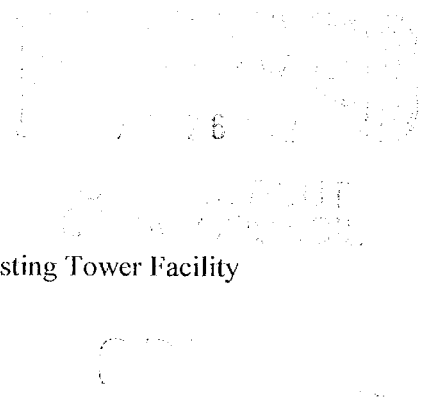


EM-AT&T-077-120426

April 26, 2012

Ms. Linda Roberts, Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051



RE: AT&T Exempt Modification Acknowledgement
Antenna Upgrade on an Existing Installation on an Existing Tower Facility
239 Middle Turnpike East, Manchester, CT

Dear Ms. Roberts:

Enclosed please find an original and 5 copies of the above noted Exempt Modification and the corresponding filing fee on behalf of AT&T.

The installation consists of adding three antennas and a surge arrestor on the tower with supporting ground equipment. The supporting ground equipment will be located on AT&T's existing concrete pad.

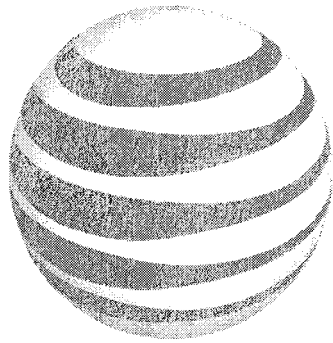
Please do not hesitate to contact me with any questions or concerns.

Thank you.

Sincerely,

A large, stylized handwritten signature in black ink, appearing to read 'Lauren Groppi', is written over the typed name and address.

Lauren Groppi
TRM, Inc.
16 Chestnut Street, Suite 220
Foxborough, MA 02035
lgroppi@trmcom.com



at&t

Request of AT&T

For Acknowledgement to Modify
An Existing Installation on a Monopole

Located at 239 Middle Turnpike East, Manchester, CT

Table of Contents

1. Project Narrative and Summary
2. Exhibits
 - A. Site Plan
 - B. Structural Analysis
 - C. Radio Frequency Electromagnetic Power Density Reports

CONNECTICUT SITING COUNCIL

Request of AT&T :
For Acknowledgement of an Exempt :
Modification to an Existing Monopole : April 12, 2012
Located at 239 Middle Turnpike East, :
Manchester, CT :

EXEMPT MODIFICATION
TO MODIFY AN INSTALLATION ON AN EXISTING MONOPOLE AT
239 Middle Turnpike East, MANCHESTER, CT

1. Introduction

Pursuant to Section 16-50j-72 and 16-50j-73 of the Connecticut General Statutes (the "Statute"), AT&T requests that the Connecticut Siting Council (the "Council") acknowledge this Exempt Modification to an existing installation on an existing monopole. The existing monopole is located at 239 Middle Turnpike East, Manchester, CT and is owned by the Town of Manchester.

The AT&T modification involves adding three (3) antennas and modifying the existing mount to a T-Frame Mount at one hundred forty three feet (143') above ground level along with accompanying ground equipment.

The modification will not cause substantial adverse environmental effect. The Site is technically feasible, environmentally feasible and avoids the unnecessary siting of additional tower facilities within the Town of Manchester.

2. Proposed AT&T Installation

AT&T is licensed to provide wireless telecommunication services to the State of Connecticut by the Federal Communications Commission ("FCC").

The existing one hundred and eighty four foot (184') monopole is located at 239 Middle Turnpike East (Latitude: 41° 47' 3.81" N, Longitude: 72° 30' 42.12" W).

The AT&T installation is proposed at one hundred forty three (143') feet above ground level. The ground equipment will be located on AT&T's existing concrete pad. The proposed AT&T installation will not interfere with either of the existing facilities.

AT&T intends to add one (1) KMW Communications AM-X-16-65-00T antenna, two (2) Commscope SBNH-1D6565C antennas, (6) Ericsson RRU11 Remote Radio Heads and one (1) DC6-48-60-18-8F Surge Arrestor on the monopole. In addition to the antennas

and surge arrestor, one (1) 3/8" fiber cable will be run to serve all of the new antennas along with two (2) 5/8" DC cables. These cables will be placed on the interior of the monopole.

AT&T proposes to place the ground equipment on the existing concrete pad. The ground installation includes one Purcell cabinet which will house one (1) DC6-48-60RM BTS and one (1) RBS6601 LTE. Further details can be seen on the Site Plan attached as Exhibit A.

A. Technical Feasibility

The monopole is capable of supporting AT&T's proposed installation. Hudson Design Group, LLC performed a structural assessment on monopole and provided a full report to AT&T. Based on their review, Hudson Design Group determined that the existing monopole will satisfy the requirements of applicable codes and standards, consistent with the requirement of the Statute. Please see Exhibit B for the Structural Analysis.

B. Environmental Feasibility

The proposed installation will have negligible impact. The environmental impact to the Town of Manchester is reduced by carriers collocating on an existing installation on an existing structure. AT&T proposes to collocate at approximately 143' feet above ground level by replacing its existing antenna mount with a T-Frame Mount, which will not increase the height of the monopole and have little or no increase in visibility to the Town.

AT&T's proposed installation will not impact wetlands or water resources.

AT&T's proposed facilities will not create air pollutants nor increase the impact on air quality during normal operation of the facility. There will only be a slight increase in noise pollution during site construction.

There will be a small amount of traffic generated at the Site during construction as workers arrive and depart the site and materials are delivered. When construction is complete, the traffic will be minimal with an average of one maintenance visit per month.

C. Public Safety Concerns

The proposed installation will not have an adverse impact to the health and safety of the surrounding residences and businesses.

The total radio frequency electromagnetic power density at the Site will not be increased above the standard adopted by the Connecticut Department of

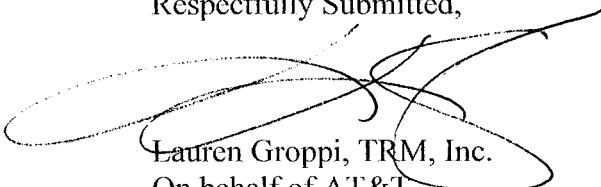
Environmental Protection as set forth in Section 22a-162 of the Connecticut General Statutes and the MPE limits established by the Federal Communications Commission. These findings are noted in the power density report included as Exhibit C.

With the proposed installation, AT&T will better serve its customers including local residences and businesses. By seeking to expand their LTE network in Connecticut, AT&T will be able to provide more reliable wireless service to their customers in the Manchester area, fulfilling their coverage goals to comply with their FCC License.

3. Conclusion

The proposed installation will comply with all the requirements set forth by the Statute. In accordance with RCSA § 16-50j-73, the proposed installation does not increase the tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by 6 decibels, nor will it add radio frequency sending or receiving capability to or above the standard adopted by the State Department of Environmental Protection pursuant to Section 22a-162 of the Connecticut General Statutes. Therefore, AT&T respectfully requests that the Council an approval of this Exempt Modification Application at 239 Middle Turnpike East, Manchester, CT.

Respectfully Submitted,



Lauren Groppi, TRM, Inc.
On behalf of AT&T

Cc: Scott Shanley, General Manager, Town of Manchester
Linda Roberts, Executive Director, Connecticut Siting Council

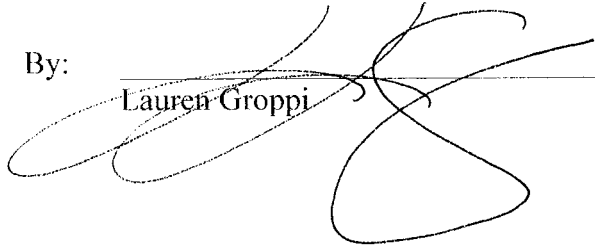
Certificate of Service

This is to certify that on this 26th day of April, 2012 the foregoing Application was sent via first class mail, to the following:

Scott Shanley, General Manager
Town of Manchester, Connecticut
41 Center Street
Manchester, CT 06040

By:

Lauren Groppi

A handwritten signature in black ink, appearing to be 'Lauren Groppi', written over a horizontal line. The signature is stylized and somewhat abstract, with several loops and a long horizontal stroke extending to the right.

STRUCTURAL ANALYSIS REPORT

For

CT5448

AWE-MANCHESTER CENTRAL

239 Middle Turnpike East
Manchester, CT 06040

Antennas Mounted to the Monopole



Prepared for:



at&t

500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

Dated:
April 10, 2012

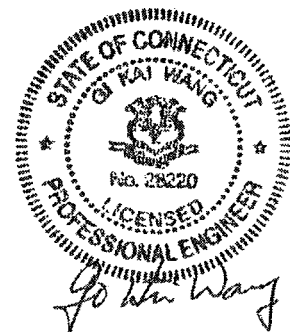
Prepared by:

HUDSON DESIGN GROUP, LLC.

1600 Osgood Street Building 20 North, Suite 2-101
North Andover, MA 01845

Phone: (978) 557-5553

www.hudsondesigngroupllc.com





SCOPE OF WORK:

Hudson Design Group LLC (HDG) has been authorized by AT&T to conduct a structural evaluation of the 184' monopole supporting the proposed AT&T antennas located at elevation 143' above the ground level.

This report represents this office's findings, conclusions and recommendations pertaining to the support of AT&T's existing and proposed antennas listed below.

Record drawings of the existing monopole were not available for our use. The previous structural analysis report prepared by Malouf Engineering Intl., Inc., dated January 30, 2009, was available and obtained for our use. The previous structural analysis report prepared by Bay State Design, dated May 27, 2010, was also available and obtained for our use.

CONCLUSION SUMMARY:

Based on our evaluation, we have determined that the existing monopole is in conformance with the ANSI/TIA-222-F Standard for the loading considered under the criteria listed in this report. The monopole structure is rated at 99.0% - (Base Plate Controlling).



APPURTENANCES CONFIGURATION:

| Tenant | Appurtenances | Elev. | Mount |
|-----------------|---------------------------------------|-------------|------------------------|
| | Lighting Rod | 185' | Top of Monopole |
| | 10' Omni | 185' | Low Profile Platform |
| | (2) 20' Dipole | 185' | Low Profile Platform |
| | (3) APXV18-206517S Antennas | 174' | 1' Side Mount Standoff |
| | (6) APX16DWV-16DWVS Antennas | 164' | Low Profile Platform |
| | (3) ATMAP1412D | 164' | Low Profile Platform |
| | (3) ACU-A11-N | 164' | Low Profile Platform |
| | (3) 840-10054 Antennas | 153' | Low Profile Platform |
| | (3) DB980F65T4E Antennas | 153' | Low Profile Platform |
| | (6) APXV86-906513 Antennas | 153' | Low Profile Platform |
| | (3) 860-10025 RCU | 153' | Low Profile Platform |
| | GPS | 153' | Low Profile Platform |
| | (3) 2.5' Dish | 149' | Low Profile Platform |
| | 4' Dish | 146' | Low Profile Platform |
| AT&T | (3) 800-10121 Antennas | 143' | 12' T-Frame |
| AT&T | (6) LGP21400 TMA | 143' | 12' T-Frame |
| AT&T | AM-X-CD-16-65 Antenna | 143' | 12' T-Frame |
| AT&T | (2) SBNH-1D6565C Antennas | 143' | 12' T-Frame |
| AT&T | (6)RRUs | 143' | 12' T-Frame |
| AT&T | Surge Arrestor DC6-48-60-18-8F | 143' | 12' T-Frame |
| | 20' Omni | 125' | Low Profile Platform |
| | (2) 10' Yagi | 125' | Low Profile Platform |
| | GPS | 54' | 1' Side Mount Standoff |

**Proposed AT&T Appurtenances shown in Bold.*

AT&T EXISTING/PROPOSED COAX CABLES:

| Tenant | Coax Cables | Elev. | Mount |
|-----------------|----------------------------|-------------|------------------------|
| AT&T | (6) 1 5/8" Cables | 143' | Inside Monopole |
| AT&T | Fiber Cable | 143' | Inside Monopole |
| AT&T | (2) DC Power Cables | 143' | Inside Monopole |

**Proposed AT&T Coax Cables shown in Bold.*



ANALYSIS RESULTS SUMMARY:

| Component | Max. Stress Ratio | Elev. of Component (ft) | Pass/Fail | Comments |
|------------------------|--------------------------|--------------------------------|------------------|-----------------|
| Pole Section-L1 | 14.7 % | 166.62 – 184.0 | PASS | |
| Pole Section-L2 | 63.5 % | 133.18 – 166.62 | PASS | |
| Pole Section-L3 | 86.2 % | 88.09 – 133.18 | PASS | |
| Pole Section-L4 | 90.5 % | 44.03 – 88.09 | PASS | |
| Pole Section-L5 | 98.8 % | 1.0 – 44.03 | PASS | |
| Base Plate | 99.0 % | 1.0 | PASS | |



DESIGN CRITERIA:

1. EIA/TIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures

County: Hartford
Wind Load: 80 mph (fastest mile)
 100 mph (3 second gust)
Nominal Ice Thickness: 1/2 inch

2. Approximate height above grade to proposed antennas: 143'-0"

***Calculations and referenced documents are attached.**

ASSUMPTIONS:

1. The monopole dimensions, member sizes and strength of material are as indicated in the previous structural analysis report prepared by Bay State Design, dated May 27, 2010.
2. The monopole and foundation are properly constructed and maintained. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. All antennas, mounts coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer requirements.
4. The support mounts and platforms are not analyzed and are considered adequate to support the loading. The analysis is limited to the primary support structure itself.
5. All prior structural modification, if any, are assumed to be as per the data supplied (if available), and installed properly.
6. The foundation of the tower was not checked due to lack of information. As-built foundation drawings and geotechnical report would be required to determine whether the foundation is capable of supporting the proposed loadings.



SUPPORT RECOMMENDATIONS:

HDG recommends that the proposed antennas, RRHs and surge arrestor be mounted on the proposed T-frames supported by the monopole.

Reference HDG's Latest Construction Drawings for all component and connection requirements (attached).

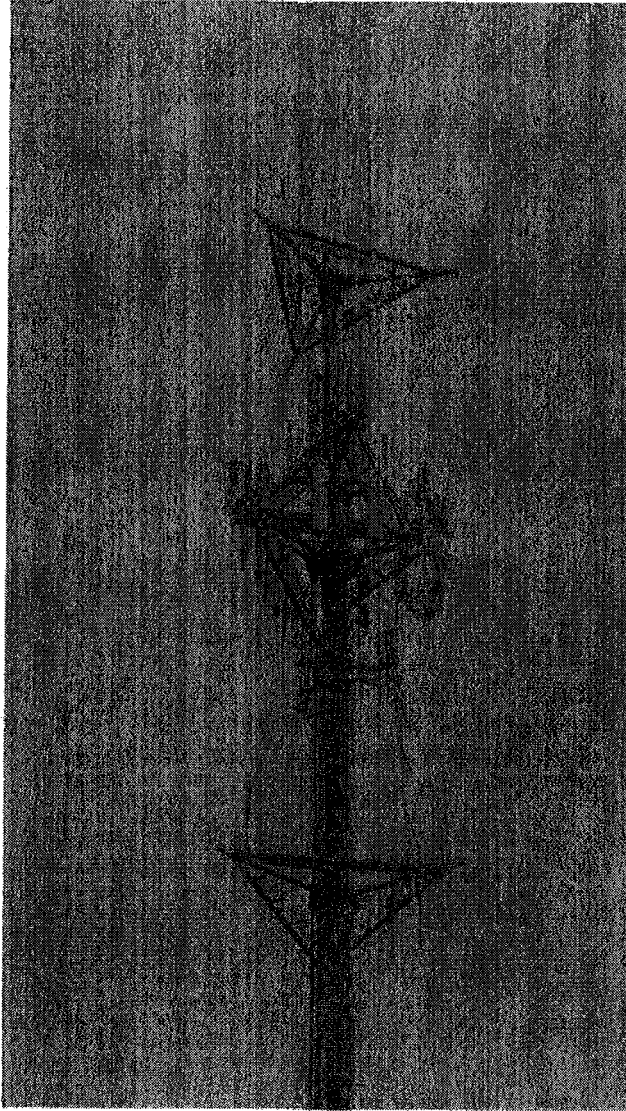


Photo 1: Photo illustrating the Monopole with Appurtenances shown.



CONSTRUCTION DRAWINGS

PROJECT INFORMATION

SCOPE OF WORK: UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS
 SITE ADDRESS: 239 MIDDLE TURNPIKE EAST
 MANCHESTER, CT 06040
 LATITUDE: 41° 47' 3.81" N
 LONGITUDE: 72° 30' 42.12" W
 JURISDICTION: NATIONAL, STATE & LOCAL CODES OR ORDINANCES
 CURRENT USE: TELECOMMUNICATIONS FACILITY
 PROPOSED USE: TELECOMMUNICATIONS FACILITY
 MAP/BLOCK/LOT: 92/3950/239
 SAND USE: MUNICIPAL 94
 PROPERTY OWN: 41 CENTER STREET
 MANCHESTER, CT 06040



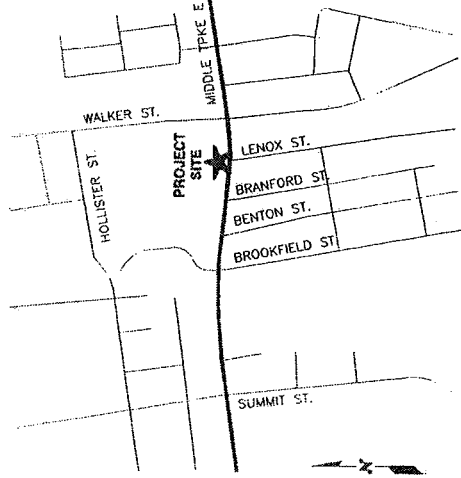
SITE NUMBER: CT5448
SITE NAME: AWE-MANCHESTER CENTRAL

DRAWING INDEX

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| GN-1 GENERAL NOTES | 1 |
| A-1 COMPOUND & EQUIPMENT PLAN | 1 |
| A-2 ANTENNA LAYOUT AND ELEVATION | 1 |
| A-3 DETAILS | 1 |
| A-4 DETAILS | 1 |
| G-1 PLUMBING DIAGRAM & GROUNDING DETAILS | 1 |

VICINITY MAP

DIRECTIONS TO SITE:
 HEAD EAST ON ENTERPRISE DR TOWARD CAPITOL BLVD - GO 0.4 MI. TURN LEFT AT CAPITOL BLVD - GO 0.3 MI. TURN LEFT AT WEST ST - GO 0.3 MI. TURN LEFT TO MERGE ONTO I-81 N
 GO 0.9 MI. TAKE EXIT 29 FOR US-5 N/C-15 TOWARD I-81 N
 HARTFORD/ROCKY HILL - GO 0.4 MI. LEFT AT I-81 N ONTO I-84
 E/US-6 E - GO 2.9 MI. TAKE EXIT 60 FOR MIDDLE TURNPIKE W/US-47 W
 MANCHESTER - GO 0.4 MI. TURN RIGHT AT US-47/US-6 - GO 0.3 MI. SLIGHT LEFT TOWARD
 MIDDLE TURNPIKE W - GO 0.1 MI. SLIGHT RIGHT AT MIDDLE TURNPIKE W - GO 2.5 MI. ARRIVE
 AT 239 MIDDLE TURNPIKE EAST, MANCHESTER.



GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PREPARED, AND CORRECTED WORK OF A&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE AGENCIES FOR THE PURPOSES OF CONDUCTING ANY WORK.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSIBLE 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 MAIN RESPONSIBLE ENGINEER OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

72 HOURS

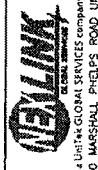


BEFORE YOU DIG



CALL TOLL FREE 800-922-4455

UNDERGROUND SERVICE ALERT



UNLINK GLOBAL SERVICES COMPANY
 500 MARSHALL PHELPS ROAD UNIT F, 2A
 WINDSOR, CT 06095

SITE NUMBER: CT5448
SITE NAME: AWE-MANCHESTER CENTRAL
 239 MIDDLE TURNPIKE EAST
 MANCHESTER, CT 06040
 HARTFORD COUNTY



500 ENTERPRISE DRIVE, SUITE 3A
 ROCKY HILL, CT 06867



| NO. | DATE | DESCRIPTION | BY | CHK BY | ISSUED BY |
|-----|----------|-------------------------|----|--------|-----------|
| 1 | 10/29/21 | ISSUED FOR CONSTRUCTION | DR | DC | DR |
| 2 | 10/29/21 | ISSUED FOR REVIEW | DR | DC | DR |

SCALE: AS SHOWN
 DESIGNED BY: DC
 DRAWN BY: DR

AT&T
 TITLE SHEET
 (LIE)
 DRAWING NUMBER
 T-1

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR PROJECT COMPLIANCE WITH THE NEC (AS ADDED BY THE CITY), THE STATE-SPECIFIC (CUI, LPI, OR NFPA) LIGHTING CODES, AND GENERAL STANDARDS. THE SUBCONTRACTOR SHALL REVIEW ALL RECORDS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GESS) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDED CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND B1) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A "BEST" RESULT OF 5 OHMS OR LESS.
4. METAL MESHING SHALL NOT BE USED AS THE NEC REQUIRES EQUIPMENT GROUNDING CONDUCTORS STRAPPED TO COPPER CONDUCTORS WITH GREEN INSULATION SIZED IN ACCORDANCE WITH THE NEC. SHALL BE FINISHED AND INSTALLED WITH THE POWER CIRCUITS TO ITS 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 ANTI-OXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. GCS BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED 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 SHALL BE 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. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD WITH A MINIMUM OF 200 WELDS PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR - MELINK
SUBCONTRACTOR - AT&T MOBILITY
OWNER - AT&T MOBILITY
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE THEMSELVES 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.
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 APPLICABLE REGULATIONS AND ORDINANCES. THE PERFORMANCE OF THE WORK SHALL BE CARRIED OUT IN STRICT ACCORDANCE WITH ALL APPLICABLE MANUFACTURER, 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. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. 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.
9. 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.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAINTMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COILS, CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ALL REMOVED ITEMS SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENHANCED AND SHALL BE DONE IN ACCORDANCE WITH ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. 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) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE PROTECTED WITH AN APPROVED TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH UNITS SPECIFICATIONS AND GENERAL CONSTRUCTION SPECIFICATIONS FOR CONSTRUCTION OF AT&T MOBILITY SITES.
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONSTRUCTION WORK SHALL BE IN ACCORDANCE WITH THE EXISTING CONSTRUCTION DRAWINGS. THE CONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. 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 SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW. WORK SHOULD BE SCHEDULED FOR AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY REGULATIONS 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 PROTECTIVE EQUIPMENT SHOULD BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20. APPLICABLE BUILDING CODES:
SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL AND LOCAL BUILDING CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
AMENDMENTS: 2003 IBC WITH 2005 CT SUPPLEMENT & 2009 CT AMENDMENTS
ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS
LIGHTNING CODE: REFER TO ELECTRICAL DRAWINGS
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, ASD, NINTH EDITION;
TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL
ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES, REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.
FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS

| ACL | ABOVE GRADE LEVEL | B.C. | GENERAL CONTRACTOR | RF | RADIO FREQUENCY |
|----------|-------------------------|--------|--------------------|------|----------------------------|
| AWG | AMERICAN WIRE GAUGE | MGB | MASTER GROUND BUS | TSD | TO BE DETERMINED |
| BCW | BARE COPPER WIRE | MIN | MINIMUM | TBR | TO BE REMOVED |
| BTS | BASE TRANSCIVER STATION | NEW | NEW | TBRR | TO BE REMOVED AND REPLACED |
| EXISTING | EXISTING | N.T.S. | NOT TO SCALE | TYP | TYPICAL |
| EQ | EQUIPMENT GROUND | REF | REFERENCE | | |
| ESR | EQUIPMENT GROUND RING | REQ | REQUIRED | | |

AT&T
GENERAL NOTES
(LITE)
GENERAL NOTES
DATE: 10/27/11
BY: [Signature]
SCALE: AS SHOWN
REVISIONS BY: [Signature]
DATE: 10/27/11
BY: [Signature]
SCALE: AS SHOWN
REVISIONS BY: [Signature]
DATE: 10/27/11
BY: [Signature]

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

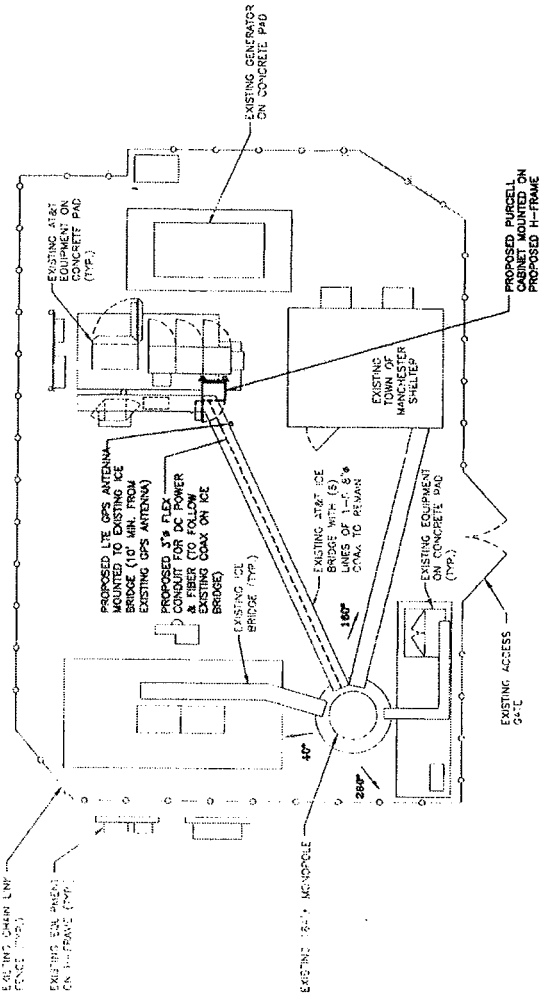
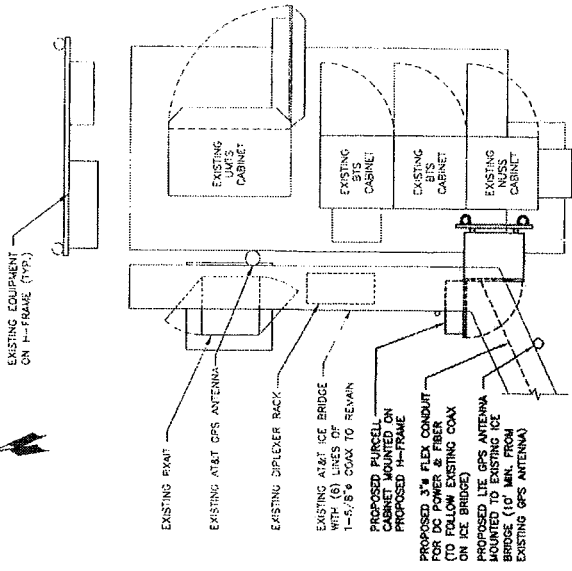
SITE NUMBER: CT5448
SITE NAME: ANEHAN-CHESTER
CENTRAL
239 MIDDLE TURNPIKE EAST
MIDDLETOWN, CT 06440
HARTFORD COUNTY

MELINK
A UNIT-LOCAL SERVICES COMPANY
600 WASHINGTON PIERS ROAD, UNIT# 2A
MIDDLETOWN, CT 06456

Hudson
Design Services
100 WASHINGTON PIERS ROAD, UNIT# 2A
MIDDLETOWN, CT 06456

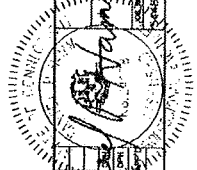
NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

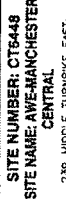


EQUIPMENT PLAN
SCALE: 1/2" = 1'-0"
0 1'-0" 2'-0" 4'-0" 6'-0"

COMPOUND PLAN
SCALE: 3/16" = 1'-0"
0 2'-0" 5'-0" 10'-0" 16'-0"



500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06867



UNITHA GLOBAL SERVICES COMPANY
860 MARSHALL PHELPS ROAD, UNIT# 2A
WINDSOR, CT 06895

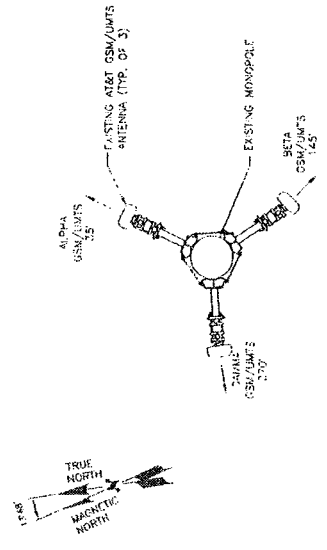


UNTHA GLOBAL SERVICES COMPANY
860 MARSHALL PHELPS ROAD, UNIT# 2A
WINDSOR, CT 06895

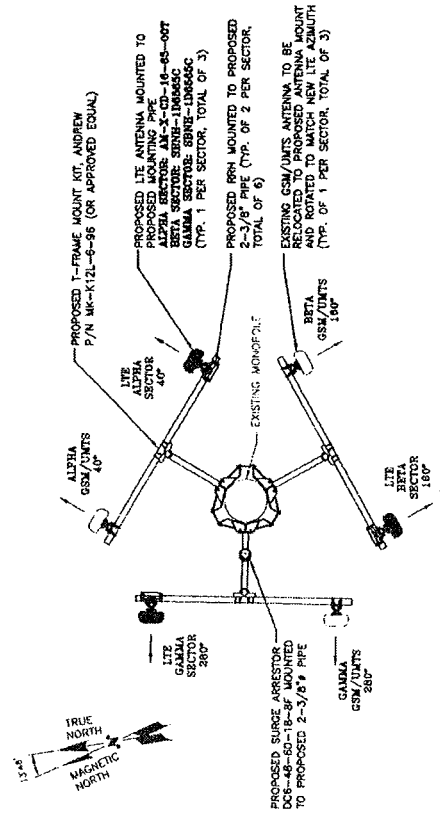
| | | | | | |
|-----|----------|-------------------------|----------|-------|------------------------------------------------|
| NO. | DATE | BY | CHK'D BY | SCALE | DESCRIPTION |
| 1 | 10/23/17 | ISSUED FOR CONSTRUCTION | | | AT&T EQUIPMENT COMPOUND & EQUIPMENT PLAN (L1E) |
| 2 | 10/23/17 | ISSUED FOR REVIEW | | | AT&T EQUIPMENT COMPOUND & EQUIPMENT PLAN (L1E) |

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

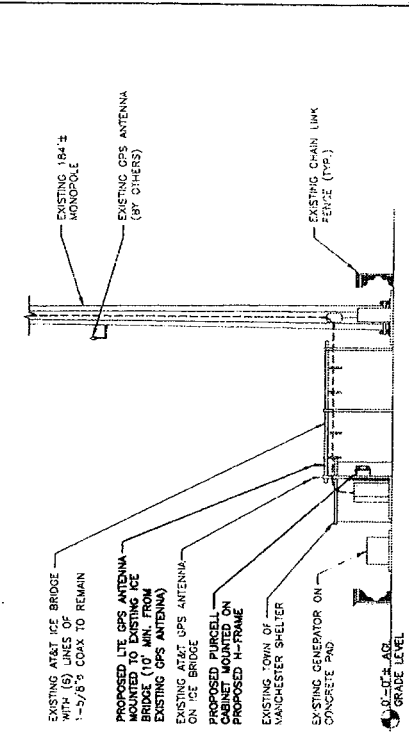
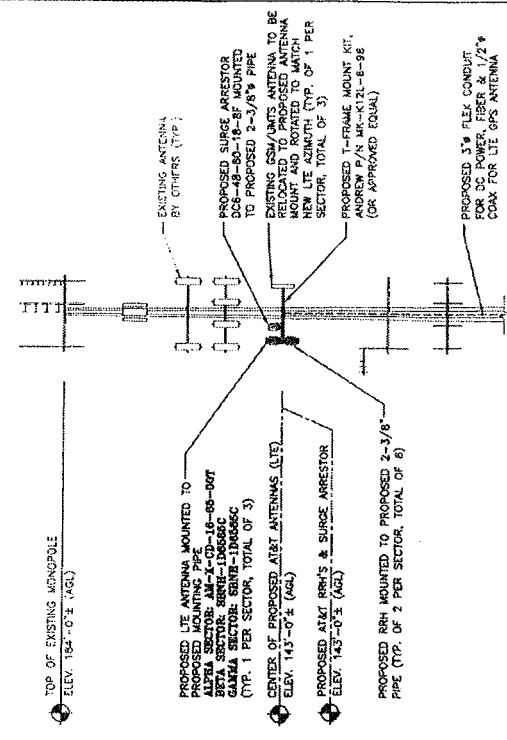
NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES AND EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.



EXISTING GSM/UMTS ANTENNA PLAN
SCALE: N.T.S.

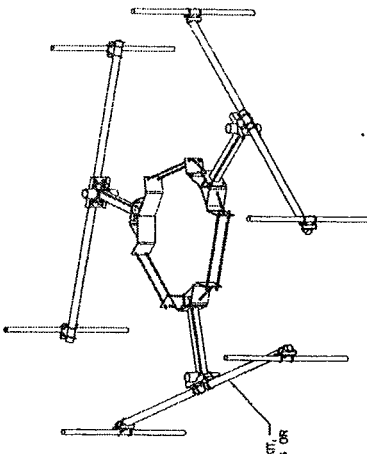


PROPOSED LTE ANTENNA PLAN
SCALE: N.T.S.

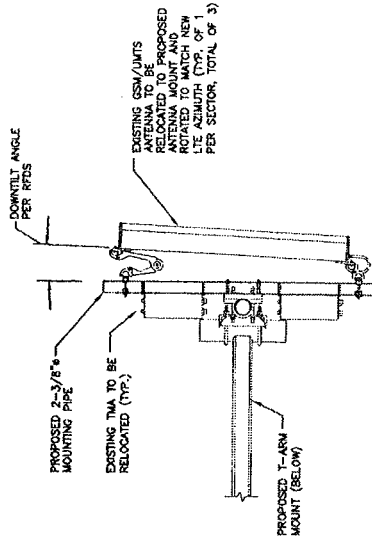


NORTH ELEVATION
SCALE: 3/32\"/>

| | | | | |
|----------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <p>500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067</p> | | <p>SITE NUMBER: CT5-448 SITE NAME: AWE-MANCHESTER CENTRAL 239 MIDDLE TURNPIKE EAST MANCHESTER, CT 06040 HARTFORD COUNTY</p> | <p> <small>GLOBAL SERVICES COMPANY</small> 800 MARSHALL PHELPS ROAD UNIT# 2A WINDSOR, CT 06095</p> | <p> Hudson Design Group 1100 WASHINGTON STREET HARTFORD, CT 06103 TEL: 860-234-1100</p> |
| <p>1 10/27/11 ISSUED FOR CONSTRUCTION</p> | <p>0 10/27/11 SHOULD BE REVIEWED</p> | <p>BY: [Signature]</p> | <p>DATE: 10/27/11</p> | <p>SCALE: AS SHOWN</p> |
| <p>AT&T ANTENNA LAYOUT AND ELEVATION (LIE)</p> | | <p>DATE: 10/27/11</p> | | |



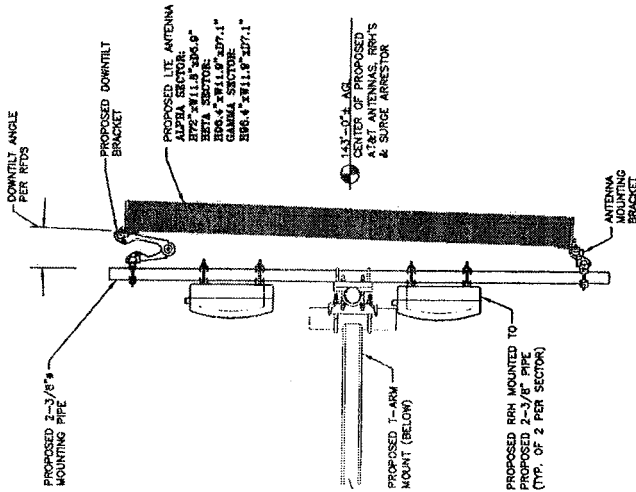
ANTENNA MOUNT DETAIL
SCALE: N.T.S.



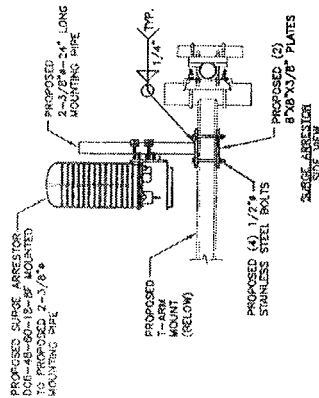
EXISTING UMS/GSM ANTENNA MOUNTING DETAIL
SCALE: N.T.S.

NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT IS DETERMINED PRIOR TO CONSTRUCTION.

NOTE:
REFER TO THE FINAL BS DATA SHEET FOR FINAL ANTENNA SETTINGS.



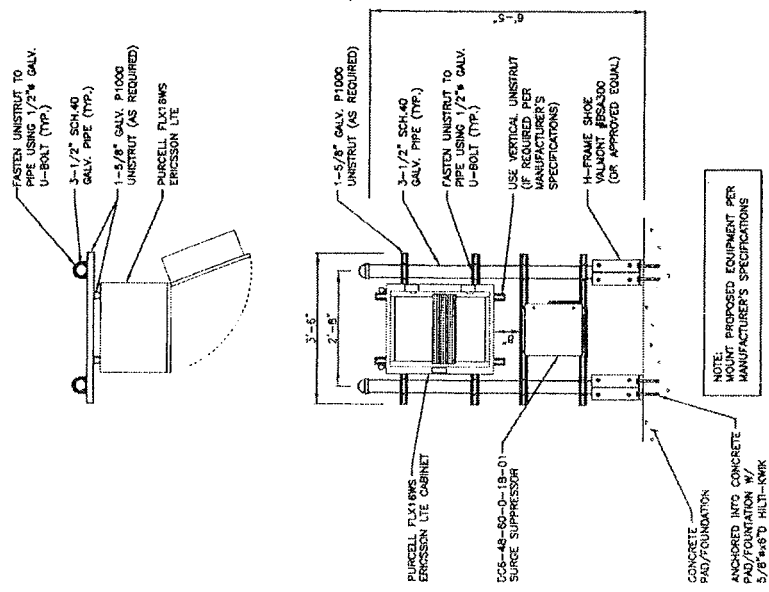
PROPOSED LTE ANTENNA, RRH & SURGE ARRESTOR MOUNTING DETAIL
SCALE: N.T.S.



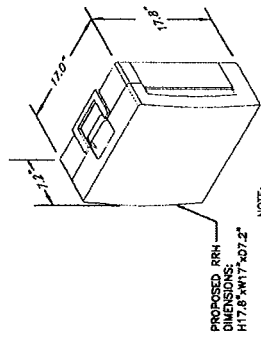
| | | | | | |
|--------------------------------------------------------------------------------|--------------------------------------------|-----------------|--------------------------------------------------------------------------|------------------------|------------------------|
| <p>Hudson Engineering</p> | <p>MEXLINK Aerial Services Company</p> | <p>at&t</p> | <p>DESIGNED BY: DC</p> | <p>DATE: 01/11/11</p> | <p>SCALE: AS SHOWN</p> |
| | | | <p>500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06867</p> | <p>DESIGNED BY: DC</p> | <p>DATE: 01/11/11</p> |
| <p>SITE NUMBER: CTS44B SITE NAME: AVE-MANCHESTER CENTRAL</p> | | | <p>500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06867</p> | | |
| <p>239 MIDDLE TURNPIKE EAST MANSFIELD, CT 06108 HARTFORD COUNTY</p> | | | <p>500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06867</p> | | |
| <p>800 MANSFIELD BELLS ROAD UNIT# 2A MANSFIELD, CT 06108</p> | | | <p>500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06867</p> | | |
| <p>AT&T DETAILS (LFE) GSM/UMTS A-3</p> | | | <p>1 10/29/11 ISSUED FOR CONSTRUCTION 0 10/23/11 SEND FOR REVIEW</p> | | |

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

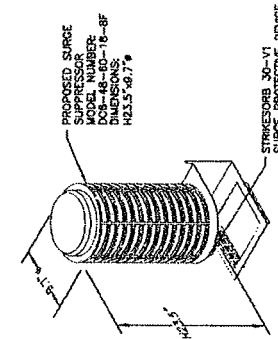
NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT IS DETERMINED PRIOR TO CONSTRUCTION.



