



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

January 4, 2016

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

**RE: Notice of Exempt Modification for T-Mobile / L700 Crown Site BU: 806359**  
**T-Mobile Site ID: CTNH009B**  
**423 Oronoque Road, Milford, CT 06460**  
**Latitude: 41° 14' 16.23" / Longitude: -73° 5' 10.0"**

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 83 foot level of the existing 100 foot monopole at 423 Oronoque Road in Milford, CT. The tower is owned by Crown Castle and the property is owned by David Guernsey. T-Mobile now intends to replace all antennas with (9) new 700MHz antennas, add (1) Hybrid cable, keep (3) TMA remove remaining and add (3) RRU's. These antennas would be installed at the 83 foot level of the tower.

Please be advised per the attached email from Stephen H. Harris, C.Z.E.O., the Zoning Enforcement Officer for the City of Milford, they only have two previous zoning related documents on file and they are two zoning applications (attached to his email). I have also enclosed an email from myself as the Tower Owner on behalf of Crown Castle.

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, City of Milford and David Guernsey as the property owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

**The Foundation for a Wireless World.**

CrownCastle.com

Melanie A. Bachman

January 4, 2016

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

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

Sincerely,



Kimberly Myl  
Real Estate Specialist  
Crown Castle  
1200 MacArthur Boulevard, Suite 200  
Mahwah, New Jersey 07430  
201-236-9069  
[kimberly.myl@crowncastle.com](mailto:kimberly.myl@crowncastle.com)

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes

Tab 2: Exhibit-2: Structural Modification Report

Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

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

Mr. David Guernsey  
423 Oronoque Road  
Milford, CT 06460

Winthrop S. Smith, Jr., Esq.  
Dey Smith, LLC  
9 Depot Street, 2<sup>nd</sup> Floor  
Milford, CT 06460

**From:** [Holzschuh, Cymon](#)  
**To:** [Myl, Kimberly](#)  
**Cc:** [Cunliffe, Fred](#)  
**Subject:** RE: Existing Telecommunication Tower located at 423 Oronoque Road, Milford (Crown Castle 806359 / TMO CTNH009B) CSC Requirement  
**Date:** Monday, January 04, 2016 11:46:00 AM  
**Attachments:** [image001.png](#)

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Hello,

Be advised that, per the [Council Database of CSC-Approved Telecommunications Sites](#), the facility at 423 Oronoque Road was approved in Docket 56 as item 3 (d0056.3 in Column A for 423 Oronoque Rd). Any facilities certificated by the council should have the approval decision listed in Column A – if Column A is blank, the facility was not certificated by the Council. Per the [Council website](#), the Council approved the construction, maintenance and operation at a facility in Milford in Docket 56 - this appears to be the facility in question.

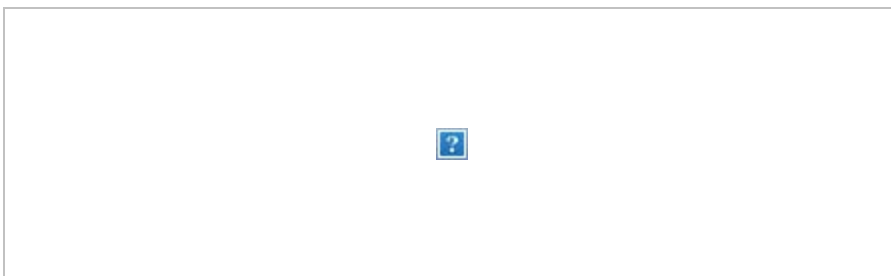
In the [Decision and Order for Docket 56](#), item 5 (the database incorrectly listed item 3 – a correction will be included in the next update) includes the condition that the total height of the monopole, excluding antennas, shall not exceed 100 feet. Because an exempt modification filing, by definition, does not change the height of the tower, this approval therefore included no conditions that restrict exempt modifications (meaning, no conditions that restrict antenna mounting configuration or height).

Note that municipalities may be unlikely to carry records of approval for facilities that were certificated by the Council.

Also, be advised that exempt modification filings that propose a “one-for-one” swap of antennas (meaning the total number of antennas remains the same, or decreases), are not required to include information concerning the facility’s conditions of approval.

Thanks,

Cymon Holzschuh  
Siting Analyst  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051  
P: 860.827.2941 | F: 860.827.2950



[www.ct.gov/deep](http://www.ct.gov/deep)

***Conserving, improving and protecting our natural resources and environment;  
Ensuring a clean, affordable, reliable, and sustainable energy supply.***

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**From:** Myl, Kimberly [mailto:Kimberly.Myl@crowncastle.com]  
**Sent:** Monday, January 04, 2016 9:25 AM  
**To:** CSC-DL Siting Council  
**Subject:** Existing Telecommunication Tower located at 423 Oronoque Road, Milford (Crown Castle 806359 / TMO CTNH009B) CSC Requirement

To Whom It May Concern:

Please be advised both the township (email below) and Crown Castle as the tower owner, do not have the original zoning resolution on file. The only documentation the town was able to provide were two zoning applications. Please use this email as notification to waive this requirement as we will include this and the email from the township within our submission.

Please let me know if you have any questions or need additional information. Thank you in advance.

**KIMBERLY MYL**

Real Estate Specialist  
T: (201) 236-9069 | M: (201) 993-3697

**CROWN CASTLE**

1200 MacArthur Blvd, Suite 200  
Mahwah, NJ 07430

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**From:** Stephen H. Harris [mailto:shharris@ci.milford.ct.us]  
**Sent:** Thursday, December 31, 2015 8:10 AM  
**To:** Myl, Kimberly  
**Subject:** 423 Oronoque Rd. Cell Towers Milford

Hello Kimberly,

I've attached two zoning permits. This is the only thing in the file in the way of approval. Hope it helps.

Stephen H. Harris, C.Z.E.O.  
Zoning Enforcement Officer  
70 West River Street  
Milford, Connecticut 06460  
203-783-3245  
[shharris@ci.milford.ct.us](mailto:shharris@ci.milford.ct.us)

This email may contain confidential or privileged material. Use or disclosure of it by anyone other than the recipient is unauthorized. If you are not an intended recipient, please delete this email.



DATE FILED 22 Nov 06  
 RECEIPT # \_\_\_\_\_  
 FEE \$ ~~1250~~ receipt  
 (INCLUDES CZC & STATE SURCHARGE  
 \$30.00 AS OF 7/1/04)

## City of Milford, Connecticut APPLICATION FOR ZONING PERMIT

**INSTRUCTIONS:** Fill out this application in ball point pen. A scaled plot plan in duplicate, based on a certified surveyor's map may be required to be submitted with this application showing the proposed or existing lot and building dimensions and the location of all buildings in relation to the street lines, side lot lines and rear lot lines.

State Law now allows the applicant to advertise the issuance of this permit before proceeding with the described work. (See staff for details)

ADDRESS OF PROPERTY 423 Oranogue Rd ZONE R-30  
 MAP 74 BLOCK 925 PARCEL 3-A LOT NO. \_\_\_\_\_ ADDRESS MAP NO. \_\_\_\_\_ LOT SIZE \_\_\_\_\_

WIDTH OF STREET RIGHT OF WAY LESS THAN 50 FT.? YES \_\_\_ NO \_\_\_ CORNER LOT? YES \_\_\_ NO \_\_\_

IS ANY PORTION OF THE LOT BELOW REGULATORY FLOOD ELEVATION? YES \_\_\_ ZONE \_\_\_\_\_ NO \_\_\_

CAM YES \_\_\_ NO

CITY WATER \_\_\_ PRIVATE WELL\* \_\_\_ SEWER\*\* \_\_\_ SEPTIC\*\*\* \_\_\_ ENGINEERING OFF STREET PERMIT # \_\_\_\_\_

OWNER David Guernsey PHONE X \_\_\_\_\_

ADDRESS OF OWNER 423 Oranogue Rd Milford CT  
STREET CITY STATE ZIP CODE

PRESENT USE OF PROPERTY \_\_\_\_\_

PROPOSED CONSTRUCTION NEW \_\_\_ ADDITION \_\_\_ ALTERATION \_\_\_ REPAIR \_\_\_

SIZE/USE OF PROPOSED CONSTRUCTION COLOCATE 3 pairs of cell tower antennas at 83' ± tallest structure on pole is at 95' ± approved by sitting council

NO. OF STORIES \_\_\_ HEIGHT \_\_\_ LOT COVERAGE \_\_\_ % REQ. PARKING SPACES 2 PROVIDED \_\_\_

WETLANDS APPROVAL REQUIRED YES \_\_\_ NO \_\_\_ DATE OF HISTORIC DIST. CERT. OF APPROP. \_\_\_\_\_

APPROVAL DATES: CASPR \_\_\_\_\_ SITE PLAN REV. \_\_\_\_\_ SP. PERMIT \_\_\_\_\_ SP. EXC. \_\_\_\_\_

ZBA \_\_\_\_\_ CAM EXEMPTION ISSUED \_\_\_\_\_ SUBDIV. NAME \_\_\_\_\_

**CERTIFICATION:** (WARNING) I hereby certify that I am making this application on behalf of and with full authority of the owner of the property and that I am aware of the Zoning Regulations pertinent in this case and that the statements made herein are true and correct. APPROVAL SHALL BE VALID FOR PLANS AS SUBMITTED.

**THE OCCUPANCY AND USE OF LAND AND BUILDINGS OR STRUCTURES  
 PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY IS PROHIBITED**

APPROVED BY: Peter W. Suther ACP  
ZONING OFFICIAL

DATE ISSUED 22 Nov 06

APPLICANT: H. Karna Fournier  
 NAME: \_\_\_\_\_  
 SIGNATURE H. Karna Fournier  
 ADDRESS 30 Cold Spring Rd.  
 CITY Rocky Hill STATE CT ZIP 06067  
 TELEPHONE NO. (860) 266-3988

\*Permit required from State Health Dept. for apartments, subdivisions, trailer parks, shopping centers and public buildings.  
 \*\*Permits for sewer connections are granted by Sewer Commission  
 \*\*\*Septic system approvals are granted by Health Department

423 Oranogue Rd

423 Oranogue Rd



DATE FILED 11/10/08  
 RECEIPT # 8912  
 FEE \$ 42  
 (INCLUDES CZC & STATE SURCHARGE \$30.00 AS OF 7/1/04)

## City of Milford, Connecticut APPLICATION FOR ZONING PERMIT

**INSTRUCTIONS:** Fill out this application in ball point pen. A scaled plot plan in duplicate, based on a certified surveyor's map may be required to be submitted with this application showing the proposed or existing lot and building dimensions and the location of all buildings in relation to the street lines, side lot lines and rear lot lines.

State Law now allows the applicant to advertise the issuance of this permit before proceeding with the described work. (See staff for details)

ADDRESS OF PROPERTY 423 Oronoque Road ZONE R-30  
 MAP 74 BLOCK 925 PARCEL 3-A LOT NO. \_\_\_\_\_ ADDRESS MAP NO. \_\_\_\_\_ LOT SIZE 11100 SFT  
 WIDTH OF STREET RIGHT OF WAY LESS THAN 50 FT.? YES \_\_\_ NO / CORNER LOT? YES \_\_\_ NO /  
 IS ANY PORTION OF THE LOT BELOW REGULATORY FLOOD ELEVATION? YES \_\_\_ ZONE \_\_\_\_\_ NO /  
 CAM YES \_\_\_ NO /  
 CITY WATER N/A PRIVATE WELL\* \_\_\_ SEWER\*\* \_\_\_ SEPTIC\*\*\* \_\_\_ ENGINEERING OFF STREET PERMIT # N/A

X OWNER Crown Castle International PHONE 201-236-9059  
 X ADDRESS OF OWNER 500 W. Cummings St Pk, Woburn MA 01801  
STREET CITY STATE ZIP CODE

PRESENT USE OF PROPERTY Cell Tower

PROPOSED CONSTRUCTION NEW \_\_\_ ADDITION X ALTERATION \_\_\_ REPAIR \_\_\_  
 SIZE/USE OF PROPOSED CONSTRUCTION Adding 3 antennas to existing cell tower  
POCKET COMMUNICATIONS

NO. OF STORIES 1 HEIGHT 10 LOT COVERAGE 100 % REQ. PARKING SPACES 0 PROVIDED 0  
 WETLANDS APPROVAL REQUIRED YES \_\_\_ NO / DATE OF HISTORIC DIST. CERT. OF APPROP. N/A  
 APPROVAL DATES: CASPR 1 SITE PLAN REV. 1 SP. PERMIT 1 SP. EXC. 1  
 ZBA 1 CAM EXEMPTION ISSUED 1 SUBDIV. NAME \_\_\_\_\_

**CERTIFICATION:** (WARNING) I hereby certify that I am making this application on behalf of and with full authority of the owner of the property and that I am aware of the Zoning Regulations pertinent in this case and that the statements made herein are true and correct. APPROVAL SHALL BE VALID FOR PLANS AS SUBMITTED.

