



February 9, 2016

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

Regarding: Notice of Exempt Modification – Antenna Swap  
& Addition of Three Radio Heads plus A2  
Property Address: modules  
Kikapoo Road, Middlefield, CT 06455

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 75-foot self-support tower at the above-referenced address, latitude 41.5136031, longitude -72.7458319. Said monopole is owned by American Tower Corporation. The existing equipment shelter is 21.7' x 25' totaling 542.5 square feet.

AT&T desires to modify its existing telecommunications facility by swapping three (3) antennas and adding three remote-radio heads (“RRHs”) with A2 modules. The centerline height of said antennas is and will remain at 77 feet. Antennas are mounted utilizing a platform with hand rails.

Please accept this application as notification pursuant to R.C.S.A. §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.C.S.A. §16-50j-73, a copy of this letter is being sent to Edward P. Bailey First Selectmen for the Town of Middlefield. A copy of this letter is also being sent to the property owner American Tower Corporation.

The planned modifications to AT&T’s facility fall squarely within those activities explicitly provided for in R.C.S.A. §16-50j-72 (b)(2). Specifically:

1. The planned modification will not result in an increase in the height of the existing structure. The antennas to be swapped will be installed at the existing height of 77 feet on the 75-foot monopole.
2. The proposed modifications will not involve any changes to ground-mounted equipment, and therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.

4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above Federal Communications Commission (FCC) safety standard. An RF emissions calculation (attached) for AT&T's modified facility is herein provided.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The self support tower and its foundation can support AT&T's proposed modifications (please see attached structural analysis completed by American Tower dated December 8, 2015).

For the foregoing reasons, AT&T respectfully requests that the proposed antenna swap and remote radio head installation be allowed within the exempt modifications under R.C.S.A. §16-50j-72 (b)(2).

Sincerely,

Sarah Snell  
Site Acquisition Specialist

cc: Edward P. Bailey, First Selectmen Town of Middlefield  
American Tower Corporation

**PROJECT INFORMATION**

SCOPE OF WORK:

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

SITE ADDRESS: 134 KIKAPOO ROAD  
MIDDLEFIELD, CT 06455

LATITUDE: 41.5136031 41° 30' 48.97116"N  
LONGITUDE: -72.7458319 -72° 44' 44.99484"W

USID: 59336

TOWER OWNER: AMERICAN TOWER  
302485

TYPE OF SITE: MONOPINE/INDOOR EQUIPMENT

MONOPINE HEIGHT: 79'-0"±

RAD CENTER: 78'-0"±

CURRENT USE: UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

PROPOSED USE: UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY



**at&t**  
**MOBILITY**

**FA CODE: 10034970**  
**SITE NUMBER: CT1016**  
**SITE NAME: MIDDLEFIELD-KICKAPOO**

**PROJECT TEAM**

**CLIENT REPRESENTATIVE**

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

**SITE ACQUISITION:**

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

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ADDRESS: 16 ESQUIRE ROAD  
BILLERICA, MA 01821  
CONTACT: DAVID COOPER  
PHONE: 617-639-4908  
EMAIL: dcooper@empiretelecomm.com

COMPANY: COM-EX CONSULTANTS, LLC  
ADDRESS: 4 SECOND AVENUE  
SUITE 204  
DENVER, NJ 07834  
CONTACT: NICHOLAS D. BARILE, P.E.  
PHONE: 862-209-4300  
EMAIL: nbarile@comexconsultants.com

**RF ENGINEER:**

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

**CONSTRUCTION MANAGEMENT:**

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

**DRAWING INDEX**

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**VICINITY MAP**

FROM ROCKY HILL, CT: HEAD N. ON ROCAMORA ROAD TOWARD WEBSTER LANE, TAKE THE 1ST LEFT ONTO WEBSTER LANE, TURN LEFT ONTO CT-160 W/ELM STREET, TAKE THE 1ST LEFT ONTO GILBERT AVE, TURN RIGHT ONTO W STREET, TURN LEFT TO MERGE ONTO I-91 S BALDWIN AVE, CONTINUE ONTO PRESTON AVENUE, TURN LEFT ONTO EAST MAIN STREET, TAKE THE RAMP TO MIDDLEFIELD/MIDDLETOWN, MERGE ONTO CT-66 E, TURN RIGHT ONTO CT-147 S/BAILEYVILLE ROAD, TURN RIGHT ONTO LAKE ROAD, CONTINUE ONTO LAKE BESECK ROAD, SLIGHT LEFT ONTO LAKE SHORE DRIVE, TAKE THE 1ST LEFT TO STAY ON LAKE SHORE DRIVE, TAKE THE 1ST RIGHT ONTO KICKAPOO ROAD, SITE WILL BE ON THE RIGHT.



**GENERAL NOTES**

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

**APPROVALS**

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

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



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



**SITE NUMBER: CT1016**  
**SITE NAME: MIDDLEFIELD-KICKAPOO**  
134 KIKAPOO ROAD  
MIDDLEFIELD, CT 06455  
MIDDLESEX COUNTY



NO.	DATE	REVISIONS	BY	CHK	APP'D
A	10/08/15	INITIAL REVIEW	NJM	NDB	NDB
SCALE: AS SHOWN		DESIGNED BY: NJM	DRAWN BY: NJM		

AT&T		
DRAWING TITLE:		
TITLE SHEET		
JOB NUMBER	DRAWING NUMBER	REV
15095-EMP	T-1	A

**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 1/2" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50.

**GENERAL NOTES:**

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:  
 CONTRACTOR – EMPIRE TELECOM  
 SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)  
 OWNER – AT&T MOBILITY  
 OEM – ORIGINAL EQUIPMENT MANUFACTURER
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR (EMPIRE TELECOM).
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
7. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
8. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR
9. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
12. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
14. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy=36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741-000-3APS-A00Z-00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."
16. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
17. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
18. SINCE THE CELL SITE MAY BE ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

19. SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
  - INTERNATIONAL BUILDING CODE: IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
  - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
  - FIRE/LIFE SAFETY CODE: NFPA-101 2009 WITH LOCAL & COUNTY AMENDMENTS
20. SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:
  - AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
  - AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, THIRTEENTH EDITION
  - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
  - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA-222-G-1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
  - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
  - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
  - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVELY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT
  - TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS
21. FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.
22. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.
23. INFORMATION SHOWN ON THIS SET OF PLANS TAKEN FROM DRAWINGS PREPARED BY DEWBERRY ENGINEERING FOR A RECENT UPGRADE DATED 02/27/2012. CONTRACTOR TO NOTIFY DESIGN ENGINEER OF ANY DISCREPANCIES PRIOR TO COMMENCEMENT OF CONSTRUCTION.

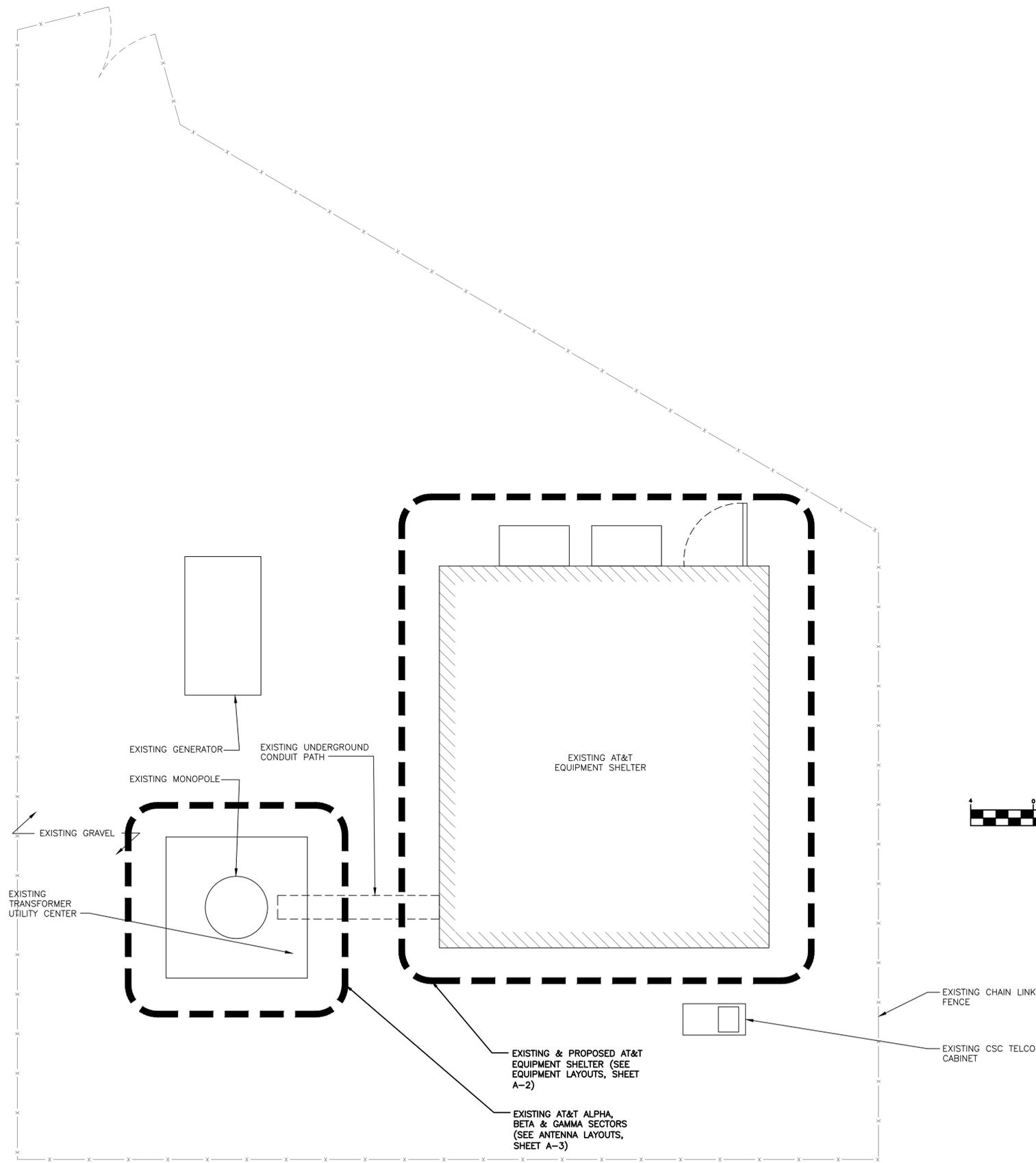


**SITE NUMBER: CT1016**  
**SITE NAME: MIDDLEFIELD-KICKAPOO**  
 134 KIKAPOO ROAD  
 MIDDLEFIELD, CT 06455  
 MIDDLESEX COUNTY

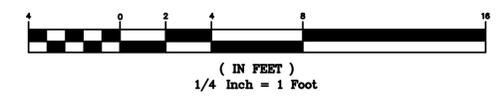


A	10/08/15	INITIAL REVIEW	NJM	NDB	NDB
NO.	DATE	REVISIONS	BY	CHK	APP'D
SCALE: AS SHOWN		DESIGNED BY: NJM	DRAWN BY: NJM		

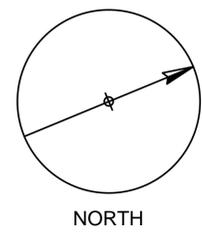
<b>AT&amp;T</b>		
DRAWING TITLE: <b>GROUNDING &amp; GENERAL NOTES</b>		
JOB NUMBER	DRAWING NUMBER	REV
15095-EMP	GN-1	A



**COMPOUND LAYOUT**  
SCALE: 1" = 4'-0"



NOTE:  
CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.



**COM-EX**  
Consultants  
4 SECOND AVENUE  
SUITE 204  
DENVER, NJ 07834  
PHONE: 862.209.4300  
FAX: 862.209.4301

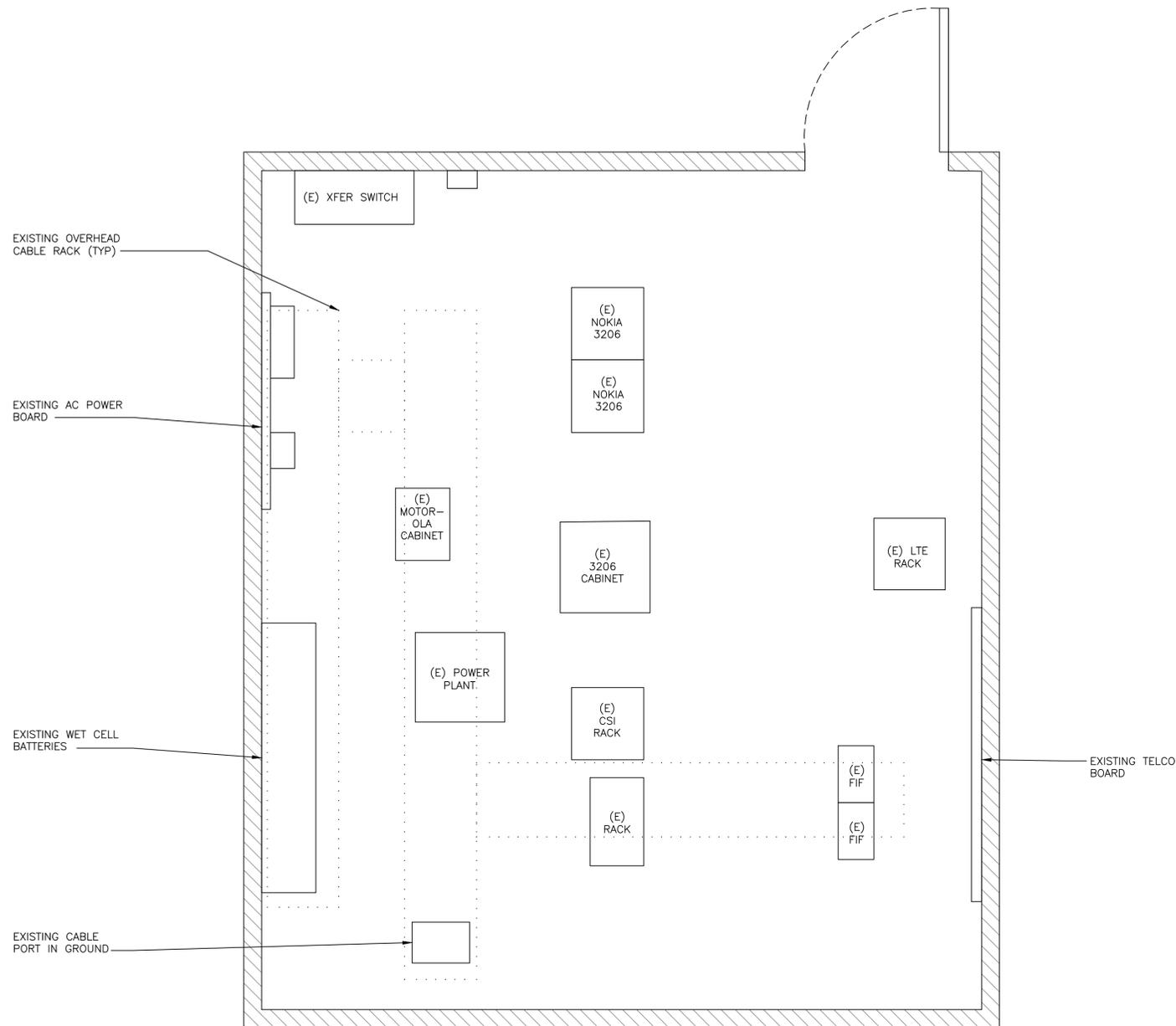
**EMPIRE**  
telecom  
16 ESQUIRE ROAD  
BILLERICA, MA 01821

