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

February 19, 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: 842860**
AT&T Site ID: CT5346
315 Old Hartford Road, Colchester, CT 06415
Latitude: 41° 34' 49.69" / Longitude: -72° 21' 0.07"

Dear Ms. Bachman:

AT&T currently maintains six (6) antennas at the 57-foot level of the existing 60-foot monopole at 315 Old Hartford Road in Colchester, CT. The tower is owned by Crown Castle. The property is owned by the Cell Tower Lease Acquisition LLC. AT&T now intends to replace three (3) antennas with three (3) new 700 MHz antennas. These antennas would be installed at the 57-foot level of the tower. AT&T also intends to install three (3) RRU's and three (3) A2 modules.

This facility was approved by the by the Connecticut Siting Council in Petition No. 605 on January 21, 2003. This tower was approved without conditions.

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 Mr. Art Shilosky, First Selectman, Town of Colchester, 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: Mr. Art Shilosky, First Selectman
127 Norwich Avenue
Colchester, CT 06415

Cell Tower Lease Acquisition LLC
Dept 3342
Carol Stream, IL 60132-3342

PETITION OF AT&T WIRELESS TO THE CONNECTICUT SITING COUNCIL FOR A DECLARATORY RULING THAT NO CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED IS REQUIRED TO REPLACE AN EXISTING TOWER FACILITY IN COLCHESTER, CONNECTICUT	)	**PETITION NO. __**
	)	**JANUARY 21, 2003**

PETITION FOR DECLARATORY RULING
REPLACEMENT OF EXISTING 50' TOWER
315 OLD HARTFORD ROAD, COLCHESTER, CONNECTICUT

I. Introduction

AT&T Wireless PCS, LLC ("AT&T") hereby petitions the Connecticut Siting Council ("Council") pursuant to Sections 16-50j-38 and 16-50j-39 of the Regulations of Connecticut State Agencies ("R.C.S.A.") for a declaratory ruling that a Certificate of Environmental Compatibility and Public Need ("Certificate") is not required under the provisions of Connecticut General Statutes ("C.G.S.") § 16-50k to replace an existing tower at 315 Old Hartford Road in the Town of Colchester, Connecticut. AT&T will replace an existing 60' lattice tower located at the property, add its own antennas and construct other equipment at grade (the "Facility"). AT&T respectfully submits that the replacement tower and Facility proposed by AT&T present no significant adverse environmental impacts which would otherwise warrant review by the Council in a full docket and Certificate proceeding. As such, AT&T respectfully requests a declaratory ruling that its modifications to the existing tower and construction of the Facility do not require a Certificate.

II. Existing Facility

The existing facility at 315 Old Hartford Road consists of a 60' lattice tower immediately adjacent to a large commercial garage used by a busing company. The existing tower is currently being used for communications by Laidlaw Bus Company, on property owned by the Clark Family Partnership. The tower is accessory to the principal use of the premises and does not have the structural capacity to support AT&T's proposed antennas. See letter of structural integrity prepared by Dewberry-Goodkind, Inc., annexed hereto as Exhibit A. Land uses surrounding the proposed Facility are predominantly commercial and the property is in close proximity to Route 2.

III. Proposed AT&T Modifications

AT&T is licensed by the Federal Communications Commission ("FCC") to provide PCS services in this area of the State of Connecticut. As shown on the enclosed plans prepared by Dewberry-Goodkind, Inc., including a site plan, detail plan and elevation, AT&T Wireless proposes to replace an existing 60' lattice tower with a 60' monopole tower. The replacement monopole will be slightly relocated for construction purposes. Existing whip and yagi antennas used by the bus company will be relocated to the replacement tower. AT&T will also install six panel antennas at the 57.5'' level of the tower with associated equipment cabinets (2 proposed, 2 future, each 76"H x 30" W x 30" D) installed on a 10'-3¼" x 6'-0" concrete pad located near the base of the replacement tower and surrounded by a 6' chain link fence.

IV. The Proposed Modifications Will Not Have a Substantial Adverse Environmental Effect

A comparison of existing and proposed conditions reveals no substantial adverse environmental impacts associated with AT&T's Facility. The proposed Facility involves the replacement of an existing 60' lattice tower with a 60' monopole tower. The replacement tower will be the same height as the existing tower and will not create a structure in the landscape that is out of scale vertically with the surrounding landscape, nor adversely impact the surrounding commercial properties. See site plan. The tower is currently at capacity with replacement being the only practical option to accommodate AT&T's proposed antennas. See Exhibit A.

The replacement tower will be constructed in an already disturbed area that is currently paved and the limits of disturbance of all construction activities will be confined to the greatest extent possible. The existing driveway will also be utilized to access the proposed Facility. All erosion and sediment control measures shall be installed, as necessary, and in accordance with the "Connecticut Guidelines for Soil Erosion and Sediment Control" and amendments, as published by the Connecticut Council on Soil and Water Conservation.

The operation of AT&T's antennas will not increase the total radio frequency electromagnetic power density at the site to a level at or above the applicable standards. As set forth in an Emissions Report prepared by Nader Soliman, RF Engineer, annexed hereto as Exhibit B, the total radio frequency power density at the replacement tower site's boundary will not be increased to or above the standard adopted by the Connecticut Department of Environmental Protection as set forth in Section 22a-162 of the

Connecticut General Statutes and the MPE limits established by the Federal Communications Commission.

V. Conclusion

AT&T Wireless will not need to establish an entirely new telecommunications tower facility to provide coverage in this area of Colchester should the replacement tower be approved. The proposed replacement tower and associated Facility modifications are consistent with legislative findings outlined in Section 16-50g and 16-50aa of the General Statutes of Connecticut that seek to avoid the unnecessary proliferation of towers in the State. For all the foregoing reasons, AT&T Wireless petitions the Connecticut Siting Council for a determination that the proposed replacement tower and other improvements do not require a Certificate of Environmental Compatibility and Public Need and that the Council issue an order approving same.

Respectfully Submitted,

Christopher B. Fisher
On behalf of AT&T Wireless

cc: First Selectman, Town of Colchester
Sue Silva, Bechtel

PROJECT INFORMATION

SCOPE OF WORK:
- AT&T ANTENNAS: (1) NEW ANTENNA PER SECTOR, FOR A TOTAL (3) NEW ANTENNAS. (2) EXISTING ANTENNAS PER SECTOR FOR 3 SECTORS, FOR A TOTAL OF (6) EXISTING ANTENNAS TO REMAIN. (1) EXISTING ANTENNA PER SECTOR FOR (3) SECTORS, FOR A TOTAL OF (3) EXISTING ANTENNAS TO BE REMOVED.
- AT&T RRUs: (1) NEW RRUs PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (3) NEW RRUs. (1) NEW A2 MODULE PER SECTOR FOR (3) SECTORS, FOR A TOTAL OF (3) NEW A2 MODULES. (1) EXISTING RRU PER SECTOR TO BE REUSED, FOR A TOTAL OF (3) EXISTING RRUs.
- AT&T SQUID: (1) EXISTING DC-6 SQUID TO REMAIN.

SITE ADDRESS:	315 OLD HARTFORD ROAD COLCHESTER, CT 06415
LATITUDE: LONGITUDE:	41.5806919 41° 34' 50.49084"N -72.3503989 -72° 21' 01.43604"W
USID:	25960
TOWER OWNER:	AT&T MOBILITY
TYPE OF SITE:	MONOPOLE/OUTDOOR EQUIPMENT
MONOPOLE HEIGHT:	60'-0"±
RAD CENTER:	57'-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 LAYOUTS	0
A-3	ANTENNA LAYOUTS & ELEVATIONS	0
A-4	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:	
SITE ACQUISITION:		
CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		

at&t MOBILITY

FA CODE: 10070973
SITE NUMBER: CT5346
SITE NAME: COLCHESTER NORTH CENTRAL
BUN #: 842860

VICINITY MAP

START OUT GOING NE ON ENTERPRISE DR TOWARD CAPITOL BLVD, TURN LEFT ONTO CAPITOL BLVD, TURN LEFT ONTO WEST ST, MERGE ONTO I-91 N VIA THE RAMP ON THE LEFT TOWARD HARTFORD, MERGE ONTO CT-3 N VIA EXIT 25 TOWARD GLASTONBURY, MERGE ONTO CT-2E TOWARD NORWICH , TAKE EXIT 17 TOWARD BUSINESS ROUT/COLCHESTER, TURN LEFT AT MILL HILL RD, TURN SLIGHT RIGHT ONTO OLD HARTFORD RD, SITE WILL BE ON THE RIGHT.

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

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: CT5346
SITE NAME: COLCHESTER NORTH CENTRAL
315 OLD HARTFORD ROAD
COLCHESTER, CT 06415
NEW LONDON COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	02/08/16	ISSUED AS FINAL	JW	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL: STATE OF CONNECTICUT, NICHOLAS D. BARILE, 18643, PROFESSIONAL ENGINEER

AT&T

DRAWING TITLE: TITLE SHEET

JOB NUMBER	DRAWING NUMBER	REV
15162-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 A RECENT UPGRADE DATED 08/17/2012. CONTRACTOR TO NOTIFY DESIGN ENGINEER OF ANY DISCREPANCIES PRIOR TO COMMENCEMENT OF CONSTRUCTION.

