EMPIRE telecom

July 17, 2018

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

Regarding:	Notice of Exempt Modification – Swap of (3) antennas and addition of (3) radios
Property Address:	1 Hartford Square, New Britain, CT (the "Property", AT&T Site # CT5254)
Applicant:	AT&T Mobility ("AT&T")

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 175 foot Self-Support Tower ("tower") at the above-referenced address, latitude 41.6663919 N, longitude -72.8127989 W. AT&T's facility consists of nine (9) wireless telecommunications antennas at 162 feet. The tower is controlled and owned by Hartford Square Associates and managed by SBA Communications. Assessor's information is attached hereto.

AT&T desires to modify its existing telecommunications facility by swapping three (3) antennas and adding three (3) remote radio units. The centerline height of said antennas is and will remain at 162 feet.

Please accept this application as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72 (b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Mayor of the City of New Britain and New Britain Municipal Development. Notice is also being sent to Hartford Square Associates as owner of the property and SBA Communications as the site manager of the property.

The planned modifications to AT&T's facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The planned modifications will not result in an increase in the height of the existing structure. AT&T's antennas and associated lines will be installed at 162 foot level of the 175 foot tower.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.

16 Esquire Road, Billerica, MA 01862 Phone 978-284-3906 Email: ncaplan@empiretelecomm.com

4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. An RF emissions calculation is attached.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (Please see attached Structural Analysis completed by All Pro Consulting Group dated July 13, 2018).

For the foregoing reasons AT&T respectfully requests that the swap of antennas and addition of remote radio heads be allowed within the exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Nicole Caplan
Site Acquisition Specialist
Empire Telecom

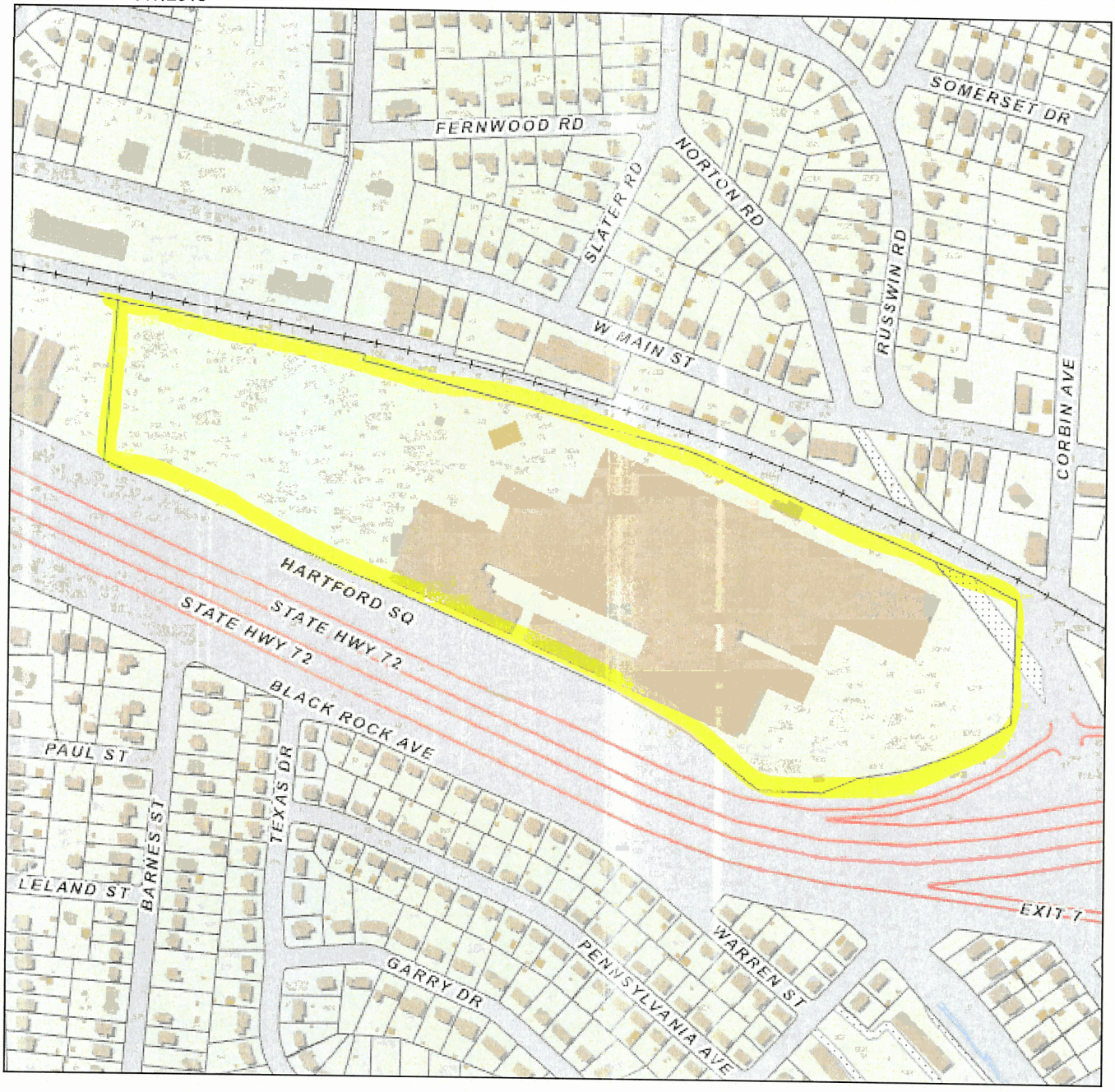
CC: The Honorable Erin E. Stewart, Mayor, City of New Britain
New Britain Municipal Development, Planning and Zoning for City of New Britain
Hartford Square Associates, LLC, Property Owner
SBA Communications, c/o Carla Shorter

16 Esquire Road, Billerica, MA 01862 Phone 978-284-3906 Email: ncaplan@empiretelecomm.com

City of New Britain

Geographic Information System (GIS)

Date Printed: 7/17/2018



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 City of New Britain and its mapping contractors assume no legal responsibility for the information contained herein.

Approximate Scale: 1 inch = 400 feet

0 400 Feet

N W E S

1 HARTFORD SQ

Location	1 HARTFORD SQ	**Mblu**	F4A/ 2/ / /
Acct#	44950001	**Owner**	HARTFORD SQUARE ASSOCIATES LLC
Assessment	$4,333,350	**Appraisal**	$6,190,500
PID	764	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$4,021,200	$2,169,300	$6,190,500
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$2,814,840	$1,518,510	$4,333,350

Owner of Record

Owner	HARTFORD SQUARE ASSOCIATES LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	1 HARTFORD SQ WEST BOX #15 NEW BRITAIN, CT 06052	**Book & Page**	1903/1103
		Sale Date	12/03/2014

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
HARTFORD SQUARE ASSOCIATES LLC	$0		1903/1103	12/03/2014
HARTFORD SQUARE ASSOCIATES LLC	$0		1895/ 267	07/22/2014
HARTFORD SQUARE ASSOCIATES LLC	$0		1895/ 157	07/22/2014
HARTFORD SQUARE ASSOCIATES LLC	$0	1	1830/ 539	12/06/2011
HARTFORD SQUARE ASSOCIATES LLC	$3,500,000		1813/ 22	02/14/2011

Building Information

Building 1 : Section 1

Year Built:	1940
Living Area:	542,561
Replacement Cost:	$18,387,603

Building Percent Good:	20
Replacement Cost Less Depreciation:	$3,677,500

Building Attributes	
Field	**Description**
STYLE	Warehouse
MODEL	Ind/Comm
Grade	C
Stories:	2
Occupancy	31
Exterior Wall 1	Brick/Masonry
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Metal/Tin
Interior Wall 1	Minimum/Masonr
Interior Wall 2	
Interior Floor 1	Finished Concr
Interior Floor 2	
Central Heat	Yes
AC Type	Partial
Bldg Use	Ind Whse MDL-96
Apt Units	
Total Bedrms	00
Total Baths	0
Comm Units	
Ind Units	
1st Floor Use:	4010
Heat/AC	Unit Heat
Frame Type	Steel
Baths/Plumbing	Average
Ceiling/Wall	Ceil & Min WL
Rooms/Prtns	Average
Wall Height	18
% Comn Wall	

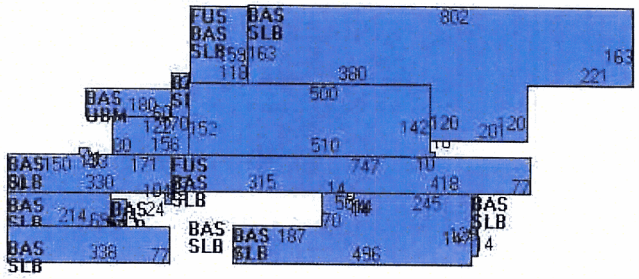
Building 1 : Section 1

Year Built:	1940
Living Area:	0
Replacement Cost:	$18,387,603
Building Percent Good:	20
Replacement Cost Less Depreciation:	$3,677,500

Building Photo

(http://images.vgsi.com/photos/NewBritainCTPhotos//\00\03\49,

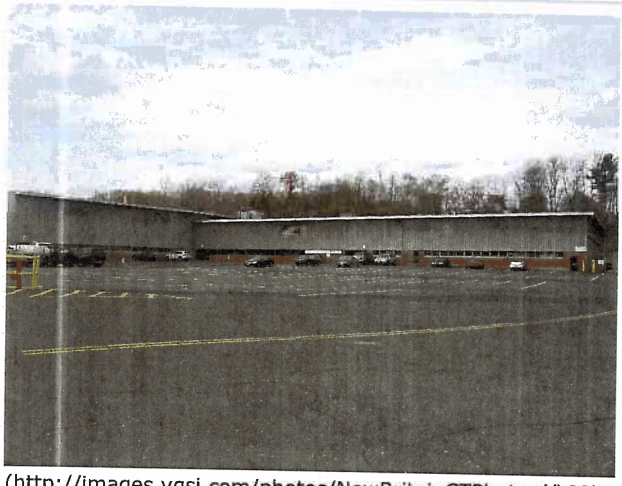
Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	466,084	466,084
FUS	Finished Upper Story	76,477	76,477
SLB	Slab	0	0
UBM	Basement	10,800	0
		553,361	542,561

Building Attributes	
Field	**Description**
Style	Outbuildings
Model	
Grade	
Stories	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Central Heat Sys	
AC Type	
Total Bedrooms	
Total Full Baths	
Total Half Baths	
Total Xtra Fixtrs	
Total Rooms	
Bath Style	
Kitchen Style	
Whirlpool Tub	
Fireplaces	
Rec Room Finish	
Rec Room Qual	
Bsmt Garages	
Bldg Nbhd	

Building Photo



(http://images.vgsi.com/photos/NewBritainCTPhotos//\00\03\49,

Building Layout

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
A/C	Central A/C	18000 S.F.	$11,700	1
LDL2	Load Lv Manual	8 Units	$1,900	1

Land

Land Use

Land Line Valuation

Use Code	4010	**Size (Acres)**	31.10
Description	Ind Whse MDL-96	**Depth**	
Zone	I2	**Assessed Value**	$1,518,510
Neighborhood	101G	**Appraised Value**	$2,169,300
Alt Land Appr	No		
Category			

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV5	Conc Pad			1836 S.F.	$22,000	1
UST2	Utility Metal			3036 S.F.	$21,900	1
CB4	PreCastConcCel			200 S.F.	$33,000	1
UST3	Utility Masonr			484 S.F.	$4,600	1
CB3	PreCastConcCel			240 S.F.	$55,400	1
UST2	Utility Metal			320 S.F.	$2,300	1
CB3	PreCastConcCel			360 S.F.	$83,200	1
UST1	Utility Frame			320 S.F.	$2,800	1
FN4	Fence-8' Chain			272 L.F.	$3,500	1
UST2	Utility Metal			2000 S.F.	$14,400	1
SCL1	Scales-Mech			60 Tons	$37,800	1
TNK2	Tank Bulk			300000 Gal	$1,200	1
PAV1	Paving Asphalt			50000 S.F.	$48,000	1
BLB2	Billboard 2 Side			2 Units	$0	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$4,021,200	$2,169,300	$6,190,500
2016	$4,466,700	$2,076,000	$6,542,700
2015	$4,466,700	$2,076,000	$6,542,700

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$2,814,840	$1,518,510	$4,333,350
2016	$3,126,690	$1,453,200	$4,579,890
2015	$3,126,690	$1,453,200	$4,579,890

WIRELESS COMMUNICATIONS FACILITY
CT5254 - LTE 4C/5C
NEW BRITAIN WEST
SBA TOWERS SITE NO.: CT04382
1 HARTFORD SQUARE
NEW BRITAIN, CT 06052

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA-222 REVISION "G" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2016 CONNECTICUT FIRE SAFETY CODE AND, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

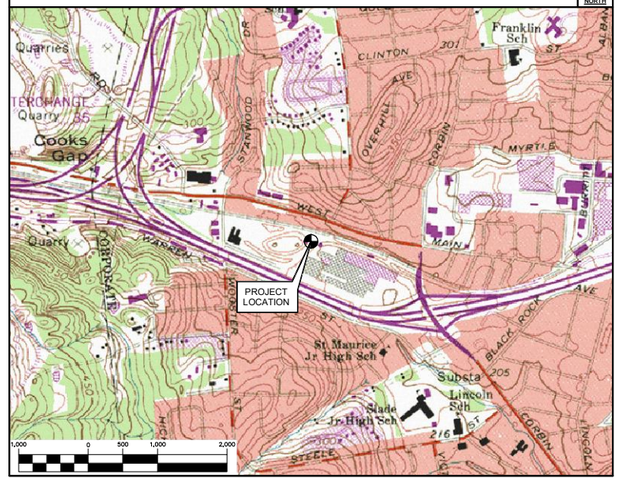
FROM: 500 ENTERPRISE DRIVE, ROCKY HILL, CONNECTICUT

TO: 1 HARTFORD SQUARE, NEW BRITAIN, CONNECTICUT

1.	HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD	0.30 MI
2.	TURN LEFT ONTO CAPITAL BLVD	0.20 MI
3.	USE LEFT TWO LANES TO TURN LEFT ONTO STATE HWY 411	0.30 MI
4.	TURN LEFT TO MERGE ONTO I-91 S	0.30 MI
5.	MERGE ONTO I-91 S	1.40 MI
6.	TAKE EXIT 22N TO MERGE ONTO CT-9N TOWARD NEW BRITAIN	4.80 MI
7.	USE THE LEFT LANE TO TAKE EXIT 24 TOWARD CT-71/CT-372/KENSINGTON	0.40 MI
8.	KEEP LEFT AT THE FORK TO CONTINUE TOWARD CT-571 W	0.40 MI
9.	CONTINUE ONTO CT-571 W	0.80 MI
10.	CONTINUE ONTO CORBIN AVE	1.20 MI
11.	TURN LEFT ONTO BLACK ROCK AVE	0.40 MI
12.	TURN RIGHT AT WARREN ST	0.05 MI
13.	CONTINUE ONTO HARTFORD SQUARE	0.10 MI
14.	ARRIVE AT 1 HARTFORD SQUARE	

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   - A. REMOVE AND REPLACE EXISTING POS.4 ANTENNA FOR PROPOSED OCTO-PORT ANTENNA, (1) PER SECTOR.
   - B. INSTALL (3) NEW RRUS-32 B66 AT LATTICE TOWER LEVEL.
   - C. DECOMMISSION & REMOVE (3) EXISTING RRUW'S WITHIN EXISTING EQUIPMENT SHELTER.
   - D. DECOMMISSION & REMOVE EXISTING GSM EQUIPMENT CABINET WITHIN EXISTING EQUIPMENT SHELTER
   - E. DECOMMISSION & REMOVE EXISTING UMTS EQUIPMENT CABINET WITHIN EXISTING EQUIPMENT SHELTER.
   - F. INSTALL (3) NEW RRUS-11, WITHIN EXISTING EQUIPMENT CABINET.
   - G. INSTALL (6) NEW SURGE ARRESTORS, (2) PER SECTOR, CONNECTED TO (P) RRUS-11.
   - H. REMOVE & REPLACE EXISTING DUL UNIT FOR (2) DUS41 UNITS & (2) NEW XMU + IDL2 UNITS.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT5254
AT&T SITE NAME:	NEW BRITAIN WEST
SITE ADDRESS:	SBA TOWERS SITE NO.: CT04382 1 HARTFORD SQUARE NEW BRITAIN, CT 06052
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-39'-59.23" N LONGITUDE: 72°-48'-46.06" W GROUND ELEVATION: ±230' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	NOTES, SPECIFICATIONS AND DETAILS	0
C-1	PLANS AND ELEVATION	0
C-2	LTE 4C/5C EQUIPMENT DETAILS	0
E-1	LTE SCHEMATIC DIAGRAM AND NOTES	0
E-2	LTE WIRING DIAGRAM	0
E-3	TYPICAL ELECTRICAL DETAILS	0

NO.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
	11/07/17	TJB	KAW/R	PRELIMINARY CDs - ISSUED FOR CLIENT REVIEW

STATE OF CONNECTICUT · GARY A. KNOX · 27517 · LICENSED PROFESSIONAL ENGINEER

EMPIRE telecom

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

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY

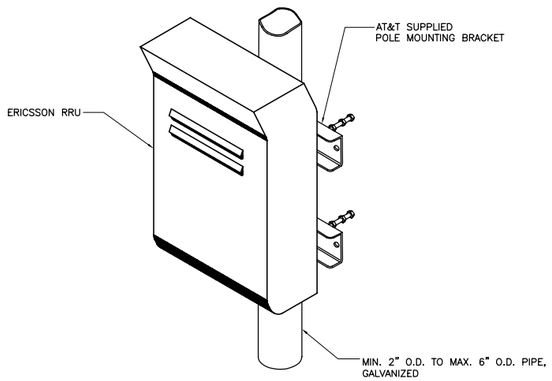
NEW BRITAIN WEST
CT5254 - LTE 4C/5C
1 HARTFORD SQUARE
NEW BRITAIN, CT 06052

DATE: 10/06/17
SCALE: AS NOTED
JOB NO. 17004.59

TITLE SHEET

T-1

Sheet No. 1 of 7



ISOMETRIC VIEW

NOTES:

1. AT&T SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

1 / N-1 **TYPICAL RRUS MOUNTING DETAILS**

SCALE: NTS

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2016 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 90-105 MPH (3 SECOND GUST)
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 97 MPH (Vasd) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

PAINT NOTES

PAINTING SCHEDULE:

1. ANTENNA PANELS:

   A. SHERWIN WILLIAMS POLANE-B
   B. COLOR TO BE MATCHED WITH EXISTING TOWER STRUCTURE.

2. COAXIAL CABLES:

   A. ONE COAT OF DTM BONDING PRIMER (2-5 MILS. DRY FINISH)
   B. TWO COATS OF DTM ACRYLIC PRIMER/FINISH (2.5-5 MILS. DRY FINISH)
   C. COLOR TO BE FIELD MATCHED WITH EXISTING STRUCTURE.

EXAMINATION AND PREPARATION:

1. DO NOT APPLY PAINT IN SNOW, RAIN, FOG OR MIST OR WHEN RELATIVE HUMIDITY EXCEEDS 85%. DO NOT APPLY PAINT TO DAMP OR WET SURFACES.
2. VERIFY THAT SUBSTRATE CONDITIONS ARE READY TO RECEIVE WORK. EXAMINE SURFACE SCHEDULED TO BE FINISHED PRIOR TO COMMENCEMENT OF WORK. REPORT ANY CONDITION THAT MAY POTENTIALLY AFFECT PROPER APPLICATION.
3. TEST SHOP APPLIED PRIMER FOR COMPATIBILITY WITH SUBSEQUENT COVER MATERIALS.
4. PERFORM PREPARATION AND CLEANING PROCEDURE IN STRICT ACCORDANCE WITH COATING MANUFACTURER'S INSTRUCTIONS FOR EACH SUBSTRATE CONDITION.
5. CORRECT DEFECTS AND CLEAN SURFACES WHICH AFFECT WORK OF THIS SECTION. REMOVE EXISTING COATINGS THAT EXHIBIT LOOSE SURFACE DEFECTS.
6. IMPERVIOUS SURFACE: REMOVE MILDEW BY SCRUBBING WITH SOLUTION OF TRI-SODIUM PHOSPHATE AND BLEACH. RINSE WITH CLEAN WATER AND ALLOW SURFACE TO DRY.
7. ALUMINUM SURFACE SCHEDULED FOR PAINT FINISH: REMOVE SURFACE CONTAMINATION BY STEAM OR HIGH-PRESSURE WATER. REMOVE OXIDATION WITH ACID ETCH AND SOLVENT WASHING. APPLY ETCHING PRIMER IMMEDIATELY FOLLOWING CLEANING.
8. FERROUS METALS: CLEAN UNGALVANIZED FERROUS METAL SURFACES THAT HAVE NOT BEEN SHOP COATED; REMOVE OIL, GREASE, DIRT, LOOSE MILL SCALE, AND OTHER FOREIGN SUBSTANCES. USE SOLVENT OR MECHANICAL CLEANING METHODS THAT COMPLY WITH THE STEEL STRUCTURES PAINTING COUNCIL'S (SSPC) RECOMMENDATIONS. TOUCH UP BARE AREAS AND SHOP APPLIED PRIME COATS THAT HAVE BEEN DAMAGED. WIRE BRUSH, CLEAN WITH SOLVENTS RECOMMENDED BY PAINT MANUFACTURER, AND TOUCH UP WITH THE SAME PRIMER AS THE SHOP COAT.
9. GALVANIZED SURFACES: CLEAN GALVANIZED SURFACES WITH NON-PETROLEUM-BASED SOLVENTS SO SURFACE IS FREE OF OIL AND SURFACE CONTAMINANTS. REMOVE PRETREATMENT FROM GALVANIZED SHEET METAL FABRICATED FROM COIL STOCK BY MECHANICAL METHODS.
10. ANTENNA PANELS: REMOVE ALL OIL, DUST, GREASE, DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION. PANELS MUST BE WIPED WITH METHYL ETHYL KETONE (MEK).
11. COAXIAL CABLES: REMOVE ALL OIL, DUST, GREASE. DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION.

CLEANING:

1. COLLECT WASTE MATERIAL, WHICH MAY CONSTITUTE A FIRE HAZARD, PLACE IN CLOSED METAL CONTAINERS AND REMOVE DAILY FROM SITE.

APPLICATION:

1. APPLY PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. DO NOT APPLY FINISHES TO SURFACES THAT ARE NOT DRY.
3. APPLY EACH COAT TO UNIFORM FINISH.
4. APPLY EACH COAT OF PAINT SLIGHTLY DARKER THAN PRECEDING COAT UNLESS OTHERWISE APPROVED.
5. SAND METAL LIGHTLY BETWEEN COATS TO ACHIEVE REQUIRED FINISH.
6. VACUUM CLEAN SURFACES FREE OF LOOSE PARTICLES. USE TACK CLOTH JUST PRIOR TO APPLYING NEXT COAT.
7. ALLOW APPLIED COAT TO DRY BEFORE NEXT COAT IS APPLIED.

COMPLETED WORK:

1. SAMPLES: PREPARE 24" X 24" SAMPLE AREA FOR REVIEW.
2. MATCH APPROVED SAMPLES FOR COLOR, TEXTURE AND COVERAGE. REMOVE REFINISH OR REPAINT WORK NOT IN COMPLIANCE WITH SPECIFIED REQUIREMENTS.

