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

December 5, 2016

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

RE: **Notice of Exempt Modification for AT&T/ LTE 3C Crown Site BU: 841290**
AT&T Site ID: CT2130
363 Riversville Road, Greenwich, CT 06831
Latitude: 41° 3' 58.6" / Longitude: -73° 40' 17.4"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 149-foot level of the existing 160-foot monopole at 363 Riversville Road in Greenwich, CT. The tower is owned by Crown Castle. The property is owned by the Greenwich Council Boy Scouts of America. AT&T intends to replace three (3) RRU12/A2s with (3) RRU32 B2s, as well as, install two (2) DC and one (1) fiber line.

In communications with the Town of Greenwich, the original Zoning Approval for this tower is unavailable.

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

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

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

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

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

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

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

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

Sincerely,

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

Attachments:

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

cc: Mr. Peter J. Tesei
Town of Greenwich
101 Field Point Road
Greenwich, CT 06830

Greenwich Council Boy Scouts of America
63 Mason Street
Greenwich, CT 06830

Terry, Dashanna

From: Patrick LaRow <Patrick.LaRow@greenwichct.org>
Sent: Thursday, January 21, 2016 12:08 PM
To: Terry, Dashanna
Cc: Barbadora, Jeff
Subject: Re: Zoning Documents - Tower at 363 Riversville Road

The Planning and Zoning office does not have any documents related to a telecommunications facility at this address.

Patrick LaRow, AICP
Deputy Director / Assistant Town Planner

Town of Greenwich
Planning and Zoning
101 Field Point Road
Greenwich, CT 06830

Phone: (203) 622-7894 Fax: (203) 622-3795
Patrick.LaRow@greenwichct.org

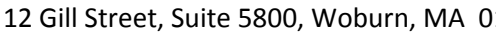
From: "Terry, Dashanna" <Dashanna.Terry@crowncastle.com>
To: "patrick.larow@greenwichct.org" <patrick.larow@greenwichct.org>
Cc: "Barbadora, Jeff" <Jeff.Barbadora@crowncastle.com>
Date: 01/21/2016 10:29 AM
Subject:Zoning Documents - Tower at 363 Riversville Road

Hello Patrick,

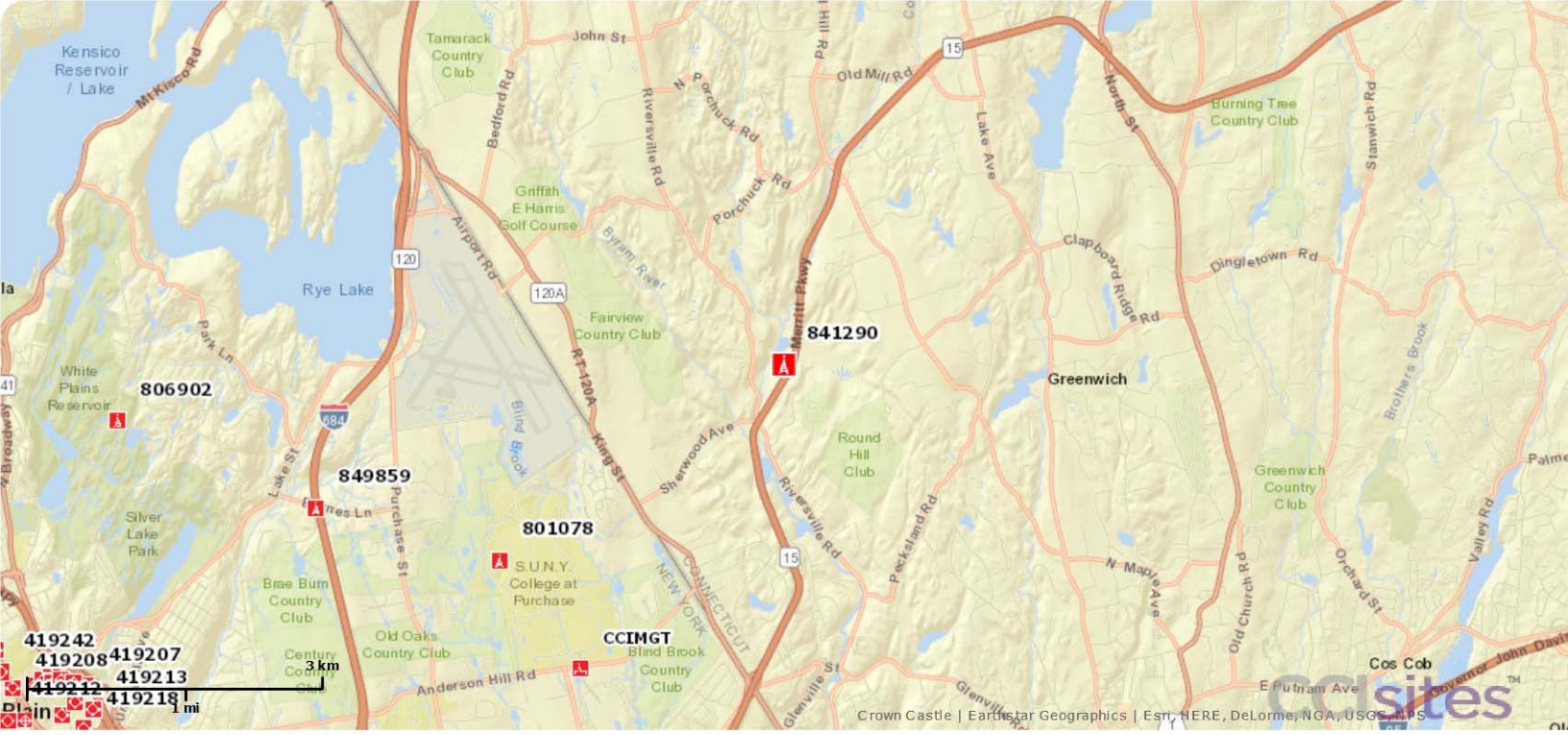
Thank you for speaking with me this morning regarding zoning documents for the tower at 363 Riversville Road. Could you please confirm here that you do not have original zoning documents for this tower?

Best,
Dashanna

DASHANNA TERRY
Real Estate Project Coordinator
T: (781) 970-0067| M: (571) 241-0984



12 Gill Street, Suite 5800, Woburn, MA 01801 Crowncastle.com


Kensico Reservoir / Lake
Mt Kisco Rd
Tamarack Country Club
John St
Bedford Rd
Riversville Rd
N Porchuck Rd
Porchuck Rd
Old Mill Rd
Lake Ave
North St
Burning Tree Country Club
Stanwich Rd
Griffith E Harris Golf Course
Byram River
Airport Rd
120
120A
Rye Lake
Fairview Country Club
Merritt Pkwy
841290
Clapboard Ridge Rd
Dingletown Rd
Park Ln
White Plains Reservoir
806902
Rt 120A
King St
Sherwood Ave
Greenwich
Brothers Brook
Blind Brook
Round Hill Club
Greenwich Country Club
Lake St
849859
Purchase St
Elmes Ln
Silver Lake Park
801078
S.U.N.Y. College at Purchase
Riversville Rd
Peckland Rd
N Maple Ave
Old Church Rd
Orchard St
Valley Rd
Brae Burn Country Club
CONNECTICUT
NEW YORK
Century Country Club
Old Oaks Country Club
CCIMGT
Blind Brook Country Club
Anderson Hill Rd
Glenville St
E Putnam Ave
Cos Cob
Governor John Davis
419242
419208
419207
419213
419212
419218
Plain
3 km
1 mi
Crown Castle | Earthstar Geographics | Esri, HERE, DeLorme, NGA, USGS, NPS
ccisites

PROJECT TEAM

CLIENT REPRESENTATIVE:

EMPIRE TELECOM
16 ESQUIRE ROAD
BILLERICA, MA 01821
DAVID COOPER
617-639-4908
dcooper@empiretelecomm.com

SITE ACQUISITION & ZONING:

EMPIRE TELECOM
16 ESQUIRE ROAD
BILLERICA, MA 01821
DAVID COOPER
617-639-4908
dcooper@empiretelecomm.com

ENGINEERING:

TRYLON TSF
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 75038
PHONE: 1-855-669-5421

RF ENGINEER:

AT&T MOBILITY - NEW ENGLAND
550 COCHITUATE ROAD
SUITE 550 13 & 14
FRAMINGHAM, MA 01701
CAMERON SYME
508-596-7146
cs6970@att.com

CONSTRUCTION MANAGEMENT:

EMPIRE TELECOM
16 ESQUIRE ROAD
BILLERICA, MA 01821
GRZEGORZ "GREG" DORMAN
484-683-1750
gdorman@empiretelecomm.com

TOWER OWNER:

UNKNOWN

GENERAL NOTES

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

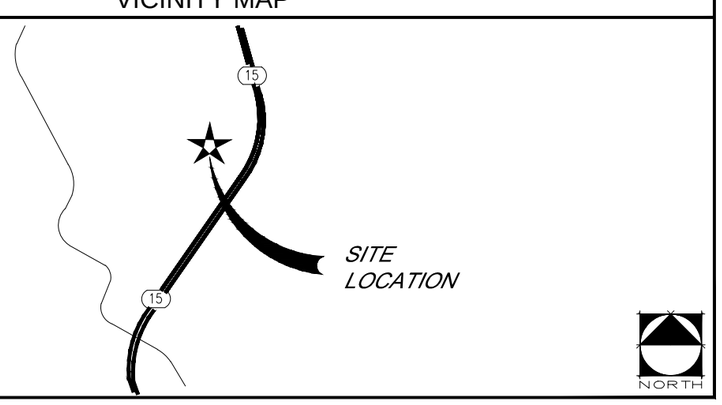
SITE INFORMATION

LATITUDE:	41° 3' 59.57316" N
LONGITUDE:	73° 40' 17.09796" W
LAT./LONG. TYPE:	NAD 83
GROUND ELEVATION:	N/A
APN/UPC:	N/A
AREA OF CONSTRUCTION:	EXISTING
ZONING/JURISDICTION:	CITY OF GREENWICH
CURRENT ZONING:	N/A
EXISTING USE:	TELECOMMUNICATIONS FACILITY
COUNTY:	FAIRFIELD COUNTY
HANDICAP REQUIREMENTS:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS NOT REQUIRED.

at&t Mobility

LTE BWE EXPANSION
CT2130
GREENWICH NORTH
363 RIVERSVILLE ROAD
GREENWICH, CT 06831
FA CODE: 10034990

VICINITY MAP



DRIVING DIRECTIONS

2130GREENWICH RIVERSIDEMERRITT PARKWAY NORTH TO EXIT 28 MAKE LEFT AT THE END OF THE RAMP. TAKE TO FIRST LEFT PORCHUK RD MAKE LEFT FOLLOW TO FORK MAKE LEFT CONTINUE TILL END MAKE LEFT ON TO RIVERVILLE RD FOLLOW TO BOY SCOUT CAMP MAKE LEFT INTO CAMP DRIVE SLOW THRU CAMP. MAKE RIGHT AT SMALL BRIDGE FOLLOW TO MONO-POLE IN BACK OF CAMP UP HILL.DEMARC IS IN THE SHELTER.ADDRESS: 363 RIVERVILLE DRIVE,GREENWICH, CONNECTICUT, 06830ACCESS: 24/7KEY AT SITE UNDER CINGULAR A/C UNITGATE COMBO 0043 CONTACT: TO FOLLOW SECURITY: NO ISSUESPOWER COMPANY: NORTHEAST UTILITIES (800) 286-2000)METER# : NOT INSTALLED YETFIRE: (203) 622-3950POLICE: (203) 622-8000GSM CIRCUIT: 88DHZA264356 &88DHZA295457SWITCH ID: BRPTCTBSC01 BCF 15UMTS CIRCUIT : 88DHZA295466 & 88DHZA295468 ALSO 88DHZA508339 & 88DHZA508340

CODE COMPLIANCE

BUILDING CODE: 2012 & 2016 CONNECTICUT COMMERCIAL BUILDING CODE

ELECTRICAL CODE: 2014 CONNECTICUT ELECTRICAL CODE

LIGHTNING PROTECTION CODE: NFPA 780 - 2000, LIGHTNING PROTECTION CODE

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.

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.

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

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

APPROVALS

AT&T (RF): _____ DATE: _____

AT&T (CONST.): _____ DATE: _____

AT&T (OPS): _____ DATE: _____

TOWER OWNER: _____ DATE: _____

JURISDICTIONAL APPROVAL

BASED ON INFORMATION PROVIDED BY AT&T REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409(A), AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW AND LIMITED/PARTIAL ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW OR ADMINISTRATIVE REVIEW).

PROJECT DESCRIPTION

THIS PROJECT WILL BE COMPRISED OF:
CHANGES ON THE EXISTING SELF SUPPORTING TOWER:

- REMOVE (3) EXISTING RRUS-12 + RRUS-A2 (1) PER SECTOR FOR (3) SECTORS.
- INSTALL (3) NEW RRUS-32 B2, (1) PER SECTOR FOR (3) SECTORS.
- REUSE (1) EXISTING DC6 SQUID.
- REUSE (2) EXISTING DC POWER TRUNK.
- REUSE (1) EXISTING FIBER TRUNK.
- REUSE (12) EXISTING RF CABLES.

CHANGES IN THE EXISTING AT&T EQUIPMENT ENCLOSURE AREA:

- INSTALL (1) NEW XMU.