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: CT5346

SITE NAME: COLCHESTER NORTH CENTRAL

315 OLD HARTFORD ROAD
COLCHESTER, CT 06415
NEW LONDON COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	02/08/16	ISSUED AS FINAL	JW	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

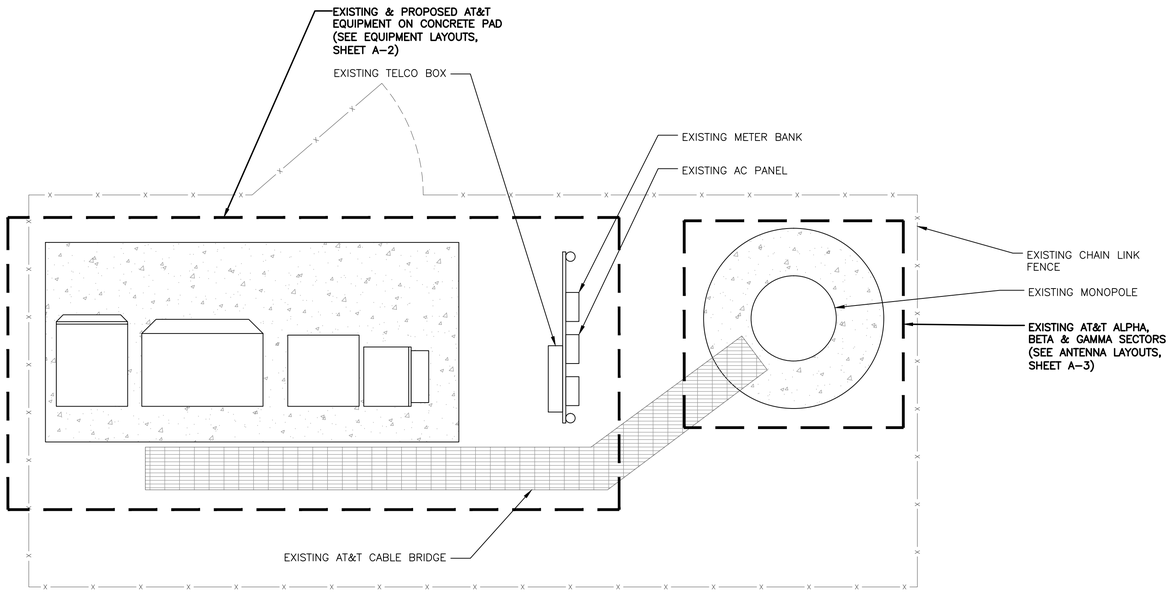
SEAL:

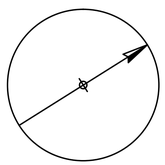
STATE OF CONNECTICUT
DOUGLAS G. BASIL
REGISTERED
PROFESSIONAL ENGINEER
PRINCIPAL ELECTRONICS ENGINEER
CT LICENSE NO. 23643

AT&T

DRAWING TITLE:
GROUNDING & GENERAL NOTES

JOB NUMBER	DRAWING NUMBER	REV
15162-EMP	GN-1	0





COMPOUND LAYOUT
SCALE: 3/8" = 1'-0"

0 1'-4" 2'-8" 5'-4"

GRAPHIC SCALE: 3/8"=1'-0"

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.

COM-EX Consultants
115 ROUTE 46
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PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5346

SITE NAME: COLCHESTER NORTH CENTRAL

315 OLD HARTFORD ROAD
COLCHESTER, CT 06415
NEW LONDON COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	02/08/16	ISSUED AS FINAL	JW	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL:
STATE OF CONNECTICUT
NICHOLAS D. BARTOLOMEO
No. 23843
REGISTERED PROFESSIONAL ENGINEER
PROFESSIONAL ENGINEER
CT LICENSE NO. 23843

AT&T

DRAWING TITLE:
COMPOUND LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
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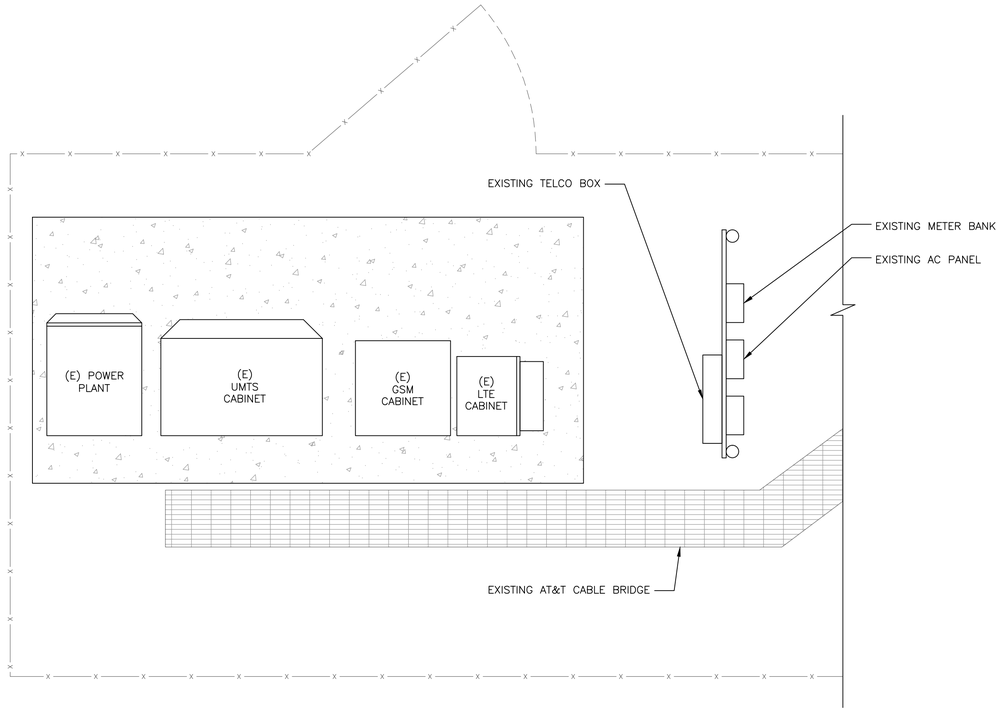

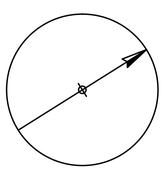

EXISTING EQUIPMENT LAYOUT

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

0 1 2 4

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

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0	02/08/16	ISSUED AS FINAL	JW	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL:

STATE OF CONNECTICUT
THOMAS B. BASSETT
No. 28643
REGISTERED
PROFESSIONAL ENGINEER
THOMAS B. BASSETT
PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

DRAWING TITLE:
EQUIPMENT LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
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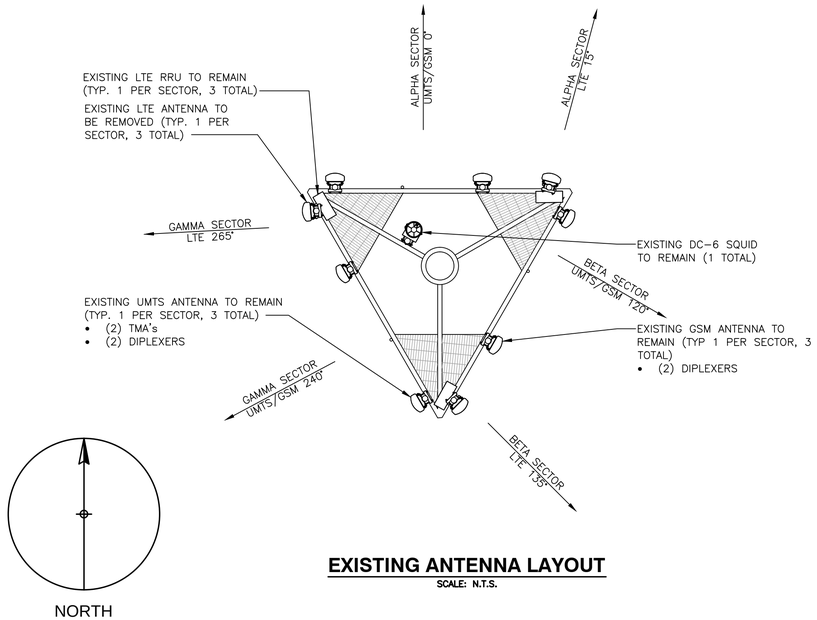