DATE	DRAWN BY	CHK'D BY	DESCRIPTION
11/07/17	TJB	KAW/R	PRELIMINARY CDs - ISSUED FOR CLIENT REVIEW

CAMILO A. GARCIA — LICENSED PROFESSIONAL ENGINEER — 27517 — CONNECTICUT — 2/28/18

EMPIRE telecom

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

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY

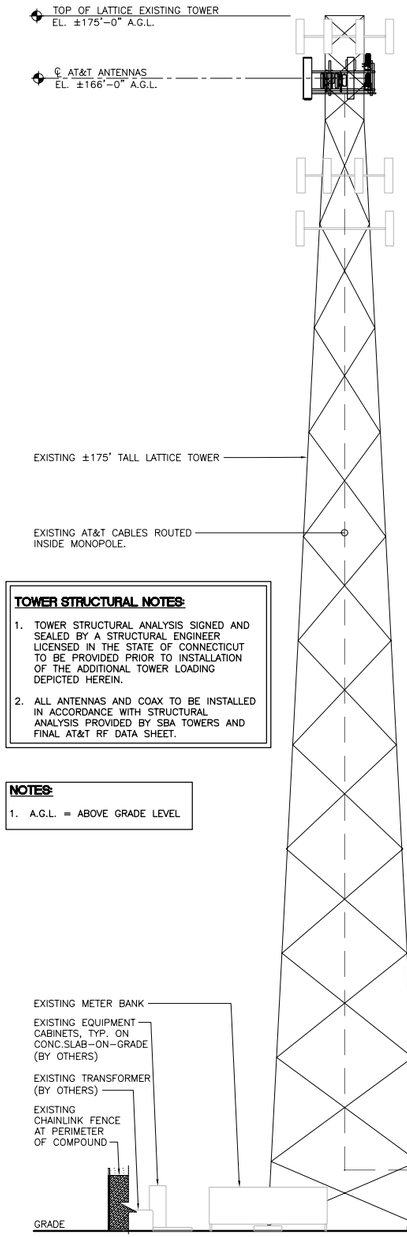
NEW BRITAIN WEST
CT5254 - LTE 4C/5C
1 HARTFORD SQUARE
NEW BRITAIN, CT 06052

DATE:	10/06/17
SCALE:	AS NOTED
JOB NO.	17004.59

NOTES, SPECIFICATIONS AND DETAILS

N-1

Sheet No. 2 of 7



TOWER STRUCTURAL NOTES:

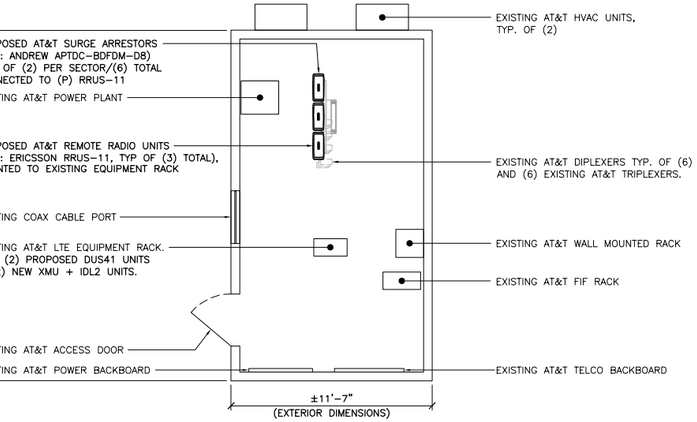
1. TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY SBA TOWERS AND FINAL AT&T RF DATA SHEET.

NOTES:

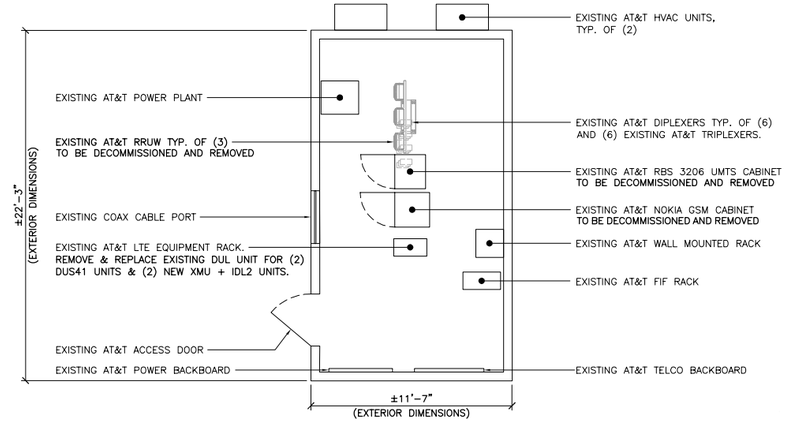
1. A.G.L. = ABOVE GRADE LEVEL

5 C-1 **TOWER ELEVATION**
SCALE: 1" = 10'

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.



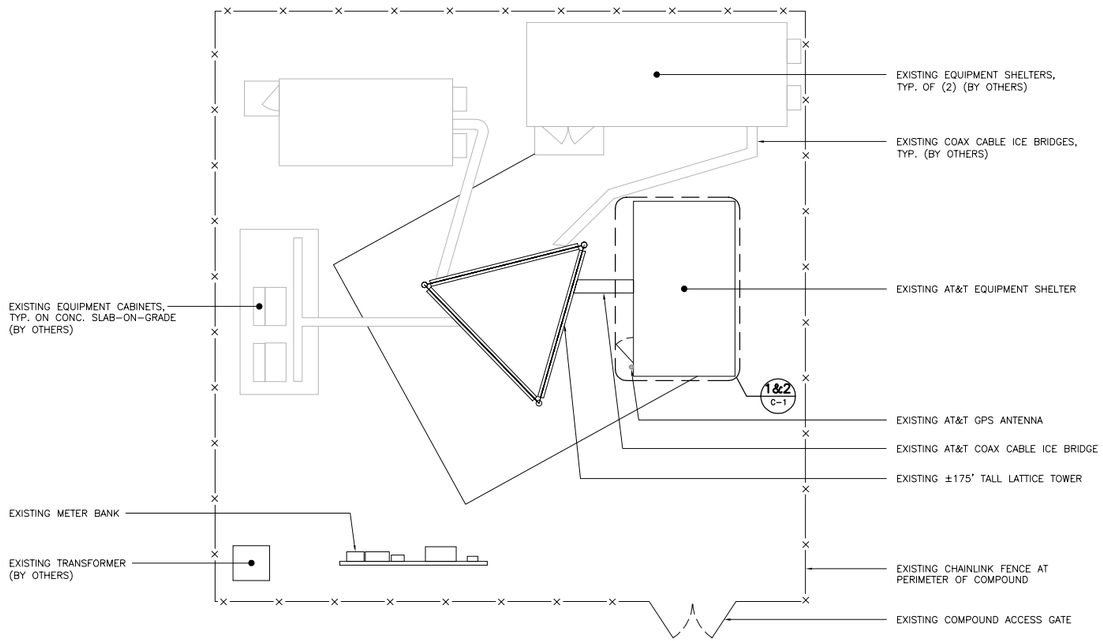
2 C-1 **PROPOSED EQUIPMENT LAYOUT PLAN**
SCALE: 1/4" = 1'-0"
TRUE NORTH



1 C-1 **EXISTING EQUIPMENT LAYOUT PLAN**
SCALE: 1/4" = 1'-0"
TRUE NORTH

SURGE ARESSTOR		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ANDREW MODEL: APTDC-BDFDM-DB	3.46"H x 3.46"W x 1.65"D	1.32 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.		

3 C-1 **ANDREW APTDC-BDFDM-DB DETAIL**
SCALE: NOT TO SCALE



5 C-1

4 C-1 **COMPOUND PLAN**
SCALE: 1/8" = 1'-0"
TRUE NORTH

NO.	DESCRIPTION	CHK'D BY	DRAWN BY	DATE
A	PRELIMINARY CDs - ISSUED FOR CLIENT REVIEW	KAW/R	TJB	11/07/17

STATE OF CONNECTICUT — ENGINEER — 27517 LICENSED PROFESSIONAL ENGINEER

EMPIRE telecom

CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY

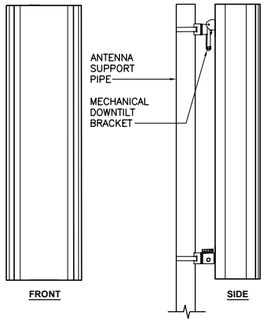
NEW BRITAIN WEST
CT5254 - LTE 4C/5C
1 HARTFORD SQUARE
NEW BRITAIN, CT 06052

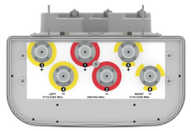
DATE: 10/06/17
SCALE: AS NOTED
JOB NO. 17004.59

PLANS AND ELEVATION

C-1

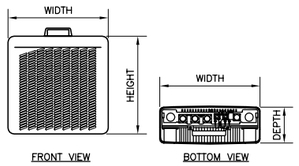
Sheet No. 3 of 7




BOTTOM

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: CCI MODEL: HPA-65R-BUU-H6	72.3"L x 14.4"W x 7.3"D	42.9 LBS.

5 C-2 PROPOSED ANTENNA DETAIL
SCALE: 1/2" = 1'-0"

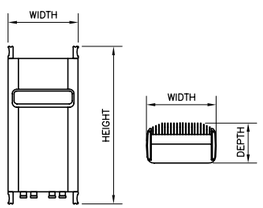


RRUS-11

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 11	17.8"H x 17.3"W x 7.2"D	50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

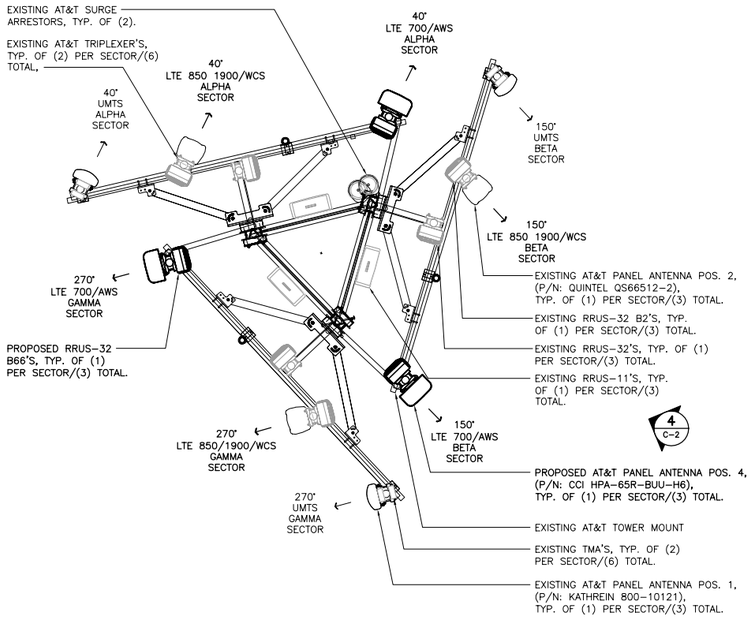
6 C-2 ERICSSON RRUS 11 DETAIL
SCALE: 1" = 1'-0"



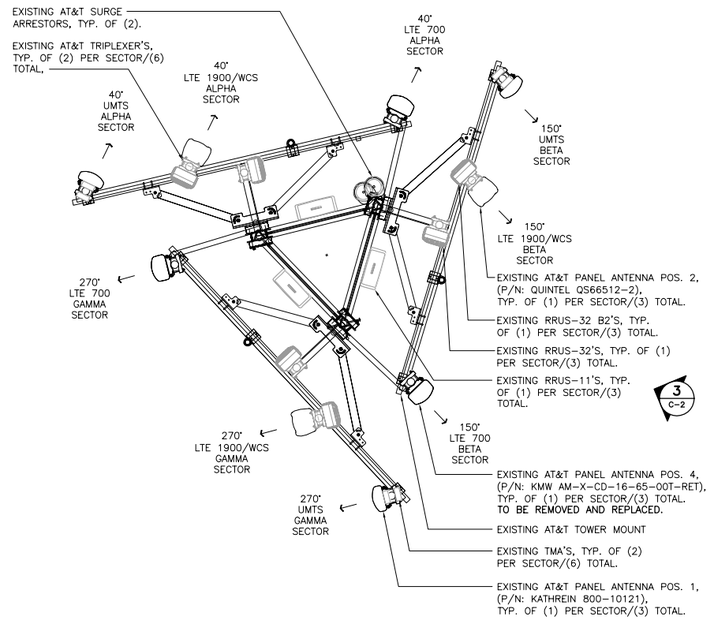
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS-32 B66	27.17"H x 12.05"W x 7.01"D	52.91 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

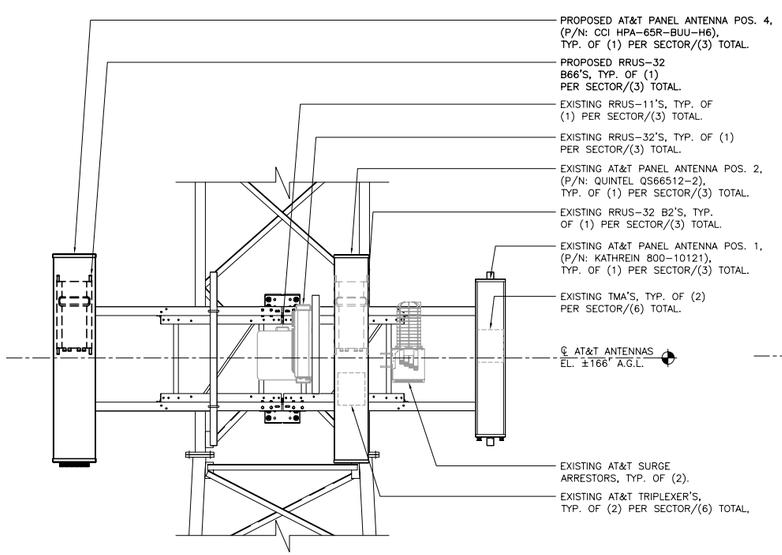
7 C-2 ERICSSON RRUS 32 B66 DETAIL
SCALE: 1" = 1'-0"



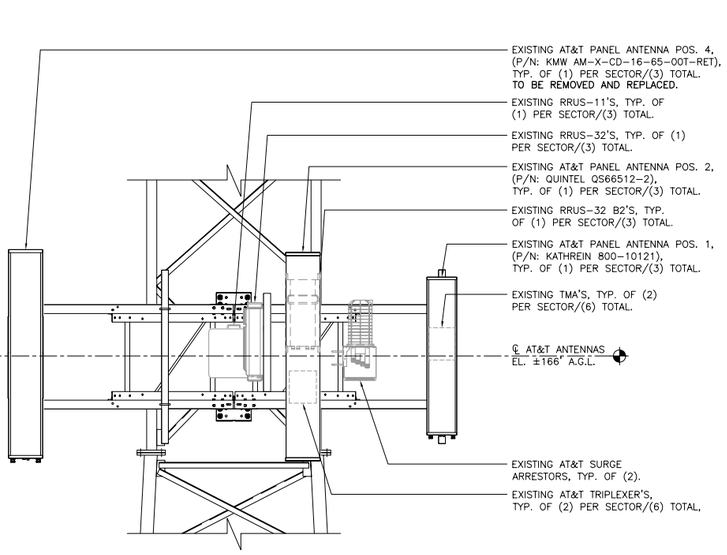
2 C-2 PROPOSED ANTENNA PLAN
SCALE: 3/8" = 1'-0" NORTH



1 C-2 EXISTING ANTENNA PLAN
SCALE: 3/8" = 1'-0" NORTH



4 C-2 PROPOSED ANTENNA ELEVATION
SCALE: 1/2" = 1'-0"



3 C-2 EXISTING ANTENNA ELEVATION
SCALE: 1/2" = 1'-0"

NO.	DESCRIPTION	CHK'D BY	DRAWN BY	DATE
A	PRELIMINARY CDs - ISSUED FOR CLIENT REVIEW	KAW/R	TJB	11/07/17

EMPIRE telecom
CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY

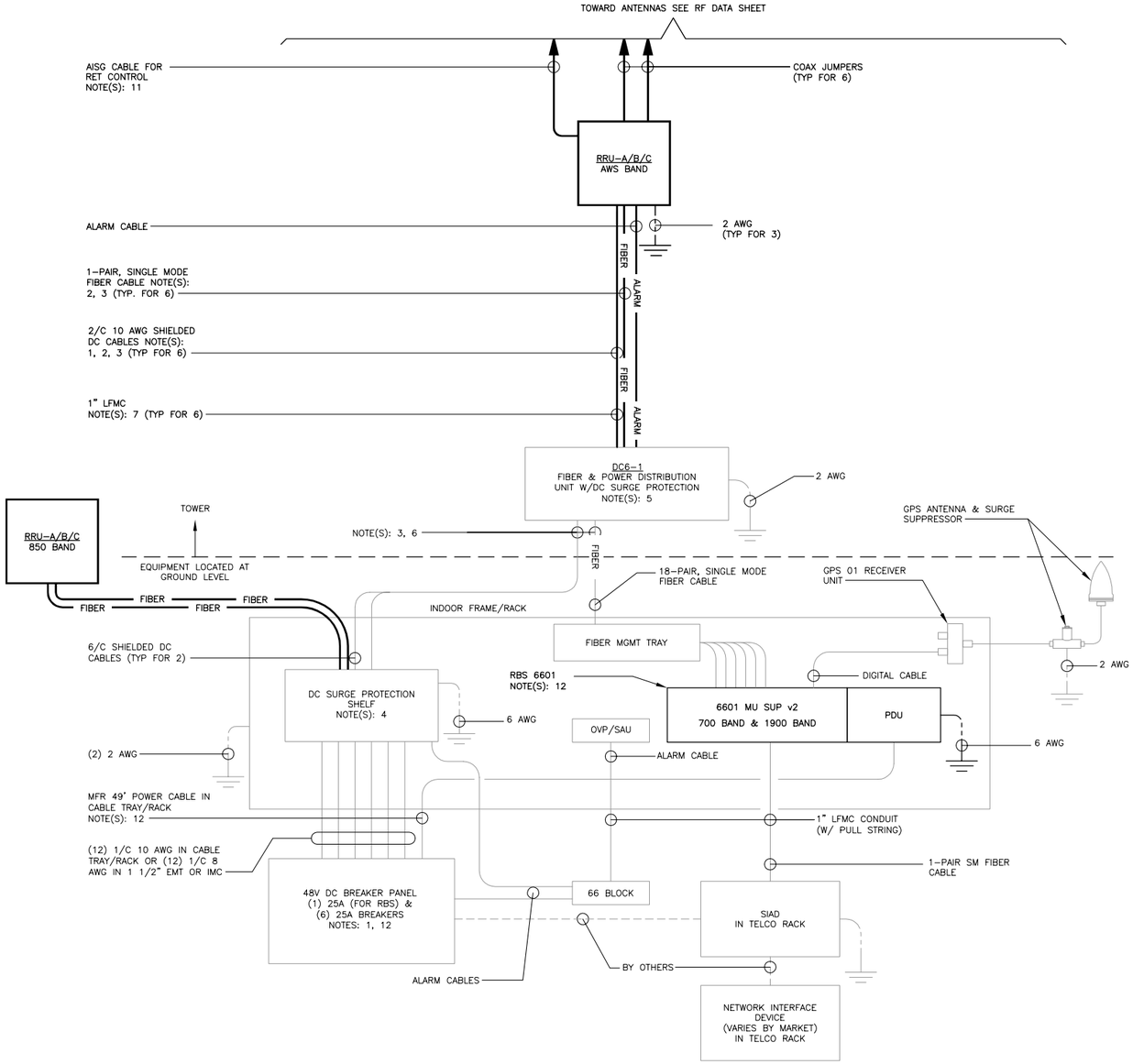
NEW BRITAIN WEST
CT5254 - LTE 4C/5C
1 HARTFORD SQUARE
NEW BRITAIN, CT 06052

DATE: 10/06/17
SCALE: AS NOTED
JOB NO. 17004.59

LTE 4C/5C EQUIPMENT DETAILS

C-2

Sheet No. 4 of 7



1 / E-1

LTE SCHEMATIC DIAGRAM

NOT TO SCALE

LTE SCHEMATIC DIAGRAM NOTES:

1. BREAKERS TO BE TAGGED AND LOCKED OUT. A 20A (MIN.) OR 30A (MAX.) BREAKER FOR RRUs MAY BE SUBSTITUTED FOR THE RECOMMENDED 25A BREAKER. SIZE 12 CONDUCTORS MAY BE USED ONLY WITH 20A BREAKERS.
2. LEAVE COILED AND PROTECTED UNTIL TERMINATED.
3. DC AND FIBER CABLE SHALL BE ROUTED WITH THE EXISTING COAX CABLE.
4. DC SURGE PROTECTION SHELF SHALL BE RAYCAP DCx-48-60-RM.
5. FIBER & DC DISTRIBUTION BOX W/DC SURGE PROTECTION SHALL BE RAYCAP DC6-48-60-18-8F.
6. SUPPORT FIBER & DC POWER CABLES WITH SNAP-IN HANGERS SPACED NO GREATER THAN 3 FEET APART ON TOWER. SUPPORT FIBER AND DC POWER CABLES INSIDE MONOPOLE WITH CABLE HOISTING GRIPS AT 250 FT MAXIMUM INTERVALS. DRESS CABLES TO PREVENT CONTACT WITH ENTRANCE AND EXIT OPENINGS.
7. CONDUIT TO BE USED ON A TOWER IF THE RRU IS MORE THAN 10' FROM THE DISTRIBUTION UNITS. MAX CABLE LENGTH IS 16 FEET.
8. SINGLE-CONDUCTOR DC POWER CABLES SHALL BE TELCOFLEX® OR KS24194™, COPPER, UL LISTED RHH NON-HALOGEN, LOW SMOKE WITH BRAIDED COVER, TYPE TC (1/0 AND LARGER). UNLESS OTHERWISE NOTED, STRANDING SHALL BE CLASS B (TYPE II) FOR CABLES SIZES 14, 12 & 10 AWG AND CLASS I (TYPE IV) FOR SIZES 8 AWG AND LARGER. CABLES SHALL BE COLOR CODED RED FOR +24V, BLUE FOR -48V AND GRAY FOR 24V AND 48V RETURN CONDUCTORS. MULTI-CONDUCTOR DC POWER CABLES SHALL BE COPPER, CLASS B STRANDING WITH FLAME RETARDANT PVC JACKET, TYPE TC, UL LISTED FOR 90°C DRY/ 75°C WET INSTALLATION.
9. GROUNDING WIRES SHALL BE COPPER, GREEN THHN/THWN UL LISTED FOR 90°C DRY/75°C WET INSTALLATION. MINIMUM SIZE IS 6 AWG UNLESS NOTED OTHERWISE.
10. FIBER OPTIC CABLES SHALL BE INSTALLED IN FLEXIBLE CONDUIT AS SCOPED BY MARKET.
11. RET CONTROL FROM THE RRU IS AN OPTIONAL METHOD OF CONNECTION. REFER TO RF DATA SHEET FOR APPLICABILITY.
12. RBS 6601 VARIANT 2 REQUIRES A 25A BREAKER AND 10 AWG (MIN.) CONDUCTORS. REPLACE EXISTING 15A OR 20A BREAKERS AND 12 AWG CONDUCTORS WHEN UPGRADING AN EXISTING RBS 6601 VARIANT 1.

