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

February 11, 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: 806369**
AT&T Site ID: CT5131
439-455 Homestead Avenue, Hartford, CT 06105
Latitude: 41° 47' 1.61" / Longitude: -72° 42' 13.66"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 119-foot level of the existing 145-foot monopole at 123 Costello Road in Newington, CT. The tower and property are owned by Crown Castle. AT&T now intends to replace three (3) antennas with two (2) new CCI and one (1) new Quintel 1.9 GHz antennas. These antennas would be installed at the 119-foot level of the tower. AT&T also intends to install three (3) RRU32s.

This facility was approved by the Connecticut Siting Council in Docket No. 126 on April 9, 1990. This approval included the conditions that:

1. The monopole tower including antennas and associated equipment shall not exceed a height of 153 feet above ground level, 215 AMSL.

2. The facility shall be constructed in accordance with the State of Connecticut Basic Building Code.

3. The tower shall be designed and constructed to withstand 125 mph winds with two-inch radial ice accumulation.

4. The Certificate Holder shall prepare a Development and Management (D&M) plan for this site in compliance with the Section 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The D&M plan shall include detailed plans of the site preparation with a soil boring report; plans design details, and specifications for the tower foundation; and a site plan with placement of the tower as far removed from abutting properties and structures as possible.

5. The Certificate Holder shall prepare the D&M plan in the consultation with the City of Hartford, which may provide its comments to the Council within 20 days of submission to the City.

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

7. The Certificate Holder shall provide the Council a recalculated report of power density if and when additional channels over the proposed 90 channels, higher wattage over the proposed 100 watts per channel, or if other circumstances in operation cause a change in power density above the levels originally calculated in the application.

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

9. If this facility does not initially provide, or permanently ceases to provide, cellular service following the completion of construction, this Decision and Oder shall be void, and the tower and all associated equipment in the application shall be dismantled and removed or reapplication of any new use shall be made to the Council before any such new use is made.

10. Unless otherwise approved by the Council, this Decision and Order shall be void if construction authorized herein is not completed within three years of the effected date of this Decision and Order.

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 The Honorable Luke Bronin, Mayor, City of Hartford as well as the property owner, and Crown Castle is the tower owner.

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

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

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

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

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

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

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

Sincerely,

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

Attachments:

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

cc: The Honorable Luke Bronin, Mayor, City of Hartford
Office of the Mayor
550 Main Street Room 200
Hartford, CT 06103

DOCKET NO. 126 - AN APPLICATION OF METRO MOBILE CTS OF HARTFORD, INC., FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, OPERATION, AND MAINTENANCE OF A CELLULAR TELEPHONE TOWER AND ASSOCIATED EQUIPMENT IN THE CITY OF HARTFORD, CONNECTICUT.	:	Connecticut Siting Council
	:	April 9, 1990

D E C I S I O N A N D O R D E R

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council finds that the effects associated with the construction, operation, and maintenance of a cellular telephone facility at the proposed Hartford site, including effects on the natural environment; ecological integrity and balance; forests and parks; air and water purity; and fish and wildlife are not significant either alone or cumulatively with other effects, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application, and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by Section 16-50k of the General Statutes of Connecticut (CGS), be issued to Metro Mobile CTS of Hartford, Inc., for the construction, operation, and maintenance of a cellular telecommunications tower, associated equipment, and building at the proposed site in Hartford, Connecticut.

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

1. The monopole tower including antennas and associated equipment shall not exceed a height of 153 feet above ground level, 215 feet AMSL.

2. The facility shall be constructed in accordance with the State of Connecticut Basic Building Code.

3. The tower shall be designed and constructed to withstand 125 mph winds with two-inch radial ice accumulation.

4. The Certificate Holder shall prepare a Development and Management (D&M) plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The D&M plan shall include detailed plans of the site preparation with a soil boring report; plans, design details, and specifications for the tower foundation; and a site plan with placement of the tower as far removed from abutting properties and structures as possible.

5. The Certificate Holder shall prepare the D&M plan in consultation with the City of Hartford, which may provide its comments to the Council within 20 days of submission to the City.

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

7. The Certificate Holder shall provide the Council a recalculated report of power density if and when additional channels over the proposed 90 channels, higher wattage over the proposed 100 watts per channel, or if other circumstances in operation cause a change in power density above the levels originally calculated in the application.

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

9. If this facility does not initially provide, or permanently ceases to provide, cellular service following the completion of construction, this Decision and Order shall be void, and the tower and all associated equipment in this application shall be dismantled and removed or reapplication of any new use shall be made to the Council before any such new use is made.

10. Unless otherwise approved by the Council, this Decision and Order shall be void if construction authorized herein is not completed within three years of the effective date of this Decision and Order.

Pursuant to Section 16-50p of the CGS, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below. A notice of issuance shall be published in the Hartford Courant.

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

The parties or intervenors to this proceeding are:

(Applicant)

Metro Mobile CTS of
Hartford, Inc.
100 Corporate Drive
Windsor, CT 06095
Attn: Gary N. Schulman
Vice President and
General Manager

(Its Representative)

Robinson & Cole
One Commercial Plaza
Hartford, CT 06103-3597
Attn: Earl W. Phillips
Jr., Esq.

(Intervenor)

SNET Cellular, Inc.
227 Church Street
New Haven, CT 06506

(Its Representative)

Peter J. Tyrrell
Senior Attorney
SNET Cellular, Inc.
227 Church Street
Room 1021
New Haven, CT 06506

JAW

4248E

CERTIFICATION

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case in Docket No. 126 - An application of Metro Mobile CTS of Hartford, Inc., for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a cellular telephone tower and associated equipment in the City of Hartford, Connecticut, or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut the 9th day of April, 1990.

Council Members	Vote Cast
Gloria Dibble Pond Gloria Dibble Pond Chairperson	Yes
Commissioner Peter Boucher Designee: Robert A. Pulito	Yes
Commissioner Leslie Carothers Designee: Brian Emerick	Yes
Harry E. Covey Harry E. Covey	Yes
Mortimer A. Gelston Mortimer A. Gelston	Yes
Daniel P. Lynch, Jr. Daniel P. Lynch, Jr.	Yes
Paulann H. Sheets Paulann H. Sheets	Abstain
William H. Smith William H. Smith	Yes
Colin C. Tait Colin C. Tait	Yes

PROJECT INFORMATION

SCOPE OF WORK:
LTE 3C

- AT&T ANTENNAS (1) NEW ANTENNA PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (3) NEW ANTENNAS. (1) EXISTING ANTENNA TO BE REMOVED PER SECTOR, FOR A TOTAL OF (3) ANTENNAS TO BE REMOVED. (2) EXISTING ANTENNAS TO REMAIN PER SECTOR, FOR A TOTAL OF (6) EXISTING ANTENNAS.
- AT&T RRUS: (1) NEW RRUs PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (3) NEW RRUs; (2) EXISTING RRUS PER SECTOR TO REMAIN, FOR A TOTAL OF (6) EXISTING RRUs.

SITE ADDRESS:	439–455 HOMESTEAD AVENUE HARTFORD, CT 06112
LATITUDE:	41.7835919 41° 47' 0.93084" N
LONGITUDE:	–72.7041969 –72° 42' 15.11604" W
USID:	4544
TOWER OWNER:	
TYPE OF SITE:	MONOPOLE/OUTDOOR EQUIPMENT
MONOPOLE HEIGHT:	140'–0"±
RAD CENTER:	119'–0"±
CURRENT USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
PROPOSED USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

DRAWING INDEX

		REV.
T–1	TITLE SHEET	0
GN–1	GROUNDING & GENERAL NOTES	0
A–1	COMPOUND LAYOUT	0
A–2	EQUIPMENT LAYOUT	0
A–3	ANTENNA LAYOUTS & ELEVATION	0
A–4	DETAILS	0
A–5	RRU MOUNTING DETAILS	0
G–1	GROUNDING, ONE–LINE DIAGRAM & DETAILS	0

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN, ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AMD MAY IMPOSE CHANGES OR SITE MODIFICATIONS.

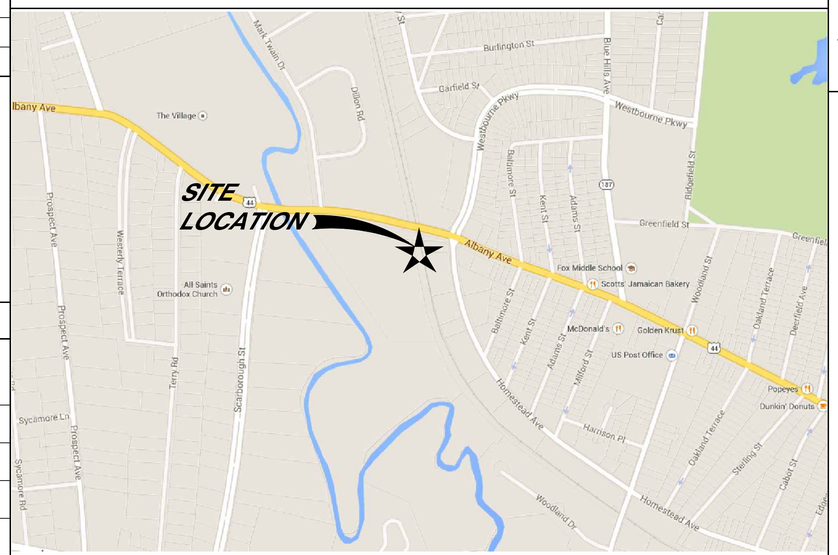
DISCIPLINE:	NAME:	DATE:
SITE ACQUISITION:		
CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		

at&t MOBILITY

FA CODE: 10071191
SITE NUMBER: CT5131
SITE NAME: NW HARTFORD

VICINITY MAP

1. START OUT GOING NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD; 0.4 MILES. TURN LEFT ONTO CAPITAL BLVD; 0.6 MILES. TURN LEFT ONTO WEST ST; 0.8 MILES. MERGE ONTO I–91 N VIA THE RAMP ON THE LEFT TOWARD HARTFORD; 0.9 MILES. TAKE THE I–84 W EXIT, EXIT 32A–32B, ON THE LEFT TOWARD TRUMBULL ST/WATERBURY; 10.1 MILES. TAKE THE I–91 N EXIT TOWARD SPRINGFIELD; 10.3 MILES. TAKE THE TRUMBULL STREET EXIT, EXIT 32B, ON THE LEFT; 10.5 MILES. RAMP BECOMES TRUMBULL ST; 10.6 MILES. TURN RIGHT ONTO US–44/MAIN ST, CONTINUE TO FOLLOW US–44, MAP US–44 IS JUST PAST WINDSOR ST; 12.3 MILES. TURN LEFT ONTO BALTIMORE ST, BALTIMORE ST IS JUST PAST KENT ST, HARTFORD ALL NATIONS SDA CHR IS ON THE LEFT; 12.5 MILES. TURN SHARP RIGHT ONTO HOMESTEAD AVE.



PROJECT TEAM

CLIENT REPRESENTATIVE
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617–639–4908
EMAIL: dcooper@empiretelecomm.com

SITE ACQUISITION:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617–639–4908
EMAIL: dcooper@empiretelecomm.com

ZONING:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617–639–4908
EMAIL: dcooper@empiretelecomm.com

ENGINEERING:
COMPANY: COM–EX CONSULTANTS, LLC
ADDRESS: 115 ROUTE 46, SUITE E39, MOUNTAIN LAKES, NJ 07046
CONTACT: NICHOLAS D. BARILE, P.E.
PHONE: 862–209–4300
EMAIL: nbarile@comexconsultants.com

RF ENGINEER:
COMPANY: AT&T MOBILITY – NEW ENGLAND
ADDRESS: 550 COCHITUATE ROAD, SUITE 550 13 & 14, FRAMINGHAM, MA 01701
CONTACT: CAMERON SYME
PHONE: 508–596–7146
EMAIL: cs6970@att.com

CONSTRUCTION MANAGEMENT:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: GRZEGORZ "GREG" DORMAN
PHONE: 484–683–1750
EMAIL: gdorman@empiretelecomm.com

GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY, AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CONNECTICUT ONE CALL SYSTEM, INC. 1-800-922-4455 STOP · CALL BEFORE YOU DIG!

CONNECTICUT LAW REQUIRES TWO WORKING DAYS NOTICE PRIOR TO ANY EARTH MOVING ACTIVITIES BY CALLING 800–922–4455 OR DIAL 811

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5131
SITE NAME: NW HARTFORD
439–455 HOMESTEAD AVENUE
HARTFORD, CT 06112
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	12/11/15	ISSUED AS FINAL	PV	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: CJT | DRAWN BY: PAV

SEAL: STATE OF CONNECTICUT · DOUGLAS D. BRUSH · 18043 · REGISTERED PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER
CT LICENSE NO. 18043

AT&T

DRAWING TITLE: TITLE SHEET

JOB NUMBER	DRAWING NUMBER	REV
15195–EMP	T–1	0

GROUNDING NOTES:

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

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

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 25471-000-3PS-EG00-0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.

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

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

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

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

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.

13. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV-G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE CHANGED FROM 2 AWG TO 2/0 AWG. IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM EIGHT FEET (8') TO TEN FEET (10').

14. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE ½" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR – EMPIRE TELECOM
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY
   OEM – ORIGINAL EQUIPMENT MANUFACTURER

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR (EMPIRE TELECOM).

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

7. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

8. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR

9. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

12. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

14. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy=36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741-000-3APS-A00Z-00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

16. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

17. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

18. SINCE THE CELL SITE MAY BE ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

19. SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
    - INTERNATIONAL BUILDING CODE: IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
    - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
    - FIRE/LIFE SAFETY CODE: NFPA-101 2009 WITH LOCAL & COUNTY AMENDMENTS

20. SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:
    - AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
    - AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, THIRTEENTH EDITION
    - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
    - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA-222-G-1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
    - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
    - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
    - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVELY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT
    - TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

21. FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

22. 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 AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.

23. INFORMATION SHOWN ON THIS SET OF PLANS TAKEN FROM DRAWINGS PREPARED BY HUDSON DESIGN GROUP FOR AN LTE UPGRADE DATED 04/05/2012. CONTRACTOR TO NOTIFY DESIGN ENGINEER OF ANY DISCREPANCIES PRIOR TO COMMENCEMENT OF CONSTRUCTION.

