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

December 16, 2016

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: 806382**
AT&T Site ID: CT5836
74 Goodrich Lane, Portland, CT 06480
Latitude: 41° 36' 29.9" / Longitude: -72° 35' 29.56"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 116-foot level of the existing 160-foot monopole at 74 Goodrich Lane in Portland, CT. The tower and property is owned by Crown Castle. AT&T now intends to replace three (3) RRHs is with three (3) new RRHs, six (6) diplexers with six (6) new diplexers, and three (3) BiasT's with three (3) new BiasT's. AT&T also intends to add twelve (12) tower mounted switches.

This facility was approved by the by the Connecticut Siting Council in Docket No. 58 on July 11, 1986. This approval included the conditions that:

1. The proposed Bloomfield and Middlefield sites are rejected without prejudice.
2. The antennas on the Glastonbury tower shall be mounted no higher than 180' level of this existing tower.
3. The Portland and Rocky Hill towers shall be monopoles.
4. The towers shall be no taller than necessary to provide the proposed service, and in no event shall exceed total heights, including antennas, of
    a. 190' at the Haddam site;
    b. 173' at the Portland site;

This modification complies with the aforementioned condition(s).

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. Susan S. Branfield, First Selectman, Town of Portland, and Crown Castle is the tower and property 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. Susan S. Branfield, First Selectman
Town of Portland
33 E Main St
Portland, CT 06480

DOCKET NO. 58

AN APPLICATION OF HARTFORD CELLULAR COMPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF FACILITIES TO PROVIDE CELLULAR SERVICE IN HARTFORD, TOLLAND, AND MIDDLESEX COUNTIES.	:	CONNECTICUT SITING COUNCIL
	:	July 11, 1986

FINDINGS OF FACT

1. Hartford Cellular Company (Hartford), in accordance with provisions of sections 16-50g to 16-50z of the Connecticut General Statutes (CGS), applied to the Connecticut Siting Council (Council) on January 15, 1986, for a certificate of environmental compatibility and public need (certificate) for the construction, maintenance, and operation of telecommunication towers and associated equipment buildings to provide Domestic Public Cellular Radio Telecommunication Service (cellular service) in the Hartford New England County Metropolitan Area (Hartford NECMA). (Record)
2. Cellular tower sites were proposed for the towns of Bloomfield (two), Glastonbury, Haddam, Hartford, Middlefield, Portland, Rocky Hill, Somers, and Willington, Connecticut. (Hartford 1, p. 2)
3. On April 14, 1986, the applicant amended its application to include a proposed tower site in the Town of Vernon. On May 12, 1986, the applicant withdrew one of its proposed Bloomfield sites and proposed a substitute tower site in the Town of Windsor. (Hartford 1, Exhibit 7, p. 4; Hartford 17, p. 2)
4. The application was accompanied by proof of service as required by section 16-501 of the CGS. (Record)
5. The fee as prescribed by section 16-50v-1 of the Regulations of State Agencies (RSA) accompanied the application. (Record)

6. Affidavits of newspaper notice as required by section 16-501 of the CGS were supplied by the applicant. Newspaper notices of this application were published twice by the applicant in the Hartford Courant, Manchester Journal-Inquirer, the Middletown Press, and the Willimantic Chronicle. Notice of the amendment for a proposed Vernon tower site was published twice by the applicant in the Hartford Courant and the Manchester Journal Inquirer. Notice of the amendment for a proposed Windsor site was published twice in the Hartford Courant. (Hartford 1, p. 5; Hartford 7, p. 2; Hartford 17, p. 3)

7. The Council and its staff inspected the proposed tower sites in the towns of Bloomfield and Hartford on March 18, 1986; in Willington and Somers on April 15, 1986; in Portland, Glastonbury, Haddam, Rocky Hill and Middlefield on April 17, 1986; and in Vernon on May 21, 1986. (Record)

8. Pursuant to section 16-50m of the CGS, the Council, after giving due notice thereof, held public hearings on this application on March 18, 1986, at 7:00 P.M. in the Bloomfield Town Hall in Bloomfield; on April 15, 1986, at 7:00 P.M. in the Center School in Willington; on April 17, 1986, at 7:00 P.M. in the Portland Public Library in Portland; and on May 21, 1986, at 7:00 P.M. in the Vernon Center Middle School in Vernon. (Record)

9. The following state agency filed written comments with the Council pursuant to section 16-50j of the CGS: the Department of Environmental Protection (DEP). (Record)

10. The parties to the proceeding are the applicant and those persons and organizations whose names are listed in the Decision and Order which accompanies these findings. (Record)

11. The Council took administrative notice of its complete record in Docket 56; in Docket 40, of Sections I-IV of the application and the Council's Findings of Fact, Opinion, and Decision and Order; in Docket 51, of the Council's Findings of Fact, Opinion, and Decision and Order; in Docket 11, of the Council's Findings of Fact, Opinion, and Decision and Order, and Volume #1 of the Application; in Docket 24, of the Council's Findings of Fact, Opinion, and Decision and Order; and of the Public Utility Environmental Standards Act, CGS 16-50g-z. (Record)

12. Exhibits in this application are as follows:

1) Application dated January 15, 1986; 2) Responses to Pre-Hearing Questions Set #1, dated March 14, 1986; 3) Responses to Pre-hearing Questions Set #2, dated March 18, 1986; 4) Responses to Questions dated April 4, 1986; 5) Responses to Questions dated April 11, 1986; 6) Zoning regulations of specified communities; 7) Amendement to application with Vernon site, dated April 14, 1986; 8) Site-line graphics from Talcott Mountain Science Center Observatory; 9) Dimension of spire atop Heublein Tower; 10) Responses to questions in Peter Cubeta letter dated April 9, 1986; 11) Two sets of 15½"x20" coverage maps; 12) Report on three Portland site alternates; 13) Response dated May 21, 1986, on Rosenfeld property; 14) Response dated April 15, 1986; 15) Response dated April 17, 1986; 16) Response dated May 9, 1986; 17) Amendment to application with Windsor site, dated May 12, 1986; 18) Response dated May 21, 1986; 19) Visibility from

Portland, CT : Commercial Property Record Card

[Back to Search Results] [Start a New Search][Help with Printing]

Search For Properties

Parcel ID

Street Name

GOODRICH LANE

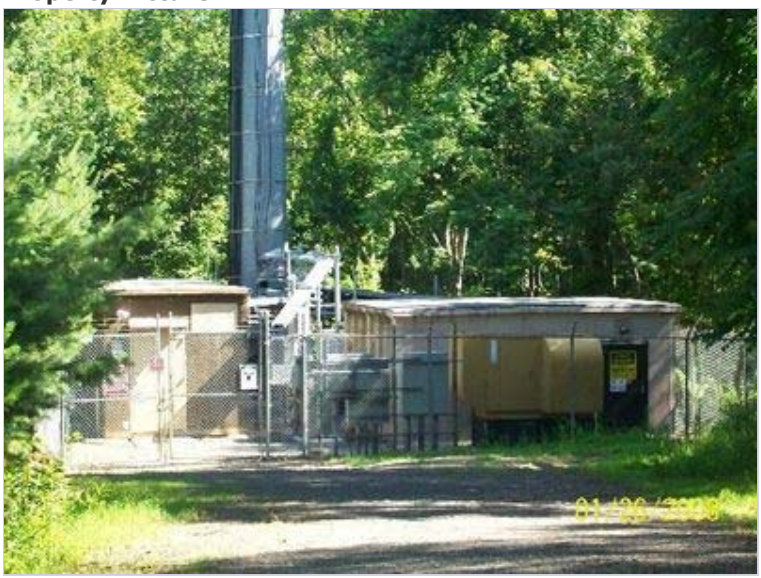
Search Reset Search

Parcel ID	Card	Map-Block-Lot	Location	Zoning	State Class	Acres
00354100	1	084/0009	74 GOODRICH LANE	R25	431 - n/a	0.083

Owner Information

Hale Joan J Crown Atlantic Llc
Pmb 353
4017 Washington Rd
Mcmurray PA 15317

Property Picture



Deed Information

Book/Page: 284/47
Deed Date: 1992/12/23

Building Information

Building No: 0
Year Built: 0
No of Units: 0
Structure Type:
Grade:
Living Units: 0
Identical Units: 0
Net Leasable Area: 0

Valuation

Land: $68,300
Building: $161,950
Total: $230,250
Net Assessment: $161,180

Sales History

Book/Page	Date	Price	Type	Validity

Permit History

Date	Purpose	Price
2015/11/12	REPLC ANTN	$15,000
2014/11/19	ADD REPLA 3 ANT	$15,000

Out Building Information

Structure Code	Width	Lgth/SqFt	Year	RCNLD
Fence Chain	8	260	1996	$4,050
Cell Tower	1	160	1978	$140,400
Shed Frame	1	200	1978	$6,930
Shed Frame	1	96	2000	$1,300
Paving Conc Slab	1	2640	1996	$9,270

Exterior/Interior Information

Levels	Size	Use Type	Ext. Walls	Const. Type	Partitions	Heating	A/C	Plumbing	Condition	Func.	Utility	Unadj. RCNLD

Building Sketch

	Descriptor/Area

Notice

The information delivered through this on-line database is provided in the spirit of open access to government information and is intended as an enhanced service and convenience for citizens of Portland, CT.

The providers of this database: Tyler/CLT, Big Room Studios, and Portland, CT assume no liability for any error or omission in the information provided herein.

Revaluation October 1, 2011. Data is updated in February, April, July and October.

Comments regarding this service should be directed to: assessor@portlandct.org

BUILT BY bigRoom STUDIOS


806382
876364
Meadow Rd
Golf Club Rd
TPC at River Highlands
Geer St
Woodside Rd
Field Rd
Vincy Dr
Shadow Ln
Cromwell
Main St
Nooks Hill Rd
Chelsea Dr
Hillside Rd
Dead Mans Swamp
Connecticut River
West St
Timber Hill Rd
Diane Dr
South St
River Rd
Round Meadow
Main St-CT-17A
Meadow Rd
Gospel Ln
Summer St
Bartlett St
William St
Fairway Dr
Portland Golf Club
Portland Course West
Quarry Ridge Golf Course
Rose Hill Rd
Carr Brook
Cox Rd
Wilcox Hill Rd
Glastonbury Tpke
Paley Farms Rd
Isinglass Hill Rd
Hales Brook
Appletree Ln
Wangunk Meadows
Thompson Hill Rd
E Cotton Hill Rd
N Mulford Rd
Buck Brook
Reservoir Rd
Portland Reservoir
Midwood Farm Rd
Reservoir Brook
Old Marlborough Tpke
South Rd
Mulford Rd
Cox Rd
Stocking Brook
Wood Choppers Rd
Stephen Tom Rd
Great Hill Rd
Rattlesnake Brook
Penfield
Green River
2 km
1 mi
Crown Castle | Earthstar Geographics | Esri, HERE, DeLorme, NGA, USGS, NPS
CCIsites™

WIRELESS COMMUNICATIONS FACILITY
CT5836 - LTE BWE
PORTLAND
CROWN CASTLE SITE NO.: 806382
74 GOODRICH LANE
PORTLAND, CT 06480

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.

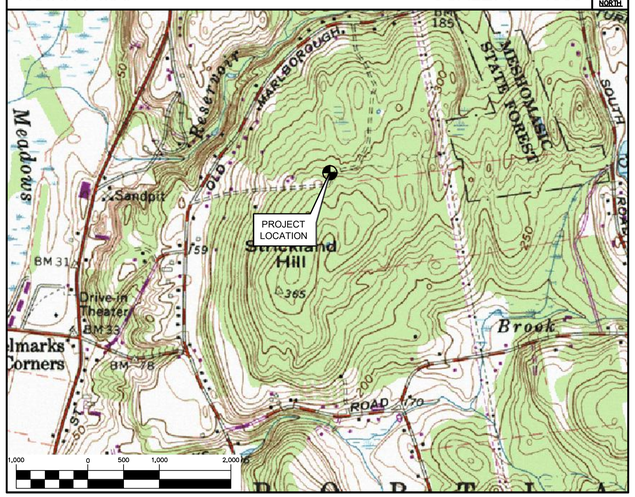
SITE DIRECTIONS

FROM: 500 ENTERPRISE DRIVE, ROCKY HILL, CONNECTICUT
TO: 74 GOODRICH LANE, PORTLAND, CONNECTICUT

1.	HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD	0.30 MI
2.	TURN LEFT ONTO CAPITAL BLVD	0.30 MI
3.	TURN LEFT ONTO WEST ST	0.30 MI
4.	TURN LEFT TO MERGE ONTO I–91 S TOWARD NEW HAVEN	1.40 MI
5.	MERGE ONTO CT–9 S via EXIT 22S TOWARD MIDDLETOWN/OLD SAYBROOK	5.60 MI
6.	TURN RIGHT ONTO CT–17/SAINT JOHNS SQ.	0.20 MI
7.	TURN RIGHT ONTO CT–66/CT–17/MAIN ST. CONTINUE TO FOLLOW MAIN ST.	4.00 MI
8.	MAIN ST. BECOMES SAGE HOLLOW RD.	0.10 MI
9.	TURN SLIGHT LEFT ONTO CORNWALL ST.	0.40 MI
10.	TURN LEFT ONTO OLD MARLBOROUGH TURNPIKE	0.10 MI
11.	TAKE THE 1ST RIGHT ONTO GOODRICH LANE.	0.30 MI
12.	ARRIVE AT 74 GOODRICH LANE ON LEFT	

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

   A. REMOVE AND REPLACE (3) EXISTING RRUS–11 FOR PROPOSED RRUS–12, TYP. OF (3) TOTAL BEHIND POSITION 3 ANTENNA.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT5836
AT&T SITE NAME:	PORTLAND
SITE ADDRESS:	CROWN CASTLE SITE NO.: 806382 74 GOODRICH LANE PORTLAND, CT 06480
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°–36'–29.490"N LONGITUDE: 72°–35'–29.396"W GROUND ELEVATION: ±338.5' AMSL GROUND ELEVATION REFERENCED FROM GOOGLE EARTH. COORDINATES REFERENCED FROM RFDS DOCUMENTS.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T–1	TITLE SHEET	0
N–1	NOTES AND SPECIFICATIONS	0
C–1	PLANS AND ELEVATION	0
C–2	LTE BWE EQUIPMENT DETAILS	0
E–1	TYPICAL ELECTRICAL DETAILS AND NOTES	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/30/16	KAW	JTD	CONSTRUCTION DOCUMENTS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT — DEPARTMENT OF CONSUMER PROTECTION — PROFESSIONAL ENGINEER

at&t

EMPIRE telecom

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

AT&T MOBILITY

WIRELESS COMMUNICATIONS FACILITY

PORTLAND

CT5836 – LTE BWE

74 GOODRICH LANE
PORTLAND, CT 06480

DATE: 11/17/16
SCALE: AS NOTED
JOB NO. 16071.81

TITLE SHEET

T–1

Sheet No. 1 of 5

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): 100–120 MPH (3 SECOND GUST)
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 101 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. ANTENNA PANELS:
   A. SHERWIN WILLIAMS POLANE–B
   B. COLOR TO BE MATCHED WITH EXISTING TOWER STRUCTURE.
2. COAXIAL CABLES:
   A. ONE COAT OF DTM BONDING PRIMER (2–5 MILS. DRY FINISH)
   B. TWO COATS OF DTM ACRYLIC PRIMER/FINISH (2.5–5 MILS. DRY FINISH)
   C. COLOR TO BE FIELD MATCHED WITH EXISTING STRUCTURE.