ELECTRICAL NOTES

1. PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND ALL MANUFACTURER DOCUMENTATION FOR ALL EQUIPMENT TO BE INSTALLED.
2. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
3. CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
4. MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
5. PRIOR TO INSTALLATION CONTRACTOR SHALL MEASURE EXISTING ELECTRICAL LOAD AND VERIFY EXISTING AVAILABLE CAPACITY FOR PROPOSED INSTALLATION. IF INADEQUATE CAPACITY IS AVAILABLE, CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRIC UTILITY COMPANY TO UPGRADE EXISTING ELECTRIC SERVICE.
6. CONTRACTOR SHALL INSPECT EXISTING GROUNDING AND LIGHTNING PROTECTION SYSTEM AND ENSURE THAT IT IS IN COMPLIANCE WITH NEC, AND SITE OWNER'S SPECIFICATIONS. THE RESULTS OF THIS INSPECTION SHALL BE PRESENTED TO OWNERS REPRESENTATIVE, AND ANY DEFICIENCIES SHALL BE CORRECTED.
7. ALL TRANSMISSION TOWER SITES CONTAIN AN EXTENSIVE BURIED GROUNDING SYSTEM. ALL GROUNDING WORK MUST BE COORDINATED WITH, AND APPROVED BY, THE TOWER OWNER'S SITE REPRESENTATIVE. ALL OF THE TOWER OWNER'S SPECIFICATIONS MUST BE STRICTLY FOLLOWED.
8. PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
9. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:
10. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
11. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.
12. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNER'S REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS MAY BE REQUIRED BY THE LOCAL AUTHORITY.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
15. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.
16. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.
17. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.
18. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
19. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122. (MIN. #12 AWG).
20. CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

   TEST 1: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

   THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

   1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
   2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
   3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. TESTING SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNERS CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

NO.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
A	11/07/17	TJB	KAW/R	PRELIMINARY CDs - ISSUED FOR CLIENT REVIEW

CONNECTICUT LICENSED PROFESSIONAL ENGINEER 27517 KEVIN A. WARREN

EMPIRE telecom

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

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY

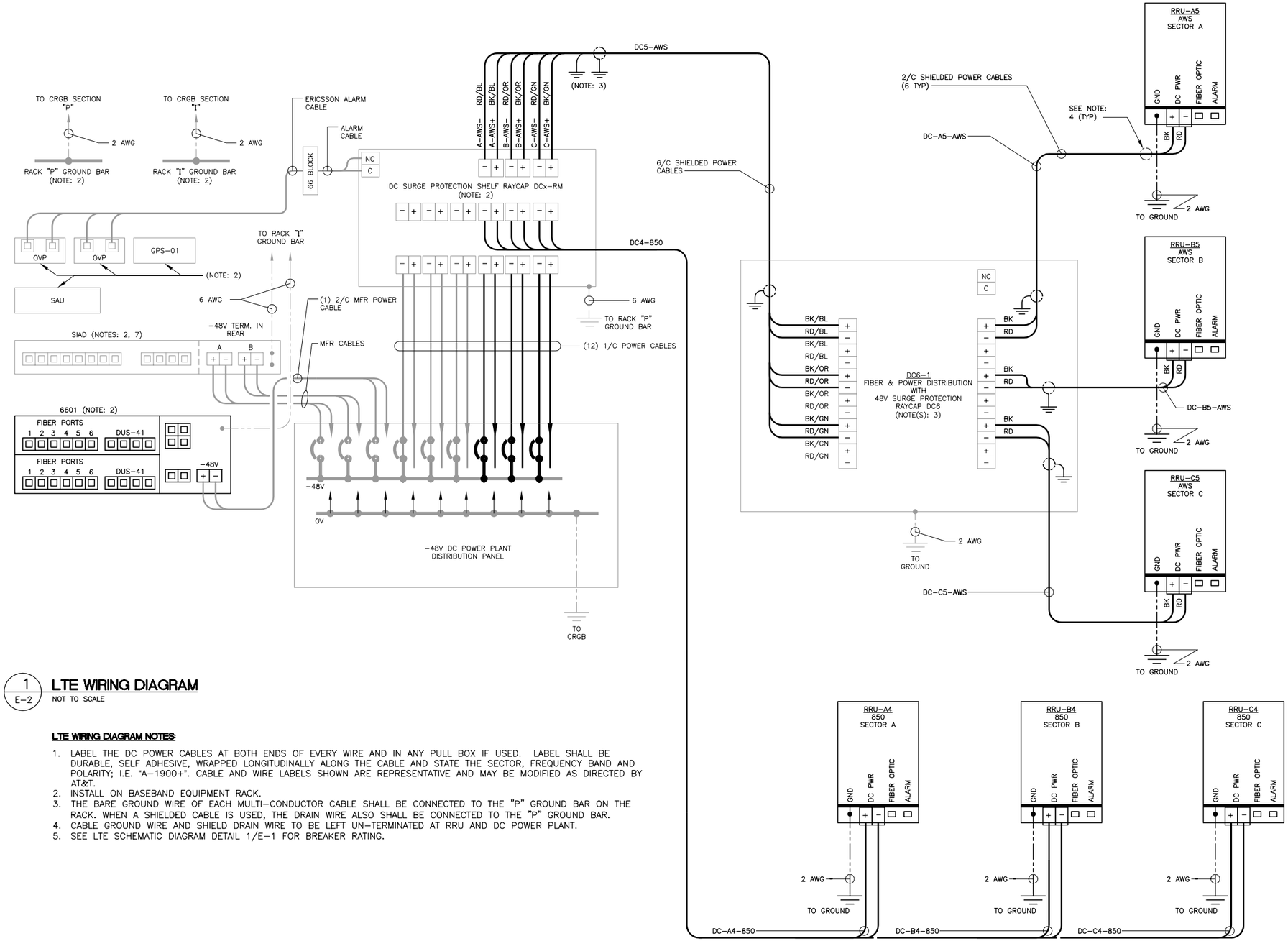
NEW BRITAIN WEST
CT5254 - LTE 4C/5C
1 HARTFORD SQUARE
NEW BRITAIN, CT 06052

DATE:	10/06/17
SCALE:	AS NOTED
JOB NO.	17004.59

LTE SCHEMATIC DIAGRAM AND NOTES

E-1

Sheet No. 5 of 7



1 E-2 LTE WIRING DIAGRAM

NOT TO SCALE

LTE WIRING DIAGRAM NOTES:

1. LABEL THE DC POWER CABLES AT BOTH ENDS OF EVERY WIRE AND IN ANY PULL BOX IF USED. LABEL SHALL BE DURABLE, SELF ADHESIVE, WRAPPED LONGITUDINALLY ALONG THE CABLE AND STATE THE SECTOR, FREQUENCY BAND AND POLARITY; I.E. "A-1900+". CABLE AND WIRE LABELS SHOWN ARE REPRESENTATIVE AND MAY BE MODIFIED AS DIRECTED BY AT&T.
2. INSTALL ON BASEBAND EQUIPMENT RACK.
3. THE BARE GROUND WIRE OF EACH MULTI-CONDUCTOR CABLE SHALL BE CONNECTED TO THE "P" GROUND BAR ON THE RACK. WHEN A SHIELDED CABLE IS USED, THE DRAIN WIRE ALSO SHALL BE CONNECTED TO THE "P" GROUND BAR.
4. CABLE GROUND WIRE AND SHIELD DRAIN WIRE TO BE LEFT UN-TERMINATED AT RRU AND DC POWER PLANT.
5. SEE LTE SCHEMATIC DIAGRAM DETAIL 1/E-1 FOR BREAKER RATING.

11/07/17	TJB	KAW/R	PRELIMINARY CDs - ISSUED FOR CLIENT REVIEW
DATE	DRAWN BY	CHK'D BY	DESCRIPTION

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

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY

NEW BRITAIN WEST

CT5254 - LTE 4C/5C
1 HARTFORD SQUARE
NEW BRITAIN, CT 06052

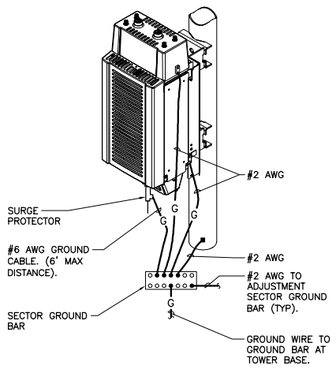
DATE:	10/06/17
SCALE:	AS NOTED
JOB NO.	17004.59

LTE WIRING DIAGRAM

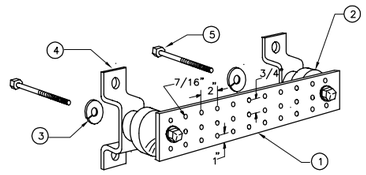
E-2

Sheet No. 6 of 7

EACH RRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:
1. AT TOP OF THE CABINET
2. AT RIGHT SIDE OF THE CABINET.



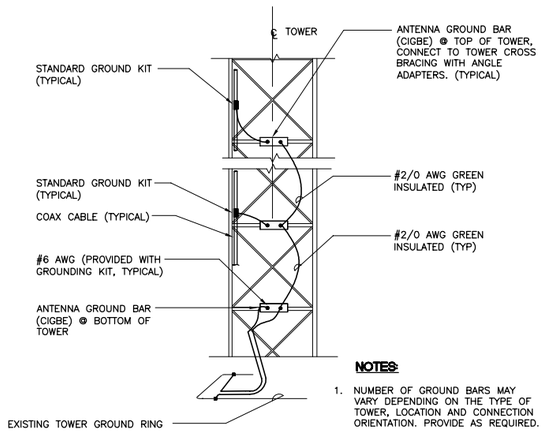
1 / E-3 **RRU POLE MOUNT GROUNDING**
NOT TO SCALE



LEGEND

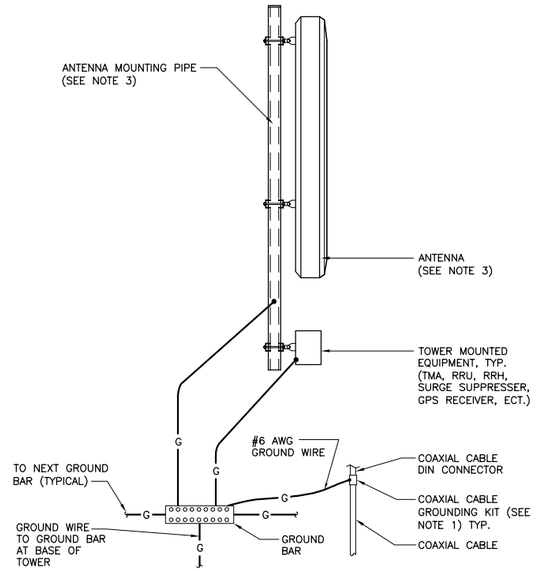
1. TINNED COPPER GROUND BAR, 1/4"x 4"x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG .
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 2. 3061-4.
3. 3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. 4. CAT NO. A-6056.
5. STAINLESS STEEL SECURITY SCREWS.

2 / E-3 **GROUND BAR DETAIL**
NOT TO SCALE



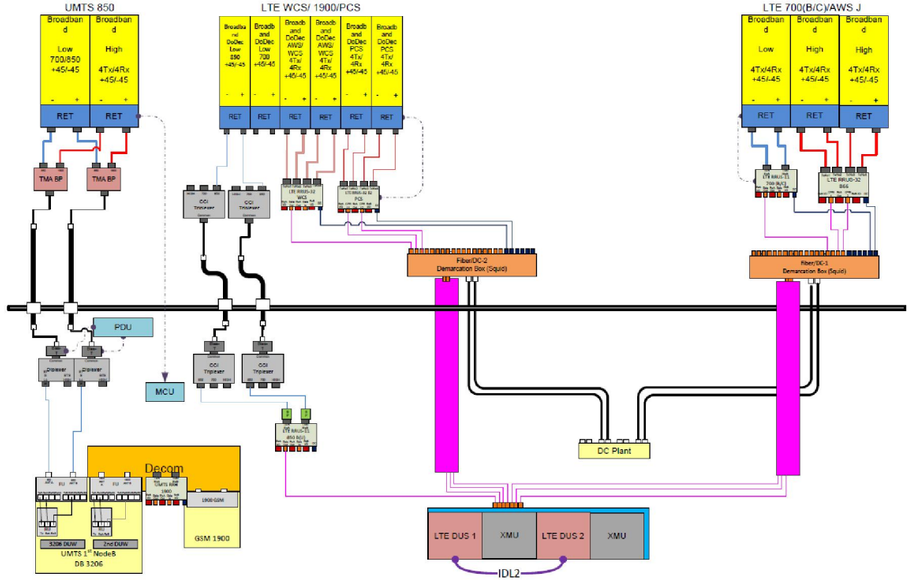
NOTES:
1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.

3 / E-3 **ANTENNA CABLE GROUNDING - LATTICE TOWER**
NOT TO SCALE

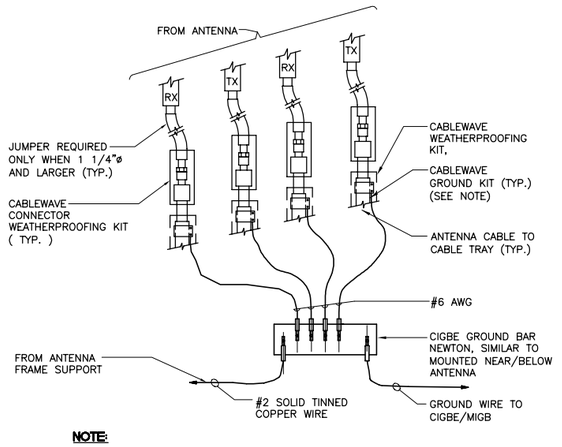


NOTES:
1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

4 / E-3 **TYPICAL ANTENNA GROUNDING DETAIL**
NOT TO SCALE

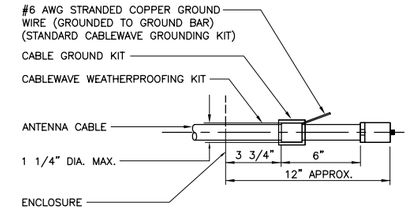


5 / E-3 **RF PLUMBING DIAGRAM**
NOT TO SCALE



NOTE:
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

6 / E-3 **CONNECTION OF GROUND WIRES TO GROUND BAR**
NOT TO SCALE



NOTE:
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

7 / E-3 **ANTENNA CABLE GROUNDING DETAIL**
NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
C	11/07/17	TJB	KAW/R	PRELIMINARY CDs - ISSUED FOR CLIENT REVIEW

STATE OF CONNECTICUT — GARRIA — 27517 — LICENSED PROFESSIONAL ENGINEER

EMPIRE telecom

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

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
NEW BRITAIN WEST
CT5254 - LTE 4C/5C
1 HARTFORD SQUARE
NEW BRITAIN, CT 06052

DATE: 10/06/17
SCALE: AS NOTED
JOB NO. 17004.59

TYPICAL ELECTRICAL DETAILS

E-3
Sheet No. 7 of 7

ALLPRO
CONSULTING GROUP, INC.
9221 Lyndon B. Johnson Freeway, #204, Dallas, TX 75243 ★ PHONE 972-231-8893 ★ FAX 1-866-364-8375
www.allprocgi.com ★ e-mail: info@allprocgi.com

Tower Structural Analysis Report for
SBA Communications Corporation

Existing 175' Self Support Tower

SBA Site Name: New Britain 2, CT
SBA Site Number: CT04382-S-02
Carrier Name: AT&T
Carrier Site ID/Name: CT5254 / New Britain
App #: 75434, v2.

Site Location:
1 Hartford Square,
New Britain, CT 06052-1161
Hartford County

Latitude: 41.666411
Longitude: -72.812803

ACGI Job # 17-8042
(Refer Previous SA ACGI Job # 18-3610, dated 05/31/2018)

ANALYSIS RESULTS		
Tower Components	88.8 %	**Pass**
Tower Foundation Capacity	56.6 %	**Pass**
Net Change in Tower Stress	- 1.0 %	**Change from previous Structural Analysis Allpro Consulting Group, Inc ACGI Job # 18-3610, dated 05/31/2018**
Change due to mount reinforcement	+ 0.9 %	-

Prepared By:
Abhishek Patil, EIT

STATE OF CONNECTICUT
JOJI M. GEORGE
No. 24444
LICENSED
PROFESSIONAL ENGINEER

07/13/2018
Approved By:
Joji George, P.E.
CT PE #24444

TABLE OF CONTENTS

1. ANALYSIS SUMMARY

The existing 175' Self Support Tower located in New Britain, CT was analyzed by Allpro Consulting Group, Inc (ACGI) for the existing loads and the proposed **AT&T** antennas and coaxes as authorized by SBA Communication Corp. Based on the results of the analysis, the existing tower with mentioned proposed and existing loading is found **to be in code compliance** with *TIA-222-G, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2016 Connecticut state building code (IBC 2012).*

2. SCOPE & SOURCE OF INFORMATION

The purpose of this structural analysis is to determine whether the existing structure is capable of supporting additional proposed loads.

SOURCE OF INFORMATION		
Tower Data:	Rohn Industries, Inc.	Original Tower Drawings by Rohn Industries, Inc. (Eng. File No. 44545AE dated 08/18/2000)
	FDH Engineering, Inc.	Previous Structural Analysis by FDH Engineering, Inc.(FDH Project Number 16BICQ1400, dated 05/13/2016)
	Allpro Consulting Group Inc.,	Previous Structural Analysis by Allpro Consulting Group Inc., ACGI # 16-4300, dated 12/07/2016. Previous Modification Design by Allpro consulting Group Inc., ACGI # 17-0378, dated 03/09/2017. Previous Structural Analysis Allpro Consulting Group, Inc., ACGI Job # 17-1365, dated 03/24/2017 Previous Structural Analysis Allpro Consulting Group, Inc., ACGI Job # 17-6645, dated 10/26/2017 Previous Structural Analysis Allpro Consulting Group, Inc., ACGI Job # 18-3610, dated 05/31/2018
Foundation Data:	Rohn Industries, Inc.	Existing MAT foundation data is as per original foundation design by Rohn Industries, Inc. (Eng. File No. 44545AE dated 07/26/2000)
Geotechnical Report:	Jaworski Geotech, Inc	Foundation design was based on geotechnical report (No. 00309G dated 07/05/2000)

Loading Data:	Allpro Consulting Group Inc., SBA Communication Corp.	Existing Loading as per previous Structural Analysis Allpro Consulting Group, Inc., ACGI # 17-6645, dated 10/26/2017 Existing loading as per SBA Site Summary, dated 08/14/2017. Proposed final loading for AT&T as per SBA Portal, App #75434, v2.
Authorization:	SBA Communication Corp.	

3. ANALYSIS METHODS & DATA

The analysis was performed in accordance with Telecommunication Industry Association specification TIA-222-G. The tower was modeled using TNX Tower, a 3-D finite element program. TNX Tower is a general-purpose modeling, analysis, and design program created specifically for communication towers using the EIA-222-C, EIA-222-D, TIA/EIA-222-F or TIA-222-G standards. The 3-D model included the tower, with existing appurtenances and all proposed loads.

SITE DATA	
SBA Site Name:	New Britain 2, CT
SBA Site Number:	CT04382-S-02
Carrier Site ID:	CT5254 / New Britain
City, State:	New Britain, CT
County:	Hartford County
Code Wind Load Requirement:	TIA-222-G & IBC 2012 (122 mph ultimate wind speed equivalent to 95 mph nominal wind speed)
Wind Load Used:	TIA-222-G Code: • Nominal wind speed of 95 mph (3 second gust wind speed) • Structure Class II*. • Exposure Category B. • Topographic Category 1. • Crest Height 0.00 ft. • A wind speed of 50 mph is used in combination with ice • Nominal ice thickness of 1.0 in.
Seismic Check:	S_s=0.183 < 1.0, thus seismic loading can be ignored as per 2.7.3 of the TIA-222-G Code

*This structural analysis is based upon the tower being classified as a class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

TOWER DATA	
Tower Type:	Self Support Tower
Height:	175'
Cross Section:	Triangular

Steel Strength:	Legs – 50 ksi , Braces – 36 ksi
Type of Foundation:	Mat Foundation with (3) Pedestals

TOWER HISTORY	
Tower Manufacturer / Model:	Rohn Industries, Inc.
Date of Original Design:	08/18/2000
Previous Modifications:	Allpro Consulting Group Inc, Job #17-0378, dated 03/03/2017.
Original Design Code Requirements:	TIA-222-F 2005, 80 mph wind speed + 1" radical ice 38 mph wind speed

4. CONCLUSIONS

RESULT SUMMARY		
MEMBER	*% Capacity*	*Pass/Acceptable*
Legs	**60.6 %**	**Pass**
Diagonals	**88.8 %**	**Pass**
Top Girt	**3.8 %**	**Pass**
Bolt checks	**88.8 %**	**Pass**
Anchor Bolts	**51.7 %**	**Pass**
Foundation (see attached MathCAD for details)	**Net Soil Pressure (18.7 %)**	**Pass**
	Horizontal shear (25.9 %)	**Pass**
	Safety against overturning (56.6 %)	**Pass**
OVERALL TOWER RATING = 88.8 %		

As per the results of the analysis, the existing tower **is in code compliance** for the new and existing antenna loads.

Decrease of stress ratio by 1.0% from previous structural analysis is due to change in existing load by Sprint when compared to Sprint proposed loading from previous SA and proposed load change by AT&T

Maximum tower stress **is less than 100%, the acceptable stress ratio** making it **in code compliance** under the TIA-222-G code and 2016 Connecticut state building code (IBC 2012).

5. DISCLAIMER

Installation procedures and related loading are not within the scope of this analysis. A contractor experienced in similar work should perform all installation work. The engineering services provided by Allpro Consulting Group, Inc. (ACGI) are limited to the computer analysis and calculations of the structure with the proposed and existing loads. This analysis is considered void if the loading mentioned in this report is changed or is different as installed. It is assumed that the existing structure is properly maintained and is in good condition free of any defects. Scope of this analysis does not include existing connections, except as noted in this report.

ACGI does not make any warranties, expressed or implied in connection with this engineering analysis report and disclaims any liability arising from deficiencies or any existing conditions of the original structure. ACGI will not be responsible for consequential or incidental damages sustained by any parties as a result of any data or conclusions included in this Report. The maximum liability of ACGI pursuant to this report shall be limited to the consulting fee received for the preparation of the report.

6. ASSUMPTIONS

This analysis was completed based on the following assumptions:

- Tower has been properly maintained.
- Tower erection was in accordance to manufacturer drawings and modification reports.
- Leg flanges have been properly designed by manufacturer to not be a limiting reaction.
- Welds have been properly designed and installed by manufacturer to not be a limiting reaction.
- Foundation data was not provided. It is assumed that the foundation is designed to resist the original tower reactions.
- Foundation does not have structural damage.
- Bolts have been properly tightened according to manufacturer specifications.
- Appurtenance, mount and transmission line sizes and weights are best estimates using the tnxTower database and manufacturer information.

7. APPURTENANCE LISTING

EXISTING LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
172±	3	KMW ETCR-654L12H6	(3) T-Frames with (3) V-Brace Kits; (3) SitePro SFS-V-L; (6) 2-3/8"x6" Pipe Masts SitePro BBPM-K1	(4) 1-1/4" Fiber (4) 1/2" Fiber	Sprint Nextel
	4	Andrew VHLP2-18 Dish			
	3	Dragonwave Horizon Duo			
	3	ALU 1900 Mhz RRUs			
	6	ALU 800 Mhz RRUs			
	3	ALU TD-RRH8x20-25 RRUs			
162±	3	Kathrein 800 10121	(3) T-Frames	(12) 1-5/8" Coax (2) 1/2" Fiber (4) 3/4" DC Power (1) 3" Flex Conduit	AT&T*
	3	Quintel Technology QS66512-2			
	6	KMW AM-X-CD-16-65-00T			
	3	Ericsson RRUS-32			
	3	Ericsson RRUS-11			
	3	Ericsson RRUS-32 B2s			
	6	Powerwave LGP 21401			
	6	CCI TPX-070821			
	6	Kathrein 860-10025			
	2	Raycap DC6-48-60-18-8F			
152±	3	Ericsson Air 21 B2A/B4P Antenna	(3) T-Frames	(12) 1-5/8" Coax (1) 1-5/8" Hybrid (1) 1-1/4" Hybrid	T-Mobile
	3	Ericsson Air 32 Antenna			
	3	Commscope LNX-6515DS-A1M Antenna			
	3	Ericsson KRY 112 144/1 TMA			
	3	Ericsson RRUS 11 (Band 12)			
140±	6	Andrew SBNHH-1D65B	(3) T-Frames	(12) 1-5/8" Coax (2) 1-5/8" Hybrid	Verizon
	3	Kathrein 800 10735v01			
	3	Antel BXA-80080/4CF			
	3	Alcatel Lucent RRH-2x60-AWS			
	3	Alcatel Lucent RRH-2x60-PCS			
	3	Alcatel Lucent RRH-2X60W-700U			
	1	RFS DB-T1-6Z-8AB-0Z			
130±	3	Kathrein 742 213	(3) Pipe Mounts	(6) 1-5/8" Coax	Metro PCS

*The (2) 1/2" Fiber Cable and (4) 3/4" DC Power Cable for ATT will be Installed in (1) 3" Conduit.

FINAL SPRINT NEXTEL LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
162±	3	Kathrein 800 10121 Antenna	(3) T-Frames **with V-Stablilizer reinforcement kits**	(12) 1-5/8" Coax (2) 1/2" Fiber (4) 3/4" DC Power (1) 3" Flex Conduit	AT&T
	3	Quintel Technology QS66512-2			
	3	KMW AM-X-CD-16-65-00T			
	3	**CCI HPA-65R-BUU-H-6 Antennas**			
	6	Powerwave LGP 21401			
	6	CCI TPX-070821			
	3	Ericsson RRUS-32			
	3	Ericsson RRUS-11			
	3	Ericsson RRUS-32 B2s			
	3	**Ericsson RRUS-32 B66**			
	2	Raycap DC6-48-60-18-8F			
	6	Kathrein 860-10025 RET			

1. ACGI should be notified of any discrepancies found in the data listed in this report.
2. Notify ACGI if any potential physical and other interference with existing antennas for a redesign.