THE OCCUPANCY AND USE OF LAND AND BUILDINGS OR STRUCTURES  
PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY IS PROHIBITED

APPROVED BY: [Signature]  
 ZONING OFFICIAL  
 DATE ISSUED 10/17/08

APPLICANT:  
 NAME: Ryan Bugdoffer  
 SIGNATURE [Signature]  
 ADDRESS 50 Eastman St  
 CITY South Eastern STATE MA ZIP 02375  
 TELEPHONE NO. (814) 388-9479

\*Permit required from State Health Dept. for apartments, subdivisions, trailer parks, shopping centers and public buildings.  
 \*\*Permits for sewer connections are granted by Sewer Commission  
 \*\*\*Septic system approvals are granted by Health Department

423 Oronoque Rd



**GENERAL NOTES:**

- FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:  
PROJECT MANAGEMENT - CROWN CASTLE  
CONTRACTOR - GENERAL CONTRACTOR (CONSTRUCTION)  
OWNER - T-MOBILE  
OEM - ORIGINAL EQUIPMENT MANUFACTURER
- PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF PROJECT MANAGEMENT.
- ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK.
- ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
- DRAWINGS PROVIDED HERE ARE NOT TO SCALE UNLESS OTHERWISE NOTED AND ARE INTENDED TO SHOW OUTLINE ONLY.
- UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY PROJECT MANAGEMENT.
- CONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. CONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. CONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH PROJECT MANAGEMENT.
- THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
- CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
- CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
- THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
- CONTRACTOR SHALL NOTIFY DEWBERRY 48 HOURS IN ADVANCE OF POURING CONCRETE, OR BACKFILLING TRENCHES, SEALING ROOF AND WALL PENETRATIONS & POST DOWNS, FINISHING NEW WALLS OR FINAL ELECTRICAL CONNECTIONS FOR ENGINEER REVIEW.
- CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. CONTRACTOR SHALL NOTIFY PROJECT MANAGEMENT OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
- THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY CONTRACTOR 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.
- SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

**SITE WORK GENERAL NOTES:**

- THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
- 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 CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR 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.
- ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
- IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, TOP SOIL AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
- 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, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
- CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION.
- THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE T-MOBILE SPECIFICATION FOR SITE SIGNAGE.
- THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE TRANSMISSION EQUIPMENT AND TOWER AREAS.
- 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.
- THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION, SEE SOIL COMPACTION NOTES.
- 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.
- EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL JURISDICTION'S GUIDELINES FOR EROSION AND SEDIMENT CONTROL.

**ELECTRICAL INSTALLATION NOTES:**

- ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.
- CONTRACTOR SHALL MODIFY EXISTING CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLING TO THE NEW BTS EQUIPMENT. CONTRACTOR SHALL SUBMIT MODIFICATIONS TO PROJECT MANAGEMENT FOR APPROVAL.
- CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT OBSCURED.
- WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.
- ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.
- CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.
- EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC & OSHA, AND MATCH EXISTING INSTALLATION REQUIREMENTS.
- ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S).
- PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.
- ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
- POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
- POWER PHASE CONDUCTORS (I.E., HOTS) SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL.) PHASE CONDUCTOR COLOR CODES SHALL CONFORM WITH THE NEC & OSHA AND MATCH EXISTING INSTALLATION REQUIREMENTS.
- SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (SIZE 6 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
- SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED OUTDOORS, OR BELOW GRADE, SHALL BE SINGLE CONDUCTOR #2 AWG SOLID TINNED COPPER CABLE, UNLESS OTHERWISE SPECIFIED.
- POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.
- ALL POWER AND POWER GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (90°C IF AVAILABLE).
- RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
- NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
- ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40, OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
- ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
- GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.
- RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.
- LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
- CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.
- CABINETS, BOXES, AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
- CABINETS, BOXES, AND WIREWAYS TO MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
- WIREWAYS SHALL BE EPOXY-COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD; SHALL BE PANOUT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
- EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
- METAL RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED, OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
- NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
- THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM PROJECT MANAGEMENT BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
- THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.

**CONCRETE AND REINFORCING STEEL NOTES:**

- ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
- ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. A HIGHER STRENGTH (4000 PSI) MAY BE USED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
- REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE (UNO). SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
- THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:  
CONCRETE CAST AGAINST EARTH.....3 IN.  
CONCRETE EXPOSED TO EARTH OR WEATHER:  
#6 AND LARGER .....2 IN.  
#5 AND SMALLER & WWF.....1 1/2 IN.  
CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:  
SLAB AND WALL .....3/4 IN.  
BEAMS AND COLUMNS.....1 1/2 IN.
- A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
- INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
- CONCRETE CYLINDER TEST IS NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC 1905.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER:  
(A) RESULTS OF CONCRETE CYLINDER TESTS PERFORMED AT THE SUPPLIER'S PLANT,  
(B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.  
FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.
- AS AN ALTERNATIVE TO ITEM 7, TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.
- EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY CYLINDER TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

**STRUCTURAL STEEL NOTES:**

- ALL STEEL WORK SHALL BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE DRAWINGS UNLESS NOTED OTHERWISE. STRUCTURAL STEEL SHALL BE ASTM-A-36 UNLESS OTHERWISE NOTED ON THE SITE SPECIFIC DRAWINGS. STEEL DESIGN, INSTALLATION AND BOLTING SHALL BE PERFORMED IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "MANUAL OF STEEL CONSTRUCTION".
- ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION". PAINTED SURFACES SHALL BE TOUCHED UP.
- BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4"Ø) CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
- NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIA. ASTM A 307 BOLTS UNLESS NOTED OTHERWISE.
- INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
- CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ENGINEER REVIEW & APPROVAL ON PROJECTS REQUIRING STRUCTURAL STEEL.
- ALL STRUCTURAL STEEL WORK SHALL BE DONE IN ACCORDANCE WITH AISC SPECIFICATIONS.

**CONSTRUCTION NOTES:**

- FIELD VERIFICATION:  
CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, T-MOBILE ANTENNA PLATFORM LOCATION AND ANTENNAS TO BE REPLACED.
- COORDINATION OF WORK:  
CONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH PROJECT MANAGEMENT.
- CABLE LADDER RACK:  
CONTRACTOR SHALL FURNISH AND INSTALL CABLE LADDER RACK, CABLE TRAY, AND CONDUIT AS REQUIRED TO SUPPORT CABLES TO THE NEW BTS LOCATION.
- GROUNDING OF ALL EQUIPMENT AND ANTENNAS IS NOT CONSIDERED PART OF THE SCOPE OF THIS PROJECT AND IS THE RESPONSIBILITY OF THE OWNER AND CONTRACTOR AT THE TIME OF CONSTRUCTION. ALL EQUIPMENT AND ANTENNAS TO BE INSTALLED AND GROUNDED IN ACCORDANCE WITH GOVERNING BUILDING CODE, MANUFACTURER RECOMMENDATIONS AND OWNER SPECIFICATIONS.



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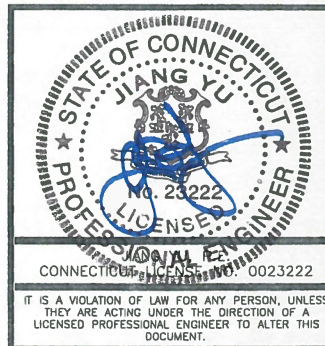
**CTNH009B  
NHV 104 943122**

**CONSTRUCTION DRAWINGS**

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DRAWN BY: RA

REVIEWED BY: BSH

CHECKED BY: GHN

PROJECT NUMBER: 50066258

JOB NUMBER: 50074607

SITE ADDRESS:

423 ORONOQUE ROAD  
MILFORD, CT 06460  
NEW HAVEN COUNTY

SHEET TITLE

**GENERAL NOTES**

SHEET NUMBER



**CTNH009B**  
**NHV 104 943122**

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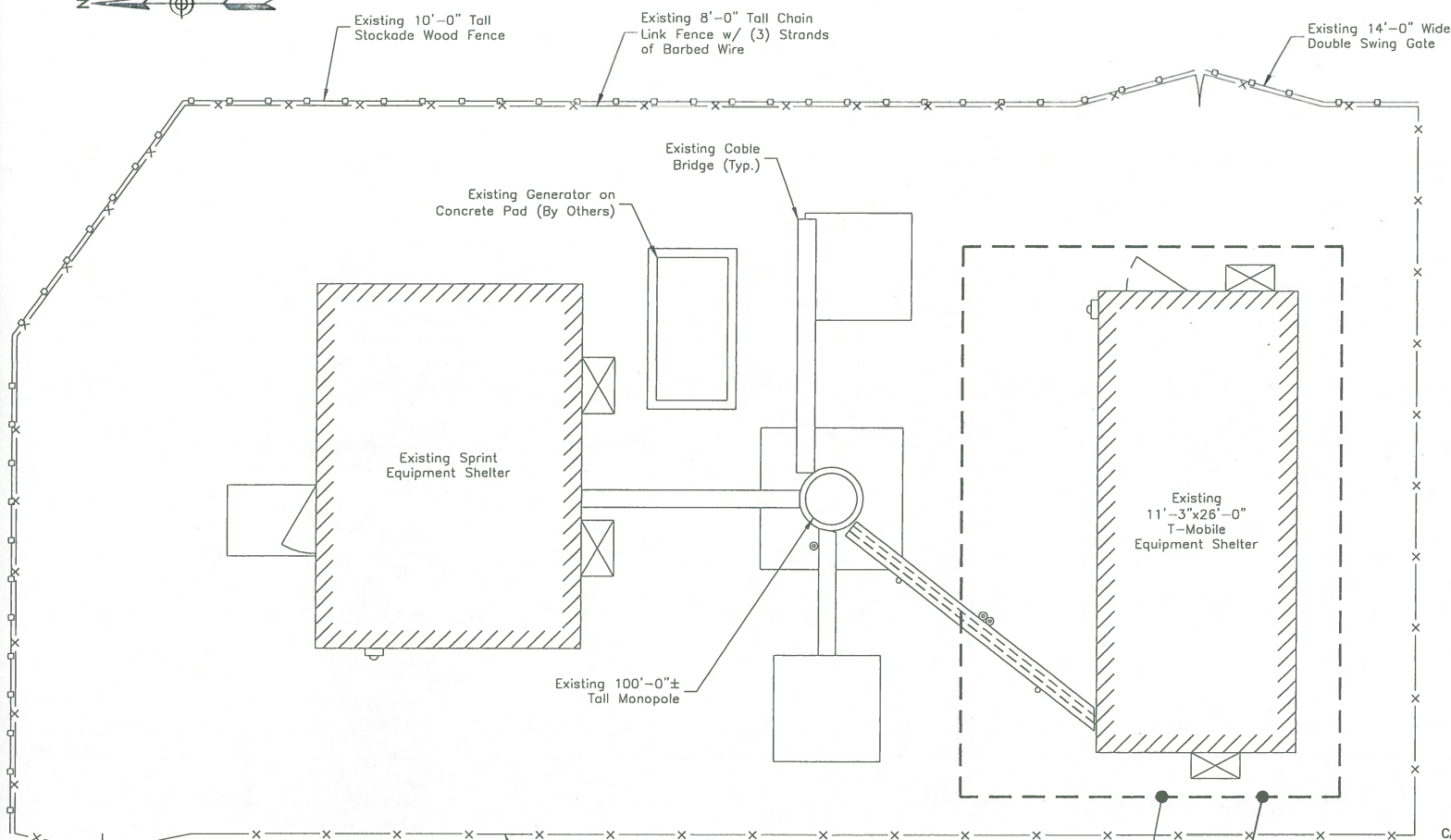
423 ORONOQUE ROAD  
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SHEET TITLE

COMPOUND PLAN &  
EQUIPMENT PLANS

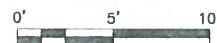
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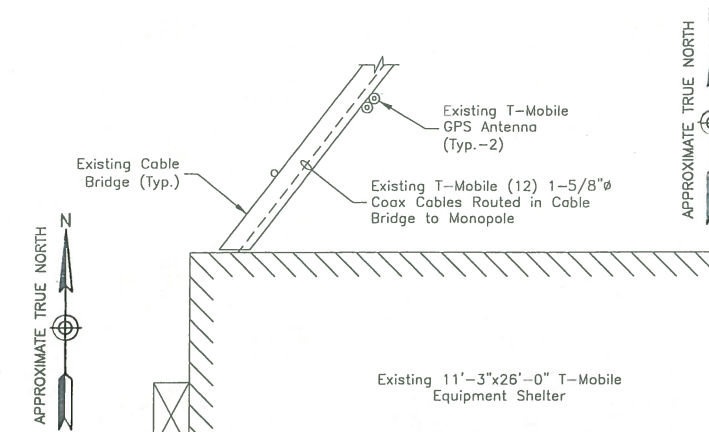
**COMPOUND PLAN**

SCALE: 1"=10' FOR 11"x17"  
1"=5' FOR 22"x34"



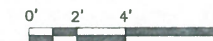
**NOTES:**

- NORTH ARROW SHOWN AS APPROXIMATE.
- NOT ALL INFORMATION IS SHOWN FOR CLARITY.
- ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, BIAS TEES, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY AW SOLUTIONS DATED DECEMBER 2, 2015.