**SITE NUMBER: CT1016**  
**SITE NAME: MIDDLEFIELD-KICKAPOO**  
134 KIKAPOO ROAD  
MIDDLEFIELD, CT 06455  
MIDDLESEX COUNTY

 **at&t**  
MOBILITY  
550 COCHITUATE ROAD  
FRAMINGHAM, MA 01701

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

AT&T		
DRAWING TITLE: COMPOUND LAYOUT		
JOB NUMBER	DRAWING NUMBER	REV
15095-EMP	A-1	A

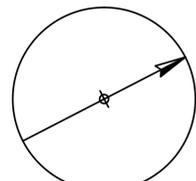


**EXISTING EQUIPMENT LAYOUT**

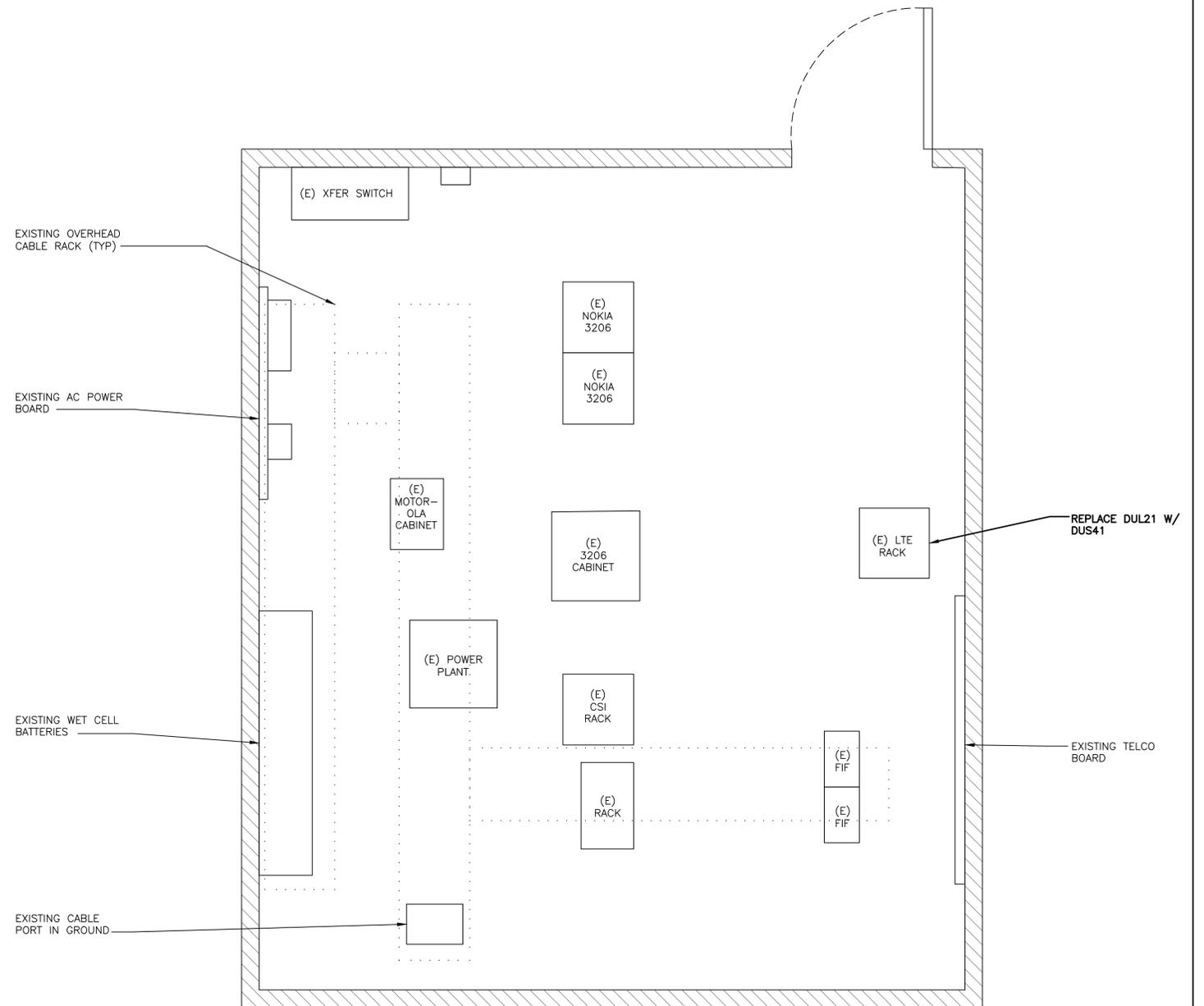
SCALE: 1/4" = 1'-0"



( IN FEET )  
1/4 Inch = 1 Foot



NORTH

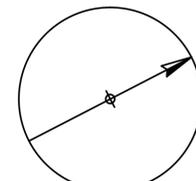


**PROPOSED EQUIPMENT LAYOUT**

SCALE: 1/4" = 1'-0"



( IN FEET )  
1/4 Inch = 1 Foot



NORTH

**COM-EX**  
Consultants  
4 SECOND AVENUE  
SUITE 204  
DENVER, NJ 07834  
PHONE: 862.209.4300  
FAX: 862.209.4301

**EMPIRE**  
telecom  
16 ESQUIRE ROAD  
BILLERICA, MA 01821

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134 KIKAPOO ROAD  
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MIDDLESEX COUNTY

**at&t**  
MOBILITY  
550 COCHITUATE ROAD  
FRAMINGHAM, MA 01701

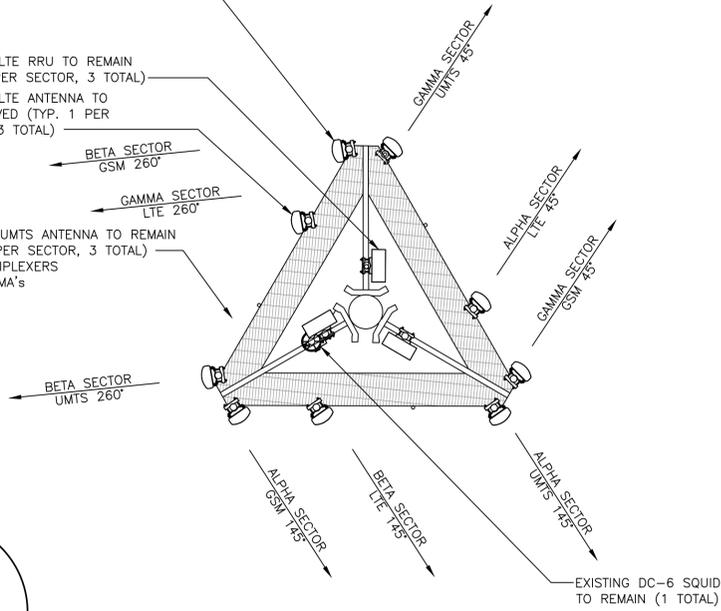
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AT&T		
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EQUIPMENT LAYOUT		
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15095-EMP	A-2	A

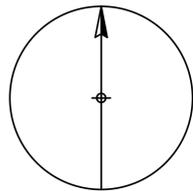
EXISTING GSM ANTENNA TO REMAIN (TYP. 1 PER SECTOR, 3 TOTAL)  
 • (2) TMA's  
 • (2) DIPLEXERS

EXISTING LTE RRU TO REMAIN (TYP. 1 PER SECTOR, 3 TOTAL)  
 EXISTING LTE ANTENNA TO BE REMOVED (TYP. 1 PER SECTOR, 3 TOTAL)

EXISTING UMS ANTENNA TO REMAIN (TYP. 1 PER SECTOR, 3 TOTAL)  
 • (2) DIPLEXERS  
 • (2) TMA's



**EXISTING ANTENNA LAYOUT**  
 SCALE: N.T.S.

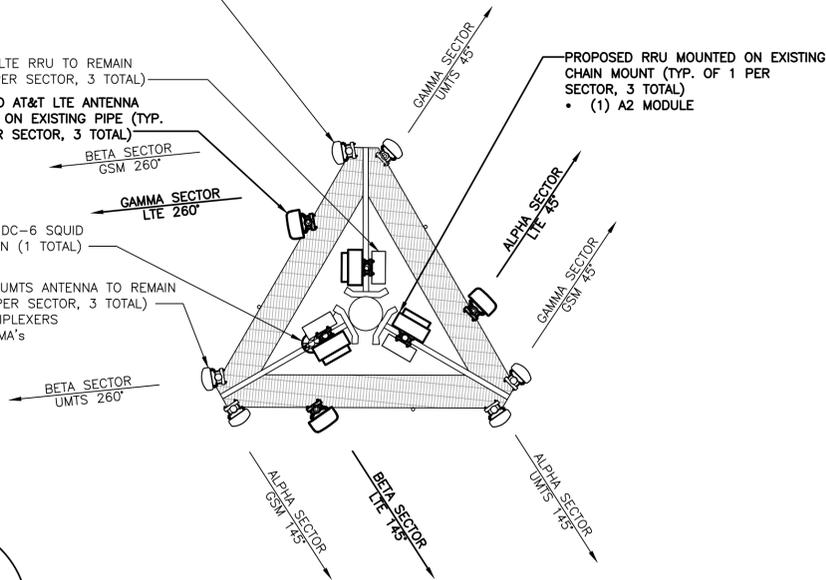


NORTH

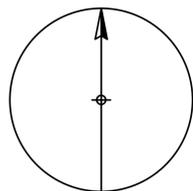
EXISTING GSM ANTENNA TO REMAIN (TYP. 1 PER SECTOR, 3 TOTAL)  
 • (2) TMA's  
 • (2) DIPLEXERS

EXISTING LTE RRU TO REMAIN (TYP. 1 PER SECTOR, 3 TOTAL)  
**PROPOSED AT&T LTE ANTENNA MOUNTED ON EXISTING PIPE (TYP. OF 1 PER SECTOR, 3 TOTAL)**

EXISTING DC-6 SQUID TO REMAIN (1 TOTAL)  
 EXISTING UMS ANTENNA TO REMAIN (TYP. 1 PER SECTOR, 3 TOTAL)  
 • (2) DIPLEXERS  
 • (2) TMA's



**PROPOSED ANTENNA LAYOUT**  
 SCALE: N.T.S.



NORTH

EXISTING LTE ANTENNA TO BE REMOVED (TYP. 1 PER SECTOR, 3 TOTAL)

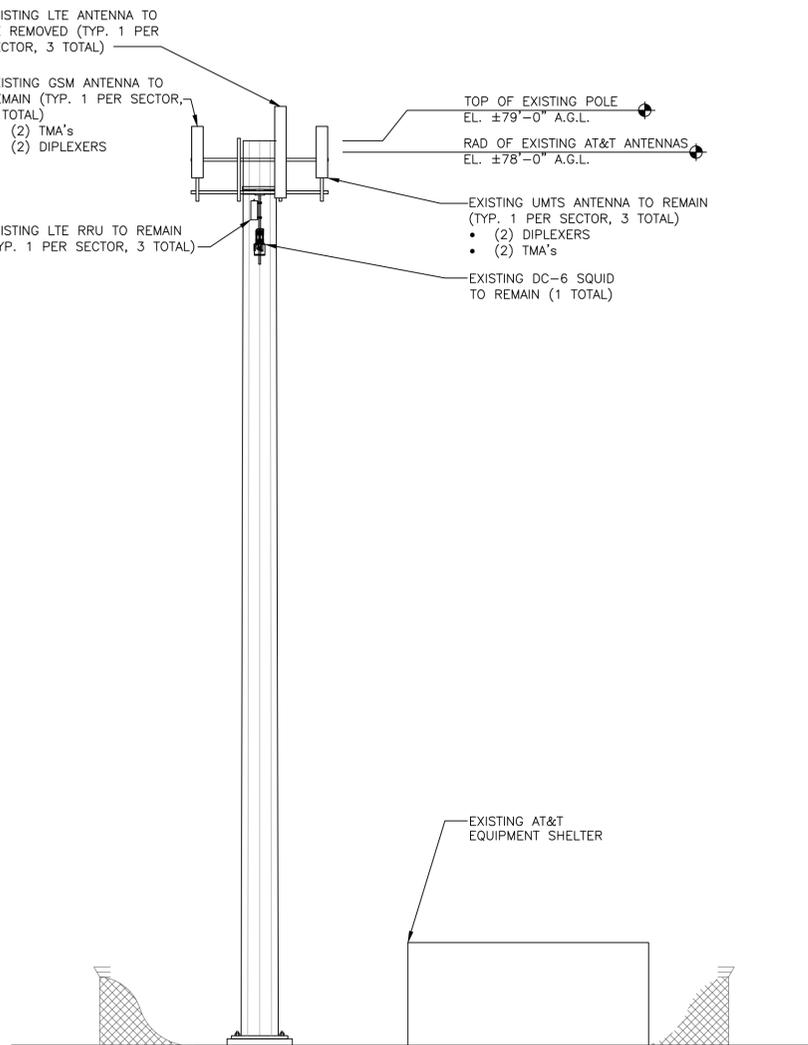
EXISTING GSM ANTENNA TO REMAIN (TYP. 1 PER SECTOR, 3 TOTAL)  
 • (2) TMA's  
 • (2) DIPLEXERS

EXISTING LTE RRU TO REMAIN (TYP. 1 PER SECTOR, 3 TOTAL)

TOP OF EXISTING POLE  
 EL. ±79'-0" A.G.L.  
 RAD OF EXISTING AT&T ANTENNAS  
 EL. ±78'-0" A.G.L.