EXAMINATION AND PREPARATION:

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

CLEANING:

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

APPLICATION:

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

COMPLETED WORK:

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/30/16	KAW	JTD	CONSTRUCTION DOCUMENTS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

at&t

EMPIRE telecom

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

AT&T MOBILITY

WIRELESS COMMUNICATIONS FACILITY

PORTLAND

CT5836 - LTE BWE

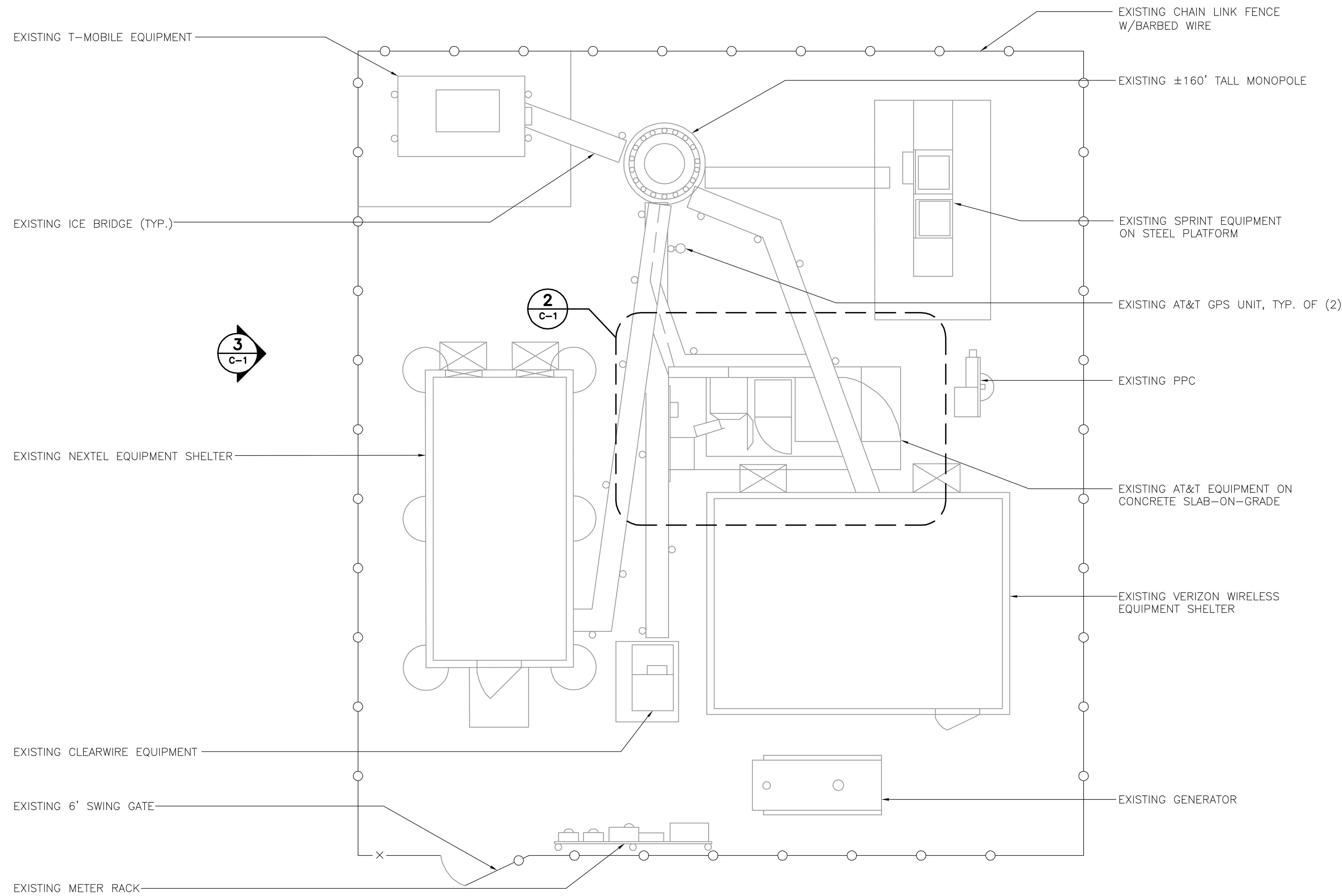
74 GOODRICH LANE
PORTLAND, CT 06480

DATE: 11/17/16
SCALE: AS NOTED
JOB NO. 16071.81

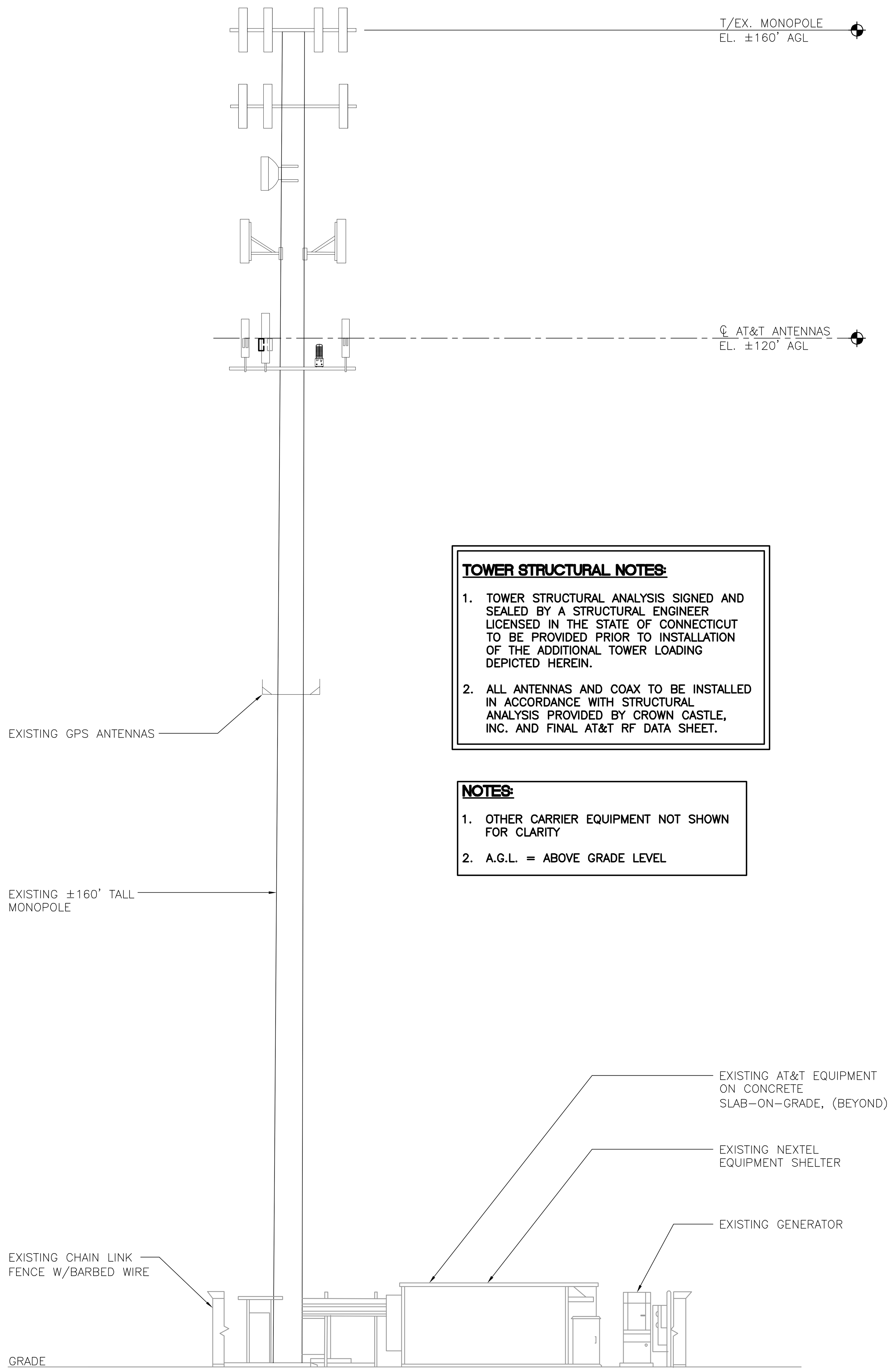
NOTES AND SPECIFICATIONS

N–1

Sheet No. 2 of 5



1 C–1 **COMPOUND PLAN**
SCALE: 3/16" = 1'–0"
NORTH



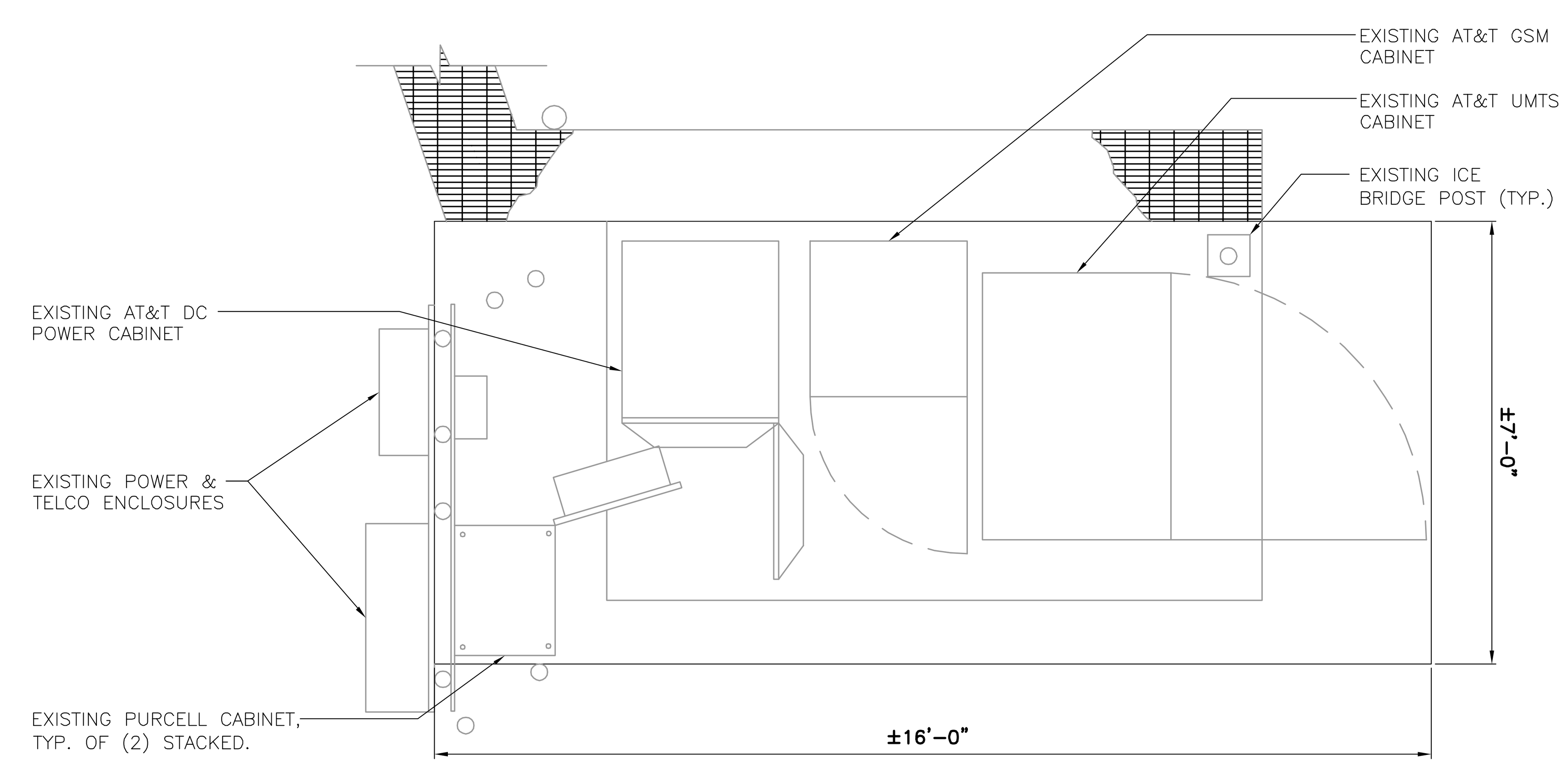
TOWER STRUCTURAL NOTES:

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

3 C–1 **WEST ELEVATION**
SCALE: 1" = 10'



2 C–1 **EQUIPMENT LAYOUT PLAN**
SCALE: 1/8" = 1'–0"
NORTH

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/30/16	KAW	JTD	CONSTRUCTION DOCUMENTS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

at&t

EMPIRE telecom

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

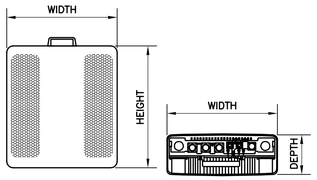
AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
PORTLAND
CT5836 – LTE BWE
74 GOODRICH LANE
PORTLAND, CT 06480

DATE: 11/17/16
SCALE: AS NOTED
JOB NO. 16071.81

PLANS AND ELEVATION

C–1

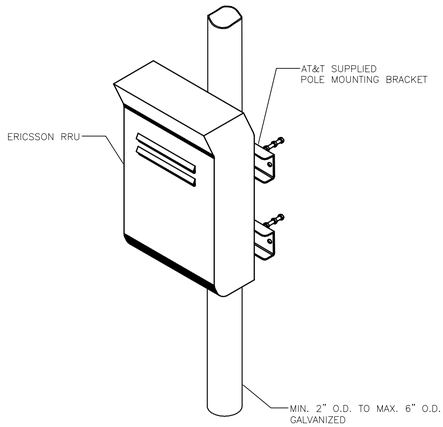
Sheet No. 3 of 6



RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 12	20.4"L x 18.5"W x 7.5"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.

5 C-2 ERICSSON RRUS 12 DETAIL
SCALE: 1" = 1'-0"

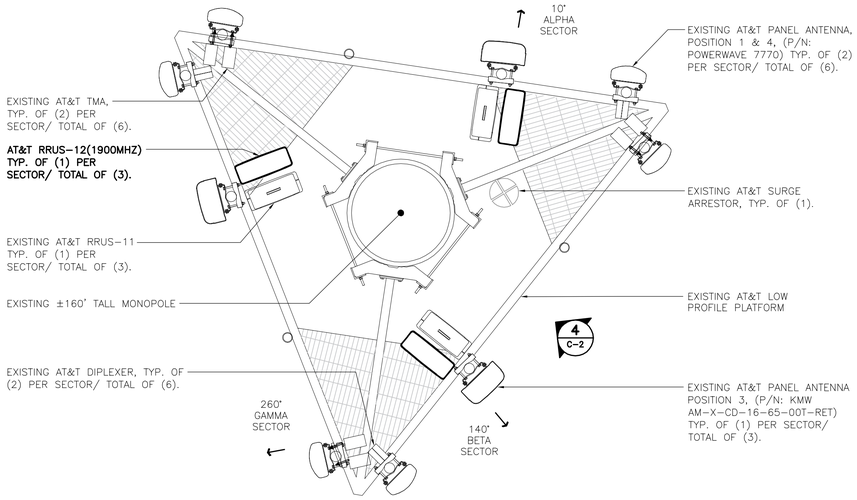


ISOMETRIC VIEW

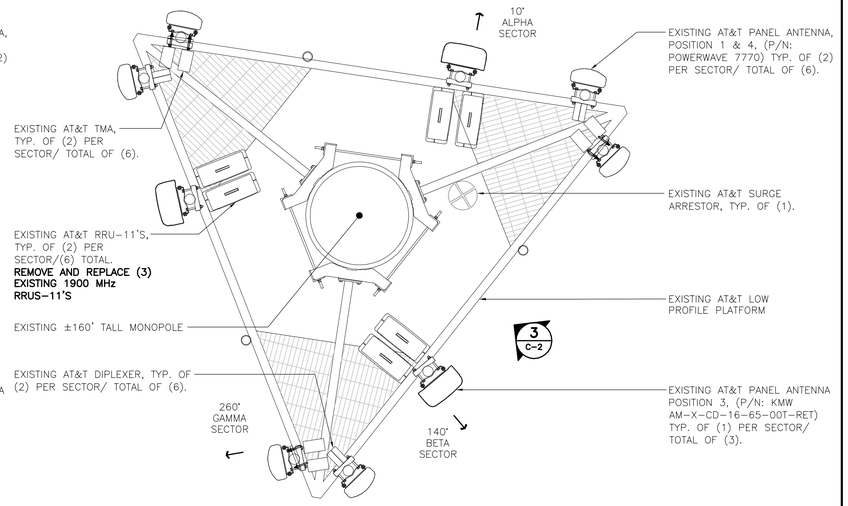
NOTES:

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

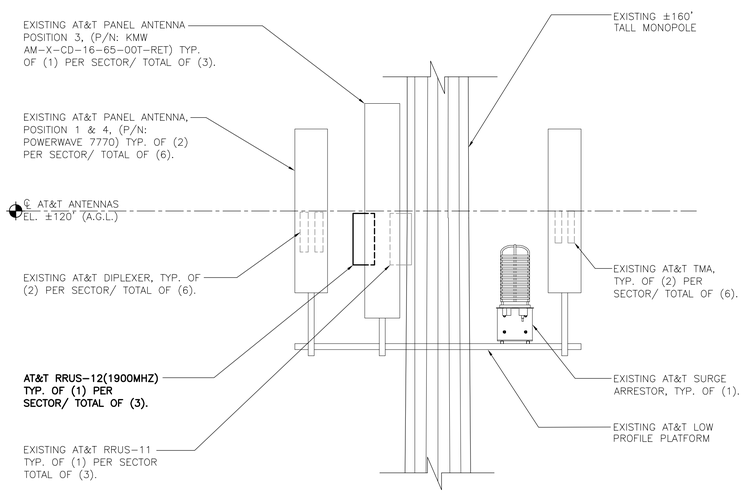
6 C-2 EQUIPMENT ELEVATION
SCALE: 3/4" = 1'-0"



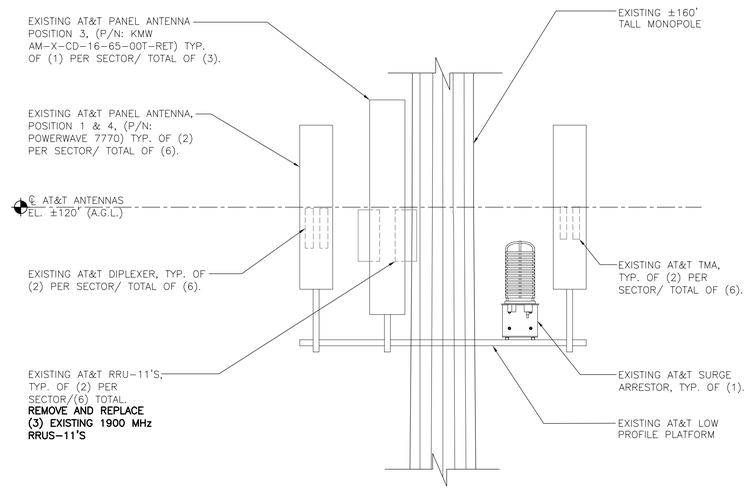
2 C-2 PROPOSED ANTENNA PLAN
SCALE: 1/2" = 1'-0" NORTH



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



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



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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/30/16	KAW	JTD	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

at&t

EMPIRE telecom

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

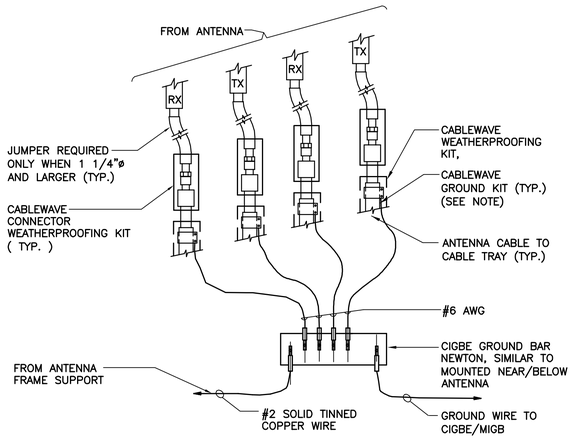
AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
PORTLAND
CT5836 - LTE BWE
74 GOODRICH LANE
PORTLAND, CT 06480