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PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
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BILLERICA, MA 01821

SITE NUMBER: CT5131
SITE NAME: NW HARTFORD

439-455 HOMESTEAD AVENUE
HARTFORD, CT 06112
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	12/11/15	ISSUED AS FINAL	PV	NDB	NDB

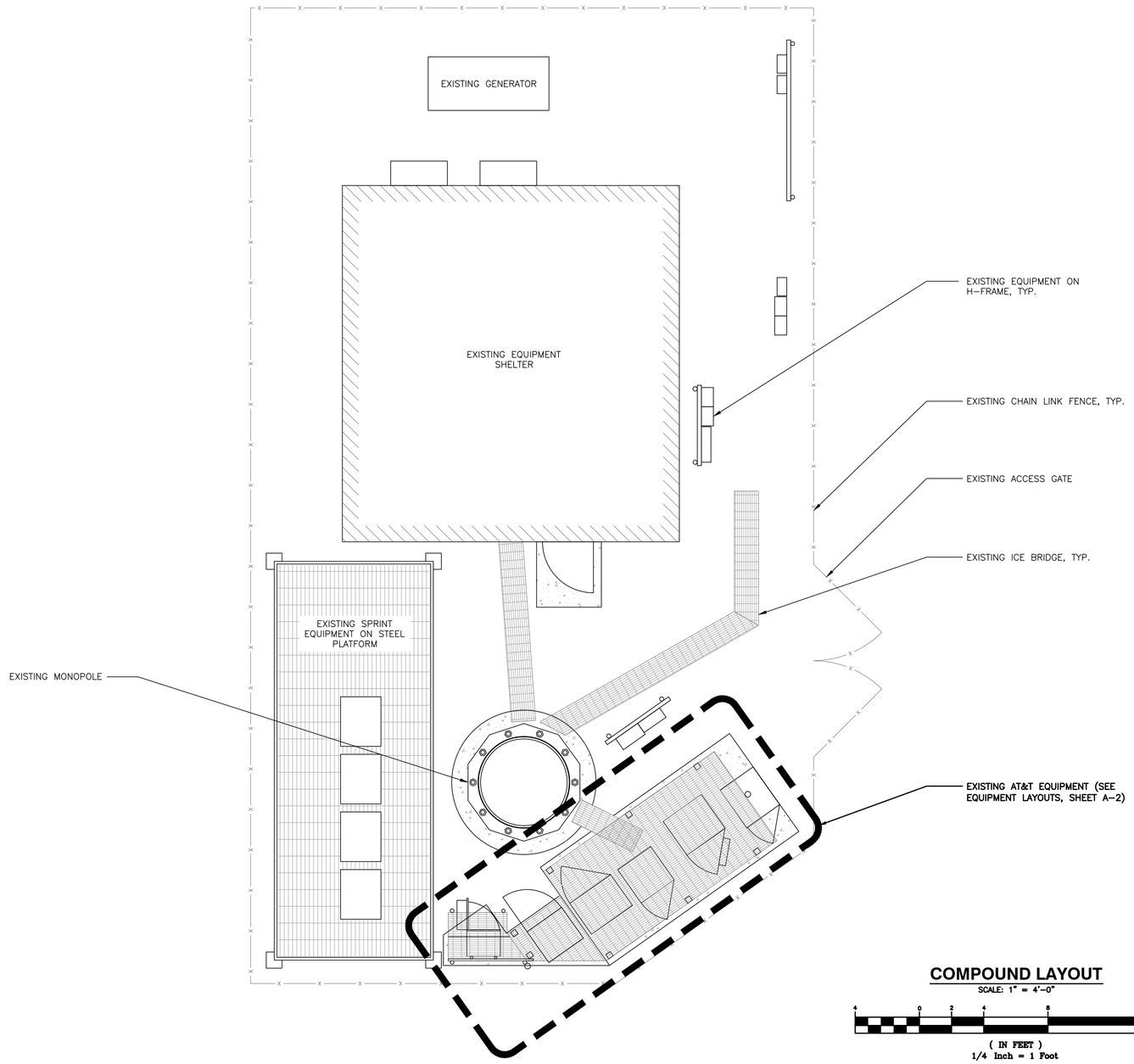
SCALE: AS SHOWN | DESIGNED BY: CJT | DRAWN BY: PAV

SEAL:
STATE OF CONNECTICUT
DOUGLAS G. BALL
LICENSED PROFESSIONAL ENGINEER
PROFESSIONAL ENGINEER
CT LICENSE NO. 23643

AT&T

DRAWING TITLE:
GROUNDING & GENERAL NOTES

JOB NUMBER	DRAWING NUMBER	REV
15195-EMP	GN-1	0

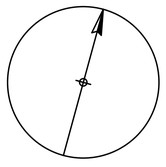


COMPOUND LAYOUT

SCALE: 1" = 4'-0"

4 0 2 4 8 16

(IN FEET)
1/4 Inch = 1 Foot



NORTH

NOTE:
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 AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.

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SCALE: AS SHOWN | DESIGNED BY: CJT | DRAWN BY: PAV

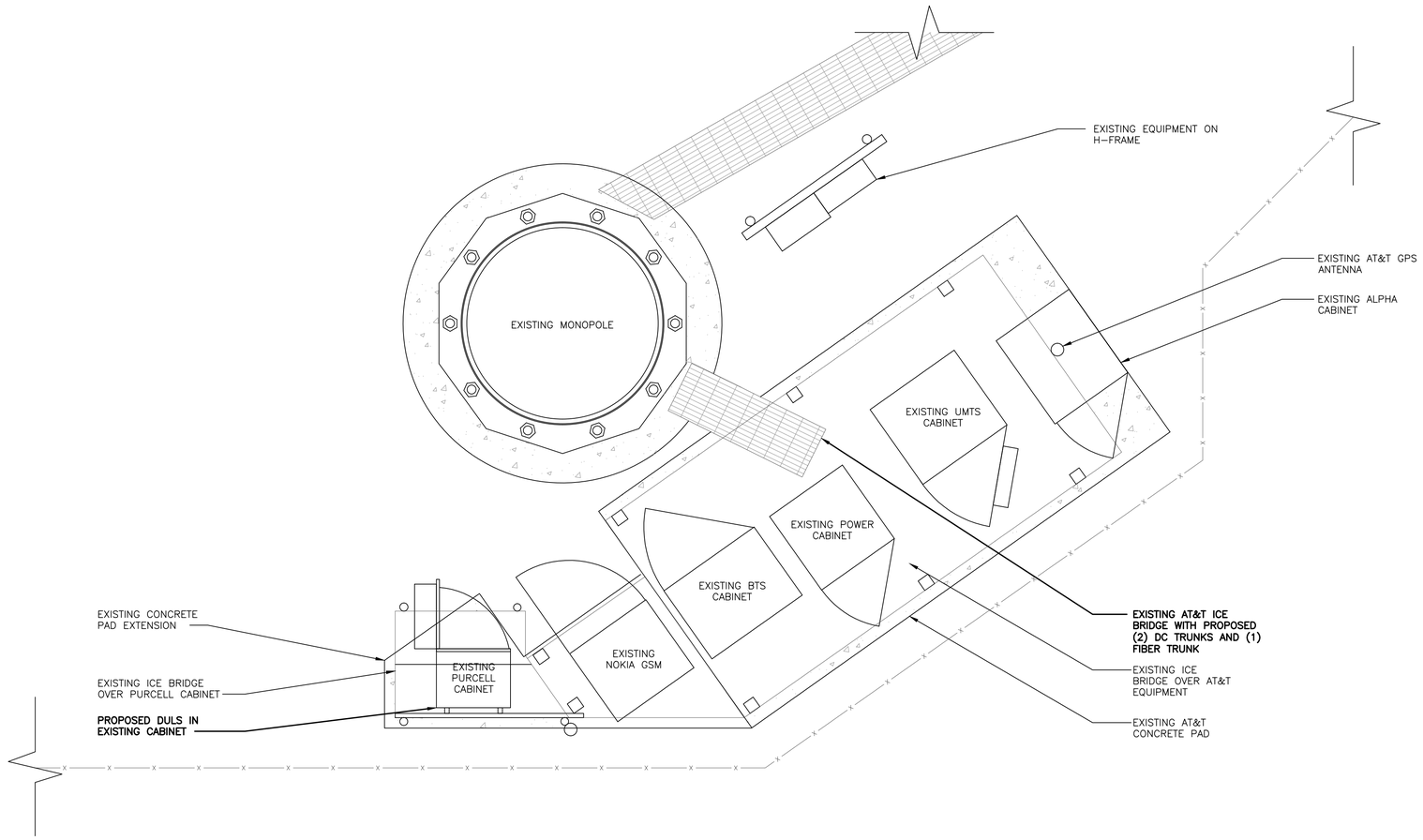
SEAL:

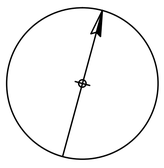
STATE OF CONNECTICUT
NICHOLAS D. BUTLER
LICENSED PROFESSIONAL ENGINEER
NICHOLAS D. BUTLER
PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

DRAWING TITLE:
COMPOUND LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
15195-EMP	A-1	0





EXISTING EQUIPMENT LAYOUT

SCALE: 1/2" = 1'-0"

2 0 1 2 4 8

(IN FEET)
1/2 Inch = 1 Foot

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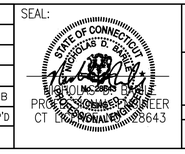
0	12/11/15	ISSUED AS FINAL	PV	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: CJT | DRAWN BY: PAV

SEAL:

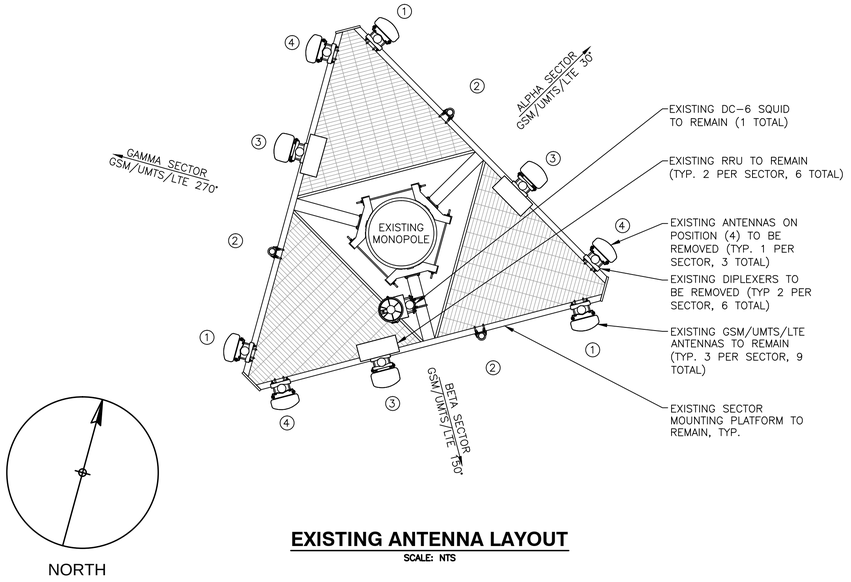


PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

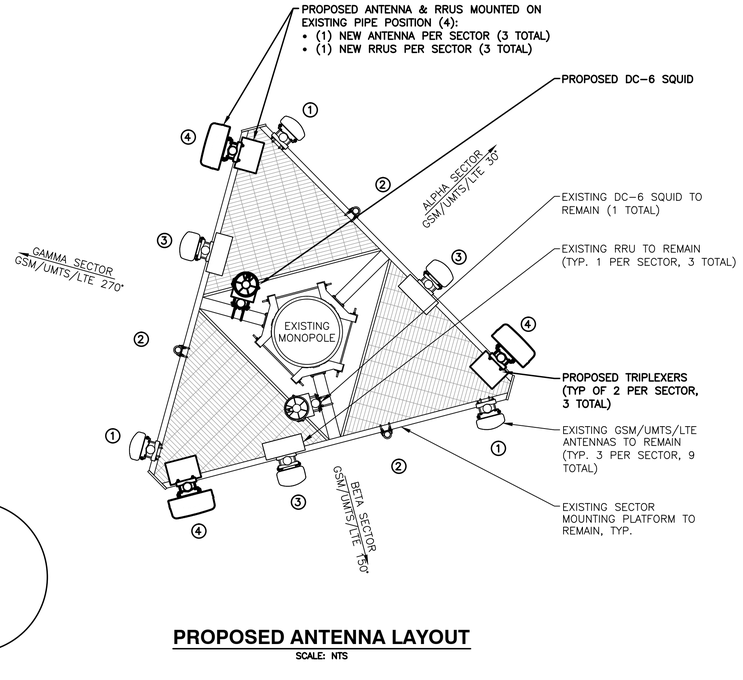
DRAWING TITLE:
EQUIPMENT LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
15195-EMP	A-2	0



