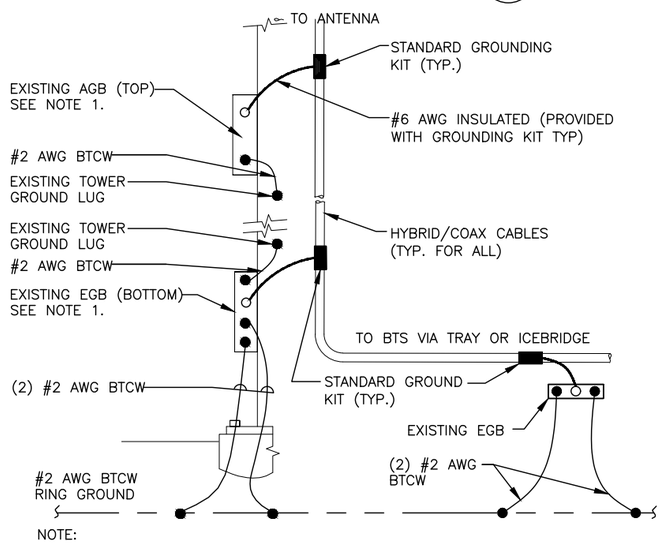
TOWER TOP CABLE GROUNDING DETAIL (3 / E-1)
SCALE: N.T.S

NOTE:

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



ONE LINE POWER DIAGRAM (4 / E-1)
SCALE: N.T.S



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

TOWER BOTTOM CABLE GROUNDING DETAIL (5 / E-1)
SCALE: N.T.S

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)
GND	GROUND
⏚	GROUND
GFI	GROUND FAULT INTERRUPTER
H.P	HORSE POWER
MGB	MASTER GROUND BAR ○ MECHANICAL CONNECTION ● CADWELD CONNECTION
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"x8' COPPER CLAD STAINLESS STEEL GROUND ROD
○-●	● EXOTHERMIC (CAD WELD) OR ○ MECHANICAL (COMPRESSION TYPE) CONNECTION
NEC	NATIONAL ELECTRIC CODE
ø	PHASE
PPC	POWER PROTECTION CABINET
P	POLE
PVC	POLYVINYL CHLORIDE
UL	UNDERWRITER LABORATORIES
⊠	OMNI-DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALL

ELECTRICAL & GROUNDING NOTES

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

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SHEET TITLE
ONE-LINE DIAGRAM & GROUNDING DETAILS (L600)

SHEET NUMBER
E-1

STRUCTURAL ANALYSIS REPORT

For

CT11451G

27 Maynard Road
Salem, CT 06420

Antennas Mounted to the Tower

Prepared for:

Transcend Wireless

T-Mobile

Dated: May 21, 2019

Prepared by:

HUDSON Design Group LLC

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STATE OF CONNECTICUT
GI KAI WANG
No. 28220
LICENSED PROFESSIONAL ENGINEER
5/21/2019

SCOPE OF WORK:

Hudson Design Group LLC (HDG) has been authorized by T-Mobile to conduct a structural evaluation of the 100' self-supporting tower supporting the proposed T-Mobile's antennas located at elevation 82' above the ground level.

This report represents this office's findings, conclusions and recommendations pertaining to the support of T-Mobile's existing and proposed antennas listed below.

Record drawings of the existing tower prepared by Central Tower Inc., dated September 1, 1999, were available and obtained for our use. The previous structural analysis report prepared by this office, dated October 29, 2012, was used for tower analysis.

CONCLUSION SUMMARY:

Based on our evaluation, we have determined that the existing tower and foundation **are in conformance** with the ANSI/TIA-222-G Standard for the loading considered under the criteria listed in this report. The tower structure is rated at **85.8%** - (Diagonal at Tower Section T4 from EL.20' to EL.40' Controlling).

HUDSON Design Group LLC

APPURTENANCES CONFIGURATION:

Tenant	Appurtenances	Elev.	Mount
	Lightning Rod	100'	Tower Leg
	15' Dipole	100'	Tower Leg
	10' Omni	100'	Tower Leg
	(3) 8' Omni	100'	T - Frame
T-Mobile	(3) APX16DWV-16DWVS Antennas	82'	T - Frame
T-Mobile	(6) RRUS 11	82'	T - Frame
T-Mobile	***(3) APXVAARR24_43-U-NA20 Antennas***	82'	T - Frame
T-Mobile	***(3) Radio 4449***	82'	T - Frame
AT&T	(6) Powerwave 7770 Antennas	70'	T - Frame
AT&T	(6) LGP 21400 TMA	70'	T - Frame
AT&T	(6) LGP 21900	70'	T - Frame
AT&T	AM-X-CD-14-65 Antenna	70'	T - Frame
AT&T	P65-17-XLH-RR Antenna	70'	T - Frame
AT&T	AM-X-CD-16-65 Antenna	70'	T - Frame
AT&T	(6) RRUs	70'	T - Frame
AT&T	DC6-48-60-18-8F	70'	Tower Leg
AT&T	GPS-TMG-HR-26N	20'	Tower Leg

Proposed T-Mobile Appurtenances shown in Bold.

T-MOBILE EXISTING/PROPOSED COAX CABLES:

Tenant	Coax Cables	Elev.	Mount
T-Mobile	(1) Fiber Cable	82'	T - Bracket
T-Mobile	***(1) Fiber Cable***	82'	T - Bracket

Proposed T-Mobile Coax Cables shown in Bold.

HUDSON Design Group LLC

ANALYSIS RESULTS SUMMARY:

Component	Max. Stress Ratio	Elev. of Component (ft)	Pass/Fail	Comments
Legs	59.0 %	0 – 20	PASS	
Diagonals	**85.8 %**	20 – 40	PASS	**Controlling**
Top Girts	1.8 %	80 – 100	PASS	
Bottom Girts	6.7 %	80 – 100	PASS	

FOUNDATION ANALYSIS RESULTS SUMMARY:

	Design Reactions X 1.35	Proposed Reactions	Pass/Fail	Comments
AXIAL	**46.0 k**	23.5 k	PASS	
SHEAR	**40.2 k**	25.4 k	PASS	
MOMENT	**2887 ft-k**	1597 ft-k	PASS	

DESIGN CRITERIA:

1. EIA/TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures

2. 2018 Connecticut State Building Code

   City/Town: Salem
   County: New London
   Wind Load: 120 mph
   Structural Class: II
   Exposure Category: B
   Topographic Category: 1
   Ice Thickness: 0.75 inch

3. Approximate height above grade to proposed antennas: 82'

ASSUMPTIONS:

1. The tower dimensions, member sizes and material strength are as indicated in the record drawings of the existing tower prepared by Central Tower Inc., dated September 1, 1999.

2. The existing appurtenances configuration is as stated in this report. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.

3. The tower and foundation are properly constructed and maintained. 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. The support mounts and platforms are not analyzed and are considered adequate to support the loading. The analysis is limited to the primary support structure itself.

5. All prior structural modification, if any, are assumed to be as per the data supplied (if available), and installed properly.

SUPPORT RECOMMENDATIONS:

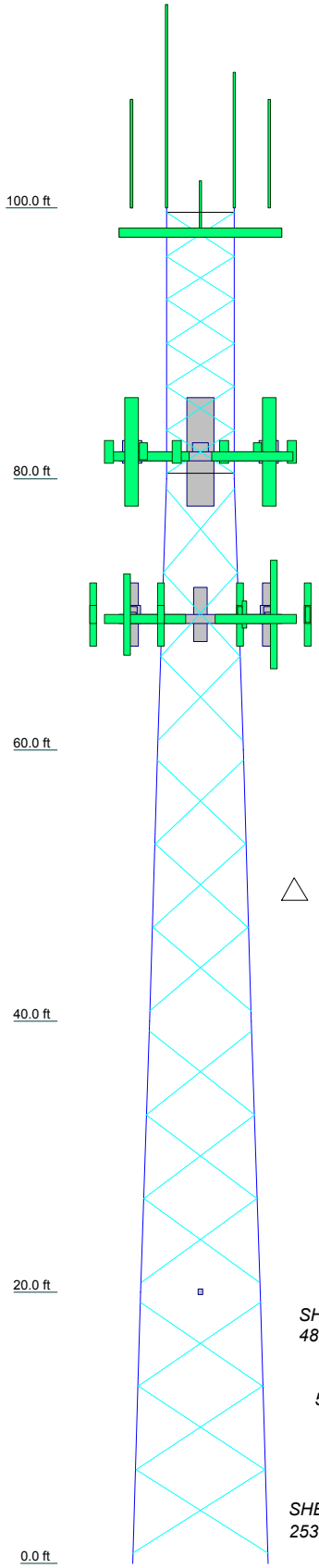
HDG recommends that the proposed antennas and radios be mounted on the existing T-frame supported by the tower.

Photo 1: Photo illustrating the Tower with Appurtenances shown.