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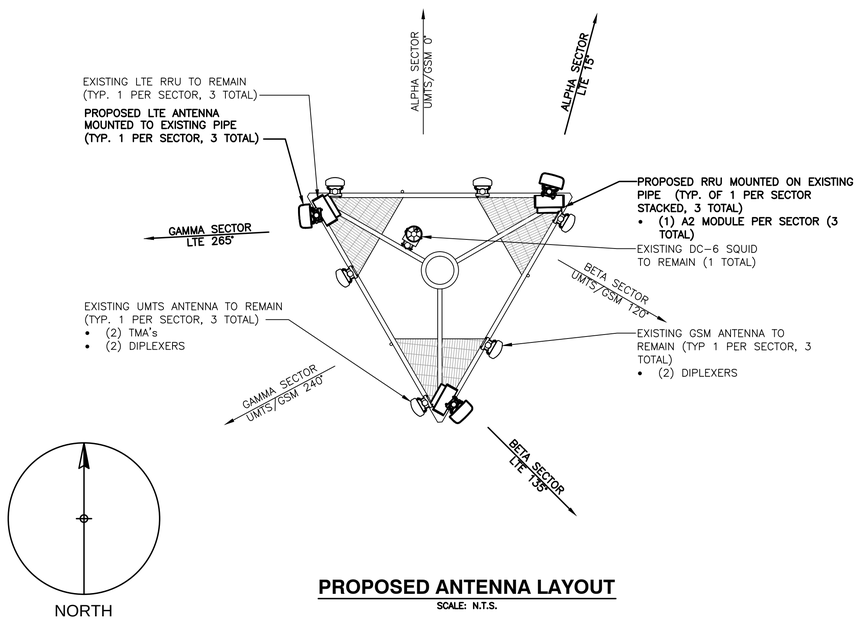
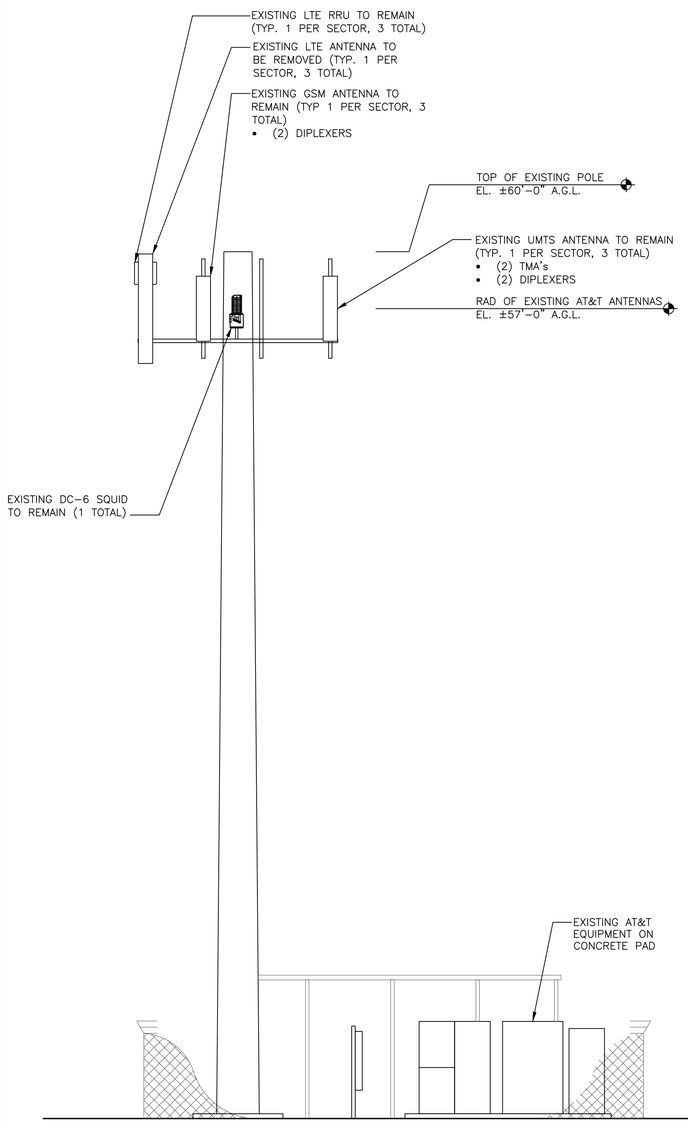
SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT

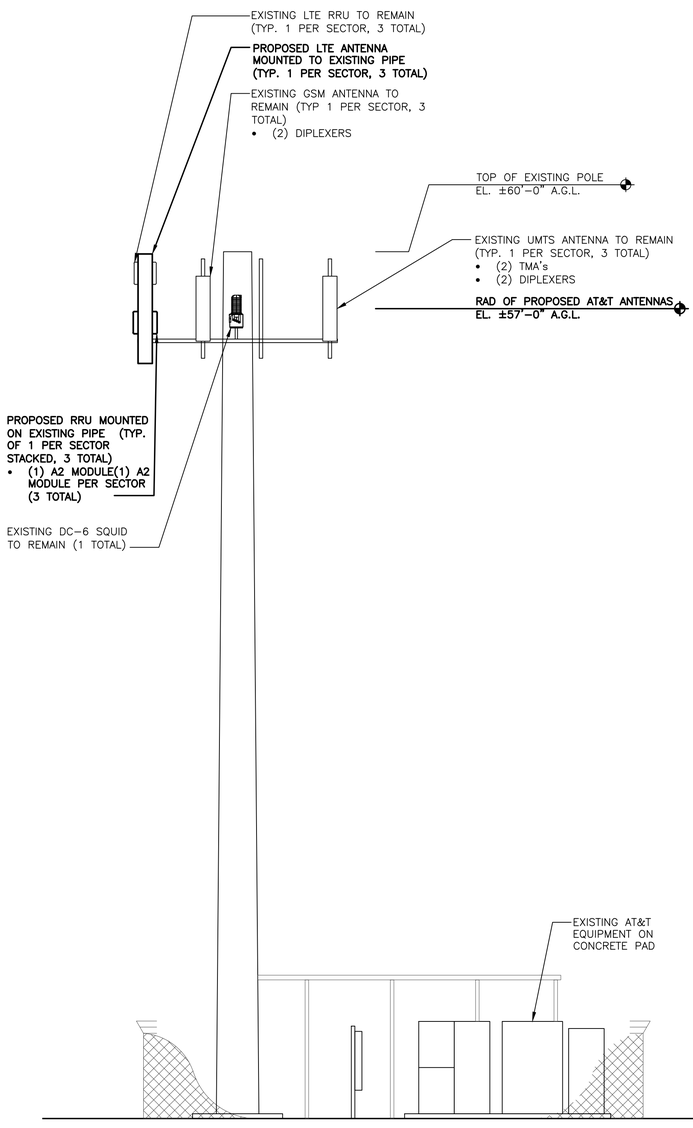
SCALE: N.T.S.



EXISTING 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.



PROPOSED TOWER ELEVATION

SCALE: NTS

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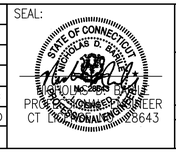
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL:

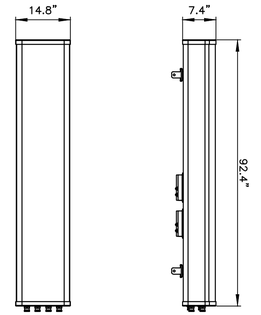


PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

DRAWING TITLE:
ANTENNA LAYOUTS & ELEVATIONS

JOB NUMBER	DRAWING NUMBER	REV
15162-EMP	A-3	0

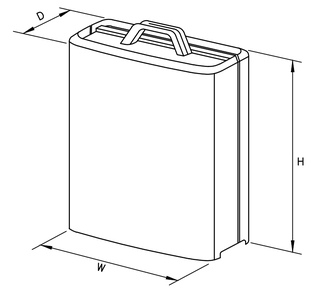


FRONT VIEW SIDE VIEW

BOTTOM VIEW

MANUFACTURER	CCI
MODEL	HPA-65R-BUU-H8
WEIGHT	68 LBS

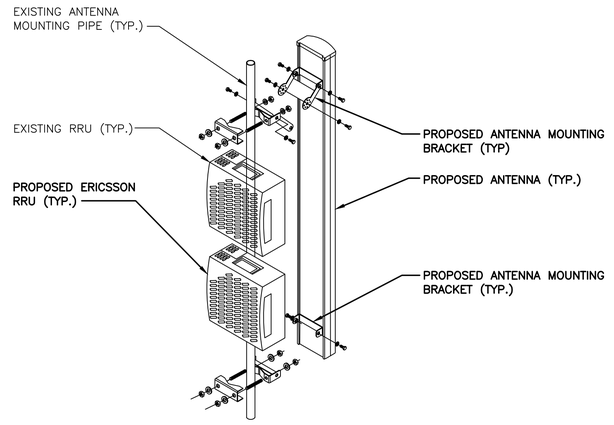
LTE ANTENNA DETAIL
SCALE: N.T.S.



MODEL	L x W x H	WEIGHT
*RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
RRUS-12	20.4"x18.5"x7.5"	58 LBS
A2 MODULE	16.4" x 15.2" x 3.4"	22 LBS

*DENOTES EXISTING.

RRUS DETAIL
SCALE: N.T.S.



ANTENNA AND RRU MOUNTING DETAIL
SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	–	–	–
	A3	POWERWAVE	7770	55"x11"x5"
	A4	KMW	AM-X-CD-17-65-00T-RET	96"x11.8"x6"
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	–	–	–
	B3	POWERWAVE	7770	55"x11"x5"
	B4	KMW	AM-X-CD-17-65-00T-RET	96"x11.8"x6"
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	–	–	–
	G3	POWERWAVE	7770	55"x11"x5"
	G4	ANDREW	SBNH-1D6565C	96.4"x11.9"x7.1"

FINAL ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	–	–	–
	A3	POWERWAVE	7770	55"x11"x5"
	A4	**CCI**	**HPA-65R-BUU-H8**	**92.4"x14.8"x7.4"**
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	–	–	–
	B3	POWERWAVE	7770	55"x11"x5"
	B4	**CCI**	**HPA-65R-BUU-H8**	**92.4"x14.8"x7.4"**
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	–	–	–
	G3	POWERWAVE	7770	55"x11"x5"
	G4	**CCI**	**HPA-65R-BUU-H8**	**92.4"x14.8"x7.4"**

PROPOSED RRU SCHEDULE

SECTOR	MAKE	MODEL	SIZE (INCHES)	ADDITIONAL COMPONENT	SIZE (INCHES)
ALPHA	**ERICSSON**	**RRUS-12**	**20.4"x18.5"x9.5"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"	–	–
	–	–	–		
BETA	**ERICSSON**	**RRUS-12**	**20.4"x18.5"x9.5"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"	–	–
	–	–	–		
GAMMA	**ERICSSON**	**RRUS-12**	**20.4"x18.5"x9.5"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"	–	–
	–	–	–		