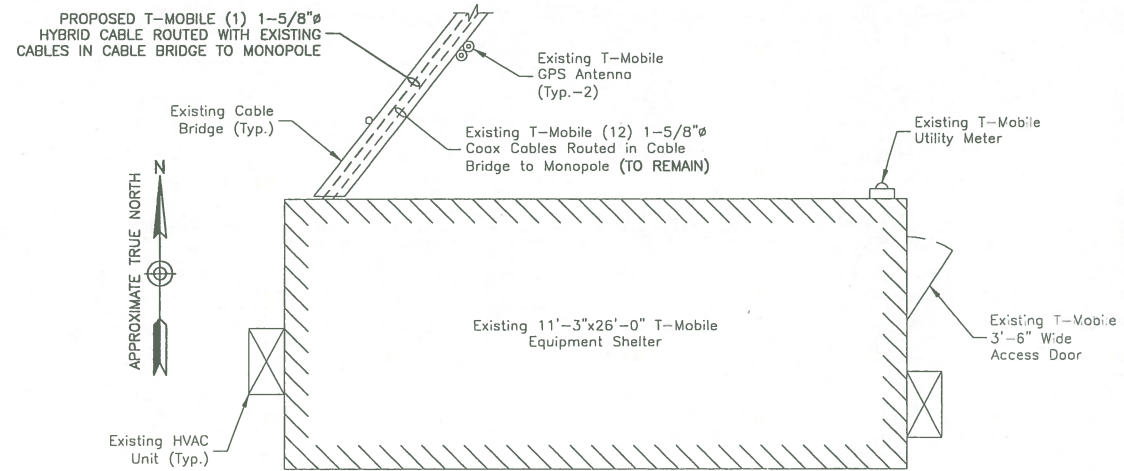


**EXISTING EQUIPMENT PLAN**

SCALE: 1/8"=1' FOR 11"x17"  
1/4"=1' FOR 22"x34"



PROPOSED T-MOBILE (1) 1-5/8" HYBRID CABLE ROUTED WITH EXISTING CABLES IN CABLE BRIDGE TO MONOPOLE



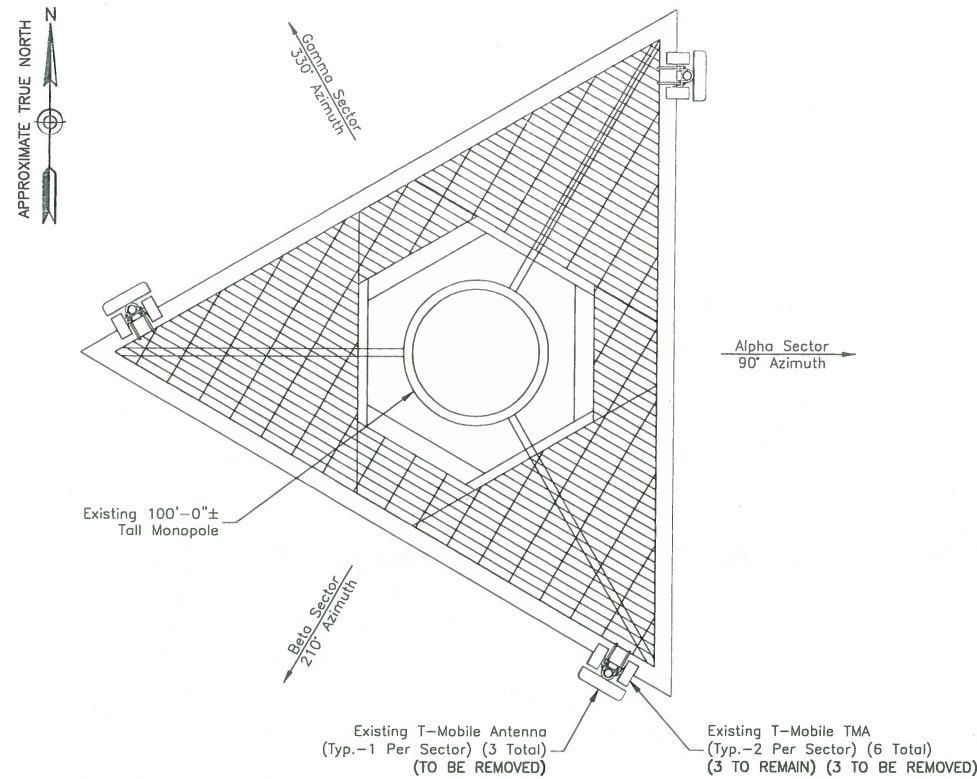
**PROPOSED EQUIPMENT PLAN**

SCALE: 1/8"=1' FOR 11"x17"  
1/4"=1' FOR 22"x34"



**NOTES:**

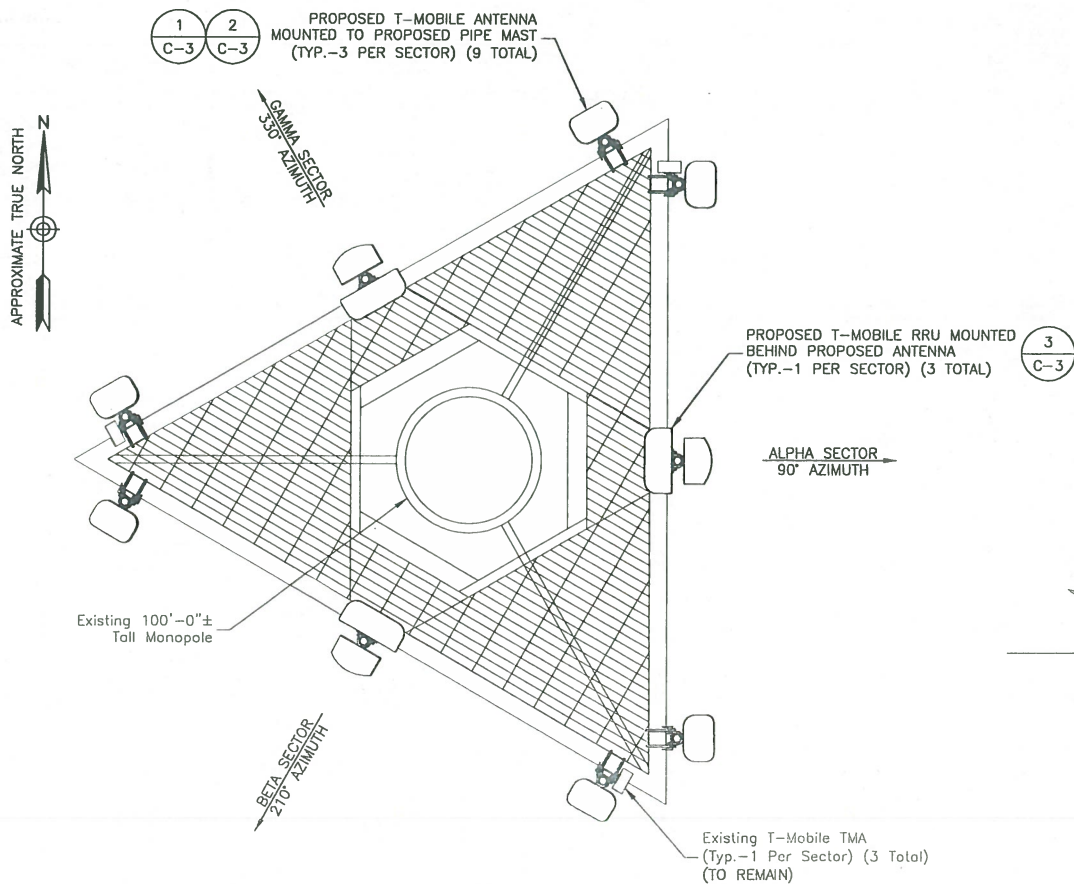
- NO ACCESS WAS AVAILABLE TO EXISTING T-MOBILE SHELTER AT TIME OF SITE VISIT.
- NO EQUIPMENT IS PROPOSED INSIDE EXISTING T-MOBILE SHELTER.



**EXISTING ANTENNA LAYOUT**

SCALE: N.T.S.

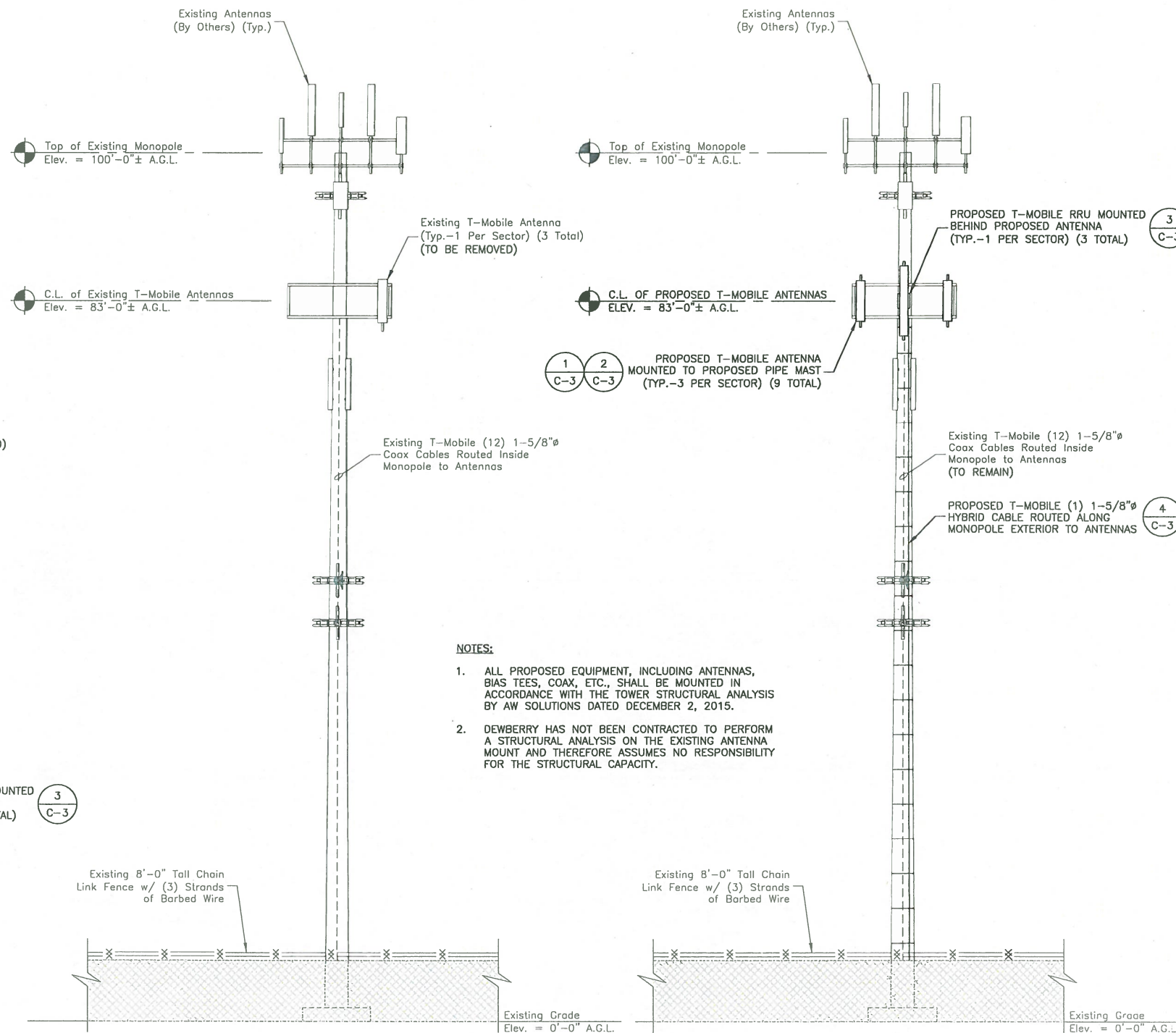
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**PROPOSED ANTENNA LAYOUT**

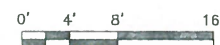
SCALE: N.T.S.

2



**EXISTING ELEVATION**

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



3

**PROPOSED ELEVATION**

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



4

**NOTES:**

1. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, BIAS TEES, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY AW SOLUTIONS DATED DECEMBER 2, 2015.
2. DEWBERRY HAS NOT BEEN CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THE EXISTING ANTENNA MOUNT AND THEREFORE ASSUMES NO RESPONSIBILITY FOR THE STRUCTURAL CAPACITY.



