Crown Castle
12 Gill Street, Suite 5800
Woburn, MA 01801

February 1, 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: 873633**
AT&T Site ID: CTL02082
Located at: 10 Bona Street, Milford, CT 06461
Latitude: 41° 13' 12.27" / Longitude: -73°4'38.56

Dear Ms. Bachman,

AT&T currently maintains nine (9) antennas at the 136 foot level of the existing 133 foot monopole located at 10 Bona Street, Milford, CT. The tower is owned by Crown Castle. The property is owned by Crown Castle. AT&T now proposes to replace three (3) antennas with three (3) new antennas; and, add three (3) RRUs (non-antennas), one (1) raycap, two (2) DC power cables, and one (1) fiber cable. The antennas would be installed at the same 136 foot level of the tower.

This facility was approved by the City of Milford Planning and Zoning Commission on August 21, 2001. This approval included the condition(s) that:

1. The applicant will be required to pave 200± of Bona Street from Erna Avenue to City standards for acceptance.

This modification complies with the aforementioned condition(s).

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16-50j-72(b)(2). In

accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Benjamin G. Blake, Mayor for the City of Milford, as well as the property owner and the tower owner.

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

2. The proposed modification 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-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Amanda Goodall.

Sincerely,

Amanda Goodall
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
339-205-7017
Amanda.Goodall@crowncastle.com
Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 4: Exhibit-3: General Power Density Table report (RF Emissions Analysis Report)

cc: The Honorable Benjamin G. Blake, Mayor
City of Milford
70 West River Street
Milford, CT 06460

Crown Castle (Both Property Owner and Tower Owner)
12 Gill Street, Suite 5800
Woburn, Ma 01801

009585 VOL 2501 PG 379

City of Milford, Connecticut

Founded 1639

ZONING BOARD OF APPEALS

70 West River Street
Milford, CT 06460-3317
Telephone (203) 783-3245
Fax (203) 783-3303

THIS IS TO CERTIFY THAT, Integrated Mobile Services, Inc., was granted a variance by the Zoning Board of Appeals on March 13, 2001, for the property located at: **10 Bona Street,** Assessor's Map **43 & 53 ,** Block **304 ,** Parcel **69, 70, 71 & 72,** in the City of Milford, County of New Haven, State of Connecticut, of which, Joseph N. Clemente, 10 Bona Street, Milford, CT, is the owner.

A VARIANCE WAS GRANTED TO:

Vary Section 4.1.13 exceptions to height requirements to allow 150 ft. high monopole where 50 ft. is permitted.

"NO VARIANCE, SPECIAL PERMIT OR SPECIAL EXCEPTION GRANTED PURSUANT TO CHAPTER 124 OF ANY SPECIAL ACT SHALL BE EFFECTIVE UNTIL A COPY THEREOF...IS RECORDED IN THE LAND RECORDS OF THE TOWN IN WHICH SUCH PREMISES ARE LOCATED." P.A. 75-317

RECORDED: _____ **ZONING BOARD OF APPEALS**
DATE

CITY CLERK REC. NO. _____ **BY:** Errol Van Hise 8/9
Errol Van Hise, Chairman

Received for record AUG 21 2001
at 9:20:56 AM and recorded by me.
Milford City Clerk

009587

CITY OF MILFORD, CONNECTICUT

THIS IS TO CERTIFY THAT INTEGRATED MOBILE SERVICES, LLC

WAS GRANTED A SPECIAL PERMIT BY THE

MILFORD PLANNING & ZONING BOARD ON AUGUST 7, 2001 FOR

PROPERTY LOCATED AT 10 BONA STREET

MAP 43 & 53 BLOCK 304 PARCEL 69-72

IN THE CITY OF MILFORD, COUNTY OF NEW HAVEN, STATE OF

CONNECTICUT FOR WHICH JOSEPH N. CLEMENTE IS THE OWNER.

THE SPECIAL PERMIT WAS GRANTED:

To construct a 150' monopole communication tower with up to 4 equipment buildings (up to 12' x 26' size). A variance was granted March 13, 2001 by the ZBA to increase the allowable height from 50' to 150' in a GI zone. All construction shall be in accordance with plans as follows:

SHEET	ENTITLED	DATED
Title Sheet	Integrated Mobile Services, LLC	11/22/99
C-1	Site Plan	11//22/99; revised to 2/21/00
C-2	Site Details	11/10/99; revised to 2/21/00
C-3	Compound Plan & Elevation	11/10/99; revised to 2/21/00

The following city department reports apply: Letter from B. C. Kolwicz dated February 2, 2000; Police Department memo from Sgt. P. Ellsworth dated December 8, 1999. The applicant will be required to pave 200± of Bona Street from Erna Avenue to city standards for acceptance.

"NO VARIANCE, SPECIAL PERMIT OR SPECIAL EXCEPTION GRANTED PURSUANT TO CHAPTER 124 OF ANY SPECIAL ACT SHALL BE EFFECTIVE UNTIL A COPY THEREOF...IS RECORDED IN THE LAND RECORDS OF THE TOWN IN WHICH SUCH PREMISES ARE LOCATED."
P.A. 75-317
PLANNING & ZONING BOARD

RECORDED _____

CITY CLERK REC. NO._____

BY:

WADE E. PIERCE
EXECUTIVE SECRETARY

Received for record AUG 21 2001
at 9:42:19 AM and recorded by me.
Alan H. Jepson
Milford City Clerk

City of Milford, Connecticut

OFFICE OF:
TOWN-CITY CLERK

To: Mayor James Richetelli
Michele Collins, Chmn.
Bd. of Aldermen
Chief Louis LaVecchia, Fire Dept.
Chief Thomas Flaherty, Police Dept.
Bruce Kolwicz, Public Wks. Dir.
Anthony Pinto
Marilyn Lipton, City Attorney
William Gaffney, Assessor
John Casey, City Engineer
Wade Pierce, City Planner

From: Alan Jepson
City Clerk

Date: March 5, 2003

Subject: Board of Alderman Referral Items No. 8a New Business

At the Regular Meeting of the Board of Aldermen held on March 3, 2003, the following action was taken:

8. New Business
   a. Board of Aldermen approval is requested for the acceptance of Bona Street (for the length paved) as a City street per the recommendation of the Planning and Zoning Board.

   Approved unanimously.

70 West River Street, Milford, CT 06460-3364 Tel 203-783-3210 FAX 203-783-3362

City of Milford, Connecticut
- Founded 1639 -
70 West River Street - Milford, CT 06460-3317
Tel 203-783-3245 FAX 203-783-3303

Planning and Zoning
Office

February 5, 2003

Mr. Carlos Centore
63-2 North Branford Road
Branford, CT 06405

RE: 10 BONA STREET – STREET ACCEPTANCE

Dear Mr. Centore:

At its meeting held on Tuesday, February 4, 2003 the Milford Planning & Zoning Board moved to recommend to the Board of Aldermen that Bona Street (for the length paved) be accepted as a city street; (in conjunction with CGS 8-24 municipal improvements). Letter of recommendation from the Director of Public Works Bruce Kolwicz dated January 24, 2003 is attached.

Very truly yours,

Peter W. Gaboriault for WEP

WADE E. PIERCE
Executive Secretary to the
Planning & Zoning Board

WEP/cv

C: Michele Collins, Chair
Board of Aldermen

Marilyn Lipton, City Attorney

Mayor James Richetelli, Jr.

City of Milford, Connecticut

OFFICE OF:
BRUCE C. KOLWICZ
DIRECTOR OF PUBLIC WORKS

Date: January 24, 2003

To: Peter Crabtree, Planning & Zoning

From: Bruce C. Kolwicz, P.W. Director

Re: 10 Bona Street

This street can be accepted as a public street.

BCK:kh

83 FORD STREET MILFORD, CONNECTICUT 06460 (203) 783-3265

SITE NAME: MILFORD - BONA ST.
FA NUMBER: 10035338
SITE NUMBER: CTL02082

10 BONA STREET
MILFORD, CT 06460
COUNTY: NEW HAVEN

CROWN CASTLE SITE NAME: MILFORD
CROWN CASTLE SITE #: 873633

PROJECT TEAM

CLIENT REPRESENTATIVE

COMPANY: SMARTLINK, LLC
ADDRESS: 1362 MELLON ROAD, SUITE 140
CITY, STATE, ZIP: HANOVER, MD 21076
CONTACT: RICH WAGNER
E-MAIL: RWAGNER@SMARTLINKLLC.COM

SITE ACQUISITION

COMPANY: SMARTLINK, LLC
ADDRESS: 33 BOSTON POST ROAD WEST, SUITE 210
CITY, STATE, ZIP: MARLBOROUGH, MA 01752
CONTACT: TODD OLIVER
PHONE: (774) 369-3618
E-MAIL: TODD.OLIVER@SMARTLINKLLC.COM

ENGINEER

COMPANY: MASER CONSULTING CONNECTICUT
ADDRESS: 331 NEWMAN SPRINTS RD., SUITE 203
CITY, STATE, ZIP: RED BANK, NJ 07701-5699
CONTACT: FRANK PAZDEN
PHONE: (973) 398-3110 x4505
E-MAIL: FPAZDEN@MASERCONSULTING.COM

RF ENGINEER

COMPANY: NEW CINGULAR WIRELESS PCS, LLC
ADDRESS: 550 COCHITUATE RD.
CITY, STATE, ZIP: FRAMINGHAM, MA 01701
CONTACT: CAMERON SYME
E-MAIL: CS6970@ATT.COM

CONSTRUCTION MANAGER

COMPANY: SMARTLINK, LLC.
ADDRESS: 33 BOSTON POST ROAD WEST, SUITE 210
CITY, STATE, ZIP: MARLBOROUGH, MA 01752
CONTACT: MARK DONNELLY
PHONE: (617) 515-2080
E-MAIL: MARK.DONNELLY@SMARTLINKLLC.COM

SITE INFORMATION

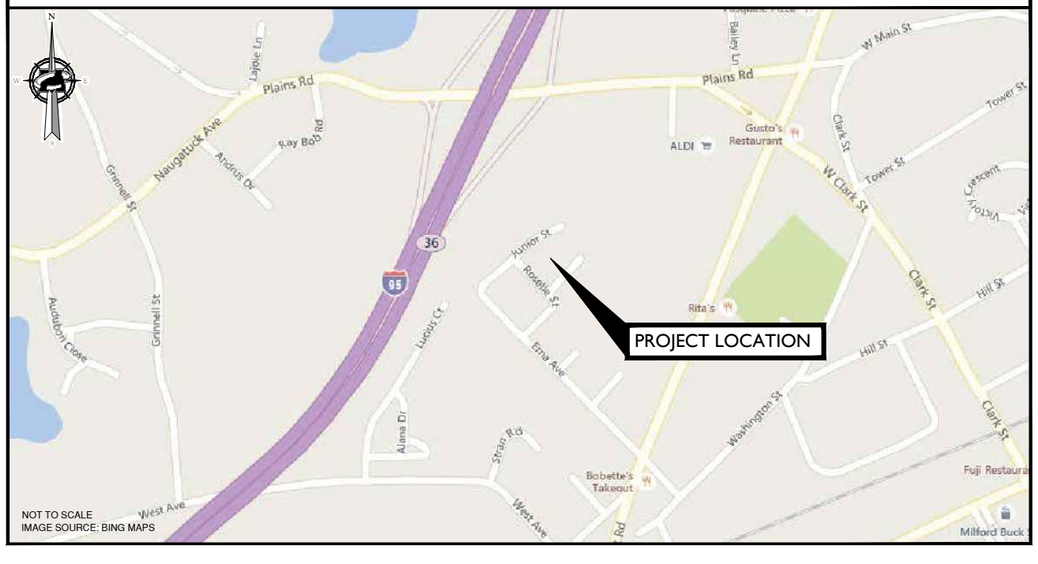
APPLICANT/LESSEE

NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE RD.
FRAMINGHAM, MA 01701

TOWER OWNER:

NAME:	CROWN CASTLE INTERNATIONAL
ADDRESS:	500 W. CUMMINGS PARK, # 3600
CITY, STATE, ZIP:	WOBURN, MA 01801
SITE ID #:	873633
LATITUDE:	41°-13'-12.36" N
LONGITUDE:	73°-04"-38.63" W
LAT./LONG. TYPE:	NAD 83
AREA OF CONSTRUCTION:	EXISTING EQUIPMENT SHELTER AND MONOPOLE
ZONING/JURISDICTION:	MILFORD
CURRENT USE:	UNMANNED TELECOMMUNICATIONS FACILITY
PROPOSED USE:	NO CHANGE
HANDICAP REQUIREMENTS:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS NOT REQUIRED.
CONSTRUCTION TYPE:	IIB
USE GROUP:	U

VICINITY MAP



CODE COMPLIANCE

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THE LATEST EDITIONS OF THE FOLLOWING CODES.

1. CONNECTICUT STATE BUILDING CODE (2005) & ALL SUBSEQUENT AMENDMENTS
2. NATIONAL ELECTRIC CODE 2011
3. NATIONAL FIRE PROTECTION ASSOCIATION 70 - 2011
4. LIGHTNING PROTECTION CODE 201
5. AMERICAN CONCRETE INSTITUTE 318
6. AMERICAN INSTITUTE OF STEEL CONSTRICTION 14 ED.
7. EIA/TIA-222 REVISION F
8. TIA 607 FOR GROUNDING
9. INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS 81
10. IEEE C2 LATEST EDITION
11. TELCORDIA GR-1275 12. ANSI T1.311

GENERAL CONTRACTOR 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.

GENERAL NOTES

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.

SHEET	DESCRIPTION
T-1	TITLE SHEET
GN-1	GENERAL NOTES
A-1	COMPOUND PLAN AND EQUIPMENT PLAN
A-2	ELEVATION VIEW AND ANTENNA SCHEDULE
A-3	ANTENNA LAYOUTS
A-4	DETAILS
A-5	RF PLUMBING DIAGRAMS
G-1	GROUNDING DETAILS
S-1	STRUCTURAL DETAILS

PROJECT DESCRIPTION/SCOPE OF WORK

LTE WCS WILL BE 3C AT THE SITE WITH BRONZE STANDARD CONFIGURATION.

PROPOSED PROJECT SCOPE HEREIN BASED ON RFDS ID # 751467, VERSION 1.00, LAST REVISED 06/29/15.

THIS PROJECT WILL BE COMPRISED OF:

- (3) NEW ANTENNAS TO REPLACE (3) EXISTING ANTENNAS, (1) PER SECTOR
- (3) NEW LTE RRH'S, (1) PER SECTOR
- ADD (1) FIBER CABLE PER SECTOR
- ADD (2) DC TRUNKS PER SECTOR
- REMOVE THE TOP DIPLEXERS FROM GSM AND LINE AND CONNECT THE JUMPERS TO THE 850 PORT OF THE OCTOPORT ANTENNA
- NEW HARDWARE R S03(XMU 03) WILL BE PLACED INSIDE 6601 CHASSIS INSTEAD OF NEW DUS-41
- ADD (1) DC6 (SQUID) SURGE SUPPRESSOR

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smartlink
1362 MELLON ROAD
SUITE 140
HANOVER, MD 21076
TEL: (410) 582-8043 FAX: (443) 221-2962

at&t
NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

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SCALE:	JOB NUMBER:
AS SHOWN	15946018A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
1	01/28/16	REVISED PER MOUNT ANALYSIS	SMG	FEP
0	10/23/15	ISSUED FOR REVIEW	RAP	FEP

STATE OF CONNECTICUT
FRANK E. PAZDEN
No. 28188
REGISTERED PROFESSIONAL ENGINEER
ENGINEER: FRANK E. PAZDEN CT LIC. NO. 28188
PROFESSIONAL ENGINEER

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF THE RESPONSIBLE LICENSED PROFFESIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SITE NAME:
MILFORD - BONA ST.
FA# 10035338
SITE # CTL02082
CROWN CASTLE SITE ID #: 873633
10 BONA STREET
MILFORD, CT 06460
COUNTY OF NEW HAVEN

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions @maserconsulting.com

SHEET TITLE: TITLE SHEET

SHEET NUMBER: T-1

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING 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 GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5O HMS OR LESS.
4. THE SUBCONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.
5. 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.
6. 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.
7. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE EQUIPMENT GROUND RING WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
8. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK TO BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.
9. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE #2 AWG SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
10. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
11. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. ALL BENDS SHALL BE MADE WITH 12" RADIUS OR LARGER.
12. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
13. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS EXCEPT FOR GROUND BAR CONNECTION FROM MGB TO OUTSIDE EXTERIOR GROUND SHALL ALL BE CADWELD CONNECTIONS.
14. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
15. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED TO THE TOWER GROUND BAR.
16. APPROVED ANTIOXIDANT COATINGS (I.E. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
17. ALL EXTERIOR AND INTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
18. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
19. BOND ALL METALLIC OBJECTS WITHIN 6 FT OF MAIN GROUND WIRES WITH 1-#2 AWG TIN-PLATED COPPER GROUND CONDUCTOR.
20. 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.
21. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/4" IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50.