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SITE NUMBER: CT5346

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NEW LONDON COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

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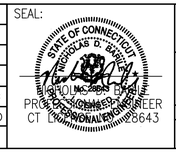
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL:


PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

DRAWING TITLE:
DETAILS

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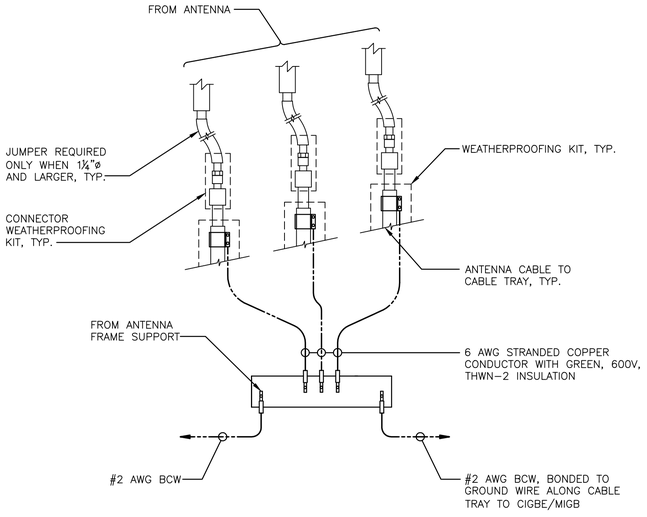
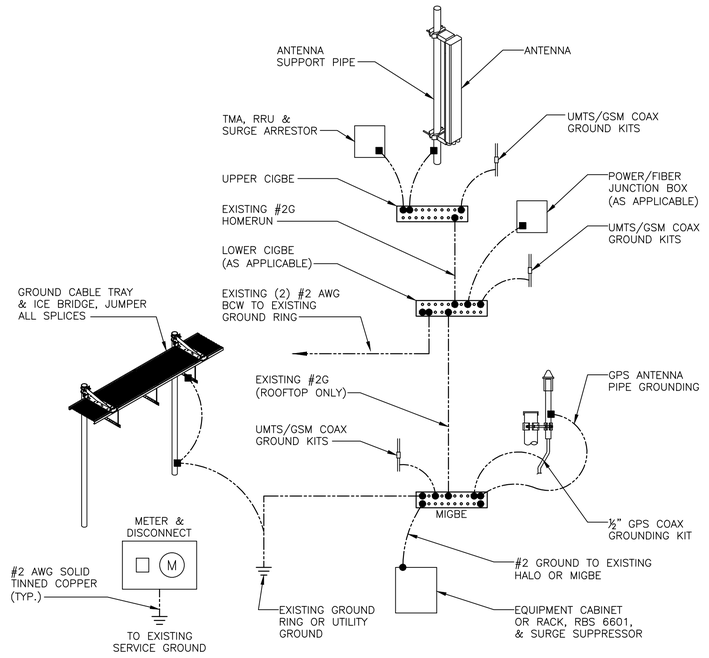


GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



GROUNDING RISER DIAGRAM

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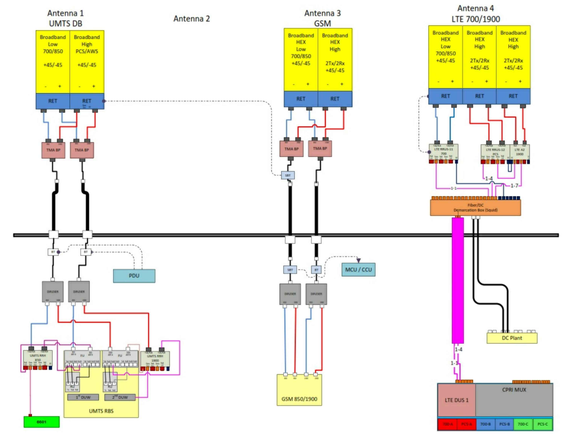

TYPICAL PLUMBING DIAGRAM (PER SECTOR)

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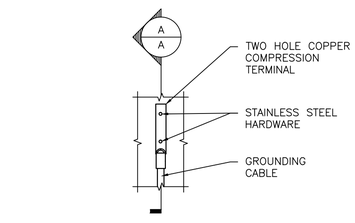
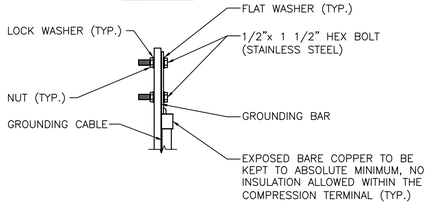


ELEVATION



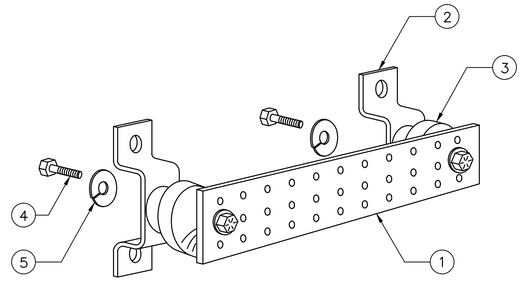
SECTION "A–A"

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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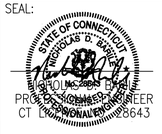

PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

DRAWING TITLE:
GROUNDING, ONE–LINE DIAGRAM & DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15162–EMP	G–1	0

PJF PAUL J. FORD & COMPANY

Date: **Janurary 21, 2016**

Charles Trask
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
980-209-8228

Paul J. Ford and Company
250 E. Broadstreet
Columbus, OH
614-221-6679
jkrus@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT5346
	Carrier Site Name:	Colchester North Central
Crown Castle Designation:	**Crown Castle BU Number:**	842860
	Crown Castle Site Name:	COLCHESTER NORTH CENTRAL
	Crown Castle JDE Job Number:	357651
	Crown Castle Work Order Number:	1159623
	Crown Castle Application Number:	322537 Rev. 0
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37515-3391.001.7805
Site Data:	**315 OLD HARTFORD ROAD, COLCHESTER, New London County, CT**	
	Latitude *41° 34' 49.69"*, Longitude *-72° 21' 0.07"*	
	61 Foot - Monopole Tower	

Dear Charles Trask,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 850729, in accordance with application 322537, revision 0.

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

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 CT State Building Code based upon a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

Jeffrey Krus, P.E., LEED AP
Project Engineer

1-21-16

PAUL J. FORD & COMPANY

Date: **Janurary 21, 2016**

Charles Trask
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3530 Toringdon Way Suite 300
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980-209-8228

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Subject: **Structural Analysis Report**

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	Carrier Site Name:	Colchester North Central
Crown Castle Designation:	**Crown Castle BU Number:**	842860
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Respectfully submitted by:

Jeffrey Krus, P.E., LEED AP
Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 61 ft Monopole tower. The monopole was field mapped, by GPD & Northeast Towers Inc, and a sketch, dated 12/3/08, doucments this field mapping . The foundation was mapped by GPD and a report, dated November 16, 2012, documents the results of this field mapping. The original design specifications for the monopole are unknown.

2) ANALYSIS CRITERIA

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 CT State Building Code based upon a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 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
53.0	55.0	3	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe	-	-	
		3	ericsson	RRUS 12			
		3	ericsson	RRUS A2			

Table 2 - Existing 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
59.00	69.0	1	rfs celwave	BMR12	-	-	1
	59.0	1	tower mounts	Side Arm Mount [SO 701-1]			
53.0	55.0	2	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe	-	-	2
		1	andrew	SBNH-1D6565C w/ Mount Pipe			
		3	ericsson	RRUS-11	12 2 1	7/8” 3/4" 3/8”	1
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
	53.0	1	tower mounts	Platform Mount [LP 403-1]			
44.0	44.0	1	andrew	DB438-A	1	1/2"	1
		1	tower mounts	Side Arm Mount [SO 701-1]			
30.0	30.0	2	andrew	DB438-A	2	1/2"	1
		1	tower mounts	Side Arm Mount [SO 701-1]			

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E., P.C. February, 19, 2003	5142093	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Tower Engineering Professionals TEP: 65064-71810 December 30, 2015	6060632	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Tower Engineering Professionals TEP # 65064-72261 December 28, 2015	6041767	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.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5.)

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	60 - 36	Pole	TP32.125x27.375x0.204	1	-4.48	975.39	15.7	Pass
L2	36 - 0	Pole	TP37.875x31.1872x0.22	2	-8.16	1208.45	40.3	Pass
							Summary	
						Pole (L2)	40.3	Pass
						Rating =	40.3	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	-	27.3%	Pass
1	Base Plate	-	3.0%	Pass
1	Base Foundation Steel	-	14.9%	Pass
1	Base Foundation Soil Interaction	-	73.6%	Pass

Structure Rating (max from all components) =	73.6%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Capacities up to 105% are considered acceptable based on analysis methods used.

4.1) Recommendations

The monopole and its foundation have sufficient capacity to carry the existing and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

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 New London County, Connecticut.
2) Basic wind speed of 85.00 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.00 pcf.
6) A wind speed of 37.60 mph is used in combination with ice.
7) Deflections calculated using a wind speed of 50.00 mph.
8) A non-linear (P-delta) analysis was used.
9) Pressures are calculated at each section.
10) Stress ratio used in pole design is 1.333.

