



July 5, 2018

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

Regarding: Notice of Exempt Modification – Adding (3) new antennas, (6) Remote Radio Units (RRUS), and (3) DC Squid surge suppressors.

Property Address: 239 Middle Turnpike Road, Manchester, CT 06040 (also known by the Town of Manchester, CT as “239 Middle Turnpike East”)

Applicant: AT&T Mobility (“AT&T”, Site # CT5448)

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 184-foot monopole at the above-referenced address, latitude 41.78444444444444, longitude -72.51166666666667. Said property is owned by Town of Manchester.

AT&T desires to modify its existing telecommunications facility by Adding (3) new antennas, (3) RRUS-32 B66 RRUs, (3) 4478 B5 RRUs, and (3) DC Squid surge suppressors. The centerline height of said antennas is and will remain at 143 feet.

AT&T is processing this work as one combined proposed construction installation, but released the work in two phases for administrative purposes, referring to these projects as LTE4C and LTE5C upgrades. As such, the work in total is depicted on two sets of Construction Drawings; both by Centek Engineering; dated June 7, 2018. Centek also completed two separate Structural Analysis Reports to accompany these Drawings, both dated June 7, 2018; both sets provided herewith. The singular Radio Frequency Emissions Analysis Report by Centerline Communications dated July 2, 2018, reflects the full scope of proposed work.

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 Town Manager of the Town of Manchester James Davis, the town’s Building Official Greg Smith, and the Zoning Enforcement Officer James Davis. A copy is also being sent to the Town of Manchester, c/o Scott Shanley, General Manager as the Town is the owner of the ground and structure on which AT&T is located.



July 5, 2018
Page 2 of 2

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 the existing mount height of 143' on the Monopole tower.
2. The proposed modifications will not involve any changes to ground-space footprint 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.
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 the two Structural Analyses completed by Timothy J Lynn of Centek Engineering on 6/7/2018)

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

Sincerely,

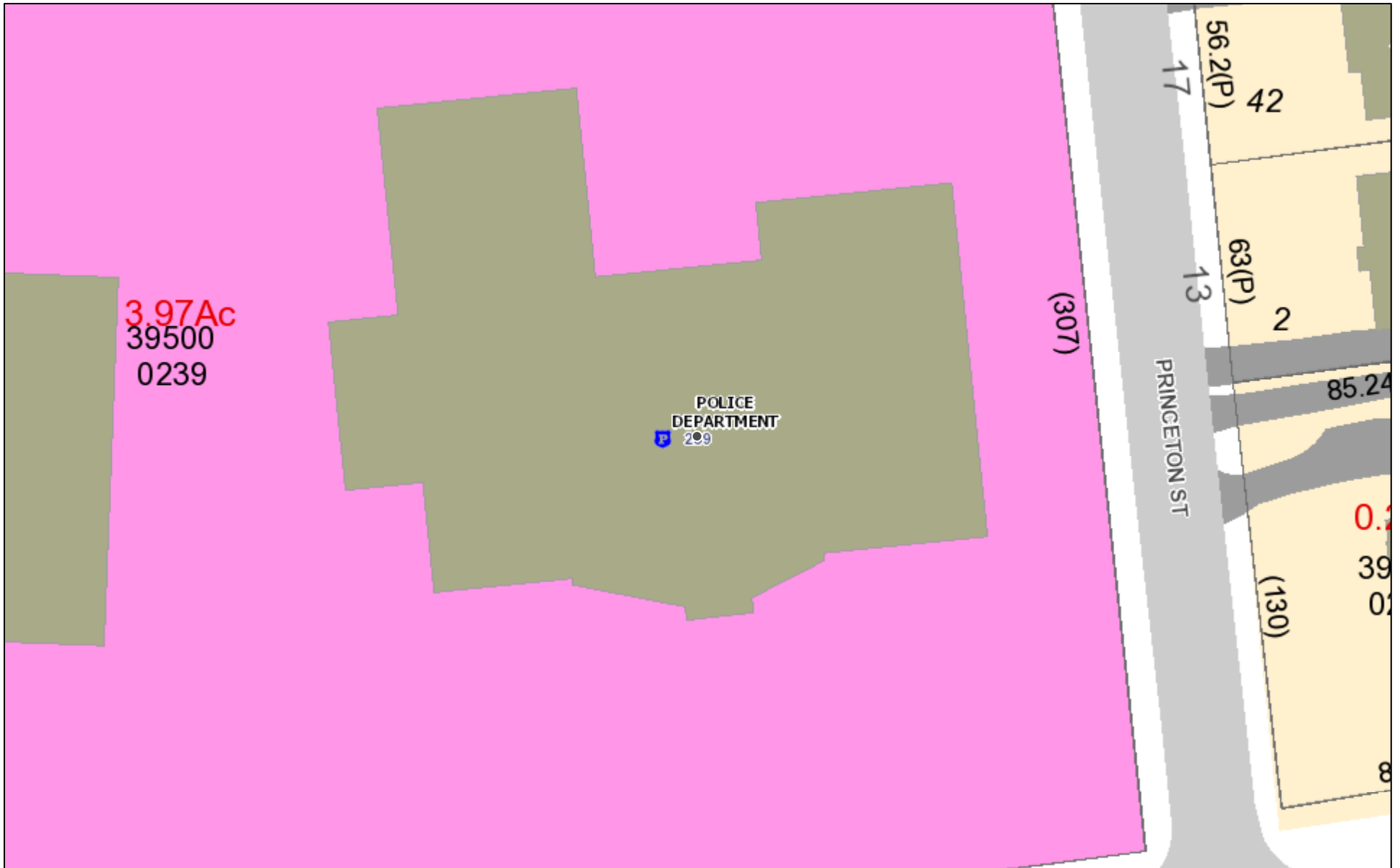
Nicole Caplan

Site Acquisition Specialist
Empire Telecom
16 Esquire Road
Billerica, MA 01862
Phone: 978-284-3906
Fax: 978-923-7909
Email: ncaplan@empiretelecomm.com

Enclosures:

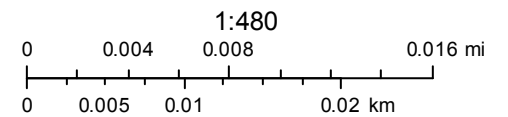
CC: Jay Moran, Town Mayor
Greg Smith, Town Building Official
James Davis, Zoning Enforcement Officer; Town Planner
Town of Manchester, c/o Scott Shanley, General Manager

Town of Manchester, CT



July 5, 2018

- Parcels
 - Easement Lines
 - Leader Lines
- Road Names**



Manchester GIS

239 MIDDLE TURNPIKE EAST

Parcel Address 239 MIDDLE TPKE E
RPKEY 395000239
Type PARCEL
Source Type
Source Document
Owner Name TOWN OF MANCHESTER
Co Owner POLICE DEPARTMENT
Owner Address 41 CENTER ST
City MANCHESTER
State CT
Zip Postal 06040-5096
Book 0
Page 0
Vision Acreage 3.97
Appraisal 6,062,100.00
Assessment 4,243,700.00
Actual Year Built 1995
Is Condo NO
Is Commercial YES
Use Code Municipal 94
Zone Desc Residence A
Sale Price 0.00
Sale Date 00/00/0000

Property Card



2

[Zoom to](#)





WIRELESS COMMUNICATIONS FACILITY

CT5448 - LTE 4C AWS

MANCHESTER CENTRAL

239 MIDDLE TURNPIKE EAST

MANCHESTER, CT 06040

GENERAL NOTES

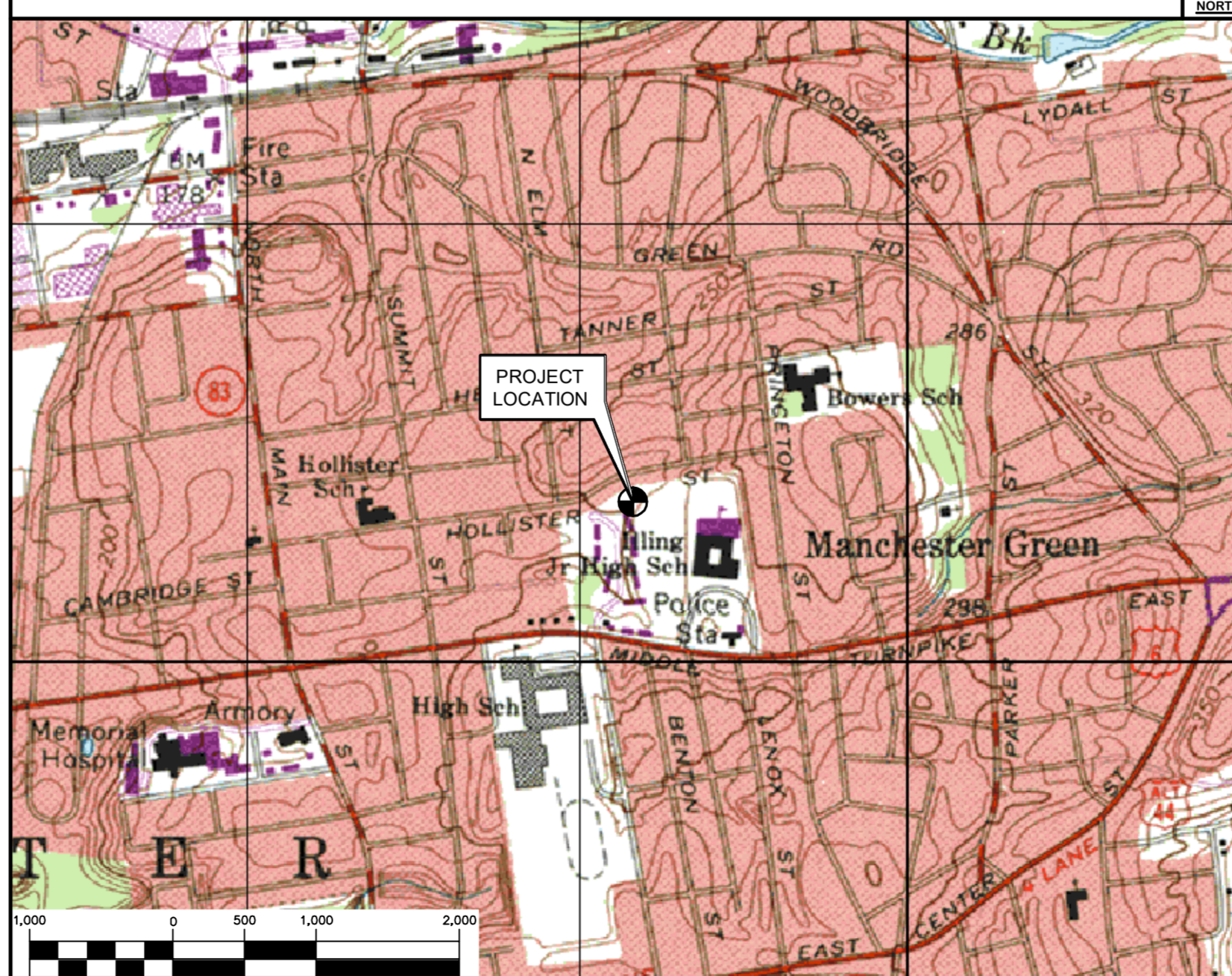
1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA-222 REVISION "G" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2016 CONNECTICUT FIRE SAFETY CODE AND, NATIONAL ELECTRICAL 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:	239 MIDDLE TURNPIKE EAST MANCHESTER, CONNECTICUT
	1. HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD		0.36 MI
	2. TURN LEFT ONTO CAPITAL BLVD		0.27 MI
	3. TURN LEFT ONTO WEST ST		0.16 MI
	4. MERGE ONTO I-91 N VIA THE RAMP ON THE LEFT TOWARD HARTFORD		7.79 MI
	5. MERGE ONTO CT-15 N/WILBUR CROSS HWY N VIA EXIT 29 TOWARD I-84 E/E HARTFORD/BOSTON		2.14 MI
	6. CT-15 N/WILBUR CROSS HWY N BECOMES I-84 E/US-6 E/WILBUR CROSS HWY N		1.50 MI
	7. KEEP LEFT TO TAKE I-84 E/US-6 E/WILBUR CROSS HWY N TOWARD BOSTON		1.35 MI
	8. TAKE THE US-6/US-44/MIDDLE TPKE W EXIT, EXIT 60, TOWARD MANCHESTER		0.41 MI
	9. TURN RIGHT ONTO MIDDLE TURNPIKE W/US-6 E/US-44 E.		0.46 MI
	10. TURN RIGHT TO STAY ON MIDDLE TURNPIKE W		2.45 MI
	11. TURN LEFT		0.08 MI
	12. 239 MIDDLE TURNPIKE EAST		0.00 MI

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. AT ANTENNA SECTORS:
 - INSTALL (3) NEW RRU'S-32 B66
 - INSTALL (3) NEW HEX-PORT ANTENNAS
 - RELOCATE (6) EXISTING ANTENNAS
 - RELOCATE (3) EXISTING RRU'S-32
 - RELOCATE (6) EXISTING TMA'S
 - B. WORK WITHIN EXISTING AT&T COMPOUND
 - REMOVE AND REPLACE EXISTING DUL DUS AND UPGRADE FOR A PROPOSED 5216 UNIT WITHIN EXISTING PURCELL CABINET
 - DECOMMISSION AND REMOVE (2) EXISTING NOKIA GSM CABINETS
 - DECOMMISSION AND REMOVE EXISTING RXAIT CABINET

PROJECT INFORMATION

AT&T SITE NUMBER:	CT5448
AT&T SITE NAME:	MANCHESTER CENTRAL
SITE ADDRESS:	239 MIDDLE TURNPIKE EAST MANCHESTER, CT 06040
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
AT&T PACE ID NUMBERS:	MRCTB025336
AT&T FA LOCATION CODE:	10071105
ENGINEER:	CENITEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-47'-03.84" N LONGITUDE: 72°-30'-42.30" W GROUND ELEVATION: ±288' 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 ANTENNA SCHEDULE	0
C-1	COMPOUND PLAN	0
C-2	PLANS & ELEVATION	0
C-3	LTE 4C AWS ANTENNA LAYOUT PLANS	0
C-4	DETAILS	0
E-1	LTE SCHEMATIC DIAGRAM AND NOTES	0
E-2	LTE WIRING DIAGRAM	0
E-3	TYPICAL ELECTRICAL DETAILS	0

PROFESSIONAL ENGINEER SEAL



CENITEK engineering
Centered on Solutions™
(203) 488-0360
(203) 488-8387 Fax
63-2 North Branford Road
Branford, CT 06405
www.CenitekEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
MANCHESTER CENTRAL
CT5448 - LTE 4C AWS
239 MIDDLE TURNPIKE EAST
MANCHESTER, CT 06040

DATE: 01/16/18
SCALE: AS NOTED
JOB NO. 17004.67

TITLE SHEET

T-1

NOTES AND SPECIFICATIONS

DESIGN BASIS:

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

- 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 (V_{asd}) (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:

- ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
- 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.
- 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.
- DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
- THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
- 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.
- 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.
- 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.
- 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
- 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.
- 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.
- 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.
- NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
- REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

- ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)
 - STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
 - STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
 - STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
 - STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
 - PIPE---ASTM A53 (FY = 35 KSI)
 - CONNECTION BOLTS---ASTM A325-N
 - U-BOLTS---ASTM A36
 - ANCHOR RODS---ASTM F 1554
 - WELDING ELECTRODE---ASTM E 70XX
- 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.
- STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
- PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
- FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
- INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
- AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
- 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.
- ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
- 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.
- CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
- 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.
- LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
- SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
- MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
- FABRICATE BEAMS WITH MILL CAMBER UP.
- 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.
- COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
- INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
- 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

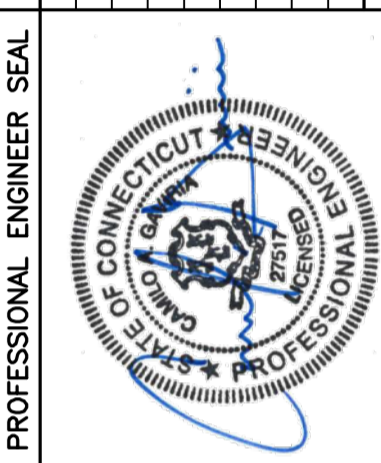
PAINTING SCHEDULE:

- ANTENNA PANELS:**
 - SHERWIN WILLIAMS POLANE-B
 - COLOR TO BE MATCHED WITH EXISTING TOWER STRUCTURE.
 - COAXIAL CABLES:**
 - ONE COAT OF DTM BONDING PRIMER (2-5 MILS. DRY FINISH)
 - TWO COATS OF DTM ACRYLIC PRIMER/FINISH (2.5-5 MILS. DRY FINISH)
 - COLOR TO BE FIELD MATCHED WITH EXISTING STRUCTURE.
- EXAMINATION AND PREPARATION:**
- 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.
 - 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.
 - TEST SHOP APPLIED PRIMER FOR COMPATIBILITY WITH SUBSEQUENT COVER MATERIALS.
 - PERFORM PREPARATION AND CLEANING PROCEDURE IN STRICT ACCORDANCE WITH COATING MANUFACTURER'S INSTRUCTIONS FOR EACH SUBSTRATE CONDITION.
 - CORRECT DEFECTS AND CLEAN SURFACES WHICH AFFECT WORK OF THIS SECTION. REMOVE EXISTING COATINGS THAT EXHIBIT LOOSE SURFACE DEFECTS.
 - IMPERVIOUS SURFACE: REMOVE MILDEW BY SCRUBBING WITH SOLUTION OF TRI-SODIUM PHOSPHATE AND BLEACH. RINSE WITH CLEAN WATER AND ALLOW SURFACE TO DRY.
 - 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.
 - 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 PRIMER 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.
 - 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.
 - 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).
 - COAXIAL CABLES: REMOVE ALL OIL, DUST, GREASE, DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION.
- CLEANING:**
- COLLECT WASTE MATERIAL, WHICH MAY CONSTITUTE A FIRE HAZARD, PLACE IN CLOSED METAL CONTAINERS AND REMOVE DAILY FROM SITE.
- APPLICATION:**
- APPLY PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
 - DO NOT APPLY FINISHES TO SURFACES THAT ARE NOT DRY.
 - APPLY EACH COAT TO UNIFORM FINISH.
 - APPLY EACH COAT OF PAINT SLIGHTLY DARKER THAN PRECEDING COAT UNLESS OTHERWISE APPROVED.
 - SAND METAL LIGHTLY BETWEEN COATS TO ACHIEVE REQUIRED FINISH.
 - VACUUM CLEAN SURFACES FREE OF LOOSE PARTICLES. USE TACK CLOTH JUST PRIOR TO APPLYING NEXT COAT.
 - ALLOW APPLIED COAT TO DRY BEFORE NEXT COAT IS APPLIED.
- COMPLETED WORK:**
- SAMPLES: PREPARE 24" X 24" SAMPLE AREA FOR REVIEW.
 - MATCH APPROVED SAMPLES FOR COLOR, TEXTURE AND COVERAGE. REMOVE REFINISH OR REPAINT WORK NOT IN COMPLIANCE WITH SPECIFIED REQUIREMENTS.

ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	BAND	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA Ø HEIGHT	AZIMUTH	TMA/DIPLEXER/TRIPLEXER (QTY)	(E/P) RRU (QTY)	FEEDER	(E/P) RAYCAP (QTY)
A1	PROPOSED	LTE AWS	HPA-65R-BUU-H6	72X14.8X9	±143'	40°		(P) RRU-32 B66 (1)	FIBER AND DC POWER	
A2	EXISTING	UMTS 850/1900	800-10121	54.5X10.3X5.9	±143'	40°	(E) P WAVE LGP21401 SINGLE 1900 W 850BP (850) (2)	(E) POWERWAVE LGP 21901 (2)	(2) 1-5/8"Ø COAX	(E) RAYCAP DC6-48-60-18-8C (1)
A3	EXISTING	LTE WCS	OPA-65R-LCUU-H6	72X14.8X7.4	±143'	40°		(E) RRU-32 (1)	FIBER AND DC POWER	
A4	EXISTING	LTE 700/1900	OPA-65R-LCUU-H6	72X14.8X7.4	±143'	40°		(E) RRU-11 (1), (E) RRU-12+RRU-A2 (1)	FIBER AND DC POWER	(E) RAYCAP DC6-48-60-18-8C (1)
B1	PROPOSED	LTE AWS	HPA-65R-BUU-H8	92.4X14.8X7.4	±143'	160°		(P) RRU-32 B66 (1)	FIBER AND DC POWER	
B2	EXISTING	UMTS 850/1900	800-10121	54.5X10.3X5.9	±143'	160°	(E) P WAVE LGP21401 SINGLE 1900 W 850BP (850) (2)	(E) POWERWAVE LGP 21901 (2)	(2) 1-5/8"Ø COAX	
B3	EXISTING	LTE WCS	OPA-65R-LCUU-H8	92.7X14.4X7	±143'	160°		(E) RRU-32 (1)	FIBER AND DC POWER	
B4	EXISTING	LTE 700/1900	OPA-65R-LCUU-H8	92.7X14.4X7	±143'	160°		(E) RRU-11 (1), (E) RRU-12+RRU-A2 (1)	FIBER AND DC POWER	
C1	PROPOSED	LTE AWS	HPA-65R-BUU-H8	92.4X14.8X7.4	±143'	280°		(P) RRU-32 B66 (1)	FIBER AND DC POWER	
C2	EXISTING	UMTS 850/1900	800-10121	54.5X10.3X5.9	±143'	280°	(E) P WAVE LGP21401 SINGLE 1900 W 850BP (850) (2)	(E) POWERWAVE LGP 21901 (2)	(2) 1-5/8"Ø COAX	
C3	EXISTING	LTE WCS	OPA-65R-LCUU-H8	92.7X14.4X7	±143'	280°		(E) RRU-32 (1)	FIBER AND DC POWER	
C4	EXISTING	LTE 700/1900	OPA-65R-LCUU-H8	92.7X14.4X7	±143'	280°		(E) RRU-11 (1), (E) RRU-12+RRU-A2 (1)	FIBER AND DC POWER	

RRU	SIZE (INCHES) (L x W x D)
RRUS-11	19.7 x 17 x 7.2
RRUS-12	20.4 x 18.5 x 7.5
RRUS-A2	16.4 x 15.1 x 3.4
RRUS-32	27.2 x 12.1 x 7
RRUS-32 B66	27.2 x 12.1 x 7

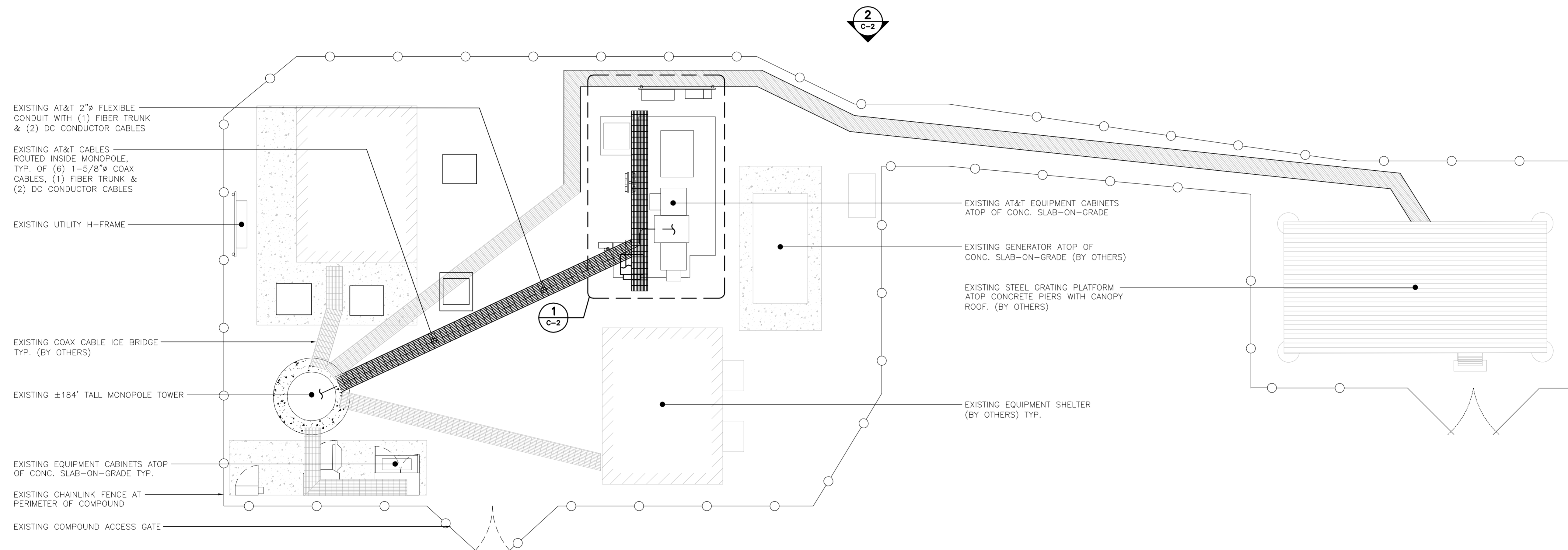


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 SCALE: AS NOTED
 JOB NO. 17004.67
 NOTES, SPECIFICATIONS AND ANTENNA SCHEDULE

CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
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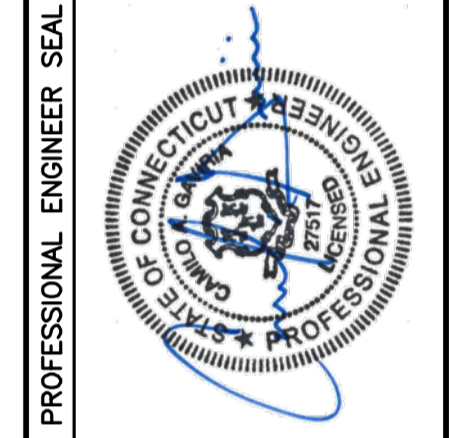
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C-1

COMPOUND PLAN

SCALE: 3/16" = 1'-0"

TRUE NORTH

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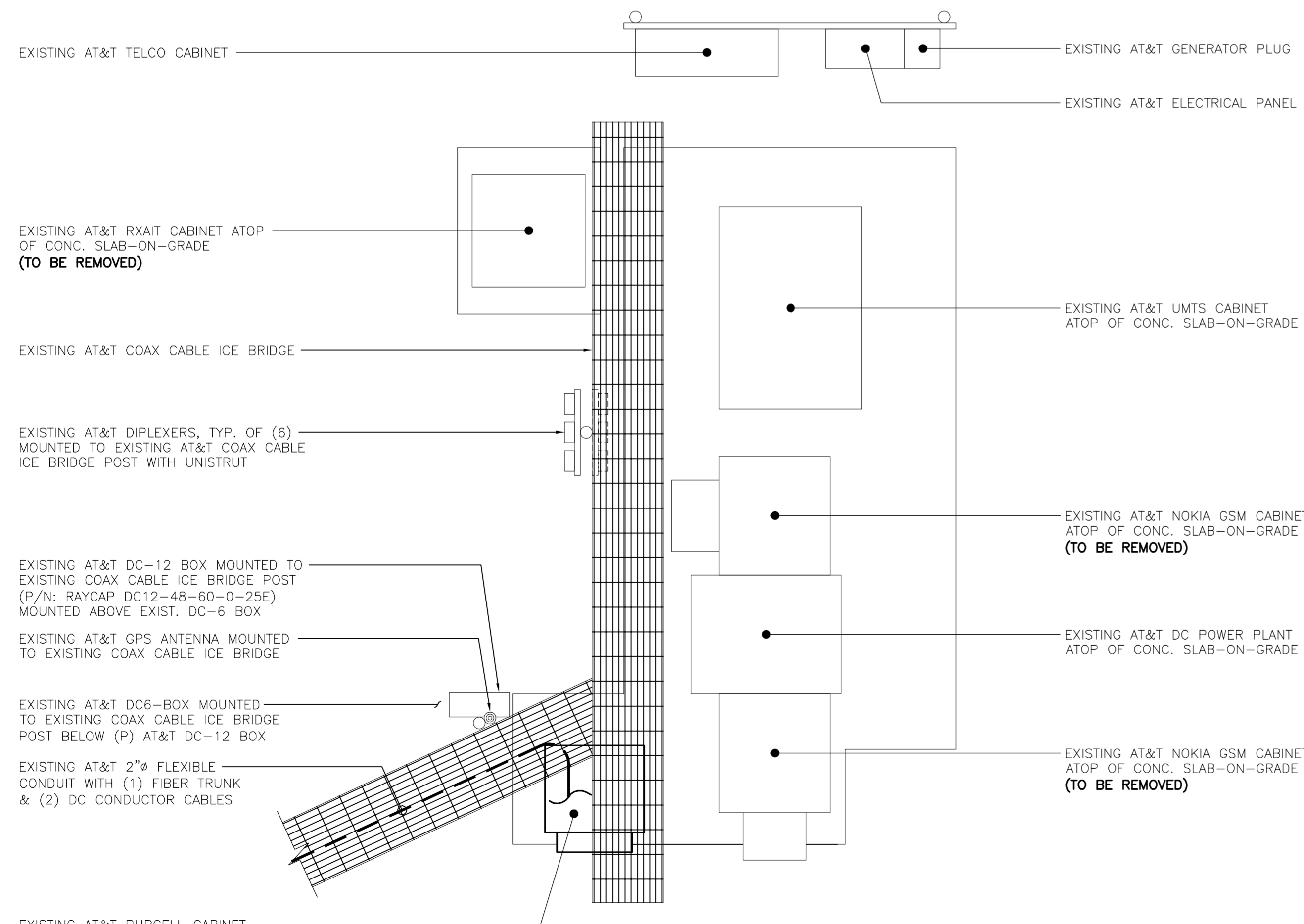
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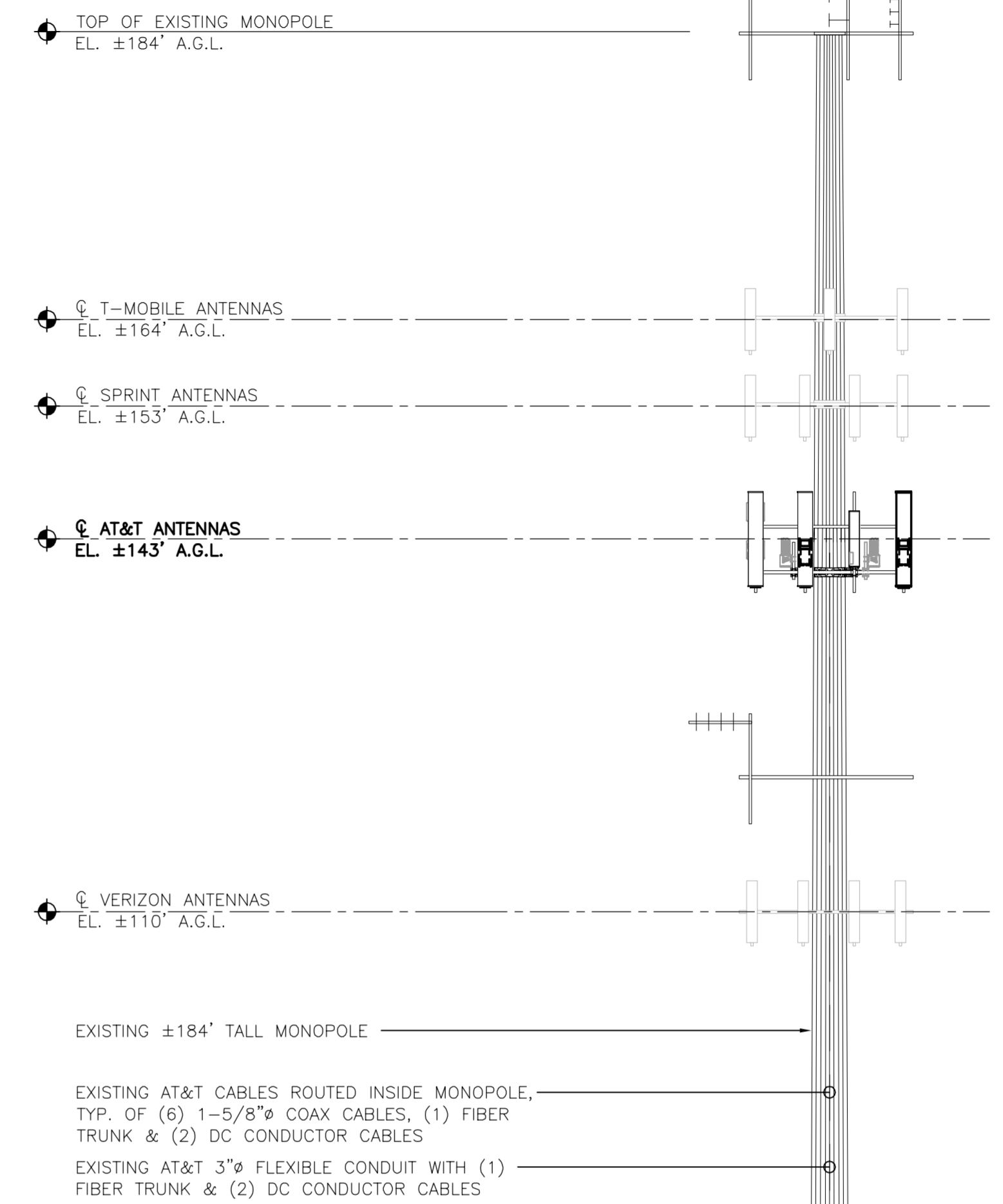
COMPOUND PLAN

C-1

Sheet No. 3 of 9



1 EQUIPMENT LAYOUT PLAN
 SCALE: 1/2" = 1'-0"
 TRUE NORTH

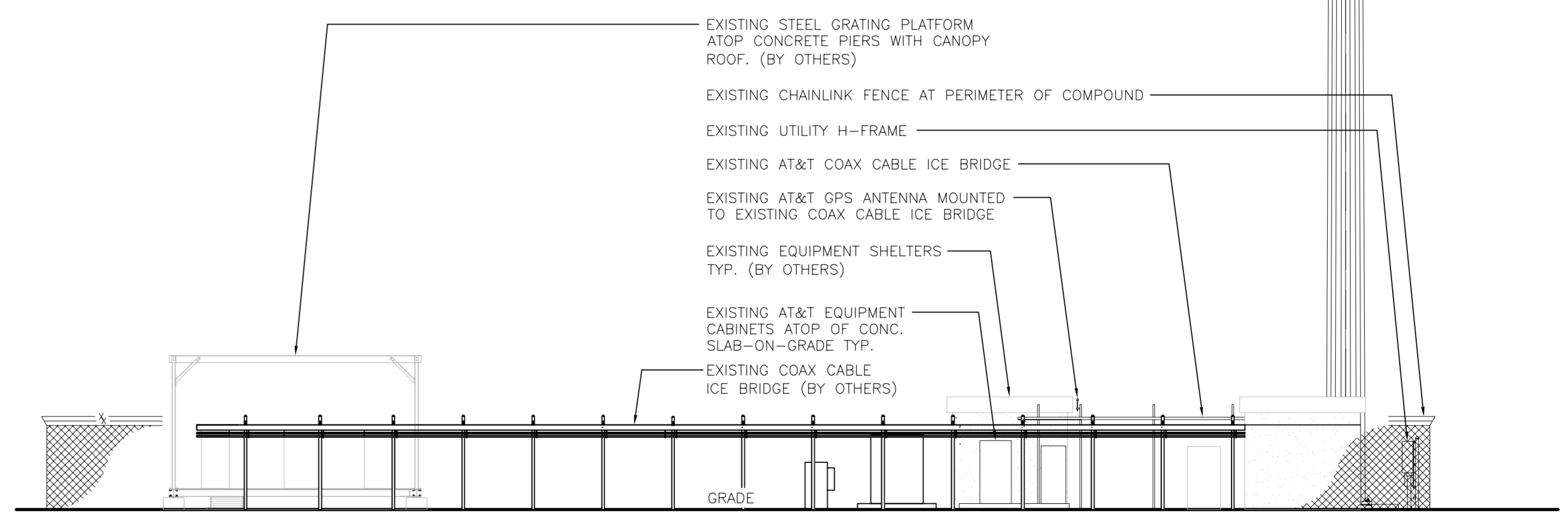


TOWER STRUCTURAL NOTES:

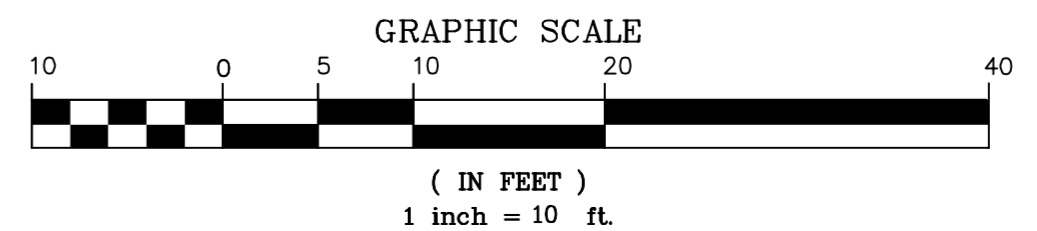
- REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., PROJ. NO. 17004.67, DATED JUNE 07, 2018 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
- ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CENTEK ENGINEERING, INC. AND FINAL AT&T RF DATA SHEET.