HUDSON
Design Group LLC

CALCULATIONS

Section	T5	T4	T3	T2	T1
Legs	SR 3 3/4	SR 3 1/2	SR 3 1/4	SR 3	SR 2 1/4
Leg Grade	A572-50				
Diagonals	L2 1/2x2 1/2x3/16	L2x2x1/4		L2x2x3/16	SR 1
Diagonal Grade	A36				
Top Girts	N.A.				SR 1
Bottom Girts	N.A.				SR 1
Face Width (ft) 10	8.75	7.5	6.25		5
# Panels @ (ft)	12 @ 6.16667				6 @ 3.20833
Weight (lb) 10927.2	2876.5	2551.8	2225.6	1809.8	1463.5



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	100	Radio 4449	82
15' Dipole	100	Radio 4449	82
Omni 3"x10'	100	Radio 4449	82
Omni 3"x8'	100	(2) Ericsson RRU	70
Omni 3"x8'	100	(2) Ericsson RRU	70
Omni 3"x8'	100	(2) Ericsson RRU	70
PiROD 12' T-Frame	98.5	Surge Arrestor (DC6-48-60-18-8F)	70
PiROD 12' T-Frame	98.5	PiROD 15' T-Frame (ATI)	70
PiROD 12' T-Frame (T-Mobile - existing)	82	PiROD 15' T-Frame	70
		PiROD 15' T-Frame	70
PiROD 12' T-Frame	82	(2) Powerwave 7770 w/mount pipe	70
PiROD 12' T-Frame	82	(2) Powerwave 7770 w/mount pipe	70
APX16DWV-16DWVS-E-A20 w/mount pipe	82	(2) Powerwave 7770 w/mount pipe	70
APX16DWV-16DWVS-E-A20 w/mount pipe	82	(2) Powerwave LGP21900	70
		(2) Powerwave LGP21900	70
APX16DWV-16DWVS-E-A20 w/mount pipe	82	(2) Powerwave LGP21900	70
		(2) Powerwave TMA LGP21400	70
(2) RRUS 11	82	(2) Powerwave TMA LGP21400	70
(2) RRUS 11	82	(2) Powerwave TMA LGP21400	70
(2) RRUS 11	82	KMW AM-X-CD-14-65-00T-RET w/mount pipe	70
APXVAARR24_43-U-NA20 w/mount pipe (T-Mobile - proposed)	82	Powerwave P65-17-XLH-RR w/mount pipe	70
APXVAARR24_43-U-NA20 w/mount pipe	82	KMW AM-X-CD-16-65-00T-RET w/mount pipe	70
APXVAARR24_43-U-NA20 w/mount pipe	82	PCTEL GPS-TMG-HR-26N	20

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 85.8%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 192261 lb
SHEAR: 14087 lb

UPLIFT: -174886 lb
SHEAR: 13987 lb

AXIAL 48298 lb
SHEAR 4878 lb
MOMENT 317475 lb-ft
TORQUE 1054 lb-ft
50 mph WIND - 0.7500 in ICE

AXIAL 23527 lb
SHEAR 25369 lb
MOMENT 1597110 lb-ft
TORQUE 4846 lb-ft
REACTIONS - 120 mph WIND

Hudson Design Group LLC
45 Beechwood Drive
North Andover, MA 01845
Phone: (978) 557-5553
FAX: (978) 336-5586

Job: **CT11451G Salem, CT**			
Project: **100 ft Self Supporting Tower**			
Client: T-Mobile	Drawn by: kw		App'd:
Code: TIA-222-G	Date: 05/21/19		Scale: NTS
Path: C:\Users\kwang\Documents\HUDSON DESIGN GROUP\AAA\CT11451G - SST (T-Mobile - TRANSCEND)\CT11451G\CT11451Geri			Dwg No. E-1

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 100.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.00 ft at the top and 10.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in New London County, Connecticut.
Basic wind speed of 120 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Tower Section Geometry

Tower Section	*Tower Elevation*	*Assembly Database*	*Description*	*Section Width*	*Number of Sections*	*Section Length*
	ft			*ft*		*ft*
T1	100.00-80.00			5.00	1	20.00
T2	80.00-60.00			5.00	1	20.00
T3	60.00-40.00			6.25	1	20.00
T4	40.00-20.00			7.50	1	20.00
T5	20.00-0.00			8.75	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	*Tower Elevation*	*Diagonal Spacing*	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*	*Top Girt Offset*	*Bottom Girt Offset*
	ft	*ft*				*in*	*in*
T1	100.00-80.00	3.21	X Brace	No	No	4.5000	4.5000
T2	80.00-60.00	6.17	X Brace	No	No	9.0000	9.0000
T3	60.00-40.00	6.17	X Brace	No	No	9.0000	9.0000
T4	40.00-20.00	6.17	X Brace	No	No	9.0000	9.0000
T5	20.00-0.00	6.17	X Brace	No	No	9.0000	9.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 100.00-80.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T2 80.00-60.00	Solid Round	3	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T3 60.00-40.00	Solid Round	3 1/4	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T4 40.00-20.00	Solid Round	3 1/2	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T5 20.00-0.00	Solid Round	3 3/4	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 100.00-80.00	Solid Round	1	A36 (36 ksi)	Solid Round	1	A36 (36 ksi)

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 plf
T-bracket	C	No	Yes	Af (CaAa)	100.00 - 7.00	2	2	0.0000	3.0000		8.40
7/8	A	No	Yes	Ar (CaAa)	100.00 - 7.00	4	4	0.0000	1.1100		0.54
7/8	A	No	Yes	Ar (CaAa)	100.00 - 7.00	1	1	0.0000	1.1100		0.54
7/8 (AT&T)	B	No	Yes	Ar (CaAa)	70.00 - 7.00	12	6	0.0000	1.1100		0.54
FB-L98B-002 (AT&T)	B	No	Yes	Ar (CaAa)	70.00 - 7.00	1	1	0.0000	0.4000		0.25
WR-VG122ST-BRD A (AT&T)	B	No	Yes	Ar (CaAa)	70.00 - 7.00	2	2	0.0000	0.4000		0.25
**********											
1 1/4 Fiber Cable (T-Mobile - existing)	A	No	Yes	Ar (CaAa)	82.00 - 7.00	1	1	0.0000	1.5500		0.66
**********											
1 1/4 Fiber Cable (T-Mobile - proposed)	A	No	Yes	Ar (CaAa)	82.00 - 7.00	1	1	0.0000	1.5500		0.66
T-bracket	A	No	Yes	Af (CaAa)	82.00 - 7.00	1	1	0.0000	3.0000		8.40

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Lightning Rod	A	None		0.0000	100.00	No Ice	0.75	0.75	10.00
						1/2" Ice	1.25	1.25	40.00
						1" Ice	1.75	1.75	70.00
15' Dipole	C	From Leg	0.00	0.0000	100.00	No Ice	4.83	4.83	40.00
			0.00			1/2" Ice	7.54	7.54	81.87
			7.50			1" Ice	9.10	9.10	133.46
Omni 3"x10'	B	From Leg	0.00	0.0000	100.00	No Ice	3.00	3.00	20.00
			0.00			1/2" Ice	4.03	4.03	41.79
			5.00			1" Ice	5.03	5.03	70.14
PiROD 12' T-Frame	C	From Face	1.50	0.0000	98.50	No Ice	12.20	12.20	360.00
			0.00			1/2" Ice	17.60	17.60	490.00
			0.00			1" Ice	23.00	23.00	620.00
Omni 3"x8'	B	From Leg	3.00	0.0000	100.00	No Ice	2.40	2.40	25.00
			0.00			1/2" Ice	3.19	3.19	42.51
			4.00			1" Ice	3.67	3.67	65.37
Omni 3"x8'	C	From Leg	3.00	0.0000	100.00	No Ice	2.40	2.40	25.00
			0.00			1/2" Ice	3.19	3.19	42.51
			4.00			1" Ice	3.67	3.67	65.37
PiROD 12' T-Frame	C	From Face	0.00	0.0000	98.50	No Ice	12.20	12.20	360.00
			0.00			1/2" Ice	17.60	17.60	490.00
			0.00			1" Ice	23.00	23.00	620.00
Omni 3"x8'	C	From Leg	3.00	0.0000	100.00	No Ice	2.40	2.40	25.00
			0.00			1/2" Ice	3.19	3.19	42.51
			4.00			1" Ice	3.67	3.67	65.37
**********									
PiROD 15' T-Frame (AT&T)	A	From Leg	1.50	0.0000	70.00	No Ice	15.00	15.00	500.00
			0.00			1/2" Ice	20.60	20.60	650.00
			0.00			1" Ice	26.20	26.20	800.00
PiROD 15' T-Frame	B	From Leg	1.50	0.0000	70.00	No Ice	15.00	15.00	500.00
			0.00			1/2" Ice	20.60	20.60	650.00
			0.00			1" Ice	26.20	26.20	800.00
PiROD 15' T-Frame	C	From Leg	1.50	0.0000	70.00	No Ice	15.00	15.00	500.00
			0.00			1/2" Ice	20.60	20.60	650.00
			0.00			1" Ice	26.20	26.20	800.00
(2) Powerwave 7770 w/mount pipe	A	From Leg	3.00	0.0000	70.00	No Ice	5.65	4.10	57.25
			0.00			1/2" Ice	6.03	4.75	103.17
			0.00			1" Ice	6.42	5.42	155.38
(2) Powerwave 7770 w/mount pipe	B	From Leg	3.00	0.0000	70.00	No Ice	5.65	4.10	57.25
			0.00			1/2" Ice	6.03	4.75	103.17
			0.00			1" Ice	6.42	5.42	155.38
(2) Powerwave 7770 w/mount pipe	C	From Leg	3.00	0.0000	70.00	No Ice	5.65	4.10	57.25
			0.00			1/2" Ice	6.03	4.75	103.17
			0.00			1" Ice	6.42	5.42	155.38
(2) Powerwave LGP21900	A	From Leg	3.00	0.0000	70.00	No Ice	0.20	0.10	5.50
			0.00			1/2" Ice	0.26	0.14	7.70
			0.00			1" Ice	0.33	0.19	10.94
(2) Powerwave LGP21900	B	From Leg	3.00	0.0000	70.00	No Ice	0.20	0.10	5.50
			0.00			1/2" Ice	0.26	0.14	7.70
			0.00			1" Ice	0.33	0.19	10.94
(2) Powerwave LGP21900	C	From Leg	3.00	0.0000	70.00	No Ice	0.20	0.10	5.50
			0.00			1/2" Ice	0.26	0.14	7.70
			0.00			1" Ice	0.33	0.19	10.94
(2) Powerwave TMA LGP21400	A	From Leg	3.00	0.0000	70.00	No Ice	1.05	0.38	14.10
			0.00			1/2" Ice	1.18	0.47	21.29
			0.00			1" Ice	1.32	0.57	30.37
(2) Powerwave TMA LGP21400	B	From Leg	3.00	0.0000	70.00	No Ice	1.05	0.38	14.10
			0.00			1/2" Ice	1.18	0.47	21.29