EXISTING UMS ANTENNA TO REMAIN (TYP. 1 PER SECTOR, 3 TOTAL)  
 • (2) DIPLEXERS  
 • (2) TMA's

EXISTING DC-6 SQUID TO REMAIN (1 TOTAL)



**EXISTING TOWER ELEVATION**  
 SCALE: N.T.S.

**PROPOSED AT&T LTE ANTENNA MOUNTED ON EXISTING PIPE (TYP. OF 1 PER SECTOR, 3 TOTAL)**

EXISTING GSM ANTENNA TO REMAIN (TYP. 1 PER SECTOR, 3 TOTAL)  
 • (2) TMA's  
 • (2) DIPLEXERS

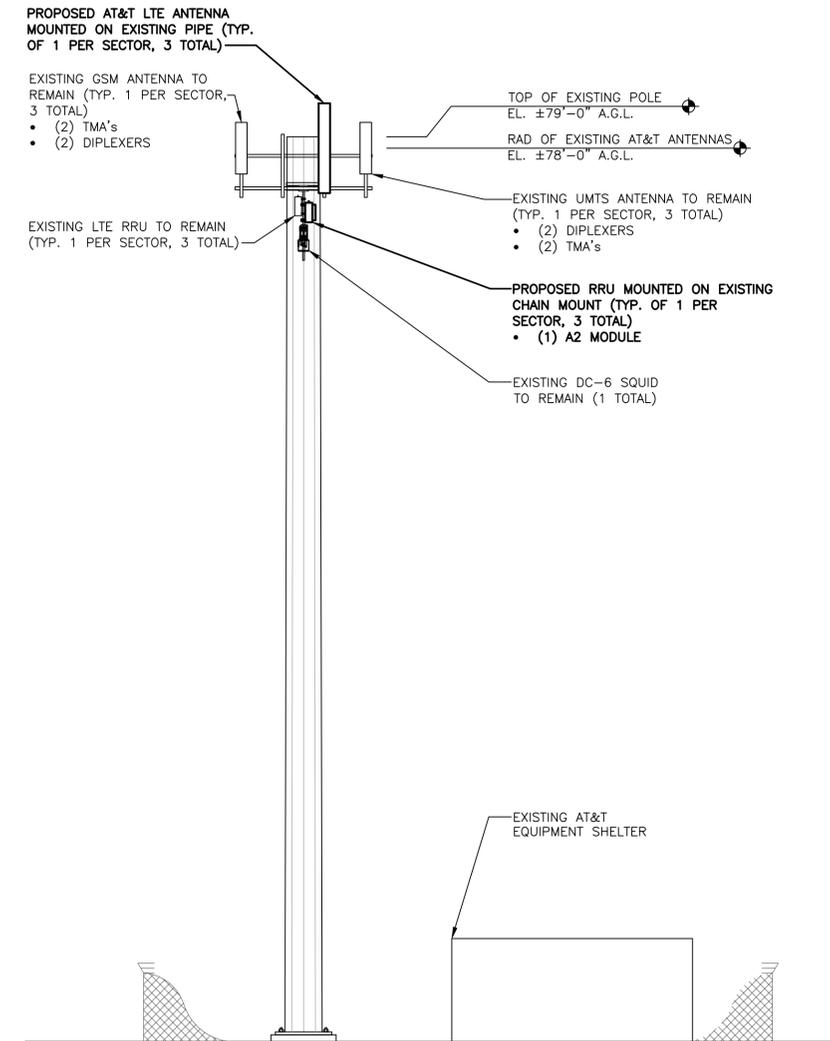
EXISTING LTE RRU TO REMAIN (TYP. 1 PER SECTOR, 3 TOTAL)

TOP OF EXISTING POLE  
 EL. ±79'-0" A.G.L.  
 RAD OF EXISTING AT&T ANTENNAS  
 EL. ±78'-0" A.G.L.

EXISTING UMS ANTENNA TO REMAIN (TYP. 1 PER SECTOR, 3 TOTAL)  
 • (2) DIPLEXERS  
 • (2) TMA's

**PROPOSED RRU MOUNTED ON EXISTING CHAIN MOUNT (TYP. OF 1 PER SECTOR, 3 TOTAL)**  
 • (1) A2 MODULE

EXISTING DC-6 SQUID TO REMAIN (1 TOTAL)

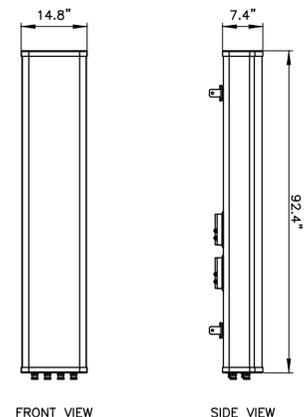


**PROPOSED TOWER ELEVATION**  
 SCALE: N.T.S.

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

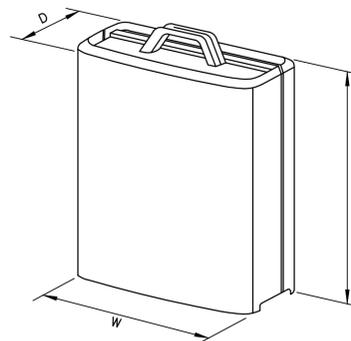
NO.	DATE	REVISIONS	BY	CHK	APP'D
A	10/08/15	INITIAL REVIEW	NJM	NDB	NDB
SCALE: AS SHOWN		DESIGNED BY: NJM	DRAWN BY: NJM		

<b>AT&amp;T</b>		
DRAWING TITLE: <b>ANTENNA LAYOUTS &amp; ELEVATIONS</b>		
JOB NUMBER 15095-EMP	DRAWING NUMBER A-3	REV A



FRONT VIEW	
SIDE VIEW	
BOTTOM VIEW	
MANUFACTURER	CCI
MODEL	OPA-65R-BUU-H8
WEIGHT	68.0 LBS

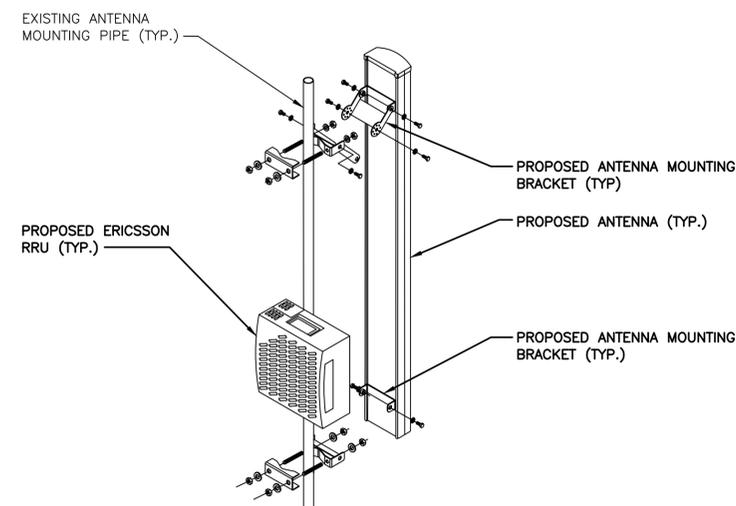
**LTE ANTENNA DETAIL**  
SCALE: N.T.S.



MODEL	L x W x H	WEIGHT
*RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
RRUS-12	20.4"x18.5"x7.5"	58 LBS

\*DENOTES EXISTING.

**RRUS DETAIL**  
SCALE: N.T.S.



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

EXISTING ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770.00.850.06	55"x11"x5"
	A2	-	-	-
	A3	ANDREW	96.4"x11.9"x7.1"	96.4"x11.9"x7.1"
	A4	POWERWAVE	7770.00.850.06	55"x11"x5"
BETA	B1	POWERWAVE	7770.00.850.06	55"x11"x5"
	B2	-	-	-
	B3	ANDREW	96.4"x11.9"x7.1"	96.4"x11.9"x7.1"
	B4	POWERWAVE	7770.00.850.06	55"x11"x5"
GAMMA	G1	POWERWAVE	7770.00.850.06	55"x11"x5"
	G2	-	-	-
	G3	ANDREW	96.4"x11.9"x7.1"	96.4"x11.9"x7.1"
	G4	POWERWAVE	7770.00.850.06	55"x11"x5"

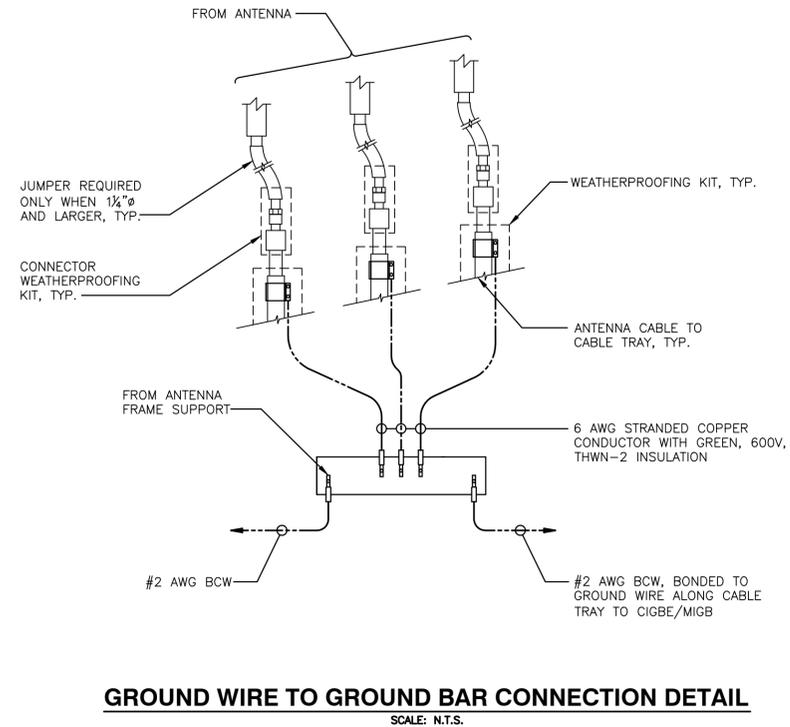
FINAL ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770.00.850.06	55"x11"x5"
	A2	-	-	-
	A3	CCI	OPA-65R-BUU-H8	92.4"x14.8"x7.4"
	A4	POWERWAVE	7770.00.850.06	55"x11"x5"
BETA	B1	POWERWAVE	7770.00.850.06	55"x11"x5"
	B2	-	-	-
	B3	CCI	OPA-65R-BUU-H8	92.4"x14.8"x7.4"
	B4	POWERWAVE	7770.00.850.06	55"x11"x5"
GAMMA	G1	POWERWAVE	7770.00.850.06	55"x11"x5"
	G2	-	-	-
	G3	CCI	OPA-65R-BUU-H8	92.4"x14.8"x7.4"
	G4	POWERWAVE	7770.00.850.06	55"x11"x5"

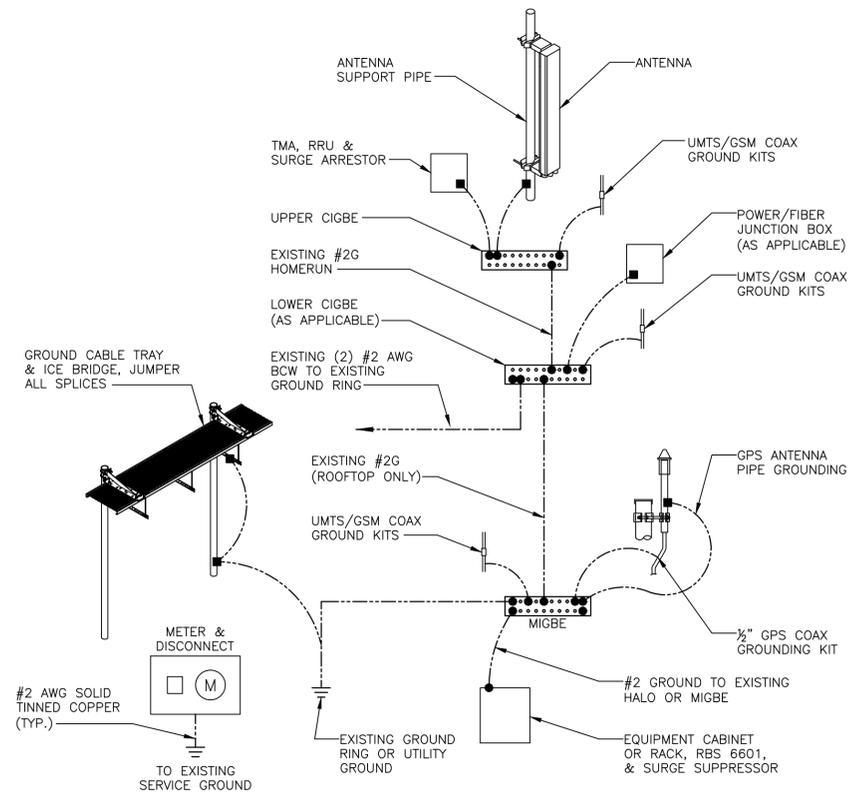
PROPOSED RRU SCHEDULE

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

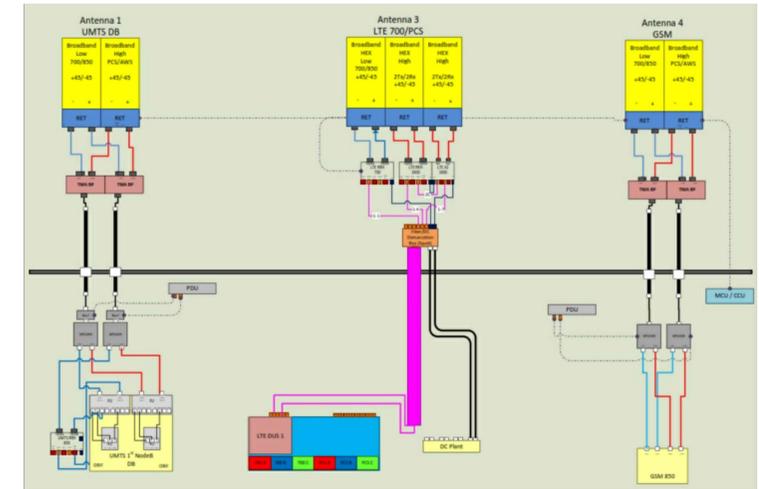
PROJECT OWNER IS RESPONSIBLE FOR PROVIDING A STRUCTURAL STABILITY ANALYSIS TO DETERMINE THE CAPACITY AND SUITABILITY OF THE EXISTING ANTENNA SUPPORT STRUCTURE TO SAFELY CARRY ALL ADDITIONAL LOADS IMPOSED BY THE PROPOSED EQUIPMENT AS SHOWN HEREIN. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING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



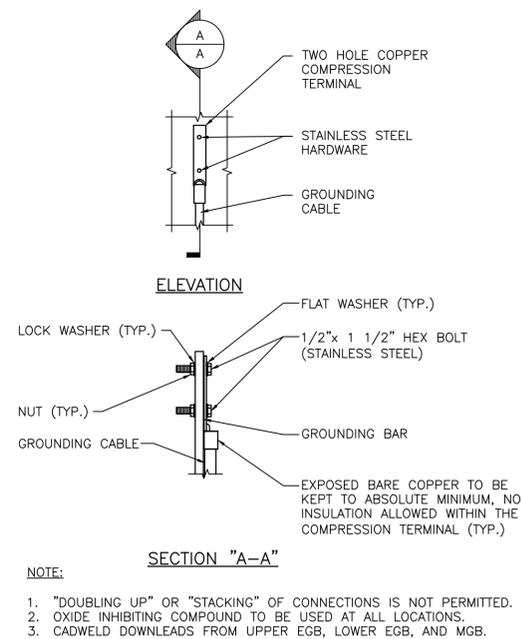
**GROUND WIRE TO GROUND BAR CONNECTION DETAIL**  
SCALE: N.T.S.



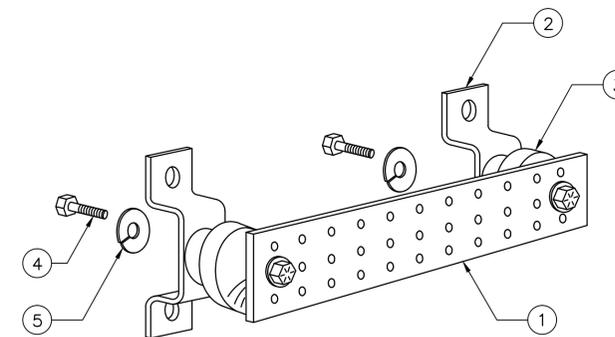
**GROUNDING RISER DIAGRAM**  
SCALE: N.T.S.