DATE: 11/17/16
SCALE: AS NOTED
JOB NO. 16071.81

LTE BWE EQUIPMENT DETAILS

C-2

Sheet No. 4 of 5

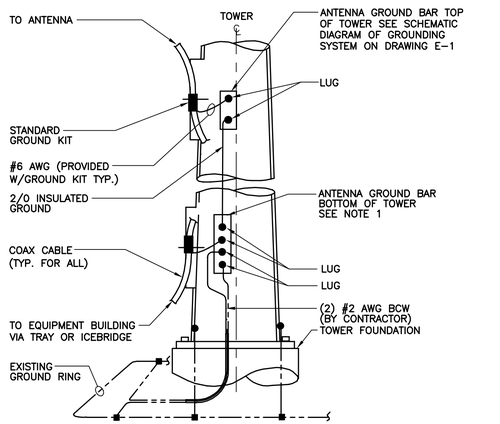


NOTE:

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

5 E-1 CONNECTION OF GROUND WIRES TO GROUND BAR

NOT TO SCALE

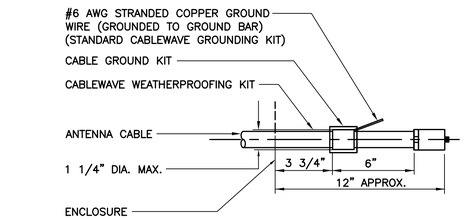


NOTES:

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-1 ANTENNA CABLE GROUNDING - TOWER

NOT TO SCALE

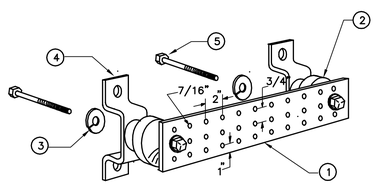


NOTE:

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

4 E-1 ANTENNA CABLE GROUNDING DETAIL

NOT TO SCALE

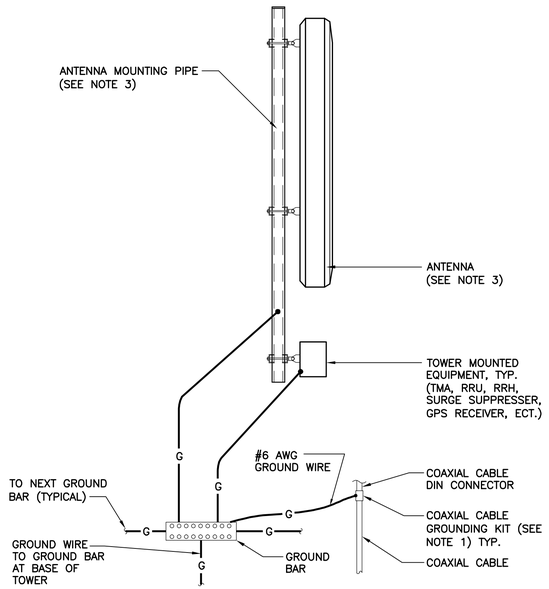


LEGEND

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

3 E-1 GROUND BAR DETAIL

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-1 TYPICAL ANTENNA GROUNDING DETAIL

NOT TO SCALE

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.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/30/16	KAW	JTD	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

at&t

EMPIRE telecom

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

AT&T MOBILITY

WIRELESS COMMUNICATIONS FACILITY

PORTLAND

CT5836 - LTE BWE

74 GOODRICH LANE

PORTLAND, CT 06480

DATE:	11/17/16
SCALE:	AS NOTED
JOB NO.	16071.81

TYPICAL ELECTRICAL DETAILS AND NOTES

E-1

Sheet No. 5 of 5

December 08, 2016

Kevin Morrow
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6619

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	10071206
	Carrier Site Name:	CT5836
Crown Castle Designation:	**Crown Castle BU Number:**	806382
	Crown Castle Site Name:	HRT 082 943274
	Crown Castle JDE Job Number:	410781
	Crown Castle Work Order Number:	1333375
	Crown Castle Application Number:	370113 Rev. 0
Engineering Firm Designation:	**B+T Group Project Number:**	81363.015.01
Site Data:	**74 Goodrich Lane, Portland, Middlesex County, CT** **Latitude *41° 36' 29.9"*, Longitude *-72° 35' 29.56"*** **160 Foot - Monopole**	

Dear Kevin Morrow,

B+T Group 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 978214, in accordance with application 370113, revision 0.

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 1 and Table 2 for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2012 International Building Code based upon an ultimate 3-second gust wind speed of 130 mph converted to a nominal 3-second gust wind speed of 101 mph per section 1609.3.1 as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B and Risk Category II were used in this analysis.

All equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *B+T Group* 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:
B+T Engineering, Inc.

Jennifer Tillson, E.I.
Project Engineer

Scott S. Vance, P.E.
Engineer of Record
COA: PEC.0001564 Expires: 02/10/2017

12/8/16

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA
Table 1 - Proposed Antenna and Cable Information
Table 2 - Existing and Reserved Antenna and Cable Information
Table 3 - Design Antenna and Cable Information

3) ANALYSIS PROCEDURE
Table 4 - Documents Provided
3.1) Analysis Method
3.2) Assumptions

4) ANALYSIS RESULTS
Table 5 - Section Capacity (Summary)
Table 6 – Tower Components vs. Capacity
4.1) Recommendations

5) APPENDIX A
tnxTower Output

6) APPENDIX B
Base Level Drawing

7) APPENDIX C
Additional Calculations

1) INTRODUCTION

This tower is a 160 ft. Monopole designed by Valmont in January of 1998. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. This tower has been modified by B+T Group in May of 2013 and those modifications were incorporated in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 101 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category B with topographic category 1 and crest height of 0 feet.

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
116.0	120.0	3	Ericsson	RRUS 11	--	--	--
		3	Ericsson	RRUS 12			
		3	Powerwave Tech.	1001983			
		12	Powerwave Tech.	7020.00			
		6	Powerwave Tech.	LGP13519			

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
160.0	160.0	3	Alcatel Lucent	RRH2X60-AWS	--	--	2
		3	Alcatel Lucent	RRH2X60-PCS			
		3	Alcatel Lucent	RRH2x60-700			
		6	Andrew	SBNHH-1D65B			
		1	RFS Celwave	DB-B1-6C-8AB-0Z			
		3	Andrew	HBXX-6517DS-A2M	11 2 1	1-5/8 1-1/4 1/2	1
		2	Decibel	DB846F65ZAXY			
		4	Decibel	DB846H80E-SX			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		2	RFS Celwave	FD9R6004/2C-3L			
		1	--	Platform Mount [LP 713-1]			
150.0	152.0	3	Alcatel Lucent	1900MHz RRH	4 3 1 1	17/64 1-1/4 7/8 1/8	2
		3	Alcatel Lucent	800MHZ RRH			
		3	Argus Tech.	LLPX310R-V1			
		1	Box Enclosures And Assembly	BEN-92P			
		3	Nokia	FWHR			
		3	RFS Celwave	APXVSPP18-C-A20			
	150.0	1	--	Platform Mount [LP 713-1]	--	--	1
142.0	144.0	2	Radiowaves	HP3-11	2	1/2	1
	142.0	1	--	Side Arm Mount [SO 101-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
134.0	137.0	3	Commscope	SBNH-1D65C-SR	1	1-5/8	1
		3	Ericsson	ERICSSON AIR 21 B4A B2P			
		3	Ericsson	RRUS 11 B12			
		3	Ericsson	RRUS 11 B2			
	134.0	1	--	T-Arm Mount [TA 602-3]			
116.0	120.0	**3**	**Ericsson**	**RRUS-11**	**--**	**--**	**4**
		6	**Powerwave Tech.**	**LGP21901**			
		3	KMW Comm.	AM-X-CD-16-65-00T-RET	12 2 1	1-1/4 3/4 3/8	1
		6	Powerwave Tech.	7770.00			
		6	Powerwave Tech.	LGP21401			
		1	Raycap	DC6-48-60-18-8F			
	116.0	1	--	Platform Mount [LP 303-1]			
61.0	61.0	2	Lucent	KS24019-L112A	2	1/2	1
		2	--	Side Arm Mount [SO 701-1]			
50.0	50.0	2	--	Side Arm Mount [SO 701-1]	--	--	3

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Empty Mount; Considered in This Analysis
4) Equipment To Be Removed; Not Considered in This Analysis

Table 3 - Design 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)
157	157	12	Swedcom	ALP 9212-N	--	--
		1	Valmont	Cellular Platform		
148	148	12	Swedcom	ALP 9212-N	--	--
		1	Valmont	Cellular Platform		
138	138	12	Swedcom	ALP 9212-N	--	--
		1	Valmont	Cellular Platform		
128	128	12	Swedcom	ALP 9212-N	--	--
		1	Valmont	Cellular Platform		
60	60	2	Generic	GPS	--	--
		2	Generic	Short Straight Arm		
50	50	2	Generic	GPS	--	--
		2	Generic	Short Straight Arm		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	AT&T Mobility Co-locate, Rev# 0	370113	CCI Sites
Tower Manufacturer Drawing	Valmont, Order No: 16750-98	255193	CCI Sites
Tower Modification Drawing	B+T Group, Date: 05/29/2013	3865159	CCI Sites
Post Modification Inspection	TEP, Date: 09/17/2013	3996803	CCI Sites
Foundation Drawing	Valmont, Order No: 16750-98	301226	CCI Sites
Geotech Report	TGG, Project No. 067058	1041653	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 12/05/2016	CCI Sites

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) Mount areas and weights are assumed based on photographs provided.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 123.667	Pole	TP29.05x18.87x0.188	1	-9.875	965.169	84.8	Pass
L2	123.667 - 76.25	Pole	TP41.95x27.461x0.313	2	-21.725	2534.090	80.8	Pass
L3	76.25 - 51	Pole	TP48.398x39.715x0.344	3	-31.113	3182.680	85.6	Pass
L4	51 - 37	Pole	TP52.32x48.398x0.433	4	-33.690	3100.280	92.8	Pass
L5	37 - 0	Pole	TP62x49.672x0.406	5	-51.768	4570.550	80.3	Pass
							Summary	
						Pole (L4)	92.8	Pass
						Rating =	92.8	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	77.7	Pass
1	Base Plate	Base	42.0	Pass
1	Base Foundation (Structural)	Base	50.7	Pass
1	Base Foundation (Soil Interaction)	Base	69.0	Pass

Structure Rating (max from all components) =	92.8%

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

4.1) Recommendations

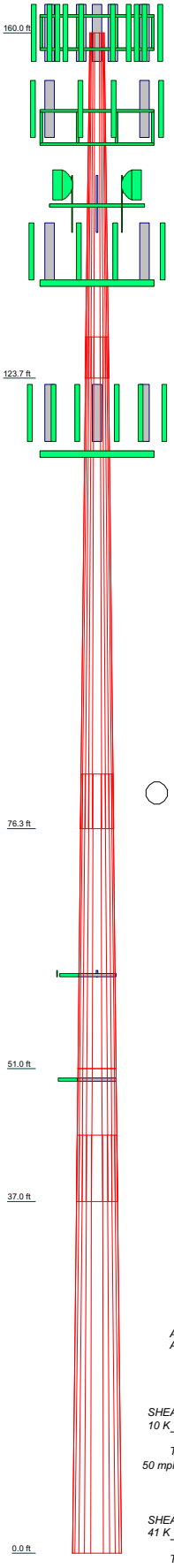
The tower and its foundation have sufficient capacity to carry the Final load configurations. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	36.333	12	0.188	4.333	18.870	29.050	A572-65	1.8
2	51.750	12	0.313	5.750	27.461	41.950	A572-65	6.1
3	31.000	12	0.344		39.715	48.398	A572-65	5.1
4	14.000	12	0.433	7.000	48.398	52.320	A572-65	3.3
5	44.000	12	0.406		49.672	62.000	A572-65	10.9

40.076028ksi



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) DB846H80E-SX w/ Mount Pipe (E)	160	SBNH-1D65C-SR w/ Mount Pipe (E)	134
(2) DB846H80E-SX w/ Mount Pipe (E)	160	ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	134
(2) DB846F65ZAXY w/ Mount Pipe (E)	160	ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	134
HBXX-6517DS-A2M w/ Mount Pipe (E)	160	ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	134
HBXX-6517DS-A2M w/ Mount Pipe (E)	160	RRUS 11 B12 (E)	134
HBXX-6517DS-A2M w/ Mount Pipe (E)	160	RRUS 11 B12 (E)	134
(2) FD9R6004/2C-3L (E)	160	RRUS 11 B12 (E)	134
DB-T1-6Z-8AB-0Z (E)	160	RRUS 11 B2 (E)	134
(2) SBNHH-1D65B w/ Mount Pipe (R)	160	RRUS 11 B2 (E)	134
(2) SBNHH-1D65B w/ Mount Pipe (R)	160	RRUS 11 B2 (E)	134
(2) SBNHH-1D65B w/ Mount Pipe (R)	160	T-Arm Mount [TA 602-3] (E)	134
DB-B1-6C-8AB-0Z (R)	160	SBNH-1D65C-SR w/ Mount Pipe (E)	134
RRH2x60-700 (R)	160	SBNH-1D65C-SR w/ Mount Pipe (E)	134
RRH2x60-700 (R)	160	AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	116
RRH2x60-700 (R)	160	(2) 7770.00 w/ Mount Pipe (E)	116
RRH2X60-PCS (R)	160	(2) 7770.00 w/ Mount Pipe (E)	116
RRH2X60-PCS (R)	160	(2) 7770.00 w/ Mount Pipe (E)	116
RRH2X60-PCS (R)	160	(2) LGP21401 (E)	116
RRH2X60-AWS (R)	160	(2) LGP21401 (E)	116
RRH2X60-AWS (R)	160	(2) LGP21401 (E)	116
RRH2X60-AWS (R)	160	DC6-48-60-18-8F (E)	116
Platform Mount [LP 713-1] (E)	160	RRUS 11 (P)	116
LLPX310R-V1 w/ Mount Pipe (R)	150	RRUS 11 (P)	116
LLPX310R-V1 w/ Mount Pipe (R)	150	RRUS 11 (P)	116
LLPX310R-V1 w/ Mount Pipe (R)	150	RRUS 12 (P)	116
APXVSPP18-C-A20 w/ Mount Pipe (R)	150	RRUS 12 (P)	116
APXVSPP18-C-A20 w/ Mount Pipe (R)	150	RRUS 12 (P)	116
APXVSPP18-C-A20 w/ Mount Pipe (R)	150	(2) LGP13519 (P)	116
1900MHz RRH (R)	150	(2) LGP13519 (P)	116
1900MHz RRH (R)	150	(2) LGP13519 (P)	116
1900MHz RRH (R)	150	(4) 7020.00 (P)	116
800MHZ RRH (R)	150	(4) 7020.00 (P)	116
800MHZ RRH (R)	150	(4) 7020.00 (P)	116
800MHZ RRH (R)	150	1001983 (P)	116
FWHR (R)	150	1001983 (P)	116
FWHR (R)	150	1001983 (P)	116
FWHR (R)	150	3' x 2" Pipe Mount (E-For TMA)	116
BEN-92P (R)	150	3' x 2" Pipe Mount (E-For TMA)	116
(2) 6' x 2" Mount Pipe (E-Empty)	150	(2) 3' x 2" Pipe Mount (E-For TMA)	116
(2) 6' x 2" Mount Pipe (E-Empty)	150	Platform Mount [LP 303-1] (E)	116
(2) 6' x 2" Mount Pipe (E-Empty)	150	AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	116
Platform Mount [LP 713-1] (E)	150	AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	116
4' x 2" Horizontal Face Mount Pipe (E-Dish Tie Back)	145	2' x 2" Pipe Mount (E)	61
		2' x 2" Pipe Mount (E)	61
4' x 2" Horizontal Face Mount Pipe (E-Dish Tie Back)	145	Side Arm Mount [SO 701-1] (E)	61
		Side Arm Mount [SO 701-1] (E)	61
J-Box - 1' x 1' x 4" (E-Per Photo)	145	KS24019-L112A (E)	61
(2) 6' x 3" Mount Pipe (E)	142	KS24019-L112A (E)	61
(2) 6' x 3" Mount Pipe (E)	142	Side Arm Mount [SO 701-1] (E-Empty)	50
(2) 6' x 3" Mount Pipe (E)	142	Side Arm Mount [SO 701-1] (E-Empty)	50
Side Arm Mount [SO 101-3] (E)	142	2' x 2" Pipe Mount (E-Empty)	50
Radiowaves HP3-11 (E)	142	2' x 2" Pipe Mount (E-Empty)	50
Radiowaves HP3-11 (E)	142		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	40.076028ksi	40 ksi	55 ksi

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 101 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 0.000 ft
8. TOWER RATING: 92.8%