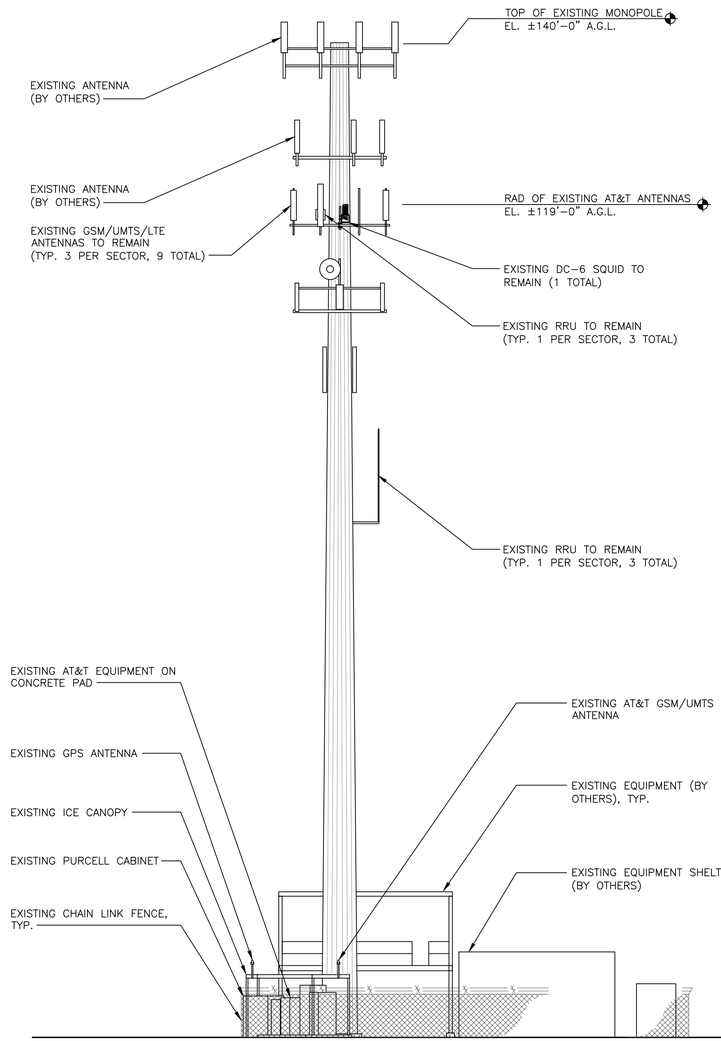
EXISTING ANTENNA LAYOUT

SCALE: NTS



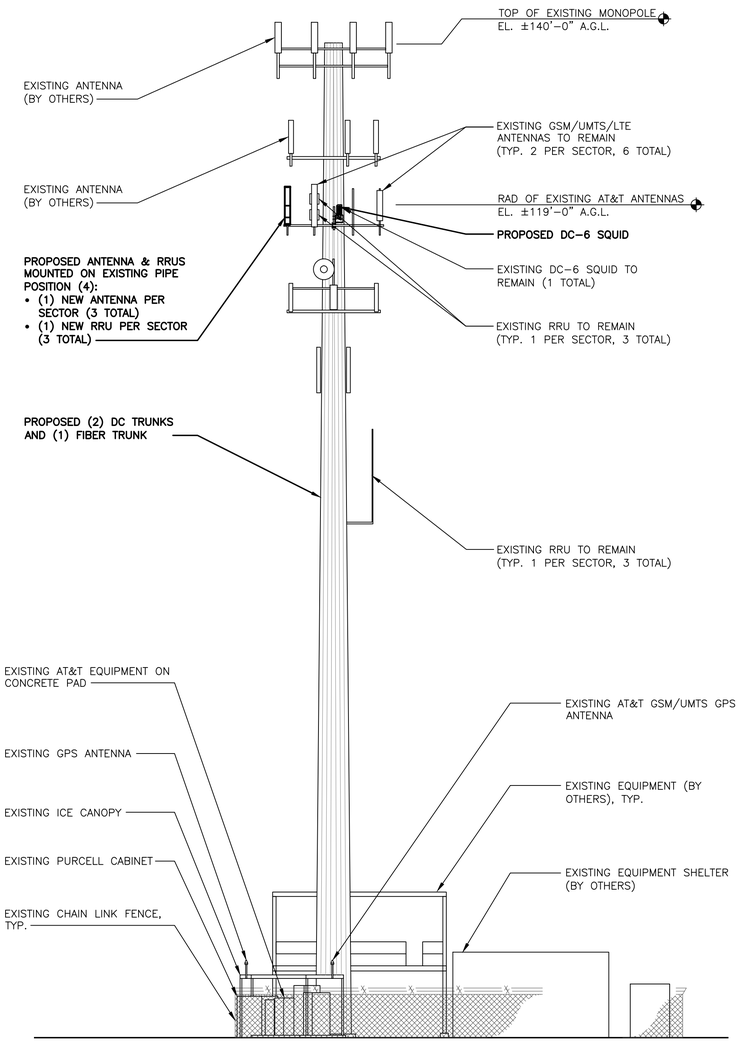
PROPOSED ANTENNA LAYOUT

SCALE: NTS



EXISTING TOWER ELEVATION

SCALE: NTS



PROPOSED TOWER ELEVATION

SCALE: NTS

PROJECT OWNER IS RESPONSIBLE FOR PROVIDING A STRUCTURAL STABILITY ANALYSIS TO DETERMINE THE CAPACITY AND SUITABILITY OF THE EXISTING ANTENNA SUPPORT STRUCTURE TO SAFELY CARRY ALL ADDITIONAL LOADS IMPOSED BY THE PROPOSED EQUIPMENT AS SHOWN HEREIN. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING ANY REQUIRED STRUCTURAL MODIFICATIONS INTO THEIR SCOPE OF WORK.

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SCALE: AS SHOWN | DESIGNED BY: CJT | DRAWN BY: PAV

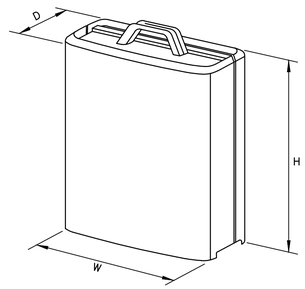
SEAL: STATE OF CONNECTICUT — NICHOLAS D. BARTH — 28643 — REGISTERED PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

DRAWING TITLE:
ANTENNA LAYOUTS & ELEVATION

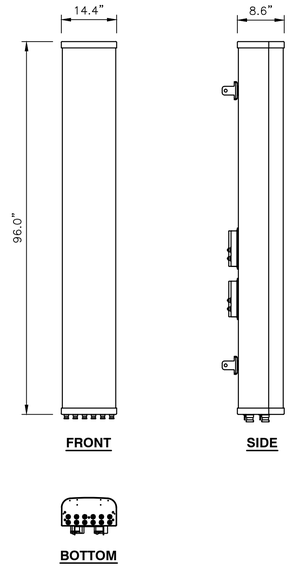
JOB NUMBER	DRAWING NUMBER	REV
15195-EMP	A-3	0



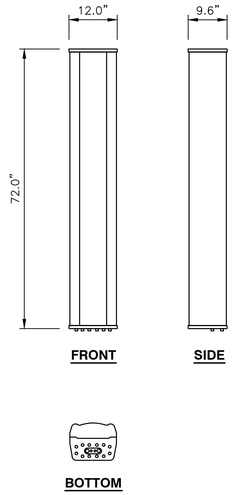
MODEL	L x W x H	WEIGHT
*RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
*RRUS-12	20.4" x 18.5" x 7.5"	58 LBS
RRUS-32	29.9" x 13.3" x 9.5"	77 LBS

*DENOTES EXISTING.

RRUS DETAIL
SCALE: N.T.S.



TPA-65R-LCUUUU-H8 (ALPHA SECTOR) ANTENNA DETAIL
SCALE: N.T.S.

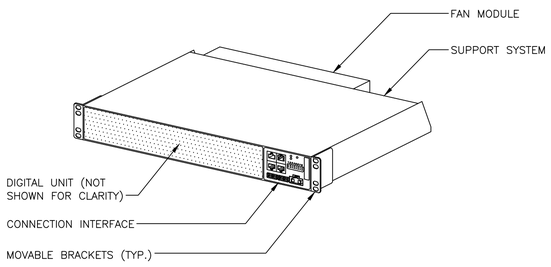


QS66512-3 (BETA & GAMMA SECTORS) ANTENNA DETAIL
SCALE: N.T.S.

ERICSSON RBS-6601

DIMENSIONS, WxDxH: 2.6"H x 13.77"D x 19"W

WEIGHT: <22 lbs.



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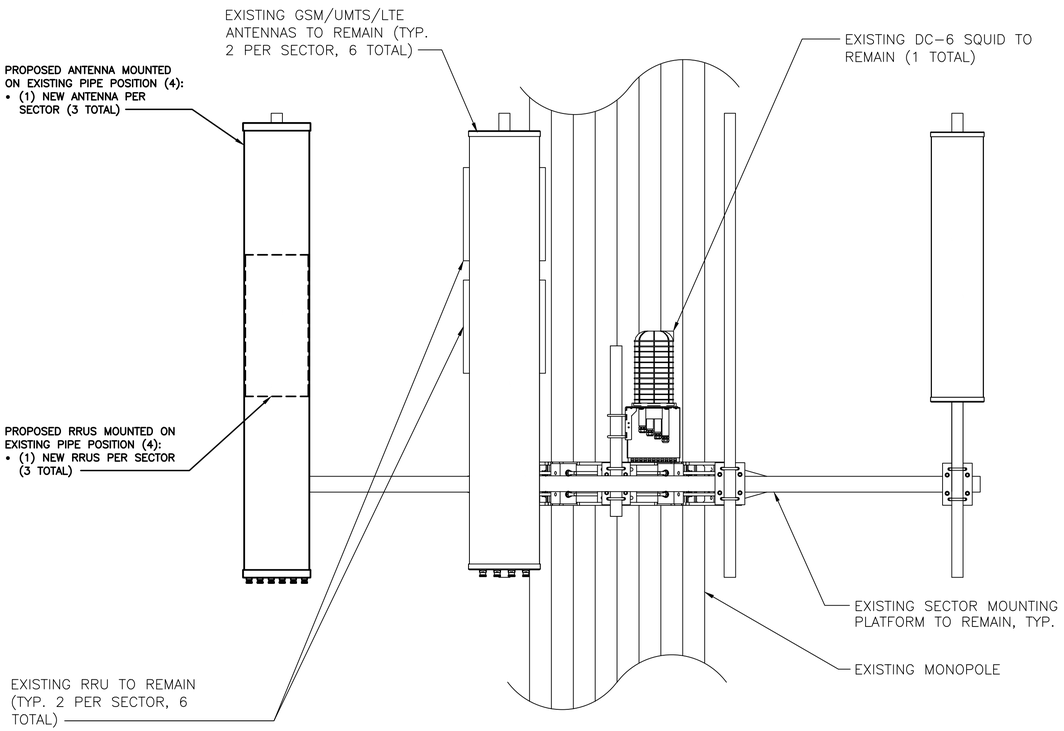
SCALE: AS SHOWN | DESIGNED BY: CJT | DRAWN BY: PAV

SEAL:
STATE OF CONNECTICUT
DOUGLAS B. BURDEN
LICENSED PROFESSIONAL ENGINEER
PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

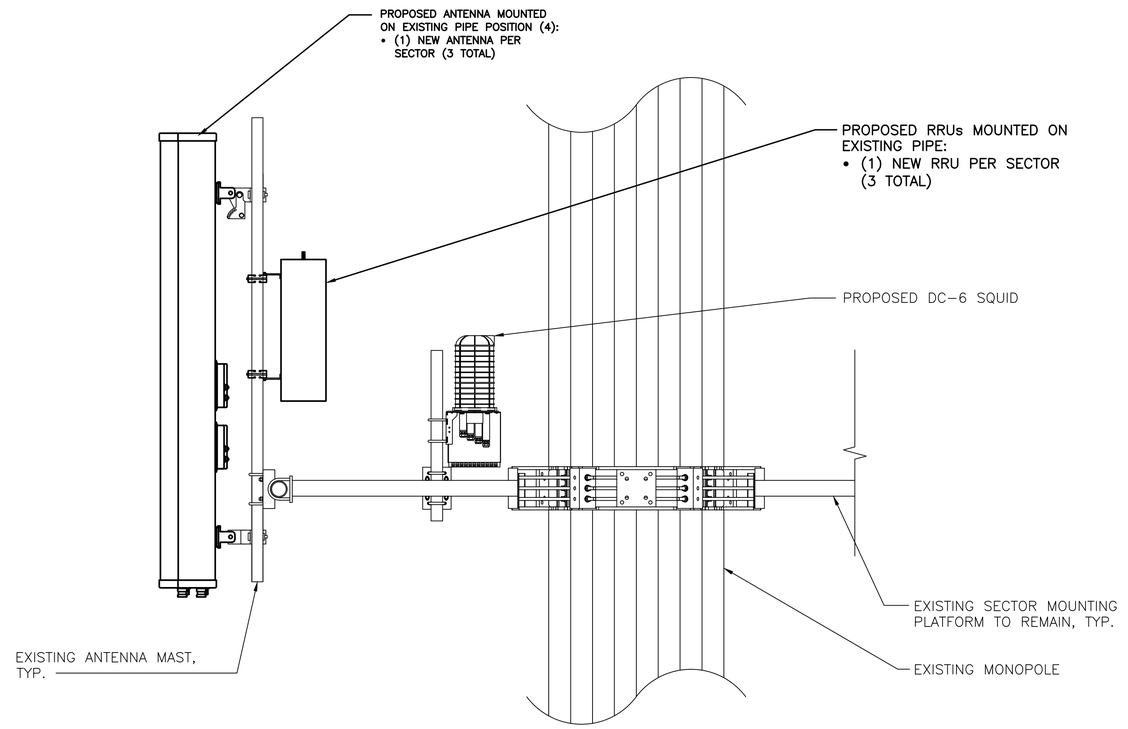
DRAWING TITLE: DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15195-EMP	A-4	0



PROPOSED ANTENNA & RRU MOUNTING DETAIL (FRONT VIEW)

SCALE: N.T.S.



PROPOSED ANTENNA & RRU MOUNTING DETAIL (SIDE VIEW)

SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	–	–	–
	A3	POWERWAVE	P65-17-XLH-RR	96"x12"x6"
	A4	POWERWAVE	7770	55"x11"x5"
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	–	–	–
	B3	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	B4	POWERWAVE	7770	55"x11"x5"
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	–	–	–
	G3	POWERWAVE	P65-16-XLH-RR	72"x12"x6"
	G4	POWERWAVE	7770	55"x11"x5"

FINAL ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	–	–	–
	A3	POWERWAVE	P65-17-XLH-RR	96"x12"x6"
	A4	**CCI**	**TPA-65R-LCUUUU-H8**	**96"x14.4"x8.6"**
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	–	–	–
	B3	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	B4	**QUINTEL**	**QS66512-3**	**72"x12"x9.6"**
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	–	–	–
	G3	POWERWAVE	P65-16-XLH-RR	72"x12"x6"
	G4	**QUINTEL**	**QS66512-3**	**72"x12"x9.6"**

FINAL RRU SCHEDULE

SECTOR	MAKE	MODEL	SIZE (INCHES)	ADDITIONAL COMPONENT	SIZE (INCHES)
ALPHA	ERICSSON	RRUS-12 (EXISTING)	20.4"x18.5"x7.5"		
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
	ERICSSON	**RRUS-32**	**29.9x13.3x9.5**		
BETA	ERICSSON	RRUS-12 (EXISTING)	20.4"x18.5"x7.5"		
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
	ERICSSON	**RRUS-32**	**29.9x13.3x9.5**		
GAMMA	ERICSSON	RRUS-12 (EXISTING)	20.4"x18.5"x7.5"		
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
	ERICSSON	**RRUS-32**	**29.9x13.3x9.5**		

PROJECT OWNER IS RESPONSIBLE FOR PROVIDING A STRUCTURAL STABILITY ANALYSIS TO DETERMINE THE CAPACITY AND SUITABILITY OF THE EXISTING ANTENNA SUPPORT STRUCTURE TO SAFELY CARRY ALL ADDITIONAL LOADS IMPOSED BY THE PROPOSED EQUIPMENT AS SHOWN HEREIN. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING ANY REQUIRED STRUCTURAL MODIFICATIONS INTO THEIR SCOPE OF WORK.