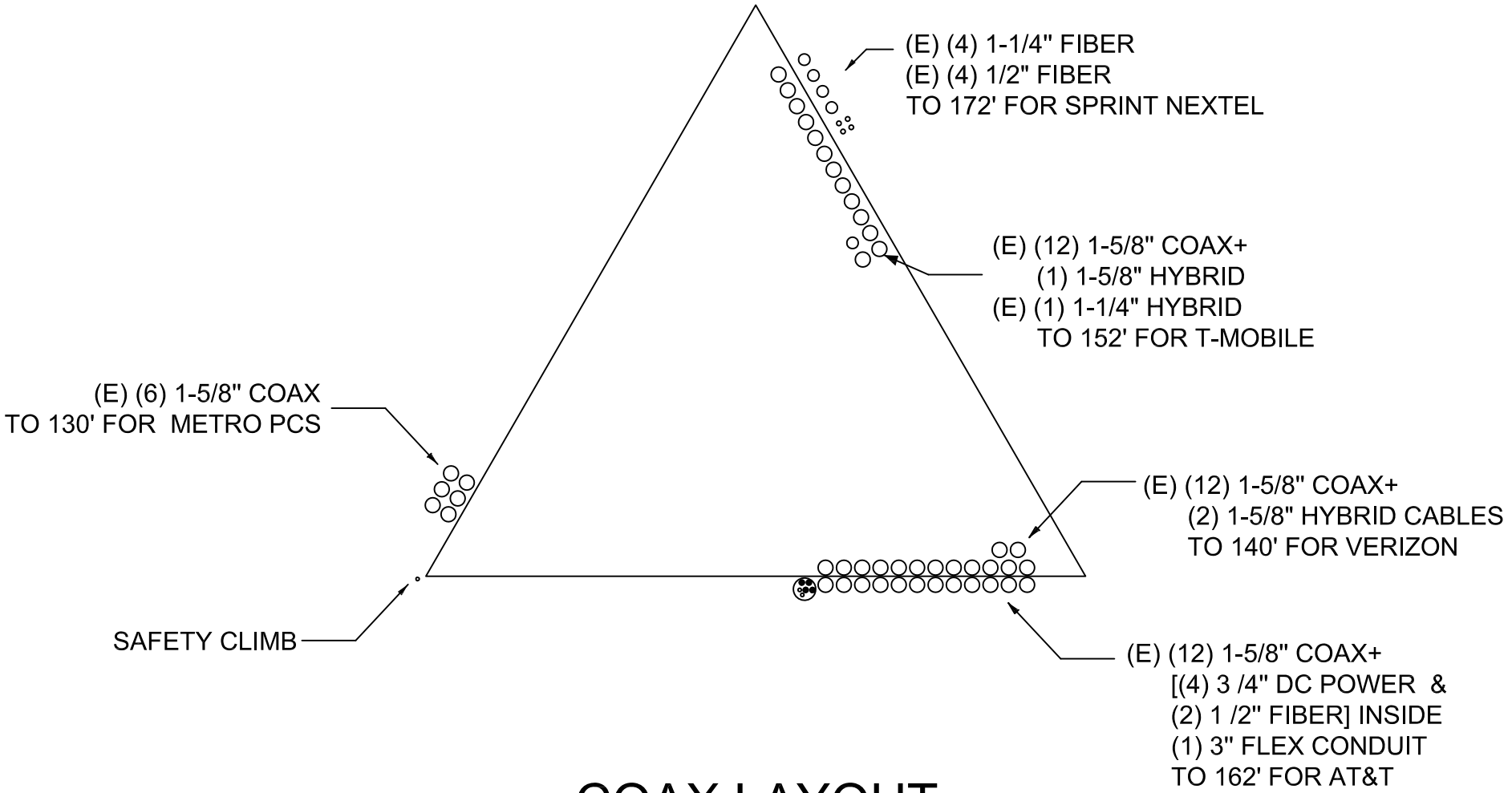
8. SUMMARY OF WORKING PERCENTAGE OF STRUCTURAL COMPONENTS

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	176 - 160	Leg	ROHN 3 EH	3	-14.16	119.12	11.9	Pass
T2	160 - 140	Leg	ROHN 4 EH	33	-54.15	183.54	29.5	Pass
T3	140 - 120	Leg	ROHN 5 EH	66	-99.00	254.38	38.9	Pass
T4	120 - 100	Leg	ROHN 6 EHS	93	-136.50	274.77	49.7	Pass
T5	100 - 93.3333	Leg	ROHN 6 EH	114	-148.78	343.10	43.4	Pass
T6	93.3333 - 86.6667	Leg	ROHN 6 EH	123	-160.51	343.10	46.8	Pass
T7	86.6667 - 80	Leg	ROHN 6 EH	132	-171.92	343.10	50.1	Pass
T8	80 - 60	Leg	ROHN 6 EH	141	-205.23	343.10	59.8	Pass
T9	60 - 40	Leg	ROHN 8 EHS	162	-234.00	386.39	60.6	Pass
T10	40 - 20	Leg	ROHN 8 X-STR	177	-264.30	505.55	52.3	Pass
							53.7 (b)	
T11	20 - 0	Leg	ROHN 8 EH	192	-293.26	505.55	58.0	Pass
T1	176 - 160	Diagonal	L2x2x1/4	9	-3.17	19.13	16.6	Pass
							32.9 (b)	
T2	160 - 140	Diagonal	L2x2x3/16	36	-4.37	11.91	36.7	Pass
							63.8 (b)	
T3	140 - 120	Diagonal	L2x2x3/16	69	-5.91	7.89	75.0	Pass
							88.8 (b)	
T4	120 - 100	Diagonal	L2 1/2x2 1/2x3/16	97	-6.57	9.76	67.3	Pass
							82.8 (b)	
T5	100 - 93.3333	Diagonal	L2 1/2x2 1/2x3/16	118	-6.57	8.87	74.0	Pass
							83.1 (b)	
T6	93.3333 - 86.6667	Diagonal	L2 1/2x2 1/2x3/16	127	-6.74	8.09	83.4	Pass
							83.7 (b)	
T7	86.6667 - 80	Diagonal	L2.5x2.5x3/16 + L2.5x2.5x3/16 (C-shape)	136	-6.80	21.82	31.2	Pass
							54.7 (b)	
T8	80 - 60	Diagonal	L3x3x1/4	145	-7.14	13.19	54.2	Pass
T9	60 - 40	Diagonal	L3 1/2x3 1/2x1/4	166	-8.57	14.60	58.7	Pass
							58.9 (b)	
T10	40 - 20	Diagonal	L3 1/2x3 1/2x1/4	181	-9.05	12.18	74.3	Pass
T11	20 - 0	Diagonal	L4x4x1/4	196	-10.09	15.47	65.2	Pass
							66.0 (b)	
T1	176 - 160	Top Girt	L2x2x1/4	4	-0.41	12.90	3.2	Pass
							3.8 (b)	
							Summary	
						Leg (T9)	60.6	Pass
						Diagonal (T3)	88.8	Pass
						Top Girt (T1)	3.8	Pass
						Bolt Checks	88.8	Pass
						RATING =	**88.8**	**Pass**

APPENDIX

COAX LAYOUT


(E) (4) 1-1/4" FIBER
(E) (4) 1/2" FIBER
TO 172' FOR SPRINT NEXTEL
(E) (12) 1-5/8" COAX+
(1) 1-5/8" HYBRID
(E) (1) 1-1/4" HYBRID
TO 152' FOR T-MOBILE
(E) (6) 1-5/8" COAX
TO 130' FOR METRO PCS
(E) (12) 1-5/8" COAX+
(2) 1-5/8" HYBRID CABLES
TO 140' FOR VERIZON
SAFETY CLIMB
(E) (12) 1-5/8" COAX+
[(4) 3 /4" DC POWER &
(2) 1 /2" FIBER] INSIDE
(1) 3" FLEX CONDUIT
TO 162' FOR AT&T

COAX LAYOUT

TOWER DATA

This site will be taken offline on June 30th 2018. Please start using the new site at https://hazards.atcouncil.org.

Search Results

Query Date: Tue Jul 10 2018
Latitude: 41.6664
Longitude: -72.8128

ASCE 7-10 Windspeeds (3-sec peak gust in mph*):

Risk Category I: 111
Risk Category II: 122
Risk Category III-IV: 131
MRI 10-Year:** 76
MRI 25-Year:** 86
MRI 50-Year:** 92
MRI 100-Year:** 99

ASCE 7-05 Windspeed:
100 (3-sec peak gust in mph)
ASCE 7-93 Windspeed:
80 (fastest mile in mph)

*Miles per hour
**Mean Recurrence Interval

Users should consult with local building officials to determine if there are community-specific wind speed requirements that govern.

Print your results

WINDSPEED WEBSITE DISCLAIMER

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the windspeed report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the windspeed report provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the windspeed load report.

USGS Design Maps Summary Report

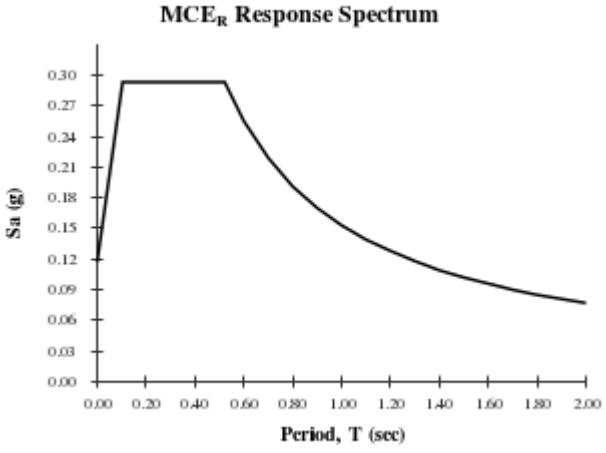
User–Specified Input

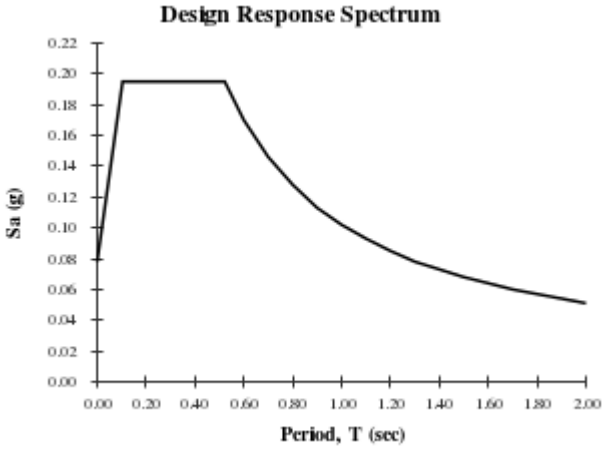
Report Title	Seismic check Tue July 10, 2018 20:22:14 UTC
Building Code Reference Document	2012/2015 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	41.66641°N, 72.8128°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

USGS–Provided Output

S_S =	0.183 g	S_{MS} =	0.293 g	S_{DS} =	0.195 g
S_1 =	0.064 g	S_{M1} =	0.153 g	S_{D1} =	0.102 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.

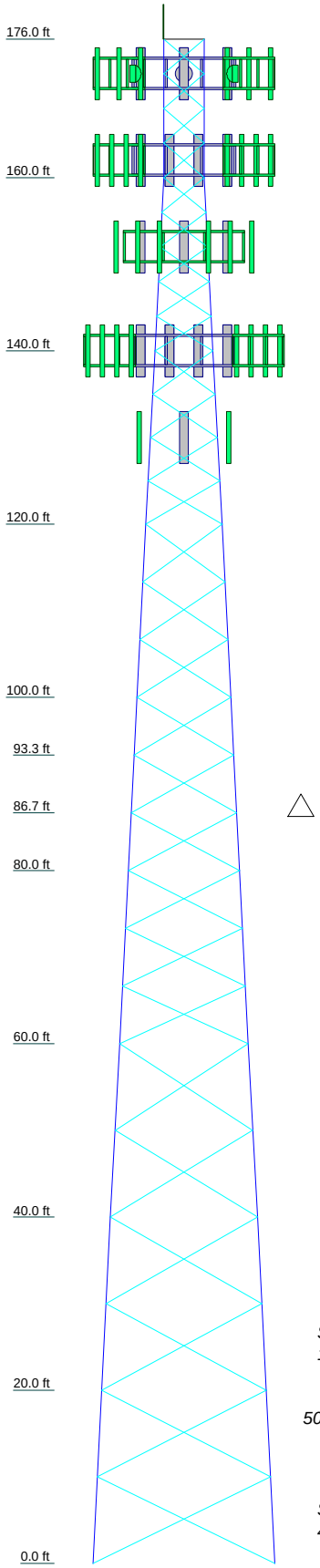





41.666411, -72.812803
80°
70°
60°
50°
40°
30°
20°
10°
280°
270°
260°
250°

TOWER ELEVATION DRAWING

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11
Legs	ROHN 3 EH	ROHN 4 EH	ROHN 5 EH	ROHN 6 EHS	ROHN 6 EH				ROHN 8 EHS	ROHN 8 X-STR	ROHN 8 EH
Leg Grade	A572-50										
Diagonals	L2x2x1/4	L2x2x3/16		L2 1/2x2 1/2x3/16			A	L3x3x1/4	L3 1/2x3 1/2x1/4		L4x4x1/4
Diagonal Grade	A36							A572-50			
Top Girts	L2x2x1/4	N.A.									
Face Width (ft) 21	4.6875	6.72656	8.76563	10.8047	11.4844	12.1641	12.8438	14.8828	16.9219	18.9609	
# Panels @ (ft)	9 @ 4	4 @ 5	9 @ 6.66667					6 @ 10			
Weight (K) 24.7	1.1	1.5	1.9	2.1	0.9	0.9	0.9	3.2	3.4	4.2	4.6



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2.5x2.5x3/16 + L2.5x2.5x3/16 (C-shape)		

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 Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 95 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 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: 88.8%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 301 K
SHEAR: 31 K

UPLIFT: -257 K
SHEAR: 27 K

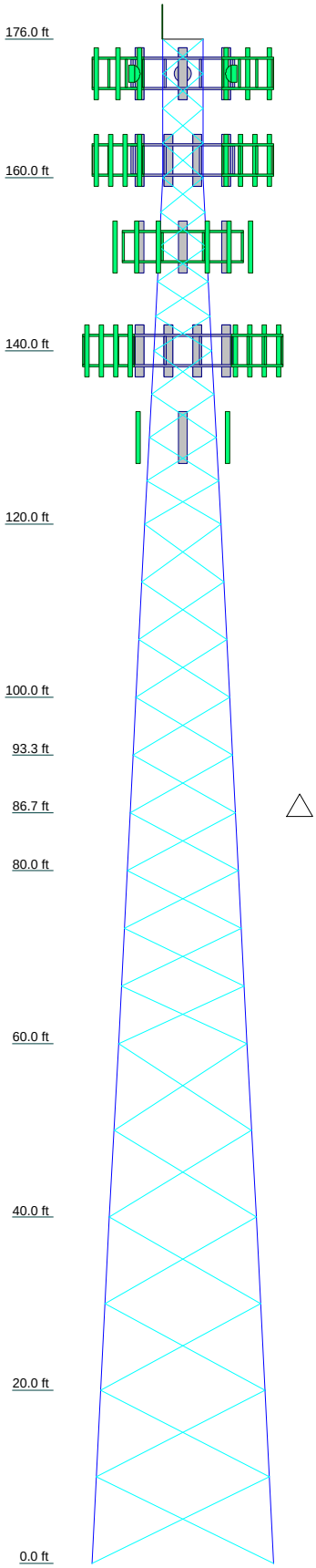
AXIAL 184 K
SHEAR 15 K *MOMENT 1711 kip-ft*
TORQUE 12 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 62 K
SHEAR 48 K *MOMENT 5093 kip-ft*
TORQUE 50 kip-ft
REACTIONS - 95 mph WIND

Allpro Consulting Group, Inc
9221 Lyndon B Johnson Fwy
Dallas, TX 75243
Phone: 972-231-8893
FAX: 866-364-8375

Job: **17-8042**			
Project: **CT04382-S-02 New Britain 2, CT**			
Client: SBA Network Services, Inc.	Drawn by: apatil	App'd:	
Code: TIA-222-G	Date: 07/12/18	Scale: NTS	
Path:		Dwg No. E-1	

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11
Legs	ROHN 3 EH	ROHN 4 EH	ROHN 5 EH	ROHN 6 EHS				ROHN 6 EH	ROHN 8 EHS	ROHN 8 X-STR	ROHN 8 EH
Leg Grade	A572-50										
Diagonals	L2x2x1/4	L2x2x3/16		L2 1/2x2 1/2x3/16			A	L3x3x1/4	L3 1/2x3 1/2x1/4		L4x4x1/4
Diagonal Grade	A36							A572-50			
Top Girts	L2x2x1/4	N.A.									
Face Width (ft) 21	4.6875	6.72656	8.76563	10.8047	11.4844	12.1641	12.8438	14.8828	16.9219	18.9609	
# Panels @ (ft)	9 @ 4	4 @ 5	9 @ 6.66667						6 @ 10		
Weight (K) 24.7	1.1	1.5	1.9	2.1	0.9	0.9	0.9	3.2	3.4	4.2	4.6



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	176	HPA-65R-BUU-H6	162
ETCR-654L12H6	172	RRUS 32 B66	162
ETCR-654L12H6	172	RRUS 32 B66	162
ETCR-654L12H6	172	RRUS 32 B66	162
1900 MHz RRH	172	(3) V-Stabilizer	162
1900 MHz RRH	172	AM-X-CD-16-65-00T	162
1900 MHz RRH	172	AM-X-CD-16-65-00T	162
Horizon Duo	172	AM-X-CD-16-65-00T	162
Horizon Duo	172	Kathrein 800-10121	162
Horizon Duo	172	Ericsson RRUS 11 (Band 12)	152
(2) 800 MHz RRH	172	KRY 112 144/1	152
(2) 800 MHz RRH	172	KRY 112 144/1	152
(2) 800 MHz RRH	172	KRY 112 144/1	152
TD-RRH8x20-25	172	(3) T-Frames	152
TD-RRH8x20-25	172	LNX-6515DS-A1M w/ Mount Pipe	152
TD-RRH8x20-25	172	LNX-6515DS-A1M w/ Mount Pipe	152
(3) T-Frames	172	LNX-6515DS-A1M w/ Mount Pipe	152
(3) SFS-V	172	AIR 21 B2A/B4P w/ Mount Pipe	152
(2) VHLP2-18	172	AIR 21 B2A/B4P w/ Mount Pipe	152
VHLP2-18	172	AIR 21 B2A/B4P w/ Mount Pipe	152
VHLP2-18	172	Ericsson AIR 32	152
Kathrein 800-10121	162	Ericsson AIR 32	152
Kathrein 800-10121	162	Ericsson AIR 32	152
QS65512-2	162	Ericsson RRUS 11 (Band 12)	152
QS65512-2	162	Ericsson RRUS 11 (Band 12)	152
QS65512-2	162	RRH-2x60-AWS	140
(2) LGP 21401	162	RRH-2x60-PCS	140
(2) LGP 21401	162	RRH-2x60-PCS	140
(2) LGP 21401	162	RRH-2x60-PCS	140
(2) Katherin 860-10025	162	RRH 2x60-700	140
(2) Katherin 860-10025	162	RRH 2x60-700	140
(2) Katherin 860-10025	162	RRH 2x60-700	140
Ericsson RRUS 11	162	DB-T1-6Z-8AB-0Z	140
Ericsson RRUS 11	162	(3) T-Frames	140
Ericsson RRUS 11	162	(2) SBNHH-1D65B w/ Mount Pipe	140
Ericsson RRUS 32	162	(2) SBNHH-1D65B w/ Mount Pipe	140
Ericsson RRUS 32	162	(2) SBNHH-1D65B w/ Mount Pipe	140
Ericsson RRUS 32	162	800 10735v01 w/ Mount Pipe	140
Ericsson RRUS 32 B2s	162	800 10735v01 w/ Mount Pipe	140
Ericsson RRUS 32 B2s	162	800 10735v01 w/ Mount Pipe	140
Ericsson RRUS 32 B2s	162	BXA-80080/4CF w/ Mount Pipe	140
(2) TPX-070821	162	BXA-80080/4CF w/ Mount Pipe	140
(2) TPX-070821	162	BXA-80080/4CF w/ Mount Pipe	140
(2) TPX-070821	162	RRH-2x60-AWS	140
DC6-48-60-18-8F	162	RRH-2x60-AWS	140
DC6-48-60-18-8F	162	(3) Pipe Mounts	130
(3) T-Frames	162	742 213 w/ Mount Pipe	130
HPA-65R-BUU-H6	162	742 213 w/ Mount Pipe	130
HPA-65R-BUU-H6	162	742 213 w/ Mount Pipe	130

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2.5x2.5x3/16 + L2.5x2.5x3/16 (C-shape)		

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 Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 95 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 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

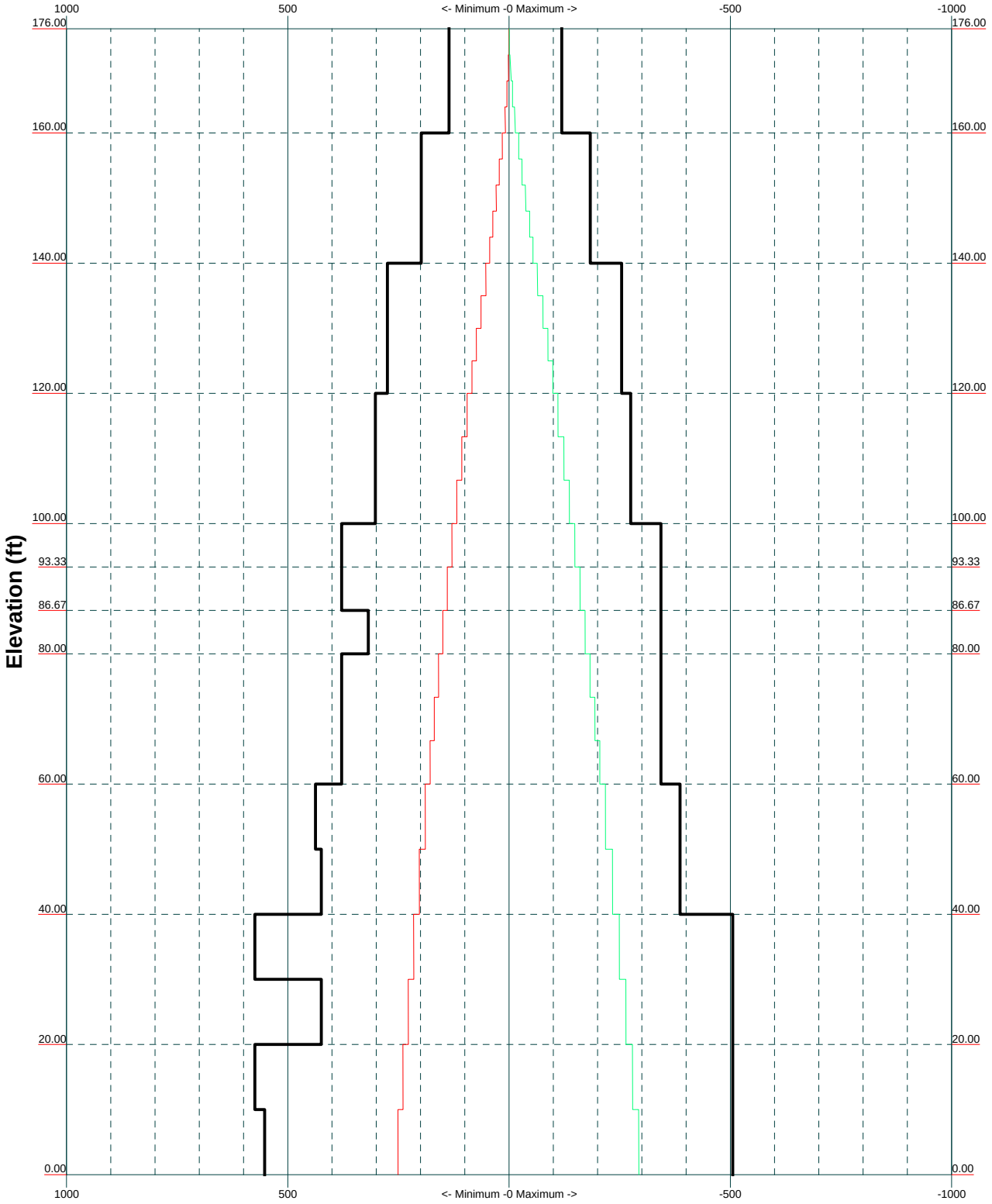
Allpro Consulting Group, Inc
9221 Lyndon B Johnson Fwy
Dallas, TX 75243
Phone: 972-231-8893
FAX: 866-364-8375

Job: ***17-8042***			
Project: ***CT04382-S-02 New Britain 2, CT***			
Client: SBA Network Services, Inc.	Drawn by: apatil	App'd:	
Code: TIA-222-G	Date: 07/12/18	Scale: NTS	
Path:		Dwg No. E-1	

MISCELLANEOUS PLOTS

TIA-222-G - 95 mph/50 mph 1.0000 in Ice Exposure B

Leg Capacity ——— **Leg Compression (K)**



Allpro Consulting Group, Inc
9221 Lyndon B Johnson Fwy
Dallas, TX 75243
Phone: 972-231-8893
FAX: 866-364-8375