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*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	60.0000-36.0000	24.0000	2.68	18	27.3750	32.1250	0.2040	0.8160	A572-60 (60 ksi)
L2	36.0000-0.0000	38.6771		18	31.1872	37.8750	0.2200	0.8800	A572-60 (60 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	27.7973	17.5931	1640.9351	9.6457	13.9065	117.9977	3284.0294	8.7982	4.4590	21.858
	32.6206	20.6687	2660.7496	11.3320	16.3195	163.0411	5325.0003	10.3363	5.2950	25.956
L2	32.1383	21.6237	2619.8187	10.9933	15.8431	165.3605	5243.0845	10.8139	5.1017	23.19
	38.4593	26.2937	4710.1529	13.3675	19.2405	244.8041	9426.5036	13.1494	6.2788	28.54

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 60.0000-36.0000				1	1	1		
L2 36.0000-0.0000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF4-50A(1/2")	C	No	Inside Pole	59.0000 - 8.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
LDF5-50A(7/8)	C	No	Inside Pole	53.0000 - 8.0000	12	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
						2" Ice	0.0000	0.33
						4" Ice	0.0000	0.33
FB-L98B-034-XXX(3/8)	C	No	Inside Pole	53.0000 - 8.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
						2" Ice	0.0000	0.06
						4" Ice	0.0000	0.06
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	53.0000 - 8.0000	2	No Ice	0.0000	0.58
						1/2" Ice	0.0000	0.58
						1" Ice	0.0000	0.58
						2" Ice	0.0000	0.58
						4" Ice	0.0000	0.58
LDF4-50A(1/2")	C	No	Inside Pole	44.0000 - 8.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
LDF4-50A(1/2")	C	No	Inside Pole	29.0000 - 8.0000	2	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
2" (Nominal) Conduit	C	No	Inside Pole	56.0000 - 8.0000	1	No Ice	0.0000	0.72
						1/2" Ice	0.0000	0.72
						1" Ice	0.0000	0.72
						2" Ice	0.0000	0.72
						4" Ice	0.0000	0.72

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	60.0000-36.0000	A	0.000	0.000	0.000	0.000	0.00

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
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.11
L2	36.0000-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.18

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	60.0000-36.0000	A	0.784	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.11
L2	36.0000-0.0000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.18

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	60.0000-36.0000	0.0000	0.0000	0.0000	0.0000
L2	36.0000-0.0000	0.0000	0.0000	0.0000	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 8' x 5/8"	C	From Leg	0.0000 0.00 4.00	0.0000	61.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.5000 1.3135 2.1437 3.6130 5.6835	0.5000 1.3135 2.1437 3.6130 5.6835	0.01 0.01 0.02 0.06 0.20
***									
BMR12	C	From Leg	4.0000 0.00 10.00	0.0000	59.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.2600 15.3236 17.4038 20.7954 25.7289	13.2600 15.3236 17.4038 20.7954 25.7289	0.12 0.21 0.31 0.56 1.21
Side Arm Mount [SO 701-1]	C	From Leg	2.0000 0.00 0.00	0.0000	60.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.8500 1.1400 1.4300 2.0100 3.1700	1.6700 2.3400 3.0100 4.3500 7.0300	0.07 0.08 0.09 0.12 0.18
*** ***									
RRUS-11	C	From Leg	4.0000 0.00	0.0000	53.0000	No Ice 1/2"	3.2486 3.4905	1.3726 1.5510	0.05 0.07

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
			2.00			Ice	3.7411	1.7380	0.09
						1" Ice	4.2682	2.1381	0.15
						2" Ice	5.4260	3.0418	0.31
						4" Ice			
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.0000	0.0000	53.0000	No Ice	6.2208	4.8204	0.09
			0.00			1/2"	6.7144	5.5082	0.14
			2.00			Ice	7.2182	6.2127	0.21
						1" Ice	8.2568	7.6716	0.36
						2" Ice	10.4762	11.0613	0.76
						4" Ice			
(2) LGP21401	C	From Leg	4.0000	0.0000	53.0000	No Ice	1.2880	0.3640	0.01
			0.00			1/2"	1.4453	0.4785	0.02
			2.00			Ice	1.6112	0.6017	0.03
						1" Ice	1.9690	0.8739	0.05
						2" Ice	2.7882	1.5220	0.14
						4" Ice			
DC6-48-60-18-8F	C	From Leg	4.0000	0.0000	53.0000	No Ice	1.4667	1.4667	0.02
			0.00			1/2"	1.6667	1.6667	0.04
			2.00			Ice	1.8778	1.8778	0.06
						1" Ice	2.3333	2.3333	0.11
						2" Ice	3.3778	3.3778	0.24
						4" Ice			
HPA-65R-BUU-H8 w/ Mount Pipe	C	From Leg	4.0000	0.0000	53.0000	No Ice	13.5328	9.5823	0.10
			0.00			1/2"	14.3352	11.0517	0.20
			2.00			Ice	15.1425	12.4963	0.30
						1" Ice	16.7076	14.7516	0.55
						2" Ice	19.9544	19.4621	1.22
						4" Ice			
RRUS 12	C	From Leg	4.0000	0.0000	53.0000	No Ice	3.6692	1.4875	0.06
			0.00			1/2"	3.9256	1.6727	0.08
			2.00			Ice	4.1907	1.8665	0.11
						1" Ice	4.7468	2.2800	0.17
						2" Ice	5.9627	3.2107	0.34
						4" Ice			
RRUS A2	C	From Leg	4.0000	0.0000	53.0000	No Ice	2.4107	0.5345	0.02
			0.00			1/2"	2.6193	0.6669	0.03
			2.00			Ice	2.8366	0.8079	0.05
						1" Ice	3.2970	1.1159	0.09
						2" Ice	4.3216	1.8356	0.20
						4" Ice			
***									
RRUS-11	A	From Leg	4.0000	0.0000	53.0000	No Ice	3.2486	1.3726	0.05
			0.00			1/2"	3.4905	1.5510	0.07
			2.00			Ice	3.7411	1.7380	0.09
						1" Ice	4.2682	2.1381	0.15
						2" Ice	5.4260	3.0418	0.31
						4" Ice			
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.0000	0.0000	53.0000	No Ice	6.2208	4.8204	0.09
			0.00			1/2"	6.7144	5.5082	0.14
			2.00			Ice	7.2182	6.2127	0.21
						1" Ice	8.2568	7.6716	0.36
						2" Ice	10.4762	11.0613	0.76
						4" Ice			
(2) LGP21401	A	From Leg	4.0000	0.0000	53.0000	No Ice	1.2880	0.3640	0.01
			0.00			1/2"	1.4453	0.4785	0.02
			2.00			Ice	1.6112	0.6017	0.03
						1" Ice	1.9690	0.8739	0.05
						2" Ice	2.7882	1.5220	0.14
						4" Ice			
HPA-65R-BUU-H8 w/ Mount Pipe	A	From Leg	4.0000	0.0000	53.0000	No Ice	13.5328	9.5823	0.10
			0.00			1/2"	14.3352	11.0517	0.20
			2.00			Ice	15.1425	12.4963	0.30
						1" Ice	16.7076	14.7516	0.55
						2" Ice	19.9544	19.4621	1.22
						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
RRUS 12	A	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.6692 3.9256 4.1907 4.7468 5.9627	1.4875 1.6727 1.8665 2.2800 3.2107	0.06 0.08 0.11 0.17 0.34
RRUS A2	A	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4107 2.6193 2.8366 3.2970 4.3216	0.5345 0.6669 0.8079 1.1159 1.8356	0.02 0.03 0.05 0.09 0.20
****									
RRUS-11	B	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.2208 6.7144 7.2182 8.2568 10.4762	4.8204 5.5082 6.2127 7.6716 11.0613	0.09 0.14 0.21 0.36 0.76
(2) LGP21401	B	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.3640 0.4785 0.6017 0.8739 1.5220	0.01 0.02 0.03 0.05 0.14
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.5328 14.3352 15.1425 16.7076 19.9544	9.5823 11.0517 12.4963 14.7516 19.4621	0.10 0.20 0.30 0.55 1.22
RRUS 12	B	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.6692 3.9256 4.1907 4.7468 5.9627	1.4875 1.6727 1.8665 2.2800 3.2107	0.06 0.08 0.11 0.17 0.34
RRUS A2	B	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4107 2.6193 2.8366 3.2970 4.3216	0.5345 0.6669 0.8079 1.1159 1.8356	0.02 0.03 0.05 0.09 0.20
Platform Mount [LP 403-1]	C	None		0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	18.8500 24.3000 29.7500 40.6500 62.4500	18.8500 24.3000 29.7500 40.6500 62.4500	1.50 1.80 2.09 2.69 3.87
*** ***									
DB438-A	B	From Leg	4.0000 0.00 0.00	0.0000	44.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.6222 0.7302 0.8469 1.1062 1.7284	0.6222 0.7302 0.8469 1.1062 1.7284	0.01 0.01 0.02 0.05 0.12
Side Arm Mount [SO 701-1]	B	From Leg	2.0000 0.00	0.0000	44.0000	No Ice 1/2"	0.8500 1.1400	1.6700 2.3400	0.07 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	1.4300	3.0100	0.09
						1" Ice	2.0100	4.3500	0.12
						2" Ice	3.1700	7.0300	0.18
						4" Ice			
***									
MYA1505K	B	From Leg	0.0000	0.0000	29.0000	No Ice	0.5400	0.5400	0.00
			0.00			1/2"	1.2100	1.2100	0.00
			1.00			Ice	1.8800	1.8800	0.01
						1" Ice	3.2200	3.2200	0.01
						2" Ice	5.9000	5.9000	0.01
						4" Ice			
(2) DB438-A	B	From Leg	4.0000	0.0000	29.0000	No Ice	0.6222	0.6222	0.01
			0.00			1/2"	0.7302	0.7302	0.01
			1.00			Ice	0.8469	0.8469	0.02
						1" Ice	1.1062	1.1062	0.05
						2" Ice	1.7284	1.7284	0.12
						4" Ice			
Side Arm Mount [SO 701-1]	B	From Leg	2.0000	0.0000	29.0000	No Ice	0.8500	1.6700	0.07
			0.00			1/2"	1.1400	2.3400	0.08
			0.00			Ice	1.4300	3.0100	0.09
						1" Ice	2.0100	4.3500	0.12
						2" Ice	3.1700	7.0300	0.18
						4" Ice			
***									