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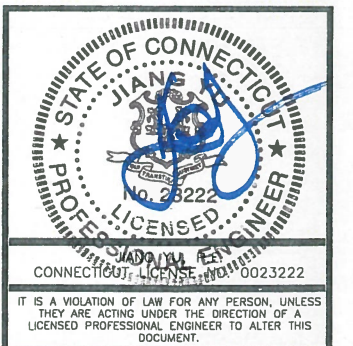
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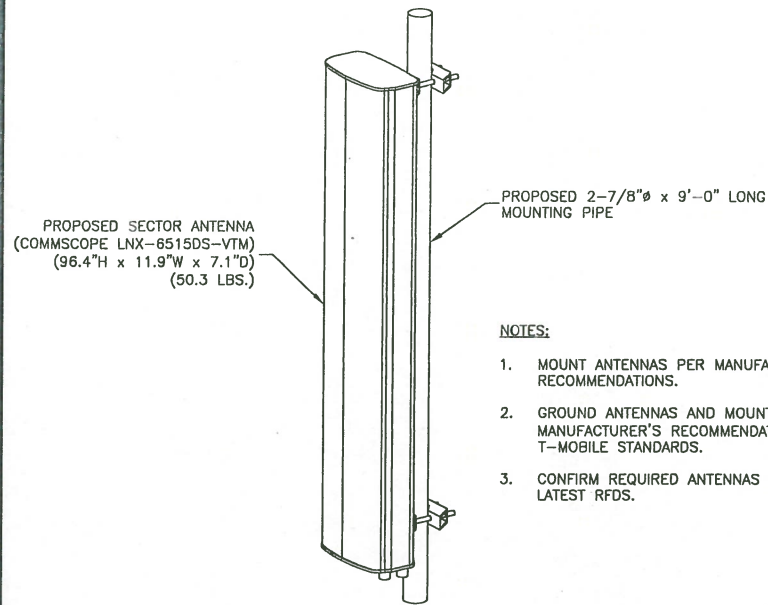
423 ORONOQUE ROAD  
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SHEET TITLE

ANTENNA LAYOUTS &  
ELEVATIONS

SHEET NUMBER

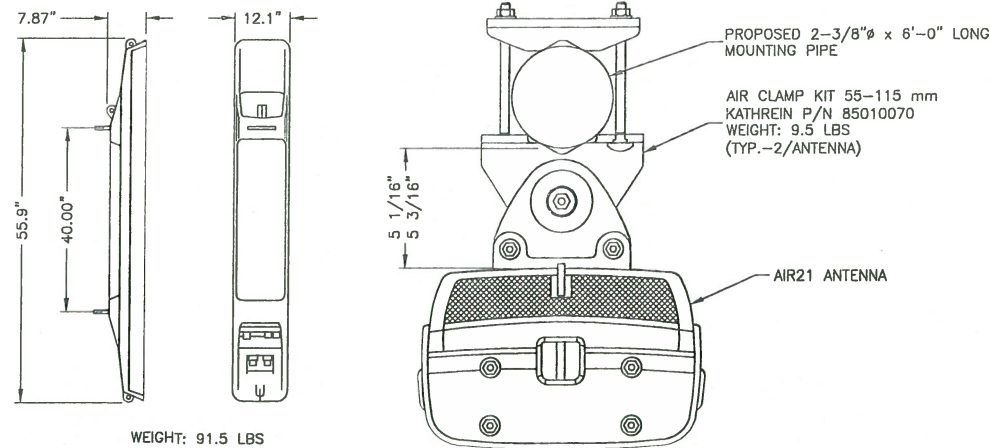
C-2



- NOTES:**
1. MOUNT ANTENNAS PER MANUFACTURER'S RECOMMENDATIONS.
  2. GROUND ANTENNAS AND MOUNTS PER MANUFACTURER'S RECOMMENDATIONS AND T-MOBILE STANDARDS.
  3. CONFIRM REQUIRED ANTENNAS WITH THE LATEST RFDS.

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

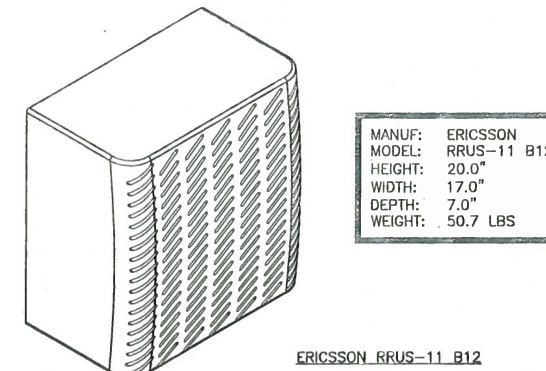
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- NOTES:**
1. MOUNT ANTENNAS PER MANUFACTURER'S RECOMMENDATIONS.
  2. GROUND ANTENNAS AND MOUNTS PER MANUFACTURER'S RECOMMENDATIONS AND T-MOBILE STANDARDS.
  3. CONFIRM REQUIRED ANTENNAS WITH THE LATEST RFDS.

**AIR21 ANTENNA DETAIL**  
SCALE: N.T.S.

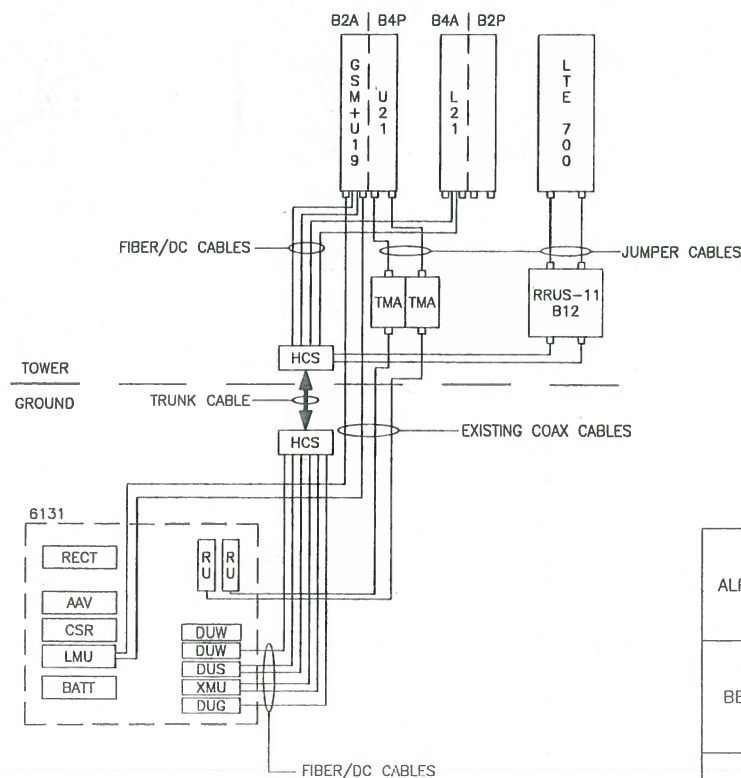
2



- RRU NOTES:**
1. MOUNT EQUIPMENT WITH MANUFACTURER PROVIDED MOUNTING BRACKETS.
  2. GROUND EQUIPMENT AND MOUNTS PER MANUFACTURER'S RECOMMENDATIONS AND T-MOBILE STANDARDS.
  3. CONFIRM REQUIRED EQUIPMENT WITH THE LATEST RFDS.

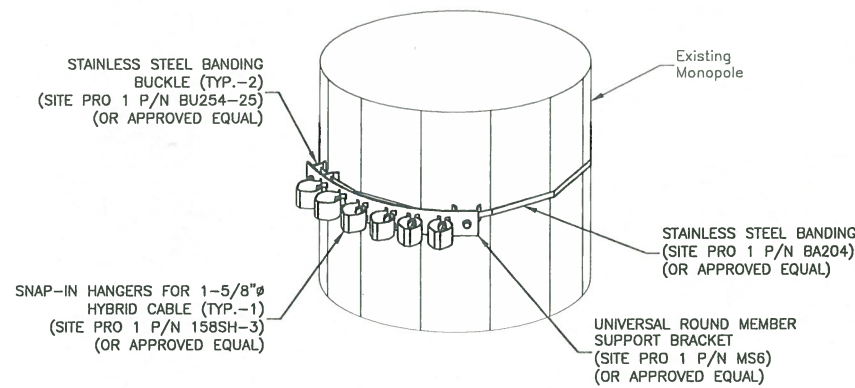
**RRUS-11 - REMOTE RADIO UNIT**  
SCALE: N.T.S.

3



**SITE CONFIGURATION 702Cu**  
SCALE: N.T.S.

5



- NOTE:**
1. SUPPORT BRACKETS SHALL BE SPACED AT 4'-0" C-C MAX.

**COAX SUPPORT DETAIL**  
SCALE: N.T.S.

4

ANTENNAS		COAX		HYBRID	CABLE LENGTHS	RRU		TMA	
EXISTING	PROPOSED	EXISTING	PROPOSED	PROPOSED		EXISTING	PROPOSED	EXISTING	PROPOSED
ALPHA	EXISTING RFS ANTENNA	ERICSSON AIR21 B2A B4P	(4) 1-5/8"φ	-	133'-0"	-	-	(2) KRY 112 144/1	(1) TO BE REMOVED
	-	COMMSCOPE LNX-6515DS-VTM	-	-		-	RRUS-11 B12	-	-
	-	ERICSSON AIR21 B4A B2P	-	-		-	-	-	-
BETA	EXISTING RFS ANTENNA	ERICSSON AIR21 B2A B4P	(4) 1-5/8"φ	-	133'-0"	-	-	(2) KRY 112 144/1	(1) TO BE REMOVED
	-	COMMSCOPE LNX-6515DS-VTM	-	(1) 1-5/8"φ		-	RRUS-11 B12	-	-
	-	ERICSSON AIR21 B4A B2P	-	-		-	-	-	-
GAMMA	EXISTING RFS ANTENNA	ERICSSON AIR21 B2A B4P	(4) 1-5/8"φ	-	133'-0"	-	-	(2) KRY 112 144/1	(1) TO BE REMOVED
	-	COMMSCOPE LNX-6515DS-VTM	-	-		-	RRUS-11 B12	-	-
	-	ERICSSON AIR21 B4A B2P	-	-		-	-	-	-

**T-Mobile**

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**CROWN CASTLE**

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CLIFTON PARK, NY 12065

**CTNH009B**  
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NEW HAVEN COUNTY

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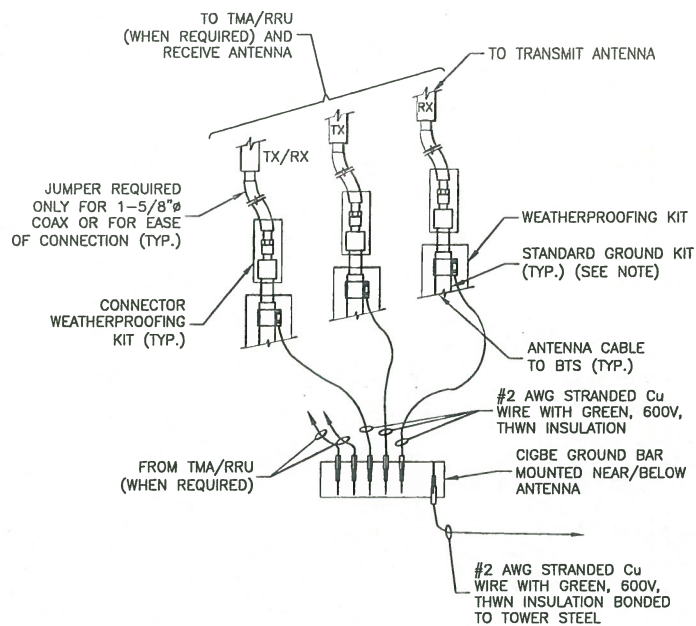
CONSTRUCTION  
DETAILS

SHEET NUMBER

C-3

**GROUNDING NOTES:**

- THE CONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE CONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE ENGINEER FOR RESOLUTION.
- ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GE'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS. ALL AVAILABLE GROUNDING ELECTRODES SHALL BE CONNECTED TOGETHER IN ACCORDANCE WITH THE NEC.
- THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. USE OF OTHER METHODS MUST BE PRE-APPROVED BY THE ENGINEER IN WRITING.
- THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS ON TOWER SITES AND 10 OHMS OR LESS ON ROOFTOP SITES. WHEN ADDING ELECTRODES, CONTRACTOR SHALL MAINTAIN A MINIMUM DISTANCE BETWEEN THE ADDED ELECTRODE AND ANY OTHER EXISTING ELECTRODE EQUAL TO THE BURIED LENGTH OF THE ROD. IDEALLY, CONTRACTOR SHALL STRIVE TO KEEP THE SEPARATION DISTANCE EQUAL TO TWICE THE BURIED LENGTH OF THE RODS.
- THE CONTRACTOR 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.
- METAL CONDUIT AND TRAY SHALL BE GROUNDING AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE AND UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
- 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 TRANSMISSION EQUIPMENT.
- 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.
- ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
- USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. IN ALL CASES, BENDS SHALL BE MADE WITH A MINIMUM BEND RADIUS OF 8 INCHES.
- EACH INTERIOR TRANSMISSION CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH 6 AWG STRANDED, GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRE UNLESS NOTED OTHERWISE IN THE DETAILS. EACH OUTDOOR CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER WIRE UNLESS NOTED OTHERWISE IN THE DETAILS.
- ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE 2 AWG SOLID TIN-PLATED COPPER UNLESS OTHERWISE INDICATED.
- EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE. CONNECTIONS TO ABOVE GRADE UNITS SHALL BE MADE WITH EXOTHERMIC WELDS WHERE PRACTICAL OR WITH 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS. HIGH PRESSURE CRIMP CONNECTORS MAY ONLY BE USED WITH WRITTEN PERMISSION FROM T-MOBILE MARKET REPRESENTATIVE.
- EXOTHERMIC WELDS SHALL BE PERMITTED ON TOWERS ONLY WITH THE EXPRESS APPROVAL OF THE TOWER MANUFACTURER OR THE CONTRACTOR'S STRUCTURAL ENGINEER.
- ALL WIRE TO WIRE GROUND CONNECTIONS TO THE INTERIOR GROUND RING SHALL BE FORMED USING HIGH PRESS CRIMPS OR SPLIT BOLT CONNECTORS WHERE INDICATED IN THE DETAILS.
- ON ROOFTOP SITES WHERE EXOTHERMIC WELDS ARE A FIRE HAZARD COPPER COMPRESSION CAP CONNECTORS MAY BE USED FOR WIRE TO WIRE CONNECTIONS. 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS SHALL BE USED FOR CONNECTION TO ALL ROOFTOP TRANSMISSION EQUIPMENT AND STRUCTURAL STEEL.
- COAX BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR USING TWO-HOLE MECHANICAL TYPE BRASS CONNECTORS AND STAINLESS STEEL HARDWARE.
- APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
- ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
- MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
- BOND ALL METALLIC OBJECTS WITHIN 6 FT OF THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER GROUND CONDUCTOR. DURING EXCAVATION FOR NEW GROUND CONDUCTORS, IF EXISTING GROUND CONDUCTORS ARE ENCOUNTERED, BOND EXISTING GROUND CONDUCTORS TO NEW CONDUCTORS.
- 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 WITH LISTED BONDING FITTINGS.