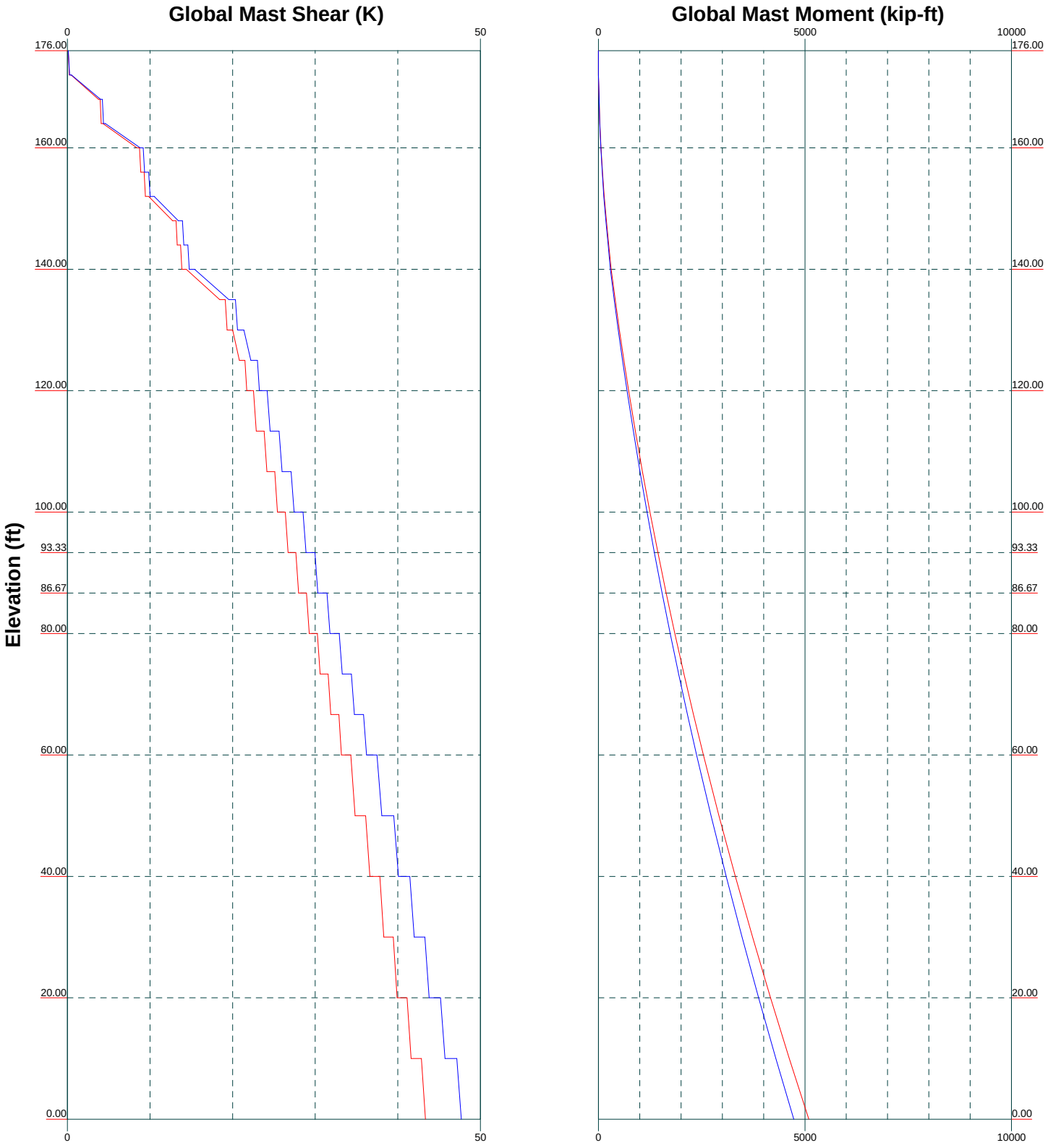
Job: ***17-8042***			
Project: ***CT04382-S-02 New Britain 2, CT***			
Client: SBA Network Services, Inc.	Drawn by: apatil	App'd:	
Code: TIA-222-G	Date: 07/12/18	Scale: NTS	
Path:		Dwg No. E-3	

TIA-222-G - 95 mph/50 mph 1.0000 in Ice Exposure B

Vx Vz

Maximum Values

Mx Mz

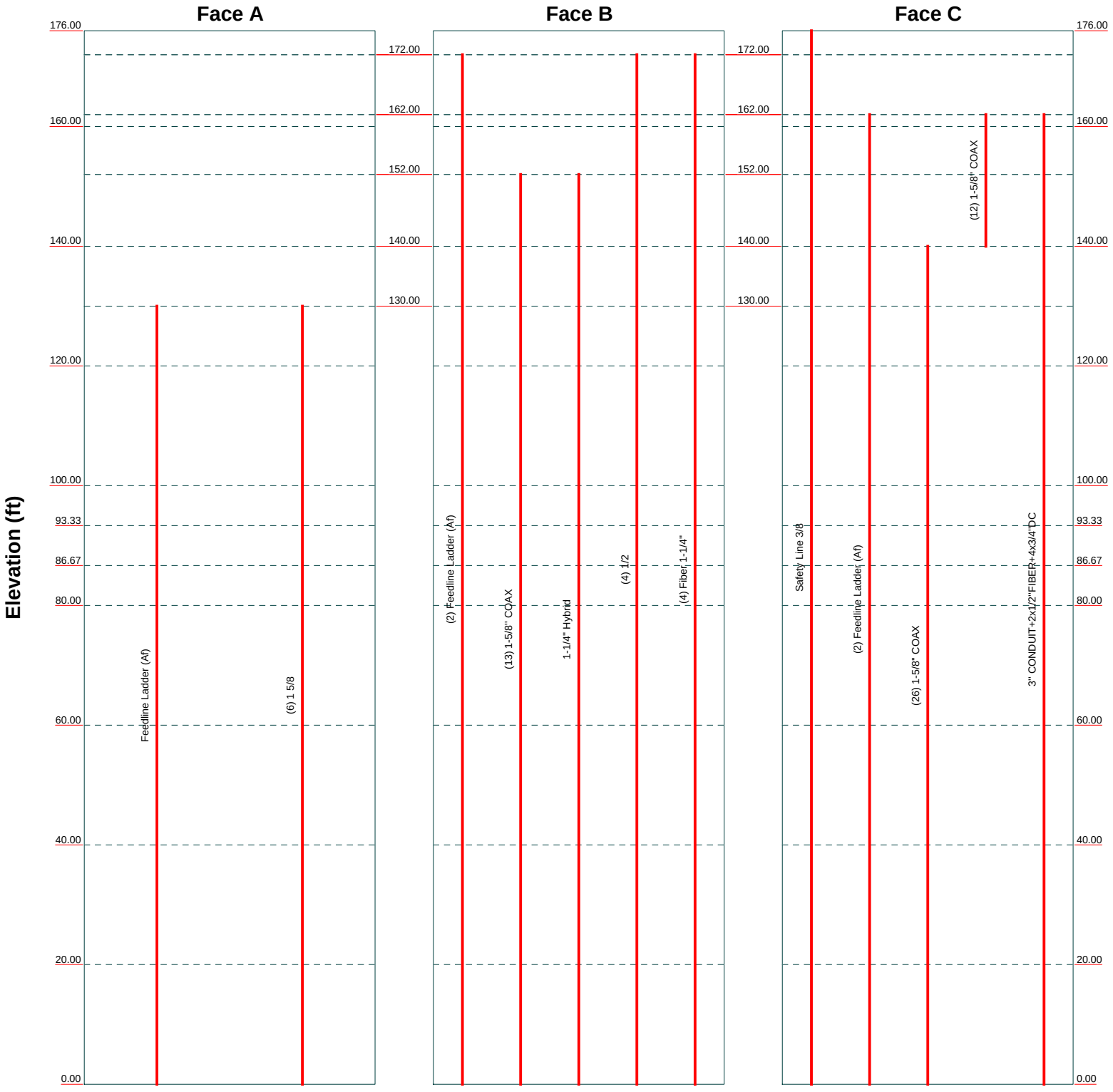


Allpro Consulting Group, Inc
9221 Lyndon B Johnson Fwy
Dallas, TX 75243
Phone: 972-231-8893
FAX: 866-364-8375

Job: ***17-8042***			
Project: ***CT04382-S-02 New Britain 2, CT***			
Client: SBA Network Services, Inc.	Drawn by: apatil	App'd:	
Code: TIA-222-G	Date: 07/12/18	Scale: NTS	
Path:		Dwg No. E-4	

Feed Line Distribution Chart
0' - 176'

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

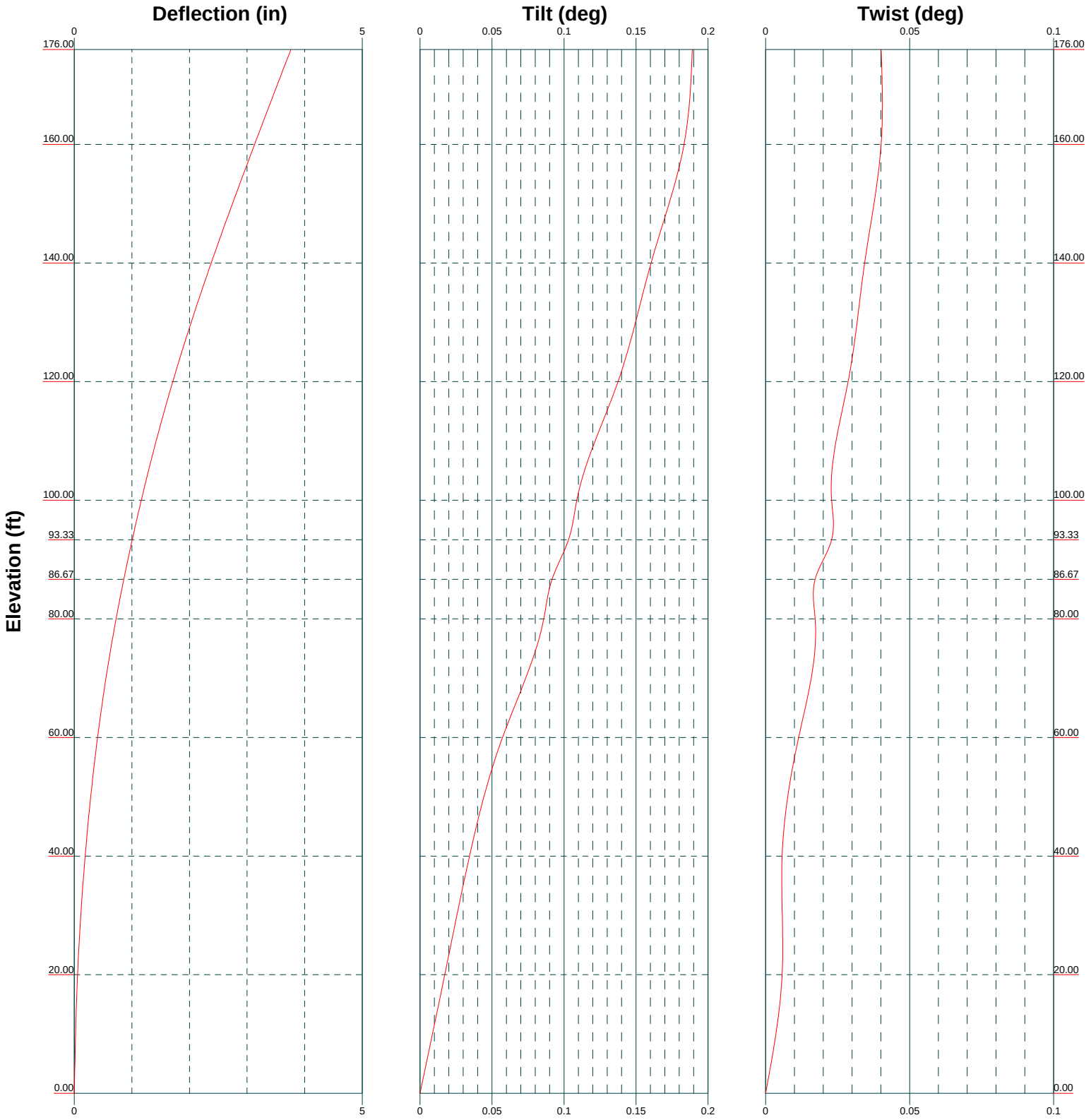


Allpro Consulting Group, Inc
9221 Lyndon B Johnson Fwy
Dallas, TX 75243
Phone: 972-231-8893
FAX: 866-364-8375

Job:	***17-8042***		
Project:	***CT04382-S-02 New Britain 2, CT***		
Client: SBA Network Services, Inc.		Drawn by: apatil	App'd:
Code: TIA-222-G		Date: 07/12/18	Scale: NTS
Path:			Dwg No. E-7

TIA-222-G - Service - 60 mph

Maximum Values

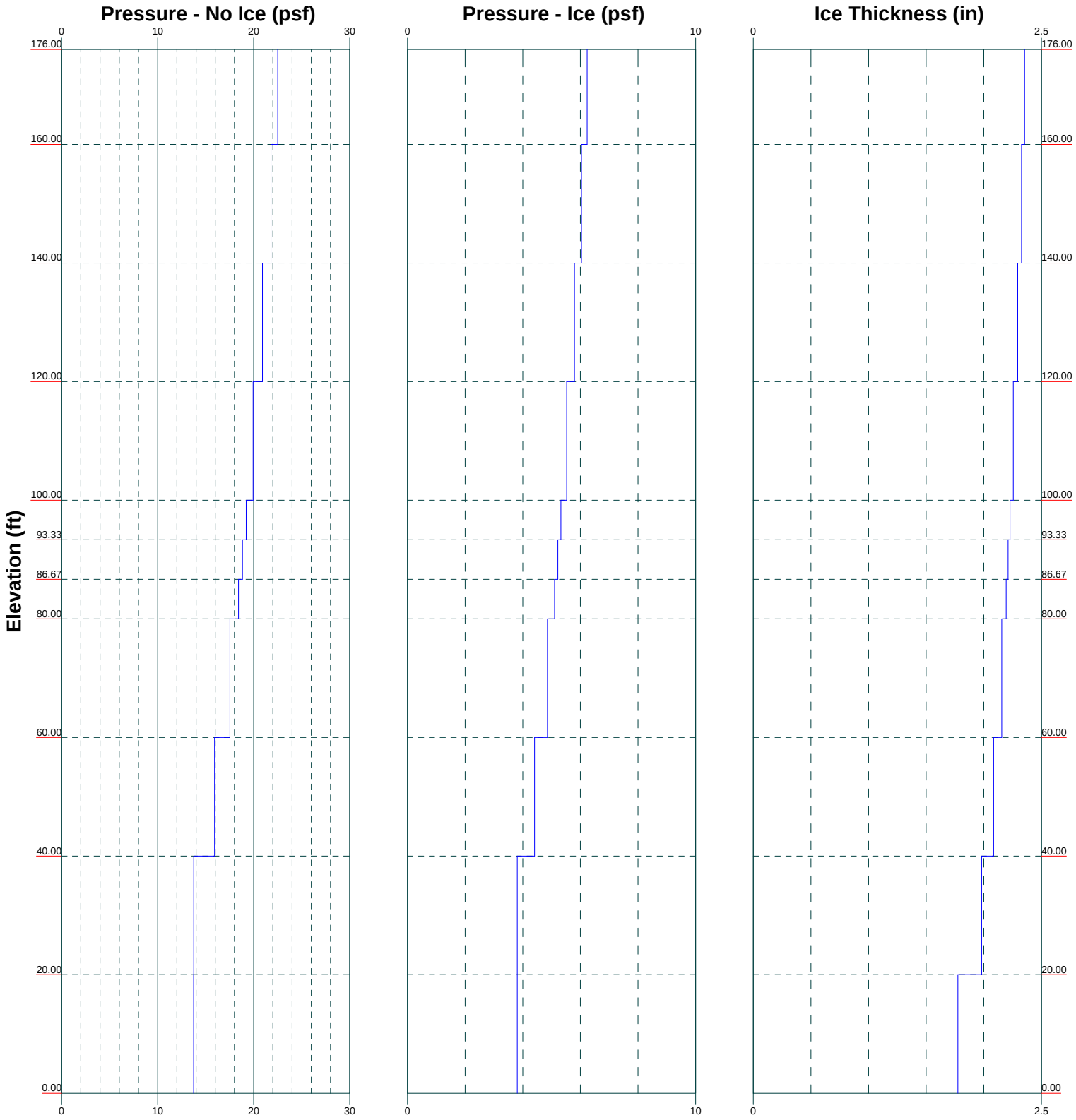


Allpro Consulting Group, Inc
9221 Lyndon B Johnson Fwy
Dallas, TX 75243
Phone: 972-231-8893
FAX: 866-364-8375

Job: ***17-8042***			
Project: ***CT04382-S-02 New Britain 2, CT***			
Client: SBA Network Services, Inc.	Drawn by: apatil	App'd:	
Code: TIA-222-G	Date: 07/12/18	Scale: NTS	
Path:		Dwg No. E-5	

Wind Pressures and Ice Thickness

TIA-222-G - 95 mph/50 mph 1.0000 in Ice Exposure B



Allpro Consulting Group, Inc
9221 Lyndon B Johnson Fwy
Dallas, TX 75243
Phone: 972-231-8893
FAX: 866-364-8375

Job: ***17-8042***			
Project: ***CT04382-S-02 New Britain 2, CT***			
Client: SBA Network Services, Inc.	Drawn by: apatil	App'd:	
Code: TIA-222-G	Date: 07/12/18	Scale: NTS	
Path:		Dwg No. E-9	

TNX TOWER CALCULATION PRINTOUT

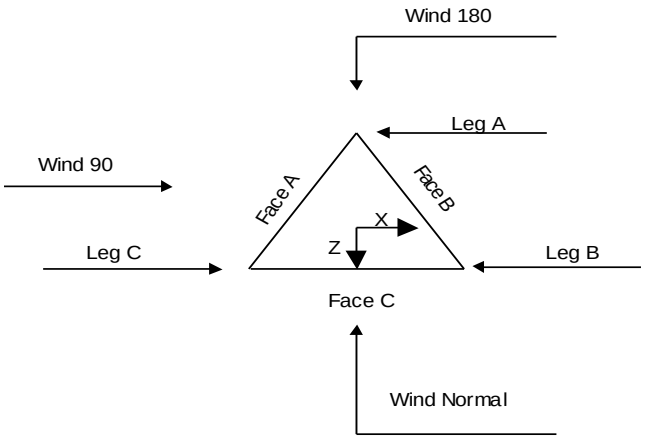
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 176.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 4.69 ft at the top and 21.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 95 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
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.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area	√	SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	176.00-160.00			4.69	1	16.00
T2	160.00-140.00			4.69	1	20.00
T3	140.00-120.00			6.73	1	20.00
T4	120.00-100.00			8.77	1	20.00
T5	100.00-93.33			10.80	1	6.67
T6	93.33-86.67			11.48	1	6.67
T7	86.67-80.00			12.16	1	6.67
T8	80.00-60.00			12.84	1	20.00
T9	60.00-40.00			14.88	1	20.00
T10	40.00-20.00			16.92	1	20.00
T11	20.00-0.00			18.96	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	176.00-160.00	4.00	X Brace	No	No	0.0000	0.0000
T2	160.00-140.00	4.00	X Brace	No	No	0.0000	0.0000
T3	140.00-120.00	5.00	X Brace	No	No	0.0000	0.0000
T4	120.00-100.00	6.67	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T5	100.00-93.33	6.67	X Brace	No	No	0.0000	0.0000
T6	93.33-86.67	6.67	X Brace	No	No	0.0000	0.0000
T7	86.67-80.00	6.67	X Brace	No	No	0.0000	0.0000
T8	80.00-60.00	6.67	X Brace	No	No	0.0000	0.0000
T9	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T10	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T11	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 176.00-160.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T2 160.00-140.00	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T3 140.00-120.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 120.00-100.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 100.00-93.33	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 93.33-86.67	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 86.67-80.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Arbitrary Shape	L2.5x2.5x3/16 + L2.5x2.5x3/16 (C-shape)	A36 (36 ksi)
T8 80.00-60.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A572-50 (50 ksi)
T9 60.00-40.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T10 40.00-20.00	Pipe	ROHN 8 X-STR	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T11 20.00-0.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Equal Angle	L4x4x1/4	A572-50 (50 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 176.00-160.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Flat Bar		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 176.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T2 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T3 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T4 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T5 100.00-93.33	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T6 93.33-86.67	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T7 86.67-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T8 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T9 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T10 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T11 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 176.00-160.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 160.00-140.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 140.00-120.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 120.00-100.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 100.00-93.33	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 93.33-86.67	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 86.67-80.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 80.00-60.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 60.00-40.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 40.00-20.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T11 20.00-0.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 176.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 100.00-93.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 93.33-86.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 86.67-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 176.00-160.00	Flange	0.8750 A325N	4	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 160.00-140.00	Flange	1.0000 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 140.00-120.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 120.00-100.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 100.00-93.33	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 93.33-86.67	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 86.67-80.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 80.00-60.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 60.00-40.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 40.00-20.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T11 20.00-0.00	Flange	1.0000 A354-BC	10	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
***												
Safety Line 3/8	C	No	Ar (CaAa)	176.00 - 0.00	0.0000	-0.5	1	1	0.5000	0.3750		0.22
Feedline Ladder (Af)	A	No	Af (CaAa)	130.00 - 0.00	0.0000	-0.2	1	1	3.0000	2.5000		8.40
Feedline Ladder (Af)	B	No	Af (CaAa)	172.00 - 0.00	-2.0000	-0.2	2	1	3.0000	2.5000		8.40
Feedline Ladder (Af)	C	No	Af (CaAa)	162.00 - 0.00	-2.0000	-0.3	2	1	3.0000	2.5000		8.40
***												
1 5/8	A	No	Ar (CaAa)	130.00 - 0.00	0.0000	-0.4	6	3	0.5000	1.9800		1.04
***												
1-5/8" COAX	B	No	Ar (CaAa)	152.00 - 0.00	-0.5000	-0.2	13	12	0.5000	1.9800		1.04
1-1/4" Hybrid	B	No	Ar (CaAa)	152.00 - 0.00	-1.0000	-0.2	1	1	0.5000	1.5500		1.04
***												
***												
1-5/8" COAX	C	No	Ar (CaAa)	140.00 - 0.00	0.0000	-0.4	26	12	0.5000	1.9800		1.04
***												
1-5/8" COAX	C	No	Ar (CaAa)	162.00 - 140.00	-0.5000	-0.4	12	12	0.5000	1.9800		1.04
3" CONDUIT+2 x1/2"FIBER+4 x3/4"DC	C	No	Ar (CaAa)	162.00 - 0.00	0.0000	-0.3	1	1	0.5000	3.0000		2.25
1/2	B	No	Ar (CaAa)	172.00 - 0.00	0.0000	-0.2	4	2	0.5800	0.5800		0.25
Fiber 1-1/4"	B	No	Ar (CaAa)	172.00 - 0.00	0.0000	-0.2	4	4	0.5800	1.5500		1.04

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	176.00-160.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	20.224	0.000	0.26
		C	0.000	0.000	7.619	0.000	0.07
T2	160.00-140.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	66.455	0.000	0.61
		C	0.000	0.000	70.937	0.000	0.64
T3	140.00-120.00	A	0.000	0.000	16.047	0.000	0.15
		B	0.000	0.000	88.287	0.000	0.73
		C	0.000	0.000	126.377	0.000	0.93
T4	120.00-100.00	A	0.000	0.000	32.093	0.000	0.29
		B	0.000	0.000	88.287	0.000	0.73

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	126.377	0.000	0.93
T5	100.00-93.33	A	0.000	0.000	10.698	0.000	0.10
		B	0.000	0.000	29.429	0.000	0.24
		C	0.000	0.000	42.126	0.000	0.31
T6	93.33-86.67	A	0.000	0.000	10.698	0.000	0.10
		B	0.000	0.000	29.429	0.000	0.24
		C	0.000	0.000	42.126	0.000	0.31
T7	86.67-80.00	A	0.000	0.000	10.698	0.000	0.10
		B	0.000	0.000	29.429	0.000	0.24
		C	0.000	0.000	42.126	0.000	0.31
T8	80.00-60.00	A	0.000	0.000	32.093	0.000	0.29
		B	0.000	0.000	88.287	0.000	0.73
		C	0.000	0.000	126.377	0.000	0.93
T9	60.00-40.00	A	0.000	0.000	32.093	0.000	0.29
		B	0.000	0.000	88.287	0.000	0.73
		C	0.000	0.000	126.377	0.000	0.93
T10	40.00-20.00	A	0.000	0.000	32.093	0.000	0.29
		B	0.000	0.000	88.287	0.000	0.73
		C	0.000	0.000	126.377	0.000	0.93
T11	20.00-0.00	A	0.000	0.000	32.093	0.000	0.29
		B	0.000	0.000	88.287	0.000	0.73
		C	0.000	0.000	126.377	0.000	0.93