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
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service

Comb. No.	Description
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 Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	12.31	-0.00	0.00
	Max. H_x	11	8.16	8.23	-0.01
	Max. H_z	2	8.16	-0.01	8.27
	Max. M_x	2	369.78	-0.01	8.27
	Max. M_z	5	368.28	-8.23	0.01
	Max. Torsion	13	2.78	4.10	7.16
	Min. Vert	10	8.16	7.13	-4.14
	Min. H_x	5	8.16	-8.23	0.01
	Min. H_z	8	8.16	0.01	-8.27
	Min. M_x	8	-371.28	0.01	-8.27
	Min. M_z	11	-368.96	8.23	-0.01
	Min. Torsion	7	-2.78	-4.10	-7.16

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	8.16	0.00	0.00	0.74	0.34	0.00
Dead+Wind 0 deg - No Ice	8.16	0.01	-8.27	-369.78	0.28	-2.10
Dead+Wind 30 deg - No Ice	8.16	4.12	-7.17	-320.17	-184.02	-0.86
Dead+Wind 60 deg - No Ice	8.16	7.13	-4.14	-184.57	-318.92	0.61
Dead+Wind 90 deg - No Ice	8.16	8.23	-0.01	0.69	-368.28	1.92
Dead+Wind 120 deg - No Ice	8.16	7.12	4.13	185.96	-318.87	2.71
Dead+Wind 150 deg - No Ice	8.16	4.10	7.16	321.61	-183.92	2.78
Dead+Wind 180 deg - No Ice	8.16	-0.01	8.27	371.28	0.40	2.10
Dead+Wind 210 deg - No Ice	8.16	-4.12	7.17	321.67	184.70	0.86
Dead+Wind 240 deg - No Ice	8.16	-7.13	4.14	186.06	319.60	-0.61
Dead+Wind 270 deg - No Ice	8.16	-8.23	0.01	0.81	368.96	-1.92
Dead+Wind 300 deg - No Ice	8.16	-7.12	-4.13	-184.46	319.55	-2.71
Dead+Wind 330 deg - No Ice	8.16	-4.10	-7.16	-320.11	184.60	-2.78
Dead+Ice	12.31	0.00	-0.00	1.43	0.95	0.00
Dead+Wind 0 deg+Ice	12.31	0.00	-1.88	-85.21	0.94	-0.51
Dead+Wind 30 deg+Ice	12.31	0.94	-1.63	-73.61	-42.06	-0.19
Dead+Wind 60 deg+Ice	12.31	1.62	-0.94	-41.90	-73.54	0.18
Dead+Wind 90 deg+Ice	12.31	1.87	-0.00	1.43	-85.05	0.50
Dead+Wind 120 deg+Ice	12.31	1.62	0.94	44.76	-73.52	0.69
Dead+Wind 150 deg+Ice	12.31	0.93	1.63	76.48	-42.03	0.69
Dead+Wind 180 deg+Ice	12.31	-0.00	1.88	88.10	0.97	0.51
Dead+Wind 210 deg+Ice	12.31	-0.94	1.63	76.49	43.97	0.19
Dead+Wind 240 deg+Ice	12.31	-1.62	0.94	44.78	75.45	-0.18
Dead+Wind 270 deg+Ice	12.31	-1.87	0.00	1.46	86.96	-0.50
Dead+Wind 300 deg+Ice	12.31	-1.62	-0.94	-41.87	75.43	-0.69
Dead+Wind 330 deg+Ice	12.31	-0.93	-1.63	-73.60	43.95	-0.69
Dead+Wind 0 deg - Service	8.16	0.00	-2.86	-127.47	0.32	-0.73
Dead+Wind 30 deg - Service	8.16	1.43	-2.48	-110.29	-63.45	-0.30
Dead+Wind 60 deg - Service	8.16	2.47	-1.43	-63.37	-110.13	0.21
Dead+Wind 90 deg - Service	8.16	2.85	-0.00	0.73	-127.21	0.66
Dead+Wind 120 deg -	8.16	2.46	1.43	64.84	-110.11	0.94

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
Service						
Dead+Wind 150 deg - Service	8.16	1.42	2.48	111.77	-63.42	0.96
Dead+Wind 180 deg - Service	8.16	-0.00	2.86	128.96	0.36	0.73
Dead+Wind 210 deg - Service	8.16	-1.43	2.48	111.79	64.13	0.30
Dead+Wind 240 deg - Service	8.16	-2.47	1.43	64.87	110.81	-0.21
Dead+Wind 270 deg - Service	8.16	-2.85	0.00	0.77	127.89	-0.66
Dead+Wind 300 deg - Service	8.16	-2.46	-1.43	-63.34	110.79	-0.94
Dead+Wind 330 deg - Service	8.16	-1.42	-2.48	-110.28	64.10	-0.96

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-8.16	0.00	0.00	8.16	-0.00	0.000%
2	0.01	-8.16	-8.27	-0.01	8.16	8.27	0.000%
3	4.12	-8.16	-7.17	-4.12	8.16	7.17	0.001%
4	7.13	-8.16	-4.14	-7.13	8.16	4.14	0.001%
5	8.23	-8.16	-0.01	-8.23	8.16	0.01	0.000%
6	7.12	-8.16	4.13	-7.12	8.16	-4.13	0.000%
7	4.10	-8.16	7.16	-4.10	8.16	-7.16	0.000%
8	-0.01	-8.16	8.27	0.01	8.16	-8.27	0.000%
9	-4.12	-8.16	7.17	4.12	8.16	-7.17	0.000%
10	-7.13	-8.16	4.14	7.13	8.16	-4.14	0.001%
11	-8.23	-8.16	0.01	8.23	8.16	-0.01	0.000%
12	-7.12	-8.16	-4.13	7.12	8.16	4.13	0.000%
13	-4.10	-8.16	-7.16	4.10	8.16	7.16	0.000%
14	0.00	-12.31	0.00	-0.00	12.31	0.00	0.000%
15	0.00	-12.31	-1.88	-0.00	12.31	1.88	0.002%
16	0.94	-12.31	-1.63	-0.94	12.31	1.63	0.002%
17	1.62	-12.31	-0.94	-1.62	12.31	0.94	0.002%
18	1.87	-12.31	-0.00	-1.87	12.31	0.00	0.002%
19	1.62	-12.31	0.94	-1.62	12.31	-0.94	0.002%
20	0.93	-12.31	1.63	-0.93	12.31	-1.63	0.002%
21	-0.00	-12.31	1.88	0.00	12.31	-1.88	0.002%
22	-0.94	-12.31	1.63	0.94	12.31	-1.63	0.002%
23	-1.62	-12.31	0.94	1.62	12.31	-0.94	0.002%
24	-1.87	-12.31	0.00	1.87	12.31	-0.00	0.002%
25	-1.62	-12.31	-0.94	1.62	12.31	0.94	0.002%
26	-0.93	-12.31	-1.63	0.93	12.31	1.63	0.002%
27	0.00	-8.16	-2.86	-0.00	8.16	2.86	0.000%
28	1.43	-8.16	-2.48	-1.43	8.16	2.48	0.003%
29	2.47	-8.16	-1.43	-2.47	8.16	1.43	0.003%
30	2.85	-8.16	-0.00	-2.85	8.16	0.00	0.000%
31	2.46	-8.16	1.43	-2.46	8.16	-1.43	0.000%
32	1.42	-8.16	2.48	-1.42	8.16	-2.48	0.000%
33	-0.00	-8.16	2.86	0.00	8.16	-2.86	0.000%
34	-1.43	-8.16	2.48	1.43	8.16	-2.48	0.003%
35	-2.47	-8.16	1.43	2.47	8.16	-1.43	0.003%
36	-2.85	-8.16	0.00	2.85	8.16	-0.00	0.000%
37	-2.46	-8.16	-1.43	2.46	8.16	1.43	0.000%
38	-1.42	-8.16	-2.48	1.42	8.16	2.48	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	9	0.00000001	0.00006449
3	Yes	8	0.00000001	0.00011080
4	Yes	8	0.00000001	0.00006582
5	Yes	9	0.00000001	0.00005003
6	Yes	9	0.00000001	0.00008592
7	Yes	9	0.00000001	0.00007246
8	Yes	9	0.00000001	0.00006487
9	Yes	9	0.00000001	0.00004367
10	Yes	8	0.00000001	0.00010938
11	Yes	9	0.00000001	0.00005019
12	Yes	9	0.00000001	0.00006713
13	Yes	9	0.00000001	0.00009126
14	Yes	6	0.00000001	0.00000001
15	Yes	7	0.00000001	0.00010994
16	Yes	7	0.00000001	0.00009130
17	Yes	7	0.00000001	0.00008769
18	Yes	7	0.00000001	0.00010317
19	Yes	7	0.00000001	0.00011948
20	Yes	7	0.00000001	0.00012228
21	Yes	7	0.00000001	0.00011595
22	Yes	7	0.00000001	0.00009888
23	Yes	7	0.00000001	0.00009383
24	Yes	7	0.00000001	0.00010772
25	Yes	7	0.00000001	0.00011801
26	Yes	7	0.00000001	0.00012213
27	Yes	8	0.00000001	0.00005256
28	Yes	7	0.00000001	0.00013145
29	Yes	7	0.00000001	0.00012123
30	Yes	8	0.00000001	0.00004401
31	Yes	8	0.00000001	0.00006078
32	Yes	8	0.00000001	0.00006039
33	Yes	8	0.00000001	0.00005354
34	Yes	7	0.00000001	0.00013989
35	Yes	7	0.00000001	0.00012548
36	Yes	8	0.00000001	0.00004450
37	Yes	8	0.00000001	0.00005657
38	Yes	8	0.00000001	0.00006410