NOTES:

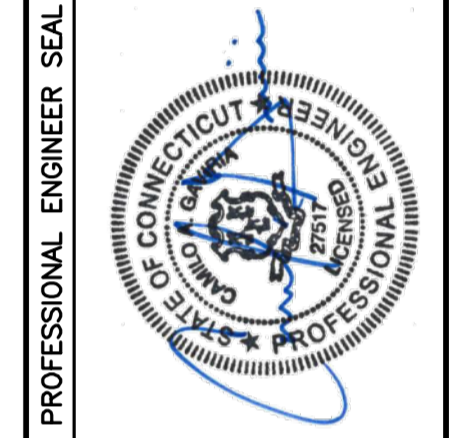
- OTHER CARRIER EQUIPMENT NOT SHOWN FOR CLARITY
- A.G.L. = ABOVE GRADE LEVEL



2 NORTH TOWER ELEVATION
 SCALE: 1" = 10'



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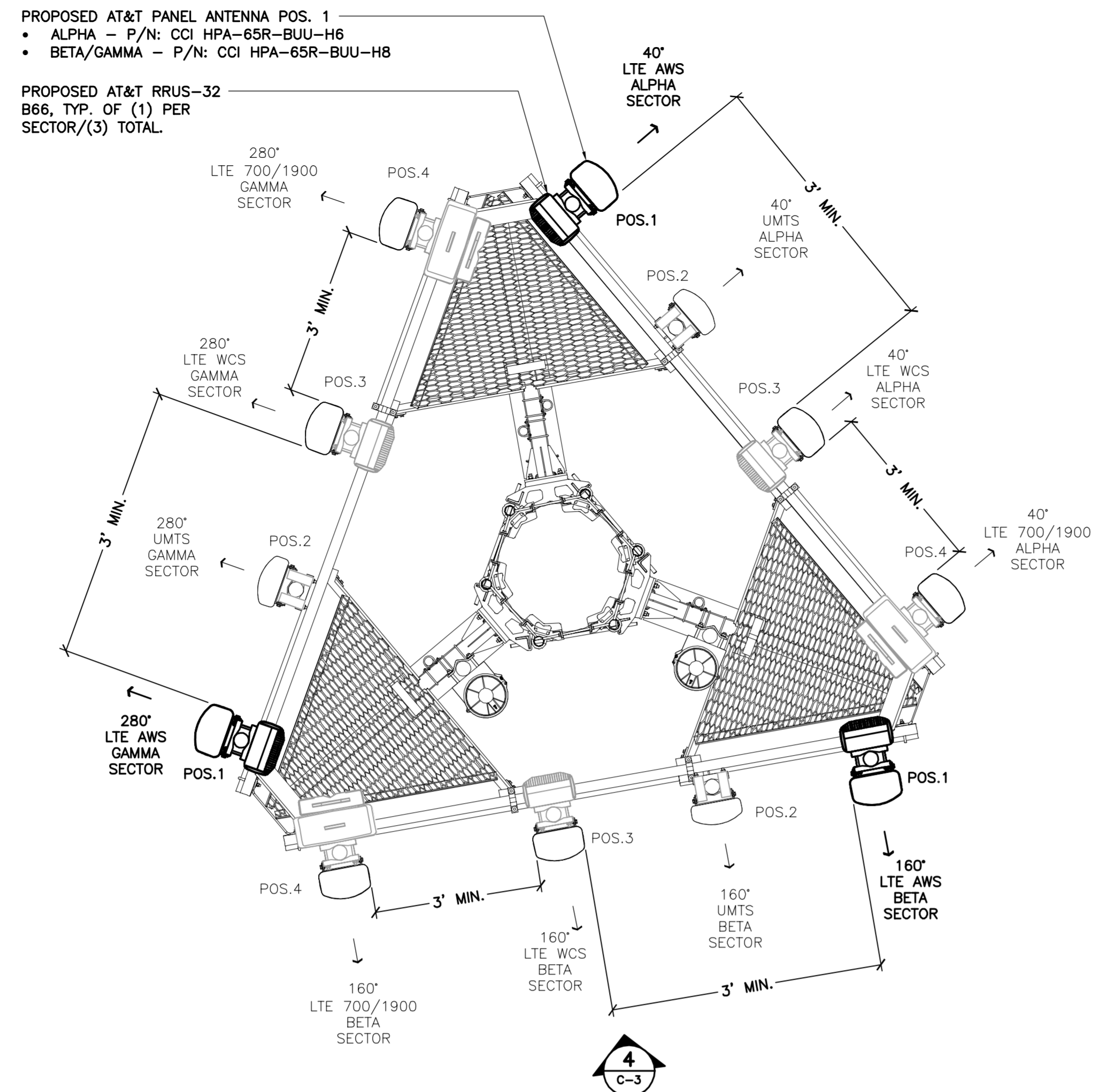
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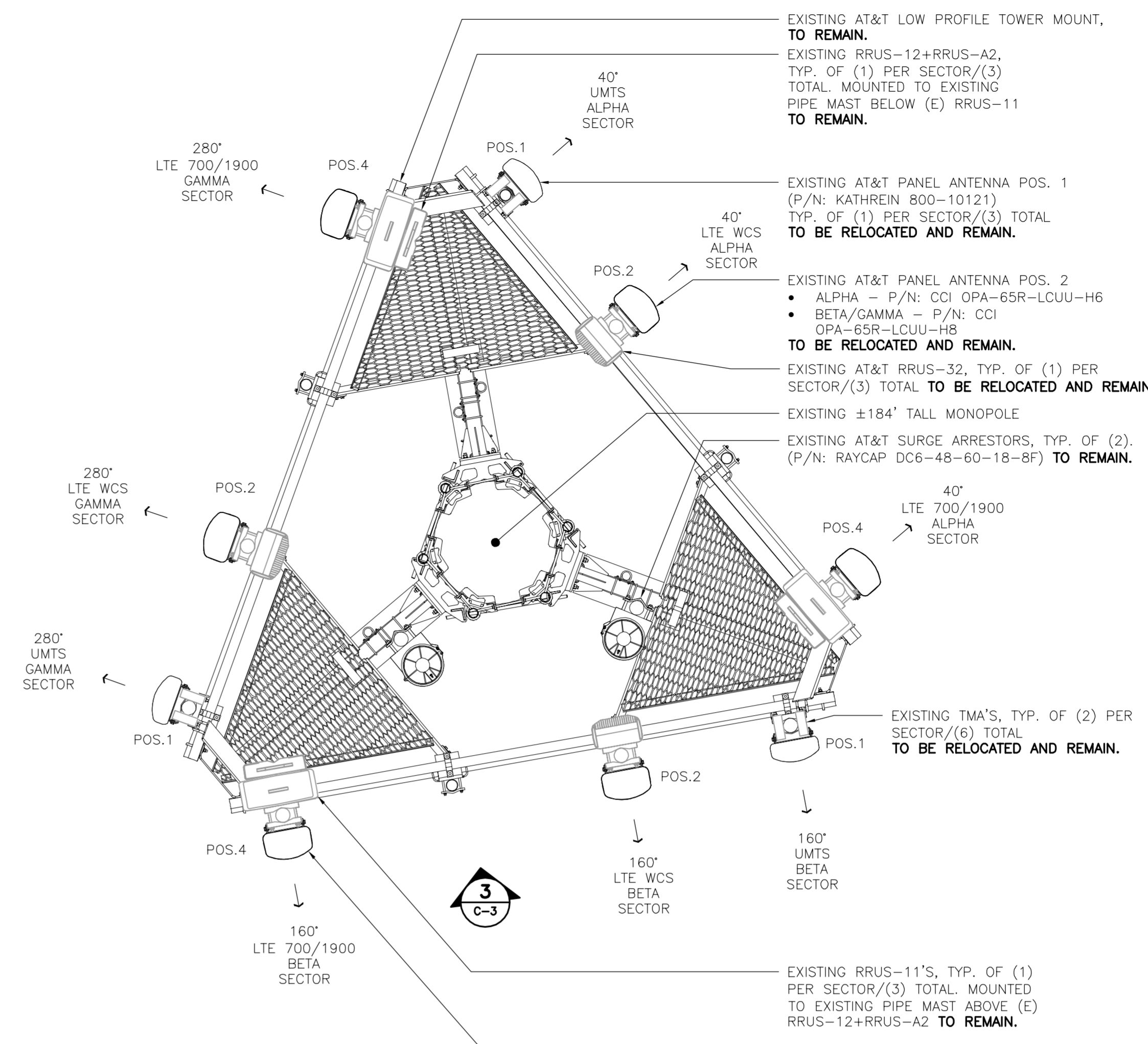
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PLANS AND ELEVATION

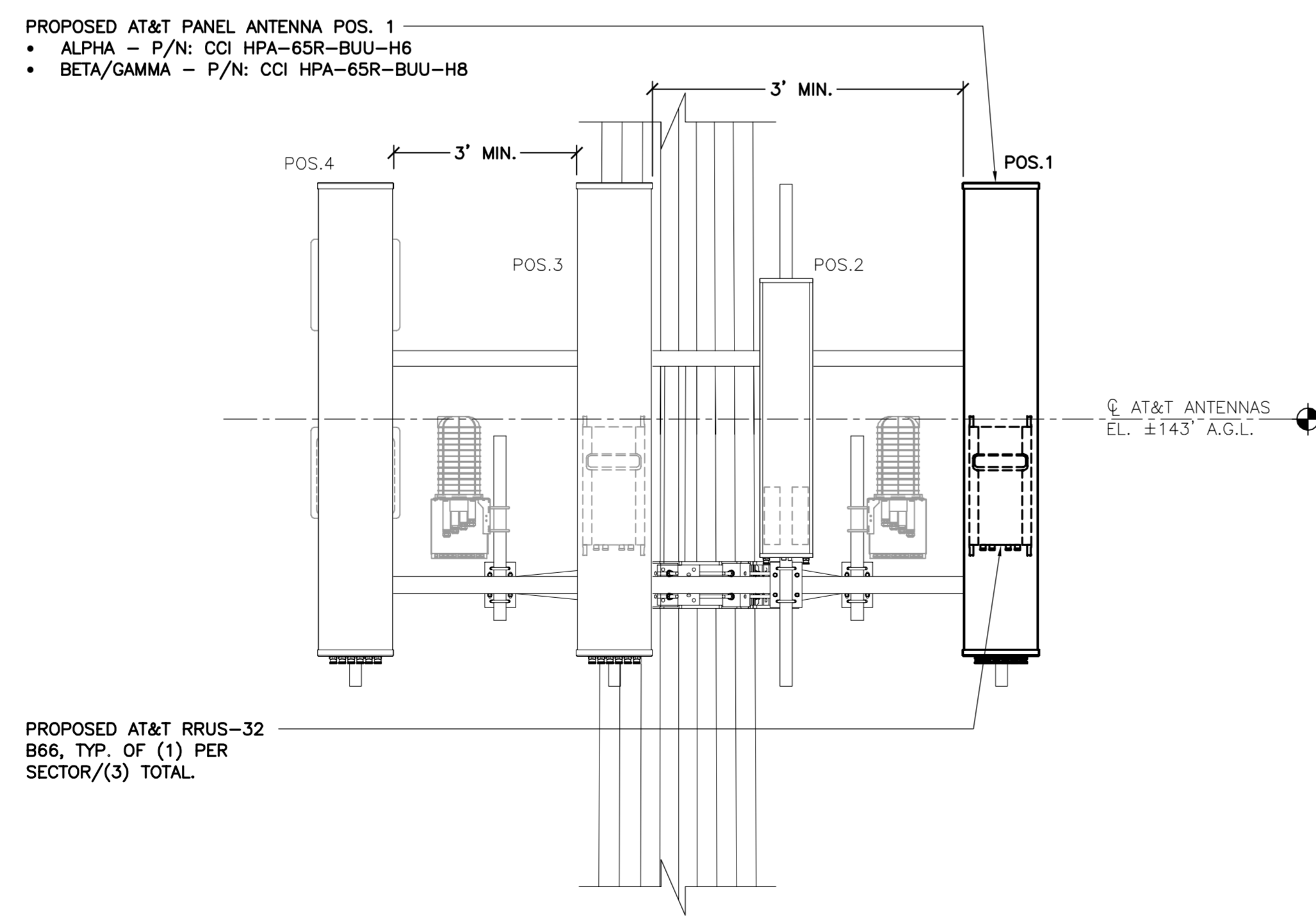
C-2
 Sheet No. 4 of 9



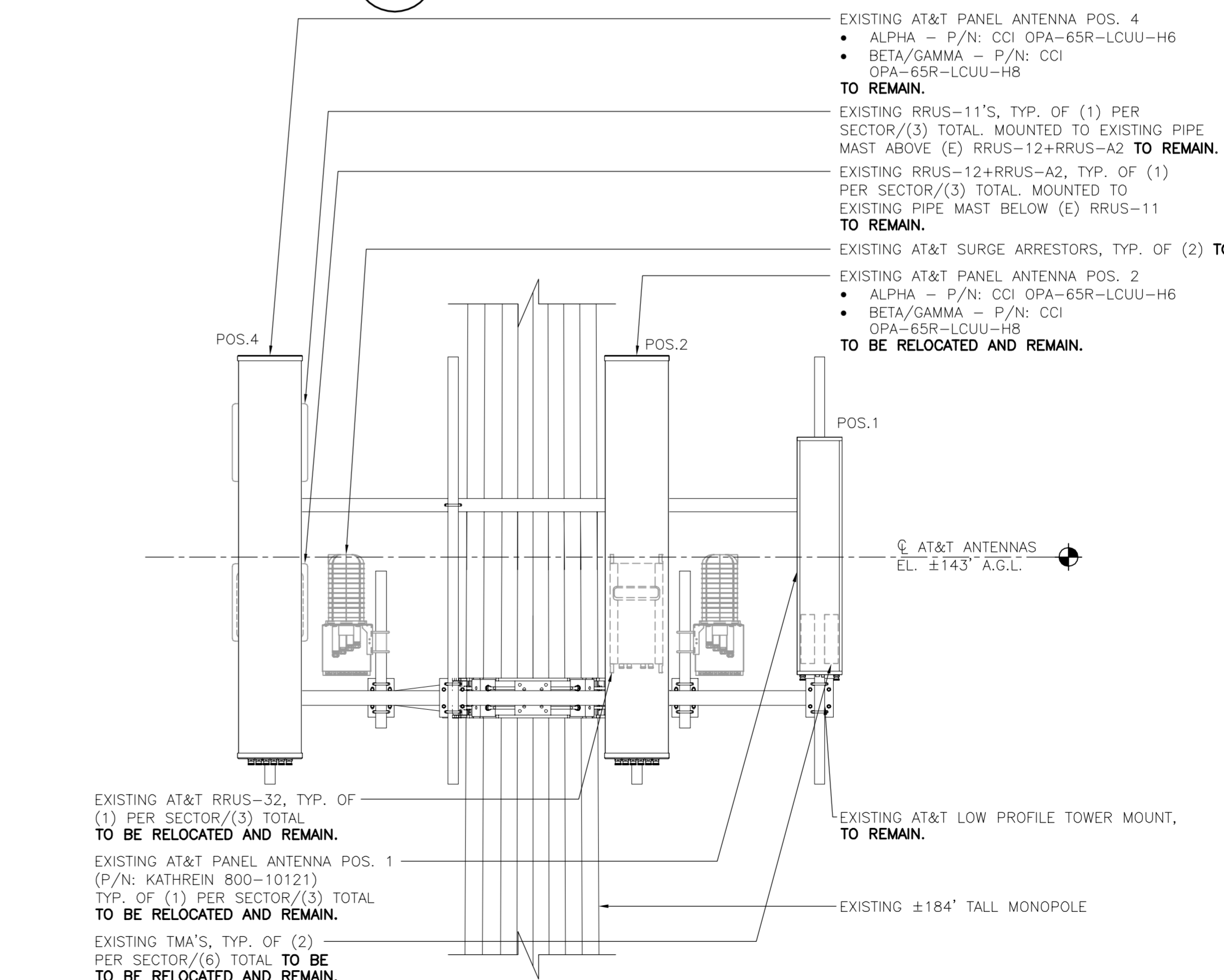
2 PROPOSED ANTENNA PLAN
C-3 SCALE: 3/8" = 1'-0" NORTH



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



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



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

PROPOSED AT&T PANEL ANTENNA POS. 1
• ALPHA - P/N: CCI HPA-65R-BUU-H6
• BETA/GAMMA - P/N: CCI HPA-65R-BUU-H8

PROPOSED AT&T PANEL ANTENNA POS. 1
• ALPHA - P/N: CCI HPA-65R-BUU-H6
• BETA/GAMMA - P/N: CCI HPA-65R-BUU-H8

EXISTING AT&T LOW PROFILE TOWER MOUNT, TO REMAIN.
EXISTING RRUS-12+RRUS-A2, TYP. OF (1) PER SECTOR/(3) TOTAL. MOUNTED TO EXISTING PIPE MAST BELOW (E) RRUS-11 TO REMAIN.

EXISTING AT&T PANEL ANTENNA POS. 1 (P/N: KATHREIN 800-10121) TYP. OF (1) PER SECTOR/(3) TOTAL TO BE RELOCATED AND REMAIN.

EXISTING AT&T PANEL ANTENNA POS. 2
• ALPHA - P/N: CCI OPA-65R-LCUU-H6
• BETA/GAMMA - P/N: CCI OPA-65R-LCUU-H8 TO BE RELOCATED AND REMAIN.

EXISTING AT&T RRUS-32, TYP. OF (1) PER SECTOR/(3) TOTAL TO BE RELOCATED AND REMAIN.

EXISTING ±184' TALL MONOPOLE
EXISTING AT&T SURGE ARRESTORS, TYP. OF (2). (P/N: RAYCAP DC6-48-60-18-8F) TO REMAIN.

EXISTING TMA'S, TYP. OF (2) PER SECTOR/(6) TOTAL TO BE RELOCATED AND REMAIN.

EXISTING RRUS-11'S, TYP. OF (1) PER SECTOR/(3) TOTAL. MOUNTED TO EXISTING PIPE MAST ABOVE (E) RRUS-12+RRUS-A2 TO REMAIN.

EXISTING AT&T PANEL ANTENNA POS. 4
• ALPHA - P/N: CCI OPA-65R-LCUU-H6
• BETA/GAMMA - P/N: CCI OPA-65R-LCUU-H8 TO REMAIN.

EXISTING AT&T PANEL ANTENNA POS. 4
• ALPHA - P/N: CCI OPA-65R-LCUU-H6
• BETA/GAMMA - P/N: CCI OPA-65R-LCUU-H8 TO REMAIN.

EXISTING RRUS-11'S, TYP. OF (1) PER SECTOR/(3) TOTAL. MOUNTED TO EXISTING PIPE MAST ABOVE (E) RRUS-12+RRUS-A2 TO REMAIN.

EXISTING RRUS-12+RRUS-A2, TYP. OF (1) PER SECTOR/(3) TOTAL. MOUNTED TO EXISTING PIPE MAST BELOW (E) RRUS-11 TO REMAIN.

EXISTING AT&T SURGE ARRESTORS, TYP. OF (2) TO REMAIN.

EXISTING AT&T PANEL ANTENNA POS. 2
• ALPHA - P/N: CCI OPA-65R-LCUU-H6
• BETA/GAMMA - P/N: CCI OPA-65R-LCUU-H8 TO BE RELOCATED AND REMAIN.

EXISTING AT&T LOW PROFILE TOWER MOUNT, TO REMAIN.

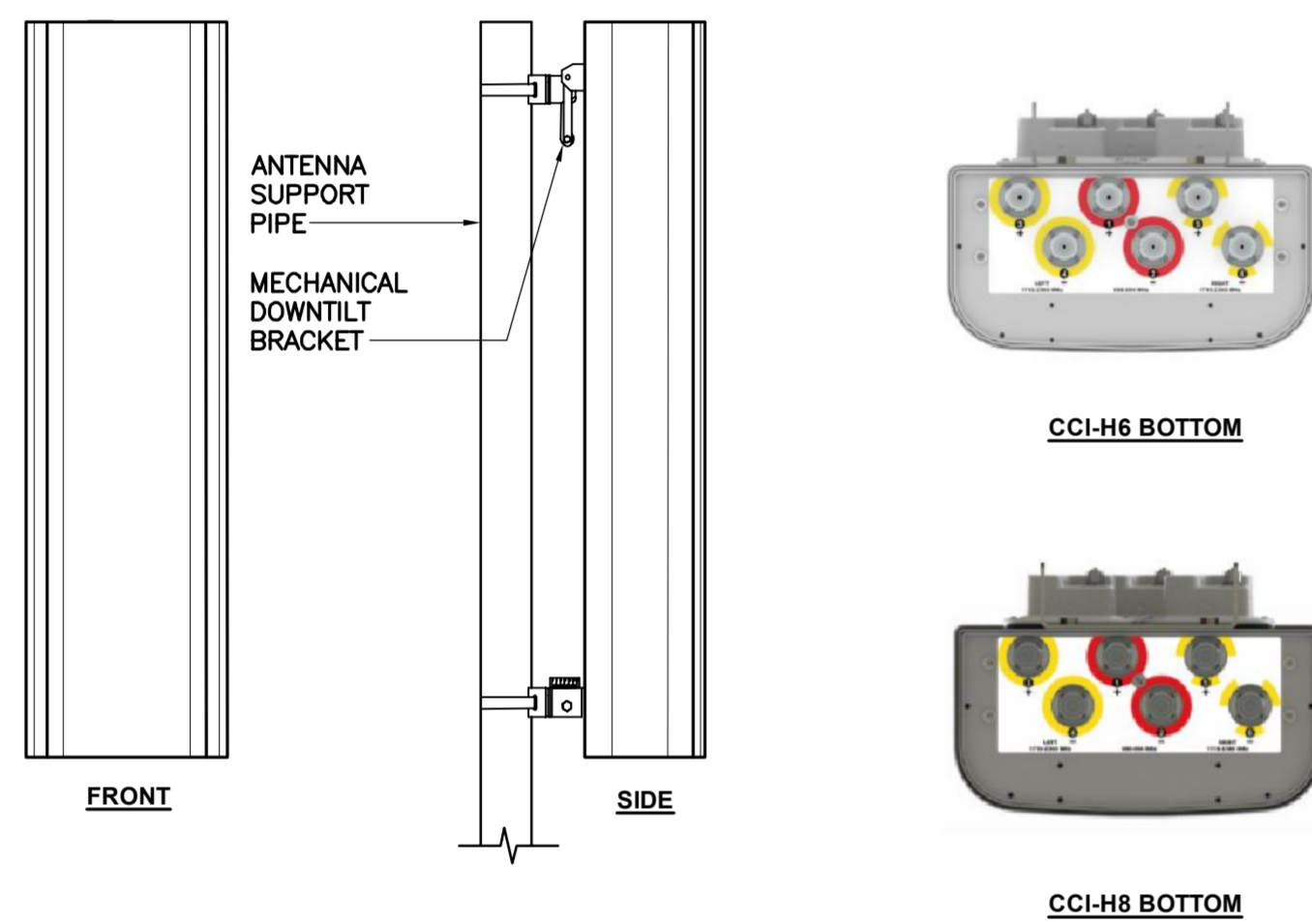
EXISTING ±184' TALL MONOPOLE

EXISTING AT&T RRUS-32, TYP. OF (1) PER SECTOR/(3) TOTAL TO BE RELOCATED AND REMAIN.

EXISTING AT&T PANEL ANTENNA POS. 1 (P/N: KATHREIN 800-10121) TYP. OF (1) PER SECTOR/(3) TOTAL TO BE RELOCATED AND REMAIN.

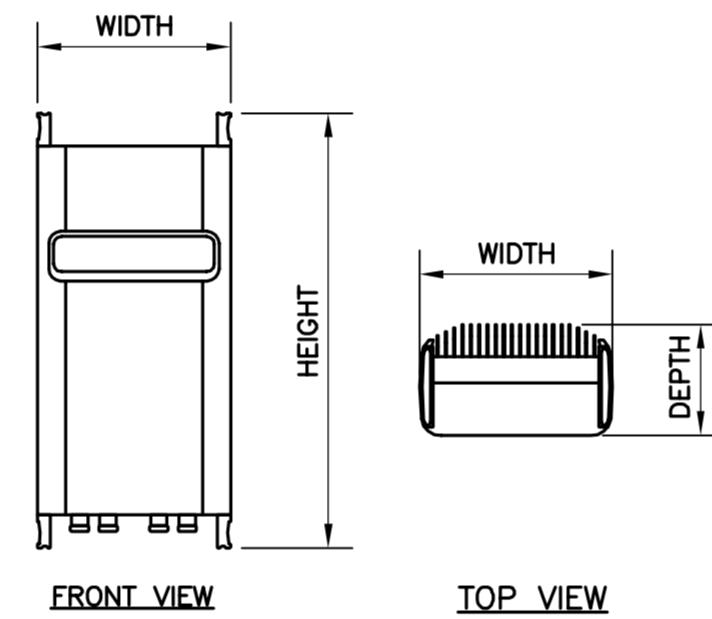
EXISTING TMA'S, TYP. OF (2) PER SECTOR/(6) TOTAL TO BE RELOCATED AND REMAIN.

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JOB NO.:	17004.67
LTE 4C AWS ANTENNA LAYOUT PLANS	
C-3	
Sheet No. 5	of 9



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: CCI MODEL: HPA-65R-BUU-H6	72"L x 14.8"W x 9"D	51 LBS.
MAKE: CCI MODEL: HPA-65R-BUU-H8	92.4"L x 14.8"W x 7.4"D	68 LBS.

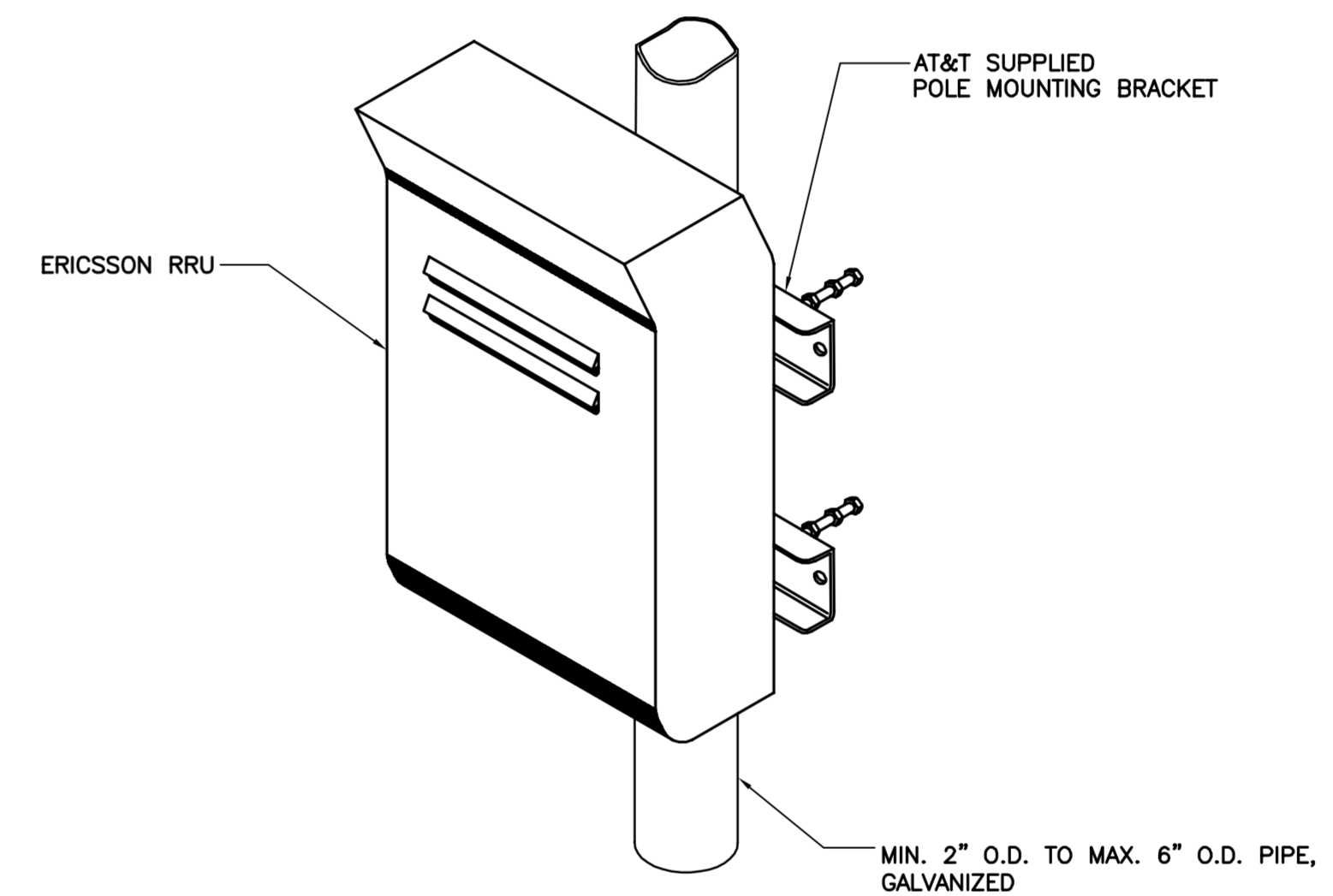
1 PROPOSED ANTENNA DETAIL
C-4 SCALE: NTS



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.

2 ERICSSON RRUS 32 B66 DETAIL
C-4 SCALE: 1" = 1'-0"



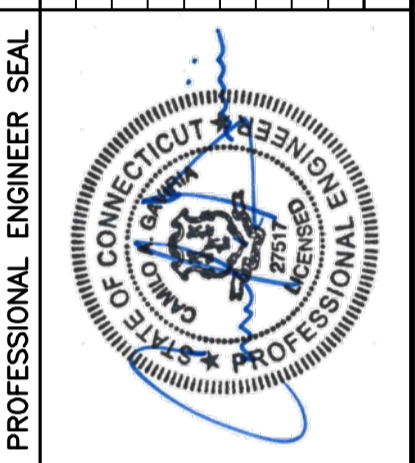
ISOMETRIC VIEW

NOTES:

- 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.
- NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

3 TYPICAL RRUS MOUNTING DETAILS
C-4 SCALE: NTS

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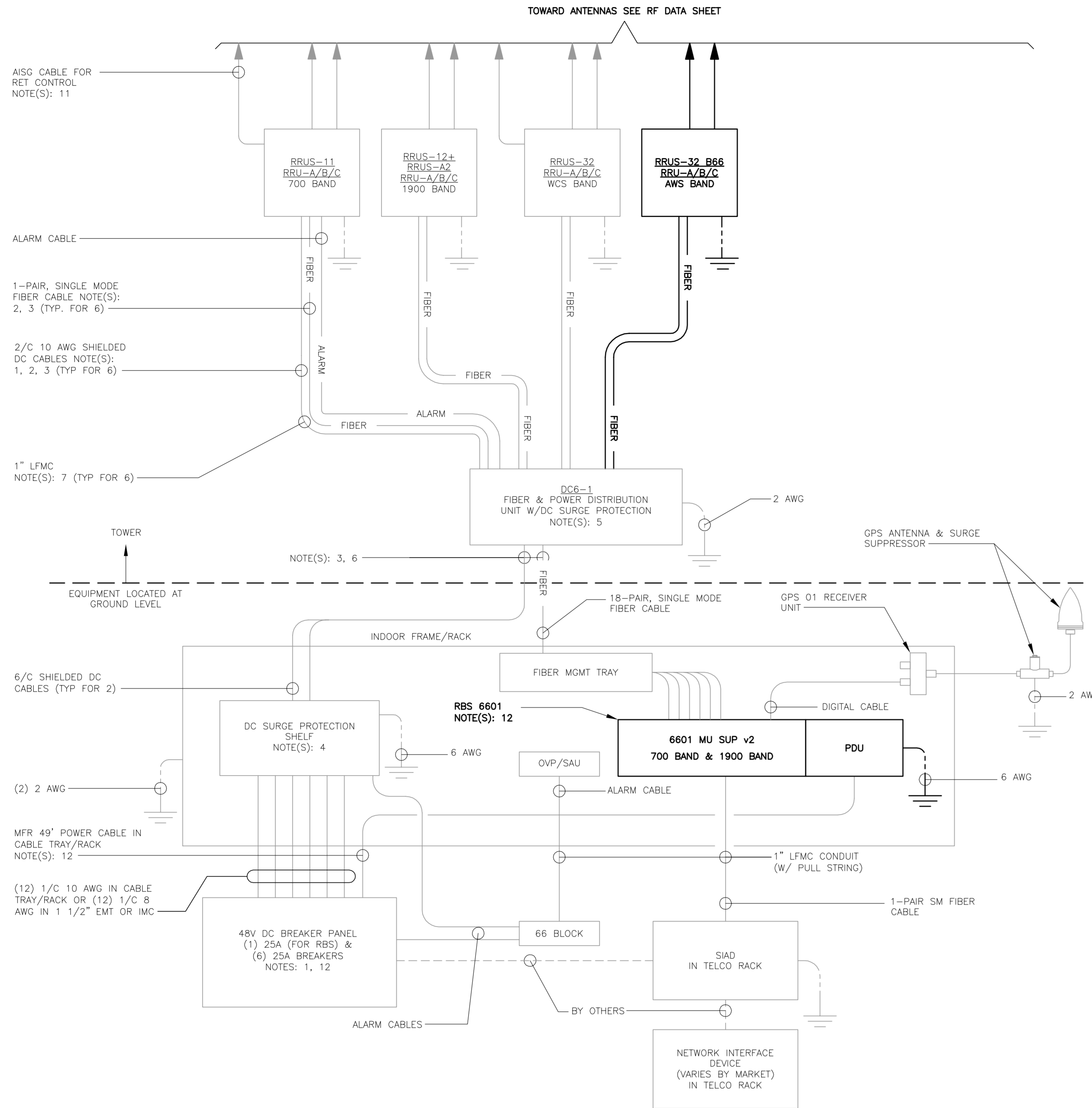


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DETAILS
C-4
Sheet No. 6 of 9



1 LTE SCHEMATIC DIAGRAM
E-1 NOT TO SCALE

LTE SCHEMATIC DIAGRAM NOTES:

- 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.
- LEAVE COILED AND PROTECTED UNTIL TERMINATED.
- DC AND FIBER CABLE SHALL BE ROUTED WITH THE EXISTING COAX CABLE.
- DC SURGE PROTECTION SHELF SHALL BE RAYCAP DCx-48-60-RM.
- FIBER & DC DISTRIBUTION BOX W/DC SURGE PROTECTION SHALL BE RAYCAP DC6-48-60-18-8F.
- 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.
- CONDUIT TO BE USED ON A TOWER IF THE RRU IS MORE THAN 10' FROM THE DISTRIBUTION UNITS. MAX CABLE LENGTH IS 16 FEET.
- 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 III) 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.
- 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.
- FIBER OPTIC CABLES SHALL BE INSTALLED IN FLEXIBLE CONDUIT AS SCOPED BY MARKET.
- RET CONTROL FROM THE RRU IS AN OPTIONAL METHOD OF CONNECTION. REFER TO RF DATA SHEET FOR APPLICABILITY.
- 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.

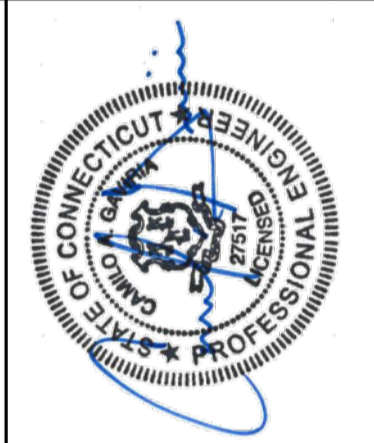
ELECTRICAL NOTES

- 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.
- INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
- CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
- MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
- 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.
- 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.
- 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.
- PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
- 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.
- MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
- 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.
- 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.
- 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.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
- 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.
- 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.
- 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.
- GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
- EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122. (MIN. #12 AWG).
- 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

- 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:
 - TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
 - CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
 - GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.
- 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.
- 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.
- CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

0	06/07/18	KAWUR	DND	CONSTRUCTION DRAWINGS	ISSUED FOR CONSTRUCTION
REV.	DATE	DRAWN BY	CHECK'D BY	DESCRIPTION	

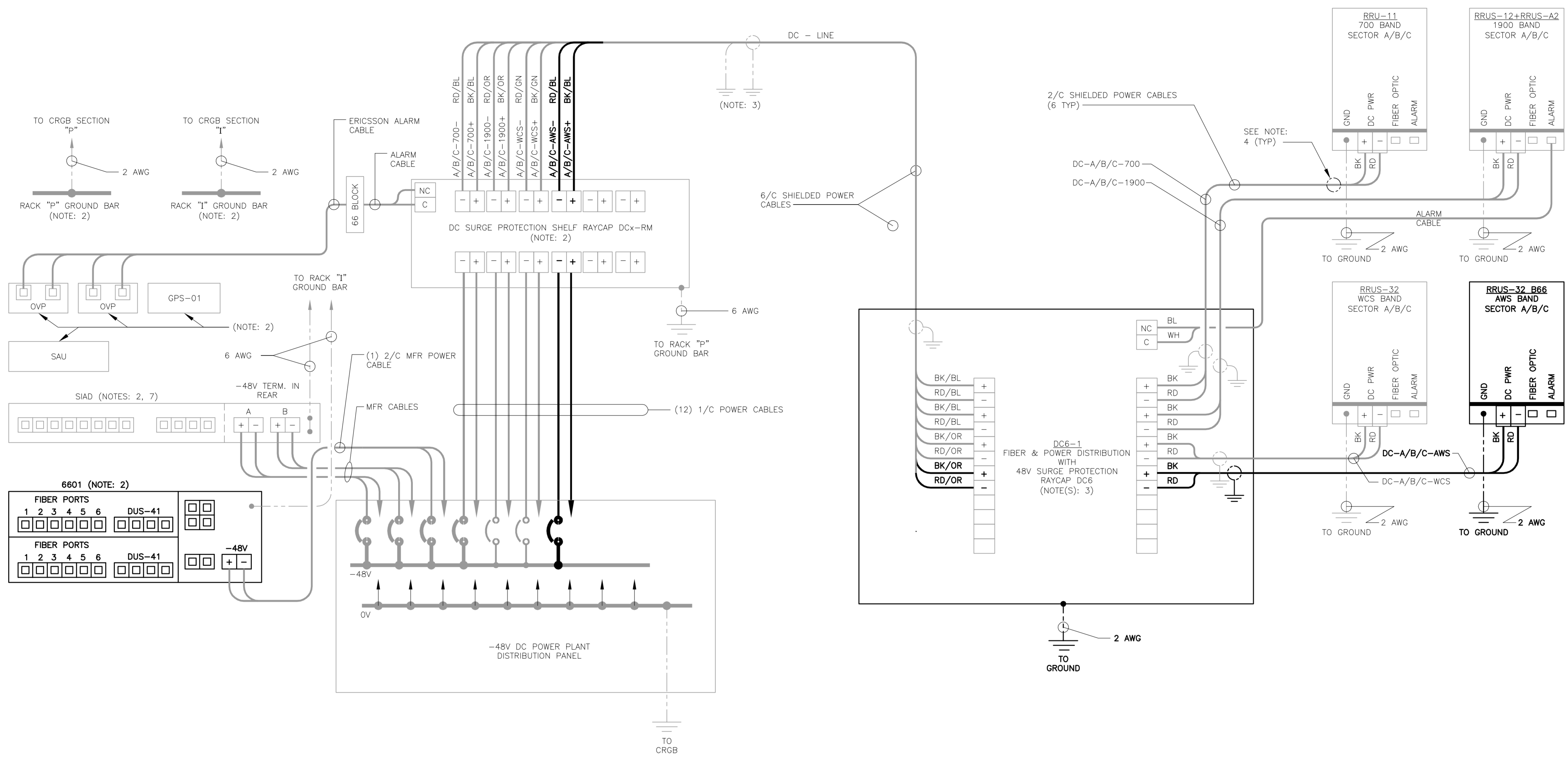


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AT&T MOBILITY
 WIRELESS COMMUNICATIONS FACILITY
MANCHESTER CENTRAL
 CT5448 - LTE 4C AWS
 239 MIDDLE TURNPIKE EAST
 MANCHESTER, CT 06040

DATE: 01/16/18
 SCALE: AS NOTED
 JOB NO. 17004.67

LTE SCHEMATIC
 DIAGRAM
 AND NOTES



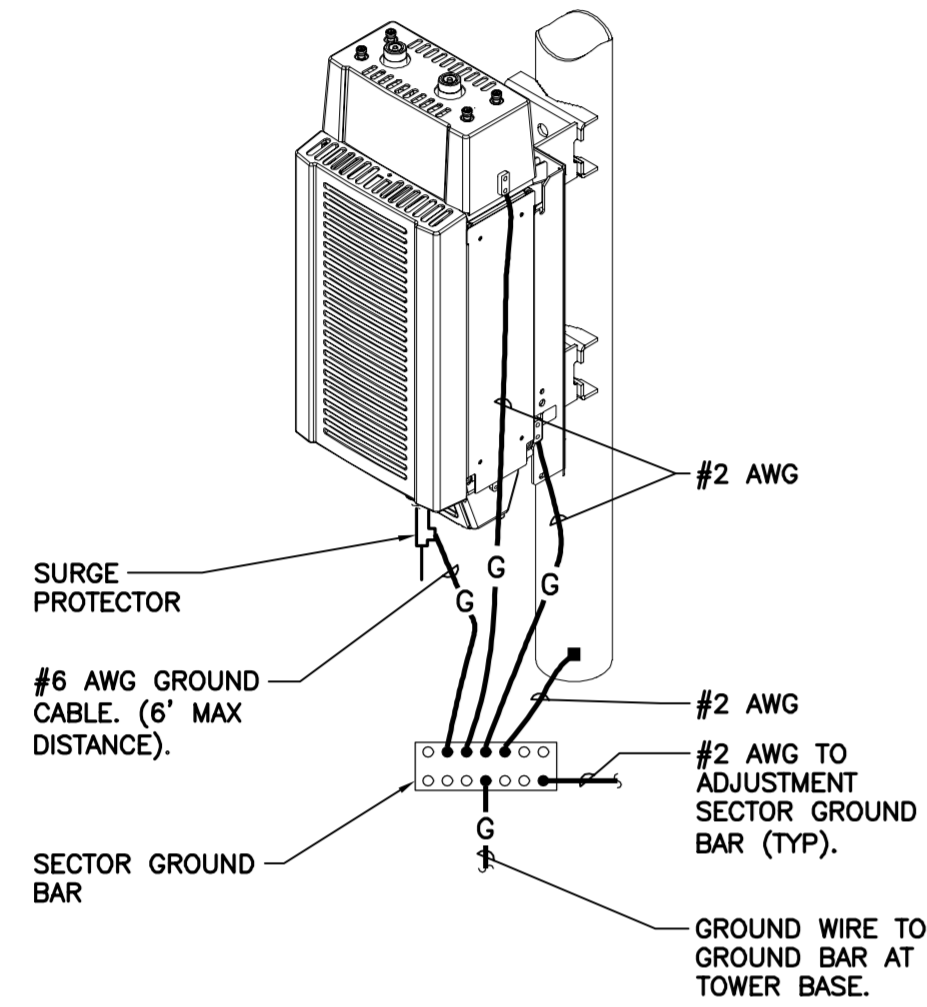
1 LTE WIRING DIAGRAM
E-2 NOT TO SCALE

LTE WIRING DIAGRAM NOTES:

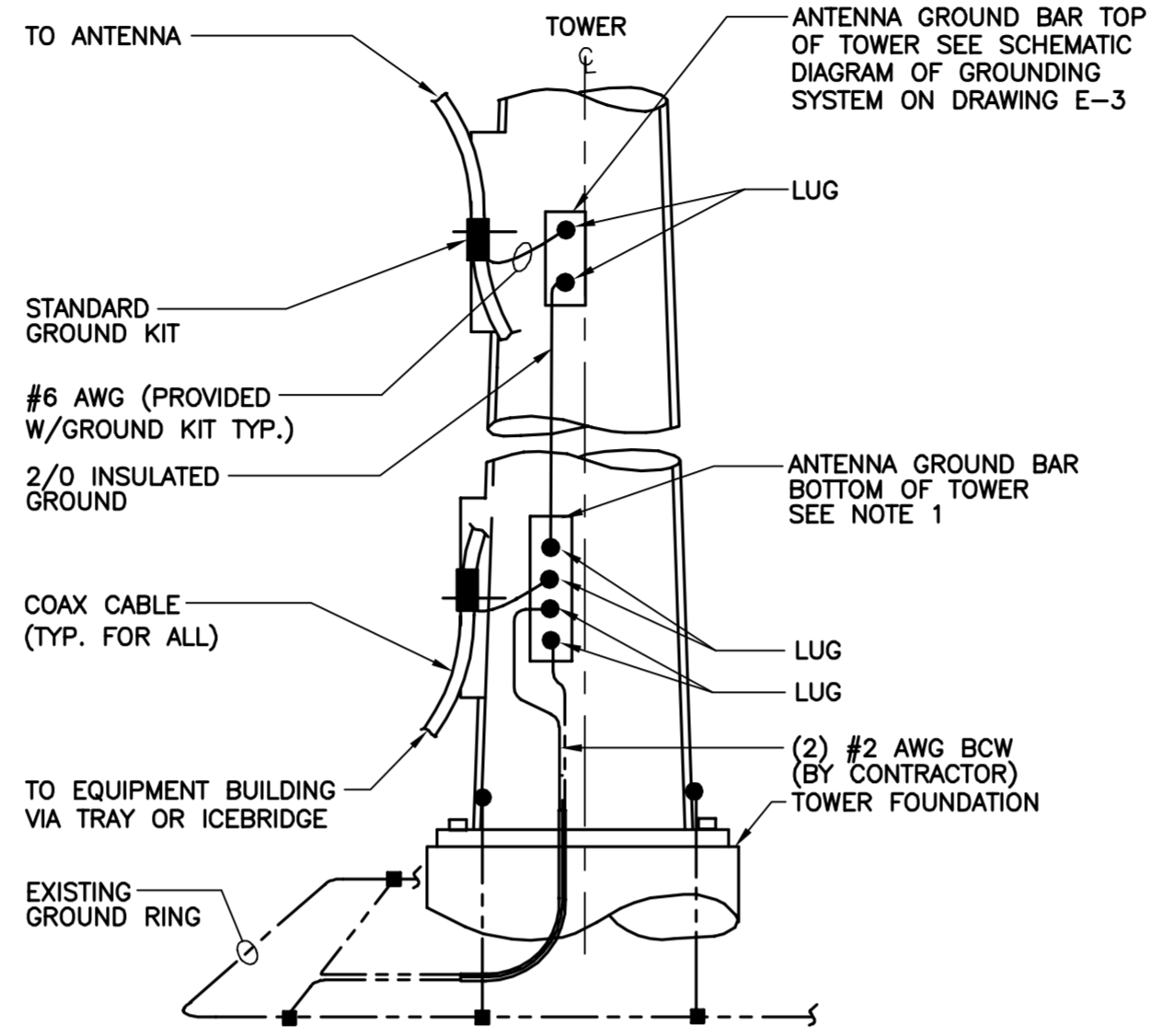
1. LABEL THE DC POWER CABLES AT BOTH ENDS OF EVERY WIRE AND IN ANY PULL BOX IF USED. LABEL SHALL BE DURABLE, SELF ADHESIVE, WRAPPED LONGITUDINALLY ALONG THE CABLE AND STATE THE SECTOR, FREQUENCY BAND AND POLARITY; I.E. "A-1900+". CABLE AND WIRE LABELS SHOWN ARE REPRESENTATIVE AND MAY BE MODIFIED AS DIRECTED 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.