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1" Ice	1.32	0.57	30.37
(2) Powerwave TMA	C	From Leg	3.00	0.0000	70.00	No Ice	1.05	0.38	14.10
LGP21400			0.00			1/2" Ice	1.18	0.47	21.29
			0.00			1" Ice	1.32	0.57	30.37
**********									
KMW	A	From Leg	3.00	0.0000	70.00	No Ice	5.23	4.02	54.65
AM-X-CD-14-65-00T-RET			0.00			1/2" Ice	5.62	4.63	99.88
w/mount pipe			0.00			1" Ice	6.01	5.26	151.04
Powerwave P65-17-XLH-RR	B	From Leg	3.00	0.0000	70.00	No Ice	11.75	9.39	122.11
w/mount pipe			0.00			1/2" Ice	12.47	10.90	212.11
			0.00			1" Ice	13.18	12.24	313.12
KMW	C	From Leg	3.00	0.0000	70.00	No Ice	8.26	6.30	74.05
AM-X-CD-16-65-00T-RET			0.00			1/2" Ice	8.82	7.48	139.04
w/mount pipe			0.00			1" Ice	9.35	8.37	211.91
(2) Ericsson RRU	A	From Leg	3.00	0.0000	70.00	No Ice	1.77	0.93	44.00
			0.00			1/2" Ice	1.94	1.06	58.64
			0.00			1" Ice	2.11	1.20	75.83
(2) Ericsson RRU	B	From Leg	3.00	0.0000	70.00	No Ice	1.77	0.93	44.00
			0.00			1/2" Ice	1.94	1.06	58.64
			0.00			1" Ice	2.11	1.20	75.83
(2) Ericsson RRU	C	From Leg	3.00	0.0000	70.00	No Ice	1.77	0.93	44.00
			0.00			1/2" Ice	1.94	1.06	58.64
			0.00			1" Ice	2.11	1.20	75.83
Surge Arrestor	B	From Leg	0.50	0.0000	70.00	No Ice	0.79	0.79	20.00
(DC6-48-60-18-8F)			0.00			1/2" Ice	1.27	1.27	35.12
			0.00			1" Ice	1.45	1.45	52.57
PCTEL GPS-TMG-HR-26N	A	From Leg	0.50	0.0000	20.00	No Ice	0.08	0.08	1.00
			0.00			1/2" Ice	0.12	0.12	2.39
			0.00			1" Ice	0.18	0.18	4.51
**********									
PiROD 12' T-Frame	A	From Leg	1.50	0.0000	82.00	No Ice	12.20	12.20	360.00
(T-Mobile - existing)			0.00			1/2" Ice	17.60	17.60	490.00
			0.00			1" Ice	23.00	23.00	620.00
PiROD 12' T-Frame	B	From Leg	1.50	0.0000	82.00	No Ice	12.20	12.20	360.00
			0.00			1/2" Ice	17.60	17.60	490.00
			0.00			1" Ice	23.00	23.00	620.00
PiROD 12' T-Frame	C	From Leg	1.50	0.0000	82.00	No Ice	12.20	12.20	360.00
			0.00			1/2" Ice	17.60	17.60	490.00
			0.00			1" Ice	23.00	23.00	620.00
APX16DWV-16DWVS-E-A	A	From Leg	3.00	0.0000	82.00	No Ice	6.78	3.57	62.60
20 w/mount pipe			0.00			1/2" Ice	7.26	4.41	111.44
			0.00			1" Ice	7.73	5.13	166.82
APX16DWV-16DWVS-E-A	B	From Leg	3.00	0.0000	82.00	No Ice	6.78	3.57	62.60
20 w/mount pipe			0.00			1/2" Ice	7.26	4.41	111.44
			0.00			1" Ice	7.73	5.13	166.82
APX16DWV-16DWVS-E-A	C	From Leg	3.00	0.0000	82.00	No Ice	6.78	3.57	62.60
20 w/mount pipe			0.00			1/2" Ice	7.26	4.41	111.44
			0.00			1" Ice	7.73	5.13	166.82
(2) RRUS 11	A	From Leg	2.00	0.0000	82.00	No Ice	2.83	1.18	51.00
			0.00			1/2" Ice	3.04	1.33	71.87
			0.00			1" Ice	3.26	1.48	95.79
(2) RRUS 11	B	From Leg	2.00	0.0000	82.00	No Ice	2.83	1.18	51.00
			0.00			1/2" Ice	3.04	1.33	71.87
			0.00			1" Ice	3.26	1.48	95.79
(2) RRUS 11	C	From Leg	2.00	0.0000	82.00	No Ice	2.83	1.18	51.00
			0.00			1/2" Ice	3.04	1.33	71.87
			0.00			1" Ice	3.26	1.48	95.79

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
**********									
APXVAARR24_43-U-NA20	A	From Leg	3.00	0.0000	82.00	No Ice	20.24	11.19	174.32
w/mount pipe			0.00			1/2" Ice	20.89	12.62	311.78
(T-Mobile - proposed)			0.00			1" Ice	21.55	13.71	460.89
APXVAARR24_43-U-NA20	B	From Leg	3.00	0.0000	82.00	No Ice	20.24	11.19	174.32
w/mount pipe			0.00			1/2" Ice	20.89	12.62	311.78
			0.00			1" Ice	21.55	13.71	460.89
APXVAARR24_43-U-NA20	C	From Leg	3.00	0.0000	82.00	No Ice	20.24	11.19	174.32
w/mount pipe			0.00			1/2" Ice	20.89	12.62	311.78
			0.00			1" Ice	21.55	13.71	460.89
Radio 4449	A	From Leg	2.00	0.0000	82.00	No Ice	1.65	1.16	74.00
			0.00			1/2" Ice	1.81	1.30	90.16
			0.00			1" Ice	1.98	1.45	108.95
Radio 4449	B	From Leg	2.00	0.0000	82.00	No Ice	1.65	1.16	74.00
			0.00			1/2" Ice	1.81	1.30	90.16
			0.00			1" Ice	1.98	1.45	108.95
Radio 4449	C	From Leg	2.00	0.0000	82.00	No Ice	1.65	1.16	74.00
			0.00			1/2" Ice	1.81	1.30	90.16
			0.00			1" Ice	1.98	1.45	108.95

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
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	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp

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

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	18	192143.64	12386.91	-6885.93
	Max. H_x	18	192143.64	12386.91	-6885.93
	Max. H_z	5	-148850.30	-9730.33	7069.71
	Min. Vert	7	-174831.76	-12323.23	6818.16
	Min. H_x	7	-174831.76	-12323.23	6818.16
	Min. H_z	18	192143.64	12386.91	-6885.93
Leg B	Max. Vert	10	192260.55	-12310.34	-6848.04
	Max. H_x	23	-174886.06	12236.96	6775.04
	Max. H_z	25	-150338.65	9765.37	7098.16
	Min. Vert	23	-174886.06	12236.96	6775.04
	Min. H_x	10	192260.55	-12310.34	-6848.04
	Min. H_z	10	192260.55	-12310.34	-6848.04
Leg A	Max. Vert	2	188370.87	5.47	13808.07
	Max. H_x	21	5651.64	2286.23	229.83
	Max. H_z	2	188370.87	5.47	13808.07
	Min. Vert	15	-171830.10	-5.79	-13681.36
	Min. H_x	9	5651.65	-2285.91	229.83
	Min. H_z	15	-171830.10	-5.79	-13681.36

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	19605.87	0.00	-0.00	2189.82	-147.47	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	23527.11	0.00	-24655.87	-1563422.68	-178.07	97.35
0.9 Dead+1.6 Wind 0 deg - No	17645.35	0.00	-24655.91	-1562833.84	-133.66	97.13