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

   CONTRACTOR – SMARTLINK
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T (NEW CINGULAR WIRELESS PCS, LLC)
2. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
3. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
4. 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.
5. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. 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. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
11. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE RESPONSIBLE ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING & EXCAVATION.
12. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, AS DIRECTED BY THE RESPONSIBLE ENGINEER, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.
13. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY SHALL BE GRADED TO A UNIFORM SLOPE AND STABILIZED TO PREVENT EROSION.
14. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
15. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
16. THE SUBGRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.
18. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
19. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE.
20. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
21. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR.
22. 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 UTILITIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
23. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
24. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS.
25. ALL STRUCTUAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
26. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."
27. 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 DESCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
28. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION, ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
29. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN ALERT OF DANGEROUS EXOPOSURE LEVELS.

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1	01/28/16	REVISED PER MOUNT ANALYSIS	SMG	FEP
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STATE OF CONNECTICUT
FRANK E. PAZDEN
12418
REGISTERED PROFESSIONAL ENGINEER
FRANK E. PAZDEN
ENGINEER OF RECORD
PE.0012418

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CROWN CASTLE SITE ID #: 873633

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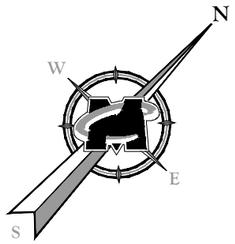
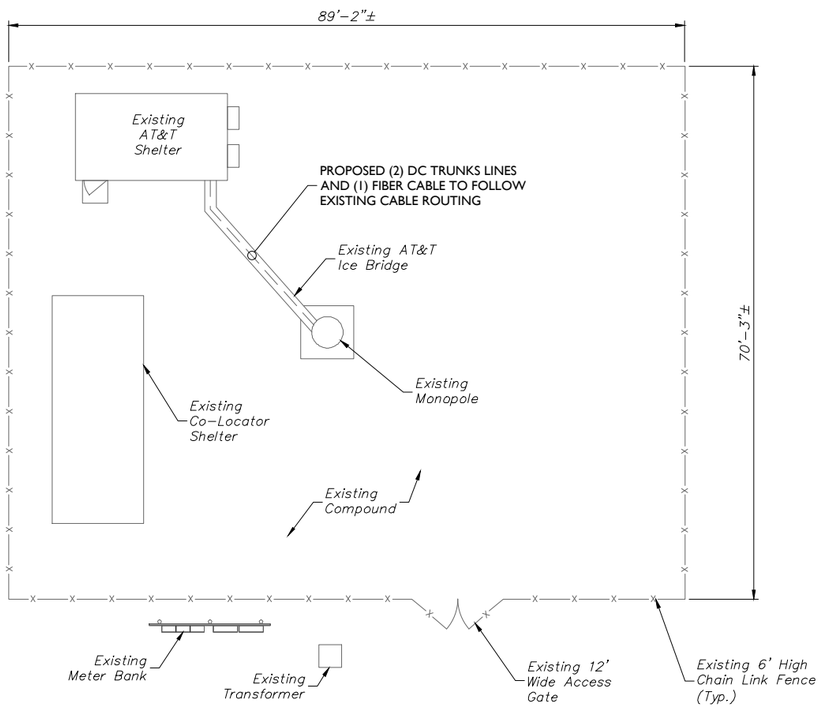
SHEET TITLE:
GENERAL NOTES

SHEET NUMBER:
GN-1





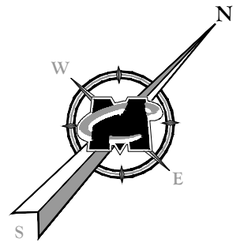
COMPOUND PLAN

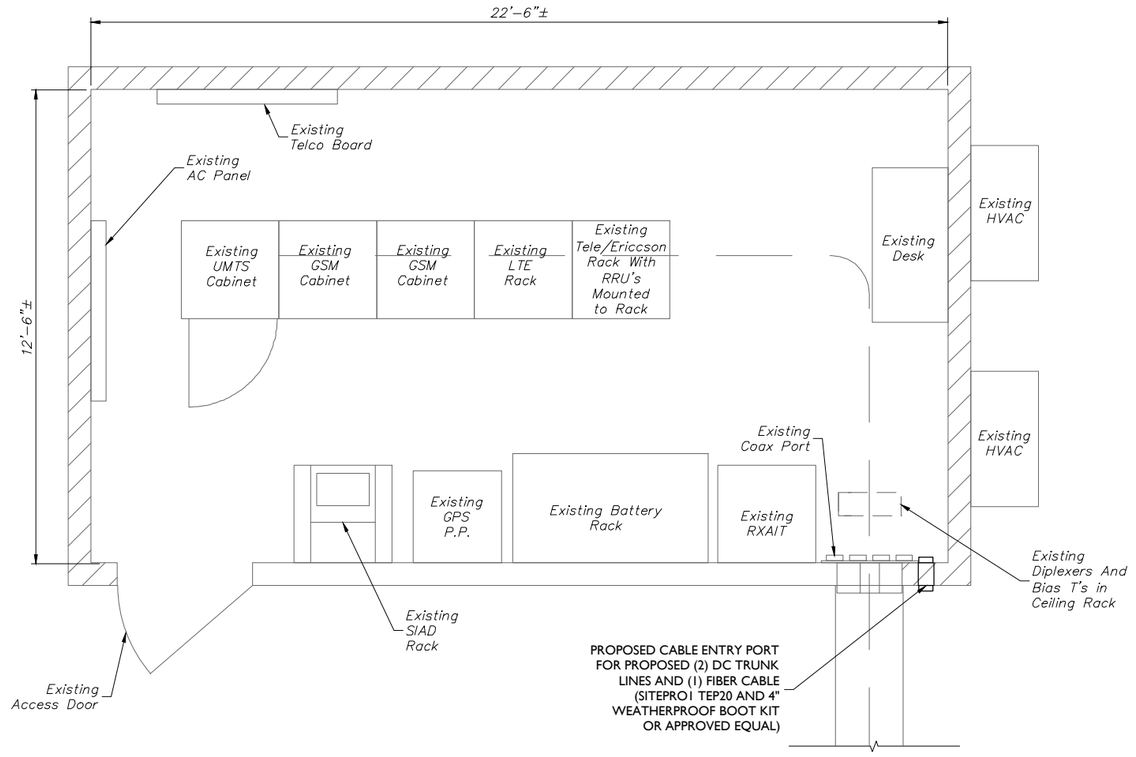
GRAPHIC SCALE

10 0 5 10 20

(IN FEET)

SCALE: 1" = 10' FOR 24"X36" DRAWINGS
(DO NOT SCALE 11"X17" DRAWINGS)





EQUIPMENT PLAN

GRAPHIC SCALE

2 0 1 2 4

(IN FEET)

SCALE: 1" = 2' FOR 24"X36" DRAWINGS
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STATE OF CONNECTICUT
FRANK E. FAZDEN
No. 28188
REGISTERED
PROFESSIONAL ENGINEER
FRANK E. FAZDEN
ENGINEER FOR MASER CONSULTING CT #28188

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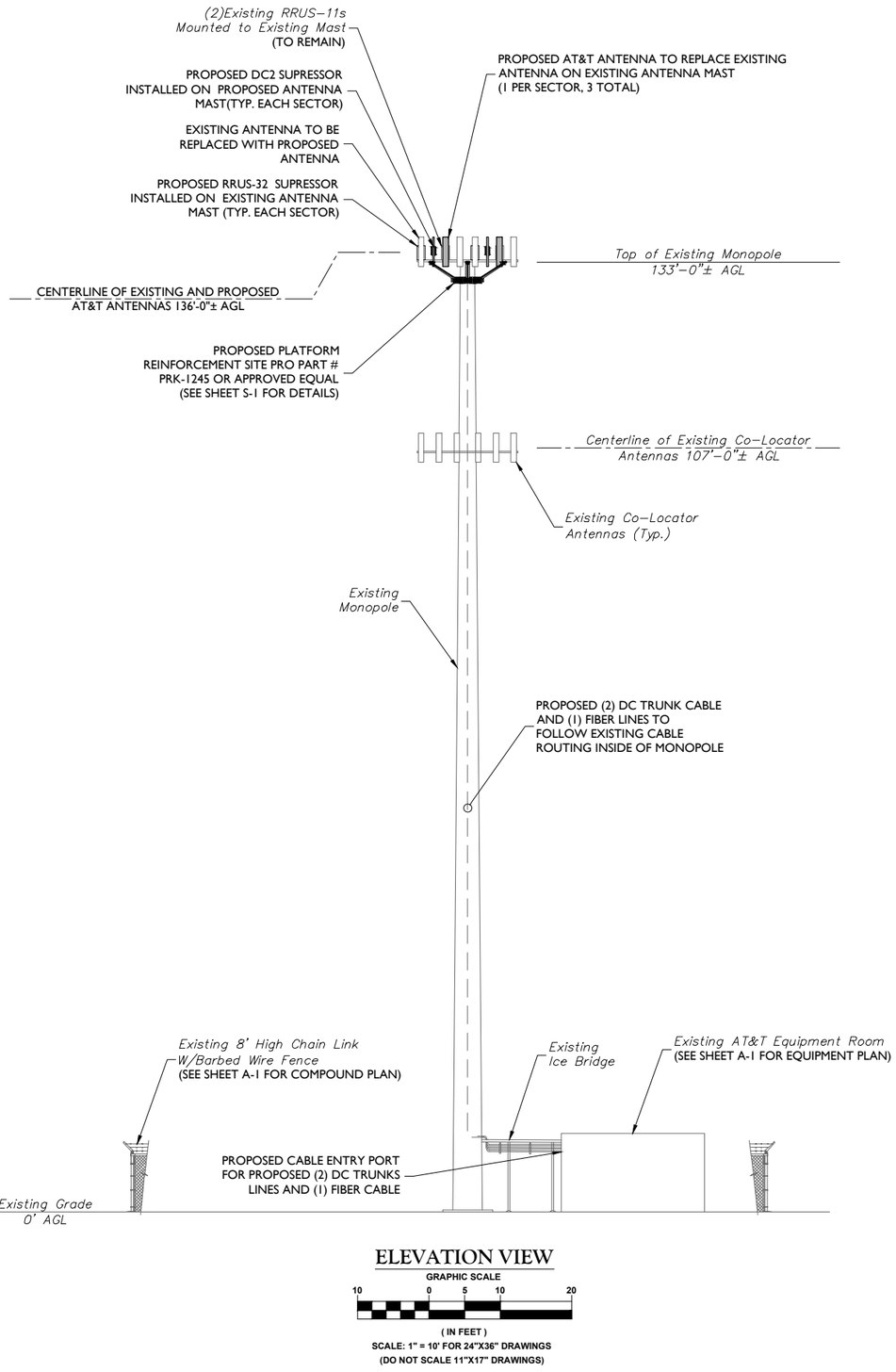
SHEET TITLE:

COMPOUND PLAN
AND EQUIPMENT PLAN

SHEET NUMBER:

A-1



ELEVATION VIEW

GRAPHIC SCALE

10 0 5 10 20

(IN FEET)

SCALE: 1" = 10' FOR 24"X36" DRAWINGS

(DO NOT SCALE 11"X17" DRAWINGS)

PROPOSED ANTENNA AND RRUS CONFIGURATION

SECTOR		EXISTING ANTENNA CONFIGURATION	PROPOSED ANTENNA CONFIGURATION	TECHNOLOGY	ANTENNA STATUS	HEIGHT (in)	WIDTH (in)	DEPTH (in)	WEIGHT (lbs)	ANTENNA AZIMUTH	ANT. CL ELEV (ft.)	RRUS CONFIGURATION	STATUS
ALPHA	A1	Powerwave 7770	Powerwave 7770	UMTS	REMAIN	55.00	11.00	5.00	35.00	143°	136'	-	-
	A2	KMW AM-X-CD-14-65-00T-RET	CCI OPA-65R-LCUU-H4	WCS LTE/GSM	NEW	48.00	14.40	7.30	57.00	23°	136'	RRUS-32	NEW
	A3	CSS DUO1417 8686	KMW AM-X-CD-14-65-00T-RET	LTE	RELOCATED	48.00	11.80	5.90	36.40	23°	136'	(2)RRUS-11	REMAIN
BETA	B1	Powerwave 7770	Powerwave 7770	UMTS	REMAIN	55.00	11.00	5.00	35.00	263°	136'	-	-
	B2	KMW AM-X-CD-14-65-00T-RET	CCI OPA-65R-LCUU-H4	WCS LTE/GSM	NEW	48.00	14.40	7.30	57.00	143°	136'	RRUS-32	NEW
	B3	CSS DUO1417 8686	KMW AM-X-CD-14-65-00T-RET	LTE	RELOCATED	48.00	11.80	5.90	36.40	143°	136'	(2)RRUS-11	REMAIN
GAMMA	C1	Powerwave 7770	Powerwave 7770	UMTS	REMAIN	55.00	11.00	5.00	35.00	23°	136'	-	-
	C2	KMW AM-X-CD-14-65-00T-RET	CCI OPA-65R-LCUU-H4	WCS LTE/GSM	NEW	48.00	14.40	7.30	57.00	263°	136'	RRUS-32	NEW
	C3	CSS DUO1417 8686	KMW AM-X-CD-14-65-00T-RET	LTE	RELOCATED	48.00	11.80	5.90	36.40	263°	136'	(2)RRUS-11	REMAIN

ANTENNA SCHEDULE

STRUCTURAL NOTES:

1. A STRUCTURAL ANALYSIS TO DETERMINE IF THE EXISTING STRUCTURE AND FOUNDATION CAN ADEQUATELY SUPPORT THE PROPOSED LOADING HAS NOT BEEN PREPARED/ANALYZED BY MASER AND IS TO BE PERFORMED BY OTHERS.
2. NO CONSTRUCTION OF THE PROPOSED LOADING SHOWN SHALL PROCEED UNTIL ADEQUACY OF EXISTING STRUCTURE AND FOUNDATION, INCLUDING THE PROPOSED AT&T ANTENNA MOUNTING CONFIGURATION SHOWN HEREIN, HAS BEEN CONFIRMED BY SMARTLINK.
3. THE STRUCTURE ELEVATION IS SHOWN FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT REFLECT AS-BUILT FIELD CONDITIONS FOR ALL EXISTING INVENTORY LOADING/ANTENNAS/APPURTANENCES ON STRUCTURE. REFER TO THE LATEST STRUCTURAL ANALYSIS FOR EXISTING STRUCTURE LOADING AND THE PROPOSED METHOD OF ATTACHMENT OF THE PROPOSED ANTENNAS/CABLES.
4. THE CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT ANY IMPROVEMENTS AND REINFORCEMENTS REQUIRED BY THE STRUCTURAL ANALYSIS CERTIFICATION ARE PROPERLY INSTALLED PRIOR TO THE ADDITION OF ANTENNAS, CABLES, SUPPORTS AND APPURTENANCES PROPOSED ON THESE DRAWINGS OR OTHERWISE NOTED IN THE STRUCTURAL ANALYSIS.