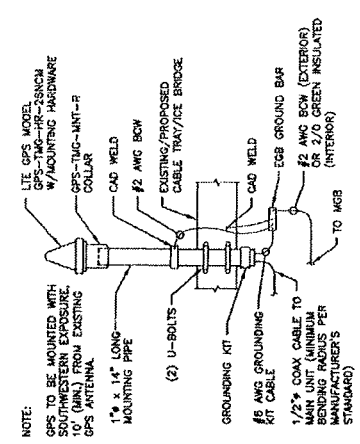
PROPOSED EQUIPMENT MOUNTING DETAIL
SCALE: N.T.S.



RRH DETAIL
SCALE: N.T.S.



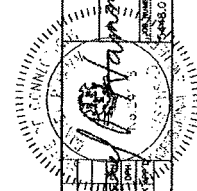
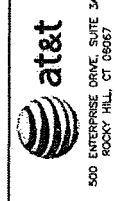
DC SURGE SUPPRESSOR DETAIL
SCALE: N.T.S.



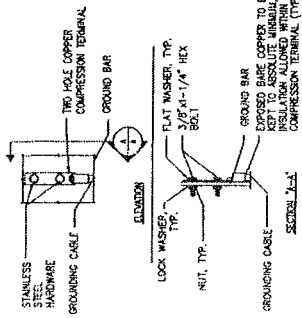
GPS MOUNTING DETAIL
SCALE: N.T.S.



SITE NUMBER: CTE448
SITE NAME: AWE-MANCHESTER CENTRAL
239 MIDDLE TURNPIKE EAST
MANCHESTER, CT 06040
HARTFORD COUNTY

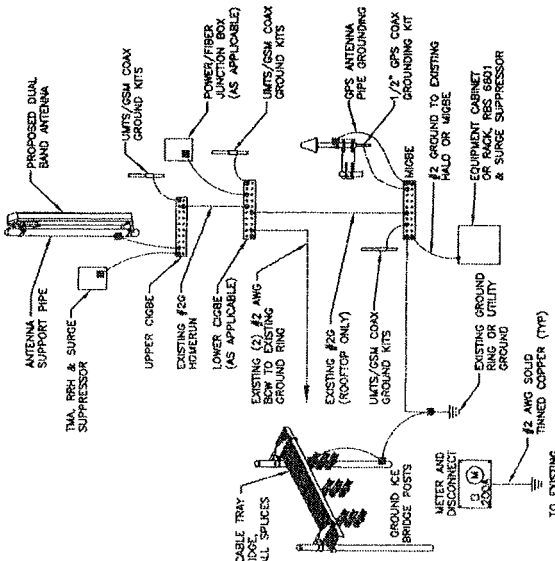


| | | | |
|-----------------|----------|-------------------------|------|
| AT&T | | DETAILS (LIE) | |
| DESIGNED BY: DC | | DRAWN BY: DB | |
| NO. | DATE | REVISIONS | DATE |
| 1 | 10/29/11 | ISSUED FOR CONSTRUCTION | |
| 2 | 02/23/12 | ISSUED FOR REVIEW | |
| PROJECT: AT&T | | SHEET NO: 01 | |
| SCALE: AS SHOWN | | SHEET TOTAL: 01 | |

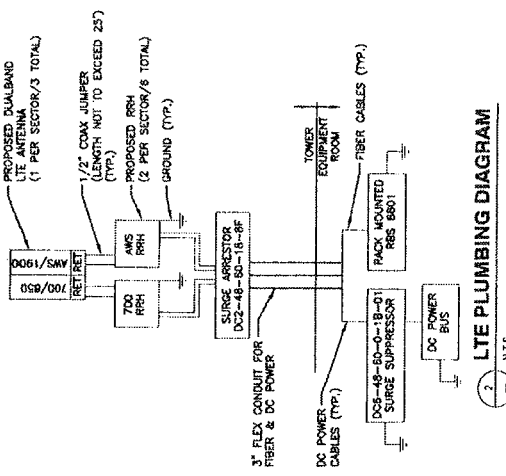


NOTE:
1. "DOWELING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. COPPER DOWELNAILS FROM UPPER EGG, LOWER EGG, AND MBE.

TYPICAL GROUND BAR CONNECTION DETAIL
H.T.S.



GROUNDING RISER DIAGRAM
H.T.S.



LTE PLUMBING DIAGRAM
N.T.S.

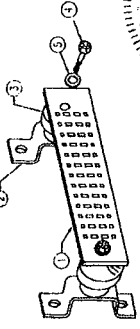
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY THE CONDUCTOR AND DESTINATION.

SECTION "A" - SURGE ARRESTORS

- CABLE ENTRY PORTS (MATCH PLATES) (#2)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- TELECOM FRAMEWORK (IF AVAILABLE) (#2)
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
- INTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)

WIRELESS SOLUTIONS INC.

| NO. | REQ. | PART NO. | DESCRIPTION |
|-----|------|---------------------|------------------------------|
| 1 | 1 | HUB-0420-15 | SOLID GRD. BAR (20"x4"x1/4") |
| 2 | 2 | WALL MTC. BRKT. | WALL MTC. BRKT. |
| 3 | 2 | INSULATORS | INSULATORS |
| 4 | 4 | 5/8"-11x1" N.H.C.S. | 5/8"-11x1" N.H.C.S. |
| 5 | 4 | 5/8" LOCKWASHER | 5/8" LOCKWASHER |



GROUND BAR - DETAIL
H.T.S.

Hudson
Design Group, Inc.

100 WEST 20TH ST
SUITE 300
MANHATTAN, NY 10011
TEL: 212 692 1000
WWW.HUDSONDESIGN.COM

at&t

500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

MEXLINK
GLOBAL SERVICES COMPANY

800 MARSHALL FIELD ROAD, SUITE 2A
WINDSOR, CT 06095

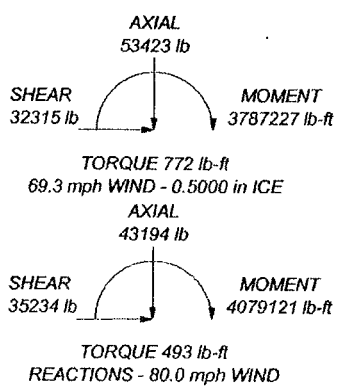
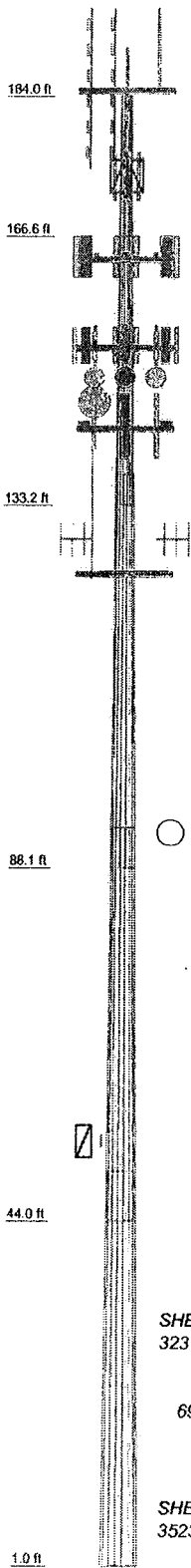
SITE NUMBER: CTF448
SITE NAME: AVERMARE-CHESTER CENTRAL
235 MIDDLE TURPIKE EAST
MANCHESTER, CT 06040
HARTFORD COUNTY

AT&T
GROUNDING DIAGRAM & GROUNDING DETAILS (LTE)
DATE: 01/22/13 ISSUED FOR CONSTRUCTION
DATE: 03/22/13 ISSUED FOR REVIEW
BY: LMK
CHECKED BY: DR
DESIGNED BY: DC
SCALE: AS SHOWN
0-1



CALCULATIONS

| | | | | | |
|--------------------|---------|---------|---------|---------|---------|
| Section | 1 | 2 | 3 | 4 | 5 |
| Length (ft) | 17.38 | 36.36 | 48.89 | 49.05 | 49.14 |
| Number of Straps | 18 | 18 | 18 | 18 | 18 |
| Thickness (in) | 0.1875 | 0.2550 | 0.3750 | 0.4375 | 0.4375 |
| Socket Length (ft) | 2.92 | 3.90 | 4.89 | 6.11 | 6.11 |
| Top Dia (in) | 15.5999 | 18.3689 | 25.0613 | 34.0369 | 42.6744 |
| Bot Dia (in) | 16.3960 | 26.4607 | 35.8924 | 44.9030 | 53.5000 |
| G-325B | | | A572-55 | | |
| Weight (lb) | 607.6 | 2173.1 | 5960.6 | 9046.6 | 11084.1 |



DESIGNED APPURTENANCE LOADING

| TYPE | ELEVATION | TYPE | ELEVATION |
|--------------------------------|-----------|---------------------------------------------------------|-----------|
| Lighning Rod 1/2"x10' | 185 | VHLP2.5-180 | 149 |
| PIROD 13' Low Profile Platform | 185 | VHLP2.5-180 | 149 |
| Omni 2 1/2"x10' | 185 | HP4-105 | 146 |
| 20'-4 Bay Dipole | 185 | PIROD 12' T-Frame (ATI - proposed) | 143 |
| 20'-4 Bay Dipole | 185 | PIROD 12' T-Frame (ATI - proposed) | 143 |
| 1' Side Mount Standoff | 174 | PIROD 12' T-Frame (ATI - proposed) | 143 |
| 1' Side Mount Standoff | 174 | Kathrein 800 10121 w/mount pipe (ATI - existing) | 143 |
| 1' Side Mount Standoff | 174 | Kathrein 800 10121 w/mount pipe (ATI - existing) | 143 |
| APXV18-206517S-C | 174 | Kathrein 800 10121 w/mount pipe (ATI - existing) | 143 |
| APXV18-206517S-C | 174 | Kathrein 800 10121 w/mount pipe (ATI - existing) | 143 |
| PIROD 13' Low Profile Platform | 164 | (2) Powerwave TMA LGP21400 (ATI - existing) | 143 |
| (2) APX16DWV-16DWVS | 164 | (2) Powerwave TMA LGP21400 (ATI - existing) | 143 |
| (2) APX16DWV-16DWVS | 164 | (2) Powerwave TMA LGP21400 (ATI - existing) | 143 |
| (2) APX16DWV-16DWVS | 164 | (2) Powerwave TMA LGP21400 (ATI - existing) | 143 |
| RFS ATMAP1412D-1A20 | 164 | (2) Powerwave TMA LGP21400 (ATI - existing) | 143 |
| RFS ATMAP1412D-1A20 | 164 | KMW AM-X-CD-16-65-00T-RET w/mount pipe (ATI - proposed) | 143 |
| RFS ATMAP1412D-1A20 | 164 | RFS ACU-A11-N | 143 |
| RFS ACU-A11-N | 164 | RFS ACU-A11-N | 143 |
| RFS ACU-A11-N | 164 | RFS ACU-A11-N | 143 |
| PIROD 13' Low Profile Platform | 153 | SBNH-1D6565C w/mount pipe (ATI - proposed) | 143 |
| 840-10054 w/mount pipe | 153 | SBNH-1D6565C w/mount pipe (ATI - proposed) | 143 |
| GPS | 153 | (2) Ericsson RRU (ATI - proposed) | 143 |
| 840-10054 w/mount pipe | 153 | (2) Ericsson RRU (ATI - proposed) | 143 |
| 840-10054 w/mount pipe | 153 | (2) Ericsson RRU (ATI - proposed) | 143 |
| 840-10054 w/mount pipe | 153 | Surge Arrestor (DC6-48-60-18-8F) (ATI - proposed) | 143 |
| Kathrein 860 10025 RCU | 153 | PIROD 13' Low Profile Platform | 125 |
| Kathrein 860 10025 RCU | 153 | 10' Yagi | 125 |
| DB980F65T4E-M | 153 | 10' Yagi | 125 |
| DB980F65T4E-M | 153 | Omni 2 1/2"x20' | 125 |
| DB980F65T4E-M | 153 | 1' Side Mount Standoff | 54 |
| (2) APXV86-906513 | 153 | GPS | 54 |
| (2) APXV86-906513 | 153 | | |
| (2) APXV86-906513 | 153 | | |
| VHLP2.5-180 | 149 | | |

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 80.0 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69.3 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 60.0 mph wind.
5. TOWER RATING: 99%

| | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------|--|
| <p align="center">Hudson Design Group, LLC 1600 Osgood Street, Building 20 North, Suite 2-101 North Andover, MA 01845 Phone: (978) 557-5553 FAX: (978) 226-5586</p> | | <p>Job: CT 5448 Manchester, CT Project: 184 ft monopole Client: AT&T Code: TIA/EIA-222-F Path:</p> | | <p>Drawn by: kw Date: 04/11/12 Scale: NTS Dwg No. E-1</p> | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------|--|

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------|
| tnxTower Hudson Design Group, LLC 1600 Osgood Street, Building 20 North, Suite 2-101 North Andover, MA 01845 Phone: (978) 557-5553 FAX: (978) 226-5586 | Job CT 5448 Manchester, CT | Page 1 of 10 |
| | Project 184 ft monopole | Date 09:04:33 04/11/12 |
| | Client AT&T | Designed by kw |

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in Hartford County, Connecticut.

Basic wind speed of 80.0 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56.0 pcf.

A wind speed of 69.3 mph is used in combination with ice.

Temperature drop of 50.0 °F.

Deflections calculated using a wind speed of 60.0 mph.

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

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

Tapered Pole Section Geometry

| Section | Elevation ft | Section Length ft | Splice Length ft | Number of Sides | Top Diameter in | Bottom Diameter in | Wall Thickness in | Bend Radius in | Pole Grade |
|---------|-----------------|-------------------------|------------------------|-----------------------|-----------------------|--------------------------|-------------------------|----------------------|---------------------|
| L1 | 184.00-166.62 | 17.38 | 2.92 | 18 | 15.5000 | 19.3990 | 0.1875 | 0.7500 | A572-65 (65 ksi) |
| L2 | 166.62-133.18 | 36.36 | 3.80 | 18 | 18.3689 | 26.4007 | 0.2500 | 1.0000 | A572-65 (65 ksi) |
| L3 | 133.18-88.09 | 48.89 | 4.99 | 18 | 25.0613 | 35.8924 | 0.3750 | 1.5000 | A572-65 (65 ksi) |
| L4 | 88.09-44.03 | 49.05 | 6.11 | 18 | 34.0369 | 44.9030 | 0.4375 | 1.7500 | A572-65 (65 ksi) |
| L5 | 44.03-1.00 | 49.14 | | 18 | 42.6744 | 53.5000 | 0.4375 | 1.7500 | 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 | I/Q in ⁵ | w in | w/t |
|---------|----------------|-------------------------|----------------------|---------|---------|------------------------|----------------------|------------------------|---------|--------|
| L1 | 15.7391 | 9.1129 | 269.9504 | 5.4359 | 7.8740 | 34.2838 | 540.2560 | 4.5573 | 2.3980 | 12.789 |
| L2 | 19.6983 | 11.4332 | 533.1255 | 6.8201 | 9.8547 | 54.0986 | 1066.9525 | 5.7177 | 3.0842 | 16.449 |
| L3 | 26.8080 | 20.7506 | 1792.8103 | 9.2835 | 13.4116 | 133.6765 | 3587.9796 | 10.3773 | 4.2065 | 16.826 |
| L4 | 35.6845 | 46.6570 | 6654.5323 | 11.9278 | 17.2908 | 369.5157 | 13483.8766 | 21.1413 | 5.6571 | 15.085 |
| L5 | 44.6996 | 58.6513 | 13219.0421 | 14.9941 | 21.6786 | 609.7733 | 26455.4782 | 29.3312 | 6.7407 | 15.407 |
| | 54.3253 | 73.6839 | 26211.1184 | 18.8372 | 27.1780 | 964.4241 | 52456.7261 | 36.8490 | 8.6460 | 19.762 |

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------|
| tnxTower Hudson Design Group, LLC 1600 Osgood Street, Building 20 North, Suite 2-101 North Andover, MA 01845 Phone: (978) 557-5553 FAX: (978) 226-5586 | Job CT 5448 Manchester, CT | Page 2 of 10 |
| | Project 184 ft monopole | Date 09:04:33 04/11/12 |
| | Client AT&T | Designed by kw |

Feed Line/Linear Appurtenances - Entered As Area

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Total Number | CAAA | | Weight plf |
|-------------------------------------------|-------------|--------------|--------------------|-----------------|--------------|----------|----------|---------------|
| | | | | | | In Face | Out Face | |
| 7/8 | A | No | Inside Pole | 184.00 - 1.00 | 2 | No Ice | 0.00 | 0.54 |
| | | | | | | 1/2" Ice | 0.00 | 0.54 |
| 7/8 | A | No | Inside Pole | 184.00 - 1.00 | 2 | No Ice | 0.00 | 0.54 |
| | | | | | | 1/2" Ice | 0.00 | 0.54 |
| 1 5/8 | A | No | Inside Pole | 162.00 - 1.00 | 12 | No Ice | 0.00 | 1.04 |
| | | | | | | 1/2" Ice | 0.00 | 1.04 |
| 1 5/8 | A | No | Inside Pole | 155.00 - 1.00 | 6 | No Ice | 0.00 | 1.04 |
| | | | | | | 1/2" Ice | 0.00 | 1.04 |
| 1 5/8 | B | No | CaAa (Out Of Face) | 155.00 - 1.00 | 1 | No Ice | 0.20 | 1.04 |
| | | | | | | 1/2" Ice | 0.30 | 2.55 |
| 1 5/8 | B | No | CaAa (Out Of Face) | 155.00 - 1.00 | 8 | No Ice | 0.20 | 1.04 |
| | | | | | | 1/2" Ice | 0.30 | 2.55 |
| 1 5/8 (AT&T - existing) | A | No | Inside Pole | 143.00 - 1.00 | 6 | No Ice | 0.00 | 1.04 |
| | | | | | | 1/2" Ice | 0.00 | 1.04 |
| 1/2 | A | No | Inside Pole | 125.00 - 1.00 | 3 | No Ice | 0.00 | 0.25 |
| | | | | | | 1/2" Ice | 0.00 | 0.25 |
| 1/2 | A | No | Inside Pole | 54.00 - 1.00 | 1 | No Ice | 0.00 | 0.25 |
| | | | | | | 1/2" Ice | 0.00 | 0.25 |
| ***** FB-L98B-002 (AT&T - proposed) | A | No | Inside Pole | 143.00 - 1.00 | 1 | No Ice | 0.00 | 0.25 |
| | | | | | | 1/2" Ice | 0.00 | 0.25 |
| WR-VG122ST-BRDA (AT&T - proposed) | A | No | Inside Pole | 143.00 - 1.00 | 2 | No Ice | 0.00 | 0.25 |
| | | | | | | 1/2" Ice | 0.00 | 0.25 |

Feed Line/Linear Appurtenances Section Areas

| Tower Section | Tower Elevation ft | Face | A _R ft ² | A _F ft ² | CAAA In Face ft ² | CAAA Out Face ft ² | Weight lb |
|---------------|-----------------------|------|-----------------------------------|-----------------------------------|------------------------------------|-------------------------------------|--------------|
| L1 | 184.00-166.62 | A | 0.000 | 0.000 | 0.000 | 0.000 | 37.54 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| L2 | 166.62-133.18 | A | 0.000 | 0.000 | 0.000 | 0.000 | 636.70 |
| | | B | 0.000 | 0.000 | 0.000 | 38.883 | 204.24 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| L3 | 133.18-88.09 | A | 0.000 | 0.000 | 0.000 | 0.000 | 1284.34 |
| | | B | 0.000 | 0.000 | 0.000 | 80.350 | 422.04 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| L4 | 88.09-44.03 | A | 0.000 | 0.000 | 0.000 | 0.000 | 1263.49 |
| | | B | 0.000 | 0.000 | 0.000 | 78.515 | 412.40 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| L5 | 44.03-1.00 | A | 0.000 | 0.000 | 0.000 | 0.000 | 1242.28 |
| | | B | 0.000 | 0.000 | 0.000 | 76.679 | 402.76 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |

Feed Line/Linear Appurtenances Section Areas - With Ice

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------|
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| | Project 184 ft monopole | Date 09:04:33 04/11/12 |
| | Client AT&T | Designed by kw |

| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | A _R ft ² | A _F ft ² | C _A A _A In Face ft ² | C _A A _A Out Face ft ² | Weight lb |
|---------------|--------------------|-------------|------------------|--------------------------------|--------------------------------|-------------------------------------------------------|--------------------------------------------------------|-----------|
| L1 | 184.00-166.62 | A | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 37.54 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| L2 | 166.62-133.18 | A | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 636.70 |
| | | B | | 0.000 | 0.000 | 0.000 | 58.520 | 500.77 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| L3 | 133.18-88.09 | A | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 1284.34 |
| | | B | | 0.000 | 0.000 | 0.000 | 120.930 | 1034.82 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| L4 | 88.09-44.03 | A | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 1263.49 |
| | | B | | 0.000 | 0.000 | 0.000 | 118.167 | 1011.18 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| L5 | 44.03-1.00 | A | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 1242.28 |
| | | B | | 0.000 | 0.000 | 0.000 | 115.405 | 987.54 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |

Discrete Tower Loads

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment ° | Placement ft | C _A A _A Front ft ² | C _A A _A Side ft ² | Weight lb |
|--------------------------------|-------------|-------------|-------------------------------------|----------------------|--------------|-----------------------------------------------------|----------------------------------------------------|--------------------|
| Lightning Rod 1/2"x10' | A | None | | 0.0000 | 185.00 | No Ice 0.50 1/2" Ice 1.51 | 0.50 1.51 | 35.00 41.17 |
| PiROD 13' Low Profile Platform | A | None | | 0.0000 | 185.00 | No Ice 15.70 1/2" Ice 20.10 | 15.70 20.10 | 1300.00 1765.00 |
| Omni 2 1/2"x10' | C | From Face | 3.50 -4.00 5.00 | 0.0000 | 185.00 | No Ice 2.50 1/2" Ice 3.53 | 2.50 3.53 | 25.00 43.64 |
| 20'-4 Bay Dipole | A | From Face | 3.50 4.00 0.00 | 0.0000 | 185.00 | No Ice 4.75 1/2" Ice 6.25 | 4.75 6.25 | 50.00 80.00 |
| 20'-4 Bay Dipole | A | From Face | 3.50 -2.00 0.00 | 0.0000 | 185.00 | No Ice 4.75 1/2" Ice 6.25 | 4.75 6.25 | 50.00 80.00 |
| ***** | | | | | | | | |
| 1' Side Mount Standoff | A | From Face | 0.50 0.00 0.00 | 0.0000 | 174.00 | No Ice 1.00 1/2" Ice 1.50 | 1.00 1.50 | 30.00 50.00 |
| 1' Side Mount Standoff | B | From Face | 0.50 0.00 0.00 | 0.0000 | 174.00 | No Ice 1.00 1/2" Ice 1.50 | 1.00 1.50 | 30.00 50.00 |
| 1' Side Mount Standoff | C | From Face | 0.50 0.00 0.00 | 0.0000 | 174.00 | No Ice 1.00 1/2" Ice 1.50 | 1.00 1.50 | 30.00 50.00 |
| APXV18-206517S-C | A | From Face | 1.00 0.00 0.00 | 0.0000 | 174.00 | No Ice 5.17 1/2" Ice 5.62 | 3.04 3.47 | 26.40 53.00 |
| APXV18-206517S-C | B | From Face | 1.00 0.00 0.00 | 0.0000 | 174.00 | No Ice 5.17 1/2" Ice 5.62 | 3.04 3.47 | 26.40 53.00 |
| APXV18-206517S-C | C | From Face | 1.00 0.00 | 0.0000 | 174.00 | No Ice 5.17 1/2" Ice 5.62 | 3.04 3.47 | 26.40 53.00 |

| | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------------|-------------|-------------------|
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| | Project | 184 ft monopole | Date | 09:04:33 04/11/12 |
| | Client | AT&T | Designed by | kw |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment ° | Placement ft | C _{AA} Front ft ² | C _{AA} Side ft ² | Weight lb |
|--------------------------------|-------------|-------------|----------------------------------------------|-------------------------|-----------------|------------------------------------------|-----------------------------------------|--------------------|
| ***** | | | 0.00 | | | | | |
| PiROD 13' Low Profile Platform | A | None | | 0.0000 | 164.00 | No Ice 15.70 1/2" Ice 20.10 | 15.70 20.10 | 1300.00 1765.00 |
| (2) APX16DWV-16DWVS | A | From Face | 3.50 0.00 0.00 | 0.0000 | 164.00 | No Ice 9.79 1/2" Ice 10.29 | 4.96 5.38 | 18.50 74.78 |
| (2) APX16DWV-16DWVS | B | From Face | 3.50 0.00 0.00 | 0.0000 | 164.00 | No Ice 9.79 1/2" Ice 10.29 | 4.96 5.38 | 18.50 74.78 |
| (2) APX16DWV-16DWVS | C | From Face | 3.50 0.00 0.00 | 0.0000 | 164.00 | No Ice 9.79 1/2" Ice 10.29 | 4.96 5.38 | 18.50 74.78 |
| RFS ATMAP1412D-1A20 | A | From Face | 3.50 0.00 0.00 | 0.0000 | 164.00 | No Ice 1.17 1/2" Ice 1.31 | 0.47 0.57 | 13.00 20.62 |
| RFS ATMAP1412D-1A20 | B | From Face | 3.50 0.00 0.00 | 0.0000 | 164.00 | No Ice 1.17 1/2" Ice 1.31 | 0.47 0.57 | 13.00 20.62 |
| RFS ATMAP1412D-1A20 | C | From Face | 3.50 0.00 0.00 | 0.0000 | 164.00 | No Ice 1.17 1/2" Ice 1.31 | 0.47 0.57 | 13.00 20.62 |
| RFS ACU-A11-N | A | From Face | 3.50 0.00 0.00 | 0.0000 | 164.00 | No Ice 0.14 1/2" Ice 0.19 | 0.08 0.12 | 1.00 2.28 |
| RFS ACU-A11-N | B | From Face | 3.50 0.00 0.00 | 0.0000 | 164.00 | No Ice 0.14 1/2" Ice 0.19 | 0.08 0.12 | 1.00 2.28 |
| RFS ACU-A11-N | C | From Face | 3.50 0.00 0.00 | 0.0000 | 164.00 | No Ice 0.14 1/2" Ice 0.19 | 0.08 0.12 | 1.00 2.28 |
| ***** | | | | | | | | |
| PiROD 13' Low Profile Platform | A | None | | 0.0000 | 153.00 | No Ice 15.70 1/2" Ice 20.10 | 15.70 20.10 | 1300.00 1765.00 |
| 840-10054 w/mount pipe | A | From Face | 3.50 0.00 0.00 | 0.0000 | 153.00 | No Ice 5.41 1/2" Ice 5.83 | 2.39 2.92 | 46.43 80.72 |
| GPS | A | From Face | 3.50 0.00 0.00 | 0.0000 | 153.00 | No Ice 0.21 1/2" Ice 0.32 | 0.21 0.32 | 5.00 7.52 |
| 840-10054 w/mount pipe | B | From Face | 3.50 0.00 0.00 | 0.0000 | 153.00 | No Ice 5.41 1/2" Ice 5.83 | 2.39 2.92 | 46.43 80.72 |
| 840-10054 w/mount pipe | C | From Face | 3.50 0.00 0.00 | 0.0000 | 153.00 | No Ice 5.41 1/2" Ice 5.83 | 2.39 2.92 | 46.43 80.72 |
| Kathrein 860 10025 RCU | A | From Face | 3.50 0.00 0.00 | 0.0000 | 153.00 | No Ice 0.16 1/2" Ice 0.23 | 0.14 0.20 | 1.20 2.76 |
| Kathrein 860 10025 RCU | B | From Face | 3.50 0.00 0.00 | 0.0000 | 153.00 | No Ice 0.16 1/2" Ice 0.23 | 0.14 0.20 | 1.20 2.76 |
| Kathrein 860 10025 RCU | C | From Face | 3.50 0.00 0.00 | 0.0000 | 153.00 | No Ice 0.16 1/2" Ice 0.23 | 0.14 0.20 | 1.20 2.76 |
| DB980F65T4E-M | A | From Face | 3.50 0.00 | 0.0000 | 153.00 | No Ice 3.90 1/2" Ice 4.28 | 2.29 2.65 | 8.50 29.47 |

| | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------------|-------------|-------------------|
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| | Project | 184 ft monopole | Date | 09:04:33 04/11/12 |
| | Client | AT&T | Designed by | kw |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment ° | Placement ft | C _{AA} Front | C _{AA} Side | Weight lb |
|---------------------------------------------------|-------------|-------------|----------------------------------------|----------------------|--------------|--------------------------------|----------------------|--------------------|
| DB980F65T4E-M | B | From Face | 0.00 3.50 0.00 | 0.0000 | 153.00 | No Ice 3.90 1/2" Ice 4.28 | 2.29 2.65 | 8.50 29.47 |
| DB980F65T4E-M | C | From Face | 0.00 3.50 0.00 | 0.0000 | 153.00 | No Ice 3.90 1/2" Ice 4.28 | 2.29 2.65 | 8.50 29.47 |
| (2) APXV86-906513 | A | From Face | 0.00 3.50 0.00 | 0.0000 | 153.00 | No Ice 6.67 1/2" Ice 7.10 | 2.81 3.14 | 31.00 66.29 |
| (2) APXV86-906513 | B | From Face | 0.00 3.50 0.00 | 0.0000 | 153.00 | No Ice 6.67 1/2" Ice 7.10 | 2.81 3.14 | 31.00 66.29 |
| (2) APXV86-906513 | C | From Face | 0.00 3.50 0.00 | 0.0000 | 153.00 | No Ice 6.67 1/2" Ice 7.10 | 2.81 3.14 | 31.00 66.29 |
| ***** | | | | | | | | |
| PIROD 13' Low Profile Platform | A | None | | 0.0000 | 125.00 | No Ice 15.70 1/2" Ice 20.10 | 15.70 20.10 | 1300.00 1765.00 |
| 10' Yagi | A | From Face | 0.00 3.50 4.00 | 0.0000 | 125.00 | No Ice 2.33 1/2" Ice 3.13 | 0.47 0.64 | 25.00 132.43 |
| 10' Yagi | B | From Face | 0.00 3.50 4.00 | 0.0000 | 125.00 | No Ice 2.33 1/2" Ice 3.13 | 0.47 0.64 | 25.00 132.43 |
| Omni 2 1/2"x20' | A | From Face | 0.00 3.50 9.00 | 0.0000 | 125.00 | No Ice 5.00 1/2" Ice 7.03 | 5.00 7.03 | 40.00 76.96 |
| ***** | | | | | | | | |
| 1' Side Mount Standoff | A | From Face | 0.00 3.50 0.00 | 0.0000 | 54.00 | No Ice 1.00 1/2" Ice 1.50 | 1.00 1.50 | 30.00 50.00 |
| GPS | A | From Face | 0.00 1.00 0.00 | 0.0000 | 54.00 | No Ice 0.21 1/2" Ice 0.32 | 0.21 0.32 | 5.00 7.52 |
| ***** | | | | | | | | |
| PIROD 12' T-Frame (AT&T - proposed) | A | From Face | 0.00 2.00 0.00 | 0.0000 | 143.00 | No Ice 12.20 1/2" Ice 17.60 | 12.20 17.60 | 360.00 490.00 |
| PIROD 12' T-Frame (AT&T - proposed) | B | From Face | 0.00 2.00 0.00 | 0.0000 | 143.00 | No Ice 12.20 1/2" Ice 17.60 | 12.20 17.60 | 360.00 490.00 |
| PIROD 12' T-Frame (AT&T - proposed) | C | From Face | 0.00 2.00 0.00 | 0.0000 | 143.00 | No Ice 12.20 1/2" Ice 17.60 | 12.20 17.60 | 360.00 490.00 |
| Kathrein 800 10121 w/mount pipe (AT&T - existing) | A | From Face | 0.00 3.50 0.00 | 0.0000 | 143.00 | No Ice 5.72 1/2" Ice 6.21 | 4.81 5.49 | 78.15 126.48 |
| Kathrein 800 10121 w/mount pipe (AT&T - existing) | B | From Face | 0.00 3.50 0.00 | 0.0000 | 143.00 | No Ice 5.72 1/2" Ice 6.21 | 4.81 5.49 | 78.15 126.48 |
| Kathrein 800 10121 w/mount pipe (AT&T - existing) | C | From Face | 0.00 3.50 0.00 | 0.0000 | 143.00 | No Ice 5.72 1/2" Ice 6.21 | 4.81 5.49 | 78.15 126.48 |
| (2) Powerwave TMA LGP21400 (AT&T - existing) | A | From Face | 0.00 2.50 0.00 | 0.0000 | 143.00 | No Ice 1.23 1/2" Ice 1.38 | 0.41 0.52 | 14.10 21.29 |

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| | Project 184 ft monopole | Date 09:04:33 04/11/12 |
| | Client AT&T | Designed by kw |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment ° | Placement ft | C _{AA} Front ft ² | C _{AA} Side ft ² | Weight lb |
|-------------------------------------------------------------------|-------------------|----------------|-----------------------|------------|----------------------------|-----------------|---------------------------------------------|--------------------------------------------|------------------|
| | | | Horz Lateral ft | Vert ft | | | | | |
| (2) Powerwave TMA LGP21400 (AT&T - existing) | B | From Face | 2.50 0.00 0.00 | | 0.0000 | 143.00 | No Ice 1/2" Ice 1.38 | 0.41 0.52 | 14.10 21.29 |
| (2) Powerwave TMA LGP21400 (AT&T - existing) | C | From Face | 2.50 0.00 0.00 | | 0.0000 | 143.00 | No Ice 1/2" Ice 1.38 | 0.41 0.52 | 14.10 21.29 |
| KMW AM-X-CD-16-65-00T-RET w/mount pipe (AT&T - proposed) | A | From Face | 3.50 0.00 0.00 | | 0.0000 | 143.00 | No Ice 1/2" Ice 9.15 | 6.30 7.48 | 74.05 136.21 |
| SBNH-1D6565C w/mount pipe (AT&T - proposed) | B | From Face | 3.50 0.00 0.00 | | 0.0000 | 143.00 | No Ice 1/2" Ice 12.40 | 10.29 11.81 | 113.11 203.89 |
| SBNH-1D6565C w/mount pipe (AT&T - proposed) | C | From Face | 3.50 0.00 0.00 | | 0.0000 | 143.00 | No Ice 1/2" Ice 12.40 | 10.29 11.81 | 113.11 203.89 |
| (2) Ericsson RRU (AT&T - proposed) | A | From Face | 2.50 0.00 0.00 | | 0.0000 | 143.00 | No Ice 1/2" Ice 2.26 | 1.08 1.23 | 44.00 58.64 |
| (2) Ericsson RRU (AT&T - proposed) | B | From Face | 2.50 0.00 0.00 | | 0.0000 | 143.00 | No Ice 1/2" Ice 2.26 | 1.08 1.23 | 44.00 58.64 |
| (2) Ericsson RRU (AT&T - proposed) | C | From Face | 2.50 0.00 0.00 | | 0.0000 | 143.00 | No Ice 1/2" Ice 2.26 | 1.08 1.23 | 44.00 58.64 |
| Surge Arrestor (DC6-48-60-18-8F) (AT&T - proposed) | C | From Face | 1.00 0.00 0.00 | | 0.0000 | 143.00 | No Ice 1/2" Ice 1.46 | 1.27 1.46 | 20.00 35.12 |

Dishes

| Description | Face or Leg | Dish Type | Offset Type | Offsets: | | Azimuth Adjustment ° | 3 dB Beam Width ° | Elevation ft | Outside Diameter ft | Aperture Area ft ² | Weight lb |
|-------------|-------------------|-----------------------------|----------------|-----------------------|------------|----------------------------|----------------------------|-----------------|---------------------------|-------------------------------------|-----------------|
| | | | | Horz Lateral ft | Vert ft | | | | | | |
| VHLP2.5-180 | A | Paraboloid w/o Radome | From Face | 3.50 0.00 0.00 | | 0.0000 | | 149.00 | 2.50 | No Ice 1/2" Ice 5.24 | 69.00 95.89 |
| VHLP2.5-180 | B | Paraboloid w/o Radome | From Face | 3.50 0.00 0.00 | | 0.0000 | | 149.00 | 2.50 | No Ice 1/2" Ice 5.24 | 69.00 95.89 |
| VHLP2.5-180 | C | Paraboloid w/o Radome | From Face | 3.50 0.00 0.00 | | 0.0000 | | 149.00 | 2.50 | No Ice 1/2" Ice 5.24 | 69.00 95.89 |
| HP4-105 | A | Paraboloid w/Shroud (HP) | From Face | 3.50 0.00 0.00 | | 0.0000 | | 146.00 | 4.00 | No Ice 1/2" Ice 13.09 | 79.00 146.19 |

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| | Project 184 ft monopole | Date 09:04:33 04/11/12 |
| | Client AT&T | Designed by kw |

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 |
| 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 Reactions

| Location | Condition | Gov. Load Comb. | Vertical lb | Horizontal, X lb | Horizontal, Z lb |
|----------|---------------------|-----------------|-------------|------------------|------------------|
| Pole | Max. Vert | 18 | 53422.51 | -32242.81 | -310.56 |
| | Max. H _x | 11 | 43193.62 | 35006.53 | 27.91 |
| | Max. H _z | 2 | 43193.62 | 225.75 | 34870.69 |
| | Max. M _x | 2 | 4023374.74 | 225.75 | 34870.69 |
| | Max. M _z | 5 | 4064213.17 | -35139.17 | -388.93 |
| | Max. Torsion | 21 | 771.72 | -278.74 | -32091.10 |
| | Min. Vert | 1 | 43193.62 | 0.00 | 0.00 |
| | Min. H _x | 5 | 43193.62 | -35139.17 | -388.93 |
| | Min. H _z | 8 | 43193.62 | -352.51 | -34968.11 |

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| | Project 184 ft monopole | Date 09:04:33 04/11/12 |
| | Client AT&T | Designed by kw |

| Location | Condition | Gov. Load Comb. | Vertical lb | Horizontal, X lb | Horizontal, Z lb |
|----------|---------------------|-----------------|-------------|------------------|------------------|
| | Min. M _x | 8 | -4039492.81 | -352.51 | -34968.11 |
| | Min. M _z | 11 | -4041587.47 | 35006.53 | 27.91 |
| | Min. Torsion | 26 | -553.82 | 16088.49 | 27756.30 |