B+T Group
717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

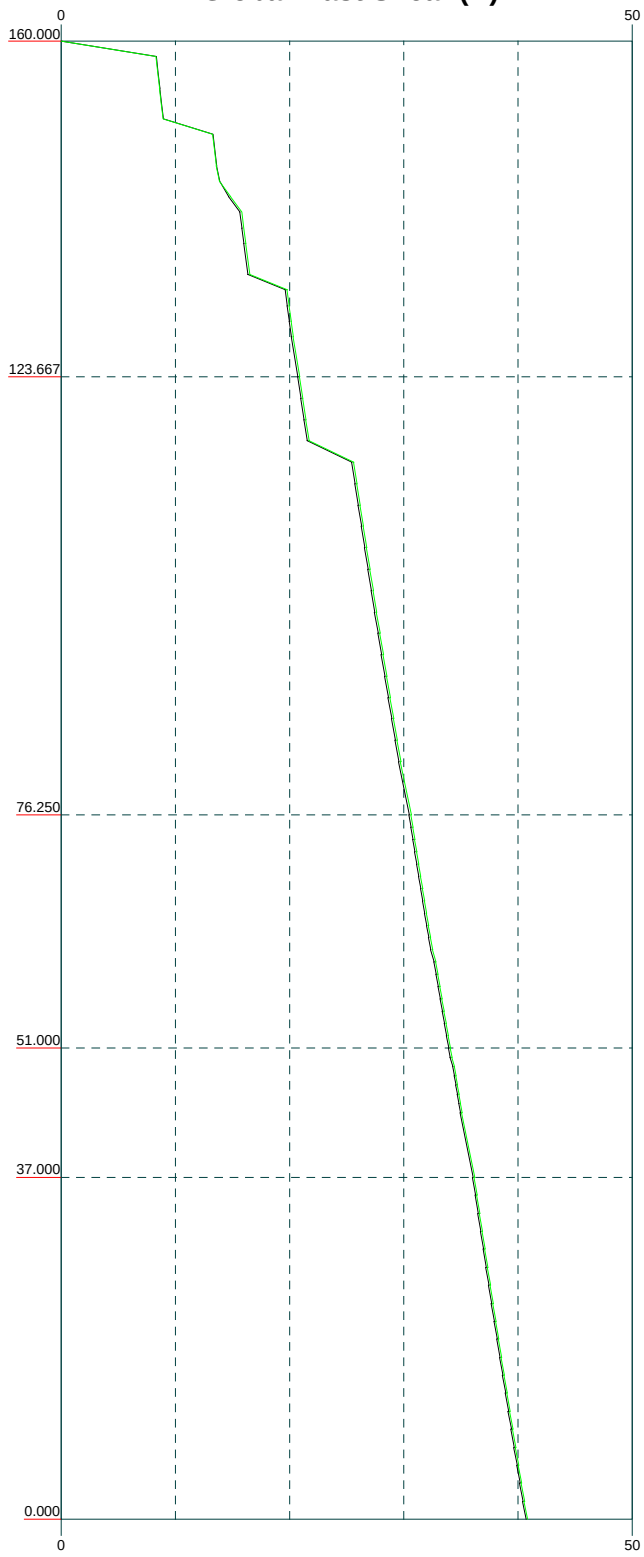
Job: 81363.015.01 - HRT 082 943274, CT (BU# 80638			
Project:			
Client: Crown Castle	Drawn by: Sunil Kamath	App'd:	
Code: TIA-222-G	Date: 12/07/16	Scale: NTS	
Path:		Dwg No. E-1	

TIA-222-G - 101 mph/50 mph 0.750 in Ice Exposure B

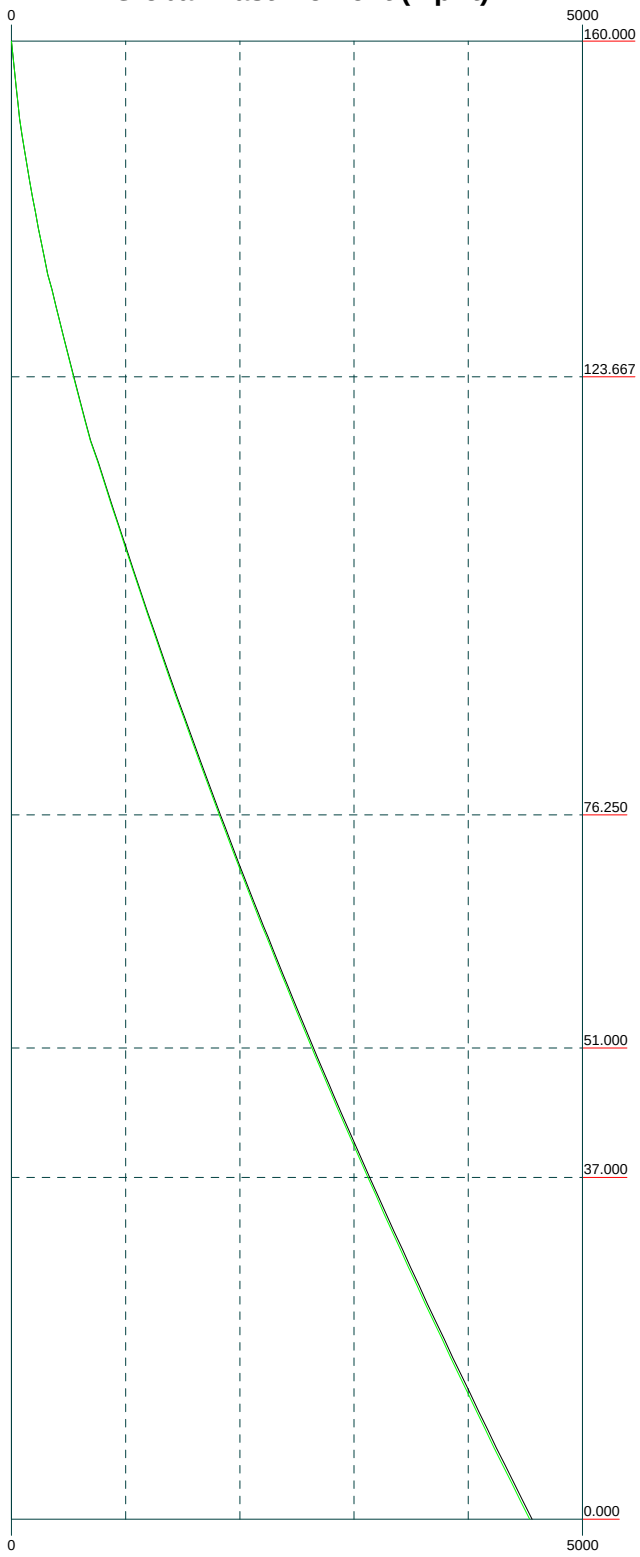
Maximum Values

Vx Vz Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)

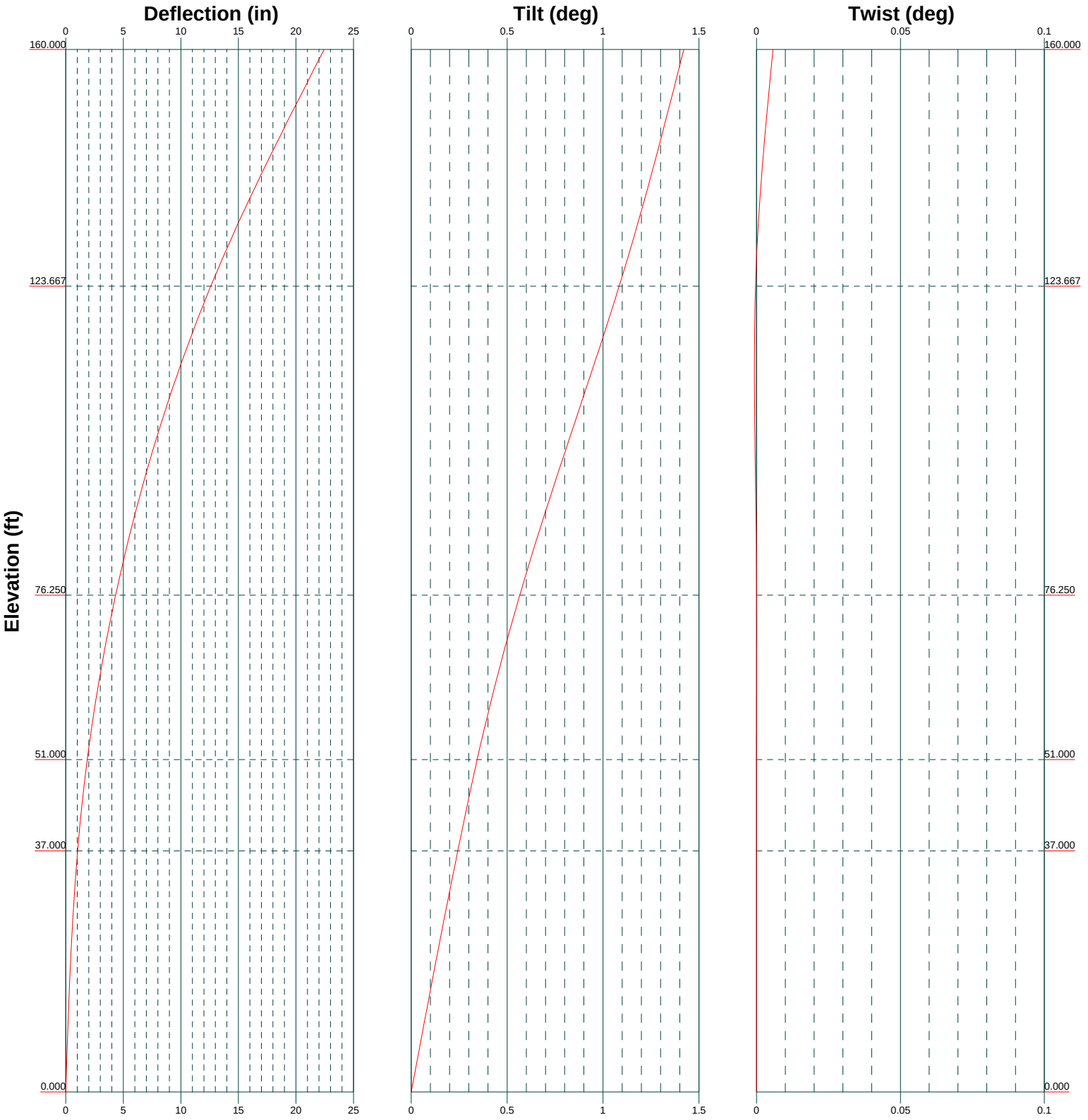


B+T Group
717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 81363.015.01 - HRT 082 943274, CT (BU# 806382			
Project:			
Client: Crown Castle	Drawn by: Sunil Kamath	App'd:	
Code: TIA-222-G	Date: 12/07/16	Scale: NTS	
Path:		Dwg No. E-4	

TIA-222-G - Service - 60 mph

Maximum Values

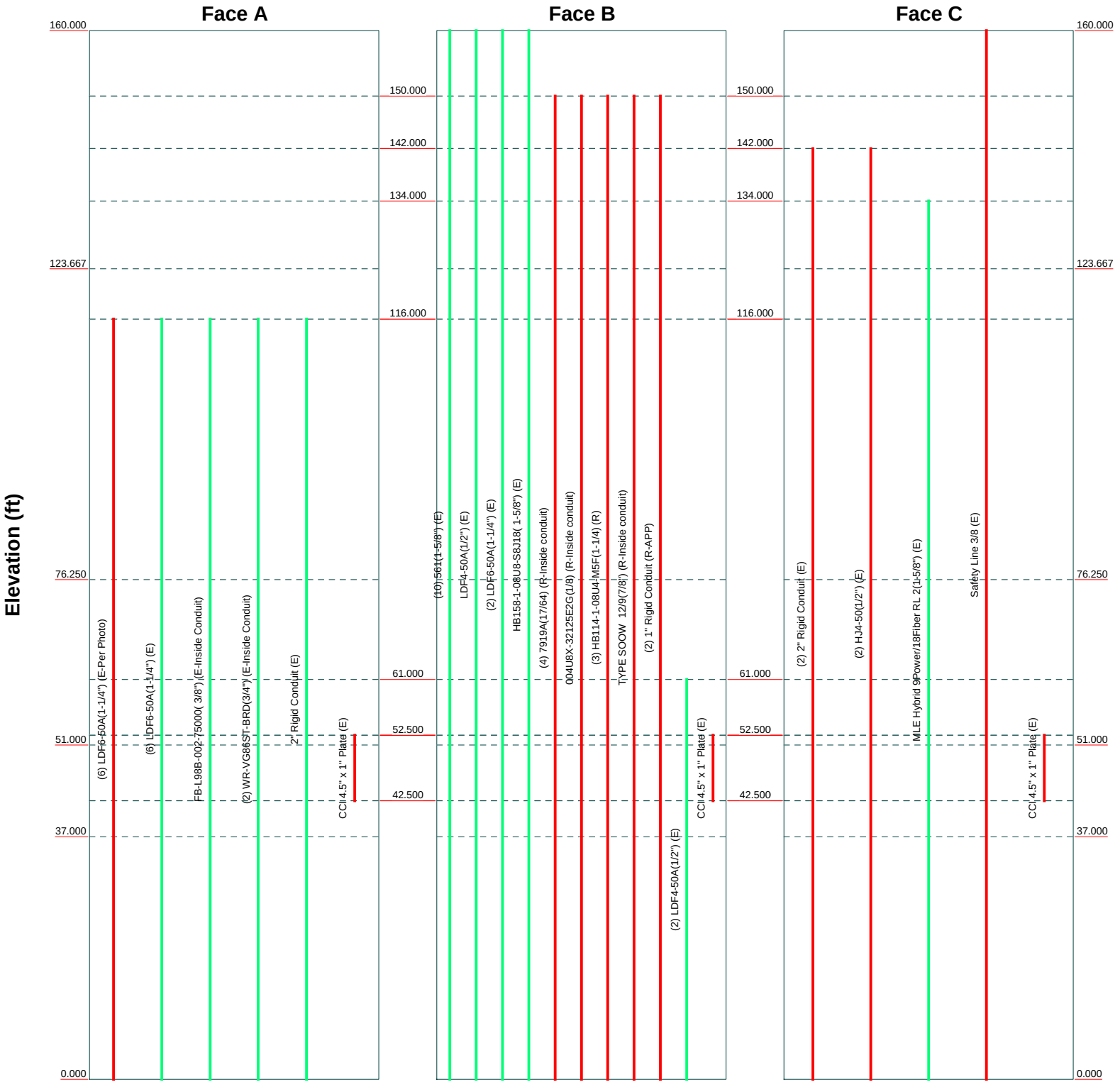


B+T Group
717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 81363.015.01 - HRT 082 943274, CT (BU# 806382			
Project:			
Client: Crown Castle	Drawn by: Sunil Kamath	App'd:	
Code: TIA-222-G	Date: 12/07/16	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 160'

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



B+T Group
717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 81363.015.01 - HRT 082 943274, CT (BU# 806382			
Project:			
Client: Crown Castle	Drawn by: Sunil Kamath	App'd:	
Code: TIA-222-G	Date: 12/07/16	Scale: NTS	
Path:		Dwg No. E-7	

Tower Input Data

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

Tower is located in Middlesex County, Connecticut.
Basic wind speed of 101 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		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	160.000-123.667	36.333	4.333	12	18.870	29.050	0.188	0.750	A572-65 (65 ksi)
L2	123.667-76.250	51.750	5.750	12	27.461	41.950	0.313	1.250	A572-65 (65 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
L3	76.250-51.000	31.000	0.000	12	39.715	48.398	0.344	1.375	A572-65 (65 ksi)
L4	51.000-37.000	14.000	7.000	12	48.398	52.320	0.433	1.731	40.076028ksi (40 ksi)
L5	37.000-0.000	44.000		12	49.672	62.000	0.406	1.625	A572-65 (65 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	19.536	11.280	502.514	6.688	9.775	51.410	1018.229	5.551	4.555	24.292
	30.075	17.426	1852.870	10.333	15.048	123.131	3754.417	8.576	7.283	38.842
L2	29.686	27.318	2569.965	9.719	14.225	180.668	5207.445	13.445	6.522	20.871
	43.430	41.898	9271.410	14.906	21.730	426.662	18786.390	20.621	10.405	33.296
L3	42.784	43.579	8622.350	14.095	20.572	419.122	17471.219	21.448	9.722	28.283
	50.106	53.191	15678.080	17.204	25.070	625.362	31768.040	26.179	12.050	35.053
L4	50.106	66.843	19629.140	17.172	25.070	782.960	39773.960	32.898	11.811	27.291
	54.166	72.308	24847.930	18.576	27.102	916.838	50348.643	35.588	12.862	29.719
L5	53.454	64.445	19964.737	17.637	25.730	775.933	40453.969	31.718	12.223	30.088
	64.187	80.572	39016.215	22.051	32.116	1214.853	79057.429	39.655	15.527	38.221

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 160.000-123.667				1	1	1			
L2 123.667-76.250				1	1	1			
L3 76.250-51.000				1	1	1			
L4 51.000-37.000				1	1	0.987468			
L5 37.000-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
7919A(17/64) (R-Inside conduit)	B	Surface Ar (CaAa)	150.000 - 0.000	4	2	0.350 0.420	0.000		0.000
004U8X-32125E2G(1/8) (R-Inside conduit)	B	Surface Ar (CaAa)	150.000 - 0.000	1	1	0.350 0.420	0.000		0.000
HB114-1-08U4-M5F(1-1/4) (R)	B	Surface Ar (CaAa)	150.000 - 0.000	3	3	0.200 0.350	1.540		0.001
TYPE SOOW 12/9(7/8")	B	Surface Ar	150.000 - 0.000	1	1	0.420	0.000		0.001

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
(R-Inside conduit)		(CaAa)				0.500			
1" Rigid Conduit	B	Surface Ar	150.000 - 0.000	2	2	0.350	1.000		0.001
(R-APP)		(CaAa)				0.500			
s									
2" Rigid Conduit	C	Surface Ar	142.000 - 0.000	2	2	0.100	2.000		0.003
(E)		(CaAa)				0.200			
HJ4-50(1/2")	C	Surface Ar	142.000 - 0.000	2	2	0.200	0.580		0.000
(E)		(CaAa)				0.250			
s									
LDF6-50A(1-1/4")	A	Surface Ar	116.000 - 0.000	6	6	-0.490	1.550		0.001
(E-Per Photo)		(CaAa)				-0.350			
s									
Safety Line 3/8	C	Surface Ar	160.000 - 0.000	1	1	-0.490	0.375		0.000
(E)		(CaAa)				-0.480			
s									
CCI 4.5" x 1" Plate	A	Surface Af	52.500 - 42.500	1	1	0.450	4.500	11.000	0.000
(E)		(CaAa)				0.500			
CCI 4.5" x 1" Plate	B	Surface Af	52.500 - 42.500	1	1	0.450	4.500	11.000	0.000
(E)		(CaAa)				0.500			
CCI 4.5" x 1" Plate	C	Surface Af	52.500 - 42.500	1	1	0.450	4.500	11.000	0.000
(E)		(CaAa)				0.500			
s									