**TYPICAL PLUMBING DIAGRAM (PER SECTOR)**  
SCALE: N.T.S.



**TYPICAL GROUND BAR CONNECTION DETAIL**  
SCALE: N.T.S.



ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20"x 4"x 1/4")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	5/8"-11x1" H.H.C.S.
5	4	5/8" LOCK WASHER

**NOTES:**

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

**SECTION "P" - SURGE PRODUCERS**

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

**SECTION "A" - SURGE ABSORBERS**

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

**GROUND BAR DETAIL**  
SCALE: N.T.S.

NO.	DATE	REVISIONS	BY	CHK	APP'D
A	10/08/15	INITIAL REVIEW	NJM	NDB	NDB
SCALE: AS SHOWN		DESIGNED BY: NJM	DRAWN BY: NJM		

AT&T		
DRAWING TITLE:		
GROUNDING, ONE-LINE DIAGRAM & DETAILS		
JOB NUMBER	DRAWING NUMBER	REV
15095-EMP	G-1	A

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

AT&T Existing Facility

Site ID: CT1016

Middlefield- Kikapoo  
134 Kikapoo Road  
Middlefield, CT 06455

**February 8, 2016**

**EBI Project Number: 6216000614**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general public allowable limit:	<b>10.42 %</b>

February 8, 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: **CT1016 – Middlefield- Kikapoo**

EBI Consulting was directed to analyze the proposed AT&T facility located at **134 Kikapoo Road, Middlefield, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  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 ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 700 and 850 MHz Bands are approximately  $467 \mu\text{W}/\text{cm}^2$  and  $567 \mu\text{W}/\text{cm}^2$  respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is  $1000 \mu\text{W}/\text{cm}^2$ . 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 **134 Kikapoo Road, Middlefield, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

- 1) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 2 UMTS channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 4) 2 LTE channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 5) 2 GSM channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 6) 2 GSM channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

- 7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 8) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antennas used in this modeling are the **CCI HPA-65R-BUU-H8**, and the **Powerwave 7770.00** for transmission in the 700 MHz, 850 MHz and 1900 MHz (PCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 10) The antenna mounting height centerline of the proposed antennas is **77 feet** above ground level (AGL).
- 11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

**AT&T Site Inventory and Power Data**

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	77 feet	Height (AGL):	77 feet	Height (AGL):	77 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A1 MPE%	<b>1.98</b>	Antenna B1 MPE%	<b>1.98</b>	Antenna C1 MPE%	<b>1.98</b>
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	CCI OPA-65R-BUU-H8	Make / Model:	CCI OPA-65R-BUU-H8	Make / Model:	CCI OPA-65R-BUU-H8
Gain:	13.15 / 14.95 dBd	Gain:	13.15 / 14.95 dBd	Gain:	13.15 / 14.95 dBd
Height (AGL):	77 feet	Height (AGL):	77 feet	Height (AGL):	77 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	6,229.75	ERP (W):	6,229.75	ERP (W):	6,229.75
Antenna A2 MPE%	<b>6.46</b>	Antenna B2 MPE%	<b>6.46</b>	Antenna C2 MPE%	<b>6.46</b>
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	77 feet	Height (AGL):	77 feet	Height (AGL):	77 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A3 MPE%	<b>1.98</b>	Antenna B3 MPE%	<b>1.98</b>	Antenna C3 MPE%	<b>1.98</b>

Site Composite MPE%	
Carrier	MPE%
AT&T – Max per sector	<b>10.42 %</b>
No Additional Carriers per CSC database	NA
<b>Site Total MPE %:</b>	<b>10.42 %</b>

AT&T Sector 1 Total:	5.41 %
AT&T Sector 2 Total:	5.41 %
AT&T Sector 3 Total:	5.41 %
<b>Site Total:</b>	<b>10.42 %</b>

AT&T _ Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	77	5.91	850	567	1.04 %
AT&T 1900 MHz (PCS) UMTS	2	656.33	77	9.36	1900	1000	0.94 %
AT&T 700 MHz LTE	2	1239.23	77	17.68	700	467	3.78 %
AT&T 1900 MHz (PCS) LTE	2	1875.65	77	26.75	1900	1000	2.68 %
AT&T 850 MHz GSM	2	414.12	77	5.91	850	567	1.04 %
AT&T 1900 MHz (PCS) GSM	2	656.33	77	9.36	1900	1000	0.94 %
						<b>Total:</b>	<b>10.42 %</b>

## Summary

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

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

AT&T Sector	Power Density Value (%)
Sector 1:	10.42 %
Sector 2:	10.42 %
Sector 3 :	10.42 %
AT&T Maximum Total (per sector):	10.42 %
Site Total:	10.42 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **10.42%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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



Scott Heffernan  
RF Engineering Director

**EBI Consulting**  
21 B Street  
Burlington, MA 01803



**AMERICAN TOWER®**  
CORPORATION

**INFINIGY**

FROM ZERO TO INFINIGY  
the solutions are endless

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## Structural Analysis Report

**Structure** : 75 ft Monopole  
**ATC Site Name** : Mdfd - Middlefield, CT  
**ATC Site Number** : 302485  
**Engineering Number** : 64436721  
**Proposed Carrier** : AT&T Mobility  
**Carrier Site Name** : Middlefield Kickapoo  
**Carrier Site Number** : CT1016/FA#10034970  
**Site Location** : 134 Kikapoo Road  
Middlefield, CT 06455-1334  
41.513611,-72.745800  
**County** : Middlesex  
**Date** : December 8, 2015  
**Max Usage** : 94%  
**Result** : Pass

Prepared By:  
Nathaniel Ober  
Infinigy





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Calculations .....	Attached



## Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 75 ft monopole to reflect the change in loading by AT&T Mobility.

## Supporting Documents

<b>Tower Drawings</b>	Project #HTS071108, dated July 10, 2008
<b>Foundation Drawing</b>	Southern New England Telephone Project #38920, dated October 28, 1983
<b>Geotechnical Report</b>	S&ME Job # 1261-08-261M, dated July 30, 2008

## Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

<b>Basic Wind Speed:</b>	120 mph (3-Second Gust)
<b>Basic Wind Speed w/ Ice:</b>	50 mph (3-Second Gust) w/ 3/4" radial ice concurrent
<b>Code:</b>	ANSI/TIA-222-G / 2003 IBC w/ 2005 CT Supplement & 2009 CT Amendment
<b>Structure Class:</b>	II
<b>Exposure Category:</b>	B
<b>Topographic Category:</b>	1
<b>Crest Height:</b>	0 ft
<b>Spectral Response:</b>	$S_s = 0.24, S_1 = 0.06$
<b>Site Class:</b>	D - Stiff Soil

## Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at [Engineering@americantower.com](mailto:Engineering@americantower.com). Please include the American Tower site name, site number, and engineering number in the subject line for any questions.



**Existing and Reserved Equipment**

Elevation <sup>1</sup> (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
83.0	83.0	1	10' Omni	Flush	(1) 1 5/8" Coax	SPOK Holdings, Inc.
75.0	75.0	1	6' Omni	Flush	(1) 7/8" Coax	US Treasury
73.0	77.0	6	Powerwave 7020	Platform w/ Handrails	(12) 7/8" Coax (2) 0.78" 8 AWG 6 (1) 3" Conduit (1) 1 5/8" Coax	AT&T Mobility
		6	Powerwave LGP21401			
		1	Raycap DC6-48-60-18-8F (23.5" Height)			
		3	Ericsson RRUS 11 (Band 12)			
	6	Powerwave 7770.00	USA Mobility			
78.0	1	8' Omni				
10.0	10.0	1	Channel Master Type 120	Leg	(1) 0.28" RG-6	SPOK Holdings, Inc.

**Equipment to be Removed**

Elevation <sup>1</sup> (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
77.0	80.0	3	Andrew SBNH-1D6565C	-	(1) 0.39" Cable	AT&T Mobility

**Proposed Equipment**

Elevation <sup>1</sup> (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
73.0	77.0	6	Powerwave LGP21401	Platform w/ Handrails	(1) 0.39" Fiber Trunk	AT&T Mobility
		3	Ericsson RRUS A2 Module (15.1")			
		3	Ericsson RRUS-12 800MHz			
		3	CCI CCI-HPA-65R-BUU-H8			

<sup>1</sup>Mount elevation is defined as height above bottom of steel structure to the bottom of mount, RAD elevation is defined as center of antenna above ground level (AGL).

Install proposed coax inside the pole shaft.

### Structure Usages

Structural Component	Controlling Usage	Pass/Fail
Anchor Bolts	39%	Pass
Shaft	94%	Pass
Base Plate	73%	Pass

### Foundations

Reaction Component	Analysis Reactions	% of Usage
Moment (Kips-Ft)	731.3	71%
Axial (Kips)	17.1	2%
Shear (Kips)	13.2	70%

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

### Deflection and Sway\*

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Sway (Rotation) (°)
73.0	Powerwave Allgon LGP21401	AT&T Mobility	0.647	0.947
	Ericsson RRUS A2 Module (15.1")			
	Ericsson RRUS-12 800 MHz			
	CCI CCI-HPA-65R-BUU-H8			
10.0	Channel Master Type 120	SPOK Holdings, Inc.	0.012	0.141

\*Deflection and Sway was evaluated considering a design wind speed of 60 mph (3-Second Gust) per ANSI/TIA-222-G



## **Standard Conditions**

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessary limited, to:

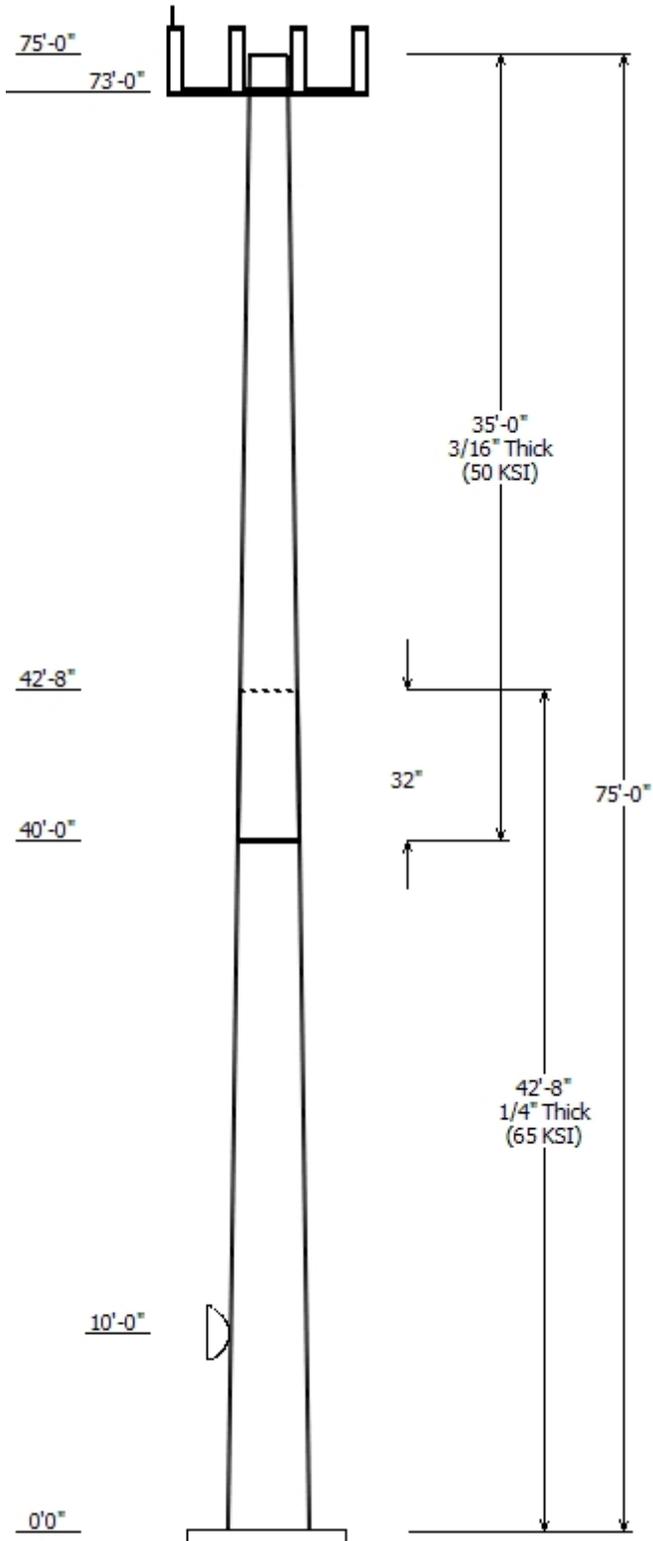
- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.
- Information from drawings in the possession of American Tower Corporation, or generated by field inspections or measurements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

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and that their capacity has not significantly changed from the "as new" condition.