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Ice						
1.2 Dead+1.6 Wind 30 deg - No Ice	23527.06	12159.01	-21059.89	-1339331.65	-774951.85	2477.65
0.9 Dead+1.6 Wind 30 deg - No Ice	17645.29	12159.00	-21059.90	-1338923.13	-774293.01	2475.58
1.2 Dead+1.6 Wind 60 deg - No Ice	23526.99	21332.63	-12316.41	-780926.76	-1357365.69	4227.43
0.9 Dead+1.6 Wind 60 deg - No Ice	17645.23	21332.61	-12316.41	-780967.50	-1356243.20	4223.85
1.2 Dead+1.6 Wind 90 deg - No Ice	23527.06	25112.37	-0.05	2659.28	-1594609.80	4846.15
0.9 Dead+1.6 Wind 90 deg - No Ice	17645.29	25112.38	-0.04	1992.84	-1593295.12	4841.98
1.2 Dead+1.6 Wind 120 deg - No Ice	23527.12	21806.05	12589.79	800455.00	-1382038.81	4129.55
0.9 Dead+1.6 Wind 120 deg - No Ice	17645.36	21806.09	12589.80	799156.03	-1380889.39	4126.07
1.2 Dead+1.6 Wind 150 deg - No Ice	23527.06	12189.14	21112.35	1357728.87	-782562.25	2308.51
0.9 Dead+1.6 Wind 150 deg - No Ice	17645.29	12189.16	21112.35	1355987.08	-781888.42	2306.82
1.2 Dead+1.6 Wind 180 deg - No Ice	23527.00	-0.00	23919.37	1540916.39	-179.07	-97.36
0.9 Dead+1.6 Wind 180 deg - No Ice	17645.24	-0.00	23919.35	1539029.74	-134.42	-97.14
1.2 Dead+1.6 Wind 210 deg - No Ice	23527.06	-12158.89	21059.95	1344596.46	774621.96	-2477.56
0.9 Dead+1.6 Wind 210 deg - No Ice	17645.29	-12158.91	21059.95	1342867.69	774045.01	-2475.52
1.2 Dead+1.6 Wind 240 deg - No Ice	23527.12	-21970.41	12684.69	800103.69	1381072.63	-4226.82
0.9 Dead+1.6 Wind 240 deg - No Ice	17645.36	-21970.45	12684.70	798806.68	1380015.83	-4223.15
1.2 Dead+1.6 Wind 270 deg - No Ice	23527.06	-25112.37	-0.05	2659.40	1594254.58	-4846.15
0.9 Dead+1.6 Wind 270 deg - No Ice	17645.29	-25112.38	-0.04	1992.93	1593028.96	-4841.99
1.2 Dead+1.6 Wind 300 deg - No Ice	23526.99	-21168.27	-12221.52	-781279.70	1357620.67	-4130.17
0.9 Dead+1.6 Wind 300 deg - No Ice	17645.23	-21168.25	-12221.51	-781318.46	1356583.65	-4126.78
1.2 Dead+1.6 Wind 330 deg - No Ice	23527.06	-12189.26	-21112.28	-1352465.95	782178.45	-2308.61
0.9 Dead+1.6 Wind 330 deg - No Ice	17645.29	-12189.25	-21112.30	-1352044.34	781600.97	-2306.89
1.2 Dead+1.0 Ice+1.0 Temp	48298.38	0.00	-0.00	6503.04	-224.97	0.01
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	48298.38	-0.00	-4789.64	-302400.02	-225.90	-50.16
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	48298.38	2382.20	-4126.09	-259867.45	-154038.77	483.70
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	48298.38	4160.54	-2402.09	-148332.82	-268506.01	886.88
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	48298.38	4852.58	-0.00	6556.09	-312855.59	1053.91
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	48298.38	4224.31	2438.91	163529.63	-272118.81	937.22
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	48298.38	2385.79	4132.31	274450.46	-154899.75	570.41
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	48298.38	-0.00	4723.19	313047.95	-226.81	50.17
1.2 Dead+1.0 Wind 210	48298.38	-2382.20	4126.09	272969.58	153591.29	-483.43

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	48298.38	-4218.09	2435.31	162674.44	270184.93	-886.97
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	48298.38	-4852.58	-0.00	6555.73	312402.92	-1053.91
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	48298.38	-4166.76	-2405.68	-149188.08	269534.64	-937.13
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	48298.38	-2385.79	-4132.32	-261348.51	154441.76	-570.67
Dead+Wind 0 deg - Service	19605.87	0.00	-3852.60	-242368.99	-147.88	15.20
Dead+Wind 30 deg - Service	19605.87	1899.88	-3290.68	-207375.16	-121144.74	389.72
Dead+Wind 60 deg - Service	19605.87	3333.30	-1924.48	-120171.10	-212098.64	660.51
Dead+Wind 90 deg - Service	19605.87	3923.91	-0.00	2198.66	-249147.87	753.91
Dead+Wind 120 deg - Service	19605.87	3407.31	1967.21	126790.41	-215948.98	644.97
Dead+Wind 150 deg - Service	19605.87	1904.60	3298.87	213821.55	-122330.23	363.42
Dead+Wind 180 deg - Service	19605.87	0.00	3737.48	242428.92	-148.01	-15.19
Dead+Wind 210 deg - Service	19605.87	-1899.88	3290.68	211770.77	120850.20	-389.72
Dead+Wind 240 deg - Service	19605.87	-3433.00	1982.04	126735.59	215558.06	-660.14
Dead+Wind 270 deg - Service	19605.87	-3923.91	-0.00	2198.68	248852.03	-753.91
Dead+Wind 300 deg - Service	19605.87	-3307.61	-1909.65	-120225.91	211897.54	-644.93
Dead+Wind 330 deg - Service	19605.87	-1904.60	-3298.87	-209425.98	122033.01	-363.42

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	100 - 80	0.918	43	0.0583	0.0297
T2	80 - 60	0.672	43	0.0540	0.0232
T3	60 - 40	0.413	43	0.0465	0.0126
T4	40 - 20	0.206	47	0.0324	0.0066
T5	20 - 0	0.068	47	0.0161	0.0028

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.00	Lightning Rod	43	0.918	0.0583	0.0297	404690
98.50	PiROD 12' T-Frame	43	0.900	0.0580	0.0293	404690
82.00	PiROD 12' T-Frame	43	0.697	0.0545	0.0241	116409
70.00	PiROD 15' T-Frame	43	0.540	0.0510	0.0178	246468
20.00	PCTEL GPS-TMG-HR-26N	47	0.068	0.0161	0.0028	56936

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	100 - 80	Leg	2 1/4	2	-13814.70	127031.00	10.9	Pass
T2	80 - 60	Leg	3	47	-54878.70	155959.00	35.2	Pass
T3	60 - 40	Leg	3 1/4	68	-104092.00	203387.00	51.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T4	40 - 20	Leg	3 1/2	89	-147101.00	256463.00	57.4	Pass
T5	20 - 0	Leg	3 3/4	110	-185844.00	314965.00	59.0	Pass
T1	100 - 80	Diagonal	1	11	-3707.21	11398.90	32.5	Pass
T2	80 - 60	Diagonal	L2x2x3/16	49	-8165.12	9529.62	85.7	Pass
T3	60 - 40	Diagonal	L2x2x1/4	70	-7406.75	10132.60	73.1	Pass
T4	40 - 20	Diagonal	L2x2x1/4	91	-7158.26	8339.04	85.8	Pass
T5	20 - 0	Diagonal	L2 1/2x2 1/2x3/16	112	-7193.71	10664.20	67.5	Pass
T1	100 - 80	Top Girt	1	5	-119.71	6785.94	1.8	Pass
T1	100 - 80	Bottom Girt	1	9	-453.01	6785.94	6.7	Pass
							Summary	
						Leg (T5)	59.0	Pass
						Diagonal (T4)	85.8	Pass
						Top Girt (T1)	1.8	Pass
						Bottom Girt (T1)	6.7	Pass
						RATING =	**85.8**	**Pass**

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

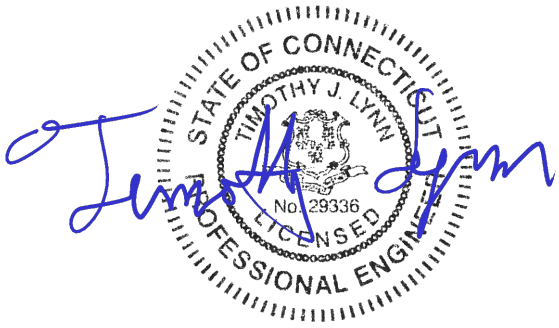
T-Mobile Site #: CT11451G

27 Maynard Road
Salem, CT

Centek Project No. 19027.19

Date: April 30, 2019

Max Stress Ratio = 86.7%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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CENTEK engineering

Centered on Solutions℠

April 30, 2019

Mr. Dan Reid
Transcend Wireless
10 Industrial Ave
Mahwah, NJ 07430

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CT11451G
27 Maynard Road
Salem, CT 06420

Centek Project No. 19027.19

Dear Mr. Reid,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing mount, consisting three (3) V-Frame (SitePro P/N: VFA10-U) sector mounts with stiff arms to support the proposed equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2015 International Building Code as modified by the 2018 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- T-Mobile:
  V-Arms: Three (3) RFS APX16DWV-16DWV-S-E-A20 panel antennas, three (3) RFS APXVAARR24_43-U-NA20 panel antennas, three (3) Ericsson RRUS11 B2 remote radio units, three (3) Ericsson RRUS11 B4 remote radio units and three (3) Ericsson 4449 B71 B12 remote radio units mounted on three (3) T-Arms with a RAD center elevation of 82-ft +/- AGL.

The antenna mount was analyzed per the requirements of the 2015 International Building Code as modified by the 2018 Connecticut State Building Code considering a nominal design wind speed of 105 mph for Salem as required in Appendix N of the 2018 Connecticut State Building Code.