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 klf
561(1-5/8")	B	No	Inside Pole	160.000 - 0.000	10	No Ice	0.000	0.001
(E)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
LDF4-50A(1/2")	B	No	Inside Pole	160.000 - 0.000	1	No Ice	0.000	0.000
(E)						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
LDF6-50A(1-1/4")	B	No	Inside Pole	160.000 - 0.000	2	No Ice	0.000	0.001
(E)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
HB158-1-08U8-S8J18(	B	No	Inside Pole	160.000 - 0.000	1	No Ice	0.000	0.001
1-5/8")						1/2" Ice	0.000	0.001
(E)						1" Ice	0.000	0.001
s								
s								
MLE Hybrid	C	No	Inside Pole	134.000 - 0.000	1	No Ice	0.000	0.001
9Power/18Fiber RL						1/2" Ice	0.000	0.001
2(1-5/8")						1" Ice	0.000	0.001
(E)								
LDF6-50A(1-1/4")	A	No	Inside Pole	116.000 - 0.000	6	No Ice	0.000	0.001
(E)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
FB-L98B-002-75000(	A	No	Inside Pole	116.000 - 0.000	1	No Ice	0.000	0.000
3/8")						1/2" Ice	0.000	0.000
(E-Inside Conduit)						1" Ice	0.000	0.000
WR-VG86ST-BRD(3/4")	A	No	Inside Pole	116.000 - 0.000	2	No Ice	0.000	0.001
(E-Inside Conduit)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
2" Rigid Conduit	A	No	Inside Pole	116.000 - 0.000	1	No Ice	0.000	0.003
(E)						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.003

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
S								
LDF4-50A(1/2") (E)	B	No	Inside Pole	61.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
S								

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	160.000-123.667	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	17.432	0.000	0.725
		C	0.000	0.000	10.822	0.000	0.131
L2	123.667-76.250	A	0.000	0.000	36.968	0.000	0.475
		B	0.000	0.000	31.390	0.000	1.012
		C	0.000	0.000	26.245	0.000	0.350
L3	76.250-51.000	A	0.000	0.000	24.608	0.000	0.302
		B	0.000	0.000	17.840	0.000	0.542
		C	0.000	0.000	15.101	0.000	0.187
L4	51.000-37.000	A	0.000	0.000	19.395	0.000	0.167
		B	0.000	0.000	15.643	0.000	0.303
		C	0.000	0.000	14.124	0.000	0.103
L5	37.000-0.000	A	0.000	0.000	34.410	0.000	0.442
		B	0.000	0.000	24.494	0.000	0.801
		C	0.000	0.000	20.480	0.000	0.273

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	160.000-123.667	A	1.734	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	74.304	0.000	1.517
		C		0.000	0.000	41.684	0.000	0.599
L2	123.667-76.250	A	1.674	0.000	0.000	63.442	0.000	1.207
		B		0.000	0.000	133.797	0.000	2.438
		C		0.000	0.000	89.920	0.000	1.352
L3	76.250-51.000	A	1.601	0.000	0.000	41.340	0.000	0.765
		B		0.000	0.000	70.922	0.000	1.277
		C		0.000	0.000	48.240	0.000	0.709
L4	51.000-37.000	A	1.543	0.000	0.000	29.571	0.000	0.479
		B		0.000	0.000	44.328	0.000	0.739
		C		0.000	0.000	32.575	0.000	0.438
L5	37.000-0.000	A	1.411	0.000	0.000	57.290	0.000	1.039
		B		0.000	0.000	96.292	0.000	1.727
		C		0.000	0.000	65.228	0.000	0.931

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	160.000-123.667	0.476	0.404	0.883	0.635
L2	123.667-76.250	-0.231	0.804	0.412	0.986
L3	76.250-51.000	-0.350	0.871	0.375	1.150
L4	51.000-37.000	-0.306	0.763	0.335	1.109
L5	37.000-0.000	-0.384	0.956	0.409	1.347

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	8	7919A(17/64)	123.67 - 150.00	1.0000	1.0000
L1	9	004U8X-32125E2G(1/8)	123.67 - 150.00	1.0000	1.0000
L1	10	HB114-1-08U4-M5F(1-1/4)	123.67 - 150.00	1.0000	1.0000
L1	11	TYPE SOOW 12/9(7/8")	123.67 - 150.00	1.0000	1.0000
L1	12	1" Rigid Conduit	123.67 - 150.00	1.0000	1.0000
L1	14	2" Rigid Conduit	123.67 - 142.00	1.0000	1.0000
L1	15	HJ4-50(1/2")	123.67 - 142.00	1.0000	1.0000
L1	27	Safety Line 3/8	123.67 - 160.00	1.0000	1.0000
L1	19	LDF6-50A(1-1/4")	123.67 - 116.00	1.0000	1.0000
L2	8	7919A(17/64)	76.25 - 123.67	1.0000	1.0000
L2	9	004U8X-32125E2G(1/8)	76.25 - 123.67	1.0000	1.0000
L2	10	HB114-1-08U4-M5F(1-1/4)	76.25 - 123.67	1.0000	1.0000
L2	11	TYPE SOOW 12/9(7/8")	76.25 - 123.67	1.0000	1.0000
L2	12	1" Rigid Conduit	76.25 - 123.67	1.0000	1.0000
L2	14	2" Rigid Conduit	76.25 - 123.67	1.0000	1.0000
L2	15	HJ4-50(1/2")	76.25 - 123.67	1.0000	1.0000
L2	19	LDF6-50A(1-1/4")	76.25 - 116.00	1.0000	1.0000
L2	27	Safety Line 3/8	76.25 - 123.67	1.0000	1.0000
L2	29	CCI 4.5" x 1" Plate	76.25 - 52.50	1.0000	1.0000
L2	30	CCI 4.5" x 1" Plate	76.25 - 52.50	1.0000	1.0000
L2	31	CCI 4.5" x 1" Plate	76.25 - 52.50	1.0000	1.0000
L4	8	7919A(17/64)	37.00 - 51.00	1.0000	1.0000
L4	9	004U8X-32125E2G(1/8)	37.00 - 51.00	1.0000	1.0000
L4	10	HB114-1-08U4-M5F(1-1/4)	37.00 - 51.00	1.0000	1.0000
L4	11	TYPE SOOW 12/9(7/8")	37.00 - 51.00	1.0000	1.0000
L4	12	1" Rigid Conduit	37.00 - 51.00	1.0000	1.0000
L4	14	2" Rigid Conduit	37.00 - 51.00	1.0000	1.0000
L4	15	HJ4-50(1/2")	37.00 - 51.00	1.0000	1.0000
L4	19	LDF6-50A(1-1/4")	37.00 - 51.00	1.0000	1.0000
L4	27	Safety Line 3/8	37.00 - 51.00	1.0000	1.0000
L4	29	CCI 4.5" x 1" Plate	42.50 - 51.00	1.0000	1.0000
L4	30	CCI 4.5" x 1" Plate	42.50 - 51.00	1.0000	1.0000
L4	31	CCI 4.5" x 1" Plate	42.50 - 51.00	1.0000	1.0000

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
(2) DB846H80E-SX w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	5.331 5.888 6.412	7.735 8.930 9.843	0.041 0.099 0.165
(2) DB846H80E-SX w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	5.331 5.888 6.412	7.735 8.930 9.843	0.041 0.099 0.165
(2) DB846F65ZAXY w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	7.271 7.832 8.348	7.821 9.010 9.912	0.047 0.114 0.189
HBXX-6517DS-A2M w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	8.765 9.342 9.889	6.963 8.182 9.144	0.067 0.137 0.215
HBXX-6517DS-A2M w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	8.765 9.342 9.889	6.963 8.182 9.144	0.067 0.137 0.215
HBXX-6517DS-A2M w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	8.765 9.342 9.889	6.963 8.182 9.144	0.067 0.137 0.215
(2) FD9R6004/2C-3L (E)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	0.314 0.386 0.466	0.076 0.119 0.169	0.003 0.005 0.009
DB-T1-6Z-8AB-0Z (E)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	4.800 5.070 5.348	2.000 2.193 2.393	0.044 0.080 0.120
(2) SBNHH-1D65B w/ Mount Pipe (R)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	8.397 8.960 9.490	7.071 8.260 9.170	0.066 0.135 0.212
(2) SBNHH-1D65B w/ Mount Pipe (R)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	8.397 8.960 9.490	7.071 8.260 9.170	0.066 0.135 0.212
(2) SBNHH-1D65B w/ Mount Pipe (R)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	8.397 8.960 9.490	7.071 8.260 9.170	0.066 0.135 0.212
DB-B1-6C-8AB-0Z (R)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	4.800 5.070 5.348	2.000 2.193 2.393	0.044 0.080 0.120
RRH2x60-700 (R)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	3.500 3.761 4.029	1.816 2.052 2.289	0.060 0.083 0.109
RRH2x60-700 (R)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	3.500 3.761 4.029	1.816 2.052 2.289	0.060 0.083 0.109
RRH2x60-700 (R)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	3.500 3.761 4.029	1.816 2.052 2.289	0.060 0.083 0.109
RRH2X60-PCS (R)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	2.200 2.393 2.593	1.723 1.901 2.087	0.055 0.075 0.099
RRH2X60-PCS (R)	B	From Leg	4.000 0.000	0.000	160.000	No Ice 1/2" Ice	2.200 2.393	1.723 1.901	0.055 0.075

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
			0.000			1" Ice	2.593	2.087	0.099
RRH2X60-PCS	C	From Leg	4.000	0.000	160.000	No Ice	2.200	1.723	0.055
(R)			0.000			1/2" Ice	2.393	1.901	0.075
			0.000			1" Ice	2.593	2.087	0.099
RRH2X60-AWS	A	From Leg	4.000	0.000	160.000	No Ice	3.500	1.816	0.060
(R)			0.000			1/2" Ice	3.761	2.052	0.083
			0.000			1" Ice	4.029	2.289	0.109
RRH2X60-AWS	B	From Leg	4.000	0.000	160.000	No Ice	3.500	1.816	0.060
(R)			0.000			1/2" Ice	3.761	2.052	0.083
			0.000			1" Ice	4.029	2.289	0.109
RRH2X60-AWS	C	From Leg	4.000	0.000	160.000	No Ice	3.500	1.816	0.060
(R)			0.000			1/2" Ice	3.761	2.052	0.083
			0.000			1" Ice	4.029	2.289	0.109
Platform Mount [LP 713-1]	C	None		0.000	160.000	No Ice	31.270	31.270	1.510
(E)						1/2" Ice	39.680	39.680	1.929
						1" Ice	48.090	48.090	2.348
s									
LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.000	0.000	150.000	No Ice	4.538	2.983	0.045
			0.000			1/2" Ice	4.891	3.526	0.083
(R)			2.000			1" Ice	5.254	4.086	0.126
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.000	0.000	150.000	No Ice	4.538	2.983	0.045
			0.000			1/2" Ice	4.891	3.526	0.083
(R)			2.000			1" Ice	5.254	4.086	0.126
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.000	0.000	150.000	No Ice	4.538	2.983	0.045
			0.000			1/2" Ice	4.891	3.526	0.083
(R)			2.000			1" Ice	5.254	4.086	0.126
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000	0.000	150.000	No Ice	8.262	6.946	0.083
			0.000			1/2" Ice	8.822	8.127	0.151
(R)			2.000			1" Ice	9.346	9.021	0.227
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000	0.000	150.000	No Ice	8.262	6.946	0.083
			0.000			1/2" Ice	8.822	8.127	0.151
(R)			2.000			1" Ice	9.346	9.021	0.227
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000	0.000	150.000	No Ice	8.262	6.946	0.083
			0.000			1/2" Ice	8.822	8.127	0.151
(R)			2.000			1" Ice	9.346	9.021	0.227
1900MHz RRH	A	From Leg	4.000	0.000	150.000	No Ice	2.492	3.258	0.044
(R)			0.000			1/2" Ice	2.695	3.484	0.075
			2.000			1" Ice	2.906	3.718	0.110
1900MHz RRH	B	From Leg	4.000	0.000	150.000	No Ice	2.492	3.258	0.044
(R)			0.000			1/2" Ice	2.695	3.484	0.075
			2.000			1" Ice	2.906	3.718	0.110
1900MHz RRH	C	From Leg	4.000	0.000	150.000	No Ice	2.492	3.258	0.044
(R)			0.000			1/2" Ice	2.695	3.484	0.075
			2.000			1" Ice	2.906	3.718	0.110
800MHZ RRH	A	From Leg	4.000	0.000	150.000	No Ice	2.134	1.773	0.053
(R)			0.000			1/2" Ice	2.320	1.946	0.074
			2.000			1" Ice	2.512	2.127	0.098
800MHZ RRH	B	From Leg	4.000	0.000	150.000	No Ice	2.134	1.773	0.053
(R)			0.000			1/2" Ice	2.320	1.946	0.074
			2.000			1" Ice	2.512	2.127	0.098
800MHZ RRH	C	From Leg	4.000	0.000	150.000	No Ice	2.134	1.773	0.053
(R)			0.000			1/2" Ice	2.320	1.946	0.074
			2.000			1" Ice	2.512	2.127	0.098
FWHR	A	From Leg	4.000	0.000	150.000	No Ice	1.035	0.508	0.026
(R)			0.000			1/2" Ice	1.164	0.601	0.036
			2.000			1" Ice	1.300	0.701	0.048
FWHR	B	From Leg	4.000	0.000	150.000	No Ice	1.035	0.508	0.026

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
(R)			0.000			1/2" Ice	1.164	0.601	0.036
			2.000			1" Ice	1.300	0.701	0.048
FWHR	C	From Leg	4.000	0.000	150.000	No Ice	1.035	0.508	0.026
(R)			0.000			1/2" Ice	1.164	0.601	0.036
			2.000			1" Ice	1.300	0.701	0.048
BEN-92P	C	From Leg	4.000	0.000	150.000	No Ice	0.645	0.420	0.002
(R)			0.000			1/2" Ice	0.747	0.507	0.008
			2.000			1" Ice	0.857	0.601	0.016
(2) 6' x 2" Mount Pipe	A	From Leg	4.000	0.000	150.000	No Ice	1.425	1.425	0.022
(E-Empty)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
(2) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	150.000	No Ice	1.425	1.425	0.022
(E-Empty)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
(2) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	150.000	No Ice	1.425	1.425	0.022
(E-Empty)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
Platform Mount [LP 713-1]	C	None		0.000	150.000	No Ice	31.270	31.270	1.510
(E)						1/2" Ice	39.680	39.680	1.929
						1" Ice	48.090	48.090	2.348
s									
(2) 6' x 3" Mount Pipe	A	From Leg	2.000	0.000	142.000	No Ice	1.767	1.767	0.030
(E)			0.000			1/2" Ice	2.129	2.129	0.044
			0.000			1" Ice	2.501	2.501	0.061
(2) 6' x 3" Mount Pipe	B	From Leg	2.000	0.000	142.000	No Ice	1.767	1.767	0.030
(E)			0.000			1/2" Ice	2.129	2.129	0.044
			0.000			1" Ice	2.501	2.501	0.061
(2) 6' x 3" Mount Pipe	C	From Leg	2.000	0.000	142.000	No Ice	1.767	1.767	0.030
(E)			0.000			1/2" Ice	2.129	2.129	0.044
			0.000			1" Ice	2.501	2.501	0.061
4' x 2" Horizontal Face Mount	B	From Face	0.500	0.000	145.000	No Ice	0.866	0.043	0.010
Pipe			0.000			1/2" Ice	1.111	0.087	0.017
(E-Dish Tie Back)			0.000			1" Ice	1.365	0.131	0.027
4' x 2" Horizontal Face Mount	C	From Face	0.500	0.000	145.000	No Ice	0.866	0.043	0.010
Pipe			0.000			1/2" Ice	1.111	0.087	0.017
(E-Dish Tie Back)			0.000			1" Ice	1.365	0.131	0.027
J-Box - 1' x 1' x 4"	C	From Leg	0.500	0.000	145.000	No Ice	2.133	1.200	0.020
(E-Per Photo)			0.000			1/2" Ice	2.315	1.343	0.039
			0.000			1" Ice	2.504	1.493	0.061
Side Arm Mount [SO 101-3]	C	None		0.000	142.000	No Ice	7.500	7.500	0.252
(E)						1/2" Ice	8.900	8.900	0.333
						1" Ice	10.300	10.300	0.414
s									
SBNH-1D65C-SR w/ Mount	A	From Leg	4.000	0.000	134.000	No Ice	11.683	9.842	0.083
Pipe			0.000			1/2" Ice	12.404	11.366	0.172
(E)			3.000			1" Ice	13.135	12.914	0.272
SBNH-1D65C-SR w/ Mount	B	From Leg	4.000	0.000	134.000	No Ice	11.683	9.842	0.083
Pipe			0.000			1/2" Ice	12.404	11.366	0.172
(E)			3.000			1" Ice	13.135	12.914	0.272
SBNH-1D65C-SR w/ Mount	C	From Leg	4.000	0.000	134.000	No Ice	11.683	9.842	0.083
Pipe			0.000			1/2" Ice	12.404	11.366	0.172
(E)			3.000			1" Ice	13.135	12.914	0.272
ERICSSON AIR 21 B4A	A	From Leg	4.000	0.000	134.000	No Ice	6.329	5.642	0.112
B2P w/ Mount Pipe			0.000			1/2" Ice	6.775	6.426	0.169
(E)			3.000			1" Ice	7.214	7.131	0.233
ERICSSON AIR 21 B4A	B	From Leg	4.000	0.000	134.000	No Ice	6.329	5.642	0.112
B2P w/ Mount Pipe			0.000			1/2" Ice	6.775	6.426	0.169