Unless explicitly agreed by both the client and American Tower Corporation, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

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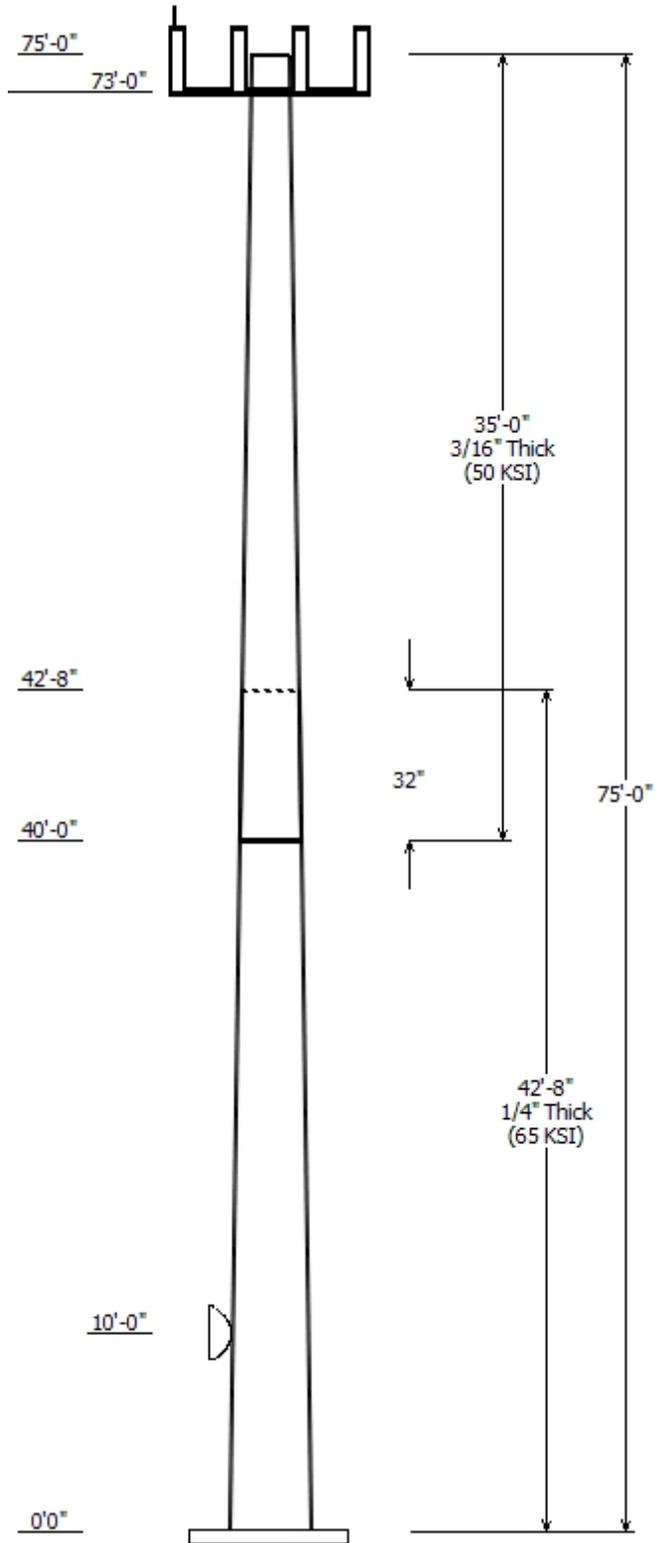
Job Information	
Pole :	302485
Code :	ANSI/TIA-222-G
Description :	75 ft ITT Meyer Monopole
Client :	AT&T MOBILITY
Struct Class :	II
Location :	Mdfd - Middlefield, CT
Shape :	12 Sides
Exposure :	B
Height :	75.00 (ft)
Topo :	1
Base Elev (ft):	0.00
Taper:	0.17793(in/ft)

Sections Properties						
Shaft Section	Length (ft)	Diameter (in)		Joint Type	Overlap Length (in)	Steel Grade (ksi)
		Top	Bottom			
1	42.667	20.37	27.97	0.250	0.000	65
2	35.000	15.00	21.22	0.188 Slip Joint	32.000	50

Discrete Appurtenance			
Attach Elev (ft)	Force Elev (ft)	Qty	Description
83.000	83.000	1	10' Omni
75.000	75.000	1	6' Omni
73.000	78.000	1	8' Omni
73.000	77.000	6	Powerwave Allgon LGP21401
73.000	77.000	1	Flat Platform with Handrails
73.000	77.000	3	CCI CCI-HPA-65R-BUU-H8
73.000	77.000	6	Powerwave Allgon 7770.00
73.000	77.000	3	Ericsson RRUS-12 800 MHz
73.000	77.000	3	Ericsson RRUS 11 (Band 12)
73.000	77.000	3	Ericsson RRUS A2 Module
73.000	77.000	6	Powerwave Allgon LGP21401
73.000	77.000	1	Raycap DC6-48-60-18-8F (23.5"
73.000	77.000	6	Powerwave Allgon 7020
10.000	10.000	1	Channel Master Type 120

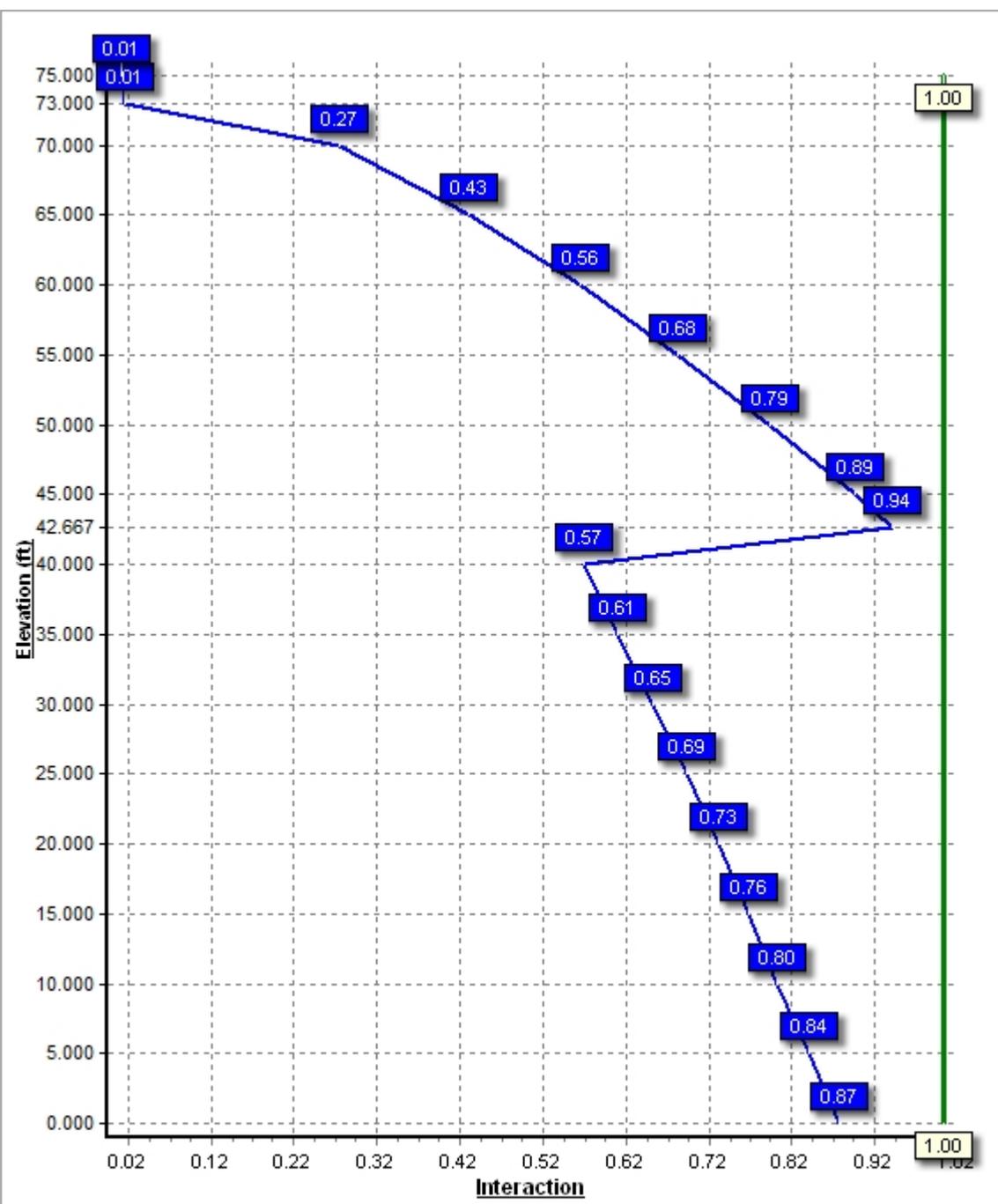
Linear Appurtenance			
Elev (ft)	Description	Exposed To Wind	
From	To		
5.000	10.000	0.28" RG-6	No
5.000	73.000	0.39" Fiber Trunk	No
5.000	73.000	0.78" 8 AWG 6	No
5.000	73.000	1 5/8" Coax	No
5.000	73.000	3" Conduit	No
5.000	73.000	7/8" Coax	No
5.000	75.000	7/8" Coax	No
5.000	83.000	1 5/8" Coax	No

Load Cases	
1.2D + 1.6W	120 mph with No Ice
0.9D + 1.6W	120 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	50 mph with 0.75 in Radial Ice
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Lateral Forces Method
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Modal Analysis Method
(0.9 - 0.2Sds) * DL + E	Seismic (Reduced DL) Equivalent Lateral
(0.9 - 0.2Sds) * DL + E	Seismic (Reduced DL) Equivalent Modal
1.0D + 1.0W	Serviceability 60 mph



Reactions			
Load Case	Moment (kip-ft)	Shear (kip)	Axial (kip)
1.2D + 1.6W	731.28	13.22	9.91
0.9D + 1.6W	725.25	13.21	7.42
1.2D + 1.0Di + 1.0Wi	110.85	1.92	17.01
(1.2 + 0.2Sds) * DL + E ELFM	31.15	0.48	9.89
(1.2 + 0.2Sds) * DL + E EMAM	92.32	1.33	9.89
(0.9 - 0.2Sds) * DL + E ELFM	30.82	0.48	6.71
(0.9 - 0.2Sds) * DL + E EMAM	91.30	1.33	6.71
1.0D + 1.0W	113.81	2.07	8.30

Dish Deflections			
Load Case	Attach Elev (ft)	Deflection (in)	Rotation (deg)
1.0D + 1.0W	10.00	0.150	0.141



Site Number: 302485

Code: ANSI/TIA-222-G

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Site Name: Mdfd - Middlefield, CT

Engineering Number: 64436721

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Customer: AT&T MOBILITY

**Analysis Parameters**

Location:	Middlesex County, CT	Height (ft):	75
Code:	ANSI/TIA-222-G	Base Diameter (in):	27.97
Shape:	12 Sides	Top Diameter (in):	15.00
Pole Type:	Taper	Taper (in/ft) :	0.178
Pole Manufacturer:	ITT Meyer		

**Ice & Wind Parameters**

Structure Class:	II	Design Wind Speed Without Ice:	120 mph
Exposure Category:	B	Design Wind Speed With Ice:	50 mph
Topographic Category:	1	Operational Wind Speed:	60 mph
Crest Height:	0.0 ft	Design Ice Thickness:	0.75 in

**Seismic Parameters**

Analysis Method:	Equivalent Modal Analysis & Equivalent Lateral Force Methods		
Site Class:	D - Stiff Soil		
Period Based on Rayleigh Method (sec):	1.49		
T <sub>L</sub> (sec):	6	p:	1.3
S <sub>s</sub> :	0.239	S <sub>1</sub> :	0.062
F <sub>a</sub> :	1.600	F <sub>v</sub> :	2.400
S <sub>ds</sub> :	0.255	S <sub>d1</sub> :	0.099
		C <sub>s</sub> :	0.044
		C <sub>s</sub> Max:	0.044
		C <sub>s</sub> Min:	0.030

**Load Cases**

1.2D + 1.6W	120 mph with No Ice
0.9D + 1.6W	120 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	50 mph with 0.75 in Radial Ice
(1.2 + 0.2Sds) * DL + E ELFM	Seismic Equivalent Lateral Forces Method
(1.2 + 0.2Sds) * DL + E EMAM	Seismic Equivalent Modal Analysis Method
(0.9 - 0.2Sds) * DL + E ELFM	Seismic (Reduced DL) Equivalent Lateral Forces Method
(0.9 - 0.2Sds) * DL + E EMAM	Seismic (Reduced DL) Equivalent Modal Analysis Method
1.0D + 1.0W	Serviceability 60 mph

Site Number: 302485

Code: ANSI/TIA-222-G

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Site Name: Mdfd - Middlefield, CT

Engineering Number: 64436721

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Customer: AT&T MOBILITY

**Shaft Section Properties**

Sect Info	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Slip Joint Len (in)	Weight (lb)	Bottom						Top						
							Dia (in)	Elev (ft)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Taper (in/ft)
1-12	42.667	0.2500	65		0.00	2,796	27.97	0.00	22.31	2188.6	27.83	111.88	20.37	42.67	16.20	837.9	19.70	81.51	0.177932
2-12	35.000	0.1875	50	Slip	32.00	1,289	21.22	40.00	12.70	717.8	28.19	113.21	15.00	75.00	8.94	250.5	19.29	80.00	0.177932
Shaft Weight						4,085													

**Discrete Appurtenance Properties**

Attach Elev (ft)	Description	Qty	Weight (lb)	No Ice EPAa (sf)	Orientation Factor	Weight (lb)	Ice EPAa (sf)	Orientation Factor	Distance From Face (ft)	Vert Ecc (ft)
83.00	10' Omni	1	25.00	3.000	1.00	146.14	5.793	1.00	0.000	0.000
75.00	6' Omni	1	25.00	1.760	1.00	99.33	2.980	1.00	0.000	0.000
73.00	8' Omni	1	25.00	2.400	1.00	122.28	4.292	1.00	0.000	5.000
73.00	CCI CCI-HPA-65R-BUU-H8	3	68.00	12.980	0.79	335.08	14.473	0.79	0.000	4.000
73.00	Ericsson RRUS 11 (Band 12)	3	50.00	2.570	0.50	124.39	3.170	0.50	0.000	4.000
73.00	Ericsson RRUS A2 Module	3	22.00	2.060	0.67	71.93	2.614	0.67	0.000	4.000
73.00	Ericsson RRUS-12 800 MHz	3	60.00	2.700	0.67	140.48	3.325	0.67	0.000	4.000
73.00	Flat Platform with Handrails	1	2000.00	42.400	1.00	3,322.38	61.914	1.00	0.000	4.000
73.00	Powerwave Allgon 7020	6	2.20	0.400	0.50	16.21	0.598	0.50	0.000	4.000
73.00	Powerwave Allgon 7770.00	6	35.00	5.510	0.77	158.40	6.479	0.77	0.000	4.000
73.00	Powerwave Allgon LGP21401	6	14.10	1.100	0.50	44.48	1.527	0.50	0.000	4.000
73.00	Powerwave Allgon LGP21401	6	14.10	1.100	0.50	44.48	1.527	0.50	0.000	4.000
73.00	Raycap DC6-48-60-18-8F	1	20.00	1.110	0.50	93.47	2.473	0.50	0.000	4.000
10.00	Channel Master Type 120	1	126.00	20.190	1.00	282.45	22.279	1.00	0.000	0.000
Totals		42	3213.40			7,663.20			Number of Loadings :	14

**Linear Appurtenance Properties**

Elev From (ft)	Elev To (ft)	Qty	Description	Coax Diameter (in)	Coax Weight (lb/ft)	Projected Width (in)	Exposed To Wind	Carrier
5.00	83.00	1	1 5/8" Coax	1.98	0.82	N	0.00	SPOK Holdings, Inc.
5.00	75.00	1	7/8" Coax	1.09	0.33	N	0.00	US Treasury
5.00	73.00	1	0.39" Fiber Trunk	0.39	0.06	N	0.00	AT&T Mobility
5.00	73.00	2	0.78" 8 AWG 6	0.78	0.59	N	0.00	AT&T Mobility
5.00	73.00	1	1 5/8" Coax	1.98	0.82	N	0.00	USA Mobility
5.00	73.00	1	3" Conduit	3.50	7.58	N	0.00	AT&T Mobility
5.00	73.00	12	7/8" Coax	1.09	0.33	N	0.00	AT&T Mobility
5.00	10.00	1	0.28" RG-6	0.28	0.03	N	0.00	SPOK Holdings, Inc.