 PROFESSIONAL ENGINEER SEAL	 at&t	 EMPIRE telecom	 CENTEK engineering Centered on Solutions™ (203) 488-0360 (203) 488-8387 Fax 63-2 North Branford Road Branford, CT 06405 www.CentekEng.com	AT&T MOBILITY WIRELESS COMMUNICATIONS FACILITY MANCHESTER CENTRAL CT5448 - LTE 4C AWS 239 MIDDLE TURNPIKE EAST MANCHESTER, CT 06040	DATE: 01/16/18 SCALE: AS NOTED JOB NO. 17004.67
LTE WIRING DIAGRAM					
E-2 Sheet No. 8 of 9					

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

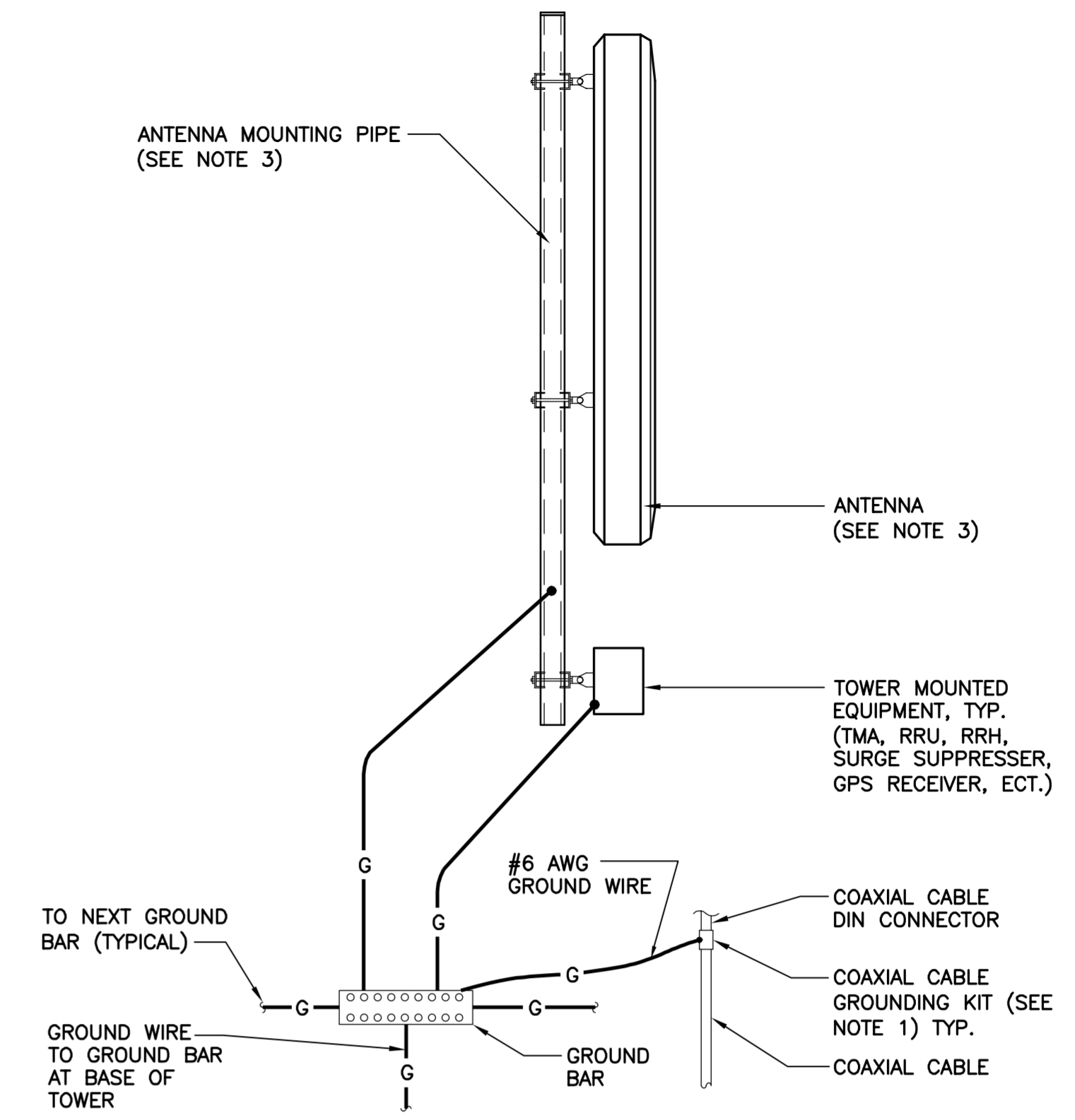


3 RRU POLE MOUNT GROUNING
 E-3 NOT TO SCALE



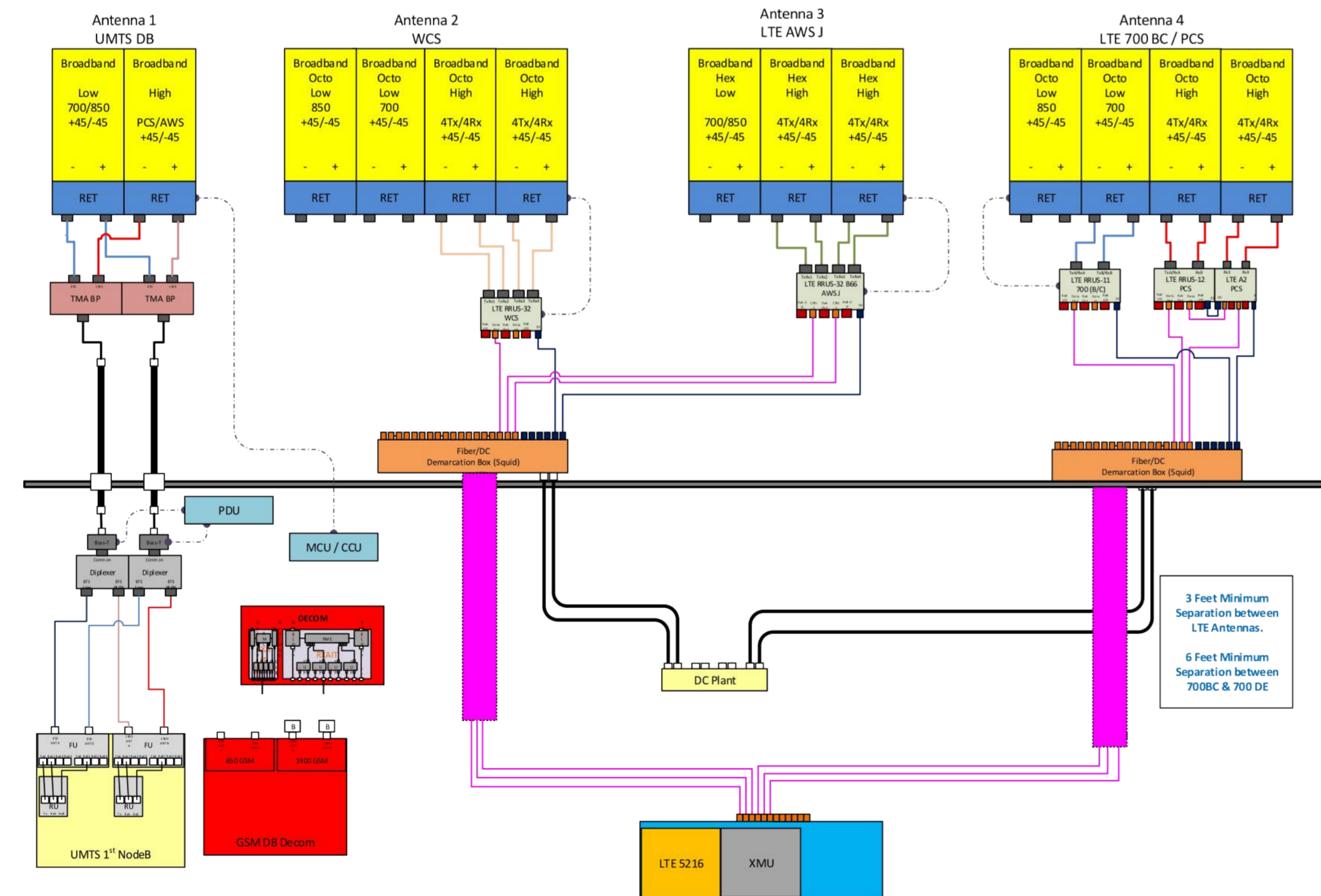
NOTES:
 1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
 2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

2 ANTENNA CABLE GROUNING - TOWER
 E-3 NOT TO SCALE

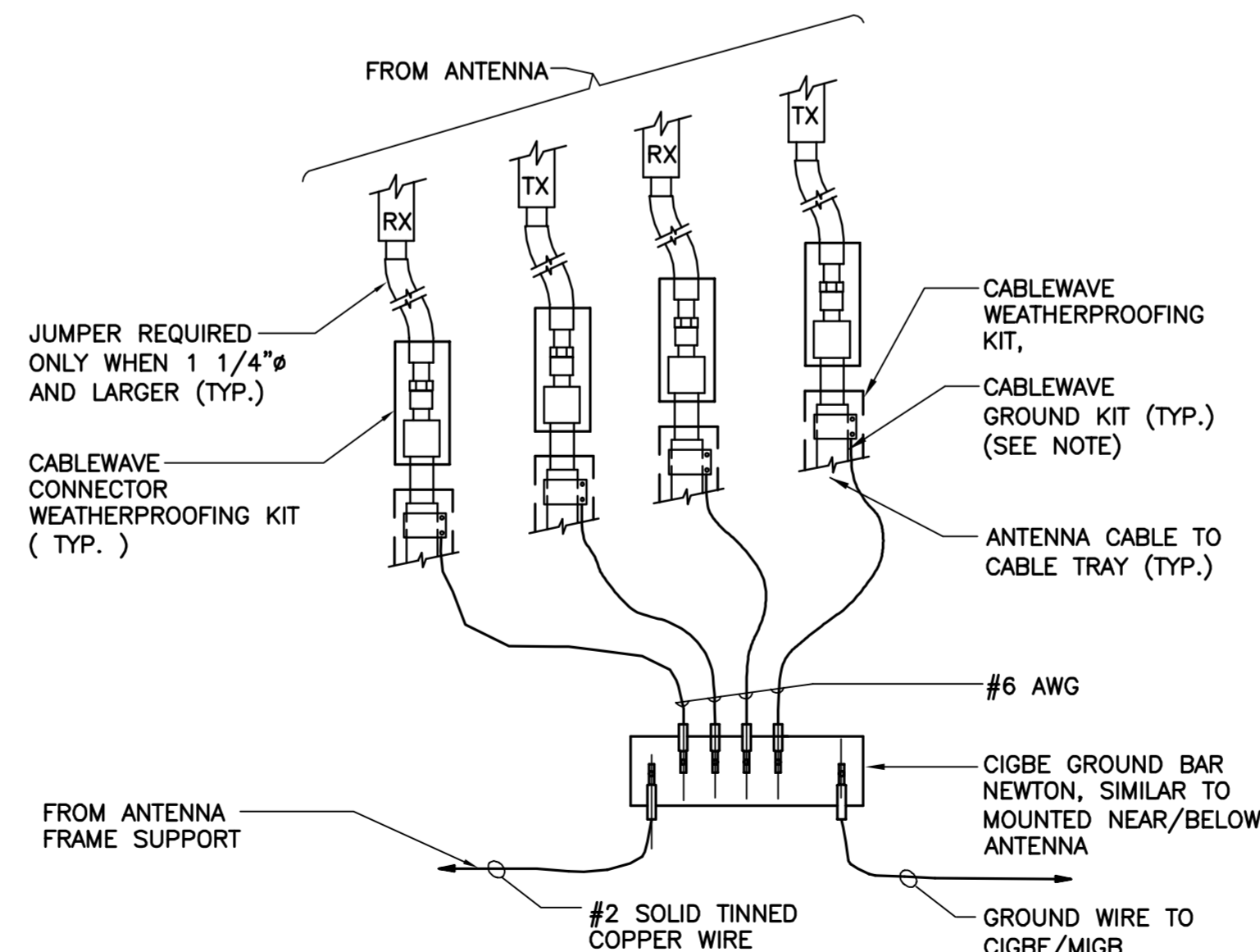


NOTES:
 1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
 2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
 3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 TYPICAL ANTENNA GROUNING DETAIL
 E-3 NOT TO SCALE

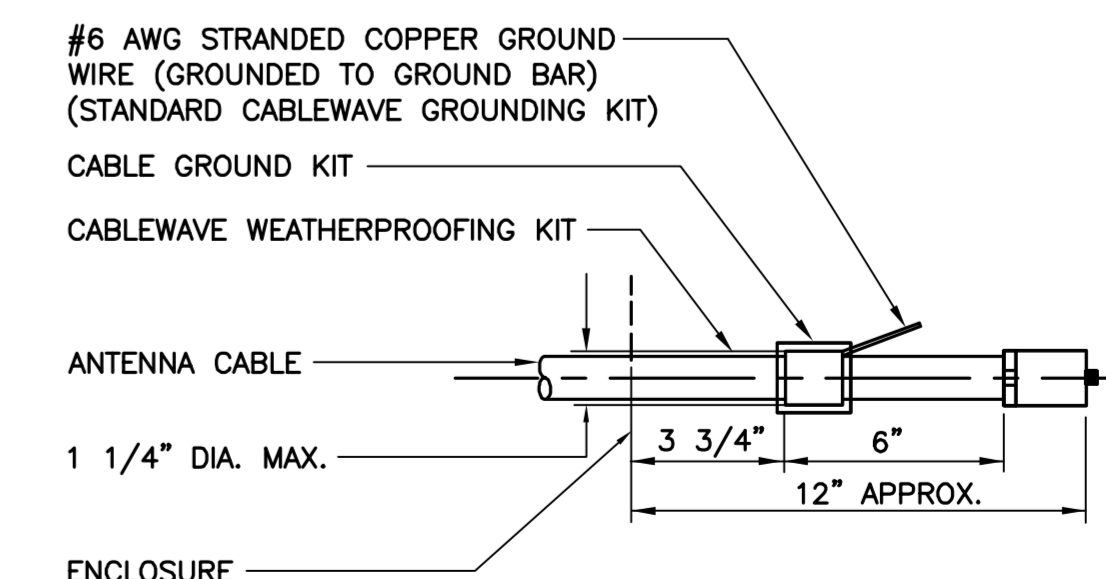


6 RF PLUMBING DIAGRAM
 E-3 NOT TO SCALE



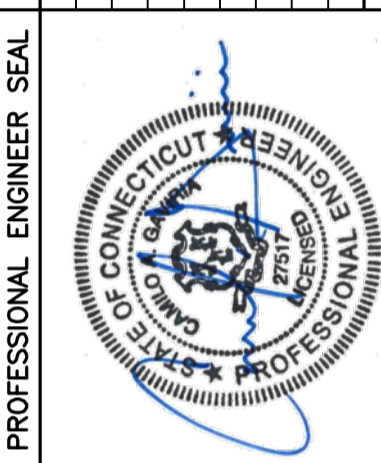
NOTE:
 1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

5 CONNECTION OF GROUND WIRES TO GROUND BAR
 E-3 NOT TO SCALE



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

4 ANTENNA CABLE GROUNING DETAIL
 E-3 NOT TO SCALE



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TYPICAL ELECTRICAL DETAILS

E-3
 Sheet No. 9 of 9

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	06/07/18	KAWUR	DMD	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

Structural Analysis Report

Tower Analysis

AT&T Site #: CT5448

AT&T Site Name: Manchester Central

Project: LTE 5C

PACE #: MRCTB028167

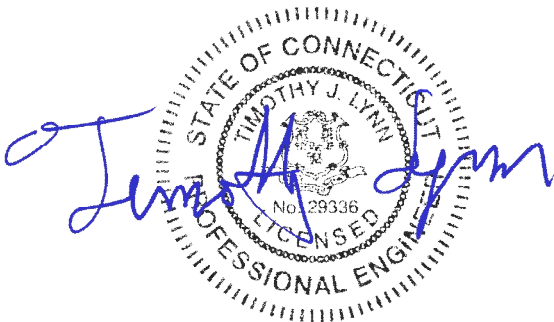
PT #: 2051A0FCWH

FA #: 10071105

*239 Middle Turnpike East
Manchester, CT 06040*

Centek Project No. 17004.67

Date: June 7, 2018



Prepared for:
AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

Table of Contents

SECTION 1 - REPORT

- INTRODUCTION
- ANTENNA AND APPURTENANCE SUMMARY
- PRIMARY ASSUMPTIONS USED IN THE ANALYSIS
- ANALYSIS
- TOWER LOADING
- TOWER CAPACITY
- ANCHORS AND SUPPORT FRAME
- CONCLUSION

SECTION 2 – CONDITIONS & SOFTWARE

- STANDARD ENGINEERING CONDITIONS
- GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

SECTION 3 – CALCULATIONS

- TNXTOWER INPUT/OUTPUT SUMMARY
- TNXTOWER DETAILED OUTPUT
- FOUNDATION ANALYSIS

SECTION 4 – REFERENCE MATERIAL

- RF DATA SHEET
- ANTENNA CUT SHEETS

Introduction

The purpose of this report is to summarize the results of the non-linear, P- Δ structural analysis of the antenna upgrade proposed by AT&T Mobility on the existing monopole (tower) located in Manchester, Connecticut.

The host tower is a 183-ft tall, five-section, eighteen sided, tapered monopole, originally designed and manufactured by Engineered Endeavors Incorporated (EEI); project no. 9892 dated October 4, 2002. The tower geometry, structure member sizes and foundation system information were obtained from the original manufacturers design documents. Tower reinforcement information was obtained from a previous structural analysis report prepared by Hudson Design Group dated February 3 2016.

Antenna and appurtenance information were obtained from a previous structural analysis report prepared by Centek dated June 14, 2017 and a AT&T RF data sheet.

The tower is made up of five (5) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 15.5-in at the top and 53.5-in at the base.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- UNKNOWN (EXISTING):
Antennas: Two (2) 4-bay dipole antennas, two (2) 2-ft dishes and one (1) lighting rod mounted on a 12-ft low profile platform with an elevation of 184-ft above grade level.
Coax Cables: Four (4) 7/8" \varnothing coax cables running on the inside of the existing tower.
- T-MOBILE (EXISTING):
Antennas: Three (3) Ericsson AIR32 panel antennas, three (3) Ericsson AIR21 panel antennas, three (3) Andrew LNX-6515DS panel antennas, three (3) RFS ATMAP1412D-1A20 TMA's and three (3) Ericsson RRUS-11 remote radio heads mounted on a 12-ft platform w/ handrails with a RAD center elevation of 164-ft above grade level.
Coax Cables: Eighteen (18) 1-5/8" \varnothing coax cables and two (2) fiber cables running on the inside of the existing tower
- SPRINT (EXISTING/RESERVED):
Antennas: Three (3) RFS APXVSP18-C-A20 panel antennas, three (3) RFS APXVTM14 panel antennas, six (6) ALU 1900 MHz RRH's, three (3) ALU 800 MHz RRH's and three (3) ALU TD-RRH-8x20 remote radio heads mounted to a low profile platform with a RAD center elevation of 153-ft above grade level.
Coax Cables: Three (3) 1-5/8" \varnothing Hybriflex cables running on the inside of the existing tower.

- **UNKNOWN (EXISTING):**
Antennas: One (1) 20-ft 4-bay dipole antenna, two (2) 10-ft Omni-directional whip antennas and three (3) yagi antennas mounted on a 12-ft low profile platform with an elevation of 123-ft above grade level.
Coax Cables: Five (5) 1/2" Ø coax cables running on the inside of the existing tower.
- **VERIZON (EXISTING):**
Antennas: Six (6) Andrew LNX-6514DS panel antennas, six (6) Andrew HBXX-6517DS panel antennas, three (3) Alcatel-Lucent RRH2x40-07U remote radio heads, three (3) Alcatel-Lucent RRH2x60-AWS remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads and two (2) RFS DB-T1-6Z-8AB-0Z main distribution boxes mounted on a 12-ft low profile platform with a RAD center elevation of 113-ft above grade level.
Coax Cables: Two (2) 1-5/8" Ø fiber cables running on the inside of the existing tower.
- **UNKNOWN (EXISTING):**
Antennas: One (1) GPS antenna mounted on 2-ft standoff with an elevation of 54-ft above grade level.
Coax Cables: One (1) 1/2" Ø coax cable running on the inside of the existing tower.
- **AT&T (EXISTING TO REMAIN):**
Antennas: Three (3) Kathrein 800-10121 panel antennas, two (2) CCI OPA-65R-LCUU-H6 panel antennas, four (4) CCI OPA-65R-LCUU-H8 panel antennas, one (1) CCI HPA-65R-BUU-H6 panel antenna, two (2) CCI HPA-65R-BUU-H8 panel antennas, six (6) LGP21401 TMAs, three (3) Ericsson RRUS-11, three (3) Ericsson RRUS-12, three (3) Ericsson A2s, three (3) Ericsson RRUS-32, three (3) Ericsson RRUS-32 B66 and two (2) Raycap DC6-48-60-18-8F surge arrestor mounted on a 12-ft platform w/ handrails with a RAD center elevation of 143-ft above grade level.
Coax Cables: Six (6) 1-5/8" Ø coax cables, two (2) fiber cables and four (4) dc control cables running on the inside of the existing tower.
- **AT&T (PROPOSED):**
Antennas: **Three (3) Ericsson 4478 remote radio heads and one (1) DC squid mounted on a 12-ft platform w/ handrails with a RAD center elevation of 143-ft above grade level.**
Coax Cables: **Two (2) dc control cables running on the inside of the existing tower.**

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables to be installed as indicated in this report.

Analysis

The existing flagpole was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled “Structural Standard for Antenna Support Structures and Antennas”, the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC¹ and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 0.75” radial ice on the tower structure and its components.

Basic Wind Speed:	Hartford County; $v = 90-105$ mph	[Annex B of TIA-222-G-2005]
	Manchester; $v = 97$ mph	[Appendix N of the 2016 CT Building Code]
Load Cases:	<u>Load Case 1</u> ; 97 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	[Appendix N of the 2016 CT Building Code]
	<u>Load Case 2</u> ; 50 mph wind speed w/ 1.00” radial ice plus gravity load – used in calculation of tower stresses.	[Annex B of TIA-222-G-2005]

¹ The 2012 International Building Code as amended by the 2016 Connecticut State Building Code (CSBC).

Tower Capacity

- Calculated stresses were found to be within allowable limits. In Load Case 1, per tnxTower “Section Capacity Table”, this tower was found to be at **99.9%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L2)	133.08'-166.50'	99.9%	PASS

Foundation and Anchors

The existing foundation consists of a 7.0 Ø x 32.0-ft long reinforced concrete caisson. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned EEI design report; project no. 9892 dated October 4, 2002. The base of the tower is connected to the foundation by means of (18) 2.25"Ø, ASTM A615-75 anchor bolts embedded approximately 7-ft into the concrete foundation structure.

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	47 kips
	Compression	66 kips
	Moment	6025 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	93.5%	PASS
	Lateral Deflection	0.34 in.	PASS

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	89.0%	PASS
Base Plate	Bending	77.0%	PASS

CENTEK Engineering, Inc.
Structural Analysis – Monopole
AT&T Antenna Upgrade – CT5448
Manchester, CT
June 7, 2018

Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

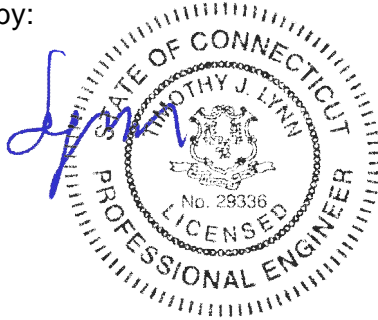
The analysis is based, in part, on the information provided to this office by AT&T. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer



*Standard Conditions for Furnishing of
Professional Engineering Services on
Existing Structures*

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

DESIGNED APPURTENANCE LOADING

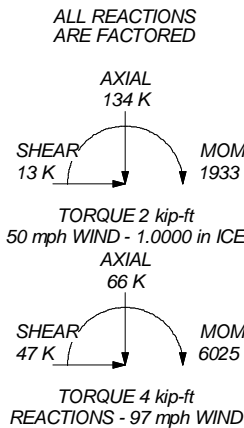
TYPE	ELEVATION	TYPE	ELEVATION
Andrew 2' w/Radome	185	(2) LGP21401 TMA (ATI)	143
Andrew 2' w/Radome	185	A2 (ATI)	143
4 Bay DiPole (Town)	184	A2 (ATI)	143
EEI 12-ft Low Profile Platform (Town)	184	A2 (ATI)	143
15' Lighting Rod	184	RRUS-11 (ATI)	143
4 Bay DiPole (Town)	184	RRUS-11 (ATI)	143
AIR32 (T-Mobile)	164	RRUS-11 (ATI)	143
AIR21 (T-Mobile)	164	RRUS-12 (ATI)	143
AIR21 (T-Mobile)	164	RRUS-12 (ATI)	143
AIR21 (T-Mobile)	164	RRUS-12 (ATI)	143
LNX-6515DS (T-Mobile)	164	RRUS-32 (ATI)	143
LNX-6515DS (T-Mobile)	164	RRUS-32 (ATI)	143
LNX-6515DS (T-Mobile)	164	RRUS-32 (ATI)	143
ATMAP1412D-1A20 (T-Mobile)	164	DC6-48-60-18-8F Surge Arrestor (ATI)	143
ATMAP1412D-1A20 (T-Mobile)	164	DC6-48-60-18-8F Surge Arrestor (ATI)	143
ATMAP1412D-1A20 (T-Mobile)	164	DC6-48-60-18-8F Surge Arrestor (ATI - Proposed)	143
RRUS-11 (T-Mobile)	164	Commscope MTC3607R Platform (ATI)	143
RRUS-11 (T-Mobile)	164	800-10121 (ATI)	143
13' Platform w/rails (T-Mobile)	164	OPA-65R-LCUU-H6 (ATI)	143
AIR32 (T-Mobile)	164	OPA-65R-LCUU-H6 (ATI)	143
AIR32 (T-Mobile)	164	800-10121 (ATI)	143
APXVSP18-C-A20 (Sprint)	153	800-10121 (ATI)	143
APXVTM14 (Sprint)	153	3' Yagi (Town)	123
APXVTM14 (Sprint)	153	EEI 12-ft Low Profile Platform (Town)	123
APXVTM14 (Sprint)	153	3' Yagi (Town)	123
FD-RRH 2x50 800 (Sprint)	153	20' 4-Bay Dipole (Town)	123
FD-RRH 2x50 800 (Sprint)	153	10' x 2" Dia Omni (Town)	123
FD-RRH 2x50 800 (Sprint)	153	3' Yagi (Town)	123
(2) FD-RRH 4x40 1900 (Sprint)	153	10' x 2" Dia Omni (Town)	123
(2) FD-RRH 4x40 1900 (Sprint)	153	10' x 2" Dia Omni (Town)	123
(2) FD-RRH 4x40 1900 (Sprint)	153	HBXX-6517DS (Verizon)	113
TD-RRH8x20-25 (Sprint)	153	LNX-6514DS-VTM (Verizon)	113
TD-RRH8x20-25 (Sprint)	153	HBXX-6517DS (Verizon)	113
TD-RRH8x20-25 (Sprint)	153	HBXX-6517DS (Verizon)	113
TD-RRH8x20-25 (Sprint)	153	LNX-6514DS-VTM (Verizon)	113
TD-RRH8x20-25 (Sprint)	153	HBXX-6517DS (Verizon)	113
EEI 12-ft Low Profile Platform (Sprint/Clearwire)	153	LNX-6514DS-VTM (Verizon)	113
APXVSP18-C-A20 (Sprint)	153	HBXX-6517DS (Verizon)	113
APXVSP18-C-A20 (Sprint)	153	RRH2x60-AWS (Verizon)	113
VHLP2-23 (Clearwire)	150	RRH2x60-AWS (Verizon)	113
VHLP2-23 (Clearwire)	150	RRH2x40-07-U (Verizon)	113
VHLP2-23 (Clearwire)	150	RRH2x40-07-U (Verizon)	113
OPA-65R-LCUU-H8 (ATI)	143	RRH2x60-PCS (Verizon)	113
OPA-65R-LCUU-H8 (ATI)	143	RRH2x60-PCS (Verizon)	113
OPA-65R-LCUU-H8 (ATI)	143	RRH2x60-PCS (Verizon)	113
OPA-65R-LCUU-H8 (ATI)	143	RRH2x60-PCS (Verizon)	113
HPA-65R-BUU-H8 (ATI)	143	DB-T1-6Z-8AB-OZ (Verizon)	113
HPA-65R-BUU-H8 (ATI)	143	DB-T1-6Z-8AB-OZ (Verizon)	113
HPA-65R-BUU-H8 (ATI)	143	DB-T1-6Z-8AB-OZ (Verizon)	113
RRUS-32 (ATI)	143	EEI 12-ft Low Profile Platform (Verizon)	113
RRUS-32 (ATI)	143	LNX-6514DS-VTM (Verizon)	113
RRUS-32 (ATI)	143	HBXX-6517DS (Verizon)	113
B14 4478 (ATI - Proposed)	143	LNX-6514DS-VTM (Verizon)	113
B14 4478 (ATI - Proposed)	143	HBXX-6517DS (Verizon)	113
B14 4478 (ATI - Proposed)	143	LNX-6514DS-VTM (Verizon)	113
(2) LGP21401 TMA (ATI)	143	2' Stand-Off	54
(2) LGP21401 TMA (ATI)	143	GPS	54

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 99.9%



Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	17.50	18	0.1875	3.00	15.5000	19.4200	A572-65	0.6
2	36.42	18	0.2500	3.83	18.3730	26.4100	A572-65	2.2
3	23.92	18	0.3750	25.0648	30.2800		A572-65	2.6
4	25.00	18	0.4150	5.00	30.2800	35.9800	A572-65	3.7
5	49.08	18	0.4850	6.17	33.9300	44.9800	A572-65	10.0
6	49.08	18	0.5400	42.5334	53.5000		A572-65	13.6
								32.7

Centek Engineering Inc.
 63-2 North Branford Rd.
 Branford, CT 06405
 Phone: (203) 488-0580
 FAX: (203) 488-8587

Job: 17004.67 - CT5448		
Project: 183' EEI Monopole - 239 Middle Turnpike Manchester, CT		
Client: AT&T Mobility	Drawn by: T.JL	App'd:
Code: TIA-222-G	Date: 06/07/18	Scale: NTS
Path:		Dwg No: E-1

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 1 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Tower Input Data

There is a pole section.

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

The following design criteria apply:

Basic wind speed of 97 mph.

Structure Class III.

Exposure Category C.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 1.0000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

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

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

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

Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension Bypass Mast Stability Checks Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-G Bracing Resist. Exemption Use TIA-222-G Tension Splice Exemption <div style="background-color: #cccccc; text-align: center; padding: 2px;">Poles</div> Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
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Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	184.00-166.50	17.50	3.00	18	15.5000	19.4200	0.1875	0.7500	A572-65 (65 ksi)
L2	166.50-133.08	36.42	3.83	18	18.3730	26.4100	0.2500	1.0000	A572-65 (65 ksi)
L3	133.08-112.99	23.92	0.00	18	25.0648	30.2800	0.3750	1.5000	A572-65

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 2 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L4	112.99-87.99	25.00	5.00	18	30.2800	35.8800	0.4150	1.6600	(65 ksi) A572-65
L5	87.99-43.91	49.08	6.17	18	33.9300	44.8800	0.4850	1.9400	(65 ksi) A572-65
L6	43.91-1.00	49.08		18	42.5334	53.5000	0.5400	2.1600	(65 ksi) A572-65

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	15.7391	9.1129	269.9504	5.4359	7.8740	34.2838	540.2560	4.5573	2.3980	12.789
	19.7196	11.4457	534.8757	6.8275	9.8654	54.2176	1070.4552	5.7240	3.0879	16.469
L2	19.3287	14.3806	596.7256	6.4337	9.3335	63.9339	1194.2363	7.1917	2.7936	11.175
	26.8174	20.7580	1794.7237	9.2868	13.4163	133.7721	3591.8090	10.3810	4.2082	16.833
L3	26.2994	29.3870	2263.2318	8.7649	12.7329	177.7464	4529.4417	14.6963	3.7514	10.004
	30.7471	35.5944	4021.6758	10.6163	15.3822	261.4493	8048.6435	17.8006	4.6693	12.451
L4	30.7471	39.3385	4432.8193	10.6021	15.3822	288.1777	8871.4714	19.6730	4.5989	11.082
	36.4335	46.7149	7423.2205	12.5901	18.2270	407.2642	14856.2087	23.3619	5.5845	13.457
L5	35.5862	51.4849	7275.7826	11.8730	17.2364	422.1163	14561.1388	25.7473	5.1181	10.553
	45.5723	68.3412	17017.2074	15.7602	22.7990	746.4002	34056.8065	34.1771	7.0453	14.526
L6	44.5895	71.9751	16035.5005	14.9077	21.6070	742.1442	32092.1010	35.9944	6.5355	12.103
	54.3253	90.7713	32164.8894	18.8008	27.1780	1183.4899	64372.1021	45.3943	8.4656	15.677

Tower Elevation	Gusset Area (per face)	Gusset Thickness	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
ft	ft ²	in							
L1				1	1	1			
184.00-166.50									
L2				1	1	1			
166.50-133.08									
L3				1	1	1			
133.08-112.99									
L4				1	1	1			
112.99-87.99									
L5				1	1	1			
87.99-43.91									
L6				1	1	1			
43.91-1.00									

Monopole Base Plate Data

Base Plate Data	
Base plate is square	
Base plate is grouted	√
Anchor bolt grade	A615-75
Anchor bolt size	2.2500 in
Number of bolts	18
Embedment length	84.0000 in
f _c	4 ksi
Grout space	4.0000 in

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 3 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Base Plate Data	
Base plate grade	A572-60
Base plate thickness	2.0000 in
Bolt circle diameter	62.0000 in
Outer diameter	68.0000 in
Inner diameter	43.0000 in
Base plate type	Stiffened Plate
Bolts per stiffener	1
Stiffener thickness	0.7500 in
Stiffener height	12.0000 in

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A		Weight plf
						No Ice	ft ² /ft	
7/8 (Town)	C	No	Inside Pole	184.00 - 7.00	4	No Ice	0.00	0.54
						1/2" Ice	0.00	0.54
						1" Ice	0.00	0.54
1/2 (Town)	C	No	Inside Pole	123.00 - 7.00	5	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1/2 (Town)	C	No	Inside Pole	54.00 - 7.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1 5/8 (T-Mobile)	C	No	Inside Pole	164.00 - 7.00	18	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
HYBRIFLEX 1-1/4" (T-Mobile)	C	No	Inside Pole	164.00 - 7.00	2	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
HYBRIFLEX 1-5/8" (Sprint)	C	No	Inside Pole	153.00 - 7.00	3	No Ice	0.00	1.90
						1/2" Ice	0.00	1.90
						1" Ice	0.00	1.90
1 5/8 (AT&T)	C	No	Inside Pole	143.00 - 7.00	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
Fiber Trunk (AT&T)	C	No	Inside Pole	143.00 - 7.00	1	No Ice	0.00	1.00
						1/2" Ice	0.00	1.00
						1" Ice	0.00	1.00
DC Trunk (AT&T)	C	No	Inside Pole	143.00 - 7.00	2	No Ice	0.00	0.11
						1/2" Ice	0.00	0.11
						1" Ice	0.00	0.11
HYBRIFLEX 1-5/8" (Verizon)	C	No	Inside Pole	113.00 - 7.00	2	No Ice	0.00	1.90
						1/2" Ice	0.00	1.90
						1" Ice	0.00	1.90
Fiber Trunk (AT&T)	C	No	Inside Pole	143.00 - 7.00	1	No Ice	0.00	1.00
						1/2" Ice	0.00	1.00
						1" Ice	0.00	1.00
DC Trunk (AT&T)	C	No	Inside Pole	143.00 - 7.00	2	No Ice	0.00	0.11
						1/2" Ice	0.00	0.11
						1" Ice	0.00	0.11
DC Trunk (AT&T - Proposed)	C	No	Inside Pole	143.00 - 7.00	2	No Ice	0.00	0.11
						1/2" Ice	0.00	0.11
						1" Ice	0.00	0.11

Feed Line/Linear Appurtenances Section Areas

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 4 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	184.00-166.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.04
L2	166.50-133.08	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.93
L3	133.08-112.99	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.78
L4	112.99-87.99	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.08
L5	87.99-43.91	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.90
L6	43.91-1.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.60

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} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	184.00-166.50	A	2.954	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.04
L2	166.50-133.08	A	2.907	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.93
L3	133.08-112.99	A	2.851	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.78
L4	112.99-87.99	A	2.793	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.08
L5	87.99-43.91	A	2.677	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.90
L6	43.91-1.00	A	2.407	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.60

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	184.00-166.50	0.0000	0.0000	0.0000	0.0000
L2	166.50-133.08	0.0000	0.0000	0.0000	0.0000
L3	133.08-112.99	0.0000	0.0000	0.0000	0.0000
L4	112.99-87.99	0.0000	0.0000	0.0000	0.0000
L5	87.99-43.91	0.0000	0.0000	0.0000	0.0000
L6	43.91-1.00	0.0000	0.0000	0.0000	0.0000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	17004.67 - CT5448	Page	5 of 42	
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT		Date	08:11:50 06/07/18
	Client	AT&T Mobility		Designed by	TJL

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
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Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
15' Lighting Rod	B	From Face	3.00	0.0000	184.00	No Ice	4.50	4.50	0.05
			0.00			1/2" Ice	6.03	6.03	0.08
			7.00			1" Ice	7.58	7.58	0.12
4 Bay DiPole (Town)	A	From Face	3.00	0.0000	184.00	No Ice	3.15	3.15	0.03
			4.00			1/2" Ice	4.00	4.00	0.06
			7.00			1" Ice	4.85	4.85	0.09
4 Bay DiPole (Town)	A	From Face	3.00	0.0000	184.00	No Ice	3.15	3.15	0.03
			-2.00			1/2" Ice	4.00	4.00	0.06
			7.00			1" Ice	4.85	4.85	0.09
EEI 12-ft Low Profile Platform (Town)	C	None		0.0000	184.00	No Ice	15.00	15.00	1.50
						1/2" Ice	18.40	18.40	1.75
						1" Ice	21.80	21.80	2.00
AIR32 (T-Mobile)	A	From Leg	3.00	0.0000	164.00	No Ice	6.51	4.71	0.13
			6.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR32 (T-Mobile)	B	From Leg	3.00	0.0000	164.00	No Ice	6.51	4.71	0.13
			6.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR32 (T-Mobile)	C	From Leg	3.00	0.0000	164.00	No Ice	6.51	4.71	0.13
			6.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR21 (T-Mobile)	A	From Leg	3.00	0.0000	164.00	No Ice	6.53	4.36	0.08
			-6.00			1/2" Ice	6.98	4.77	0.12
			0.00			1" Ice	7.43	5.20	0.17
AIR21 (T-Mobile)	B	From Leg	3.00	0.0000	164.00	No Ice	6.53	4.36	0.08
			-6.00			1/2" Ice	6.98	4.77	0.12
			0.00			1" Ice	7.43	5.20	0.17
AIR21 (T-Mobile)	C	From Leg	3.00	0.0000	164.00	No Ice	6.53	4.36	0.08
			-6.00			1/2" Ice	6.98	4.77	0.12
			0.00			1" Ice	7.43	5.20	0.17
LNX-6515DS (T-Mobile)	A	From Leg	3.00	0.0000	164.00	No Ice	11.45	7.70	0.06
			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
LNX-6515DS (T-Mobile)	B	From Leg	3.00	0.0000	164.00	No Ice	11.45	7.70	0.06
			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
LNX-6515DS (T-Mobile)	C	From Leg	3.00	0.0000	164.00	No Ice	11.45	7.70	0.06
			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
ATMAP1412D-1A20 (T-Mobile)	A	From Leg	3.00	0.0000	164.00	No Ice	0.00	0.47	0.01
			0.00			1/2" Ice	0.00	0.57	0.02
			0.00			1" Ice	0.00	0.69	0.03

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	17004.67 - CT5448	Page	6 of 42
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date	08:11:50 06/07/18
	Client	AT&T Mobility	Designed by	TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight
			Horz	Vert			Front	Side	
			ft	ft	°	ft	ft ²	ft ²	K
ATMAP1412D-1A20 (T-Mobile)	B	From Leg	3.00	0.0000	164.00	No Ice	0.00	0.47	0.01
			0.00	0.00		1/2" Ice	0.00	0.57	0.02
			0.00	0.00		1" Ice	0.00	0.69	0.03
ATMAP1412D-1A20 (T-Mobile)	C	From Leg	3.00	0.0000	164.00	No Ice	0.00	0.47	0.01
			0.00	0.00		1/2" Ice	0.00	0.57	0.02
			0.00	0.00		1" Ice	0.00	0.69	0.03
RRUS-11 (T-Mobile)	A	From Leg	3.00	0.0000	164.00	No Ice	2.57	1.07	0.05
			0.00	0.00		1/2" Ice	2.76	1.21	0.07
			0.00	0.00		1" Ice	2.97	1.36	0.09
RRUS-11 (T-Mobile)	B	From Leg	3.00	0.0000	164.00	No Ice	2.57	1.07	0.05
			0.00	0.00		1/2" Ice	2.76	1.21	0.07
			0.00	0.00		1" Ice	2.97	1.36	0.09
RRUS-11 (T-Mobile)	C	From Leg	3.00	0.0000	164.00	No Ice	2.57	1.07	0.05
			0.00	0.00		1/2" Ice	2.76	1.21	0.07
			0.00	0.00		1" Ice	2.97	1.36	0.09
13' Platform w/rails (T-Mobile)	C	None		0.0000	164.00	No Ice	31.30	31.30	1.82
				0.00		1/2" Ice	40.20	40.20	2.45
				0.00		1" Ice	49.10	49.10	3.08
APXVSP18-C-A20 (Sprint)	A	From Leg	3.00	0.0000	153.00	No Ice	8.02	5.28	0.06
			-2.00	0.00		1/2" Ice	8.48	5.74	0.11
			0.00	0.00		1" Ice	8.94	6.20	0.16
APXVSP18-C-A20 (Sprint)	B	From Leg	3.00	0.0000	153.00	No Ice	8.02	5.28	0.06
			-2.00	0.00		1/2" Ice	8.48	5.74	0.11
			0.00	0.00		1" Ice	8.94	6.20	0.16
APXVSP18-C-A20 (Sprint)	C	From Leg	3.00	0.0000	153.00	No Ice	8.02	5.28	0.06
			-2.00	0.00		1/2" Ice	8.48	5.74	0.11
			0.00	0.00		1" Ice	8.94	6.20	0.16
APXVTM14 (Sprint)	A	From Leg	3.00	0.0000	153.00	No Ice	6.34	3.61	0.06
			2.00	0.00		1/2" Ice	6.72	3.97	0.10
			0.00	0.00		1" Ice	7.10	4.33	0.14
APXVTM14 (Sprint)	B	From Leg	3.00	0.0000	153.00	No Ice	6.34	3.61	0.06
			2.00	0.00		1/2" Ice	6.72	3.97	0.10
			0.00	0.00		1" Ice	7.10	4.33	0.14
APXVTM14 (Sprint)	C	From Leg	3.00	0.0000	153.00	No Ice	6.34	3.61	0.06
			2.00	0.00		1/2" Ice	6.72	3.97	0.10
			0.00	0.00		1" Ice	7.10	4.33	0.14
FD-RRH 2x50 800 (Sprint)	A	From Leg	3.00	0.0000	153.00	No Ice	2.06	1.93	0.06
			-2.00	0.00		1/2" Ice	2.24	2.11	0.09
			0.00	0.00		1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800 (Sprint)	B	From Leg	3.00	0.0000	153.00	No Ice	2.06	1.93	0.06
			-2.00	0.00		1/2" Ice	2.24	2.11	0.09
			0.00	0.00		1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800 (Sprint)	C	From Leg	3.00	0.0000	153.00	No Ice	2.06	1.93	0.06
			-2.00	0.00		1/2" Ice	2.24	2.11	0.09
			0.00	0.00		1" Ice	2.43	2.29	0.11
(2) FD-RRH 4x40 1900 (Sprint)	A	From Leg	3.00	0.0000	153.00	No Ice	2.24	2.32	0.06
			-2.00	0.00		1/2" Ice	2.44	2.53	0.08
			0.00	0.00		1" Ice	2.65	2.74	0.11
(2) FD-RRH 4x40 1900 (Sprint)	B	From Leg	3.00	0.0000	153.00	No Ice	2.24	2.32	0.06
			-2.00	0.00		1/2" Ice	2.44	2.53	0.08
			0.00	0.00		1" Ice	2.65	2.74	0.11
(2) FD-RRH 4x40 1900 (Sprint)	C	From Leg	3.00	0.0000	153.00	No Ice	2.24	2.32	0.06
			-2.00	0.00		1/2" Ice	2.44	2.53	0.08
			0.00	0.00		1" Ice	2.65	2.74	0.11
TD-RRH8x20-25 (Sprint)	A	From Leg	3.00	0.0000	153.00	No Ice	4.05	1.53	0.07
			2.00	0.00		1/2" Ice	4.30	1.71	0.10
			0.00	0.00		1" Ice	4.56	1.90	0.13