SHEET	DESCRIPTION
T-1	TITLE SHEET
GN-1	GROUNDING & GENERAL NOTES
A-1	COMPOUND PLAN
A-2	EQUIPMENT LAYOUTS
A-3	ANTENNA LAYOUTS
A-4	TOWER ELEVATION
A-5	DETAILS
G-1	GROUNDING, ONE-LINE DIAGRAM & DETAILS

at&t Mobility
1355 WEST UNIVERSITY DRIVE
MESA, AZ 85201-5419

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

PLANS PREPARED BY:
Trylon
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 75038

NO.	DATE	DESCRIPTION	BY
A	11/14/16	FOR REVIEW	DSM
0	11/22/16	ISSUE FOR CONSTRUCTION	DSM

SITE INFORMATION:

CT2130
GREENWICH NORTH
FA CODE: 10034990

363 RIVERSVILLE ROAD
GREENWICH, CT 06831

SEAL:

MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

TITLE SHEET

SHEET NUMBER:

T-1

GENERAL NOTES:

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

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

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

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

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

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

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

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

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

10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF ALL SCR1 'AP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

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

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

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

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

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

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

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

19. SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

    - INTERNATIONAL BUILDING CODE: IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
    - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
    - FIRE/LIFE SAFETY CODE: NFPA-101 2009 WITH LOCAL & COUNTY AMENDMENTS

20. SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

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

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

GROUNDING NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

at&t Mobility
1355 WEST UNIVERSITY DRIVE
MESA, AZ 85201-5419

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

PLANS PREPARED BY:
Trylon
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 75038

NO.	DATE	DESCRIPTION	BY
A	11/14/16	FOR REVIEW	DSM
0	11/22/16	ISSUE FOR CONSTRUCTION	DSM

SITE INFORMATION:

CT2130
GREENWICH NORTH
FA CODE: 10034990

363 RIVERSVILLE ROAD
GREENWICH, CT 06831

SEAL:

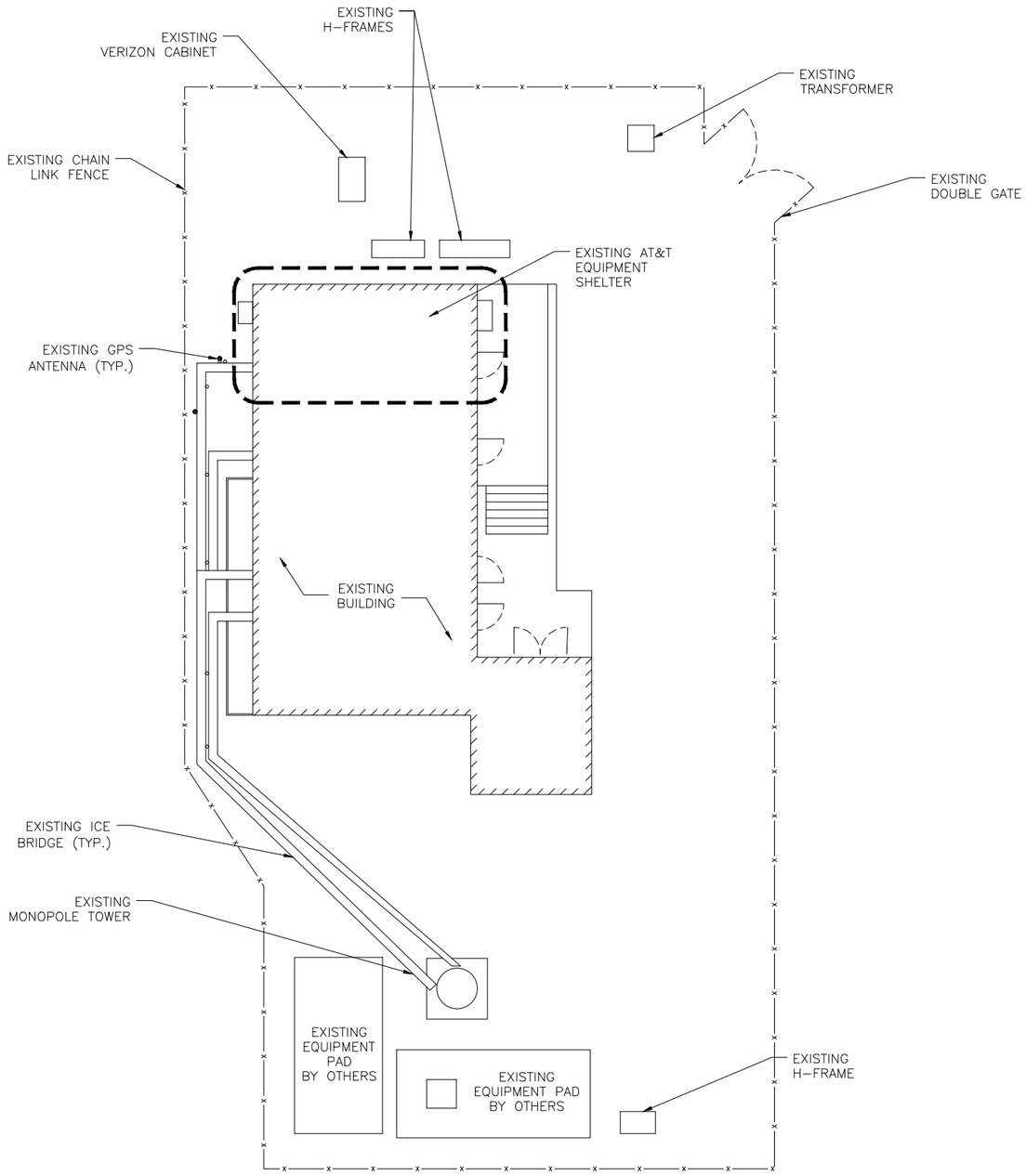
MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

GENERAL NOTES &
GROUNDING NOTES

SHEET NUMBER:

GN-1



COMPOUND PLAN

22"x34" SCALE: 1/8" = 1'-0"
11"x17" SCALE: 1/16" = 1'-0"

8' 6' 4' 2' 0" 8'

at&t Mobility
1355 WEST UNIVERSITY DRIVE
MESA, AZ 85201-5419

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

PLANS PREPARED BY:
Trylon
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 75038

NO.	DATE	DESCRIPTION	BY
A	11/14/16	FOR REVIEW	DSM
0	11/22/16	ISSUE FOR CONSTRUCTION	DSM

SITE INFORMATION:

CT2130
GREENWICH NORTH
FA CODE: 10034990

363 RIVERSVILLE ROAD
GREENWICH, CT 06831

SEAL:

STATE OF CONNECTICUT
MICHAEL F. PLAHOVINSAK
No. 25849
REGISTERED PROFESSIONAL ENGINEER
11-22-2016

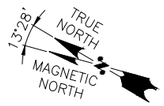
MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

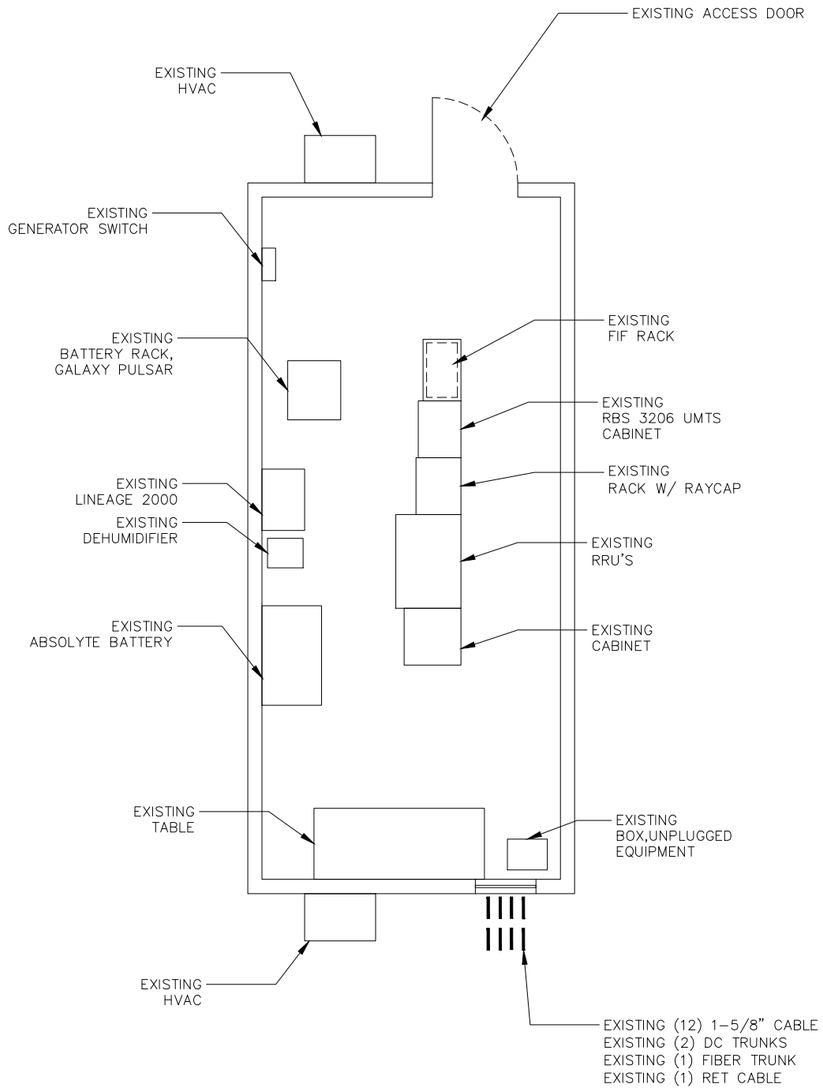
SHEET TITLE:

COMPOUND PLAN

SHEET NUMBER:

A-1



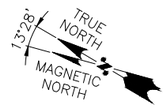


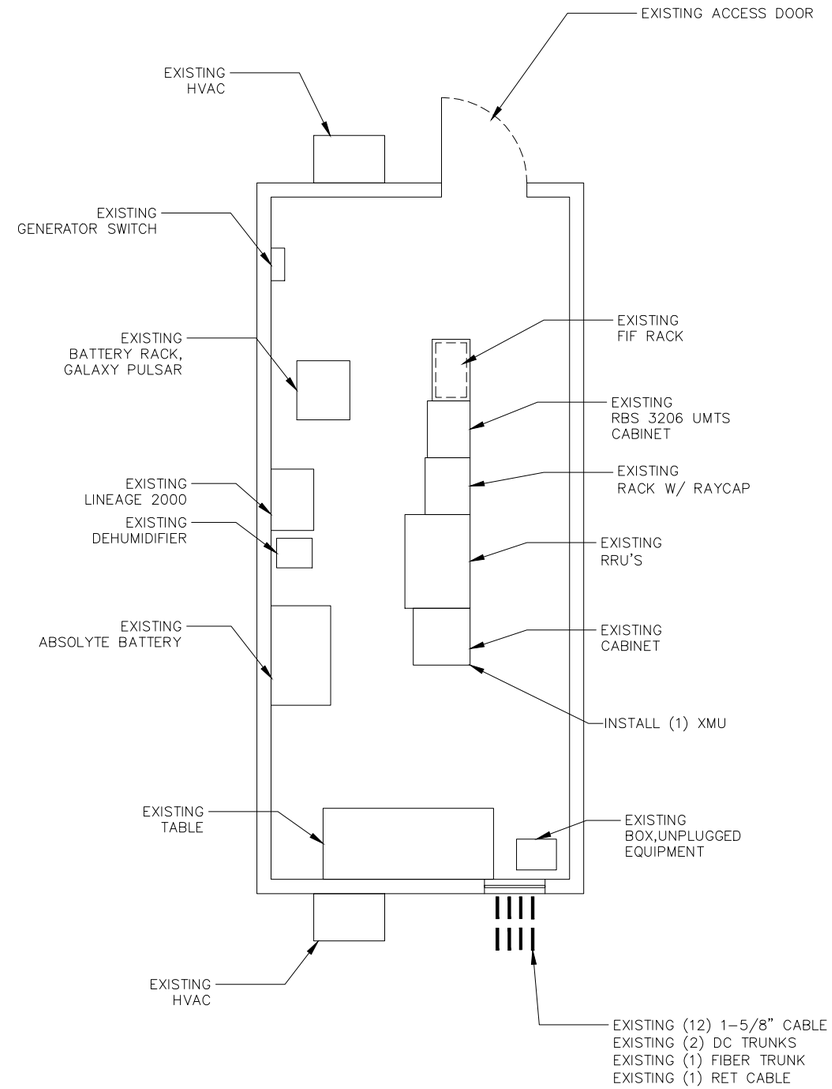
EXISTING EQUIPMENT LAYOUT

22"x34" SCALE: 3/8" = 1'-0"
11"x17" SCALE: 3/16" = 1'-0"

2' 1' 0" 2'

1





PROPOSED EQUIPMENT LAYOUT

22"x34" SCALE: 3/8" = 1'-0"
11"x17" SCALE: 3/16" = 1'-0"

2' 1' 0" 2'

2

at&t Mobility
1355 WEST UNIVERSITY DRIVE
MESA, AZ 85201-5419

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

PLANS PREPARED BY:
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1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 75038