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	176.00-160.00	A	2.353	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	51.224	0.000	1.04
		C		0.000	0.000	21.058	0.000	0.42
T2	160.00-140.00	A	2.327	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	144.942	0.000	2.90
		C		0.000	0.000	138.876	0.000	3.00
T3	140.00-120.00	A	2.294	0.000	0.000	27.072	0.000	0.57
		B		0.000	0.000	184.000	0.000	3.64
		C		0.000	0.000	141.379	0.000	3.72
T4	120.00-100.00	A	2.256	0.000	0.000	53.726	0.000	1.12
		B		0.000	0.000	182.824	0.000	3.58
		C		0.000	0.000	140.565	0.000	3.67
T5	100.00-93.33	A	2.227	0.000	0.000	17.802	0.000	0.37
		B		0.000	0.000	60.643	0.000	1.18
		C		0.000	0.000	46.649	0.000	1.21
T6	93.33-86.67	A	2.211	0.000	0.000	17.744	0.000	0.37
		B		0.000	0.000	60.479	0.000	1.17
		C		0.000	0.000	46.536	0.000	1.20
T7	86.67-80.00	A	2.194	0.000	0.000	17.682	0.000	0.37
		B		0.000	0.000	60.305	0.000	1.16
		C		0.000	0.000	46.415	0.000	1.20
T8	80.00-60.00	A	2.156	0.000	0.000	52.628	0.000	1.08
		B		0.000	0.000	179.742	0.000	3.43
		C		0.000	0.000	138.433	0.000	3.54
T9	60.00-40.00	A	2.085	0.000	0.000	51.842	0.000	1.05
		B		0.000	0.000	177.539	0.000	3.33
		C		0.000	0.000	136.908	0.000	3.45
T10	40.00-20.00	A	1.981	0.000	0.000	50.698	0.000	1.00
		B		0.000	0.000	174.335	0.000	3.18
		C		0.000	0.000	134.689	0.000	3.32

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T11	20.00-0.00	A	1.775	0.000	0.000	48.429	0.000	0.92
		B		0.000	0.000	167.987	0.000	2.89
		C		0.000	0.000	130.289	0.000	3.08

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	176.00-160.00	3.5178	-3.4818	3.8873	-2.9441
T2	160.00-140.00	11.1702	-4.6882	10.8580	-3.2552
T3	140.00-120.00	14.6761	-4.3344	12.0774	-3.4323
T4	120.00-100.00	15.3828	-4.1637	11.9689	-3.2050
T5	100.00-93.33	16.9954	-4.6269	13.2875	-3.5893
T6	93.33-86.67	17.7571	-4.8461	13.9167	-3.7743
T7	86.67-80.00	17.6437	-4.8358	13.8258	-3.8606
T8	80.00-60.00	18.9127	-5.2040	15.3554	-4.2236
T9	60.00-40.00	21.5118	-5.9178	17.4994	-4.8582
T10	40.00-20.00	23.2488	-6.4150	19.1988	-5.4008
T11	20.00-0.00	23.9298	-6.6383	20.4078	-5.8847

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	Safety Line 3/8	160.00 - 176.00	0.6000	0.4161
T1	4	Feedline Ladder (Af)	160.00 - 172.00	1.0000	1.0000
T1	5	Feedline Ladder (Af)	160.00 - 162.00	1.0000	1.0000
T1	16	1-5/8" COAX	160.00 - 162.00	0.6000	0.4161
T1	17	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	160.00 - 162.00	0.6000	0.4161
T1	19	1/2	160.00 - 172.00	0.6000	0.4161
T1	20	Fiber 1-1/4"	160.00 - 172.00	0.6000	0.4161
T2	2	Safety Line 3/8	140.00 - 160.00	0.6000	0.4841
T2	4	Feedline Ladder (Af)	140.00 - 160.00	1.0000	1.0000
T2	5	Feedline Ladder (Af)	140.00 - 160.00	1.0000	1.0000
T2	9	1-5/8" COAX	140.00 - 152.00	0.5000	0.5000
T2	10	1-1/4" Hybrid	140.00 - 152.00	0.5000	0.5000
T2	16	1-5/8" COAX	140.00 -	0.6000	0.4841

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			160.00		
T2	17	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	140.00 - 160.00	0.6000	0.4841
T2	19	1/2	140.00 - 160.00	0.6000	0.4841
T2	20	Fiber 1-1/4"	140.00 - 160.00	0.6000	0.4841
T3	2	Safety Line 3/8	120.00 - 140.00	0.6000	0.5808
T3	3	Feedline Ladder (Af)	120.00 - 130.00	1.0000	1.0000
T3	4	Feedline Ladder (Af)	120.00 - 140.00	1.0000	1.0000
T3	5	Feedline Ladder (Af)	120.00 - 140.00	1.0000	1.0000
T3	7	1 5/8	120.00 - 130.00	0.6000	0.5808
T3	9	1-5/8" COAX	120.00 - 140.00	0.5000	0.5000
T3	10	1-1/4" Hybrid	120.00 - 140.00	0.5000	0.5000
T3	14	1-5/8" COAX	120.00 - 140.00	0.6000	0.5808
T3	17	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	120.00 - 140.00	0.6000	0.5808
T3	19	1/2	120.00 - 140.00	0.6000	0.5808
T3	20	Fiber 1-1/4"	120.00 - 140.00	0.6000	0.5808
T4	2	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T4	3	Feedline Ladder (Af)	100.00 - 120.00	1.0000	1.0000
T4	4	Feedline Ladder (Af)	100.00 - 120.00	1.0000	1.0000
T4	5	Feedline Ladder (Af)	100.00 - 120.00	1.0000	1.0000
T4	7	1 5/8	100.00 - 120.00	0.6000	0.6000
T4	9	1-5/8" COAX	100.00 - 120.00	0.5000	0.5000
T4	10	1-1/4" Hybrid	100.00 - 120.00	0.5000	0.5000
T4	14	1-5/8" COAX	100.00 - 120.00	0.6000	0.6000
T4	17	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	100.00 - 120.00	0.6000	0.6000
T4	19	1/2	100.00 - 120.00	0.6000	0.6000
T4	20	Fiber 1-1/4"	100.00 - 120.00	0.6000	0.6000
T5	2	Safety Line 3/8	93.33 - 100.00	0.6000	0.6000
T5	3	Feedline Ladder (Af)	93.33 - 100.00	1.0000	1.0000
T5	4	Feedline Ladder (Af)	93.33 - 100.00	1.0000	1.0000
T5	5	Feedline Ladder (Af)	93.33 - 100.00	1.0000	1.0000
T5	7	1 5/8	93.33 - 100.00	0.6000	0.6000
T5	9	1-5/8" COAX	93.33 - 100.00	0.5000	0.5000
T5	10	1-1/4" Hybrid	93.33 - 100.00	0.5000	0.5000
T5	14	1-5/8" COAX	93.33 - 100.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T5	17	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	93.33 - 100.00	0.6000	0.6000
T5	19	1/2	93.33 - 100.00	0.6000	0.6000
T5	20	Fiber 1-1/4"	93.33 - 100.00	0.6000	0.6000
T6	2	Safety Line 3/8	86.67 - 93.33	0.6000	0.6000
T6	3	Feedline Ladder (Af)	86.67 - 93.33	1.0000	1.0000
T6	4	Feedline Ladder (Af)	86.67 - 93.33	1.0000	1.0000
T6	5	Feedline Ladder (Af)	86.67 - 93.33	1.0000	1.0000
T6	7	1 5/8	86.67 - 93.33	0.6000	0.6000
T6	9	1-5/8" COAX	86.67 - 93.33	0.5000	0.5000
T6	10	1-1/4" Hybrid	86.67 - 93.33	0.5000	0.5000
T6	14	1-5/8" COAX	86.67 - 93.33	0.6000	0.6000
T6	17	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	86.67 - 93.33	0.6000	0.6000
T6	19	1/2	86.67 - 93.33	0.6000	0.6000
T6	20	Fiber 1-1/4"	86.67 - 93.33	0.6000	0.6000
T7	2	Safety Line 3/8	80.00 - 86.67	0.6000	0.6000
T7	3	Feedline Ladder (Af)	80.00 - 86.67	1.0000	1.0000
T7	4	Feedline Ladder (Af)	80.00 - 86.67	1.0000	1.0000
T7	5	Feedline Ladder (Af)	80.00 - 86.67	1.0000	1.0000
T7	7	1 5/8	80.00 - 86.67	0.6000	0.6000
T7	9	1-5/8" COAX	80.00 - 86.67	0.5000	0.5000
T7	10	1-1/4" Hybrid	80.00 - 86.67	0.5000	0.5000
T7	14	1-5/8" COAX	80.00 - 86.67	0.6000	0.6000
T7	17	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	80.00 - 86.67	0.6000	0.6000
T7	19	1/2	80.00 - 86.67	0.6000	0.6000
T7	20	Fiber 1-1/4"	80.00 - 86.67	0.6000	0.6000
T8	2	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T8	3	Feedline Ladder (Af)	60.00 - 80.00	1.0000	1.0000
T8	4	Feedline Ladder (Af)	60.00 - 80.00	1.0000	1.0000
T8	5	Feedline Ladder (Af)	60.00 - 80.00	1.0000	1.0000
T8	7	1 5/8	60.00 - 80.00	0.6000	0.6000
T8	9	1-5/8" COAX	60.00 - 80.00	0.5000	0.5000
T8	10	1-1/4" Hybrid	60.00 - 80.00	0.5000	0.5000
T8	14	1-5/8" COAX	60.00 - 80.00	0.6000	0.6000
T8	17	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	60.00 - 80.00	0.6000	0.6000
T8	19	1/2	60.00 - 80.00	0.6000	0.6000
T8	20	Fiber 1-1/4"	60.00 - 80.00	0.6000	0.6000
T9	2	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T9	3	Feedline Ladder (Af)	40.00 - 60.00	1.0000	1.0000
T9	4	Feedline Ladder (Af)	40.00 - 60.00	1.0000	1.0000
T9	5	Feedline Ladder (Af)	40.00 - 60.00	1.0000	1.0000
T9	7	1 5/8	40.00 - 60.00	0.6000	0.6000
T9	9	1-5/8" COAX	40.00 - 60.00	0.5000	0.5000
T9	10	1-1/4" Hybrid	40.00 - 60.00	0.5000	0.5000
T9	14	1-5/8" COAX	40.00 - 60.00	0.6000	0.6000
T9	17	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	40.00 - 60.00	0.6000	0.6000
T9	19	1/2	40.00 - 60.00	0.6000	0.6000
T9	20	Fiber 1-1/4"	40.00 - 60.00	0.6000	0.6000
T10	2	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T10	3	Feedline Ladder (Af)	20.00 - 40.00	1.0000	1.0000
T10	4	Feedline Ladder (Af)	20.00 - 40.00	1.0000	1.0000
T10	5	Feedline Ladder (Af)	20.00 - 40.00	1.0000	1.0000
T10	7	1 5/8	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T10	9	1-5/8" COAX	20.00 - 40.00	0.5000	0.5000
T10	10	1-1/4" Hybrid	20.00 - 40.00	0.5000	0.5000
T10	14	1-5/8" COAX	20.00 - 40.00	0.6000	0.6000
T10	17	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	20.00 - 40.00	0.6000	0.6000
T10	19	1/2	20.00 - 40.00	0.6000	0.6000
T10	20	Fiber 1-1/4"	20.00 - 40.00	0.6000	0.6000
T11	2	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T11	3	Feedline Ladder (Af)	0.00 - 20.00	1.0000	1.0000
T11	4	Feedline Ladder (Af)	0.00 - 20.00	1.0000	1.0000
T11	5	Feedline Ladder (Af)	0.00 - 20.00	1.0000	1.0000
T11	7	1 5/8	0.00 - 20.00	0.6000	0.6000
T11	9	1-5/8" COAX	0.00 - 20.00	0.5000	0.5000
T11	10	1-1/4" Hybrid	0.00 - 20.00	0.5000	0.5000
T11	14	1-5/8" COAX	0.00 - 20.00	0.6000	0.6000
T11	17	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	0.00 - 20.00	0.6000	0.6000
T11	19	1/2	0.00 - 20.00	0.6000	0.6000
T11	20	Fiber 1-1/4"	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod	C	From Leg	0.00	2.00	0.0000	176.00	No Ice	0.25	0.25	0.03
			0.00				1/2" Ice	0.66	0.66	0.03
							1" Ice	0.97	0.97	0.04
***										
ETCR-654L12H6	A	From Leg	3.00	0.00	0.0000	172.00	No Ice	15.71	6.00	0.08
			0.00				1/2" Ice	16.28	6.52	0.17
							1" Ice	16.86	7.05	0.26
ETCR-654L12H6	B	From Leg	3.00	0.00	0.0000	172.00	No Ice	15.71	6.00	0.08
			0.00				1/2" Ice	16.28	6.52	0.17
							1" Ice	16.86	7.05	0.26
ETCR-654L12H6	C	From Leg	3.00	0.00	0.0000	172.00	No Ice	15.71	6.00	0.08
			0.00				1/2" Ice	16.28	6.52	0.17
							1" Ice	16.86	7.05	0.26
1900 MHz RRH	A	From Leg	3.00	0.00	0.0000	172.00	No Ice	2.31	2.38	0.06
			0.00				1/2" Ice	2.52	2.58	0.08
							1" Ice	2.73	2.79	0.11
1900 MHz RRH	B	From Leg	3.00	0.00	0.0000	172.00	No Ice	2.31	2.38	0.06
			0.00				1/2" Ice	2.52	2.58	0.08
							1" Ice	2.73	2.79	0.11
1900 MHz RRH	C	From Leg	3.00	0.00	0.0000	172.00	No Ice	2.31	2.38	0.06
			0.00				1/2" Ice	2.52	2.58	0.08
							1" Ice	2.73	2.79	0.11
Horizon Duo	A	From Leg	3.00	0.00	0.0000	172.00	No Ice	0.55	0.34	0.01
			0.00				1/2" Ice	0.65	0.43	0.01

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* *K*
			0.00			1" Ice	0.76	0.52	0.02
Horizon Duo	B	From Leg	3.00	0.0000	172.00	No Ice	0.55	0.34	0.01
			0.00			1/2" Ice	0.65	0.43	0.01
			0.00			1" Ice	0.76	0.52	0.02
Horizon Duo	C	From Leg	3.00	0.0000	172.00	No Ice	0.55	0.34	0.01
			0.00			1/2" Ice	0.65	0.43	0.01
			0.00			1" Ice	0.76	0.52	0.02
(2) 800 MHz RRH	A	From Leg	3.00	0.0000	172.00	No Ice	2.13	1.77	0.05
			0.00			1/2" Ice	2.32	1.95	0.07
			0.00			1" Ice	2.51	2.13	0.10
(2) 800 MHz RRH	B	From Leg	3.00	0.0000	172.00	No Ice	2.13	1.77	0.05
			0.00			1/2" Ice	2.32	1.95	0.07
			0.00			1" Ice	2.51	2.13	0.10
(2) 800 MHz RRH	C	From Leg	3.00	0.0000	172.00	No Ice	2.13	1.77	0.05
			0.00			1/2" Ice	2.32	1.95	0.07
			0.00			1" Ice	2.51	2.13	0.10
TD-RRH8x20-25	A	From Leg	3.00	0.0000	172.00	No Ice	3.70	1.29	0.07
			0.00			1/2" Ice	3.95	1.46	0.09
			0.00			1" Ice	4.20	1.64	0.12
TD-RRH8x20-25	B	From Leg	3.00	0.0000	172.00	No Ice	3.70	1.29	0.07
			0.00			1/2" Ice	3.95	1.46	0.09
			0.00			1" Ice	4.20	1.64	0.12
TD-RRH8x20-25	C	From Leg	3.00	0.0000	172.00	No Ice	3.70	1.29	0.07
			0.00			1/2" Ice	3.95	1.46	0.09
			0.00			1" Ice	4.20	1.64	0.12
(3) T-Frames	A	None		0.0000	172.00	No Ice	33.11	33.11	1.54
						1/2" Ice	44.90	44.90	2.16
						1" Ice	56.69	56.69	2.78
***									
AM-X-CD-16-65-00T	A	From Leg	3.00	0.0000	162.00	No Ice	8.26	4.64	0.05
			0.00			1/2" Ice	8.97	5.14	0.10
			0.00			1" Ice	9.60	5.69	0.14
AM-X-CD-16-65-00T	B	From Leg	3.00	0.0000	162.00	No Ice	8.26	4.64	0.05
			0.00			1/2" Ice	8.97	5.14	0.10
			0.00			1" Ice	9.60	5.69	0.14
AM-X-CD-16-65-00T	C	From Leg	3.00	0.0000	162.00	No Ice	8.26	4.64	0.05
			0.00			1/2" Ice	8.97	5.14	0.10
			0.00			1" Ice	9.60	5.69	0.14
Kathrein 800-10121	A	From Leg	3.00	0.0000	162.00	No Ice	5.46	3.29	0.04
			0.00			1/2" Ice	6.01	3.72	0.08
			0.00			1" Ice	6.57	4.18	0.11
Kathrein 800-10121	B	From Leg	3.00	0.0000	162.00	No Ice	5.46	3.29	0.04
			0.00			1/2" Ice	6.01	3.72	0.08
			0.00			1" Ice	6.57	4.18	0.11
Kathrein 800-10121	C	From Leg	3.00	0.0000	162.00	No Ice	5.46	3.29	0.04
			0.00			1/2" Ice	6.01	3.72	0.08
			0.00			1" Ice	6.57	4.18	0.11
QS65512-2	A	From Leg	3.00	0.0000	162.00	No Ice	8.40	6.80	0.11
			0.00			1/2" Ice	9.11	7.41	0.17
			0.00			1" Ice	9.83	8.11	0.23
QS65512-2	B	From Leg	3.00	0.0000	162.00	No Ice	8.40	6.80	0.11
			0.00			1/2" Ice	9.11	7.41	0.17
			0.00			1" Ice	9.83	8.11	0.23
QS65512-2	C	From Leg	3.00	0.0000	162.00	No Ice	8.40	6.80	0.11
			0.00			1/2" Ice	9.11	7.41	0.17
			0.00			1" Ice	9.83	8.11	0.23
(2) LGP 21401	A	From Leg	3.00	0.0000	162.00	No Ice	1.95	0.53	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Offsets: ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00					1/2" Ice	2.19	0.69	0.04
			0.00					1" Ice	2.45	0.86	0.05
(2) LGP 21401	B	From Leg	3.00			0.0000	162.00	No Ice	1.95	0.53	0.03
			0.00					1/2" Ice	2.19	0.69	0.04
			0.00					1" Ice	2.45	0.86	0.05
(2) LGP 21401	C	From Leg	3.00			0.0000	162.00	No Ice	1.95	0.53	0.03
			0.00					1/2" Ice	2.19	0.69	0.04
			0.00					1" Ice	2.45	0.86	0.05
(2) Katherin 860-10025	A	From Leg	3.00			0.0000	162.00	No Ice	0.14	0.12	0.00
			0.00					1/2" Ice	0.22	0.19	0.00
			0.00					1" Ice	0.31	0.28	0.00
(2) Katherin 860-10025	B	From Leg	3.00			0.0000	162.00	No Ice	0.14	0.12	0.00
			0.00					1/2" Ice	0.22	0.19	0.00
			0.00					1" Ice	0.31	0.28	0.00
(2) Katherin 860-10025	C	From Leg	3.00			0.0000	162.00	No Ice	0.14	0.12	0.00
			0.00					1/2" Ice	0.22	0.19	0.00
			0.00					1" Ice	0.31	0.28	0.00
Ericsson RRUS 11	A	From Leg	3.00			0.0000	162.00	No Ice	2.94	1.19	0.06
			0.00					1/2" Ice	3.42	1.40	0.07
			0.00					1" Ice	3.56	1.63	0.09
Ericsson RRUS 11	B	From Leg	3.00			0.0000	162.00	No Ice	2.94	1.19	0.06
			0.00					1/2" Ice	3.42	1.40	0.07
			0.00					1" Ice	3.56	1.63	0.09
Ericsson RRUS 11	C	From Leg	3.00			0.0000	162.00	No Ice	2.94	1.19	0.06
			0.00					1/2" Ice	3.42	1.40	0.07
			0.00					1" Ice	3.56	1.63	0.09
Ericsson RRUS 32	A	From Leg	3.00			0.0000	162.00	No Ice	1.93	0.67	0.08
			0.00					1/2" Ice	2.19	0.88	0.09
			0.00					1" Ice	2.47	1.11	0.10
Ericsson RRUS 32	B	From Leg	3.00			0.0000	162.00	No Ice	1.93	0.67	0.08
			0.00					1/2" Ice	2.19	0.88	0.09
			0.00					1" Ice	2.47	1.11	0.10
Ericsson RRUS 32	C	From Leg	3.00			0.0000	162.00	No Ice	1.93	0.67	0.08
			0.00					1/2" Ice	2.19	0.88	0.09
			0.00					1" Ice	2.47	1.11	0.10
Ericsson RRUS 32 B2s	A	From Leg	3.00			0.0000	162.00	No Ice	3.52	2.51	0.05
			0.00					1/2" Ice	3.86	2.83	0.08
			0.00					1" Ice	4.22	3.16	0.11
Ericsson RRUS 32 B2s	B	From Leg	3.00			0.0000	162.00	No Ice	3.52	2.51	0.05
			0.00					1/2" Ice	3.86	2.83	0.08
			0.00					1" Ice	4.22	3.16	0.11
Ericsson RRUS 32 B2s	C	From Leg	3.00			0.0000	162.00	No Ice	3.52	2.51	0.05
			0.00					1/2" Ice	3.86	2.83	0.08
			0.00					1" Ice	4.22	3.16	0.11
(2) TPX-070821	A	From Leg	3.00			0.0000	162.00	No Ice	0.55	0.12	0.01
			0.00					1/2" Ice	0.68	0.19	0.01
			0.00					1" Ice	0.84	0.28	0.01
(2) TPX-070821	B	From Leg	3.00			0.0000	162.00	No Ice	0.55	0.12	0.01
			0.00					1/2" Ice	0.68	0.19	0.01
			0.00					1" Ice	0.84	0.28	0.01
(2) TPX-070821	C	From Leg	3.00			0.0000	162.00	No Ice	0.55	0.12	0.01
			0.00					1/2" Ice	0.68	0.19	0.01
			0.00					1" Ice	0.84	0.28	0.01
DC6-48-60-18-8F	A	From Leg	3.00			0.0000	162.00	No Ice	2.57	4.32	0.03
			0.00					1/2" Ice	2.87	4.68	0.06
			0.00					1" Ice	3.18	5.06	0.10
DC6-48-60-18-8F	B	From Leg	3.00			0.0000	162.00	No Ice	2.57	4.32	0.03

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 K
			0.00			1/2" Ice	2.87	4.68	0.06
			0.00			1" Ice	3.18	5.06	0.10
(3) T-Frames	C	None		0.0000	162.00	No Ice	33.11	33.11	1.54
						1/2" Ice	44.90	44.90	2.16
						1" Ice	56.69	56.69	2.78
***									
LNX-6515DS-A1M w/ Mount Pipe	A	From Leg	3.00	0.0000	152.00	No Ice	11.45	9.36	0.08
			0.00			1/2" Ice	12.06	10.68	0.16
			0.00			1" Ice	12.69	11.71	0.25
LNX-6515DS-A1M w/ Mount Pipe	B	From Leg	3.00	0.0000	152.00	No Ice	11.45	9.36	0.08
			0.00			1/2" Ice	12.06	10.68	0.16
			0.00			1" Ice	12.69	11.71	0.25
LNX-6515DS-A1M w/ Mount Pipe	C	From Leg	3.00	0.0000	152.00	No Ice	11.45	9.36	0.08
			0.00			1/2" Ice	12.06	10.68	0.16
			0.00			1" Ice	12.69	11.71	0.25
AIR 21 B2A/B4P w/ Mount Pipe	A	From Leg	3.00	0.0000	152.00	No Ice	7.09	6.02	0.12
			0.00			1/2" Ice	7.78	7.17	0.18
			0.00			1" Ice	8.37	8.03	0.25
AIR 21 B2A/B4P w/ Mount Pipe	B	From Leg	3.00	0.0000	152.00	No Ice	7.09	6.02	0.12
			0.00			1/2" Ice	7.78	7.17	0.18
			0.00			1" Ice	8.37	8.03	0.25
AIR 21 B2A/B4P w/ Mount Pipe	C	From Leg	3.00	0.0000	152.00	No Ice	7.09	6.02	0.12
			0.00			1/2" Ice	7.78	7.17	0.18
			0.00			1" Ice	8.37	8.03	0.25
Ericsson AIR 32	A	From Leg	3.00	0.0000	152.00	No Ice	6.51	4.71	0.13
			0.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
Ericsson AIR 32	B	From Leg	3.00	0.0000	152.00	No Ice	6.51	4.71	0.13
			0.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
Ericsson AIR 32	C	From Leg	3.00	0.0000	152.00	No Ice	6.51	4.71	0.13
			0.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
Ericsson RRUS 11 (Band 12)	A	From Leg	3.00	0.0000	152.00	No Ice	2.52	1.07	0.06
			0.00			1/2" Ice	2.72	1.21	0.07
			0.00			1" Ice	2.92	1.36	0.10
Ericsson RRUS 11 (Band 12)	B	From Leg	3.00	0.0000	152.00	No Ice	2.52	1.07	0.06
			0.00			1/2" Ice	2.72	1.21	0.07
			0.00			1" Ice	2.92	1.36	0.10
Ericsson RRUS 11 (Band 12)	C	From Leg	3.00	0.0000	152.00	No Ice	2.52	1.07	0.06
			0.00			1/2" Ice	2.72	1.21	0.07
			0.00			1" Ice	2.92	1.36	0.10
KRY 112 144/1	A	From Leg	3.00	0.0000	152.00	No Ice	0.41	0.19	0.01
			0.00			1/2" Ice	0.50	0.26	0.01
			0.00			1" Ice	0.60	0.33	0.02
KRY 112 144/1	B	From Leg	3.00	0.0000	152.00	No Ice	0.41	0.19	0.01
			0.00			1/2" Ice	0.50	0.26	0.01
			0.00			1" Ice	0.60	0.33	0.02
KRY 112 144/1	C	From Leg	3.00	0.0000	152.00	No Ice	0.41	0.19	0.01
			0.00			1/2" Ice	0.50	0.26	0.01
			0.00			1" Ice	0.60	0.33	0.02
(3) T-Frames	A	None		0.0000	152.00	No Ice	33.11	33.11	1.54
						1/2" Ice	44.90	44.90	2.16
						1" Ice	56.69	56.69	2.78
***									
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	3.00	0.0000	140.00	No Ice	8.86	7.30	0.07
			0.00			1/2" Ice	9.62	8.58	0.14