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job		17004.67 - CT5448					Page		
	Project		183' EEI Monopole - 239 Middle Turnpike Manchester, CT					Date		
	Client		AT&T Mobility					Designed by		
							7 of 42		08:11:50 06/07/18	
							TJL			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
TD-RRH8x20-25 (Sprint)	B	From Leg	3.00	0.0000	153.00	No Ice	4.05	1.53	0.07
			2.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25 (Sprint)	C	From Leg	3.00	0.0000	153.00	No Ice	4.05	1.53	0.07
			2.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
EEI 12-ft Low Profile Platform (Sprint/Clearwire)	C	None		0.0000	153.00	No Ice	15.00	15.00	1.50
						1/2" Ice	18.40	18.40	1.75
						1" Ice	21.80	21.80	2.00
800-10121 (AT&T)	A	From Leg	3.00	0.0000	143.00	No Ice	5.16	3.29	0.05
			2.00			1/2" Ice	5.51	3.64	0.08
			0.00			1" Ice	5.87	3.99	0.12
800-10121 (AT&T)	B	From Leg	3.00	0.0000	143.00	No Ice	5.16	3.29	0.05
			2.00			1/2" Ice	5.51	3.64	0.08
			0.00			1" Ice	5.87	3.99	0.12
800-10121 (AT&T)	C	From Leg	3.00	0.0000	143.00	No Ice	5.16	3.29	0.05
			2.00			1/2" Ice	5.51	3.64	0.08
			0.00			1" Ice	5.87	3.99	0.12
OPA-65R-LCUU-H6 (AT&T)	A	From Leg	3.00	0.0000	143.00	No Ice	9.66	5.52	0.07
			-2.00			1/2" Ice	10.13	5.97	0.13
			0.00			1" Ice	10.61	6.43	0.20
OPA-65R-LCUU-H6 (AT&T)	A	From Leg	3.00	0.0000	143.00	No Ice	9.66	5.52	0.07
			-6.00			1/2" Ice	10.13	5.97	0.13
			0.00			1" Ice	10.61	6.43	0.20
OPA-65R-LCUU-H8 (AT&T)	B	From Leg	3.00	0.0000	143.00	No Ice	12.98	7.52	0.09
			-2.00			1/2" Ice	13.56	8.09	0.16
			0.00			1" Ice	14.15	8.67	0.24
OPA-65R-LCUU-H8 (AT&T)	B	From Leg	3.00	0.0000	143.00	No Ice	12.98	7.52	0.09
			-6.00			1/2" Ice	13.56	8.09	0.16
			0.00			1" Ice	14.15	8.67	0.24
OPA-65R-LCUU-H8 (AT&T)	C	From Leg	3.00	0.0000	143.00	No Ice	12.98	7.52	0.09
			-2.00			1/2" Ice	13.56	8.09	0.16
			0.00			1" Ice	14.15	8.67	0.24
OPA-65R-LCUU-H8 (AT&T)	C	From Leg	3.00	0.0000	143.00	No Ice	12.98	7.52	0.09
			-6.00			1/2" Ice	13.56	8.09	0.16
			0.00			1" Ice	14.15	8.67	0.24
HPA-65R-BUU-H6 (AT&T)	A	From Leg	3.00	0.0000	143.00	No Ice	9.66	6.45	0.05
			6.00			1/2" Ice	10.13	6.91	0.11
			0.00			1" Ice	10.61	7.38	0.18
HPA-65R-BUU-H8 (AT&T)	B	From Leg	3.00	0.0000	143.00	No Ice	12.98	7.52	0.07
			6.00			1/2" Ice	13.56	8.09	0.14
			0.00			1" Ice	14.15	8.67	0.22
HPA-65R-BUU-H8 (AT&T)	C	From Leg	3.00	0.0000	143.00	No Ice	12.98	7.52	0.07
			6.00			1/2" Ice	13.56	8.09	0.14
			0.00			1" Ice	14.15	8.67	0.22
RRUS-32 (AT&T)	A	From Leg	3.00	0.0000	143.00	No Ice	3.31	2.42	0.08
			6.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32 (AT&T)	B	From Leg	3.00	0.0000	143.00	No Ice	3.31	2.42	0.08
			6.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32 (AT&T)	C	From Leg	3.00	0.0000	143.00	No Ice	3.31	2.42	0.08
			6.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
B14 4478 (AT&T - Proposed)	A	From Leg	3.00	0.0000	143.00	No Ice	1.63	0.91	0.06
			6.00			1/2" Ice	1.79	1.03	0.07
			0.00			1" Ice	1.95	1.17	0.09

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	17004.67 - CT5448	Page	8 of 42
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date	08:11:50 06/07/18
	Client	AT&T Mobility	Designed by	TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight
			Horz	Vert			Front	Side	
			ft	ft	°	ft	ft ²	ft ²	K
B14 4478 (AT&T - Proposed)	B	From Leg	3.00	0.0000		143.00	No Ice 1.63	0.91	0.06
			6.00				1/2" Ice 1.79	1.03	0.07
			0.00				1" Ice 1.95	1.17	0.09
B14 4478 (AT&T - Proposed)	C	From Leg	3.00	0.0000		143.00	No Ice 1.63	0.91	0.06
			6.00				1/2" Ice 1.79	1.03	0.07
			0.00				1" Ice 1.95	1.17	0.09
(2) LGP21401 TMA (AT&T)	A	From Leg	3.00	0.0000		143.00	No Ice 0.00	0.37	0.02
			2.00				1/2" Ice 0.00	0.48	0.02
			0.00				1" Ice 0.00	0.60	0.03
(2) LGP21401 TMA (AT&T)	B	From Leg	3.00	0.0000		143.00	No Ice 0.00	0.37	0.02
			2.00				1/2" Ice 0.00	0.48	0.02
			0.00				1" Ice 0.00	0.60	0.03
(2) LGP21401 TMA (AT&T)	C	From Leg	3.00	0.0000		143.00	No Ice 0.00	0.37	0.02
			2.00				1/2" Ice 0.00	0.48	0.02
			0.00				1" Ice 0.00	0.60	0.03
A2 (AT&T)	A	From Leg	3.00	0.0000		143.00	No Ice 2.08	0.50	0.02
			-2.00				1/2" Ice 2.26	0.61	0.03
			0.00				1" Ice 2.44	0.73	0.05
A2 (AT&T)	B	From Leg	3.00	0.0000		143.00	No Ice 2.08	0.50	0.02
			-2.00				1/2" Ice 2.26	0.61	0.03
			0.00				1" Ice 2.44	0.73	0.05
A2 (AT&T)	C	From Leg	3.00	0.0000		143.00	No Ice 2.08	0.50	0.02
			-2.00				1/2" Ice 2.26	0.61	0.03
			0.00				1" Ice 2.44	0.73	0.05
RRUS-11 (AT&T)	A	From Leg	3.00	0.0000		143.00	No Ice 2.57	1.07	0.05
			-2.00				1/2" Ice 2.76	1.21	0.07
			0.00				1" Ice 2.97	1.36	0.09
RRUS-11 (AT&T)	B	From Leg	3.00	0.0000		143.00	No Ice 2.57	1.07	0.05
			-2.00				1/2" Ice 2.76	1.21	0.07
			0.00				1" Ice 2.97	1.36	0.09
RRUS-11 (AT&T)	C	From Leg	3.00	0.0000		143.00	No Ice 2.57	1.07	0.05
			-2.00				1/2" Ice 2.76	1.21	0.07
			0.00				1" Ice 2.97	1.36	0.09
RRUS-12 (AT&T)	A	From Leg	3.00	0.0000		143.00	No Ice 3.15	1.29	0.06
			2.00				1/2" Ice 3.36	1.44	0.08
			0.00				1" Ice 3.59	1.60	0.11
RRUS-12 (AT&T)	B	From Leg	3.00	0.0000		143.00	No Ice 3.15	1.29	0.06
			2.00				1/2" Ice 3.36	1.44	0.08
			0.00				1" Ice 3.59	1.60	0.11
RRUS-12 (AT&T)	C	From Leg	3.00	0.0000		143.00	No Ice 3.15	1.29	0.06
			2.00				1/2" Ice 3.36	1.44	0.08
			0.00				1" Ice 3.59	1.60	0.11
RRUS-32 (AT&T)	A	From Leg	3.00	0.0000		143.00	No Ice 3.31	2.42	0.08
			6.00				1/2" Ice 3.56	2.64	0.10
			0.00				1" Ice 3.81	2.86	0.14
RRUS-32 (AT&T)	B	From Leg	3.00	0.0000		143.00	No Ice 3.31	2.42	0.08
			6.00				1/2" Ice 3.56	2.64	0.10
			0.00				1" Ice 3.81	2.86	0.14
RRUS-32 (AT&T)	C	From Leg	3.00	0.0000		143.00	No Ice 3.31	2.42	0.08
			6.00				1/2" Ice 3.56	2.64	0.10
			0.00				1" Ice 3.81	2.86	0.14
DC6-48-60-18-8F Surge Arrestor (AT&T)	A	From Leg	1.00	0.0000		143.00	No Ice 1.91	1.91	0.02
			0.00				1/2" Ice 2.10	2.10	0.04
			0.00				1" Ice 2.29	2.29	0.06
DC6-48-60-18-8F Surge Arrestor (AT&T)	B	From Leg	1.00	0.0000		143.00	No Ice 1.91	1.91	0.02
			0.00				1/2" Ice 2.10	2.10	0.04
			0.00				1" Ice 2.29	2.29	0.06

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job		17004.67 - CT5448					Page		9 of 42
	Project		183' EEI Monopole - 239 Middle Turnpike Manchester, CT					Date		08:11:50 06/07/18
	Client		AT&T Mobility					Designed by		TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	CAAA		Weight	
			Horz	Vert			Front	Side		
			ft	ft	°	ft	ft ²	ft ²	K	
DC6-48-60-18-8F Surge Arrestor (AT&T - Proposed)	C	From Leg	1.00		0.0000	143.00	No Ice	1.91	1.91	0.02
			0.00				1/2" Ice	2.10	2.10	0.04
			0.00				1" Ice	2.29	2.29	0.06
Commscope MTC3607R Platform (AT&T)	A	None			0.0000	143.00	No Ice	53.00	53.00	2.52
							1/2" Ice	68.00	68.00	3.20
							1" Ice	83.00	83.00	3.88
3' Yagi (Town)	A	From Face	3.00		0.0000	123.00	No Ice	2.08	2.08	0.03
			-6.00				1/2" Ice	3.79	3.79	0.05
			4.00				1" Ice	5.52	5.52	0.09
20' 4-Bay Dipole (Town)	A	From Face	3.00		0.0000	123.00	No Ice	4.00	4.00	0.06
			4.00				1/2" Ice	6.00	6.00	0.10
			6.00				1" Ice	8.00	8.00	0.14
10' x 2" Dia Omni (Town)	B	From Face	3.00		0.0000	123.00	No Ice	2.00	2.00	0.02
			-6.00				1/2" Ice	3.02	3.02	0.03
			9.00				1" Ice	4.07	4.07	0.05
3' Yagi (Town)	B	From Face	3.00		0.0000	123.00	No Ice	2.08	2.08	0.03
			-3.00				1/2" Ice	3.79	3.79	0.05
			4.00				1" Ice	5.52	5.52	0.09
10' x 2" Dia Omni (Town)	B	From Face	3.00		0.0000	123.00	No Ice	2.00	2.00	0.02
			0.00				1/2" Ice	3.02	3.02	0.03
			9.00				1" Ice	4.07	4.07	0.05
3' Yagi (Town)	B	From Face	3.00		0.0000	123.00	No Ice	2.08	2.08	0.03
			0.00				1/2" Ice	3.79	3.79	0.05
			1.00				1" Ice	5.52	5.52	0.09
EEI 12-ft Low Profile Platform (Town)	C	None			0.0000	123.00	No Ice	15.00	15.00	1.50
							1/2" Ice	18.40	18.40	1.75
							1" Ice	21.80	21.80	2.00
LNX-6514DS-VTM (Verizon)	A	From Face	3.00		0.0000	113.00	No Ice	8.17	5.41	0.04
			-6.00				1/2" Ice	8.63	5.86	0.09
			0.00				1" Ice	9.10	6.33	0.15
HBXX-6517DS (Verizon)	A	From Face	3.00		0.0000	113.00	No Ice	8.53	5.24	0.05
			-4.00				1/2" Ice	9.00	5.71	0.10
			0.00				1" Ice	9.48	6.18	0.16
LNX-6514DS-VTM (Verizon)	A	From Face	3.00		0.0000	113.00	No Ice	8.17	5.41	0.04
			0.00				1/2" Ice	8.63	5.86	0.09
			0.00				1" Ice	9.10	6.33	0.15
HBXX-6517DS (Verizon)	A	From Face	3.00		0.0000	113.00	No Ice	8.53	5.24	0.05
			4.00				1/2" Ice	9.00	5.71	0.10
			0.00				1" Ice	9.48	6.18	0.16
LNX-6514DS-VTM (Verizon)	B	From Face	3.00		0.0000	113.00	No Ice	8.17	5.41	0.04
			-6.00				1/2" Ice	8.63	5.86	0.09
			0.00				1" Ice	9.10	6.33	0.15
HBXX-6517DS (Verizon)	B	From Face	3.00		0.0000	113.00	No Ice	8.53	5.24	0.05
			-4.00				1/2" Ice	9.00	5.71	0.10
			0.00				1" Ice	9.48	6.18	0.16
LNX-6514DS-VTM (Verizon)	B	From Face	3.00		0.0000	113.00	No Ice	8.17	5.41	0.04
			0.00				1/2" Ice	8.63	5.86	0.09
			0.00				1" Ice	9.10	6.33	0.15
HBXX-6517DS (Verizon)	B	From Face	3.00		0.0000	113.00	No Ice	8.53	5.24	0.05
			4.00				1/2" Ice	9.00	5.71	0.10
			0.00				1" Ice	9.48	6.18	0.16
LNX-6514DS-VTM (Verizon)	C	From Face	3.00		0.0000	113.00	No Ice	8.17	5.41	0.04
			-6.00				1/2" Ice	8.63	5.86	0.09
			0.00				1" Ice	9.10	6.33	0.15
HBXX-6517DS (Verizon)	C	From Face	3.00		0.0000	113.00	No Ice	8.53	5.24	0.05
			-4.00				1/2" Ice	9.00	5.71	0.10
			0.00				1" Ice	9.48	6.18	0.16

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	17004.67 - CT5448	Page	10 of 42
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date	08:11:50 06/07/18
	Client	AT&T Mobility	Designed by	TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
LNX-6514DS-VTM (Verizon)	C	From Face	3.00	0.0000	113.00	No Ice	8.17	5.41	0.04
			0.00			1/2" Ice	8.63	5.86	0.09
			0.00			1" Ice	9.10	6.33	0.15
HBXX-6517DS (Verizon)	C	From Face	3.00	0.0000	113.00	No Ice	8.53	5.24	0.05
			4.00			1/2" Ice	9.00	5.71	0.10
			0.00			1" Ice	9.48	6.18	0.16
RRH2x60-AWS (Verizon)	A	From Face	3.00	0.0000	113.00	No Ice	3.36	2.03	0.06
			-4.00			1/2" Ice	3.61	2.26	0.08
			0.00			1" Ice	3.88	2.50	0.11
RRH2x60-AWS (Verizon)	B	From Face	3.00	0.0000	113.00	No Ice	3.36	2.03	0.06
			-4.00			1/2" Ice	3.61	2.26	0.08
			0.00			1" Ice	3.88	2.50	0.11
RRH2x60-AWS (Verizon)	C	From Face	3.00	0.0000	113.00	No Ice	3.36	2.03	0.06
			-4.00			1/2" Ice	3.61	2.26	0.08
			0.00			1" Ice	3.88	2.50	0.11
RRH2x40-07-U (Verizon)	A	From Face	3.00	0.0000	113.00	No Ice	0.00	1.23	0.05
			0.00			1/2" Ice	0.00	1.39	0.07
			0.00			1" Ice	0.00	1.55	0.09
RRH2x40-07-U (Verizon)	B	From Face	3.00	0.0000	113.00	No Ice	0.00	1.23	0.05
			0.00			1/2" Ice	0.00	1.39	0.07
			0.00			1" Ice	0.00	1.55	0.09
RRH2x40-07-U (Verizon)	C	From Face	3.00	0.0000	113.00	No Ice	0.00	1.23	0.05
			0.00			1/2" Ice	0.00	1.39	0.07
			0.00			1" Ice	0.00	1.55	0.09
RRH2x60-PCS (Verizon)	A	From Face	3.00	0.0000	113.00	No Ice	2.15	1.35	0.06
			4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH2x60-PCS (Verizon)	B	From Face	3.00	0.0000	113.00	No Ice	2.15	1.35	0.06
			4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH2x60-PCS (Verizon)	C	From Face	3.00	0.0000	113.00	No Ice	2.15	1.35	0.06
			4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
DB-T1-6Z-8AB-0Z (Verizon)	A	From Face	3.00	0.0000	113.00	No Ice	4.80	2.00	0.04
			0.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
DB-T1-6Z-8AB-0Z (Verizon)	B	From Face	3.00	0.0000	113.00	No Ice	4.80	2.00	0.04
			0.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
EEI 12-ft Low Profile Platform (Verizon)	C	None		0.0000	113.00	No Ice	15.00	15.00	1.50
						1/2" Ice	18.40	18.40	1.75
						1" Ice	21.80	21.80	2.00
GPS	C	From Leg	1.00	0.0000	54.00	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02
2' Stand -Off	C	From Leg	1.00	0.0000	54.00	No Ice	0.80	0.13	0.02
			0.00			1/2" Ice	0.96	0.18	0.03
			0.00			1" Ice	1.13	0.24	0.04

Dishes

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 11 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

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	
VHLP2-23 (Clearwire)	A	Paraboloid w/Shroud (HP)	From Leg	3.00	Worst		150.00	2.17	No Ice	3.72	
				-5.00					1/2" Ice	4.01	0.04
				0.00					1" Ice	4.30	0.05
VHLP2-23 (Clearwire)	B	Paraboloid w/Shroud (HP)	From Leg	3.00	Worst		150.00	2.17	No Ice	3.72	
				-5.00					1/2" Ice	4.01	0.04
				0.00					1" Ice	4.30	0.05
VHLP2-23 (Clearwire)	C	Paraboloid w/Shroud (HP)	From Leg	3.00	Worst		150.00	2.17	No Ice	3.72	
				-5.00					1/2" Ice	4.01	0.04
				0.00					1" Ice	4.30	0.05
Andrew 2' w/Radome	A	Paraboloid w/Radome	From Leg	2.00	Worst		185.00	2.00	No Ice	3.14	
				0.00					1/2" Ice	3.41	0.28
				0.00					1" Ice	3.68	0.49
Andrew 2' w/Radome	B	Paraboloid w/Radome	From Leg	2.00	Worst		185.00	2.00	No Ice	3.14	
				0.00					1/2" Ice	3.41	0.28
				0.00					1" Ice	3.68	0.49

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e ft ²	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 184.00-166.50	174.92	1.424	37	25.855	A	0.000	25.855	25.855	100.00	0.000	0.000
					B	0.000	25.855	100.00	0.000	0.000	
					C	0.000	25.855	100.00	0.000	0.000	
L2 166.50-133.08	148.98	1.376	36	64.258	A	0.000	64.258	64.258	100.00	0.000	0.000
					B	0.000	64.258	100.00	0.000	0.000	
					C	0.000	64.258	100.00	0.000	0.000	
L3 133.08-112.99	122.77	1.321	35	47.753	A	0.000	47.753	47.753	100.00	0.000	0.000
					B	0.000	47.753	100.00	0.000	0.000	
					C	0.000	47.753	100.00	0.000	0.000	
L4 112.99-87.99	100.14	1.266	33	69.980	A	0.000	69.980	69.980	100.00	0.000	0.000
					B	0.000	69.980	100.00	0.000	0.000	
					C	0.000	69.980	100.00	0.000	0.000	
L5 87.99-43.91	65.44	1.158	30	149.061	A	0.000	149.061	149.061	100.00	0.000	0.000
					B	0.000	149.061	100.00	0.000	0.000	
					C	0.000	149.061	100.00	0.000	0.000	
L6 43.91-1.00	22.63	0.926	24	176.851	A	0.000	176.851	176.851	100.00	0.000	0.000
					B	0.000	176.851	100.00	0.000	0.000	
					C	0.000	176.851	100.00	0.000	0.000	

Tower Pressure - With Ice

$G_H = 1.100$

Section Elevation ft	z ft	K _Z	q _z psf	t _z in	A _G ft ²	F a c e ft ²	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1	174.92	1.424	9	2.9537	34.470	A	0.000	34.470	34.470	100.00	0.000	0.000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	17004.67 - CT5448	Page	12 of 42	
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT		Date	08:11:50 06/07/18
	Client	AT&T Mobility		Designed by	TJL

Section Elevation ft	z ft	K _Z	q _z psf	t _z in	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _{AA} In Face ft ²	C _{AA} Out Face ft ²
184.00-166.50						B	0.000	34.470		100.00	0.000	0.000
L2	148.98	1.376	8	2.9067	80.711	C	0.000	34.470		100.00	0.000	0.000
166.50-133.08						A	0.000	80.711	80.711	100.00	0.000	0.000
L3	122.77	1.321	8	2.8510	57.485	B	0.000	80.711		100.00	0.000	0.000
133.08-112.99						C	0.000	80.711		100.00	0.000	0.000
L4	112.99-87.99	1.266	8	2.7935	81.619	A	0.000	57.485	57.485	100.00	0.000	0.000
						B	0.000	57.485		100.00	0.000	0.000
						C	0.000	57.485		100.00	0.000	0.000
L5	87.99-43.91	1.158	7	2.6771	169.584	A	0.000	81.619	81.619	100.00	0.000	0.000
						B	0.000	81.619		100.00	0.000	0.000
						C	0.000	81.619		100.00	0.000	0.000
L6	43.91-1.00	0.926	6	2.4075	195.997	A	0.000	169.584	169.584	100.00	0.000	0.000
						B	0.000	169.584		100.00	0.000	0.000
						C	0.000	169.584		100.00	0.000	0.000
						A	0.000	195.997	195.997	100.00	0.000	0.000
						B	0.000	195.997		100.00	0.000	0.000
						C	0.000	195.997		100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.100$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _{AA} In Face ft ²	C _{AA} Out Face ft ²
L1	174.92	1.424	11	25.855	A	0.000	25.855	25.855	100.00	0.000	0.000
184.00-166.50					B	0.000	25.855		100.00	0.000	0.000
					C	0.000	25.855		100.00	0.000	0.000
L2	148.98	1.376	11	64.258	A	0.000	64.258	64.258	100.00	0.000	0.000
166.50-133.08					B	0.000	64.258		100.00	0.000	0.000
					C	0.000	64.258		100.00	0.000	0.000
L3	122.77	1.321	10	47.753	A	0.000	47.753	47.753	100.00	0.000	0.000
133.08-112.99					B	0.000	47.753		100.00	0.000	0.000
					C	0.000	47.753		100.00	0.000	0.000
L4	100.14	1.266	10	69.980	A	0.000	69.980	69.980	100.00	0.000	0.000
112.99-87.99					B	0.000	69.980		100.00	0.000	0.000
					C	0.000	69.980		100.00	0.000	0.000
L5	87.99-43.91	1.158	9	149.061	A	0.000	149.061	149.061	100.00	0.000	0.000
					B	0.000	149.061		100.00	0.000	0.000
					C	0.000	149.061		100.00	0.000	0.000
L6	43.91-1.00	0.926	7	176.851	A	0.000	176.851	176.851	100.00	0.000	0.000
					B	0.000	176.851		100.00	0.000	0.000
					C	0.000	176.851		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1	0.04	0.61	A	1	0.65	37	1	1	25.855	0.69	39.58	C

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	17004.67 - CT5448	Page	13 of 42
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date	08:11:50 06/07/18
	Client	AT&T Mobility	Designed by	TJL

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
184.00-166.50			B	1	0.65		1	1	25.855			
			C	1	0.65		1	1	25.855			
L2	0.93	2.18	A	1	0.65	36	1	1	64.258	1.66	49.78	C
166.50-133.08			B	1	0.65		1	1	64.258			
			C	1	0.65		1	1	64.258			
L3	0.78	2.64	A	1	0.65	35	1	1	47.753	1.19	59.10	C
133.08-112.99			B	1	0.65		1	1	47.753			
			C	1	0.65		1	1	47.753			
L4	1.08	3.66	A	1	0.65	33	1	1	69.980	1.67	66.68	C
112.99-87.99			B	1	0.65		1	1	69.980			
			C	1	0.65		1	1	69.980			
L5	1.90	10.01	A	1	0.65	30	1	1	149.061	3.23	73.38	C
87.99-43.91			B	1	0.65		1	1	149.061			
			C	1	0.65		1	1	149.061			
L6	1.60	13.59	A	1	0.65	24	1	1	176.851	3.07	71.52	C
43.91-1.00			B	1	0.65		1	1	176.851			
			C	1	0.65		1	1	176.851			
Sum Weight:	6.33	32.69						OTM	951.29 kip-ft	11.51		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1	0.04	0.61	A	1	0.65	37	1	1	25.855	0.69	39.58	C
184.00-166.50			B	1	0.65		1	1	25.855			
			C	1	0.65		1	1	25.855			
L2	0.93	2.18	A	1	0.65	36	1	1	64.258	1.66	49.78	C
166.50-133.08			B	1	0.65		1	1	64.258			
			C	1	0.65		1	1	64.258			
L3	0.78	2.64	A	1	0.65	35	1	1	47.753	1.19	59.10	C
133.08-112.99			B	1	0.65		1	1	47.753			
			C	1	0.65		1	1	47.753			
L4	1.08	3.66	A	1	0.65	33	1	1	69.980	1.67	66.68	C
112.99-87.99			B	1	0.65		1	1	69.980			
			C	1	0.65		1	1	69.980			
L5	1.90	10.01	A	1	0.65	30	1	1	149.061	3.23	73.38	C
87.99-43.91			B	1	0.65		1	1	149.061			
			C	1	0.65		1	1	149.061			
L6	1.60	13.59	A	1	0.65	24	1	1	176.851	3.07	71.52	C
43.91-1.00			B	1	0.65		1	1	176.851			
			C	1	0.65		1	1	176.851			
Sum Weight:	6.33	32.69						OTM	951.29 kip-ft	11.51		

Tower Forces - No Ice - Wind 90 To Face

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 14 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJJ

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 184.00-166.50	0.04	0.61	A	1	0.65	37	1	1	25.855	0.69	39.58	C
			B	1	0.65		1	1	25.855			
			C	1	0.65		1	1	25.855			
L2 166.50-133.08	0.93	2.18	A	1	0.65	36	1	1	64.258	1.66	49.78	C
			B	1	0.65		1	1	64.258			
			C	1	0.65		1	1	64.258			
L3 133.08-112.99	0.78	2.64	A	1	0.65	35	1	1	47.753	1.19	59.10	C
			B	1	0.65		1	1	47.753			
			C	1	0.65		1	1	47.753			
L4 112.99-87.99	1.08	3.66	A	1	0.65	33	1	1	69.980	1.67	66.68	C
			B	1	0.65		1	1	69.980			
			C	1	0.65		1	1	69.980			
L5 87.99-43.91	1.90	10.01	A	1	0.65	30	1	1	149.061	3.23	73.38	C
			B	1	0.65		1	1	149.061			
			C	1	0.65		1	1	149.061			
L6 43.91-1.00	1.60	13.59	A	1	0.65	24	1	1	176.851	3.07	71.52	C
			B	1	0.65		1	1	176.851			
			C	1	0.65		1	1	176.851			
Sum Weight:	6.33	32.69						OTM	951.29 kip-ft	11.51		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 184.00-166.50	0.04	1.91	A	1	1.2	9	1	1	34.470	0.39	22.51	C
			B	1	1.2		1	1	34.470			
			C	1	1.2		1	1	34.470			
L2 166.50-133.08	0.93	5.25	A	1	1.2	8	1	1	80.711	0.89	26.67	C
			B	1	1.2		1	1	80.711			
			C	1	1.2		1	1	80.711			
L3 133.08-112.99	0.78	4.83	A	1	1.2	8	1	1	57.485	0.61	30.35	C
			B	1	1.2		1	1	57.485			
			C	1	1.2		1	1	57.485			
L4 112.99-87.99	1.08	6.75	A	1	1.2	8	1	1	81.619	0.83	33.17	C
			B	1	1.2		1	1	81.619			
			C	1	1.2		1	1	81.619			
L5 87.99-43.91	1.90	16.22	A	1	1.2	7	1	1	169.584	1.57	35.61	C
			B	1	1.2		1	1	169.584			
			C	1	1.2		1	1	169.584			
L6 43.91-1.00	1.60	20.11	A	1	1.2	6	1	1	195.997	1.45	33.81	C
			B	1	1.2		1	1	195.997			
			C	1	1.2		1	1	195.997			
Sum Weight:	6.33	55.07						OTM	489.38 kip-ft	5.74		

Tower Forces - With Ice - Wind 60 To Face

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 15 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJJ

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K				psf			ft ²	K	plf	
L1 184.00-166.50	0.04	1.91	A	1	1.2	9	1	1	34.470	0.39	22.51	C
			B	1	1.2		1	1	34.470			
			C	1	1.2		1	1	34.470			
L2 166.50-133.08	0.93	5.25	A	1	1.2	8	1	1	80.711	0.89	26.67	C
			B	1	1.2		1	1	80.711			
			C	1	1.2		1	1	80.711			
L3 133.08-112.99	0.78	4.83	A	1	1.2	8	1	1	57.485	0.61	30.35	C
			B	1	1.2		1	1	57.485			
			C	1	1.2		1	1	57.485			
L4 112.99-87.99	1.08	6.75	A	1	1.2	8	1	1	81.619	0.83	33.17	C
			B	1	1.2		1	1	81.619			
			C	1	1.2		1	1	81.619			
L5 87.99-43.91	1.90	16.22	A	1	1.2	7	1	1	169.584	1.57	35.61	C
			B	1	1.2		1	1	169.584			
			C	1	1.2		1	1	169.584			
L6 43.91-1.00	1.60	20.11	A	1	1.2	6	1	1	195.997	1.45	33.81	C
			B	1	1.2		1	1	195.997			
			C	1	1.2		1	1	195.997			
Sum Weight:	6.33	55.07						OTM	489.38 kip-ft	5.74		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K				psf			ft ²	K	plf	
L1 184.00-166.50	0.04	1.91	A	1	1.2	9	1	1	34.470	0.39	22.51	C
			B	1	1.2		1	1	34.470			
			C	1	1.2		1	1	34.470			
L2 166.50-133.08	0.93	5.25	A	1	1.2	8	1	1	80.711	0.89	26.67	C
			B	1	1.2		1	1	80.711			
			C	1	1.2		1	1	80.711			
L3 133.08-112.99	0.78	4.83	A	1	1.2	8	1	1	57.485	0.61	30.35	C
			B	1	1.2		1	1	57.485			
			C	1	1.2		1	1	57.485			
L4 112.99-87.99	1.08	6.75	A	1	1.2	8	1	1	81.619	0.83	33.17	C
			B	1	1.2		1	1	81.619			
			C	1	1.2		1	1	81.619			
L5 87.99-43.91	1.90	16.22	A	1	1.2	7	1	1	169.584	1.57	35.61	C
			B	1	1.2		1	1	169.584			
			C	1	1.2		1	1	169.584			
L6 43.91-1.00	1.60	20.11	A	1	1.2	6	1	1	195.997	1.45	33.81	C
			B	1	1.2		1	1	195.997			
			C	1	1.2		1	1	195.997			
Sum Weight:	6.33	55.07						OTM	489.38 kip-ft	5.74		

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 16 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 184.00-166.50	0.04	0.61	A	1	0.65	11	1	1	25.855	0.21	11.78	C
			B	1	0.65		1	1	25.855			
			C	1	0.65		1	1	25.855			
L2 166.50-133.08	0.93	2.18	A	1	0.65	11	1	1	64.258	0.50	14.82	C
			B	1	0.65		1	1	64.258			
			C	1	0.65		1	1	64.258			
L3 133.08-112.99	0.78	2.64	A	1	0.65	10	1	1	47.753	0.35	17.59	C
			B	1	0.65		1	1	47.753			
			C	1	0.65		1	1	47.753			
L4 112.99-87.99	1.08	3.66	A	1	0.65	10	1	1	69.980	0.50	19.85	C
			B	1	0.65		1	1	69.980			
			C	1	0.65		1	1	69.980			
L5 87.99-43.91	1.90	10.01	A	1	0.65	9	1	1	149.061	0.96	21.84	C
			B	1	0.65		1	1	149.061			
			C	1	0.65		1	1	149.061			
L6 43.91-1.00	1.60	13.59	A	1	0.65	7	1	1	176.851	0.91	21.29	C
			B	1	0.65		1	1	176.851			
			C	1	0.65		1	1	176.851			
Sum Weight:	6.33	32.69						OTM	283.19 kip-ft	3.43		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 184.00-166.50	0.04	0.61	A	1	0.65	11	1	1	25.855	0.21	11.78	C
			B	1	0.65		1	1	25.855			
			C	1	0.65		1	1	25.855			
L2 166.50-133.08	0.93	2.18	A	1	0.65	11	1	1	64.258	0.50	14.82	C
			B	1	0.65		1	1	64.258			
			C	1	0.65		1	1	64.258			
L3 133.08-112.99	0.78	2.64	A	1	0.65	10	1	1	47.753	0.35	17.59	C
			B	1	0.65		1	1	47.753			
			C	1	0.65		1	1	47.753			
L4 112.99-87.99	1.08	3.66	A	1	0.65	10	1	1	69.980	0.50	19.85	C
			B	1	0.65		1	1	69.980			
			C	1	0.65		1	1	69.980			
L5 87.99-43.91	1.90	10.01	A	1	0.65	9	1	1	149.061	0.96	21.84	C
			B	1	0.65		1	1	149.061			
			C	1	0.65		1	1	149.061			
L6 43.91-1.00	1.60	13.59	A	1	0.65	7	1	1	176.851	0.91	21.29	C
			B	1	0.65		1	1	176.851			
			C	1	0.65		1	1	176.851			
Sum Weight:	6.33	32.69						OTM	283.19 kip-ft	3.43		

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 17 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 184.00-166.50	0.04	0.61	A	1	0.65	11	1	1	25.855	0.21	11.78	C
			B	1	0.65	1	1	25.855				
			C	1	0.65	1	1	25.855				
L2 166.50-133.08	0.93	2.18	A	1	0.65	11	1	1	64.258	0.50	14.82	C
			B	1	0.65	1	1	64.258				
			C	1	0.65	1	1	64.258				
L3 133.08-112.99	0.78	2.64	A	1	0.65	10	1	1	47.753	0.35	17.59	C
			B	1	0.65	1	1	47.753				
			C	1	0.65	1	1	47.753				
L4 112.99-87.99	1.08	3.66	A	1	0.65	10	1	1	69.980	0.50	19.85	C
			B	1	0.65	1	1	69.980				
			C	1	0.65	1	1	69.980				
L5 87.99-43.91	1.90	10.01	A	1	0.65	9	1	1	149.061	0.96	21.84	C
			B	1	0.65	1	1	149.061				
			C	1	0.65	1	1	149.061				
L6 43.91-1.00	1.60	13.59	A	1	0.65	7	1	1	176.851	0.91	21.29	C
			B	1	0.65	1	1	176.851				
			C	1	0.65	1	1	176.851				
Sum Weight:	6.33	32.69						OTM	283.19 kip-ft	3.43		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M _x kip-ft	Sum of Overturning Moments, M _z kip-ft	Sum of Torques kip-ft
Leg Weight	32.69					
Bracing Weight	0.00					
Total Member Self-Weight	32.69					
Total Weight	55.22			-0.85	-0.09	
Wind 0 deg - No Ice		0.01	-29.34	-3504.08	-0.58	0.28
Wind 30 deg - No Ice		14.80	-25.42	-3034.98	-1768.10	-1.08
Wind 60 deg - No Ice		25.63	-14.68	-1752.89	-3061.88	-2.15
Wind 90 deg - No Ice		29.59	-0.01	-1.34	-3535.26	-2.65
Wind 120 deg - No Ice		25.62	14.66	1750.34	-3061.39	-2.43
Wind 150 deg - No Ice		14.79	25.41	3032.80	-1767.24	-1.57
Wind 180 deg - No Ice		-0.01	29.34	3502.39	0.41	-0.28
Wind 210 deg - No Ice		-14.80	25.42	3033.29	1767.93	1.08
Wind 240 deg - No Ice		-25.63	14.68	1751.20	3061.71	2.15
Wind 270 deg - No Ice		-29.59	0.01	-0.35	3535.09	2.65
Wind 300 deg - No Ice		-25.62	-14.66	-1752.04	3061.22	2.43
Wind 330 deg - No Ice		-14.79	-25.41	-3034.49	1767.07	1.57
Member Ice	22.38					
Total Weight Ice	120.41			-7.88	-2.88	
Wind 0 deg - Ice		0.00	-13.30	-1581.91	-3.09	-0.03
Wind 30 deg - Ice		6.68	-11.52	-1371.14	-793.90	-1.15
Wind 60 deg - Ice		11.57	-6.65	-795.08	-1372.76	-1.97
Wind 90 deg - Ice		13.36	-0.00	-8.09	-1584.56	-2.26
Wind 120 deg - Ice		11.57	6.65	778.96	-1372.54	-1.94

<p style="text-align: center;">tnxTower</p> <p style="text-align: center;">Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587</p>	<p>Job</p> <p style="text-align: center;">17004.67 - CT5448</p>	<p>Page</p> <p style="text-align: center;">18 of 42</p>
	<p>Project</p> <p style="text-align: center;">183' EEI Monopole - 239 Middle Turnpike Manchester, CT</p>	<p>Date</p> <p style="text-align: center;">08:11:50 06/07/18</p>
	<p>Client</p> <p style="text-align: center;">AT&T Mobility</p>	<p>Designed by</p> <p style="text-align: center;">TJL</p>

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M _x kip-ft	Sum of Overturning Moments, M _z kip-ft	Sum of Torques kip-ft
Wind 150 deg - Ice		6.68	11.51	1355.17	-793.53	-1.11
Wind 180 deg - Ice		-0.00	13.30	1566.16	-2.66	0.03
Wind 210 deg - Ice		-6.68	11.52	1355.39	788.15	1.15
Wind 240 deg - Ice		-11.57	6.65	779.33	1367.01	1.97
Wind 270 deg - Ice		-13.36	0.00	-7.66	1578.81	2.26
Wind 300 deg - Ice		-11.57	-6.65	-794.71	1366.79	1.94
Wind 330 deg - Ice		-6.68	-11.51	-1370.93	787.78	1.11
Total Weight	55.22			-0.85	-0.09	
Wind 0 deg - Service		0.00	-8.74	-1043.70	-0.23	0.08
Wind 30 deg - Service		4.41	-7.57	-904.06	-526.40	-0.32
Wind 60 deg - Service		7.63	-4.37	-522.40	-911.53	-0.64
Wind 90 deg - Service		8.81	-0.00	-0.99	-1052.45	-0.79
Wind 120 deg - Service		7.63	4.37	520.46	-911.39	-0.72
Wind 150 deg - Service		4.40	7.56	902.22	-526.14	-0.47
Wind 180 deg - Service		-0.00	8.74	1042.01	0.06	-0.08
Wind 210 deg - Service		-4.41	7.57	902.37	526.22	0.32
Wind 240 deg - Service		-7.63	4.37	520.71	911.36	0.64
Wind 270 deg - Service		-8.81	0.00	-0.70	1052.28	0.79
Wind 300 deg - Service		-7.63	-4.37	-522.15	911.22	0.72
Wind 330 deg - Service		-4.40	-7.56	-903.92	525.97	0.47

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

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 19 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	184 - 166.5	Pole	Max Tension	39	0.00	0.00	-0.00
			Max. Compression	26	-8.01	-2.85	3.47
			Max. Mx	8	-2.18	-44.55	0.09
			Max. My	2	-2.19	-0.14	44.76
			Max. Vy	8	3.20	-44.55	0.09
			Max. Vx	2	-3.19	-0.14	44.76
			Max. Torque	20			-1.97
			Max Tension	1	0.00	0.00	0.00
L2	166.5 - 133.08	Pole	Max. Compression	26	-54.36	-3.75	2.84
			Max. Mx	8	-14.08	-494.09	0.16
			Max. My	2	-14.15	-0.17	492.18
			Max. Vy	8	27.55	-494.09	0.16
			Max. Vx	2	-27.28	-0.17	492.18
			Max. Torque	20			-1.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-77.99	-4.22	10.12
L3	133.08 - 112.99	Pole	Max. Mx	8	-23.33	-1204.82	0.81
			Max. My	2	-23.41	-0.16	1197.53
			Max. Vy	8	37.84	-1204.82	0.81
			Max. Vx	2	-37.44	-0.16	1197.53
			Max. Torque	20			-4.30
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-84.95	-4.49	10.79
			Max. Mx	8	-28.65	-1979.86	0.94
L4	112.99 - 87.99	Pole	Max. My	2	-28.72	-0.18	1964.48
			Max. Vy	8	39.70	-1979.86	0.94
			Max. Vx	2	-39.30	-0.18	1964.48
			Max. Torque	20			-4.30
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-105.22	-4.51	11.45
			Max. Mx	8	-43.91	-3775.41	1.09
			Max. My	2	-43.95	-0.18	3742.66
L5	87.99 - 43.91	Pole	Max. Vy	8	43.88	-3775.41	1.09