Tower Mast Reaction Summary

| Load Combination | Vertical lb | Shear _x lb | Shear _z lb | Overturing Moment, M _x lb-ft | Overturing Moment, M _z lb-ft | Torque lb-ft |
|-----------------------------|-------------|-----------------------|-----------------------|-----------------------------------------|-----------------------------------------|--------------|
| Dead Only | 43193.62 | 0.00 | 0.00 | 581.09 | -1258.90 | 0.00 |
| Dead+Wind 0 deg - No Ice | 43193.62 | -225.75 | -34870.69 | -4023374.74 | 32949.40 | -84.51 |
| Dead+Wind 30 deg - No Ice | 43193.62 | 17223.92 | -30203.53 | -3485162.13 | -1979974.14 | -493.33 |
| Dead+Wind 60 deg - No Ice | 43193.62 | 30525.60 | -17178.77 | -1972483.68 | -3534646.81 | 75.31 |
| Dead+Wind 90 deg - No Ice | 43193.62 | 35139.17 | 388.93 | 60177.86 | -4064213.17 | -21.98 |
| Dead+Wind 120 deg - No Ice | 43193.62 | 30529.77 | 17588.22 | 2035624.23 | -3534892.36 | -229.64 |
| Dead+Wind 150 deg - No Ice | 43193.62 | 17906.41 | 30170.87 | 3480598.14 | -2084372.25 | -378.92 |
| Dead+Wind 180 deg - No Ice | 43193.62 | 352.51 | 34968.11 | 4039492.81 | -54826.01 | -313.49 |
| Dead+Wind 210 deg - No Ice | 43193.62 | -17602.29 | 29985.08 | 3452642.03 | 2035755.09 | 485.09 |
| Dead+Wind 240 deg - No Ice | 43193.62 | -30377.85 | 17239.84 | 1982903.12 | 3509475.49 | 314.33 |
| Dead+Wind 270 deg - No Ice | 43193.62 | -35006.53 | -27.91 | -3070.00 | 4041587.47 | 121.55 |
| Dead+Wind 300 deg - No Ice | 43193.62 | -30474.74 | -17556.45 | -2029753.32 | 3524189.55 | 238.20 |
| Dead+Wind 330 deg - No Ice | 43193.62 | -17527.43 | -30236.51 | -3490024.84 | 2023337.45 | 287.89 |
| Dead+Ice+Temp | 53422.51 | -0.00 | -0.00 | 1413.46 | -3576.02 | 0.00 |
| Dead+Wind 0 deg+Ice+Temp | 53422.51 | -179.74 | -32013.59 | -3736507.61 | 24003.56 | 460.39 |
| Dead+Wind 30 deg+Ice+Temp | 53422.51 | 15845.51 | -27727.12 | -3236276.29 | -1846647.68 | 197.42 |
| Dead+Wind 60 deg+Ice+Temp | 53422.51 | 27997.09 | -15804.11 | -1836262.01 | -3281860.08 | 544.17 |
| Dead+Wind 90 deg+Ice+Temp | 53422.51 | 32242.81 | 310.56 | 49875.76 | -3775318.14 | 240.03 |
| Dead+Wind 120 deg+Ice+Temp | 53422.51 | 28002.54 | 16129.12 | 1889191.29 | -3282384.08 | -219.70 |
| Dead+Wind 150 deg+Ice+Temp | 53422.51 | 16390.32 | 27701.66 | 3234573.68 | -1931496.28 | -623.49 |
| Dead+Wind 180 deg+Ice+Temp | 53422.51 | 278.74 | 32091.10 | 3751487.27 | -46824.97 | -771.72 |
| Dead+Wind 210 deg+Ice+Temp | 53422.51 | -16146.86 | 27553.14 | 3211820.28 | 1886510.10 | -205.17 |
| Dead+Wind 240 deg+Ice+Temp | 53422.51 | -27880.46 | 15851.10 | 1846373.94 | 3256229.73 | -240.57 |
| Dead+Wind 270 deg+Ice+Temp | 53422.51 | -32139.21 | -21.85 | -1451.02 | 3751912.37 | -162.24 |
| Dead+Wind 300 deg+Ice+Temp | 53422.51 | -27960.79 | -16105.02 | -1882708.49 | 3268658.61 | 227.75 |
| Dead+Wind 330 deg+Ice+Temp | 53422.51 | -16088.49 | -27756.30 | -3240678.06 | 1876606.70 | 553.82 |
| Dead+Wind 0 deg - Service | 43193.62 | -126.98 | -19614.76 | -2266574.46 | 18007.71 | -57.71 |
| Dead+Wind 30 deg - Service | 43193.62 | 9688.46 | -16989.49 | -1963312.58 | -1116084.49 | -290.47 |
| Dead+Wind 60 deg - Service | 43193.62 | 17170.65 | -9663.06 | -1111093.39 | -1992075.83 | 34.49 |
| Dead+Wind 90 deg - Service | 43193.62 | 19765.80 | 218.78 | 34164.73 | -2290460.19 | -18.84 |
| Dead+Wind 120 deg - Service | 43193.62 | 17173.00 | 9893.37 | 1147210.74 | -1992269.46 | -132.29 |
| Dead+Wind 150 deg - Service | 43193.62 | 10072.36 | 16971.11 | 1961329.59 | -1174966.92 | -211.35 |
| Dead+Wind 180 deg - Service | 43193.62 | 198.29 | 19669.57 | 2276180.41 | -31454.91 | -169.50 |
| Dead+Wind 210 deg - Service | 43193.62 | -9901.29 | 16866.61 | 1945490.97 | 1146402.09 | 287.97 |
| Dead+Wind 240 deg - Service | 43193.62 | -17087.54 | 9697.41 | 1117451.72 | 1976740.76 | 190.06 |
| Dead+Wind 270 deg - Service | 43193.62 | -19691.17 | -15.70 | -1476.36 | 2276559.53 | 75.75 |
| Dead+Wind 300 deg - Service | 43193.62 | -17142.04 | -9875.50 | -1143383.14 | 1985093.10 | 135.00 |
| Dead+Wind 330 deg - Service | 43193.62 | -9859.18 | -17008.04 | -1966093.98 | 1139425.10 | 157.01 |

Solution Summary

| | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------------|-------------|-------------------|
| tnxTower Hudson Design Group, LLC 1600 Osgood Street, Building 20 North, Suite 2-101 North Andover, MA 01845 Phone: (978) 557-5553 FAX: (978) 226-5586 | Job | CT 5448 Manchester, CT | Page | 9 of 10 |
| | Project | 184 ft monopole | Date | 09:04:33 04/11/12 |
| | Client | AT&T | Designed by | kw |

| Load Comb. | Sum of Applied Forces | | | Sum of Reactions | | | % Error |
|------------|-----------------------|-----------|-----------|------------------|----------|-----------|---------|
| | PX lb | PY lb | PZ lb | PX lb | PY lb | PZ lb | |
| 1 | 0.00 | -43193.62 | 0.00 | 0.00 | 43193.62 | 0.00 | 0.000% |
| 2 | -225.75 | -43193.62 | -34870.69 | 225.75 | 43193.62 | 34870.69 | 0.000% |
| 3 | 17223.92 | -43193.62 | -30203.53 | -17223.92 | 43193.62 | 30203.53 | 0.000% |
| 4 | 30525.60 | -43193.62 | -17178.77 | -30525.60 | 43193.62 | 17178.77 | 0.000% |
| 5 | 35139.17 | -43193.62 | 388.93 | -35139.17 | 43193.62 | -388.93 | 0.000% |
| 6 | 30529.77 | -43193.62 | 17588.22 | -30529.77 | 43193.62 | -17588.22 | 0.000% |
| 7 | 17906.41 | -43193.62 | 30170.87 | -17906.41 | 43193.62 | -30170.87 | 0.000% |
| 8 | 352.51 | -43193.62 | 34968.11 | -352.51 | 43193.62 | -34968.11 | 0.000% |
| 9 | -17602.29 | -43193.62 | 29985.08 | 17602.29 | 43193.62 | -29985.08 | 0.000% |
| 10 | -30377.85 | -43193.62 | 17239.84 | 30377.85 | 43193.62 | -17239.84 | 0.000% |
| 11 | -35006.53 | -43193.62 | -27.91 | 35006.53 | 43193.62 | 27.91 | 0.000% |
| 12 | -30474.74 | -43193.62 | -17556.45 | 30474.74 | 43193.62 | 17556.45 | 0.000% |
| 13 | -17527.43 | -43193.62 | -30236.51 | 17527.43 | 43193.62 | 30236.51 | 0.000% |
| 14 | 0.00 | -53422.51 | 0.00 | 0.00 | 53422.51 | 0.00 | 0.000% |
| 15 | -179.74 | -53422.51 | -32013.51 | 179.74 | 53422.51 | 32013.59 | 0.000% |
| 16 | 15845.51 | -53422.51 | -27727.11 | -15845.51 | 53422.51 | 27727.12 | 0.000% |
| 17 | 27997.08 | -53422.51 | -15804.11 | -27997.09 | 53422.51 | 15804.11 | 0.000% |
| 18 | 32242.72 | -53422.51 | 310.56 | -32242.81 | 53422.51 | -310.56 | 0.000% |
| 19 | 28002.53 | -53422.51 | 16129.12 | -28002.54 | 53422.51 | -16129.12 | 0.000% |
| 20 | 16390.32 | -53422.51 | 27701.66 | -16390.32 | 53422.51 | -27701.66 | 0.000% |
| 21 | 278.74 | -53422.51 | 32091.01 | -278.74 | 53422.51 | -32091.10 | 0.000% |
| 22 | -16146.86 | -53422.51 | 27553.13 | 16146.86 | 53422.51 | -27553.14 | 0.000% |
| 23 | -27880.46 | -53422.51 | 15851.09 | 27880.46 | 53422.51 | -15851.10 | 0.000% |
| 24 | -32139.12 | -53422.51 | -21.85 | 32139.21 | 53422.51 | 21.85 | 0.000% |
| 25 | -27960.78 | -53422.51 | -16105.01 | 27960.79 | 53422.51 | 16105.02 | 0.000% |
| 26 | -16088.49 | -53422.51 | -27756.29 | 16088.49 | 53422.51 | 27756.30 | 0.000% |
| 27 | -126.98 | -43193.62 | -19614.76 | 126.98 | 43193.62 | 19614.76 | 0.000% |
| 28 | 9688.46 | -43193.62 | -16989.49 | -9688.46 | 43193.62 | 16989.49 | 0.000% |
| 29 | 17170.65 | -43193.62 | -9663.06 | -17170.65 | 43193.62 | 9663.06 | 0.000% |
| 30 | 19765.78 | -43193.62 | 218.78 | -19765.80 | 43193.62 | -218.78 | 0.000% |
| 31 | 17173.00 | -43193.62 | 9893.37 | -17173.00 | 43193.62 | -9893.37 | 0.000% |
| 32 | 10072.36 | -43193.62 | 16971.11 | -10072.36 | 43193.62 | -16971.11 | 0.000% |
| 33 | 198.29 | -43193.62 | 19669.56 | -198.29 | 43193.62 | -19669.57 | 0.000% |
| 34 | -9901.29 | -43193.62 | 16866.61 | 9901.29 | 43193.62 | -16866.61 | 0.000% |
| 35 | -17087.54 | -43193.62 | 9697.41 | 17087.54 | 43193.62 | -9697.41 | 0.000% |
| 36 | -19691.17 | -43193.62 | -15.70 | 19691.17 | 43193.62 | 15.70 | 0.000% |
| 37 | -17142.04 | -43193.62 | -9875.50 | 17142.04 | 43193.62 | 9875.50 | 0.000% |
| 38 | -9859.18 | -43193.62 | -17008.04 | 9859.18 | 43193.62 | 17008.04 | 0.000% |

Maximum Tower Deflections - Service Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|---------------------|-----------------|--------|---------|
| L1 | 184 - 166.62 | 94.5284 | 31 | 4.4869 | 0.0255 |
| L2 | 169.54 - 133.18 | 81.0584 | 31 | 4.4037 | 0.0158 |
| L3 | 136.98 - 88.09 | 52.6843 | 31 | 3.7798 | 0.0070 |
| L4 | 93.08 - 44.03 | 23.5595 | 31 | 2.4599 | 0.0019 |
| L5 | 50.14 - 1 | 6.6639 | 31 | 1.2540 | 0.0005 |

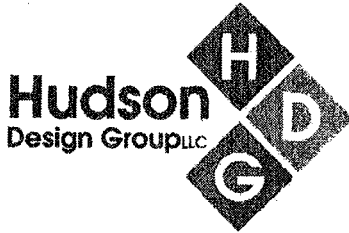
Critical Deflections and Radius of Curvature - Service Wind

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------|
| tnxTower Hudson Design Group, LLC 1600 Osgood Street, Building 20 North, Suite 2-101 North Andover, MA 01845 Phone: (978) 557-5553 FAX: (978) 226-5586 | Job CT 5448 Manchester, CT | Page 10 of 10 |
| | Project 184 ft monopole | Date 09:04:33 04/11/12 |
| | Client AT&T | Designed by kw |

| Elevation | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------|--------------------------------|-----------------|---------------|--------|---------|------------------------|
| 185.00 | Lightning Rod 1/2"x10' | 31 | 94.5284 | 4.4869 | 0.0255 | 19270 |
| 174.00 | 1' Side Mount Standoff | 31 | 85.1912 | 4.4385 | 0.0185 | 9634 |
| 164.00 | PiROD 13' Low Profile Platform | 31 | 75.9746 | 4.3409 | 0.0131 | 4781 |
| 153.00 | PiROD 13' Low Profile Platform | 31 | 66.1273 | 4.1568 | 0.0096 | 3051 |
| 149.00 | VHLP2.5-180 | 31 | 62.6551 | 4.0731 | 0.0088 | 2696 |
| 146.00 | HP4-105 | 31 | 60.0972 | 4.0053 | 0.0083 | 2479 |
| 143.00 | PiROD 12' T-Frame | 31 | 57.5831 | 3.9337 | 0.0078 | 2294 |
| 125.00 | PiROD 13' Low Profile Platform | 31 | 43.5781 | 3.4425 | 0.0054 | 1993 |
| 54.00 | 1' Side Mount Standoff | 31 | 7.6809 | 1.3562 | 0.0006 | 1740 |

Section Capacity Table

| Section No. | Elevation ft | Component Type | Size | Critical Element | P lb | SF*P _{allow} lb | % Capacity | Pass Fail |
|-------------|-----------------|----------------|-------------------------|------------------|-----------|--------------------------|------------|-----------|
| L1 | 184 - 166.62 | Pole | TP19.399x15.5x0.1875 | 1 | -2680.25 | 574112.41 | 14.7 | Pass |
| L2 | 166.62 - 133.18 | Pole | TP26.4007x18.3689x0.25 | 2 | -8301.11 | 1044133.52 | 63.5 | Pass |
| L3 | 133.18 - 88.09 | Pole | TP35.8924x25.0613x0.375 | 3 | -16973.10 | 2129320.78 | 86.2 | Pass |
| L4 | 88.09 - 44.03 | Pole | TP44.903x34.0369x0.4375 | 4 | -27808.00 | 3112274.94 | 90.5 | Pass |
| L5 | 44.03 - 1 | Pole | TP53.5x42.6744x0.4375 | 5 | -43162.50 | 3830601.95 | 98.8 | Pass |
| Summary | | | | | | | | |
| Pole (L5) | | | | | | | 98.8 | Pass |
| Base Plate | | | | | | | 99.0 | Pass |
| RATING = | | | | | | | 99.0 | Pass |

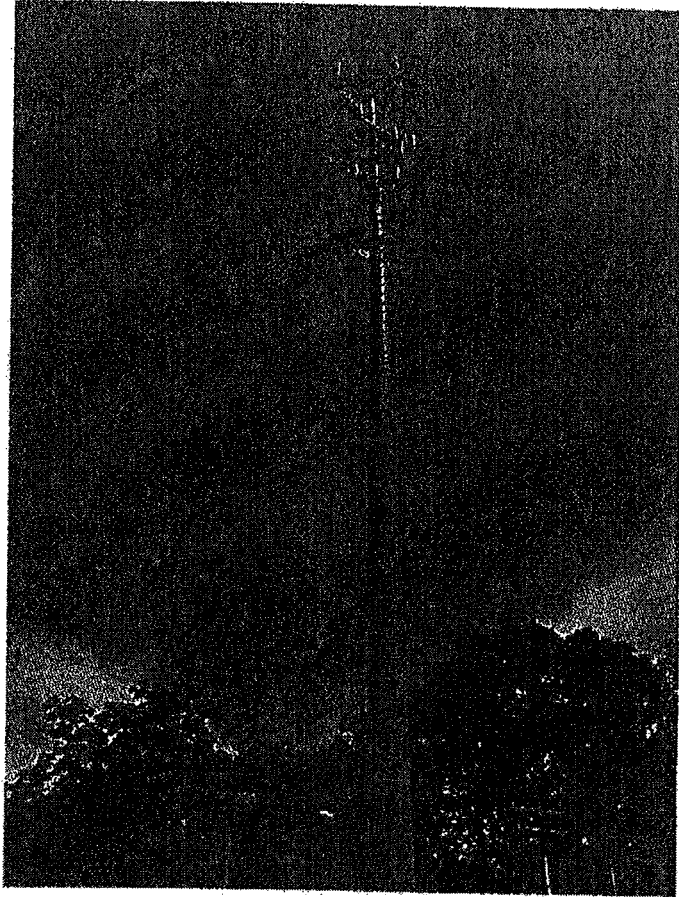


REFERENCE DOCUMENTS

CT 5448



STRUCTURAL ANALYSIS REPORT



clearw're®
wireless broadband

CT-HFD0043A
Manchester Police Department
239 Middle Turnpike East
Manchester, CT 06040

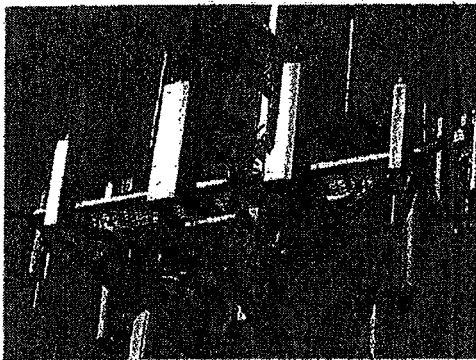
May 27, 2010

INTRODUCTION:

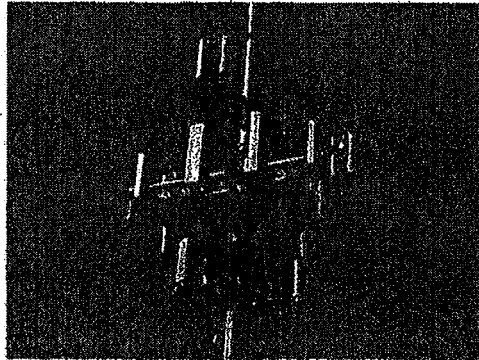
The purpose of this analysis is to determine the structural capability of the existing 184'-0" Monopole behind the Manchester Police Department at 239 Middle Turnpike Road in Manchester, CT. The monopole is a (5) section, (18) sided tapered monopole originally designed and manufactured by Engineered Endeavors, Inc.

Clearwire is proposing to add the following to the existing Sprint/Nextel mount previously installed on the monopole:

| Quantity | Model No. | Elevation |
|----------|--------------------------------------|-----------|
| 3 | Kathrein 840 10054 Panel Antenna | 153'-0" |
| 3 | Samsung WiMAX U-RAS Flexible RRU | 153'-0" |
| 3 | Andrew VHLP2.5-11 30" Microwave Dish | 149'-0" |



Existing Sprint/Nextel Mount



Existing Sprint/Nextel Mount

A total of (1) existing Sprint/Nextel antenna per sector will be removed and replaced with the proposed Kathrein panel antenna listed above.

Clearwire antennas and dishes are to be mounted to a 3 1/2" STD pipe sized to accommodate the 4'-0" required separation between panel antenna and microwave dish center lines.

In addition, a total of (6) lines of 5/16" fiber run inside a 2" flexible conduit and (3) lines of 1/2" coax will be banded to the outside of the monopole to the proposed Clearwire equipment.

ASSUMPTIONS:

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

- Information supplied by the client regarding the structure itself, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from drawings in the possession of Bay State Design, Inc., or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to Bay State Design, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, BSD assumes that all structures were constructed in accordance with the drawings / specifications and are in good condition and have not significantly changed from the "as new" condition.

All services were performed to codes specified by the client. BSD does not imply to have met any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are different from the minimum values recommended by code, the client shall specify the exact requirement.

All services are performed in accordance with generally accepted engineering principles and practices. Bay State Design, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information provided.

REFERENCES:

This structural analysis was evaluated using RISA Tower, a general-purpose modeling, analysis, and design program created specifically for communications towers in accordance with the following:

- TIA/EIA 222-F Structural Standards for Steel Antenna Tower and Antenna Supporting Structures
- International Building Code 2003 Edition
- CT State Building Code 2005
- Structural Analysis prepared by Natcomm for Pocket Communications dated 10/13/09
- EEI Job #09892 REV 3 tower design drawings

Existing antenna inventory was compiled using a combination of reference to previous structural calculations listed above and observations made from ground level by Bay State Design on 12/4/09.

TOWER ANALYSIS RESULTS:

The following stresses were observed including the proposed Clearwire loading:

| COMPONENT | CONTROLLING ELEVATION | % CAPACITY | PASS / FAIL |
|------------|-----------------------|------------|-------------|
| POLE | 166'-184' | 29.00% | PASS |
| POLE | 133'-166' | 74.30% | PASS |
| POLE | 88'-133' | 80.00% | PASS |
| POLE | 44'-88' | 81.70% | PASS |
| POLE | 0'44' | 87.30% | PASS |
| BASE PLATE | | 91.40% | PASS |

FOUNDATION ANALYSIS:

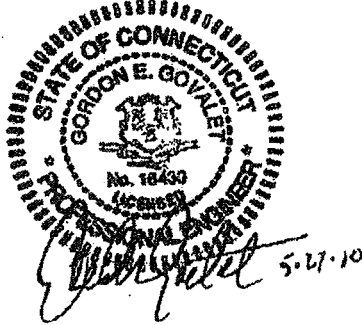
Bay State Design, Inc., reviewed original foundation design calculations from Engineered Endeavors, Inc. dated 3/23/99. A comparison of calculated capacity loads for the foundation to the new loads including the proposed Clearwire equipment is below.

| FOUNDATION LOAD COMPARISON | | | |
|----------------------------|-----------------------|-----------------------|------------------|
| Loads | Original Design (EEI) | (P) Clearwire Loading | Status |
| Moment | 3669.30 k-ft | 3459.70 k-ft | PASS |
| Axial | 42.60 k | 47.45 k | increase of 11 % |
| Shear | 27.80 k | 29.20 k | increase of 5% |

Given these relatively small increases and the low stresses observed on the monopole shaft, it is reasonable to conclude the foundation is adequate for the proposed loading.

CONCLUSION:

Based on the following calculations, Bay State Design, Inc. concludes the existing tower meets the structural requirements as specified by TIA/EIA-222-F. The highest observed stress on the tower was 91.40%.



Gordon E. Govalet, P.E.
President
Bay State Design, Inc.