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	60 - 36	2.186	34	0.2668	0.0076
L2	38.6771 - 0	1.050	33	0.2281	0.0038

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
61.0000	Lightning Rod 8' x 5/8"	34	2.186	0.2668	0.0076	39104
60.0000	Side Arm Mount [SO 701-1]	34	2.186	0.2668	0.0076	39104
59.0000	BMR12	34	2.128	0.2657	0.0074	39104
53.0000	RRUS-11	33	1.784	0.2586	0.0063	27931
44.0000	DB438-A	33	1.301	0.2428	0.0047	12220
29.0000	MYA1505K	33	0.681	0.1879	0.0025	12229

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	60 - 36	6.277	8	0.7626	0.0220
L2	38.6771 - 0	3.019	8	0.6552	0.0110

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
61.0000	Lightning Rod 8' x 5/8"	8	6.277	0.7626	0.0220	13698
60.0000	Side Arm Mount [SO 701-1]	8	6.277	0.7626	0.0220	13698
59.0000	BMR12	8	6.111	0.7597	0.0214	13698
53.0000	RRUS-11	8	5.124	0.7406	0.0181	9784
44.0000	DB438-A	8	3.739	0.6968	0.0135	4280
29.0000	MYA1505K	8	1.958	0.5400	0.0073	4283

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	60 - 36 (1)	TP32.125x27.375x0.204	24.0000	0.0000	0.0	36.000	20.3257	-4.48	731.72	0.006
L2	36 - 0 (2)	TP37.875x31.1872x0.22	38.6771	0.0000	0.0	34.478	26.2937	-8.16	906.56	0.009

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	60 - 36 (1)	TP32.125x27.375x0.204	95.94	7.303	36.000	0.203	0.00	0.000	36.000	0.000
L2	36 - 0 (2)	TP37.875x31.1872x0.22	371.28	18.200	34.478	0.528	0.00	0.000	34.478	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	60 - 36 (1)	TP32.125x27.375x0.204	5.94	0.292	24.000	0.025	2.46	0.091	24.000	0.004
L2	36 - 0 (2)	TP37.875x31.1872x0.22	8.27	0.315	24.000	0.026	2.10	0.050	24.000	0.002

Pole Interaction Design Data

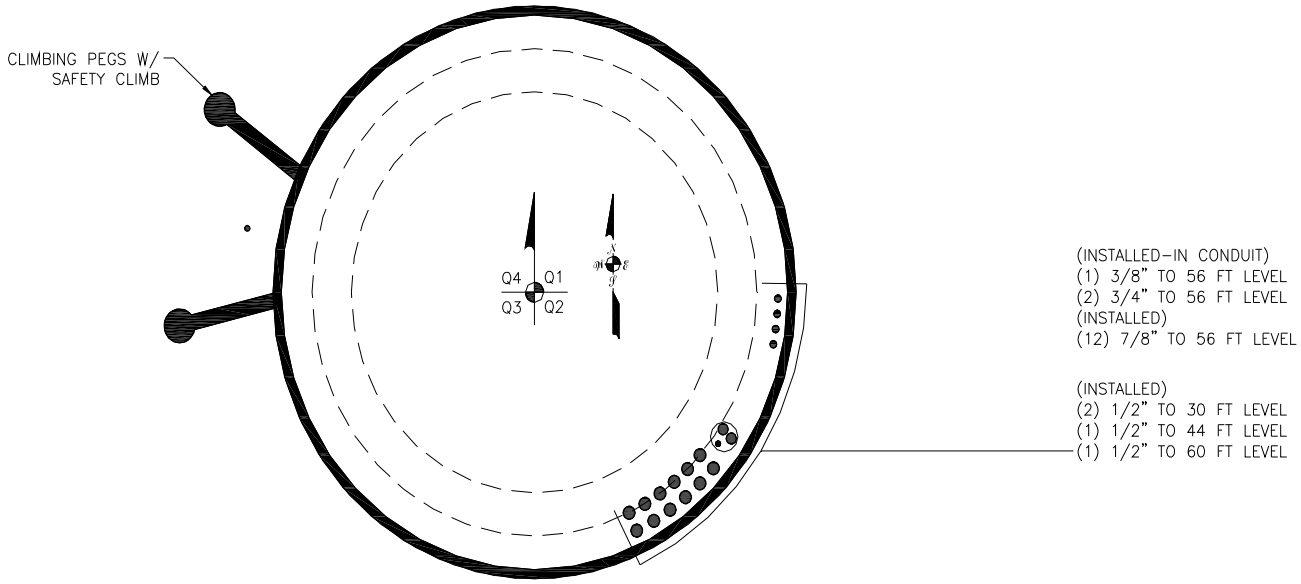
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	60 - 36 (1)	0.006	0.203	0.000	0.025	0.004	0.209 ✔	1.333	H1-3+VT ✔
L2	36 - 0 (2)	0.009	0.528	0.000	0.026	0.002	0.537 ✔	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	60 - 36	Pole	TP32.125x27.375x0.204	1	-4.48	975.39	15.7	Pass
L2	36 - 0	Pole	TP37.875x31.1872x0.22	2	-8.16	1208.45	40.3	Pass
							Summary	
						Pole (L2)	40.3	Pass
						RATING =	**40.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



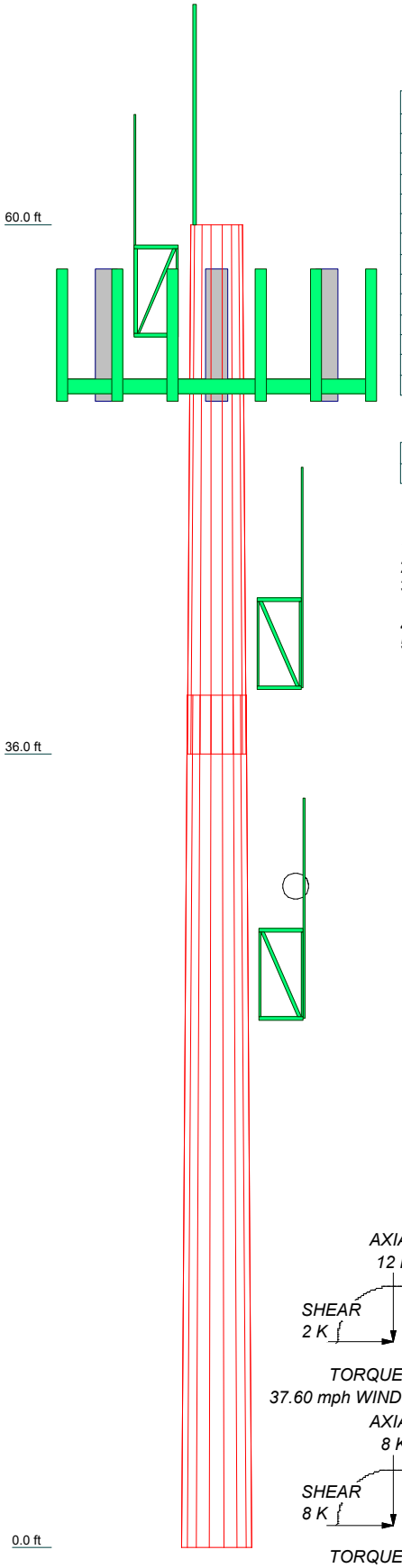
APPENDIX C

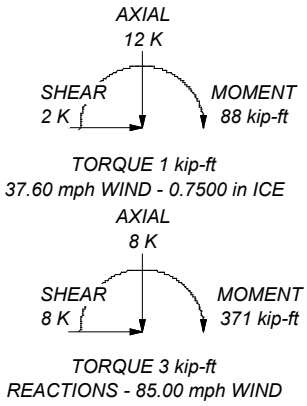
ADDITIONAL CALCULATIONS

Program Version 6.1.4.1 - 12/17/2013 File:G:/TOWER/375_Crown_Castle/2015/37515-3391_842860_COLCHESTER NORTH CENTRA/37515-3391.001.7805_SA_1159623/Project Info/37515-3391.001.7805.eri

Program Version 6.1.4.1 - 12/17/2013 File:G:/TOWER/375_Crown_Castle/2015/37515-3391_842860_COLCHESTER NORTH CENTRA/37515-3391.001.7805_SA_1159623/Project Info/37515-3391.001.7805.eri

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	24.0000	18	0.2040	2.6771	27.3750	32.1250	A572-60	1.6
2	38.6771	18	0.2200		31.1872	37.8750		3.2