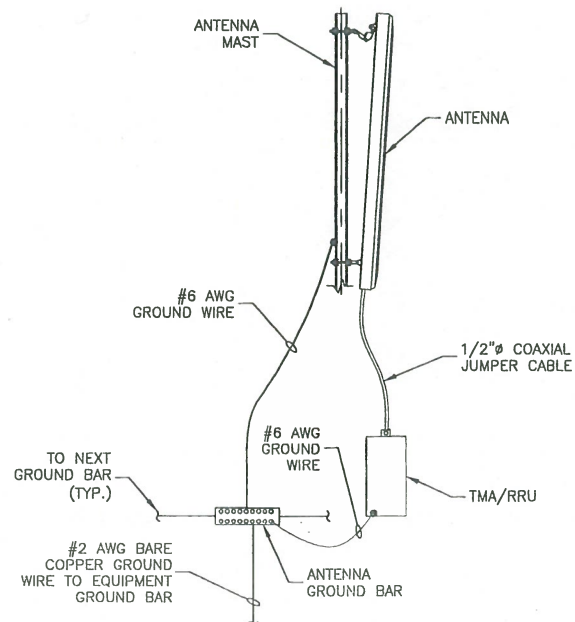
**NOTE:**

- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

**CONNECTION OF GROUND WIRES TO GROUNDING BAR (CIGBE)**

SCALE: N.T.S.

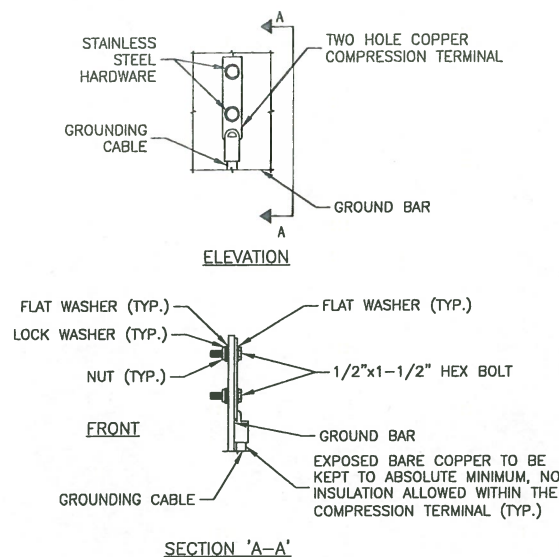
1



**TYPICAL ANTENNA GROUNDING DETAIL**

SCALE: N.T.S.

3



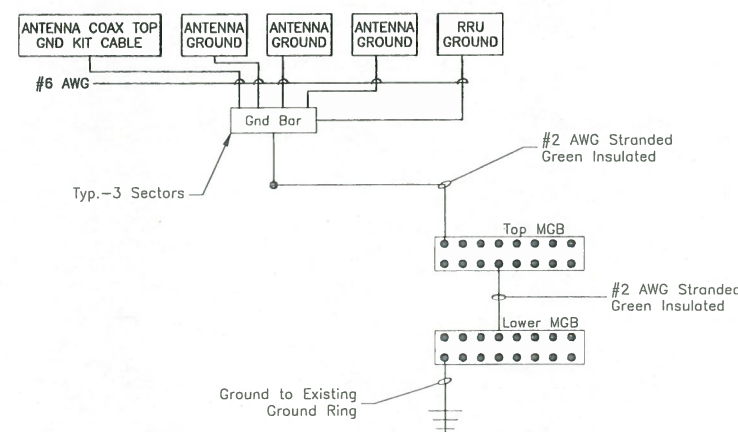
**NOTES:**

- DOUBLING UP OR STACKING OF CONNECTIONS IS NOT PERMITTED.
- OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

**TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL**

SCALE: N.T.S.

2



**NOTES:**

- BOND ANTENNA GROUNDING KIT CABLE TO TOP CIGBE
- BOND ANTENNA GROUNDING KIT CABLE TO BOTTOM CIGBE.
- SCHEMATIC GROUNDING DIAGRAM IS TYPICAL FOR EACH SECTOR.
- VERIFY EXISTING GROUND SYSTEM IS INSTALLED PER T-MOBILE STANDARDS.

**SCHEMATIC GROUNDING DIAGRAM**

SCALE: N.T.S.

4

**T-Mobile**

T-MOBILE NORTHEAST LLC  
35 GRIFFIN RD SOUTH  
BLOOMFIELD, CT 06002

**CROWN CASTLE**

CROWN CASTLE  
3 CORPORATE PARK DRIVE, SUITE 101  
CLIFTON PARK, NY 12065

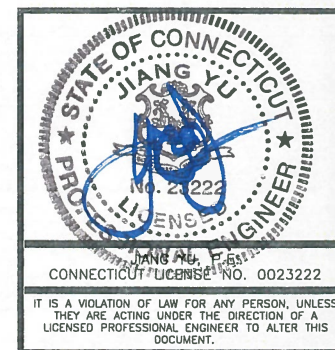
**CTNH009B  
NHV 104 943122**

**CONSTRUCTION DRAWINGS**

NO.	DATE	DESCRIPTION
3	12/16/15	ISSUED AS FINAL
2	12/09/15	ISSUED AS FINAL
1	10/27/15	ISSUED AS FINAL
0	10/16/15	ISSUED AS FINAL
A	10/07/15	ISSUED FOR REVIEW

**Dewberry**

Dewberry Engineers Inc.  
600 PARSIPPANY ROAD  
SUITE 301  
PARSIPPANY, NJ 07054  
PHONE: 973.739.9400  
FAX: 973.739.9710



DRAWN BY: RA

REVIEWED BY: BSH

CHECKED BY: GHN

PROJECT NUMBER: 50066258

JOB NUMBER: 50074607

SITE ADDRESS:

423 ORONOQUE ROAD  
MILFORD, CT 06460  
NEW HAVEN COUNTY

SHEET TITLE

GROUNDING NOTES & DETAILS

SHEET NUMBER



Date: **December 02, 2015**

Cheryl Schultz  
Crown Castle  
3530 Toringdon Way Suite 300  
Charlotte, NC 28277

AW Solutions  
300 Crown Oak Centre Drive  
Longwood, FL 32750  
(407) 260-0231

**Subject: Structural Analysis Report**

**Carrier Designation:** T-Mobile Co-Locate  
**Carrier Site Number:** CTNH009B  
**Carrier Site Name:** NH009/CrownOronoque\_ET

**Crown Castle Designation:** **Crown Castle BU Number:** 806359  
**Crown Castle Site Name:** NHV 104 943122  
**Crown Castle JDE Job Number:** 346200  
**Crown Castle Work Order Number:** 1161267  
**Crown Castle Application Number:** 310127 Rev. 7

**Engineering Firm Designation:** **AW Solutions Project Number:** 806359

**Site Data:** **423 ORONOQUE ROAD, MILFORD, New Haven County, CT**  
**Latitude 41° 14' 16.23", Longitude -73° 5' 10"**  
**100 Foot - Monopole Tower**

Ms. Schultz,

AW Solutions 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 851216, in accordance with application 310127, revision 7.

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: Installed + 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 2005 CT State Building Code with 2009 amendment based upon a wind speed of 90 mph fastest mile.

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

Structural analysis prepared by: Sarah Parinella, EI / JFB

Respectfully submitted by:



Alan Lockrem, PE  
Director of Engineering

12/03/15

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## 1) INTRODUCTION

This tower is a 100 ft Monopole tower designed by VALMONT in August of 1986. The tower was originally designed for a wind speed of 0 mph per EIA-222-C. The tower was modified per reinforcement drawings by Paul J Ford and Company, dated April 2009. Reinforcement consists of four additional anchor bolts.

## 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, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

**Table 1 - Proposed Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
83.0	83.0	3	commscope	LNx-6515DS-VTM w/ Mount Pipe	1	1-5/8	-
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	RRUS 11 B12			

**Table 2 - Existing and Reserved Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
100.0	105.0	3	alcatel lucent	RRH2x40-AWS	14 1 1	7/8 1/2 1-5/8	1
		3	antel	BXA-171063-8BF-EDIN-0 w/ Mount Pipe			
		5	decibel	DB846F65ZAXY w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		5	rfs celwave	FD9R6004/2C-3L			
	102.0	3	antel	BXA-171063-8BF-EDIN-2 w/ Mount Pipe			
		1	decibel	DB846F65ZAXY w/ Mount Pipe			
		1	gps	GPS_A			
		1	rfs celwave	FD9R6004/2C-3L			
		3	swedcom	SWCP 2x5514 w/ Mount Pipe			
100.0	1	tower mounts	Platform Mount [LP 602-1]				
95.0	95.0	1	til-tek	TA-2335-DAB-L-095 w/ Mount Pipe	1	7/8	1
		1	tower mounts	Pipe Mount [PM 602-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
83.0	83.0	3	ericsson	KRY 112 144/1	12	1-5/8	1
		3	rfs celwave	APX16DWV-16DWVS-E-A20 w/ Mount Pipe	-	-	2
		1	tower mounts	Platform Mount [LP 602-1]	-	-	1
73.0	73.0	3	rfs celwave	APXV18-206517S-C	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 602-3]			
50.0	50.0	1	til-tek	TA-2324-LHCP	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 102-3]			
45.0	45.0	1	prodelin	1111	2	19/64	1
		1	tower mounts	Side Arm Mount [SO 102-3]			
		1	trimble	57860-30			

- 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)
-						

### 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH	1256016	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FPL Construction	1256012	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont	1245431	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Paul J Ford	2280914	CCISITES

#### 3.1) Analysis Method

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



### 3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
- 5) The existing base plate grout was not considered in this analysis.