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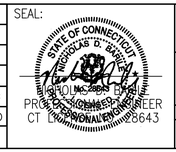
NO.	DATE	REVISIONS	BY	CHK	APP'D
0	12/11/15	ISSUED AS FINAL	PV	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: CJT | DRAWN BY: PAV

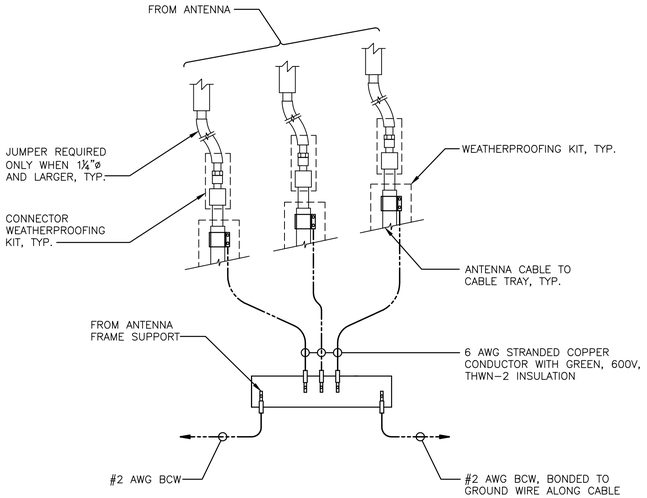
SEAL:



AT&T

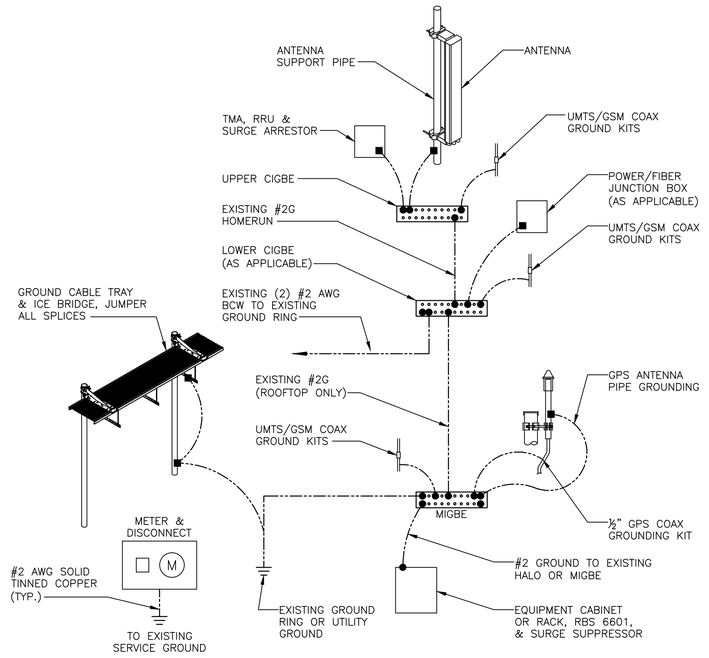
DRAWING TITLE:
RRU MOUNTING DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15195-EMP	A-5	0



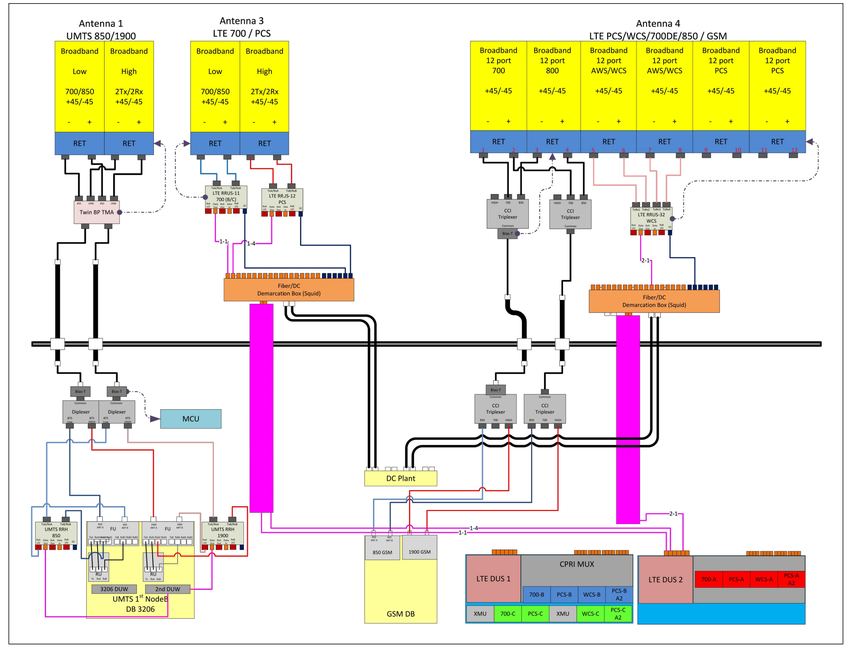
GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



GROUNDING RISER DIAGRAM

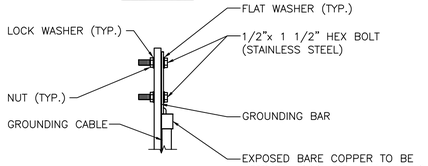
SCALE: N.T.S.



TYPICAL PLUMBING DIAGRAM (PER SECTOR)

SCALE: N.T.S.

ELEVATION



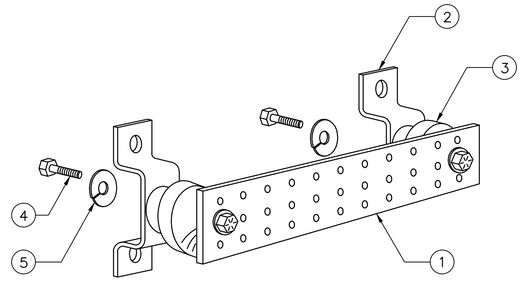
SECTION "A–A"

NOTE:

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

TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20"x 4"x ¼")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	⅝"–11x1" H.H.C.S.
5	4	⅝" LOCK WASHER

NOTES:

EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION

SECTION "P" – SURGE PRODUCERS
- CABLE ENTRY PORTS (HATCH PLATES) (#2)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- TELCO GROUND BAR
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
- +24V POWER SUPPLY RETURN BAR (#2)
- –48V POWER SUPPLY RETURN BAR (#2)
- RECTIFIER FRAMES

SECTION "A" – SURGE ABSORBERS
- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)

GROUND BAR DETAIL

SCALE: N.T.S.

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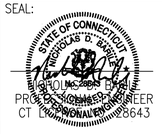
SEAL:



AT&T

DRAWING TITLE:
GROUNDING, ONE–LINE DIAGRAM & DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15195–EMP	G–1	0

Date: **December 09, 2015**

Darcy Tarr
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Destek Engineering, LLC
1281 Kennestone Circle, Ste. 100
Marietta, GA 30066
(770) 693-0835

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT5131
	Carrier Site Name:	NW Hartford
Crown Castle Designation:	**Crown Castle BU Number:**	806369
	Crown Castle Site Name:	HRT 094 943225
	Crown Castle JDE Job Number:	358359
	Crown Castle Work Order Number:	1162729
	Crown Castle Application Number:	323211 Rev. 1
Engineering Firm Designation:	**Destek Engineering, LLC Project Number:**	1502501
Site Data:	**439-455 HOMESTEAD AVE, HARTFORD, Hartford County, CT** **Latitude *41° 47' 1.61"*, Longitude *-72° 42' 13.66"*** **140 Foot - Monopole Tower**	

Dear Darcy Tarr,

Destek Engineering, LLC 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 852717, in accordance with application 323211, revision 1.

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

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

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code requirements based upon a wind speed of 80 mph fastest mile.

All modifications and 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 *Destek Engineering, LLC* 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.

Structural analysis prepared by: Bowen Shen, EIT

Respectfully submitted by:

12/09/2015

Ahmet Colakoglu, PE
President

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 140 ft Monopole tower mapped by Tower Engineering Professionals in July of 2008. The tower original design standard and wind speed are unknown.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 38 mph with 1 inch ice thickness and 50 mph under service loads.

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
115.0	117.0	1	cci antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe	2 1	3/4 3/8	-
		3	ericsson	RRUS 12			
		3	ericsson	RRUS 32			
		2	quintel technology	QS66512-3 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			

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
142.0	142.0	3	alcatel lucent	RRH2x40-AWS	13	1-5/8	1
		3	amphenol	BXA-80063-4BF-EDIN-X w/ Mount Pipe			
		3	antel	BXA-171063-8BF-EDIN-2 w/ Mount Pipe			
		3	antel	BXA-171063/8CF-EDIN-2 w/ Mount Pipe			
		3	css	X7C-FRO-660-V w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 712-1]			
126.0	128.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	-	-	2
		3	ericsson	AIR 21 B2A B4P w/ Mount Pipe	12 1	1-5/8 1-1/4	1
		3	ericsson	AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	RRUS 11 B12	-	-	2
	126.0	3	rfs celwave	ATMAA1412D-1A20	-	-	1
		1	tower mounts	Platform Mount [LP 712-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
115.0	117.0	3	ericsson	RRUS-11	-	-	1
		3	ericsson	RRUS-11	-	-	3
		1	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe	2 12 1	3/4 1-5/8 3/8	1
		6	powerwave technologies	7020.00			
		6	powerwave technologies	7020.00	-	-	3
		3	powerwave technologies	7770.00 w/ Mount Pipe			1
		3	powerwave technologies	7770.00 w/ Mount Pipe			3
		6	powerwave technologies	LGP21401			1
		6	powerwave technologies	LGP21401			3
		2	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			1
		1	raycap	DC6-48-60-18-8F			
	115.0	1	tower mounts	Platform Mount [LP 712-1]			
103.0	104.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	-	-	1
	103.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Pipe Mount [PM 601-3]			
	102.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER			
102.0	108.0	1	andrew	VHLP2-180	3 1 3 3 3	1-1/4 5/8 1/4 5/16 1/2	1
		1	andrew	VHLP2.5-11			
	104.0	3	alcatel lucent	TD-RRH8x20-25			
		3	argus technologies	LLPX310R-V1 w/ Mount Pipe			
		1	powerwave technologies	P40-16-XLPP-RR-A w/ Mount Pipe			
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
	102.0	2	dragonwave	HORIZON COMPACT			
		3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
		3	samsung telecommunications	WIMAX DAP HEAD			
		1	tower mounts	Platform Mount [LP 712-1]			
94.0	94.0	3	kathrein	742 213	6	1-5/8	1
		1	Tower mounts	Pipe Mount [PM 602-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
74.0	80.0	1	antel	BCD-87010	1	7/8	1

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

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)
Unknown						

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Tower Engineering Professionals, Project #081972.03, 08/04/2008	2294838	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Tower Engineering Professionals, Project #081972, 07/28/2008	2294380	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Tower Engineering Professionals, Project #081972, 07/28/2008	2294379	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	Crown Castle, Project #1121759, 09/21/2015	5894652	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), 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.

This analysis may be affected if any assumptions are not valid or have been made in error. Destek Engineering, LLC 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	140 - 86.8333	Pole	TP39.223x26.216x0.313	1	-19.559	1962.962	54.9	Pass
L2	86.8333 - 38	Pole	TP50.56x37.212x0.406	2	-31.937	3294.136	74.2	Pass
L3	38 - 0	Pole	TP59.05x48.033x0.5	3	-49.342	4900.574	72.5	Pass
							Summary	
						Pole (L2)	74.2	Pass
						Rating =	74.2	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	79.7	Pass
1	Base Plate	0	27.6	Pass
1	Base Foundation	0	55.0	Pass
1	Base Foundation Soil Interaction	0	33.0	Pass

Structure Rating (max from all components) =	79.7%

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

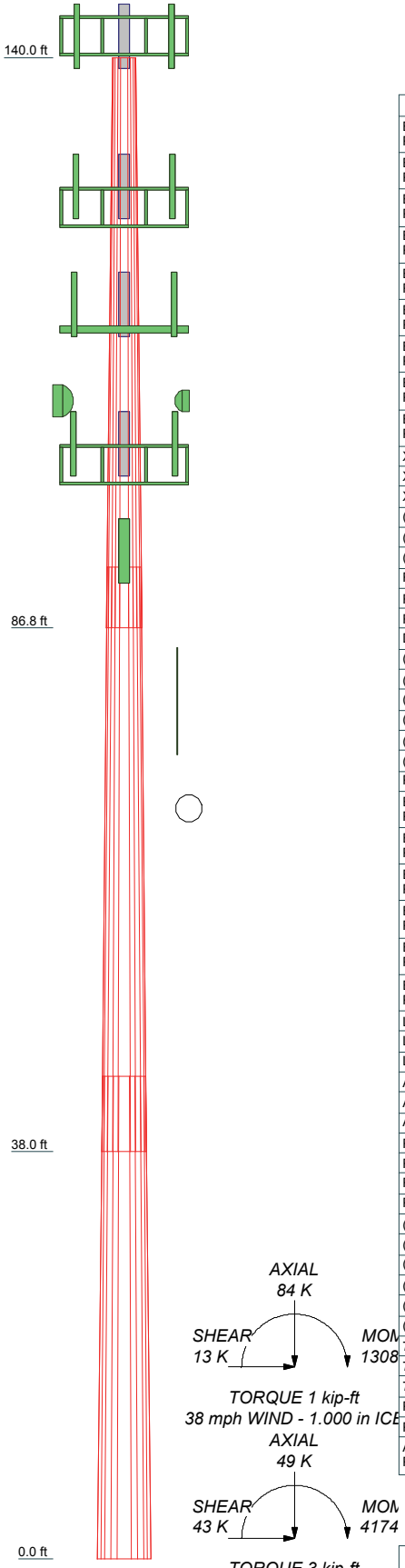
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. 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	53.167	12	0.313	5.667	26.216	39.223		5.9
2	54.500	12	0.406	7.000	37.212	50.560	A572-65	10.5
3	45.000	12	0.500		48.033	59.050		13.1
								29.5



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
BXA-80063-4BF-EDIN-X w/ Mount Pipe	142	(2) LGP21401	115
BXA-80063-4BF-EDIN-X w/ Mount Pipe	142	(2) LGP21401	115
BXA-80063-4BF-EDIN-X w/ Mount Pipe	142	(2) LGP21401	115
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	142	(2) 7020.00	115
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	142	(2) 7020.00	115
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	142	(2) 7020.00	115
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	142	DC6-48-60-18-8F	115
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	142	RRUS-11	115
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	142	RRUS-11	115
X7C-FRO-660-V w/ Mount Pipe	142	RRUS-11	115
X7C-FRO-660-V w/ Mount Pipe	142	TPA-65R-LCUUUU-H8 w/ Mount Pipe	115
X7C-FRO-660-V w/ Mount Pipe	142	QS66512-3 w/ Mount Pipe	115
(2) FD9R6004/2C-3L	142	QS66512-3 w/ Mount Pipe	115
(2) FD9R6004/2C-3L	142	RRUS 12	115
(2) FD9R6004/2C-3L	142	RRUS 12	115
RRH2x40-AWS	142	RRUS 12	115
RRH2x40-AWS	142	RRUS 32	115
RRH2x40-AWS	142	RRUS 32	115
DB-T1-6Z-8AB-0Z	142	RRUS 32	115
(2) 12' Hor x 4" x 4" Angle Mount	142	DC6-48-60-18-8F	115
(2) 12' Hor x 4" x 4" Angle Mount	142	Platform Mount [LP 712-1]	115
(2) 12' Hor x 4" x 4" Angle Mount	142	8'x2 1/2" Pipe Mount	115
(2) 4' x 2" Pipe Mount	142	8'x2 1/2" Pipe Mount	115
(2) 4' x 2" Pipe Mount	142	8'x2 1/2" Pipe Mount	115
(2) 4' x 2" Pipe Mount	142	PCS 1900MHz 4x45W-65MHz	103
Platform Mount [LP 712-1]	142	PCS 1900MHz 4x45W-65MHz	103
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	PCS 1900MHz 4x45W-65MHz	103
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	PCS 1900MHz 4x45W-65MHz	103
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	PCS 1900MHz 4x45W-65MHz	103
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	PCS 1900MHz 4x45W-65MHz	103
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	800MHz 2X50W RRH W/FILTER	103
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	800MHz 2X50W RRH W/FILTER	103
LNX-6515DS-VTM w/ Mount Pipe	126	800MHz 2X50W RRH W/FILTER	103
LNX-6515DS-VTM w/ Mount Pipe	126	Pipe Mount [PM 601-3]	103
LNX-6515DS-VTM w/ Mount Pipe	126	APXVTM14-C-120 w/ Mount Pipe	102
ATMAA1412D-1A20	126	APXVTM14-C-120 w/ Mount Pipe	102
ATMAA1412D-1A20	126	APXVTM14-C-120 w/ Mount Pipe	102
ATMAA1412D-1A20	126	LLPX310R-V1 w/ Mount Pipe	102
RRUS 11 B12	126	LLPX310R-V1 w/ Mount Pipe	102
RRUS 11 B12	126	LLPX310R-V1 w/ Mount Pipe	102
RRUS 11 B12	126	APXVSPP18-C-A20 w/ Mount Pipe	102
RRUS 11 B12	126	APXVSPP18-C-A20 w/ Mount Pipe	102
Platform Mount [LP 712-1]	126	P40-16-XLPP-RR-A w/ Mount Pipe	102
(3) 12' Hor x 4" x 4" Angle Mount	126	TD-RRH8x20-25	102
(3) 12' Hor x 4" x 4" Angle Mount	126	TD-RRH8x20-25	102
(3) 12' Hor x 4" x 4" Angle Mount	126	TD-RRH8x20-25	102
(2) 8'x2 1/2" Pipe Mount	126	WIMAX DAP HEAD	102
(2) 8'x2 1/2" Pipe Mount	126	WIMAX DAP HEAD	102
(2) 8'x2 1/2" Pipe Mount	126	WIMAX DAP HEAD	102
7770.00 w/ Mount Pipe	115	IBC1900BB-1	102
7770.00 w/ Mount Pipe	115	IBC1900BB-1	102
7770.00 w/ Mount Pipe	115	IBC1900BB-1	102
P65-17-XLH-RR w/ Mount Pipe	115	IBC1900HG-2A	102
P65-17-XLH-RR w/ Mount Pipe	115	IBC1900HG-2A	102
AM-X-CD-16-65-00T-RET w/ Mount Pipe	115	IBC1900HG-2A	102
		HORIZON COMPACT	102
		HORIZON COMPACT	102
		Platform Mount [LP 712-1]	102
		12' Hor x 2.5" x 2.5" Angle Mount	102
		12' Hor x 2.5" x 2.5" Angle Mount	102
		12' Hor x 2.5" x 2.5" Angle Mount	102
		VHLP2-180	102
		VHLP2.5-11	102
		742 213	94
		Pipe Mount [PM 602-3]	94
		742 213	94
		742 213	94
		BCD-87010	74

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.