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 K
			0.00			1" Ice	10.34	9.72	0.22
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	8.86 9.62 10.34	7.30 8.58 9.72	0.07 0.14 0.22
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	8.86 9.62 10.34	7.30 8.58 9.72	0.07 0.14 0.22
800 10735v01 w/ Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	8.96 9.60 10.23	5.41 6.60 7.50	0.06 0.12 0.19
800 10735v01 w/ Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	8.96 9.60 10.23	5.41 6.60 7.50	0.06 0.12 0.19
800 10735v01 w/ Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	8.96 9.60 10.23	5.41 6.60 7.50	0.06 0.12 0.19
BXA-80080/4CF w/ Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	5.49 5.94 6.40	4.03 4.65 5.30	0.03 0.08 0.13
BXA-80080/4CF w/ Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	5.49 5.94 6.40	4.03 4.65 5.30	0.03 0.08 0.13
BXA-80080/4CF w/ Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	5.49 5.94 6.40	4.03 4.65 5.30	0.03 0.08 0.13
RRH-2x60-AWS	A	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.35 2.56 2.79	1.53 1.72 1.92	0.04 0.06 0.08
RRH-2x60-AWS	B	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.35 2.56 2.79	1.53 1.72 1.92	0.04 0.06 0.08
RRH-2x60-AWS	C	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.35 2.56 2.79	1.53 1.72 1.92	0.04 0.06 0.08
RRH-2x60-PCS	A	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.45 2.67 2.90	1.43 1.61 1.81	0.06 0.07 0.09
RRH-2x60-PCS	B	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.45 2.67 2.90	1.43 1.61 1.81	0.06 0.07 0.09
RRH-2x60-PCS	C	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.45 2.67 2.90	1.43 1.61 1.81	0.06 0.07 0.09
RRH 2x60-700	A	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.57 2.79 3.02	1.93 2.13 2.34	0.03 0.05 0.07
RRH 2x60-700	B	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.57 2.79 3.02	1.93 2.13 2.34	0.03 0.05 0.07
RRH 2x60-700	C	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.57 2.79 3.02	1.93 2.13 2.34	0.03 0.05 0.07
DB-T1-6Z-8AB-0Z	A	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	5.60 5.92 6.24	2.33 2.56 2.79	0.04 0.08 0.12
(3) T-Frames	C	None		0.0000	140.00	No Ice 1/2" Ice	30.02 40.48	30.02 40.48	0.95 1.40

Allpro Consulting Group, Inc
9221 Lyndon B Johnson Fwy
Dallas, TX 75243
Phone: 972-231-8893
FAX: 866-364-8375

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* K
						1" Ice	50.94	50.94	1.86
***									
742 213 w/ Mount Pipe	A	From Leg	1.50	0.0000	130.00	No Ice	5.37	4.62	0.05
			0.00			1/2" Ice	5.95	6.00	0.09
			0.00			1" Ice	6.50	6.98	0.15
742 213 w/ Mount Pipe	B	From Leg	1.50	0.0000	130.00	No Ice	5.37	4.62	0.05
			0.00			1/2" Ice	5.95	6.00	0.09
			0.00			1" Ice	6.50	6.98	0.15
742 213 w/ Mount Pipe	C	From Leg	1.50	0.0000	130.00	No Ice	5.37	4.62	0.05
			0.00			1/2" Ice	5.95	6.00	0.09
			0.00			1" Ice	6.50	6.98	0.15
(3) Pipe Mounts	C	None		0.0000	130.00	No Ice	5.78	5.78	0.16
						1/2" Ice	7.37	7.37	0.18
						1" Ice	8.96	8.96	0.20
***									
HPA-65R-BUU-H6	A	From Leg	3.00	0.0000	162.00	No Ice	9.49	5.49	0.04
			0.00			1/2" Ice	9.96	5.94	0.10
			0.00			1" Ice	10.43	6.41	0.16
HPA-65R-BUU-H6	B	From Leg	3.00	0.0000	162.00	No Ice	9.49	5.49	0.04
			0.00			1/2" Ice	9.96	5.94	0.10
			0.00			1" Ice	10.43	6.41	0.16
HPA-65R-BUU-H6	C	From Leg	3.00	0.0000	162.00	No Ice	9.49	5.49	0.04
			0.00			1/2" Ice	9.96	5.94	0.10
			0.00			1" Ice	10.43	6.41	0.16
RRUS 32 B66	A	From Leg	3.00	0.0000	162.00	No Ice	2.32	1.65	0.08
			0.00			1/2" Ice	2.51	1.83	0.10
			0.00			1" Ice	2.71	2.01	0.12
RRUS 32 B66	A	From Leg	3.00	0.0000	162.00	No Ice	2.32	1.65	0.08
			0.00			1/2" Ice	2.51	1.83	0.10
			0.00			1" Ice	2.71	2.01	0.12
RRUS 32 B66	A	From Leg	3.00	0.0000	162.00	No Ice	2.32	1.65	0.08
			0.00			1/2" Ice	2.51	1.83	0.10
			0.00			1" Ice	2.71	2.01	0.12
(3) V-Stabilizer	C	From Leg	1.50	0.0000	162.00	No Ice	1.09	4.42	0.38
			0.00			1/2" Ice	2.55	9.33	0.53
			0.00			1" Ice	4.02	14.24	0.68
***									
(3) SFS-V	A	From Leg	1.50	0.0000	172.00	No Ice	10.21	5.10	0.07
			0.00			1/2" Ice	13.08	6.54	0.09
			0.00			1" Ice	15.95	7.98	0.12

Dishes

Description	*Face or Leg*	*Dish Type*	*Offset Type*	*Offsets: Horz Lateral Vert* ft	*Azimuth Adjustment* °	*3 dB Beam Width* °	*Elevation* ft	*Outside Diameter* ft		*Aperture Area* ft^2	*Weight* K
(2) VHLP2-18	A	Paraboloid w/Shroud (HP)	From Leg	3.00	0.0000		172.00	2.00	No Ice	3.14	0.05
				0.00					1/2" Ice	3.41	0.06
				0.00					1" Ice	3.68	0.06

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-18	B	Paraboloid w/Shroud (HP)	From Leg	3.00 0.00 0.00	0.0000		172.00	2.00	No Ice 1/2" Ice 1" Ice	3.14 3.41 3.68	0.05 0.06 0.06
VHLP2-18	C	Paraboloid w/Shroud (HP)	From Leg	3.00 0.00 0.00	0.0000		172.00	2.00	No Ice 1/2" Ice 1" Ice	3.14 3.41 3.68	0.05 0.06 0.06

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
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

Comb. No.	Description
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 Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	176 - 160	3.760	40	0.1878	0.0414
T2	160 - 140	3.130	40	0.1829	0.0410
T3	140 - 120	2.377	40	0.1624	0.0367
T4	120 - 100	1.710	40	0.1374	0.0296
T5	100 - 93.3333	1.163	40	0.1086	0.0228
T6	93.3333 - 86.6667	1.006	40	0.1005	0.0205
T7	86.6667 - 80	0.860	40	0.0923	0.0180
T8	80 - 60	0.726	40	0.0839	0.0156
T9	60 - 40	0.404	40	0.0578	0.0108
T10	40 - 20	0.189	39	0.0349	0.0070
T11	20 - 0	0.057	39	0.0174	0.0033

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
176.00	Lightning Rod	40	3.760	0.1878	0.0414	396366
172.00	(2) VHLP2-18	40	3.602	0.1872	0.0414	396366
162.00	AM-X-CD-16-65-00T	40	3.208	0.1841	0.0412	141604
152.00	LNX-6515DS-A1M w/ Mount Pipe	40	2.822	0.1762	0.0398	83257
140.00	(2) SBNHH-1D65B w/ Mount Pipe	40	2.377	0.1624	0.0367	55874
130.00	742 213 w/ Mount Pipe	40	2.030	0.1504	0.0333	44172

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	176 - 160	14.976	2	0.7457	0.1659
T2	160 - 140	12.470	3	0.7270	0.1645
T3	140 - 120	9.479	3	0.6453	0.1473
T4	120 - 100	6.823	3	0.5463	0.1187
T5	100 - 93.3333	4.646	3	0.4322	0.0916
T6	93.3333 - 86.6667	4.021	3	0.4001	0.0820
T7	86.6667 - 80	3.439	3	0.3674	0.0723
T8	80 - 60	2.903	3	0.3342	0.0627
T9	60 - 40	1.618	3	0.2304	0.0432
T10	40 - 20	0.759	3	0.1390	0.0281
T11	20 - 0	0.231	3	0.0696	0.0131

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
176.00	Lightning Rod	2	14.976	0.7457	0.1659	110911
172.00	(2) VHLP2-18	2	14.346	0.7435	0.1661	110911
162.00	AM-X-CD-16-65-00T	3	12.780	0.7315	0.1651	39530
152.00	LNX-6515DS-A1M w/ Mount Pipe	3	11.246	0.7002	0.1598	21947
140.00	(2) SBNHH-1D65B w/ Mount Pipe	3	9.479	0.6453	0.1473	14187
130.00	742 213 w/ Mount Pipe	3	8.097	0.5978	0.1334	11137

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	176	Leg	A325N	0.8750	4	2.33	40.59	0.057	1	Bolt Tension
		Diagonal	A325N	0.6250	1	3.00	9.11	0.329	1	Member Block Shear
		Top Girt	A325N	0.6250	1	0.35	9.11	0.038	1	Member Block Shear
T2	160	Leg	A325N	1.0000	4	10.94	53.01	0.206	1	Bolt Tension
		Diagonal	A325N	0.6250	1	4.36	6.83	0.638	1	Member Block Shear
T3	140	Leg	A325N	1.0000	6	13.98	53.01	0.264	1	Bolt Tension
		Diagonal	A325N	0.6250	1	6.07	6.83	0.888	1	Member Block Shear
T4	120	Leg	A325N	1.0000	6	19.70	53.01	0.372	1	Bolt Tension
		Diagonal	A325N	0.6250	1	6.48	7.83	0.828	1	Member Bearing
T5	100	Diagonal	A325N	0.6250	1	6.50	7.83	0.831	1	Member Bearing
T6	93.3333	Diagonal	A325N	0.6250	1	6.56	7.83	0.837	1	Member Bearing
T7	86.6667	Leg	A325N	1.0000	6	24.95	53.01	0.471	1	Bolt Tension
		Diagonal	A325N	0.6250	1	6.80	12.43	0.547	1	Bolt Shear
T8	80	Leg	A325N	1.0000	8	22.31	53.01	0.421	1	Bolt Tension
		Diagonal	A325N	0.7500	1	7.26	14.14	0.513	1	Member Bearing
T9	60	Leg	A325N	1.0000	8	25.36	53.01	0.478	1	Bolt Tension
		Diagonal	A325N	0.7500	1	8.33	14.14	0.589	1	Member Bearing
T10	40	Leg	A325N	1.0000	8	28.48	53.01	0.537	1	Bolt Tension
		Diagonal	A325N	0.7500	1	8.51	14.14	0.602	1	Member Bearing
T11	20	Leg	A354-BC	1.0000	10	25.12	55.22	0.455	1	Bolt Tension
		Diagonal	A325N	0.7500	1	9.33	14.14	0.660	1	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	176 - 160	ROHN 3 EH	16.00	4.00	42.2 K=1.00	3.0159	-14.16	119.12	0.119 [1]
T2	160 - 140	ROHN 4 EH	20.03	4.01	32.6 K=1.00	4.4074	-54.15	183.54	0.295 [1]
T3	140 - 120	ROHN 5 EH	20.03	5.01	32.7 K=1.00	6.1120	-99.00	254.38	0.389 [1]
T4	120 - 100	ROHN 6 EHS	20.03	6.68	36.0 K=1.00	6.7133	-136.50	274.77	0.497 [1]
T5	100 - 93.3333	ROHN 6 EH	6.68	6.68	36.5 K=1.00	8.4049	-148.78	343.10	0.434 [1]
T6	93.3333 - 86.6667	ROHN 6 EH	6.68	6.68	36.5 K=1.00	8.4049	-160.51	343.10	0.468 [1]
T7	86.6667 - 80	ROHN 6 EH	6.68	6.68	36.5 K=1.00	8.4049	-171.92	343.10	0.501 [1]
T8	80 - 60	ROHN 6 EH	20.03	6.68	36.5 K=1.00	8.4049	-205.23	343.10	0.598 [1]
T9	60 - 40	ROHN 8 EHS	20.03	10.02	41.2 K=1.00	9.7193	-234.00	386.39	0.606 [1]
T10	40 - 20	ROHN 8 X-STR	20.03	10.02	41.8 K=1.00	12.7627	-264.30	505.55	0.523 [1]
T11	20 - 0	ROHN 8 EH	20.03	10.02	41.8 K=1.00	12.7627	-293.26	505.55	0.580 [1]

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	176 - 160	L2x2x1/4	6.16	2.77	93.8 K=1.10	0.9380	-3.17	19.13	0.166 [1]
T2	160 - 140	L2x2x3/16	7.65	3.61	112.4 K=1.02	0.7148	-4.37	11.91	0.367 [1]
T3	140 - 120	L2x2x3/16	9.87	4.70	143.1 K=1.00	0.7148	-5.91	7.89	0.750 [1]
T4	120 - 100	L2 1/2x2 1/2x3/16	12.41	5.96	144.5 K=1.00	0.9023	-6.57	9.76	0.673 [1]
T5	100 - 93.3333	L2 1/2x2 1/2x3/16	12.99	6.25	151.6 K=1.00	0.9023	-6.57	8.87	0.740 [1]
T6	93.3333 - 86.6667	L2 1/2x2 1/2x3/16	13.58	6.55	158.7 K=1.00	0.9023	-6.74	8.09	0.834 [1]
T7	86.6667 - 80	L2.5x2.5x3/16 + L2.5x2.5x3/16 (C-shape)	14.17	6.97	76.5 K=1.00	0.9165	-6.80	21.82	0.312 [1]
T8	80 - 60	L3x3x1/4	16.00	7.75	157.0 K=1.00	1.4400	-7.14	13.19	0.542 [1]
T9	60 - 40	L3 1/2x3 1/2x1/4	19.22	9.35	161.7 K=1.00	1.6900	-8.57	14.60	0.587 [1]
T10	40 - 20	L3 1/2x3 1/2x1/4	20.99	10.24	177.1 K=1.00	1.6900	-9.05	12.18	0.743 [1]
T11	20 - 0	L4x4x1/4	22.80	11.15	168.3 K=1.00	1.9400	-10.09	15.47	0.652 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	176 - 160	L2x2x1/4	4.69	4.16	127.6 K=1.00	0.9380	-0.41	12.90	0.032 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	176 - 160	ROHN 3 EH	16.00	4.00	42.2	3.0159	9.32	135.72	0.069 [1]
T2	160 - 140	ROHN 4 EH	20.03	4.01	32.6	4.4074	43.75	198.34	0.221 [1]
T3	140 - 120	ROHN 5 EH	20.03	5.01	32.7	6.1120	83.90	275.04	0.305 [1]
T4	120 - 100	ROHN 6 EHS	20.03	6.68	36.0	6.7133	118.18	302.10	0.391 [1]
T5	100 - 93.3333	ROHN 6 EH	6.68	6.68	36.5	8.4049	129.18	378.22	0.342 [1]
T6	93.3333 - 86.6667	ROHN 6 EH	6.68	6.68	36.5	8.4049	139.61	378.22	0.369 [1]
T7	86.6667 - 80	ROHN 6 EH	6.68	6.68	36.5	8.4049	149.69	378.22	0.396 [1]
T8	80 - 60	ROHN 6 EH	20.03	6.68	36.5	8.4049	178.45	378.22	0.472 [1]
T9	60 - 40	ROHN 8 EHS	20.03	10.02	41.2	9.7193	202.84	437.37	0.464 [1]
T10	40 - 20	ROHN 8 X-STR	20.03	10.02	41.8	12.7627	227.87	574.32	0.397 [1]
T11	20 - 0	ROHN 8 EH	20.03	10.02	41.8	12.7627	251.18	574.32	0.437 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	176 - 160	L2x2x1/4	6.16	2.77	56.9	0.5629	3.00	24.49	0.122 [1]
T2	160 - 140	L2x2x3/16	6.97	3.27	65.9	0.4307	4.36	18.73	0.232 [1]
T3	140 - 120	L2x2x3/16	9.44	4.48	89.4	0.4307	6.07	18.73	0.324 [1]
T4	120 - 100	L2 1/2x2 1/2x3/16	11.29	5.41	85.2	0.5713	6.48	24.85	0.261 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T5	100 - 93.3333	L2 1/2x2 1/2x3/16	12.99	6.25	98.2	0.5713	6.50	24.85	0.262 [1]
T6	93.3333 - 86.6667	L2 1/2x2 1/2x3/16	13.58	6.55	102.8	0.5713	6.56	24.85	0.264 [1]
T7	86.6667 - 80	L2.5x2.5x3/16 + L2.5x2.5x3/16 (C-shape)	14.17	6.97	76.5	0.9165	6.58	29.70	0.222 [1]
T8	80 - 60	L3x3x1/4	16.00	7.75	101.7	0.9159	7.26	44.65	0.163 [1]
T9	60 - 40	L3 1/2x3 1/2x1/4	19.22	9.35	104.5	1.1034	8.33	53.79	0.155 [1]
T10	40 - 20	L3 1/2x3 1/2x1/4	20.10	9.80	109.4	1.1034	8.51	53.79	0.158 [1]
T11	20 - 0	L4x4x1/4	22.80	11.15	108.3	1.2909	9.33	62.93	0.148 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	176 - 160	L2x2x1/4	4.69	4.16	86.6	0.5629	0.35	24.49	0.014 [1]

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	176 - 160	Leg	ROHN 3 EH	3	-14.16	119.12	11.9	Pass
T2	160 - 140	Leg	ROHN 4 EH	33	-54.15	183.54	29.5	Pass
T3	140 - 120	Leg	ROHN 5 EH	66	-99.00	254.38	38.9	Pass
T4	120 - 100	Leg	ROHN 6 EHS	93	-136.50	274.77	49.7	Pass
T5	100 - 93.3333	Leg	ROHN 6 EH	114	-148.78	343.10	43.4	Pass
T6	93.3333 - 86.6667	Leg	ROHN 6 EH	123	-160.51	343.10	46.8	Pass
T7	86.6667 - 80	Leg	ROHN 6 EH	132	-171.92	343.10	50.1	Pass
T8	80 - 60	Leg	ROHN 6 EH	141	-205.23	343.10	59.8	Pass
T9	60 - 40	Leg	ROHN 8 EHS	162	-234.00	386.39	60.6	Pass
T10	40 - 20	Leg	ROHN 8 X-STR	177	-264.30	505.55	52.3 53.7 (b)	Pass
T11	20 - 0	Leg	ROHN 8 EH	192	-293.26	505.55	58.0	Pass
T1	176 - 160	Diagonal	L2x2x1/4	9	-3.17	19.13	16.6 32.9 (b)	Pass
T2	160 - 140	Diagonal	L2x2x3/16	36	-4.37	11.91	36.7 63.8 (b)	Pass
T3	140 - 120	Diagonal	L2x2x3/16	69	-5.91	7.89	75.0 88.8 (b)	Pass
T4	120 - 100	Diagonal	L2 1/2x2 1/2x3/16	97	-6.57	9.76	67.3 82.8 (b)	Pass
T5	100 - 93.3333	Diagonal	L2 1/2x2 1/2x3/16	118	-6.57	8.87	74.0 83.1 (b)	Pass
T6	93.3333 - 86.6667	Diagonal	L2 1/2x2 1/2x3/16	127	-6.74	8.09	83.4 83.7 (b)	Pass
T7	86.6667 - 80	Diagonal	L2.5x2.5x3/16 + L2.5x2.5x3/16	136	-6.80	21.82	31.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
			(C-shape)				54.7 (b)	
T8	80 - 60	Diagonal	L3x3x1/4	145	-7.14	13.19	54.2	Pass
T9	60 - 40	Diagonal	L3 1/2x3 1/2x1/4	166	-8.57	14.60	58.7	Pass
							58.9 (b)	
T10	40 - 20	Diagonal	L3 1/2x3 1/2x1/4	181	-9.05	12.18	74.3	Pass
T11	20 - 0	Diagonal	L4x4x1/4	196	-10.09	15.47	65.2	Pass
							66.0 (b)	
T1	176 - 160	Top Girt	L2x2x1/4	4	-0.41	12.90	3.2	Pass
							3.8 (b)	
							Summary	
						Leg (T9)	60.6	Pass
						Diagonal (T3)	88.8	Pass
						Top Girt (T1)	3.8	Pass
						Bolt Checks	88.8	Pass
						RATING =	**88.8**	**Pass**

MATHCAD CALCULATION PRINTOUT

EXISTING 176' SELF SUPPORT TOWER ANCHOR BOLT CHECK

REACTIONS ON THE FOUNDATION

As per Tnx output (see attached)

Down load; $Pv := 301 \cdot kips$ Shear; $S := 31 \cdot kips$

Uplift load; $P_{up} := 257 \cdot kips$ Moment; $M := 0 \cdot kips \cdot ft$

Anchor Rod Data is as per tower design by ROHN DWG No. C880790 R3, dated 08/12/1988.

Number of Anchor Rods: $N_{anchors} := 10$

Diameter of Anchors: $D_{anchors} := 1.0in$ $n := 8in^{-1}$

Net Tensile Area of Anchors: $A_{anchors} := \frac{\pi}{4} \cdot \left(D_{anchors} - \frac{0.9743}{n} \right)^2 = 0.606 \cdot in^2$

Ultimate Tensile Stress: $F_{anchors} := 125ksi$ (ASTM A354 Gr. BC)

Saftey Factor for Anchor: $\phi_{anchor} := 0.8$ (Section 4.9.9, TIA-222-G Addendum 2)

Allowable Axial Load per Anchor: $T_{cap} := \phi_{anchor} \cdot F_{anchors} \cdot A_{anchors}$

$T_{cap} = 60.574 \cdot kips$

Interaction Equation for Anchor Rods as per Section 4.9.9, TIA-222-G Addendum 1 and Figure 4.4

For detail type (C) as per Figure 4.4 $\eta := 0.55$

Maximum Load on Anchor: $T_{max} := \frac{P_{up} + \frac{S}{\eta}}{N_{anchors}}$ $T_{max} = 31.336 \cdot kips$

Anchor Rod Capacity: $\frac{T_{max}}{T_{cap}} = 51.732 \cdot \%$ OK!