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

### 4) ANALYSIS RESULTS

**Table 5 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	100 - 46.8333	Pole	TP33.26x23.43x0.313	1	-9.599	1673.581	62.5	Pass
L2	46.8333 - 0	Pole	TP41.3x31.68x0.375	2	-19.919	2569.037	87.7	Pass
							Summary	
						Pole (L2)	87.7	Pass
						Rating =	87.7	Pass

**Table 6 - Tower Component Stresses vs. Capacity - LC5**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	83.7	Pass
1	Base Plate	0	50.4	Pass
1	Base Foundation Structural	0	41.8	Pass
1	Base Foundation Soil Interaction	0	44.5	Pass

<b>Structure Rating (max from all components) =</b>	<b>87.7%</b>
---	--------------

Notes:

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

### 4.1) Recommendations

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

**APPENDIX A**  
**TNXTOWER OUTPUT**

### DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
SWCP 2x5514 w/ Mount Pipe	100	KRY 112 144/1	83
(2) DB846F65ZAXY w/ Mount Pipe	100	Platform Mount [LP 602-1]	83
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	100	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	83
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	100	LNX-6515DS-VTM w/ Mount Pipe	83
(2) FD9R6004/2C-3L	100	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	83
RRH2x40-AWS	100	RRUS 11 B12	83
SWCP 2x5514 w/ Mount Pipe	100	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	83
(2) DB846F65ZAXY w/ Mount Pipe	100	LNX-6515DS-VTM w/ Mount Pipe	83
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	100	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	83
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	100	RRUS 11 B12	83
(2) FD9R6004/2C-3L	100	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	83
RRH2x40-AWS	100	LNX-6515DS-VTM w/ Mount Pipe	83
DB-T1-6Z-8AB-0Z	100	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	83
SWCP 2x5514 w/ Mount Pipe	100	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	83
DB846F65ZAXY w/ Mount Pipe	100	RRUS 11 B12	83
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	100	APXV18-206517S-C	73
DB846F65ZAXY w/ Mount Pipe	100	APXV18-206517S-C	73
GPS_A	100	APXV18-206517S-C	73
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	100	Pipe Mount [PM 602-3]	73
FD9R6004/2C-3L	100	Side Arm Mount [SO 102-3]	50
RRH2x40-AWS	100	6' x 2" Mount Pipe	50
FD9R6004/2C-3L	100	TA-2324-LHCP	50
Platform Mount [LP 602-1]	100	Side Arm Mount [SO 102-3]	45
TA-2335-DAB-L-095 w/ Mount Pipe	95	6' x 2" Mount Pipe	45
Pipe Mount [PM 602-1]	95	57860-30	45
KRY 112 144/1	83	1111	45
KRY 112 144/1	83		

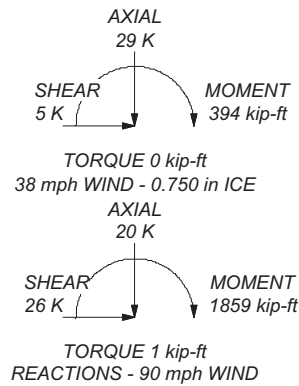
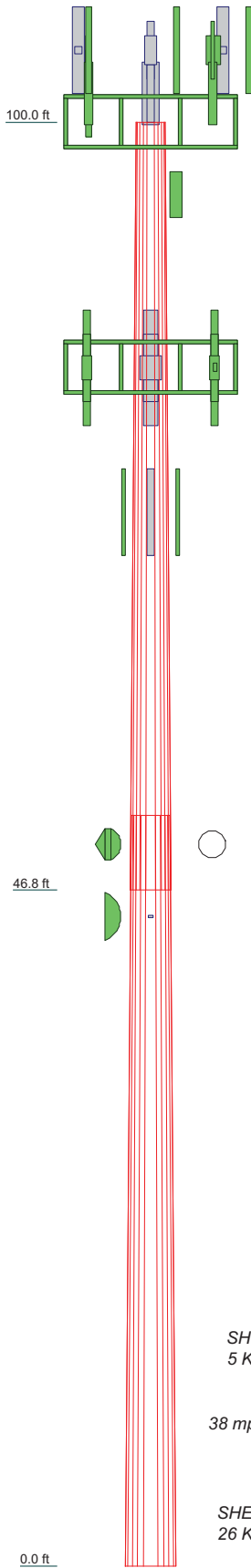
### MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	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.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 87.7%

Section	1	2
Length (ft)	53.167	52.000
Number of Sides	12	12
Thickness (in)	0.313	0.375
Socket Length (ft)	5.167	
Top Dia (in)	23.430	31.680
Bot Dia (in)	33.260	41.300
Grade	A572-65	
Weight (K)	5.1	7.7



**AW Solutions**  
 300 Crown Oak Centre Drive  
 Longwood, FL 32750  
 Phone: (407) 260-0231  
 FAX:

Job: **BU806359**  
 Project: **WO1161267**  
 Client: Crown Castle  
 Code: TIA/EIA-222-F  
 Path: C:\Users\BMS\CROWN CASTLE\CRG - STRUCTURAL\BU806359 - WO1161267\ENGINEERING\TOWER\BU806359 WO1161267.dwg  
 Drawn by: Sarah Parinella, EI  
 Date: 12/02/15  
 App'd:  
 Scale: NTS  
 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:

- 3) Tower is located in New Haven County, Connecticut.
- 4) Basic wind speed of 90 mph.
- 5) Nominal ice thickness of 0.750 in.
- 6) Ice density of 56.000 pcf.
- 7) A wind speed of 38 mph is used in combination with ice.
- 8) Temperature drop of 50.000 °F.
- 9) Deflections calculated using a wind speed of 50 mph.
- 10) A non-linear (P-delta) analysis was used.
- 11) Pressures are calculated at each section.
- 12) Stress ratio used in pole design is 1.333.
- 13) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Use TIA-222-G Tension Splice Capacity Exemption	Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feedline Torque Include Angle Block Shear Check <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
--	--	--

## 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	100.000- 46.833	53.167	5.167	12	23.430	33.260	0.313	1.250	A572-65 (65 ksi)
L2	46.833-0.000	52.000		12	31.680	41.300	0.375	1.500	A572-65 (65 ksi)

## Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	24.257	23.262	1586.772	8.276	12.137	130.741	3215.230	11.449	5.442	17.414
	34.433	33.153	4593.664	11.795	17.229	266.629	9308.009	16.317	8.076	25.844
L2	33.787	37.800	4728.279	11.207	16.410	288.132	9580.776	18.604	7.485	19.96
	42.757	49.417	10564.262	14.651	21.393	493.809	21406.058	24.322	10.063	26.836

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor $A_r$	Adjust. Factor $A_r$	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
ft	ft <sup>2</sup>	in						
L1 100.000-46.833				1	1	1		
L2 46.833-0.000				1	1	1		

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		$C_{AA}$ ft <sup>2</sup> /ft	Weight plf
LDF4-50A(1/2")	C	No	Inside Pole	100.000 - 8.000	1	No Ice	0.000	0.150
						1/2" Ice	0.000	0.150
						1" Ice	0.000	0.150
LDF5-50A(7/8)	C	No	Inside Pole	100.000 - 8.000	14	No Ice	0.000	0.330
						1/2" Ice	0.000	0.330
						1" Ice	0.000	0.330
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	100.000 - 8.000	1	No Ice	0.000	1.300
						1/2" Ice	0.000	1.300
						1" Ice	0.000	1.300
AVA5-50( 7/8)	A	No	Inside Pole	95.000 - 8.000	1	No Ice	0.000	0.300
						1/2" Ice	0.000	0.300
						1" Ice	0.000	0.300
LDF7-50A(1-5/8)	B	No	Inside Pole	83.000 - 8.000	12	No Ice	0.000	0.820
						1/2" Ice	0.000	0.820
						1" Ice	0.000	0.820
MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	B	No	CaAa (Out Of Face)	83.000 - 8.000	1	No Ice	0.163	1.070
						1/2" Ice	0.263	2.368
						1" Ice	0.362	4.277
CR 50 1873(1-5/8")	B	No	CaAa (Out Of Face)	73.000 - 8.000	5	No Ice	0.000	0.830
						1/2" Ice	0.000	2.345
						1" Ice	0.000	4.471
CR 50 1873(1-5/8")	B	No	CaAa (Out Of Face)	73.000 - 8.000	1	No Ice	0.198	0.830
						1/2" Ice	0.298	2.345
						1" Ice	0.398	4.471
LDF4-50A(1/2")	A	No	Inside Pole	50.000 - 8.000	1	No Ice	0.000	0.150
						1/2" Ice	0.000	0.150
						1" Ice	0.000	0.150
7916A(19/64)	A	No	Inside Pole	45.000 - 8.000	2	No Ice	0.000	0.033
						1/2" Ice	0.000	0.033
						1" Ice	0.000	0.033
***								
Safety Line 5/8	B	No	CaAa (Out Of Face)	100.000 - 10.000	1	No Ice	0.088	0.400
						1/2" Ice	0.188	1.243
						1" Ice	0.288	2.697

### Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
L1	100.000-46.833	A	0.000	0.000	0.000	0.000	0.015
		B	0.000	0.000	0.000	15.737	0.546
		C	0.000	0.000	0.000	0.000	0.323
L2	46.833-0.000	A	0.000	0.000	0.000	0.000	0.020
		B	0.000	0.000	0.000	17.241	0.632
		C	0.000	0.000	0.000	0.000	0.236

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section <i>n</i>	Tower Elevation <i>ft</i>	Face or Leg	Ice Thickness <i>in</i>	$A_R$ <i>ft<sup>2</sup></i>	$A_F$ <i>ft<sup>2</sup></i>	$C_{AA}$ In Face <i>ft<sup>2</sup></i>	$C_{AA}$ Out Face <i>ft<sup>2</sup></i>	Weight <i>K</i>
L1	100.000-46.833	A	0.750	0.000	0.000	0.000	0.000	0.015
		B		0.000	0.000	0.000	33.062	1.116
		C		0.000	0.000	0.000	0.000	0.323
L2	46.833-0.000	A	0.750	0.000	0.000	0.000	0.000	0.020
		B		0.000	0.000	0.000	34.416	1.378
		C		0.000	0.000	0.000	0.000	0.236

### Feed Line Center of Pressure

Section	Elevation <i>ft</i>	$CP_x$ <i>in</i>	$CP_z$ <i>in</i>	$CP_x$ Ice <i>in</i>	$CP_z$ Ice <i>in</i>
L1	100.000-46.833	0.359	0.207	0.640	0.370
L2	46.833-0.000	0.418	0.241	0.730	0.422

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert <i>ft</i> <i>ft</i> <i>ft</i>	Azimuth Adjustmen <i>t</i>  <i>o</i>	Placement  <i>ft</i>	$C_{AA}$ Front  <i>ft<sup>2</sup></i>	$C_{AA}$ Side  <i>ft<sup>2</sup></i>	Weight  <i>K</i>	
*100*									
SWCP 2x5514 w/ Mount Pipe	A	From Leg	4.000	0.000	100.000	No Ice	7.251	6.966	0.039
			0.000			1/2"	7.751	7.746	0.104
			2.000			Ice	8.252	8.499	0.174
						1" Ice			
(2) DB846F65ZAXY w/ Mount Pipe	A	From Leg	4.000	0.000	100.000	No Ice	7.271	7.821	0.047
			0.000			1/2"	7.877	9.010	0.114
			5.000			Ice	8.484	9.912	0.189
						1" Ice			
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	A	From Leg	4.000	0.000	100.000	No Ice	3.179	3.353	0.029
			0.000			1/2"	3.555	3.971	0.061
			5.000			Ice	3.964	4.595	0.099
						1" Ice			
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	A	From Leg	4.000	0.000	100.000	No Ice	3.179	3.353	0.029
			0.000			1/2"	3.555	3.971	0.061
			2.000			Ice	3.964	4.595	0.099
						1" Ice			
(2) FD9R6004/2C-3L	A	From Leg	4.000	0.000	100.000	No Ice	0.367	0.085	0.003
			0.000			1/2"	0.451	0.136	0.005
			5.000			Ice	0.543	0.196	0.009
						1" Ice			
RRH2x40-AWS	A	From Leg	4.000	0.000	100.000	No Ice	2.522	1.589	0.044
			0.000			1/2"	2.753	1.795	0.061
			5.000			Ice	2.993	2.010	0.082
						1" Ice			
SWCP 2x5514 w/ Mount Pipe	B	From Leg	4.000	0.000	100.000	No Ice	7.251	6.966	0.039
			0.000			1/2"	7.751	7.746	0.104
			2.000			Ice	8.252	8.499	0.174
						1" Ice			
(2) DB846F65ZAXY w/ Mount Pipe	B	From Leg	4.000	0.000	100.000	No Ice	7.271	7.821	0.047
			0.000			1/2"	7.877	9.010	0.114
			5.000			Ice	8.484	9.912	0.189
						1" Ice			
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	B	From Leg	4.000	0.000	100.000	No Ice	3.179	3.353	0.029
			0.000			1/2"	3.555	3.971	0.061
			5.000			Ice	3.964	4.595	0.099