A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the installation, it is our opinion that the subject antenna mount has sufficient capacity to support the aforementioned antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Prepared by:

Fernando J. Palacios
Engineer

Section 2 - Calculations

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: Loads on Equipment

Location: Salem, CT

Rev. 0: 04/25/19

Prepared by: F.J.P Checked by: C.A.G.
Job No. 19027.19

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed	$V := 105$	mph	(User Input - 2018 CSBC Appendix N)
Basic Wind Speed with Ice	$V_i := 50$	mph	(User Input per Annex B of TIA-222-G)

Input

Structure Type =	Structure_Type := Lattice		(User Input)
Structure Category =	SC := II		(User Input)
Exposure Category =	Exp := C		(User Input)
Structure Height =	$h := 100$	ft	(User Input)
Height to Center of Antennas =	$z := 82$	ft	(User Input)
Radial Ice Thickness =	$t_i := 0.75$	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)
Topograpic Factor =	$K_{zt} := 1.0$		(User Input)
	$K_a := 1.0$		(User Input)
Gust Response Factor =	$G_H = 1.2$		(User Input)

Output

Wind Direction Probability Factor =

$$K_d := \begin{cases} 0.95 & \text{if Structure\_Type} = \text{Pole} \\ 0.85 & \text{if Structure\_Type} = \text{Lattice} \end{cases} = 0.85$$

(Per Table 2-2 of TIA-222-G)

(Per Table 2-3 of TIA-222-G)

Importance Factors =

$$I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1$$

$$K_{iz} := \left(\frac{z}{33}\right)^{0.1} = 1.095$$

Velocity Pressure Coefficient Antennas =

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.643$$

$$Kz := 2.01 \cdot \left(\left(\frac{z}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.214$$

Velocity Pressure w/o Ice Antennas = $qz := 0.00256 \cdot K_d \cdot Kz \cdot V^2 \cdot I_{Wind} = 29.12$ psf

Velocity Pressure with Ice Antennas = $qz_{ice} := 0.00256 \cdot K_d \cdot Kz \cdot V_i^2 \cdot I_{Wind} = 6.603$ psf

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAARR24_43-U-NA20		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 19.7$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 133.4$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.9$		
Antenna Force Coefficient =	$Ca_{ant} = 1.31$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 13.1$	sf
Total Antenna Wind Force Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 598$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 264$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 15.8$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 164$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.3$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 85$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 133$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \cdot 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \cdot 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 353$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 353$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS - APX16DWV-16DWV-S-E-A20		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)
Antenna Width =	$W_{ant} := 13$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)
Antenna Weight =	$WT_{ant} := 48.4$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.3$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$	sf
Total Antenna Wind Force Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 226$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.2$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 55$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.7$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 68$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 2.6$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 27$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 48$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 3914$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 127$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 127$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson 4449 B71B12		
RRUS Shape =	Flat		(User Input)
RRUS Height =	$L_{RRUS} := 14.9$	in	(User Input)
RRUS Width =	$W_{RRUS} := 13.2$	in	(User Input)
RRUS Thickness =	$T_{RRUS} := 10.4$	in	(User Input)
RRUS Weight =	$WT_{RRUS} := 74$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$		
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$		

Wind Load (without ice)

Surface Area for One RRUS =	$SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 57$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 45$	lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 20$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.7$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 16$	lbs

Gravity Load (without ice)

Weight of All RRUSs =	$WT_{RRUS} \cdot N_{RRUS} = 74$	lbs

Gravity Loads (ice only)

Volume of Each RRUS =	$V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$	cu in
Volume of Ice on Each RRUS =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2058$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 67$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 67$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson RRUS 11		
RRUS Shape =	Flat		(User Input)
RRUS Height =	$L_{RRUS} := 19.7$	in	(User Input)
RRUS Width =	$W_{RRUS} := 16.97$	in	(User Input)
RRUS Thickness =	$T_{RRUS} := 7.2$	in	(User Input)
RRUS Weight =	$WT_{RRUS} := 50.7$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.2$		
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$		

Wind Load (without ice)

Surface Area for One RRUS =	$SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 2.3$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 97$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 41$	lbs

Wind Load (with ice)

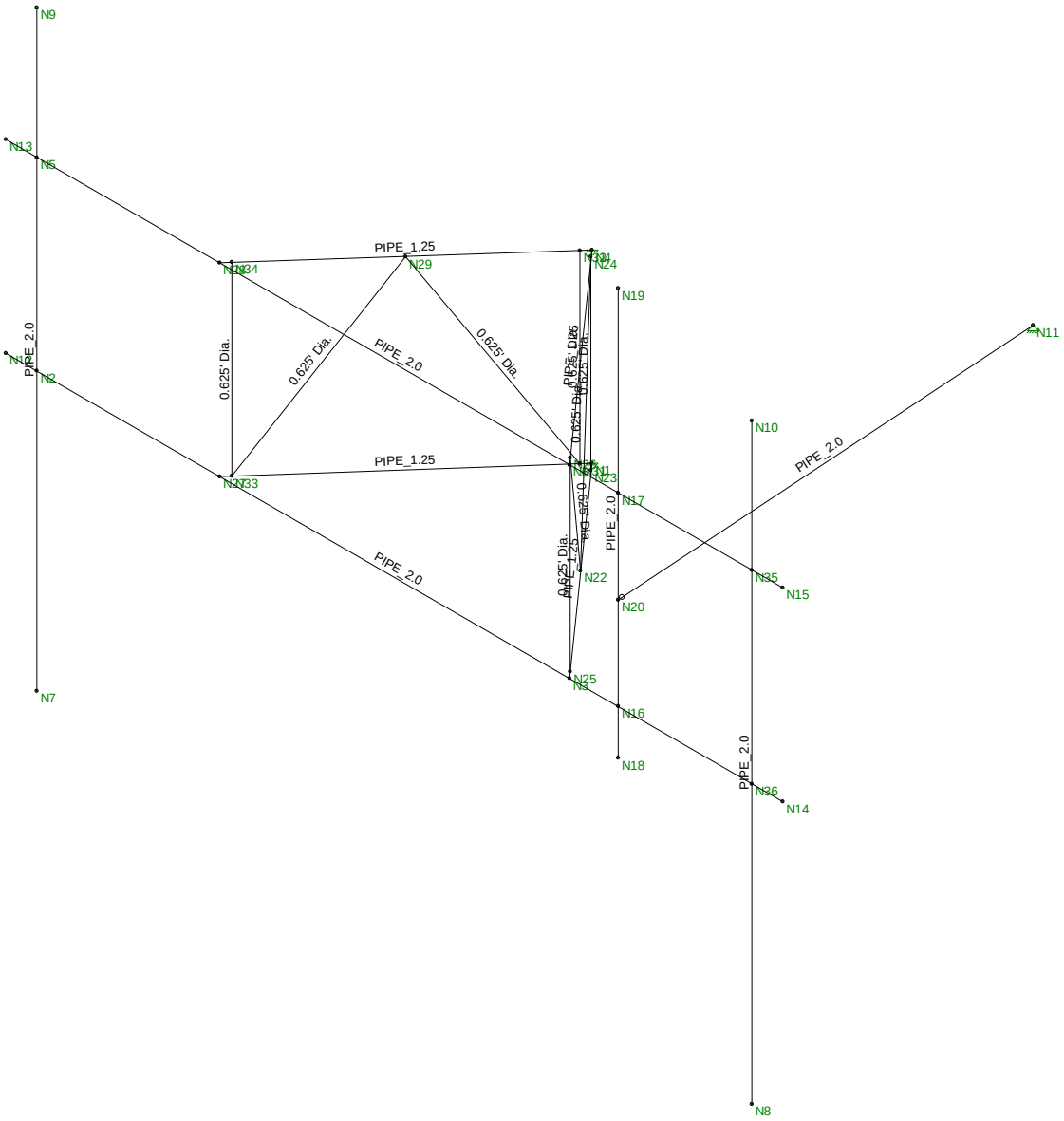
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 3.2$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 31$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.7$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 16$	lbs

Gravity Load (without ice)

Weight of All RRUSs =	$WT_{RRUS} \cdot N_{RRUS} = 51$	lbs

Gravity Loads (ice only)

Volume of Each RRUS =	$V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2407$	cu in
Volume of Ice on Each RRUS =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2475$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 80$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 80$	lbs