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FRANK E. PAZDEN
No. 28188
REGISTERED PROFESSIONAL ENGINEER
FRANK E. PAZDEN
REGISTERED PROFESSIONAL ENGINEER
No. 28188

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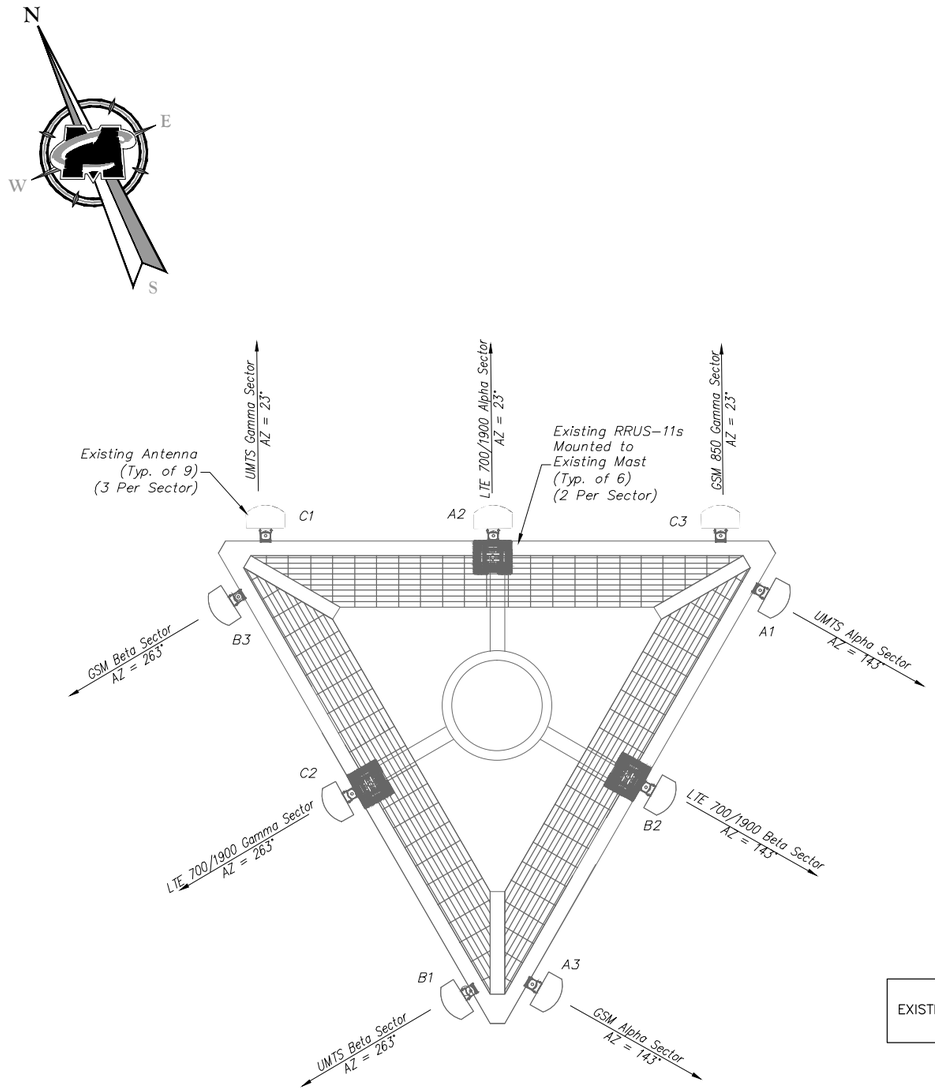
SHEET TITLE:
ELEVATION VIEW AND ANTENNA SCHEDULE

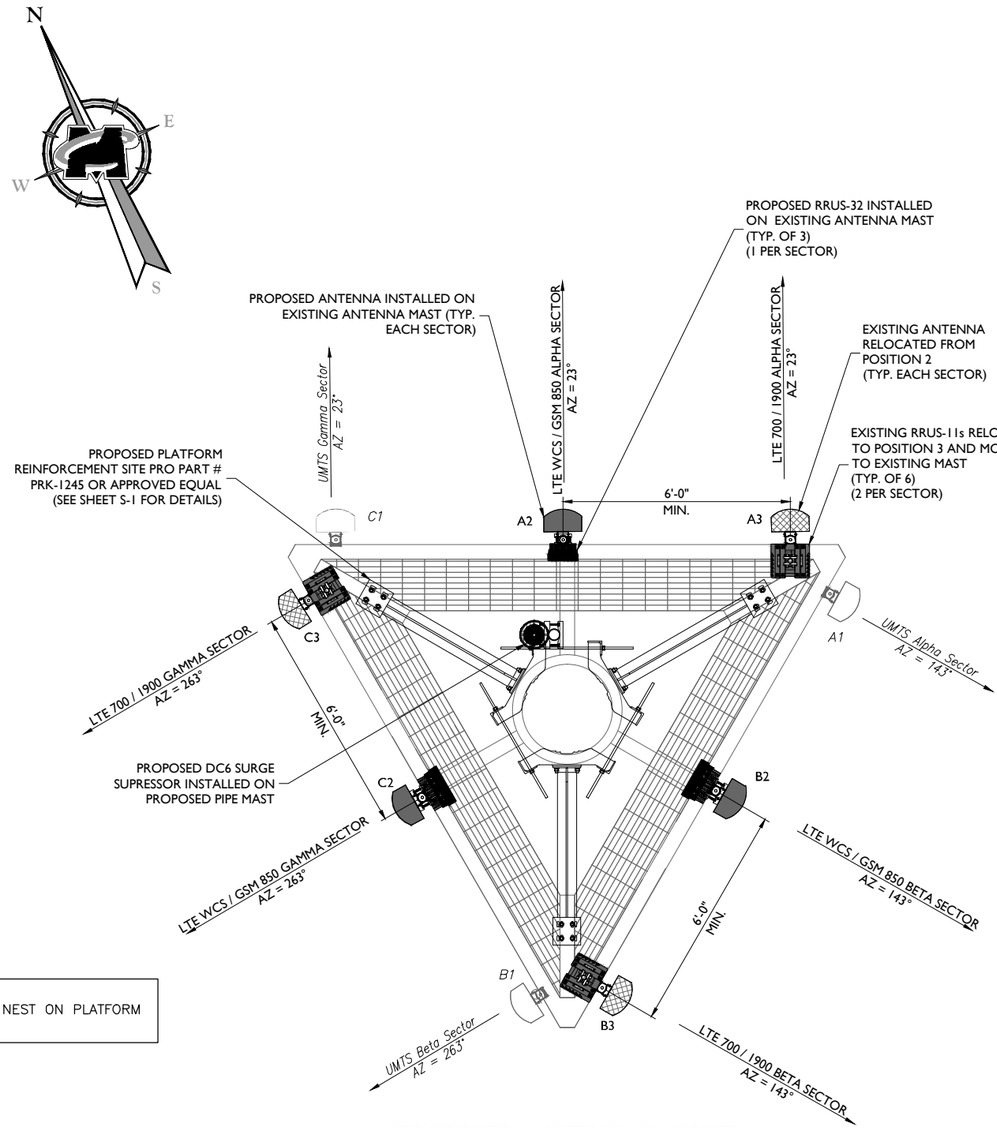
SHEET NUMBER:
A-2



EXISTING - ANTENNA LAYOUT

NOT TO SCALE

EXISTING BIRD NEST ON PLATFORM



PROPOSED - ANTENNA LAYOUT

NOT TO SCALE

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ENGINEER - PROJECT MANAGER
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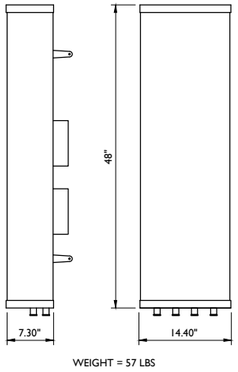
SHEET TITLE:
ANTENNA LAYOUTS

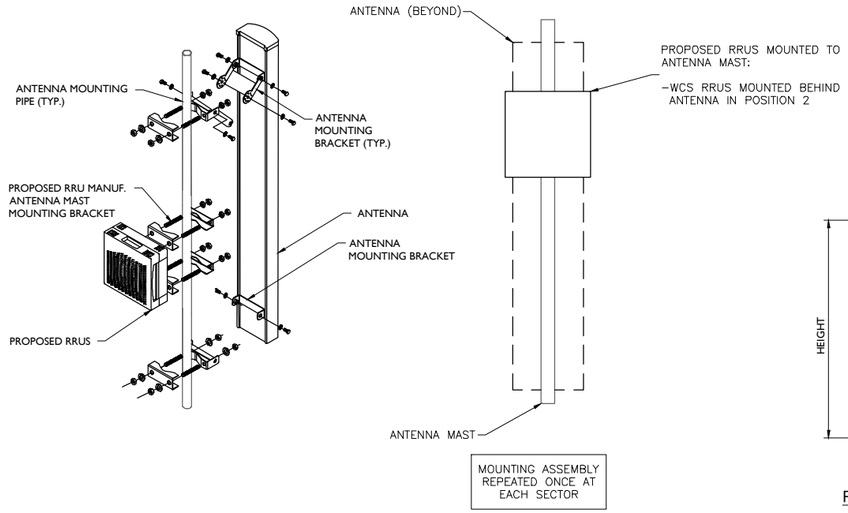
SHEET NUMBER:
A-3



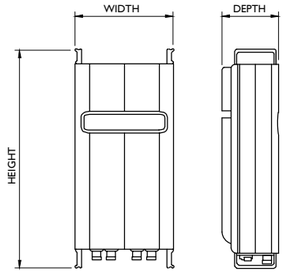
WEIGHT = 57 LBS

CCI OPA-65R-LCUU-H4

ANTENNA DETAIL
NOT TO SCALE



ANTENNA AND RRUS MOUNTING DETAILS
NOT TO SCALE



RRUS FRONT VIEW

SIZE AND WEIGHT TABLE

RRUS	WIDTH	DEPTH	HEIGHT	WEIGHT W/O BRACKET
RRUS-32 4X25-WCS (WITH SOLAR SHIELD)	-	-	-	-
RRUS-32 4X25-WCS (WITHOUT SOLAR SHIELD)	12.1"	6.7"	26.7"	60

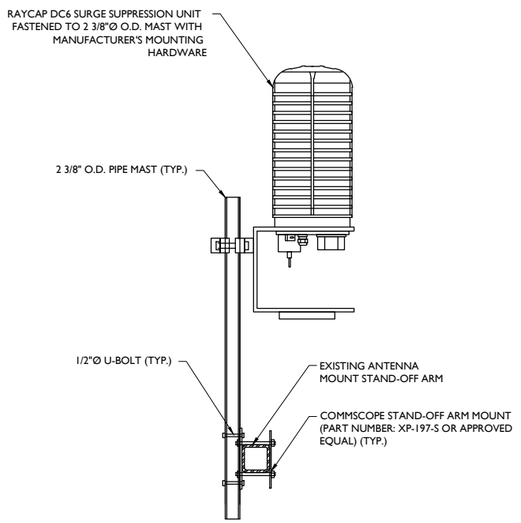
MINIMUM CLEARANCE TABLE

RRUS CABINET	CLEARANCES (INCHES)	COMMENTS
FRONT	-	INSTALLATION ACCESS
REAR	-	ZERO REAR CLEARANCE IS ALLOWED USING SUPPLIED MOUNTING BRACKETS
RIGHT	-	AIR FLOW
LEFT	-	AIR FLOW
TOP	-	AIR FLOW
BOTTOM	-	CONDUIT ROUTING

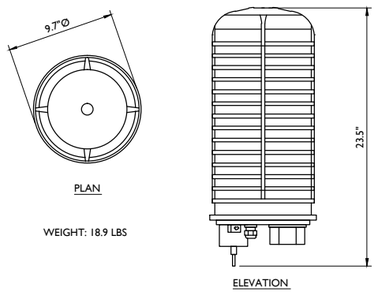
NOTE:

USE 1/2" COAXIAL CABLE W/7/16 DIN MALE CONNECTORS ON BOTH ENDS.

PROPOSED RRUS-32 DETAIL
NOT TO SCALE



DC6 SURGE SUPRESSION DOME STAND-OFF MOUNT
NOT TO SCALE



PLAN

WEIGHT: 18.9 LBS

ELEVATION

RAYCAP DC6-48-60-18-8F SURGE SUPPRESSOR
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STATE OF CONNECTICUT
FRANK E. FAZIDEN
No. 28188
LICENSED PROFESSIONAL ENGINEER
FRANK E. FAZIDEN
ENGINEER-IN-RESPONSIBLE CHARGE
No. 28188

SITE NAME:

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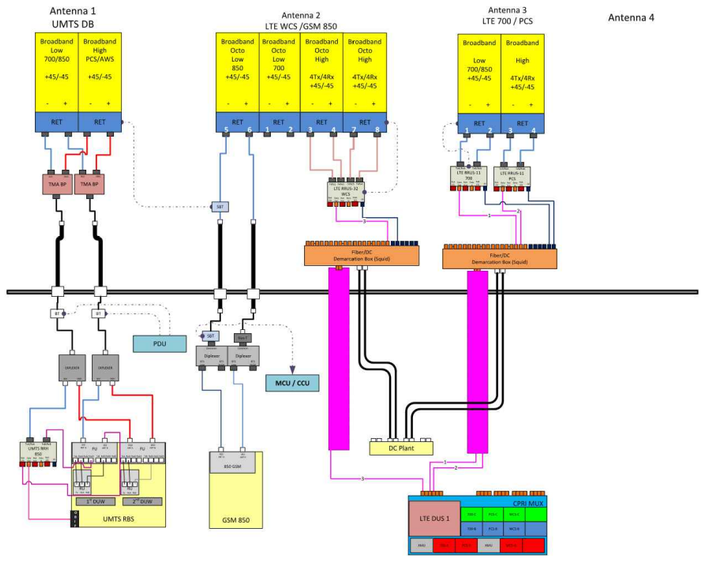
SHEET TITLE: DETAILS

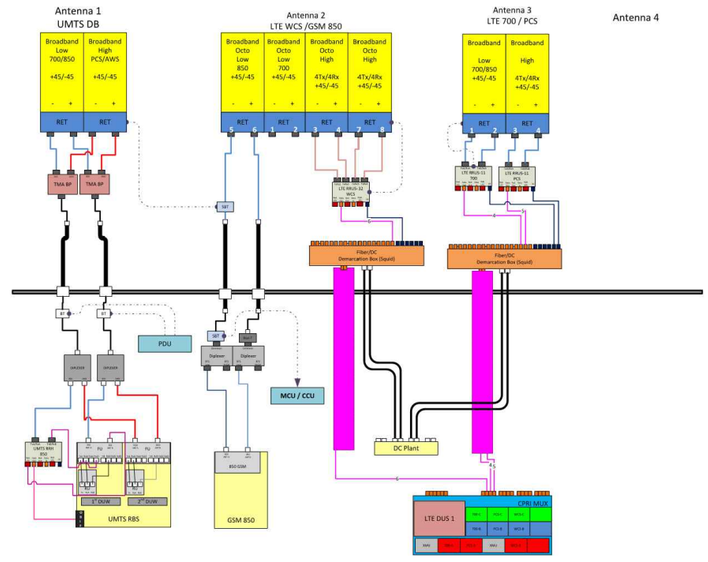
SHEET NUMBER: A-4

Diagram - Sector A | Diagram File Name - CT2082_BrnzStand_A_wcs_Rev1.vsd
Atoll Site Name - CTU2082 | Location Name - MILFORD BONA ST | Market - CONNECTICUT | Market Cluster - NEW ENGLAND
Comments:



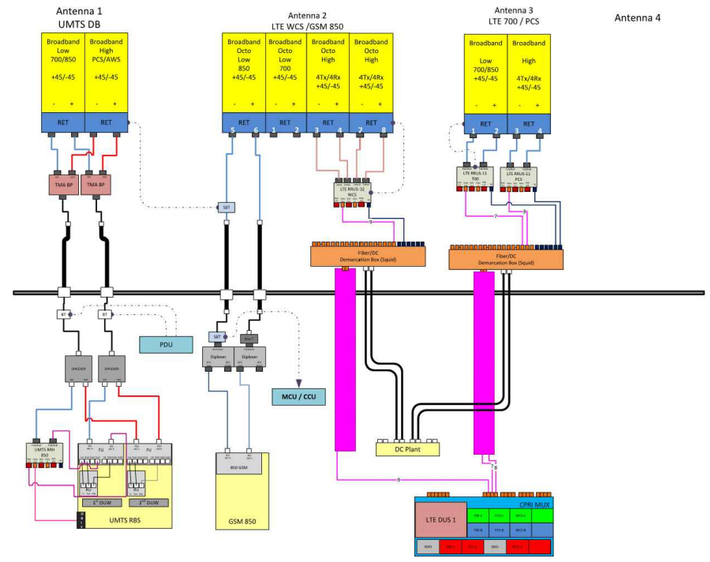
ALPHA SECTOR

Diagram - Sector B | Diagram File Name - CT2082_BrnzStand_B_wcs_Rev1.vsd
Atoll Site Name - CTU2082 | Location Name - MILFORD BONA ST | Market - CONNECTICUT | Market Cluster - NEW ENGLAND
Comments:



BETA SECTOR

Diagram - Sector C | Diagram File Name - CT2082_BrnzStand_C_wcs_Rev1.vsd
Atoll Site Name - CTU2082 | Location Name - MILFORD BONA ST | Market - CONNECTICUT | Market Cluster - NEW ENGLAND
Comments:



GAMMA SECTOR

BASED ON RF ENGINEERING DESIGN ENTITLED "NEW-ENGLAND_CONNECTICUT_CTU2082_2016-LTE-Next-Carrier_LTE-3C_mm093q_2051A02JYA_10035338_61172_06-29-2015_Preliminary-Approved_v1.00"

RF PLUMBING DIAGRAMS

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STATE OF CONNECTICUT · FRANK E. PALDEN · 18788 · PROFESSIONAL ENGINEER
FRANK E. PALDEN
ENGINEER

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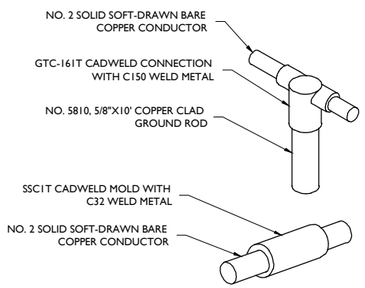
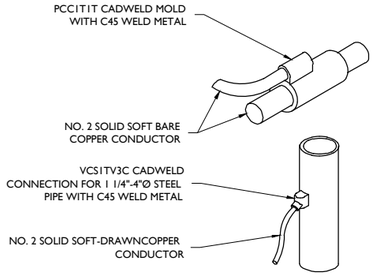
SHEET TITLE :
RF PLUMBING DIAGRAMS

SHEET NUMBER :
A-5

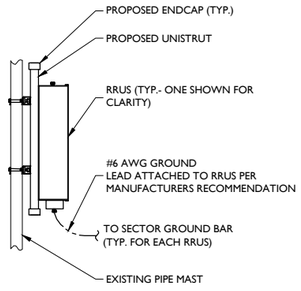




CADWELD DETAILS

NOT TO SCALE

NOT TO SCALE



RRH GROUNDING

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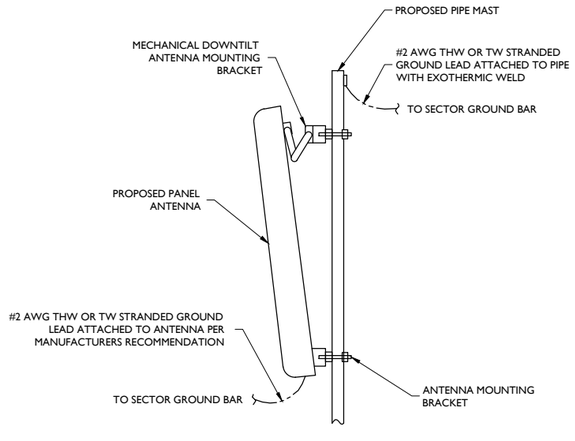

ANTENNA GROUNDING

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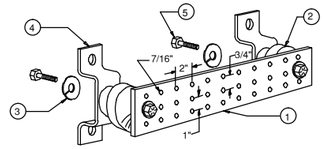


LEGEND

1- TINNED COPPER GROUND BAR, 1/4"x4"x20", NEWTON INSTRUMENT CO. CAT. NO. B-6142 OR EQUAL. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.

2- INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4

3- 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8

4- WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-5056

5- 5/8-11 X 1" HHCS BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1

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

SECTION "P" - SURGE PRODUCERS

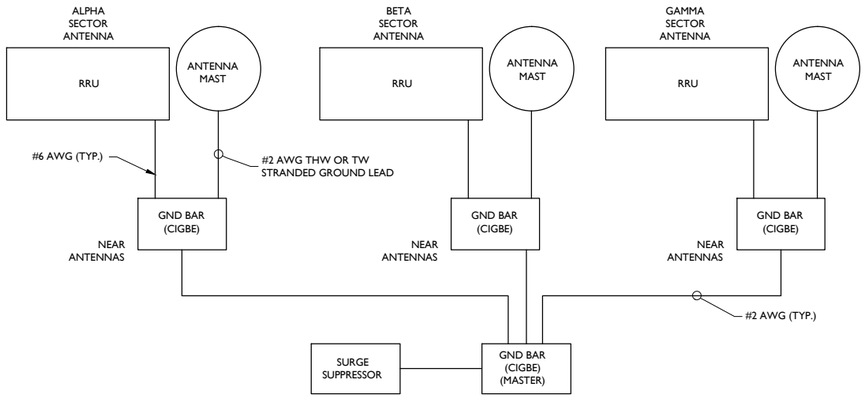
CABLE ENTRY PORTS (HATCH PLATES) (#2)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
+24V POWER SUPPLY RETURN BAR (#2)
-48V POWER SUPPLT RETURN BAR (#2)
RECTIFIER FRAMES.

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)

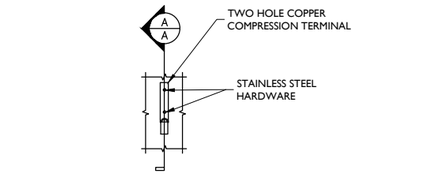
MASTER GROUND BAR

NOT TO SCALE

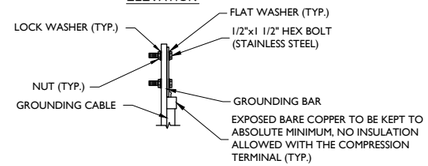


SCHEMATIC DIAGRAM GROUNDING SYSTEM

NOT TO SCALE



ELEVATION



SECTION A-A

TYPICAL GROUND BAR CONNECTION DETAIL

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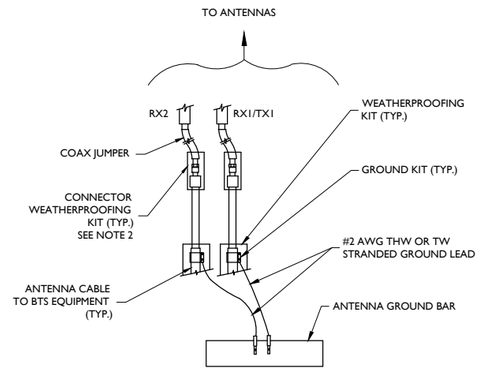

NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

TYPICAL GROUND WIRE TO GROUNDING BAR

NOT TO SCALE

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1362 MELLON ROAD
SUITE 140
HANOVER, MD 21076
TEL: (410) 582-8043 FAX: (443) 221-2962

at&t
NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

811 Know what's below. Call before you dig

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

SCALE:	JOB NUMBER:
AS SHOWN	15946018A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
1	01/28/16	REVISED PER MOUNT ANALYSIS	SMG	FEP
0	10/23/15	ISSUED FOR REVIEW	RAP	FEP

STATE OF CONNECTICUT · FRANK E. PAZDEN · No. 28188 · LICENSED PROFESSIONAL ENGINEER

FRANK E. PAZDEN
REGISTERED PROFESSIONAL ENGINEER
ENGINEERING CERTIFICATION NUMBER: 28188

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF THE RESPONSIBLE LICENSED PROFFESIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SITE NAME:

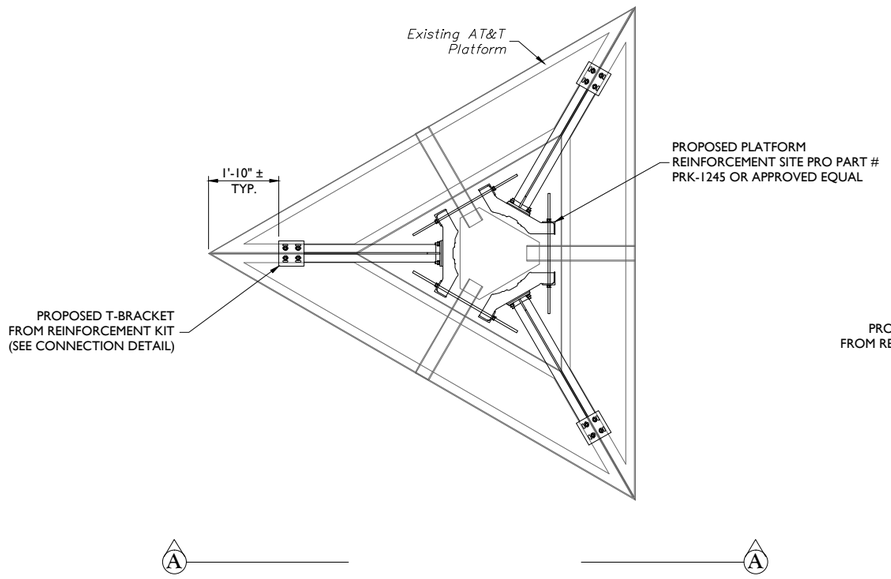
MILFORD - BONA ST.
FA# 10035338
SITE # CTL02082
CROWN CASTLE SITE ID #: 873633

10 BONA STREET
MILFORD, CT 06460
COUNTY OF NEW HAVEN

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions @maserconsulting.com

SHEET TITLE:
GROUNDING DETAILS

SHEET NUMBER:
G-1



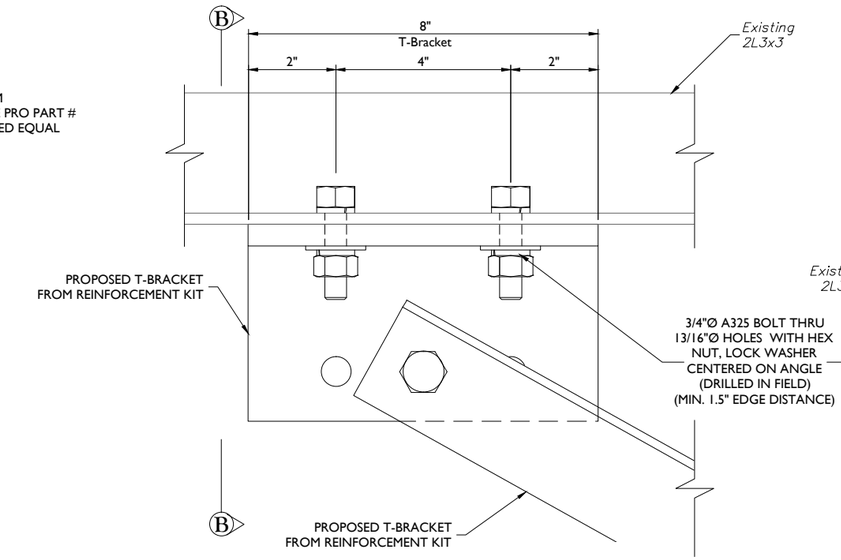
PLAN VIEW

GRAPHIC SCALE

2 0 1 2 4

(IN FEET)

SCALE: 1" = 2' FOR 24"X36" DRAWINGS
(DO NOT SCALE 11"X17" DRAWINGS)



CONNECTION DETAIL

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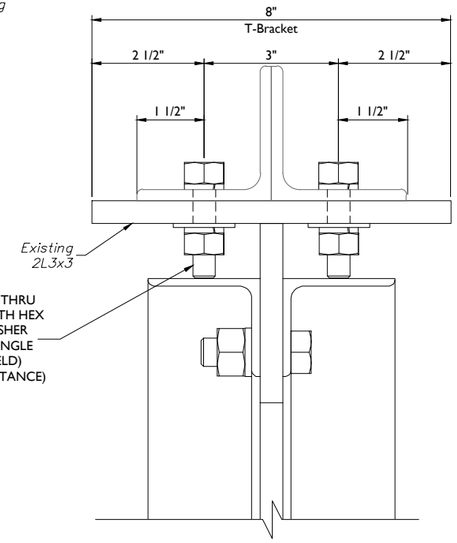

SECTION B-B

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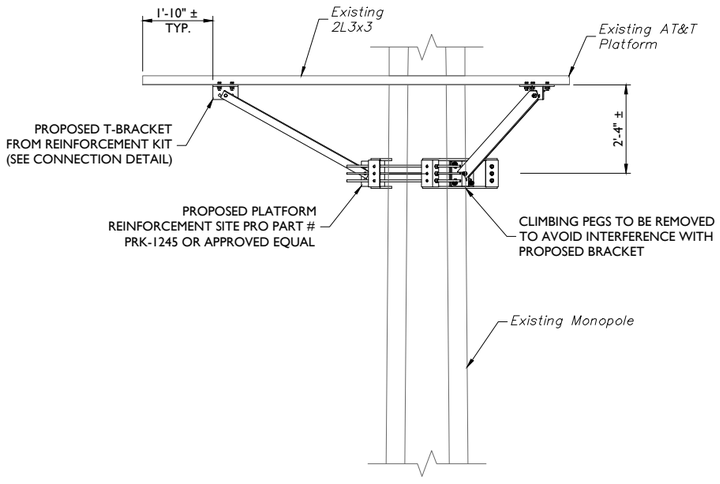

ELEVATION A-A

ALL PROPOSED MODIFICATION COMPONENTS SHALL BE INSTALLED PRIOR TO INSTALLATION OF ANY PROPOSED EQUIPMENT OR MODIFICATIONS TO EXISTING EQUIPMENT.

EXISTING BIRDS NEST LOCATED ON PLATFORM. ALL NECESSARY PERMITS AND REGULATIONS SHALL BE FOLLOWED AS PERTAINS TO WORKING AROUND NEST.

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COUNTY OF NEW HAVEN

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions @maserconsulting.com

SHEET TITLE :

STRUCTURAL DETAILS

SHEET NUMBER :

S-1

Date: **October 05, 2015**

Randy Wofford
Crown Castle
1500 Corporate Drive
Canonsburg, PA 15317
(724) 416-2376

Vertical Structures, Inc.
309 Spangler Dr, Suite E
Richmond, KY 40475
(859) 624-8360
ncoomes@verticalstructures.com

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Change-Out**	
	Carrier Site Number:	CTL02082
	Carrier Site Name:	Milford Bona St
Crown Castle Designation:	**Crown Castle BU Number:**	873633
	Crown Castle Site Name:	Milford
	Crown Castle JDE Job Number:	347972
	Crown Castle Work Order Number:	1124198
	Crown Castle Application Number:	311083 Rev. 1
Engineering Firm Designation:	**Vertical Structures, Inc. Project Number:**	2015-004-026
Site Data:	**10 Bona Street, Milford, CT, New Haven County**	
	Latitude *41° 13' 12.27"*, Longitude *-73° 4' 38.56"*	
	133 Foot - Monopole Tower	

Dear Randy Wofford,

Vertical Structures, Inc. 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 830648.

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

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

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 Connecticut State Building Code based upon a wind speed of 90 mph fastest mile.

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

Respectfully submitted by:

Nathan Coomes, P.E.
Project Engineer

10/5/15

Date: **October 05, 2015**

Randy Wofford
Crown Castle
1500 Corporate Drive
Canonsburg, PA 15317
(724) 416-2376

Vertical Structures, Inc.
309 Spangler Dr, Suite E
Richmond, KY 40475
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Respectfully submitted by:

Nathan Coomes, P.E.
Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 133 ft Monopole tower designed by Summit in 2001. 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/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 90 mph with no ice and 50 mph under service loads. Also, per Crown Castle's direction and in accordance with ASCE-7-05 we have considered a fastest mile wind speed of 38 mph with an escalating 0.75 inch ice thickness.

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
133.0	136.0	3	cci antennas	OPA-65R-LCUU-H4 w/ Mount Pipe	2 1	3/4 3/8	
		3	ericsson	RRUS 32 B30 BTS			
		1	raycap	DC6-48-60-18-8F			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
133.0	136.0	3	kmw communications	AM-X-CD-14-65-00T-RET w/ Mount Pipe	12 2 1	1 5/8 7/8 17/64	1
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe			2
	133.0	1		Platform Mount [LP 1201-1]			1
		6	ericsson	RRUS-11 BTS			
		12	powerwave technologies	LGP21401 TMA			
		1	raycap	DC6-48-60-18-8F			
115.0	115.0	1		Side Arm Mount [SO 102-1]			1
		1	rfs celwave	TMA-DB-T1-6Z-8AB-0Z w/ Mount Pipe			
113.0	113.0	1		Platform Mount [LP 303-1]	1 12	1 1/4 1 5/8	1
		3	alcatel lucent	9442 RRH2X40-AWS TMA			
		3	amphenol	BXA-171063-8BF-EDIN-4 w/ Mount Pipe			
		3	antel	BXA-171063-8BF-2 w/ Mount Pipe			
		6	antel	LPA-80090/4CF w/ Mount Pipe			
		3	swedcom	SWCP 2x5514 w/ Mount Pipe			

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

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
133	133	1	summit	14' L.P. Platform		
		1		5/8" Lightning Rod		
		12	decibel	DB896H Panel Antenna		
123	123	1	summit	14' Clamp-On L.P. Platform		
		12	dapa	48000 PCS Panel Antenna		
113	113	1	summit	14' Clamp-On L.P. Platform		
		12	dapa	48000 PCS Panel Antenna		
103	103	1	summit	14' Clamp-On L.P. Platform		
		12	dapa	48000 PCS Panel Antenna		
93	93	1	summit	14' Clamp-On L.P. Platform		
		12	dapa	48000 PCS Panel Antenna		
83	83	1	summit	14' Clamp-On L.P. Platform		
		12	dapa	48000 PCS Panel Antenna		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Appplication	AT&T Mobility Change-Out Revision #1	311083	CCIsites
Tower Drawing	Summit Design No. 16109-R4	1339622	CCIsites
Foundation Drawing	Summit Design No. 16109	1340388	CCIsites
Geotechnical Report	Criscuolo Shepard Associates Project No. 2001.927	1340372	CCIsites

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. Vertical Structures, Inc. 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 (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
L1	133 - 86.5	Pole	TP33.116x24x0.25	1	-8499.08	1321408.18	51.3	Pass
L2	86.5 - 39.75	Pole	TP41.78x31.7828x0.2813	2	-15307.20	1878450.19	76.2	Pass
L3	39.75 - 0	Pole	TP49.01x40.1883x0.375	3	-25333.70	3009407.34	69.5	Pass
							Summary	
						Pole (L2)	76.2	Pass
						Rating =	76.2	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	52.2	Pass
1	Base Plate	0	60.9	Pass
1	Base Foundation	0	49.9	Pass
1	Base Foundation Soil Interaction	0	68.0	Pass