Site Number: 302485

Code: ANSI/TIA-222-G

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Site Name: Mdfd - Middlefield, CT

Engineering Number: 64436721

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Customer: AT&T MOBILITY

**Segment Properties** (Max Len : 5.ft)

Seg Top Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Fy (ksi)	S (in <sup>3</sup> )	Z (in <sup>3</sup> )	Weight (lb)
0.00		0.2500	27.970	22.315	2,188.6	27.83	111.88	74.4	151.2	0.0	0.0
5.00		0.2500	27.080	21.598	1,984.5	26.88	108.32	75.4	141.6	0.0	373.6
10.00		0.2500	26.191	20.882	1,793.6	25.93	104.76	76.4	132.3	0.0	361.4
15.00		0.2500	25.301	20.166	1,615.3	24.97	101.20	77.5	123.3	0.0	349.2
20.00		0.2500	24.411	19.450	1,449.2	24.02	97.65	78.5	114.7	0.0	337.0
25.00		0.2500	23.522	18.734	1,295.0	23.07	94.09	79.6	106.4	0.0	324.8
30.00		0.2500	22.632	18.017	1,152.1	22.11	90.53	80.6	98.3	0.0	312.6
35.00		0.2500	21.742	17.301	1,020.1	21.16	86.97	81.6	90.6	0.0	300.5
40.00	Bot - Section 2	0.2500	20.853	16.585	898.6	20.21	83.41	81.9	83.2	0.0	288.3
42.67	Top - Section 1	0.1875	20.753	12.417	670.3	27.51	110.68	60.3	62.4	0.0	262.7
45.00		0.1875	20.338	12.166	630.5	26.92	108.47	60.7	59.9	0.0	97.6
50.00		0.1875	19.448	11.629	550.6	25.65	103.72	61.7	54.7	0.0	202.4
55.00		0.1875	18.559	11.092	477.8	24.38	98.98	62.6	49.7	0.0	193.3
60.00		0.1875	17.669	10.554	411.7	23.11	94.23	63.0	45.0	0.0	184.1
65.00		0.1875	16.779	10.017	352.0	21.84	89.49	63.0	40.5	0.0	175.0
70.00		0.1875	15.890	9.480	298.3	20.56	84.74	63.0	36.3	0.0	165.9
73.00		0.1875	15.356	9.158	268.9	19.80	81.90	63.0	33.8	0.0	95.1
75.00		0.1875	15.000	8.943	250.5	19.29	80.00	63.0	32.3	0.0	61.6
4,085.1											

Site Number: 302485

Code: ANSI/TIA-222-G

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Site Name: Mdfd - Middlefield, CT

Engineering Number: 64436721

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Customer: AT&T MOBILITY

<b>Load Case:</b> 1.2D + 1.6W	120 mph with No Ice	21 Iterations
Gust Response Factor : 1.10		Wind Importance Factor : 1.00
Dead Load Factor : 1.20		
Wind Load Factor : 1.60		

**Applied Segment Forces Summary**

Seg Elev (ft)	Description	Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
		Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		256.1	0.0					0.0	0.0	256.1	0.0	0.0	0.0
5.00		504.0	448.3					0.0	0.0	504.0	448.3	0.0	0.0
10.00	Appertunance(s)	487.4	433.7	871.1	0.0	0.0	151.2	0.0	88.7	1,358.6	673.5	0.0	0.0
15.00		470.9	419.0					0.0	88.5	470.9	507.5	0.0	0.0
20.00		454.3	404.4					0.0	88.5	454.3	492.9	0.0	0.0
25.00		437.8	389.8					0.0	88.5	437.8	478.3	0.0	0.0
30.00		426.2	375.2					0.0	88.5	426.2	463.7	0.0	0.0
35.00		422.8	360.5					0.0	88.5	422.8	449.0	0.0	0.0
40.00	Bot - Section 2	325.7	345.9					0.0	88.5	325.7	434.4	0.0	0.0
42.67	Top - Section 1	213.8	315.3					0.0	47.2	213.8	362.5	0.0	0.0
45.00		310.8	117.1					0.0	41.3	310.8	158.4	0.0	0.0
50.00		419.0	242.9					0.0	88.5	419.0	331.4	0.0	0.0
55.00		410.8	231.9					0.0	88.5	410.8	320.4	0.0	0.0
60.00		401.0	221.0					0.0	88.5	401.0	309.5	0.0	0.0
65.00		389.6	210.0					0.0	88.5	389.6	298.5	0.0	0.0
70.00		303.7	199.0					0.0	88.5	303.7	287.5	0.0	0.0
73.00	Appertunance(s)	185.1	114.2	5,805.7	0.0	23,324.8	3,644.9	0.0	53.1	5,990.8	3,812.1	0.0	0.0
75.00	Appertunance(s)	73.2	73.9	98.7	0.0	0.0	30.0	0.0	2.8	171.9	106.7	0.0	0.0
<b>Totals:</b>										13,267.7	9,934.70	0.00	0.00

Site Number: 302485

Code: ANSI/TIA-222-G

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Site Name: Mdfd - Middlefield, CT

Engineering Number: 64436721

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Customer: AT&T MOBILITY

**Load Case:** 1.2D + 1.6W

120 mph with No Ice

21 Iterations

Gust Response Factor : 1.10

Wind Importance Factor : 1.00

Dead Load Factor : 1.20

Wind Load Factor : 1.60

**Calculated Forces**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-9.91	-13.22	0.00	-731.28	0.00	731.28	1,493.32	746.66	1,706.94	842.99	0.00	0.00	0.874
5.00	-9.36	-12.79	0.00	-665.15	0.00	665.15	1,465.61	732.80	1,621.01	800.56	0.24	-0.45	0.838
10.00	-8.62	-11.50	0.00	-601.19	0.00	601.19	1,436.55	718.28	1,535.71	758.43	0.96	-0.91	0.799
15.00	-8.03	-11.08	0.00	-543.71	0.00	543.71	1,406.16	703.08	1,451.17	716.68	2.16	-1.36	0.765
20.00	-7.47	-10.67	0.00	-488.31	0.00	488.31	1,374.43	687.21	1,367.55	675.38	3.83	-1.82	0.729
25.00	-6.92	-10.27	0.00	-434.96	0.00	434.96	1,341.35	670.68	1,284.99	634.61	5.97	-2.27	0.691
30.00	-6.40	-9.88	0.00	-383.61	0.00	383.61	1,306.94	653.47	1,203.65	594.44	8.59	-2.72	0.650
35.00	-5.90	-9.48	0.00	-334.24	0.00	334.24	1,271.18	635.59	1,123.67	554.94	11.68	-3.16	0.607
40.00	-5.44	-9.16	0.00	-286.86	0.00	286.86	1,222.49	611.24	1,035.38	511.34	15.22	-3.60	0.566
42.67	-5.05	-8.94	0.00	-262.45	0.00	262.45	673.89	336.95	571.43	282.21	17.29	-3.83	0.938
45.00	-4.86	-8.65	0.00	-241.59	0.00	241.59	665.07	332.54	552.46	272.84	19.21	-4.03	0.893
50.00	-4.50	-8.24	0.00	-198.35	0.00	198.35	645.50	322.75	512.31	253.01	23.70	-4.52	0.792
55.00	-4.15	-7.84	0.00	-157.14	0.00	157.14	625.02	312.51	472.93	233.56	28.68	-4.98	0.680
60.00	-3.83	-7.44	0.00	-117.95	0.00	117.95	598.44	299.22	430.66	212.69	34.12	-5.39	0.562
65.00	-3.53	-7.04	0.00	-80.77	0.00	80.77	567.98	283.99	387.72	191.48	39.95	-5.73	0.429
70.00	-3.26	-6.72	0.00	-45.58	0.00	45.58	537.53	268.76	347.04	171.39	46.09	-5.99	0.273
73.00	-0.10	-0.36	0.00	-2.10	0.00	2.10	519.25	259.63	323.71	159.87	49.89	-6.09	0.013
75.00	0.00	-0.35	0.00	-1.39	0.00	1.39	507.07	253.54	308.61	152.41	52.43	-6.10	0.009

Site Number: 302485

Code: ANSI/TIA-222-G

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Site Name: Mdfd - Middlefield, CT

Engineering Number: 64436721

12/8/2015 4:27:55 PM

Customer: AT&T MOBILITY

<b>Load Case:</b> 0.9D + 1.6W	120 mph with No Ice (Reduced DL)	21 Iterations
Gust Response Factor : 1.10		Wind Importance Factor : 1.00
Dead Load Factor : 0.90		
Wind Load Factor : 1.60		

**Applied Segment Forces Summary**

Seg Elev (ft)	Description	Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
		Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		256.1	0.0					0.0	0.0	256.1	0.0	0.0	0.0
5.00		504.0	336.2					0.0	0.0	504.0	336.2	0.0	0.0
10.00	Appertunance(s)	487.4	325.2	871.1	0.0	0.0	113.4	0.0	66.5	1,358.6	505.1	0.0	0.0
15.00		470.9	314.3					0.0	66.4	470.9	380.6	0.0	0.0
20.00		454.3	303.3					0.0	66.4	454.3	369.7	0.0	0.0
25.00		437.8	292.3					0.0	66.4	437.8	358.7	0.0	0.0
30.00		426.2	281.4					0.0	66.4	426.2	347.7	0.0	0.0
35.00		422.8	270.4					0.0	66.4	422.8	336.8	0.0	0.0
40.00	Bot - Section 2	325.7	259.4					0.0	66.4	325.7	325.8	0.0	0.0
42.67	Top - Section 1	213.8	236.5					0.0	35.4	213.8	271.9	0.0	0.0
45.00		310.8	87.8					0.0	31.0	310.8	118.8	0.0	0.0
50.00		419.0	182.2					0.0	66.4	419.0	248.6	0.0	0.0
55.00		410.8	174.0					0.0	66.4	410.8	240.3	0.0	0.0
60.00		401.0	165.7					0.0	66.4	401.0	232.1	0.0	0.0
65.00		389.6	157.5					0.0	66.4	389.6	223.9	0.0	0.0
70.00		303.7	149.3					0.0	66.4	303.7	215.7	0.0	0.0
73.00	Appertunance(s)	185.1	85.6	5,805.7	0.0	23,324.8	2,733.7	0.0	39.8	5,990.8	2,859.1	0.0	0.0
75.00	Appertunance(s)	73.2	55.4	98.7	0.0	0.0	22.5	0.0	2.1	171.9	80.0	0.0	0.0
<b>Totals:</b>										13,267.7	7,451.03	0.00	0.00

Site Number: 302485

Code: ANSI/TIA-222-G

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Site Name: Mdfd - Middlefield, CT

Engineering Number: 64436721

12/8/2015 4:27:56 PM

Customer: AT&T MOBILITY

**Load Case:** 0.9D + 1.6W

120 mph with No Ice (Reduced DL)

21 Iterations

Gust Response Factor : 1.10

Wind Importance Factor : 1.00

Dead Load Factor : 0.90

Wind Load Factor : 1.60

**Calculated Forces**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-7.42	-13.21	0.00	-725.25	0.00	725.25	1,493.32	746.66	1,706.94	842.99	0.00	0.00	0.866
5.00	-6.99	-12.76	0.00	-659.17	0.00	659.17	1,465.61	732.80	1,621.01	800.56	0.24	-0.45	0.828
10.00	-6.41	-11.45	0.00	-595.35	0.00	595.35	1,436.55	718.28	1,535.71	758.43	0.95	-0.90	0.790
15.00	-5.95	-11.02	0.00	-538.10	0.00	538.10	1,406.16	703.08	1,451.17	716.68	2.14	-1.35	0.755
20.00	-5.51	-10.60	0.00	-483.01	0.00	483.01	1,374.43	687.21	1,367.55	675.38	3.79	-1.80	0.719
25.00	-5.09	-10.19	0.00	-430.01	0.00	430.01	1,341.35	670.68	1,284.99	634.61	5.92	-2.25	0.682
30.00	-4.68	-9.78	0.00	-379.07	0.00	379.07	1,306.94	653.47	1,203.65	594.44	8.51	-2.69	0.642
35.00	-4.30	-9.38	0.00	-330.15	0.00	330.15	1,271.18	635.59	1,123.67	554.94	11.56	-3.13	0.599
40.00	-3.94	-9.06	0.00	-283.27	0.00	283.27	1,222.49	611.24	1,035.38	511.34	15.07	-3.56	0.557
42.67	-3.65	-8.84	0.00	-259.12	0.00	259.12	673.89	336.95	571.43	282.21	17.12	-3.79	0.924
45.00	-3.50	-8.54	0.00	-238.50	0.00	238.50	665.07	332.54	552.46	272.84	19.02	-3.98	0.880
50.00	-3.22	-8.13	0.00	-195.79	0.00	195.79	645.50	322.75	512.31	253.01	23.45	-4.47	0.779
55.00	-2.95	-7.73	0.00	-155.13	0.00	155.13	625.02	312.51	472.93	233.56	28.38	-4.93	0.670
60.00	-2.71	-7.32	0.00	-116.50	0.00	116.50	598.44	299.22	430.66	212.69	33.76	-5.33	0.553
65.00	-2.49	-6.93	0.00	-79.88	0.00	79.88	567.98	283.99	387.72	191.48	39.52	-5.67	0.422
70.00	-2.29	-6.61	0.00	-45.25	0.00	45.25	537.53	268.76	347.04	171.39	45.60	-5.92	0.269
73.00	-0.07	-0.35	0.00	-2.09	0.00	2.09	519.25	259.63	323.71	159.87	49.35	-6.02	0.013
75.00	0.00	-0.35	0.00	-1.39	0.00	1.39	507.07	253.54	308.61	152.41	51.87	-6.03	0.009

Site Number: 302485

Code: ANSI/TIA-222-G

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Site Name: Mdfd - Middlefield, CT

Engineering Number: 64436721

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Customer: AT&T MOBILITY

<b>Load Case:</b> 1.2D + 1.0Di + 1.0Wi	50 mph with 0.75 in Radial Ice	20 Iterations
Gust Response Factor : 1.10	Ice Dead Load Factor : 1.00	Wind Importance Factor : 1.00
Dead Load Factor : 1.20		Ice Importance Factor : 1.00
Wind Load Factor : 1.00		

**Applied Segment Forces Summary**

Seg Elev (ft)	Description	Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
		Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		36.1	0.0					0.0	0.0	36.1	0.0	0.0	0.0
5.00		71.4	660.1					0.0	0.0	71.4	660.1	0.0	0.0
10.00	Appertunance(s)	69.7	663.7	104.3	0.0	0.0	156.7	0.0	88.7	174.0	909.0	0.0	0.0
15.00		67.8	653.9					0.0	88.5	67.8	742.4	0.0	0.0
20.00		65.8	639.6					0.0	88.5	65.8	728.1	0.0	0.0
25.00		63.8	622.9					0.0	88.5	63.8	711.4	0.0	0.0
30.00		62.5	604.8					0.0	88.5	62.5	693.3	0.0	0.0
35.00		62.4	585.7					0.0	88.5	62.4	674.2	0.0	0.0
40.00	Bot - Section 2	48.3	565.7					0.0	88.5	48.3	654.2	0.0	0.0
42.67	Top - Section 1	31.8	433.2					0.0	47.2	31.8	480.4	0.0	0.0
45.00		46.5	219.0					0.0	41.3	46.5	260.3	0.0	0.0
50.00		63.0	454.2					0.0	88.5	63.0	542.7	0.0	0.0
55.00		62.3	436.4					0.0	88.5	62.3	524.9	0.0	0.0
60.00		61.3	418.3					0.0	88.5	61.3	506.8	0.0	0.0
65.00		60.1	399.9					0.0	88.5	60.1	488.4	0.0	0.0
70.00		47.2	381.2					0.0	88.5	47.2	469.7	0.0	0.0
73.00	Appertunance(s)	29.0	220.8	828.0	0.0	3,331.6	7,292.7	0.0	53.1	856.9	7,566.7	0.0	0.0
75.00	Appertunance(s)	11.5	143.8	18.1	0.0	0.0	104.3	0.0	2.8	29.6	250.9	0.0	0.0
<b>Totals:</b>										1,911.00	16,863.5	0.00	0.00