Envelope Only Solution

Centek Engineering		
FJP	CT11451G	Apr 30, 2019 at 10:43 AM
19027.19	Member Framing	CT11451G_AMA.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Grade B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[..	Lcomp bot[..	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	(E) Antenn...	8			Lbyy						Lateral
2	M2	(E) Antenn...	8			Lbyy						Lateral
3	M3	(E) Pipe 1...	3.564			Lbyy						Lateral
4	M4	(E) Pipe 1...	3.564			Lbyy						Lateral
5	M5	(E) Horizo...	5.69			Lbyy						Lateral
6	M6	(E) Horizo...	10.5			Lbyy						Lateral
7	M7	(E) Horizo...	10.5			Lbyy						Lateral
8	M8	(E) Antenn...	5.5			Lbyy						Lateral
9	M9	(E) SR5/8	2.5			Lbyy						Lateral
10	M10	(E) SR5/8	3.005			Lbyy						Lateral
11	M11	(E) SR5/8	3.005			Lbyy						Lateral
12	M12	(E) SR5/8	2.5			Lbyy						Lateral
13	M13	(E) Pipe 1...	3.564			Lbyy						Lateral
14	M14	(E) Pipe 1...	3.564			Lbyy						Lateral
15	M15	(E) SR5/8	2.5			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[..	Lcomp bot[..	L-torq...	Kyy	Kzz	Cb	Functi...
16	M16	(E) SR5/8	3.005			Lbyy						Lateral
17	M17	(E) SR5/8	3.005			Lbyy						Lateral
18	M18	(E) SR5/8	2.5			Lbyy						Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Desig..	A [in2]	Iyy [i...	Izz [i..	J [in4]
1	(E) Pipe 1.25	PIPE_1.25	Beam	Pipe	A53 Grade B	Typical	.625	.184	.184	.368
2	(E) Horizontals Pipe 2.0	PIPE_2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
3	(E) SR5/8	0.625' Dia.	Colu...	BAR	A36 Gr.36	Typical	.307	.007	.007	.015
4	(E) Antenna Mast Pip...	PIPE_2.0	Colu...	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N7	N9			(E) Antenna Mast ...	Column	Pipe	A53 Grad...	Typical
2	M2	N8	N10			(E) Antenna Mast ...	Column	Pipe	A53 Grad...	Typical
3	M3	N4	N6			(E) Pipe 1.25	Beam	Pipe	A53 Grad...	Typical
4	M4	N1	N3			(E) Pipe 1.25	Beam	Pipe	A53 Grad...	Typical
5	M5	N11	N20			(E) Horizontals Pip...	Beam	Pipe	A53 Grad...	Typical
6	M6	N13	N15			(E) Horizontals Pip...	Beam	Pipe	A53 Grad...	Typical
7	M7	N12	N14			(E) Horizontals Pip...	Beam	Pipe	A53 Grad...	Typical
8	M8	N18	N19			(E) Antenna Mast ...	Column	Pipe	A53 Grad...	Typical
9	M9	N24	N23			(E) SR5/8	Column	BAR	A36 Gr.36	Typical
10	M10	N24	N22			(E) SR5/8	Column	BAR	A36 Gr.36	Typical
11	M11	N22	N26			(E) SR5/8	Column	BAR	A36 Gr.36	Typical
12	M12	N25	N26			(E) SR5/8	Column	BAR	A36 Gr.36	Typical
13	M13	N4	N28			(E) Pipe 1.25	Beam	Pipe	A53 Grad...	Typical
14	M14	N1	N27			(E) Pipe 1.25	Beam	Pipe	A53 Grad...	Typical
15	M15	N32	N31			(E) SR5/8	Column	BAR	A36 Gr.36	Typical
16	M16	N31	N29			(E) SR5/8	Column	BAR	A36 Gr.36	Typical
17	M17	N29	N33			(E) SR5/8	Column	BAR	A36 Gr.36	Typical
18	M18	N33	N34			(E) SR5/8	Column	BAR	A36 Gr.36	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
1	N1	-1.125	0.4165	-0.166667	0	
2	N2	-5.958333	0.4165	2.5	0	
3	N3	1.239583	0.4165	2.5	0	
4	N4	-1.125	2.9165	-0.166667	0	
5	N5	-5.958333	2.9165	2.5	0	
6	N6	1.239583	2.9165	2.5	0	
7	N7	-5.958333	-3.3335	2.5	0	
8	N8	3.708333	-3.3335	2.5	0	
9	N9	-5.958333	4.6665	2.5	0	
10	N10	3.708333	4.6665	2.5	0	
11	N11	1.825	2	-3.18	0	
12	N12	-6.375	0.4165	2.5	0	
13	N13	-6.375	2.9165	2.5	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
14	N14	4.125	0.4165	2.5	0	
15	N15	4.125	2.9165	2.5	0	
16	N16	1.895833	0.4165	2.5	0	
17	N17	1.895833	2.9165	2.5	0	
18	N18	1.895833	-0.1876...	2.5	0	
19	N19	1.895833	5.312333	2.5	0	
20	N20	1.895833	1.6665	2.5	0	
21	N22	0.057292	0.4165	1.166667	0	
22	N23	-1.048979	0.4165	-0.080934	0	
23	N24	-1.048979	2.9165	-0.080934	0	
24	N25	1.163562	0.4165	2.414267	0	
25	N26	1.163562	2.9165	2.414267	0	
26	N27	-3.489583	0.4165	2.5	0	
27	N28	-3.489583	2.9165	2.5	0	
28	N29	-2.307292	2.9165	1.166667	0	
29	N31	-1.201021	0.4165	-0.080934	0	
30	N32	-1.201021	2.9165	-0.080934	0	
31	N33	-3.413562	0.4165	2.414267	0	
32	N34	-3.413562	2.9165	2.414267	0	
33	N35	3.708333	2.9165	2.5	0	
34	N36	3.708333	0.4165	2.5	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N4	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N11	Reaction	Reaction	Reaction			
4	N23						
5	N24						
6	N31						
7	N32						

Member Point Loads (BLC 2 : Dead Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.024	1.25
2	M1	Y	-.024	6.75
3	M1	Y	-.051	4.167
4	M1	Y	-.051	5.417
5	M2	Y	-.067	.5
6	M2	Y	-.067	7.5
7	M2	Y	-.074	4

Member Point Loads (BLC 3 : Ice Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.064	6.75
2	M1	Y	-.064	1.25
3	M1	Y	-.08	4.167
4	M1	Y	-.08	5.417

Member Point Loads (BLC 3 : Ice Load) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
5	M2	Y	-.176	.5
6	M2	Y	-.176	7.5
7	M2	Y	-.067	4

Member Point Loads (BLC 4 : Wind with Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.013	6.75
2	M1	X	.013	1.25
3	M1	X	.016	4.167
4	M1	X	.016	5.417
5	M2	X	.043	.5
6	M2	X	.043	7.5
7	M2	X	.016	4

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.027	6.75
2	M1	X	.027	1.25
3	M1	X	.041	4.167
4	M1	X	.041	5.417
5	M2	X	.132	.5
6	M2	X	.132	7.5
7	M2	X	.045	4

Member Point Loads (BLC 6 : Wind with Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	.034	1.25
2	M1	Z	.034	6.75
3	M1	Z	.031	4.167
4	M1	Z	.031	5.417
5	M2	Z	.082	.5
6	M2	Z	.082	7.5
7	M2	Z	.02	4

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	.113	1.25
2	M1	Z	.113	6.75
3	M1	Z	.097	4.167
4	M1	Z	.097	5.417
5	M2	Z	.299	.5
6	M2	Z	.299	7.5
7	M2	Z	.057	4

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (i...
No Data to Print ...			

Member Distributed Loads (BLC 4 : Wind with Ice X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.001	.001	0	0
2	M2	X	.001	.001	0	0
3	M8	X	.001	.001	0	0
4	M3	X	.0009	.0009	0	0
5	M4	X	.0009	.0009	0	0
6	M13	X	.0009	.0009	0	0
7	M14	X	.0009	.0009	0	0
8	M9	X	.0003	.0003	0	0
9	M10	X	.0003	.0003	0	0
10	M11	X	.0003	.0003	0	0
11	M12	X	.0003	.0003	0	0
12	M15	X	.0003	.0003	0	0
13	M16	X	.0003	.0003	0	0
14	M17	X	.0003	.0003	0	0
15	M18	X	.0003	.0003	0	0
16	M5	X	.001	.001	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.006	.006	0	0
2	M2	X	.006	.006	0	0
3	M8	X	.006	.006	0	0
4	M3	X	.004	.004	0	0
5	M4	X	.004	.004	0	0
6	M13	X	.004	.004	0	0
7	M14	X	.004	.004	0	0
8	M9	X	.002	.002	0	0
9	M10	X	.002	.002	0	0
10	M11	X	.002	.002	0	0
11	M12	X	.002	.002	0	0
12	M15	X	.002	.002	0	0
13	M16	X	.002	.002	0	0
14	M17	X	.002	.002	0	0
15	M18	X	.002	.002	0	0
16	M5	X	.006	.006	0	0

Member Distributed Loads (BLC 6 : Wind with Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.001	.001	0	0
2	M2	Z	.001	.001	0	0
3	M8	Z	.001	.001	0	0
4	M6	Z	.001	.001	0	0
5	M7	Z	.001	.001	0	0
6	M3	Z	.0009	.0009	0	0
7	M4	Z	.0009	.0009	0	0
8	M13	Z	.0009	.0009	0	0
9	M14	Z	.0009	.0009	0	0
10	M9	Z	.0003	.0003	0	0
11	M10	Z	.0003	.0003	0	0
12	M11	Z	.0003	.0003	0	0

Member Distributed Loads (BLC 6 : Wind with Ice Z) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
13	M12	Z	.0003	.0003	0	0
14	M15	Z	.0003	.0003	0	0
15	M16	Z	.0003	.0003	0	0
16	M17	Z	.0003	.0003	0	0
17	M18	Z	.0003	.0003	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.006	.006	0	0
2	M2	Z	.006	.006	0	0
3	M8	Z	.006	.006	0	0
4	M6	Z	.006	.006	0	0
5	M7	Z	.006	.006	0	0
6	M3	Z	.004	.004	0	0
7	M4	Z	.004	.004	0	0
8	M13	Z	.004	.004	0	0
9	M14	Z	.004	.004	0	0
10	M9	Z	.002	.002	0	0
11	M10	Z	.002	.002	0	0
12	M11	Z	.002	.002	0	0
13	M12	Z	.002	.002	0	0
14	M15	Z	.002	.002	0	0
15	M16	Z	.002	.002	0	0
16	M17	Z	.002	.002	0	0
17	M18	Z	.002	.002	0	0

Basic Load Cases

	BLC Description	Category	X Gr...	Y Gr...	Z Gr...	Joint	Point	Distri...	Area(...	Surface(Plate/Wall)
1	Self Weight	DL		-1						
2	Dead Load	None					7			
3	Ice Load	None					7			
4	Wind with Ice X	None					7	16		
5	Wind X	None					7	16		
6	Wind with Ice Z	None					7	17		
7	Wind Z	None					7	17		