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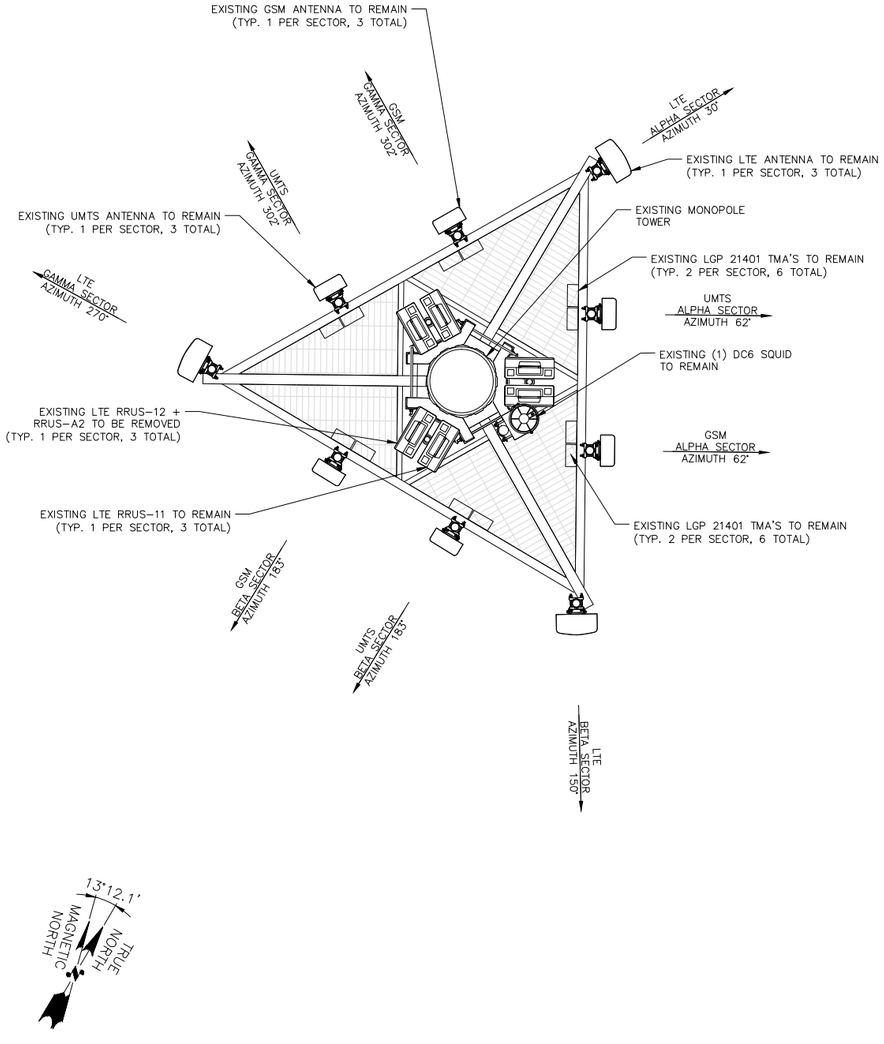
SHEET TITLE:

EQUIPMENT LAYOUTS

SHEET NUMBER:

A-2



EXISTING ANTENNA LAYOUT

NOT TO SCALE

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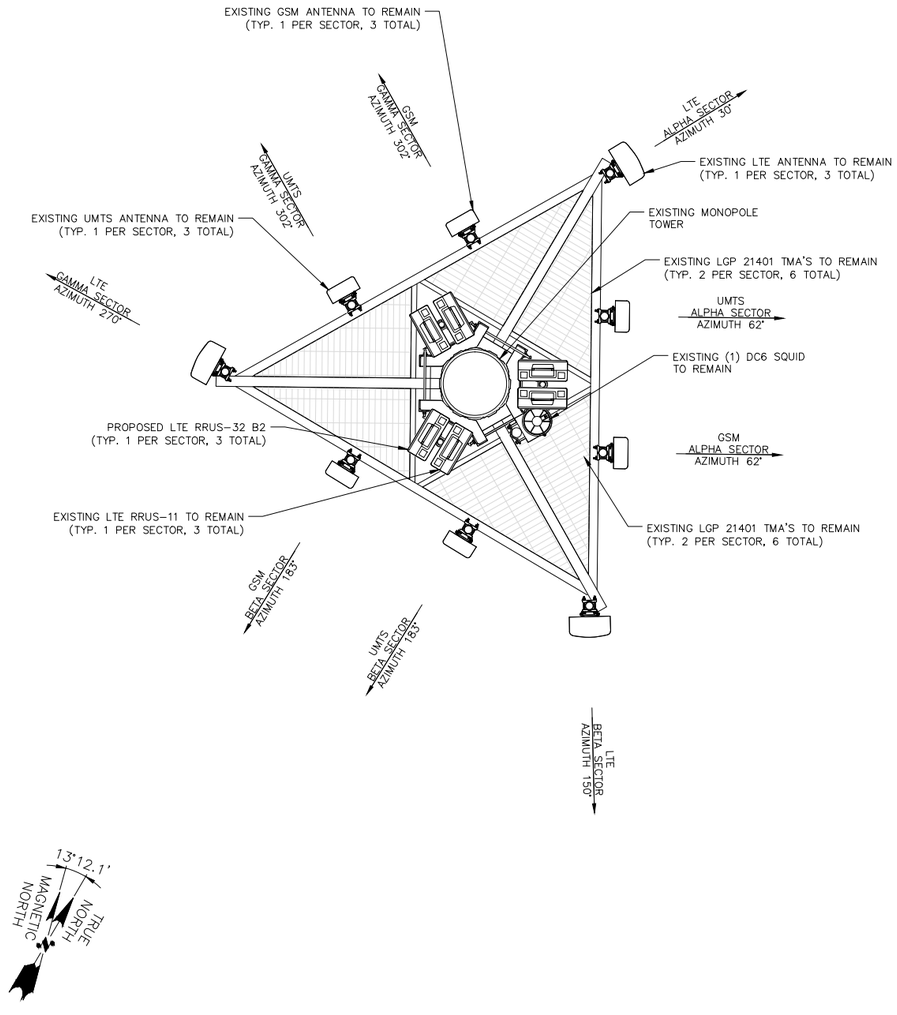

PROPOSED ANTENNA LAYOUT

NOT TO SCALE

2

at&t Mobility
1355 WEST UNIVERSITY DRIVE
MESA, AZ 85201-5419

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

PLANS PREPARED BY:
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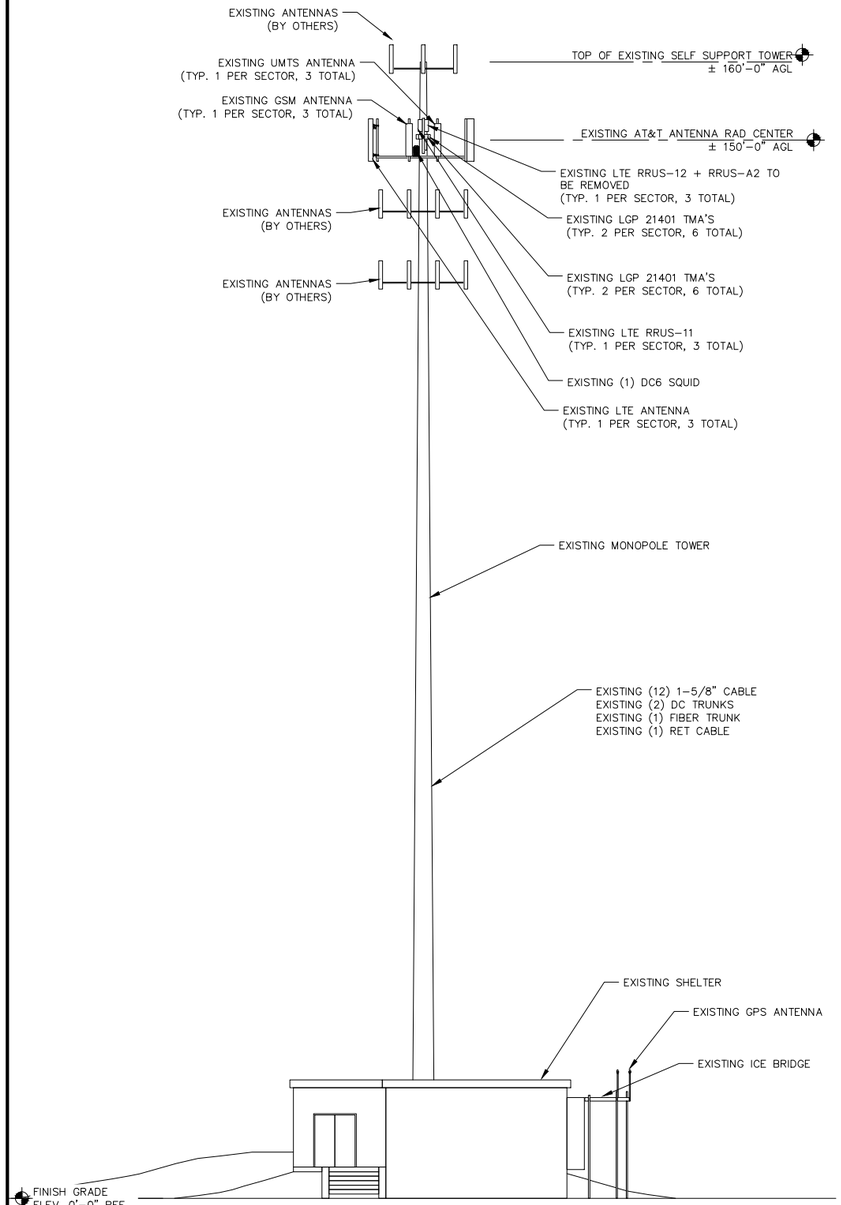
SHEET TITLE:

ANTENNA LAYOUTS

SHEET NUMBER:

A-3

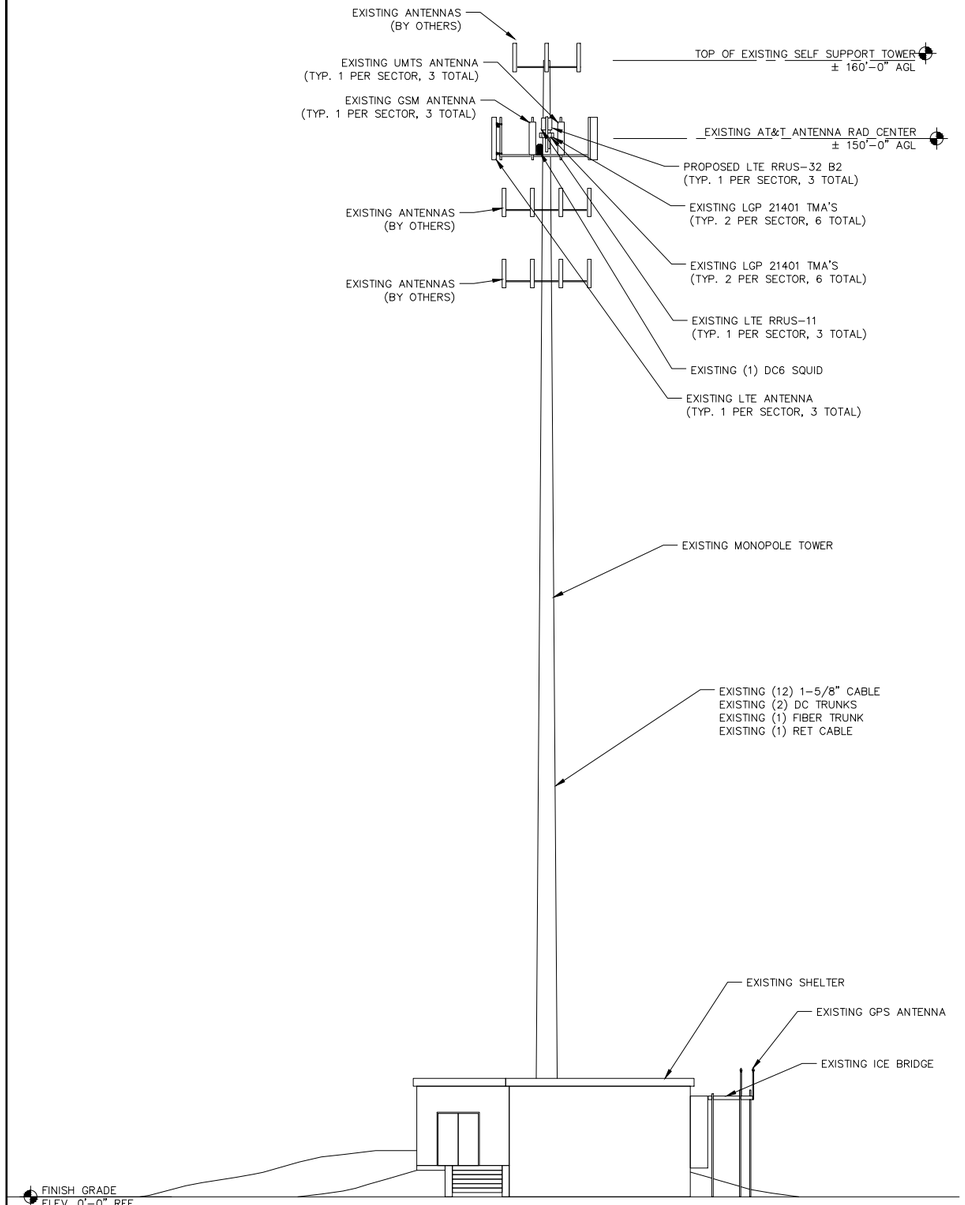


EXISTING TOWER ELEVATION

22"x34" SCALE: 3/32" = 1'-0"
11"x17" SCALE: 3/64" = 1'-0"

8' 4' 0" 8'

1



PROPOSED TOWER ELEVATION

22"x34" SCALE: 3/32" = 1'-0"
11"x17" SCALE: 3/64" = 1'-0"

8' 4' 0" 8'

2

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MESA, AZ 85201-5419

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GREENWICH, CT 06831

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STATE OF CONNECTICUT
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No. 25849
PROFESSIONAL ENGINEER
LICENSED
11-22-2016

MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

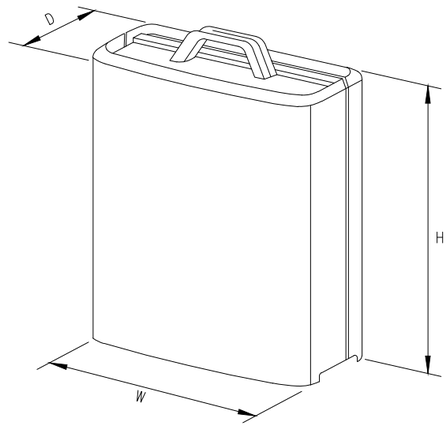
SHEET TITLE:

TOWER ELEVATION

SHEET NUMBER:

A-4

NOT USED | N.T.S | 1



MODEL	L x W x H	WEIGHT
RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
RRUS-12	20.4" x 18.5" x 7.5"	58 LBS
RRUS-32	29.9" x 13.3" x 9.5"	77 LBS
RRUS-32 B2	20.9" x 9.5" x 3.3"	77 LBS
RRUS-E2	20.4" x 18.5" x 7.5"	58 LBS
A2 MODULE	16.4" x 15.2" x 3.4"	22 LBS

RRUS DETAILS | N.T.S | 2

NOT USED | N.T.S | 3

NOT USED | N.T.S | 4

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MESA, AZ 85201-5419

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

PLANS PREPARED BY:
Trylon
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 75038

NO.	DATE	DESCRIPTION	BY
A	11/14/16	FOR REVIEW	DSM
0	11/22/16	ISSUE FOR CONSTRUCTION	DSM

SITE INFORMATION:

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GREENWICH NORTH
FA CODE: 10034990

363 RIVERSVILLE ROAD
GREENWICH, CT 06831

SEAL:

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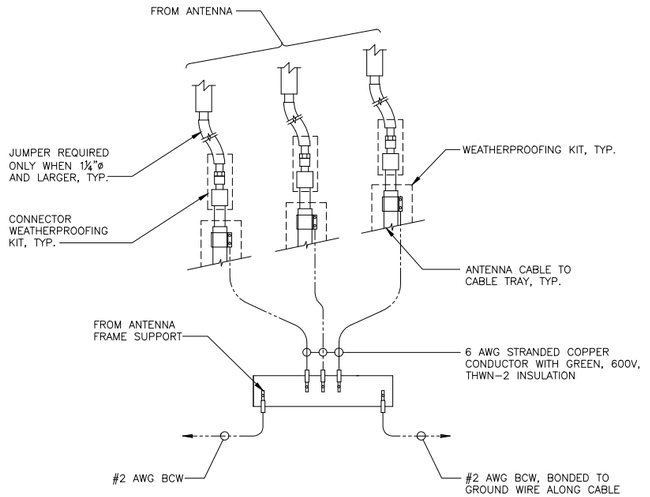
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

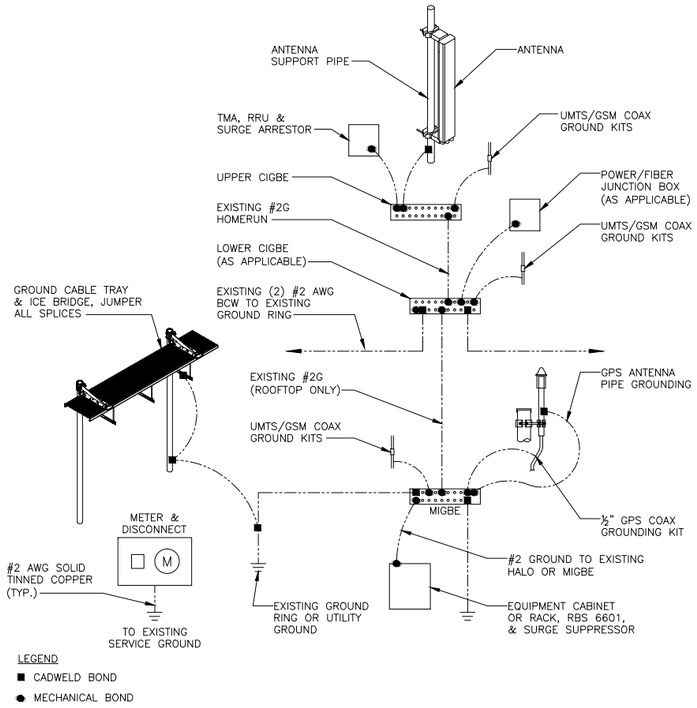
DETAILS

SHEET NUMBER:

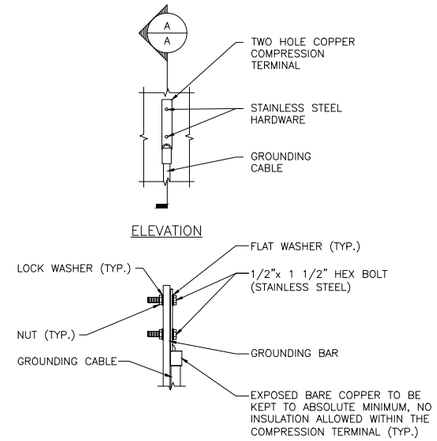
A-5



GROUND WIRE TO GROUND BAR CONNECTION DETAILS | N.T.S | 1



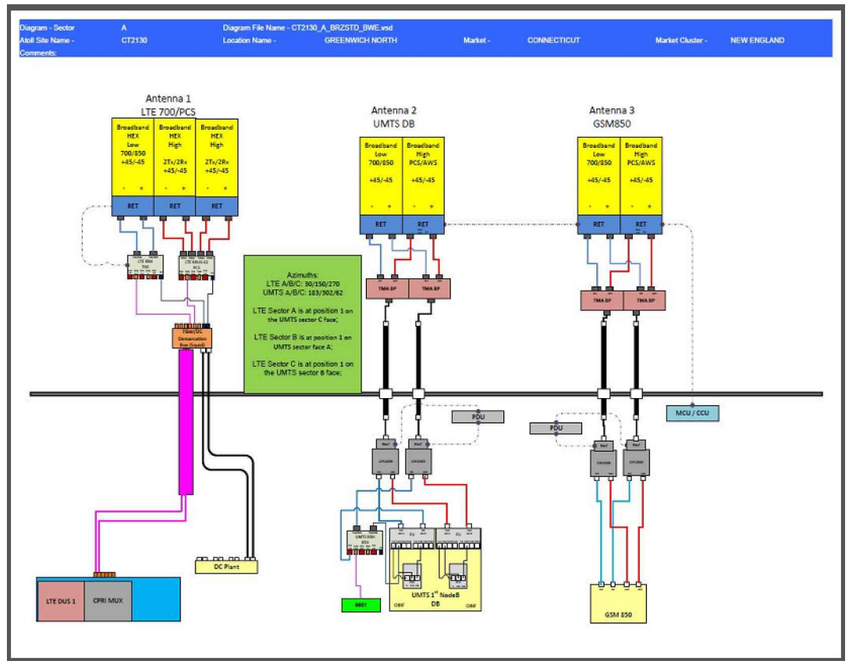
GROUND RISER DIAGRAM | N.T.S | 2



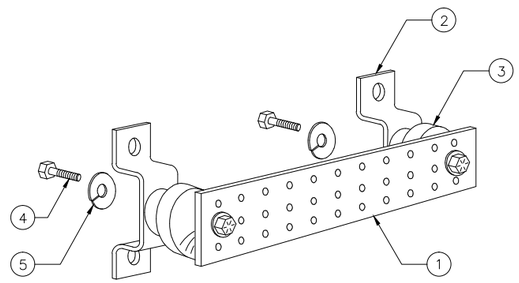
NOTE:

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

TYPICAL GROUND BAR CONNECTION DETAILS | N.T.S | 3



PLUMBING DIAGRAM | N.T.S | 4



ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20"x 4"x ¼")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	⅜"-11x1" H.H.C.S.
5	4	⅜" LOCK WASHER

NOTES:

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

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

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

GROUND BAR DETAILS | N.T.S | 5

at&t Mobility
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EMPIRE telecom
16 ESQUIRE ROAD
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NO.	DATE	DESCRIPTION	BY
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SEAL:

MICHAEL F. PLAHOVINSAK, P.E. #25849
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614-398-6250 / mike@mfpeng.com

SHEET TITLE:

GROUNDING, ONE-LINE DIAGRAM & DETAILS

SHEET NUMBER:

G-1

Date: **November 04, 2016**

CROWN CASTLE

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

Crown Castle
2000 Corporate Dr.
Canonsburg, PA
(724) 416-2000

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT2130
	Carrier Site Name:	Greenwich North
Crown Castle Designation:	**Crown Castle BU Number:**	841290
	Crown Castle Site Name:	GREENWICH NORTH
	Crown Castle JDE Job Number:	401576
	Crown Castle Work Order Number:	1321783
	Crown Castle Application Number:	365454 Rev. 3
Engineering Firm Designation:	**Crown Castle Project Number:**	1321783
Site Data:	**363 RIVERSVILLE ROAD, GREENWICH, Fairfield County, CT** **Latitude *41° 3' 58.6"*, Longitude *-73° 40' 17.4"*** **160 Foot - Monopole Tower**	

Dear Kevin Morrow,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1321783, in accordance with application 365454, revision 3.

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

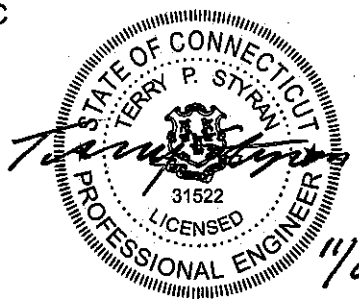
LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

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

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

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

Structural analysis prepared by: Allan R. Smith, E.I.T. / MRC
Respectfully submitted by:



11/07/2014

Terry P. Styran, P.E.
Senior Project Engineer

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7) APPENDIX C
Additional Calculations

1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by Engineered Endeavors, Inc. in April of 2003. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 93 mph with no ice, 50 mph with 0.75-inch ice thickness and 60 mph under service loads, exposure category B with topographic category 1 and crest height of 0 feet.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
149.0	149.0	3	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	2 1	7/8 3/8	-
		3	ericsson	RRUS 11			
		3	ericsson	RRUS 32 B2			
		1	raycap	DC6-48-60-18-8F			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
160.0	163.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	13	1-5/8	1
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	RRUS 11 B12			
		3	rfs celwave	ATMAA1412D-1A20			
	160.0	1	tower mounts	Platform Mount [LP 1201-1]			
153.0	153.0	3	ericsson	TME-RRUS-11	2	3/8	1
		1	raycap	TME-DC6-48-60-18-8F			
		1	tower mounts	Side Arm Mount [SO 102-3]			
149.0	151.0	6	powerwave technologies	7770.00 w/ Mount Pipe	12 2 2	1-5/8 7/8 3/8	1
		12	powerwave technologies	LGP21401			
	149.0	3	powerwave technologies	P65-16-XLH-RR w/ mount pipe	-	-	2
		1	tower mounts	Platform Mount [LP 1201-1]			1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
140.0	142.0	6	amphenol	WWX063X19G00 w/ Mount Pipe	2	1-5/8	3
		1	antel	BXA-70063/8CFx2 w/ Mount Pipe			
		2	decibel	DB844H80E-XY w/ Mount Pipe			
		2	powerwave technologies	P65-16-XL-M w/ Mount Pipe	18	1-5/8	1
		4	rfs celwave	APL868013-42T0 w/ Mount Pipe			
	140.0	3	alcatel lucent	TME-RRH2X60-PCS	-	-	3
		3	alcatel lucent	TME-RRH2x60 AWS			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 1201-1]	-	-	1
120.0	122.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3 2	1-1/4 1/2	1
	120.0	1	tower mounts	Platform Mount [LP 1201-1]			
119.0	119.0	3	alcatel lucent	1900MHz RRH	-	-	1
		3	alcatel lucent	TME-800MHZ RRH			
		1	tower mounts	Side Arm Mount [SO 102-3]			
72.0	73.0	1	gps	GPS_A	1	1/2	1
	72.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Existing Equipment to be Removed; NOT included in this analysis
3) Reserved Equipment

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
160	160	3	-	Panel Antenna	-	-
150	150	12	Allgon	ALP 11011	-	-
140	140	12	Allgon	ALP 11011	-	-
130	130	12	Allgon	ALP 11011	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	WEI Geotechnical Engineers	5121535	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Engineered Endeavors, Inc.	4468638	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Engineered Endeavors, Inc.	5121537	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 152	Pole	TP30.62x29x0.1875	1	-4.71	1135.55	7.5	Pass
L2	152 - 111.29	Pole	TP38.86x30.62x0.25	2	-21.25	1934.28	38.7	Pass
L3	111.29 - 77.42	Pole	TP45.09x37.263x0.3125	3	-29.28	2892.94	50.7	Pass
L4	77.42 - 36.46	Pole	TP52.62x43.2359x0.4375	4	-43.58	5028.09	44.4	Pass
L5	36.46 - 0	Pole	TP59x50.3353x0.5	5	-63.73	6604.55	45.0	Pass
							Summary	
						Pole (L3)	50.7	Pass
						Rating =	50.7	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	33.2	Pass
1	Base Plate	0	58.3	Pass
1	Base Foundation	0	37.2	Pass
1	Base Foundation Soil Interaction	0	35.8	Pass
1	Flange Bolts	152	9.8	Pass
1	Flange Plate	152	12.7	Pass