Destek Engineering, LLC
1281 Kennestone Circle, Ste. 100
Marietta, GA 30066
Phone: (770) 693-0835
FAX:

Job: 806369 HRT 094 943225			
Project: 1502501			
Client: Crown Castle	Drawn by: Ahmet Colakoglu		App'd:
Code: TIA/EIA-222-F	Date: 12/09/15		Scale: NTS
Path: Y:\2015\02 - Crown\1502501 - 806369 HRT 094 943225 Wo 1162729\TNXTower\806369 wo 1162729.eri			Dwg No. E-1

Tower Input Data

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

1) Tower is located in Hartford County, Connecticut.
2) Basic wind speed of 80 mph.
3) Nominal ice thickness of 1.000 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.000 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50.000 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) 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		Treat Feedline Bundles As Cylinder
	Consider Moments - Horizontals		Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Calculate Redundant Bracing Forces
	Use Moment Magnification	√	Use Clear Spans For Wind Area		Ignore Redundant Members in FEA
√	Use Code Stress Ratios		Use Clear Spans For KL/r		SR Leg Bolts Resist Compression
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		All Leg Panels Have Same Allowable
√	Escalate Ice	√	Bypass Mast Stability Checks		Offset Girt At Foundation
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Consider Feedline Torque
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Include Angle Block Shear Check
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Poles
	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends	√	Include Shear-Torsion Interaction
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	Add IBC .6D+W Combination		Use TIA-222-G Tension Splice Capacity Exemption		

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	140.000-86.833	53.167	5.667	12	26.216	39.223	0.313	1.250	A572-65 (65 ksi)
L2	86.833-38.000	54.500	7.000	12	37.212	50.560	0.406	1.625	A572-65 (65 ksi)
L3	38.000-0.000	45.000		12	48.033	59.050	0.500	2.000	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	27.141	26.065	2232.375	9.273	13.580	164.388	4523.397	12.829	6.188	19.803
	40.607	39.154	7566.452	13.930	20.318	372.410	15331.683	19.270	9.674	30.958
L2	39.961	48.146	8324.740	13.176	19.276	431.879	16868.180	23.696	8.884	21.868
	52.344	65.607	21064.222	17.955	26.190	804.282	42681.825	32.290	12.461	30.674

Section	Tip Dia.	Area	I	r	C	I/C	J	It/Q	w	w/t
	in	in^2	in^4	in	in	in^3	in^4	in^2	in	
L3	51.502	76.528	22069.805	17.017	24.881	887.010	44719.408	37.665	11.533	23.066
	61.133	94.266	41247.015	20.961	30.588	1348.475	83577.635	46.395	14.485	28.971

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
L1 140.000-86.833				1	1	1		
L2 86.833-38.000				1	1	1		
L3 38.000-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number		C_AA_A	Weight
				ft			ft^2/ft	klf
LDF7-50A(1-5/8")	A	No	Inside Pole	140.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
HB158-1-08U8-S8J18(1-5/8)	A	No	Inside Pole	140.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
*****								
LCF158-50JA-A0(1 5/8")	A	No	Inside Pole	126.000 - 0.000	6	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
LCF158-50JA-A0(1 5/8")	A	No	CaAa (Out Of Face)	126.000 - 0.000	1	No Ice	0.198	0.000
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
						2" Ice	0.598	0.010
						4" Ice	0.998	0.029
LCF158-50JA-A0(1 5/8")	A	No	CaAa (Out Of Face)	126.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.029
LCF158-50JA-A0(1 5/8")	C	No	CaAa (Out Of Face)	126.000 - 0.000	4	No Ice	0.000	0.000
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.029
MLE Hybrid 9Power/18Fiber RL 2(1 1/4)	C	No	CaAa (Out Of Face)	126.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.029
*****								
LDF7-50A(1-5/8")	B	No	Inside Pole	115.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
FB-L98B-034-XXXXXX(3/8")	B	No	Inside Pole	115.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000

Description	*Face or Leg*	*Allow Shield*	*Component Type*	*Placement*	*Total Number*		*C_AA_A*	*Weight*
				ft			*ft^2/ft*	*klf*
						4" Ice	0.000	0.000
WR-VG86ST-BRD(3/4)	B	No	Inside Pole	115.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
2" Rigid Conduit	B	No	Inside Pole	115.000 - 0.000	1	No Ice	0.000	0.003
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.003
						2" Ice	0.000	0.003
						4" Ice	0.000	0.003
******								
2" Rigid Conduit	A	No	CaAa (Out Of Face)	102.000 - 0.000	1	No Ice	0.200	0.003
						1/2" Ice	0.300	0.004
						1" Ice	0.400	0.006
						2" Ice	0.600	0.013
						4" Ice	1.000	0.032
2" Rigid Conduit	A	No	CaAa (Out Of Face)	102.000 - 0.000	1	No Ice	0.000	0.003
						1/2" Ice	0.000	0.004
						1" Ice	0.000	0.006
						2" Ice	0.000	0.013
						4" Ice	0.000	0.032
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	102.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
FSJ4-50B(1/2")	A	No	Inside Pole	102.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
LDF1-50A(1/4")	A	No	CaAa (Out Of Face)	102.000 - 0.000	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
ATCB-B01-005(5/16)	A	No	CaAa (Out Of Face)	102.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
ATCB-B01-005(5/16)	A	No	CaAa (Out Of Face)	102.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
HB114-1-08U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	102.000 - 0.000	3	No Ice	0.154	0.001
						1/2" Ice	0.254	0.002
						1" Ice	0.354	0.004
						2" Ice	0.554	0.010
						4" Ice	0.954	0.028
*****								
AVA7-50(1-5/8)	A	No	CaAa (Out Of Face)	94.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.030
*****								
LDF5-50A(7/8")	A	No	CaAa (Out Of Face)	74.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.003
						2" Ice	0.000	0.008
						4" Ice	0.000	0.025
*****								
Step Pegs (CaAa)	A	No	CaAa (Out Of Face)	140.000 - 0.000	1	No Ice	0.080	0.003
						1/2" Ice	0.180	0.004
						1" Ice	0.280	0.004
						2" Ice	0.480	0.006

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						4" Ice	0.880	0.009
Safety Line 3/8	A	No	CaAa (Out Of Face)	140.000 - 0.000	1	No Ice	0.037	0.000
						1/2" Ice	0.137	0.001
						1" Ice	0.238	0.001
						2" Ice	0.437	0.002
						4" Ice	0.838	0.004
*****								
FB-L98B-034-XXX(3/8)	B	No	Inside Pole	115.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
WR-VG86ST-BRD(3/4)	B	No	Inside Pole	115.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001

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	140.000-86.833	A	0.000	0.000	0.000	17.035	0.901
		B	0.000	0.000	0.000	0.000	0.425
		C	0.000	0.000	0.000	7.007	0.064
L2	86.833-38.000	A	0.000	0.000	0.000	25.174	1.250
		B	0.000	0.000	0.000	0.000	0.737
		C	0.000	0.000	0.000	22.560	0.177
L3	38.000-0.000	A	0.000	0.000	0.000	19.589	0.976
		B	0.000	0.000	0.000	0.000	0.573
		C	0.000	0.000	0.000	17.556	0.138

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	140.000-86.833	A	1.158	0.000	0.000	0.000	54.248	2.048
		B		0.000	0.000	0.000	0.000	0.425
		C		0.000	0.000	0.000	17.550	1.166
L2	86.833-38.000	A	1.079	0.000	0.000	0.000	70.415	4.694
		B		0.000	0.000	0.000	0.000	0.737
		C		0.000	0.000	0.000	56.506	1.908
L3	38.000-0.000	A	1.000	0.000	0.000	0.000	52.380	3.382
		B		0.000	0.000	0.000	0.000	0.573
		C		0.000	0.000	0.000	42.159	1.344

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	140.000-86.833	-0.168	-0.336	-0.313	-0.829
L2	86.833-38.000	-0.475	-0.338	-0.858	-0.739
L3	38.000-0.000	-0.494	-0.351	-0.907	-0.778

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
** 142 ft **									
BXA-80063-4BF-EDIN-X w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.089 5.515 5.953 6.859 8.816	3.472 4.045 4.640 5.957 8.886	0.030 0.070 0.116 0.227 0.554
BXA-80063-4BF-EDIN-X w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.089 5.515 5.953 6.859 8.816	3.472 4.045 4.640 5.957 8.886	0.030 0.070 0.116 0.227 0.554
BXA-80063-4BF-EDIN-X w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.089 5.515 5.953 6.859 8.816	3.472 4.045 4.640 5.957 8.886	0.030 0.070 0.116 0.227 0.554
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
X7C-FRO-660-V w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.458 11.127 11.763 13.064 15.784	7.529 8.715 9.615 11.449 15.603	0.061 0.139 0.225 0.426 0.975

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
X7C-FRO-660-V w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.458 11.127 11.763 13.064 15.784	7.529 8.715 9.615 11.449 15.603	0.061 0.139 0.225 0.426 0.975
X7C-FRO-660-V w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.458 11.127 11.763 13.064 15.784	7.529 8.715 9.615 11.449 15.603	0.061 0.139 0.225 0.426 0.975
(2) FD9R6004/2C-3L	A	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
(2) FD9R6004/2C-3L	B	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
(2) FD9R6004/2C-3L	C	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
RRH2x40-AWS	A	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.522 2.753 2.993 3.499 4.615	1.589 1.795 2.010 2.465 3.479	0.044 0.061 0.082 0.132 0.275
RRH2x40-AWS	B	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.522 2.753 2.993 3.499 4.615	1.589 1.795 2.010 2.465 3.479	0.044 0.061 0.082 0.132 0.275
RRH2x40-AWS	C	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.522 2.753 2.993 3.499 4.615	1.589 1.795 2.010 2.465 3.479	0.044 0.061 0.082 0.132 0.275
DB-T1-6Z-8AB-0Z	A	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	0.044 0.080 0.120 0.213 0.455
(2) 12' Hor x 4" x 4" Angle Mount	A	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 6.564 7.536 9.506 13.551	0.156 0.212 0.277 0.432 0.847	0.206 0.249 0.302 0.439 0.841
(2) 12' Hor x 4" x 4" Angle Mount	B	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.600 6.564 7.536 9.506 13.551	0.156 0.212 0.277 0.432 0.847	0.206 0.249 0.302 0.439 0.841

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
						4" Ice			
(2) 12' Hor x 4" x 4" Angle Mount	C	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 6.564 7.536 9.506 13.551	0.156 0.212 0.277 0.432 0.847	0.206 0.249 0.302 0.439 0.841
(2) 4' x 2" Pipe Mount	A	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.785 1.028 1.281 1.814 3.111	0.785 1.028 1.281 1.814 3.111	0.029 0.035 0.044 0.072 0.167
(2) 4' x 2" Pipe Mount	B	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.785 1.028 1.281 1.814 3.111	0.785 1.028 1.281 1.814 3.111	0.029 0.035 0.044 0.072 0.167
(2) 4' x 2" Pipe Mount	C	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.785 1.028 1.281 1.814 3.111	0.785 1.028 1.281 1.814 3.111	0.029 0.035 0.044 0.072 0.167
Platform Mount [LP 712-1]	C	None		0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.530 29.940 35.350 46.170 67.810	24.530 29.940 35.350 46.170 67.810	1.335 1.646 1.956 2.577 3.820
** 126 ft **									
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.814 7.334 7.850 8.912 11.158	5.631 6.468 7.244 8.849 12.273	0.112 0.169 0.232 0.383 0.806
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.814 7.334 7.850 8.912 11.158	5.631 6.468 7.244 8.849 12.273	0.112 0.169 0.232 0.383 0.806
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.814 7.334 7.850 8.912 11.158	5.631 6.468 7.244 8.849 12.273	0.112 0.169 0.232 0.383 0.806
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.175	5.642 6.480 7.257 8.864 12.293	0.112 0.169 0.233 0.383 0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.175	5.642 6.480 7.257 8.864 12.293	0.112 0.169 0.233 0.383 0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice 1/2" Ice	6.825 7.347 7.863	5.642 6.480 7.257	0.112 0.169 0.233

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	8.926	8.864	0.383
						2" Ice	11.175	12.293	0.807
						4" Ice			
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.683 12.404 13.135 14.601 17.875	9.842 11.366 12.914 15.267 20.139	0.083 0.173 0.273 0.506 1.151
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.683 12.404 13.135 14.601 17.875	9.842 11.366 12.914 15.267 20.139	0.083 0.173 0.273 0.506 1.151
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.683 12.404 13.135 14.601 17.875	9.842 11.366 12.914 15.267 20.139	0.083 0.173 0.273 0.506 1.151
ATMAA1412D-1A20	A	From Leg	4.000 0.000 0.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.167 1.314 1.469 1.806 2.584	0.467 0.575 0.691 0.951 1.573	0.013 0.021 0.030 0.056 0.137
ATMAA1412D-1A20	B	From Leg	4.000 0.000 0.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.167 1.314 1.469 1.806 2.584	0.467 0.575 0.691 0.951 1.573	0.013 0.021 0.030 0.056 0.137
ATMAA1412D-1A20	C	From Leg	4.000 0.000 0.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.167 1.314 1.469 1.806 2.584	0.467 0.575 0.691 0.951 1.573	0.013 0.021 0.030 0.056 0.137
RRUS 11 B12	A	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.306 3.550 3.802 4.334 5.501	1.361 1.540 1.728 2.130 3.038	0.051 0.072 0.095 0.153 0.314
RRUS 11 B12	B	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.306 3.550 3.802 4.334 5.501	1.361 1.540 1.728 2.130 3.038	0.051 0.072 0.095 0.153 0.314
RRUS 11 B12	C	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.306 3.550 3.802 4.334 5.501	1.361 1.540 1.728 2.130 3.038	0.051 0.072 0.095 0.153 0.314
Platform Mount [LP 712-1]	C	None		0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.530 29.940 35.350 46.170 67.810	24.530 29.940 35.350 46.170 67.810	1.335 1.646 1.956 2.577 3.820
(3) 12' Hor x 4" x 4" Angle Mount	A	From Leg	4.000 0.000	0.000	126.000	No Ice	5.600 6.564	0.156 0.212	0.206 0.249