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(E)			3.000			1" Ice	7.214	7.131	0.233
ERICSSON AIR 21 B4A	C	From Leg	4.000	0.000	134.000	No Ice	6.329	5.642	0.112
B2P w/ Mount Pipe			0.000			1/2" Ice	6.775	6.426	0.169
(E)			3.000			1" Ice	7.214	7.131	0.233
RRUS 11 B12	A	From Leg	4.000	0.000	134.000	No Ice	2.833	1.182	0.051
(E)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095
RRUS 11 B12	B	From Leg	4.000	0.000	134.000	No Ice	2.833	1.182	0.051
(E)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095
RRUS 11 B12	C	From Leg	4.000	0.000	134.000	No Ice	2.833	1.182	0.051
(E)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095
RRUS 11 B2	A	From Leg	4.000	0.000	134.000	No Ice	2.833	1.182	0.051
(E)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095
RRUS 11 B2	B	From Leg	4.000	0.000	134.000	No Ice	2.833	1.182	0.051
(E)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095
RRUS 11 B2	C	From Leg	4.000	0.000	134.000	No Ice	2.833	1.182	0.051
(E)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095
T-Arm Mount [TA 602-3]	C	None		0.000	134.000	No Ice	11.590	11.590	0.774
(E)						1/2" Ice	15.440	15.440	0.990
						1" Ice	19.290	19.290	1.206
s									
AM-X-CD-16-65-00T-RET	A	From Leg	4.000	0.000	116.000	No Ice	8.262	6.304	0.074
w/ Mount Pipe			0.000			1/2" Ice	8.822	7.479	0.139
(E)			4.000			1" Ice	9.346	8.368	0.212
AM-X-CD-16-65-00T-RET	B	From Leg	4.000	0.000	116.000	No Ice	8.262	6.304	0.074
w/ Mount Pipe			0.000			1/2" Ice	8.822	7.479	0.139
(E)			4.000			1" Ice	9.346	8.368	0.212
AM-X-CD-16-65-00T-RET	C	From Leg	4.000	0.000	116.000	No Ice	8.262	6.304	0.074
w/ Mount Pipe			0.000			1/2" Ice	8.822	7.479	0.139
(E)			4.000			1" Ice	9.346	8.368	0.212
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.000	0.000	116.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			4.000			1" Ice	6.607	5.711	0.157
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.000	0.000	116.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			4.000			1" Ice	6.607	5.711	0.157
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	116.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			4.000			1" Ice	6.607	5.711	0.157
(2) LGP21401	A	From Leg	4.000	0.000	116.000	No Ice	1.104	0.207	0.014
(E)			0.000			1/2" Ice	1.239	0.274	0.021
			4.000			1" Ice	1.381	0.348	0.030
(2) LGP21401	B	From Leg	4.000	0.000	116.000	No Ice	1.104	0.207	0.014
(E)			0.000			1/2" Ice	1.239	0.274	0.021
			4.000			1" Ice	1.381	0.348	0.030
(2) LGP21401	C	From Leg	4.000	0.000	116.000	No Ice	1.104	0.207	0.014
(E)			0.000			1/2" Ice	1.239	0.274	0.021
			4.000			1" Ice	1.381	0.348	0.030
DC6-48-60-18-8F	C	From Leg	4.000	0.000	116.000	No Ice	0.917	0.917	0.019
(E)			0.000			1/2" Ice	1.458	1.458	0.037
			4.000			1" Ice	1.643	1.643	0.057
RRUS 11	A	From Leg	4.000	0.000	116.000	No Ice	2.784	1.187	0.048

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
(P)			0.000			1/2" Ice	2.992	1.334	0.068
			4.000			1" Ice	3.207	1.490	0.092
RRUS 11	B	From Leg	4.000	0.000	116.000	No Ice	2.784	1.187	0.048
(P)			0.000			1/2" Ice	2.992	1.334	0.068
			4.000			1" Ice	3.207	1.490	0.092
RRUS 11	C	From Leg	4.000	0.000	116.000	No Ice	2.784	1.187	0.048
(P)			0.000			1/2" Ice	2.992	1.334	0.068
			4.000			1" Ice	3.207	1.490	0.092
RRUS 12	A	From Leg	4.000	0.000	116.000	No Ice	3.145	1.285	0.058
(P)			0.000			1/2" Ice	3.365	1.438	0.081
			4.000			1" Ice	3.592	1.600	0.108
RRUS 12	B	From Leg	4.000	0.000	116.000	No Ice	3.145	1.285	0.058
(P)			0.000			1/2" Ice	3.365	1.438	0.081
			4.000			1" Ice	3.592	1.600	0.108
RRUS 12	C	From Leg	4.000	0.000	116.000	No Ice	3.145	1.285	0.058
(P)			0.000			1/2" Ice	3.365	1.438	0.081
			4.000			1" Ice	3.592	1.600	0.108
(2) LGP13519	A	From Leg	4.000	0.000	116.000	No Ice	0.290	0.181	0.005
(P)			0.000			1/2" Ice	0.362	0.241	0.008
			4.000			1" Ice	0.441	0.310	0.012
(2) LGP13519	B	From Leg	4.000	0.000	116.000	No Ice	0.290	0.181	0.005
(P)			0.000			1/2" Ice	0.362	0.241	0.008
			4.000			1" Ice	0.441	0.310	0.012
(2) LGP13519	C	From Leg	4.000	0.000	116.000	No Ice	0.290	0.181	0.005
(P)			0.000			1/2" Ice	0.362	0.241	0.008
			4.000			1" Ice	0.441	0.310	0.012
(4) 7020.00	A	From Leg	4.000	0.000	116.000	No Ice	0.102	0.175	0.002
(P)			0.000			1/2" Ice	0.147	0.239	0.005
			4.000			1" Ice	0.199	0.311	0.009
(4) 7020.00	B	From Leg	4.000	0.000	116.000	No Ice	0.102	0.175	0.002
(P)			0.000			1/2" Ice	0.147	0.239	0.005
			4.000			1" Ice	0.199	0.311	0.009
(4) 7020.00	C	From Leg	4.000	0.000	116.000	No Ice	0.102	0.175	0.002
(P)			0.000			1/2" Ice	0.147	0.239	0.005
			4.000			1" Ice	0.199	0.311	0.009
1001983	A	From Leg	4.000	0.000	116.000	No Ice	0.176	0.083	0.002
(P)			0.000			1/2" Ice	0.232	0.126	0.004
			4.000			1" Ice	0.295	0.178	0.006
1001983	B	From Leg	4.000	0.000	116.000	No Ice	0.176	0.083	0.002
(P)			0.000			1/2" Ice	0.232	0.126	0.004
			4.000			1" Ice	0.295	0.178	0.006
1001983	C	From Leg	4.000	0.000	116.000	No Ice	0.176	0.083	0.002
(P)			0.000			1/2" Ice	0.232	0.126	0.004
			4.000			1" Ice	0.295	0.178	0.006
3' x 2" Pipe Mount	A	From Leg	4.000	0.000	116.000	No Ice	0.583	0.583	0.011
(E-For TMA)			0.000			1/2" Ice	0.770	0.770	0.017
			4.000			1" Ice	0.967	0.967	0.024
3' x 2" Pipe Mount	B	From Leg	4.000	0.000	116.000	No Ice	0.583	0.583	0.011
(E-For TMA)			0.000			1/2" Ice	0.770	0.770	0.017
			4.000			1" Ice	0.967	0.967	0.024
(2) 3' x 2" Pipe Mount	C	From Leg	4.000	0.000	116.000	No Ice	0.583	0.583	0.011
(E-For TMA)			0.000			1/2" Ice	0.770	0.770	0.017
			4.000			1" Ice	0.967	0.967	0.024
Platform Mount [LP 303-1]	C	None		0.000	116.000	No Ice	14.660	14.660	1.250
(E)						1/2" Ice	18.870	18.870	1.481
						1" Ice	23.080	23.080	1.713
S									

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
KS24019-L112A	A	From Leg	3.000	0.000	61.000	No Ice	0.141	0.141	0.005
(E)			0.000			1/2" Ice	0.198	0.198	0.007
			0.000			1" Ice	0.262	0.262	0.009
KS24019-L112A	C	From Leg	3.000	0.000	61.000	No Ice	0.141	0.141	0.005
(E)			0.000			1/2" Ice	0.198	0.198	0.007
			0.000			1" Ice	0.262	0.262	0.009
2' x 2" Pipe Mount	A	From Leg	3.000	0.000	61.000	No Ice	0.023	0.023	0.007
(E)			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
2' x 2" Pipe Mount	C	From Leg	3.000	0.000	61.000	No Ice	0.023	0.023	0.007
(E)			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
Side Arm Mount [SO 701-1]	A	From Leg	1.500	0.000	61.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
Side Arm Mount [SO 701-1]	C	From Leg	1.500	0.000	61.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
s									
2' x 2" Pipe Mount	A	From Leg	3.000	0.000	50.000	No Ice	0.023	0.023	0.007
(E-Empty)			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
2' x 2" Pipe Mount	C	From Leg	3.000	0.000	50.000	No Ice	0.023	0.023	0.007
(E-Empty)			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
Side Arm Mount [SO 701-1]	A	From Leg	1.500	0.000	50.000	No Ice	0.850	1.670	0.065
(E-Empty)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
Side Arm Mount [SO 701-1]	C	From Leg	1.500	0.000	50.000	No Ice	0.850	1.670	0.065
(E-Empty)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
s									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
Radiowaves HP3-11	B	Paraboloid	From	2.000	70.000		142.000	3.167	No Ice	7.876	0.050
(E)		w/Shroud (HP)	Leg	0.000					1/2" Ice	8.296	0.093
				2.000					1" Ice	8.716	0.135
Radiowaves HP3-11	C	Paraboloid	From	2.000	78.000		142.000	3.167	No Ice	7.876	0.050
(E)		w/Shroud (HP)	Leg	0.000					1/2" Ice	8.296	0.093
				2.000					1" Ice	8.716	0.135
s											

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
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

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	160 - 123.667	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-29.586	-1.391	-1.532
			Max. Mx	8	-9.900	-455.524	-2.175
			Max. My	14	-9.876	-2.410	-457.275
			Max. Vy	8	20.162	-455.524	-2.175
			Max. Vx	2	-20.328	0.826	457.094
			Max. Torque	9			-1.643
L2	123.667 - 76.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-51.789	-1.712	-4.939
			Max. Mx	8	-21.742	-1647.383	-9.169
			Max. My	14	-21.726	-8.907	-1656.529
			Max. Vy	8	29.582	-1647.383	-9.169
			Max. Vx	2	-29.750	4.578	1656.083
			Max. Torque	9			-1.782
L3	76.25 - 51	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-66.121	-1.729	-7.078
			Max. Mx	8	-31.123	-2631.251	-13.869
			Max. My	14	-31.114	-13.167	-2645.343
			Max. Vy	8	33.940	-2631.251	-13.869
			Max. Vx	2	-34.092	7.461	2644.914
			Max. Torque	9			-1.775
L4	51 - 37	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-69.903	-1.391	-7.376
			Max. Mx	8	-33.699	-2872.289	-14.960
			Max. My	14	-33.692	-14.051	-2887.441
			Max. Vy	8	34.968	-2872.289	-14.960
			Max. Vx	2	-35.106	8.454	2887.216
			Max. Torque	9			-1.653
L5	37 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-95.049	-2.017	-11.158
			Max. Mx	8	-51.769	-4538.066	-22.875
			Max. My	14	-51.768	-21.297	-4559.085
			Max. Vy	8	40.709	-4538.066	-22.875
			Max. Vx	2	-40.841	13.036	4557.952
			Max. Torque	9			-1.543

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	34	95.049	4.906	-8.569
	Max. H_x	20	51.792	40.634	0.067
	Max. H_z	2	51.792	0.101	40.812
	Max. M_x	2	4557.952	0.101	40.812
	Max. M_z	8	4538.066	-40.680	-0.154
	Max. Torsion	21	1.283	40.634	0.067
	Min. Vert	7	38.844	-35.152	20.448
	Min. H_x	9	38.844	-40.680	-0.154
	Min. H_z	14	51.792	-0.164	-40.786
	Min. M_x	14	-4559.085	-0.164	-40.786
	Min. M_z	20	-4532.307	40.634	0.067
	Min. Torsion	9	-1.542	-40.680	-0.154

Tower Mast Reaction Summary

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
Dead Only	43.160	0.000	0.000	2.031	0.468	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	51.792	-0.101	-40.812	-4557.952	13.036	-0.220
0.9 Dead+1.6 Wind 0 deg - No Ice	38.844	-0.101	-40.812	-4517.377	12.779	-0.226
1.2 Dead+1.6 Wind 30 deg - No Ice	51.792	20.229	-35.394	-3955.753	-2254.425	0.074
0.9 Dead+1.6 Wind 30 deg - No Ice	38.844	20.229	-35.394	-3920.600	-2234.197	0.072
1.2 Dead+1.6 Wind 60 deg - No Ice	51.792	35.152	-20.448	-2286.300	-3919.697	1.010
0.9 Dead+1.6 Wind 60 deg - No Ice	38.844	35.152	-20.448	-2266.234	-3884.421	1.012
1.2 Dead+1.6 Wind 90 deg - No Ice	51.792	40.680	0.154	22.874	-4538.066	1.536
0.9 Dead+1.6 Wind 90 deg - No Ice	38.844	40.680	0.154	22.038	-4497.195	1.542
1.2 Dead+1.6 Wind 120 deg - No Ice	51.792	35.229	20.541	2300.663	-3928.551	1.150
0.9 Dead+1.6 Wind 120 deg - No Ice	38.844	35.229	20.541	2279.233	-3893.198	1.159
1.2 Dead+1.6 Wind 150 deg - No Ice	51.792	20.339	35.391	3957.788	-2266.342	0.786
0.9 Dead+1.6 Wind 150 deg - No Ice	38.844	20.339	35.391	3921.383	-2246.014	0.794
1.2 Dead+1.6 Wind 180 deg - No Ice	51.792	0.164	40.786	4559.085	-21.297	0.656
0.9 Dead+1.6 Wind 180 deg - No Ice	38.844	0.164	40.786	4517.255	-21.233	0.662
1.2 Dead+1.6 Wind 210 deg - No Ice	51.792	-20.164	35.307	3947.774	2245.881	0.108
0.9 Dead+1.6 Wind 210 deg - No Ice	38.844	-20.164	35.307	3911.455	2225.463	0.110
1.2 Dead+1.6 Wind 240 deg - No Ice	51.792	-35.155	20.362	2278.434	3921.307	-0.893
0.9 Dead+1.6 Wind 240 deg - No Ice	38.844	-35.155	20.362	2257.205	3885.739	-0.895
1.2 Dead+1.6 Wind 270 deg - No Ice	51.792	-40.634	-0.067	-4.833	4532.307	-1.277
0.9 Dead+1.6 Wind 270 deg - No Ice	38.844	-40.634	-0.067	-5.416	4491.230	-1.283
1.2 Dead+1.6 Wind 300 deg - No Ice	51.792	-35.125	-20.515	-2291.806	3914.109	-0.495
0.9 Dead+1.6 Wind 300 deg - No Ice	38.844	-35.125	-20.515	-2271.706	3878.624	-0.503
1.2 Dead+1.6 Wind 330 deg - No Ice	51.792	-20.277	-35.401	-3954.193	2258.245	-0.201
0.9 Dead+1.6 Wind 330 deg - No Ice	38.844	-20.277	-35.401	-3919.067	2237.722	-0.209
1.2 Dead+1.0 Ice+1.0 Temp	95.049	0.000	0.000	11.158	-2.017	-0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	95.049	-0.023	-9.200	-1096.531	0.661	-0.117
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	95.049	4.918	-8.585	-1013.647	-587.776	-0.064
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	95.049	7.608	-4.416	-524.194	-921.425	0.126

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
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	95.049	8.804	0.033	15.601	-1066.120	0.257
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	95.049	7.627	4.441	549.286	-923.452	0.227
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	95.049	4.406	7.654	937.904	-533.913	0.197
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	95.049	0.035	9.195	1118.512	-6.578	0.196
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	95.049	-4.906	8.569	1033.872	581.798	0.098
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	95.049	-7.608	4.400	544.453	917.399	-0.105
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	95.049	-8.796	-0.017	9.634	1060.683	-0.210
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	95.049	-7.608	-4.437	-525.812	916.342	-0.107
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	95.049	-4.395	-7.656	-915.446	528.028	-0.091
Dead+Wind 0 deg - Service	43.160	-0.020	-8.054	-893.976	2.921	-0.044
Dead+Wind 30 deg - Service	43.160	3.992	-6.985	-775.646	-442.603	0.016
Dead+Wind 60 deg - Service	43.160	6.937	-4.035	-447.615	-769.796	0.204
Dead+Wind 90 deg - Service	43.160	8.028	0.030	6.097	-891.293	0.309
Dead+Wind 120 deg - Service	43.160	6.952	4.054	453.646	-771.541	0.231
Dead+Wind 150 deg - Service	43.160	4.014	6.984	779.250	-444.945	0.158
Dead+Wind 180 deg - Service	43.160	0.032	8.049	897.399	-3.823	0.131
Dead+Wind 210 deg - Service	43.160	-3.979	6.968	777.271	441.640	0.021
Dead+Wind 240 deg - Service	43.160	-6.938	4.018	449.273	770.828	-0.180
Dead+Wind 270 deg - Service	43.160	-8.019	-0.013	0.653	890.880	-0.257
Dead+Wind 300 deg - Service	43.160	-6.932	-4.049	-448.697	769.416	-0.100
Dead+Wind 330 deg - Service	43.160	-4.002	-6.986	-775.339	444.074	-0.041