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 20 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L6	43.91 - 1	Pole	Max. Vx	2	-43.47	-0.18	3742.66
			Max. Torque	20			-4.27
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-133.79	-4.55	11.55
			Max. Mx	8	-66.21	-6025.47	1.83
			Max. My	2	-66.21	-0.92	5972.59
			Max. Vy	8	47.42	-6025.47	1.83
			Max. Vx	2	-47.02	-0.92	5972.59
			Max. Torque	20			-4.16

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	30	133.79	-13.36	0.00
	Max. H _x	21	49.70	47.35	-0.01
	Max. H _z	2	66.26	-0.01	46.95
	Max. M _x	2	5972.59	-0.01	46.95
	Max. M _z	8	6025.47	-47.35	0.01
	Max. Torsion	8	4.15	-47.35	0.01
	Min. Vert	25	49.70	23.66	40.65
	Min. H _x	9	49.70	-47.35	0.01
	Min. H _z	14	66.26	0.01	-46.95
	Min. M _x	14	-5970.33	0.01	-46.95
	Min. M _z	20	-6025.22	47.35	-0.01
	Min. Torsion	20	-4.15	47.35	-0.01

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	55.22	0.00	0.00	-0.85	-0.09	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	66.26	0.01	-46.95	-5972.59	-0.92	0.46
0.9 Dead+1.6 Wind 0 deg - No Ice	49.70	0.01	-46.95	-5869.39	-0.88	0.45
1.2 Dead+1.6 Wind 30 deg - No Ice	66.26	23.69	-40.67	-5172.86	-3013.70	-1.68
0.9 Dead+1.6 Wind 30 deg - No Ice	49.70	23.69	-40.67	-5083.45	-2961.75	-1.69
1.2 Dead+1.6 Wind 60 deg - No Ice	66.26	41.01	-23.49	-2987.32	-5218.77	-3.37
0.9 Dead+1.6 Wind 60 deg - No Ice	49.70	41.01	-23.49	-2935.59	-5128.85	-3.37
1.2 Dead+1.6 Wind 90 deg - No Ice	66.26	47.35	-0.01	-1.83	-6025.47	-4.15
0.9 Dead+1.6 Wind 90 deg - No Ice	49.70	47.35	-0.01	-1.55	-5921.67	-4.14
1.2 Dead+1.6 Wind 120 deg - No Ice	66.26	41.00	23.46	2983.82	-5217.87	-3.82
0.9 Dead+1.6 Wind 120 deg - No Ice	49.70	41.00	23.46	2932.68	-5127.99	-3.81

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 21 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
No Ice						
1.2 Dead+1.6 Wind 150 deg - No Ice	66.26	23.66	40.65	5169.85	-3012.21	-2.47
0.9 Dead+1.6 Wind 150 deg - No Ice	49.70	23.66	40.65	5081.05	-2960.30	-2.46
1.2 Dead+1.6 Wind 180 deg - No Ice	66.26	-0.01	46.95	5970.33	0.70	-0.46
0.9 Dead+1.6 Wind 180 deg - No Ice	49.70	-0.01	46.95	5867.75	0.72	-0.45
1.2 Dead+1.6 Wind 210 deg - No Ice	66.26	-23.69	40.67	5170.64	3013.38	1.67
0.9 Dead+1.6 Wind 210 deg - No Ice	49.70	-23.69	40.67	5081.84	2961.53	1.68
1.2 Dead+1.6 Wind 240 deg - No Ice	66.26	-41.01	23.49	2985.21	5218.44	3.36
0.9 Dead+1.6 Wind 240 deg - No Ice	49.70	-41.01	23.49	2934.06	5128.61	3.36
1.2 Dead+1.6 Wind 270 deg - No Ice	66.26	-47.35	0.01	-0.22	6025.22	4.15
0.9 Dead+1.6 Wind 270 deg - No Ice	49.70	-47.35	0.01	0.06	5921.49	4.14
1.2 Dead+1.6 Wind 300 deg - No Ice	66.26	-41.00	-23.46	-2985.91	5217.72	3.83
0.9 Dead+1.6 Wind 300 deg - No Ice	49.70	-41.00	-23.46	-2934.20	5127.88	3.82
1.2 Dead+1.6 Wind 330 deg - No Ice	66.26	-23.66	-40.65	-5172.04	3012.07	2.48
0.9 Dead+1.6 Wind 330 deg - No Ice	49.70	-23.66	-40.65	-5082.64	2960.20	2.47
1.2 Dead+1.0 Ice+1.0 Temp	133.79	0.00	-0.00	-11.55	-4.55	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	133.79	0.00	-13.30	-1927.95	-4.86	0.15
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	133.79	6.68	-11.52	-1671.38	-967.58	-1.08
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	133.79	11.57	-6.65	-970.03	-1672.26	-2.03
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	133.79	13.36	-0.00	-11.93	-1930.01	-2.42
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	133.79	11.57	6.65	946.22	-1671.98	-2.17
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	133.79	6.68	11.51	1647.67	-967.14	-1.34
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	133.79	-0.00	13.30	1904.45	-4.41	-0.15
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	133.79	-6.68	11.52	1647.91	958.27	1.09
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	133.79	-11.57	6.65	946.62	1662.95	2.03
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	133.79	-13.36	0.00	-11.47	1920.76	2.43
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	133.79	-11.57	-6.65	-969.64	1662.77	2.17
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	133.79	-6.68	-11.51	-1671.16	957.92	1.34
Dead+Wind 0 deg - Service	55.22	0.00	-8.74	-1103.60	-0.25	0.09
Dead+Wind 30 deg - Service	55.22	4.41	-7.57	-955.97	-556.59	-0.32
Dead+Wind 60 deg - Service	55.22	7.63	-4.37	-552.41	-963.81	-0.65
Dead+Wind 90 deg - Service	55.22	8.81	-0.00	-1.09	-1112.81	-0.80
Dead+Wind 120 deg - Service	55.22	7.63	4.37	550.27	-963.66	-0.73
Dead+Wind 150 deg - Service	55.22	4.40	7.56	953.93	-556.33	-0.48
Dead+Wind 180 deg - Service	55.22	-0.00	8.74	1101.71	0.05	-0.09

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 22 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead+Wind 210 deg - Service	55.22	-4.41	7.57	954.08	556.38	0.32
Dead+Wind 240 deg - Service	55.22	-7.63	4.37	550.53	963.60	0.65
Dead+Wind 270 deg - Service	55.22	-8.81	0.00	-0.79	1112.60	0.80
Dead+Wind 300 deg - Service	55.22	-7.63	-4.37	-552.15	963.46	0.73
Dead+Wind 330 deg - Service	55.22	-4.40	-7.56	-955.82	556.12	0.48

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-55.22	0.00	0.00	55.22	0.00	0.000%
2	0.01	-66.26	-46.95	-0.01	66.26	46.95	0.000%
3	0.01	-49.70	-46.95	-0.01	49.70	46.95	0.000%
4	23.69	-66.26	-40.67	-23.69	66.26	40.67	0.000%
5	23.69	-49.70	-40.67	-23.69	49.70	40.67	0.000%
6	41.01	-66.26	-23.49	-41.01	66.26	23.49	0.000%
7	41.01	-49.70	-23.49	-41.01	49.70	23.49	0.000%
8	47.35	-66.26	-0.01	-47.35	66.26	0.01	0.000%
9	47.35	-49.70	-0.01	-47.35	49.70	0.01	0.000%
10	41.00	-66.26	23.46	-41.00	66.26	-23.46	0.000%
11	41.00	-49.70	23.46	-41.00	49.70	-23.46	0.000%
12	23.66	-66.26	40.65	-23.66	66.26	-40.65	0.000%
13	23.66	-49.70	40.65	-23.66	49.70	-40.65	0.000%
14	-0.01	-66.26	46.95	0.01	66.26	-46.95	0.000%
15	-0.01	-49.70	46.95	0.01	49.70	-46.95	0.000%
16	-23.69	-66.26	40.67	23.69	66.26	-40.67	0.000%
17	-23.69	-49.70	40.67	23.69	49.70	-40.67	0.000%
18	-41.01	-66.26	23.49	41.01	66.26	-23.49	0.000%
19	-41.01	-49.70	23.49	41.01	49.70	-23.49	0.000%
20	-47.35	-66.26	0.01	47.35	66.26	-0.01	0.000%
21	-47.35	-49.70	0.01	47.35	49.70	-0.01	0.000%
22	-41.00	-66.26	-23.46	41.00	66.26	23.46	0.000%
23	-41.00	-49.70	-23.46	41.00	49.70	23.46	0.000%
24	-23.66	-66.26	-40.65	23.66	66.26	40.65	0.000%
25	-23.66	-49.70	-40.65	23.66	49.70	40.65	0.000%
26	0.00	-133.79	0.00	-0.00	133.79	0.00	0.000%
27	0.00	-133.79	-13.30	-0.00	133.79	13.30	0.000%
28	6.68	-133.79	-11.52	-6.68	133.79	11.52	0.000%
29	11.57	-133.79	-6.65	-11.57	133.79	6.65	0.000%
30	13.36	-133.79	-0.00	-13.36	133.79	0.00	0.000%
31	11.57	-133.79	6.65	-11.57	133.79	-6.65	0.000%
32	6.68	-133.79	11.51	-6.68	133.79	-11.51	0.000%
33	-0.00	-133.79	13.30	0.00	133.79	-13.30	0.000%
34	-6.68	-133.79	11.52	6.68	133.79	-11.52	0.000%
35	-11.57	-133.79	6.65	11.57	133.79	-6.65	0.000%
36	-13.36	-133.79	0.00	13.36	133.79	-0.00	0.000%
37	-11.57	-133.79	-6.65	11.57	133.79	6.65	0.000%
38	-6.68	-133.79	-11.51	6.68	133.79	11.51	0.000%
39	0.00	-55.22	-8.74	-0.00	55.22	8.74	0.000%
40	4.41	-55.22	-7.57	-4.41	55.22	7.57	0.000%
41	7.63	-55.22	-4.37	-7.63	55.22	4.37	0.000%
42	8.81	-55.22	-0.00	-8.81	55.22	0.00	0.000%
43	7.63	-55.22	4.37	-7.63	55.22	-4.37	0.000%
44	4.40	-55.22	7.56	-4.40	55.22	-7.56	0.000%
45	-0.00	-55.22	8.74	0.00	55.22	-8.74	0.000%
46	-4.41	-55.22	7.57	4.41	55.22	-7.57	0.000%
47	-7.63	-55.22	4.37	7.63	55.22	-4.37	0.000%

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 23 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
48	-8.81	-55.22	0.00	8.81	55.22	-0.00	0.000%
49	-7.63	-55.22	-4.37	7.63	55.22	4.37	0.000%
50	-4.40	-55.22	-7.56	4.40	55.22	7.56	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.0000001	0.0000001
2	Yes	5	0.0000001	0.00029586
3	Yes	5	0.0000001	0.00012141
4	Yes	7	0.0000001	0.00020565
5	Yes	6	0.0000001	0.00078338
6	Yes	7	0.0000001	0.00021472
7	Yes	6	0.0000001	0.00082088
8	Yes	6	0.0000001	0.00013759
9	Yes	5	0.0000001	0.00078056
10	Yes	7	0.0000001	0.00020132
11	Yes	6	0.0000001	0.00076523
12	Yes	7	0.0000001	0.00021312
13	Yes	6	0.0000001	0.00081485
14	Yes	5	0.0000001	0.00028627
15	Yes	5	0.0000001	0.00011673
16	Yes	7	0.0000001	0.00021114
17	Yes	6	0.0000001	0.00080663
18	Yes	7	0.0000001	0.00020235
19	Yes	6	0.0000001	0.00076949
20	Yes	6	0.0000001	0.00013666
21	Yes	5	0.0000001	0.00077547
22	Yes	7	0.0000001	0.00021584
23	Yes	6	0.0000001	0.00082563
24	Yes	7	0.0000001	0.00020378
25	Yes	6	0.0000001	0.00077570
26	Yes	5	0.0000001	0.00015126
27	Yes	7	0.00004632	0.00065672
28	Yes	8	0.0000001	0.00050057
29	Yes	8	0.0000001	0.00053296
30	Yes	7	0.00004631	0.00071793
31	Yes	8	0.0000001	0.00046863
32	Yes	8	0.0000001	0.00050394
33	Yes	7	0.00004632	0.00064111
34	Yes	8	0.0000001	0.00048939
35	Yes	8	0.0000001	0.00046205
36	Yes	7	0.00004629	0.00070899
37	Yes	8	0.0000001	0.00052525
38	Yes	8	0.0000001	0.00048560
39	Yes	4	0.0000001	0.00048180
40	Yes	5	0.0000001	0.00041911
41	Yes	5	0.0000001	0.00047058
42	Yes	5	0.0000001	0.00009185
43	Yes	5	0.0000001	0.00039881
44	Yes	5	0.0000001	0.00045645
45	Yes	4	0.0000001	0.00047912
46	Yes	5	0.0000001	0.00044458
47	Yes	5	0.0000001	0.00040227
48	Yes	5	0.0000001	0.00009167

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	17004.67 - CT5448	Page	24 of 42	
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT		Date	08:11:50 06/07/18
	Client	AT&T Mobility		Designed by	TJL

49	Yes	5	0.00000001	0.00047691
50	Yes	5	0.00000001	0.00041017

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	184 - 166.5	41.301	42	2.0163	0.0131
L2	169.5 - 133.08	35.242	42	1.9671	0.0078
L3	136.91 - 112.99	22.559	42	1.6785	0.0038
L4	112.99 - 87.99	14.865	42	1.3608	0.0028
L5	92.99 - 43.91	9.787	42	1.0600	0.0017
L6	50.08 - 1	2.663	42	0.5062	0.0006

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.00	Andrew 2' w/Radome	42	41.301	2.0163	0.0131	36486
184.00	15' Lighting Rod	42	41.301	2.0163	0.0131	36486
164.00	AIR32	42	32.984	1.9361	0.0064	9740
153.00	APXVSP18-C-A20	42	28.586	1.8497	0.0047	6710
150.00	VHLP2-23	42	27.421	1.8213	0.0045	6185
143.00	800-10121	42	24.772	1.7483	0.0041	5225
123.00	3' Yagi	42	17.877	1.5018	0.0033	3971
113.00	LNx-6514DS-VTM	42	14.868	1.3609	0.0028	3676
54.00	GPS	42	3.093	0.5511	0.0006	4007

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	184 - 166.5	223.062	8	10.9116	0.0695
L2	169.5 - 133.08	190.430	8	10.6582	0.0408
L3	136.91 - 112.99	122.044	8	9.0973	0.0200
L4	112.99 - 87.99	80.480	8	7.3772	0.0146
L5	92.99 - 43.91	53.012	8	5.7472	0.0089
L6	50.08 - 1	14.427	8	2.7439	0.0030

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
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tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 25 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Elevation	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.00	Andrew 2' w/Radome	8	223.062	10.9116	0.0696	7486
184.00	15' Lighting Rod	8	223.062	10.9116	0.0696	7486
164.00	AIR32	8	178.263	10.4916	0.0335	1962
153.00	APXVSPP18-C-A20	8	154.555	10.0247	0.0248	1325
150.00	VHLP2-23	8	148.272	9.8708	0.0234	1216
143.00	800-10121	8	133.987	9.4755	0.0213	1019
123.00	3' Yagi	8	96.759	8.1405	0.0172	762
113.00	LNx-6514DS-VTM	8	80.496	7.3780	0.0146	700
54.00	GPS	8	16.759	2.9872	0.0033	743

Base Plate Design Data

Plate Thickness	Number of Anchor Bolts	Anchor Bolt Size	Actual Allowable Ratio Bolt Tension K	Actual Allowable Ratio Concrete Stress ksi	Actual Allowable Ratio Plate Stress ksi	Actual Allowable Ratio Stiffener Stress ksi	Controlling Condition	Critical Ratio
2.0000	18	2.2500	198.17	3.500	41.562	21.932	Bolt T	0.89
			223.65	4.080	54.000	54.000		✓
			0.89	0.86	0.77	0.41		

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio P _u /φP _n
L1	184 - 182.964	TP19.42x15.5x0.1875	17.50	183.00	397.9	9.2509	-6.36	13.20	0.482
	182.964 - 181.929					9.2509	-6.36	13.20	0.482
	181.929 - 180.893					9.3890	-6.48	13.80	0.469
	180.893 - 179.857					9.5271	-6.59	14.41	0.457
	179.857 - 178.821					9.6651	-6.71	15.05	0.446
	178.821 - 177.786					9.8032	-6.83	15.70	0.435
	177.786 - 176.75					9.9413	-6.95	16.38	0.424
	176.75 - 175.714					10.0793	-7.07	17.07	0.414
	175.714 - 174.679					10.2174	-7.19	17.78	0.405
	174.679 - 173.643					10.3555	-7.31	18.51	0.395

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	17004.67 - CT5448	Page	26 of 42
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date	08:11:50 06/07/18
	Client	AT&T Mobility	Designed by	TJL

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
	173.643 - 172.607					10.4935	-7.44	19.26	0.386
	172.607 - 171.571					10.6316	-7.56	20.03	0.377
	171.571 - 170.536					10.7697	-7.68	20.82	0.369
	170.536 - 169.5					10.9077	-7.81	21.63	0.361
L2	169.5 - 166.5	TP26.41x18.373x0.25	36.42	183.00	329.3	11.4457	-3.80	24.99	0.152
	14.9059					-4.94	31.05	0.159	
	14.9059					-8.75	31.05	0.282	
	15.4816					-20.71	34.79	0.595	
	15.4816					-20.72	34.79	0.595	
	15.7695					-21.03	36.77	0.572	
	16.0573					-21.34	38.82	0.550	
	16.3452					-21.65	40.95	0.529	
	16.6330					-21.97	43.15	0.509	
	16.9209					-22.28	45.43	0.491	
	17.4966					-31.91	50.22	0.635	
	17.4966					-31.92	50.22	0.636	
	17.7952					-32.51	52.84	0.615	
	18.0723					-32.77	55.35	0.592	
	18.3602					-33.10	58.03	0.570	
	18.6480					-33.43	60.80	0.550	
	19.2237					-52.87	66.61	0.794	
	19.2237					-52.88	66.61	0.794	
	19.5116					-53.22	69.65	0.764	
	19.7994					-53.56	72.78	0.736	
L3	136.91 - 133.08	TP30.28x25.0648x0.375	23.92	183.00	250.5	20.0873	-21.83	76.00	0.287
	29.3871					-32.08	105.76	0.303	
	30.3810					-55.59	116.86	0.476	
	30.6553					-55.89	120.05	0.466	
	31.2041					-15.62	126.62	0.123	
	31.4785					-15.82	129.99	0.122	
	31.7529					-16.03	133.42	0.120	

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 27 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
	127.793 - 126.736					32.0273	-16.24	136.90	0.119
	126.736 - 125.678					32.3017	-16.45	140.45	0.117
	125.678 - 124.621					32.5761	-16.67	144.06	0.116
	124.621 - 123.564					32.8505	-16.88	147.73	0.114
	123.564 - 122.506					33.1249	-18.88	151.47	0.125
	122.506 - 121.449					33.3993	-19.10	155.26	0.123
	121.449 - 120.392					33.6737	-19.32	159.12	0.121
	120.392 - 119.334					33.9481	-19.55	163.04	0.120
	119.334 - 118.277					34.2225	-19.77	167.03	0.118
	118.277 - 117.219					34.4969	-20.00	171.08	0.117
	117.219 - 116.162					34.7712	-20.23	175.19	0.116
	116.162 - 115.105					35.0456	-20.47	179.37	0.114
	115.105 - 114.047					35.3200	-20.70	183.62	0.113
	114.047 - 112.99					35.5944	-23.33	187.93	0.124
L4	112.99 - 111.937	TP35.88x30.28x0.415	25.00	183.00	205.5	39.6491	-23.59	212.09	0.111
	111.937 - 110.885					39.9596	-23.86	217.11	0.110
	110.885 - 109.832					40.2702	-24.12	222.22	0.109
	109.832 - 108.779					40.5808	-24.39	227.40	0.107
	108.779 - 107.727					40.8914	-24.66	232.66	0.106
	107.727 - 106.674					41.2020	-24.94	238.00	0.105
	106.674 - 105.622					41.5126	-25.21	243.42	0.104
	105.622 - 104.569					41.8232	-25.49	248.93	0.102
	104.569 - 103.516					42.1337	-25.77	254.51	0.101
	103.516 - 102.464					42.4443	-26.05	260.18	0.100
	102.464 - 101.411					42.7549	-26.33	265.94	0.099
	101.411 - 100.358					43.0655	-26.61	271.77	0.098
	100.358 - 99.3058					43.3761	-26.90	277.70	0.097
	99.3058 - 98.2532					43.6867	-27.18	283.71	0.096
	98.2532 - 97.2005					43.9972	-27.47	289.80	0.095
	97.2005 - 96.1479					44.3078	-27.76	295.98	0.094

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	17004.67 - CT5448	Page	28 of 42
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date	08:11:50 06/07/18
	Client	AT&T Mobility	Designed by	TJL

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
	96.1479 - 95.0953					44.6184	-28.06	302.25	0.093
	95.0953 - 94.0426					44.9290	-28.35	308.60	0.092
	94.0426 - 92.99					45.2396	-28.65	315.05	0.091
L5	92.99 - 87.99	TP44.88x33.93x0.485	49.08	183.00	179.0	46.7149	-14.52	346.89	0.042
	87.99 - 85.8839					53.9255	-31.62	390.68	0.081
	85.8839 - 83.7778					54.6488	-32.29	406.61	0.079
	83.7778 - 81.6717					55.3721	-32.96	422.97	0.078
	81.6717 - 79.5656					56.0955	-33.64	439.76	0.076
	79.5656 - 77.4594					56.8188	-34.33	456.99	0.075
	77.4594 - 75.3533					57.5421	-35.02	474.67	0.074
	75.3533 - 73.2472					58.2655	-35.73	492.80	0.072
	73.2472 - 71.1411					58.9888	-36.43	511.38	0.071
	71.1411 - 69.035					59.7121	-37.15	530.42	0.070
	69.035 - 66.9289					60.4355	-37.87	549.93	0.069
	66.9289 - 64.8228					61.1588	-38.60	569.92	0.068
	64.8228 - 62.7167					61.8821	-39.33	590.38	0.067
	62.7167 - 60.6106					62.6055	-40.08	611.32	0.066
	60.6106 - 58.5044					63.3288	-40.82	632.76	0.065
	58.5044 - 56.3983					64.0522	-41.58	654.69	0.064
	56.3983 - 54.2922					64.7755	-42.34	677.12	0.063
	54.2922 - 52.1861					65.4988	-43.14	700.06	0.062
	52.1861 - 50.08					66.2222	-43.91	723.51	0.061
L6	50.08 - 43.91	TP53.5x42.5334x0.54	49.08	183.00	142.6	68.3412	-23.01	795.21	0.029
	43.91 - 41.6516					74.3380	-24.86	825.59	0.030
	41.6516 - 39.3932					74.3380	-48.39	825.59	0.059
	39.3932 - 37.1347					75.2029	-49.29	854.74	0.058
	37.1347 - 34.8763					76.0678	-50.20	884.57	0.057
	34.8763 - 32.6179					76.9327	-51.11	915.09	0.056
	32.6179 - 30.3595					77.7977	-52.03	946.30	0.055
	30.3595 - 28.1011					78.6626	-52.96	978.22	0.054
						79.5275	-53.90	1010.84	0.053

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 29 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
	28.1011 - 25.8426					80.3924	-54.84	1044.18	0.053
	25.8426 - 23.5842					81.2573	-55.79	1078.25	0.052
	23.5842 - 21.3258					82.1222	-56.75	1113.04	0.051
	21.3258 - 19.0674					82.9871	-57.72	1148.58	0.050
	19.0674 - 16.8089					83.8520	-58.70	1184.87	0.050
	16.8089 - 14.5505					84.7169	-59.68	1221.92	0.049
	14.5505 - 12.2921					85.5819	-60.67	1259.72	0.048
	12.2921 - 10.0337					86.4468	-61.67	1298.31	0.048
	10.0337 - 7.77526					87.3117	-62.68	1337.67	0.047
	7.77526 - 5.51684					88.1766	-63.69	1377.81	0.046
	5.51684 - 3.25842					89.0415	-64.71	1418.76	0.046
	3.25842 - 1					89.9064	-65.74	1460.50	0.045

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{ux} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M _{uy} kip-ft	φM _{uy} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L1	184 - 182.964	TP19.42x15.5x0.1875	7.42	218.78	0.034	0.00	218.78	0.000
	182.964 - 181.929		7.42	218.78	0.034	0.00	218.78	0.000
	181.929 - 180.893		8.54	225.40	0.038	0.00	225.40	0.000
	180.893 - 179.857		9.70	232.12	0.042	0.00	232.12	0.000
	179.857 - 178.821		10.89	238.93	0.046	0.00	238.93	0.000
	178.821 - 177.786		12.11	245.85	0.049	0.00	245.85	0.000
	177.786 - 176.75		13.35	252.86	0.053	0.00	252.86	0.000
	176.75 - 175.714		14.63	259.97	0.056	0.00	259.97	0.000
	175.714 - 174.679		15.95	267.18	0.060	0.00	267.18	0.000
	174.679 - 173.643		17.29	274.49	0.063	0.00	274.49	0.000
	173.643 - 172.607		18.66	281.90	0.066	0.00	281.90	0.000
	172.607 - 171.571		20.07	289.41	0.069	0.00	289.41	0.000
	171.571 - 170.536		21.51	297.01	0.072	0.00	297.01	0.000
	170.536 - 169.5		22.98	304.71	0.075	0.00	304.71	0.000

<p style="text-align: center;">tnxTower</p> <p style="text-align: center;">Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587</p>	Job	Page	
		17004.67 - CT5448	30 of 42
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date
		08:11:50 06/07/18	
Client	AT&T Mobility	Designed by	
		TJL	

Section No.	Elevation ft	Size	M_{ux}	ϕM_{rx}	Ratio	M_{uy}	ϕM_{ry}	Ratio
			kip-ft	kip-ft	$\frac{M_{ux}}{\phi M_{rx}}$	kip-ft	kip-ft	$\frac{M_{uy}}{\phi M_{ry}}$
L2	169.5 - 166.5	TP26.41x18.373x0.25	12.98	333.56	0.039	0.00	333.56	0.000
	169.5 - 166.5		16.09	425.48	0.038	0.00	425.48	0.000
	166.5 - 164.856		29.07	425.48	0.068	0.00	425.48	0.000
	164.856 - 163.212		36.13	459.21	0.079	0.00	459.21	0.000
	163.212 - 161.568		36.12	459.21	0.079	0.00	459.21	0.000
	161.568 - 159.924		42.39	476.55	0.089	0.00	476.55	0.000
	159.924 - 158.281		48.74	494.22	0.099	0.00	494.22	0.000
	158.281 - 156.637		55.17	512.21	0.108	0.00	512.21	0.000
	156.637 - 154.993		61.69	530.52	0.116	0.00	530.52	0.000
	154.993 - 153.349		68.29	549.15	0.124	0.00	549.15	0.000
	153.349 - 151.705		83.68	587.38	0.142	0.00	587.38	0.000
	151.705 - 150.061		83.67	587.38	0.142	0.00	587.38	0.000
	150.061 - 148.417		93.31	607.71	0.154	0.00	607.71	0.000
	148.417 - 146.773		102.63	626.89	0.164	0.00	626.89	0.000
	146.773 - 145.129		112.38	647.13	0.174	0.00	647.13	0.000
	145.129 - 143.486		122.19	667.69	0.183	0.00	667.69	0.000
	143.486 - 141.842		145.56	709.78	0.205	0.00	709.78	0.000
	141.842 - 140.198		145.55	709.78	0.205	0.00	709.78	0.000
	140.198 - 138.554		161.38	731.30	0.221	0.00	731.30	0.000
	L3		138.554 - 136.91	TP30.28x25.0648x0.375	177.25	753.15	0.235	0.00
136.91 - 133.08		80.75	772.99		0.104	0.00	772.99	0.000
133.08 - 132.023		112.39	1100.47		0.102	0.00	1100.47	0.000
132.023 - 130.965		230.49	1176.75		0.196	0.00	1176.75	0.000
130.965 - 129.908		240.90	1198.25		0.201	0.00	1198.25	0.000
129.908 - 128.851		689.60	1241.85		0.555	0.00	1241.85	0.000
128.851 - 127.793		719.55	1263.94		0.569	0.00	1263.94	0.000
127.793 - 126.736		749.61	1286.23		0.583	0.00	1286.23	0.000
126.736 - 125.678		779.77	1308.72		0.596	0.00	1308.72	0.000
125.678 - 124.621		810.05	1331.39		0.608	0.00	1331.39	0.000
124.621 - 123.564		840.42	1354.26		0.621	0.00	1354.26	0.000
		870.91	1377.33		0.632	0.00	1377.33	0.000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 31 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{rx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	M_{uy} kip-ft	ϕM_{ry} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ry}}$
	123.564 - 122.506		907.17	1400.58	0.648	0.00	1400.58	0.000
	122.506 - 121.449		939.83	1424.04	0.660	0.00	1424.04	0.000
	121.449 - 120.392		972.58	1447.69	0.672	0.00	1447.69	0.000
	120.392 - 119.334		1005.43	1471.53	0.683	0.00	1471.53	0.000
	119.334 - 118.277		1038.38	1495.58	0.694	0.00	1495.58	0.000
	118.277 - 117.219		1071.45	1519.81	0.705	0.00	1519.81	0.000
	117.219 - 116.162		1104.62	1544.24	0.715	0.00	1544.24	0.000
	116.162 - 115.105		1137.89	1568.87	0.725	0.00	1568.87	0.000
	115.105 - 114.047		1171.28	1593.68	0.735	0.00	1593.68	0.000
	114.047 - 112.99		1204.83	1618.70	0.744	0.00	1618.70	0.000
L4	112.99 - 111.937	TP35.88x30.28x0.415	1244.69	1812.66	0.687	0.00	1812.66	0.000
	111.937 - 110.885		1284.66	1841.37	0.698	0.00	1841.37	0.000
	110.885 - 109.832		1324.73	1870.29	0.708	0.00	1870.29	0.000
	109.832 - 108.779		1364.91	1899.45	0.719	0.00	1899.45	0.000
	108.779 - 107.727		1405.18	1928.83	0.729	0.00	1928.83	0.000
	107.727 - 106.674		1445.57	1958.43	0.738	0.00	1958.43	0.000
	106.674 - 105.622		1486.05	1988.27	0.747	0.00	1988.27	0.000
	105.622 - 104.569		1526.63	2018.33	0.756	0.00	2018.33	0.000
	104.569 - 103.516		1567.32	2048.61	0.765	0.00	2048.61	0.000
	103.516 - 102.464		1608.11	2079.12	0.773	0.00	2079.12	0.000
	102.464 - 101.411		1649.01	2109.85	0.782	0.00	2109.85	0.000
	101.411 - 100.358		1690.00	2140.81	0.789	0.00	2140.81	0.000
	100.358 - 99.3058		1731.10	2171.99	0.797	0.00	2171.99	0.000
	99.3058 - 98.2532		1772.30	2203.40	0.804	0.00	2203.40	0.000
	98.2532 - 97.2005		1813.61	2235.04	0.811	0.00	2235.04	0.000
	97.2005 - 96.1479		1855.02	2266.90	0.818	0.00	2266.90	0.000
	96.1479 - 95.0953		1896.53	2298.99	0.825	0.00	2298.99	0.000
	95.0953 - 94.0426		1938.14	2331.30	0.831	0.00	2331.30	0.000
	94.0426 - 92.99		1979.87	2363.84	0.838	0.00	2363.84	0.000
	92.99 - 87.99		1047.99	2521.47	0.416	0.00	2521.47	0.000
L5	92.99 - 87.99	TP44.88x33.93x0.485	1132.00	2791.96	0.405	0.00	2791.96	0.000

<p style="text-align: center;">tnxTower</p> <p style="text-align: center;">Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587</p>	<p>Job</p> <p style="text-align: center;">17004.67 - CT5448</p>	<p>Page</p> <p style="text-align: center;">32 of 42</p>
	<p>Project</p> <p style="text-align: center;">183' EEI Monopole - 239 Middle Turnpike Manchester, CT</p>	<p>Date</p> <p style="text-align: center;">08:11:50 06/07/18</p>
	<p>Client</p> <p style="text-align: center;">AT&T Mobility</p>	<p>Designed by</p> <p style="text-align: center;">TJL</p>

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{ux} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M_{uy} kip-ft	ϕM_{uy} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
	87.99 - 85.8839		2265.21	2868.93	0.790	0.00	2868.93	0.000
	85.8839 - 83.7778		2350.85	2946.94	0.798	0.00	2946.94	0.000
	83.7778 - 81.6717		2436.88	3026.00	0.805	0.00	3026.00	0.000
	81.6717 - 79.5656		2523.33	3106.11	0.812	0.00	3106.11	0.000
	79.5656 - 77.4594		2610.18	3187.27	0.819	0.00	3187.27	0.000
	77.4594 - 75.3533		2697.44	3269.47	0.825	0.00	3269.47	0.000
	75.3533 - 73.2472		2785.09	3352.72	0.831	0.00	3352.72	0.000
	73.2472 - 71.1411		2873.14	3437.01	0.836	0.00	3437.01	0.000
	71.1411 - 69.035		2961.59	3522.35	0.841	0.00	3522.35	0.000
	69.035 - 66.9289		3050.43	3608.73	0.845	0.00	3608.73	0.000
	66.9289 - 64.8228		3139.67	3696.17	0.849	0.00	3696.17	0.000
	64.8228 - 62.7167		3229.30	3784.65	0.853	0.00	3784.65	0.000
	62.7167 - 60.6106		3319.31	3874.18	0.857	0.00	3874.18	0.000
	60.6106 - 58.5044		3409.72	3964.75	0.860	0.00	3964.75	0.000
	58.5044 - 56.3983		3500.50	4056.38	0.863	0.00	4056.38	0.000
	56.3983 - 54.2922		3591.68	4149.04	0.866	0.00	4149.04	0.000
	54.2922 - 52.1861		3683.30	4242.76	0.868	0.00	4242.76	0.000
	52.1861 - 50.08		3775.41	4337.52	0.870	0.00	4337.52	0.000
	50.08 - 43.91		1987.55	4621.15	0.430	0.00	4621.15	0.000
L6	50.08 - 43.91	TP53.5x42.5334x0.54	2060.69	4903.43	0.420	0.00	4903.43	0.000
	43.91 - 41.6516		4047.99	4903.43	0.826	0.00	4903.43	0.000
	41.6516 - 39.3932		4148.93	5018.90	0.827	0.00	5018.90	0.000
	39.3932 - 37.1347		4250.26	5135.72	0.828	0.00	5135.72	0.000
	37.1347 - 34.8763		4351.97	5253.88	0.828	0.00	5253.88	0.000
	34.8763 - 32.6179		4454.05	5373.39	0.829	0.00	5373.39	0.000
	32.6179 - 30.3595		4556.50	5494.24	0.829	0.00	5494.24	0.000
	30.3595 - 28.1011		4659.32	5616.43	0.830	0.00	5616.43	0.000
	28.1011 - 25.8426		4762.48	5739.97	0.830	0.00	5739.97	0.000
	25.8426 - 23.5842		4865.99	5864.86	0.830	0.00	5864.86	0.000
	23.5842 - 21.3258		4969.84	5991.08	0.830	0.00	5991.08	0.000
	21.3258 - 19.0674		5074.02	6118.66	0.829	0.00	6118.66	0.000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 33 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{ux} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M_{uy} kip-ft	ϕM_{uy} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
	19.0674 - 16.8089		5178.52	6247.57	0.829	0.00	6247.57	0.000
	16.8089 - 14.5505		5283.33	6377.83	0.828	0.00	6377.83	0.000
	14.5505 - 12.2921		5388.45	6509.43	0.828	0.00	6509.43	0.000
	12.2921 - 10.0337		5493.88	6642.38	0.827	0.00	6642.38	0.000
	10.0337 - 7.77526		5599.59	6776.67	0.826	0.00	6776.67	0.000
	7.77526 - 5.51684		5705.59	6912.31	0.825	0.00	6912.31	0.000
	5.51684 - 3.25842		5811.87	7049.29	0.824	0.00	7049.29	0.000
	3.25842 - 1		5918.42	7187.62	0.823	0.00	7187.62	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	184 - 182.964	TP19.42x15.5x0.1875	1.08	343.65	0.003	0.26	438.09	0.001
	182.964 - 181.929		1.11	348.78	0.003	0.26	438.09	0.001
	181.929 - 180.893		1.14	353.91	0.003	0.26	451.35	0.001
	180.893 - 179.857		1.17	359.04	0.003	0.26	464.80	0.001
	179.857 - 178.821		1.20	364.16	0.003	0.26	478.45	0.001
	178.821 - 177.786		1.23	369.29	0.003	0.26	492.29	0.001
	177.786 - 176.75		1.26	374.42	0.003	0.26	506.34	0.001
	176.75 - 175.714		1.29	379.55	0.003	0.26	520.58	0.000
	175.714 - 174.679		1.32	384.68	0.003	0.26	535.02	0.000
	174.679 - 173.643		1.35	389.81	0.003	0.26	549.65	0.000
	173.643 - 172.607		1.38	394.94	0.003	0.26	564.49	0.000
	172.607 - 171.571		1.41	400.07	0.004	0.26	579.52	0.000
	171.571 - 170.536		1.44	405.20	0.004	0.26	594.75	0.000
	170.536 - 169.5		1.48	410.32	0.004	0.26	610.17	0.000
L2	169.5 - 166.5	TP26.41x18.373x0.25	0.73	422.50	0.002	0.12	667.94	0.000
	169.5 - 166.5		0.86	553.72	0.002	0.14	852.01	0.000
	166.5 - 164.856		1.65	564.41	0.003	0.26	852.01	0.000
	164.856 - 163.212		3.80	575.10	0.007	0.26	919.54	0.000
	163.212 - 161.568		3.85	585.80	0.007	0.26	919.54	0.000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 34 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	161.568 - 159.924		3.90	596.49	0.007	0.26	954.27	0.000
	159.924 - 158.281		3.95	607.18	0.007	0.26	989.65	0.000
	158.281 - 156.637		4.00	617.88	0.006	0.26	1025.67	0.000
	156.637 - 154.993		4.05	628.57	0.006	0.26	1062.33	0.000
	154.993 - 153.349		4.10	639.26	0.006	0.26	1099.64	0.000
	153.349 - 151.705		5.65	649.96	0.009	0.26	1176.19	0.000
	151.705 - 150.061		5.69	660.65	0.009	0.26	1176.19	0.000
	150.061 - 148.417		5.93	671.34	0.009	0.26	1216.90	0.000
	148.417 - 146.773		5.97	682.03	0.009	0.26	1255.32	0.000
	146.773 - 145.129		6.01	692.73	0.009	0.26	1295.84	0.000
	145.129 - 143.486		6.05	703.42	0.009	0.26	1337.02	0.000
	143.486 - 141.842		9.65	714.11	0.014	0.68	1421.29	0.000
	141.842 - 140.198		9.67	724.81	0.013	0.49	1421.29	0.000
	140.198 - 138.554		9.69	735.50	0.013	0.49	1464.39	0.000
	138.554 - 136.91		9.71	743.95	0.013	0.49	1508.14	0.000
	136.91 - 133.08		4.16	762.25	0.005	0.20	1547.88	0.000
L3	136.91 - 133.08	TP30.28x25.0648x0.375	5.70	1128.58	0.005	0.29	2203.63	0.000
	133.08 - 132.023		9.88	1138.77	0.009	0.49	2356.37	0.000
	132.023 - 130.965		9.90	1148.96	0.009	0.49	2399.44	0.000
	130.965 - 129.908		28.29	1159.16	0.024	0.96	2486.74	0.000
	129.908 - 128.851		28.39	1169.35	0.024	0.96	2530.98	0.000
	128.851 - 127.793		28.49	1179.54	0.024	0.96	2575.61	0.000
	127.793 - 126.736		28.59	1189.73	0.024	0.96	2620.63	0.000
	126.736 - 125.678		28.69	1199.93	0.024	0.96	2666.03	0.000
	125.678 - 124.621		28.79	1210.12	0.024	0.96	2711.83	0.000
	124.621 - 123.564		28.89	1220.31	0.024	0.96	2758.02	0.000
	123.564 - 122.506		30.84	1230.51	0.025	3.88	2804.60	0.001
	122.506 - 121.449		30.94	1240.70	0.025	3.88	2851.57	0.001
	121.449 - 120.392		31.04	1250.89	0.025	3.88	2898.93	0.001
	120.392 - 119.334		31.14	1261.09	0.025	3.88	2946.68	0.001

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	17004.67 - CT5448	Page	35 of 42
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date	08:11:50 06/07/18
	Client	AT&T Mobility	Designed by	TJL

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$		
L4	119.334 - 118.277	TP35.88x30.28x0.415	31.24	1271.28	0.025	3.88	2994.81	0.001		
	118.277 - 117.219		31.34	1281.47	0.024	3.87	3043.34	0.001		
	117.219 - 116.162		31.44	1291.66	0.024	3.87	3092.26	0.001		
	116.162 - 115.105		31.54	1301.86	0.024	3.87	3141.57	0.001		
	115.105 - 114.047		31.64	1312.05	0.024	3.87	3191.27	0.001		
	114.047 - 112.99		37.84	1322.24	0.029	4.30	3241.36	0.001		
	112.99 - 111.937		37.94	1472.86	0.026	4.30	3629.75	0.001		
	111.937 - 110.885		38.04	1484.40	0.026	4.30	3687.23	0.001		
	110.885 - 109.832		38.13	1495.94	0.025	4.30	3745.16	0.001		
	109.832 - 108.779		38.23	1507.48	0.025	4.30	3803.54	0.001		
	108.779 - 107.727		38.33	1519.01	0.025	4.29	3862.38	0.001		
	107.727 - 106.674		38.43	1530.55	0.025	4.29	3921.66	0.001		
	106.674 - 105.622		38.53	1542.09	0.025	4.29	3981.40	0.001		
	105.622 - 104.569		38.62	1553.63	0.025	4.29	4041.58	0.001		
	104.569 - 103.516		38.72	1565.16	0.025	4.29	4102.23	0.001		
	103.516 - 102.464		38.82	1576.70	0.025	4.29	4163.32	0.001		
	102.464 - 101.411		38.92	1588.24	0.025	4.29	4224.86	0.001		
	101.411 - 100.358		39.02	1599.78	0.024	4.29	4286.85	0.001		
	100.358 - 99.3058		39.11	1611.31	0.024	4.29	4349.30	0.001		
	99.3058 - 98.2532		39.21	1622.85	0.024	4.28	4412.20	0.001		
	98.2532 - 97.2005		39.31	1634.39	0.024	4.28	4475.55	0.001		
	97.2005 - 96.1479		39.41	1645.92	0.024	4.28	4539.35	0.001		
	96.1479 - 95.0953		39.51	1657.46	0.024	4.28	4603.60	0.001		
	95.0953 - 94.0426		39.61	1669.00	0.024	4.28	4668.30	0.001		
	94.0426 - 92.99		39.70	1680.54	0.024	4.28	4733.46	0.001		
	92.99 - 87.99		19.58	1735.34	0.011	2.06	5049.12	0.000		
	L5		92.99 - 87.99	TP44.88x33.93x0.485	20.84	1976.33	0.011	2.22	5590.75	0.000
			87.99 - 85.8839		40.61	2003.20	0.020	4.27	5744.87	0.001
			85.8839 - 83.7778		40.80	2030.07	0.020	4.27	5901.09	0.001
			83.7778 - 81.6717		41.00	2056.94	0.020	4.27	6059.41	0.001
81.6717 - 79.5656		41.19	2083.81		0.020	4.27	6219.82	0.001		

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	17004.67 - CT5448	Page	36 of 42
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date	08:11:50 06/07/18
	Client	AT&T Mobility	Designed by	TJL

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	79.5656 - 77.4594		41.38	2110.68	0.020	4.27	6382.32	0.001
	77.4594 - 75.3533		41.57	2137.55	0.019	4.26	6546.92	0.001
	75.3533 - 73.2472		41.76	2164.42	0.019	4.26	6713.62	0.001
	73.2472 - 71.1411		41.95	2191.29	0.019	4.26	6882.42	0.001
	71.1411 - 69.035		42.14	2218.16	0.019	4.26	7053.31	0.001
	69.035 - 66.9289		42.33	2245.03	0.019	4.26	7226.30	0.001
	66.9289 - 64.8228		42.51	2271.90	0.019	4.26	7401.38	0.001
	64.8228 - 62.7167		42.70	2298.77	0.019	4.25	7578.56	0.001
	62.7167 - 60.6106		42.89	2325.64	0.018	4.25	7757.83	0.001
	60.6106 - 58.5044		43.07	2352.51	0.018	4.25	7939.20	0.001
	58.5044 - 56.3983		43.25	2379.38	0.018	4.25	8122.67	0.001
	56.3983 - 54.2922		43.44	2406.25	0.018	4.25	8308.23	0.001
	54.2922 - 52.1861		43.70	2433.12	0.018	4.25	8495.92	0.000
	52.1861 - 50.08		43.88	2459.99	0.018	4.16	8685.67	0.000
L6	50.08 - 43.91	TP53.5x42.5334x0.54	22.14	2538.71	0.009	2.04	9253.58	0.000
	43.91 - 41.6516		44.84	2793.60	0.016	4.16	9818.83	0.000
	41.6516 - 39.3932		45.01	2825.73	0.016	4.16	10050.08	0.000
	39.3932 - 37.1347		45.18	2857.86	0.016	4.16	10284.00	0.000
	37.1347 - 34.8763		45.35	2889.99	0.016	4.16	10520.58	0.000
	34.8763 - 32.6179		45.51	2922.12	0.016	4.16	10759.92	0.000
	32.6179 - 30.3595		45.67	2954.25	0.015	4.16	11001.92	0.000
	30.3595 - 28.1011		45.82	2986.38	0.015	4.16	11246.58	0.000
	28.1011 - 25.8426		45.97	3018.51	0.015	4.16	11494.00	0.000
	25.8426 - 23.5842		46.12	3050.63	0.015	4.16	11744.08	0.000
	23.5842 - 21.3258		46.27	3082.76	0.015	4.16	11996.83	0.000
	21.3258 - 19.0674		46.41	3114.89	0.015	4.16	12252.25	0.000
	19.0674 - 16.8089		46.55	3147.02	0.015	4.15	12510.42	0.000
	16.8089 - 14.5505		46.68	3179.15	0.015	4.15	12771.25	0.000
	14.5505 - 12.2921		46.81	3211.28	0.015	4.15	13034.75	0.000
	12.2921 - 10.0337		46.94	3243.41	0.014	4.15	13301.00	0.000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 37 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	10.0337 - 7.77526		47.07	3275.54	0.014	4.15	13569.92	0.000
	7.77526 - 5.51684		47.19	3307.67	0.014	4.15	13841.50	0.000
	5.51684 - 3.25842		47.31	3339.80	0.014	4.15	14115.83	0.000
	3.25842 - 1		47.42	3371.93	0.014	4.15	14392.83	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Ratio V_u	Ratio T_u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		ϕP_n	ϕM_{ux}	ϕM_{uy}	ϕV_n	ϕT_n			
L1	184 - 182.964	0.482	0.034	0.000	0.003	0.001	0.516	1.000	4.8.2 ✓
	182.964 - 181.929	0.482	0.034	0.000	0.003	0.001	0.516	1.000	4.8.2 ✓
	181.929 - 180.893	0.469	0.038	0.000	0.003	0.001	0.507	1.000	4.8.2 ✓
	180.893 - 179.857	0.457	0.042	0.000	0.003	0.001	0.499	1.000	4.8.2 ✓
	179.857 - 178.821	0.446	0.046	0.000	0.003	0.001	0.492	1.000	4.8.2 ✓
	178.821 - 177.786	0.435	0.049	0.000	0.003	0.001	0.484	1.000	4.8.2 ✓
	177.786 - 176.75	0.424	0.053	0.000	0.003	0.001	0.477	1.000	4.8.2 ✓
	176.75 - 175.714	0.414	0.056	0.000	0.003	0.000	0.471	1.000	4.8.2 ✓
	175.714 - 174.679	0.405	0.060	0.000	0.003	0.000	0.464	1.000	4.8.2 ✓
	174.679 - 173.643	0.395	0.063	0.000	0.003	0.000	0.458	1.000	4.8.2 ✓
	173.643 - 172.607	0.386	0.066	0.000	0.003	0.000	0.452	1.000	4.8.2 ✓
	172.607 - 171.571	0.377	0.069	0.000	0.004	0.000	0.447	1.000	4.8.2 ✓
	171.571 - 170.536	0.369	0.072	0.000	0.004	0.000	0.441	1.000	4.8.2 ✓
	170.536 - 169.5	0.361	0.075	0.000	0.004	0.000	0.436	1.000	4.8.2 ✓
	169.5 - 166.5	0.152	0.039	0.000	0.002	0.000	0.191	1.000	4.8.2 ✓
L2	169.5 - 166.5	0.159	0.038	0.000	0.002	0.000	0.197	1.000	4.8.2 ✓
	166.5 - 164.856	0.282	0.068	0.000	0.003	0.000	0.350	1.000	4.8.2 ✓
	164.856 - 163.212	0.595	0.079	0.000	0.007	0.000	0.674	1.000	4.8.2 ✓

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	17004.67 - CT5448	Page	38 of 42
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date	08:11:50 06/07/18
	Client	AT&T Mobility	Designed by	TJL

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		P_u	M_{ux}	M_{uy}	V_u	T_u			
	163.212 - 161.568	0.595	0.079	0.000	0.007	0.000	0.674	1.000	4.8.2 ✓
	161.568 - 159.924	0.572	0.089	0.000	0.007	0.000	0.661	1.000	4.8.2 ✓
	159.924 - 158.281	0.550	0.099	0.000	0.007	0.000	0.648	1.000	4.8.2 ✓
	158.281 - 156.637	0.529	0.108	0.000	0.006	0.000	0.637	1.000	4.8.2 ✓
	156.637 - 154.993	0.509	0.116	0.000	0.006	0.000	0.625	1.000	4.8.2 ✓
	154.993 - 153.349	0.491	0.124	0.000	0.006	0.000	0.615	1.000	4.8.2 ✓
	153.349 - 151.705	0.635	0.142	0.000	0.009	0.000	0.778	1.000	4.8.2 ✓
	151.705 - 150.061	0.636	0.142	0.000	0.009	0.000	0.778	1.000	4.8.2 ✓
	150.061 - 148.417	0.615	0.154	0.000	0.009	0.000	0.769	1.000	4.8.2 ✓
	148.417 - 146.773	0.592	0.164	0.000	0.009	0.000	0.756	1.000	4.8.2 ✓
	146.773 - 145.129	0.570	0.174	0.000	0.009	0.000	0.744	1.000	4.8.2 ✓
	145.129 - 143.486	0.550	0.183	0.000	0.009	0.000	0.733	1.000	4.8.2 ✓
	143.486 - 141.842	0.794	0.205	0.000	0.014	0.000	0.999	1.000	4.8.2 ✓
	141.842 - 140.198	0.794	0.205	0.000	0.013	0.000	0.999	1.000	4.8.2 ✓
	140.198 - 138.554	0.764	0.221	0.000	0.013	0.000	0.985	1.000	4.8.2 ✓
	138.554 - 136.91	0.736	0.235	0.000	0.013	0.000	0.972	1.000	4.8.2 ✓
	136.91 - 133.08	0.287	0.104	0.000	0.005	0.000	0.392	1.000	4.8.2 ✓
L3	136.91 - 133.08	0.303	0.102	0.000	0.005	0.000	0.405	1.000	4.8.2 ✓
	133.08 - 132.023	0.476	0.196	0.000	0.009	0.000	0.672	1.000	4.8.2 ✓
	132.023 - 130.965	0.466	0.201	0.000	0.009	0.000	0.667	1.000	4.8.2 ✓
	130.965 - 129.908	0.123	0.555	0.000	0.024	0.000	0.679	1.000	4.8.2 ✓
	129.908 - 128.851	0.122	0.569	0.000	0.024	0.000	0.692	1.000	4.8.2 ✓
	128.851 - 127.793	0.120	0.583	0.000	0.024	0.000	0.704	1.000	4.8.2 ✓
	127.793 - 126.736	0.119	0.596	0.000	0.024	0.000	0.715	1.000	4.8.2 ✓
	126.736 - 125.678	0.117	0.608	0.000	0.024	0.000	0.726	1.000	4.8.2 ✓
	125.678 - 124.621	0.116	0.621	0.000	0.024	0.000	0.737	1.000	4.8.2 ✓

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	17004.67 - CT5448	Page	39 of 42
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date	08:11:50 06/07/18
	Client	AT&T Mobility	Designed by	TJL

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		P_u	M_{ux}	M_{uy}	V_u	T_u			
	124.621 - 123.564	0.114	0.632	0.000	0.024	0.000	0.747	1.000	4.8.2 ✓
	123.564 - 122.506	0.125	0.648	0.000	0.025	0.001	0.773	1.000	4.8.2 ✓
	122.506 - 121.449	0.123	0.660	0.000	0.025	0.001	0.784	1.000	4.8.2 ✓
	121.449 - 120.392	0.121	0.672	0.000	0.025	0.001	0.794	1.000	4.8.2 ✓
	120.392 - 119.334	0.120	0.683	0.000	0.025	0.001	0.804	1.000	4.8.2 ✓
	119.334 - 118.277	0.118	0.694	0.000	0.025	0.001	0.813	1.000	4.8.2 ✓
	118.277 - 117.219	0.117	0.705	0.000	0.024	0.001	0.823	1.000	4.8.2 ✓
	117.219 - 116.162	0.116	0.715	0.000	0.024	0.001	0.831	1.000	4.8.2 ✓
	116.162 - 115.105	0.114	0.725	0.000	0.024	0.001	0.840	1.000	4.8.2 ✓
	115.105 - 114.047	0.113	0.735	0.000	0.024	0.001	0.848	1.000	4.8.2 ✓
	114.047 - 112.99	0.124	0.744	0.000	0.029	0.001	0.869	1.000	4.8.2 ✓
L4	112.99 - 111.937	0.111	0.687	0.000	0.026	0.001	0.799	1.000	4.8.2 ✓
	111.937 - 110.885	0.110	0.698	0.000	0.026	0.001	0.808	1.000	4.8.2 ✓
	110.885 - 109.832	0.109	0.708	0.000	0.025	0.001	0.818	1.000	4.8.2 ✓
	109.832 - 108.779	0.107	0.719	0.000	0.025	0.001	0.827	1.000	4.8.2 ✓
	108.779 - 107.727	0.106	0.729	0.000	0.025	0.001	0.835	1.000	4.8.2 ✓
	107.727 - 106.674	0.105	0.738	0.000	0.025	0.001	0.844	1.000	4.8.2 ✓
	106.674 - 105.622	0.104	0.747	0.000	0.025	0.001	0.852	1.000	4.8.2 ✓
	105.622 - 104.569	0.102	0.756	0.000	0.025	0.001	0.859	1.000	4.8.2 ✓
	104.569 - 103.516	0.101	0.765	0.000	0.025	0.001	0.867	1.000	4.8.2 ✓
	103.516 - 102.464	0.100	0.773	0.000	0.025	0.001	0.874	1.000	4.8.2 ✓
	102.464 - 101.411	0.099	0.782	0.000	0.025	0.001	0.881	1.000	4.8.2 ✓
	101.411 - 100.358	0.098	0.789	0.000	0.024	0.001	0.888	1.000	4.8.2 ✓
	100.358 - 99.3058	0.097	0.797	0.000	0.024	0.001	0.895	1.000	4.8.2 ✓
	99.3058 - 98.2532	0.096	0.804	0.000	0.024	0.001	0.901	1.000	4.8.2 ✓
	98.2532 - 97.2005	0.095	0.811	0.000	0.024	0.001	0.907	1.000	4.8.2 ✓

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	17004.67 - CT5448	Page	40 of 42
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date	08:11:50 06/07/18
	Client	AT&T Mobility	Designed by	TJL

Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	97.2005 - 96.1479	0.094	0.818	0.000	0.024	0.001	0.913	1.000	4.8.2 ✓
	96.1479 - 95.0953	0.093	0.825	0.000	0.024	0.001	0.918	1.000	4.8.2 ✓
	95.0953 - 94.0426	0.092	0.831	0.000	0.024	0.001	0.924	1.000	4.8.2 ✓
	94.0426 - 92.99	0.091	0.838	0.000	0.024	0.001	0.929	1.000	4.8.2 ✓
	92.99 - 87.99	0.042	0.416	0.000	0.011	0.000	0.458	1.000	4.8.2 ✓
L5	92.99 - 87.99	0.044	0.405	0.000	0.011	0.000	0.449	1.000	4.8.2 ✓
	87.99 - 85.8839	0.081	0.790	0.000	0.020	0.001	0.871	1.000	4.8.2 ✓
	85.8839 - 83.7778	0.079	0.798	0.000	0.020	0.001	0.878	1.000	4.8.2 ✓
	83.7778 - 81.6717	0.078	0.805	0.000	0.020	0.001	0.884	1.000	4.8.2 ✓
	81.6717 - 79.5656	0.076	0.812	0.000	0.020	0.001	0.889	1.000	4.8.2 ✓
	79.5656 - 77.4594	0.075	0.819	0.000	0.020	0.001	0.894	1.000	4.8.2 ✓
	77.4594 - 75.3533	0.074	0.825	0.000	0.019	0.001	0.899	1.000	4.8.2 ✓
	75.3533 - 73.2472	0.072	0.831	0.000	0.019	0.001	0.904	1.000	4.8.2 ✓
	73.2472 - 71.1411	0.071	0.836	0.000	0.019	0.001	0.908	1.000	4.8.2 ✓
	71.1411 - 69.035	0.070	0.841	0.000	0.019	0.001	0.911	1.000	4.8.2 ✓
	69.035 - 66.9289	0.069	0.845	0.000	0.019	0.001	0.915	1.000	4.8.2 ✓
	66.9289 - 64.8228	0.068	0.849	0.000	0.019	0.001	0.918	1.000	4.8.2 ✓
	64.8228 - 62.7167	0.067	0.853	0.000	0.019	0.001	0.920	1.000	4.8.2 ✓
	62.7167 - 60.6106	0.066	0.857	0.000	0.018	0.001	0.923	1.000	4.8.2 ✓
	60.6106 - 58.5044	0.065	0.860	0.000	0.018	0.001	0.925	1.000	4.8.2 ✓
	58.5044 - 56.3983	0.064	0.863	0.000	0.018	0.001	0.927	1.000	4.8.2 ✓
	56.3983 - 54.2922	0.063	0.866	0.000	0.018	0.001	0.929	1.000	4.8.2 ✓
	54.2922 - 52.1861	0.062	0.868	0.000	0.018	0.000	0.930	1.000	4.8.2 ✓
	52.1861 - 50.08	0.061	0.870	0.000	0.018	0.000	0.931	1.000	4.8.2 ✓
	50.08 - 43.91	0.029	0.430	0.000	0.009	0.000	0.459	1.000	4.8.2 ✓
L6	50.08 - 43.91	0.030	0.420	0.000	0.008	0.000	0.450	1.000	4.8.2 ✓

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 41 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	43.91 - 41.6516	0.059	0.826	0.000	0.016	0.000	0.884	1.000	4.8.2 ✓
	41.6516 - 39.3932	0.058	0.827	0.000	0.016	0.000	0.885	1.000	4.8.2 ✓
	39.3932 - 37.1347	0.057	0.828	0.000	0.016	0.000	0.885	1.000	4.8.2 ✓
	37.1347 - 34.8763	0.056	0.828	0.000	0.016	0.000	0.884	1.000	4.8.2 ✓
	34.8763 - 32.6179	0.055	0.829	0.000	0.016	0.000	0.884	1.000	4.8.2 ✓
	32.6179 - 30.3595	0.054	0.829	0.000	0.015	0.000	0.884	1.000	4.8.2 ✓
	30.3595 - 28.1011	0.053	0.830	0.000	0.015	0.000	0.883	1.000	4.8.2 ✓
	28.1011 - 25.8426	0.053	0.830	0.000	0.015	0.000	0.882	1.000	4.8.2 ✓
	25.8426 - 23.5842	0.052	0.830	0.000	0.015	0.000	0.882	1.000	4.8.2 ✓
	23.5842 - 21.3258	0.051	0.830	0.000	0.015	0.000	0.881	1.000	4.8.2 ✓
	21.3258 - 19.0674	0.050	0.829	0.000	0.015	0.000	0.880	1.000	4.8.2 ✓
	19.0674 - 16.8089	0.050	0.829	0.000	0.015	0.000	0.879	1.000	4.8.2 ✓
	16.8089 - 14.5505	0.049	0.828	0.000	0.015	0.000	0.877	1.000	4.8.2 ✓
	14.5505 - 12.2921	0.048	0.828	0.000	0.015	0.000	0.876	1.000	4.8.2 ✓
	12.2921 - 10.0337	0.048	0.827	0.000	0.014	0.000	0.875	1.000	4.8.2 ✓
	10.0337 - 7.77526	0.047	0.826	0.000	0.014	0.000	0.873	1.000	4.8.2 ✓
	7.77526 - 5.51684	0.046	0.825	0.000	0.014	0.000	0.872	1.000	4.8.2 ✓
	5.51684 - 3.25842	0.046	0.824	0.000	0.014	0.000	0.870	1.000	4.8.2 ✓
	3.25842 - 1	0.045	0.823	0.000	0.014	0.000	0.869	1.000	4.8.2 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	184 - 166.5	Pole	TP19.42x15.5x0.1875	1	-6.36	13.20	51.6	Pass
L2	166.5 - 133.08	Pole	TP26.41x18.373x0.25	2	-52.88	66.61	99.9	Pass
L3	133.08 - 112.99	Pole	TP30.28x25.0648x0.375	3	-23.33	187.93	86.9	Pass
L4	112.99 - 87.99	Pole	TP35.88x30.28x0.415	4	-28.65	315.05	92.9	Pass
L5	87.99 - 43.91	Pole	TP44.88x33.93x0.485	5	-43.91	723.51	93.1	Pass

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.67 - CT5448	Page 42 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 08:11:50 06/07/18
	Client AT&T Mobility	Designed by TJL

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail	
L6	43.91 - 1	Pole	TP53.5x42.5334x0.54	6	-50.20	884.57	88.5	Pass	
							Summary		
							Pole (L2)	99.9	Pass
							Base Plate	88.6	Pass
							RATING =	99.9	Pass

Program Version 7.0.5.1 - 2/1/2016 File:J:/Jobs/1700400.WI/67_Manchester Central CT5448/04_Structural/5C/Tower/Backup Documentation/ERI Files/183' EEI Monopole Manchester, CT.eri

Caisson Foundation:

Input Data:

Shear Force =	S := 47k	<i>USER INPUT-FROM trnTower</i>
Overturing Moment =	M := 6025ft-k	<i>USER INPUT-FROM trnTower</i>
Applied Axial Load =	A1 := 66k	<i>USER INPUT-FROM trnTower</i>
Bending Moment =	Mu := 6304ft-k	<i>USER INPUT-FROM LPILE</i>
Moment Capacity =	Mn := 7489ft-k	<i>USER INPUT-FROM LPILE</i>
Foundation Diameter =	d := 7.0ft	<i>USER INPUT</i>
Overall Length of Caisson =	Lc := 32ft	<i>USER INPUT</i>
Depth From Top of Caisson to Grade =	Lpag := 1.0ft	<i>USER INPUT</i>
Number of Rebar =	n := 27	<i>USER INPUT</i>
Area of Rebar =	Ar := 1.560in ²	<i>USER INPUT</i>
Rebar Yield Strength =	fy := 60ksi	<i>USER INPUT</i>
Concrete Comp Strength =	fc := 4ksi	<i>USER INPUT</i>

Check Moment Capacity:

Factor of Safety =	$FS := \frac{0.9Mn}{Mu} = 1.069$
Factor of Safety Required =	FS _{reqd} := 1.0
	FOSCheck := if(FS ≥ FS _{reqd} , "OK", "NO GOOD")
	FOSCheck = "OK"

Manchester Green Caisson Analysis.Ipo

LPILE Plus for Windows, Version 5.0 (5.0.47)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

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This program is licensed to:

TJL
Centek Engineering

Files Used for Analysis

Path to file locations: J:\Jobs\1700400.WI\67_Manchester Central
CT5448\04_Structural\5C\Tower\Backup Documentati on\Foundati on\
Name of input data file: Manchester Green Caisson Analysis.Ipd
Name of output file: Manchester Green Caisson Analysis.Ipo
Name of plot output file: Manchester Green Caisson Analysis.Ipp
Name of runtime file: Manchester Green Caisson Analysis.Ipr

Time and Date of Analysis

Date: June 7, 2018 Time: 8:14:39

Problem Title

17004.67 - CT5448

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Manchester Green Caisson Analysis.lpo

Basic Program Options:

Analysis Type 3:

- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:

- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:

- Number of pile increments = 100
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:

- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 8

Pile Structural Properties and Geometry

Pile Length = 384.00 in

Depth of ground surface below top of pile = 12.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	84.00000000	2443920.	5541.8000	3604997.
2	384.0000	84.00000000	2443920.	5541.8000	3604997.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness

Manchester Green Caisson Analysis.lpo

that the above values of moment of inertia and modulus of are not used for any computations other than total stress due to combined axial loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 12.000 in
 Distance from top of pile to bottom of layer = 60.000 in
 p-y subgrade modulus k for top of soil layer = 1.000 lbs/in**3
 p-y subgrade modulus k for bottom of layer = 1.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 60.000 in
 Distance from top of pile to bottom of layer = 120.000 in
 p-y subgrade modulus k for top of soil layer = 40.000 lbs/in**3
 p-y subgrade modulus k for bottom of layer = 40.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 120.000 in
 Distance from top of pile to bottom of layer = 192.000 in
 p-y subgrade modulus k for top of soil layer = 40.000 lbs/in**3
 p-y subgrade modulus k for bottom of layer = 40.000 lbs/in**3

Layer 4 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 192.000 in
 Distance from top of pile to bottom of layer = 420.000 in
 p-y subgrade modulus k for top of soil layer = 200.000 lbs/in**3
 p-y subgrade modulus k for bottom of layer = 200.000 lbs/in**3

(Depth of lowest layer extends 36.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 8 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	12.00	0.05800

Manchester Green Caisson Analysis.Ipo

2	60.00	0.05800
3	60.00	0.04100
4	120.00	0.04100
5	120.00	0.04100
6	192.00	0.04100
7	192.00	0.04100
8	420.00	0.04100

 Shear Strength of Soils

Shear strength parameters with depth defined using 8 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	12.000	0.00000	30.00	-----	-----
2	60.000	0.00000	30.00	-----	-----
3	60.000	0.00000	38.00	-----	-----
4	120.000	0.00000	38.00	-----	-----
5	120.000	0.00000	38.00	-----	-----
6	192.000	0.00000	38.00	-----	-----
7	192.000	0.00000	38.00	-----	-----
8	420.000	0.00000	38.00	-----	-----

Notes:

- (1) Cohesion = uniaxial compressive strength for rock materials.
- (2) Values of E50 are reported for clay strata.
- (3) Default values will be generated for E50 when input values are 0.
- (4) RQD and k_rm are reported only for weak rock strata.

 Loading Type

Static loading criteria was used for computation of p-y curves.

 Pile-head Loading and Pile-head Fixity Conditions

Manchester Green Caisson Analysis.lpo

Number of Loads specified = 2

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)

Shear force at pile head = 47000.000 lbs

Bending moment at pile head = 72300000.000 in-lbs

Axial load at pile head = 66000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)

Shear force at pile head = 18000.000 lbs

Bending moment at pile head = 27768000.000 in-lbs

Axial load at pile head = 66000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 84.0000 in

Material Properties:

Compressive Strength of Concrete = 4.000 kip/in**2

Yield Stress of Reinforcement = 60. kip/in**2

Modulus of Elasticity of Reinforcement = 29000. kip/in**2

Number of Reinforcing Bars = 27

Area of Single Bar = 1.56000 in**2

Number of Rows of Reinforcing Bars = 27

Manchester Green Caisson Analysis.Ipo

Area of Steel = 42.120 in**2
 Area of Shaft = 5541.769 in**2
 Percentage of Steel Reinforcement = 0.760 percent
 Cover Thickness (edge to bar center) = 5.688 in

Unfactored Axial Squash Load Capacity = 21226.01 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	1.560	36.251
2	1.560	35.761
3	1.560	34.787
4	1.560	33.343
5	1.560	31.448
6	1.560	29.127
7	1.560	26.413
8	1.560	23.341
9	1.560	19.954
10	1.560	16.297
11	1.560	12.420
12	1.560	8.374
13	1.560	4.216
14	1.560	0.000
15	1.560	-4.216
16	1.560	-8.374
17	1.560	-12.420
18	1.560	-16.297
19	1.560	-19.954
20	1.560	-23.341
21	1.560	-26.413
22	1.560	-29.127
23	1.560	-31.448
24	1.560	-33.343
25	1.560	-34.787
26	1.560	-35.761
27	1.560	-36.251

Axial Thrust Force = 66000.00 lbs

Bending Max. Steel Moment Stress in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi
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Manchester Green Caisson Analysis. I po

psi

6045346. 750. 18882 12038461. 1410. 79912 17977019. 2070. 35643 23862421. 2729. 90421 29697712. 3392. 11282 29697712. 5996. 28914 29697712. 7052. 94422 29697712. 8102. 43873 29697712. 9160. 67759 29697712. 10218. 53286 29697712. 11276. 00246 29697712. 12333. 08446 29697712. 13389. 77602 29697712. 14446. 07537 29697712. 15501. 97978 29697712. 16557. 48745 29697712. 17612. 59555 29697712. 18667. 30272 29697712. 19715. 83594 29697712. 20756. 72218 29697712. 21810. 42237 29697712. 22863. 67789 29697712. 23916. 48716	9. 672554E+12 9. 630769E+12 9. 587743E+12 9. 544968E+12 9. 503268E+12 7. 919390E+12 6. 788048E+12 5. 939542E+12 5. 279593E+12 4. 751634E+12 4. 319667E+12 3. 959695E+12 3. 655103E+12 3. 394024E+12 3. 167756E+12 2. 969771E+12 2. 795079E+12 2. 639797E+12 2. 500860E+12 2. 375817E+12 2. 262683E+12 2. 159834E+12 2. 065928E+12	6. 250000E-07 0. 00000125 0. 00000188 0. 00000250 0. 00000313 0. 00000375 0. 00000438 0. 00000500 0. 00000563 0. 00000625 0. 00000688 0. 00000750 0. 00000813 0. 00000875 0. 00000938 0. 00001000 0. 00001063 0. 00001125 0. 00001188 0. 00001250 0. 00001313 0. 00001375 0. 00001438	0. 00002946 0. 00005583 0. 00008217 0. 00010851 0. 00013493 0. 00008667 0. 00009914 0. 00011186 0. 00012428 0. 00013671 0. 00014915 0. 00016160 0. 00017407 0. 00018656 0. 00019905 0. 00021156 0. 00022409 0. 00023662 0. 00024937 0. 00026239 0. 00027496 0. 00028755 0. 00030015	47. 13866276 44. 66753143 43. 82445556 43. 40278620 43. 17914540 23. 11277407 22. 66135687 22. 37217718 22. 09365445 21. 87295264 21. 69431287 21. 54722840 21. 42442936 21. 32071871 21. 23228878 21. 15628070 21. 09051150 21. 03327888 20. 99999875 20. 99114174 20. 94946271 20. 91268784 20. 88018125	104. 73066 196. 92922 287. 69326 377. 15165 465. 61554 298. 78096 340. 43279 382. 64898 423. 54600 464. 20867 504. 63631 544. 82819 584. 78371 624. 50213 663. 98279 703. 22495 742. 22796 780. 99098 820. 14370 859. 83048 897. 83134 935. 59328 973. 11539
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Manchester Green Caisson Analysis.lpo

29697712. 24968. 84677	1. 979847E+12	0. 00001500	0. 00031277	20. 85141724	1010. 39692
29697712. 26020. 75401	1. 900654E+12	0. 00001563	0. 00032541	20. 82595271	1047. 43706
30030413. 27072. 20523	1. 848025E+12	0. 00001625	0. 00033806	20. 80341464	1084. 23508
31112167. 28123. 19691	1. 843684E+12	0. 00001688	0. 00035072	20. 78348511	1120. 79022
32192771. 29173. 72822	1. 839587E+12	0. 00001750	0. 00036340	20. 76588625	1157. 10143
33272227. 30223. 79349	1. 835709E+12	0. 00001813	0. 00037610	20. 75038773	1193. 16815
34350527. 31273. 39014	1. 832028E+12	0. 00001875	0. 00038881	20. 73678428	1228. 98949
35427661. 32322. 51640	1. 828524E+12	0. 00001938	0. 00040154	20. 72489566	1264. 56447
36503625. 33371. 16759	1. 825181E+12	0. 00002000	0. 00041429	20. 71456915	1299. 89238
37578408. 34419. 34263	1. 821983E+12	0. 00002063	0. 00042705	20. 70566458	1334. 97216
38652012. 35467. 03516	1. 818918E+12	0. 00002125	0. 00043983	20. 69806677	1369. 80324
39724428. 36514. 24241	1. 815974E+12	0. 00002188	0. 00045263	20. 69166809	1404. 38469
40795645. 37560. 96289	1. 813140E+12	0. 00002250	0. 00046544	20. 68637091	1438. 71544
41865658. 38607. 19211	1. 810407E+12	0. 00002313	0. 00047827	20. 68209261	1472. 79470
42934467. 39652. 92466	1. 807767E+12	0. 00002375	0. 00049112	20. 67876059	1506. 62177
44002054. 40698. 16041	1. 805212E+12	0. 00002438	0. 00050398	20. 67630225	1540. 19540
46133548. 42787. 12264	1. 800334E+12	0. 00002563	0. 00052977	20. 67377633	1606. 57912
48260092. 44874. 04767	1. 795724E+12	0. 00002688	0. 00055562	20. 67409927	1671. 93860
50381626. 46958. 90540	1. 791347E+12	0. 00002813	0. 00058154	20. 67692810	1736. 26624
52498088. 49041. 66645	1. 787169E+12	0. 00002938	0. 00060753	20. 68197745	1799. 55414
54609419. 51122. 29833	1. 783165E+12	0. 00003063	0. 00063360	20. 68901199	1861. 79446
56715552. 53200. 77026	1. 779311E+12	0. 00003188	0. 00065974	20. 69783145	1922. 97895
58816429. 55277. 04686	1. 775590E+12	0. 00003313	0. 00068596	20. 70827061	1983. 09949
60911984. 57351. 09423	1. 771985E+12	0. 00003438	0. 00071226	20. 72018677	2042. 14756
63002147.	1. 768481E+12	0. 00003563	0. 00073863	20. 73345727	2100. 11441

Manchester Green Caisson Analysis.lpo

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60000.00000						
66343869.	1.740167E+12	0.00003813	0.00078807	20.67081732	2205.15006	
60000.00000						
67647204.	1.718024E+12	0.00003938	0.00081129	20.60422200	2252.82886	
60000.00000						
68803827.	1.693633E+12	0.00004063	0.00083389	20.52653414	2298.25976	
60000.00000						
69827958.	1.667533E+12	0.00004188	0.00085590	20.43950111	2341.58505	
60000.00000						
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60000.00000						
71645651.	1.614550E+12	0.00004438	0.00089893	20.25750929	2423.67205	
60000.00000						
72480445.	1.588612E+12	0.00004563	0.00092013	20.16732949	2462.89289	
60000.00000						
73195635.	1.561507E+12	0.00004688	0.00094073	20.06888598	2500.16358	
60000.00000						
73891154.	1.535401E+12	0.00004813	0.00096126	19.97428519	2536.56589	
60000.00000						
74567456.	1.510227E+12	0.00004938	0.00098173	19.88312906	2572.09741	
60000.00000						
75139500.	1.484237E+12	0.00005063	0.00100162	19.78498846	2605.86075	
60000.00000						
75709789.	1.459466E+12	0.00005188	0.00102153	19.69224018	2638.98036	
60000.00000						
76278283.	1.435827E+12	0.00005313	0.00104149	19.60450369	2671.45244	
60000.00000						
76818316.	1.412751E+12	0.00005438	0.00106473	19.58121461	2708.61411	
60000.00000						
77273118.	1.389180E+12	0.00005563	0.00108359	19.48030275	2737.79855	
60000.00000						
77726490.	1.366620E+12	0.00005688	0.00110249	19.38439268	2766.40422	
60000.00000						
78178397.	1.345005E+12	0.00005813	0.00112142	19.29316145	2794.42772	
60000.00000						
78589087.	1.323606E+12	0.00005938	0.00114005	19.20086378	2821.38031	
60000.00000						
78948866.	1.302249E+12	0.00006063	0.00115831	19.10620791	2847.17150	
60000.00000						
79307354.	1.281735E+12	0.00006188	0.00117661	19.01585287	2872.41693	
60000.00000						
79664564.	1.262013E+12	0.00006313	0.00119493	18.92955083	2897.11428	
60000.00000						
80020471.	1.243036E+12	0.00006438	0.00121328	18.84706646	2921.26058	
60000.00000						
80366489.	1.224632E+12	0.00006563	0.00123158	18.76698035	2944.74785	
60000.00000						

Manchester Green Caisson Analysis.lpo

80646071. 60000.00000	1. 205923E+12	0.00006688	0.00124931	18.68133169	2966.90203
80924525. 60000.00000	1. 187883E+12	0.00006813	0.00126707	18.59923786	2988.53911
81201810. 60000.00000	1. 170477E+12	0.00006938	0.00128486	18.52050358	3009.65607
81477935. 60000.00000	1. 153670E+12	0.00007063	0.00130268	18.44495612	3030.25064
81752910. 60000.00000	1. 137432E+12	0.00007188	0.00132052	18.37243527	3050.32053
82026683. 60000.00000	1. 121732E+12	0.00007313	0.00133839	18.30278081	3069.86251
82281488. 60000.00000	1. 106306E+12	0.00007438	0.00135610	18.23331159	3088.66617
82775114. 60000.00000	1. 076749E+12	0.00007688	0.00139692	18.17137510	3130.17846
83180386. 60000.00000	1. 047942E+12	0.00007938	0.00143047	18.02165955	3161.76803
83581857. 60000.00000	1. 020847E+12	0.00008188	0.00146412	17.88238066	3191.48693
83979494. 60000.00000	9. 953125E+11	0.00008438	0.00149788	17.75263220	3219.31698
84309693. 60000.00000	9. 704713E+11	0.00008688	0.00153085	17.62126404	3244.54116
84605864. 60000.00000	9. 466390E+11	0.00008938	0.00156349	17.49355084	3267.63302
84898589. 60000.00000	9. 240663E+11	0.00009188	0.00159623	17.37389106	3288.93589
85187850. 60000.00000	9. 026527E+11	0.00009438	0.00162907	17.26166385	3308.43252
85473566. 60000.00000	8. 823078E+11	0.00009688	0.00166202	17.15630347	3326.10469
85755708. 60000.00000	8. 629505E+11	0.00009938	0.00169507	17.05730921	3341.93429
85974984. 60000.00000	8. 439262E+11	0.00010188	0.00172721	16.95419937	3355.47850
86180564. 60000.00000	8. 256820E+11	0.00010438	0.00175927	16.85526270	3367.19810
86654761. 60000.00000	8. 108048E+11	0.00010688	0.00179550	16.80000025	3378.35876
86660796. 60000.00000	7. 923273E+11	0.00010938	0.00183437	16.77139145	3387.78887
86845513. 60000.00000	7. 762727E+11	0.00011188	0.00186547	16.67457765	3393.34734
87027254. 60000.00000	7. 608940E+11	0.00011438	0.00189667	16.58289832	3397.24147
87206010. 60000.00000	7. 461477E+11	0.00011688	0.00192798	16.49604303	3399.45361
87380367. 60000.00000	7. 319821E+11	0.00011938	0.00195939	16.41372138	3398.42620

Manchester Green Caisson Analysis.lpo

60000.00000						
87510085.	7.180315E+11	0.00012188	0.00198997	16.32795256	3390.80810	
60000.00000						
87624659.	7.045199E+11	0.00012438	0.00202030	16.24362570	3388.07163	
60000.00000						
87737885.	6.915301E+11	0.00012688	0.00205073	16.16341442	3392.87929	
60000.00000						
87849750.	6.790319E+11	0.00012938	0.00208127	16.08709341	3396.46563	
60000.00000						
87960240.	6.669971E+11	0.00013188	0.00211191	16.01445490	3398.81568	
60000.00000						
88069335.	6.553997E+11	0.00013438	0.00214265	15.94530612	3399.91407	
60000.00000						
88175441.	6.442041E+11	0.00013688	0.00217358	15.88007265	3395.69882	
60000.00000						
88279558.	6.333959E+11	0.00013938	0.00220466	15.81816119	3388.87605	
60000.00000						
88382688.	6.229617E+11	0.00014188	0.00223581	15.75903600	3383.40951	
60000.00000						
88484801.	6.128817E+11	0.00014438	0.00226706	15.70255941	3388.63164	
60000.00000						
88585858.	6.031378E+11	0.00014688	0.00229839	15.64860123	3392.88430	
60000.00000						
88670367.	5.936092E+11	0.00014938	0.00232928	15.59349900	3396.09110	
60000.00000						
88736152.	5.842710E+11	0.00015188	0.00235965	15.53675956	3398.30219	
60000.00000						
88801067.	5.752296E+11	0.00015438	0.00239010	15.48239833	3399.60778	
60000.00000						
88864879.	5.664693E+11	0.00015688	0.00242064	15.43038529	3399.54820	
60000.00000						
88864879.	5.575836E+11	0.00015938	0.00245437	15.39999908	3392.94688	
60000.00000						
88864879.	5.489722E+11	0.00016188	0.00249287	15.39999908	3385.08602	
60000.00000						
88931021.	5.410252E+11	0.00016438	0.00253137	15.39999908	3379.85511	
60000.00000						
89181496.	5.344209E+11	0.00016688	0.00256610	15.37738341	3385.65547	
60000.00000						
89234703.	5.268470E+11	0.00016938	0.00259587	15.32616895	3389.49523	
60000.00000						
89287445.	5.194906E+11	0.00017188	0.00262570	15.27681452	3392.74877	
60000.00000						
89339714.	5.123424E+11	0.00017438	0.00265560	15.22924501	3395.40968	
60000.00000						
89442822.	4.986359E+11	0.00017938	0.00271559	15.13918537	3398.92730	
60000.00000						
89543689.	4.856607E+11	0.00018438	0.00277588	15.05563205	3399.31952	
60000.00000						

Manchester Green Caisson Analysis.lpo

89639495.	4. 733439E+11	0. 00018938	0. 00283678	14. 97971159	3389. 70133
60000. 00000					
89715993.	4. 615614E+11	0. 00019438	0. 00289674	14. 90286237	3380. 33145
60000. 00000					
89767817.	4. 502461E+11	0. 00019938	0. 00295540	14. 82334203	3371. 72237
60000. 00000					
89818815.	4. 394804E+11	0. 00020438	0. 00301422	14. 74847800	3380. 05625
60000. 00000					
89869015.	4. 292251E+11	0. 00020938	0. 00307320	14. 67795736	3386. 97512
60000. 00000					
89918368.	4. 194443E+11	0. 00021438	0. 00313234	14. 61148721	3392. 45361
60000. 00000					
89966867.	4. 101054E+11	0. 00021938	0. 00319164	14. 54880720	3396. 46585
60000. 00000					
90014493.	4. 011788E+11	0. 00022438	0. 00325112	14. 48967952	3398. 98499
60000. 00000					
90061214.	3. 926374E+11	0. 00022938	0. 00331077	14. 43388635	3399. 98328
60000. 00000					
90104871.	3. 844475E+11	0. 00023438	0. 00337093	14. 38262433	3393. 52747
60000. 00000					
90147717.	3. 765962E+11	0. 00023938	0. 00343124	14. 33417612	3385. 91344
60000. 00000					
90184647.	3. 690420E+11	0. 00024438	0. 00349243	14. 29126292	3378. 07003
60000. 00000					
90216809.	3. 617717E+11	0. 00024938	0. 00355433	14. 25294846	3370. 03698
60000. 00000					
90248443.	3. 547850E+11	0. 00025438	0. 00361635	14. 21662670	3361. 97123
60000. 00000					
90279528.	3. 480656E+11	0. 00025938	0. 00367851	14. 18219000	3365. 42906
60000. 00000					
90295700.	3. 415440E+11	0. 00026438	0. 00374097	14. 15022415	3373. 65701
60000. 00000					
90296277.	3. 352066E+11	0. 00026938	0. 00380257	14. 11625558	3380. 53275
60000. 00000					

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 89806.48547
in-kip

Axial Thrust Force = 66000.00 lbs

Bending Max. Steel Moment Stress in-lbs psi	Bending Stiffness lb-in ²	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Max. Concrete Position inches	Concrete Stress psi
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Manchester Green Caisson Analysis.lpo

6045346. 750. 18882 12038461. 1410. 79912 17977019. 2070. 35643 23862421. 2729. 90421 29697712. 3392. 11282 29697712. 5996. 28914 29697712. 7052. 94422 29697712. 8102. 43873 29697712. 9160. 67759 29697712. 10218. 53286 29697712. 11276. 00246 29697712. 12333. 08446 29697712. 13389. 77602 29697712. 14446. 07537 29697712. 15501. 97978 29697712. 16557. 48745 29697712. 17612. 59555 29697712. 18667. 30272 29697712. 19715. 83594 29697712. 20756. 72218 29697712. 21810. 42237 29697712. 22863. 67789 29697712. 23916. 48716 29697712.	9. 672554E+12 9. 630769E+12 9. 587743E+12 9. 544968E+12 9. 503268E+12 7. 919390E+12 6. 788048E+12 5. 939542E+12 5. 279593E+12 4. 751634E+12 4. 319667E+12 3. 959695E+12 3. 655103E+12 3. 394024E+12 3. 167756E+12 2. 969771E+12 2. 795079E+12 2. 639797E+12 2. 500860E+12 2. 375817E+12 2. 262683E+12 2. 159834E+12 2. 065928E+12 1. 979847E+12	6. 250000E-07 0. 00000125 0. 00000188 0. 00000250 0. 00000313 0. 00000375 0. 00000438 0. 00000500 0. 00000563 0. 00000625 0. 00000688 0. 00000750 0. 00000813 0. 00000875 0. 00000938 0. 00001000 0. 00001063 0. 00001125 0. 00001188 0. 00001250 0. 00001313 0. 00001375 0. 00001438 0. 00001500	0. 00002946 0. 00005583 0. 00008217 0. 00010851 0. 00013493 0. 00008667 0. 00009914 0. 00011186 0. 00012428 0. 00013671 0. 00014915 0. 00016160 0. 00017407 0. 00018656 0. 00019905 0. 00021156 0. 00022409 0. 00023662 0. 00024937 0. 00026239 0. 00027496 0. 00028755 0. 00030015 0. 00031277	47. 13866276 44. 66753143 43. 82445556 43. 40278620 43. 17914540 23. 11277407 22. 66135687 22. 37217718 22. 09365445 21. 87295264 21. 69431287 21. 54722840 21. 42442936 21. 32071871 21. 23228878 21. 15628070 21. 09051150 21. 03327888 20. 99999875 20. 99114174 20. 94946271 20. 91268784 20. 88018125 20. 85141724	104. 73066 196. 92922 287. 69326 377. 15165 465. 61554 298. 78096 340. 43279 382. 64898 423. 54600 464. 20867 504. 63631 544. 82819 584. 78371 624. 50213 663. 98279 703. 22495 742. 22796 780. 99098 820. 14370 859. 83048 897. 83134 935. 59328 973. 11539 1010. 39692
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Manchester Green Caisson Analysis.lpo

24968. 84677						
29697712.	1. 900654E+12	0. 00001563	0. 00032541	20. 82595271	1047. 43706	
26020. 75401						
30030413.	1. 848025E+12	0. 00001625	0. 00033806	20. 80341464	1084. 23508	
27072. 20523						
31112167.	1. 843684E+12	0. 00001688	0. 00035072	20. 78348511	1120. 79022	
28123. 19691						
32192771.	1. 839587E+12	0. 00001750	0. 00036340	20. 76588625	1157. 10143	
29173. 72822						
33272227.	1. 835709E+12	0. 00001813	0. 00037610	20. 75038773	1193. 16815	
30223. 79349						
34350527.	1. 832028E+12	0. 00001875	0. 00038881	20. 73678428	1228. 98949	
31273. 39014						
35427661.	1. 828524E+12	0. 00001938	0. 00040154	20. 72489566	1264. 56447	
32322. 51640						
36503625.	1. 825181E+12	0. 00002000	0. 00041429	20. 71456915	1299. 89238	
33371. 16759						
37578408.	1. 821983E+12	0. 00002063	0. 00042705	20. 70566458	1334. 97216	
34419. 34263						
38652012.	1. 818918E+12	0. 00002125	0. 00043983	20. 69806677	1369. 80324	
35467. 03516						
39724428.	1. 815974E+12	0. 00002188	0. 00045263	20. 69166809	1404. 38469	
36514. 24241						
40795645.	1. 813140E+12	0. 00002250	0. 00046544	20. 68637091	1438. 71544	
37560. 96289						
41865658.	1. 810407E+12	0. 00002313	0. 00047827	20. 68209261	1472. 79470	
38607. 19211						
42934467.	1. 807767E+12	0. 00002375	0. 00049112	20. 67876059	1506. 62177	
39652. 92466						
44002054.	1. 805212E+12	0. 00002438	0. 00050398	20. 67630225	1540. 19540	
40698. 16041						
46133548.	1. 800334E+12	0. 00002563	0. 00052977	20. 67377633	1606. 57912	
42787. 12264						
48260092.	1. 795724E+12	0. 00002688	0. 00055562	20. 67409927	1671. 93860	
44874. 04767						
50381626.	1. 791347E+12	0. 00002813	0. 00058154	20. 67692810	1736. 26624	
46958. 90540						
52498088.	1. 787169E+12	0. 00002938	0. 00060753	20. 68197745	1799. 55414	
49041. 66645						
54609419.	1. 783165E+12	0. 00003063	0. 00063360	20. 68901199	1861. 79446	
51122. 29833						
56715552.	1. 779311E+12	0. 00003188	0. 00065974	20. 69783145	1922. 97895	
53200. 77026						
58816429.	1. 775590E+12	0. 00003313	0. 00068596	20. 70827061	1983. 09949	
55277. 04686						
60911984.	1. 771985E+12	0. 00003438	0. 00071226	20. 72018677	2042. 14756	
57351. 09423						
63002147.	1. 768481E+12	0. 00003563	0. 00073863	20. 73345727	2100. 11441	
59422. 87849						

Manchester Green Caisson Analysis.lpo

64861801. 60000.00000	1.758964E+12	0.00003688	0.00076413	20.72205681	2154.88850
66343869. 60000.00000	1.740167E+12	0.00003813	0.00078807	20.67081732	2205.15006
67647204. 60000.00000	1.718024E+12	0.00003938	0.00081129	20.60422200	2252.82886
68803827. 60000.00000	1.693633E+12	0.00004063	0.00083389	20.52653414	2298.25976
69827958. 60000.00000	1.667533E+12	0.00004188	0.00085590	20.43950111	2341.58505
70808613. 60000.00000	1.641939E+12	0.00004313	0.00087776	20.35385746	2383.72785
71645651. 60000.00000	1.614550E+12	0.00004438	0.00089893	20.25750929	2423.67205
72480445. 60000.00000	1.588612E+12	0.00004563	0.00092013	20.16732949	2462.89289
73195635. 60000.00000	1.561507E+12	0.00004688	0.00094073	20.06888598	2500.16358
73891154. 60000.00000	1.535401E+12	0.00004813	0.00096126	19.97428519	2536.56589
74567456. 60000.00000	1.510227E+12	0.00004938	0.00098173	19.88312906	2572.09741
75139500. 60000.00000	1.484237E+12	0.00005063	0.00100162	19.78498846	2605.86075
75709789. 60000.00000	1.459466E+12	0.00005188	0.00102153	19.69224018	2638.98036
76278283. 60000.00000	1.435827E+12	0.00005313	0.00104149	19.60450369	2671.45244
76818316. 60000.00000	1.412751E+12	0.00005438	0.00106473	19.58121461	2708.61411
77273118. 60000.00000	1.389180E+12	0.00005563	0.00108359	19.48030275	2737.79855
77726490. 60000.00000	1.366620E+12	0.00005688	0.00110249	19.38439268	2766.40422
78178397. 60000.00000	1.345005E+12	0.00005813	0.00112142	19.29316145	2794.42772
78589087. 60000.00000	1.323606E+12	0.00005938	0.00114005	19.20086378	2821.38031
78948866. 60000.00000	1.302249E+12	0.00006063	0.00115831	19.10620791	2847.17150
79307354. 60000.00000	1.281735E+12	0.00006188	0.00117661	19.01585287	2872.41693
79664564. 60000.00000	1.262013E+12	0.00006313	0.00119493	18.92955083	2897.11428
80020471. 60000.00000	1.243036E+12	0.00006438	0.00121328	18.84706646	2921.26058
80366489. 60000.00000	1.224632E+12	0.00006563	0.00123158	18.76698035	2944.74785
80646071. 60000.00000	1.205923E+12	0.00006688	0.00124931	18.68133169	2966.90203

Manchester Green Caisson Analysis.lpo

60000.00000						
80924525.	1.	187883E+12	0.00006813	0.00126707	18.59923786	2988.53911
60000.00000						
81201810.	1.	170477E+12	0.00006938	0.00128486	18.52050358	3009.65607
60000.00000						
81477935.	1.	153670E+12	0.00007063	0.00130268	18.44495612	3030.25064
60000.00000						
81752910.	1.	137432E+12	0.00007188	0.00132052	18.37243527	3050.32053
60000.00000						
82026683.	1.	121732E+12	0.00007313	0.00133839	18.30278081	3069.86251
60000.00000						
82281488.	1.	106306E+12	0.00007438	0.00135610	18.23331159	3088.66617
60000.00000						
82775114.	1.	076749E+12	0.00007688	0.00139692	18.17137510	3130.17846
60000.00000						
83180386.	1.	047942E+12	0.00007938	0.00143047	18.02165955	3161.76803
60000.00000						
83581857.	1.	020847E+12	0.00008188	0.00146412	17.88238066	3191.48693
60000.00000						
83979494.	9.	953125E+11	0.00008438	0.00149788	17.75263220	3219.31698
60000.00000						
84309693.	9.	704713E+11	0.00008688	0.00153085	17.62126404	3244.54116
60000.00000						
84605864.	9.	466390E+11	0.00008938	0.00156349	17.49355084	3267.63302
60000.00000						
84898589.	9.	240663E+11	0.00009188	0.00159623	17.37389106	3288.93589
60000.00000						
85187850.	9.	026527E+11	0.00009438	0.00162907	17.26166385	3308.43252
60000.00000						
85473566.	8.	823078E+11	0.00009688	0.00166202	17.15630347	3326.10469
60000.00000						
85755708.	8.	629505E+11	0.00009938	0.00169507	17.05730921	3341.93429
60000.00000						
85974984.	8.	439262E+11	0.00010188	0.00172721	16.95419937	3355.47850
60000.00000						
86180564.	8.	256820E+11	0.00010438	0.00175927	16.85526270	3367.19810
60000.00000						
86654761.	8.	108048E+11	0.00010688	0.00179550	16.80000025	3378.35876
60000.00000						
86660796.	7.	923273E+11	0.00010938	0.00183437	16.77139145	3387.78887
60000.00000						
86845513.	7.	762727E+11	0.00011188	0.00186547	16.67457765	3393.34734
60000.00000						
87027254.	7.	608940E+11	0.00011438	0.00189667	16.58289832	3397.24147
60000.00000						
87206010.	7.	461477E+11	0.00011688	0.00192798	16.49604303	3399.45361
60000.00000						
87380367.	7.	319821E+11	0.00011938	0.00195939	16.41372138	3398.42620
60000.00000						

Manchester Green Caisson Analysis.lpo

87510085. 60000.00000	7. 180315E+11	0.00012188	0.00198997	16. 32795256	3390. 80810
87624659. 60000.00000	7. 045199E+11	0.00012438	0.00202030	16. 24362570	3388. 07163
87737885. 60000.00000	6. 915301E+11	0.00012688	0.00205073	16. 16341442	3392. 87929
87849750. 60000.00000	6. 790319E+11	0.00012938	0.00208127	16. 08709341	3396. 46563
87960240. 60000.00000	6. 669971E+11	0.00013188	0.00211191	16. 01445490	3398. 81568
88069335. 60000.00000	6. 553997E+11	0.00013438	0.00214265	15. 94530612	3399. 91407
88175441. 60000.00000	6. 442041E+11	0.00013688	0.00217358	15. 88007265	3395. 69882
88279558. 60000.00000	6. 333959E+11	0.00013938	0.00220466	15. 81816119	3388. 87605
88382688. 60000.00000	6. 229617E+11	0.00014188	0.00223581	15. 75903600	3383. 40951
88484801. 60000.00000	6. 128817E+11	0.00014438	0.00226706	15. 70255941	3388. 63164
88585858. 60000.00000	6. 031378E+11	0.00014688	0.00229839	15. 64860123	3392. 88430
88670367. 60000.00000	5. 936092E+11	0.00014938	0.00232928	15. 59349900	3396. 09110
88736152. 60000.00000	5. 842710E+11	0.00015188	0.00235965	15. 53675956	3398. 30219
88801067. 60000.00000	5. 752296E+11	0.00015438	0.00239010	15. 48239833	3399. 60778
88864879. 60000.00000	5. 664693E+11	0.00015688	0.00242064	15. 43038529	3399. 54820
88864879. 60000.00000	5. 575836E+11	0.00015938	0.00245437	15. 39999908	3392. 94688
88864879. 60000.00000	5. 489722E+11	0.00016188	0.00249287	15. 39999908	3385. 08602
88931021. 60000.00000	5. 410252E+11	0.00016438	0.00253137	15. 39999908	3379. 85511
89181496. 60000.00000	5. 344209E+11	0.00016688	0.00256610	15. 37738341	3385. 65547
89234703. 60000.00000	5. 268470E+11	0.00016938	0.00259587	15. 32616895	3389. 49523
89287445. 60000.00000	5. 194906E+11	0.00017188	0.00262570	15. 27681452	3392. 74877
89339714. 60000.00000	5. 123424E+11	0.00017438	0.00265560	15. 22924501	3395. 40968
89442822. 60000.00000	4. 986359E+11	0.00017938	0.00271559	15. 13918537	3398. 92730
89543689. 60000.00000	4. 856607E+11	0.00018438	0.00277588	15. 05563205	3399. 31952
89639495. 60000.00000	4. 733439E+11	0.00018938	0.00283678	14. 97971159	3389. 70133

Manchester Green Caisson Analysis.lpo

60000.00000						
89715993.	4.615614E+11	0.00019438	0.00289674	14.90286237	3380.33145	
60000.00000						
89767817.	4.502461E+11	0.00019938	0.00295540	14.82334203	3371.72237	
60000.00000						
89818815.	4.394804E+11	0.00020438	0.00301422	14.74847800	3380.05625	
60000.00000						
89869015.	4.292251E+11	0.00020938	0.00307320	14.67795736	3386.97512	
60000.00000						
89918368.	4.194443E+11	0.00021438	0.00313234	14.61148721	3392.45361	
60000.00000						
89966867.	4.101054E+11	0.00021938	0.00319164	14.54880720	3396.46585	
60000.00000						
90014493.	4.011788E+11	0.00022438	0.00325112	14.48967952	3398.98499	
60000.00000						
90061214.	3.926374E+11	0.00022938	0.00331077	14.43388635	3399.98328	
60000.00000						
90104871.	3.844475E+11	0.00023438	0.00337093	14.38262433	3393.52747	
60000.00000						
90147717.	3.765962E+11	0.00023938	0.00343124	14.33417612	3385.91344	
60000.00000						
90184647.	3.690420E+11	0.00024438	0.00349243	14.29126292	3378.07003	
60000.00000						
90216809.	3.617717E+11	0.00024938	0.00355433	14.25294846	3370.03698	
60000.00000						
90248443.	3.547850E+11	0.00025438	0.00361635	14.21662670	3361.97123	
60000.00000						
90279528.	3.480656E+11	0.00025938	0.00367851	14.18219000	3365.42906	
60000.00000						
90295700.	3.415440E+11	0.00026438	0.00374097	14.15022415	3373.65701	
60000.00000						
90296277.	3.352066E+11	0.00026938	0.00380257	14.11625558	3380.53275	
60000.00000						

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 89806.48547
in-kip

 Computed Values of Load Distribution and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
 Specified shear force at pile head = 47000.000 lbs
 Specified moment at pile head = 72300000.000 in-lbs
 Specified axial load at pile head = 66000.000 lbs

Manchester Green Caisson Analysis.lpo

Depth Es*h X F/L in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Flx. Rig. EI lbs-in**2	Soil Res. p lbs/in
0.000	1.886	7.23E+07	47000.	-0.013257	1254.422	1.59E+12	0.000
0.000							
30.720	1.500	7.38E+07	46723.	-0.011826	1279.642	1.54E+12	-28.081
71.885							
61.440	1.160	7.52E+07	41911.	-0.010312	1304.377	1.48E+12	-1855.126
6142.217							
92.160	0.867226	7.55E+07	-25800.	-0.008731	1309.791	1.47E+12	-2452.807
10861.							
122.880	0.622824	7.36E+07	-1.04E+05	-0.007201	1276.065	1.55E+12	-2598.077
16018.							
153.600	0.423055	6.92E+07	-1.79E+05	-0.005838	1201.204	1.68E+12	-2284.600
20737.							
184.320	0.262138	6.27E+07	-2.41E+05	-0.004668	1089.556	1.77E+12	-1737.727
25456.							
215.040	0.134719	5.37E+07	-3.59E+05	-0.003656	934.095	1.78E+12	-4051.264
1.15E+05							
245.760	0.035502	4.09E+07	-4.57E+05	-0.002843	715.480	1.81E+12	-1622.029
1.75E+05							
276.480	-0.042917	2.67E+07	-4.48E+05	-0.002382	471.448	9.52E+12	2224.473
1.99E+05							
307.200	-0.114972	1.44E+07	-3.50E+05	-0.002316	259.096	9.61E+12	3706.009
1.24E+05							
337.920	-0.185585	5.49E+06	-2.26E+05	-0.002286	106.215	9.67E+12	4316.528
89315.							
368.640	-0.255630	6.60E+05	-84232.	-0.002277	23.244	9.67E+12	5147.710
77328.							

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection = 1.88554530 in

Manchester Green Caisson Analysis.lpo

Computed slope at pile head = -0.01325692
 Maximum bending moment = 75652080. lbs-in
 Maximum shear force = -467135.20911 lbs
 Depth of maximum bending moment = 80.64000000 in
 Depth of maximum shear force = 257.28000 in
 Number of iterations = 19
 Number of zero deflection points = 1

 Computed Values of Load Distribution and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
 Specified shear force at pile head = 18000.000 lbs
 Specified moment at pile head = 27768000.000 in-lbs
 Specified axial load at pile head = 66000.000 lbs

Depth Es*h X F/L in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Flx. Rig. EI lbs-in**2	Soil Res. p lbs/in
0.000	0.339107	2.78E+07	18000.	-0.001633	489.117	9.51E+12	0.000
0.000	30.720	2.83E+07	17947.	-0.001542	498.669	9.51E+12	-5.435
71.885	61.440	2.89E+07	16944.	-0.001450	508.133	9.51E+12	-390.890
6142.217	92.160	2.92E+07	1944.805	-0.001356	513.416	9.51E+12	-569.292
10861.	122.880	2.90E+07	-17097.	-0.001262	509.589	9.51E+12	-671.929
16018.	153.600	2.81E+07	-37879.	-0.001169	495.114	9.51E+12	-668.250
20737.	184.320	2.66E+07	-57398.	-0.001081	469.895	9.52E+12	-591.275
25456.	215.040	2.40E+07	-1.25E+05	-0.000999	423.723	9.54E+12	-2264.986
1.52E+05	245.760	1.92E+07	-1.80E+05	-0.000929	341.783	9.58E+12	-1266.150
1.75E+05	276.480	1.33E+07	-2.00E+05	-0.000877	239.657	9.62E+12	-1.581
1.99E+05	307.200	7.33E+06	-1.77E+05	-0.000844	137.856	9.66E+12	1527.738

Manchester Green Caisson Analysis.lpo

2. 23E+05
 337. 920 -0. 052005 2. 79E+06 -1. 15E+05 -0. 000829 59. 847 9. 67E+12 2227. 195
 1. 64E+05
 368. 640 -0. 077370 3. 36E+05 -42862. -0. 000824 17. 686 9. 67E+12 2614. 868
 1. 30E+05

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 2:

Pile-head deflection = 0. 33910668 in
 Computed slope at pile head = -0. 00163268
 Maximum bending moment = 29185573. lbs-in
 Maximum shear force = -200229. 18041 lbs
 Depth of maximum bending moment = 96. 00000000 in
 Depth of maximum shear force = 276. 48000 in
 Number of iterations = 8
 Number of zero deflection points = 1

 Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacement in
 Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
 Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
 Type 4 = Deflection and Moment, S = Pile-head Slope, radians
 Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 47000.	M= 7. 23E+07	66000. 0000	1. 8855	7. 5652E+07	-467135.

Manchester Green Caisson Analysis.lpo

1 V= 18000. M= 2.78E+07 66000.0000 0.3391067 2.9186E+07 -200229.

 Computed Pile-head Stiffness Matrix Members
 K22, K23, K32, K33 for Superstructure

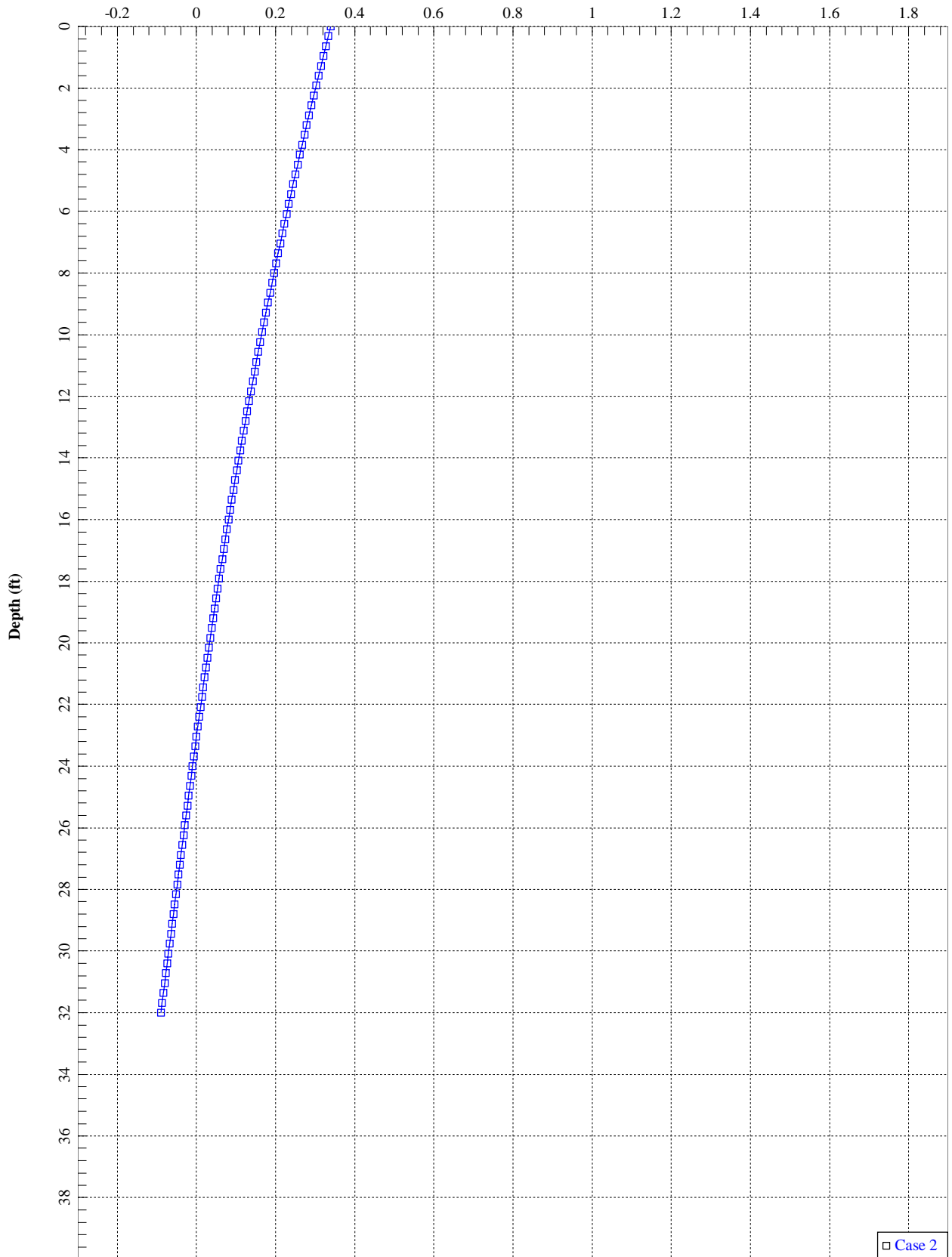
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
0.00260107	4700.00007	931391.00104	1806947.	3.580796E+08
0.00783001	14148.40980	2803766.	1806947.	3.580796E+08
0.01241027	22424.69897	4443864.	1806947.	3.580796E+08
0.01566001	28296.81959	5607532.	1806947.	3.580796E+08
0.01818133	32851.59020	6510074.	1806885.	3.580636E+08
0.02024366	36573.10877	7247238.	1806645.	3.580004E+08
0.02198856	39719.60788	7870342.	1806376.	3.579289E+08
0.02350073	42445.22939	8410004.	1806124.	3.578613E+08
0.02483494	44849.39794	8885962.	1805899.	3.578008E+08
0.02602867	47000.00000	9311683.	1805701.	3.577472E+08

Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
0.00007803	27934.62813	7230000.	3.579824E+08	9.265249E+10
0.00023639	84134.70591	21764469.	3.559194E+08	9.207136E+10
0.00073016	135465.39980	34495867.	1.855284E+08	4.724425E+10
0.00148021	184376.32670	43528937.	1.245607E+08	2.940722E+10
0.00191607	223367.38179	50535531.	1.165760E+08	2.637462E+10
0.00225215	255947.44825	56260335.	1.136460E+08	2.498076E+10
0.00251071	282374.36293	61100588.	1.124680E+08	2.433600E+10
0.00272588	304699.85403	65293406.	1.117805E+08	2.395317E+10
0.00292417	324427.68983	68991733.	1.109471E+08	2.359364E+10
0.00312016	342297.50164	72300000.	1.097051E+08	2.317188E+10

K22 = abs(Shear Reaction/Top y)
 K23 = abs(Shear Reaction/Top Rotation)
 K32 = abs(Moment Reaction/Top y)
 K33 = abs(Moment Reaction/Top Rotation)

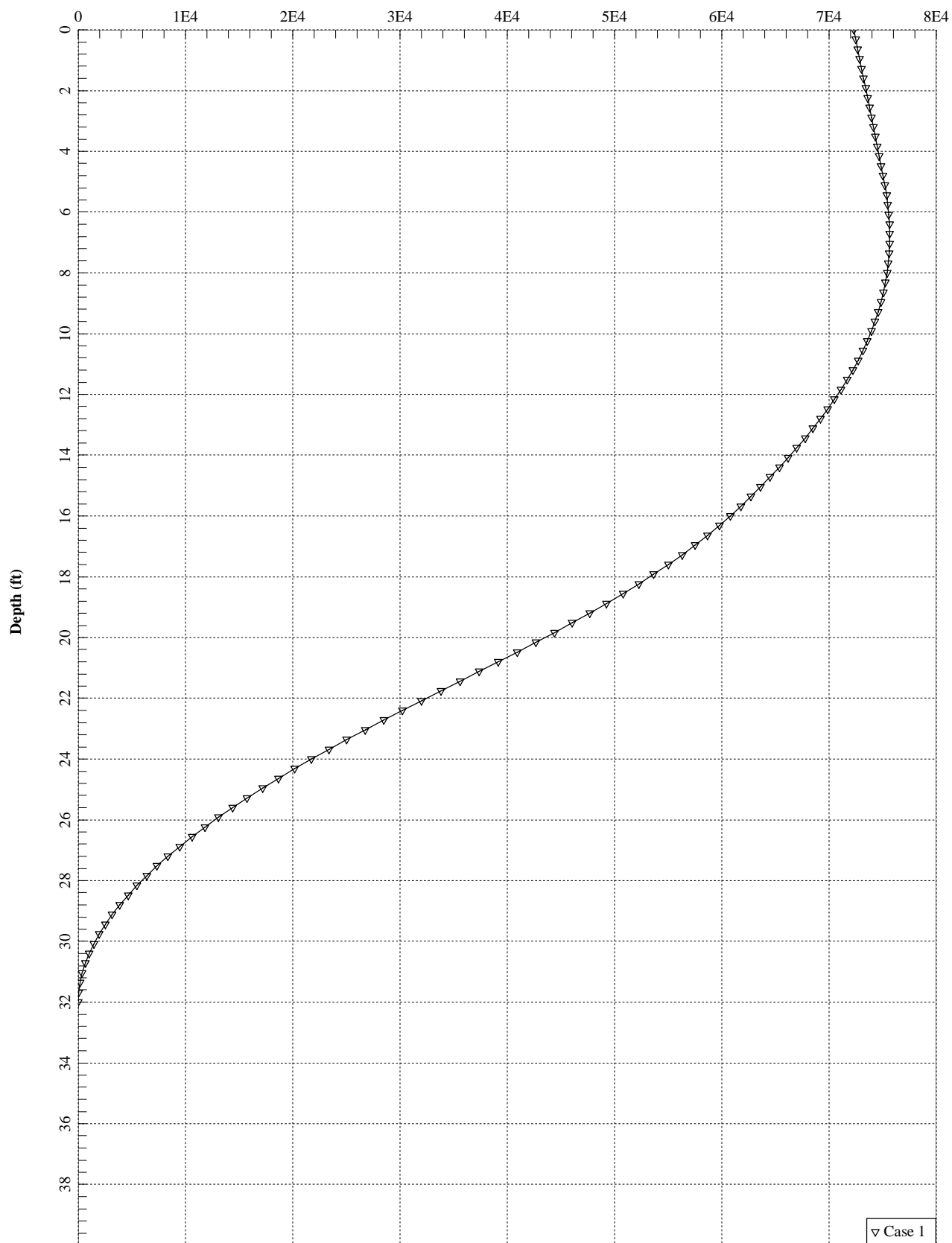
The analysis ended normally.

Lateral Deflection (in)

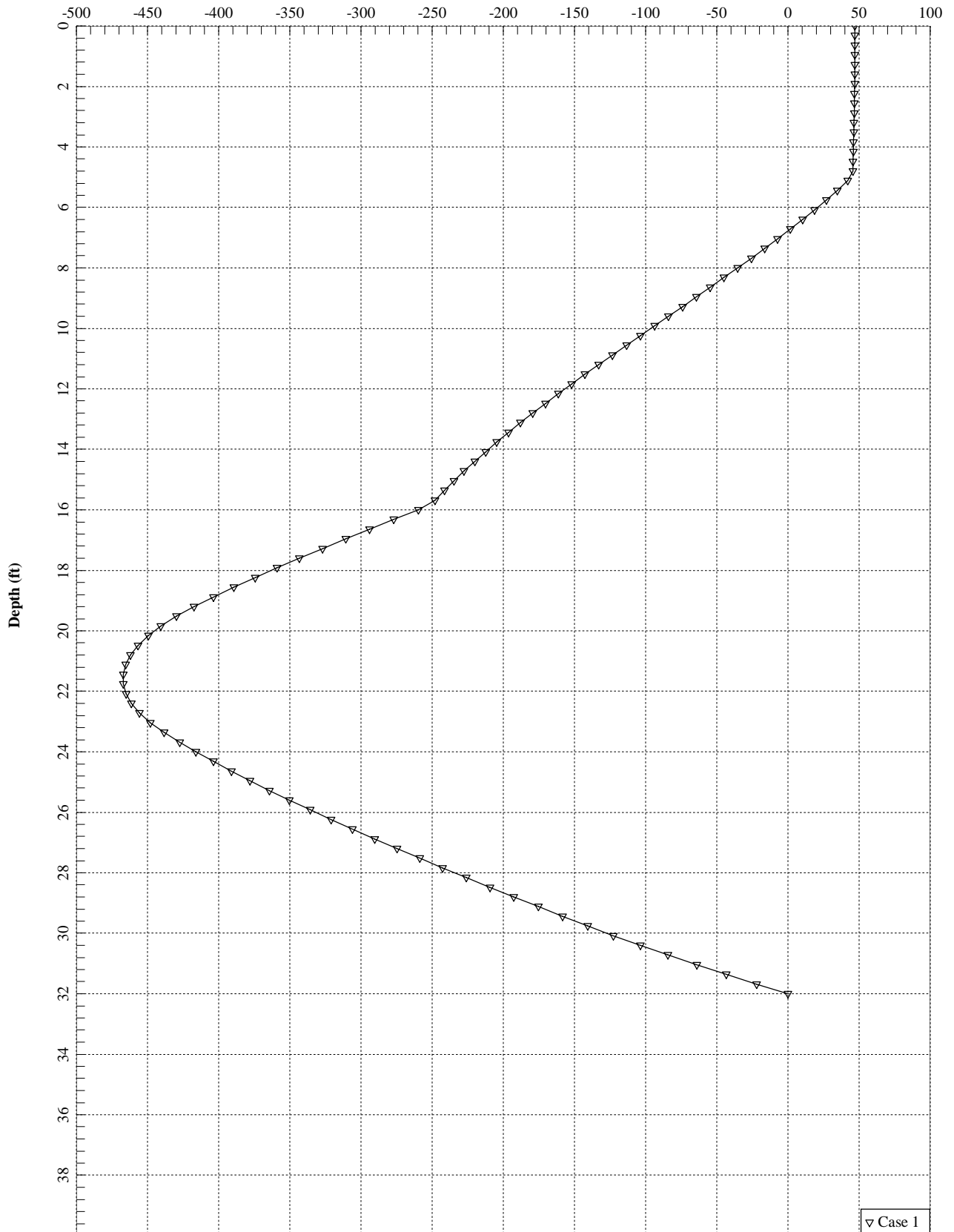


□ Case 2

Bending Moment (in-kips)



Shear Force (kips)



▽ Case 1

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CTL05448	DATE:	12/19/2017	RF DESIGN ENG:	Rahimuddin Mohammed	RF PERF ENG:		RFDS PROGRAM TYPE:	2018 LTE Next Carrier	
ISSUE:	Bronze Standard	Approved? (Y/N):	Yes	RF DESIGN PHONE:	202 999 2776	RF PERF PHONE:		RFDS TECHNOLOGY:	LTE 5C	
REVISION:	Preliminary	RF MANAGER:	John Benedetto	RF DESIGN EMAIL:	rx855w@att.com	RF PERF EMAIL:		STATE/STATUS:	Final/RF Approval	
INITIATIVE /PROJECT:	Bronze RRH - LTE 5C_850				RFDS VERSION:	1.00	RFDS ID:	2141672		
					GSM FREQUENCY:	rx855w	Created By:	rx855w	Updated By:	rx855w
					UMTS FREQUENCY:	850, 1900	Date Created:	12/19/2017 9:44:36 AM	Date Updated:	1/5/2018 12:12:04 PM
					LTE FREQUENCY:	700, 1900, AWS, WCS				
					I-PLAN JOB # 1:	NER-RCTB-17-08526	IPLAN PRD GRP SUB GRP #1:	LTE Next Carrier LTE 5C		
					I-PLAN JOB # 2:		IPLAN PRD GRP SUB GRP #2:			
					I-PLAN JOB # 3:		IPLAN PRD GRP SUB GRP #3:			
					I-PLAN JOB # 4:		IPLAN PRD GRP SUB GRP #4:			
					I-PLAN JOB # 5:		IPLAN PRD GRP SUB GRP #5:			
					I-PLAN JOB # 6:		IPLAN PRD GRP SUB GRP #6:			
					I-PLAN JOB # 7:		IPLAN PRD GRP SUB GRP #7:			
					I-PLAN JOB # 8:		IPLAN PRD GRP SUB GRP #8:			

Section 2 - LOCATION INFORMATION

USID:	26172	FA LOCATION CODE:	10071105	LOCATION NAME:	MANCHESTER CENTRAL	ORACLE PTN # 1:	2051A0FCWH	PACE JOB # 1:	MRCTB028167
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CONNECTICUT	ORACLE PTN # 2:		PACE JOB # 2:	
ADDRESS:	239 MIDDLE TURNPIKE EAST	CITY:	MANCHESTER	STATE:	CT	ORACLE PTN # 3:		PACE JOB # 3:	
ZIP CODE:	06040	COUNTY:	HARTFORD	LONG (DEC. DEG.):	-72.5116989	ORACLE PTN # 4:		PACE JOB # 4:	
LATITUDE (D-M-S):	41d 47m 3.81084s	LONGITUDE (D-M-S):	-72d -30m -42.11604s	LAT (DEC. DEG.):	41.7843919	ORACLE PTN # 5:		PACE JOB # 5:	
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	<p>UPDATED 7/05MANCHESTER DOWNTOWN-GSM CT-4481-84 EAST. STAY IN YOUR RIGHT HAND LANE FOR ABOUT THREE MILES. YOU WILL THEN SEE SIGNS FOR I-384 GET ONTO THIS HIGHWAY. YOU WILL THEN GET OFF OF EXIT 3.WHEN YOU GET TO THE END OF THE EXIT GO EAST/NORTH ON ROUTE 83.STAY ON ROUTE 83 FOR ABOUT THREE MILES AND THEN TAKE A RIGHT ONTO MIDDLE TURNPIKE EAST .GO ABOUT A MILE DOWN THIS ROAD AND LOOK FOR THE MANCHESTER POLICE DEPARTMENT.OUR SITE IS IN THE BACK OF THE PARKING LOT AT THE POLICE DEPARTMENT.GO INTO THE MAIN ENTRANCE OF THE POLICE DEPARTMENT AND LET THE OFFICER AT THE FRONT DESK KNOW THAT YOU WILL BE WORKING IN THEIR BACK PARKING LOT. ADDRESS: 239 MIDDLE TURNPIKE EAST,MANCHESTER,CT.06045MANCHESTER POLICE DEPARTMENT : 860-845-5500LTE RADIOS:UP ON TOWERACCESS:KEYED PADLOCKCONTACT:MANCHESTER POLICESECURITY: NONEGROUND LEVEL-OUTDOOR CABINETPOWER COMPANY: 89-095-485-2 NORTHEAST UTILITIESGENERATOR PLUG,CAMLOCKT-1 CIRCUIT NUMBERS:GSM:705662-ET-229GSM-710398-ET-249UMTS CIRCUITS:ON FIBERT-1 SMART CARDS LOCATED IN HOFFMAN BOX ON OUTSIDE OF COMPOUND. SNET: (800) 448-1008 AND (203) 420-3131 (24-HR REPAIR)</p>					ORACLE PTN # 6:		PACE JOB # 6:	
						ORACLE PTN # 7:		PACE JOB # 7:	
						ORACLE PTN # 8:		PACE JOB # 8:	
						BORDER CELL WITH CONTOUR COORD:		SEARCH RING NAME:	
						AM STUDY REQ'D (Y/N):	No	SEARCH_RING_ID:	
						FREQ COORD:		BTA:	
						OPS DISTRICT:	CT-North	LAC(GSM):	
						OPS ZONE:	NE_CT_N_TLDN_N_CS	LAC(UMTS):	05990
						RF DISTRICT:	NPO Triage	BSC(GSM):	
						RF ZONE:	Hotseat	RNC(UMTS):	MDTWCTNICRBR05
						PARENT NAME(GSM):		MME POOL ID(LTE):	FF01
						PARENT NAME(UMTS):	MIDDLETOWN RNC05		

Section 3 - LICENSE COVERAGE/FILING INFORMATION

CGSA - NO FILING TRIGGERED (Yes/No):	No	CGSA LOSS:		PCS REDUCED - UPS ZIP:		CGSA CALL SIGNS:
CGSA - MINOR FILING NEEDED (Yes/No):	No	CGSA EXT AGMT NEEDED:		PCS POPS REDUCED:		
CGSA - MAJOR FILING NEEDED (Yes/No):	Yes	CGSA SCORECARD UPDATED:				

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	Yes	GROUND ELEVATION (ft):		STRUCTURE TYPE:	MONOPOLE	MARKET LOCATION 700 MHz Band:	
ADDITIONAL REGULATORY?:	Yes	HEIGHT OVERALL (ft):	199.00	FCC ASR NUMBER:	NR	MARKET LOCATION 850 MHz Band:	
SUB-LEASE RIGHTS?:	Yes	STRUCTURE HEIGHT (ft):	199.00			MARKET LOCATION 1900 MHz Band:	
LIGHTING TYPE:	NOT REQUIRED					MARKET LOCATION AWS Band:	
						MARKET LOCATION WCS Band:	
						MARKET LOCATION Future Band:	

Section 15A - CURRENT TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800-10121	OPA-65R-LCUU-H6	HPA-65R-BUU-H6	OPA-65R-LCUU-H6			
ANTENNA VENDOR	Kathrein	CCI Antennas	CCI	CCI Antennas			
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9	72X14.8X7.4	72X14.8X9	72X14.8X7.4			
ANTENNA WEIGHT	44.1	73	51	73			
AZIMUTH	40	40	40	40			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	143	143	143	143			
ANTENNA TIP HEIGHT	145	146	146	146			
MECHANICAL DOWNTILT	0	0	0	0			
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025	Built in	Built in	Built in		
SURGE ARRESTOR (QTY/MODEL)		1	DC/Fiber Squid		1	DC/Fiber Squid	
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 21901					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006	LTE RRH	LTE RRH	LTE RRH		
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860					
PDU FOR TMA (QTY/MODEL)	1	Powerwave LGP 12104					
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1	RRUS-11 (DISCONTINUED)		
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1	RRUS-12+RRUS-A2 (DISCONTINUED 3/31/18)		
RRH - AWS band (QTY/MODEL)			1	RRUS-32 B66 (DISCONTINUED 3/31/18)			
RRH - WCS band (QTY/MODEL)		1	RRUS-32				
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1			CTV54481	CTV54481		UMTS 850	800 10121 @850_Xpol_10dt	13.4	40	0	None	Andrew 1-5/8 (850)	180						249.46		1	
	PORT 3			CTU54487	CTU54487		UMTS 1900	800 10121 @1950_Xpol_4dt	16.89	40	0	None	Andrew 1-5/8 (1900)	180						522.4		2	
ANTENNA POSITION 2	PORT 3		26172.A.WCS.4G.1	CTL05448_3A_1	CTL05448_3A_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_04DT	17.8	40	4	Top	FIBER	0						1285.2866		4	

ANTENNA POSITION 3	PORT 3		26172.A.AWS.4G.1	CTL05448_2A_2	CTL05448_2A_2		LTE AWS	HPA-65R-BUU-H6_2133MHz_04DT	17.19	40	4	Top	FIBER	0						5070.2572		6	
ANTENNA POSITION 4	PORT 1		26172.A.700.4G.1	CTL05448_7A_1	CTL05448_7A_1		LTE 700	OPA-65R-LCUU-H6_719MHz_02DT	14	40	2	Top	FIBER	0						1475.7065		7	
	PORT 3		26172.A.1900.4G.1	CTL05448_9A_1	CTL05448_9A_1		LTE 1900	OPA-65R-LCUU-H6_1930MHz_04DT	17.4	40	4	Top	FIBER	0						3664.3757		8	
	PORT 4		26172.A.1900.4G.1	CTL05448_9A_2	CTL05448_9A_2		LTE 1900	OPA-65R-LCUU-H6_1930MHz_04DT	17.4	40	4	Top	FIBER	0						3664.3757		8	

Section 15B - CURRENT TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800-10121	OPA-65R-LCUU-H8	HPA-65R-BUU-H8	OPA-65R-LCUU-H8			
ANTENNA VENDOR	Kathrein	CCI Antennas	CCI	CCI Antennas			
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9	92.7X14.4X7	92.4X14.8X7.4	92.7X14.4X7			
ANTENNA WEIGHT	44.1	88	68	88			
AZIMUTH	160	160	160	160			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	143	143	143	143			
ANTENNA TIP HEIGHT	145	147	147	147			
MECHANICAL DOWNTILT	0	0	0	0			
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025	Built in	Built in	Built in		
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 21901					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)			LTE RRH	LTE RRH	LTE RRH		
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860					
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)					1	RRUS-11 (DISCONTINUED)	
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)					1	RRUS-12+RRUS-A2 (DISCONTINUED 3/31/18)	
RRH - AWS band (QTY/MODEL)			1	RRUS-32 B66 (DISCONTINUED 3/31/18)			
RRH - WCS band (QTY/MODEL)		1	RRUS-32				
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RX/IT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)	
ANTENNA POSITION 1	PORT 1			CTV54482	CTV54482		UMTS 850	800 10121 @850_Xpol_12dt	13.3	160	0	None	Andrew 1-5/8 (850)	180						243.78		9		
	PORT 3			CTU54488	CTU54488		UMTS 1900	800 10121 @1950_Xpol_7dt	16.5	160	0	None	Andrew 1-5/8 (1900)	180							476.43		10	
ANTENNA POSITION 2	PORT 3		26172.B.WCS.4G.1	CTL05448_3B_1	CTL05448_3B_1		LTE WCS	OPA-65R-LCUU-H8_2350MHz_06DT	17.4	160	6	Top	FIBER	0							1285.2866		12	

ANTENNA POSITION 3	PORT 3		26172.B.AWS.4G.1	CTL05448_2B_2	CTL05448_2B_2		LTE AWS	HPA-65R-BUU-H8_2133MHz_06DT	17.3	160	6	Top	FIBER	0						5070.2572		14	
ANTENNA POSITION 4	PORT 1		26172.B.700.4G.1	CTL05448_7B_1	CTL05448_7B_1		LTE 700	OPA-65R-LCUU-H8_719MHz_08DT	14.6	160	8	Top	FIBER	0						1475.7065		15	
	PORT 3		26172.B.1900.4G.1	CTL05448_9B_1	CTL05448_9B_1		LTE 1900	OPA-65R-LCUU-H8_1930MHz_06DT	17.4	160	6	Top	FIBER	0						3664.3757		16	
	PORT 4		26172.B.1900.4G.1	CTL05448_9B_2	CTL05448_9B_2		LTE 1900	OPA-65R-LCUU-H8_1930MHz_06DT	17.4	160	6	Top	FIBER	0						3664.3757		16	

Section 15C - CURRENT TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800-10121	OPA-65R-LCUU-H8	HPA-65R-BUU-H8	OPA-65R-LCUU-H8			
ANTENNA VENDOR	Kathrein	CCI Antennas	CCI	CCI Antennas			
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9	92.7X14.4X7	92.4X14.8X7.4	92.7X14.4X7			
ANTENNA WEIGHT	44.1	88	68	88			
AZIMUTH	280	280	280	280			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	143	143	143	143			
ANTENNA TIP HEIGHT	145	147	147	147			
MECHANICAL DOWNTILT	0	0	0	0			
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025	Built in	Built in	Built in		
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 21901					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)			LTE RRH	LTE RRH	LTE RRH		
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860					
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)					1	RRUS-11 (DISCONTINUED)	
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)					1	RRUS-12+RRUS-A2 (DISCONTINUED 3/31/18)	
RRH - AWS band (QTY/MODEL)			1	RRUS-32 B66 (DISCONTINUED 3/31/18)			
RRH - WCS band (QTY/MODEL)		1	RRUS-32				
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RX/IT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)	
ANTENNA POSITION 1	PORT 1			CTV54483	CTV54483		UMTS 850	800 10121 @850_Xpol_12dt	13.3	280	0	None	Andrew 1-5/8 (850)	180						243.78		17		
	PORT 3			CTU54489	CTU54489		UMTS 1900	800 10121 @1950_Xpol_8dt	16.2	280	0	None	Andrew 1-5/8 (1900)	180							444.63		18	
ANTENNA POSITION 2	PORT 3		26172.C.WCS.4G.1	CTL05448_3C_1	CTL05448_3C_1		LTE WCS	OPA-65R-LCUU-H8_2350MHz_05DT	17.4	280	5	Top	FIBER	0							1285.2866		20	

ANTENNA POSITION 3	PORT 3		26172.C.AWS.4G.1	CTL05448_2C_2	CTL05448_2C_2		LTE AWS	HPA-65R-BUU-H8_2133MHz_05DT	17.4	280	5	Top	FIBER	0						5070.2572		22	
ANTENNA POSITION 4	PORT 1		26172.C.700.4G.1	CTL05448_7C_1	CTL05448_7C_1		LTE 700	OPA-65R-LCUU-H8_719MHz_09DT	14.5	280	9	Top	FIBER	0						1475.7065		23	
	PORT 3		26172.C.1900.4G.1	CTL05448_9C_1	CTL05448_9C_1		LTE 1900	OPA-65R-LCUU-H8_1930MHz_05DT	17.3	280	5	Top	FIBER	0						3664.3757		24	
	PORT 4		26172.C.1900.4G.1	CTL05448_9C_2	CTL05448_9C_2		LTE 1900	OPA-65R-LCUU-H8_1930MHz_05DT	17.3	280	5	Top	FIBER	0						3664.3757		24	

Section 16A - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7																
Existing Antenna?			Yes																				
ANTENNA MAKE - MODEL																							
ANTENNA VENDOR																							
ANTENNA SIZE (H x W x D)																							
ANTENNA WEIGHT																							
AZIMUTH																							
MAGNETIC DECLINATION																							
RADIATION CENTER (feet)																							
ANTENNA TIP HEIGHT																							
MECHANICAL DOWNTILT																							
FEEDER AMOUNT																							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)																							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)																							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)																							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)																							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)																							
Antenna RET Motor (QTY/MODEL)				Built in																			
SURGE ARRESTOR (QTY/MODEL)			1	DC Only Squid																			
DIPLEXER (QTY/MODEL)																							
DUPLEXER (QTY/MODEL)																							
Antenna RET CONTROL UNIT (QTY/MODEL)				LTE RRH																			
DC BLOCK (QTY/MODEL)																							
TMA/LNA (QTY/MODEL)																							
CURRENT INJECTORS FOR TMA (QTY/MODEL)																							
PDU FOR TMA (QTY/MODEL)																							
FILTER (QTY/MODEL)																							
SQUID (QTY/MODEL)																							
FIBER TRUNK (QTY/MODEL)																							
DC TRUNK (QTY/MODEL)																							
REPEATER (QTY/MODEL)																							
RRH - 700 band (QTY/MODEL)																							
RRH - 850 band (QTY/MODEL)			1	4478 B5																			
RRH - 1900 band (QTY/MODEL)																							
RRH - AWS band (QTY/MODEL)																							
RRH - WCS band (QTY/MODEL)																							
Additional RRH #1 - any band (QTY/MODEL)																							
Additional RRH #2 - any band (QTY/MODEL)																							
Additional Component 1 (QTY/MODEL)																							
Additional Component 2 (QTY/MODEL)																							
Additional Component 3 (QTY/MODEL)																							
Local Market Note 1	SOW:- Add LTE Radios. - Add DC only squid.																						
Local Market Note 2																							
Local Market Note 3																							
PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 3	PORT 1		26172.A.850.4G.1	CTL05448_8A_1	CTL05448_8A_1		LTE 850	HPA-65R-BUU-H6_849MHz_02DT	15.01	40	2	Top	FIBER	0						1000		5	

Section 16B - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?			Yes				
ANTENNA MAKE - MODEL							
ANTENNA VENDOR							
ANTENNA SIZE (H x W x D)							
ANTENNA WEIGHT							
AZIMUTH							
MAGNETIC DECLINATION							
RADIATION CENTER (feet)							
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT							
FEEDER AMOUNT							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)			Built in				
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)			LTE RRH				
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)			1	4478 B5			
RRH - 1900 band (QTY/MODEL)							
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	SOW:- Add LTE Radios.- Add DC only squid.						
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 3	PORT 1		26172.B.850.4G.1	CTL05448_8B_1	CTL05448_8B_1		LTE 850	HPA-65R-BUU-H8_849MHz_08DT	16.1	160	8	Top	FIBER	0						1000		13	

Section 16C - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?			Yes				
ANTENNA MAKE - MODEL							
ANTENNA VENDOR							
ANTENNA SIZE (H x W x D)							
ANTENNA WEIGHT							
AZIMUTH							
MAGNETIC DECLINATION							
RADIATION CENTER (feet)							
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT							
FEEDER AMOUNT							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)			Built in				
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)			LTE RRH				
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)			1	4478 B5			
RRH - 1900 band (QTY/MODEL)							
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	SOW:- Add LTE Radios. - Add DC only squid.						
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 3	PORT 1		26172.C.850.4G.1	CTL05448_8C_1	CTL05448_8C_1		LTE 850	HPA-65R-BUU-H8_849MHz_09DT	16	280	9	Top	FIBER	0						1000		21	

Section 17A - FINAL TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800-10121	OPA-65R-LCUU-H6	HPA-65R-BUU-H6	OPA-65R-LCUU-H6			
ANTENNA VENDOR	Kathrein	CCI Antennas	CCI	CCI Antennas			
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9	72X14.8X7.4	72X14.8X9	72X14.8X7.4			
ANTENNA WEIGHT	44.1	73	51	73			
AZIMUTH	40	40	40	40			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	143	143	143	143			
ANTENNA TIP HEIGHT	145	146	146	146			
MECHANICAL DOWNTILT	0	0	0	0			
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025	Built in	Built in	Built in		
SURGE ARRESTOR (QTY/MODEL)	1		DC/Fiber Squid	DC Only Squid	DC/Fiber Squid		
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 21901					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006	LTE RRH	LTE RRH	LTE RRH		
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860					
PDU FOR TMA (QTY/MODEL)	1	Powerwave LGP 12104					
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1	RRUS-11 (DISCONTINUED)		
RRH - 850 band (QTY/MODEL)			1	4478 B5			
RRH - 1900 band (QTY/MODEL)				1	RRUS-12+RRUS-A2 (DISCONTINUED 3/31/18)		
RRH - AWS band (QTY/MODEL)			1	RRUS-32 B66 (DISCONTINUED 3/31/18)			
RRH - WCS band (QTY/MODEL)		1	RRUS-32				
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	SOW:- Add LTE Radios.- Add DC only squid.						
Local Market Note 2							
Local Market Note 3	1x5216+1xXMU						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)	
ANTENNA POSITION 1	PORT 1	26172.A.850.3G.1		CTV54481	CTV54481		UMTS 850	800 10121 @850_Xpol_10dt	13.4	40	0	None	Andrew 1-5/8 (850)	180					249.46			1		
	PORT 3	26172.A.1900.3G.2		CTU54487	CTU54487		UMTS 1900	800 10121 @1950_Xpol_4dt	16.89	40	0	None	Andrew 1-5/8 (1900)	180					522.4			2		
ANTENNA POSITION 2	PORT 3	26172.A.WCS.4G.tmp1	26172.A.WCS.4G.1	CTL05448_3A_1	CTL05448_3A_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_04DT	17.8	40	4	Top	FIBER	0						1285.2866			4	

ANTENNA POSITION 3	PORT 1	26172.A.850.4G.tmp1	26172.A.850.4G.1	CTL05448_8A_1	CTL05448_8A_1		LTE 850	HPA-65R-BUU-H6_849MHz_02DT	15.01	40	2	Top	FIBER	0						1000		5	
	PORT 3	26172.A.AWS.4G.tmp4	26172.A.AWS.4G.4	CTL05448_2A_2	CTL05448_2A_2		LTE AWS	HPA-65R-BUU-H6_2170MHz_04DT	17.3	40	4	Top	FIBER	0						5070.2572		6	
ANTENNA POSITION 4	PORT 1	26172.A.700.4G.1	26172.A.700.4G.1	CTL05448_7A_1	CTL05448_7A_1		LTE 700	OPA-65R-LCUU-H6_719MHz_02DT	14	40	2	Top	FIBER	0						1475.7065		7	
	PORT 3	26172.A.1900.4G.1	26172.A.1900.4G.1	CTL05448_9A_1	CTL05448_9A_1		LTE 1900	OPA-65R-LCUU-H6_1930MHz_04DT	17.4	40	4	Top	FIBER	0						3664.3757		8	
	PORT 4	26172.A.1900.4G.tmp4	26172.A.1900.4G.2	CTL05448_9A_2	CTL05448_9A_2		LTE 1900	OPA-65R-LCUU-H6_1930MHz_04DT	17.4	40	4	Top	FIBER	0						3664.3757		8	

Section 17B - FINAL TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800-10121	OPA-65R-LCUU-H8	HPA-65R-BUU-H8	OPA-65R-LCUU-H8			
ANTENNA VENDOR	Kathrein	CCI Antennas	CCI	CCI Antennas			
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9	92.7X14.4X7	92.4X14.8X7.4	92.7X14.4X7			
ANTENNA WEIGHT	44.1	88	68	88			
AZIMUTH	160	160	160	160			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	143	143	143	143			
ANTENNA TIP HEIGHT	145	147	147	147			
MECHANICAL DOWNTILT	0	0	0	0			
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025	Built in	Built in	Built in		
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 21901					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)			LTE RRH	LTE RRH	LTE RRH		
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860					
PDU FOR TMA (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)					1	RRUS-11 (DISCONTINUED)	
RRH - 850 band (QTY/MODEL)			1	4478 B5			
RRH - 1900 band (QTY/MODEL)					1	RRUS-12+RRUS-A2 (DISCONTINUED 3/31/18)	
RRH - AWS band (QTY/MODEL)			1	RRUS-32 B66 (DISCONTINUED 3/31/18)			
RRH - WCS band (QTY/MODEL)		1	RRUS-32				
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	SOW:- Add LTE Radios.- Add DC only squid.						
Local Market Note 2							
Local Market Note 3	1x5216+1xXMU						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	26172.B.850.3G.1		CTV54482	CTV54482		UMTS 850	800 10121 @850_Xpol_12dt	13.3	160	0	None	Andrew 1-5/8 (850)	180						243.78		9	
	PORT 3	26172.B.1900.3G.2		CTU54488	CTU54488		UMTS 1900	800 10121 @1950_Xpol_7dt	16.5	160	0	None	Andrew 1-5/8 (1900)	180						476.43		10	
ANTENNA POSITION 2	PORT 3	26172.B.WCS.4G.tmp1	26172.B.WCS.4G.1	CTL05448_3B_1	CTL05448_3B_1		LTE WCS	OPA-65R-LCUU-H8_2350MHz_06DT	17.4	160	6	Top	FIBER	0						1285.2866		12	

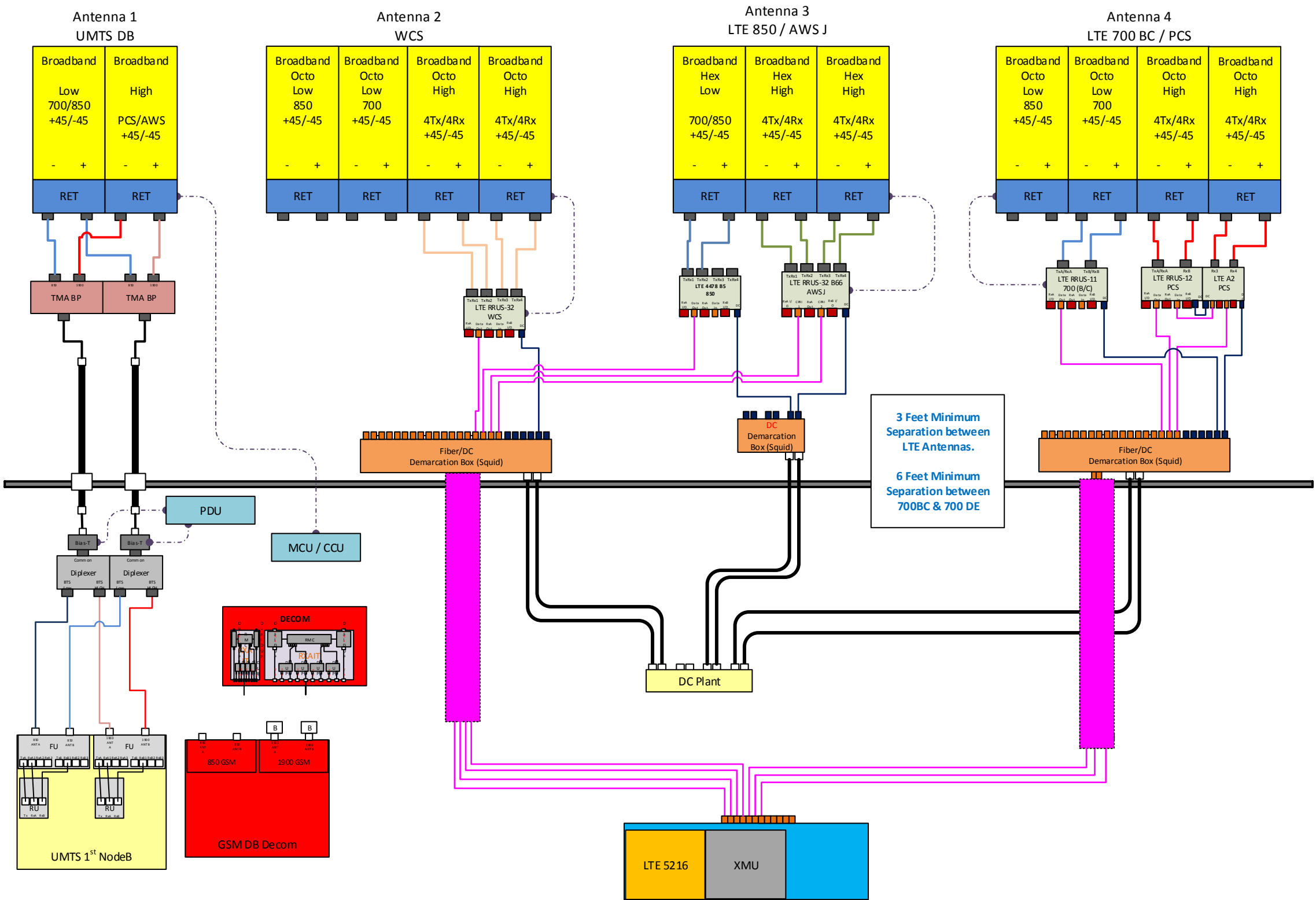
ANTENNA POSITION 3	PORT 1	26172.B.850.4G.tmp1	26172.B.850.4G.1	CTL05448_8B_1	CTL05448_8B_1		LTE 850	HPA-65R-BUU-H8_849MHz_08DT	16.1	160	8	Top	FIBER	0						1000		13	
	PORT 3	26172.B.AWS.4G.tmp4	26172.B.AWS.4G.4	CTL05448_2B_2	CTL05448_2B_2		LTE AWS	HPA-65R-BUU-H8_2170MHz_06DT	17.4	160	6	Top	FIBER	0						5070.2572		14	
ANTENNA POSITION 4	PORT 1	26172.B.700.4G.1	26172.B.700.4G.1	CTL05448_7B_1	CTL05448_7B_1		LTE 700	OPA-65R-LCUU-H8_719MHz_08DT	14.6	160	8	Top	FIBER	0						1475.7065		15	
	PORT 3	26172.B.1900.4G.1	26172.B.1900.4G.1	CTL05448_9B_1	CTL05448_9B_1		LTE 1900	OPA-65R-LCUU-H8_1930MHz_06DT	17.4	160	6	Top	FIBER	0						3664.3757		16	
	PORT 4	26172.B.1900.4G.tmp4	26172.B.1900.4G.2	CTL05448_9B_2	CTL05448_9B_2		LTE 1900	OPA-65R-LCUU-H8_1930MHz_06DT	17.4	160	6	Top	FIBER	0						3664.3757		16	

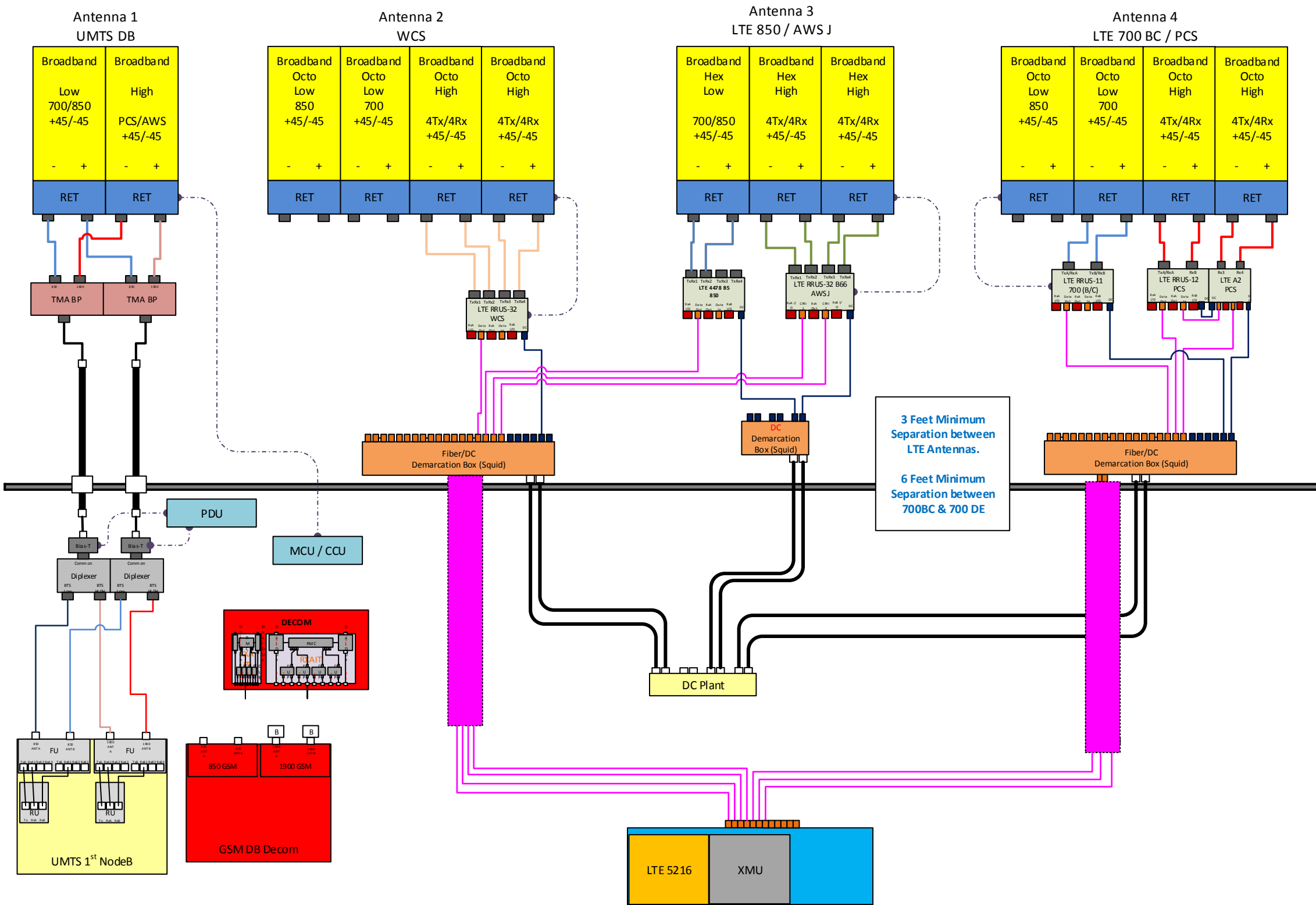
Section 17C - FINAL TOWER CONFIGURATION - SECTOR C

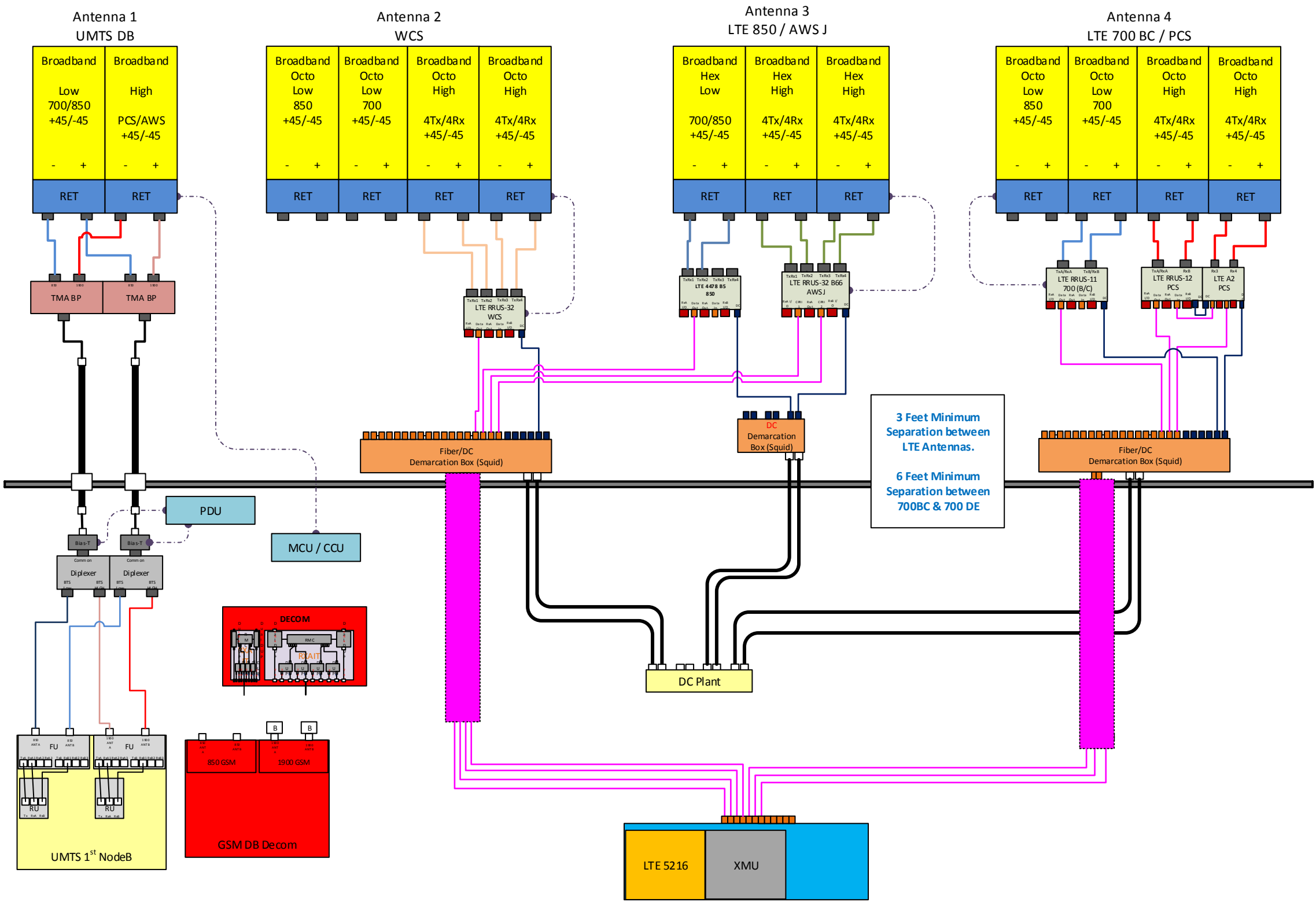
ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800-10121	OPA-65R-LCUU-H8	HPA-65R-BUU-H8	OPA-65R-LCUU-H8			
ANTENNA VENDOR	Kathrein	CCI Antennas	CCI	CCI Antennas			
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9	92.7X14.4X7	92.4X14.8X7.4	92.7X14.4X7			
ANTENNA WEIGHT	44.1	88	68	88			
AZIMUTH	280	280	280	280			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	143	143	143	143			
ANTENNA TIP HEIGHT	145	147	147	147			
MECHANICAL DOWNTILT	0	0	0	0			
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025	Built in	Built in	Built in		
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 21901					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)			LTE RRH	LTE RRH	LTE RRH		
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860					
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)					1	RRUS-11 (DISCONTINUED)	
RRH - 850 band (QTY/MODEL)			1	4478 B5			
RRH - 1900 band (QTY/MODEL)					1	RRUS-12+RRUS-A2 (DISCONTINUED 3/31/18)	
RRH - AWS band (QTY/MODEL)			1	RRUS-32 B66 (DISCONTINUED 3/31/18)			
RRH - WCS band (QTY/MODEL)		1	RRUS-32				
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	SOW:- Add LTE Radios. - Add DC only squid.						
Local Market Note 2							
Local Market Note 3	1x5216+1xXMU						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	26172.C.850.3G.1		CTV54483	CTV54483		UMTS 850	800 10121 @850_Xpol_12dt	13.3	280	0	None	Andrew 1-5/8 (850)	180						243.78		17	
	PORT 3	26172.C.1900.3G.2		CTU54489	CTU54489		UMTS 1900	800 10121 @1950_Xpol_8dt	16.2	280	0	None	Andrew 1-5/8 (1900)	180						444.63		18	
ANTENNA POSITION 2	PORT 3	26172.C.WCS.4G.tmp1	26172.C.WCS.4G.1	CTL05448_3C_1	CTL05448_3C_1		LTE WCS	OPA-65R-LCUU-H8_2350MHz_05DT	17.4	280	5	Top	FIBER	0						1285.2866		20	

ANTENNA POSITION 3	PORT 1	26172.C.850.4G.tmp1	26172.C.850.4G.1	CTL05448_8C_1	CTL05448_8C_1		LTE 850	HPA-65R-BUU-H8_849MHz_09DT	16	280	9	Top	FIBER	0						1000		21	
	PORT 3	26172.C.AWS.4G.tmp4	26172.C.AWS.4G.4	CTL05448_2C_2	CTL05448_2C_2		LTE AWS	HPA-65R-BUU-H8_2170MHz_05DT	17.4	280	5	Top	FIBER	0						5070.2572		22	
ANTENNA POSITION 4	PORT 1	26172.C.700.4G.1	26172.C.700.4G.1	CTL05448_7C_1	CTL05448_7C_1		LTE 700	OPA-65R-LCUU-H8_719MHz_09DT	14.5	280	9	Top	FIBER	0						1475.7065		23	
	PORT 3	26172.C.1900.4G.1	26172.C.1900.4G.1	CTL05448_9C_1	CTL05448_9C_1		LTE 1900	OPA-65R-LCUU-H8_1930MHz_05DT	17.3	280	5	Top	FIBER	0						3664.3757		24	
	PORT 4	26172.C.1900.4G.tmp4	26172.C.1900.4G.2	CTL05448_9C_2	CTL05448_9C_2		LTE 1900	OPA-65R-LCUU-H8_1930MHz_05DT	17.3	280	5	Top	FIBER	0						3664.3757		24	







NOTES

Date Time (Eastern)	Version	ATTUID	Note
12/19/2017 10:47:33 AM	1.00	rx855w	SOW: Add LTE 850 RRUS 4478 B5./ Add DC only squid.

WORKFLOW SUMMARY

Date	FROM State / Status	FROM ATTUID	TO State / Status	TO ATTUID	Operation	Comments	PACE Status
01/05/2018	Preliminary In Progress	rx855w	Preliminary Submitted for Approval	RC475S	Promote	Preliminary RFDS	NER-RCTB-17-08526 MRCTB028167 SUCCESS 01/05/2018 12:22:22 PM
01/23/2018	Preliminary Submitted for Approval	RC475S	Preliminary Approved	DC5778	Promote		
03/13/2018	Preliminary Approved	DC5778	Final RF Approval	OM636A	Promote	Please promote to final	

Radio 4478

4T4R low band platform

- 4TX/4RX, FDD LTE
- , 600MHz, B5, B12, B13, B14
- 4x40W, Full-band IBW
- 2x 2.5/5/10Gbps CPRI
- Weight < 60 lb (27.2kg)
 - 380Hx335Wx186D mm (24 l)
 - Two handles Dimensions: 14.9"L x 13.1"W x 7.3"D
- -48 VDC
- AISG TMA & RET support
- 2 external alarms
- IP65, -40 to +55° C



PERFORMANCE EVOLUTION

MIMO // Cloud RAN // Gigabit speeds



- Dimensions now confirmed to be the same for all bands
- Handle design has changed based on usability analysis
- 600MHz availability on track for October 2017



Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT5448

FA#: 10071105

Manchester Central
239 Middle Turnpike East
Manchester, CT 6040

July 2, 2018

Centerline Communications Project Number: 950006-132

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	14.75 %



July 2, 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: **CT5448 – Manchester Central**

Centerline Communications, LLC (“Centerline”) was directed to analyze the proposed AT&T facility located at **239 Middle Turnpike East, Manchester, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately $467 \mu\text{W}/\text{cm}^2$ and $567 \mu\text{W}/\text{cm}^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



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

Additional details can be found in FCC OET 65.



CALCULATIONS

Calculations were performed for the proposed AT&T Wireless antenna facility located at **239 Middle Turnpike East, Manchester, 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
UMTS	1900 MHz (PCS)	2	30
LTE	2300 MHz (WCS)	4	30
LTE	850 MHz	2	40
LTE	2100 MHz (AWS)	4	30
LTE	700 MHz	2	40
LTE	1900 MHz (PCS)	4	40

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	143
A	2	CCI OPA-65R-LCUU-H6	143
A	3	CCI HPA-65R-BUU-H6	143
A	4	CCI OPA-65R-LCUU-H6	143
B	1	Kathrein 800-10121	143
B	2	CCI OPA-65R-LCUU-H8	143
B	3	CCI HPA-65R-BUU-H8	143
B	4	CCI OPA-65R-LCUU-H8	143
C	1	Kathrein 800-10121	143
C	2	CCI OPA-65R-LCUU-H8	143
C	3	CCI HPA-65R-BUU-H8	143
C	4	CCI OPA-65R-LCUU-H8	143

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 / 1900 MHz (PCS)	11.45 / 14.35	4	120	2,471.44	0.60
Antenna A2	CCI OPA-65R-LCUU-H6	2300 MHz (WCS)	15.45	4	160	5,612.03	1.07
Antenna A3	CCI HPA-65R-BUU-H6	850 MHz / 2100 MHz (AWS)	12.65 / 15.05	6	200	5,311.29	1.23
Antenna A4	CCI OPA-65R-LCUU-H6	700 MHz / 1900 MHz (PCS)	11.65 / 14.85	8	320	7,227.36	1.90
Sector A Composite MPE%							4.80
Antenna B1	Kathrein 800-10121	850 MHz / 1900 MHz (PCS)	11.45 / 14.35	4	120	2,471.44	0.60
Antenna B2	CCI OPA-65R-LCUU-H8	2300 MHz (WCS)	14.95	4	160	5,001.73	0.96
Antenna B3	CCI HPA-65R-BUU-H8	850 MHz / 2100 MHz (AWS)	14.05 / 15.25	6	200	6,052.36	1.46
Antenna B4	CCI OPA-65R-LCUU-H8	700 MHz / 1900 MHz (PCS)	12.55 / 14.85	8	320	7,766.07	2.12
Sector B Composite MPE%							5.13
Antenna C1	Kathrein 800-10121	850 MHz / 1900 MHz (PCS)	11.45 / 14.35	4	120	2,471.44	0.60
Antenna C2	CCI OPA-65R-LCUU-H8	2300 MHz (WCS)	14.95	4	160	5,001.73	0.96
Antenna C3	CCI HPA-65R-BUU-H8	850 MHz / 2100 MHz (AWS)	14.05 / 15.25	6	200	6,052.36	1.46
Antenna C4	CCI OPA-65R-LCUU-H8	700 MHz / 1900 MHz (PCS)	12.55 / 14.85	8	320	7,766.07	2.12
Sector C Composite MPE%							5.13

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, the sectors with the largest calculated MPE% are Sectors B & C. 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	5.13 %
Town MFRE	0.11 %
Town MPD - ch 1	0.01 %
Town MPD - ch 2	0.02 %
Town MFD	0.03 %
Town services intercity	0.06 %
RAFS I/2	0.19 %
Town public works	0.08 %
Town Services EOC	0.08 %
Town FD	0.08 %
town SP hotline	0.11 %
Town Vol FD	0.07 %
Town Service - School	0.02 %
Htfd City FD	0.08 %
Tolland MUT	0.08 %
Sprint	2.46 %
Clearwire	0.09 %
T-Mobile	2.53 %
Verizon Wireless	3.51 %
Site Total MPE %:	14.75 %

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	4.80 %
AT&T Sector B Total:	5.13 %
AT&T Sector C Total:	5.13 %
Site Total:	14.75 %

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, the sectors with the largest calculated MPE% are Sectors B & C.

AT&T _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
AT&T 850 MHz UMTS – Antenna 1	2	418.91	143	1.60	850 MHz	567	0.28%
AT&T 1900 MHz (PCS) UMTS – Antenna 1	2	816.81	143	3.13	1900 MHz (PCS)	1000	0.31%
AT&T 2300 MHz (WCS) LTE – Antenna 2	4	1,250.43	143	9.58	2300 MHz (WCS)	1000	0.96%
AT&T 850 MHz LTE – Antenna 3	2	1,016.39	143	3.89	850 MHz	567	0.69%
AT&T 2100 MHz (AWS) LTE – Antenna 3	4	1,004.90	143	7.70	2100 MHz (AWS)	1000	0.77%
AT&T 700 MHz LTE – Antenna 4	4	719.55	143	5.51	700 MHz	467	1.18%
AT&T 1900 MHz (PCS) LTE – Antenna 4	4	1,221.97	143	9.36	1900 MHz (PCS)	1000	0.94%
						Total:	5.13%

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:	4.80 %
Sector B:	5.13 %
Sector C:	5.13 %
AT&T Maximum Total (per sector):	5.13 %
Site Total:	14.75 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **14.75 %** 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.

A handwritten signature in black ink, appearing to read 'Scott Heffernan', is positioned above the contact information.

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:

Town of Manchester
c/o Mr. Scott Shanley
41 Center Street
Manchester, CT 06040



9590 9402 3676 7335 2345 33

2. Article Number (Transfer from service label)

7017 1450 0001 7926 9168

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

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X

WR

- Agent
- Addressee

B. Received by (Printed Name)

R. Shanley

C. Date of Delivery

7/9

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

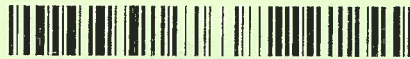
Domestic Return Receipt

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:

Mr. James Davis
Town of Manchester Zoning Dept.
41 Center Street
Manchester, CT 06040



9590 9402 3676 7335 2345 02

2. Article Number (Transfer from service label)

7017 1450 0001 7926 9144

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

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X

WR

- Agent
- Addressee

B. Received by (Printed Name)

R. Shanley

C. Date of Delivery

7/9

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

Domestic Return Receipt

Track Another Package +

Tracking Number: 70171450000179269120

Remove X

On Time

Expected Delivery on

MONDAY

9

JULY
2018 ⓘ

by

8:00pm ⓘ

 **Delivered**

July 9, 2018 at 8:05 am
Delivered, Individual Picked Up at Postal Facility
MANCHESTER, CT 06040

Get Updates ✓

Text & Email Updates



Tracking History



Product Information



See Less ^

Can't find what you're looking for?

Go to our FAQs section to find answers to your tracking questions.

FAQs (<http://faq.usps.com/?articleId=220900>)

The easiest tracking number is the one you don't have to know.

With Informed Delivery[®], you never have to type in another tracking number. Sign up to:

- See images* of incoming mail.
- Automatically track the packages you're expecting.
- Set up email and text alerts so you don't need to enter tracking numbers.
- Enter USPS Delivery Instructions[™] for your mail carrier.

Sign Up

([https://reg.usps.com/entreg/RegistrationAction_input?](https://reg.usps.com/entreg/RegistrationAction_input?app=UspsTools&appURL=https%3A%2F%2Ftools.usps.com%2Fgo)

*NOTE: Black and white (grayscale) images show the outside, front of letter-sized envelopes and mailpieces that are processed through USPS automated equipment.

Track Another Package +

Tracking Number: 70171450000179269137

Remove X

On Time

Expected Delivery on

MONDAY

9
JULY
2018 ⓘby
8:00pm ⓘ **Delivered**

July 9, 2018 at 8:05 am
Delivered, Individual Picked Up at Postal Facility
MANCHESTER, CT 06040

Text & Email Updates

Select what types of updates you'd like to receive and how. Send me a notification for:

Text**Email**

All Below Updates

Expected Delivery Updates ⓘ

Day of Delivery Updates ⓘ

- Package Delivered ⓘ
- Available for Pickup ⓘ
- Delivery Exception Updates ⓘ
- Package In-Transit Updates ⓘ

Tracking History



Product Information



See Less ^

Can't find what you're looking for?

Go to our FAQs section to find answers to your tracking questions.

FAQs (<http://faq.usps.com/?articleId=220900>)

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With Informed Delivery[®], you never have to type in another tracking number. Sign up to:

- See images* of incoming mail.
- Automatically track the packages you're expecting.
- Set up email and text alerts so you don't need to enter tracking numbers.
- Enter USPS Delivery Instructions[™] for your mail carrier.

Sign Up

([https://reg.usps.com/entreg/RegistrationAction_input?](https://reg.usps.com/entreg/RegistrationAction_input?app=UspsTools&appURL=https%3A%2F%2Ftools.usps.com%2Fgo)

*NOTE: Black and white (grayscale) images show the outside, front of letter-sized envelopes and mailpieces that are processed through USPS automated equipment.