Structure Rating (max from all components) =	**58.3%**

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

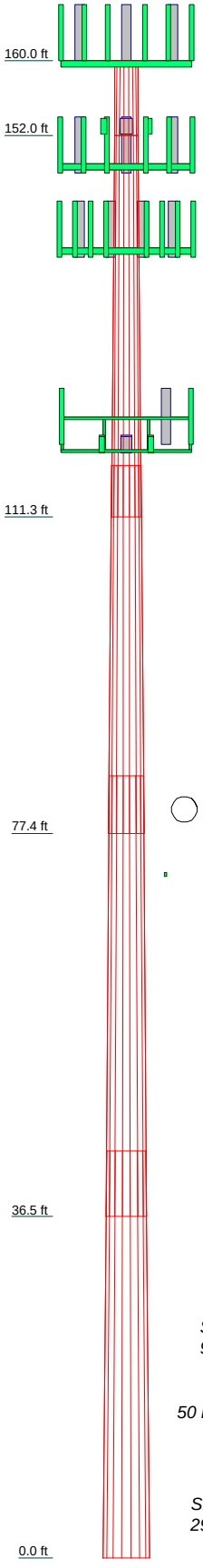
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	8.00	18	0.1875		29.0000	30.6200		0.5
2	40.71	18	0.2500	5.42	30.6200	38.8600		3.8
3	39.29	18	0.3125	6.17	37.2630	45.0900		5.4
4	47.13	18	0.4375	7.08	43.2359	52.6200		10.6
5	43.54	18	0.5000		50.3353	59.0000		12.7
							A572-65	33.0



ALL REACTIONS ARE FACTORED

AXIAL 99 K

SHEAR 9 K *MOMENT 1088 kip-ft*

TORQUE 1 kip-ft
50 mph WIND - 0.7500 in ICE

AXIAL 64 K

SHEAR 29 K *MOMENT 3492 kip-ft*

TORQUE 3 kip-ft
REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Platform Mount [LP 1201-1]	160	RRUS 11	149
Pipe Mount [PM 601-1]	160	RRUS 11	149
Pipe Mount [PM 601-1]	160	RRUS 32 B2	149
Pipe Mount [PM 601-1]	160	RRUS 32 B2	149
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	RRUS 32 B2	149
		DC6-48-60-18-8F	149
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	Platform Mount [LP 1201-1]	140
		(2) APL868013-42T0 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	(2) APL868013-42T0 w/ Mount Pipe	140
		P65-16-XL-M w/ Mount Pipe	140
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	P65-16-XL-M w/ Mount Pipe	140
		(2) WWX063X19G00 w/ Mount Pipe	140
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	(2) WWX063X19G00 w/ Mount Pipe	140
		(2) WWX063X19G00 w/ Mount Pipe	140
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	TME-RRH2X60-PCS	140
		TME-RRH2X60-PCS	140
LNX-6515DS-VTM w/ Mount Pipe	160	TME-RRH2X60-PCS	140
LNX-6515DS-VTM w/ Mount Pipe	160	TME-RRH2x60 AWS	140
LNX-6515DS-VTM w/ Mount Pipe	160	TME-RRH2x60 AWS	140
ATMAA1412D-1A20	160	TME-RRH2x60 AWS	140
ATMAA1412D-1A20	160	BXA-70063/8CFx2 w/ Mount Pipe	140
ATMAA1412D-1A20	160	(2) DB844H80E-XY w/ Mount Pipe	140
RRUS 11 B12	160	DB-T1-6Z-8AB-0Z	140
RRUS 11 B12	160	Miscellaneous [NA 510-1]	122
RRUS 11 B12	160	Platform Mount [LP 1201-1]	120
Side Arm Mount [SO 102-3]	153	(3) Pipe Mount [PM 601-1]	120
TME-RRUS-11	153	(3) Pipe Mount [PM 601-1]	120
TME-RRUS-11	153	(3) Pipe Mount [PM 601-1]	120
TME-RRUS-11	153	APXVSPP18-C-A20 w/ Mount Pipe	120
TME-DC6-48-60-18-8F	153	APXVSPP18-C-A20 w/ Mount Pipe	120
Platform Mount [LP 1201-1]	149	APXVSPP18-C-A20 w/ Mount Pipe	120
(2) 7770.00 w/ Mount Pipe	149	Side Arm Mount [SO 102-3]	119
(2) 7770.00 w/ Mount Pipe	149	1900MHz RRH	119
(2) 7770.00 w/ Mount Pipe	149	1900MHz RRH	119
(4) LGP21401	149	1900MHz RRH	119
(4) LGP21401	149	TME-800MHZ RRH	119
(4) LGP21401	149	TME-800MHZ RRH	119
HPA-65R-BUU-H6 w/ Mount Pipe	149	TME-800MHZ RRH	119
HPA-65R-BUU-H6 w/ Mount Pipe	149	Side Arm Mount [SO 701-1]	72
HPA-65R-BUU-H6 w/ Mount Pipe	149	GPS_A	72
RRUS 11	149		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 50.7%

CROWN CASTLE
The Foundation for a Wireless World

Crown Castle
2000 Corporate Dr.
Canonsburg, PA
Phone: (724) 416-2000
FAX:

Job: ***BU# 841290***			
Project:			
Client: Crown Castle	Drawn by: Allan R. Smith		App'd:
Code: TIA-222-G	Date: 11/04/16		Scale: NTS
Path: X:\ENG Work Area\ASmith\1.0 Production\1.0 WIP\841290 WO 1321783\841290.en			Dwg No. E-1

Tower Input Data

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

4) Tower is located in Fairfield County, Connecticut.
5) Basic wind speed of 93 mph.
6) Structure Class II.
7) Exposure Category B.
8) Topographic Category 1.
9) Crest Height 0.00 ft.
10) Nominal ice thickness of 0.7500 in.
11) Ice thickness is considered to increase with height.
12) Ice density of 56 pcf.
13) A wind speed of 50 mph is used in combination with ice.
14) Temperature drop of 50 °F.
15) Deflections calculated using a wind speed of 60 mph.
16) A non-linear (P-delta) analysis was used.
17) Pressures are calculated at each section.
18) Stress ratio used in pole design is 1.
19) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	160.00-152.00	8.00	0.00	18	29.0000	30.6200	0.1875	0.7500	A572-65 (65 ksi)
L2	152.00-111.29	40.71	5.42	18	30.6200	38.8600	0.2500	1.0000	A572-65 (65 ksi)
L3	111.29-77.42	39.29	6.17	18	37.2630	45.0900	0.3125	1.2500	A572-65 (65 ksi)
L4	77.42-36.46	47.13	7.08	18	43.2359	52.6200	0.4375	1.7500	A572-65 (65 ksi)
L5	36.46-0.00	43.54		18	50.3353	59.0000	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	29.4474	17.1470	1798.4090	10.2284	14.7320	122.0750	3599.1844	8.5751	4.7740	25.461
	31.0924	18.1111	2119.1346	10.8035	15.5550	136.2353	4241.0576	9.0573	5.0591	26.982
L2	31.0924	24.0986	2808.1400	10.7814	15.5550	180.5302	5619.9750	12.0516	4.9491	19.796
	39.4595	30.6370	5770.1059	13.7066	19.7409	292.2922	11547.8043	15.3214	6.3994	25.597
L3	38.9342	36.6502	6321.9884	13.1174	18.9296	333.9740	12652.2955	18.3286	6.0083	19.226
	45.7856	44.4137	11250.5543	15.8960	22.9057	491.1679	22515.9125	22.2111	7.3858	23.635
L4	45.1503	59.4309	13753.2027	15.1934	21.9638	626.1754	27524.5022	29.7211	6.8395	15.633
	53.4317	72.4619	24928.5533	18.5248	26.7310	932.5723	49889.9082	36.2378	8.4911	19.408
L5	52.5425	79.0886	24815.6294	17.6915	25.5703	970.4854	49663.9118	39.5518	7.9790	15.958
	59.9102	92.8395	40140.4258	20.7675	29.9720	1339.2642	80333.6694	46.4286	9.5040	19.008

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 160.00-152.00				1	1	1			
L2 152.00-111.29				1	1	1			
L3 111.29-77.42				1	1	1			
L4 77.42-36.46				1	1	1			
L5 36.46-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
Safety Line 3/8	B	No	CaAa (Out Of Face)	160.00 - 0.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
*								
LDF7-50A(1-5/8")	A	No	Inside Pole	160.00 - 0.00	13	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
*								
LDF2-50(3/8")	A	No	Inside Pole	153.00 - 0.00	2	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
*								
LDF2-50(3/8")	A	No	Inside Pole	149.00 - 0.00	2	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
LDF7-50A(1-5/8")	A	No	Inside Pole	149.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
WR-VG86ST-BRDA(7/8")	C	No	Inside Pole	149.00 - 0.00	2	No Ice	0.00	0.68
						1/2" Ice	0.00	0.68
						1" Ice	0.00	0.68

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
FB-L98B-034-XXX(3/8)	C	No	Inside Pole	149.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRDA(7/8")	C	No	Inside Pole	149.00 - 0.00	2	No Ice	0.00	0.68
						1/2" Ice	0.00	0.68
						1" Ice	0.00	0.68
2" Flex Conduit	A	No	Inside Pole	149.00 - 0.00	1	No Ice	0.00	0.36
						1/2" Ice	0.00	0.36
						1" Ice	0.00	0.36
*								
LDF7-50A(1-5/8")	A	No	Inside Pole	140.00 - 0.00	18	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
HB158-1-08U8-S8J18(1-5/8)	A	No	Inside Pole	140.00 - 0.00	2	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
*								
LDF4-50A(1/2")	C	No	Inside Pole	120.00 - 0.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
HB114-1-05U3-S3J(1 1/4)	C	No	Inside Pole	120.00 - 0.00	3	No Ice	0.00	0.90
						1/2" Ice	0.00	0.90
						1" Ice	0.00	0.90
*								
LDF4-50A(1/2")	C	No	Inside Pole	72.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.00-152.00	A	0.000	0.000	0.000	0.000	0.09
		B	0.000	0.000	0.000	0.300	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	152.00-111.29	A	0.000	0.000	0.000	0.000	1.33
		B	0.000	0.000	0.000	1.527	0.01
		C	0.000	0.000	0.000	0.000	0.13
L3	111.29-77.42	A	0.000	0.000	0.000	0.000	1.31
		B	0.000	0.000	0.000	1.270	0.01
		C	0.000	0.000	0.000	0.000	0.20
L4	77.42-36.46	A	0.000	0.000	0.000	0.000	1.58
		B	0.000	0.000	0.000	1.536	0.01
		C	0.000	0.000	0.000	0.000	0.24
L5	36.46-0.00	A	0.000	0.000	0.000	0.000	1.41
		B	0.000	0.000	0.000	1.367	0.01
		C	0.000	0.000	0.000	0.000	0.22

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.00-152.00	A	1.752	0.000	0.000	0.000	0.000	0.09
		B		0.000	0.000	0.000	3.103	0.02
		C		0.000	0.000	0.000	0.000	0.00
L2	152.00-111.29	A	1.722	0.000	0.000	0.000	0.000	1.33
		B		0.000	0.000	0.000	15.546	0.08
		C		0.000	0.000	0.000	0.000	0.13
L3	111.29-77.42	A	1.666	0.000	0.000	0.000	0.000	1.31
		B		0.000	0.000	0.000	12.934	0.07
		C		0.000	0.000	0.000	0.000	0.20

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L4	77.42-36.46	A	1.584	0.000	0.000	0.000	0.000	1.58
		B		0.000	0.000	0.000	15.182	0.08
		C		0.000	0.000	0.000	0.000	0.24
L5	36.46-0.00	A	1.410	0.000	0.000	0.000	0.000	1.41
		B		0.000	0.000	0.000	12.918	0.07
		C		0.000	0.000	0.000	0.000	0.22

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.00-152.00	0.0473	0.0273	0.3909	0.2257
L2	152.00-111.29	0.0474	0.0273	0.3980	0.2298
L3	111.29-77.42	0.0475	0.0274	0.4107	0.2371
L4	77.42-36.46	0.0475	0.0274	0.4095	0.2364
L5	36.46-0.00	0.0476	0.0275	0.4004	0.2312