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			1/2" Ice	7.536 9.506	0.277 0.432	0.302 0.439
						1" Ice	13.551	0.847	0.841
						2" Ice			
						4" Ice			
(3) 12' Hor x 4" x 4" Angle Mount	B	From Leg	4.000 0.000 0.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 6.564 7.536 9.506 13.551	0.156 0.212 0.277 0.432 0.847	0.206 0.249 0.302 0.439 0.841
(3) 12' Hor x 4" x 4" Angle Mount	C	From Leg	4.000 0.000 0.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 6.564 7.536 9.506 13.551	0.156 0.212 0.277 0.432 0.847	0.206 0.249 0.302 0.439 0.841
(2) 8'x2 1/2" Pipe Mount	A	From Leg	4.000 0.000 0.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.300 3.132 3.620 4.620 6.731	2.300 3.132 3.620 4.620 6.731	0.041 0.057 0.080 0.141 0.333
(2) 8'x2 1/2" Pipe Mount	B	From Leg	4.000 0.000 0.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.300 3.132 3.620 4.620 6.731	2.300 3.132 3.620 4.620 6.731	0.041 0.057 0.080 0.141 0.333
(2) 8'x2 1/2" Pipe Mount	C	From Leg	4.000 0.000 0.000	0.000	126.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.300 3.132 3.620 4.620 6.731	2.300 3.132 3.620 4.620 6.731	0.041 0.057 0.080 0.141 0.333
** 115 ft **									
7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
P65-17-XLH-RR w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.704 12.424 13.153 14.639 17.906	8.938 10.450 11.986 14.313 19.144	0.092 0.178 0.273 0.498 1.126
P65-17-XLH-RR w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice	11.704 12.424 13.153 14.639 17.906	8.938 10.450 11.986 14.313 19.144	0.092 0.178 0.273 0.498 1.126

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*
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.074 0.139 0.212 0.385 0.874
(2) LGP21401	A	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.288 1.445 1.611 1.969 2.788	0.233 0.313 0.403 0.608 1.121	0.014 0.021 0.030 0.055 0.135
(2) LGP21401	B	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.288 1.445 1.611 1.969 2.788	0.233 0.313 0.403 0.608 1.121	0.014 0.021 0.030 0.055 0.135
(2) LGP21401	C	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.288 1.445 1.611 1.969 2.788	0.233 0.313 0.403 0.608 1.121	0.014 0.021 0.030 0.055 0.135
(2) 7020.00	A	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.119 0.171 0.232 0.380 0.779	0.204 0.279 0.363 0.556 1.046	0.002 0.005 0.009 0.022 0.071
(2) 7020.00	B	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.119 0.171 0.232 0.380 0.779	0.204 0.279 0.363 0.556 1.046	0.002 0.005 0.009 0.022 0.071
(2) 7020.00	C	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.119 0.171 0.232 0.380 0.779	0.204 0.279 0.363 0.556 1.046	0.002 0.005 0.009 0.022 0.071
DC6-48-60-18-8F	A	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.798 3.038 3.543 4.658	2.567 2.798 3.038 3.543 4.658	0.019 0.041 0.067 0.129 0.299
RRUS-11	A	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
RRUS-11	B	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
RRUS-11	C	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice	3.249 3.491 3.741 4.268	1.373 1.551 1.738 2.138	0.048 0.068 0.092 0.150

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" Ice	5.426	3.042	0.310
						4" Ice			
TPA-65R-LCUUUU-H8 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.678 14.501 15.334 16.941 20.270	10.960 12.486 14.037 16.391 21.279	0.114 0.218 0.331 0.593 1.296
QS66512-3 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.637 9.290 9.910 11.176 13.829	8.463 9.657 10.620 12.610 16.806	0.131 0.206 0.290 0.486 1.023
QS66512-3 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.637 9.290 9.910 11.176 13.829	8.463 9.657 10.620 12.610 16.806	0.131 0.206 0.290 0.486 1.023
RRUS 12	A	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.669 3.926 4.191 4.747 5.963	1.488 1.673 1.866 2.280 3.211	0.058 0.081 0.108 0.171 0.344
RRUS 12	B	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.669 3.926 4.191 4.747 5.963	1.488 1.673 1.866 2.280 3.211	0.058 0.081 0.108 0.171 0.344
RRUS 12	C	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.669 3.926 4.191 4.747 5.963	1.488 1.673 1.866 2.280 3.211	0.058 0.081 0.108 0.171 0.344
RRUS 32	A	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.333 3.597 3.869 4.439 5.684	1.983 2.214 2.453 2.958 4.072	0.055 0.077 0.103 0.165 0.336
RRUS 32	B	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.333 3.597 3.869 4.439 5.684	1.983 2.214 2.453 2.958 4.072	0.055 0.077 0.103 0.165 0.336
RRUS 32	C	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.333 3.597 3.869 4.439 5.684	1.983 2.214 2.453 2.958 4.072	0.055 0.077 0.103 0.165 0.336
DC6-48-60-18-8F	A	From Leg	4.000 0.000 2.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.798 3.038 3.543 4.658	2.567 2.798 3.038 3.543 4.658	0.019 0.041 0.067 0.129 0.299
Platform Mount [LP 712-1]	C	None		0.000	115.000	No Ice 1/2" Ice	24.530 29.940 35.350	24.530 29.940 35.350	1.335 1.646 1.956

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* K
						1" Ice	46.170	46.170	2.577
						2" Ice	67.810	67.810	3.820
						4" Ice			
8'x2 1/2" Pipe Mount	A	From Leg	4.000	0.000	115.000	No Ice	2.300	2.300	0.041
			0.000			1/2"	3.132	3.132	0.057
			2.000			Ice	3.620	3.620	0.080
						1" Ice	4.620	4.620	0.141
						2" Ice	6.731	6.731	0.333
						4" Ice			
8'x2 1/2" Pipe Mount	B	From Leg	4.000	0.000	115.000	No Ice	2.300	2.300	0.041
			0.000			1/2"	3.132	3.132	0.057
			2.000			Ice	3.620	3.620	0.080
						1" Ice	4.620	4.620	0.141
						2" Ice	6.731	6.731	0.333
						4" Ice			
8'x2 1/2" Pipe Mount	C	From Leg	4.000	0.000	115.000	No Ice	2.300	2.300	0.041
			0.000			1/2"	3.132	3.132	0.057
			2.000			Ice	3.620	3.620	0.080
						1" Ice	4.620	4.620	0.141
						2" Ice	6.731	6.731	0.333
						4" Ice			
** 103 ft **									
PCS 1900MHz 4x45W-65MHz	A	From Leg	0.000	0.000	103.000	No Ice	2.709	2.611	0.060
			0.000			1/2"	2.948	2.847	0.083
			1.000			Ice	3.195	3.092	0.110
						1" Ice	3.716	3.608	0.173
						2" Ice	4.862	4.744	0.347
						4" Ice			
PCS 1900MHz 4x45W-65MHz	B	From Leg	0.000	0.000	103.000	No Ice	2.709	2.611	0.060
			0.000			1/2"	2.948	2.847	0.083
			1.000			Ice	3.195	3.092	0.110
						1" Ice	3.716	3.608	0.173
						2" Ice	4.862	4.744	0.347
						4" Ice			
PCS 1900MHz 4x45W-65MHz	C	From Leg	0.000	0.000	103.000	No Ice	2.709	2.611	0.060
			0.000			1/2"	2.948	2.847	0.083
			1.000			Ice	3.195	3.092	0.110
						1" Ice	3.716	3.608	0.173
						2" Ice	4.862	4.744	0.347
						4" Ice			
PCS 1900MHz 4x45W-65MHz	A	From Leg	0.000	0.000	103.000	No Ice	2.709	2.611	0.060
			0.000			1/2"	2.948	2.847	0.083
			0.000			Ice	3.195	3.092	0.110
						1" Ice	3.716	3.608	0.173
						2" Ice	4.862	4.744	0.347
						4" Ice			
PCS 1900MHz 4x45W-65MHz	B	From Leg	0.000	0.000	103.000	No Ice	2.709	2.611	0.060
			0.000			1/2"	2.948	2.847	0.083
			0.000			Ice	3.195	3.092	0.110
						1" Ice	3.716	3.608	0.173
						2" Ice	4.862	4.744	0.347
						4" Ice			
PCS 1900MHz 4x45W-65MHz	C	From Leg	0.000	0.000	103.000	No Ice	2.709	2.611	0.060
			0.000			1/2"	2.948	2.847	0.083
			0.000			Ice	3.195	3.092	0.110
						1" Ice	3.716	3.608	0.173
						2" Ice	4.862	4.744	0.347
						4" Ice			
800MHz 2X50W RRH W/FILTER	A	From Leg	0.000	0.000	103.000	No Ice	2.401	2.254	0.064
			0.000			1/2"	2.613	2.460	0.086
			-1.000			Ice	2.833	2.675	0.111
						1" Ice	3.300	3.132	0.172
						2" Ice	4.337	4.148	0.338
						4" Ice			

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*
800MHz 2X50W RRH W/FILTER	B	From Leg	0.000 0.000 -1.000	0.000	103.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.401 2.613 2.833 3.300 4.337	2.254 2.460 2.675 3.132 4.148	0.064 0.086 0.111 0.172 0.338
800MHz 2X50W RRH W/FILTER	C	From Leg	0.000 0.000 -1.000	0.000	103.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.401 2.613 2.833 3.300 4.337	2.254 2.460 2.675 3.132 4.148	0.064 0.086 0.111 0.172 0.338
Pipe Mount [PM 601-3]	C	None		0.000	103.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.390 5.480 6.570 8.750 13.110	4.390 5.480 6.570 8.750 13.110	0.195 0.237 0.280 0.365 0.534
** 102 ft **									
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.132 0.193 0.339 0.753
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.132 0.193 0.339 0.753
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.132 0.193 0.339 0.753
LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.065 5.480 5.905 6.788 8.704	2.983 3.526 4.086 5.313 8.131	0.045 0.083 0.126 0.232 0.544
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.065 5.480 5.905 6.788 8.704	2.983 3.526 4.086 5.313 8.131	0.045 0.083 0.126 0.232 0.544
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.065 5.480 5.905 6.788 8.704	2.983 3.526 4.086 5.313 8.131	0.045 0.083 0.126 0.232 0.544
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	102.000	No Ice 1/2" Ice 1" Ice	8.498 9.149 9.767 11.031	6.946 8.127 9.021 10.844	0.083 0.151 0.227 0.406

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" Ice 4" Ice	13.679	14.851	0.909
P40-16-XLPP-RR-A w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	9.373 9.912 10.450 11.556 13.892	4.825 5.571 6.265 7.803 11.107	0.073 0.136 0.205 0.368 0.816
TD-RRH8x20-25	A	From Leg	4.000 0.000 2.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.720 5.014 5.316 5.948 7.314	1.703 1.920 2.145 2.622 3.680	0.070 0.097 0.128 0.201 0.397
TD-RRH8x20-25	B	From Leg	4.000 0.000 2.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.720 5.014 5.316 5.948 7.314	1.703 1.920 2.145 2.622 3.680	0.070 0.097 0.128 0.201 0.397
TD-RRH8x20-25	C	From Leg	4.000 0.000 2.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.720 5.014 5.316 5.948 7.314	1.703 1.920 2.145 2.622 3.680	0.070 0.097 0.128 0.201 0.397
WIMAX DAP HEAD	A	From Leg	4.000 0.000 0.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.201
WIMAX DAP HEAD	B	From Leg	4.000 0.000 0.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.201
WIMAX DAP HEAD	C	From Leg	4.000 0.000 0.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.201
IBC1900BB-1	A	From Leg	4.000 0.000 0.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.127 1.273 1.427 1.761 2.534	0.533 0.647 0.770 1.041 1.688	0.022 0.030 0.039 0.065 0.147
IBC1900BB-1	B	From Leg	4.000 0.000 0.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.127 1.273 1.427 1.761 2.534	0.533 0.647 0.770 1.041 1.688	0.022 0.030 0.039 0.065 0.147
IBC1900BB-1	C	From Leg	4.000 0.000 0.000	0.000	102.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.127 1.273 1.427 1.761 2.534	0.533 0.647 0.770 1.041 1.688	0.022 0.030 0.039 0.065 0.147
IBC1900HG-2A	A	From Leg	4.000 0.000 0.000	0.000	102.000	No Ice 1/2" Ice	1.127 1.273 1.427	0.533 0.647 0.770	0.022 0.030 0.039

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* K
						1" Ice	1.761	1.041	0.065
						2" Ice	2.534	1.688	0.147
						4" Ice			
IBC1900HG-2A	B	From Leg	4.000	0.000	102.000	No Ice	1.127	0.533	0.022
			0.000			1/2"	1.273	0.647	0.030
			0.000			Ice	1.427	0.770	0.039
						1" Ice	1.761	1.041	0.065
						2" Ice	2.534	1.688	0.147
						4" Ice			
IBC1900HG-2A	C	From Leg	4.000	0.000	102.000	No Ice	1.127	0.533	0.022
			0.000			1/2"	1.273	0.647	0.030
			0.000			Ice	1.427	0.770	0.039
						1" Ice	1.761	1.041	0.065
						2" Ice	2.534	1.688	0.147
						4" Ice			
HORIZON COMPACT	B	From Leg	4.000	0.000	102.000	No Ice	0.841	0.429	0.012
			0.000			1/2"	0.966	0.525	0.018
			0.000			Ice	1.099	0.629	0.026
						1" Ice	1.392	0.863	0.048
						2" Ice	2.082	1.435	0.122
						4" Ice			
HORIZON COMPACT	C	From Leg	4.000	0.000	102.000	No Ice	0.841	0.429	0.012
			0.000			1/2"	0.966	0.525	0.018
			0.000			Ice	1.099	0.629	0.026
						1" Ice	1.392	0.863	0.048
						2" Ice	2.082	1.435	0.122
						4" Ice			
Platform Mount [LP 712-1]	C	None		0.000	102.000	No Ice	24.530	24.530	1.335
						1/2"	29.940	29.940	1.646
						Ice	35.350	35.350	1.956
						1" Ice	46.170	46.170	2.577
						2" Ice	67.810	67.810	3.820
						4" Ice			
12' Hor x 2.5" x 2.5" Angle Mount	A	From Leg	4.000	0.000	102.000	No Ice	3.500	0.061	0.065
			0.000			1/2"	4.454	0.097	0.093
			0.000			Ice	5.416	0.143	0.132
						1" Ice	7.367	0.260	0.238
						2" Ice	11.373	0.597	0.579
						4" Ice			
12' Hor x 2.5" x 2.5" Angle Mount	B	From Leg	4.000	0.000	102.000	No Ice	3.500	0.061	0.065
			0.000			1/2"	4.454	0.097	0.093
			0.000			Ice	5.416	0.143	0.132
						1" Ice	7.367	0.260	0.238
						2" Ice	11.373	0.597	0.579
						4" Ice			
12' Hor x 2.5" x 2.5" Angle Mount	C	From Leg	4.000	0.000	102.000	No Ice	3.500	0.061	0.065
			0.000			1/2"	4.454	0.097	0.093
			0.000			Ice	5.416	0.143	0.132
						1" Ice	7.367	0.260	0.238
						2" Ice	11.373	0.597	0.579
						4" Ice			
** 94 ft **									
742 213	A	None		0.000	94.000	No Ice	5.135	2.869	0.022
						1/2"	5.609	3.483	0.047
						Ice	6.090	3.946	0.078
						1" Ice	7.074	4.893	0.158
						2" Ice	9.130	6.876	0.394
						4" Ice			
742 213	B	None		0.000	94.000	No Ice	5.135	2.869	0.022
						1/2"	5.609	3.483	0.047
						Ice	6.090	3.946	0.078
						1" Ice	7.074	4.893	0.158
						2" Ice	9.130	6.876	0.394
						4" Ice			
742 213	C	None		0.000	94.000	No Ice	5.135	2.869	0.022