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 8' x 5/8"	61	RRUS 12	53
Side Arm Mount [SO 701-1]	60	RRUS A2	53
BMR12	59	RRUS-11	53
RRUS-11	53	(2) 7770.00 w/ Mount Pipe	53
(2) 7770.00 w/ Mount Pipe	53	(2) LGP21401	53
(2) LGP21401	53	HPA-65R-BUU-H8 w/ Mount Pipe	53
DC6-48-60-18-8F	53	RRUS 12	53
HPA-65R-BUU-H8 w/ Mount Pipe	53	RRUS A2	53
RRUS 12	53	Platform Mount [LP 403-1]	53
RRUS A2	53	DB438-A	44
RRUS-11	53	Side Arm Mount [SO 701-1]	44
(2) 7770.00 w/ Mount Pipe	53	MYA1505K	29
(2) LGP21401	53	(2) DB438-A	29
HPA-65R-BUU-H8 w/ Mount Pipe	53	Side Arm Mount [SO 701-1]	29

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-60	60 ksi	75 ksi			

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 85.00 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 37.60 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50.00 mph wind.
5. TOWER RATING: 40.3%

Paul J. Ford and Company
250 E. Broadstreet Suite 600
Columbus, OH.
Phone: 614-221-6679
FAX:

Job:	149 ft Monopole / Seneca		
Project:	PJF 37515-2554 / BU 842277		
Client: Crown Castle	Drawn by: Jeffrey Krus		App'd:
Code: TIA/EIA-222-F	Date: 01/22/16		Scale: NTS
Path:			Dwg No. E-1

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *842860*
Site Name:
App #:

Anchor Rod Data		
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	41	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	42	in
Thick:	2.5	in
Grade:	50	ksi
Clip Distance:	6	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
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:	40	in
Thick:	0.3125	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	371	ft-kips
Unfactored Axial, P:	8	kips
Unfactored Shear, V:	8	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	53.3	Kips
Allowable Tension:	195.0	Kips
Anchor Rod Stress Ratio:	27.3%	**Pass**

Base Plate Results Flexural Check

Base Plate Stress:	1.5	ksi
Allowable PL Bending Stress:	50.0	ksi
Base Plate Stress Ratio:	3.0%	**Pass**

PL Ref. Data
Yield Line (in):
19.40
Max PL Length:
19.40

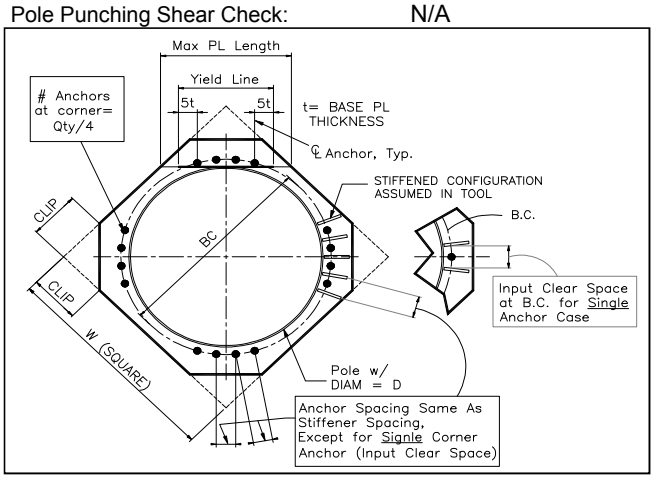
N/A - Unstiffened

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



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

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Job Number: 37515-3391.001.7805 **Page:** 1
Site Number: 842860 **By:** JAK
Site Name: COLCHESTER NORTH CENTRAL **Date:** 1/22/2016

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA/EIA-222-F

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	371.0		k-ft
Shear, V =	8.0		kips
Axial Load, P =	8.0		kips
OTM =	372.3	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-02
Seismic Design Category =	D
Reference Standard =	TIA/EIA-222-F
Use 1.3 Load Factor?	Yes
Load Factor =	1.30

Drilled Pier Parameters

Diameter =	6.5 ft
Height Above Grade =	0.16667 ft
Depth Below Grade =	16.83333333 ft
fc' =	3 ksi
εc =	0.003 in/in
Mat Ftdn. Cap Width =	ft
Mat Ftdn. Cap Length =	ft
Depth Below Grade =	ft

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

Load Combinations Checked per TIA/EIA-222-F

1. Ult. Skin Friction/2.00 + Ult. End Bearing/2.00
+ Effective Soil Wt. - Buoyant Conc. Wt. ≥ Comp.
2. Ult. Skin Friction/2.00 + Buoyant Conc. Wt./1.25 ≥ Uplift
3. Ult. Skin Friction/1.50 + Buoyant Conc. Wt./1.50 ≥ Uplift

Steel Parameters

Number of Bars =	16
Rebar Size =	#11
Rebar Fy =	60 ksi
Rebar MOE =	29000 ksi
Tie Size =	#3
Side Clear Cover to Ties =	8.625 in

Soil Parameters

Water Table Depth =	99.00 ft
Depth to Ignore Soil =	5.00 ft
Depth to Full Cohesion =	0 ft
Full Cohesion Starts at?*	Ground

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Direct Embed Pole Shaft Parameters

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

Maximum Capacity Ratios

Maximum Soil Ratio =	110.0%
Maximum Steel Ratio =	105.0%

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

Define Soil Layers

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

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	5	0	0	0	Sand				5
2	3	110	0	30	Sand				8
3	2.0833333	165	0	30	Sand				10.0833333
4	7	165	0	30	Sand	80000			17.0833333
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	13.74	ft, from Grade	
Bending Moment, M =	482.23	k-ft, from COR	
Resisting Moment, Ma =	635.03	k-ft, from COR	
MOMENT RATIO =	**75.9%**	**OK**	
Shear, V =	8.00	kips	
Resisting Shear, Va =	10.53	kips	
SHEAR RATIO =	**75.9%**	**OK**	

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	67.69	kips
UPLIFT RATIO =	**0.0%**	**OK**

Soil Results: Compression

Compression, C =	8.00	kips
Allowable Comp. Cap., Ca =	1302.02	kips
COMPRESSION RATIO =	**0.6%**	**OK**

Steel Results (ACI 318-02):

Minimum Steel Area =	15.93	sq in
Actual Steel Area =	24.96	sq in
Allowable Min Axial, Pa =	-1036.80	kips, Where Ma = 0 k-ft
Allowable Max Axial, Pa =	5447.51	kips, Where Ma = 0 k-ft
Axial Load, P =	44.92	kips @ 7.25 ft Below Grade
Moment, M =	425.69	k-ft @ 7.25 ft Below Grade
Allowable Moment, Ma =	2751.16	k-ft
MOMENT RATIO =	**15.5%**	**OK**

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

AT&T Existing Facility

Site ID: CT5346

Colchester North Central
315 Old Hartford Road
Colchester, CT 6415

February 17, 2016

EBI Project Number: 6216000633

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	22.17 %

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February 17, 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: **CT5346 – Colchester North Central**

EBI Consulting was directed to analyze the proposed AT&T facility located at **315 Old Hartford Road, Colchester, 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 **315 Old Hartford Road, Colchester, 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 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

2) 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.

3) 2 GSM 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.

4) 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.

5) 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.

6) 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.

7) 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.

8) The antennas used in this modeling are the **CCI HPA-65R-BUU-H8 and the Powerwave 7770.00** for transmission in the 700 MHz, 850 MHz and1900 MHz (PCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerline of the proposed antennas is **55 feet** above ground level (AGL).

10) 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:	CCI OPA-65R-BUU-H8	Make / Model:	CCI OPA-65R-BUU-H8	Make / Model:	CCI OPA-65R-BUU-H8
Gain:	13.15 / 14.95 dBd	Gain:	13.15 / 14.95 dBd	Gain:	13.15 / 14.95 dBd
Height (AGL):	55 feet	Height (AGL):	55 feet	Height (AGL):	55 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):	6,229.75	ERP (W):	6,229.75	ERP (W):	6,229.75
Antenna A1 MPE%	**13.56**	Antenna B1 MPE%	**13.56**	Antenna C1 MPE%	**13.56**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00
Gain:	11.4 dBd	Gain:	11.4 dBd	Gain:	11.4 dBd
Height (AGL):	55 feet	Height (AGL):	55 feet	Height (AGL):	55 feet
Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	60	Total TX Power(W):	60	Total TX Power(W):	60
ERP (W):	1,312.66	ERP (W):	1,312.66	ERP (W):	1,312.66
Antenna A2 MPE%	**1.97**	Antenna B2 MPE%	**1.97**	Antenna C2 MPE%	**1.97**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
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):	55 feet	Height (AGL):	55 feet	Height (AGL):	55 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 A3 MPE%	**4.15**	Antenna B3 MPE%	**4.15**	Antenna C3 MPE%	**4.15**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**19.68 %**
Ken-Tronics	2.49 %
Site Total MPE %:	**22.17 %**

AT&T Sector 1 Total:	19.68 %
AT&T Sector 2 Total:	19.68 %
AT&T Sector 3 Total:	19.68 %
Site Total:	22.17 %

AT&T _ Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 700 MHz LTE	2	1239.92	55	37.11	700	467	7.95 %
AT&T 1900 MHz (PCS) LTE	2	1975.65	55	56.17	1900	1000	5.62 %
AT&T 1900 MHz (PCS) GSM	2	656.33	55	19.65	1900	1000	1.97 %
AT&T 850 MHz UMTS	2	414.12	55	12.40	850	567	2.19 %
AT&T 1900 MHz (PCS) UMTS	2	656.33	55	16.65	1900	1000	1.97 %
						Total:	19.68 %

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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:	19.68 %
Sector 2:	19.68 %
Sector 3 :	19.68 %
AT&T Maximum Total (per sector):	19.68 %
Site Total:	22.17 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **22.17%** 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.

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