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	0.000	-43.160	0.000	0.000	43.160	0.000	0.000%
2	-0.101	-51.792	-40.812	0.101	51.792	40.812	0.000%
3	-0.101	-38.844	-40.812	0.101	38.844	40.812	0.000%
4	20.229	-51.792	-35.394	-20.229	51.792	35.394	0.000%
5	20.229	-38.844	-35.394	-20.229	38.844	35.394	0.000%
6	35.152	-51.792	-20.448	-35.152	51.792	20.448	0.000%
7	35.152	-38.844	-20.448	-35.152	38.844	20.448	0.000%
8	40.680	-51.792	0.154	-40.680	51.792	-0.154	0.000%
9	40.680	-38.844	0.154	-40.680	38.844	-0.154	0.000%
10	35.229	-51.792	20.541	-35.229	51.792	-20.541	0.000%
11	35.229	-38.844	20.541	-35.229	38.844	-20.541	0.000%
12	20.339	-51.792	35.391	-20.339	51.792	-35.391	0.000%
13	20.339	-38.844	35.391	-20.339	38.844	-35.391	0.000%
14	0.164	-51.792	40.786	-0.164	51.792	-40.786	0.000%
15	0.164	-38.844	40.786	-0.164	38.844	-40.786	0.000%
16	-20.164	-51.792	35.307	20.164	51.792	-35.307	0.000%
17	-20.164	-38.844	35.307	20.164	38.844	-35.307	0.000%
18	-35.155	-51.792	20.362	35.155	51.792	-20.362	0.000%
19	-35.155	-38.844	20.362	35.155	38.844	-20.362	0.000%
20	-40.634	-51.792	-0.067	40.634	51.792	0.067	0.000%
21	-40.634	-38.844	-0.067	40.634	38.844	0.067	0.000%
22	-35.125	-51.792	-20.515	35.125	51.792	20.515	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
23	-35.125	-38.844	-20.515	35.125	38.844	20.515	0.000%
24	-20.277	-51.792	-35.401	20.277	51.792	35.401	0.000%
25	-20.277	-38.844	-35.401	20.277	38.844	35.401	0.000%
26	0.000	-95.049	0.000	-0.000	95.049	-0.000	0.000%
27	-0.023	-95.049	-9.200	0.023	95.049	9.200	0.000%
28	4.918	-95.049	-8.585	-4.918	95.049	8.585	0.000%
29	7.608	-95.049	-4.416	-7.608	95.049	4.416	0.000%
30	8.804	-95.049	0.033	-8.804	95.049	-0.033	0.000%
31	7.627	-95.049	4.441	-7.627	95.049	-4.441	0.000%
32	4.406	-95.049	7.654	-4.406	95.049	-7.654	0.000%
33	0.035	-95.049	9.195	-0.035	95.049	-9.195	0.000%
34	-4.906	-95.049	8.569	4.906	95.049	-8.569	0.000%
35	-7.608	-95.049	4.400	7.608	95.049	-4.400	0.000%
36	-8.795	-95.049	-0.017	8.796	95.049	0.017	0.000%
37	-7.608	-95.049	-4.437	7.608	95.049	4.437	0.000%
38	-4.395	-95.049	-7.655	4.395	95.049	7.656	0.000%
39	-0.020	-43.160	-8.054	0.020	43.160	8.054	0.000%
40	3.992	-43.160	-6.985	-3.992	43.160	6.985	0.000%
41	6.937	-43.160	-4.035	-6.937	43.160	4.035	0.000%
42	8.028	-43.160	0.030	-8.028	43.160	-0.030	0.000%
43	6.952	-43.160	4.054	-6.952	43.160	-4.054	0.000%
44	4.014	-43.160	6.984	-4.014	43.160	-6.984	0.000%
45	0.032	-43.160	8.049	-0.032	43.160	-8.049	0.000%
46	-3.979	-43.160	6.968	3.979	43.160	-6.968	0.000%
47	-6.938	-43.160	4.018	6.938	43.160	-4.018	0.000%
48	-8.019	-43.160	-0.013	8.019	43.160	0.013	0.000%
49	-6.932	-43.160	-4.049	6.932	43.160	4.049	0.000%
50	-4.002	-43.160	-6.986	4.002	43.160	6.986	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00040623
3	Yes	4	0.00000001	0.00018420
4	Yes	5	0.00000001	0.00077453
5	Yes	5	0.00000001	0.00031469
6	Yes	5	0.00000001	0.00075816
7	Yes	5	0.00000001	0.00030696
8	Yes	5	0.00000001	0.00004573
9	Yes	4	0.00000001	0.00063178
10	Yes	5	0.00000001	0.00078923
11	Yes	5	0.00000001	0.00032061
12	Yes	5	0.00000001	0.00076641
13	Yes	5	0.00000001	0.00031036
14	Yes	4	0.00000001	0.00040610
15	Yes	4	0.00000001	0.00018226
16	Yes	5	0.00000001	0.00076324
17	Yes	5	0.00000001	0.00031009
18	Yes	5	0.00000001	0.00078312
19	Yes	5	0.00000001	0.00031886
20	Yes	4	0.00000001	0.00071107
21	Yes	4	0.00000001	0.00039988
22	Yes	5	0.00000001	0.00076659
23	Yes	5	0.00000001	0.00031102

24	Yes	5	0.00000001	0.00076918
25	Yes	5	0.00000001	0.00031235
26	Yes	4	0.00000001	0.00009222
27	Yes	5	0.00000001	0.00083488
28	Yes	5	0.00000001	0.00098888
29	Yes	5	0.00000001	0.00089898
30	Yes	5	0.00000001	0.00082518
31	Yes	5	0.00000001	0.00091934
32	Yes	5	0.00000001	0.00091920
33	Yes	5	0.00000001	0.00085334
34	Yes	5	0.00000001	0.00099930
35	Yes	5	0.00000001	0.00090830
36	Yes	5	0.00000001	0.00081717
37	Yes	5	0.00000001	0.00089220
38	Yes	5	0.00000001	0.00089379
39	Yes	4	0.00000001	0.00007895
40	Yes	4	0.00000001	0.00025974
41	Yes	4	0.00000001	0.00024522
42	Yes	4	0.00000001	0.00008999
43	Yes	4	0.00000001	0.00027182
44	Yes	4	0.00000001	0.00025321
45	Yes	4	0.00000001	0.00007948
46	Yes	4	0.00000001	0.00025281
47	Yes	4	0.00000001	0.00026918
48	Yes	4	0.00000001	0.00008565
49	Yes	4	0.00000001	0.00025142
50	Yes	4	0.00000001	0.00025498

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 123.667	22.453	45	1.424	0.003
L2	128 - 76.25	13.635	45	1.126	0.002
L3	82 - 51	5.073	45	0.627	0.000
L4	51 - 37	1.868	45	0.343	0.000
L5	44 - 0	1.404	45	0.291	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.000	(2) DB846H80E-SX w/ Mount Pipe	45	22.453	1.424	0.003	26871
150.000	LLPX310R-V1 w/ Mount Pipe	45	19.560	1.334	0.003	13435
145.000	4' x 2" Horizontal Face Mount Pipe	45	18.141	1.289	0.002	8956
144.000	Radiowaves HP3-11	45	17.861	1.280	0.002	8397
142.000	(2) 6' x 3" Mount Pipe	45	17.305	1.261	0.002	7464
134.000	SBNH-1D65C-SR w/ Mount Pipe	45	15.153	1.185	0.002	5167
116.000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	45	10.894	0.999	0.001	4564
61.000	KS24019-L112A	45	2.697	0.425	0.000	6148
50.000	2' x 2" Pipe Mount	45	1.796	0.335	0.000	6215

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 123.667	113.993	14	7.233	0.015
L2	128 - 76.25	69.272	14	5.725	0.008
L3	82 - 51	25.789	12	3.187	0.002
L4	51 - 37	9.498	12	1.745	0.001
L5	44 - 0	7.135	12	1.481	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.000	(2) DB846H80E-SX w/ Mount Pipe	14	113.993	7.233	0.015	5443
150.000	LLPX310R-V1 w/ Mount Pipe	14	99.324	6.782	0.013	2720
145.000	4' x 2" Horizontal Face Mount Pipe	14	92.130	6.552	0.012	1812
144.000	Radiowaves HP3-11	14	90.709	6.505	0.012	1698
142.000	(2) 6' x 3" Mount Pipe	14	87.891	6.412	0.011	1509
134.000	SBNH-1D65C-SR w/ Mount Pipe	14	76.977	6.027	0.010	1042
116.000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	14	55.360	5.081	0.006	914
61.000	KS24019-L112A	12	13.710	2.162	0.001	1212
50.000	2' x 2" Pipe Mount	12	9.131	1.706	0.001	1224

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	160 - 123.667 (1)	TP29.05x18.87x0.188	36.333	0.000	0.0	16.693	-9.875	965.169	0.010
L2	123.667 - 76.25 (2)	TP41.95x27.461x0.313	51.750	0.000	0.0	40.278	-21.725	2534.090	0.009
L3	76.25 - 51 (3)	TP48.398x39.715x0.344	31.000	0.000	0.0	53.191	-31.113	3182.680	0.010
L4	51 - 37 (4)	TP52.32x48.398x0.433	14.000	0.000	0.0	69.575	-33.690	3100.280	0.011
L5	37 - 0 (5)	TP62x49.672x0.406	44.000	0.000	0.0	80.572	-51.768	4570.550	0.011

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	160 - 123.667 (1)	TP29.05x18.87x0.188	457.413	544.269	0.840	0.000	544.269	0.000
L2	123.667 - 76.25 (2)	TP41.95x27.461x0.313	1656.700	2066.708	0.802	0.000	2066.708	0.000
L3	76.25 - 51 (3)	TP48.398x39.715x0.344	2645.592	3118.233	0.848	0.000	3118.233	0.000
L4	51 - 37 (4)	TP52.32x48.398x0.433	2887.775	3151.075	0.916	0.000	3151.075	0.000
L5	37 - 0 (5)	TP62x49.672x0.406	4560.742	5742.817	0.794	0.000	5742.817	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	160 - 123.667 (1)	TP29.05x18.87x0.188	20.308	482.585	0.042	0.278	1103.608	0.000
L2	123.667 - 76.25 (2)	TP41.95x27.461x0.313	29.729	1267.040	0.023	0.559	4190.633	0.000
L3	76.25 - 51 (3)	TP48.398x39.715x0.344	34.085	1591.340	0.021	0.676	6322.808	0.000
L4	51 - 37 (4)	TP52.32x48.398x0.433	35.113	1550.140	0.023	0.786	6389.391	0.000
L5	37 - 0 (5)	TP62x49.672x0.406	40.849	2285.280	0.018	0.786	11644.667	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	160 - 123.667 (1)	0.010	0.840	0.000	0.042	0.000	0.852 ✔	1.000	4.8.2 ✔
L2	123.667 - 76.25 (2)	0.009	0.802	0.000	0.023	0.000	0.811 ✔	1.000	4.8.2 ✔
L3	76.25 - 51 (3)	0.010	0.848	0.000	0.021	0.000	0.859 ✔	1.000	4.8.2 ✔
L4	51 - 37 (4)	0.011	0.916	0.000	0.023	0.000	0.928 ✔	1.000	4.8.2 ✔
L5	37 - 0 (5)	0.011	0.794	0.000	0.018	0.000	0.806 ✔	1.000	4.8.2 ✔

Section Capacity Table

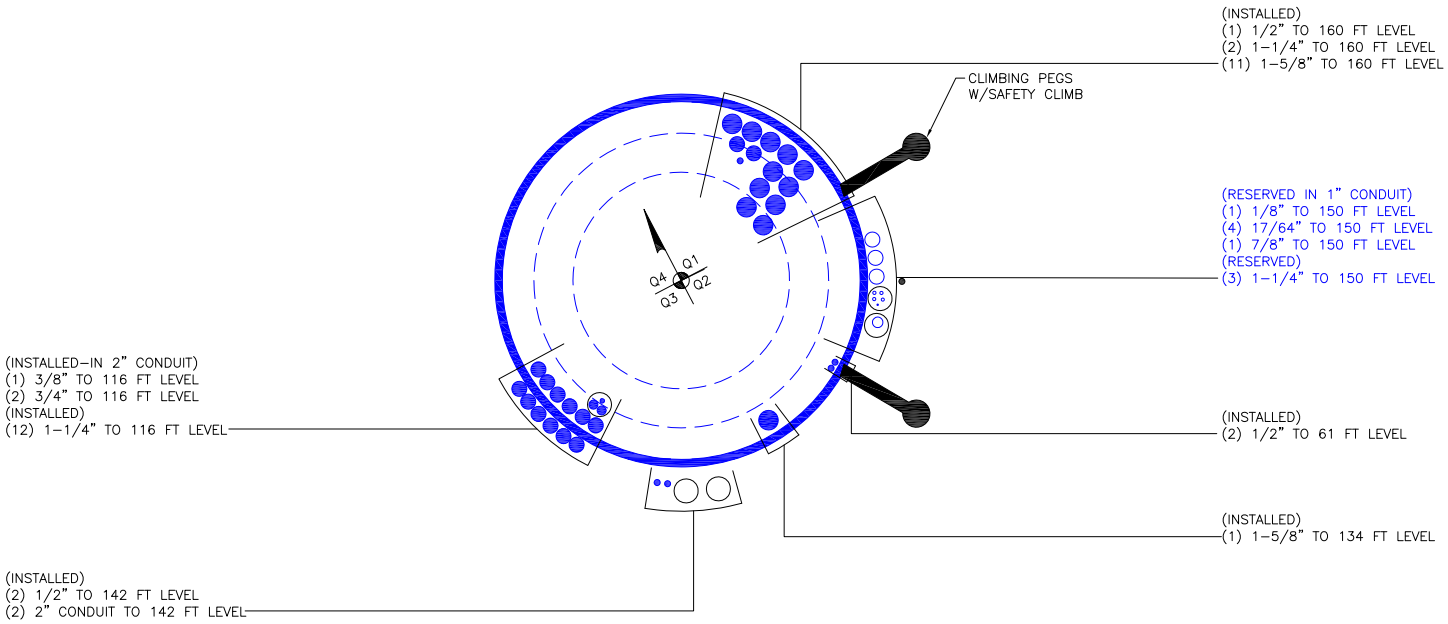
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	160 - 123.667	Pole	TP29.05x18.87x0.188	1	-9.875	965.169	**	**

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L2	123.667 - 76.25	Pole	TP41.95x27.461x0.313	2	-21.725	2534.090	**	**
L3	76.25 - 51	Pole	TP48.398x39.715x0.344	3	-31.113	3182.680	**	**
L4	51 - 37	Pole	TP52.32x48.398x0.433	4	-33.690	3100.280	**	**
L5	37 - 0	Pole	TP62x49.672x0.406	5	-51.768	4570.550	**	**
							Summary	
						Pole (L4)	**	**
						RATING =	**	**

** See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 806382

APPENDIX C

ADDITIONAL CALCULATIONS

Reinforcement 1

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
42.5	51	3	CI-XFP-0451(	F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Reinforcement 2

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Reinforcement 3

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
0				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Bottom Elevation	Top Elevation	Original Thickness	Original Yield Stress	Original Ultimate Stress	Reinforced Shaft Capacity	Reinf. 1 QTY	Reinf. 1 Type	Rein. 1 Capacity	Reinf. 2 QTY	Reinf. 2 Type	Rein. 2 Capacity	Reinf. 3 QTY	Reinf. 3 Type	Rein. 3 Capacity	Control Stress Ratio	Top Height	Section Length	Lap Splice	# of Sides	Top Diameter	Bottom Diameter	Equivalent Shaft Thickness	Equivalent Shaft Fy	Equivalent Weight Mult.		Bottom Elevation Failure	Top Elevation Failure	Section Failure %
123.6670	160.0000	0.1875	65	80	84.8%										**84.8%**	160.0000	36.3330	4.3330	12	18.8700	29.0500	0.1875	65.0	1.00	1			
76.2500	128.0000	0.3125	65	80	80.8%										**80.8%**	128.0000	51.7500	5.7500	12	27.4610	41.9500	0.3125	65.0	1.00	2			
51.0000	82.0000	0.3438	65	80	85.6%										**85.6%**	82.0000	31.0000	0.0000	12	39.7151	48.3985	0.3438	65.0	1.00	3			
37.0000	51.0000	0.3438	65	80	76.2%	3	CI-XFP-0451(	92.8%							**92.8%**	51.0000	14.0000	7.0000	12	48.3985	52.3200	0.4328	40.0	0.99	4			
0.0000	44.0000	0.4063	65	80	80.3%										**80.3%**	44.0000	44.0000	0.0000	12	49.6717	62.0000	0.4063	65.0	1.00	5			
																									6			
																									7			
																									8			
																									9			
																									10			
																									11			
																									12			
																									13			
																									14			
																									15			
																									16			
																									17			
																									18			
																									19			
																									20			
																									21			
																									22			
																									23			
																									24			
																									25			
																									26			
																									27			
																									28			
																									29			
																									30			

AeroSolutions LLC
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Section	Elevation (ft)	Moment (ft-kip)	Compression (kip)	Shear (kip)	Torsion (kip-ft)	Number of Sides	OD (in)	Thickness (in)	Yield Strength (ksi)	Flat Width (in)	Area (in²)	Moment of Inertia (in⁴)	Percent of Composite Moment of Inertia	Angle Offset to Pole Flat	Distance to Extreme Fiber (in)
Section	*Elevation*	*Moment*	*Compression*	*Shear*	*Torsion*	*PoleSides*	*PoleOD*	*PoleT*	*PoleFy*	*PoleW*	*PoleA*	*PoleI*	*PoleIPer*	*PoleCPoint*	*PoleC*
1	160	0.7	10.3	1.8	0.1	12	18.8700	0.1875	65	4.55	11.2	502	100%	TRUE	9.73
2	128	457.4	9.9	20.3	0.3	12	27.8360	0.1875	65	6.96	16.6	1628	100%	TRUE	14.38
3	123.667	546.6	10.8	20.8	0.3	12	29.0500	0.5000	65	6.44	45.7	4769	100%	TRUE	14.95
4	82	1656.7	21.7	29.7	0.6	12	40.3401	0.3125	65	9.97	40.2	8234	100%	TRUE	20.83
5	76.25	1830.1	24.1	30.6	0.6	12	41.9500	0.6563	65	9.48	86.8	18948	100%	TRUE	21.60
6	51	2645.6	31.1	34.1	0.7	12	48.3985	0.3438	65	12.05	53.0	15674	100%	TRUE	24.99
7	44	2887.8	33.7	35.1	0.8	12	50.3592	0.3438	65	12.57	55.2	17673	80%	0	25.18
8	42.5	2940.7	34.5	35.3	0.8	12	50.7794	0.7500	65	11.60	120.3	38518	89%	TRUE	26.15
9	37	3137.4	38.0	36.2	0.8	12	52.3200	0.7500	65	12.01	124.0	42192	100%	TRUE	26.95
10	0	4560.7	51.8	40.8	0.8	12	62.0000	0.4063	65	15.52	80.3	39011	100%	TRUE	32.02