PROJECT INFORMATION

SCOPE OF WORK: UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS
 SITE ADDRESS: 239 MIDDLE TURNPIKE EAST
 MANCHESTER, CT 06040
 LATITUDE: 41.784392 N 41° 47' 3.81" N
 LONGITUDE: 72.511699 W 72° 30' 42.12" W
 JURISDICTION: NATIONAL, STATE & LOCAL CODES OR ORDINANCES
 CURRENT USE: TELECOMMUNICATIONS FACILITY
 PROPOSED USE: TELECOMMUNICATIONS FACILITY
 MAP/BLOCK/LOT: 92/3950/239
 LAND USE: MUNICIPAL 94
 PROPERTY OWN: TOWN OF MANCHESTER
 41 CENTER STREET
 MANCHESTER, CT 06040



SITE NUMBER: CT5448
SITE NAME: AWE-MANCHESTER CENTRAL

DRAWING INDEX

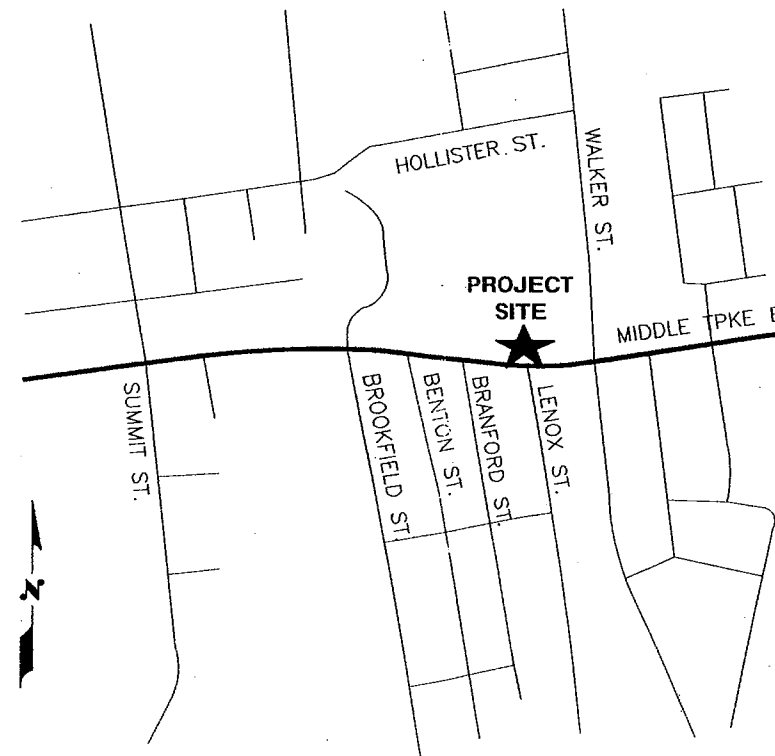
REV

VICINITY MAP

GENERAL NOTES

| | | |
|-------------|-------------------------------------------------|----------|
| T-1 | TITLE SHEET | 1 |
| GN-1 | GENERAL NOTES | 1 |
| A-1 | COMPOUND & EQUIPMENT PLAN | 1 |
| A-2 | ANTENNA LAYOUT AND ELEVATION | 1 |
| A-3 | DETAILS | 1 |
| A-4 | DETAILS | 1 |
| G-1 | PLUMBING DIAGRAM & GROUNDING DETAILS | 1 |

DIRECTIONS TO SITE:
 HEAD EAST ON ENTERPRISE DR TOWARD CAPITOL BLVD - GO 0.4 MI. TURN LEFT AT CAPITOL BLVD - GO 0.3 MI. TURN LEFT AT WEST ST - GO 0.3 MI. TURN LEFT TO MERGE ONTO I-91 N TOWARD HARTFORD - GO 7.8 MI. TAKE EXIT 29 FOR US-5 N/CT-15 TOWARD I-84/E HARTFORD/BOSTON - GO 0.4 MI. MERGE ONTO CT-15 N - GO 1.7 MI. MERGE ONTO I-84 E/US-6 E - GO 2.9 MI. TAKE EXIT 60 FOR MIDDLE TURNPIKE W/US-6/US-44 TOWARD MANCHESTER - GO 0.4 MI. TURN RIGHT AT US-44/US-6 - GO 0.3 MI. SLIGHT LEFT TOWARD MIDDLE TURNPIKE W - GO 0.1 MI. SLIGHT RIGHT AT MIDDLE TURNPIKE W - GO 2.5 MI. ARRIVE AT 239 MIDDLE TURNPIKE EAST, MANCHESTER.



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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.

72 HOURS
 BEFORE YOU DIG
 CALL TOLL FREE 800-922-4455

UNDERGROUND SERVICE ALERT

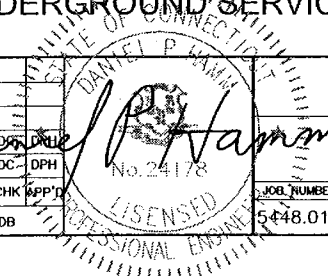
Hudson
 Design Group Inc.
 1400 OSGOOD STREET
 BUILDING 20 NORTH, SUITE 2-101
 N. ANDOVER, MA 01845
 TEL: (978) 557-5553
 FAX: (978) 336-5586

NEXLINK
 GLOBAL SERVICES
 a UniTek GLOBAL SERVICES company
 800 MARSHALL PHELPS ROAD UNIT# 2A
 WINDSOR, CT 06095

SITE NUMBER: CT5448
SITE NAME: AWE-MANCHESTER CENTRAL
 239 MIDDLE TURNPIKE EAST
 MANCHESTER, CT 06040
 HARTFORD COUNTY

500 ENTERPRISE DRIVE, SUITE 3A
 ROCKY HILL, CT 06067

| | | | | | | | | | | | |
|-----|----------|-------------------------|----|-----|-----|-----------------|--------------|------------|----------------|-------------------|--|
| | | | | | | | | | | AT&T | |
| | | | | | | | | | | TITLE SHEET (LTE) | |
| NO. | DATE | REVISIONS | BY | CHK | APP | DESIGNED BY: DC | DRAWN BY: DB | JOB NUMBER | DRAWING NUMBER | REV | |
| 1 | 03/29/12 | ISSUED FOR CONSTRUCTION | | | | | | 5448.01 | T-1 | 1 | |
| 0 | 03/23/12 | ISSUED FOR REVIEW | | | | | | | | | |



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-OFF-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.
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 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 SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
 CONTRACTOR - NEXLINK
 SUBCONTRACTOR - GENERAL CONTRACTOR (CONSTRUCTION)
 OWNER - AT&T MOBILITY
 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.
 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. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
 7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
 8. 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.
 9. 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.
 10. 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.
 11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF 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.
 12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
 13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
 14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
 15. 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) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
 16. CONSTRUCTION SHALL COMPLY WITH UMS SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."
 17. 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.
 18. 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 SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
 19. SINCE THE CELL SITE IS 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 ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
 20. APPLICABLE BUILDING CODES:
 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.
 BUILDING CODE: 2003 IBC WITH 2005 CT SUPPLEMENT & 2009 CT AMENDMENTS
 ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS
 LIGHTENING CODE: REFER TO ELECTRICAL DRAWINGS
- 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, ASD, NINTH EDITION;
 - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL
 - ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.
- 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.

ABBREVIATIONS

| | | | | | |
|----------|--------------------------|----------|--------------------|------|----------------------------|
| AGL | ABOVE GRADE LEVEL | G.C. | GENERAL CONTRACTOR | RF | RADIO FREQUENCY |
| AWG | AMERICAN WIRE GAUGE | MGB | MASTER GROUND BUS | | |
| BCW | BARE COPPER WIRE | MIN | MINIMUM | TBD | TO BE DETERMINED |
| BTS | BASE TRANSCEIVER STATION | PROPOSED | NEW | TBR | TO BE REMOVED |
| EXISTING | EXISTING | N.T.S. | NOT TO SCALE | TBRR | TO BE REMOVED AND REPLACED |
| EG | EQUIPMENT GROUND | REF | REFERENCE | | |
| EGR | EQUIPMENT GROUND RING | REQ | REQUIRED | TYP | TYPICAL |

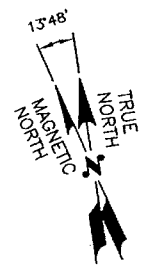
1400 OSCOOD STREET
 BUILDING 20 NORTH, SUITE 2-101
 N. ANDOVER, MA 01845
 TEL: (978) 557-5553
 FAX: (978) 336-5556

a UniTek GLOBAL SERVICES company
 800 MARSHALL PHELPS ROAD UNIT# 2A
 WINDSOR, CT 06095

SITE NUMBER: CT5448
SITE NAME: AWE-MANCHESTER CENTRAL
 239 MIDDLE TURNPIKE EAST
 MANCHESTER, CT 06040
 HARTFORD COUNTY

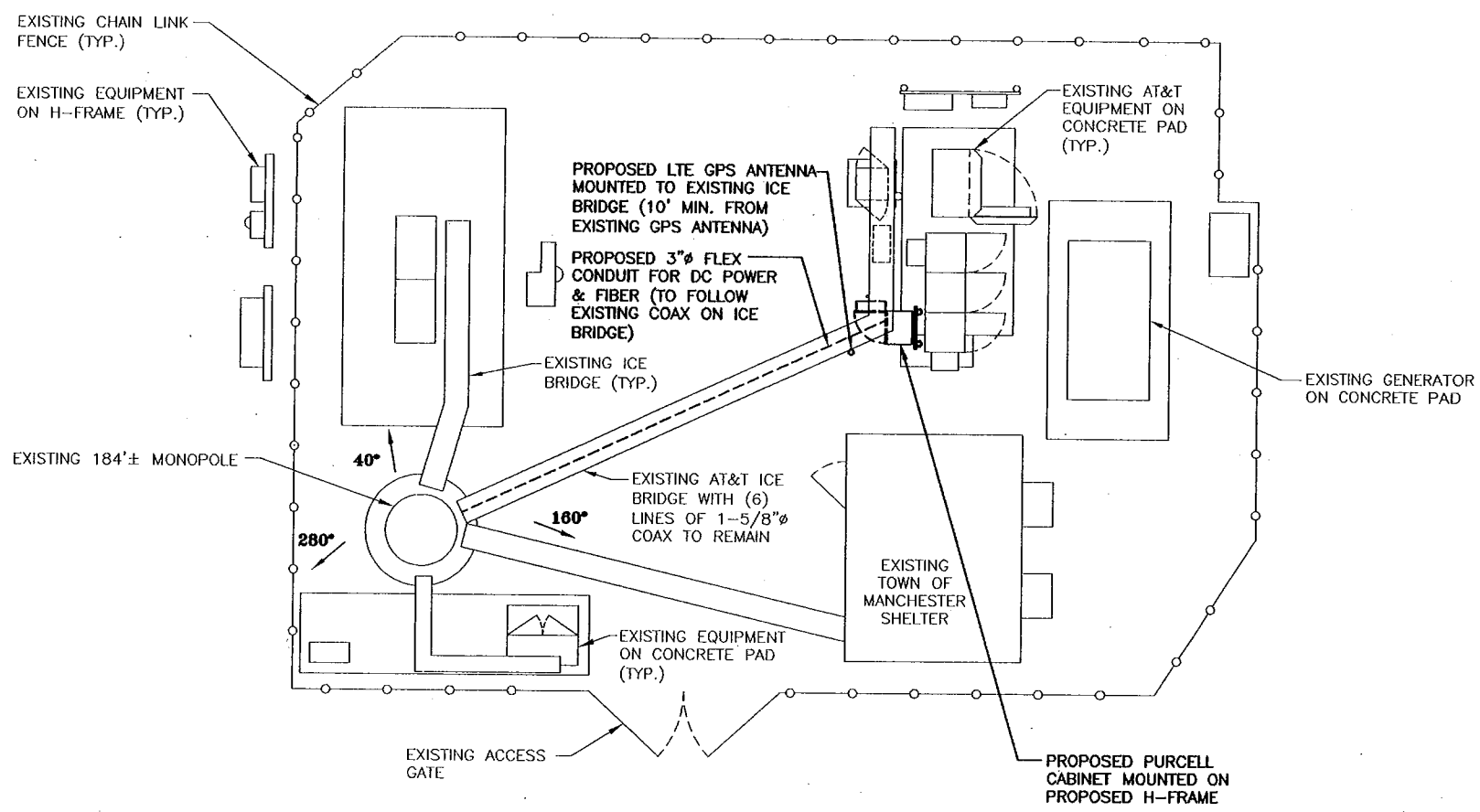
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| 1 03/29/12 ISSUED FOR CONSTRUCTION | | DB DC DPH | | AT&T | |
| 0 03/23/12 ISSUED FOR REVIEW | | BY CHK APP'D | | GENERAL NOTES (LTE) | |
| NO. | DATE | REVISIONS | BY | CHK APP'D | |
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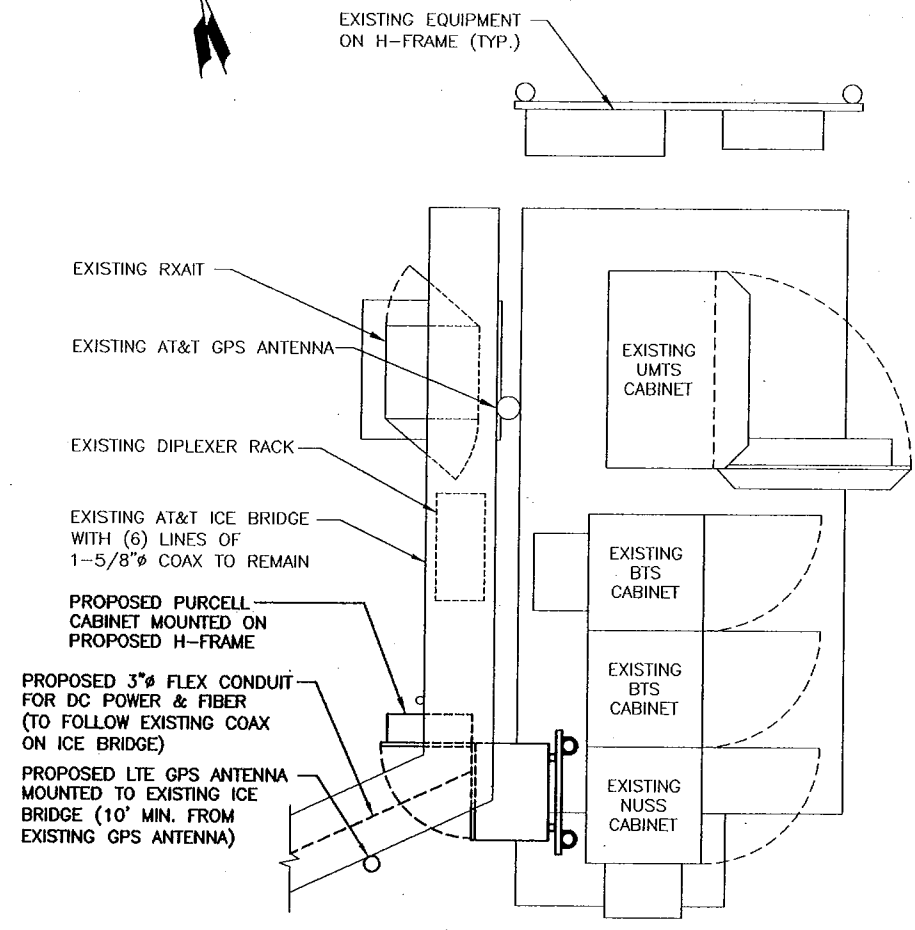


NOTE:
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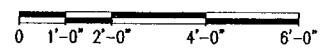
NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.



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



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



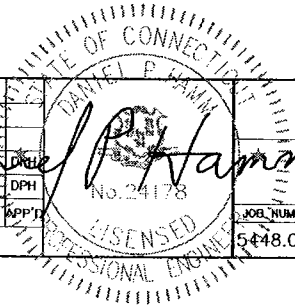
Hudson Design Group, Inc.
1600 OSGOOD STREET
BUILDING 20 NORTH SUITE 2-101
FL ANDOVER, MA 01845
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FAX: (978) 336-5586

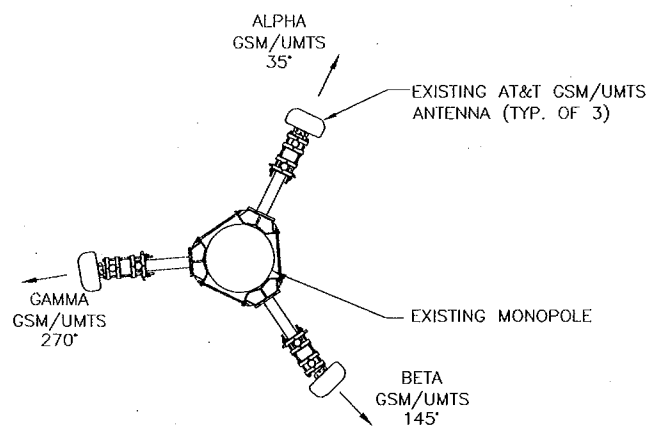
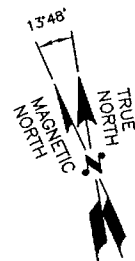
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HARTFORD COUNTY

at&t
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| | | | | | | | | AT&T | |
| | | | | | | | | COMPOUND & EQUIPMENT PLAN (LTE) | |
| NO. | DATE | REVISIONS | BY | CHK | APP'D | JOB NUMBER | DRAWING NUMBER | REV | |
| 1 | 03/29/12 | ISSUED FOR CONSTRUCTION | DC | DC | DPH | 5448.01 | A-1 | 1 | |
| 0 | 03/23/12 | ISSUED FOR REVIEW | | | | | | | |
| SCALE: AS SHOWN | | DESIGNED BY: DC | | DRAWN BY: DB | | | | | |





EXISTING GSM/UMTS ANTENNA PLAN

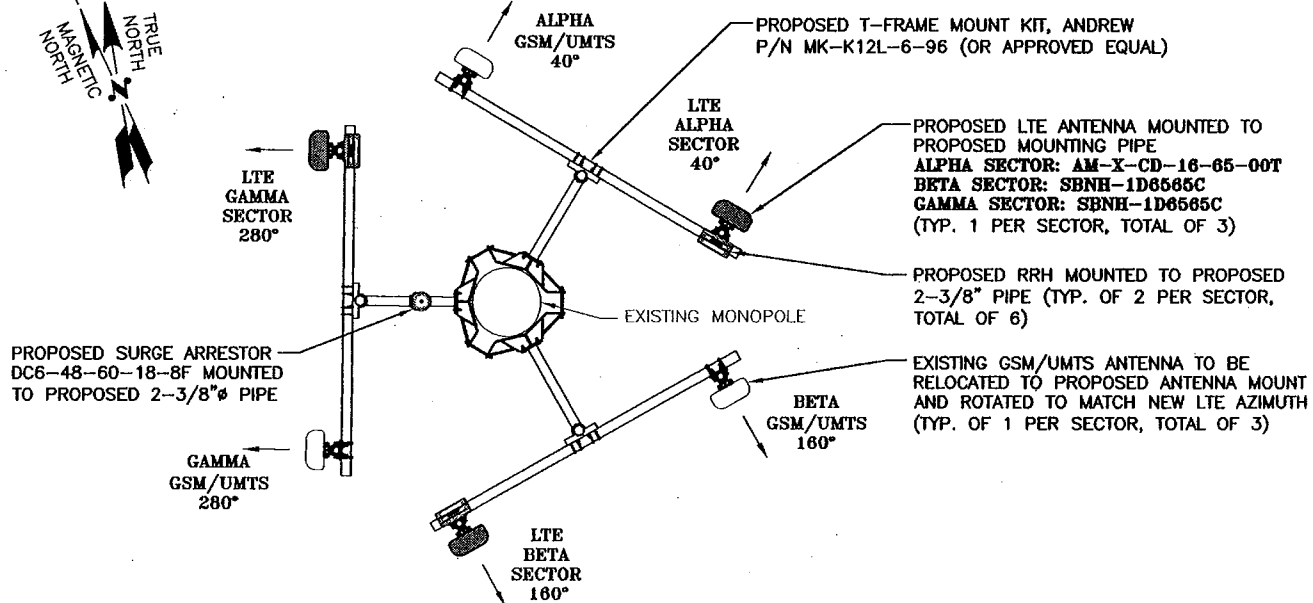
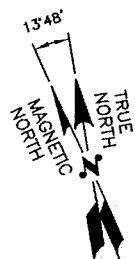
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NOTE:

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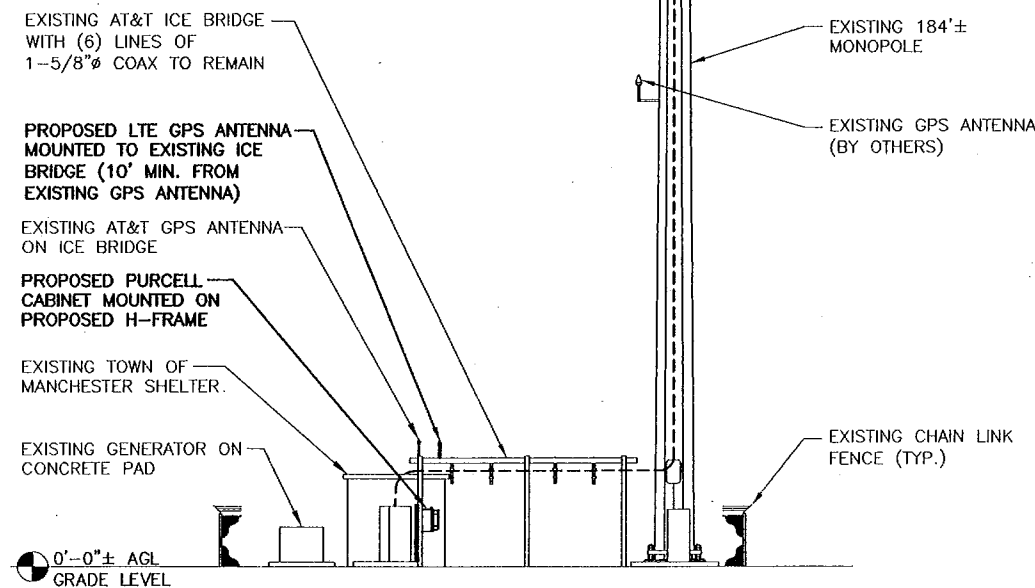
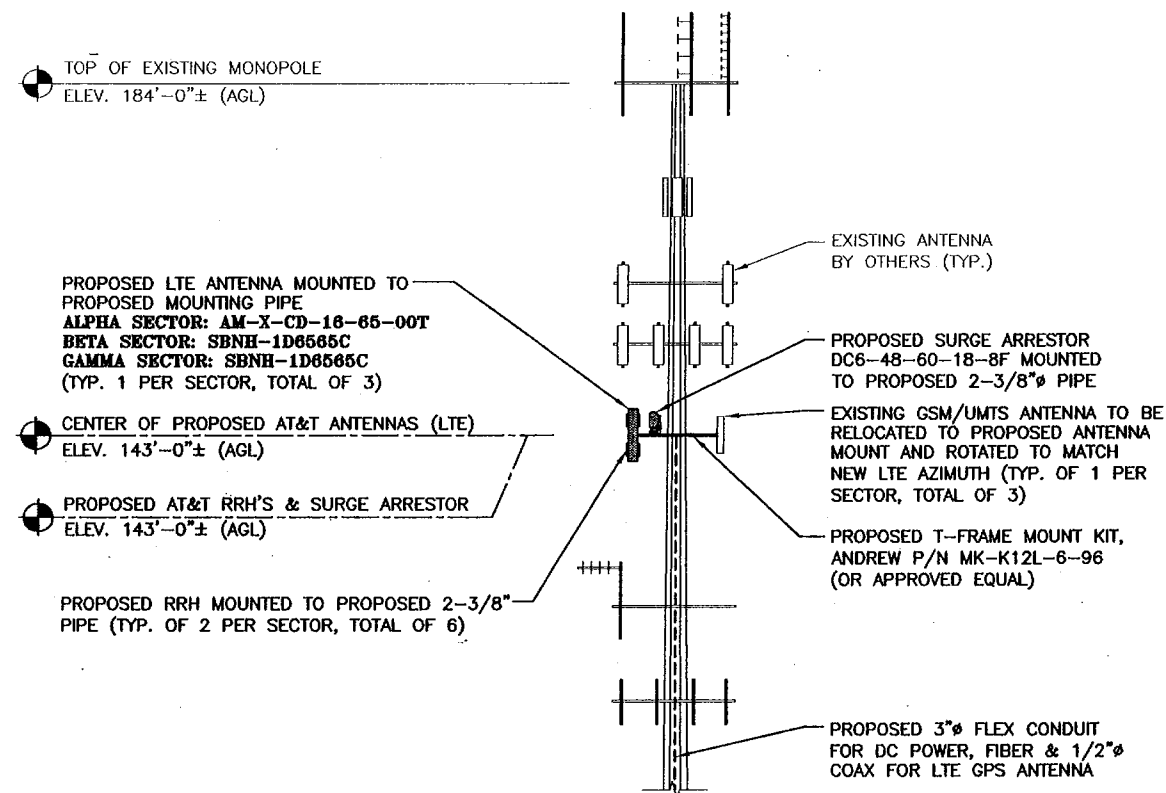
NOTE:

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PROPOSED LTE ANTENNA PLAN

SCALE: N.T.S.



NORTH ELEVATION

SCALE: 3/32"=1'-0"



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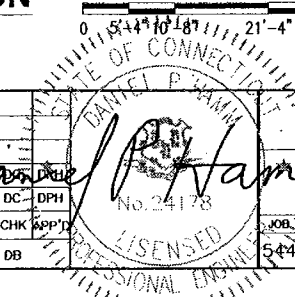
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SITE NAME: AWE-MANCHESTER CENTRAL

239 MIDDLE TURNPIKE EAST
MANCHESTER, CT 06040
HARTFORD COUNTY



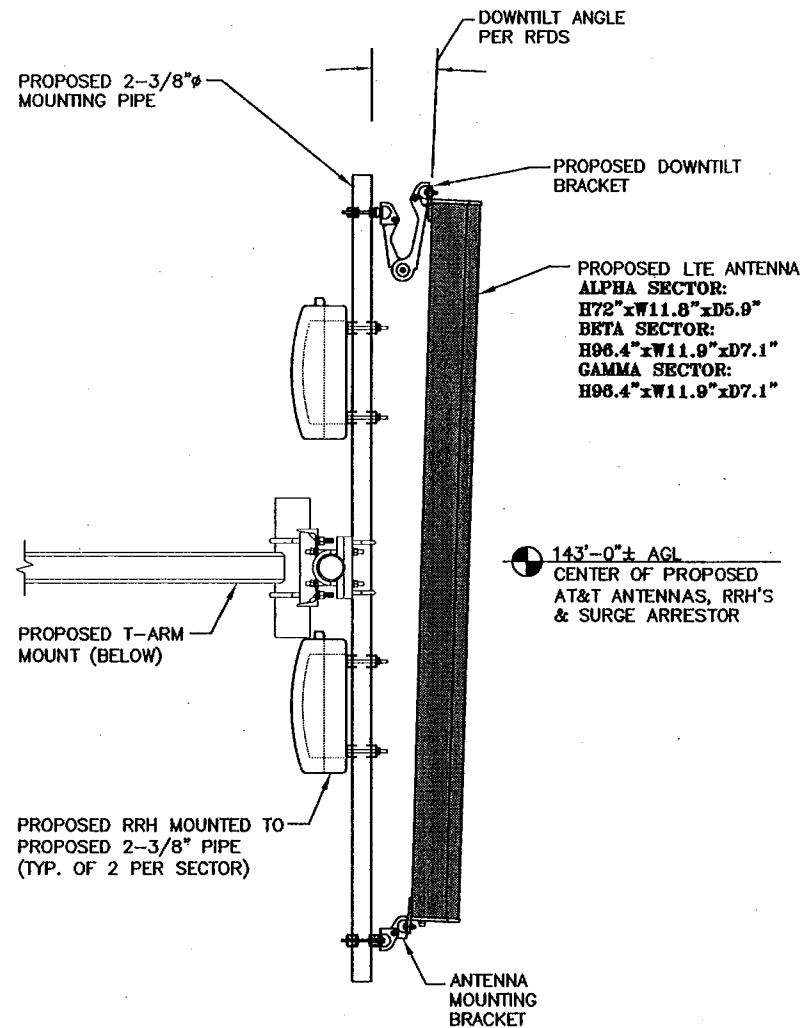
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| | | | | AT&T | |
| | | | | ANTENNA LAYOUT AND ELEVATION (LTE) | |
| NO. | DATE | REVISIONS | BY | CHK | APP'D |
| 1 | 03/29/12 | ISSUED FOR CONSTRUCTION | DB | DC | DPH |
| 0 | 03/23/12 | ISSUED FOR REVIEW | DB | DC | DPH |
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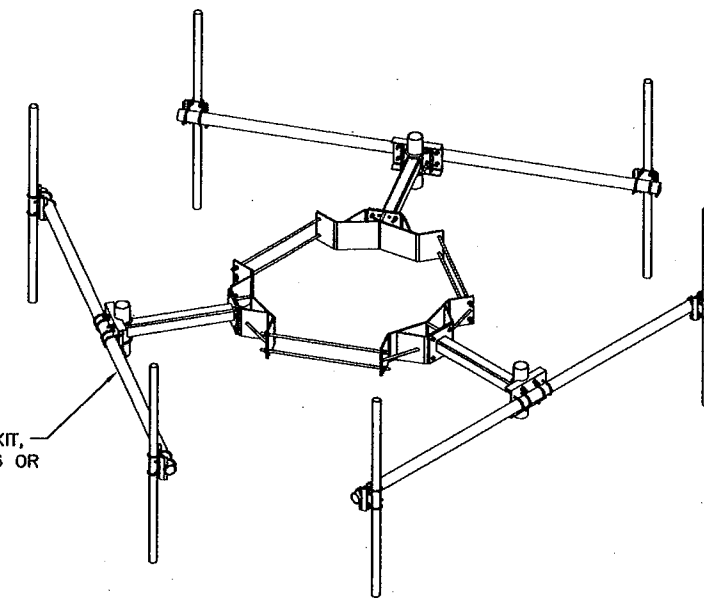
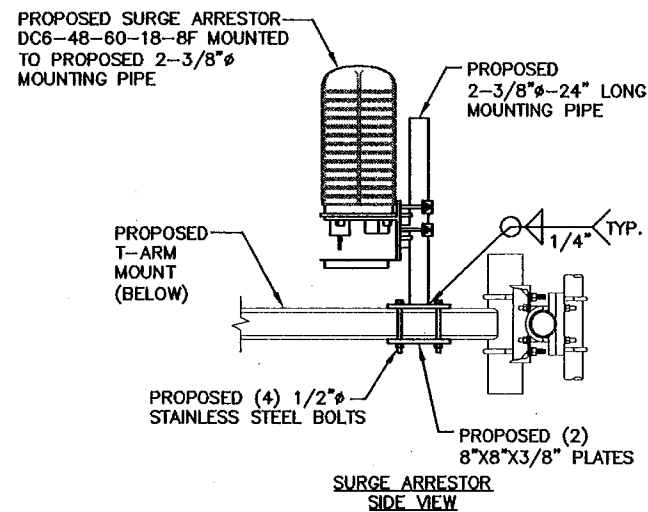


NOTE:
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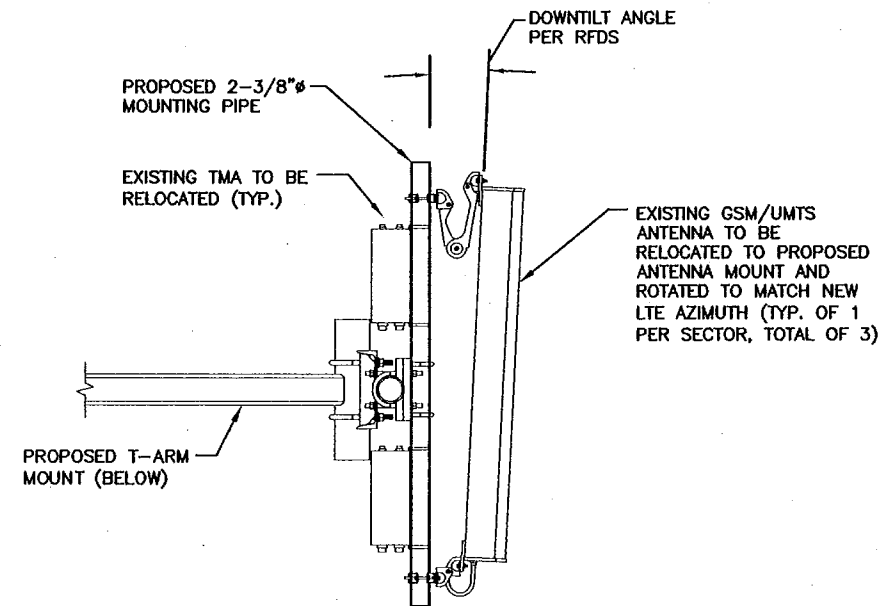
NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.



PROPOSED LTE ANTENNA, RRH & SURGE ARRESTOR MOUNTING DETAIL
SCALE: N.T.S.



ANTENNA MOUNT DETAIL
SCALE: N.T.S.



EXISTING UMTS/GSM ANTENNA MOUNTING DETAIL
SCALE: N.T.S.



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N. ANDOVER, MA 01845
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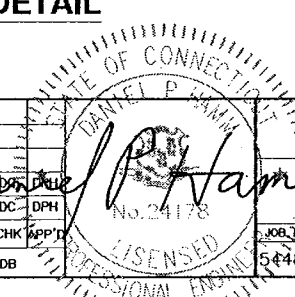
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WINDSOR, CT 06095

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SITE NAME: AWE-MANCHESTER CENTRAL
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HARTFORD COUNTY



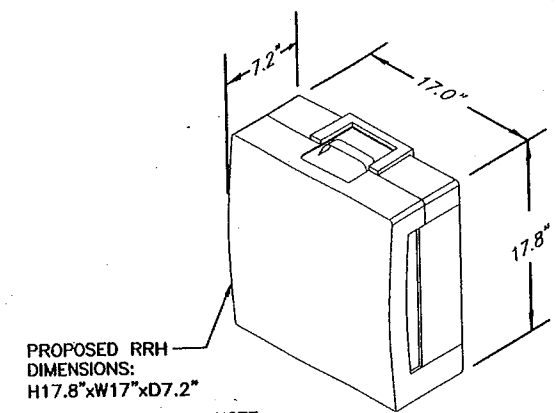
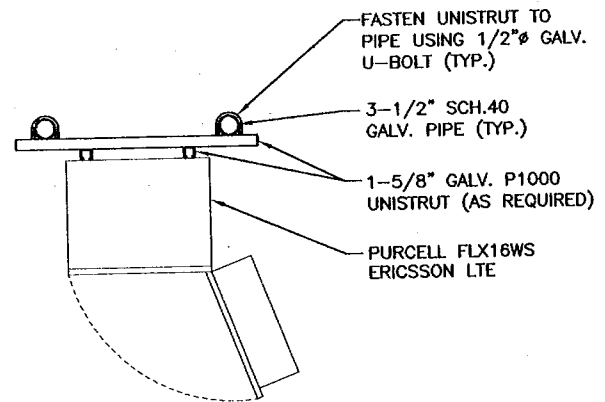
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| | | | | | | | | AT&T | |
| | | | | | | | | DETAILS (LTE) | |
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| 0 | 03/23/12 | ISSUED FOR REVIEW | | | | | | | |
| NO. | DATE | REVISIONS | BY | CHK | APP'D | | | JOB NUMBER | DRAWING NUMBER |
| | | | | | | | | 5448.01 | A-3 |
| SCALE: AS SHOWN | | DESIGNED BY: DC | DRAWN BY: DB | | | | | | 1 |



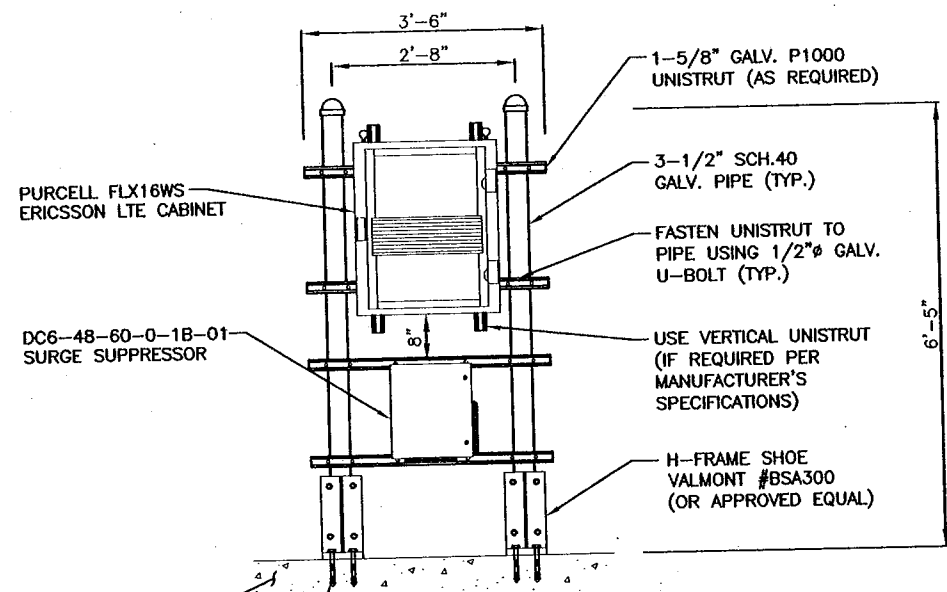
NOTE:
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NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.



PROPOSED RRH DIMENSIONS:
H17.8\"/>

RRH DETAIL
SCALE: N.T.S.

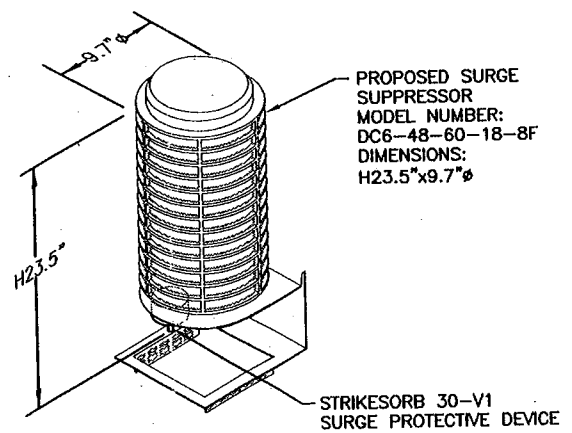


CONCRETE PAD/FOUNDATION

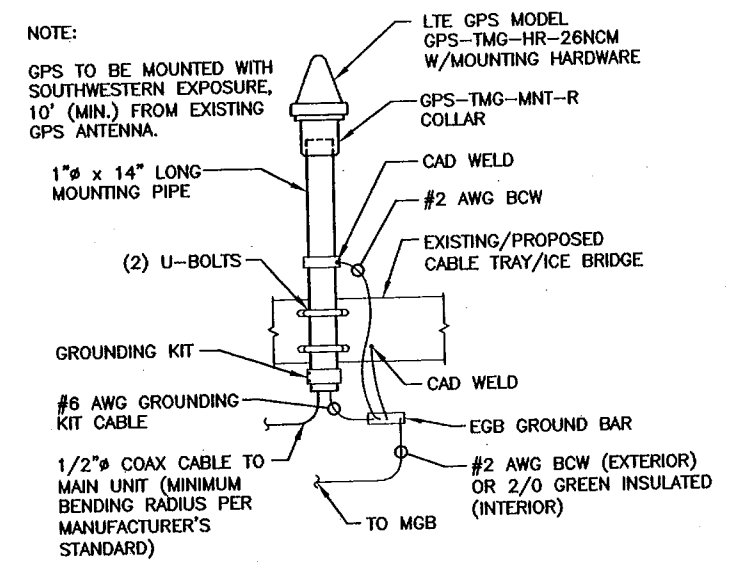
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NOTE:
MOUNT PROPOSED EQUIPMENT PER MANUFACTURER'S SPECIFICATIONS

PROPOSED EQUIPMENT MOUNTING DETAIL
SCALE: N.T.S.



DC SURGE SUPPRESSOR DETAIL
SCALE: N.T.S.



GPS MOUNTING DETAIL
SCALE: N.T.S.