Load Combinations

	Description	Solve	P...	SR...	BLC	F...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.2D + 1.6W (X-direction)	Yes	Y		1	1...	2	1.2	5	1.6																
2	0.9D + 1.6W (X-direction)	Yes	Y		1	.9	2	.9	5	1.6																
3	1.2D + 1.0Di + 1.0Wi (X...	Yes	Y		1	1...	2	1.2	3	1	4	1														
4	1.2D + 1.6W (Z-direction)	Yes	Y		1	1...	2	1.2	7	1.6																
5	0.9D + 1.6W (Z-direction)	Yes	Y		1	.9	2	.9	7	1.6																
6	1.2D + 1.0Di + 1.0Wi (Z...	Yes	Y		1	1...	2	1.2	3	1	6	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	.404	6	.601	3	1.345	3	.025	5	.056	6	.004	3
2		min	-.643	2	.115	5	-.896	5	-.035	1	-.176	2	-.03	4
3	N4	max	-.077	5	.812	6	-.582	5	-.013	5	-.094	2	.047	6
4		min	-.501	1	.267	2	-1.506	3	-.053	3	-.294	4	.005	2
5	N11	max	-.002	6	.059	4	.821	2	0	6	0	6	0	6
6		min	-.017	1	-.039	2	-.797	4	0	1	0	1	0	1
7	Totals:	max	0	6	1.4	6	0	3						
8		min	-1.12	1	.52	2	-2.274	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N1	max	0	6	0	6	0	6	0	6	0	6	0	6
2		min	0	1	0	1	0	1	0	1	0	1	0	1
3	N2	max	.064	2	-.004	5	.843	5	1.553e-03	3	3.02e-02	4	2.165e-03	2
4		min	-.02	6	-.101	3	.002	3	-6.614e-03	5	7.921e-04	3	-1.586e-03	4
5	N3	max	.063	2	.002	5	.017	6	2.052e-03	2	-6.992e-04	3	8.036e-05	2
6		min	-.022	6	-.02	3	-.054	2	-7.991e-03	4	-1.483e-02	4	-3.75e-03	6
7	N4	max	0	6	0	6	0	6	0	6	0	6	0	6
8		min	0	1	0	1	0	1	0	1	0	1	0	1
9	N5	max	.129	4	-.004	5	.749	4	1.407e-03	3	2.564e-02	5	1.453e-03	2
10		min	.03	2	-.101	3	.052	3	-1.191e-03	5	3.558e-04	3	-1.58e-03	4
11	N6	max	.129	4	-.005	5	-.023	2	-1.237e-04	5	4.271e-04	3	-3.498e-04	2
12		min	.03	2	-.018	3	-.113	4	-1.46e-03	3	-8.229e-03	5	-3.742e-03	6
13	N7	max	.237	2	-.004	5	1.365	5	1.547e-03	3	3.02e-02	4	4.341e-03	2
14		min	-.046	6	-.101	3	-.068	3	-1.304e-02	5	7.921e-04	3	-1.584e-03	4
15	N8	max	.592	2	.007	2	2.497	4	1.851e-03	2	-3.285e-04	3	1.509e-02	2
16		min	-.205	6	-.165	6	-.084	2	-4.645e-02	4	-3.092e-02	5	-4.066e-03	6
17	N9	max	.162	4	-.004	5	.733	4	1.428e-03	6	2.564e-02	5	1.314e-03	2
18		min	.002	2	-.101	3	.077	2	-1.052e-03	2	3.558e-04	3	-1.581e-03	4
19	N10	max	.2	4	.007	2	.503	5	3.529e-03	5	-2.877e-04	3	-2.088e-03	2
20		min	.066	2	-.164	6	-.071	3	-1.99e-03	3	-2.522e-02	5	-4.109e-03	6
21	N11	max	0	6	0	6	0	6	1.044e-03	6	1.389e-03	4	1.675e-03	2
22		min	0	1	0	1	0	1	3.454e-04	2	3.493e-04	3	-1.82e-03	6
23	N12	max	.064	2	.004	5	.994	5	1.553e-03	3	3.02e-02	4	2.166e-03	2
24		min	-.02	6	-.101	3	.006	3	-6.614e-03	5	7.921e-04	3	-1.586e-03	4
25	N13	max	.129	4	.004	5	.878	4	1.407e-03	3	2.564e-02	5	1.454e-03	2
26		min	.03	2	-.1	3	.054	3	-1.191e-03	5	3.558e-04	3	-1.58e-03	4
27	N14	max	.064	2	.023	2	.891	4	1.855e-03	2	-3.285e-04	3	3.237e-03	2
28		min	-.022	6	-.185	6	.009	2	-2.073e-02	4	-3.092e-02	5	-4.105e-03	6
29	N15	max	.129	4	.005	2	.573	5	5.065e-04	2	-2.877e-04	3	-3.683e-04	2
30		min	.03	2	-.185	6	-.028	3	-2.21e-03	6	-2.523e-02	5	-4.102e-03	6
31	N16	max	.064	2	-.006	2	.11	4	2.725e-03	2	-5.301e-04	3	1.509e-04	2
32		min	-.022	6	-.051	6	-.042	2	-9.884e-03	4	-2.212e-02	4	-4.22e-03	6
33	N17	max	.129	4	-.006	2	-.008	2	2.475e-05	5	-8.6e-05	3	5.704e-04	2
34		min	.03	2	-.051	6	-.037	6	-1.926e-03	3	-1.539e-02	5	-4.253e-03	6
35	N18	max	.065	2	-.006	2	.182	4	2.725e-03	2	-5.301e-04	3	1.545e-04	2
36		min	-.052	6	-.051	6	-.062	2	-9.888e-03	4	-2.212e-02	4	-4.22e-03	6
37	N19	max	.215	4	-.006	2	-.012	5	2.448e-04	5	-8.6e-05	3	3.504e-04	2
38		min	.018	2	-.051	6	-.09	6	-1.927e-03	3	-1.539e-02	5	-4.253e-03	6

Envelope Joint Displacements (Continued)

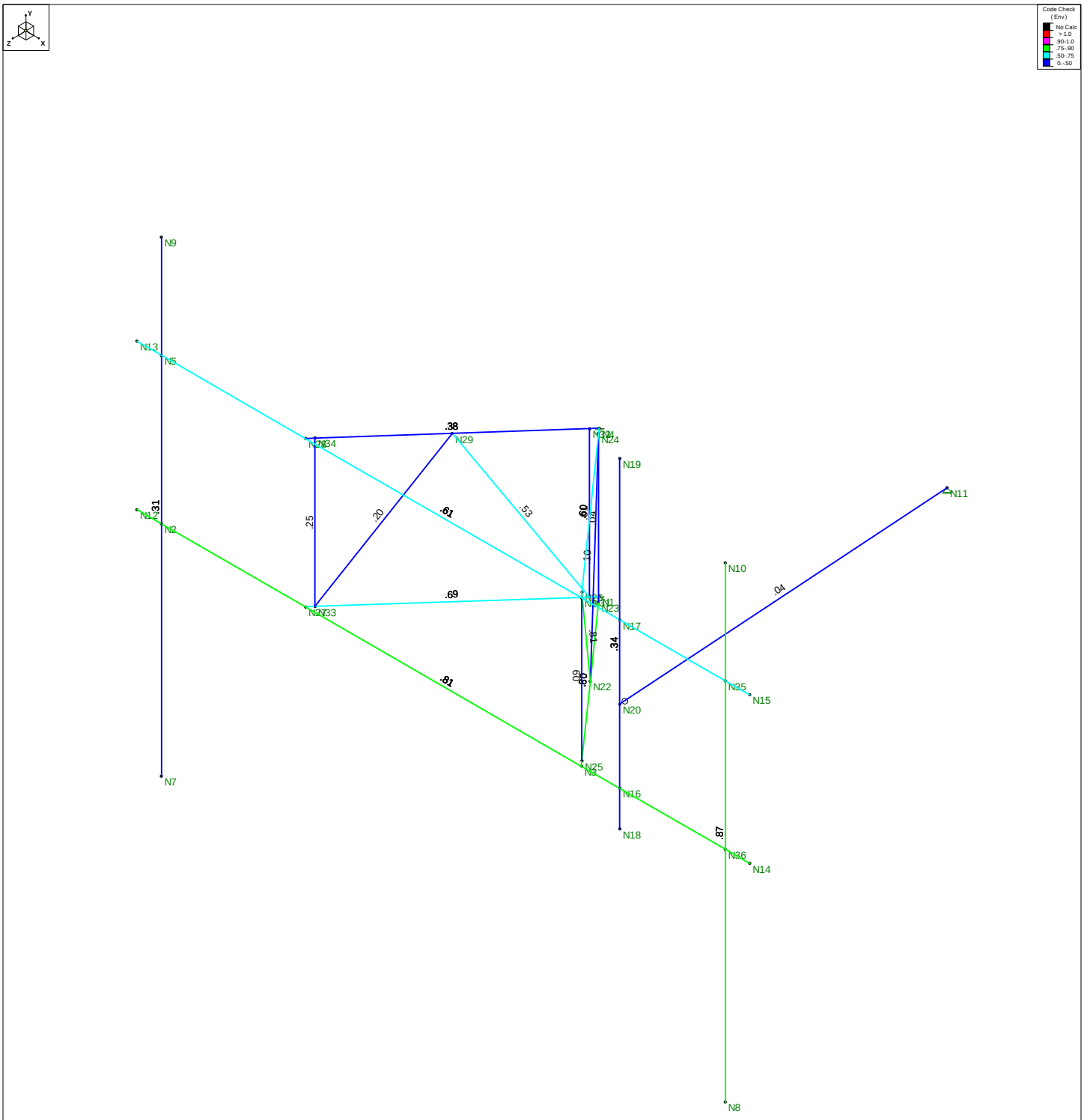
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
39	N20	max	.089	4	-.006	2	0	5	1.195e-03	2	-3.08e-04	3	1.47e-03	2
40		min	.012	3	-.051	6	-.004	1	-4.076e-03	4	-1.874e-02	5	-2.584e-03	4
41	N22	max	.082	5	-.002	2	.004	3	3.69e-04	2	5.781e-03	5	5.656e-04	2
42		min	-.007	3	-.008	6	-.071	5	-1.628e-03	4	-6.218e-04	3	-3.27e-03	4
43	N23	max	0	5	0	5	0	3	6.234e-05	1	1.129e-03	5	-1.68e-06	2
44		min	0	3	0	3	0	4	-1.808e-04	5	-5.978e-05	3	-1.605e-04	6
45	N24	max	0	4	0	5	0	3	5.557e-05	1	1.235e-03	4	-3.696e-05	5
46		min	0	3	0	3	0	5	-1.553e-05	5	2.088e-04	3	-1.821e-04	3
47	N25	max	.064	2	-.003	5	.014	6	1.828e-03	2	-3.316e-04	2	2.202e-04	2
48		min	-.018	6	-.018	3	-.055	2	-7.183e-03	4	-1.267e-02	4	-3.676e-03	6
49	N26	max	.136	4	-.003	5	-.024	2	-1.901e-04	5	5.949e-04	3	-3.613e-04	2
50		min	.031	2	-.016	3	-.12	4	-1.401e-03	6	-6.454e-03	5	-3.612e-03	6
51	N27	max	.064	2	.003	5	.056	2	5.031e-04	3	1.76e-02	5	3.046e-03	6
52		min	-.02	6	-.014	3	-.018	6	-5.026e-03	5	5.343e-05	3	1.189e-03	2
53	N28	max	.129	4	-.001	5	.117	4	6.763e-05	6	1.486e-02	4	3.091e-03	3
54		min	.03	2	-.015	3	.027	2	-7.307e-04	2	1.092e-03	3	7.796e-04	5
55	N29	max	.015	3	-.001	5	.015	3	-1.31e-04	5	2.395e-03	4	8.027e-04	1
56		min	.004	5	-.005	3	.005	5	-6.091e-04	3	8.88e-04	2	1.638e-04	5
57	N31	max	0	2	0	2	0	2	5.886e-05	4	2.214e-04	2	2.286e-04	4
58		min	0	4	0	6	0	4	-1.6e-05	3	-7.449e-04	4	3.145e-05	2
59	N32	max	0	3	0	5	0	3	3.266e-05	6	1.661e-04	3	1.039e-04	3
60		min	0	5	0	3	0	5	-1.304e-05	2	-1.464e-04	5	2.855e-05	5
61	N33	max	.061	2	0	5	.053	2	4.225e-04	3	1.564e-02	5	2.814e-03	6
62		min	-.023	6	-.011	3	-.02	6	-4.564e-03	5	-7.042e-05	3	1.114e-03	2
63	N34	max	.115	4	-.001	5	.104	4	-4.872e-05	6	1.375e-02	4	2.793e-03	3
64		min	.028	2	-.012	3	.025	2	-7.254e-04	2	1.203e-03	3	6.962e-04	5
65	N35	max	.129	4	.007	2	.447	5	5.065e-04	2	-2.877e-04	3	-3.679e-04	2
66		min	.03	2	-.164	6	-.03	3	-2.21e-03	6	-2.522e-02	5	-4.101e-03	6
67	N36	max	.064	2	.007	2	.736	4	1.855e-03	2	-3.285e-04	3	3.238e-03	2
68		min	-.022	6	-.164	6	0	2	-2.073e-02	4	-3.092e-02	5	-4.105e-03	6