Unreinforced Pole - Rev. G

Section	Section Modulus (in³)	Torsion Constant (in⁴)	Effective Yield Stress (ksi)	Nominal Bending Moment Strength (ft-kip)	Strength Resistance Factor	Design Bending Moment Strength (ft-kip)	Nominal Compressive Strength (kip)	Strength Resistance Factor	Design Compressive Strength (kip)	Nominal Shear Strength (kip)	Strength Resistance Factor	Design Shear Strength (kip)	Nominal Torsion Shear Strength (kip-ft)	Strength Resistance Factor	Design Torsion Shear Strength (kip-ft)	**Stress Ratio**
Section	*PoleS*	*PoleJ*	*PoleFye*	*PoleMn*	*PolePhiF*	*PolePhiMn*	*PolePn*	*PolePhiC*	*PolePhiPn*	*PoleVn*	*PolePhiV*	*PolePhiVn*	*PoleVtn*	*PolePhiVt*	*PolepPhiVt*	***PoleSRG***
1	52	985	78.2	336.2	0.9	302.6	879.3	0.9	791.3	439.6	0.9	395.7	7911.3	0.9	7120.1	**0.015**
2	113	3189	64.3	606.5	0.9	545.9	1069.5	0.9	962.6	534.8	0.9	481.3	14255.2	0.9	12829.7	**0.850**
3	319	9376	81.9	2177.4	0.9	1959.6	3745.6	0.9	3371.0	1872.8	0.9	1685.5	51369.7	0.9	46232.7	**0.282**
4	395	16133	69.9	2303.3	0.9	2073.0	2807.4	0.9	2526.6	1403.7	0.9	1263.3	54155.7	0.9	48740.1	**0.808**
5	877	37232	81.9	5987.1	0.9	5388.4	7112.8	0.9	6401.6	3556.4	0.9	3200.8	141176.7	0.9	127059.0	**0.343**
6	627	30703	66.5	3475.0	0.9	3127.5	3526.4	0.9	3173.8	1763.2	0.9	1586.9	81685.0	0.9	73516.5	**0.856**
7	702	34616	58.3	3412.6	0.9	3071.4	3220.9	0.9	2898.8	1610.4	0.9	1449.4	80210.4	0.9	72189.4	**0.952**
8	1473	75665	65.0	7977.6	0.9	7179.8	7817.8	0.9	7036.1	3908.9	0.9	3518.0	188055.3	0.9	169249.8	**0.415**
9	1566	82869	81.9	10684.6	0.9	9616.2	10154.8	0.9	9139.3	5077.4	0.9	4569.6	251830.2	0.9	226647.2	**0.330**
10	1218	76401	63.0	6399.5	0.9	5759.6	5064.8	0.9	4558.4	2532.4	0.9	2279.2	150399.5	0.9	135359.6	**0.804**
																0.952

Reinforced Pole / Rev. G

Section	Moment in Pole when Reinforced	Bending Stress (ksi)	Axial Stress (ksi)	Shear Stress (ksi)	Torsion Shear Stress (ksi)	Allowable Bending Stress (ksi)	Allowable Compressive Stress (ksi)	Allowable Shear Stress (ksi)	Allowable Torsion Shear Stress (ksi)	**Reinforced Pole Stress Ratio**
Section	*PoleMome*	*RPoleFbAc*	*RPoleFaAc*	*RPoleFvAc*	*RPoleFvtAc*	*PoleFbG*	*PoleFpG*	*PoleFvG*	*PoleFvtG*	***RPoleSRG***
1	0.7	0.2	0.92	0.00	0.00	70.4	70.4	70.4	70.4	**0.015**
2	457.4	48.5	0.59	0.00	0.00	57.8	57.8	57.8	57.8	**0.848**
3	546.6	20.6	0.24	0.00	0.00	73.7	73.7	73.7	73.7	**0.282**
4	1656.7	50.3	0.54	0.00	0.00	62.9	62.9	62.9	62.9	**0.808**
5	1830.1	25.0	0.28	0.00	0.00	73.7	73.7	73.7	73.7	**0.343**
6	2645.6	50.6	0.59	0.00	0.00	59.8	59.8	59.8	59.8	**0.856**
7	2305.5	39.4	0.61	0.00	0.00	52.5	52.5	52.5	52.5	**0.762**
8	2630.8	21.4	0.29	0.00	0.00	58.5	58.5	58.5	58.5	**0.371**
9	3137.4	24.0	0.31	0.00	0.00	73.7	73.7	73.7	73.7	**0.330**
10	4560.7	44.9	0.64	0.00	0.00	56.7	56.7	56.7	56.7	**0.803**
										0.856

Reinforcement 1 / Composite

Section	Qty	**Model**	Position (F-Flat, C-Corner)	Gap Between Pole and Back of Rein. (in)	Tension only or Tension & Comp.	Total Moment of Inertia (in⁴)	Axial Force (kip)	**Stress Ratio**	Centroid Offset (in)	Area (in²)	Moment of Inertia (in⁴)	**Controlling Stress Ratio**	**Thickness (in)**	**Weight Multiplier**	**Derated Yield Stress (ksi)**	**% Error in Derated Yield Stress**
Section	*Rein1Qty*	***Rein1Model***	*Rein1Pos*	*Rein1Gap*	*Rein1TC*	*Rein1ITotal*	*Rein1P*	***Rein1SR***	*CompYBar*	*CompA*	*CompI*	***CompSR***	***EPoleT***	***EPoleWM***	***EDPoleFy***	***EDPoleSRCheck***
1									0.000	11.2	502	**0.015**	**0.1875**	**1.00**	**65.0**	**0.1%**
2									0.000	16.6	1628	**0.848**	**0.1875**	**1.00**	**65.0**	**0.5%**
3									0.000	45.7	4769	**0.282**	**0.5000**	**1.00**	**65.0**	**0.4%**
4									0.000	40.2	8234	**0.808**	**0.3125**	**1.00**	**65.0**	**0.4%**
5									0.000	86.8	18948	**0.343**	**0.6563**	**1.00**	**65.0**	**0.4%**
6									0.000	53.0	15674	**0.856**	**0.3438**	**1.00**	**65.0**	**0.3%**
7	**3**	**CCI-XFP-045100**	**F**	0	T&C	4463	180.9	**0.928**	0.000	68.7	22136	**0.928**	**0.4328**	**0.99**	**40.0**	**0.2%**
8	**3**	**CCI-XFP-045100**	**F**	0	T&C	4536	95.5	**0.490**	0.000	133.8	43054	**0.490**	**0.8411**	**0.99**	**38.6**	**1.8%**
9									0.000	124.0	42192	**0.330**	**0.7500**	**1.00**	**65.0**	**0.4%**
10									0.000	80.3	39011	**0.803**	**0.4063**	**1.00**	**65.0**	**0.3%**
								0.928				**0.928**				

Rein1

Bottom	Top	Qty	Model	Position	T or T&C
42.5	51	3	FP-045100	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Flats (Used for relative orientation only. Actual flat numbers may vary.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		1				1				1							

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
	0			F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Reinforcement Capacity

AeroSolutions LLC
Optimizing Your Tower Infrastructure

5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Dimensions and Properties														Compression				Axial				
																		ASD-9			LRFD	
Model	Weight (lb/ft)	Area (in^2)	Moment of Inertia (in^4)	Moment of Inertia (in^4)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Length (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
CCI-XFP-045100	15.3	4.50	0.38	7.59	0.5	0	1	4.5	0	0	1.1875	65	80	0.80	20	1.00	20	129.7	172.9	Compress.	195.0	Rupture

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

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

Site Data

BU#:	*806382*
Site Name:	*HRT 082 943274*
App #:	*370113 Revision # 0*
Pole Manufacturer:	*Other*

Reactions		
Mu:	4560.7442	ft-kips
Axial, Pu:	51.7684	kips
Shear, Vu:	40.849053	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

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

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	70.69	in

Anchor Rod Results

Max Rod (Cu+ Vu/ή):	201.9	Kips
Allowable Axial, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	77.7%	**Pass**

Plate Data		
Diam:	76.69	in
Thick:	2.75	in
Grade:	60	ksi
Single-Rod B-eff:	12.46	in

Base Plate Results Flexural Check

Base Plate Stress:	22.7	ksi
Allowable Plate Stress:	54.0	ksi
Base Plate Stress Ratio:	42.0%	**Pass**

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

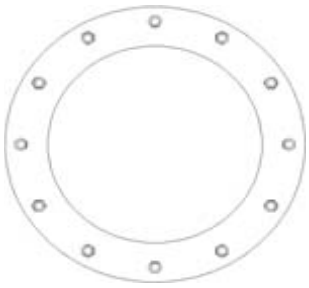
Stiffener Results

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:	62	in
Thick:	0.40625	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

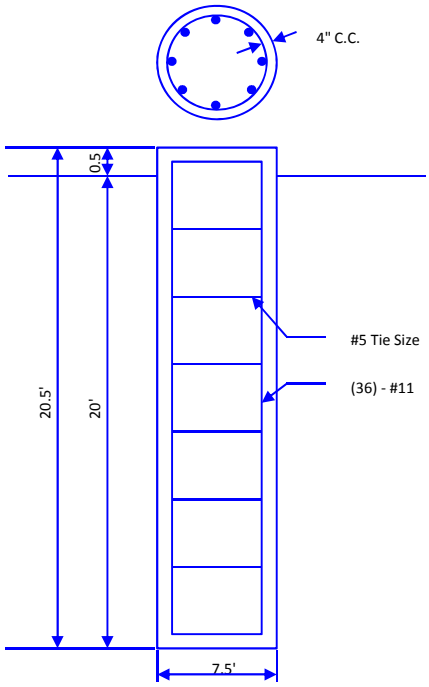
CCI Foundation Tool Suite - Monopole Pier

CCIFTS 1.2.108.14286 - Phase 1-2 Date: 07-12-2016

BU:	806382
Site Name:	HRT 082 943274, CT
App Number:	370113 Revision # 0
Work Order:	1333375

Monopole Drilled Pier

Input



Criteria

TIA Revision:	G
ACI 318 Revision:	2008
Seismic Category:	B

Forces

Compression	52	kips
Shear	41	kips
Moment	4561	k-ft
Swelling Force	0	kips

Foundation Dimensions

Pier Diameter:	7.5	ft
Ext. above grade:	0.5	ft
Depth below grade:	20	ft

Material Properties

Number of Rebar:	36	
Rebar Size:	11	
Tie Size	5	
Rebar tensile strength:	60	ksi
Concrete Strength:	4000	psi
Ultimate Concrete Strain	0.003	in/in
Clear Cover to Ties:	4	in

Soil Profile: Soil

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	1	0	1	100	0	0	0	0	0	
2	5	1	6	110		34			0	
3	3.5	6	9.5	115		38			0	
4	10.5	9.5	20	145		45			30	

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	4.44	ft
Max Moment, Mu:	4732.66	k-ft
Soil Safety Factor:	1.93	
Safety Factor Req'd:	1.33	
RATING:	69.0%	

Soil Axial Capacity

Skin Friction (k):	280.02	kips
End Bearing (k):	994.02	kips
Comp. Capacity (k), ϕCn:	1274.04	kips
Comp. (k), Cu:	52.00	kips
RATING:	4.1%	

Concrete/Steel Check

Mu (from soil analysis)	4732.66	k-ft
ϕMn	9338.06	k-ft
RATING:	50.7%	

rho provided	0.88	
rho required	0.33	OK

Rebar Spacing	5.51	
Spacing required	22.56	OK

Dev. Length required	15.23	
Dev. Length provided	53.51	OK

Overall Foundation Rating: 69.0%

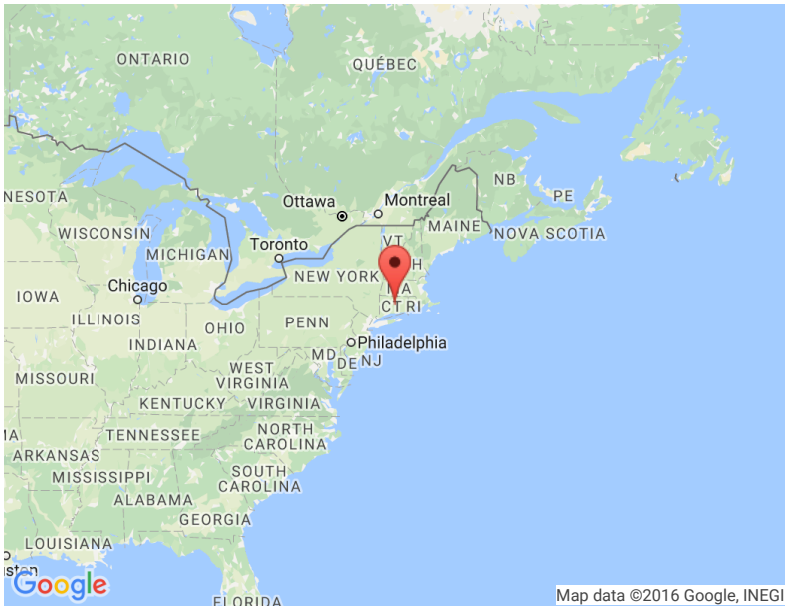
Search Results

Query Date: Wed Dec 07 2016
Latitude: 41.6083
Longitude: -72.5915

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

Risk Category I: 115
Risk Category II: 126
Risk Category III-IV: 135
MRI 10-Year:** 77
MRI 25-Year:** 87
MRI 50-Year:** 94
MRI 100-Year:** 101

ASCE 7-05 Windspeed:
104 (3-sec peak gust in mph)
ASCE 7-93 Windspeed:
82 (fastest mile in mph)



*Miles per hour
**Mean Recurrence Interval

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

Print your results

WINDSPEED WEBSITE DISCLAIMER

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

Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT5836

Portland
74 Goodrich Lane
Portland, CT 06480

December 12, 2016

Centerline Communications Project Number: 950006-001

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**9.49 %**

December 12, 2016

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

Emissions Analysis for Site: **CT5836 – Portland**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **74 Goodrich Lane, Portland, 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 **74 Goodrich Lane, Portland, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	850 MHz	2	30
UMTS	1900 MHz (PCS)	2	30
LTE	700 MHz	2	60
LTE	1900 MHz (PCS)	2	60
GSM	850 MHz	2	30
GSM	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 and 1900 MHz (PCS) 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	Powerwave 7770	120
A	2	KMW AM-X-CD-16-65-00T-RET	120
A	3	Powerwave 7770	120
B	1	Powerwave 7770	120
B	2	KMW AM-X-CD-16-65-00T-RET	120
B	3	Powerwave 7770	120
C	1	Powerwave 7770	120
C	2	KMW AM-X-CD-16-65-00T-RET	120
C	3	Powerwave 7770	120

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	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.77
Antenna A2	KMW AM-X-CD-16-65-00T-RET	700 MHz / 1900 MHz (PCS)	13.35 / 15.25	4	240	6,614.85	2.65
Antenna A3	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.77
						Sector A Composite MPE%	**4.18**
Antenna B1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.77
Antenna B2	KMW AM-X-CD-16-65-00T-RET	700 MHz / 1900 MHz (PCS)	13.35 / 15.25	4	240	6,614.85	2.65
Antenna B3	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.77
						Sector B Composite MPE%	**4.18**
Antenna C1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.77
Antenna C2	KMW AM-X-CD-16-65-00T-RET	700 MHz / 1900 MHz (PCS)	13.35 / 15.25	4	240	6,614.85	2.65
Antenna C3	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.77
						Sector C Composite MPE%	**4.18**

Table 3: AT&T Emissions Levels

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

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max Sector Value	**4.18 %**
Verizon	1.94 %
Clearwire	0.10 %
Sprint	0.22 %
Nextel	0.36 %
T-Mobile	2.69 %
Site Total MPE %:	**9.49 %**

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	4.18 %
AT&T Sector B Total:	4.18 %
AT&T Sector C Total:	4.18 %
Site Total:	9.49 %

Table 5: Site MPE Summary

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

AT&T _ Frequency Band / Technology	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	120	2.29	850 MHz	567	0.40%
AT&T 1900 MHz (PCS) UMTS	2	656.33	120	3.63	1900 MHz (PCS)	1000	0.36%
AT&T 700 MHz LTE	2	1,297.63	120	7.18	700 MHz	467	1.54%
AT&T 1900 MHz (PCS) LTE	2	2,009.79	120	11.12	1900 MHz (PCS)	1000	1.11%
AT&T 850 MHz GSM	2	414.12	120	2.29	850 MHz	567	0.40%
AT&T 1900 MHz (PCS) GSM	2	656.33	120	3.63	1900 MHz (PCS)	1000	0.36%
						Total:	4.18%

Table 6: AT&T Maximum Sector MPE Power Values

Summary

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

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

AT&T Sector	Power Density Value (%)
Sector A:	4.18 %
Sector B:	4.18 %
Sector C:	4.18 %
AT&T Maximum Total (per sector):	4.18 %
Site Total:	9.49 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **9.49 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

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