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Platform Mount [LP 1201-1]	C	None		0.0000	160.00	No Ice	23.10	23.10	2.10
						1/2" Ice	26.80	26.80	2.50
						1" Ice	30.50	30.50	2.90
Pipe Mount [PM 601-1]	A	From Leg	4.00 0.00 2.00	0.0000	160.00	No Ice	3.00	0.90	0.07
						1/2" Ice	3.74	1.12	0.08
						1" Ice	4.48	1.34	0.09
Pipe Mount [PM 601-1]	B	From Leg	4.00 0.00 2.00	0.0000	160.00	No Ice	3.00	0.90	0.07
						1/2" Ice	3.74	1.12	0.08
						1" Ice	4.48	1.34	0.09
Pipe Mount [PM 601-1]	C	From Leg	4.00 0.00 2.00	0.0000	160.00	No Ice	3.00	0.90	0.07
						1/2" Ice	3.74	1.12	0.08
						1" Ice	4.48	1.34	0.09
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	0.0000	160.00	No Ice	6.33	5.64	0.11
						1/2" Ice	6.78	6.43	0.17
						1" Ice	7.21	7.13	0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.00 3.00	0.0000	160.00	No Ice	6.33	5.64	0.11
						1/2" Ice	6.78	6.43	0.17
						1" Ice	7.21	7.13	0.23
ERICSSON AIR 21 B2A	C	From Leg	4.00	0.0000	160.00	No Ice	6.33	5.64	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
B4P w/ Mount Pipe			0.00 3.00			1/2" Ice 1" Ice	6.78 7.21	6.43 7.13	0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 0.00 3.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0.00 3.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 3.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 3.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
ATMAA1412D-1A20	A	From Leg	4.00 0.00 3.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	0.41 0.50 0.59	1.00 1.13 1.26	0.01 0.02 0.03
ATMAA1412D-1A20	B	From Leg	4.00 0.00 3.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	0.41 0.50 0.59	1.00 1.13 1.26	0.01 0.02 0.03
ATMAA1412D-1A20	C	From Leg	4.00 0.00 3.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	0.41 0.50 0.59	1.00 1.13 1.26	0.01 0.02 0.03
RRUS 11 B12	A	From Leg	4.00 0.00 3.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS 11 B12	B	From Leg	4.00 0.00 3.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS 11 B12	C	From Leg	4.00 0.00 3.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
***									
Side Arm Mount [SO 102-3]	C	None		0.0000	153.00	No Ice 1/2" Ice 1" Ice	3.00 3.48 3.96	3.00 3.48 3.96	0.08 0.11 0.14
TME-RRUS-11	A	From Leg	1.50 0.00 0.00	0.0000	153.00	No Ice 1/2" Ice 1" Ice	2.96 3.23 3.50	1.67 1.98 2.30	0.06 0.08 0.12
TME-RRUS-11	B	From Leg	1.50 0.00 0.00	0.0000	153.00	No Ice 1/2" Ice 1" Ice	2.96 3.23 3.50	1.67 1.98 2.30	0.06 0.08 0.12
TME-RRUS-11	C	From Leg	1.50	0.0000	153.00	No Ice	2.96	1.67	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice 1" Ice	3.23 3.50	1.98 2.30	0.08 0.12
TME-DC6-48-60-18-8F	A	From Leg	1.50 0.00 0.00	0.0000	153.00	No Ice 1/2" Ice 1" Ice	1.47 1.67 1.88	1.47 1.67 1.88	0.02 0.04 0.06
***									
Platform Mount [LP 1201-1]	C	None		0.0000	149.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
(4) LGP21401	A	From Leg	4.00 0.00 2.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.21 0.27 0.35	0.01 0.02 0.03
(4) LGP21401	B	From Leg	4.00 0.00 2.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.21 0.27 0.35	0.01 0.02 0.03
(4) LGP21401	C	From Leg	4.00 0.00 2.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.21 0.27 0.35	0.01 0.02 0.03
HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	9.90 10.47 11.01	8.11 9.30 10.21	0.08 0.16 0.25
HPA-65R-BUU-H6 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	9.90 10.47 11.01	8.11 9.30 10.21	0.08 0.16 0.25
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	9.90 10.47 11.01	8.11 9.30 10.21	0.08 0.16 0.25
RRUS 11	A	From Leg	4.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.09
RRUS 11	B	From Leg	4.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.09
RRUS 11	C	From Leg	4.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.09
RRUS 32 B2	A	From Leg	4.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	2.73 2.95 3.18	1.67 1.86 2.05	0.05 0.07 0.10
RRUS 32 B2	B	From Leg	4.00	0.0000	149.00	No Ice	2.73	1.67	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	2.95	1.86	0.07
			0.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	C	From Leg	4.00	0.0000	149.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			0.00			Ice	3.18	2.05	0.10
						1" Ice			
DC6-48-60-18-8F	A	From Leg	4.00	0.0000	149.00	No Ice	0.79	0.79	0.02
			0.00			1/2"	1.27	1.27	0.04
			0.00			Ice	1.45	1.45	0.05
						1" Ice			
***									
Platform Mount [LP 1201-1]	C	None		0.0000	140.00	No Ice	23.10	23.10	2.10
						1/2"	26.80	26.80	2.50
						Ice	30.50	30.50	2.90
						1" Ice			
(2) APL868013-42T0 w/ Mount Pipe	A	From Leg	4.00	0.0000	140.00	No Ice	3.10	4.80	0.02
			0.00			1/2"	3.48	5.42	0.06
			2.00			Ice	3.85	6.04	0.11
						1" Ice			
(2) APL868013-42T0 w/ Mount Pipe	B	From Leg	4.00	0.0000	140.00	No Ice	3.10	4.80	0.02
			0.00			1/2"	3.48	5.42	0.06
			2.00			Ice	3.85	6.04	0.11
						1" Ice			
P65-16-XL-M w/ Mount Pipe	A	From Leg	4.00	0.0000	140.00	No Ice	8.37	6.36	0.07
			0.00			1/2"	8.93	7.54	0.14
			2.00			Ice	9.46	8.43	0.21
						1" Ice			
P65-16-XL-M w/ Mount Pipe	C	From Leg	4.00	0.0000	140.00	No Ice	8.37	6.36	0.07
			0.00			1/2"	8.93	7.54	0.14
			2.00			Ice	9.46	8.43	0.21
						1" Ice			
(2) WWX063X19G00 w/ Mount Pipe	A	From Leg	4.00	0.0000	140.00	No Ice	8.84	7.28	0.06
			0.00			1/2"	9.41	8.50	0.13
			2.00			Ice	9.96	9.47	0.21
						1" Ice			
(2) WWX063X19G00 w/ Mount Pipe	B	From Leg	4.00	0.0000	140.00	No Ice	8.84	7.28	0.06
			0.00			1/2"	9.41	8.50	0.13
			2.00			Ice	9.96	9.47	0.21
						1" Ice			
(2) WWX063X19G00 w/ Mount Pipe	C	From Leg	4.00	0.0000	140.00	No Ice	8.84	7.28	0.06
			0.00			1/2"	9.41	8.50	0.13
			2.00			Ice	9.96	9.47	0.21
						1" Ice			
TME-RRH2X60-PCS	A	From Leg	4.00	0.0000	140.00	No Ice	2.57	2.01	0.06
			0.00			1/2"	2.79	2.22	0.08
			0.00			Ice	3.02	2.43	0.10
						1" Ice			
TME-RRH2X60-PCS	B	From Leg	4.00	0.0000	140.00	No Ice	2.57	2.01	0.06
			0.00			1/2"	2.79	2.22	0.08
			0.00			Ice	3.02	2.43	0.10
						1" Ice			
TME-RRH2X60-PCS	C	From Leg	4.00	0.0000	140.00	No Ice	2.57	2.01	0.06
			0.00			1/2"	2.79	2.22	0.08
			0.00			Ice	3.02	2.43	0.10
						1" Ice			
TME-RRH2x60 AWS	A	From Leg	4.00	0.0000	140.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			0.00			Ice	4.03	2.29	0.11
						1" Ice			
TME-RRH2x60 AWS	B	From Leg	4.00	0.0000	140.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			0.00			Ice	4.03	2.29	0.11
						1" Ice			
TME-RRH2x60 AWS	C	From Leg	4.00	0.0000	140.00	No Ice	3.50	1.82	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice 1" Ice	3.76 4.03	2.05 2.29	0.08 0.11
BXA-70063/8CFx2 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	10.89 11.60 12.32	7.63 9.11 10.61	0.06 0.13 0.22
(2) DB844H80E-XY w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	3.30 3.67 4.03	4.80 5.42 6.04	0.03 0.07 0.12
DB-T1-6Z-8AB-0Z	A	From Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.00 2.19 2.39	0.04 0.08 0.12
***									
Miscellaneous [NA 510-1]	C	None		0.0000	122.00	No Ice 1/2" Ice 1" Ice	6.00 8.50 11.00	6.00 8.50 11.00	0.26 0.34 0.42
Platform Mount [LP 1201-1]	C	None		0.0000	120.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
(3) Pipe Mount [PM 601-1]	A	From Leg	4.00 0.00 2.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	3.00 3.74 4.48	0.90 1.12 1.34	0.07 0.08 0.09
(3) Pipe Mount [PM 601-1]	B	From Leg	4.00 0.00 2.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	3.00 3.74 4.48	0.90 1.12 1.34	0.07 0.08 0.09
(3) Pipe Mount [PM 601-1]	C	From Leg	4.00 0.00 2.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	3.00 3.74 4.48	0.90 1.12 1.34	0.07 0.08 0.09
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 4.25 2.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 -4.25 2.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 4.25 2.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
**									
Side Arm Mount [SO 102-3]	C	None		0.0000	119.00	No Ice 1/2" Ice 1" Ice	3.00 3.48 3.96	3.00 3.48 3.96	0.08 0.11 0.14
1900MHz RRH	A	From Leg	1.50 0.00 0.00	0.0000	119.00	No Ice 1/2" Ice 1" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
1900MHz RRH	B	From Leg	1.50 0.00 0.00	0.0000	119.00	No Ice 1/2" Ice 1" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
1900MHz RRH	C	From Leg	1.50 0.00 0.00	0.0000	119.00	No Ice 1/2" Ice 1" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
TME-800MHZ RRH	A	From Leg	1.50 0.00 0.00	0.0000	119.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
TME-800MHZ RRH	B	From Leg	1.50 0.00 0.00	0.0000	119.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
TME-800MHZ RRH	C	From Leg	1.50 0.00 0.00	0.0000	119.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
**									
Side Arm Mount [SO 701-1]	B	None		0.0000	72.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
GPS_A	B	From Leg	3.00 0.00 1.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	0.26 0.32 0.39	0.26 0.32 0.39	0.00 0.00 0.01
* * * *									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	99.09	0.00	9.18
	Max. H_x	21	47.81	28.98	0.01
	Max. H_z	2	63.74	0.01	29.07
	Max. M_x	2	3492.34	0.01	29.07
	Max. M_z	8	3479.04	-28.98	-0.01
	Max. Torsion	11	2.83	-25.10	-14.54
	Min. Vert	19	47.81	25.09	-14.52
	Min. H_x	9	47.81	-28.98	-0.01
	Min. H_z	14	63.74	-0.01	-29.07
	Min. M_x	14	-3490.02	-0.01	-29.07
	Min. M_z	20	-3478.38	28.98	0.01
	Min. Torsion	23	-2.83	25.10	14.54

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	53.12	0.00	0.00	-0.90	-0.26	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	63.74	-0.01	-29.07	-3492.34	1.47	1.62
0.9 Dead+1.6 Wind 0 deg - No Ice	47.81	-0.01	-29.07	-3457.66	1.54	1.62
1.2 Dead+1.6 Wind 30 deg - No Ice	63.74	14.48	-25.17	-3023.73	-1738.12	0.24
0.9 Dead+1.6 Wind 30 deg - No Ice	47.81	14.48	-25.17	-2993.66	-1720.93	0.24
1.2 Dead+1.6 Wind 60 deg - No Ice	63.74	25.09	-14.52	-1745.21	-3012.08	-1.20
0.9 Dead+1.6 Wind 60 deg - No Ice	47.81	25.09	-14.52	-1727.73	-2982.34	-1.21
1.2 Dead+1.6 Wind 90 deg - No Ice	63.74	28.98	0.01	0.64	-3479.04	-2.33
0.9 Dead+1.6 Wind 90 deg - No Ice	47.81	28.98	0.01	0.93	-3444.69	-2.33
1.2 Dead+1.6 Wind 120 deg	63.74	25.10	14.54	1746.01	-3013.86	-2.83

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
- No Ice 0.9 Dead+1.6 Wind 120 deg - No Ice	47.81	25.10	14.54	1729.10	-2984.11	-2.83
1.2 Dead+1.6 Wind 150 deg - No Ice	63.74	14.50	25.18	3023.21	-1741.22	-2.57
0.9 Dead+1.6 Wind 150 deg - No Ice	47.81	14.50	25.18	2993.73	-1723.99	-2.57
1.2 Dead+1.6 Wind 180 deg - No Ice	63.74	0.01	29.07	3490.02	-2.12	-1.62
0.9 Dead+1.6 Wind 180 deg - No Ice	47.81	0.01	29.07	3455.96	-2.01	-1.62
1.2 Dead+1.6 Wind 210 deg - No Ice	63.74	-14.48	25.17	3021.41	1737.47	-0.24
0.9 Dead+1.6 Wind 210 deg - No Ice	47.81	-14.48	25.17	2991.95	1720.44	-0.24
1.2 Dead+1.6 Wind 240 deg - No Ice	63.74	-25.09	14.52	1742.90	3011.42	1.20
0.9 Dead+1.6 Wind 240 deg - No Ice	47.81	-25.09	14.52	1726.03	2981.85	1.20
1.2 Dead+1.6 Wind 270 deg - No Ice	63.74	-28.98	-0.01	-2.94	3478.38	2.33
0.9 Dead+1.6 Wind 270 deg - No Ice	47.81	-28.98	-0.01	-2.62	3444.21	2.33
1.2 Dead+1.6 Wind 300 deg - No Ice	63.74	-25.10	-14.54	-1748.30	3013.22	2.83
0.9 Dead+1.6 Wind 300 deg - No Ice	47.81	-25.10	-14.54	-1730.79	2983.63	2.83
1.2 Dead+1.6 Wind 330 deg - No Ice	63.74	-14.50	-25.18	-3025.51	1740.58	2.57
0.9 Dead+1.6 Wind 330 deg - No Ice	47.81	-14.50	-25.18	-2995.43	1723.52	2.57
1.2 Dead+1.0 Ice+1.0 Temp	99.09	0.00	-0.00	-4.39	-2.35	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	99.09	-0.00	-9.18	-1088.09	-2.40	0.88
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	99.09	4.58	-7.95	-942.90	-542.66	0.63
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	99.09	7.93	-4.59	-546.29	-938.18	0.22
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	99.09	9.16	0.00	-4.55	-1082.98	-0.26
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	99.09	7.93	4.59	537.18	-938.25	-0.66
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	99.09	4.58	7.95	933.74	-542.78	-0.89
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	99.09	0.00	9.18	1078.86	-2.53	-0.88
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	99.09	-4.58	7.95	933.67	537.73	-0.63
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	99.09	-7.93	4.59	537.06	933.25	-0.22
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	99.09	-9.16	-0.00	-4.68	1078.05	0.26
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	99.09	-7.93	-4.59	-546.41	933.32	0.66
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	99.09	-4.58	-7.95	-942.96	537.85	0.89
Dead+Wind 0 deg - Service	53.12	-0.00	-6.77	-808.69	0.14	0.31
Dead+Wind 30 deg - Service	53.12	3.37	-5.86	-700.27	-402.33	-0.03
Dead+Wind 60 deg - Service	53.12	5.84	-3.38	-404.46	-697.08	-0.35
Dead+Wind 90 deg - Service	53.12	6.75	0.00	-0.54	-805.11	-0.59
Dead+Wind 120 deg - Service	53.12	5.84	3.39	403.27	-697.49	-0.66
Dead+Wind 150 deg - Service	53.12	3.38	5.86	698.76	-403.05	-0.56
Dead+Wind 180 deg - Service	53.12	0.00	6.77	806.77	-0.69	-0.31
Dead+Wind 210 deg - Service	53.12	-3.37	5.86	698.35	401.79	0.03
Dead+Wind 240 deg -	53.12	-5.84	3.38	402.55	696.53	0.35

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Service						
Dead+Wind 270 deg - Service	53.12	-6.75	-0.00	-1.37	804.57	0.59
Dead+Wind 300 deg - Service	53.12	-5.84	-3.39	-405.18	696.95	0.66
Dead+Wind 330 deg - Service	53.12	-3.38	-5.86	-700.68	402.51	0.56

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-53.12	0.00	0.00	53.12	0.00	0.000%
2	-0.01	-63.74	-29.07	0.01	63.74	29.07	0.000%
3	-0.01	-47.81	-29.07	0.01	47.81	29.07	0.000%
4	14.48	-63.74	-25.17	-14.48	63.74	25.17	0.000%
5	14.48	-47.81	-25.17	-14.48	47.81	25.17	0.000%
6	25.09	-63.74	-14.52	-25.09	63.74	14.52	0.000%
7	25.09	-47.81	-14.52	-25.09	47.81	14.52	0.000%
8	28.98	-63.74	0.01	-28.98	63.74	-0.01	0.000%
9	28.98	-47.81	0.01	-28.98	47.81	-0.01	0.000%
10	25.10	-63.74	14.54	-25.10	63.74	-14.54	0.000%
11	25.10	-47.81	14.54	-25.10	47.81	-14.54	0.000%
12	14.50	-63.74	25.18	-14.50	63.74	-25.18	0.000%
13	14.50	-47.81	25.18	-14.50	47.81	-25.18	0.000%
14	0.01	-63.74	29.07	-0.01	63.74	-29.07	0.000%
15	0.01	-47.81	29.07	-0.01	47.81	-29.07	0.000%
16	-14.48	-63.74	25.17	14.48	63.74	-25.17	0.000%
17	-14.48	-47.81	25.17	14.48	47.81	-25.17	0.000%
18	-25.09	-63.74	14.52	25.09	63.74	-14.52	0.000%
19	-25.09	-47.81	14.52	25.09	47.81	-14.52	0.000%
20	-28.98	-63.74	-0.01	28.98	63.74	0.01	0.000%
21	-28.98	-47.81	-0.01	28.98	47.81	0.01	0.000%
22	-25.10	-63.74	-14.54	25.10	63.74	14.54	0.000%
23	-25.10	-47.81	-14.54	25.10	47.81	14.54	0.000%
24	-14.50	-63.74	-25.18	14.50	63.74	25.18	0.000%
25	-14.50	-47.81	-25.18	14.50	47.81	25.18	0.000%
26	0.00	-99.09	0.00	-0.00	99.09	0.00	0.000%
27	-0.00	-99.09	-9.18	0.00	99.09	9.18	0.000%
28	4.58	-99.09	-7.95	-4.58	99.09	7.95	0.000%
29	7.93	-99.09	-4.59	-7.93	99.09	4.59	0.000%
30	9.16	-99.09	0.00	-9.16	99.09	-0.00	0.000%
31	7.93	-99.09	4.59	-7.93	99.09	-4.59	0.000%
32	4.58	-99.09	7.95	-4.58	99.09	-7.95	0.000%
33	0.00	-99.09	9.18	-0.00	99.09	-9.18	0.000%
34	-4.58	-99.09	7.95	4.58	99.09	-7.95	0.000%
35	-7.93	-99.09	4.59	7.93	99.09	-4.59	0.000%
36	-9.16	-99.09	-0.00	9.16	99.09	0.00	0.000%
37	-7.93	-99.09	-4.59	7.93	99.09	4.59	0.000%
38	-4.58	-99.09	-7.95	4.58	99.09	7.95	0.000%
39	-0.00	-53.12	-6.77	0.00	53.12	6.77	0.000%
40	3.37	-53.12	-5.86	-3.37	53.12	5.86	0.000%
41	5.84	-53.12	-3.38	-5.84	53.12	3.38	0.000%
42	6.75	-53.12	0.00	-6.75	53.12	-0.00	0.000%
43	5.84	-53.12	3.39	-5.84	53.12	-3.39	0.000%
44	3.38	-53.12	5.86	-3.38	53.12	-5.86	0.000%
45	0.00	-53.12	6.77	-0.00	53.12	-6.77	0.000%
46	-3.37	-53.12	5.86	3.37	53.12	-5.86	0.000%
47	-5.84	-53.12	3.38	5.84	53.12	-3.38	0.000%
48	-6.75	-53.12	-0.00	6.75	53.12	0.00	0.000%
49	-5.84	-53.12	-3.39	5.84	53.12	3.39	0.000%
50	-3.38	-53.12	-5.86	3.38	53.12	5.86	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00071134
3	Yes	4	0.00000001	0.00046958
4	Yes	5	0.00000001	0.00062160
5	Yes	5	0.00000001	0.00029954
6	Yes	5	0.00000001	0.00063798
7	Yes	5	0.00000001	0.00030811
8	Yes	5	0.00000001	0.00005625
9	Yes	4	0.00000001	0.00080449
10	Yes	5	0.00000001	0.00059089
11	Yes	5	0.00000001	0.00028412
12	Yes	5	0.00000001	0.00065235
13	Yes	5	0.00000001	0.00031560
14	Yes	4	0.00000001	0.00074163
15	Yes	4	0.00000001	0.00049048
16	Yes	5	0.00000001	0.00061942
17	Yes	5	0.00000001	0.00029880
18	Yes	5	0.00000001	0.00060300
19	Yes	5	0.00000001	0.00029045
20	Yes	5	0.00000001	0.00005777
21	Yes	4	0.00000001	0.00082605
22	Yes	5	0.00000001	0.00065777
23	Yes	5	0.00000001	0.00031828
24	Yes	5	0.00000001	0.00059633
25	Yes	5	0.00000001	0.00028656
26	Yes	4	0.00000001	0.00003139
27	Yes	5	0.00000001	0.00034487
28	Yes	5	0.00000001	0.00041817
29	Yes	5	0.00000001	0.00041646
30	Yes	5	0.00000001	0.00034181
31	Yes	5	0.00000001	0.00040689
32	Yes	5	0.00000001	0.00041267
33	Yes	5	0.00000001	0.00033872
34	Yes	5	0.00000001	0.00040491
35	Yes	5	0.00000001	0.00040536
36	Yes	5	0.00000001	0.00033916
37	Yes	5	0.00000001	0.00041616
38	Yes	5	0.00000001	0.00041145
39	Yes	4	0.00000001	0.00005622
40	Yes	4	0.00000001	0.00020075
41	Yes	4	0.00000001	0.00022333
42	Yes	4	0.00000001	0.00008137
43	Yes	4	0.00000001	0.00018269
44	Yes	4	0.00000001	0.00023424
45	Yes	4	0.00000001	0.00005637
46	Yes	4	0.00000001	0.00020277
47	Yes	4	0.00000001	0.00018645
48	Yes	4	0.00000001	0.00008162
49	Yes	4	0.00000001	0.00024336
50	Yes	4	0.00000001	0.00018545

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 152	15.713	39	0.8579	0.0022
L2	152 - 111.29	14.281	39	0.8500	0.0022
L3	116.71 - 77.42	8.408	39	0.7034	0.0017
L4	83.59 - 36.46	4.221	39	0.4785	0.0008
L5	43.54 - 0	1.150	39	0.2372	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Platform Mount [LP 1201-1]	39	15.713	0.8579	0.0022	59701
153.00	Side Arm Mount [SO 102-3]	39	14.459	0.8514	0.0022	43262
149.00	Platform Mount [LP 1201-1]	39	13.748	0.8447	0.0022	29347
140.00	Platform Mount [LP 1201-1]	39	12.174	0.8196	0.0021	17876
122.00	Miscellaneous [NA 510-1]	39	9.212	0.7349	0.0018	10038
120.00	Platform Mount [LP 1201-1]	39	8.904	0.7233	0.0018	9580
119.00	Side Arm Mount [SO 102-3]	39	8.752	0.7174	0.0018	9384
72.00	Side Arm Mount [SO 701-1]	39	3.102	0.4036	0.0006	8739

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 152	67.870	2	3.7058	0.0096
L2	152 - 111.29	61.687	2	3.6718	0.0095
L3	116.71 - 77.42	36.329	2	3.0396	0.0073
L4	83.59 - 36.46	18.239	2	2.0684	0.0035
L5	43.54 - 0	4.967	2	1.0252	0.0013

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Platform Mount [LP 1201-1]	2	67.870	3.7058	0.0096	13970
153.00	Side Arm Mount [SO 102-3]	2	62.457	3.6779	0.0095	10122
149.00	Platform Mount [LP 1201-1]	2	59.387	3.6491	0.0095	6866
140.00	Platform Mount [LP 1201-1]	2	52.594	3.5406	0.0092	4175
122.00	Miscellaneous [NA 510-1]	2	39.803	3.1756	0.0079	2341
120.00	Platform Mount [LP 1201-1]	2	38.472	3.1254	0.0077	2233
119.00	Side Arm Mount [SO 102-3]	2	37.814	3.0997	0.0076	2187
72.00	Side Arm Mount [SO 701-1]	2	13.404	1.7447	0.0025	2025

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	160 - 152 (1)	TP30.62x29x0.1875	8.00	0.00	0.0	18.1111	-4.71	1135.55	0.004
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	40.71	0.00	0.0	29.7665	-21.25	1934.28	0.011
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.3125	39.29	0.00	0.0	43.1945	-29.28	2892.94	0.010
L4	77.42 - 36.46 (4)	TP52.62x43.2359x0.4375	47.13	0.00	0.0	70.5044	-43.58	5028.09	0.009
L5	36.46 - 0 (5)	TP59x50.3353x0.5	43.54	0.00	0.0	92.839	-63.73	6604.55	0.010

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
						5			

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	160 - 152 (1)	TP30.62x29x0.1875	50.40	711.82	0.071	0.00	711.82	0.000
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	561.23	1493.86	0.376	0.00	1493.86	0.000
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.3125	1286.73	2592.38	0.496	0.00	2592.38	0.000
L4	77.42 - 36.46 (4)	TP52.62x43.2359x0.4375	2282.48	5245.66	0.435	0.00	5245.66	0.000
L5	36.46 - 0 (5)	TP59x50.3353x0.5	3492.34	7939.54	0.440	0.00	7939.54	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	160 - 152 (1)	TP30.62x29x0.1875	5.71	567.77	0.010	0.01	1425.37	0.000
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	20.54	961.58	0.021	1.36	2991.37	0.000
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.3125	23.21	1446.47	0.016	1.42	5191.10	0.000
L4	77.42 - 36.46 (4)	TP52.62x43.2359x0.4375	26.36	2514.05	0.010	1.54	10504.17	0.000
L5	36.46 - 0 (5)	TP59x50.3353x0.5	29.09	3302.27	0.009	1.62	15898.50	0.000