Site Number: 302485

Code: ANSI/TIA-222-G

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Site Name: Mdfd - Middlefield, CT

Engineering Number: 64436721

12/8/2015 4:27:57 PM

Customer: AT&T MOBILITY

**Load Case:** 1.2D + 1.0Di + 1.0Wi

50 mph with 0.75 in Radial Ice

20 Iterations

Gust Response Factor : 1.10

Ice Dead Load Factor : 1.00

Wind Importance Factor : 1.00

Dead Load Factor : 1.20

Ice Importance Factor : 1.00

Wind Load Factor : 1.00

**Calculated Forces**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-17.01	-1.92	0.00	-110.85	0.00	110.85	1,493.32	746.66	1,706.94	842.99	0.00	0.00	0.143
5.00	-16.35	-1.87	0.00	-101.24	0.00	101.24	1,465.61	732.80	1,621.01	800.56	0.04	-0.07	0.138
10.00	-15.44	-1.71	0.00	-91.89	0.00	91.89	1,436.55	718.28	1,535.71	758.43	0.15	-0.14	0.132
15.00	-14.70	-1.66	0.00	-83.33	0.00	83.33	1,406.16	703.08	1,451.17	716.68	0.33	-0.21	0.127
20.00	-13.97	-1.61	0.00	-75.03	0.00	75.03	1,374.43	687.21	1,367.55	675.38	0.58	-0.28	0.121
25.00	-13.25	-1.56	0.00	-66.99	0.00	66.99	1,341.35	670.68	1,284.99	634.61	0.91	-0.35	0.115
30.00	-12.56	-1.50	0.00	-59.20	0.00	59.20	1,306.94	653.47	1,203.65	594.44	1.31	-0.42	0.109
35.00	-11.88	-1.45	0.00	-51.68	0.00	51.68	1,271.18	635.59	1,123.67	554.94	1.79	-0.48	0.102
40.00	-11.23	-1.41	0.00	-44.43	0.00	44.43	1,222.49	611.24	1,035.38	511.34	2.33	-0.55	0.096
42.67	-10.75	-1.38	0.00	-40.68	0.00	40.68	673.89	336.95	571.43	282.21	2.65	-0.59	0.160
45.00	-10.49	-1.34	0.00	-37.46	0.00	37.46	665.07	332.54	552.46	272.84	2.94	-0.62	0.153
50.00	-9.94	-1.28	0.00	-30.78	0.00	30.78	645.50	322.75	512.31	253.01	3.63	-0.70	0.137
55.00	-9.42	-1.22	0.00	-24.37	0.00	24.37	625.02	312.51	472.93	233.56	4.40	-0.77	0.119
60.00	-8.91	-1.16	0.00	-18.26	0.00	18.26	598.44	299.22	430.66	212.69	5.24	-0.83	0.101
65.00	-8.42	-1.10	0.00	-12.44	0.00	12.44	567.98	283.99	387.72	191.48	6.14	-0.88	0.080
70.00	-7.95	-1.05	0.00	-6.92	0.00	6.92	537.53	268.76	347.04	171.39	7.09	-0.92	0.055
73.00	-0.40	-0.07	0.00	-0.44	0.00	0.44	519.25	259.63	323.71	159.87	7.67	-0.94	0.003
75.00	0.00	-0.07	0.00	-0.29	0.00	0.29	507.07	253.54	308.61	152.41	8.06	-0.94	0.002

Site Number: 302485

Code: ANSI/TIA-222-G

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Site Name: Mdfd - Middlefield, CT

Engineering Number: 64436721

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Customer: AT&T MOBILITY

**Load Case:** 1.0D + 1.0W

Serviceability 60 mph

20 Iterations

Gust Response Factor : 1.10

Wind Importance Factor : 1.00

Dead Load Factor : 1.00

Wind Load Factor : 1.00

**Applied Segment Forces Summary**

Seg Elev (ft)	Description	Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
		Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		40.0	0.0					0.0	0.0	40.0	0.0	0.0	0.0
5.00		78.8	373.6					0.0	0.0	78.8	373.6	0.0	0.0
10.00	Appertunance(s)	76.2	361.4	136.1	0.0	0.0	126.0	0.0	73.9	212.3	561.3	0.0	0.0
15.00		73.6	349.2					0.0	73.7	73.6	422.9	0.0	0.0
20.00		71.0	337.0					0.0	73.7	71.0	410.8	0.0	0.0
25.00		68.4	324.8					0.0	73.7	68.4	398.6	0.0	0.0
30.00		66.6	312.6					0.0	73.7	66.6	386.4	0.0	0.0
35.00		66.1	300.5					0.0	73.7	66.1	374.2	0.0	0.0
40.00	Bot - Section 2	50.9	288.3					0.0	73.7	50.9	362.0	0.0	0.0
42.67	Top - Section 1	33.4	262.7					0.0	39.3	33.4	302.1	0.0	0.0
45.00		48.6	97.6					0.0	34.4	48.6	132.0	0.0	0.0
50.00		65.5	202.4					0.0	73.7	65.5	276.2	0.0	0.0
55.00		64.2	193.3					0.0	73.7	64.2	267.0	0.0	0.0
60.00		62.7	184.1					0.0	73.7	62.7	257.9	0.0	0.0
65.00		60.9	175.0					0.0	73.7	60.9	248.8	0.0	0.0
70.00		47.5	165.9					0.0	73.7	47.5	239.6	0.0	0.0
73.00	Appertunance(s)	28.9	95.1	907.1	0.0	3,644.5	3,037.4	0.0	44.2	936.1	3,176.8	0.0	0.0
75.00	Appertunance(s)	11.4	61.6	15.4	0.0	0.0	25.0	0.0	2.3	26.9	88.9	0.0	0.0
<b>Totals:</b>										2,073.09	8,278.92	0.00	0.00

Site Number: 302485

Code: ANSI/TIA-222-G

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Site Name: Mdfd - Middlefield, CT

Engineering Number: 64436721

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Customer: AT&T MOBILITY

**Load Case:** 1.0D + 1.0W

Serviceability 60 mph

20 Iterations

Gust Response Factor : 1.10

Wind Importance Factor : 1.00

Dead Load Factor : 1.00

Wind Load Factor : 1.00

**Calculated Forces**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-8.30	-2.07	0.00	-113.81	0.00	113.81	1,493.32	746.66	1,706.94	842.99	0.00	0.00	0.141
5.00	-7.93	-2.00	0.00	-103.49	0.00	103.49	1,465.61	732.80	1,621.01	800.56	0.04	-0.07	0.135
10.00	-7.36	-1.79	0.00	-93.51	0.00	93.51	1,436.55	718.28	1,535.71	758.43	0.15	-0.14	0.128
15.00	-6.94	-1.73	0.00	-84.55	0.00	84.55	1,406.16	703.08	1,451.17	716.68	0.34	-0.21	0.123
20.00	-6.53	-1.66	0.00	-75.92	0.00	75.92	1,374.43	687.21	1,367.55	675.38	0.60	-0.28	0.117
25.00	-6.13	-1.60	0.00	-67.62	0.00	67.62	1,341.35	670.68	1,284.99	634.61	0.93	-0.35	0.111
30.00	-5.74	-1.54	0.00	-59.63	0.00	59.63	1,306.94	653.47	1,203.65	594.44	1.34	-0.42	0.105
35.00	-5.36	-1.47	0.00	-51.96	0.00	51.96	1,271.18	635.59	1,123.67	554.94	1.82	-0.49	0.098
40.00	-5.00	-1.42	0.00	-44.59	0.00	44.59	1,222.49	611.24	1,035.38	511.34	2.37	-0.56	0.091
42.67	-4.70	-1.39	0.00	-40.80	0.00	40.80	673.89	336.95	571.43	282.21	2.69	-0.60	0.152
45.00	-4.56	-1.34	0.00	-37.56	0.00	37.56	665.07	332.54	552.46	272.84	2.99	-0.63	0.145
50.00	-4.29	-1.28	0.00	-30.84	0.00	30.84	645.50	322.75	512.31	253.01	3.69	-0.70	0.129
55.00	-4.02	-1.22	0.00	-24.44	0.00	24.44	625.02	312.51	472.93	233.56	4.46	-0.77	0.111
60.00	-3.76	-1.16	0.00	-18.35	0.00	18.35	598.44	299.22	430.66	212.69	5.31	-0.84	0.093
65.00	-3.51	-1.09	0.00	-12.57	0.00	12.57	567.98	283.99	387.72	191.48	6.22	-0.89	0.072
70.00	-3.27	-1.04	0.00	-7.10	0.00	7.10	537.53	268.76	347.04	171.39	7.17	-0.93	0.048
73.00	-0.11	-0.06	0.00	-0.33	0.00	0.33	519.25	259.63	323.71	159.87	7.77	-0.95	0.002
75.00	0.00	-0.05	0.00	-0.22	0.00	0.22	507.07	253.54	308.61	152.41	8.16	-0.95	0.001

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Site Number: 302485

Code: ANSI/TIA-222-G

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Site Name: Mdfd - Middlefield, CT

Engineering Number: 64436721

12/8/2015 4:27:57 PM

Customer: AT&T MOBILITY

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### Equivalent Lateral Forces Method Analysis

(Based on ASCE7-10 Chapters 11, 12, 15)

Spectral Response Acceleration for Short Period ( $S_s$ ):	0.24
Spectral Response Acceleration at 1.0 Second Period ( $S_1$ ):	0.06
Long-Period Transition Period ( $T_L$ ):	6
Importance Factor ( $I_E$ ):	1.00
Site Coefficient $F_a$ :	1.60
Site Coefficient $F_v$ :	2.40
Response Modification Coefficient (R):	1.50
Design Spectral Response Acceleration at Short Period ( $S_{ds}$ ):	0.25
Design Spectral Response Acceleration at 1.0 Second Period ( $S_{d1}$ ):	0.10
Seismic Response Coefficient ( $C_s$ ):	0.04
Upper Limit $C_s$	0.04
Lower Limit $C_s$	0.03
Period based on Rayleigh Method (sec):	1.49
Redundancy Factor (p):	1.30
Seismic Force Distribution Exponent (k):	1.50
Total Unfactored Dead Load:	8.30 k
Seismic Base Shear (E):	0.48 k

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### Equivalent Modal Forces Analysis

(Based on ASCE7-10 Chapters 11, 12 & 15 and ANSI/TIA-G, section 2.7)

Spectral Response Acceleration for Short Period ( $S_s$ ):	0.24
Spectral Response Acceleration at 1.0 Second Period ( $S_1$ ):	0.06
Importance Factor ( $I_E$ ):	1.00
Site Coefficient $F_a$ :	1.60
Site Coefficient $F_v$ :	2.40
Response Modification Coefficient (R):	1.50
Design Spectral Response Acceleration at Short Period ( $S_{ds}$ ):	0.25
Design Spectral Response Acceleration at 1.0 Second Period ( $S_{d1}$ ):	0.10
Period Based on Rayleigh Method (sec):	1.49
Redundancy Factor ( $\rho$ ):	1.30

#### Load Case (1.2 + 0.2Sds) \* DL + E ELFM

#### Seismic Equivalent Lateral Forces Method

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
17	74.00	64	1.840	1.726	1.048	0.447	25	54
16	71.50	139	1.718	1.191	0.842	0.349	42	118
15	67.50	240	1.531	0.580	0.580	0.217	45	203
14	62.50	249	1.312	0.138	0.347	0.090	19	211
13	57.50	258	1.111	-0.064	0.194	0.006	1	219
12	52.50	267	0.926	-0.121	0.098	-0.036	-8	227
11	47.50	276	0.758	-0.103	0.043	-0.040	-9	234
10	43.83	132	0.646	-0.069	0.021	-0.022	-2	112
9	41.33	302	0.574	-0.043	0.012	-0.004	-1	256
8	37.50	362	0.472	-0.006	0.006	0.024	8	307
7	32.50	374	0.355	0.031	0.008	0.051	17	318
6	27.50	386	0.254	0.055	0.017	0.063	21	328
5	22.50	399	0.170	0.066	0.027	0.064	22	338
4	17.50	411	0.103	0.071	0.037	0.061	22	349
3	12.50	423	0.053	0.071	0.042	0.058	21	359
2	7.50	435	0.019	0.063	0.037	0.051	19	370
1	2.50	374	0.002	0.033	0.018	0.028	9	317
10' Omni	83.00	25	2.315	5.051	2.137	0.894	19	21
6' Omni	75.00	25	1.890	1.980	1.140	0.489	11	21
Powerwave Allgon 702	73.00	13	1.791	1.496	0.961	0.406	5	11
Powerwave Allgon LGP	73.00	85	1.791	1.496	0.961	0.406	30	72
Powerwave Allgon LGP	73.00	85	1.791	1.496	0.961	0.406	30	72
Raycap DC6-48-60-18-	73.00	20	1.791	1.496	0.961	0.406	7	17
Ericsson RRUS A2 Mod	73.00	66	1.791	1.496	0.961	0.406	23	56
8' Omni	73.00	25	1.791	1.496	0.961	0.406	9	21
Ericsson RRUS 11 (Ba	73.00	150	1.791	1.496	0.961	0.406	53	127
Ericsson RRUS-12 800	73.00	180	1.791	1.496	0.961	0.406	63	153
Powerwave Allgon 777	73.00	210	1.791	1.496	0.961	0.406	74	178
CCI CCI-HPA-65R-BUU-	73.00	204	1.791	1.496	0.961	0.406	72	173
Flat Platform with H	73.00	2,000	1.791	1.496	0.961	0.406	705	1,698
Channel Master Type	10.00	126	0.034	0.069	0.041	0.055	6	107
		8,304	35.778	27.173	17.266	7.317	1,356	7,050

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**Load Case (1.2 + 0.2Sds) \* DL + E EMAM**

**Seismic Equivalent Modal Analysis Method**

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Channel Master Type	10.00	126	0.034	0.069	0.041	0.055	6	107
		8,304	35.778	27.173	17.266	7.317	1,356	7,050

**Load Case (0.9 - 0.2Sds) \* DL + E ELFM**

**Seismic (Reduced DL) Equivalent Lateral Forces Method**

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
17	74.00	64	1.840	1.726	1.048	0.447	25	54
16	71.50	139	1.718	1.191	0.842	0.349	42	118
15	67.50	240	1.531	0.580	0.580	0.217	45	203
14	62.50	249	1.312	0.138	0.347	0.090	19	211
13	57.50	258	1.111	-0.064	0.194	0.006	1	219
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11	47.50	276	0.758	-0.103	0.043	-0.040	-9	234
10	43.83	132	0.646	-0.069	0.021	-0.022	-2	112
9	41.33	302	0.574	-0.043	0.012	-0.004	-1	256
8	37.50	362	0.472	-0.006	0.006	0.024	8	307
7	32.50	374	0.355	0.031	0.008	0.051	17	318
6	27.50	386	0.254	0.055	0.017	0.063	21	328
5	22.50	399	0.170	0.066	0.027	0.064	22	338
4	17.50	411	0.103	0.071	0.037	0.061	22	349