Summary

-Foundation Reactions from Tower Base-

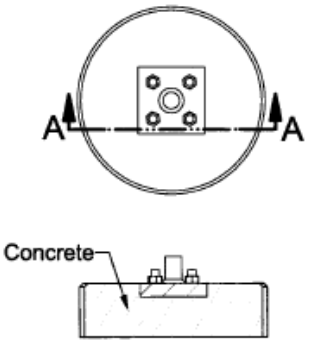
	$S = 31 \cdot kips$
Down load	$Pv = 301 \cdot kips$
Uplift load	$P_{up} = 257 \cdot kips$
Moment	$M = 0 \cdot ft \cdot kip$

Anchor Rod Check $T_{max} = 31.336 \cdot kips$ < $T_{cap} = 60.574 \cdot kips$

$Anchor\_Rod\_Check := if\left(T_{max} < T_{cap}, "OK", "Not\ OK"\right)$

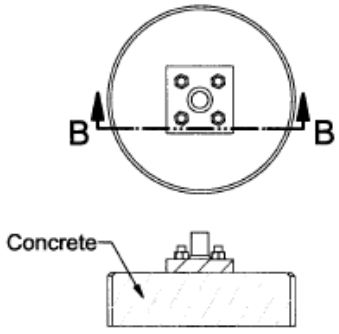
Anchor_Rod_Check = "OK"

ANSI/TIA-222-G



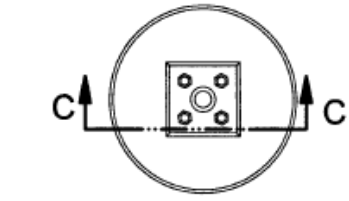
SECTION A-A

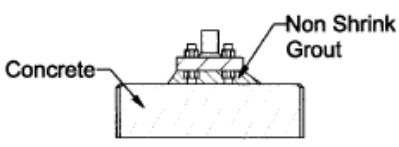
Detail Type (a)



SECTION B-B

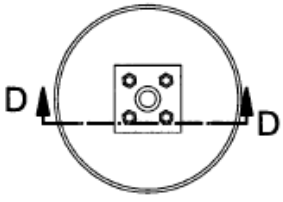
Detail Type (b)

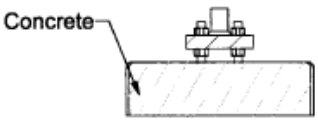




SECTION C-C

Detail Type (c)





SECTION D-D

Detail Type (d)

(See Note 1 below)

Note:

1. When clear distance from top of concrete to the bottom face of the leveling nut exceeds 1.5 times the diameter of the anchor rod, bending of the anchor rod shall be considered (refer to 4.9.9).

Figure 4-4: Anchor Rod Detail Types

4.9.9 Anchor Rods

For anchor rods, the following interaction equation shall be satisfied:

$$\left(\frac{P_u + \frac{V_u}{\eta}}{\phi R_{nt}} \right) \leq 1$$

where:

ϕ= 0.80

P_u = tension force for detail types (a), (b) & (c) and larger of compression or tension force for type (d) as depicted in Figure 4-4.

V_u = shear force (direct shear and torsion components) corresponding to P_u

R_{nt} = nominal tensile strength of anchor rod as per 4.9.6.1

η = 0.90 for detail type (a)
= 0.70 for detail type (b)
= 0.55 for detail type (c)
= 0.50 for detail type (d)

For detail type (d), when the clear distance from the top of concrete to the bottom leveling nut exceeds 1.0 times the diameter of the anchor rod, the following interaction equation shall also be satisfied:

$$\left(\frac{V_u}{\phi R_{nv}} \right)^2 + \left(\left| \frac{P_u}{\phi R_{nt}} \right| + \left| \frac{M_u}{\phi R_{nm}} \right| \right)^2 \leq 1$$

where:

M_u = bending moment corresponding to V_u
= 0.65 $l_{ar} V_u$

l_{ar} = length from top of concrete to bottom of anchor rod leveling nut

Foundation Check for 175' Self Supporting Tower

Customer Name: SBA
Customer Site Number: CT04382-S-02 / New Britain 2, CT

CarrierName: Sprint Nextel
ACGI JOB # 17-8042

By:

Allpro Consulting Group, Inc.
9221 Lyndon B. Johnson Freeway, Suite 204
Dallas, TX 75243
Tel: 972-231-8893, Fax: 866-364-8375

Foundation check

-Foundation Reactions-

((As per TNX output results from the Tower Structural Analysis by Allpro Consulting Group Inc.,)

Total Shear	$S := 48 \cdot kips$	Compression on Pedestal:	$P_c := 301 \cdot kips$
Moment	$M := 5093 \cdot ft\_K$	Uplift on Pedestal:	$P_{up} := 257 \cdot kips$
Down load, Tower weight	$Pv := 62 \cdot kips$	Shear on Pedestal:	$Sh := 31 \cdot kips$

-Soil Properties- **Soil data as per Geotechnical Evaluation of Subsurface Conditions report by Jaworski Geotech, Inc., Project # 00309G, dated 07/05/2000**

Allowable Bearing Capacity $Brg_{allw} := 5 \cdot ksf$ Safety Factor $SF := 2$ (Estimated)

Umtimate Bearing Capacity $Brg_{ultimate} := Brg_{allw} \cdot SF$ $Brg_{ultimate} = 10 \cdot ksf$

Internal angle of friction for soil, $\phi := 30 \cdot deg$

Unit wt. of soil, $\gamma_s := 0.115 \cdot kcf$

Alowable Passive Pressure see next page

Cohesion of soil, $c_u := 0.0 \cdot ksf$

Friction Factor $FF := 0.50$

Depth to be neglected $L_{neg} := 1.0 \cdot ft$

-Reinforcement Data-

Typical concrete cover $cc := 3in$

Rebar yield strength, $f_y := 60000 \cdot psi$

-Material Parameters-

Conforming to the design requirements as in ACI 318-10

Unit wt. of concrete, $\gamma_c := 0.150 \cdot kcf$

Concrete compressive strength, $f_c := 3000 \cdot psi$

-Factor of Safety for soil strength-

$\phi_{s\_Bear} := 0.75$ as per TIA-222-G code for bearing, 9.4.1

$\phi_{s\_friction} := 0.75$ as per TIA-222-G code for skin friction resistance, 9.4.1

$\phi_{s\_lateral} := 0.75$ as per TIA-222-G code for lateral resistance, 9.4.1

$\phi_{s\_uplift} := 0.75$ as per TIA-222-G code for lateral resistance, 9.4.1

DIMENSIONS

Tower face width $TWFW := 21 \cdot ft$ Tower ht. $Tw_{ht} := 175 \cdot ft$

The tower location is eccentric by $L_{pe} := 0 \cdot ft$ with respect to the mat foundation center towards the base

Type of column, col.t=0 for circular,=1 for rectangular/square $col_t := 0$

Depth of mat, $D_f := 3.5 \cdot ft$

Thickness of mat, $T_f := 4 \cdot ft$

Pedestal size, $Ped_s := 0 \cdot ft$ No. of pedestals $Nped := 3$

Extension above the grade, $E_g := 0.5 \cdot ft$

-Foundation Data as per original foundation drawing by Rohn Industries, Inc., Eng. File No. 44545AE, dated 7/26/2000

Mat Dimensions, LxB $L := 31.5 \cdot ft$ x $B := L$ $B = 31.5\,ft$

$Brg_{ultimate} = 10 \cdot ksf$ (From Geotech Report)

MAT CALCULATIONS

$$K_p := \tan\left(45deg + \frac{\phi}{2}\right)^2 \qquad K_p = 3$$

$$P_{pave} := \frac{\left(D_f - T_f - L_{neg}\right)\cdot K_p \cdot \gamma_s + \left(D_f - L_{neg}\right)\cdot K_p \cdot \gamma_s}{2} \qquad P_{pave} = 0.172 \cdot ksf$$

Calculate safety against overturning and location of resultant on the base

Resisting Moments about mid axis parallel to base

$Area_{ped} := if\left(col_t = 1, Ped_s^2, \frac{\pi}{4}\cdot Ped_s^2\right)$ $Area_{ped} = 0$

component	value, kips	lever arm, ft	resisting moment, ft-kips
1) Concrete wt.	$C_w := L\cdot B\cdot T_f\cdot(\gamma_c) + Area_{ped}\cdot\gamma_c\cdot(D_f + E_g - T_f)\cdot Nped$	$L_c := \frac{L}{2}$	$R_c := C_w \cdot L_c$
	$C_w = 595.35 \cdot kips$	$L_c = 15.75\,ft$	$R_c = 9376.763 \cdot ft\_K$
2) Soil wt.	$S_w := 0 \cdot kips$	$L_s := \frac{L}{2}$	$R_s := S_w \cdot L_s$
	$S_w = 0 \cdot kips$	$L_s = 15.75\,ft$	$R_s = 0 \cdot ft\_K$
3) Wt. of soil wedge	$W_w := 0kips$	$L_w := \left[L + \left[\left(D_f - T_f\right)\cdot\frac{\tan(\phi)}{3}\right]\right]$	$R_w := W_w \cdot L_w$
	$W_w = 0 \cdot kips$	$L_w = 31.404\,ft$	$R_w = 0 \cdot ft\_K$

4) Passive pressure $Pe_p := (D_f - E_g)\cdot B\cdot P_{pave}$ $Pe_p = 16.301\cdot kips$ $L_p := \frac{T_f}{3}$ $L_p = 1.333\,ft$ $R_p := Pe_p\cdot L_p$ $R_p = 21.735\cdot ft\_K$

5) Vertical $Pv = 62\cdot kips$

$S_{w1} := L\cdot B\cdot D_f\cdot\gamma_s$ $S_{w1} = 399.381\cdot kips$ <--- for net calcs $L_v := \frac{L}{2}$ $R_v := Pv\cdot L_v$ $R_v = 976500\,ft\cdot lb$

Total weight $T_w := C_w + S_w + W_w + Pv$ $T_w = 657.35\cdot kips$ $L_v = 15.75\,ft$ $R_v = 976.5\cdot ft\_K$

Total resisting Moment= $M_r := R_c + R_s + R_w + R_p + R_v$ $M_r = 10374.998\cdot ft\_K$

Overturning Moments component	value, kips	lever arm, ft	Overturning Moment ft-kips
1) Moment on foundation due to eccentric location of tower	$Pv = 62\cdot kips$	$L_{pe} = 0$	$M_{pe} := L_{pe}\cdot Pv$ $M_{pe} = 0\cdot ft\_K$
2) Moment on foundation	-	-	$M = 5093\cdot ft\_K$
3) Moment due to horizontal shear	$S_t := S$	$L_{hs} := D_f + E_g$ $L_{hs} = 4\,ft$	$O_{hs} := L_{hs}\cdot S_t$ $O_{hs} = 192\cdot ft\_K$

Total Overturning Moment= $M_o := M + O_{hs} + M_{pe}$ $M_o = 5285\cdot ft\_K$

Check Safety Factor against Overturning about mid axis parallel to base

$SF := \frac{0.9M_r}{M_o}$ $SF = 1.767$ > 1.0 $\frac{1.0}{SF} = 56.6\cdot\%$ **O.K!**

Calculate eccentricity, e

$e := \frac{M_o}{T_w}$ $e = 8.04\,ft$

Check location of eccentricity and determine pressure distribution under the mat

$L_{loc} := \frac{L}{6}$ $L_{loc} = 5.25\,ft$ For net bearing calcs $T_{w1} := S_{w1} + W_w$ $T_{w1} = 399.381\cdot kips$

$P_{max1} := \text{if}\left[e \le L_{loc}, \frac{T_w}{L\cdot B}\cdot\left[1 + \left(6\cdot\frac{e}{L}\right)\right], 4\cdot\frac{T_w}{3\cdot B\cdot(L - 2\cdot e)}\right]$ $P_{max1} = 1.804\cdot ksf$

$P_{max2} := \left(\frac{T_{w1}}{L\cdot B}\right)$ $P_{max2} = 0.402\cdot ksf$ $P_{net} := P_{max1} - P_{max2}$ $P_{max} := P_{net}$

Net soil pressure, $P_{net} = 1.402 \cdot ksf$ < $\phi_{s\_Bear} \cdot Brg_{ultimate} = 7.5 \cdot ksf$ $\frac{P_{net}}{(\phi_{s\_Bear} \cdot Brg_{ultimate})} = 18.692 \cdot \%$

$P_{min} := if\left[e \le L_{loc}, \frac{T_w}{L \cdot B} \cdot \left[1 - \left(6 \cdot \frac{e}{L}\right)\right], 0 \cdot ksf\right]$ $P_{min} = 0 \cdot ksf$ **O.K.!**

Check for horizontal shear $P_{hor} := \phi_{s\_lateral} \cdot \left[Pe_p + (Pv + C_w + S_w) \cdot 0.35\right]$

$P_{hor} = 184.78 \cdot kips$ > $S = 48 \cdot kips$ $\frac{S}{P_{hor}} = 25.977 \cdot \%$ **O.K!**

Since P.hor > S it is safe!

REINFORCED CONCRETE CHECK CALCULATIONS

General Input parameters

Concrete Cover, $cc := 3.0 \cdot in$

Reduction factors as per respective ACI sections

$\phi_{shear} := 0.85$ as per ACI 9.3.2.3

$\phi_{compr} := 0.75$ as per ACI 9.3.2.2

$\phi_{axten} := 0.9$ as per ACI 9.3.2.2 a

Reinforced concrete load factor as per EIA 3.1.16 $RC_{fac} := 1.0$

(Loads already factored under TIA/EIA-222-G Code)

Check for wide beam or single shear in mat

Allowable shear stress in concrete for wide beam shear criteria=

$\nu_{wide} := 2 \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}$ $\nu_{wide} = 93.113 \cdot psi$

Effective depth of stee $d := T_f - cc$ $d = 45 \cdot in$ $L_{eff} := if(e \le L_{loc}, L, L - 2 \cdot e)$ $L_{eff} = 15.42\ ft$

$dist := if\left[Nped = 3, \left(\frac{L}{2} - \frac{1}{3} \cdot \sin(60 \cdot deg) \cdot TWFW - \frac{1}{2} \cdot Ped_s - d\right), \left(\frac{L}{2} - \frac{TWFW}{2} - \frac{1}{2} \cdot Ped_s - d\right)\right]$

Factor load by RC $P_{maxf} := P_{max} \cdot RC_{fac}$ $P_{minf} := P_{min} \cdot RC_{fac}$

shear on the face of concrete=

$Shear_{wide} := (dist) \cdot B \cdot \left[\frac{P_{maxf} + \left[P_{maxf} - \frac{P_{maxf} - P_{minf}}{L_{eff}} \cdot (dist)\right]}{2}\right]$ $Shear_{wide} = 211.728 \cdot kips$

Area of concrete in shear= $A_{shear} := B \cdot d$ $A_{shear} = 17010 \cdot in^2$

Shear stress acting on concrete face= $\nu_{act} := \frac{Shear_{wide}}{A_{shear}}$ $\nu_{act} = 12.447 \cdot psi$

$\nu_{act} = 12.447 \cdot psi$ < $\nu_{wide} = 93.113 \cdot psi$ **O.K!**

Check for punching or two-way shear in mat

Calculate allowable shear stress in concrete for punching/two-way shear

$\beta := \frac{L}{B}$ $\beta = 1$

$\nu_{punch} := if\left[\left(2 + \frac{4}{\beta}\right)\cdot\phi_{shear}\cdot\sqrt{f_c\cdot psi} \le 4\cdot\phi_{shear}\cdot\sqrt{f_c\cdot psi}\,,\left(2 + \frac{4}{\beta}\right)\cdot\phi_{shear}\cdot\sqrt{f_c\cdot psi}\,,4\cdot\phi_{shear}\cdot\sqrt{f_c\cdot psi}\right]$

$\nu_{punch} = 186.226\cdot psi$ $Area_{col} := if\left[col_t = 0\,,\frac{\pi}{4}\cdot\left(Ped_s + d\right)^2\,,\left(Ped_s + d\right)^2\right]$

$P_{avg} := \frac{P_{maxf} + P_{minf}}{2}$ $Peri_{col} := if\left[col_t = 0\,,2\cdot\pi\cdot\frac{Ped_s + d}{2}\,,4\cdot\left(Ped_s + d\right)\right]$

Factor vertical load $Pvf := RC_{fac}\cdot Pv$

Shear stress acting on the concrete face= $\nu_{act} := \frac{P_c - Area_{col}\cdot P_{avg}}{Peri_{col}\cdot d\cdot 4}$

$\nu_{act} = 11.524\cdot psi$ < $\nu_{punch} = 186.226\cdot psi$ **O.K!**

Check of mat footing

$C_{wped} := Area_{ped}\cdot\gamma_c\cdot\left(D_f + E_g - T_f\right)\cdot Nped$ Wt. of concrete pedestals

$P_{upnet} := P_{up} - \frac{C_{wped} + S_w\cdot 0.95}{Nped}$ $P_{upnet} = 257\cdot kips$

Net uplift acting at mat level creating bending moment in the slab. Soil wt. reduced by 5 % to account for variation in compaction . ACI 9.3.2.2

Calculate bending moment for mat design:

$\phi_{bend} := 0.9$ $Langle := if(Nped = 3\,,\sin(60\cdot deg)\,,1)$

$\beta_1 := if\left[f_c \le 4000\cdot psi\,,0.85\,,if\left[f_c \ge 8000\cdot psi\,,0.65\,,0.85 - \left(\frac{f_c}{psi} - 4000\right)\cdot 0.05\right]\right]$ ACI 10.2.7.3

$B_{mo} := RC_{fac}\cdot\left[\left(TWFW\cdot P_{upnet}\right)\cdot Langle + S_t\cdot\left(D_f + E_g\right)\right]$ $B_{mo} = 4865.939\cdot ft\_K$

$B_{mo1} := \frac{P_{max} - P_{min}}{(L - 2\cdot e)\cdot 2}\cdot\left(TWFW\cdot Langle\cdot\frac{1}{3} + \frac{Ped_s}{2}\right)\cdot\left[\left[(L - 2\cdot e) - \left(TWFW\cdot Langle\cdot\frac{1}{3} + \frac{Ped_s}{2}\right)\right]^2\cdot 0.5\right]\cdot B$

$W_e := TWFW\cdot Langle + Ped_s$ $W_e = 18.187\,ft$ Reinforcement middle bandwidth. $B_{mo1} = 380083.881\,ft\cdot lb$

required R_u $R_u := \frac{B_{mo}}{\phi_{bend}\cdot B\cdot d^2}$ $R_u = 84.76\cdot psi$ $m := \frac{f_y}{\beta_1\cdot f_c}$ $m = 23.529$

required

$\rho := \frac{1}{m}\cdot\left[1-\sqrt{1-\left(\frac{2\cdot m\cdot R_u}{f_y}\right)}\right]$ $\rho = 0.001$

required area of steel for mat=

$Ast_f := \rho\cdot B\cdot d$ $Ast_f = 24.443\cdot in^2$

bar size provided $f_{bar} := 9$ $f_{dia} := \frac{f_{bar}}{8}\cdot in$ $f_{dia} = 1.125\cdot in$

Bar area= $f_{abar} := \pi\cdot\frac{f_{dia}^2}{4}$ $f_{abar} = 0.994\cdot in^2$

Number of bars required= $Nf_{bars} := \frac{Ast_f}{f_{abar}}$ $Nf_{bars} = 24.59$

Used $Nf_{bars} := 32$ > 27 OK!

Foundation Check Summary

-Foundation Reactions-

$S = 48\cdot kips$

Down load $Pv = 62\cdot kips$ (Weight)

Uplift load $P_{up} = 257\cdot kips$

$M = 5093\cdot ft\_K$

Stability Calculations

Safety Factor against Overturning $SF = 1.767$ > 1.0 OK! $\frac{1.0}{SF} = 56.6\cdot\%$ **OK!**

Net soil pressure, $P_{net} = 1.402\cdot ksf$ < $0.75Brg_{ultimate} = 7.5\cdot ksf$ $\frac{P_{net}}{0.75Brg_{ultimate}} = 18.692\cdot\%$ **OK!**

Check for horizontal shear $P_{hor} = 184.78\cdot kips$ > $S = 48\cdot kips$ $\frac{S}{P_{hor}} = 25.977\cdot\%$ **OK!**

Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT5254

New Britain West
1 Hartford Square
New Britain, CT 06052

February 9, 2018

Centerline Communications Project Number: 950006-089

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**13.24 %**

February 9, 2018

AT&T Mobility – New England
Attn: John Benedetto, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT5254 – New Britain West**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **1 Hartford Square, New Britain, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) 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 performed for the proposed AT&T Wireless antenna facility located at **1 Hartford Square, New Britain, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	850 MHz	2	30
LTE	850 MHz	2	60
LTE	1900 MHz (PCS)	4	60
LTE	2100 MHz (AWS)	4	60
LTE	700 MHz	2	60
LTE	2300 MHz (WCS)	4	60

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Kathrein 800-10121	166
A	2	Quintel QS66512-2	166
A	3	CCI HPA-65R-BUU-H6	166
B	1	Kathrein 800-10121	166
B	2	Quintel QS66512-2	166
B	3	CCI HPA-65R-BUU-H6	166
C	1	Kathrein 800-10121	166
C	2	Quintel QS66512-2	166
C	3	CCI HPA-65R-BUU-H6	166

Table 2: Antenna Data

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

RESULTS

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

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Kathrein 800-10121	850 MHz	11.45	2	60	837.82	0.21
Antenna A2	Quintel QS66512-2	850 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	11.35 / 13.85 / 14.35	10	600	13,995.85	2.14
Antenna A3	CCI HPA-65R-BUU-H6	700 MHz / 2300 MHz (WCS)	11.95 / 15.25	6	360	9,919.27	1.69
						Sector A Composite MPE%	**4.04**
Antenna B1	Kathrein 800-10121	850 MHz	11.45	2	60	837.82	0.21
Antenna B2	Quintel QS66512-2	850 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	11.35 / 13.85 / 14.35	10	600	13,995.85	2.14
Antenna B3	CCI HPA-65R-BUU-H6	700 MHz / 2300 MHz (WCS)	11.95 / 15.25	6	360	9,919.27	1.69
						Sector B Composite MPE%	**4.04**
Antenna C1	Kathrein 800-10121	850 MHz	11.45	2	60	837.82	0.21
Antenna C2	Quintel QS66512-2	850 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	11.35 / 13.85 / 14.35	10	600	13,995.85	2.14
Antenna C3	CCI HPA-65R-BUU-H6	700 MHz / 2300 MHz (WCS)	11.95 / 15.25	6	360	9,919.27	1.69
						Sector C Composite MPE%	**4.04**

Table 3: AT&T Emissions Levels

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

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max Sector Value	**4.04 %**
Sprint	1.67 %
Clearwire	0.07 %
T-Mobile	2.98 %
MetroPCS	0.79 %
Verizon Wireless	3.69 %
Site Total MPE %:	**13.24 %**

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	4.04 %
AT&T Sector B Total:	4.04 %
AT&T Sector C Total:	4.04 %
Site Total:	13.24 %

Table 5: Site MPE Summary

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

AT&T _ Frequency Band / Technology (Per Sectors)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	418.91	166	1.18	850 MHz	567	0.21%
AT&T 850 MHz LTE	2	818.75	166	2.30	850 MHz	567	0.41%
AT&T 1900 MHz (PCS) LTE	4	1,455.97	166	8.18	1900 MHz (PCS)	1000	0.82%
AT&T 2100 MHz (AWS) LTE	4	1,633.62	166	9.18	2100 MHz (AWS)	1000	0.92%
AT&T 700 MHz LTE	2	940.05	166	2.64	700 MHz	467	0.57%
AT&T 2300 MHz (WCS) LTE	4	2,009.79	166	11.29	2300 MHz (WCS)	1000	1.13%
						Total:	**4.04%**

Table 6: AT&T Maximum Sector MPE Power Values

Summary

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

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

AT&T Sector	Power Density Value (%)
Sector A:	4.04 %
Sector B:	4.04 %
Sector C:	4.04 %
AT&T Maximum Total (per sector):	4.04 %
Site Total:	13.24 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **13.24 %** 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.

Scott Heffernan
RF Engineering Director
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

The Honorable Erin Stewart
Mayor, City of New Britain
27 West Main st, Room 204
New Britain, CT 06051

9590 9402 3535 7305 4994 92

2. Article Number *(Transfer from service label)*

7016 3010 0000 7829 1766

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery (over $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

New Britain Municipal Development
27 West Main st, Room 311
New Britain, CT 06051

9590 9402 3535 7305 4995 08

2. Article Number *(Transfer from service label)*

7016 3010 0000 7829 1773

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery (over $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Hartford Square Associates, LLC
1 Hartford Square West - Box 15
New Britain, CT 06052

9590 9402 3535 7305 4994 78

2. Article Number *(Transfer from service label)*

7016 3010 0000 7829 1780

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X Idella ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Idella

C. Date of Delivery 7/19/18

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery (over $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

SBA Communications Corp
Attn: Carla Shorter
8051 Congress Avenue
Boca Raton, FL 33487-1307

9590 9402 3535 7305 4994 85

2. Article Number *(Transfer from service label)*

7016 3010 0000 7829 1797

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)*

C. Date of Delivery 7-20-18

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery (over $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt