Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

February 15, 2017

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

RE: **Notice of Exempt Modification for AT&T/ LTE 3C Crown Site BU: 806352**
AT&T Site ID: CT2104
126 Ledge Road, Darien, CT 06820
Latitude: 41° 4' 20.75" / Longitude: -73° 28' 41.4"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 89-foot level of the existing 117-foot monopole at 126 Ledge Road in Darien, CT. The tower is owned by Crown Castle. The property is owned by the Town of Darien. AT&T now intends to install six (6) tower mounted switches, three (3) RRU11s, and six (6) diplexers to the ground. AT&T also intends to replace existing triplexers and TMAs with new models.

This facility was approved by the by the Connecticut Siting Council on December 30, 1992. This approval included the conditions that:

1. The self-supporting monopole tower shall be no taller than necessary to provide the proposed communications service and the tower shall not exceed a total height of 113 feet above ground level (AGL), with appurtenances.

   However, this condition was rendered moot by the approval for Petition 803, which allows Sprint to install antennas at the 120-foot level. (The approval letter includes the condition that the applicant would flush-mount its antennas ton the pipe extension, but this condition only applies to Sprint.) The petition was approved without conditions restricting exempt modification.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to Ms. Jayme Stevenson, First Selectman, Town of Darien, as well as the property owner, and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeffrey Barbadora.

Sincerely,

Jeffrey Barbadora
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
781-729-0053
Jeff.Barbadora@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc:

Ms. Jayme Stevenson, First Selectman
Town of Darien
2 Renshaw Road
Darien, CT 06820

Town of Darien
Department of Planning & Zoning
2 Renshaw Road
Darien, CT 06820

DOCKET NO. 155 - An application of Metro Mobile CTS of Fairfield County, Inc., for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a cellular telephone telecommunications tower, antennas, associated equipment, and building on a 17-acre parcel of land used and owned by the Town of Darien as the Town waste transfer station off Ledge Road, with an alternative site on a 1 acre parcel owned by the Noroton Heights Fire Department, Inc., located immediately adjacent to the Noroton Heights Fire Department Building at 209 Noroton Avenue in the Town of Darien, Connecticut.

Connecticut

Siting

Council

December 30, 1992

DECISION AND ORDER

Pursuant to the foregoing Findings of Fact, and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a cellular telecommunications tower and equipment building at the proposed Darien, Connecticut, prime site including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need as provided by section 16-50k of the Connecticut General Statutes (CGS), be issued to Metro Mobile CTS of Fairfield County, Inc. (Metro Mobile), for the construction, operation, and maintenance of a cellular telecommunications tower, associated equipment, and building within property owned by the Town of Darien located on Ledge Road, Darien, Connecticut.

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

1. The self-supporting monopole tower shall be no taller than necessary to provide the proposed communications service and the tower shall not exceed a total height of 113 feet above ground level (AGL), with antennas and appurtenances.

2. The Certificate holder shall prepare a Development and Management (D&M) plan for this site in compliance with sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The D&M plan shall include detailed plans of the tower, tower foundation, equipment building, access road including all upgrades, utility connection, security fence, and detailed plans for drainage, erosion, and sedimentation controls consistent with the Connecticut Guidelines for Soil Erosion and Sedimentation Control. In addition, the D&M plan shall include detailed landscaping plans for the facility site, with options to provide landscaping on the Town property boundary north of the site and on the Middlesex Common Condominium property subject to their approval.

3. The Certificate Holder shall comply with any existing and future radio frequency (RF) standard promulgated by State or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facility granted herein shall be brought into compliance with such standards.

4. The Certificate Holder shall provide the Council a recalculated report of electromagnetic radio frequency power density if and when circumstances in operation cause a change in power density above the levels originally calculated and provided in the application.

5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

6. If the facility does not initially provide, or permanently ceases to provide cellular or other services following completion of construction, this Decision and Order shall be void, and the Certificate holder shall dismantle the tower and remove all associated equipment or reapplication for any continued or new use shall be made to the Council before any such use is made.

7. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the effective date of this Decision and Order or within three years after all appeals to this Decision and Order have been resolved.

Pursuant to CGS section 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in the Norwalk Hour, Stamford Advocate, and Darien News-Review.

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

The parties and intervenors to this proceeding are:

APPLICANT	ITS REPRESENTATIVES
Metro Mobile CTS of Fairfield County, Inc.	Metro Mobile CTS of Fairfield County, Inc. 20 Alexander Drive Wallingford, CT 06492 Attn: David S. Malko, P.E. Manager, Engineering and Regulatory Services Robinson & Cole One Commercial Plaza Hartford, CT 06103-3597 Attn: Earl W. Phillips, Jr., Esq. Charles R. Wolfe, Esq. Henry H. Sprague, III, Esq.
INTERVENOR	ITS REPRESENTATIVE
The Springwich Cellular Limited Partnership	Peter J. Tyrrell Senior Attorney SNET Cellular, Inc. 227 Church Street Room 1021 New Haven, CT 06506
PARTY	ITS REPRESENTATIVE
Middlesex Common Condominium Association, Inc.	Rebecca Oldfield Smith 53 Hale Lane Darien, Connecticut 06820
INTERVENOR	
Bruce Fletcher 236 Noroton Avenue Darien, Connecticut 06820	

PARID: 29014

TOWN OF DARIEN PUBLIC WORKS GARAGE 126 LEDGE ROAD

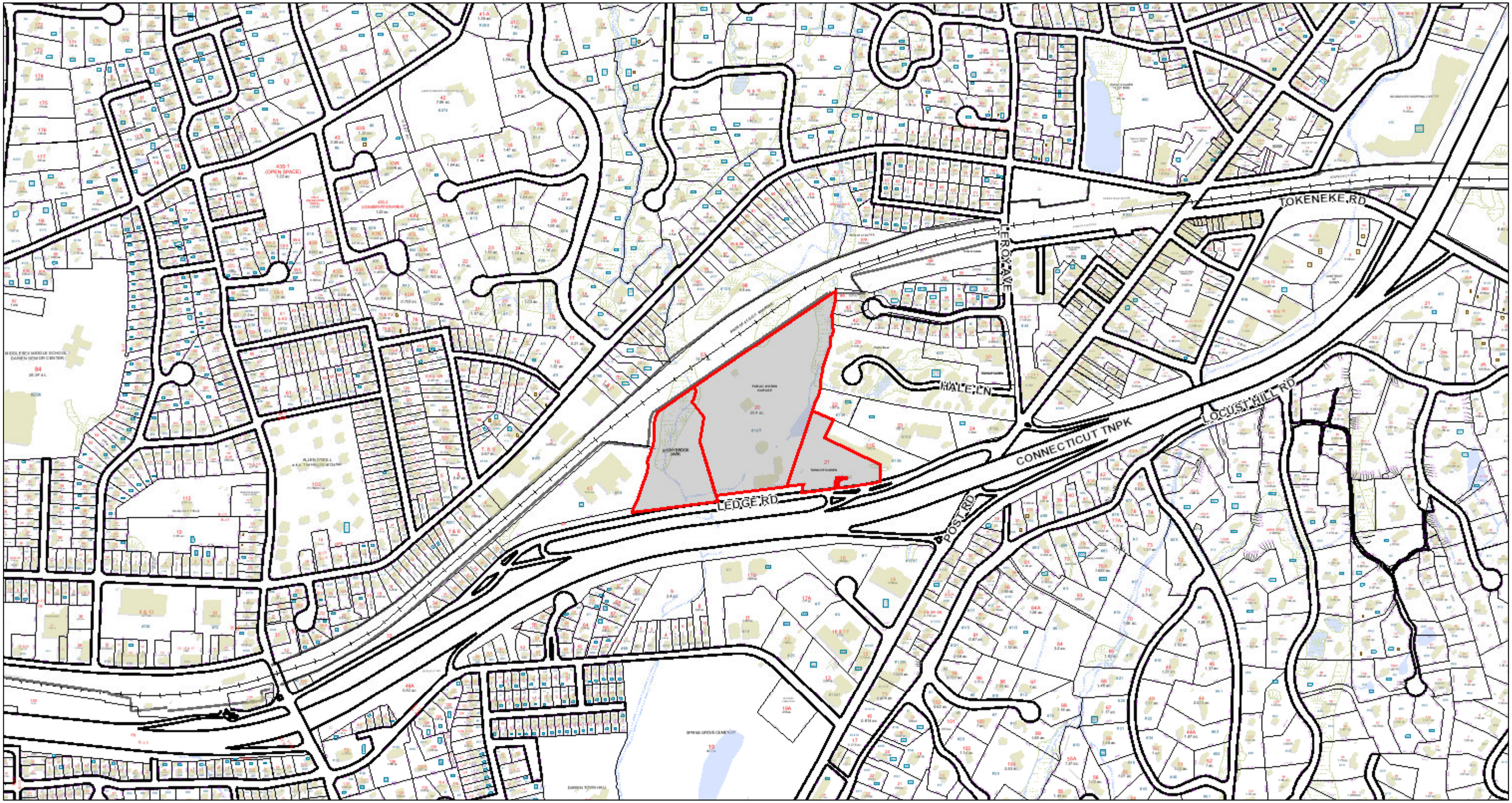
Parcel

Alt ID	39 20&21
Address	126 LEDGE ROAD
Unit	
Neighborhood	1032
Class	300
Land Use Code	903-MUNICIPAL
Living Units	
Acres	20.4
Zoning	R13
Street1/Street2	8-SECONDARY /-
Topo1/Topo2/Topo3	1-LEVEL/-/-
Util1/Util2/Util3	1-ALL PUBLIC/1-/1-
Notes	TOWN GARAGE / FIRE TRAINING=-'13 '15,AH,PRICE TOWER AND CROWN OBLD '0718X40' BLD-VERIZON-'16-ATT 110' TOWER 117'TOWERTMOBILSPRINT-'13CROWN-'15

Owners

Owner		Address	City	State	Zip
TOWN OF DARIEN	PUBLIC WORKS GARAGE	126 LEDGE ROAD	DARIEN	CT	06820

29014 126 LEDGE ROAD



February 14, 2017

1:9,526

0 0.1 0.2 0.4 mi

0 0.175 0.35 0.7 km

Town of Darien Connecticut

WIRELESS COMMUNICATIONS FACILITY
CT2104 - LTE 4C
DARIEN
CROWN CASTLE SITE NO.: 806352
126 LEDGE ROAD
DARIEN, CT 06820

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

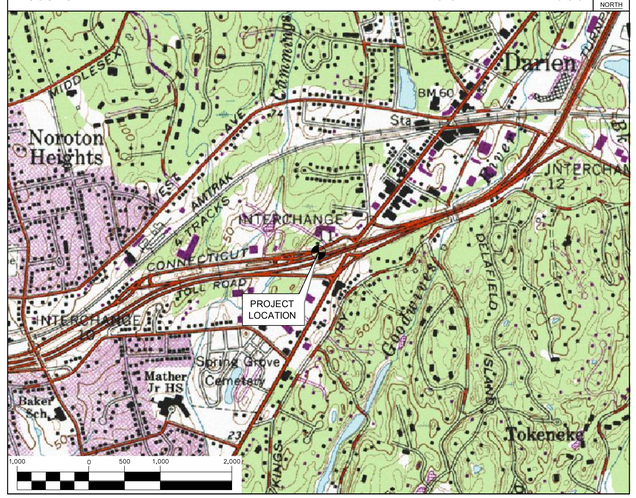
TO: 126 LEDGE ROAD, DARIEN, CONNECTICUT

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	0.30 MI
4. TURN LEFT TO MERGE ONTO I–91 S TOWARD NEW HAVEN	9.59 MI
5. TAKE EXIT 17 FOR CT–15 S/W CROSS PKWY TOWARD E MAIN ST	30.24 MI
6. MERGE ONTO CT–8 S TOWARD BRIDGEPORT	5.93 MI
7. MERGE ONTO I–95 S/GOVERNOR JOHN DAVIS LODGE TPKE TOWARD NY CITY	17.23 MI
8. TAKE EXIT 11 FOR US–1 TOWARD DARIEN/ROWAYTON	0.18 MI
9. KEEP LEFT TO TAKE RAMP TOWARD NOROTON	0.05 MI
10. MERGE ONTO LEDGE RD	0.24 MI
11. 126 LEDGE RD IS ON THE RIGHT	

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   - A. INSTALL (3) NEW RRUS–11 (LTE 850 MHz) WITHIN EXISTING EQUIPMENT SHELTER.
   - B. INSTALL (2) NEW TRIPLEXERS BEHIND POSITION 3 ANTENNA, (2) PER SECTOR/(6) TOTAL.
   - C. INSTALL (6) NEW TRIPLEXERS WITHIN EXISTING EQUIPMENT ROOM.
   - D. INSTALL (1) AT&T SURGE ARRESTOR.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT2104
AT&T SITE NAME:	DARIEN
SITE ADDRESS:	CROWN CASTLE SITE NO.: 806352 126 LEDGE ROAD DARIEN, CT 06820
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°–04'–20.76996" N LONGITUDE: 73°–28'–41.39796" W GROUND ELEVATION: ±85' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	01/12/17	KAW	CAG	CONSTRUCTION DOCUMENTS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
DARIEN
CT2104 - LTE 4C
126 LEDGE ROAD
DARIEN, CT 06820

DATE: 12/27/16
SCALE: AS NOTED
JOB NO. 16071.89

TITLE SHEET

T–1

Sheet No. 1 of 7

NOTES AND SPECIFICATIONS

DESIGN BASIS:

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

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 90–110 MPH (3 SECOND GUST)
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 93 MPH (Vasd) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7–10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

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

STRUCTURAL STEEL

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

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

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

PAINT NOTES

PAINTING SCHEDULE:

1. <u>ANTENNA PANELS:</u>

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

2. <u>COAXIAL CABLES:</u>

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

EXAMINATION AND PREPARATION:

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

CLEANING:

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

APPLICATION:

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

COMPLETED WORK:

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

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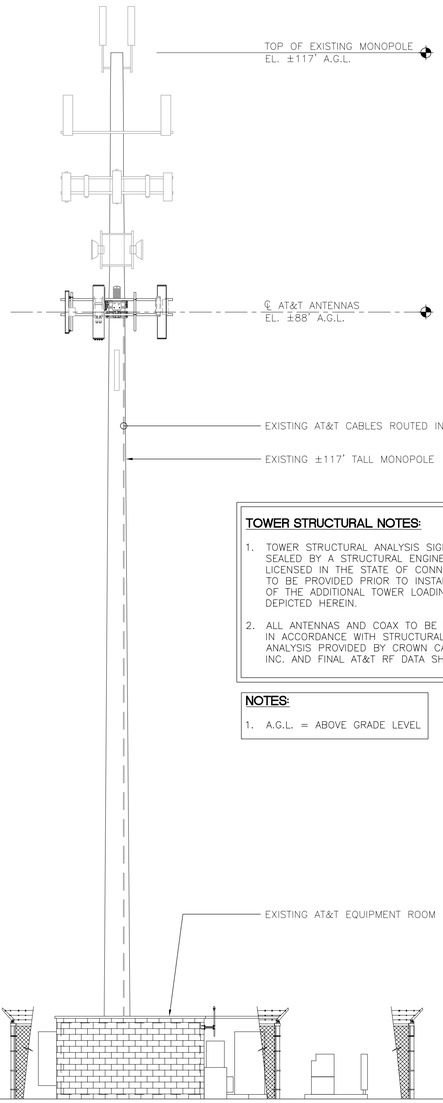
NOTES, SPECIFICATIONS AND DETAILS

N-1



TOWER STRUCTURAL NOTES:

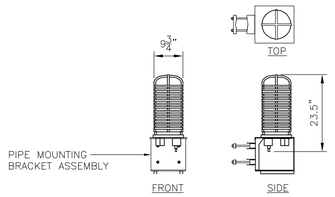
1. TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE,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

NOTES:

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

4 / C-1 **WEST ELEVATION**
SCALE: 1/8" = 1'-0"

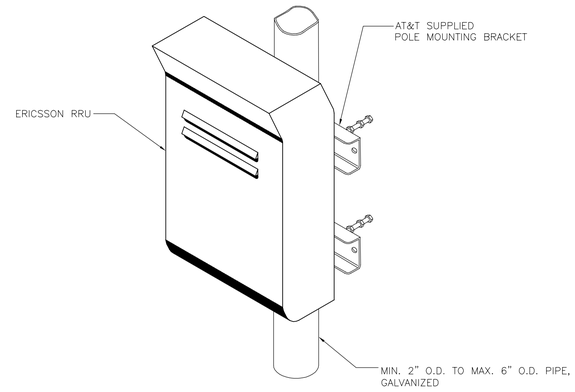
GRAPHIC SCALE
8 0 4 8 16 32
(IN FEET)
1 inch = 8 ft.



SITE TYPE	ARRESTOR MAKE/MODEL	QTY REQUIRED	ARRESTOR LOCATION	WEIGHT
	MAKE: RAYCAP (SQUID) MODEL: DC6-48-60-18-8F	(1) PER SITE	TOWER, ADJACENT TO AT&T ANTENNAS AND RRUs.	20 LBS. (WITHOUT MOUNT)

NOTES:
1. CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.

2 / C-1 **SURGE ARRESTOR DETAIL**
SCALE: NTS

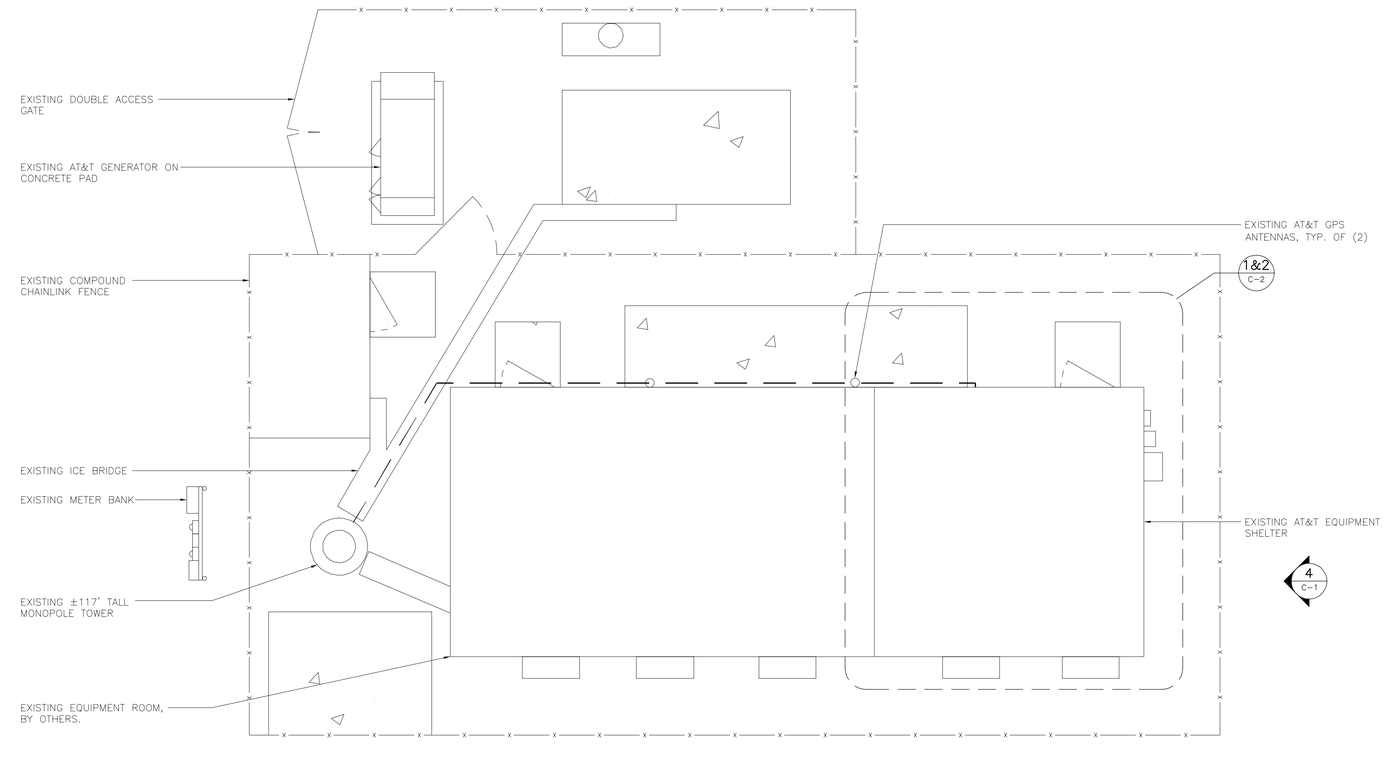


ISOMETRIC VIEW

NOTES:

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

1 / C-1 **TYPICAL RRUS MOUNTING DETAILS**
SCALE: NTS



3 / C-1 **COMPOUND PLAN**
SCALE: 1/4" = 1'-0"

TRUE NORTH

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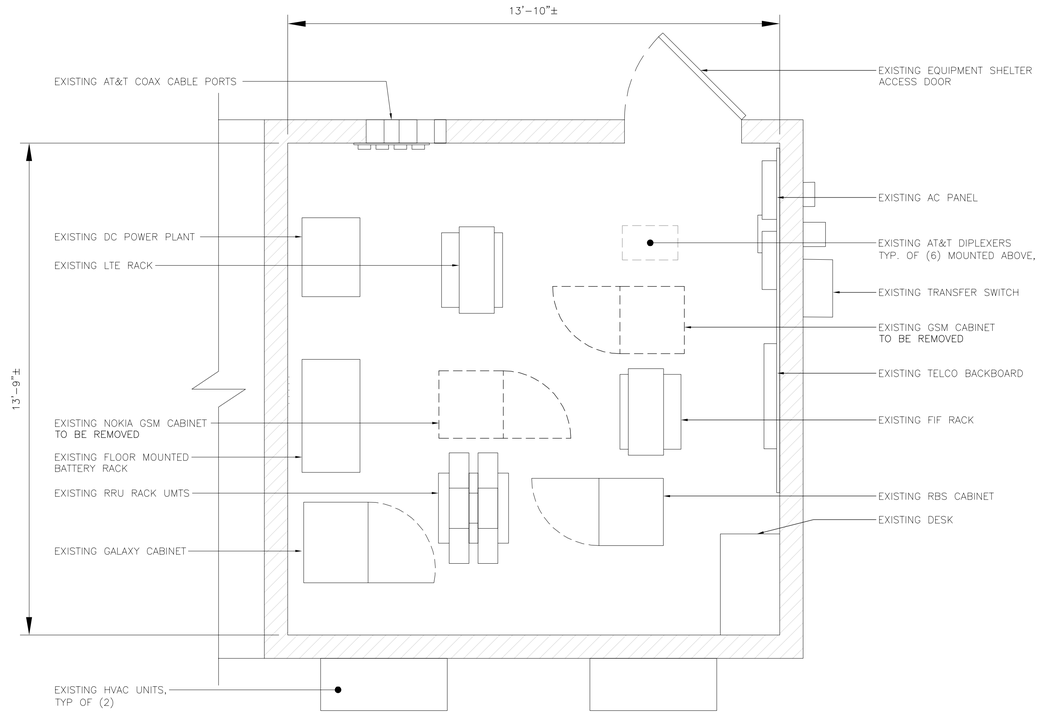
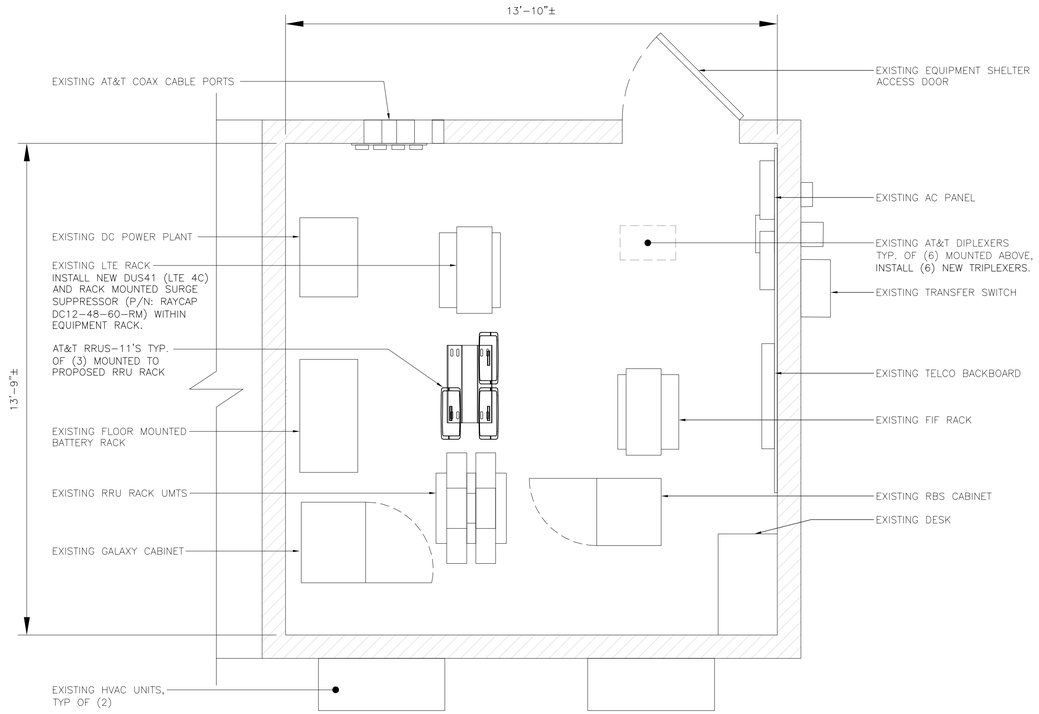
PLANS AND ELEVATION

C-1
Sheet No. 3 of 7



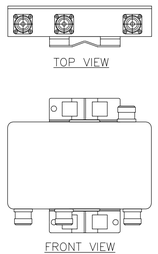
1 C-2 **EXISTING EQUIPMENT LAYOUT PLAN**
SCALE: 1/2" = 1'-0"

TRUE NORTH



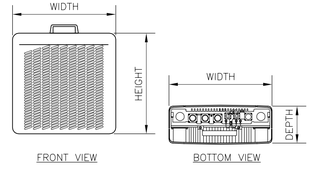
2 C-2 **PROPOSED EQUIPMENT LAYOUT PLAN**
SCALE: 1/2" = 1'-0"

TRUE NORTH



TRIPLEXER		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: CCI MODEL: TPX-070821	5.83"H x 9.65"W x 2.05"D	7.5 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.		

3 C-2 **TRIPLEXER DETAIL**
SCALE: NONE



RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 11	17.8"H x 17.3"W x 7.2"D	50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.			

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

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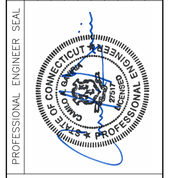

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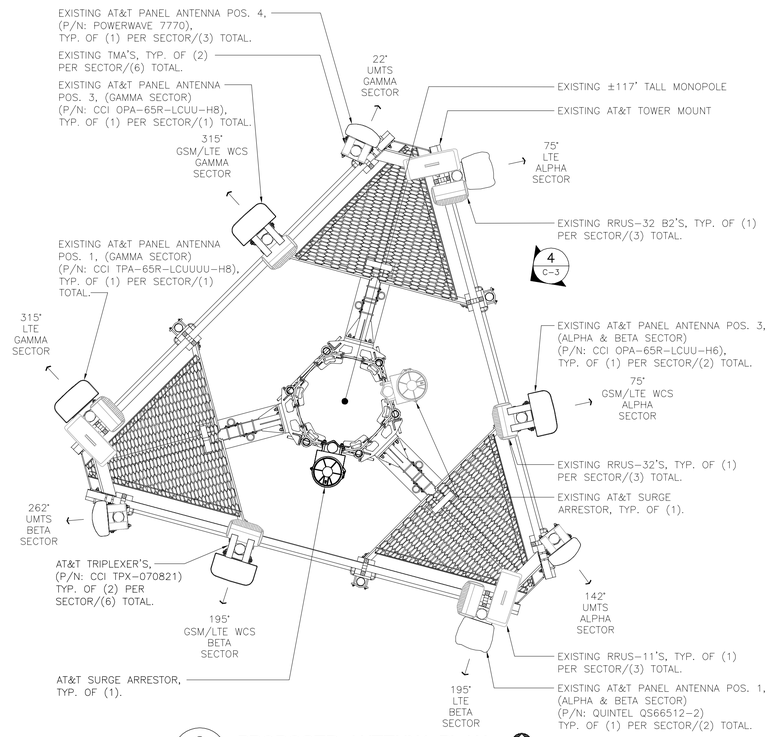
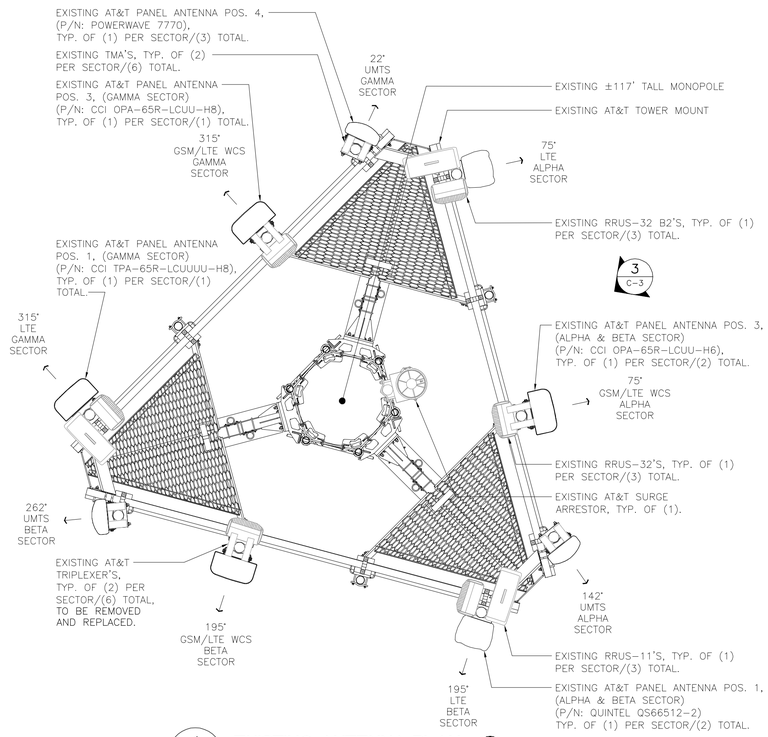
EQUIPMENT LAYOUT PLANS

C-2

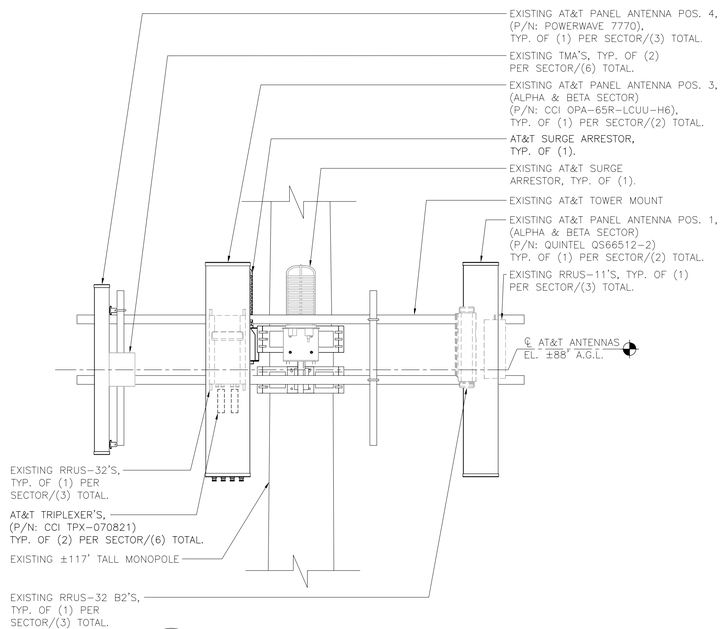
Sheet No. 4 of 7



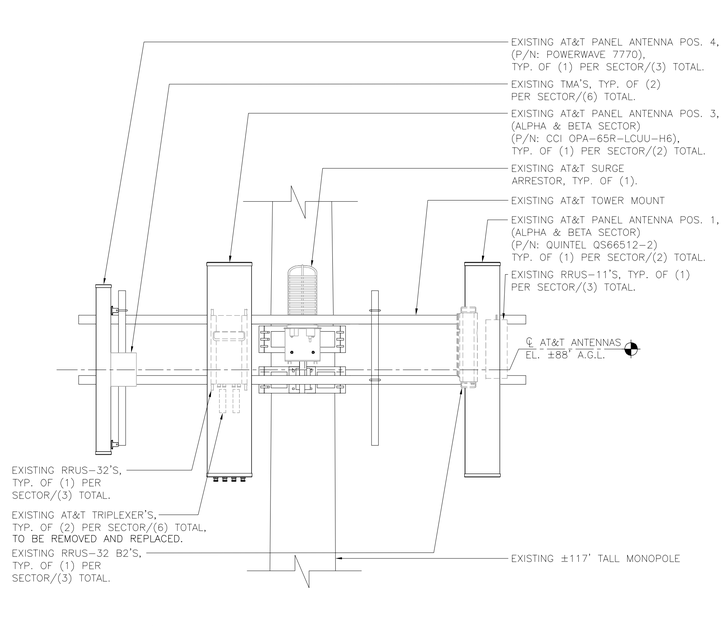
2 C-3 **PROPOSED ANTENNA PLAN**
SCALE: 1/2" = 1'-0"
NORTH



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



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



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

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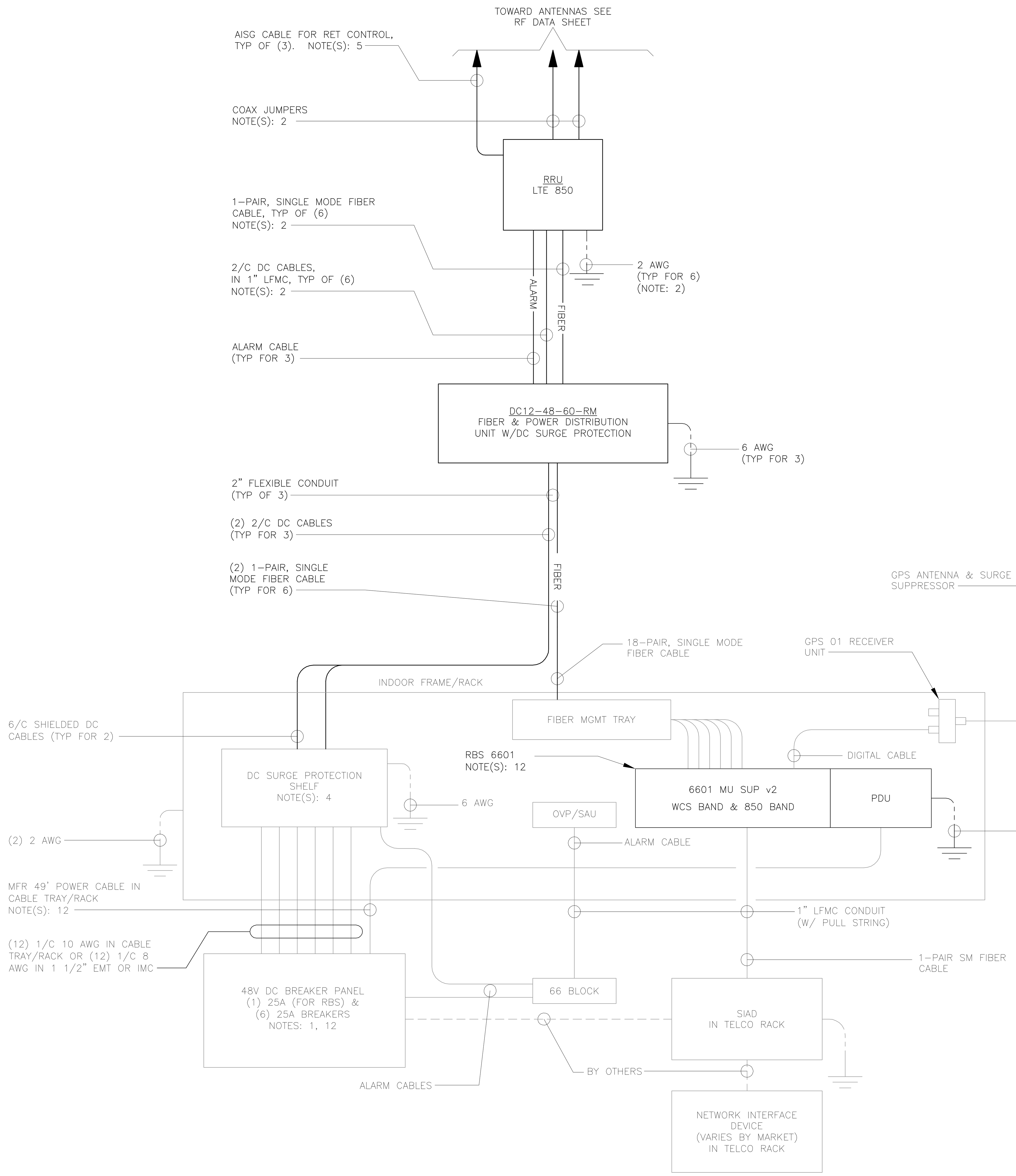
LTE 4C EQUIPMENT DETAILS

C-3

Sheet No. 5 of 7



1 E-1 **LTE SCHEMATIC DIAGRAM**

NOT TO SCALE

LTE SCHEMATIC DIAGRAM NOTES:

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

ELECTRICAL NOTES

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

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

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

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

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

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

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

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

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

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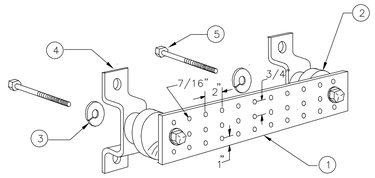
LTE SCHEMATIC DIAGRAM AND NOTES

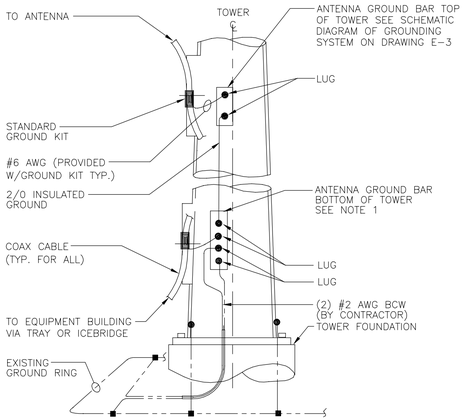
E-1



LEGEND

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

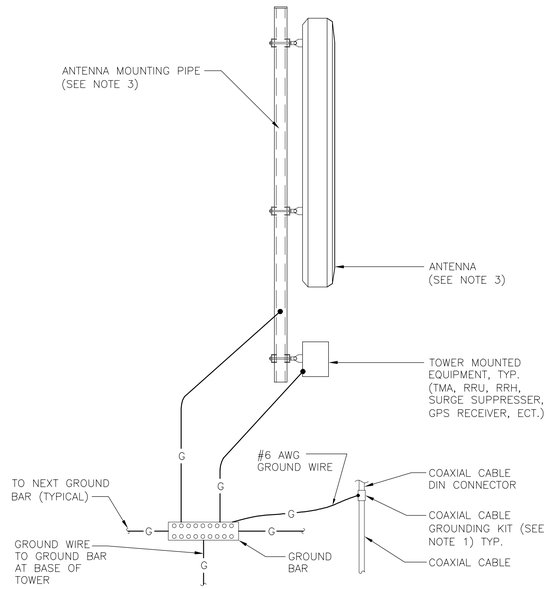
3 / E-2 **GROUND BAR DETAIL**
NOT TO SCALE



NOTES:

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

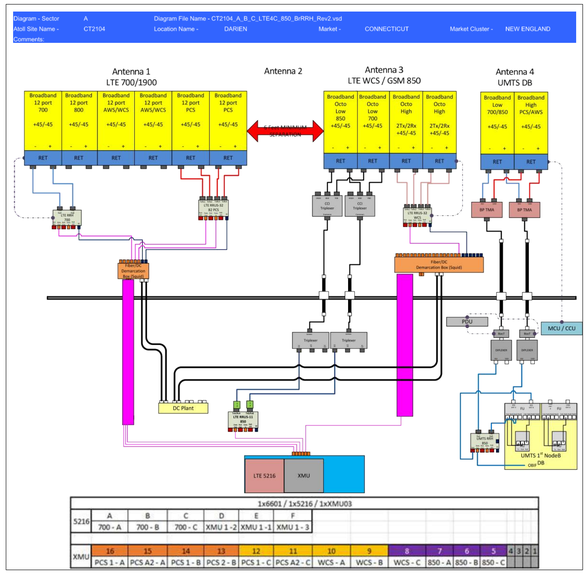
2 / E-2 **ANTENNA CABLE GROUNDING - TOWER**
NOT TO SCALE



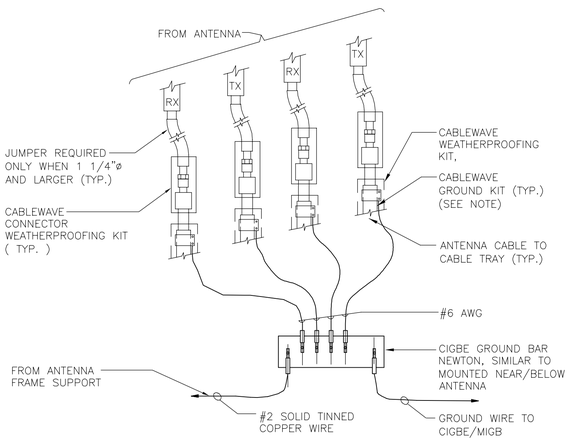
NOTES:

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

1 / E-2 **TYPICAL ANTENNA GROUNDING DETAIL**
NOT TO SCALE



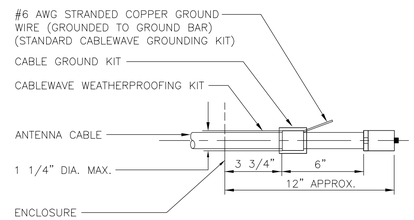
6 / E-2 **RFDS PLUMBING DIAGRAM**
NOT TO SCALE



NOTE:

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

5 / E-2 **CONNECTION OF GROUND WIRES TO GROUND BAR**
NOT TO SCALE



NOTE:

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

4 / E-2 **ANTENNA CABLE GROUNDING DETAIL**
NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	01/12/17	KAW	CAG	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY

DARIEN
CT2104 - LTE 4C
126 LEDGE ROAD
DARIEN, CT 06820

DATE: 12/27/16
SCALE: AS NOTED
JOB NO. 16071.89

TYPICAL ELECTRICAL DETAILS

E-2

PJF PAUL J. FORD & COMPANY

Date: **January 27, 2017**

Kevin Morrow
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6619

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
jjohnson@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	10035058
	Carrier Site Name:	CT2104
Crown Castle Designation:	**Crown Castle BU Number:**	806352
	Crown Castle Site Name:	BRG 302 943052
	Crown Castle JDE Job Number:	412575
	Crown Castle Work Order Number:	1338600
	Crown Castle Application Number:	371591 Rev. 2
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37517-0349.001.7805 (Proposed Loading)
Site Data:	**126 Ledge Road, DARIEN, Fairfield County, CT**	
	Latitude *41° 4' 20.75"*, Longitude *-73° 28' 41.4"*	
	117 Foot - Monopole Tower	

Dear Kevin Morrow,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 992438, in accordance with application 371591, revision 2.

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

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C with a maximum topographic factor, Kzt, of 1.0 and Risk Category II were used in this analysis.

We at *Paul J Ford and Company* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Joshua Johnson, E.I.
Structural Designer

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

1.27.17

tnxTower Report - version 7.0.5.1

Date: **January 27, 2017**

Kevin Morrow
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6619

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
jjohnson@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	10035058
	Carrier Site Name:	CT2104
Crown Castle Designation:	**Crown Castle BU Number:**	806352
	Crown Castle Site Name:	BRG 302 943052
	Crown Castle JDE Job Number:	412575
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Respectfully submitted by:

Joshua Johnson, E.I.
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 117 ft Monopole tower designed by VALMONT in May of 1992. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-E. The tower has been modified multiple times in the past to accommodate additional loading.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C with a maximum topographic factor, Kzt, of 1.0 and Risk Category II were used in this analysis.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
88.0	89.0	2	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe	1 2	3/8 5/8	-
		1	cci antennas	OPA-65R-LCUU-H8 w/ Mount Pipe			
		1	cci antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		6	powerwave technologies	7020.00			
		6	cci antennas	TPX-070821			
		3	ericsson	RRUS 32 B2			
		3	ericsson	RRUS 32 B30			
		2	quintel technology	QS66512-2 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
	88.0	1	tower mounts	Miscellaneous [NA 509-3]			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
117.0	118.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	3	1-1/4	1
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
	117.0	1	tower mounts	Pipe Mount [PM 601-3]			
115.0	115.0	3	alcatel lucent	TME-800MHZ RRH	-	-	1
		3	alcatel lucent	TME-PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Side Arm Mount [SO 102-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
110.0	110.0	3	ericsson	Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	1	1-5/8	2
		3	ericsson	RRUS 11 B12			
		1	tower mounts	T-Arm Mount [TA 602-3]			
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	12	1-5/8	1
		3	ericsson	KRY 112 144/1			
100.0	100.0	3	alcatel lucent	RRH2X40-07-U	2	1-5/8	2
		3	alcatel lucent	RRH2X60-AWS			
		3	alcatel lucent	RRH2X60-PCS			
		6	andrew	HBXX-6516DS-A2M w/ Mount Pipe			
		3	kathrein	800 10735V01 w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	decibel	DB844G65ZAXY w/ Mount Pipe	1 12	1-1/4 7/8	1
		1	gps	GPS_A			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 715-1]			
93.0	95.0	1	andrew	VHLP1-23	3	1/2	1
	94.0	1	andrew	VHLP2-11			
		1	andrew	VHLP2.5-11			
	93.0	1	tower mounts	Pipe Mount [PM 601-3]			
	92.0	1	andrew	VHLP1-23			
88.0	89.0	3	ericsson	RRUS 11	-	-	3
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP13519			
		6	powerwave technologies	LGP2140X			
		2	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			
		1	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
		3	ericsson	RRUS 11	1 2 12	3/8 5/8 1-1/4	1
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
	88.0	1	tower mounts	Platform Mount [LP 715-1]			
81.0	81.0	3	kathrein	800 10504 w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
72.0	72.0	3	andrew	LBX-9012DS-VTM w/ Mount Pipe	-	-	1
		3	decibel	DB844H90E-XY w/ Mount Pipe			
		1	tower mounts	Platform Mount (LP 101-1)			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 1307951600, 9/26/13	217769	CCISITES
4-POST-MODIFICATION INSPECTION	GPD, 2007278.24, 03/11/08	2218625	CCISITES
4-POST-MODIFICATION INSPECTION	Sabre, 11-1114, 12/7/10	2785508	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 131001.806352, 11/7/13	4069331	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25562, 5/12/14	5077215	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25562.32675, 03/01/2016	6122311	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25562, 04/06/2016	6232380	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FDH, 1308201500, 6/7/13	3907710	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont, 10844-92, 5/19/92	217772	CCISITES
MONOPOLE PRE-MOD MAPPING	FDH, 146IQW1500, 1/9/2015	-	PJF

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole was reinforced in conformance with the referenced modification drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	117 - 110	Pole	TP15.94x14.36x0.1875	1	-1.08	701.02	7.6	Pass
L2	110 - 100	Pole	TP18.2x15.94x0.1875	2	-3.60	775.82	26.9	Pass
L3	100 - 81.875	Pole	TP22.2676x18.2x0.25	3	-13.19	1301.71	70.3	Pass
L4	81.875 - 76.0833	Pole	TP23.5674x22.2676x0.3262	4	-14.50	1461.93	79.9	Pass
L5	76.0833 - 71	Pole	TP24.7082x23.5674x0.4537	5	-17.51	1633.76	85.2	Pass
L6	71 - 68.0833	Pole	TP25.3627x24.7082x0.6488	6	-18.30	2076.71	74.3	Pass
L7	68.0833 - 63.5	Pole	TP26.3913x25.3627x0.685	7	-19.63	2399.72	72.5	Pass
L8	63.5 - 47.42	Pole	TP30x26.3913x0.8147	8	-23.65	3134.39	70.3	Pass
L9	47.42 - 38.0833	Pole	TP31.6377x27.3428x0.8045	9	-27.79	3123.65	82.1	Pass
L10	38.0833 - 35	Pole	TP32.339x31.6377x0.7403	10	-31.30	3144.21	89.7	Pass
L11	35 - 12.5	Pole	TP37.4568x32.339x0.7647	11	-40.63	3949.43	88.2	Pass
L12	12.5 - 11	Pole	TP37.798x37.4568x0.7495	12	-41.28	3919.73	89.9	Pass
L13	11 - 2.5	Pole	TP39.7314x37.798x0.9196	13	-45.76	5035.53	75.1	Pass
L14	2.5 - 0	Pole	TP40.3x39.7314x0.9631	14	-47.17	5509.93	69.9	Pass
							Summary	
						Pole (L12)	89.9	Pass
						RATING =	**89.9**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	62.8	Pass
1	Base Plate	0	43.1	Pass
1	Base Foundation Steel	0	78.5	Pass
1	Base Foundation Soil Interaction	0	52.3	Pass
1	Flange	100	24.4	Pass
1	Flange	110	7.4	Pass

Structure Rating (max from all components) =	89.9%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

1) Tower is located in Fairfield County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 93 mph.
4) Structure Class II.
5) Exposure Category C.
6) Topographic Category 1.
7) Crest Height 0.0000 ft.
8) Nominal ice thickness of 0.7500 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56.00 pcf.
11) A wind speed of 50 mph is used in combination with ice.
12) Temperature drop of 50 °F.
13) Deflections calculated using a wind speed of 60 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

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	117.0000-110.0000	7.0000	0.00	12	14.3600	15.9400	0.1875	0.7500	A572-65 (65 ksi)
L2	110.0000-100.0000	10.0000	0.00	12	15.9400	18.2000	0.1875	0.7500	A572-65 (65 ksi)
L3	100.0000-81.8750	18.1250	0.00	12	18.2000	22.2676	0.2500	1.0000	A572-65 (65 ksi)
L4	81.8750-76.0833	5.7917	0.00	12	22.2676	23.5674	0.3262	1.3048	Reinf 52.81 ksi (53 ksi)
L5	76.0833-71.0000	5.0833	0.00	12	23.5674	24.7082	0.4537	1.8148	Reinf 40.66 ksi (41 ksi)
L6	71.0000-68.0833	2.9167	0.00	12	24.7082	25.3627	0.6488	2.5952	Reinf 35.47 ksi (35 ksi)

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
L7	68.0833-63.5000	4.5833	0.00	12	25.3627	26.3913	0.6850	2.7401	Reinf 37.32 ksi (37 ksi)
L8	63.5000-47.4200	16.0800	4.58	12	26.3913	30.0000	0.8147	3.2587	Reinf 37.42 ksi (37 ksi)
L9	47.4200-38.0833	13.9167	0.00	12	27.3428	31.6377	0.8045	3.2178	Reinf 36.78 ksi (37 ksi)
L10	38.0833-35.0000	3.0833	0.00	12	31.6377	32.3390	0.7403	2.9612	Reinf 36.81 ksi (37 ksi)
L11	35.0000-12.5000	22.5000	0.00	12	32.3390	37.4568	0.7647	3.0586	Reinf 38.55 ksi (39 ksi)
L12	12.5000-11.0000	1.5000	0.00	12	37.4568	37.7980	0.7495	2.9979	Reinf 38.66 ksi (39 ksi)
L13	11.0000-2.5000	8.5000	0.00	12	37.7980	39.7314	0.9195	3.6782	Reinf 38.64 ksi (39 ksi)
L14	2.5000-0.0000	2.5000		12	39.7314	40.3000	0.9631	3.8524	Reinf 39.83 ksi (40 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	14.8666	8.5566	219.3727	5.0738	7.4385	29.4916	444.5085	4.2113	3.3460	17.845
	16.5023	9.5106	301.2254	5.6394	8.2569	36.4816	610.3643	4.6808	3.7694	20.104
L2	16.5023	9.5106	301.2254	5.6394	8.2569	36.4816	610.3643	4.6808	3.7694	20.104
	18.8420	10.8750	450.3655	6.4485	9.4276	47.7710	912.5625	5.3524	4.3751	23.334
L3	18.8420	14.4498	594.2582	6.4261	9.4276	63.0339	1204.1282	7.1117	4.2076	16.83
	23.0531	17.7242	1096.7114	7.8823	11.5346	95.0800	2222.2346	8.7233	5.2977	21.191
L4	23.0531	23.0465	1416.1830	7.8550	11.5346	122.7767	2869.5707	11.3428	5.0935	15.615
	24.3987	24.4117	1683.0627	8.3203	12.2079	137.8667	3410.3414	12.0147	5.4418	16.683
L5	24.3987	33.7664	2302.5490	8.2747	12.2079	188.6113	4665.5885	16.6188	5.1002	11.242
	25.5798	35.4329	2660.5870	8.6831	12.7988	207.8772	5391.0707	17.4390	5.4059	11.915
L6	25.5798	50.2626	3713.6400	8.6133	12.7988	290.1545	7524.8415	24.7377	4.8830	7.526
	26.2574	51.6300	4025.0609	8.8476	13.1379	306.3702	8155.8647	25.4107	5.0585	7.797
L7	26.2574	54.4340	4231.2237	8.8346	13.1379	322.0624	8573.6063	26.7908	4.9613	7.243
	27.3223	56.7029	4782.6668	9.2029	13.6707	349.8478	9690.9796	27.9074	5.2370	7.645
L8	27.3223	67.0944	5602.2161	9.1564	13.6707	409.7970	11351.6087	33.0218	4.8895	6.002
	31.0583	76.5610	8323.8119	10.4483	15.5400	535.6378	16866.2995	37.6810	5.8567	7.189
L9	29.7707	68.7430	6179.6301	9.5007	14.1636	436.3046	12521.6061	33.8332	5.1719	6.429
	32.7537	79.8682	9691.6361	11.0383	16.3883	591.3750	19637.8823	39.3087	6.3230	7.86
L10	32.7537	73.6521	8974.5709	11.0613	16.3883	547.6203	18184.9137	36.2493	6.4949	8.773
	33.4798	75.3239	9599.6720	11.3123	16.7516	573.0603	19451.5380	37.0721	6.6828	9.027
L11	33.4798	77.7425	9892.6402	11.3036	16.7516	590.5493	20045.1710	38.2625	6.6176	8.654
	38.7781	90.3435	15524.8928	13.1358	19.4026	800.1445	31457.6418	44.4643	7.9891	10.448
L12	38.7781	88.5855	15235.3962	13.1412	19.4026	785.2240	30871.0433	43.5991	8.0298	10.714
	39.1313	89.4089	15664.1907	13.2634	19.5793	800.0364	31739.8972	44.0043	8.1213	10.836
L13	39.1313	109.1952	18955.4496	13.2025	19.5793	968.1348	38408.8799	53.7426	7.6655	8.336
	41.1329	114.9199	22095.7558	13.8946	20.5808	1073.6078	44771.9916	56.5601	8.1836	8.9
L14	41.1329	120.2262	23064.1769	13.8790	20.5808	1120.6623	46734.2753	59.1717	8.0669	8.376
	41.7216	121.9897	24094.0286	14.0826	20.8754	1154.1828	48821.0342	60.0396	8.2193	8.534

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF6-50A(1-1/4")	C	No	Inside Pole	117.0000 - 0.0000	3	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	110.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	CaAa (Out Of Face)	110.0000 - 0.0000	1	No Ice	0.1625	1.07
						1/2" Ice	0.2625	2.37
						1" Ice	0.3625	4.28
***								
LDF6-50A(1-1/4")	C	No	Inside Pole	100.0000 - 0.0000	1	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
LDF5-50A(7/8")	C	No	Inside Pole	100.0000 - 0.0000	12	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	100.0000 - 0.0000	2	No Ice	0.0000	1.30
						1/2" Ice	0.0000	1.30
						1" Ice	0.0000	1.30
***								
7983A(1/2")	C	No	CaAa (Out Of Face)	93.0000 - 0.0000	3	No Ice	0.0000	0.08
						1/2" Ice	0.0000	0.74
						1" Ice	0.0000	2.01
7983A(1/2")	C	No	CaAa (Out Of Face)	81.0000 - 0.0000	1	No Ice	0.0000	0.08
						1/2" Ice	0.0000	0.74
						1" Ice	0.0000	2.01
7983A(1/2")	C	No	CaAa (Out Of Face)	93.0000 - 81.0000	1	No Ice	0.0580	0.08
						1/2" Ice	0.1580	0.74
						1" Ice	0.2580	2.01
***								
LDF6-50A(1-1/4")	C	No	Inside Pole	88.0000 - 0.0000	2	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
LDF6-50A(1-1/4")	C	No	Inside Pole	88.0000 - 0.0000	12	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
FB-L98-002-XXX(3/8")	C	No	Inside Pole	88.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
WR-VG82ST-BRDA(5/8)	C	No	Inside Pole	88.0000 - 0.0000	2	No Ice	0.0000	0.31
						1/2" Ice	0.0000	0.31
						1" Ice	0.0000	0.31
2" (Nominal) Conduit	C	No	Inside Pole	88.0000 - 0.0000	1	No Ice	0.0000	0.72
						1/2" Ice	0.0000	0.72
						1" Ice	0.0000	0.72
2" (Nominal) Conduit	C	No	Inside Pole	88.0000 - 0.0000	2	No Ice	0.0000	0.72
						1/2" Ice	0.0000	0.72
						1" Ice	0.0000	0.72
FB-L98-002-XXX(3/8")	C	No	Inside Pole	88.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
WR-VG82ST-BRDA(5/8)	C	No	Inside Pole	88.0000 - 0.0000	2	No Ice	0.0000	0.31
						1/2" Ice	0.0000	0.31
						1" Ice	0.0000	0.31
***								
AVA7-50(1-5/8)	C	No	CaAa (Out Of Face)	81.0000 - 0.0000	2	No Ice	0.2010	0.70
						1/2" Ice	0.3010	2.23
						1" Ice	0.4010	4.38
AVA7-50(1-5/8)	C	No	CaAa (Out Of Face)	81.0000 - 0.0000	4	No Ice	0.0000	0.70
						1/2" Ice	0.0000	2.23
						1" Ice	0.0000	4.38
**								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	72.5000 - 0.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
3/4" Flat Reinforcement ***	C	No	CaAa (Out Of Face)	77.0800 - 72.5000	1	No Ice	0.1250	0.00
						1/2" Ice	0.2361	0.00
						1" Ice	0.3472	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	117.0000-110.0000	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	0.01
L2	110.0000-100.0000	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	1.625	0.13
L3	100.0000-81.8750	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	3.591	0.45
L4	81.8750-76.0833	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	3.093	0.21
L5	76.0833-71.0000	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	3.567	0.19
L6	71.0000-68.0833	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	2.133	0.11
L7	68.0833-63.5000	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	3.351	0.17
L8	63.5000-47.4200	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	11.757	0.60
L9	47.4200-38.0833	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	6.827	0.35
L10	38.0833-35.0000	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	2.254	0.12
L11	35.0000-12.5000	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	16.451	0.84
L12	12.5000-11.0000	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	1.097	0.06
L13	11.0000-2.5000	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	6.215	0.32
L14	2.5000-0.0000	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	1.828	0.09

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	117.0000-110.0000	A	1.697	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	0.01
L2	110.0000-100.0000	A	1.684	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	4.993	0.20
L3	100.0000-81.8750	A	1.659	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	13.298	0.79
L4	81.8750-76.0833	A	1.637	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	8.857	0.59
L5	76.0833-71.0000	A	1.625	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	10.360	0.55
L6	71.0000-68.0833	A	1.616	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	6.008	0.31
L7	68.0833-63.5000	A	1.607	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	9.408	0.49
L8	63.5000-47.4200	A	1.579	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	32.639	1.69
L9	47.4200-38.0833	A	1.539	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	18.952	0.98
L10	38.0833-35.0000	A	1.515	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	6.096	0.31
L11	35.0000-12.5000	A	1.450	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	43.272	2.19
L12	12.5000-11.0000	A	1.353	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	2.765	0.14
L13	11.0000-2.5000	A	1.279	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	15.155	0.74
L14	2.5000-0.0000	A	1.081	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	4.050	0.19

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	117.0000-110.0000	0.0000	0.0000	0.0000	0.0000
L2	110.0000-100.0000	-0.1836	0.1060	-0.4096	0.2365
L3	100.0000-81.8750	-0.2248	0.1298	-0.5905	0.3409
L4	81.8750-76.0833	-0.5293	0.3056	-1.0068	0.5813
L5	76.0833-71.0000	-0.6588	0.3804	-1.2128	0.7002
L6	71.0000-68.0833	-0.6854	0.3957	-1.2436	0.7180
L7	68.0833-63.5000	-0.6911	0.3990	-1.2629	0.7291
L8	63.5000-47.4200	-0.7054	0.4073	-1.3111	0.7569
L9	47.4200-38.0833	-0.7164	0.4136	-1.3546	0.7821
L10	38.0833-35.0000	-0.7253	0.4187	-1.3722	0.7922
L11	35.0000-12.5000	-0.7382	0.4262	-1.4038	0.8105
L12	12.5000-11.0000	-0.7488	0.4323	-1.4128	0.8157
L13	11.0000-2.5000	-0.7529	0.4347	-1.4010	0.8089
L14	2.5000-0.0000	-0.7571	0.4371	-1.3361	0.7714

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
800 EXTERNAL NOTCH FILTER	A	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02
800 EXTERNAL NOTCH FILTER	B	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02
800 EXTERNAL NOTCH FILTER	C	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02
(3) ACU-A20-N	A	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	0.0667 0.1037 0.1481	0.1167 0.1620 0.2148	0.00 0.00 0.00
(3) ACU-A20-N	B	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	0.0667 0.1037 0.1481	0.1167 0.1620 0.2148	0.00 0.00 0.00
(3) ACU-A20-N	C	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	0.0667 0.1037 0.1481	0.1167 0.1620 0.2148	0.00 0.00 0.00
Pipe Mount [PM 601-3]	C	None		0.00	117.0000	No Ice 1/2" Ice 1" Ice	4.3900 5.4800 6.5700	4.3900 5.4800 6.5700	0.20 0.24 0.28
***									
TME-PCS 1900MHz 4x45W-65MHz	A	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
TME-PCS 1900MHz 4x45W-65MHz	B	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
TME-PCS 1900MHz 4x45W-65MHz	C	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
TME-800MHZ RRH	A	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	2.1342 2.3195 2.5123	1.7730 1.9461 2.1267	0.05 0.07 0.10
TME-800MHZ RRH	B	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	2.1342 2.3195 2.5123	1.7730 1.9461 2.1267	0.05 0.07 0.10
TME-800MHZ RRH	C	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	2.1342 2.3195 2.5123	1.7730 1.9461 2.1267	0.05 0.07 0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Side Arm Mount [SO 102-3]	C	None		0.00	115.0000	No Ice 1/2" Ice 1" Ice	3.0000 3.4800 3.9600	3.0000 3.4800 3.9600	0.08 0.11 0.14
***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	6.3292 6.7751 7.2137	5.6424 6.4259 7.1313	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	6.3292 6.7751 7.2137	5.6424 6.4259 7.1313	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	6.3292 6.7751 7.2137	5.6424 6.4259 7.1313	0.11 0.17 0.23
KRY 112 144/1	A	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	0.3500 0.4259 0.5093	0.1750 0.2343 0.3009	0.01 0.01 0.02
KRY 112 144/1	B	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	0.3500 0.4259 0.5093	0.1750 0.2343 0.3009	0.01 0.01 0.02
KRY 112 144/1	B	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	0.3500 0.4259 0.5093	0.1750 0.2343 0.3009	0.01 0.01 0.02
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	7.8625 8.3076 8.7610	6.8796 7.5944 8.3255	0.16 0.23 0.31
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	7.8625 8.3076 8.7610	6.8796 7.5944 8.3255	0.16 0.23 0.31
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	7.8625 8.3076 8.7610	6.8796 7.5944 8.3255	0.16 0.23 0.31
RRUS 11 B12	A	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	2.8333 3.0426 3.2593	1.1821 1.3299 1.4848	0.05 0.07 0.10
RRUS 11 B12	B	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	2.8333 3.0426 3.2593	1.1821 1.3299 1.4848	0.05 0.07 0.10
RRUS 11 B12	C	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	2.8333 3.0426 3.2593	1.1821 1.3299 1.4848	0.05 0.07 0.10
T-Arm Mount [TA 602-3]	C	None		0.00	110.0000	No Ice 1/2" Ice 1" Ice	11.5900 15.4400 19.2900	11.5900 15.4400 19.2900	0.77 0.99 1.21
(2) 2.375" OD x 4' Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	0.8657 1.1106 1.3648	0.8657 1.1106 1.3648	0.02 0.03 0.04
(2) 2.375" OD x 4' Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	0.8657 1.1106 1.3648	0.8657 1.1106 1.3648	0.02 0.03 0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) 2.375" OD x 4' Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	0.8657 1.1106 1.3648	0.8657 1.1106 1.3648	0.02 0.03 0.04
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(2) HBXX-6516DS-A2M w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	6.6672 7.5501 8.4493	5.5365 6.8440 8.1652	0.07 0.13 0.19
(2) HBXX-6516DS-A2M w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	6.6672 7.5501 8.4493	5.5365 6.8440 8.1652	0.07 0.13 0.19
(2) HBXX-6516DS-A2M w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	6.6672 7.5501 8.4493	5.5365 6.8440 8.1652	0.07 0.13 0.19
RRH2X60-AWS	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	1.8775 2.0551 2.2401	1.2359 1.3858 1.5441	0.04 0.06 0.08
RRH2X60-AWS	B	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	1.8775 2.0551 2.2401	1.2359 1.3858 1.5441	0.04 0.06 0.08
RRH2X60-AWS	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	1.8775 2.0551 2.2401	1.2359 1.3858 1.5441	0.04 0.06 0.08
RRH2X60-PCS	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	2.2000 2.3926 2.5926	1.7233 1.9015 2.0870	0.06 0.08 0.10
RRH2X60-PCS	B	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	2.2000 2.3926 2.5926	1.7233 1.9015 2.0870	0.06 0.08 0.10
RRH2X60-PCS	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	2.2000 2.3926 2.5926	1.7233 1.9015 2.0870	0.06 0.08 0.10
800 10735V01 w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	8.8727 9.4550 10.0100	5.4888 6.7103 7.6880	0.06 0.12 0.19
800 10735V01 w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	8.8727 9.4550 10.0100	5.4888 6.7103 7.6880	0.06 0.12 0.19
800 10735V01 w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	8.8727 9.4550 10.0100	5.4888 6.7103 7.6880	0.06 0.12 0.19
RRH2X40-07-U	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	1.9250 2.0976 2.2776	1.0523 1.1871 1.3294	0.05 0.07 0.09
RRH2X40-07-U	B	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	1.9250 2.0976 2.2776	1.0523 1.1871 1.3294	0.05 0.07 0.09
RRH2X40-07-U	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	1.9250 2.0976 2.2776	1.0523 1.1871 1.3294	0.05 0.07 0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DB-T1-6Z-8AB-0Z	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	4.8000 5.0704 5.3481	2.0000 2.1926 2.3926	0.04 0.08 0.12
MG D3-800TV w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	3.5703 3.9790 4.3870	3.4178 4.1193 4.7842	0.04 0.07 0.11
MG D3-800TV w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	3.5703 3.9790 4.3870	3.4178 4.1193 4.7842	0.04 0.07 0.11
MG D3-800TV w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	3.5703 3.9790 4.3870	3.4178 4.1193 4.7842	0.04 0.07 0.11
LNX-6514DS-T4M w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	8.1976 8.7008 9.1945	6.8854 7.9512 8.8094	0.06 0.12 0.20
LNX-6514DS-T4M w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	8.1976 8.7008 9.1945	6.8854 7.9512 8.8094	0.06 0.12 0.20
LNX-6514DS-T4M w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	8.1976 8.7008 9.1945	6.8854 7.9512 8.8094	0.06 0.12 0.20
RRH2X40-AWS	A	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	2.1614 2.3597 2.5655	1.4199 1.5903 1.7676	0.04 0.06 0.08
RRH2X40-AWS	B	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	2.1614 2.3597 2.5655	1.4199 1.5903 1.7676	0.04 0.06 0.08
RRH2X40-AWS	C	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	2.1614 2.3597 2.5655	1.4199 1.5903 1.7676	0.04 0.06 0.08
(2) DB844G65ZAXY w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.03 0.08 0.13
(2) DB844G65ZAXY w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.03 0.08 0.13
(2) DB844G65ZAXY w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.03 0.08 0.13
GPS_A	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	0.2550 0.3205 0.3934	0.2550 0.3205 0.3934	0.00 0.00 0.01
(2) FD9R6004/2C-3L	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	0.3142 0.3862 0.4656	0.0762 0.1189 0.1685	0.00 0.01 0.01
(2) FD9R6004/2C-3L	B	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	0.3142 0.3862 0.4656	0.0762 0.1189 0.1685	0.00 0.01 0.01
(2) FD9R6004/2C-3L	C	From Face	4.0000	0.00	100.0000	No Ice	0.3142	0.0762	0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice 1" Ice	0.3862 0.4656	0.1189 0.1685	0.01 0.01
DB-T1-6Z-8AB-0Z	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	4.8000 5.0704 5.3481	2.0000 2.1926 2.3926	0.04 0.08 0.12
Platform Mount [LP 715-1]	C	None		0.00	100.0000	No Ice 1/2" Ice 1" Ice	44.2100 53.9700 63.7300	44.2100 53.9700 63.7300	1.77 2.32 2.87
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Pipe Mount [PM 601-3]	C	None		0.00	93.0000	No Ice 1/2" Ice 1" Ice	4.3900 5.4800 6.5700	4.3900 5.4800 6.5700	0.20 0.24 0.28
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7770.00 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	5.8287 6.2677 6.6966	4.7160 5.5082 6.2127	0.09 0.14 0.21
7770.00 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	5.8287 6.2677 6.6966	4.7160 5.5082 6.2127	0.09 0.14 0.21
7770.00 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	5.8287 6.2677 6.6966	4.7160 5.5082 6.2127	0.09 0.14 0.21
RRUS 11	A	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.09
RRUS 11	B	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.09
RRUS 11	C	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.09
DC6-48-60-18-8F	A	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	0.9167 1.4583 1.6431	0.9167 1.4583 1.6431	0.02 0.04 0.06
QS66512-2 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	8.3708 8.9314 9.4571	8.4625 9.6573 10.5478	0.14 0.21 0.30
QS66512-2 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	8.3708 8.9314 9.4571	8.4625 9.6573 10.5478	0.14 0.21 0.30
TPA-65R-LCUUUU-H8 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	13.5353 14.2380 14.9495	10.9597 12.4861 14.0367	0.11 0.22 0.33
OPA-65R-LCUU-H8 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	12.9838 13.6685 14.3572	9.3187 10.7901 12.2416	0.12 0.21 0.32
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	9.8953 10.4700 11.0098	7.1792 8.3621 9.2588	0.10 0.18 0.26

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* K
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	9.8953 10.4700 11.0098	7.1792 8.3621 9.2588	0.10 0.18 0.26
RRUS 32 B2	A	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	2.7313 2.9531 3.1823	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32 B2	B	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	2.7313 2.9531 3.1823	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32 B2	C	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	2.7313 2.9531 3.1823	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32 B30	A	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	2.7427 2.9647 3.1941	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32 B30	B	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	2.7427 2.9647 3.1941	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32 B30	C	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	2.7427 2.9647 3.1941	1.6681 1.8552 2.0493	0.05 0.07 0.10
(2) TPX-070821	A	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	0.4688 0.5585 0.6556	0.1009 0.1471 0.2020	0.01 0.01 0.02
(2) TPX-070821	B	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	0.4688 0.5585 0.6556	0.1009 0.1471 0.2020	0.01 0.01 0.02
(2) TPX-070821	C	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	0.4688 0.5585 0.6556	0.1009 0.1471 0.2020	0.01 0.01 0.02
DC6-48-60-18-8F	B	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	0.9167 1.4583 1.6431	0.9167 1.4583 1.6431	0.02 0.04 0.06
Platform Mount [LP 715-1]	C	None		0.00	88.0000	No Ice 1/2" Ice 1" Ice	44.2100 53.9700 63.7300	44.2100 53.9700 63.7300	1.77 2.32 2.87
Miscellaneous [NA 509-3]	C	None		0.00	88.0000	No Ice 1/2" Ice 1" Ice	11.8400 16.9600 22.0800	11.8400 16.9600 22.0800	0.28 0.30 0.32
(2) LGP21401	A	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	1.1040 1.2388 1.3810	0.3471 0.4422 0.5444	0.01 0.02 0.03
(2) LGP21401	B	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	1.1040 1.2388 1.3810	0.3471 0.4422 0.5444	0.01 0.02 0.03
(2) LGP21401	C	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	1.1040 1.2388 1.3810	0.3471 0.4422 0.5444	0.01 0.02 0.03
(2) 7020.00	A	From Face	4.0000	0.00	88.0000	No Ice	0.1021	0.1750	0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 1.00			1/2" Ice 1" Ice	0.1469 0.1991	0.2393 0.3109	0.01 0.01
(2) 7020.00	B	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	0.1021 0.1469 0.1991	0.1750 0.2393 0.3109	0.00 0.01 0.01
(2) 7020.00	C	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice	0.1021 0.1469 0.1991	0.1750 0.2393 0.3109	0.00 0.01 0.01
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800 10504 w/ Mount Pipe	A	From Face	1.0000 0.00 0.00	0.00	81.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11
800 10504 w/ Mount Pipe	B	From Face	1.0000 0.00 0.00	0.00	81.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11
800 10504 w/ Mount Pipe	C	From Face	1.0000 0.00 0.00	0.00	81.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11
Pipe Mount [PM 601-3]	C	None		0.00	81.0000	No Ice 1/2" Ice 1" Ice	4.3900 5.4800 6.5700	4.3900 5.4800 6.5700	0.20 0.24 0.28
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LBX-9012DS-VTM w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	72.0000	No Ice 1/2" Ice 1" Ice	5.0896 5.4911 5.8947	3.9976 4.6725 5.3288	0.05 0.09 0.14
LBX-9012DS-VTM w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	72.0000	No Ice 1/2" Ice 1" Ice	5.0896 5.4911 5.8947	3.9976 4.6725 5.3288	0.05 0.09 0.14
LBX-9012DS-VTM w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	72.0000	No Ice 1/2" Ice 1" Ice	5.0896 5.4911 5.8947	3.9976 4.6725 5.3288	0.05 0.09 0.14
DB844H90E-XY w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	72.0000	No Ice 1/2" Ice 1" Ice	3.2986 3.6675 4.0348	4.8023 5.4160 6.0401	0.03 0.07 0.12
DB844H90E-XY w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	72.0000	No Ice 1/2" Ice 1" Ice	3.2986 3.6675 4.0348	4.8023 5.4160 6.0401	0.03 0.07 0.12
DB844H90E-XY w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	72.0000	No Ice 1/2" Ice 1" Ice	3.2986 3.6675 4.0348	4.8023 5.4160 6.0401	0.03 0.07 0.12
Platform Mount (LP 101-1)	C	None		0.00	72.0000	No Ice 1/2" Ice 1" Ice	36.2100 42.8200 49.4300	36.2100 42.8200 49.4300	1.50 2.30 3.10
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Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-11	A	Paraboloid w/o Radome	From Leg	2.0000 0.00 1.00	48.00		93.0000	2.1750	No Ice 1/2" Ice 1" Ice	3.7200 4.0100 4.3000	0.03 0.05 0.07
VHLP1-23	A	Paraboloid w/o Radome	From Leg	2.0000 0.00 2.00	68.00		93.0000	1.2750	No Ice 1/2" Ice 1" Ice	1.2800 1.4500 1.6200	0.01 0.02 0.03
VHLP2.5-11	C	Paraboloid w/Shroud (HP)	From Leg	2.0000 0.00 1.00	-2.00		93.0000	2.9167	No Ice 1/2" Ice 1" Ice	6.6800 7.0700 7.4600	0.05 0.08 0.12
VHLP1-23	A	Paraboloid w/o Radome	From Leg	2.0000 0.00 -1.00	68.00		93.0000	1.2750	No Ice 1/2" Ice 1" Ice	1.2800 1.4500 1.6200	0.01 0.02 0.03
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Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 117.0000-110.0000	113.4392	1.3	27.338	9.149	A	0.000	9.149	9.149	100.00	0.000	0.000
					B	0.000	9.149		100.00	0.000	0.000
					C	0.000	9.149		100.00	0.000	0.000
L2 110.0000-100.0000	104.8897	1.278	26.890	14.727	A	0.000	14.727	14.727	100.00	0.000	0.000
					B	0.000	14.727		100.00	0.000	0.000
					C	0.000	14.727		100.00	0.000	1.625
L3 100.0000-81.8750	90.6339	1.24	26.076	31.640	A	0.000	31.640	31.640	100.00	0.000	0.000
					B	0.000	31.640		100.00	0.000	0.000
					C	0.000	31.640		100.00	0.000	3.591
L4 81.8750-76.0833	78.9518	1.204	25.329	11.451	A	0.000	11.451	11.451	100.00	0.000	0.000
					B	0.000	11.451		100.00	0.000	0.000
					C	0.000	11.451		100.00	0.000	3.093
L5 76.0833-71.0000	73.5216	1.186	24.952	10.586	A	0.000	10.586	10.586	100.00	0.000	0.000
					B	0.000	10.586		100.00	0.000	0.000
					C	0.000	10.586		100.00	0.000	3.567
L6 71.0000-68.0833	69.5353	1.172	24.661	6.300	A	0.000	6.300	6.300	100.00	0.000	0.000
					B	0.000	6.300		100.00	0.000	0.000
					C	0.000	6.300		100.00	0.000	2.133
L7 68.0833-63.5000	65.7765	1.159	24.374	10.232	A	0.000	10.232	10.232	100.00	0.000	0.000
					B	0.000	10.232		100.00	0.000	0.000
					C	0.000	10.232		100.00	0.000	3.351
L8 63.5000-47.4200	55.2885	1.117	23.499	39.115	A	0.000	39.115	39.115	100.00	0.000	0.000
					B	0.000	39.115		100.00	0.000	0.000
					C	0.000	39.115		100.00	0.000	11.757
L9 47.4200-38.0833	42.6774	1.058	22.253	24.324	A	0.000	24.324	24.324	100.00	0.000	0.000
					B	0.000	24.324		100.00	0.000	0.000
					C	0.000	24.324		100.00	0.000	6.827
L10 38.0833-35.0000	36.5360	1.024	21.536	8.509	A	0.000	8.509	8.509	100.00	0.000	0.000
					B	0.000	8.509		100.00	0.000	0.000
					C	0.000	8.509		100.00	0.000	2.254
L11 35.0000-12.5000	23.4750	0.933	19.621	67.742	A	0.000	67.742	67.742	100.00	0.000	0.000
					B	0.000	67.742		100.00	0.000	0.000
					C	0.000	67.742		100.00	0.000	16.451
L12 12.5000-11.0000	11.7489	0.85	17.879	4.869	A	0.000	4.869	4.869	100.00	0.000	0.000
					B	0.000	4.869		100.00	0.000	0.000
					C	0.000	4.869		100.00	0.000	1.097
L13 11.0000-2.5000	6.7147	0.85	17.879	28.427	A	0.000	28.427	28.427	100.00	0.000	0.000
					B	0.000	28.427		100.00	0.000	0.000
					C	0.000	28.427		100.00	0.000	6.215
L14 2.5000-0.0000	1.2470	0.85	17.879	8.631	A	0.000	8.631	8.631	100.00	0.000	0.000
					B	0.000	8.631		100.00	0.000	0.000
					C	0.000	8.631		100.00	0.000	1.828

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 117.0000-110.0000	113.4392	1.3	7.902	1.6971	11.129	A	0.000	11.129	11.129	100.00	0.000	0.000
						B	0.000	11.129		100.00	0.000	0.000
						C	0.000	11.129		100.00	0.000	0.000
L2 110.0000-100.0000	104.8897	1.278	7.773	1.6839	17.533	A	0.000	17.533	17.533	100.00	0.000	0.000
						B	0.000	17.533		100.00	0.000	0.000
						C	0.000	17.533		100.00	0.000	4.993
L3 100.0000-81.8750	90.6339	1.24	7.537	1.6595	36.653	A	0.000	36.653	36.653	100.00	0.000	0.000
						B	0.000	36.653		100.00	0.000	0.000
						C	0.000	36.653		100.00	0.000	13.298
L4 81.8750-76.0833	78.9518	1.204	7.321	1.6367	13.031	A	0.000	13.031	13.031	100.00	0.000	0.000
						B	0.000	13.031		100.00	0.000	0.000
						C	0.000	13.031		100.00	0.000	8.857
L5 76.0833-71.0000	73.5216	1.186	7.212	1.6251	11.962	A	0.000	11.962	11.962	100.00	0.000	0.000
						B	0.000	11.962		100.00	0.000	0.000
						C	0.000	11.962		100.00	0.000	10.360
L6 71.0000-68.0833	69.5353	1.172	7.128	1.6161	7.085	A	0.000	7.085	7.085	100.00	0.000	0.000
						B	0.000	7.085		100.00	0.000	0.000
						C	0.000	7.085		100.00	0.000	6.008
L7 68.0833-63.5000	65.7765	1.159	7.045	1.6071	11.460	A	0.000	11.460	11.460	100.00	0.000	0.000
						B	0.000	11.460		100.00	0.000	0.000
						C	0.000	11.460		100.00	0.000	9.408
L8 63.5000-47.4200	55.2885	1.117	6.792	1.5794	43.348	A	0.000	43.348	43.348	100.00	0.000	0.000
						B	0.000	43.348		100.00	0.000	0.000
						C	0.000	43.348		100.00	0.000	32.639
L9 47.4200-38.0833	42.6774	1.058	6.432	1.5391	26.782	A	0.000	26.782	26.782	100.00	0.000	0.000
						B	0.000	26.782		100.00	0.000	0.000
						C	0.000	26.782		100.00	0.000	18.952
L10 38.0833-35.0000	36.5360	1.024	6.225	1.5153	9.288	A	0.000	9.288	9.288	100.00	0.000	0.000
						B	0.000	9.288		100.00	0.000	0.000
						C	0.000	9.288		100.00	0.000	6.096
L11 35.0000-12.5000	23.4750	0.933	5.672	1.4498	73.178	A	0.000	73.178	73.178	100.00	0.000	0.000
						B	0.000	73.178		100.00	0.000	0.000
						C	0.000	73.178		100.00	0.000	43.272
L12 12.5000-11.0000	11.7489	0.85	5.168	1.3528	5.208	A	0.000	5.208	5.208	100.00	0.000	0.000
						B	0.000	5.208		100.00	0.000	0.000
						C	0.000	5.208		100.00	0.000	2.765
L13 11.0000-2.5000	6.7147	0.85	5.168	1.2792	30.239	A	0.000	30.239	30.239	100.00	0.000	0.000
						B	0.000	30.239		100.00	0.000	0.000
						C	0.000	30.239		100.00	0.000	15.155
L14 2.5000-0.0000	1.2470	0.85	5.168	1.0810	9.081	A	0.000	9.081	9.081	100.00	0.000	0.000
						B	0.000	9.081		100.00	0.000	0.000
						C	0.000	9.081		100.00	0.000	4.050

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 117.0000-110.0000	113.4392	1.3	10.181	9.149	A	0.000	9.149	9.149	100.00	0.000	0.000
					B	0.000	9.149		100.00	0.000	0.000
					C	0.000	9.149		100.00	0.000	0.000
L2 110.0000-100.0000	104.8897	1.278	10.014	14.727	A	0.000	14.727	14.727	100.00	0.000	0.000
					B	0.000	14.727		100.00	0.000	0.000
					C	0.000	14.727		100.00	0.000	1.625
L3 100.0000-81.8750	90.6339	1.24	9.711	31.640	A	0.000	31.640	31.640	100.00	0.000	0.000
					B	0.000	31.640		100.00	0.000	0.000
					C	0.000	31.640		100.00	0.000	3.591

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L4 81.8750-76.0833	78.9518	1.204	9.433	11.451	A	0.000	11.451	11.451	100.00	0.000	0.000
					B	0.000	11.451		100.00	0.000	0.000
					C	0.000	11.451		100.00	0.000	3.093
L5 76.0833-71.0000	73.5216	1.186	9.293	10.586	A	0.000	10.586	10.586	100.00	0.000	0.000
					B	0.000	10.586		100.00	0.000	0.000
					C	0.000	10.586		100.00	0.000	3.567
L6 71.0000-68.0833	69.5353	1.172	9.184	6.300	A	0.000	6.300	6.300	100.00	0.000	0.000
					B	0.000	6.300		100.00	0.000	0.000
					C	0.000	6.300		100.00	0.000	2.133
L7 68.0833-63.5000	65.7765	1.159	9.077	10.232	A	0.000	10.232	10.232	100.00	0.000	0.000
					B	0.000	10.232		100.00	0.000	0.000
					C	0.000	10.232		100.00	0.000	3.351
L8 63.5000-47.4200	55.2885	1.117	8.751	39.115	A	0.000	39.115	39.115	100.00	0.000	0.000
					B	0.000	39.115		100.00	0.000	0.000
					C	0.000	39.115		100.00	0.000	11.757
L9 47.4200-38.0833	42.6774	1.058	8.287	24.324	A	0.000	24.324	24.324	100.00	0.000	0.000
					B	0.000	24.324		100.00	0.000	0.000
					C	0.000	24.324		100.00	0.000	6.827
L10 38.0833-35.0000	36.5360	1.024	8.021	8.509	A	0.000	8.509	8.509	100.00	0.000	0.000
					B	0.000	8.509		100.00	0.000	0.000
					C	0.000	8.509		100.00	0.000	2.254
L11 35.0000-12.5000	23.4750	0.933	7.307	67.742	A	0.000	67.742	67.742	100.00	0.000	0.000
					B	0.000	67.742		100.00	0.000	0.000
					C	0.000	67.742		100.00	0.000	16.451
L12 12.5000-11.0000	11.7489	0.85	6.659	4.869	A	0.000	4.869	4.869	100.00	0.000	0.000
					B	0.000	4.869		100.00	0.000	0.000
					C	0.000	4.869		100.00	0.000	1.097
L13 11.0000-2.5000	6.7147	0.85	6.659	28.427	A	0.000	28.427	28.427	100.00	0.000	0.000
					B	0.000	28.427		100.00	0.000	0.000
					C	0.000	28.427		100.00	0.000	6.215
L14 2.5000-0.0000	1.2470	0.85	6.659	8.631	A	0.000	8.631	8.631	100.00	0.000	0.000
					B	0.000	8.631		100.00	0.000	0.000
					C	0.000	8.631		100.00	0.000	1.828

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

Comb. No.	Description
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
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	117 - 110	Pole	Max Tension	8	0.00	0.00	-0.00
			Max. Compression	26	-3.36	0.01	0.00
			Max. Mx	20	-1.08	16.59	-0.00
			Max. My	14	-1.08	0.02	-16.59
			Max. Vy	20	-2.63	16.59	-0.00
			Max. Vx	14	2.63	0.02	-16.59
			Max. Torque	22			-0.00
L2	110 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-9.42	0.07	0.06
			Max. Mx	8	-3.59	-74.96	0.07
			Max. My	2	-3.60	-0.03	74.86
			Max. Vy	20	-6.25	74.95	-0.02
			Max. Vx	14	6.24	0.10	-74.81
			Max. Torque	3			0.04
L3	100 - 81.875	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.91	2.92	1.33
			Max. Mx	20	-13.19	402.66	-2.21
			Max. My	2	-13.23	-0.63	398.29
			Max. Vy	20	-23.26	402.66	-2.21
			Max. Vx	14	23.10	4.73	-398.21
			Max. Torque	14			-2.60
L4	81.875 - 76.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.31	3.31	1.14
			Max. Mx	20	-14.50	542.17	-3.77
			Max. My	14	-14.52	6.95	-536.78
			Max. Vy	20	-24.53	542.17	-3.77
			Max. Vx	14	24.37	6.95	-536.78
			Max. Torque	14			-2.71
L5	76.0833 - 71	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-44.52	3.70	0.94
			Max. Mx	20	-17.51	671.11	-5.14
			Max. My	14	-17.53	8.91	-664.91
			Max. Vy	20	-27.80	671.11	-5.14
			Max. Vx	14	27.64	8.91	-664.91
			Max. Torque	14			-2.84
L6	71 - 68.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-45.61	3.93	0.82
			Max. Mx	20	-18.30	752.78	-5.93
			Max. My	14	-18.31	10.03	-746.11

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	20	-28.21	752.78	-5.93
			Max. Vx	14	28.06	10.03	-746.11
			Max. Torque	14			-2.93
L7	68.0833 - 63.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47.43	4.29	0.63
			Max. Mx	20	-19.63	883.57	-7.17
			Max. My	14	-19.64	11.80	-876.15
			Max. Vy	20	-28.87	883.57	-7.17
			Max. Vx	14	28.71	11.80	-876.15
			Max. Torque	14			-3.06
L8	63.5 - 47.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.71	5.25	0.11
			Max. Mx	20	-23.65	1225.06	-10.29
			Max. My	14	-23.66	16.22	-1215.80
			Max. Vy	20	-30.55	1225.06	-10.29
			Max. Vx	14	30.39	16.22	-1215.80
			Max. Torque	14			-3.40
L9	47.42 - 38.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.03	6.44	-0.54
			Max. Mx	20	-30.15	1665.19	-14.07
			Max. My	14	-30.16	21.57	-1653.68
			Max. Vy	20	-32.62	1665.19	-14.07
			Max. Vx	14	32.47	21.57	-1653.68
			Max. Torque	14			-3.84
L10	38.0833 - 35	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-62.50	6.70	-0.69
			Max. Mx	20	-31.30	1766.40	-14.90
			Max. My	14	-31.31	22.76	-1754.40
			Max. Vy	20	-33.04	1766.40	-14.90
			Max. Vx	14	32.88	22.76	-1754.40
			Max. Torque	14			-3.94
L11	35 - 12.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-74.06	8.57	-1.78
			Max. Mx	20	-40.63	2541.23	-20.97
			Max. My	14	-40.63	31.30	-2525.66
			Max. Vy	20	-35.89	2541.23	-20.97
			Max. Vx	14	35.73	31.30	-2525.66
			Max. Torque	14			-4.65
L12	12.5 - 11	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-74.86	8.69	-1.85
			Max. Mx	20	-41.28	2595.18	-21.37
			Max. My	14	-41.28	31.87	-2579.37
			Max. Vy	20	-36.07	2595.18	-21.37
			Max. Vx	14	35.91	31.87	-2579.37
			Max. Torque	14			-4.70
L13	11 - 2.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-80.09	9.35	-2.24
			Max. Mx	20	-45.76	2906.03	-23.63
			Max. My	14	-45.76	35.05	-2888.88
			Max. Vy	20	-37.10	2906.03	-23.63
			Max. Vx	14	36.95	35.05	-2888.88
			Max. Torque	14			-4.97
L14	2.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-81.68	9.51	-2.33
			Max. Mx	20	-47.17	2999.15	-24.30
			Max. My	14	-47.17	35.98	-2981.62
			Max. Vy	20	-37.41	2999.15	-24.30
			Max. Vx	14	37.26	35.98	-2981.62
			Max. Torque	14			-5.05

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	81.68	-0.00	-0.00
	Max. H_x	21	35.38	37.40	-0.26
	Max. H_z	3	35.38	-0.13	37.14
	Max. M_x	2	2972.39	-0.13	37.14
	Max. M_z	8	2989.55	-37.32	0.04
	Max. Torsion	24	4.08	18.64	32.11
	Min. Vert	21	35.38	37.40	-0.26
	Min. H_x	9	35.38	-37.32	0.04
	Min. H_z	14	47.18	0.36	-37.24
	Min. M_x	14	-2981.62	0.36	-37.24
	Min. M_z	20	-2999.15	37.40	-0.26
	Min. Torsion	14	-5.05	0.36	-37.24

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	39.32	0.00	0.00	-0.26	1.06	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	47.18	0.13	-37.14	-2972.39	-11.27	-3.97
0.9 Dead+1.6 Wind 0 deg - No Ice	35.38	0.13	-37.14	-2950.49	-11.52	-3.96
1.2 Dead+1.6 Wind 30 deg - No Ice	47.18	18.70	-32.21	-2577.89	-1497.00	-3.01
0.9 Dead+1.6 Wind 30 deg - No Ice	35.38	18.70	-32.21	-2558.87	-1486.33	-2.99
1.2 Dead+1.6 Wind 60 deg - No Ice	47.18	32.34	-18.61	-1489.38	-2590.43	-1.44
0.9 Dead+1.6 Wind 60 deg - No Ice	35.38	32.34	-18.61	-1478.35	-2571.72	-1.43
1.2 Dead+1.6 Wind 90 deg - No Ice	47.18	37.32	-0.04	-3.67	-2989.55	0.67
0.9 Dead+1.6 Wind 90 deg - No Ice	35.38	37.32	-0.04	-3.56	-2967.98	0.68
1.2 Dead+1.6 Wind 120 deg - No Ice	47.18	32.34	18.43	1472.43	-2591.17	2.63
0.9 Dead+1.6 Wind 120 deg - No Ice	35.38	32.34	18.43	1461.71	-2572.45	2.63
1.2 Dead+1.6 Wind 150 deg - No Ice	47.18	18.51	32.21	2577.87	-1479.43	4.37
0.9 Dead+1.6 Wind 150 deg - No Ice	35.38	18.51	32.21	2559.03	-1468.88	4.37
1.2 Dead+1.6 Wind 180 deg - No Ice	47.18	-0.36	37.24	2981.62	35.98	5.05
0.9 Dead+1.6 Wind 180 deg - No Ice	35.38	-0.36	37.24	2959.77	35.39	5.04
1.2 Dead+1.6 Wind 210 deg - No Ice	47.18	-18.88	32.18	2574.84	1517.69	3.80
0.9 Dead+1.6 Wind 210 deg - No Ice	35.38	-18.88	32.18	2556.01	1506.20	3.79
1.2 Dead+1.6 Wind 240 deg - No Ice	47.18	-32.40	18.67	1495.11	2598.52	1.74
0.9 Dead+1.6 Wind 240 deg - No Ice	35.38	-32.40	18.67	1484.22	2579.09	1.72
1.2 Dead+1.6 Wind 270 deg - No Ice	47.18	-37.40	0.26	24.30	2999.15	-0.41
0.9 Dead+1.6 Wind 270 deg - No Ice	35.38	-37.40	0.26	24.21	2976.85	-0.42
1.2 Dead+1.6 Wind 300 deg - No Ice	47.18	-32.52	-18.30	-1461.01	2610.79	-2.24
0.9 Dead+1.6 Wind 300 deg - No Ice	35.38	-32.52	-18.30	-1450.19	2591.26	-2.24
1.2 Dead+1.6 Wind 330 deg - No Ice	47.18	-18.64	-32.11	-2568.96	1495.50	-4.08
0.9 Dead+1.6 Wind 330 deg	35.38	-18.64	-32.11	-2550.00	1484.17	-4.08

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
- No Ice						
1.2 Dead+1.0 Ice+1.0 Temp	81.68	0.00	0.00	2.33	9.51	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	81.68	0.03	-9.98	-841.65	6.32	-1.68
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	81.68	5.02	-8.65	-729.72	-415.69	-1.17
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	81.68	8.69	-5.00	-420.83	-726.01	-0.40
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	81.68	10.02	-0.01	1.15	-839.13	0.51
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	81.68	8.68	4.95	420.92	-725.57	1.29
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	81.68	4.97	8.65	733.94	-410.85	1.84
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	81.68	-0.09	10.00	848.85	18.79	1.94
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	81.68	-5.07	8.65	733.91	439.91	1.37
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	81.68	-8.70	5.02	427.12	747.06	0.48
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	81.68	-10.04	0.07	8.85	860.53	-0.44
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	81.68	-8.73	-4.92	-412.99	749.48	-1.19
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	81.68	-5.00	-8.62	-726.97	433.52	-1.77
Dead+Wind 0 deg - Service	39.32	0.03	-8.64	-689.24	-1.82	-0.31
Dead+Wind 30 deg - Service	39.32	4.35	-7.50	-597.78	-346.22	-0.35
Dead+Wind 60 deg - Service	39.32	7.53	-4.33	-345.46	-599.69	-0.34
Dead+Wind 90 deg - Service	39.32	8.69	-0.01	-1.06	-692.26	-0.20
Dead+Wind 120 deg - Service	39.32	7.53	4.29	341.11	-599.85	-0.00
Dead+Wind 150 deg - Service	39.32	4.31	7.50	597.36	-342.14	0.31
Dead+Wind 180 deg - Service	39.32	-0.08	8.67	690.95	9.14	0.57
Dead+Wind 210 deg - Service	39.32	-4.39	7.49	596.65	352.60	0.53
Dead+Wind 240 deg - Service	39.32	-7.54	4.35	346.37	603.15	0.41
Dead+Wind 270 deg - Service	39.32	-8.70	0.06	5.42	696.07	0.26
Dead+Wind 300 deg - Service	39.32	-7.57	-4.26	-338.88	605.99	0.09
Dead+Wind 330 deg - Service	39.32	-4.34	-7.47	-595.70	347.45	-0.24

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-39.32	0.00	-0.00	39.32	-0.00	0.000%
2	0.13	-47.18	-37.14	-0.13	47.18	37.14	0.001%
3	0.13	-35.38	-37.14	-0.13	35.38	37.14	0.001%
4	18.70	-47.18	-32.21	-18.70	47.18	32.21	0.000%
5	18.70	-35.38	-32.21	-18.70	35.38	32.21	0.000%
6	32.34	-47.18	-18.61	-32.34	47.18	18.61	0.000%
7	32.34	-35.38	-18.61	-32.34	35.38	18.61	0.000%
8	37.33	-47.18	-0.04	-37.32	47.18	0.04	0.004%
9	37.33	-35.38	-0.04	-37.32	35.38	0.04	0.003%
10	32.34	-47.18	18.43	-32.34	47.18	-18.43	0.000%
11	32.34	-35.38	18.43	-32.34	35.38	-18.43	0.000%
12	18.51	-47.18	32.21	-18.51	47.18	-32.21	0.000%
13	18.51	-35.38	32.21	-18.51	35.38	-32.21	0.000%
14	-0.36	-47.18	37.24	0.36	47.18	-37.24	0.001%
15	-0.36	-35.38	37.24	0.36	35.38	-37.24	0.001%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
16	-18.88	-47.18	32.18	18.88	47.18	-32.18	0.000%
17	-18.88	-35.38	32.18	18.88	35.38	-32.18	0.000%
18	-32.40	-47.18	18.67	32.40	47.18	-18.67	0.000%
19	-32.40	-35.38	18.67	32.40	35.38	-18.67	0.000%
20	-37.40	-47.18	0.26	37.40	47.18	-0.26	0.004%
21	-37.40	-35.38	0.26	37.40	35.38	-0.26	0.003%
22	-32.52	-47.18	-18.30	32.52	47.18	18.30	0.000%
23	-32.52	-35.38	-18.30	32.52	35.38	18.30	0.000%
24	-18.64	-47.18	-32.11	18.64	47.18	32.11	0.000%
25	-18.64	-35.38	-32.11	18.64	35.38	32.11	0.000%
26	0.00	-81.68	0.00	-0.00	81.68	-0.00	0.001%
27	0.03	-81.68	-9.98	-0.03	81.68	9.98	0.000%
28	5.02	-81.68	-8.65	-5.02	81.68	8.65	0.000%
29	8.69	-81.68	-5.00	-8.69	81.68	5.00	0.000%
30	10.02	-81.68	-0.01	-10.02	81.68	0.01	0.000%
31	8.68	-81.68	4.95	-8.68	81.68	-4.95	0.000%
32	4.97	-81.68	8.65	-4.97	81.68	-8.65	0.000%
33	-0.09	-81.68	10.00	0.09	81.68	-10.00	0.000%
34	-5.07	-81.68	8.65	5.07	81.68	-8.65	0.000%
35	-8.70	-81.68	5.02	8.70	81.68	-5.02	0.000%
36	-10.04	-81.68	0.07	10.04	81.68	-0.07	0.000%
37	-8.73	-81.68	-4.92	8.73	81.68	4.92	0.000%
38	-5.01	-81.68	-8.63	5.00	81.68	8.62	0.000%
39	0.03	-39.32	-8.65	-0.03	39.32	8.64	0.003%
40	4.35	-39.32	-7.50	-4.35	39.32	7.50	0.003%
41	7.53	-39.32	-4.33	-7.53	39.32	4.33	0.003%
42	8.69	-39.32	-0.01	-8.69	39.32	0.01	0.003%
43	7.53	-39.32	4.29	-7.53	39.32	-4.29	0.003%
44	4.31	-39.32	7.50	-4.31	39.32	-7.50	0.003%
45	-0.08	-39.32	8.67	0.08	39.32	-8.67	0.003%
46	-4.40	-39.32	7.49	4.39	39.32	-7.49	0.003%
47	-7.54	-39.32	4.35	7.54	39.32	-4.35	0.003%
48	-8.70	-39.32	0.06	8.70	39.32	-0.06	0.003%
49	-7.57	-39.32	-4.26	7.57	39.32	4.26	0.003%
50	-4.34	-39.32	-7.47	4.34	39.32	7.47	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000362
2	Yes	14	0.00000001	0.00008347
3	Yes	14	0.00000001	0.00006585
4	Yes	16	0.00000001	0.00012418
5	Yes	16	0.00000001	0.00009179
6	Yes	16	0.00000001	0.00013424
7	Yes	16	0.00000001	0.00009937
8	Yes	13	0.00005637	0.00008453
9	Yes	13	0.00003863	0.00007036
10	Yes	16	0.00000001	0.00013102
11	Yes	16	0.00000001	0.00009709
12	Yes	16	0.00000001	0.00012151
13	Yes	16	0.00000001	0.00008987
14	Yes	15	0.00000001	0.00006082
15	Yes	14	0.00000001	0.00012135
16	Yes	16	0.00000001	0.00014004
17	Yes	16	0.00000001	0.00010377
18	Yes	16	0.00000001	0.00012607
19	Yes	16	0.00000001	0.00009311
20	Yes	13	0.00005636	0.00007791
21	Yes	13	0.00003862	0.00006574
22	Yes	16	0.00000001	0.00012723
23	Yes	16	0.00000001	0.00009397
24	Yes	16	0.00000001	0.00013581
25	Yes	16	0.00000001	0.00010063
26	Yes	9	0.00000001	0.00004033
27	Yes	15	0.00000001	0.00007880

28	Yes	15	0.00000001	0.00009181
29	Yes	15	0.00000001	0.00009303
30	Yes	15	0.00000001	0.00007734
31	Yes	15	0.00000001	0.00009257
32	Yes	15	0.00000001	0.00009108
33	Yes	15	0.00000001	0.00007941
34	Yes	15	0.00000001	0.00009701
35	Yes	15	0.00000001	0.00009511
36	Yes	15	0.00000001	0.00007999
37	Yes	15	0.00000001	0.00009464
38	Yes	15	0.00000001	0.00009619
39	Yes	12	0.00000001	0.00006220
40	Yes	12	0.00000001	0.00005568
41	Yes	12	0.00000001	0.00008212
42	Yes	12	0.00000001	0.00006068
43	Yes	12	0.00000001	0.00006575
44	Yes	12	0.00000001	0.00005547
45	Yes	12	0.00000001	0.00007051
46	Yes	12	0.00000001	0.00009188
47	Yes	12	0.00000001	0.00005529
48	Yes	12	0.00000001	0.00006163
49	Yes	12	0.00000001	0.00007181
50	Yes	12	0.00000001	0.00007717

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load*	*Tilt*	*Twist*
	ft	*in*	*Comb.*	*°*	*°*
L1	117 - 110	16.42	48	1.35	0.01
L2	110 - 100	14.45	48	1.34	0.01
L3	100 - 81.875	11.71	48	1.26	0.01
L4	81.875 - 76.0833	7.42	48	0.95	0.00
L5	76.0833 - 71	6.34	48	0.84	0.00
L6	71 - 68.0833	5.49	48	0.76	0.00
L7	68.0833 - 63.5	5.04	48	0.72	0.00
L8	63.5 - 47.42	4.37	48	0.67	0.00
L9	52 - 38.0833	2.92	48	0.54	0.00
L10	38.0833 - 35	1.51	48	0.40	0.00
L11	35 - 12.5	1.26	48	0.37	0.00
L12	12.5 - 11	0.14	48	0.11	0.00
L13	11 - 2.5	0.11	48	0.10	0.00
L14	2.5 - 0	0.01	48	0.02	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation	*Appurtenance*	*Gov. Load*	*Deflection*	*Tilt*	*Twist*	*Radius of Curvature*
ft		*Comb.*	*in*	*°*	*°*	*ft*
117.0000	APXVSPP18-C-A20 w/ Mount Pipe	48	16.42	1.35	0.01	18573
115.0000	TME-PCS 1900MHz 4x45W-65MHz	48	15.86	1.35	0.01	18573
110.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	48	14.45	1.34	0.01	13311
100.0000	(2) HBXX-6516DS-A2M w/ Mount Pipe	48	11.71	1.26	0.01	5451
95.0000	VHLP1-23	48	10.42	1.19	0.01	4110
94.0000	VHLP2-11	48	10.17	1.18	0.01	3913
93.0000	Pipe Mount [PM 601-3]	48	9.92	1.16	0.00	3735
92.0000	VHLP1-23	48	9.68	1.15	0.00	3572
88.0000	7770.00 w/ Mount Pipe	48	8.74	1.07	0.00	3041
81.0000	800 10504 w/ Mount Pipe	48	7.25	0.94	0.00	2649
72.0000	LBX-9012DS-VTM w/ Mount Pipe	48	5.65	0.77	0.00	3830

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	117 - 110	70.69	20	5.82	0.03
L2	110 - 100	62.20	20	5.76	0.03
L3	100 - 81.875	50.45	20	5.43	0.03
L4	81.875 - 76.0833	31.99	20	4.11	0.02
L5	76.0833 - 71	27.30	20	3.61	0.01
L6	71 - 68.0833	23.65	20	3.26	0.01
L7	68.0833 - 63.5	21.71	20	3.10	0.01
L8	63.5 - 47.42	18.84	20	2.87	0.01
L9	52 - 38.0833	12.57	20	2.34	0.01
L10	38.0833 - 35	6.51	20	1.74	0.00
L11	35 - 12.5	5.44	20	1.58	0.00
L12	12.5 - 11	0.61	20	0.48	0.00
L13	11 - 2.5	0.47	20	0.41	0.00
L14	2.5 - 0	0.02	20	0.09	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
117.0000	APXVSPP18-C-A20 w/ Mount Pipe	20	70.69	5.82	0.03	4412
115.0000	TME-PCS 1900MHz 4x45W-65MHz	20	68.26	5.81	0.03	4412
110.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	20	62.20	5.76	0.03	3156
100.0000	(2) HBXX-6516DS-A2M w/ Mount Pipe	20	50.45	5.43	0.03	1293
95.0000	VHLP1-23	20	44.89	5.14	0.03	973
94.0000	VHLP2-11	20	43.82	5.07	0.03	926
93.0000	Pipe Mount [PM 601-3]	20	42.75	5.00	0.03	883
92.0000	VHLP1-23	20	41.70	4.93	0.03	844
88.0000	7770.00 w/ Mount Pipe	20	37.65	4.63	0.02	717
81.0000	800 10504 w/ Mount Pipe	20	31.24	4.03	0.02	622
72.0000	LBX-9012DS-VTM w/ Mount Pipe	20	24.34	3.32	0.01	895

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 $\frac{P_u}{\phi P_n}$
L1	117 - 110 (1)	TP15.94x14.36x0.1875	7.0000	0.0000	0.0	9.5106	-1.08	701.02	0.002
L2	110 - 100 (2)	TP18.2x15.94x0.1875	10.0000	0.0000	0.0	10.8750	-3.60	775.82	0.005
L3	100 - 81.875 (3)	TP22.2676x18.2x0.25	18.1250	0.0000	0.0	17.7242	-13.19	1301.71	0.010
L4	81.875 - 76.0833 (4)	TP23.5674x22.2676x0.3262	5.7917	0.0000	0.0	24.4117	-14.50	1461.93	0.010
L5	76.0833 - 71 (5)	TP24.7082x23.5674x0.4537	5.0833	0.0000	0.0	35.4329	-17.51	1633.76	0.011
L6	71 - 68.0833 (6)	TP25.3627x24.7082x0.6488	2.9167	0.0000	0.0	51.6300	-18.30	2076.71	0.009
L7	68.0833 - 63.5 (7)	TP26.3913x25.3627x0.685	4.5833	0.0000	0.0	56.7029	-19.63	2399.72	0.008
L8	63.5 - 47.42 (8)	TP30x26.3913x0.8147	16.0800	0.0000	0.0	73.8647	-23.65	3134.39	0.008
L9	47.42 - 38.0833 (9)	TP31.6377x27.3428x0.8045	13.9167	0.0000	0.0	74.8923	-27.79	3123.65	0.009

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L10	38.0833 - 35 (10)	TP32.339x31.6377x0.7403	3.0833	0.0000	0.0	75.3239	-31.30	3144.21	0.010
L11	35 - 12.5 (11)	TP37.4568x32.339x0.7647	22.5000	0.0000	0.0	90.3435	-40.63	3949.43	0.010
L12	12.5 - 11 (12)	TP37.798x37.4568x0.7495	1.5000	0.0000	0.0	89.4089	-41.28	3919.73	0.011
L13	11 - 2.5 (13)	TP39.7314x37.798x0.9196	8.5000	0.0000	0.0	114.9200	-45.76	5035.53	0.009
L14	2.5 - 0 (14)	TP40.3x39.7314x0.9631	2.5000	0.0000	0.0	121.9900	-47.17	5509.93	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	117 - 110 (1)	TP15.94x14.36x0.1875	16.59	224.09	0.074	0.00	224.09	0.000
L2	110 - 100 (2)	TP18.2x15.94x0.1875	74.97	284.00	0.264	0.00	284.00	0.000
L3	100 - 81.875 (3)	TP22.2676x18.2x0.25	402.67	581.91	0.692	0.00	581.91	0.000
L4	81.875 - 76.0833 (4)	TP23.5674x22.2676x0.3262	542.18	688.03	0.788	0.00	688.03	0.000
L5	76.0833 - 71 (5)	TP24.7082x23.5674x0.4537	671.13	798.74	0.840	0.00	798.74	0.000
L6	71 - 68.0833 (6)	TP25.3627x24.7082x0.6488	752.81	1026.93	0.733	0.00	1026.93	0.000
L7	68.0833 - 63.5 (7)	TP26.3913x25.3627x0.685	883.60	1233.83	0.716	0.00	1233.83	0.000
L8	63.5 - 47.42 (8)	TP30x26.3913x0.8147	1225.11	1761.31	0.696	0.00	1761.31	0.000
L9	47.42 - 38.0833 (9)	TP31.6377x27.3428x0.8045	1464.95	1804.27	0.812	0.00	1804.27	0.000
L10	38.0833 - 35 (10)	TP32.339x31.6377x0.7403	1766.47	1993.42	0.886	0.00	1993.42	0.000
L11	35 - 12.5 (11)	TP37.4568x32.339x0.7647	2541.32	2914.91	0.872	0.00	2914.91	0.000
L12	12.5 - 11 (12)	TP37.798x37.4568x0.7495	2595.27	2922.82	0.888	0.00	2922.82	0.000
L13	11 - 2.5 (13)	TP39.7314x37.798x0.9196	2906.13	3920.26	0.741	0.00	3920.26	0.000
L14	2.5 - 0 (14)	TP40.3x39.7314x0.9631	2999.25	4344.27	0.690	0.00	4344.27	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	117 - 110 (1)	TP15.94x14.36x0.1875	2.63	350.51	0.008	0.00	454.38	0.000
L2	110 - 100 (2)	TP18.2x15.94x0.1875	6.25	387.91	0.016	0.01	575.85	0.000
L3	100 - 81.875 (3)	TP22.2676x18.2x0.25	23.26	650.86	0.036	1.03	1179.93	0.001
L4	81.875 - 76.0833 (4)	TP23.5674x22.2676x0.3262	24.53	730.97	0.034	0.97	1395.11	0.001
L5	76.0833 - 71 (5)	TP24.7082x23.5674x0.4537	27.80	816.88	0.034	0.89	1619.60	0.001
L6	71 - 68.0833 (6)	TP25.3627x24.7082x0.6488	28.22	1038.36	0.027	0.85	2082.28	0.000
L7	68.0833 - 63.5 (7)	TP26.3913x25.3627x0.685	28.87	1199.86	0.024	0.77	2501.81	0.000
L8	63.5 - 47.42 (8)	TP30x26.3913x0.8147	30.55	1567.20	0.019	0.57	3571.38	0.000
L9	47.42 - 38.0833 (9)	TP31.6377x27.3428x0.8045	31.90	1579.12	0.020	0.41	3658.48	0.000

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 $\frac{T_u}{\phi T_n}$
L10	38.0833 - 35 (10)	TP32.339x31.6377x0.7403	33.04	1572.10	0.021	0.26	4042.03	0.000
L11	35 - 12.5 (11)	TP37.4568x32.339x0.7647	35.89	1974.72	0.018	0.17	5910.52	0.000
L12	12.5 - 11 (12)	TP37.798x37.4568x0.7495	36.07	1959.86	0.018	0.20	5926.58	0.000
L13	11 - 2.5 (13)	TP39.7314x37.798x0.9196	37.10	2517.77	0.015	0.36	7949.06	0.000
L14	2.5 - 0 (14)	TP40.3x39.7314x0.9631	37.41	2754.97	0.014	0.41	8808.83	0.000

Pole Interaction Design Data

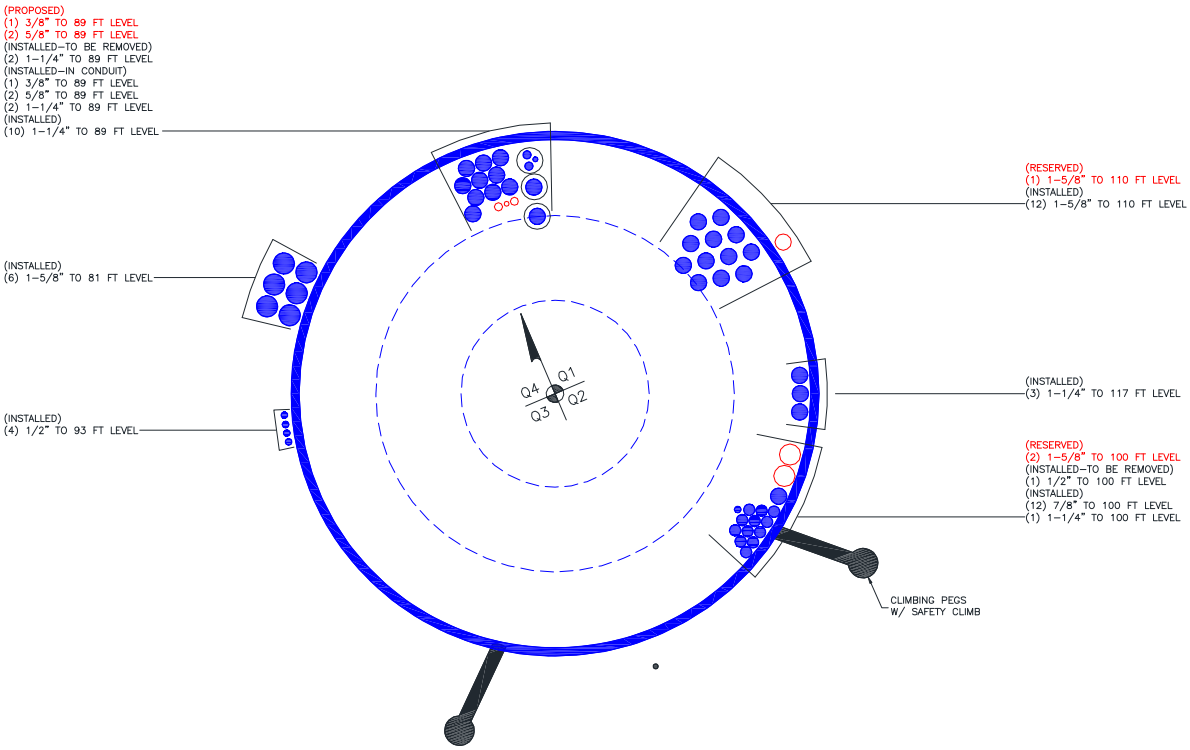
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	117 - 110 (1)	0.002	0.074	0.000	0.008	0.000	0.076 ✔	1.000	4.8.2 ✔
L2	110 - 100 (2)	0.005	0.264	0.000	0.016	0.000	0.269 ✔	1.000	4.8.2 ✔
L3	100 - 81.875 (3)	0.010	0.692	0.000	0.036	0.001	0.703 ✔	1.000	4.8.2 ✔
L4	81.875 - 76.0833 (4)	0.010	0.788	0.000	0.034	0.001	0.799 ✔	1.000	4.8.2 ✔
L5	76.0833 - 71 (5)	0.011	0.840	0.000	0.034	0.001	0.852 ✔	1.000	4.8.2 ✔
L6	71 - 68.0833 (6)	0.009	0.733	0.000	0.027	0.000	0.743 ✔	1.000	4.8.2 ✔
L7	68.0833 - 63.5 (7)	0.008	0.716	0.000	0.024	0.000	0.725 ✔	1.000	4.8.2 ✔
L8	63.5 - 47.42 (8)	0.008	0.696	0.000	0.019	0.000	0.703 ✔	1.000	4.8.2 ✔
L9	47.42 - 38.0833 (9)	0.009	0.812	0.000	0.020	0.000	0.821 ✔	1.000	4.8.2 ✔
L10	38.0833 - 35 (10)	0.010	0.886	0.000	0.021	0.000	0.897 ✔	1.000	4.8.2 ✔
L11	35 - 12.5 (11)	0.010	0.872	0.000	0.018	0.000	0.882 ✔	1.000	4.8.2 ✔
L12	12.5 - 11 (12)	0.011	0.888	0.000	0.018	0.000	0.899 ✔	1.000	4.8.2 ✔
L13	11 - 2.5 (13)	0.009	0.741	0.000	0.015	0.000	0.751 ✔	1.000	4.8.2 ✔
L14	2.5 - 0 (14)	0.009	0.690	0.000	0.014	0.000	0.699 ✔	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	117 - 110	Pole	TP15.94x14.36x0.1875	1	-1.08	701.02	7.6	Pass
L2	110 - 100	Pole	TP18.2x15.94x0.1875	2	-3.60	775.82	26.9	Pass
L3	100 - 81.875	Pole	TP22.2676x18.2x0.25	3	-13.19	1301.71	70.3	Pass
L4	81.875 - 76.0833	Pole	TP23.5674x22.2676x0.3262	4	-14.50	1461.93	79.9	Pass
L5	76.0833 - 71	Pole	TP24.7082x23.5674x0.4537	5	-17.51	1633.76	85.2	Pass
L6	71 - 68.0833	Pole	TP25.3627x24.7082x0.6488	6	-18.30	2076.71	74.3	Pass
L7	68.0833 - 63.5	Pole	TP26.3913x25.3627x0.685	7	-19.63	2399.72	72.5	Pass
L8	63.5 - 47.42	Pole	TP30x26.3913x0.8147	8	-23.65	3134.39	70.3	Pass
L9	47.42 - 38.0833	Pole	TP31.6377x27.3428x0.8045	9	-27.79	3123.65	82.1	Pass
L10	38.0833 - 35	Pole	TP32.339x31.6377x0.7403	10	-31.30	3144.21	89.7	Pass
L11	35 - 12.5	Pole	TP37.4568x32.339x0.7647	11	-40.63	3949.43	88.2	Pass
L12	12.5 - 11	Pole	TP37.798x37.4568x0.7495	12	-41.28	3919.73	89.9	Pass
L13	11 - 2.5	Pole	TP39.7314x37.798x0.9196	13	-45.76	5035.53	75.1	Pass
L14	2.5 - 0	Pole	TP40.3x39.7314x0.9631	14	-47.17	5509.93	69.9	Pass
							Summary	
						Pole (L12)	89.9	Pass
						RATING =	**89.9**	**Pass**

APPENDIX B

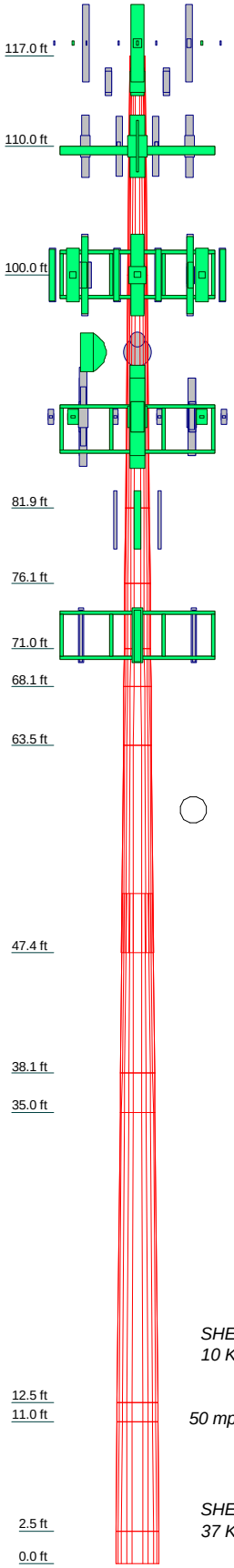
BASE LEVEL DRAWING



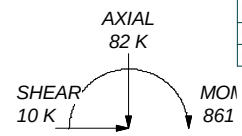
APPENDIX C

ADDITIONAL CALCULATIONS

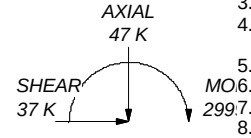
Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Length (ft)	7.0000	10.0000	18.1250	5.7917	5.0833	2.9167	4.5833	16.0800	13.9167	3.0833	22.5000	1.5000	8.5000	2.5000
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.1875	0.1875	0.2500	0.3262	0.4537	0.6488	0.6850	0.8147	0.8045	0.7403	0.7647	0.7495	0.9195	0.9631
Socket Length (ft)								4.5800						
Top Dia (in)	14.3600	15.9400	18.2000	22.2676	23.5674	24.7082	25.3627	26.3913	27.3428	31.6377	32.3390	37.4568	37.7980	39.7314
Bot Dia (in)	15.9400	18.2000	22.2676	23.5674	24.7082	25.3627	26.3913	30.0000	31.6377	32.3390	37.4568	37.7980	39.7314	40.3000
Grade	A572-65			Reinf 52.81 ksi	Reinf 40.66 ksi	Reinf 35.42 ksi	Reinf 37.32 ksi	Reinf 37.42 ksi	Reinf 36.78 ksi	Reinf 36.81 ksi	Reinf 38.55 ksi	Reinf 38.66 ksi	Reinf 38.64 ksi	Reinf 38.68 ksi
Weight (K)	0.2	0.3	1.0	0.5	0.6	0.5	0.9	3.9	3.5	0.8	6.4	0.5	3.2	1.0



ALL REACTIONS ARE FACTORED



TORQUE 2 kip-ft
50 mph WIND - 0.7500 in ICE



TORQUE 5 kip-ft
REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSPP18-C-A20 w/ Mount Pipe	117	LNX-6514DS-T4M w/ Mount Pipe	100
APXVSPP18-C-A20 w/ Mount Pipe	117	RRH2X40-AWS	100
APXVSPP18-C-A20 w/ Mount Pipe	117	RRH2X40-AWS	100
800 EXTERNAL NOTCH FILTER	117	RRH2X40-AWS	100
800 EXTERNAL NOTCH FILTER	117	(2) DB844G65ZAXY w/ Mount Pipe	100
800 EXTERNAL NOTCH FILTER	117	(2) DB844G65ZAXY w/ Mount Pipe	100
(3) ACU-A20-N	117	(2) DB844G65ZAXY w/ Mount Pipe	100
(3) ACU-A20-N	117	GPS_A	100
(3) ACU-A20-N	117	(2) FD9R6004/2C-3L	100
Pipe Mount [PM 601-3]	117	(2) FD9R6004/2C-3L	100
TME-PCS 1900MHz 4x45W-65MHz	115	(2) FD9R6004/2C-3L	100
TME-PCS 1900MHz 4x45W-65MHz	115	DB-T1-6Z-8AB-0Z	100
TME-PCS 1900MHz 4x45W-65MHz	115	Platform Mount [LP 715-1]	100
TME-800MHZ RRH	115	Pipe Mount [PM 601-3]	93
TME-800MHZ RRH	115	VHLP2-11	93
TME-800MHZ RRH	115	VHLP1-23	93
Side Arm Mount [SO 102-3]	115	VHLP2.5-11	93
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	VHLP1-23	93
		RRUS 11	88
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	RRUS 11	88
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	DC6-48-60-18-8F	88
		QS66512-2 w/ Mount Pipe	88
KRY 112 144/1	110	QS66512-2 w/ Mount Pipe	88
KRY 112 144/1	110	TPA-65R-LCUUUU-H8 w/ Mount Pipe	88
KRY 112 144/1	110	OPA-65R-LCUU-H8 w/ Mount Pipe	88
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	110	OPA-65R-LCUU-H6 w/ Mount Pipe	88
		OPA-65R-LCUU-H6 w/ Mount Pipe	88
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	110	RRUS 32 B2	88
		RRUS 32 B2	88
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	110	RRUS 32 B2	88
		RRUS 32 B30	88
RRUS 11 B12	110	RRUS 32 B30	88
RRUS 11 B12	110	RRUS 32 B30	88
RRUS 11 B12	110	(2) TPX-070821	88
T-Arm Mount [TA 602-3]	110	(2) TPX-070821	88
(2) 2.375" OD x 4' Mount Pipe	110	(2) TPX-070821	88
(2) 2.375" OD x 4' Mount Pipe	110	DC6-48-60-18-8F	88
(2) 2.375" OD x 4' Mount Pipe	110	Platform Mount [LP 715-1]	88
(2) HBXX-6516DS-A2M w/ Mount Pipe	100	Miscellaneous [NA 509-3]	88
(2) HBXX-6516DS-A2M w/ Mount Pipe	100	(2) LGP21401	88
(2) HBXX-6516DS-A2M w/ Mount Pipe	100	(2) LGP21401	88
RRH2X60-AWS	100	(2) LGP21401	88
RRH2X60-AWS	100	(2) 7020.00	88
RRH2X60-AWS	100	(2) 7020.00	88
RRH2X60-PCS	100	(2) 7020.00	88
RRH2X60-PCS	100	7770.00 w/ Mount Pipe	88
RRH2X60-PCS	100	7770.00 w/ Mount Pipe	88
800 10735V01 w/ Mount Pipe	100	7770.00 w/ Mount Pipe	88
800 10735V01 w/ Mount Pipe	100	RRUS 11	88
800 10735V01 w/ Mount Pipe	100	800 10504 w/ Mount Pipe	81
RRH2X40-07-U	100	800 10504 w/ Mount Pipe	81
RRH2X40-07-U	100	800 10504 w/ Mount Pipe	81
RRH2X40-07-U	100	Pipe Mount [PM 601-3]	81
DB-T1-6Z-8AB-0Z	100	DB844H90E-XY w/ Mount Pipe	72
MG D3-800TV w/ Mount Pipe	100	DB844H90E-XY w/ Mount Pipe	72
MG D3-800TV w/ Mount Pipe	100	Platform Mount (LP 101-1)	72
MG D3-800TV w/ Mount Pipe	100	LBX-9012DS-VTM w/ Mount Pipe	72
LNX-6514DS-T4M w/ Mount Pipe	100	LBX-9012DS-VTM w/ Mount Pipe	72
LNX-6514DS-T4M w/ Mount Pipe	100	LBX-9012DS-VTM w/ Mount Pipe	72
		DB844H90E-XY w/ Mount Pipe	72

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 89.9%

Paul J. Ford and Company
250 East Broad St., Suite 600
Columbus, Ohio
Phone: 614.221.6679
FAX:

Job:	**117' Monopole / Darien, CT**		
Project:	**PJF 37517-0349 / BU 806352**		
Client: Crown Castle	Drawn by: jjohnson	App'd:	
Code: TIA-222-G	Date: 01/30/17	Scale: NTS	
Path:		Dwg No. E-1	

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#:	
Site Name:	
App #:	

Reactions		
Mu	16.59	ft-kips
Axial, Pu:	1.08	kips
Shear, Vu:	2.63	kips
Elevation:	110	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Other

If No stiffeners, Criteria:	TIA G

<-Only Applcable to Unstiffened Cases

Bolt Data

Qty:	10		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	19.2		

Plate Data

Diam:	22	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	5.13	in

Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Diam:	15.94	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	Rigid / φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.54	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	4.04	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.971	in	
Min PL "treq" for actual **T w/ Pry**:	0.198	in	
Min PL "t1" for actual **T w/o Pry**:	0.264	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	4.04	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	7.4%	**Pass**	

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	1.6	ksi	Rigid / TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	4.8%	**Pass**	Comp. Y.L. Length: 10.70
No Prying			
Tension Side Stress Ratio, (treq/t)^2:	1.7%	**Pass**	

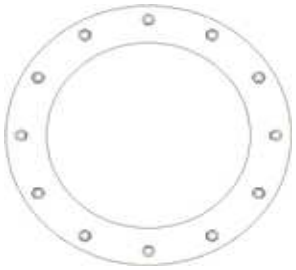
n/a

Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#:	
Site Name:	
App #:	

Reactions		
Mu	74.97	ft-kips
Axial, Pu:	3.6	kips
Shear, Vu:	6.25	kips
Elevation:	100	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Other

If No stiffeners, Criteria:	TIA G

<-Only Applcable to Unstiffened Cases

Bolt Data

Qty:	12		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	22		

Plate Data

Diam:	24	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.88	in

Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Diam:	18.2	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	Rigid / φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.54	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	13.33	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.108	in	
Min PL "treq" for actual **T w/ Pry**:	0.411	in	
Min PL "t1" for actual **T w/o Pry**:	0.548	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	13.33	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	24.4%	**Pass**	

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	5.9	ksi	Rigid / TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	18.2%	**Pass**	Comp. Y.L. Length: 12.36
No Prying			
Tension Side Stress Ratio, (treq/t)^2:	7.5%	**Pass**	

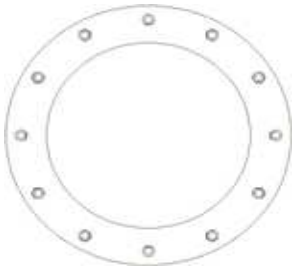
n/a

Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

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v4.4 - Effective 7-12-13

Date: 1/27/2017
PJF Project: 37517-0349.001.7805
Client Ref. # 806352
Site Name: BRG 302 943052
Description: 117ft Monopole
Owner: CCI
Engineer: JRJ

Asymmetric Anchor Rod Analysis

Moment =	2999	k-ft	TIA Ref.	G	Location =	Base Plate		
Axial =	47.0	kips	ASIF =	1.0000	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	37.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	18							

**** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. ****

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	0.0	48.22	0.00	3.98	158.83	153.23	163.23	0.00	260.00	62.8%
2	2.250	#18J A615 Gr 75	75	100	30.0	48.22	0.00	3.98	158.83	153.23	163.23	0.00	260.00	62.8%
3	2.250	#18J A615 Gr 75	75	100	60.0	48.22	0.00	3.98	158.83	153.23	163.23	0.00	260.00	62.8%
4	2.250	#18J A615 Gr 75	75	100	90.0	48.22	0.00	3.98	158.83	153.23	163.23	0.00	260.00	62.8%
5	2.250	#18J A615 Gr 75	75	100	120.0	48.22	0.00	3.98	158.83	153.23	163.23	0.00	260.00	62.8%
6	2.250	#18J A615 Gr 75	75	100	150.0	48.22	0.00	3.98	158.83	153.23	163.23	0.00	260.00	62.8%
7	2.250	#18J A615 Gr 75	75	100	180.0	48.22	0.00	3.98	158.83	153.23	163.23	0.00	260.00	62.8%
8	2.250	#18J A615 Gr 75	75	100	210.0	48.22	0.00	3.98	158.83	153.23	163.23	0.00	260.00	62.8%
9	2.250	#18J A615 Gr 75	75	100	240.0	48.22	0.00	3.98	158.83	153.23	163.23	0.00	260.00	62.8%
10	2.250	#18J A615 Gr 75	75	100	270.0	48.22	0.00	3.98	158.83	153.23	163.23	0.00	260.00	62.8%
11	2.250	#18J A615 Gr 75	75	100	300.0	48.22	0.00	3.98	158.83	153.23	163.23	0.00	260.00	62.8%
12	2.250	#18J A615 Gr 75	75	100	330.0	48.22	0.00	3.98	158.83	153.23	163.23	0.00	260.00	62.8%
13	1.750	A193 Gr B7	105	125	105.0	58.72	0.00	2.41	116.52	113.14	119.18	0.00	190.00	62.7%
14	1.750	A193 Gr B7	105	125	225.0	58.72	0.00	2.41	116.52	113.14	119.18	0.00	190.00	62.7%
15	1.750	A193 Gr B7	105	125	345.0	58.72	0.00	2.41	116.52	113.14	119.18	0.00	190.00	62.7%
16	2.250	A193 Gr B7	105	125	15.0	58.72	0.00	3.98	192.61	187.03	197.01	0.00	325.00	60.6%
17	2.250	A193 Gr B7	105	125	135.0	58.72	0.00	3.98	192.61	187.03	197.01	0.00	325.00	60.6%
18	2.250	A193 Gr B7	105	125	255.0	58.72	0.00	3.98	192.61	187.03	197.01	0.00	325.00	60.6%
								66.90						

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data	
BU#:	
Site Name:	
App #:	
Pole Manufacturer:	*Other*

Reactions		
Mu:	1880.9	ft-kips
Axial, Pu:	33.6	kips
Shear, Vu:	26.4	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

Reactions adjusted to account for additional anchor rods.

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	48.22	in

If No stiffeners, Criteria: AISC LRFD <-Only Applcable to Unstiffened Cases

Anchor Rod Results

Max Rod (Cu+ Vu/ή):	163.2 Kips	Rigid
Allowable Axial, Φ*Fu*Anet:	260.0 Kips	AISC LRFD
Anchor Rod Stress Ratio:	62.8% **Pass**	φ*Tn

Plate Data		
Diam:	54.22	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	10.80	in

Base Plate Results Flexural Check

Base Plate Stress:	23.3 ksi	Rigid
Allowable Plate Stress:	54.0 ksi	AISC LRFD
Base Plate Stress Ratio:	43.1% **Pass**	φ*Fy
		Y.L. Length: 26.48

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

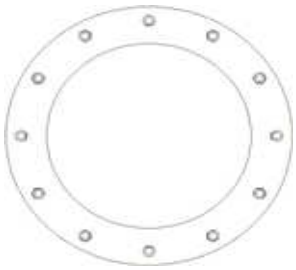
Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Diam:	40.3	in
Thick:	0.34375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

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Job Number:	37517-0349.001.7805	**Page:**	1
Site Number:	806352	**By:**	JRJ
Site Name:	BRG 302 943052	**Date:**	1/27/2017

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA-222-G

Factored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, Mu =	2999.0		k-ft
Shear, Vu =	37.0		kips
Axial Load, Pu1 =	47.0		kips (from 1.2D + 1.6W)*
Axial Load, Pu2 =	35.3	0.0	kips (from 0.9D + 1.6W)**
OTMu =	3006.4	0.0	k-ft @ Ground

***Axial Load, Pu1 will be used for Soil Compression Analysis.**

****Axial Load, Pu2 will be used for Steel Analysis.**

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-05
Seismic Design Category =	D
Reference Standard =	TIA-222-G
Use 1.3 Load Factor?	No
Load Factor =	1.00

Drilled Pier Parameters

Diameter =	6.5 ft
Height Above Grade =	0.2 ft
Depth Below Grade =	16.4 ft
fc' =	3 ksi
εc =	0.003 in/in
L / D Ratio =	2.55
Mat Ftdn. Cap Width =	ft
Mat Ftdn. Cap Length =	ft
Depth Below Grade =	ft

	Safety Factor	Φ Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

Load Combinations Checked per TIA-222-G

1. (0.75) Ult. Skin Friction + (0.75) Ult. End Bearing + (1.2) Effective Soil Wt. - (1.2) Buoyant Conc. Wt. ≥ Comp.
2. (0.75) Ult. Skin Friction + (0.9) Buoyant Conc. Wt. ≥ Uplift

Steel Parameters

Number of Bars =	22
Rebar Size =	#10
Rebar Fy =	60 ksi
Rebar MOE =	29000 ksi
Tie Size =	#6
Side Clear Cover to Ties =	5 in

Soil Parameters

Water Table Depth =	99.00 ft
Depth to Ignore Soil =	4.00 ft
Depth to Full Cohesion =	0 ft
Full Cohesion Starts at?*	Ground

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)

Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Direct Embed Pole Shaft Parameters

Dia @ Grade =	in
Dia @ Depth Below Grade =	in
Number of Sides =	
Thickness =	in
Fy =	ksi
Backfill Condition =	

Maximum Capacity Ratios

Maximum Soil Ratio =	100.0%
Maximum Steel Ratio =	100.0%

Note: The drilled pier foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the drilled pier is based the recommendations of the site specific geotechnical report. In the absence of any recommendations, the frost depth at the site or one half of the drilled pier diameter (whichever is greater) shall be ignored.

Define Soil Layers

Note: Cohesion = Undrained Shear Strengh = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	4	115		30	Sand				4
2	2	120		39	Sand	23000	420		6
3	5	135		45	Sand	30900	2150		11
4	5.4	155	14000		Clay	36900	4740		16.4
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	13.29	ft, from Grade	Shear, Vu =	37.00	kips
Bending Moment, Mu =	3498.19	k-ft, from COR	Resisting Shear, ΦVn =	70.69	kips
Resisting Moment, ΦMn =	6683.47	k-ft, from COR			
MOMENT RATIO =	**52.3%**	**OK**	**SHEAR RATIO =**	**52.3%**	**OK**

Soil Results: Uplift

Uplift, Tu =	0.00	kips
Uplift Capacity, ΦTn =	74.36	kips
UPLIFT RATIO =	**0.0%**	**OK**

Soil Results: Compression

Compression, Cu =	47.00	kips
Comp. Capacity, ΦCn =	1476.79	kips
COMPRESSION RATIO =	**3.2%**	**OK**

Steel Results (ACI 318-05):

Minimum Steel Area =	15.93	sq in	Axial Load, Pu =	59.74	kips @ 5.75 ft Below Grade
Actual Steel Area =	27.94	sq in	Moment, Mu =	3191.84	k-ft @ 5.75 ft Below Grade
			Moment, ΦMn =	4064.83	k-ft
Axial, ΦPn (min) =	-1508.76	kips, Where ΦMn = 0 k-ft	**MOMENT RATIO =**	**78.5%**	**OK**
Axial, ΦPn (max) =	7170.79	kips, Where ΦMn = 0 k-ft			

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *806352*
Site Name: *BRG 302 943052*
App #:

Loads Already Factored		
For M (WL)	1	<----Disregard
For P (DL)	1	<----Disregard

Pier Properties

Concrete:

Pier Diameter =	6.5	ft
Concrete Area =	4778.4	in^2

Reinforcement:

Clear Cover to **Tie**=	5.00	in
Horiz. **Tie** Bar Size=	6	
Vert. Cage Diameter =	5.44	ft
Vert. Cage Diameter =	65.23	in
Vertical Bar Size =	10	
Bar Diameter =	1.27	in
Bar Area =	1.27	in^2
Number of Bars =	22	
As Total=	27.94	in^2
A s/ Aconc, Rho:	0.0058	0.58%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0027
200 / Fy:	0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.58%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	7170.79	kips
at Mu=(ϕ=0.65)Mn=	3988.84	ft-kips
Max Tu, (φ=0.9) Tn =	1508.76	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	G	
Max. Factored Shaft Mu:	3191.84	ft-kips **(* Note)**
Max. Factored Shaft Pu:	59.74	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	**Shaft Factored Loads**		
1.00	Mu:	3191.84	ft-kips
1.00	Pu:	59.74	kips

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code=	2005

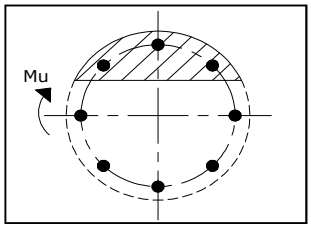
Seismic Properties

Seismic Design Category =	D
Seismic Risk =	**High**

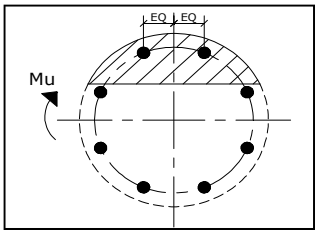
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **1**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**13.43**	in
Extreme Steel Strain, ϵt:	**0.0130**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	59.74	kips
Drilled Shaft Moment Capacity, φMn:	**4064.83**	ft-kips
Drilled Shaft Superimposed Mu:	**3191.84**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**78.5%**

Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT2104

Darien
126 Ledge Road
Darien, CT 6820

February 9, 2017

Centerline Communications Project Number: 950006-031

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**25.75 %**

February 9, 2017

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

Emissions Analysis for Site: **CT2104 – Darien**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **126 Ledge Road, Darien, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed AT&T Wireless antenna facility located at **126 Ledge Road, Darien, 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)
LTE	700 MHz	2	60
LTE	1900 MHz (PCS)	2	60
GSM	850 MHz	2	30
LTE	850 MHz	2	60
LTE	2300 MHz (WCS)	2	60
UMTS	850 MHz	2	30
UMTS	1900 MHz (PCS)	2	30

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) 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	Quintel QS66512-2	88
A	2	CCI OPA-65R-LCUU-H6	88
A	3	Powerwave 7770	88
B	1	Quintel QS66512-2	88
B	2	CCI OPA-65R-LCUU-H6	88
B	3	Powerwave 7770	88
C	1	CCI TPA-65R-LCUUUU-H8	88
C	2	CCI OPA-65R-LCUU-H8	88
C	3	Powerwave 7770	88

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	Quintel QS66512-2	700 MHz / 1900 MHz (PCS)	10.85 / 13.85	4	240	4,371.36	3.23
Antenna A2	CCI OPA-65R-LCUU-H6	850 MHz / 2300 MHz (WCS)	12.45 / 15.45	6	300	7,373.28	5.23
Antenna A3	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	1.48
						Sector A Composite MPE%	**9.94**
Antenna B1	Quintel QS66512-2	700 MHz / 1900 MHz (PCS)	10.85 / 13.85	4	240	4,371.36	3.23
Antenna B2	CCI OPA-65R-LCUU-H6	850 MHz / 2300 MHz (WCS)	12.45 / 15.45	6	300	7,373.28	5.23
Antenna B3	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	1.48
						Sector B Composite MPE%	**9.94**
Antenna C1	CCI TPA-65R-LCUUUU-H8	700 MHz / 1900 MHz (PCS)	12.95 / 13.75	4	240	5,212.56	4.23
Antenna C2	CCI OPA-65R-LCUU-H8	850 MHz / 2300 MHz (WCS)	13.35 / 14.95	6	300	7,644.19	5.68
Antenna C3	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	1.48
						Sector C Composite MPE%	**11.39**

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 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 sector with the largest calculated MPE% is Sector 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	**11.39 %**
Verizon Wireless	3.98 %
Clearwire	0.39 %
Sprint	2.45 %
MetroPCS	3.95 %
T-Mobile	3.59 %
Site Total MPE %:	**25.75 %**

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	9.94 %
AT&T Sector B Total:	9.94 %
AT&T Sector C Total:	11.39 %
Site Total:	25.75 %

Table 5: Site MPE Summary

FCC OET 65 specifies that for carriers utilizing directional antennas 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 sector with the largest calculated MPE% is Sector C.

AT&T _ Frequency Band / Technology (Sector C)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 700 MHz LTE	2	1,183.45	88	12.65	700 MHz	467	2.71%
AT&T 1900 MHz (PCS) LTE	2	1,422.82	88	15.21	1900 MHz (PCS)	1000	1.52%
AT&T 850 MHz GSM	2	648.82	88	6.94	850 MHz	567	1.22%
AT&T 850 MHz LTE	2	1,297.63	88	13.88	850 MHz	567	2.45%
AT&T 2300 MHz (WCS) LTE	2	1,875.65	88	20.06	2300 MHz (WCS)	1000	2.01%
AT&T 850 MHz UMTS	2	414.12	88	4.43	850 MHz	567	0.78%
AT&T 1900 MHz (PCS) UMTS	2	656.33	88	7.02	1900 MHz (PCS)	1000	0.70%
						Total:	11.39%

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:	9.94 %
Sector B:	9.94 %
Sector C:	11.39 %
AT&T Maximum Total (per sector):	11.39 %
Site Total:	25.75 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **25.75 %** 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.

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