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Site Name: Mdfd - Middlefield, CT

Engineering Number: 64436721

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Customer: AT&T MOBILITY

### Analysis Summary

Load Case	Reactions						Max Usage	
	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)	Elev (ft)	Interaction Ratio
1.2D + 1.6W	13.22	0.00	9.91	0.00	0.00	731.28	42.67	0.94
0.9D + 1.6W	13.21	0.00	7.42	0.00	0.00	725.25	42.67	0.92
1.2D + 1.0Di + 1.0Wi	1.92	0.00	17.01	0.00	0.00	110.85	42.67	0.16
(1.2 + 0.2Sds) * DL + E ELFM	0.48	0.00	9.89	0.00	0.00	31.15	42.67	0.05
(1.2 + 0.2Sds) * DL + E EMAM	1.33	0.00	9.89	0.00	0.00	92.32	42.67	0.14
(0.9 - 0.2Sds) * DL + E ELFM	0.48	0.00	6.71	0.00	0.00	30.82	42.67	0.05
(0.9 - 0.2Sds) * DL + E EMAM	1.33	0.00	6.71	0.00	0.00	91.30	42.67	0.14
1.0D + 1.0W	2.07	0.00	8.30	0.00	0.00	113.81	42.67	0.15

<b>Base/Flange Plate</b>	Plate Type	<b>Baseplate</b>
	Pole Diameter	27.97 in
	Pole Thickness	0.25 in
	Plate Length	44 in
	Plate Thickness	2 in
	Plate Fy	60 ksi
	Weld Length	0.25 in
	$\phi_s$ Resistance	1776.53 k-in
	Applied	1301.20 k-in
<b>Stiffeners</b>	#	0

Code Rev. **G**

Date 12/7/2015  
 Engineer Nathaniel Ober  
 Site # 302485  
 Carrier AT&T Mobility

Moment 731.3 k-ft  
 Axial 17.1 k

<b>Bolts</b>	#	8
	Bolt Circle	44 in
	(R)adial / (S)quare	S
	Bolt Gap	6 in
	Diameter	2.25 in
	Hole Diameter	2.625 in
	Type	A615-75
	Fy	75 ksi
	Fu	100 ksi
	$\phi_s$ Resistance	259.82 k
Applied	100.83 k	
<b>Reinforcement</b>	#	0
<b>Extra Bolts</b>	#	0

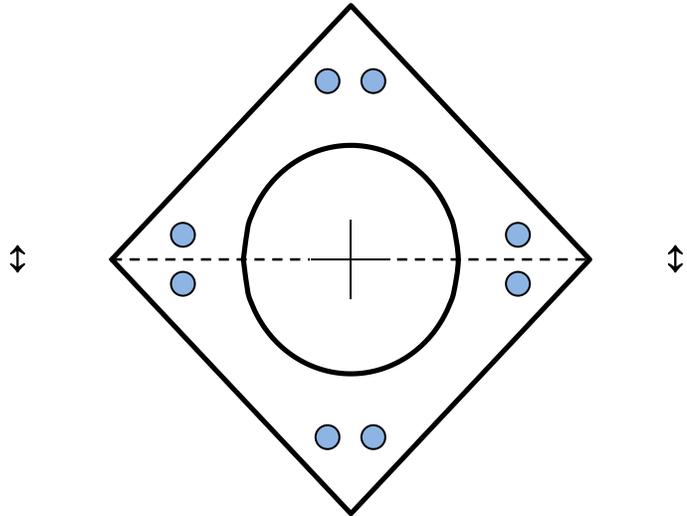


Plate Stress Ratio:  
**0.73** (Pass)

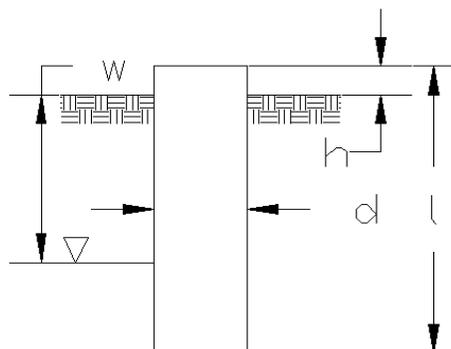
Bolt Stress Ratio:  
**0.39** (Pass)

Site Name: Middlefield CT  
 Site Number: 302485  
 Engineer: Nathaniel Ober  
 Engineering Number: 64436721  
 Date: 12/08/15

Program Last Updated: 5/13/2014  
 American Tower Corporation

**Design Base Loads (Factored) - Analysis per TIA-222-G Standards**

Analyze or Design a Foundation? Analyze  
 Foundation Mapped: N  
 Moment (M): 731.3 k-ft  
 Shear/Leg (V): 13.2 k  
 Axial Load (P): 17.1 k  
 Uplift/Leg (U): 0.0 k  
 Tower Type (GT / SST / MP): MP



Diameter of Caisson (d): 6.8 ft  
 Caisson Embedment (L-h): 5.0 ft  
 Caisson Height Above Ground (h): 0.5 ft  
 Depth Below Ground Surface to Water Table (w): 99.0 ft  
 Unit Weight of Concrete: 150.0 pcf  
 Unit Weight of Water: 62.4 pcf  
 Tension Skin Friction/Compression Skin Friction: 1.00  
 Pullout Angle: 30.0 degrees

Engineer Notes

**Soil Mechanical Properties**

Depth (ft)		$\gamma_{Soil}$	Cohesion	$\phi$	Ultimate Skin	Ultimate Bearing
Top	Bottom	(pcf)	(psf)	(degree)	Friction (psf)	Pressure (psf)
0.0	3.0	100	0	0	0	0
3.0	8.0	100	0	0	0	45000

Required Embedment: #N/A #N/A  
 Volume of Concrete: 198.0 ft<sup>3</sup> = 7.3 yd<sup>3</sup>  
 Weight of Concrete (Buoyancy Effect Considered): 29.7 k  
 Average Soil Unit Weight: 100.0 pcf  
 Skin Friction Resistance: 0.0 k  
 Compressive Bearing Resistance: 1619.9 k  
 Pullout Weight (Minus Concrete Weight): 19.7 k  
 Nominal Uplift Capacity per Leg ( $\phi_s T_n$ ): 14.8 k  
 Nominal Compressive Capacity per Leg ( $\phi_s P_n$ ): 1214.9 k  
 $P_u$ : 27.9 k  
 $T_u / \phi_s T_n$ : 0.00 Result: OK  
 $P_u / \phi_s P_n$ : 0.02 Result: OK  
 Total Lateral Resistance: 21.7 k  
 Inflection Point (Below Ground Surface): 3.7 ft  
 Design Overturning Moment At Inflection Point ( $M_D$ ): 786.4 k-ft  
 Nominal Moment Capacity ( $\phi_s M_n$ ): 17.5 k-ft  
 $\phi_s$ : 0.75

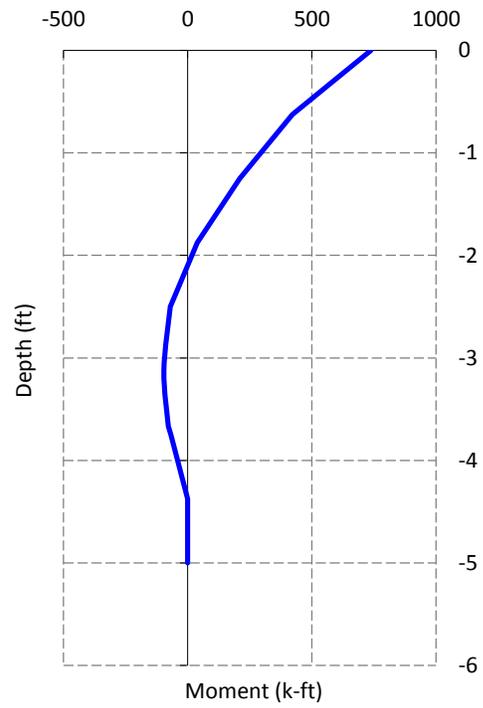
## Caisson Strength Capacity

Concrete Compressive Strength ( $f'_c$ ):	4500 psi
Vertical Steel Rebar Size #:	11
Vertical Steel Rebar Area:	1.56 in <sup>2</sup>
# of Vertical Steel Rebars:	52
Vertical Steel Rebar Yield Strength ( $F_y$ ):	60 ksi
Horizontal Tie / Stirrup Size #:	5
Horizontal Tie / Stirrup Area:	0.31 in <sup>2</sup>
Design Horizontal Tie / Stirrup Spacing:	12.0 in
Horizontal Tie / Stirrup Steel Yield Strength ( $F_y$ ):	60 ksi
Rebar Cage Diameter:	73.2 in
Strength Bending/Tension Reduction Factor ( $\phi_B$ ):	0.90 ACI318-05 - 9.3.2.1
Strength Shear Reduction Factor ( $\phi_V$ ):	0.75 ACI318-05 - 9.3.2.3
Strength Compression Reduction Factor ( $\phi_P$ ):	0.65 ACI318-05 - 9.3.2.2
Steel Elastic Modulus:	29000 ksi
Design Moment ( $M_u$ ):	737.9 k-ft
Nominal Moment Capacity ( $\phi_B M_n$ ):	13072.5 k-ft - ACI318-005 - 10.2
$M_u/\phi_B M_n$ :	0.06 Result: OK
Design Shear ( $V_u$ ):	364.3 k
Nominal Shear Capacity ( $\phi_V V_n$ ):	522.4 k - ACI318-05 - 11.3.1.1 or 11.5.7.2
$V_u/\phi_V V_n$ :	0.70 Result: OK
Design Tension ( $T_u$ ):	0.0 k
Nominal Tension Capacity ( $\phi_T T_n$ ):	4380.5 k - ACI318-05 - 10.2
$T_u/\phi_T T_n$ :	0.00 Result: OK
Design Compression ( $P_u$ ):	27.9 k
Nominal Compression Capacity ( $\phi_P P_n$ ):	10148.8 k - ACI318-05 - 10.3.6.2
$P_u/\phi_P P_n$ :	0.00 Result: OK
Bending Reinforcement Ratio:	0.016 ACI318-05 - 10.8.4 & 10.9.1
$M_u/\phi_B M_n + T_u/\phi_T T_n$ :	0.06 Result: OK

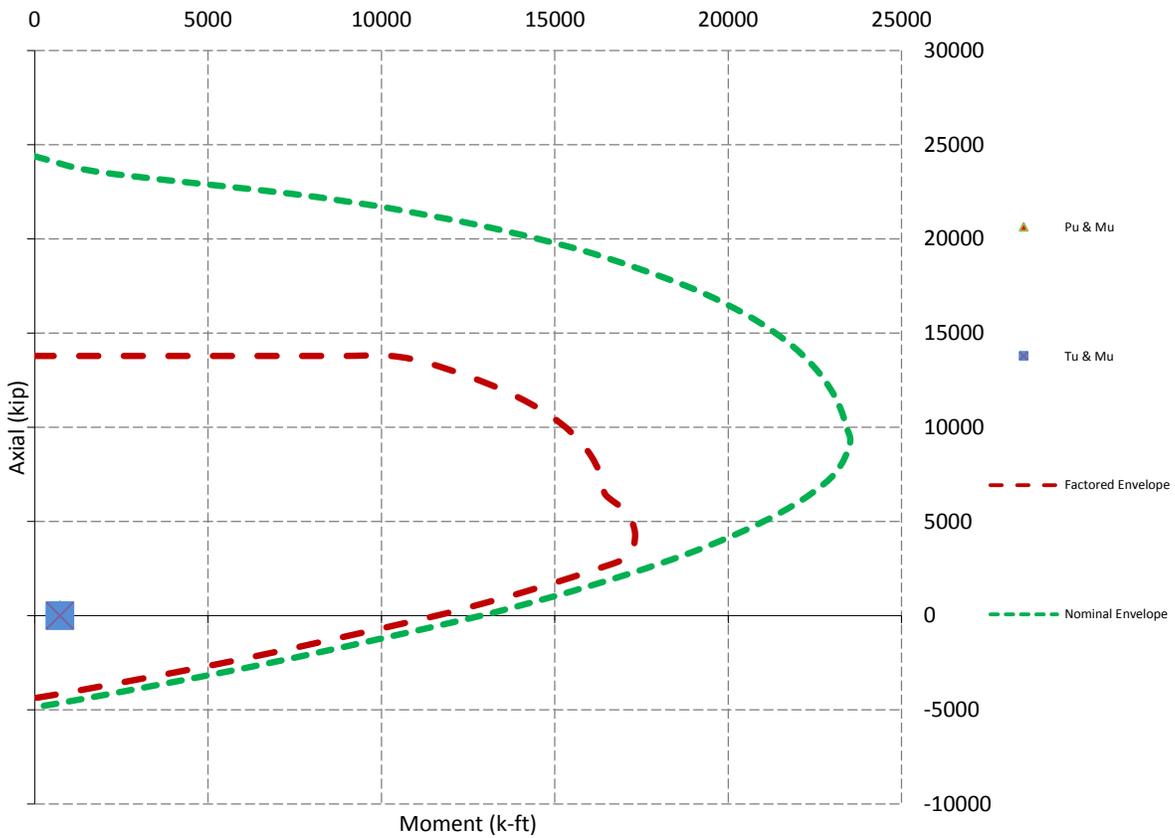
Design Factored Shear / Depth

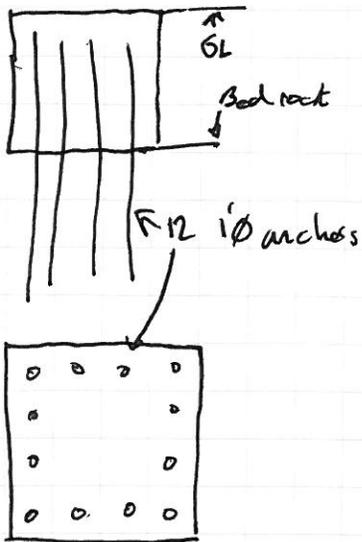


Design Factored Moment / Depth



Nominal and Factored Moment Capacity and Factored Design Loads





Anchor  $T = 60 \text{ kip}$

Design  $OTM = 796.2 \text{ k}$   $778.7 \text{ k}$

Nominal Moment Capacity ( $\phi M_n$ ) =  $17.5 \text{ k}$

Total Overturn Moment Capacity =  $\phi M_{RT}$

$$\begin{aligned} \phi M_{RT} &= \phi M_n + \sum \phi (T_{\text{anchor}} \cdot L_{\text{anchor}}) \\ &= 17.5 + .5 ((66" \cdot 240) + (46 \cdot 120) + (26 \cdot 120) + (240 \cdot 60)) \\ &= 17.5 + 1080 \\ \phi M_{RT} &= 1097.5 \text{ k-ft} \end{aligned}$$

$$OTM / \phi M_{RT} = .709 \text{ ok}$$

71.0% usage