Structure Rating (max from all components) =	76.2%

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

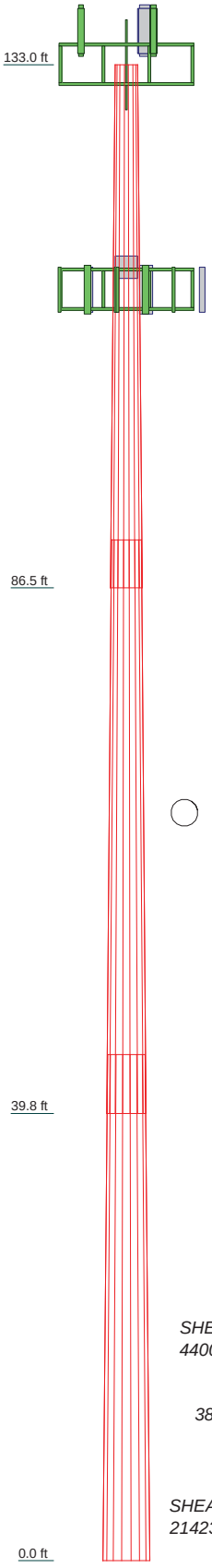
4.1) Recommendations

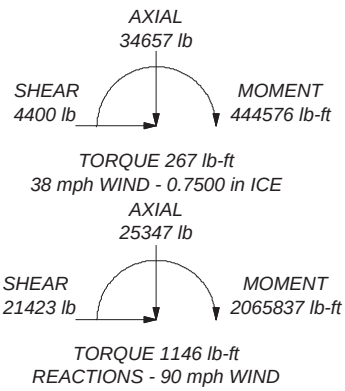
N/A

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	46.50	18	0.2500	4.25	24.0000	33.1160		3554.2
2	51.00	18	0.2813	5.25	31.7828	41.7800	A607-65	5655.6
3	45.00	18	0.3750		40.1883	49.0100		8060.2
								17270.0





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
8'x2" Antenna Mount Pipe	133	AM-X-CD-14-65-00T-RET w/ Mount Pipe (ATI Mobility)	133
Platform Mount [LP 1201-1] (ATI Mobility)	133	OPA-65R-LCUU-H4 w/ Mount Pipe (ATI Mobility)	133
7770.00 w/ mount pipe (ATI Mobility)	133	OPA-65R-LCUU-H4 w/ Mount Pipe (ATI Mobility)	133
7770.00 w/ mount pipe (ATI Mobility)	133	OPA-65R-LCUU-H4 w/ Mount Pipe (ATI Mobility)	133
7770.00 w/ mount pipe (ATI Mobility)	133	Side Arm Mount [SO 102-1]	115
(4) LGP21401 TMA (VSI) (ATI Mobility)	133	TMA-DB-T1-6Z-8AB-0Z w/ Mount Pipe	115
(4) LGP21401 TMA (VSI) (ATI Mobility)	133	Platform Mount [LP 303-1]	113
(4) LGP21401 TMA (VSI) (ATI Mobility)	133	(2) LPA-80090/4CF w/ Mount Pipe	113
(2) RRUS-11 BTS (19.69 x 16.97 x 7.17) (ATI Mobility)	133	(2) LPA-80090/4CF w/ Mount Pipe	113
(2) RRUS-11 BTS (19.69 x 16.97 x 7.17) (ATI Mobility)	133	(2) LPA-80090/4CF w/ Mount Pipe	113
(2) RRUS-11 BTS (19.69 x 16.97 x 7.17) (ATI Mobility)	133	BXA-171063-8BF-2 w/ Mount Pipe	113
RRUS 32 B30 BTS (26.7"x12.1"x6.7") (ATI Mobility)	133	BXA-171063-8BF-2 w/ Mount Pipe	113
RRUS 32 B30 BTS (26.7"x12.1"x6.7") (ATI Mobility)	133	BXA-171063-8BF-2 w/ Mount Pipe	113
RRUS 32 B30 BTS (26.7"x12.1"x6.7") (ATI Mobility)	133	SWCP 2x5514 w/ Mount Pipe	113
DC6-48-60-18-8F (24 x 11 x 11) (ATI Mobility)	133	SWCP 2x5514 w/ Mount Pipe	113
DC6-48-60-18-8F (24 x 11 x 11) (ATI Mobility)	133	SWCP 2x5514 w/ Mount Pipe	113
AM-X-CD-14-65-00T-RET w/ Mount Pipe (ATI Mobility)	133	BXA-171063-8BF-EDIN-4 w/ Mount Pipe	113
AM-X-CD-14-65-00T-RET w/ Mount Pipe (ATI Mobility)	133	BXA-171063-8BF-EDIN-4 w/ Mount Pipe	113
		BXA-171063-8BF-EDIN-4 w/ Mount Pipe	113
		9442 RRH2X40-AWS TMA	113
		9442 RRH2X40-AWS TMA	113
		9442 RRH2X40-AWS TMA	113

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 76.2%

Vertical Structures, Inc.
309 Spangler Dr, Suite E
Richmond, KY 40475
Phone: (859) 624-8360
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Job: Milford, CT BU#873633			
Project: Vertical Structures Job No. 2015-004-026			
Client: Crown Castle	Drawn by: chymore	App'd:	
Code: TIA/EIA-222-F	Date: 10/05/15	Scale: NTS	
Path: \\NAS1\CHymore\Open Jobs\2015-004-026 Milford, CT\tnx\873633.eri		Dwg No. E-1	

Tower Input Data

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

Tower is located in New Haven County, Connecticut.
Basic wind speed of 90 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	133.00-86.50	46.50	4.25	18	24.0000	33.1160	0.2500	1.0000	A607-65 (65 ksi)
L2	86.50-39.75	51.00	5.25	18	31.7828	41.7800	0.2813	1.1252	A607-65 (65 ksi)
L3	39.75-0.00	45.00		18	40.1883	49.0100	0.3750	1.5000	A607-65 (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	24.3702	18.8456	1342.9976	8.4313	12.1920	110.1540	2687.7623	9.4246	3.7840	15.136
	33.6269	26.0792	3558.9750	11.6674	16.8229	211.5550	7122.6329	13.0421	5.3884	21.554
L2	33.1191	28.1260	3526.2127	11.1830	16.1457	218.3999	7057.0654	14.0657	5.0987	18.125
	42.4245	37.0520	8061.5320	14.7320	21.2242	379.8267	16133.6715	18.5295	6.8582	24.38
L3	41.8533	47.3878	9489.8522	14.1337	20.4156	464.8323	18992.1914	23.6984	6.4131	17.102
	49.7661	57.8878	17299.0559	17.2654	24.8971	694.8227	34620.8743	28.9494	7.9658	21.242

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 133.00-86.50				1	1	1		
L2 86.50-39.75				1	1	1		
L3 39.75-0.00				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
LCF158-50A (1-5/8 FOAM) (AT&T Mobility)	C	No	Inside Pole	133.00 - 10.00	12	No Ice	0.00	0.80
						1/2" Ice	0.00	0.80
						1" Ice	0.00	0.80
						2" Ice	0.00	0.80
						4" Ice	0.00	0.80
6-8AWG 3 Pair (AT&T Mobility)	C	No	Inside Pole	133.00 - 10.00	2	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
A-DQ(ZN)B2Yn1750N (17/64" Cable) (AT&T Mobility)	C	No	Inside Pole	133.00 - 10.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
3" Rigid Conduit (AT&T Mobility)	C	No	Inside Pole	133.00 - 10.00	1	No Ice	0.00	3.00
						1/2" Ice	0.00	3.00
						1" Ice	0.00	3.00
						2" Ice	0.00	3.00
						4" Ice	0.00	3.00
FB-L98B-034-XXXXXX (3/8") (AT&T Mobility)	C	No	Inside Pole	133.00 - 10.00	1	No Ice	0.00	0.10
						1/2" Ice	0.00	0.10
						1" Ice	0.00	0.10
						2" Ice	0.00	0.10
						4" Ice	0.00	0.10
WR-VG86ST-BRD (Power Cable) (AT&T Mobility)	C	No	Inside Pole	133.00 - 10.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15

**

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	113.00 - 10.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF6-50A (1-1/4 FOAM)	B	No	Inside Pole	113.00 - 10.00	1	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66

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 lb
L1	133.00-86.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	278.25
		C	0.000	0.000	0.000	0.000	637.84
L2	86.50-39.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	490.88
		C	0.000	0.000	0.000	0.000	641.27
L3	39.75-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	312.38
		C	0.000	0.000	0.000	0.000	408.08

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 lb
L1	133.00-86.50	A	0.865	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	278.25
		C		0.000	0.000	0.000	0.000	637.84
L2	86.50-39.75	A	0.810	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	490.88
		C		0.000	0.000	0.000	0.000	641.27
L3	39.75-0.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	312.38
		C		0.000	0.000	0.000	0.000	408.08

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	133.00-86.50	0.0000	0.0000	0.0000	0.0000
L2	86.50-39.75	0.0000	0.0000	0.0000	0.0000
L3	39.75-0.00	0.0000	0.0000	0.0000	0.0000

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 lb
8'x2" Antenna Mount Pipe	A	None		0.0000	133.00	No Ice	1.90	1.90	26.00
						1/2" Ice	2.73	2.73	40.34
						1" Ice	3.40	3.40	59.96
						2" Ice	4.40	4.40	115.66
						4" Ice	6.50	6.50	297.15
**									
Platform Mount [LP 1201-1] (AT&T Mobility)	A	None		0.0000	133.00	No Ice	23.10	23.10	2100.00
						1/2" Ice	26.80	26.80	2500.00
						1" Ice	30.50	30.50	2900.00
						2" Ice	37.90	37.90	3700.00
						4" Ice	52.70	52.70	5300.00
7770.00 w/ mount pipe (AT&T Mobility)	A	From Centroid-Leg	3.72 1.60 3.00	23.0000	133.00	No Ice	6.22	4.35	56.90
						1/2" Ice	6.77	5.20	105.42
						1" Ice	7.30	5.92	160.42
						2" Ice	8.38	7.41	293.10
						4" Ice	10.69	10.76	679.83
7770.00 w/ mount pipe (AT&T Mobility)	B	From Centroid-Leg	3.72 1.60 3.00	23.0000	133.00	No Ice	6.22	4.35	56.90
						1/2" Ice	6.77	5.20	105.42
						1" Ice	7.30	5.92	160.42
						2" Ice	8.38	7.41	293.10
						4" Ice	10.69	10.76	679.83
7770.00 w/ mount pipe (AT&T Mobility)	C	From Centroid-Leg	3.72 1.60 3.00	23.0000	133.00	No Ice	6.22	4.35	56.90
						1/2" Ice	6.77	5.20	105.42
						1" Ice	7.30	5.92	160.42
						2" Ice	8.38	7.41	293.10
						4" Ice	10.69	10.76	679.83
(4) LGP21401 TMA (VSI) (AT&T Mobility)	A	From Centroid-Leg	3.72 1.60 0.00	23.0000	133.00	No Ice	1.29	0.36	14.10
						1/2" Ice	1.45	0.48	21.26
						1" Ice	1.61	0.60	30.32
						2" Ice	1.97	0.87	54.89
						4" Ice	2.79	1.52	135.29
(4) LGP21401 TMA (VSI) (AT&T Mobility)	B	From Centroid-Leg	3.72 1.60 0.00	23.0000	133.00	No Ice	1.29	0.36	14.10
						1/2" Ice	1.45	0.48	21.26
						1" Ice	1.61	0.60	30.32
						2" Ice	1.97	0.87	54.89
						4" Ice	2.79	1.52	135.29
(4) LGP21401 TMA (VSI) (AT&T Mobility)	C	From Centroid-Leg	3.72 1.60 0.00	23.0000	133.00	No Ice	1.29	0.36	14.10
						1/2" Ice	1.45	0.48	21.26
						1" Ice	1.61	0.60	30.32
						2" Ice	1.97	0.87	54.89
						4" Ice	2.79	1.52	135.29
(2) RRUS-11 BTS (19.69 x 16.97 x 7.17) (AT&T Mobility)	A	From Centroid-Leg	3.72 1.60 0.00	23.0000	133.00	No Ice	3.25	1.37	47.62
						1/2" Ice	3.49	1.55	68.42
						1" Ice	3.74	1.74	92.25
						2" Ice	4.27	2.14	149.81
						4" Ice	5.43	3.04	309.89
(2) RRUS-11 BTS (19.69 x 16.97 x 7.17) (AT&T Mobility)	B	From Centroid-Leg	3.72 1.60 0.00	23.0000	133.00	No Ice	3.25	1.37	47.62
						1/2" Ice	3.49	1.55	68.42
						1" Ice	3.74	1.74	92.25
						2" Ice	4.27	2.14	149.81
						4" Ice	5.43	3.04	309.89

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 lb
(2) RRUS-11 BTS (19.69 x 16.97 x 7.17) (AT&T Mobility)	C	From Centroid-Leg	3.72 1.60 0.00	23.0000	133.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	47.62 68.42 92.25 149.81 309.89
RRUS 32 B30 BTS (26.7"x12.1"x6.7") (AT&T Mobility)	A	From Centroid-Leg	3.72 1.60 3.00	23.0000	133.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.14 3.40 3.66 4.22 5.43	1.74 1.96 2.19 2.67 3.75	60.00 80.40 103.95 161.24 322.12
RRUS 32 B30 BTS (26.7"x12.1"x6.7") (AT&T Mobility)	B	From Centroid-Leg	3.72 1.60 3.00	23.0000	133.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.14 3.40 3.66 4.22 5.43	1.74 1.96 2.19 2.67 3.75	60.00 80.40 103.95 161.24 322.12
RRUS 32 B30 BTS (26.7"x12.1"x6.7") (AT&T Mobility)	C	From Centroid-Leg	3.72 1.60 3.00	23.0000	133.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.14 3.40 3.66 4.22 5.43	1.74 1.96 2.19 2.67 3.75	60.00 80.40 103.95 161.24 322.12
DC6-48-60-18-8F (24 x 11 x 11) (AT&T Mobility)	A	From Centroid-Leg	3.72 1.60 0.00	23.0000	133.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.47 1.67 1.88 2.33 3.38	1.47 1.67 1.88 2.33 3.38	18.90 36.62 56.82 105.34 239.02
DC6-48-60-18-8F (24 x 11 x 11) (AT&T Mobility)	C	From Centroid-Leg	3.72 1.60 3.00	23.0000	133.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.47 1.67 1.88 2.33 3.38	1.47 1.67 1.88 2.33 3.38	18.90 36.62 56.82 105.34 239.02
AM-X-CD-14-65-00T-RET w/ Mount Pipe (AT&T Mobility)	A	From Centroid-Leg	3.72 1.60 3.00	23.0000	133.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.74 6.20 6.66 7.62 9.67	4.02 4.63 5.28 6.68 9.74	34.75 79.98 131.14 254.16 610.14
AM-X-CD-14-65-00T-RET w/ Mount Pipe (AT&T Mobility)	B	From Centroid-Leg	3.72 1.60 3.00	23.0000	133.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.74 6.20 6.66 7.62 9.67	4.02 4.63 5.28 6.68 9.74	34.75 79.98 131.14 254.16 610.14
AM-X-CD-14-65-00T-RET w/ Mount Pipe (AT&T Mobility)	C	From Centroid-Leg	3.72 1.60 3.00	23.0000	133.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.74 6.20 6.66 7.62 9.67	4.02 4.63 5.28 6.68 9.74	34.75 79.98 131.14 254.16 610.14
OPA-65R-LCUU-H4 w/ Mount Pipe (AT&T Mobility)	A	From Centroid-Leg	3.72 1.60 3.00	23.0000	133.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.67 8.49 9.25 10.61 13.48	5.31 6.50 7.54 9.31 13.05	86.20 146.75 214.10 373.16 826.24
OPA-65R-LCUU-H4 w/ Mount Pipe (AT&T Mobility)	B	From Centroid-Leg	3.72 1.60 3.00	23.0000	133.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.67 8.49 9.25 10.61 13.48	5.31 6.50 7.54 9.31 13.05	86.20 146.75 214.10 373.16 826.24
OPA-65R-LCUU-H4 w/ Mount Pipe	C	From Centroid-Le	3.72 1.60	23.0000	133.00	No Ice 1/2" Ice	7.67 8.49	5.31 6.50	86.20 146.75

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(AT&T Mobility)		g	3.00			1" Ice	9.25	7.54	214.10
						2" Ice	10.61	9.31	373.16
						4" Ice	13.48	13.05	826.24
***									
Side Arm Mount [SO 102-1]	A	From Centroid-Le g	1.50 0.00 0.00	0.0000	115.00	No Ice	1.50	1.50	25.00
						1/2" Ice	1.74	1.75	35.00
						1" Ice	1.98	2.00	45.00
						2" Ice	2.46	2.50	65.00
						4" Ice	3.42	3.50	105.00
TMA-DB-T1-6Z-8AB-0Z w/ Mount Pipe	A	From Centroid-Le g	3.00 0.00 0.00	30.0000	115.00	No Ice	7.03	4.23	73.20
						1/2" Ice	7.96	5.29	130.43
						1" Ice	8.79	6.19	193.70
						2" Ice	10.21	7.68	342.34
						4" Ice	13.24	10.87	765.46
***									
Platform Mount [LP 303-1]	A	None		0.0000	113.00	No Ice	14.66	14.66	1250.00
						1/2" Ice	18.87	18.87	1481.33
						1" Ice	23.08	23.08	1712.66
						2" Ice	31.50	31.50	2175.32
						4" Ice	48.34	48.34	3100.64
(2) LPA-80090/4CF w/ Mount Pipe	A	From Centroid-Le g	3.00 1.73 0.00	30.0000	113.00	No Ice	2.63	5.18	25.60
						1/2" Ice	2.94	5.80	62.79
						1" Ice	3.25	6.43	105.47
						2" Ice	3.99	7.75	209.86
						4" Ice	5.59	10.75	518.48
(2) LPA-80090/4CF w/ Mount Pipe	B	From Centroid-Le g	3.00 1.73 0.00	30.0000	113.00	No Ice	2.63	5.18	25.60
						1/2" Ice	2.94	5.80	62.79
						1" Ice	3.25	6.43	105.47
						2" Ice	3.99	7.75	209.86
						4" Ice	5.59	10.75	518.48
(2) LPA-80090/4CF w/ Mount Pipe	C	From Centroid-Le g	3.00 1.73 0.00	30.0000	113.00	No Ice	2.63	5.18	25.60
						1/2" Ice	2.94	5.80	62.79
						1" Ice	3.25	6.43	105.47
						2" Ice	3.99	7.75	209.86
						4" Ice	5.59	10.75	518.48
BXA-171063-8BF-2 w/ Mount Pipe	A	From Centroid-Le g	3.00 1.73 0.00	30.0000	113.00	No Ice	3.41	3.58	32.40
						1/2" Ice	3.88	4.38	67.06
						1" Ice	4.35	5.06	107.41
						2" Ice	5.36	6.47	208.39
						4" Ice	7.52	9.64	522.15
BXA-171063-8BF-2 w/ Mount Pipe	B	From Centroid-Le g	3.00 1.73 0.00	30.0000	113.00	No Ice	3.41	3.58	32.40
						1/2" Ice	3.88	4.38	67.06
						1" Ice	4.35	5.06	107.41
						2" Ice	5.36	6.47	208.39
						4" Ice	7.52	9.64	522.15
BXA-171063-8BF-2 w/ Mount Pipe	C	From Centroid-Le g	3.00 1.73 0.00	30.0000	113.00	No Ice	3.41	3.58	32.40
						1/2" Ice	3.88	4.38	67.06
						1" Ice	4.35	5.06	107.41
						2" Ice	5.36	6.47	208.39
						4" Ice	7.52	9.64	522.15
SWCP 2x5514 w/ Mount Pipe	A	From Centroid-Le g	3.00 1.73 0.00	30.0000	113.00	No Ice	7.89	7.60	49.20
						1/2" Ice	8.70	8.84	120.30
						1" Ice	9.45	9.94	198.68
						2" Ice	10.81	11.81	381.25
						4" Ice	13.69	15.75	887.10
SWCP 2x5514 w/ Mount Pipe	B	From Centroid-Le	3.00 1.73	30.0000	113.00	No Ice	7.89	7.60	49.20
						1/2" Ice	8.70	8.84	120.30

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
		g	0.00			1" Ice	9.45	9.94	198.68
						2" Ice	10.81	11.81	381.25
						4" Ice	13.69	15.75	887.10
SWCP 2x5514 w/ Mount Pipe	C	From Centroid-Le g	3.00 1.73 0.00	30.0000	113.00	No Ice 1/2" Ice 1" Ice	7.89 8.70 9.45	7.60 8.84 9.94	49.20 120.30 198.68
						2" Ice	10.81	11.81	381.25
						4" Ice	13.69	15.75	887.10
BXA-171063-8BF-EDIN-4 w/ Mount Pipe	A	From Centroid-Le g	3.00 1.73 0.00	30.0000	113.00	No Ice 1/2" Ice 1" Ice	3.41 3.88 4.35	3.58 4.38 5.06	32.40 67.06 107.41
						2" Ice	5.36	6.47	208.39
						4" Ice	7.52	9.64	522.15
BXA-171063-8BF-EDIN-4 w/ Mount Pipe	B	From Centroid-Le g	3.00 1.73 0.00	30.0000	113.00	No Ice 1/2" Ice 1" Ice	3.41 3.88 4.35	3.58 4.38 5.06	32.40 67.06 107.41
						2" Ice	5.36	6.47	208.39
						4" Ice	7.52	9.64	522.15
BXA-171063-8BF-EDIN-4 w/ Mount Pipe	C	From Centroid-Le g	3.00 1.73 0.00	30.0000	113.00	No Ice 1/2" Ice 1" Ice	3.41 3.88 4.35	3.58 4.38 5.06	32.40 67.06 107.41
						2" Ice	5.36	6.47	208.39
						4" Ice	7.52	9.64	522.15
9442 RRH2X40-AWS TMA	A	From Centroid-Le g	3.00 1.73 0.00	30.0000	113.00	No Ice 1/2" Ice 1" Ice	2.51 2.75 2.99	1.59 1.80 2.01	44.09 61.46 81.72
						2" Ice	3.49	2.46	131.71
						4" Ice	4.61	3.48	275.02
9442 RRH2X40-AWS TMA	B	From Centroid-Le g	3.00 1.73 0.00	30.0000	113.00	No Ice 1/2" Ice 1" Ice	2.51 2.75 2.99	1.59 1.80 2.01	44.09 61.46 81.72
						2" Ice	3.49	2.46	131.71
						4" Ice	4.61	3.48	275.02
9442 RRH2X40-AWS TMA	C	From Centroid-Le g	3.00 1.73 0.00	30.0000	113.00	No Ice 1/2" Ice 1" Ice	2.51 2.75 2.99	1.59 1.80 2.01	44.09 61.46 81.72
						2" Ice	3.49	2.46	131.71
						4" Ice	4.61	3.48	275.02

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L1	133 - 86.5 (1)	TP33.116x24x0.25	46.50	0.00	0.0	39.000	25.4180	-8499.08	991304.00	0.009
L2	86.5 - 39.75 (2)	TP41.78x31.7828x0.2813	51.00	0.00	0.0	39.000	36.1331	-15307.20	1409190.00	0.011

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L3	39.75 - 0 (3)	TP49.01x40.1883x0.375	45.00	0.00	0.0	39.000	57.8878	-25333.70	2257620.00	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	133 - 86.5 (1)	TP33.116x24x0.25	440728.33	-26.322	39.000	0.675	0.00	0.000	39.000	0.000
L2	86.5 - 39.75 (2)	TP41.78x31.7828x0.2813	1178841.67	-39.169	39.000	1.004	0.00	0.000	39.000	0.000
L3	39.75 - 0 (3)	TP49.01x40.1883x0.375	2065833.33	-35.678	39.000	0.915	0.00	0.000	39.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	133 - 86.5 (1)	TP33.116x24x0.25	0.009	0.675	0.000	0.683 ✔	1.333	H1-3 ✔
L2	86.5 - 39.75 (2)	TP41.78x31.7828x0.2813	0.011	1.004	0.000	1.015 ✔	1.333	H1-3 ✔
L3	39.75 - 0 (3)	TP49.01x40.1883x0.375	0.011	0.915	0.000	0.926 ✔	1.333	H1-3 ✔

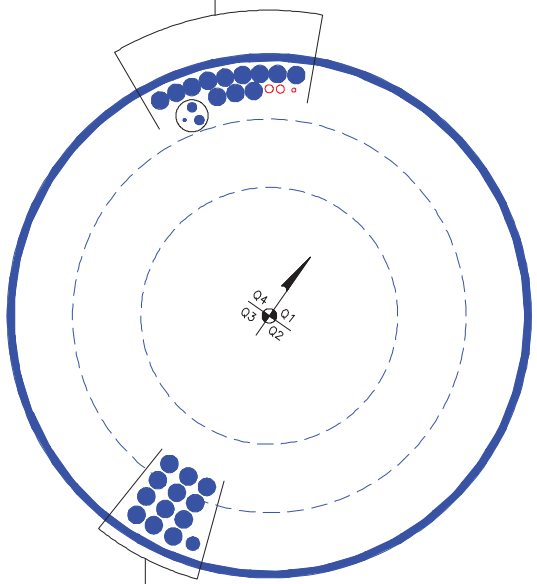
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	133 - 86.5	Pole	TP33.116x24x0.25	1	-8499.08	1321408.18	51.3	Pass
L2	86.5 - 39.75	Pole	TP41.78x31.7828x0.2813	2	-15307.20	1878450.19	76.2	Pass
L3	39.75 - 0	Pole	TP49.01x40.1883x0.375	3	-25333.70	3009407.34	69.5	Pass
							Summary	
						Pole (L2)	76.2	Pass
						RATING =	**76.2**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

(PROPOSED)
(1) 3/8" TO 133 FT LEVEL
(2) 3/4" TO 133 FT LEVEL
(INSTALLED-IN 3" CONDUIT)
(1) 17/64" TO 133 FT LEVEL
(2) 7/8" TO 133 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 133 FT LEVEL
(AT&T MOBILITY)



(INSTALLED)
(1) 1-1/4" TO 113 FT LEVEL
(12) 1-5/8" TO 113 FT LEVEL

BUSINESS UNIT: 873633 TOWER ID: C_BASELEVEL

31/10/08	UPDATED PER WORK ORDER # 237733	RJK
27/04/09	AS-BUILT INFORMATION ADDED PER WORK ORDER # 259419	CJP
27/04/10	AS-BUILT INFORMATION ADDED PER WORK ORDER # 343687	LAN
25/01/11	APPLICATION ADDED PER WORK ORDER # 383688	BBF
27/08/13	UPDATED PER WORK ORDER # 644979	TS
3/11/2014	UPDATED PER WORK ORDER 956993	BWT
25/11/2014	UPDATED PER WORK ORDER 969717	ALM
8/1/2015	UPDATED PER WORK ORDER 990774	ZMK
22/9/2015	UPDATED PER WORK ORDER 1124194	DMB

DRAWN BY: **VVR**
CHECKED BY: **JEP**
DRAWING DATE: **13/11/07**

SITE NUMBER:
SITE NAME:

SITE NAME

MILFORD

BUSINESS UNIT NUMBER

873633

SITE ADDRESS

10 BONA STREET
MILFORD, CT 06461
NEW HAVEN COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING

SCALE: 1" = 1'-0"

1

PLOT DATE: 9/22/2015 FILE NAME: 873633_BASELEVEL.dwg
Xref R:\TEMPLATES\TYPICAL BLOCKS FOR TEMPLATES\TITLE BLOCK STD-VER 5.1.dwg

APPENDIX C

ADDITIONAL CALCULATIONS

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

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

Site Data

BU#: *873633*
Site Name: *Milford, CT*
App #: *311083, Rev. 1*

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	60	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	58	in
Thick:	3.25	in
Grade:	55	ksi
Clip Distance:	8	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
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:	49.01	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	2066	ft-kips
Unfactored Axial, P:	25	kips
Unfactored Shear, V:	21	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	101.7 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	52.2% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	33.5 ksi
Allowable PL Bending Stress:	55.0 ksi
Base Plate Stress Ratio:	60.9% **Pass**

PL Ref. Data	
Yield Line (in):	33.01
Max PL Length:	33.01

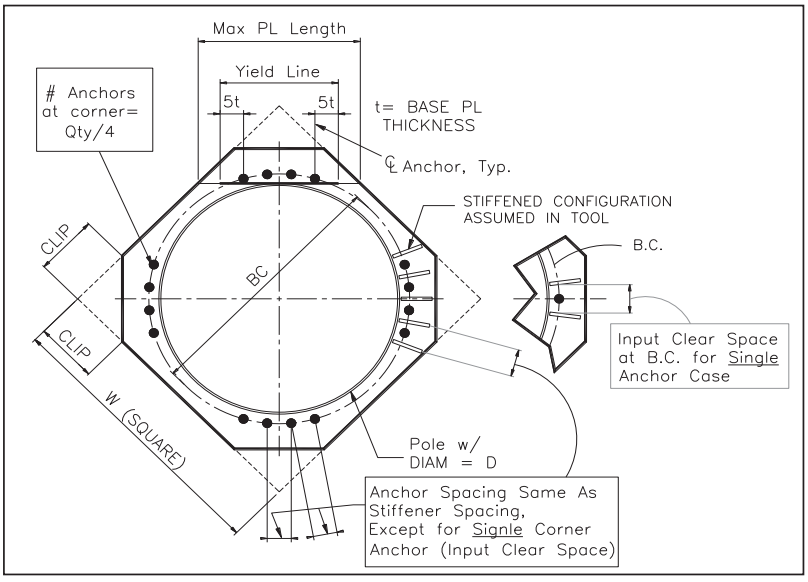
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check:	N/A



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

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

BU#: *873633*
Site Name: *Milford, CT*
App #: *311083, Rev. 1*

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Pad & Pier Data		
Base PL Dist. Above Pier:	0	in
Pier Dist. Above Grade:	6	in
Pad Bearing Depth, D:	7	ft
Pad Thickness, T:	3	ft
Pad Width=Length, L:	23.5	ft
Pier Cross Section Shape:	Square	<--Pull Down
Enter Pier Side Width:	7	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	49.00	ft^2
Pier Height:	4.50	ft
Soil (above pad) Height:	4.00	ft

Soil Parameters		
Unit Weight, γ:	125.0	pcf
Ultimate Bearing Capacity, qn:	10.00	ksf
Strength Reduct. factor, ϕ:	0.75	
Angle of Friction, Φ:	0.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: ϕ*qn:	7.50	ksf
Passive Pres. Coeff., Kp	1.00	

Forces/Moments due to Wind and Lateral Soil		
Minimum of (φ*Ultimate Pad Passive Force, Vu):	28.9	kips
Pad Force Location Above D:	1.36	ft
ϕ(Passive Pressure Moment):	39.44	ft-kips
Factored O.T. M(WL), "1.6W":	3005.8	ft-kips
Factored OT (MW-Msoil), M1	2966.35	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	0.00	ft
Sum of Soil Wedges Wt:	0.00	kips
Soil Wedges ecc, K1:	0.00	ft
Ftg+Soil above Pad wt:	533.2	kips
Unfactored (Total ftg-soil Wt):	533.21	kips
1.2D. **No Soil Wedges**.	670.27	kips
0.9D. **With Soil Wedges**	502.70	kips

Resistance due to Cohesion (Vertical)		
ϕ*(1/2*Cu)(Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	25.347	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	21.423	kips
Unfactored WL Moment, M:	2065.837	ft-kips

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	30.4164	kips
0.90	0.9D+1.6W, Pu:	22.8123	kips
1.35	Vu:	28.92105	kips
	Mu:	2788.88	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(**No Soil Wedges**) [Reaction+Conc+Soil]	670.27	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	2966.35	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 =	4.43	ft
Orthogonal qu=	2.13	ksf
qu/ϕ*qn Ratio=	**28.37%**	**Pass**

Diagonal Direction:

ecc2 = (0.707M1)/P1 =	3.13	ft
Diagonal qu=	2.25	ksf
qu/ϕ*qn Ratio=	**30.06%**	**Pass**

Run <-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

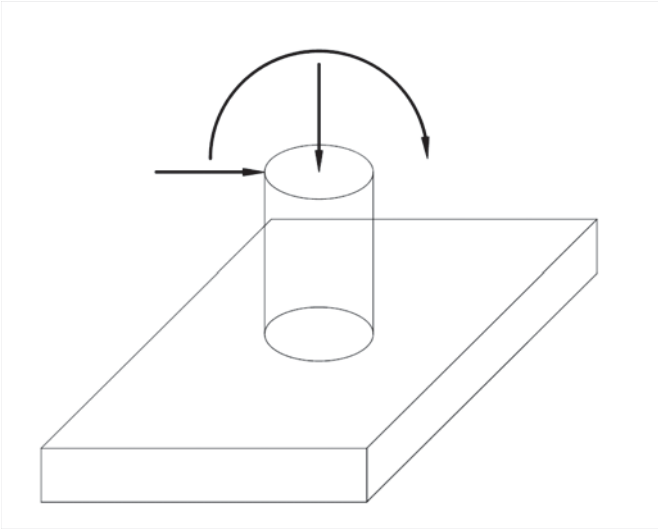
(**w/ Soil Wedges**) [Reaction+Conc+Soil]	502.70	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	2966.35	ft-kips

Orthogonal ecc3 = M2/P2 =	5.90	ft
Ortho Non Bearing Length,NBL=	11.80	ft
Orthogonal qu=	1.83	ksf
Diagonal qu=	2.19	ksf

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating			
Actual M:	2065.84		
M Orthogonal:	3712.88	**55.64%**	**Pass**
M Diagonal:	3712.88	**55.64%**	**Pass**

MAT FOUNDATION STEEL CALCULATIONS (TIA-G)

Customer: Crown Castle
Site Name: Milford, CT BU#873633
Job Number: 2015-004-026
Tower Model: 133' Summit Monopole Tower
Date: 10/5/2015



Foundation Parameters:

Mat Width: $B = 23.5\,ft$
Mat Height: $h_{mat} = 3\,ft$
Pier Height: $h_p = 4.5\,ft$
Pier Width: $D_p = 7\,ft$
Pier shape: $shape = "square"$
Concrete strenght: $f'_c = 3000\,psi$

Soil Information:

Soil density: $\gamma_s = 125 \cdot pcf$
Ultimate bearing: $q_{ult} = 10 \cdot ksf$
Depth of soil over mat: $d_s = 4\,ft$

Foundation Steel Information:

Bottom reinf. size and qty: $Size_{bot} = 11$ $N_{bot} = 24$
Top reinf. size and qty: $Size_{top} = 11$ $N_{top} = 24$
Clear cover: $cc = 3 \cdot in$

Reactions from tnxTower:

$P_u = 30.416 \cdot kip$ $V_u = 27.85 \cdot kip$
$M_u = 2685.588 \cdot kip \cdot ft$

Check One-Way Shear:

$V_{u.max} := V_1 = 278.152 \cdot kip$

$\Phi V_c := 2 \cdot \Phi_s \cdot B \cdot d_1 \cdot \sqrt{f'_c \cdot psi} = 715.564 \cdot kip$

$\%_{ows} := \frac{V_{u.max}}{\Phi V_c} = 38.9 \cdot \%$

Check Two-Way Shear:

$\sigma_{1.app} = 29.323\,psi$

$\Phi\sigma_1 := \Phi_s \cdot (2 + y) \cdot \sqrt{f'_c \cdot psi} = 0.164 \cdot ksi$

$\%_{tws} := \frac{\sigma_{1.app}}{\Phi\sigma_1} = 17.8 \cdot \%$

Check mat Flexural Steel:

$M_{pad} := \max\left(M_{pad1.2}, M_{pad0.9}\right) = 1516.513 \cdot kip \cdot ft$

$\phi M_{n1} := \phi_t \cdot A_{s.bot} \cdot f_y \cdot \left(d_1 - \frac{A_{s.bot} \cdot f_y}{0.85 \cdot f'_c \cdot B \cdot 2}\right) = 4940.347 \cdot kip \cdot ft$

$\%_{s.bot} := \frac{M_{pad}}{\phi M_{n1}} = 30.7 \cdot \%$

CAISSON Version 4.91 3:28:00 PM Monday, October 05, 2015
Vertical Structures, Inc.

```
*****************************************************************************
*                                                                           *
*  PIER FOUNDATIONS ANALYSIS AND DESIGN - (C) 1995,2002 POWER LINE SYSTEMS, INC.*
*                                                                           *
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*** ANALYSIS IDENTIFICATION : Milford, CT BU#873633
NOTES : Vertical Structures Job No. 2015-004-026

*** PIER PROPERTIES
DIAMETER (ft) = 7.000 DISTANCE FROM TOP OF PIER TO GROUND LEVEL (ft) = 0.50

*** SOIL PROPERTIES

LAYER	TYPE	THICKNESS (ft)	DEPTH AT TOP OF LAYER (ft)	DENSITY (pcf)	CU (psf)	KP	PHI (degrees)
1	C	3.50	0.00	125.0	0.0		
2	S	21.50	3.50	125.0		3.000	30.00

*** DESIGN (FACTORED) LOADS AT TOP OF PIER MOMENT (ft-k) = 2065.8 VERTICAL (k) = 25.3 SHEAR (k) = 21.4
ADDITIONAL SAFETY FACTOR AGAINST SOIL FAILURE = 4.50

*** CALCULATED PIER LENGTH (ft) = 25.500 = 25.50' OK

*** CHECK OF SOILS PROPERTIES AND ULTIMATE RESISTING FORCES ALONG PIER

TYPE	TOP OF LAYER BELOW TOP OF PIER (ft)	THICKNESS (ft)	DENSITY (pcf)	CU (psf)	KP	FORCE (k)	ARM (ft)
C	0.50	3.50	125.0	0.0		0.00	2.25
S	4.00	14.69	125.0		3.000	1254.83	13.00
S	18.69	6.81	125.0		3.000	-1157.87	22.27

*** SHEAR AND MOMENTS ALONG PIER

DISTANCE BELOW TOP OF PIER (ft)	WITH THE ADDITIONAL SAFETY FACTOR SHEAR (k)	WITH THE ADDITIONAL SAFETY FACTOR MOMENT (ft-k)	WITHOUT ADDITIONAL SAFETY FACTOR SHEAR (k)	WITHOUT ADDITIONAL SAFETY FACTOR MOMENT (ft-k)
0.00	97.0	9473.0	21.5	2105.1
2.55	97.0	9720.3	21.5	2160.1
5.10	61.9	9949.1	13.8	2210.9
7.65	-56.1	9967.3	-12.5	2215.0
10.20	-225.3	9619.5	-50.1	2137.7
12.75	-445.7	8774.9	-99.0	1950.0
15.30	-717.3	7303.0	-159.4	1622.9
17.85	-1040.1	5073.3	-231.1	1127.4
20.40	-901.6	2386.3	-200.4	530.3
22.95	-476.4	618.3	-105.9	137.4
25.50	0.0	0.0	0.0	0.0

*** WEIGHT OF CAISSON (kips) = 147.203
*** PRESSURE UNDER CAISSON DUE TO INPUT DESIGN AXIAL LOAD (psf) = 658.6

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *873633*
Site Name: *Milford, CT*
App #: *311083, Rev. 1*

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	2162.24	ft-kips **(* Note)**
Max. Service Shaft P:	25.347	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	0.9	<---- Enter Factor

Load Factor	Shaft Factored Loads		
1.30	Mu:	2810.912	ft-kips
0.90	Pu:	22.8123	kips

Pier Properties

Concrete:

Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2

Reinforcement:

Clear Cover to **Tie**=	3.00	in
Horiz. **Tie** Bar Size=	4	
Vert. Cage Diameter =	6.30	ft
Vert. Cage Diameter =	75.59	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	32	
As Total=	49.92	in^2
A s/ Aconc, Rho:	0.0090	0.90%

Material Properties		
Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	
ACI 318 Code		
Select Analysis ACI Code=	2005	
Seismic Properties		
Seismic Design Category =	C	
Seismic Risk =	**Moderate**	

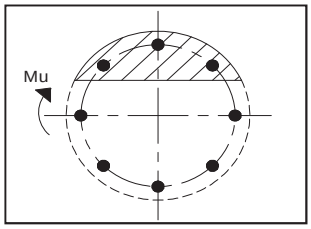
Solve (Run) <-- Press Upon Completing All Input

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:

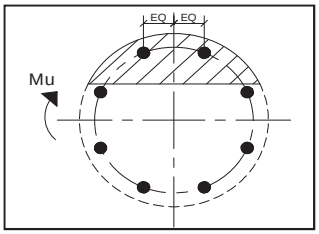
(3)*(Sqrt(f'c)/Fy:	0.0027
200 / Fy:	0.0033

Results:

Governing Orientation Case: **2**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**16.38**	in
Extreme Steel Strain, ϵt:	**0.0116**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.90%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8839.70	kips
at Mu=(ϕ=0.65)Mn=	5368.18	ft-kips
Max Tu, (φ=0.9) Tn =	2695.68	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	22.81	kips
Drilled Shaft Moment Capacity, φMn:	**7536.74**	ft-kips
Drilled Shaft Superimposed Mu:	**2810.91**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**37.3%**

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *873633*
Site Name: *Milford, CT*
App #: *311083, Rev. 1*

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties

Concrete:

Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	6.11	ft
Vert. Cage Diameter =	73.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	24	
As Total=	37.44	in^2
A s/ Aconc, Rho:	0.0068	0.68%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0027
200 / Fy: 0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.68%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8466.87	kips
at Mu=(ϕ=0.65)Mn=	5122.02	ft-kips
Max Tu, (φ=0.9) Tn =	2021.76	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	2215	ft-kips **(* Note)**
Max. Service Shaft P:	25.347	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads		
1.30	Mu:	2879.5	ft-kips
1.30	Pu:	32.9511	kips

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code=	2005

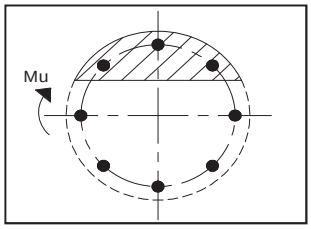
Seismic Properties

Seismic Design Category =	C
Seismic Risk =	**Moderate**

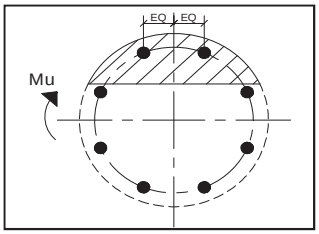
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **2**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**14.74**	in
Extreme Steel Strain, ϵt:	**0.0130**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	32.95	kips
Drilled Shaft Moment Capacity, φMn:	**5769.40**	ft-kips
Drilled Shaft Superimposed Mu:	**2879.50**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**49.9%**

SITESAFE
RF COMPLIANCE EXPERTS
A BUSINESS OF FDH VELOCITEL

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703.276.1100 • 703.276.1169 fax
info@sitesafe.com • www.sitesafe.com

SmartLink, LLC
on behalf of AT&T Mobility, LLC
Site FA – 10035338
Site ID – CTU2082 (3C)
USID – 61172
Site Name – Milford Bona St
Site Compliance Report

Bona Street
Milford, CT 06460

Latitude: N41-13-12.27
Longitude: W73-4-38.60
Structure Type: Monopole

Report generated date: January 18, 2016
Report by: Young Kim
Customer Contact: Kristen Smith

AT&T Mobility, LLC Will Be Compliant When the Remediation Recommended in Section 5.2 or Other Appropriate Remediation is Implemented.

Registered Professional Engineer (Electrical)
CERTIFICATE NO.
45335
KLAUS
BENDER
Signed: 1/20/2016
Date Signed
ARIZONA U.S.A.

Klaus Bender
Registered Professional Engineer (Electrical)

Expires December 31, 2018

Table of Contents

1 General Site Summary

1.1 Report Summary

AT&T Mobility, LLC	Summary
Access to Antennas Locked?	Yes
RF Sign(s) @ access point(s)	None
RF Sign(s) @ antennas	None
Barrier(s) @ sectors	None
Max cumulative simulated Radio Frequency Exposure (RFE) level on Ground Level	<5% of General Public limit
FCC & AT&T Compliant?	Will Be Compliant

The following documents were provided by the client and were utilized to create this report:

RFDS: NEW-ENGLAND_CONNECTICUT_CTU2082_2016-LTE-Next-Carrier_LTE-3C_mm093q_2051A02JYA_10035338_61172_06-29-2015_Preliminary-Approved_v1.00

CD's: 10035338_AE201_151103_CTL02082.Rev1

RF Configuration Datasheet: CT_33 sites with power density form

2 Map of Site

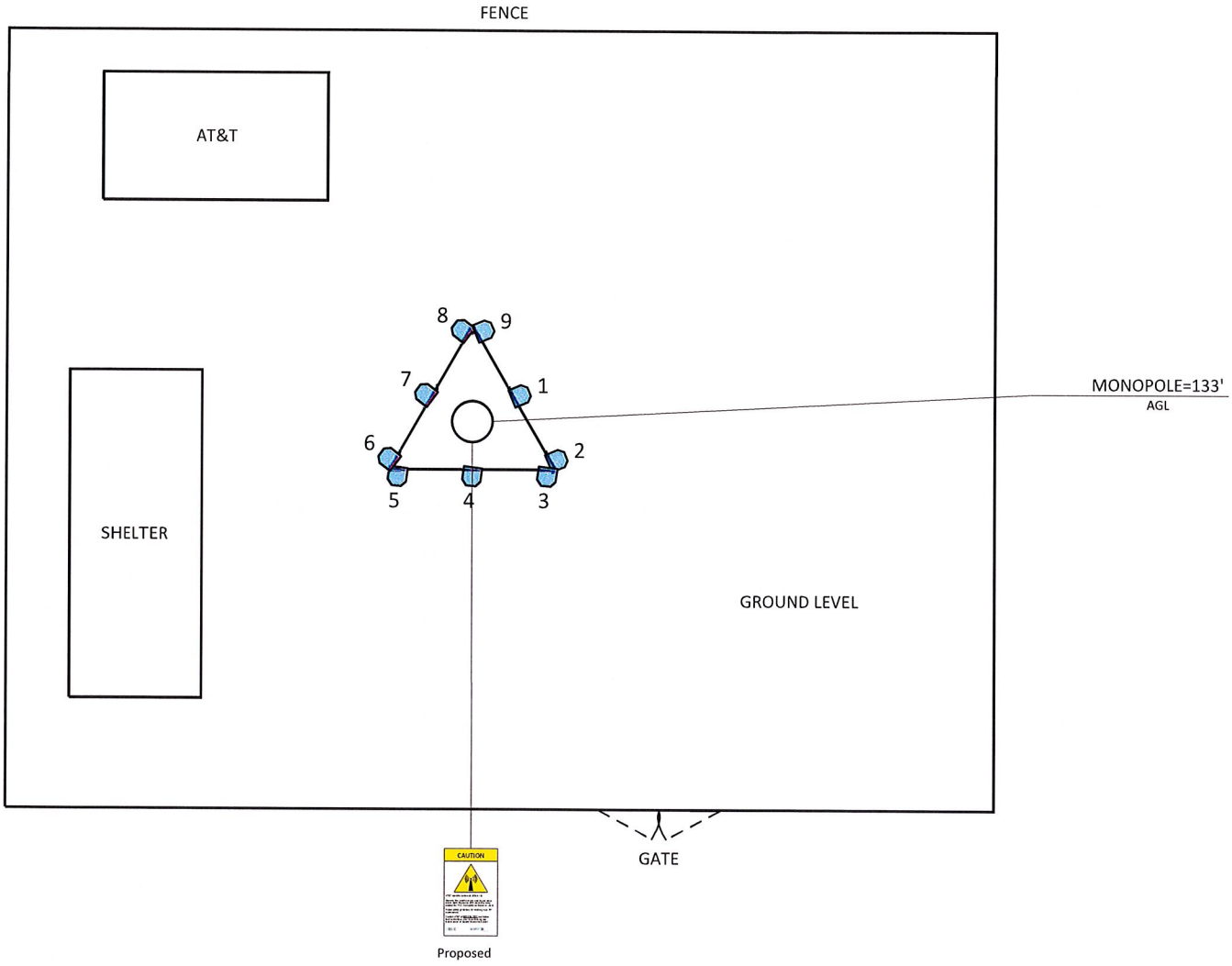
In the RF Emissions Simulations below all heights are reflected with respect to main site level. In most rooftop cases this is the height of the main rooftop and in other cases this can be ground level. Each different height area, rooftop, or platform level is labeled with its height relative to the main site level. Emissions are calculated appropriately based on the relative height and location of that area to all antennas.

The Antenna Inventory heights are referenced to the same level.

The following diagrams are included:

- Site Map
- RF Emissions Diagram
- Southeast Elevation View

Site Map For: Milford Bona St



(Feet)

0 7.6 15.2

www.sitesafe.com
Site Name:Milford Bona St

>= 5000	>= 500	>= 100	>= 5	< 5

AT&T MOBILITY LLC	VERIZON WIRELESS	T-MOBILE	METROPCS	CRICKET COMMUNICATIONS	CLEARWIRE	SPRINT

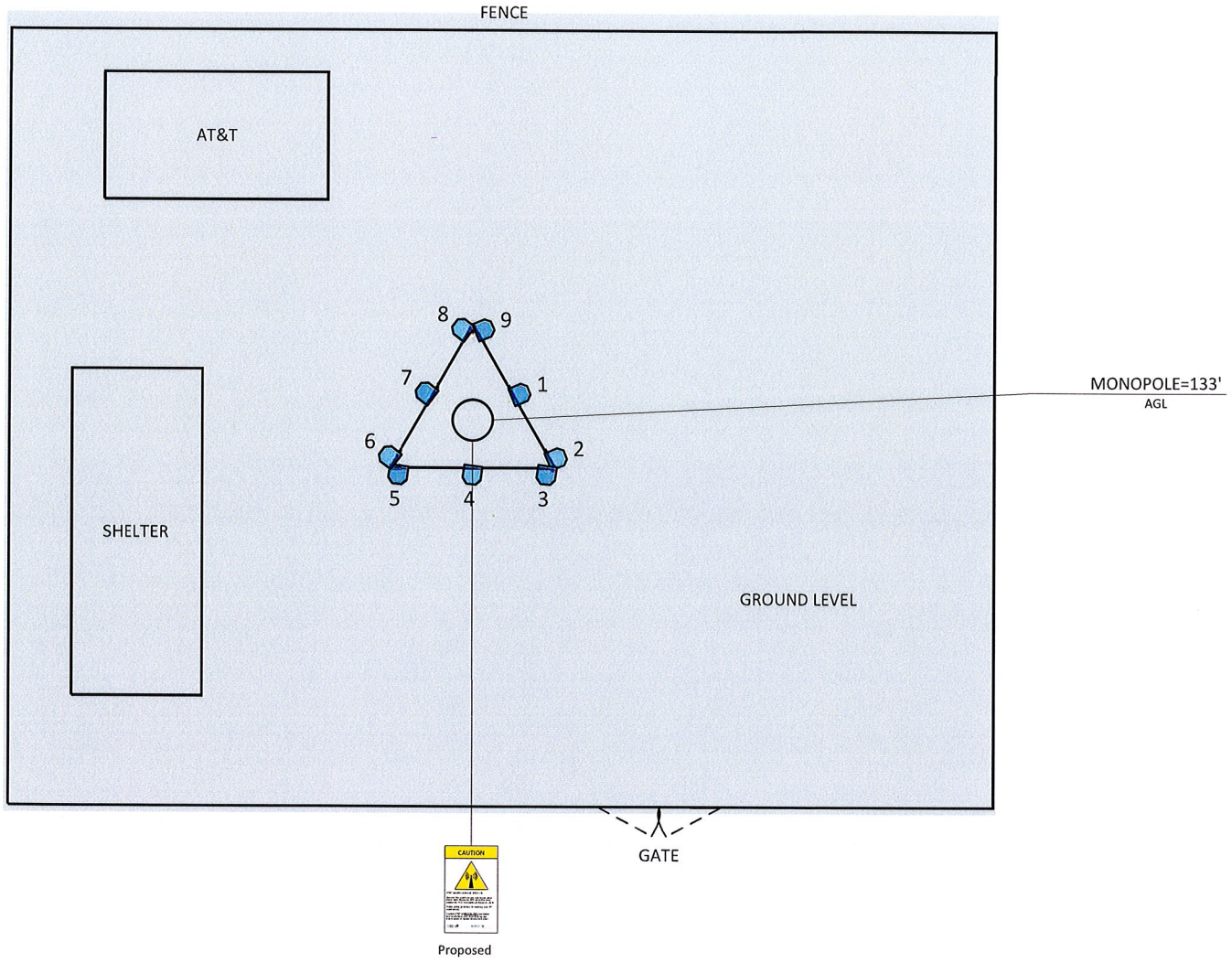
3 Antenna Inventory

The following antenna inventory was obtained by the customer and was utilized to create the site model diagrams:

Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Ant Gain (dBd)	2G GSM Radio(s)	3G UMTS Radio(s)	4G Radio(s)	Total ERP (Watts)	X	Y	Z (AGL)
1	AT&T MOBILITY LLC (Proposed)	CCI Antennas OPA-65R-LCUU-H4	Panel	850	23	60	4	11.36	1	0	0	178.7	70.7'	91.8'	134'
1	AT&T MOBILITY LLC (Proposed)	CCI Antennas OPA-65R-LCUU-H4	Panel	2300	23	61.1	4	14.26	0	0	1	637	70.7'	91.8'	134'
2	AT&T MOBILITY LLC	KMW AM-X-CD-14-65-00T	Panel	737	23	67	4	11.66	0	0	1	483.2	74'	86'	134'
2	AT&T MOBILITY LLC	KMW AM-X-CD-14-65-00T	Panel	1900	23	65	4	13.86	0	0	1	1476.2	74'	86'	134'
3	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	143	82	4.6	11.51	0	2	0	357.4	73.1'	84.5'	133.7'
3	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	143	86	4.6	13.41	0	1	0	195.5	73.1'	84.5'	133.7'
4	AT&T MOBILITY LLC (Proposed)	CCI Antennas OPA-65R-LCUU-H4	Panel	850	143	60	4	11.36	1	0	0	178.7	66.4'	84.5'	134'
4	AT&T MOBILITY LLC (Proposed)	CCI Antennas OPA-65R-LCUU-H4	Panel	2300	143	61.1	4	14.26	0	0	1	637	66.4'	84.5'	134'
5	AT&T MOBILITY LLC	KMW AM-X-CD-14-65-00T	Panel	737	143	67	4	11.66	0	0	1	483.2	59.6'	84.5'	134'
5	AT&T MOBILITY LLC	KMW AM-X-CD-14-65-00T	Panel	1900	143	65	4	13.86	0	0	1	1476.2	59.6'	84.5'	134'
6	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	263	82	4.6	11.51	0	2	0	357.4	58.8'	86.1'	133.7'
6	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	263	86	4.6	13.41	0	1	0	195.5	58.8'	86.1'	133.7'
7	AT&T MOBILITY LLC (Proposed)	CCI Antennas OPA-65R-LCUU-H4	Panel	850	263	60	4	11.36	1	0	0	178.7	62.1'	91.9'	134'
7	AT&T MOBILITY LLC (Proposed)	CCI Antennas OPA-65R-LCUU-H4	Panel	2300	263	61.1	4	14.26	0	0	1	637	62.1'	91.9'	134'
8	AT&T MOBILITY LLC	KMW AM-X-CD-14-65-00T	Panel	737	263	67	4	11.66	0	0	1	483.2	65.4'	97.6'	134'
8	AT&T MOBILITY LLC	KMW AM-X-CD-14-65-00T	Panel	1900	263	65	4	13.86	0	0	1	1476.2	65.4'	97.6'	134'
9	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	23	82	4.6	11.51	0	2	0	357.4	67.4'	97.6'	133.7'
9	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	23	86	4.6	13.41	0	1	0	195.5	67.4'	97.6'	133.7'

NOTE: X, Y and Z indicate relative position of the bottom of the antenna to the origin location on the site, displayed in the model results diagram. Specifically, the Z reference indicates the bottom of the antenna height above ground level. The distance to the bottom of the antenna is calculated by subtracting half of the length of the antenna from the antenna centerline. Effective Radiated Power (ERP) is provided by the operator or based on Sitesafe experience. The values used in the modeling may be greater than are currently deployed.

RF Emissions Simulation For: Milford Bona St



% of FCC Public Exposure Limit
Spatial average 0' - 6'

>= 5000	>= 500	>= 100	>= 5	< 5

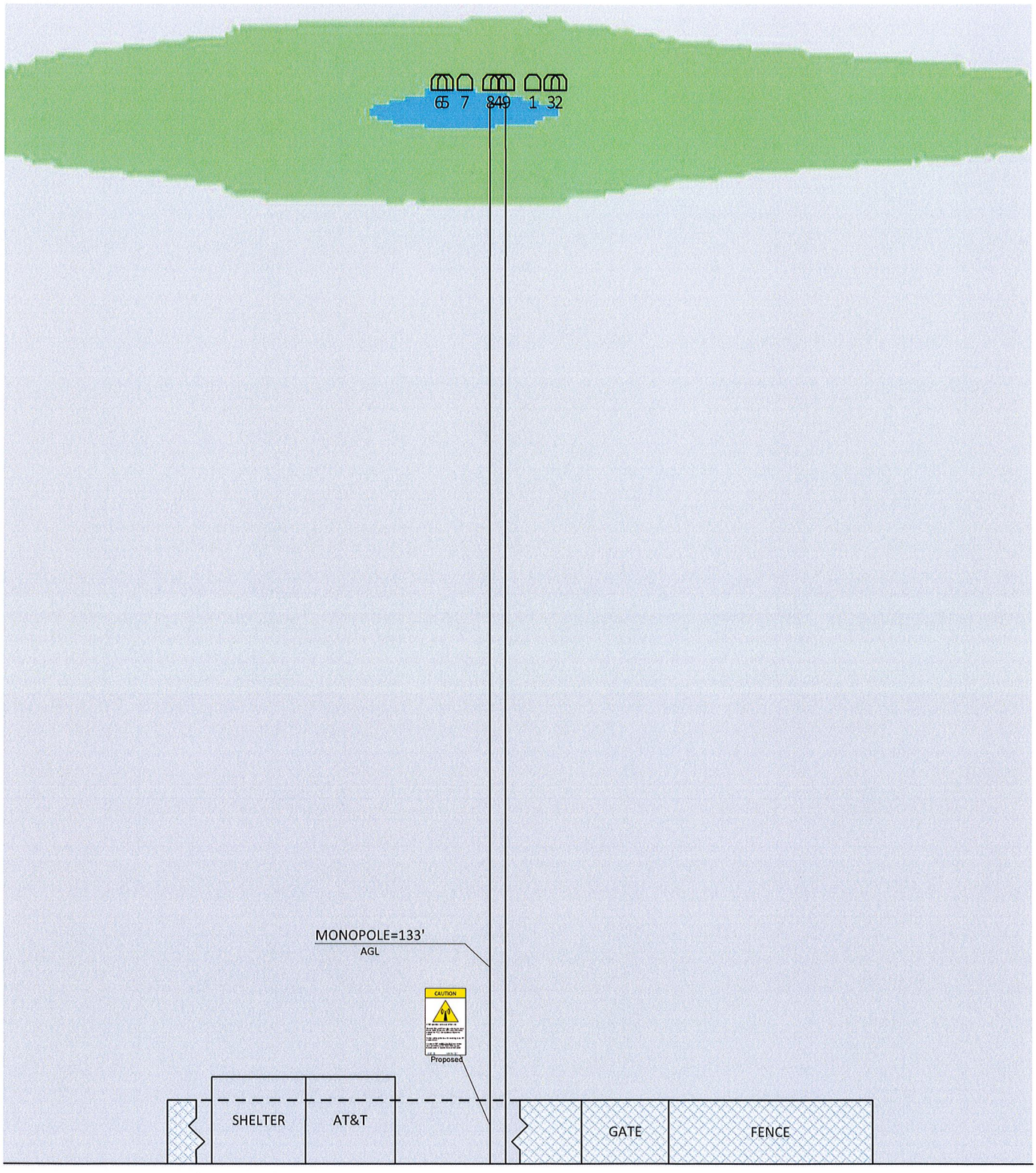
AT&T MOBILITY LLC	VERIZON WIRELESS	T-MOBILE	METROPCS	CRICKET COMMUNICATIONS	CLEARWIRE	SPRINT

(Feet)

0 7.6 15.2

www.sitesafe.com
Site Name:Milford Bona St

RF Emissions Simulation For: Milford Bona St
Southeast Elevation View



% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)

0 8.7 17.4

www.sitesafe.com
Site Name:Milford Bona St

>= 5000	>= 500	>= 100	>= 5	< 5

AT&T MOBILITY LLC	VERIZON WIRELESS	T-MOBILE	METROPCS	CRICKET COMMUNICATIONS	CLEARWIRE	SPRINT

5 Site Compliance

5.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, RF hazard signage and antenna locations, Sitesafe has determined that:

AT&T Mobility, LLC will be compliant when the remediation recommended in section 5.2 or other appropriate remediation is implemented.

The compliance determination is based on General Public RFE levels derived from theoretical modeling, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the AT&T Mobility, LLC's proposed deployment plan could result in the site being rendered non-compliant.

Modeling is used for determining compliance and the percentage of MPE contribution.

5.2 Actions for Site Compliance

Based on FCC regulations, common industry practice, and our understanding of AT&T Mobility, LLC RF Safety Policy requirements, this section provides a statement of recommendations for site compliance. Recommendations have been proposed based on our understanding of existing access restrictions, signage, and an analysis of predicted RFE levels.

The site will be made compliant if the following changes are implemented:

Monopole Base

Yellow Caution 2 sign required.

6 Engineer Certification

The professional engineer whose seal appears on the cover of this document hereby certifies and affirms that:

I am registered as a Professional Engineer in the jurisdiction indicated in the professional engineering stamp on the cover of this document; and

That I am an employee of Sitesafe, Inc., in Arlington, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio-frequency Radiation; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Young Kim.

January 18, 2016

Appendix A – Statement of Limiting Conditions

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, that Sitesafe became aware of during the normal research involved in creating this report. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data collected by Sitesafe provided by a second party and data collected by Sitesafe, the data will be used.

Appendix B – Regulatory Background Information

FCC Rules and Regulations

In 1996, the Federal Communication Commission (FCC) adopted regulations for the evaluating of the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996 the FCC periodically reviews these rules and regulations as per their congressional mandate.

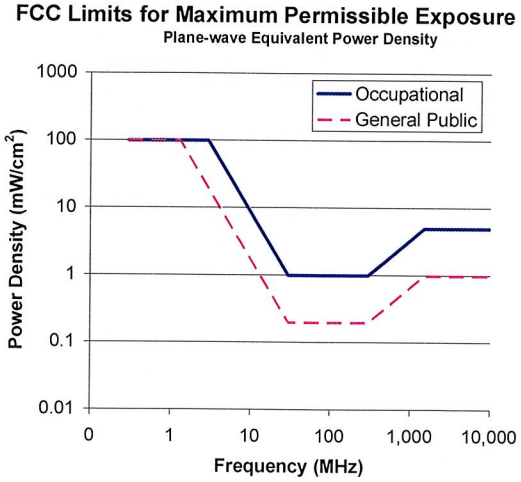
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:



Limits for Occupational/Controlled Exposure (MPE)

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

Limits for General Population/Uncontrolled Exposure (MPE)

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

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

OSHA Statement

The General Duty clause of the OSHA Act (Section 5) outlines the occupational safety and health responsibilities of the employer and employee. The General Duty clause in Section 5 states:

(a) Each employer –

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA has defined Radiofrequency and Microwave Radiation safety standards for workers who may enter hazardous RF areas. Regulation Standards 29 CFR § 1910.147 identify a generic Lock Out Tag Out procedure aimed to control the unexpected energization or start up of machines when maintenance or service is being performed.

Appendix C – Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a workers understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet based courses).

Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3 foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The further away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram: Section 4 of this report contains an RF Diagram that outlines various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

Appendix D – RF Emissions

The RF Emissions Simulation(s) in this report display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix E.

The key at the bottom of each RF Emissions Simulation indicates percentages displayed referenced to FCC General Public Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Areas indicated as Gray are predicted to be below 5% of the MPE limits. **Gray represents areas more than 20 times below the most conservative exposure limit**.
- Green represents areas are predicted to be between 5% and 100% of the MPE limits. **Green areas are accessible to anyone**.
- Blue represents areas predicted to exceed the General Public MPE limits but are less than Occupational limits. **Blue areas should be accessible only to RF trained workers**.
- Yellow represents areas predicted to exceed Occupational MPE limits. **Yellow areas should be accessible only to RF trained workers able to assess current exposure levels**.
- Red represents areas predicted to have exposure more than 10 times the Occupational MPE limits. **Red indicates that the RF levels must be reduced prior to access.** An RF Safety Plan is required which outlines how to reduce the RF energy in these areas prior to access.

Appendix E – Assumptions and Definitions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The site has been modeled with these assumptions to show the maximum RF energy density. Sitesafe believes this to be a *worst-case* analysis, based on best available data. Areas modeled to predict emissions greater than 100% of the applicable MPE level may not actually occur, but are shown as a *worst-case* prediction that could be realized real time. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Thus, at any time, if power density measurements were made, we believe the real-time measurements would indicate levels below those depicted in the RF emission diagram(s) in this report. By modeling in this way, Sitesafe has conservatively shown exclusion areas – areas that should not be entered without the use of a personal monitor, carriers reducing power, or performing real-time measurements to indicate real-time exposure levels.

Use of Generic Antennas

For the purposes of this report, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. If more specific information can be obtained for the unknown measurement criteria, Sitesafe recommends remodeling of the site utilizing the more complete and accurate data. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer's published data regarding the antenna's physical characteristics makes more conservative assumptions.

Where the frequency is unknown, Sitesafe uses the closest frequency in the antenna's range that corresponds to the highest Maximum Permissible Exposure (MPE), resulting in a conservative analysis.

Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site is safe or not with regards to Human Exposure to Radio Frequency Radiation from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – In a given direction, the relative gain of a transmitting antenna with respect to the maximum directivity of a half wave dipole multiplied by the net power accepted by the antenna from the connecting transmitter.

Gain (of an antenna) – The ratio of the maximum intensity in a given direction to the maximum radiation in the same direction from an isotropic radiator. Gain is a measure of the relative efficiency of a directional antennas as compared to an omni directional antenna.

General Population/Uncontrolled Environment – Defined by the FCC, as an area where exposure to RF energy may occur to persons who are **unaware** of the potential for exposure and who have no control of their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of "Generic" as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of antenna models to select a worst case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The maximum levels of RF exposure a person may be exposed to without harmful effect and with acceptable safety factor.

Occupational/Controlled Environment – Defined by the FCC, as an area where Radio Frequency Radiation (RFR) exposure may occur to persons who are **aware** of the

potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of Radio Frequency radiation on Humans. The guideline was published in August 1997.

OSHA (Occupational Safety and Health Administration) – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency (RF) – The frequencies of electromagnetic waves which are used for radio communications. Approximately 3 kHz to 300 GHz.

Radio Frequency Exposure (RFE) – The amount of RF power density that a person is or might be exposed to.

Spatial Average Measurement – A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average power density an average sized human will be exposed to at a location.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.

Appendix F – References

The following references can be followed for further information about RF Health and Safety.

Sitesafe, Inc.
http://www.sitesafe.com
FCC Radio Frequency Safety
http://www.fcc.gov/encyclopedia/radio-frequency-safety
National Council on Radiation Protection and Measurements (NCRP)
http://www.ncrponline.org
Institute of Electrical and Electronics Engineers, Inc., (IEEE)
http://www.ieee.org
American National Standards Institute (ANSI)
http://www.ansi.org
Environmental Protection Agency (EPA)
http://www.epa.gov/radtown/wireless-tech.html
National Institutes of Health (NIH)
http://www.niehs.nih.gov/health/topics/agents/emf/
Occupational Safety and Health Agency (OSHA)
http://www.osha.gov/SLTC/radiofrequencyradiation/
International Commission on Non-Ionizing Radiation Protection (ICNIRP)
http://www.icnirp.org
World Health Organization (WHO)
http://www.who.int/peh-emf/en/
National Cancer Institute
http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones
American Cancer Society (ACS)
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