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Me...	Shape	Code C...	Loc...	LC	Shear C...	Loc[ft]	Dir	LC	phi*Pn...	phi*P...	phi*Mn...	phi*...	Cb	Eqn
1	M1	PIPE_2.0	.312	3.75	4	.147	3.75		4	14.916	32.13	1.872	1.872	1.544	H1-1b
2	M2	PIPE_2.0	.867	3.75	4	.186	3.75		4	14.916	32.13	1.872	1.872	1.598	H1-1b
3	M3	PIPE_1.25	.598	3.5...	4	.168	0		6	14.325	19.688	.801	.801	2.37	H1-1b
4	M4	PIPE_1.25	.801	3.5...	5	.166	3.564		4	14.325	19.688	.801	.801	2.662	H1-1b
5	M5	PIPE_2.0	.042	2.8...	1	.003	0		1	21.793	32.13	1.872	1.872	1.136	H1-1b
6	M6	PIPE_2.0	.613	8.2...	4	.089	7.656		3	8.922	32.13	1.872	1.872	2.387	H1-1b
7	M7	PIPE_2.0	.810	8.3...	4	.432	8.313		4	8.922	32.13	1.872	1.872	2.502	H3-6
8	M8	PIPE_2.0	.340	1.8...	5	.212	1.891		4	22.356	32.13	1.872	1.872	2.396	H1-1b
9	M9	0.625' Dia.	.041	2.5	6	.002	2.5		6	1.88	9.94	.104	.104	2.264	H1-1b*
10	M10	0.625' Dia.	.099	3.0...	4	.029	3.005		5	1.301	9.94	.104	.104	1.795	H1-1b
11	M11	0.625' Dia.	.811	3.0...	3	.046	3.005		5	1.301	9.94	.104	.104	2.96	H1-1a
12	M12	0.625' Dia.	.090	0	4	.039	0		4	1.88	9.94	.104	.104	1.571	H1-1b
13	M13	PIPE_1.25	.378	3.5...	5	.096	3.453		6	14.325	19.688	.801	.801	2.313	H1-1b
14	M14	PIPE_1.25	.693	3.5...	4	.145	3.564		4	14.325	19.688	.801	.801	2.315	H1-1b
15	M15	0.625' Dia.	.015	0	4	.004	0		4	1.88	9.94	.104	.104	2.202	H1-1b
16	M16	0.625' Dia.	.532	0	3	.014	3.005		4	1.301	9.94	.104	.104	2.51	H1-1a
17	M17	0.625' Dia.	.204	3.0...	4	.048	3.005		5	1.301	9.94	.104	.104	2.495	H1-1b

Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Me...	Shape	Code C...	Loc...	LC	Shear C...	Loc[ft]	Dir	LC	phi*Pn...	phi*P...	phi*Mn...	phi*...	Cb	Eqn
18	M18	0.625' Dia.	.252	0	6	.015	0		5	1.88	9.94	.104	.104	2.27	H1-1b



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek Engineering		
FJP	CT11451G	Apr 30, 2019 at 10:44 AM
19027.19	Member Unity Check	CT11451G_AMA.r3d

EBI Consulting

environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11451G

CT11451G
27 Maynard Road
Salem, Connecticut 06420

May 17, 2019

EBI Project Number: 6219001677

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**17.31%**

May 17, 2019

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

Emissions Analysis for Site: CT11451G - CT11451G

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **27 Maynard Road** in **Salem, 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu W/cm^2$). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. 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 27 Maynard Road in Salem, 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) 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.

3) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 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.

5) 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.

6) 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.

7) The antennas used in this modeling are the RFS APX16DWV-16DWV-S-E-A20 for the 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 MHz channel(s) in Sector A, the RFS APX16DWV-16DWV-S-E-A20 for the 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 MHz channel(s) in Sector B, the RFS APX16DWV-16DWV-S-E-A20 for the 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 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.

8) The antenna mounting height centerline of the proposed antennas is 82 feet above ground level (AGL).

9) 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.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20
Frequency Bands:	1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz
Gain:	15.9 dBd / 15.9 dBd	Gain:	15.9 dBd / 15.9 dBd	Gain:	15.9 dBd / 15.9 dBd
Height (AGL):	82 feet	Height (AGL):	82 feet	Height (AGL):	82 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	180 Watts	Total TX Power (W):	180 Watts	Total TX Power (W):	180 Watts
ERP (W):	7,002.81	ERP (W):	7,002.81	ERP (W):	7,002.81
Antenna A1 MPE %:	**3.74%**	Antenna B1 MPE %:	**3.74%**	Antenna C1 MPE %:	**3.74%**
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	600 MHz / 700 MHz	Frequency Bands:	600 MHz / 700 MHz	Frequency Bands:	600 MHz / 700 MHz
Gain:	12.95 dBd / 13.35 dBd	Gain:	12.95 dBd / 13.35 dBd	Gain:	12.95 dBd / 13.35 dBd
Height (AGL):	82 feet	Height (AGL):	82 feet	Height (AGL):	82 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts
ERP (W):	2,481.08	ERP (W):	2,481.08	ERP (W):	2,481.08
Antenna A2 MPE %:	**3.07%**	Antenna B2 MPE %:	**3.07%**	Antenna C2 MPE %:	**3.07%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	6.81%
AT&T	8.39%
Antenna Systems 2-8	2.11%
Site Total MPE % :	17.31%

T-Mobile Sector A Total:	6.81%
T-Mobile Sector B Total:	6.81%
T-Mobile Sector C Total:	6.81%
Site Total:	17.31%

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 (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 1900 MHz UMTS	2	1167.14	82.0	12.48	1900 MHz UMTS	1000	1.25%
T-Mobile 2100 MHz LTE AWS	2	2334.27	82.0	24.96	2100 MHz LTE AWS	1000	2.50%
T-Mobile 600 MHz LTE	2	591.73	82.0	6.33	600 MHz LTE	400	1.58%
T-Mobile 700 MHz LTE	2	648.82	82.0	6.94	700 MHz LTE	467	1.49%
						Total:	**6.81%**

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:	6.81%
Sector B:	6.81%
Sector C:	6.81%
T-Mobile Maximum MPE % (Sector A):	6.81%
Site Total:	17.31%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **17.31%** 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.