Hudson Design Group

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N. ANDOVER, MA 01845

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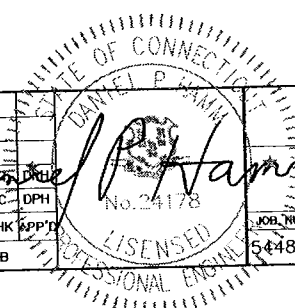
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SITE NAME: AWE-MANCHESTER CENTRAL

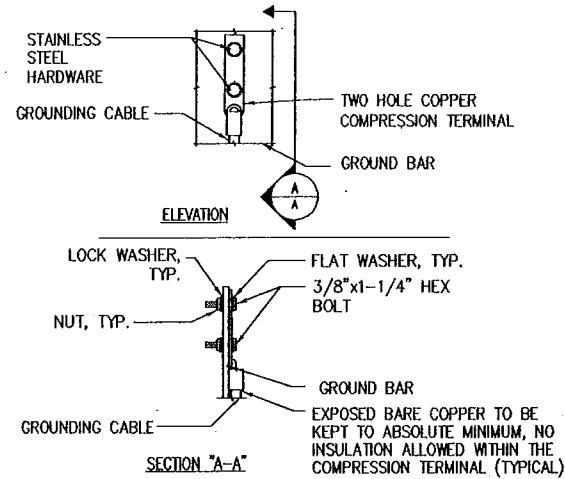
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| | | | | AT&T | |
| | | | | DETAILS (LTE) | |
| NO. | DATE | REVISIONS | BY | CHK | APP'D |
| 1 | 03/29/12 | ISSUED FOR CONSTRUCTION | DB | DC | DPH |
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| | | | JOB NUMBER: 5448.01 | | DRAWING NUMBER: A-4 |
| | | | | | REV: 1 |

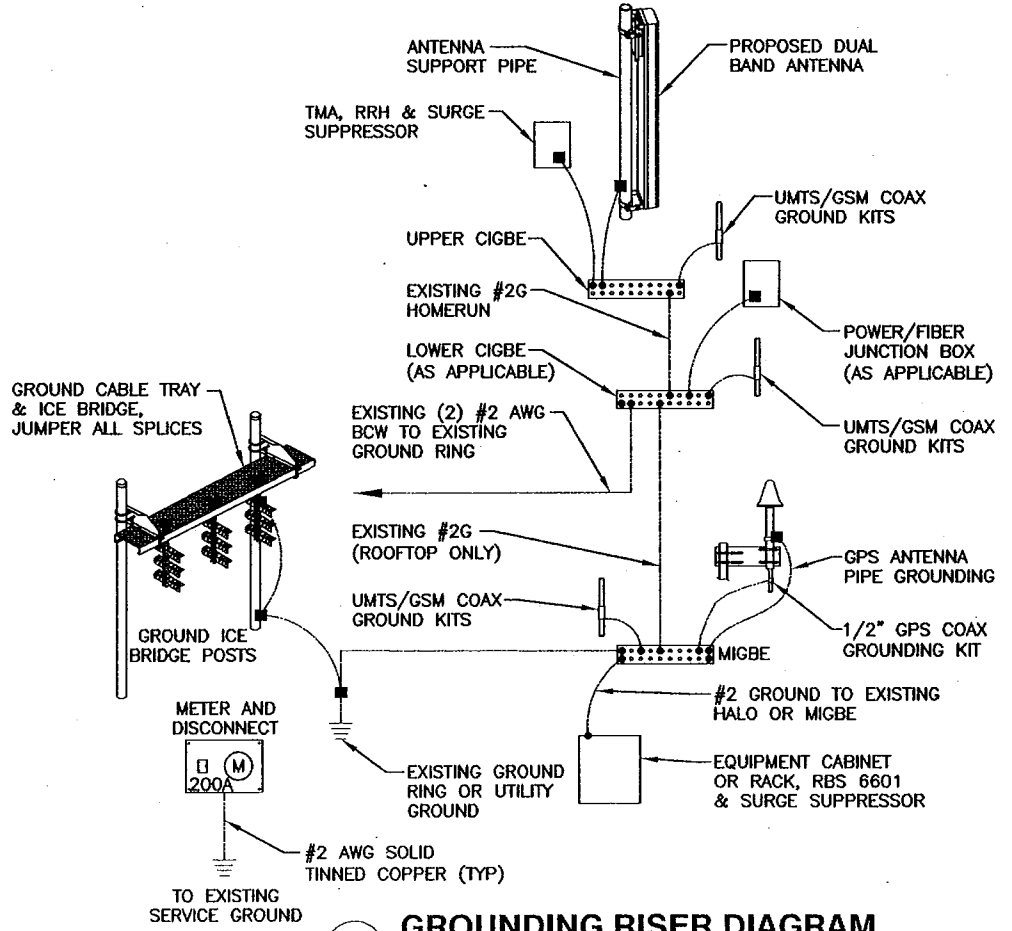




NOTE:
 1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
 2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
 3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

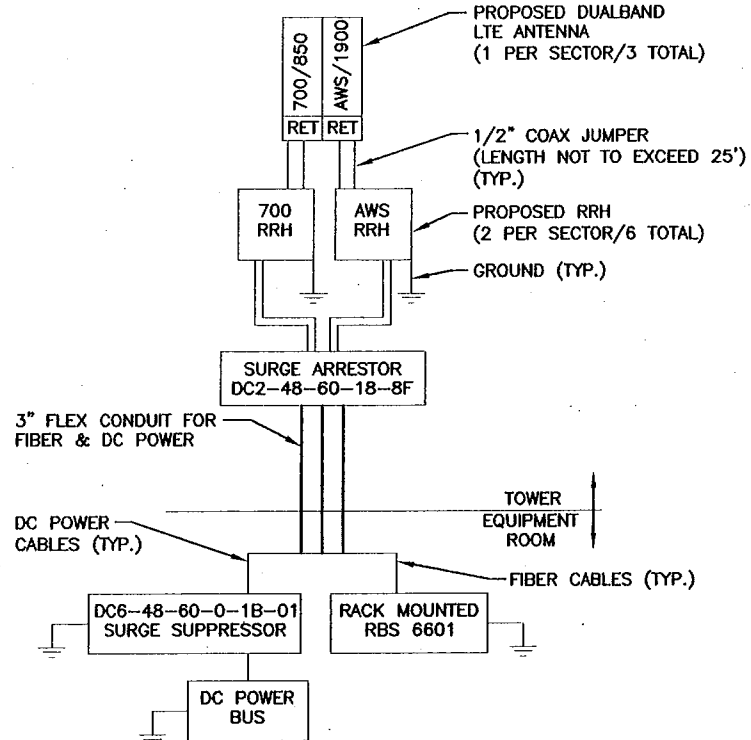
TYPICAL GROUND BAR CONNECTION DETAIL

1
 N.T.S.



GROUNDING RISER DIAGRAM

3
 N.T.S.



LTE PLUMBING DIAGRAM

2
 N.T.S.

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.

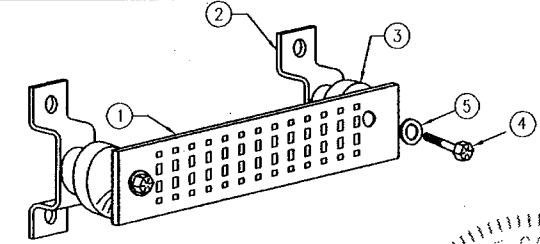
SECTION "A" - SURGE ABSORBERS

- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)

| WIRELESS SOLUTIONS INC. | | | |
|-------------------------|------|--------------|------------------------------|
| NO. | REQ. | PART NO. | DESCRIPTION |
| 1 | 1 | HLGB-0420-IS | SOLID GND. BAR (20"x4"x1/4") |
| 2 | 2 | | WALL MTG. BRKT. |
| 3 | 2 | | INSULATORS |
| 4 | 4 | | 5/8"-11x1" H.H.C.S. |
| 5 | 4 | | 5/8 LOCKWASHER |

GROUND BAR - DETAIL

4
 N.T.S.



Hudson Design Group
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SITE NUMBER: CT5448
SITE NAME: AWE-MANCHESTER CENTRAL
 239 MIDDLE TURNPIKE EAST
 MANCHESTER, CT 06040
 HARTFORD COUNTY

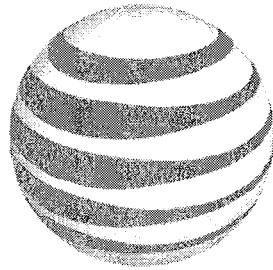
at&t
 500 ENTERPRISE DRIVE, SUITE 3A
 ROCKY HILL, CT 06067

AT&T
 DRAWING DIAGRAM & GROUNDING DETAILS (LTE)
 NO. DATE REVISIONS BY CHK APP'D
 1 03/29/12 ISSUED FOR CONSTRUCTION
 0 03/23/12 ISSUED FOR REVIEW
 SCALE: AS SHOWN DESIGNED BY: DC DRAWN BY: DB
 JOB NUMBER: 5448.01 DRAWING NUMBER: G-1 REV: 1



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Calculated Radio Frequency Emissions



at&t

CT5448

(AWE – Manchester Central)

239 Middle Turnpike East, Manchester, CT 06040

April 13, 2012

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the monopole tower located at 239 Middle Turnpike East in Manchester, CT. The coordinates of the tower are 41-47-03.86 N, 72-30-42.24 W.

AT&T is proposing the following modifications:

- 1) Install three 700MHz LTE antennas (one per sector).

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{1.6^2 \times \text{EIRP}}{4\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.

4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower.

Please refer to Attachment C for the vertical pattern of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

| Carrier | Antenna Height (Feet) | Operating Frequency (MHz) | Number of Trans. | ERP Per Transmitter (Watts) | Power Density (mw/cm ²) | Limit | %MPE |
|-------------------------|-----------------------|---------------------------|------------------|-----------------------------|-------------------------------------|--------|---------------|
| Cingular GSM | 144 | 1970 | 1 | 427 | 0.0296 | 1.0000 | 2.96% |
| Cingular UMTS | 144 | 880 | 1 | 500 | 0.0007 | 0.5067 | 1.48% |
| Town MPRE | 99 | 458.2125 | 2 | 40 | 0.0029 | 0.3055 | 0.96% |
| Town MPD - ch 1 | 190 | 465.125 | 1 | 40 | 0.0004 | 0.3101 | 0.13% |
| Town MPD - ch 2 | 177 | 465.4 | 1 | 40 | 0.0005 | 0.3103 | 0.15% |
| Town MFD | 99 | 861.7125 | 1 | 40 | 0.0015 | 0.5745 | 0.26% |
| Town services intercity | 99 | 452.55 | 1 | 40 | 0.0015 | 0.3017 | 0.49% |
| RAFS I/2 | 75 | 465.075 | 2 | 40 | 0.0051 | 0.3101 | 1.65% |
| Town public works | 99 | 151.07 | 1 | 40 | 0.0015 | 0.2000 | 0.73% |
| Town Services EOC | 99 | 153.935 | 1 | 40 | 0.0015 | 0.2000 | 0.73% |
| Town FD | 99 | 154.355 | 1 | 40 | 0.0015 | 0.2000 | 0.73% |
| town SP hotline | 86 | 45.86 | 1 | 40 | 0.0019 | 0.2000 | 0.97% |
| Town Vol FD | 69 | 811.7125 | 1 | 40 | 0.0030 | 0.5411 | 0.56% |
| Town Service - School | 170 | 469 | 1 | 40 | 0.0005 | 0.3127 | 0.16% |
| Htfd City FD | 99 | 33.9 | 1 | 40 | 0.0015 | 0.2000 | 0.73% |
| Tolland MUT | 99 | 33.94 | 1 | 40 | 0.0015 | 0.2000 | 0.73% |
| Sprint/Nextel iDEN | 153 | 851 | 12 | 100 | 0.0184 | 0.5673 | 3.25% |
| Sprint/Nextel CDMA | 153 | 1962.5 | 11 | 411 | 0.0694 | 1.0000 | 6.94% |
| Clearwire | 153 | 2496 | 2 | 153 | 0.0047 | 1.0000 | 0.47% |
| Clearwire | 149 | 18 GHz | 1 | 211 | 0.0034 | 1.0000 | 0.34% |
| Pocket | 174 | 2130 | 3 | 631 | 0.0225 | 1.0000 | 2.25% |
| T-Mobile GSM | 163 | 1945 | 8 | 162 | 0.0175 | 1.0000 | 1.75% |
| T-Mobile UMTS | 163 | 2100 | 2 | 647 | 0.0175 | 1.0000 | 1.75% |
| Verizon | 113 | 1970 | 3 | 415 | 0.0351 | 1.0000 | 3.51% |
| Verizon | 113 | 869 | 9 | 304 | 0.0770 | 0.5793 | 13.30% |
| AT&T UMTS | 143 | 880 | 2 | 565 | 0.0020 | 0.5867 | 0.34% |
| AT&T UMTS | 143 | 1900 | 2 | 1077 | 0.0038 | 1.0000 | 0.38% |
| AT&T LTE | 143 | 734 | 1 | 1375 | 0.0024 | 0.4893 | 0.49% |
| AT&T GSM | 143 | 880 | 1 | 283 | 0.0005 | 0.5867 | 0.08% |
| AT&T GSM | 143 | 1900 | 4 | 646 | 0.0045 | 1.0000 | 0.45% |
| Total | | | | | | | 44.30% |

Table 1: Carrier Information^{1 2}

¹ The existing CSC filing for Cingular should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for carriers other than AT&T was taken directly from the CSC database dated 3/29/2012.

² In the case where antenna models are not uniform across all 3 sectors for the same frequency band, the antenna model with the highest gain was used for the calculations to present a worse-case scenario.

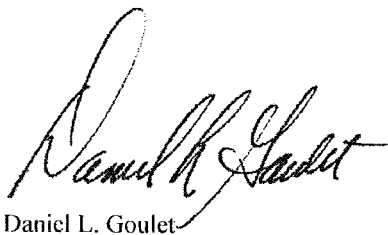
5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **44.30% of the FCC limit**.

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



Daniel L. Goulet
C Squared Systems, LLC

April 13, 2012

Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure³

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (E) (A/m) | Power Density (S) (mW/cm ²) | Averaging Time E ² , H ² or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|-----------------------------------------|-------------------------------------------------------------------|
| 0.3-3.0 | 614 | 1.63 | (100)* | 6 |
| 3.0-30 | 1842/f | 4.89/f | (900/f ²)* | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1500 | - | - | f/300 | 6 |
| 1500-100,000 | - | - | 5 | 6 |

(B) Limits for General Population/Uncontrolled Exposure⁴

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (E) (A/m) | Power Density (S) (mW/cm ²) | Averaging Time E ² , H ² or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|-----------------------------------------|-------------------------------------------------------------------|
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | (180/f ²)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | - | - | f/1500 | 30 |
| 1500-100,000 | - | - | 1.0 | 30 |

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

³ Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure

⁴ General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

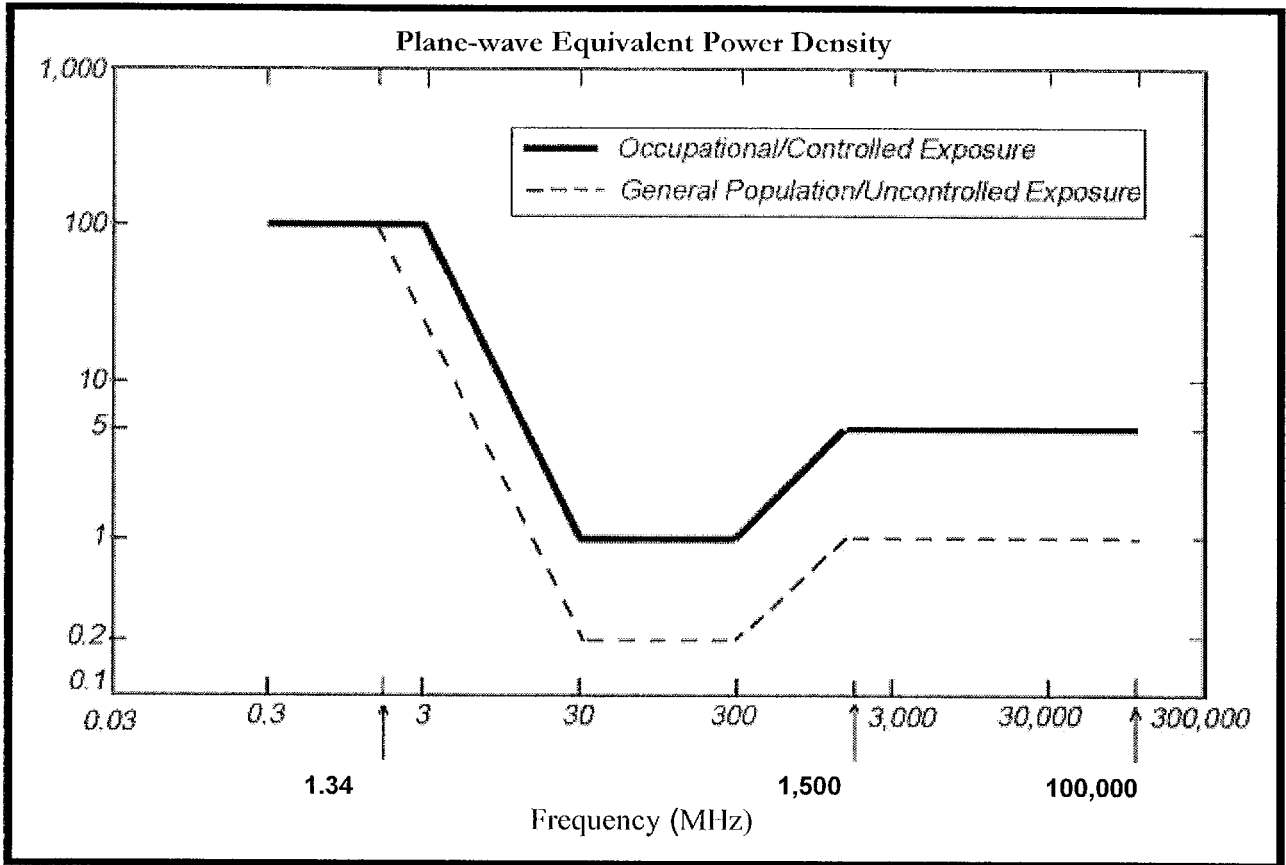
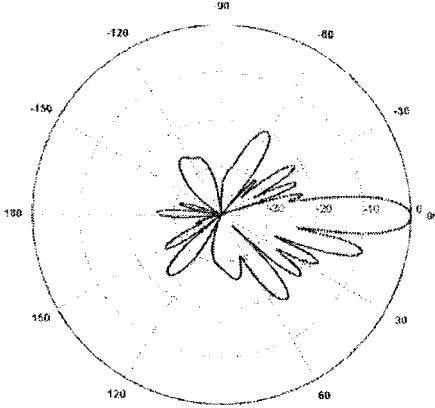
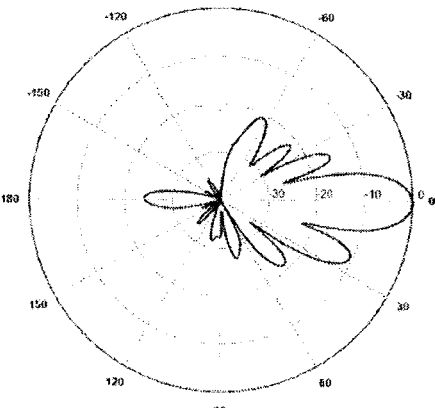
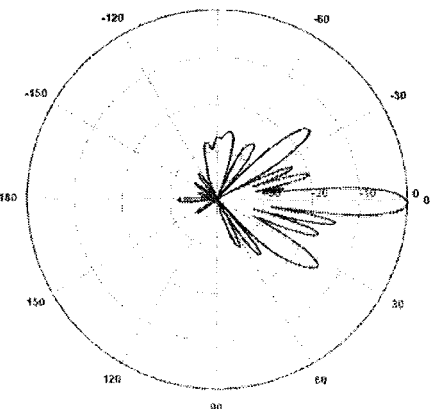


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: AT&T Antenna Data Sheets and Electrical Patterns

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p>700 MHz</p> <p>Manufacturer: Commscope Model #: SBNH-1D6565C Frequency Band: 698-806 MHz Gain: 13.6 dBd Vertical Beamwidth: 8.6° Horizontal Beamwidth: 71° Polarization: ±45° Size L x W x D: 96.4" x 11.9" x 7.1"</p> |  |
| <p>850 MHz</p> <p>Manufacturer: Kathrein-Scala Model #: 800-10121 Frequency Band: 824-896 MHz Gain: 11.5 dBd Vertical Beamwidth: 14.5° Horizontal Beamwidth: 86° Polarization: ±45° Size L x W x D: 54.5" x 10.3" x 5.9"</p> |  |
| <p>1900 MHz</p> <p>Manufacturer: Kathrein-Scala Model #: 800-10121 Frequency Band: 1850-1990 MHz Gain: 14.3 dBd Vertical Beamwidth: 6.6° Horizontal Beamwidth: 85° Polarization: ±45° Size L x W x D: 54.5" x 10.3" x 5.9"</p> |  |