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							1/2" Ice	5.609	3.483	0.047
							1" Ice	6.090	3.946	0.078
							2" Ice	7.074	4.893	0.158
							4" Ice	9.130	6.876	0.394
Pipe Mount [PM 602-3]	C	None			0.000	94.000	No Ice	7.680	7.680	0.279
							1/2" Ice	9.500	9.500	0.353
							1" Ice	11.320	11.320	0.427
							2" Ice	14.960	14.960	0.576
							4" Ice	22.240	22.240	0.873
** 74 ft **										
BCD-87010	B	From Leg	4.000	0.000	0.000	74.000	No Ice	2.903	2.903	0.027
			0.000				1/2" Ice	4.050	4.050	0.048
			6.000				1" Ice	5.213	5.213	0.077
							2" Ice	7.015	7.015	0.157
							4" Ice	9.848	9.848	0.410

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
*****												
VHLP2-180	B	Paraboloid w/Shroud (HP)	From Leg	4.000	0.000	0.000		102.000	2.000	No Ice	3.140	0.025
				0.000						1/2" Ice	3.410	0.040
				6.000						1" Ice	3.680	0.060
										2" Ice	4.210	0.090
										4" Ice	5.280	0.160
VHLP2.5-11	C	Paraboloid w/Shroud (HP)	From Leg	4.000	0.000	0.000		102.000	2.917	No Ice	6.680	0.048
				0.000						1/2" Ice	7.070	0.080
				6.000						1" Ice	7.460	0.120
										2" Ice	8.230	0.190
										4" Ice	9.780	0.340

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp

Comb. No.	Description
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	140 - 86.8333	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-39.561	2.192	2.720
			Max. Mx	11	-19.573	799.185	0.219
			Max. My	2	-19.559	-0.774	807.058
			Max. Vy	5	29.356	-799.097	1.134
			Max. Vx	2	-29.425	-0.774	807.058
			Max. Torque	10			-2.581
L2	86.8333 - 38	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-59.283	4.699	7.898
			Max. Mx	5	-31.942	-2365.946	3.314
			Max. My	2	-31.937	-2.925	2378.158
			Max. Vy	5	36.589	-2365.946	3.314
			Max. Vx	2	-36.655	-2.925	2378.158
			Max. Torque	10			-2.683
L3	38 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-83.800	7.778	13.872
			Max. Mx	5	-49.342	-4156.921	5.650
			Max. My	2	-49.341	-4.771	4173.592
			Max. Vy	5	42.983	-4156.921	5.650
			Max. Vx	2	-43.047	-4.771	4173.592
			Max. Torque	10			-2.703

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	83.800	-0.007	13.023
	Max. H_x	11	49.363	42.924	0.004
	Max. H_z	2	49.363	-0.047	43.022
	Max. M_x	2	4173.592	-0.047	43.022
	Max. M_z	5	4156.921	-42.958	0.025

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. Torsion	4	2.652	-37.209	21.492
	Min. Vert	1	49.363	0.000	0.000
	Min. H_x	5	49.363	-42.958	0.025
	Min. H_z	8	49.363	0.015	-43.000
	Min. M_x	8	-4165.962	0.015	-43.000
	Min. M_z	11	-4154.665	42.924	0.004
	Min. Torsion	10	-2.703	37.175	-21.438

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	49.363	0.000	0.000	-2.574	0.744	0.000
Dead+Wind 0 deg - No Ice	49.363	0.047	-43.022	-4173.592	-4.771	-1.273
Dead+Wind 30 deg - No Ice	49.363	21.529	-37.246	-3613.611	-2083.812	-2.150
Dead+Wind 60 deg - No Ice	49.363	37.209	-21.492	-2086.293	-3600.764	-2.652
Dead+Wind 90 deg - No Ice	49.363	42.958	-0.025	-5.650	-4156.921	-2.412
Dead+Wind 120 deg - No Ice	49.363	37.232	21.417	2072.181	-3602.895	-1.430
Dead+Wind 150 deg - No Ice	49.363	21.453	37.248	3608.325	-2074.979	0.286
Dead+Wind 180 deg - No Ice	49.363	-0.015	43.000	4165.962	2.673	1.386
Dead+Wind 210 deg - No Ice	49.363	-21.456	37.213	3604.742	2077.317	2.135
Dead+Wind 240 deg - No Ice	49.363	-37.175	21.438	2075.119	3598.441	2.703
Dead+Wind 270 deg - No Ice	49.363	-42.924	-0.004	-2.812	4154.665	2.394
Dead+Wind 300 deg - No Ice	49.363	-37.214	-21.478	-2084.198	3602.482	1.266
Dead+Wind 330 deg - No Ice	49.363	-21.526	-37.242	-3612.842	2084.498	-0.252
Dead+Ice+Temp	83.800	-0.000	-0.000	-13.872	7.778	0.000
Dead+Wind 0 deg+Ice+Temp	83.800	0.007	-13.023	-1306.056	7.010	-0.483
Dead+Wind 30 deg+Ice+Temp	83.800	6.520	-11.272	-1132.385	-638.416	-0.840
Dead+Wind 60 deg+Ice+Temp	83.800	11.276	-6.502	-659.093	-1109.648	-1.028
Dead+Wind 90 deg+Ice+Temp	83.800	13.021	-0.002	-14.285	-1282.516	-0.934
Dead+Wind 120 deg+Ice+Temp	83.800	11.286	6.491	629.626	-1110.670	-0.564
Dead+Wind 150 deg+Ice+Temp	83.800	6.508	11.277	1104.813	-636.975	0.049
Dead+Wind 180 deg+Ice+Temp	83.800	0.001	13.017	1277.377	7.822	0.511
Dead+Wind 210 deg+Ice+Temp	83.800	-6.501	11.264	1103.412	652.015	0.840
Dead+Wind 240 deg+Ice+Temp	83.800	-11.268	6.488	629.456	1124.397	1.047
Dead+Wind 270 deg+Ice+Temp	83.800	-13.013	-0.006	-14.617	1297.305	0.930
Dead+Wind 300 deg+Ice+Temp	83.800	-11.282	-6.506	-659.469	1125.943	0.518
Dead+Wind 330 deg+Ice+Temp	83.800	-6.527	-11.276	-1132.711	654.836	-0.045
Dead+Wind 0 deg - Service	49.363	0.018	-16.805	-1632.727	-1.398	-0.499
Dead+Wind 30 deg - Service	49.363	8.410	-14.549	-1413.874	-813.926	-0.840
Dead+Wind 60 deg - Service	49.363	14.535	-8.395	-816.967	-1406.775	-1.037
Dead+Wind 90 deg - Service	49.363	16.781	-0.010	-3.815	-1624.130	-0.945
Dead+Wind 120 deg - Service	49.363	14.544	8.366	808.238	-1407.607	-0.563
Dead+Wind 150 deg - Service	49.363	8.380	14.550	1408.594	-810.473	0.109
Dead+Wind 180 deg - Service	49.363	-0.006	16.797	1626.533	1.511	0.543
Dead+Wind 210 deg - Service	49.363	-8.381	14.536	1407.193	812.319	0.839
Dead+Wind 240 deg - Service	49.363	-14.521	8.374	809.385	1406.797	1.062

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+Wind 270 deg - Service	49.363	-16.767	-0.002	-2.706	1624.178	0.939
Dead+Wind 300 deg - Service	49.363	-14.537	-8.390	-816.148	1408.377	0.494
Dead+Wind 330 deg - Service	49.363	-8.409	-14.548	-1413.572	815.126	-0.101

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX	PY	PZ	PX	PY	PZ	
	K	K	K	K	K	K	
1	0.000	-49.363	0.000	0.000	49.363	0.000	0.000%
2	0.047	-49.363	-43.022	-0.047	49.363	43.022	0.000%
3	21.529	-49.363	-37.246	-21.529	49.363	37.246	0.000%
4	37.209	-49.363	-21.492	-37.209	49.363	21.492	0.000%
5	42.958	-49.363	-0.025	-42.958	49.363	0.025	0.000%
6	37.232	-49.363	21.417	-37.232	49.363	-21.417	0.000%
7	21.453	-49.363	37.248	-21.453	49.363	-37.248	0.000%
8	-0.015	-49.363	43.000	0.015	49.363	-43.000	0.000%
9	-21.456	-49.363	37.213	21.456	49.363	-37.213	0.000%
10	-37.175	-49.363	21.438	37.175	49.363	-21.438	0.000%
11	-42.924	-49.363	-0.004	42.924	49.363	0.004	0.000%
12	-37.214	-49.363	-21.478	37.214	49.363	21.478	0.000%
13	-21.526	-49.363	-37.242	21.526	49.363	37.242	0.000%
14	0.000	-83.800	0.000	0.000	83.800	0.000	0.000%
15	0.007	-83.800	-13.022	-0.007	83.800	13.023	0.000%
16	6.520	-83.800	-11.272	-6.520	83.800	11.272	0.000%
17	11.276	-83.800	-6.502	-11.276	83.800	6.502	0.000%
18	13.021	-83.800	-0.002	-13.021	83.800	0.002	0.000%
19	11.286	-83.800	6.491	-11.286	83.800	-6.491	0.000%
20	6.508	-83.800	11.277	-6.508	83.800	-11.277	0.000%
21	0.001	-83.800	13.017	-0.001	83.800	-13.017	0.000%
22	-6.501	-83.800	11.264	6.501	83.800	-11.264	0.000%
23	-11.268	-83.800	6.488	11.268	83.800	-6.488	0.000%
24	-13.012	-83.800	-0.006	13.013	83.800	0.006	0.000%
25	-11.282	-83.800	-6.506	11.282	83.800	6.506	0.000%
26	-6.527	-83.800	-11.276	6.527	83.800	11.276	0.000%
27	0.018	-49.363	-16.805	-0.018	49.363	16.805	0.000%
28	8.410	-49.363	-14.549	-8.410	49.363	14.549	0.000%
29	14.535	-49.363	-8.395	-14.535	49.363	8.395	0.000%
30	16.781	-49.363	-0.010	-16.781	49.363	0.010	0.000%
31	14.544	-49.363	8.366	-14.544	49.363	-8.366	0.000%
32	8.380	-49.363	14.550	-8.380	49.363	-14.550	0.000%
33	-0.006	-49.363	16.797	0.006	49.363	-16.797	0.000%
34	-8.381	-49.363	14.536	8.381	49.363	-14.536	0.000%
35	-14.521	-49.363	8.374	14.521	49.363	-8.374	0.000%
36	-16.767	-49.363	-0.002	16.767	49.363	0.002	0.000%
37	-14.537	-49.363	-8.390	14.537	49.363	8.390	0.000%
38	-8.409	-49.363	-14.548	8.409	49.363	14.548	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	0.00007480
3	Yes	5	0.00000001	0.00005353
4	Yes	5	0.00000001	0.00005792
5	Yes	4	0.00000001	0.00016867
6	Yes	5	0.00000001	0.00005332
7	Yes	5	0.00000001	0.00005497
8	Yes	4	0.00000001	0.00008888
9	Yes	5	0.00000001	0.00005723
10	Yes	5	0.00000001	0.00005243
11	Yes	4	0.00000001	0.00016412
12	Yes	5	0.00000001	0.00005657
13	Yes	5	0.00000001	0.00005551
14	Yes	4	0.00000001	0.00001277
15	Yes	4	0.00000001	0.00090050
16	Yes	5	0.00000001	0.00005837
17	Yes	5	0.00000001	0.00005860
18	Yes	4	0.00000001	0.00088385
19	Yes	4	0.00000001	0.00098737
20	Yes	4	0.00000001	0.00099058
21	Yes	4	0.00000001	0.00088064
22	Yes	5	0.00000001	0.00005807
23	Yes	4	0.00000001	0.00099777
24	Yes	4	0.00000001	0.00089514
25	Yes	5	0.00000001	0.00005923
26	Yes	5	0.00000001	0.00005920
27	Yes	4	0.00000001	0.00002513
28	Yes	4	0.00000001	0.00016769
29	Yes	4	0.00000001	0.00019753
30	Yes	4	0.00000001	0.00004043
31	Yes	4	0.00000001	0.00016691
32	Yes	4	0.00000001	0.00017639
33	Yes	4	0.00000001	0.00002645
34	Yes	4	0.00000001	0.00019220
35	Yes	4	0.00000001	0.00016241
36	Yes	4	0.00000001	0.00004000
37	Yes	4	0.00000001	0.00018807
38	Yes	4	0.00000001	0.00017990

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 86.8333	23.301	27	1.395	0.004
L2	92.5 - 38	10.469	27	1.079	0.002
L3	45 - 0	2.431	27	0.489	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
142.000	BXA-80063-4BF-EDIN-X w/ Mount Pipe	27	23.301	1.395	0.004	47389
126.000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	27	19.275	1.323	0.003	16924
115.000	7770.00 w/ Mount Pipe	27	16.203	1.258	0.003	9477
108.000	VHLP2-180	27	14.323	1.211	0.002	7403
103.000	PCS 1900MHz 4x45W-65MHz	27	13.028	1.173	0.002	6403
102.000	APXVTM14-C-120 w/ Mount Pipe	27	12.774	1.165	0.002	6234

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
94.000	742 213	27	10.819	1.094	0.002	5172
74.000	BCD-87010	27	6.604	0.866	0.001	4472