Pole Interaction Design Data

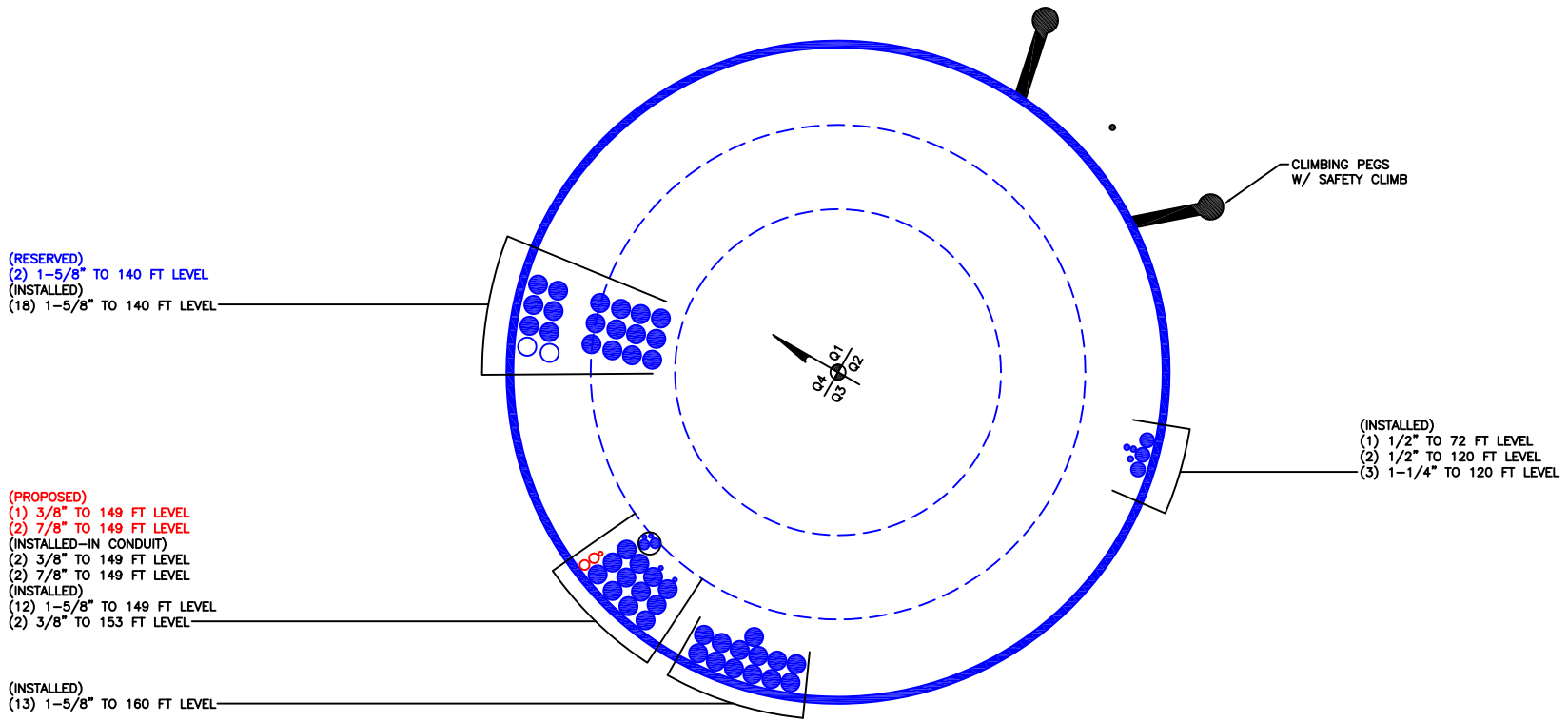
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 152 (1)	0.004	0.071	0.000	0.010	0.000	0.075 ✔	1.000	4.8.2 ✔
L2	152 - 111.29 (2)	0.011	0.376	0.000	0.021	0.000	0.387 ✔	1.000	4.8.2 ✔
L3	111.29 - 77.42 (3)	0.010	0.496	0.000	0.016	0.000	0.507 ✔	1.000	4.8.2 ✔
L4	77.42 - 36.46 (4)	0.009	0.435	0.000	0.010	0.000	0.444 ✔	1.000	4.8.2 ✔
L5	36.46 - 0 (5)	0.010	0.440	0.000	0.009	0.000	0.450 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	160 - 152	Pole	TP30.62x29x0.1875	1	-4.71	1135.55	7.5	Pass
L2	152 - 111.29	Pole	TP38.86x30.62x0.25	2	-21.25	1934.28	38.7	Pass
L3	111.29 - 77.42	Pole	TP45.09x37.263x0.3125	3	-29.28	2892.94	50.7	Pass
L4	77.42 - 36.46	Pole	TP52.62x43.2359x0.4375	4	-43.58	5028.09	44.4	Pass
L5	36.46 - 0	Pole	TP59x50.3353x0.5	5	-63.73	6604.55	45.0	Pass
							Summary	
						Pole (L3)	50.7	Pass
						RATING =	**50.7**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 841290 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

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

Site Data

BU#: *841290*
Site Name: *Greenwich North*
App #: *365454 Rev. 3*

Manufacturer:	Other

Reactions		
Moment:	50.40	ft-kips
Axial:	4.71	kips
Shear:	5.71	kips
Exterior Flange Run, T+q:	5.37	kips

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

Elevation: 152 feet

Bolt Data			
Qty:	12		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	35	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	5.4	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty	54.5	Kips
Bolt Stress Ratio:	9.8%	**Pass**

Plate Data		
Plate Outer Diam:	30.12	in
Plate Inner Diam:	28	in (Hole @ Ctr)
Thick:	1	in
Grade:	60	ksi
Effective Width:	-8.76	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	6.2	Kips, Ext. Cu=Interior Cu
Plate Stress:	6.9	ksi
Allowable Plate Stress, φ*Fy:	54.0	ksi
Plate Stress Ratio:	12.7%	**Pass**

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

n/a

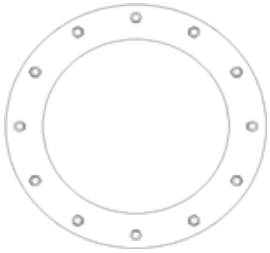
Stiffener Results

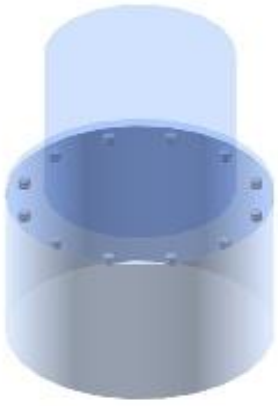
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Pole OuterDiam:	30.62	in
Thick:	0.25	in
Pole Inner Diam:	30.12	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi





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

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

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

Site Data

BU#: *841290*
Site Name: *Greenwich North*
App #: *365454 Rev. 3*

Reactions		
Mu	50.40	ft-kips
Axial, Pu:	4.71	kips
Shear, Vu:	5.71	kips
Elevation:	152	feet

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

Pole Manufacturer:	Other

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	12		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle (in.):	35		

Plate Data		
Diam:	38	in
Thick, t:	1	in
Grade (Fy):	60	ksi
Strength, Fu:	75	ksi
Single-Rod B-eff:	8.10	in

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

Pole Data		
Diam:	30.62	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	Rigid
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.54	kips	φ*Tn
Max Bolt directly applied Tu:	5.37	Kips	φTn[(1-(Vu/φVn)^2]^0.5
Min. PL "tc" for **B** cap. **w/o** Pry:	0.825	in	
Min PL "treq" for actual **T w/ Pry**:	0.189	in	
Min PL "t1" for actual **T w/o Pry**:	0.259	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	5.37	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	9.8%	**Pass**	

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	4.0	ksi	Rigid
Allowable Plate Stress:	54.0	ksi	TIA G
Compression Plate Stress Ratio:	7.4%	**Pass**	φ*Fy
No Prying			Comp. Y.L. Length:
Tension Side Stress Ratio, (treq/t)^2:	3.6%	**Pass**	16.95

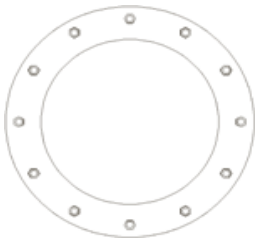
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



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

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

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

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

Site Data

BU#:	*841290*
Site Name:	*Greenwich North*
App #:	*365454 Rev. 3*
Pole Manufacturer:	*Other*

Reactions		
Mu:	3492	ft-kips
Axial, Pu:	64	kips
Shear, Vu:	29	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

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

Anchor Rod Data		
Qty:	24	
Diam:	2.5	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	69	in

Plate Data		
Diam:	73	in
Thick:	2.25	in
Grade:	60	ksi
Single-Rod B-eff:	7.80	in

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

Pole Data		
Diam:	59	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Anchor Rod Results

Max Rod (Cu+ Vu/ή):	106.3	Kips
Allowable Axial, Φ*Fu*Anet:	320.0	Kips
Anchor Rod Stress Ratio:	33.2%	**Pass**

Rigid
AISC LRFD
φ*Tn

Base Plate Results Flexural Check

Base Plate Stress:	31.5	ksi
Allowable Plate Stress:	54.0	ksi
Base Plate Stress Ratio:	58.3%	**Pass**

Rigid
AISC LRFD
φ*Fy
Y.L. Length:
35.78

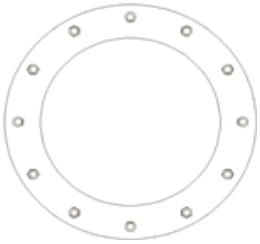
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check:	n/a



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

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

Monopole Pier and Pad Foundation

BU # : 841290
Site Name: Greenwich North
App. Number: 365454 Rev. 3
TIA-222 Revision: G

Design Reactions		
Shear, **S**:	29	kips
Moment, **M**:	3492	ft-kips
Tower Height, **H**:	160	ft
Tower Weight, **Wt**:	64	kips
Base Diameter, **BD**:	4.92	ft

Foundation Dimensions		
Depth, **D**:	9.5	ft
Pad Width, **W**:	25	ft
Neglected Depth, **N**:	5	ft
Thickness, **T**:	4.50	ft
Pier Diameter, **Pd**:	7.00	ft
Ext. Above Grade, **E**:	0.50	ft
BP Dist. Above Pier:	3	in.
Clear Cover, **Cc**:	3.5	in

Soil Properties		
Soil Unit Weight, **γ**:	0.120	kcf
Ult. Bearing Capacity, Bc:	20.0	ksf
Angle of Friction, **Φ**:	34	deg
Cohesion, **Co**:	0.000	ksf
Passive Pressure, **Pp**:	0.000	ksf
Base Friction, **μ**:	0.20	

Material Properties		
Rebar Yield Strength, **Fy**:	60000	psi
Concrete Strength, **F'c**:	4000	psi
Concrete Unit Weight, **δc**:	0.150	kcf
Seismic Zone, **z**:	1	

Rebar Properties		
Pier Rebar Size, **Sp**:	9	
Pier Rebar Quanity, **mp**:	44	28
Pad Rebar Size, **Spad**:	11	
Pad Rebar Quanity, **mpad**:	50	10
Pier Tie Size, **St**:	4	3
Tie Quanity, **mt**:	6	6

Design Checks	Capacity/ Availability	Demand/ Limits	Check
Req'd Pier Diam.(ft)	7	6.4167	**OK**
Overturning (ft-kips)	9744.66	3492.00	**35.8%**
Shear Capacity (kips)	146.97	29.00	**19.7%**
Bearing (ksf)	15.00	2.61	**17.4%**
Pad Shear - 1-way (kips)	1417.19	332.04	**23.4%**
Pad Shear - 2-way (kips)	3971.25	121.73	**3.1%**
Pad Moment Capacity (k-ft)	16672.81	1221.22	**7.3%**
Pier Moment Capacity (k-ft)	9815.92	3651.50	**37.2%**

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

AT&T Existing Facility

Site ID: CT2130

Greenwich North
363 Riversville Road
Greenwich, CT 06831

November 17, 2016

EBI Project Number: 6216005366

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	7.80 %

EBI Consulting
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November 17, 2016

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

Emissions Analysis for Site: **CT2130 – Greenwich North**

EBI Consulting was directed to analyze the proposed AT&T facility located at **363 Riversville Road, Greenwich, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at **363 Riversville Road, Greenwich, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

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

3) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 UMTS channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

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

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

7) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **CCI HPA-65R-BUU-H6 and the Powerwave 7770** for transmission in the 700 MHz, 850 MHz and the 1900 MHz (PCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerlines of the proposed antennas are **150 feet** above ground level (AGL) for **Sector A**, **150 feet** above ground level (AGL) for **Sector B** and **150 feet** above ground level (AGL) for Sector C.

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

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

AT&T Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	CCI HPA-65R-BUU-H6	Make / Model:	CCI HPA-65R-BUU-H6	Make / Model:	CCI HPA-65R-BUU-H6
Gain:	11.95 / 14.75 dBd	Gain:	11.95 / 14.75 dBd	Gain:	11.95 / 14.75 dBd
Height (AGL):	**150 feet**	Height (AGL):	**150 feet**	Height (AGL):	**150 feet**
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts
ERP (W):	5,462.56	ERP (W):	5,462.56	ERP (W):	5,462.56
Antenna A1 MPE%	**1.32 %**	Antenna B1 MPE%	**1.32 %**	Antenna C1 MPE%	**1.32 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	**150 feet**	Height (AGL):	**150 feet**	Height (AGL):	**150 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A2 MPE%	**0.48 %**	Antenna B2 MPE%	**0.48 %**	Antenna C2 MPE%	**0.48 %**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 dBd	Gain:	11.4 dBd	Gain:	11.4 dBd
Height (AGL):	**150 feet**	Height (AGL):	**150 feet**	Height (AGL):	**150 feet**
Frequency Bands	850 MHz	Frequency Bands	850 MHz	Frequency Bands	850 MHz
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	60 Watts	Total TX Power(W):	60 Watts	Total TX Power(W):	60 Watts
ERP (W):	828.23	ERP (W):	828.23	ERP (W):	828.23
Antenna A3 MPE%	**0.25 %**	Antenna B3 MPE%	**0.25 %**	Antenna C3 MPE%	**0.25 %**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**2.05 %**
T-Mobile	1.63 %
Verizon Wireless	2.83 %
Nextel	0.37 %
Sprint	0.92 %
Site Total MPE %:	**7.80 %**

AT&T Sector A Total:	2.05 %
AT&T Sector B Total:	2.05 %
AT&T Sector C Total:	2.05 %
Site Total:	7.80 %

AT&T _ Frequency Band / Technology per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 700 MHz LTE	2	940.05	150	3.26	700 MHz	467	0.70%
AT&T 1900 MHz (PCS) LTE	2	1,791.23	150	6.21	1900 MHz (PCS)	1000	0.62%
AT&T 850 MHz UMTS	2	414.12	150	1.44	850 MHz	567	0.25%
AT&T 1900 MHz (PCS) UMTS	2	656.33	150	2.28	1900 MHz (PCS)	1000	0.23%
AT&T 850 MHz GSM	2	414.12	150	1.44	850 MHz	567	0.25%
						Total:	2.05%

Summary

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

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

AT&T Sector	Power Density Value (%)
Sector A:	2.05 %
Sector B:	2.05 %
Sector C:	2.05 %
AT&T Maximum Total (per sector):	2.05 %
Site Total:	7.80 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **7.80 %** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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