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 86.8333	59.520	2	3.563	0.010
L2	92.5 - 38	26.750	2	2.757	0.004
L3	45 - 0	6.212	2	1.249	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
142.000	BXA-80063-4BF-EDIN-X w/ Mount Pipe	2	59.520	3.563	0.010	18675
126.000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	2	49.240	3.380	0.008	6668
115.000	7770.00 w/ Mount Pipe	2	41.394	3.215	0.007	3733
108.000	VHLP2-180	2	36.594	3.094	0.006	2915
103.000	PCS 1900MHz 4x45W-65MHz	2	33.287	2.997	0.005	2520
102.000	APXVTM14-C-120 w/ Mount Pipe	2	32.639	2.976	0.005	2454
94.000	742 213	2	27.646	2.794	0.005	2035
74.000	BCD-87010	2	16.877	2.213	0.003	1755

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	140 - 86.8333 (1)	TP39.223x26.216x0.313	53.167	0.000	0.0	39.000	37.759	-19.559	1472.590	0.013
L2	86.8333 - 38 (2)	TP50.56x37.212x0.406	54.500	0.000	0.0	39.000	63.365	-31.937	2471.220	0.013
L3	38 - 0 (3)	TP59.05x48.033x0.5	45.000	0.000	0.0	39.000	94.266	-49.342	3676.350	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	140 - 86.8333 (1)	TP39.223x26.216x0.313	807.059	27.971	39.000	0.717	0.000	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L2	86.8333 - 38 (2)	TP50.56x37.212x0.406	2378.158	38.050	39.000	0.976	0.000	0.000	39.000	0.000
L3	38 - 0 (3)	TP59.05x48.033x0.5	4173.592	37.141	39.000	0.952	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	140 - 86.8333 (1)	TP39.223x26.216x0.313	29.425	0.779	26.000	0.062	1.225	0.020	26.000	0.001
L2	86.8333 - 38 (2)	TP50.56x37.212x0.406	36.656	0.578	26.000	0.045	0.983	0.007	26.000	0.000
L3	38 - 0 (3)	TP59.05x48.033x0.5	43.047	0.457	26.000	0.036	1.273	0.005	26.000	0.000

Pole Interaction Design Data

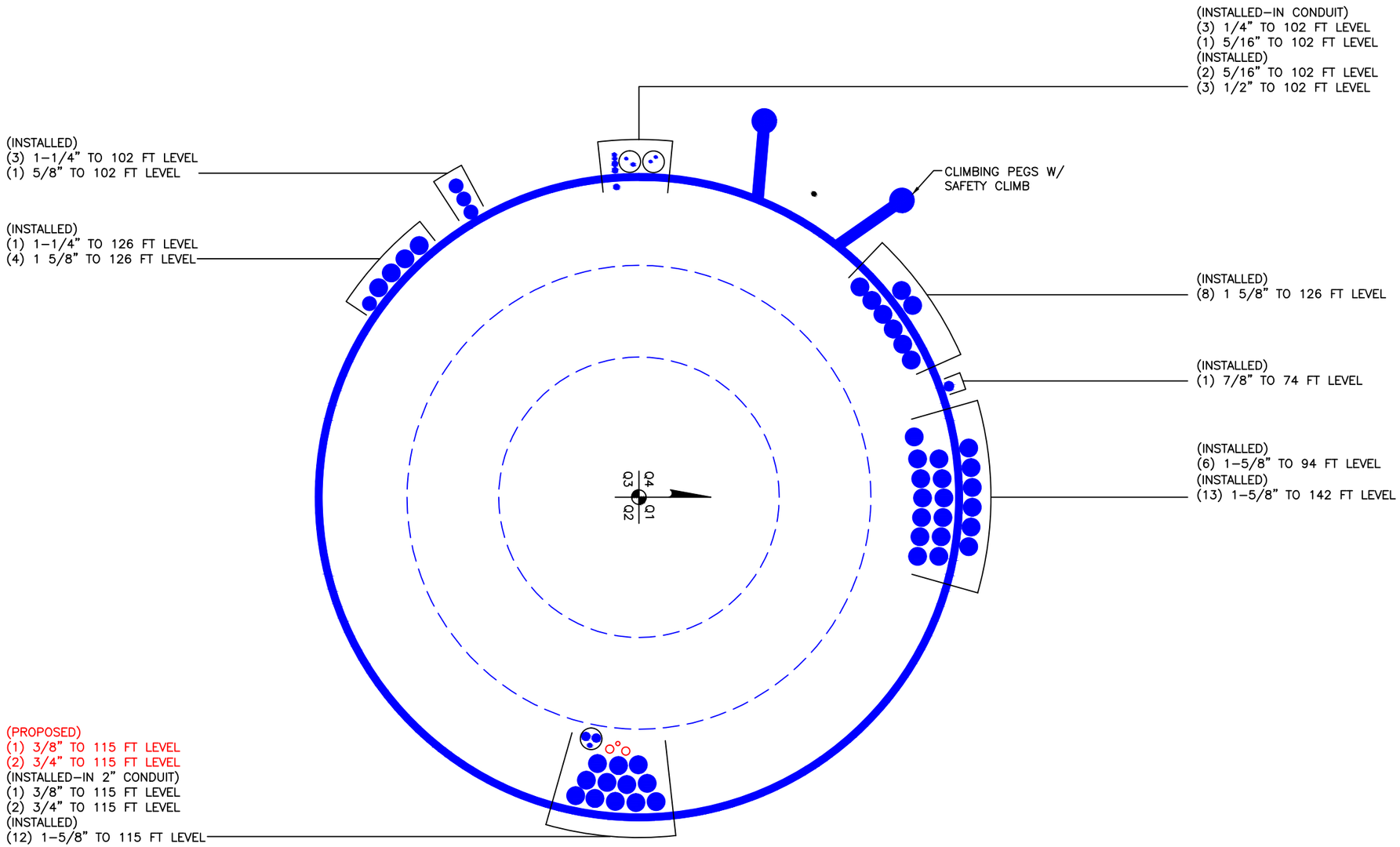
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	140 - 86.8333 (1)	0.013	0.717	0.000	0.062	0.001	0.731 ✔	1.333	H1-3+VT ✔
L2	86.8333 - 38 (2)	0.013	0.976	0.000	0.045	0.000	0.989 ✔	1.333	H1-3+VT ✔
L3	38 - 0 (3)	0.013	0.952	0.000	0.036	0.000	0.966 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	140 - 86.8333	Pole	TP39.223x26.216x0.313	1	-19.559	1962.962	54.9	Pass
L2	86.8333 - 38	Pole	TP50.56x37.212x0.406	2	-31.937	3294.136	74.2	Pass
L3	38 - 0	Pole	TP59.05x48.033x0.5	3	-49.342	4900.574	72.5	Pass
							Summary	
						Pole (L2)	74.2	Pass
						RATING =	**74.2**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 806369 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#:	*806369*
Site Name:	*HRT 094 943225*
App #:	*323211 Rev.1*
Pole Manufacturer:	*Other*

Reactions		
Moment:	4174	ft-kips
Axial:	49	kips
Shear:	43	kips

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	63.5	in

Plate Data		
Diam:	71.05	in
Thick:	3	in
Grade:	60	ksi
Single-Rod B-eff:	9.49	in

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

Pole Data		
Diam:	59.05	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

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

Anchor Rod Results

Maximum Rod Tension:	155.3 Kips	Rigid
Allowable Tension:	195.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	79.7% **Pass**	Fty*ASIF

Base Plate Results

	Flexural Check	Rigid
Base Plate Stress:	16.6 ksi	Service ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	27.6% **Pass**	Y.L. Length: 23.35

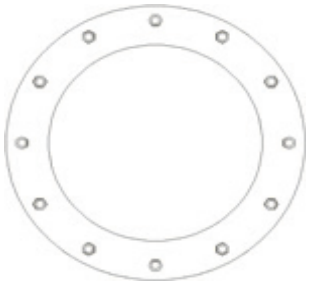
n/a

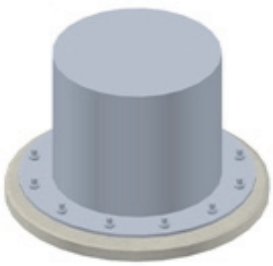
Stiffener Results

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

Pole Results

Pole Punching Shear Check:	n/a





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

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

CCI Foundation Tool Suite - Monopole Pier

CCIFTS 1.2.108.14286 - Phase 1-2 Date: 12/9/2015

BU:	806369
Site Name:	HRT 094 943225
App Number:	323211 Rev.1
Work Order:	1162729

Monopole Drilled Pier

Input

Criteria

TIA Revision:	F
ACI 318 Revision:	2002
Seismic Category:	B

Forces

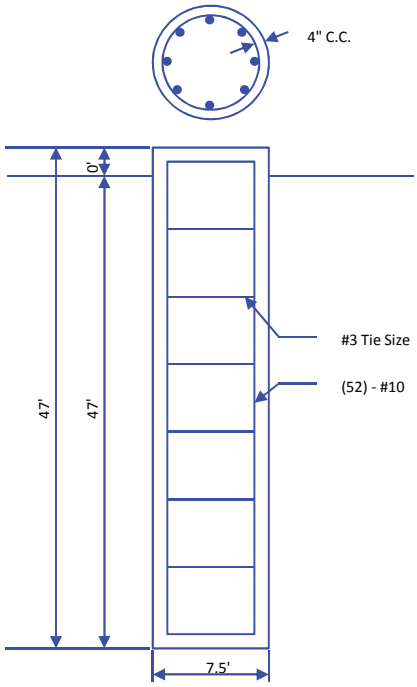
Compression	49	kips
Shear	43	kips
Moment	4174	k-ft
Swelling Force	0	kips

Foundation Dimensions

Pier Diameter:	7.5	ft
Ext. above grade:	0	ft
Depth below grade:	47	ft

Material Properties

Number of Rebar:	52	
Rebar Size:	10	
Tie Size	3	
Rebar tensile strength:	60	ksi
Concrete Strength:	3000	psi
Ultimate Concrete Strain	0.003	in/in
Clear Cover to Ties:	4	in



Soil Profile: 806369 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	2	0	2	105	0	0	0	0	0	
2	1.75	2	3.75	100	0	0	0	0	0	
3	1.25	3.75	5	100	500	30	0	0	0	
4	5	5	10	100	500	30	0.6	0.6	6	
5	15	10	25	36	100	27	0.4	0.4	3	
6	10	25	35	36	100	27	0.6	0.6	6	
7	10	35	45	41	200	0	0.6	0.6	6	
8	2	45	47	41	0	32	1	1	9	

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	7.54	ft
Max Moment, Mu:	4454.47	k-ft
Soil Safety Factor:	6.06	
Safety Factor Req'd:	2	
RATING:	33.0%	

Soil Axial Capacity

Skin Friction (k):	270.96	kips
End Bearing (k):	198.80	kips
Comp. Capacity (k), ϕCn:	469.77	kips
Comp. (k), Cu:	63.70	kips
RATING:	13.6%	

Concrete/Steel Check

Mu (from soil analysis)	5790.82	k-ft
ϕMn	10527.42	k-ft
RATING:	55.0%	

rho provided	1.04	
rho required	0.33	OK

Rebar Spacing	3.56	
Spacing required	20.32	OK

Dev. Length required	39.13	
Dev. Length provided	55.65	OK

Overall Foundation Rating: 55.0%

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

AT&T Existing Facility

Site ID: CT5131

NW Hartford
439-455 Homestead Avenue
Hartford, CT 06112

February 3, 2016

EBI Project Number: 6216000452

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	13.99 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

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February 3, 2016

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

Emissions Analysis for Site: **CT5131 – NW Hartford**

EBI Consulting was directed to analyze the proposed AT&T facility located at **439-455 Homestead Avenue, Hartford, 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 public 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 public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 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 done for the proposed AT&T Wireless antenna facility located at **439-455 Homestead Avenue, Hartford, 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.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

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

3) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 2 LTE channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 GSM channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

6) 2 LTE channels (WCS Band – 2300 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

8) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antennas used in this modeling are the **Powerwave 7770.00**, **CCI TPA-65R-LCUUUU-H8, Powerwave P65-16-XLH-RR, Powerwave P65-17-XLH-RR, KMW AM-X-CD-16-65-00T-RET and the Quintel QS66512-3** for transmission in the 700 MHz, 850 MHz 1900 MHz (WCS) and2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antenna mounting height centerline of the proposed antennas is **117 feet** above ground level (AGL).

11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	117 feet	Height (AGL):	117 feet	Height (AGL):	117 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A1 MPE%	**0.81**	Antenna B1 MPE%	**0.81**	Antenna C1 MPE%	**0.81**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Powerwave P65-17-XLH-RR	Make / Model:	KMW AM-X-CD-16-65-00T-RET	Make / Model:	Powerwave P65-17-XLH-RR
Gain:	14.3 / 15.1 dBd	Gain:	13.35 / 15.25 dBd	Gain:	12.7 / 15.1 dBd
Height (AGL):	117 feet	Height (AGL):	117 feet	Height (AGL):	117 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	7,112.97	ERP (W):	6,614.85	ERP (W):	6,117.63
Antenna A2 MPE%	**3.15**	Antenna B2 MPE%	**2.79**	Antenna C2 MPE%	**2.53**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	CCI TPS-65R-LCUUUU-H8	Make / Model:	Quintel QS66512-3	Make / Model:	Quintel QS66512-3
Gain:	13.75 / 14.45 dBd	Gain:	15.55 / 14.85 dBd	Gain:	15.55 / 14.85 dBd
Height (AGL):	117 feet	Height (AGL):	117 feet	Height (AGL):	117 feet
Frequency Bands	1900 MHz (PCS) / 2300 MHz (WCS)	Frequency Bands	1900 MHz (PCS) / 2300 MHz (WCS)	Frequency Bands	1900 MHz (PCS) / 2300 MHz (WCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	4,766.17	ERP (W):	5,819.44	ERP (W):	5,819.44
Antenna A3 MPE%	**1.39**	Antenna B3 MPE%	**1.70**	Antenna C3 MPE%	**1.70**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**5.35 %**
Sprint	1.06 %
Clearwire	0.19 %
Sensus (CL&P)	0.25 %
MetroPCS	1.57 %
T-Mobile	2.70 %
Verizon Wireless	2.87 %
Site Total MPE %:	**13.99 %**

AT&T Sector 1 Total:	5.35 %
AT&T Sector 2 Total:	5.30 %
AT&T Sector 3 Total:	5.23 %
Site Total:	13.99 %

AT&T _ Max Sector (Sector A)	**# 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	117	2.42	850	567	0.43 %
AT&T 1900 MHz (PCS)UMTS	2	656.33	117	3.83	1900	1000	0.38 %
AT&T 700 MHz LTE	2	1614.92	117	9.42	700	467	2.02 %
AT&T 1900 MHz (PCS) LTE	2	1941.56	117	11.33	1900	1000	1.13 %
AT&T 1900 MHz (PCS) LTE	2	711.41	117	4.15	1900	1000	0.42 %
AT&T 2300 MHz (WCS) LTE	2	1671.67	117	9.76	2300	1000	0.98 %
						Total:	5.35 %

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Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public 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 public exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector 1:	5.35%
Sector 2:	5.30%
Sector 3 :	5.23%
AT&T Maximum Total (Max sector):	5.35 %
Site Total:	13.99 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **13.99%** of the allowable FCC established general public 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

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Burlington, MA 01803