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	100.000	1" Ice	3.179	3.353	0.029
			0.000	0.000			No Ice	3.555	3.971	0.061
			2.000	2.000			1/2" Ice	3.964	4.595	0.099
(2) FD9R6004/2C-3L	B	From Leg	4.000	0.000	0.000	100.000	1" Ice	0.367	0.085	0.003
			0.000	0.000			No Ice	0.451	0.136	0.005
			5.000	5.000			1/2" Ice	0.543	0.196	0.009
RRH2x40-AWS	B	From Leg	4.000	0.000	0.000	100.000	1" Ice	2.522	1.589	0.044
			0.000	0.000			No Ice	2.753	1.795	0.061
			5.000	5.000			1/2" Ice	2.993	2.010	0.082
DB-T1-6Z-8AB-0Z	B	From Leg	4.000	0.000	0.000	100.000	1" Ice	5.600	2.333	0.044
			0.000	0.000			No Ice	5.915	2.558	0.080
			5.000	5.000			1/2" Ice	6.240	2.791	0.120
SWCP 2x5514 w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	100.000	1" Ice	7.251	6.966	0.039
			0.000	0.000			No Ice	7.751	7.746	0.104
			2.000	2.000			1/2" Ice	8.252	8.499	0.174
DB846F65ZAXY w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	100.000	1" Ice	7.271	7.821	0.047
			0.000	0.000			No Ice	7.877	9.010	0.114
			5.000	5.000			1/2" Ice	8.484	9.912	0.189
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	100.000	1" Ice	3.179	3.353	0.029
			0.000	0.000			No Ice	3.555	3.971	0.061
			5.000	5.000			1/2" Ice	3.964	4.595	0.099
DB846F65ZAXY w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	100.000	1" Ice	7.271	7.821	0.047
			0.000	0.000			No Ice	7.877	9.010	0.114
			2.000	2.000			1/2" Ice	8.484	9.912	0.189
GPS_A	C	From Leg	4.000	0.000	0.000	100.000	1" Ice	0.297	0.297	0.001
			0.000	0.000			No Ice	0.374	0.374	0.005
			2.000	2.000			1/2" Ice	0.459	0.459	0.010
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	100.000	1" Ice	3.179	3.353	0.029
			0.000	0.000			No Ice	3.555	3.971	0.061
			2.000	2.000			1/2" Ice	3.964	4.595	0.099
FD9R6004/2C-3L	C	From Leg	4.000	0.000	0.000	100.000	1" Ice	0.367	0.085	0.003
			0.000	0.000			No Ice	0.451	0.136	0.005
			5.000	5.000			1/2" Ice	0.543	0.196	0.009
RRH2x40-AWS	C	From Leg	4.000	0.000	0.000	100.000	1" Ice	2.522	1.589	0.044
			0.000	0.000			No Ice	2.753	1.795	0.061
			5.000	5.000			1/2" Ice	2.993	2.010	0.082
FD9R6004/2C-3L	C	From Leg	4.000	0.000	0.000	100.000	1" Ice	0.367	0.085	0.003
			0.000	0.000			No Ice	0.451	0.136	0.005
			2.000	2.000			1/2" Ice	0.543	0.196	0.009
Platform Mount [LP 602-1]	C	None			0.000	100.000	1" Ice	32.030	32.030	1.343
							No Ice	38.710	38.710	1.800
							1/2" Ice	45.390	45.390	2.257
*95* TA-2335-DAB-L-095 w/ Mount Pipe	B	From Leg	1.000	0.000	0.000	95.000	1" Ice	7.978	3.873	0.048
			0.000	0.000			No Ice	8.426	4.430	0.103
			0.000	0.000			1/2" Ice	8.885	5.005	0.163
Pipe Mount [PM 602-1]	B	From Leg	1.000	0.000	0.000	95.000	1" Ice	5.250	1.580	0.093
			0.000	0.000			No Ice	6.500	1.950	0.118
			0.000	0.000			1/2" Ice	7.750	2.320	0.142

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
						1" Ice			
*83I*									
KRY 112 144/1	A	From Leg	4.000 0.000 0.000	0.000	83.000	No Ice 1/2" Ice	0.408 0.497 0.594	0.204 0.273 0.351	0.011 0.014 0.019
						1" Ice			
KRY 112 144/1	B	From Leg	4.000 0.000 0.000	0.000	83.000	No Ice 1/2" Ice	0.408 0.497 0.594	0.204 0.273 0.351	0.011 0.014 0.019
						1" Ice			
KRY 112 144/1	C	From Leg	4.000 0.000 0.000	0.000	83.000	No Ice 1/2" Ice	0.408 0.497 0.594	0.204 0.273 0.351	0.011 0.014 0.019
						1" Ice			
Platform Mount [LP 602-1]	C	None		0.000	83.000	No Ice 1/2" Ice	32.030 38.710 45.390	32.030 38.710 45.390	1.343 1.800 2.257
						1" Ice			
*83P*									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	83.000	No Ice 1/2" Ice	6.825 7.347 7.863	5.642 6.480 7.257	0.112 0.169 0.233
						1" Ice			
LNx-6515DS-VTM w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	83.000	No Ice 1/2" Ice	11.683 12.404 13.135	9.842 11.366 12.914	0.083 0.173 0.273
						1" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	83.000	No Ice 1/2" Ice	6.825 7.347 7.863	5.642 6.480 7.257	0.112 0.169 0.233
						1" Ice			
RRUS 11 B12	A	From Leg	4.000 0.000 0.000	0.000	83.000	No Ice 1/2" Ice	3.306 3.550 3.802	1.361 1.540 1.728	0.051 0.072 0.095
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	83.000	No Ice 1/2" Ice	6.825 7.347 7.863	5.642 6.480 7.257	0.112 0.169 0.233
						1" Ice			
LNx-6515DS-VTM w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	83.000	No Ice 1/2" Ice	11.683 12.404 13.135	9.842 11.366 12.914	0.083 0.173 0.273
						1" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	83.000	No Ice 1/2" Ice	6.825 7.347 7.863	5.642 6.480 7.257	0.112 0.169 0.233
						1" Ice			
RRUS 11 B12	B	From Leg	4.000 0.000 0.000	0.000	83.000	No Ice 1/2" Ice	3.306 3.550 3.802	1.361 1.540 1.728	0.051 0.072 0.095
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	83.000	No Ice 1/2" Ice	6.825 7.347 7.863	5.642 6.480 7.257	0.112 0.169 0.233
						1" Ice			
LNx-6515DS-VTM w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	83.000	No Ice 1/2" Ice	11.683 12.404 13.135	9.842 11.366 12.914	0.083 0.173 0.273
						1" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	83.000	No Ice 1/2" Ice	6.825 7.347 7.863	5.642 6.480 7.257	0.112 0.169 0.233
						1" Ice			
RRUS 11 B12	C	From Leg	4.000 0.000	0.000	83.000	No Ice 1/2"	3.306 3.550	1.361 1.540	0.051 0.072



Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
			0.000			Ice 1" Ice	3.802	1.728	0.095
*73* APXV18-206517S-C	A	From Leg	1.000 0.000 0.000	0.000	73.000	No Ice 1/2" Ice 1" Ice	5.167 5.618 6.077	3.038 3.469 3.909	0.026 0.053 0.085
APXV18-206517S-C	B	From Leg	1.000 0.000 0.000	0.000	73.000	No Ice 1/2" Ice 1" Ice	5.167 5.618 6.077	3.038 3.469 3.909	0.026 0.053 0.085
APXV18-206517S-C	C	From Leg	1.000 0.000 0.000	0.000	73.000	No Ice 1/2" Ice 1" Ice	5.167 5.618 6.077	3.038 3.469 3.909	0.026 0.053 0.085
Pipe Mount [PM 602-3]	C	None		0.000	73.000	No Ice 1/2" Ice 1" Ice	7.680 9.500 11.320	7.680 9.500 11.320	0.279 0.353 0.427
*50* Side Arm Mount [SO 102-3]	C	None		0.000	50.000	No Ice 1/2" Ice 1" Ice	3.000 3.480 3.960	3.000 3.480 3.960	0.081 0.111 0.141
6' x 2" Mount Pipe	C	From Leg	1.000 0.000 0.000	0.000	50.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
*45* 57860-30	A	From Leg	4.000 0.000 0.000	0.000	45.000	No Ice 1/2" Ice 1" Ice	0.077 0.118 0.168	0.077 0.118 0.168	0.000 0.002 0.003
Side Arm Mount [SO 102-3]	C	None		0.000	45.000	No Ice 1/2" Ice 1" Ice	3.000 3.480 3.960	3.000 3.480 3.960	0.081 0.111 0.141
6' x 2" Mount Pipe	A	From Leg	1.000 0.000 0.000	0.000	45.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
6' x 2" Mount Pipe	C	From Leg	1.000 0.000 0.000	0.000	45.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048

**Dishes**

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft <sup>2</sup>	Weight K	
TA-2324-LHCP	C	Paraboloid w/Radome	From Leg	1.000 0.000 0.000	0.000		50.000	2.167	No Ice 1/2" Ice 1" Ice	3.690 3.980 4.270	0.028 0.048 0.069
*** 1111	C	Paraboloid w/o Radome	From Leg	1.000 0.000 0.000	0.000		45.000	3.330	No Ice 1/2" Ice 1" Ice	8.709 9.151 9.592	0.040 0.087 0.134

### Load Combinations

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

### Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	100 - 46.8333	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-16.392	-1.656	-0.999
			Max. Mx	5	-9.609	-667.308	-11.038
			Max. My	8	-9.636	-11.313	-654.595
			Max. Vy	5	18.837	-667.308	-11.038
			Max. Vx	2	-18.566	10.032	653.886
			Max. Torque	9			1.277
L2	46.8333 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-28.823	-2.526	-1.984
			Max. Mx	5	-19.919	-1851.255	-11.079
			Max. My	2	-19.920	1.420	1817.354
			Max. Vy	5	25.936	-1851.255	-11.079
			Max. Vx	2	-25.540	1.420	1817.354
			Max. Torque	11			1.329

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	19	28.823	-4.678	-2.603
	Max. H <sub>x</sub>	11	19.947	25.719	0.209
	Max. H <sub>z</sub>	2	19.947	-0.223	25.519
	Max. M <sub>x</sub>	2	1817.354	-0.223	25.519
	Max. M <sub>z</sub>	5	1851.255	-25.915	0.043
	Max. Torsion	11	1.329	25.719	0.209
	Min. Vert	1	19.947	0.000	0.000
	Min. H <sub>x</sub>	5	19.947	-25.915	0.043
	Min. H <sub>z</sub>	8	19.947	-0.177	-25.345
	Min. M <sub>x</sub>	8	-1810.548	-0.177	-25.345
	Min. M <sub>z</sub>	11	-1840.644	25.719	0.209
	Min. Torsion	3	-1.297	-12.995	21.964

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	19.947	0.000	0.000	0.641	-0.737	0.000
Dead+Wind 0 deg - No Ice	19.947	0.223	-25.519	-1817.354	1.420	0.810
Dead+Wind 30 deg - No Ice	19.947	12.995	-21.964	-1561.518	-917.007	1.297
Dead+Wind 60 deg - No Ice	19.947	22.392	-12.664	-893.323	-1594.842	1.230
Dead+Wind 90 deg - No Ice	19.947	25.915	-0.043	11.078	-1851.255	0.832
Dead+Wind 120 deg - No Ice	19.947	22.669	12.566	911.509	-1619.729	0.414
Dead+Wind 150 deg - No Ice	19.947	12.971	21.978	1575.505	-937.289	0.063
Dead+Wind 180 deg - No Ice	19.947	0.177	25.345	1810.548	-21.266	-0.394
Dead+Wind 210 deg - No Ice	19.947	-12.678	21.921	1560.685	901.000	-0.793
Dead+Wind 240 deg - No Ice	19.947	-22.227	12.569	890.238	1585.728	-1.224
Dead+Wind 270 deg - No Ice	19.947	-25.719	-0.209	-21.258	1840.644	-1.329
Dead+Wind 300 deg - No Ice	19.947	-22.318	-12.826	-922.026	1602.026	-0.836
Dead+Wind 330 deg - No Ice	19.947	-12.944	-21.993	-1574.997	934.395	-0.069
Dead+Ice+Temp	28.823	0.000	0.000	1.984	-2.526	0.000
Dead+Wind 0 deg+Ice+Temp	28.823	0.041	-5.276	-381.349	-1.995	0.225
Dead+Wind 30 deg+Ice+Temp	28.823	2.682	-4.543	-327.589	-195.594	0.334
Dead+Wind 60 deg+Ice+Temp	28.823	4.625	-2.619	-186.681	-338.411	0.314
Dead+Wind 90 deg+Ice+Temp	28.823	5.352	-0.007	4.161	-392.327	0.210
Dead+Wind 120 deg+Ice+Temp	28.823	4.678	2.603	194.202	-343.292	0.088
Dead+Wind 150 deg+Ice+Temp	28.823	2.680	4.546	334.180	-199.723	-0.023
Dead+Wind 180 deg+Ice+Temp	28.823	0.035	5.243	383.839	-6.622	-0.146
Dead+Wind 210 deg+Ice+Temp	28.823	-2.622	4.534	331.209	187.703	-0.238
Dead+Wind 240 deg+Ice+Temp	28.823	-4.594	2.601	189.884	331.824	-0.314
Dead+Wind 270 deg+Ice+Temp	28.823	-5.315	-0.041	-2.295	385.449	-0.305
Dead+Wind 300 deg+Ice+Temp	28.823	-4.612	-2.652	-192.399	335.071	-0.168
Dead+Wind 330 deg+Ice+Temp	28.823	-2.675	-4.549	-330.299	194.309	0.023
Dead+Wind 0 deg - Service	19.947	0.069	-7.876	-560.793	-0.080	0.252
Dead+Wind 30 deg - Service	19.947	4.011	-6.779	-481.780	-283.714	0.402
Dead+Wind 60 deg - Service	19.947	6.911	-3.909	-275.427	-493.053	0.380
Dead+Wind 90 deg - Service	19.947	7.998	-0.013	3.878	-572.252	0.257
Dead+Wind 120 deg - Service	19.947	6.997	3.878	281.964	-500.753	0.128

Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 150 deg - Service	19.947	4.003	6.783	487.021	-289.989	0.020
Dead+Wind 180 deg - Service	19.947	0.055	7.823	559.598	-7.091	-0.122
Dead+Wind 210 deg - Service	19.947	-3.913	6.766	482.429	277.727	-0.246
Dead+Wind 240 deg - Service	19.947	-6.860	3.879	275.382	489.193	-0.380
Dead+Wind 270 deg - Service	19.947	-7.938	-0.065	-6.112	567.930	-0.412
Dead+Wind 300 deg - Service	19.947	-6.888	-3.959	-284.301	494.241	-0.258
Dead+Wind 330 deg - Service	19.947	-3.995	-6.788	-485.956	288.050	-0.020

### Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-19.947	0.000	0.000	19.947	0.000	0.000%
2	0.223	-19.947	-25.519	-0.223	19.947	25.519	0.000%
3	12.995	-19.947	-21.964	-12.995	19.947	21.964	0.000%
4	22.392	-19.947	-12.664	-22.392	19.947	12.664	0.000%
5	25.915	-19.947	-0.043	-25.915	19.947	0.043	0.000%
6	22.669	-19.947	12.566	-22.669	19.947	-12.566	0.000%
7	12.971	-19.947	21.978	-12.971	19.947	-21.978	0.000%
8	0.177	-19.947	25.345	-0.177	19.947	-25.345	0.000%
9	-12.678	-19.947	21.921	12.678	19.947	-21.921	0.000%
10	-22.227	-19.947	12.569	22.227	19.947	-12.569	0.000%
11	-25.719	-19.947	-0.209	25.719	19.947	0.209	0.000%
12	-22.318	-19.947	-12.826	22.318	19.947	12.826	0.000%
13	-12.944	-19.947	-21.993	12.944	19.947	21.993	0.000%
14	0.000	-28.823	0.000	-0.000	28.823	-0.000	0.000%
15	0.041	-28.823	-5.276	-0.041	28.823	5.276	0.000%
16	2.682	-28.823	-4.543	-2.682	28.823	4.543	0.000%
17	4.625	-28.823	-2.619	-4.625	28.823	2.619	0.000%
18	5.352	-28.823	-0.007	-5.352	28.823	0.007	0.000%
19	4.678	-28.823	2.603	-4.678	28.823	-2.603	0.000%
20	2.680	-28.823	4.546	-2.680	28.823	-4.546	0.000%
21	0.035	-28.823	5.243	-0.035	28.823	-5.243	0.000%
22	-2.622	-28.823	4.534	2.622	28.823	-4.534	0.000%
23	-4.594	-28.823	2.601	4.594	28.823	-2.601	0.000%
24	-5.315	-28.823	-0.041	5.315	28.823	0.041	0.000%
25	-4.612	-28.823	-2.652	4.612	28.823	2.652	0.000%
26	-2.675	-28.823	-4.549	2.675	28.823	4.549	0.000%
27	0.069	-19.947	-7.876	-0.069	19.947	7.876	0.000%
28	4.011	-19.947	-6.779	-4.011	19.947	6.779	0.000%
29	6.911	-19.947	-3.909	-6.911	19.947	3.909	0.000%
30	7.998	-19.947	-0.013	-7.998	19.947	0.013	0.000%
31	6.997	-19.947	3.878	-6.997	19.947	-3.878	0.000%
32	4.003	-19.947	6.783	-4.003	19.947	-6.783	0.000%
33	0.055	-19.947	7.823	-0.055	19.947	-7.823	0.000%
34	-3.913	-19.947	6.766	3.913	19.947	-6.766	0.000%
35	-6.860	-19.947	3.879	6.860	19.947	-3.879	0.000%
36	-7.938	-19.947	-0.065	7.938	19.947	0.065	0.000%
37	-6.888	-19.947	-3.959	6.888	19.947	3.959	0.000%
38	-3.995	-19.947	-6.788	3.995	19.947	6.788	0.000%

### Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00004637
3	Yes	4	0.00000001	0.00089653
4	Yes	4	0.00000001	0.00081373
5	Yes	4	0.00000001	0.00006943
6	Yes	4	0.00000001	0.00091022
7	Yes	4	0.00000001	0.00091047
8	Yes	4	0.00000001	0.00007523
9	Yes	4	0.00000001	0.00081364
10	Yes	4	0.00000001	0.00089233
11	Yes	4	0.00000001	0.00003634
12	Yes	4	0.00000001	0.00088677
13	Yes	4	0.00000001	0.00089031
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00022827
16	Yes	4	0.00000001	0.00025123
17	Yes	4	0.00000001	0.00025210
18	Yes	4	0.00000001	0.00023573
19	Yes	4	0.00000001	0.00026177
20	Yes	4	0.00000001	0.00025953
21	Yes	4	0.00000001	0.00023102
22	Yes	4	0.00000001	0.00024874
23	Yes	4	0.00000001	0.00025130
24	Yes	4	0.00000001	0.00023110
25	Yes	4	0.00000001	0.00025417
26	Yes	4	0.00000001	0.00025243
27	Yes	4	0.00000001	0.00000992
28	Yes	4	0.00000001	0.00005683
29	Yes	4	0.00000001	0.00004400
30	Yes	4	0.00000001	0.00001004
31	Yes	4	0.00000001	0.00005469
32	Yes	4	0.00000001	0.00005420
33	Yes	4	0.00000001	0.00001006
34	Yes	4	0.00000001	0.00004403
35	Yes	4	0.00000001	0.00005637
36	Yes	4	0.00000001	0.00001007
37	Yes	4	0.00000001	0.00005021
38	Yes	4	0.00000001	0.00005081

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	100 - 46.8333	14.058	31	1.118	0.003
L2	52 - 0	4.240	31	0.726	0.001

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.000	SWCP 2x5514 w/ Mount Pipe	31	14.058	1.118	0.003	31239
95.000	TA-2335-DAB-L-095 w/ Mount Pipe	31	12.889	1.084	0.003	31239
83.000	KRY 112 144/1	31	10.142	1.000	0.002	9187
73.000	APXV18-206517S-C	31	7.991	0.923	0.002	5784
50.000	TA-2324-LHCP	31	3.957	0.704	0.001	3409
45.000	1111	31	3.308	0.645	0.001	3759

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	100 - 46.8333	45.390	6	3.608	0.010
L2	52 - 0	13.706	6	2.347	0.003

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.000	SWCP 2x5514 w/ Mount Pipe	6	45.390	3.608	0.010	9741
95.000	TA-2335-DAB-L-095 w/ Mount Pipe	6	41.619	3.499	0.010	9741
83.000	KRY 112 144/1	6	32.754	3.229	0.008	2864
73.000	APXV18-206517S-C	6	25.811	2.982	0.006	1802
50.000	TA-2324-LHCP	6	12.790	2.275	0.003	1059
45.000	1111	6	10.696	2.087	0.003	1168

### Compression Checks

#### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P K	Allow. P <sub>a</sub> K	Ratio P/P <sub>a</sub>
L1	100 - 46.8333 (1)	TP33.26x23.43x0.313	53.167	0.000	0.0	39.00	32.192	-9.599	1255.500	0.008
L2	46.8333 - 0 (2)	TP41.3x31.68x0.375	52.000	0.000	0.0	39.00	49.417	-19.919	1927.260	0.010

#### Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M <sub>x</sub> kip-ft	Actual f <sub>bx</sub> ksi	Allow. F <sub>bx</sub> ksi	Ratio f <sub>bx</sub> /F <sub>bx</sub>	Actual M <sub>y</sub> kip-ft	Actual f <sub>by</sub> ksi	Allow. F <sub>by</sub> ksi	Ratio f <sub>by</sub> /F <sub>by</sub>
L1	100 - 46.8333 (1)	TP33.26x23.43x0.313	673.54 9	32.16	39.00	0.825	0.000	0.00	39.00	0.000
L2	46.8333 - 0 (2)	TP41.3x31.68x0.375	1858.5 92	45.17	39.00	1.158	0.000	0.00	39.00	0.000

#### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f <sub>v</sub> ksi	Allow. F <sub>v</sub> ksi	Ratio f <sub>v</sub> /F <sub>v</sub>	Actual T kip-ft	Actual f <sub>vt</sub> ksi	Allow. F <sub>vt</sub> ksi	Ratio f <sub>vt</sub> /F <sub>vt</sub>
L1	100 - 46.8333 (1)	TP33.26x23.43x0.313	18.971	0.59	26.00	0.046	0.053	0.00	26.00	0.000
L2	46.8333 - 0 (2)	TP41.3x31.68x0.375	25.941	0.52	26.00	0.041	0.414	0.00	26.00	0.000

### Pole Interaction Design Data

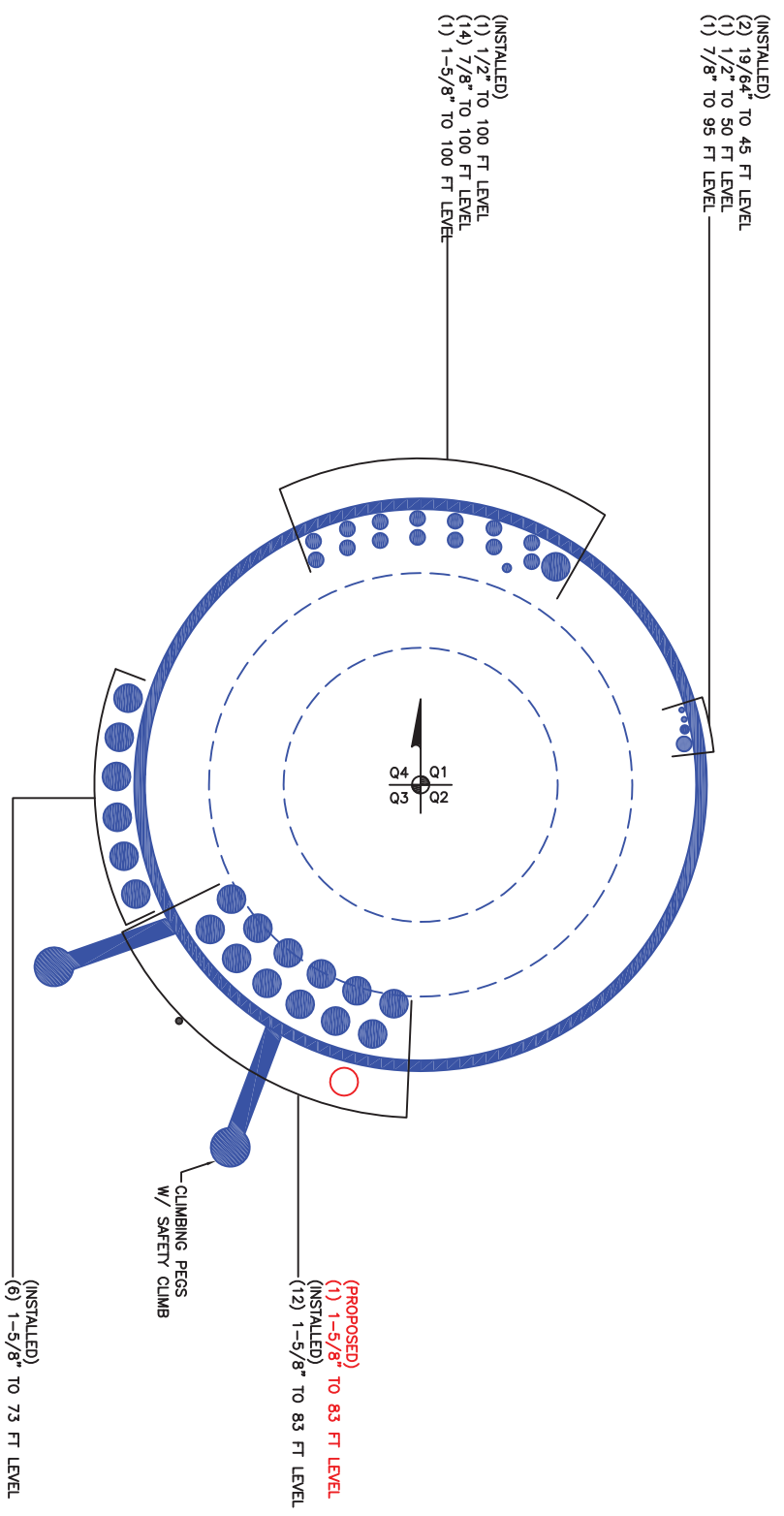
Section No.	Elevation ft	Ratio $P$ $P_a$	Ratio $f_{bx}$ $F_{bx}$	Ratio $f_{by}$ $F_{by}$	Ratio $f_v$ $F_v$	Ratio $f_{vt}$ $F_{vt}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	100 - 46.8333 (1)	0.008	0.825	0.000	0.046	0.000	0.833 ✓	1.333	H1-3+VT ✓
L2	46.8333 - 0 (2)	0.010	1.158	0.000	0.041	0.000	1.169 ✓	1.333	H1-3+VT ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	$P$ $K$	$SF \cdot P_{allow}$ $K$	% Capacity	Pass Fail	
L1	100 - 46.8333	Pole	TP33.26x23.43x0.313	1	-9.599	1673.581	62.5	Pass	
L2	46.8333 - 0	Pole	TP41.3x31.68x0.375	2	-19.919	2569.037	87.7	Pass	
							Summary		
							Pole (L2)	87.7	Pass
							<b>RATING =</b>	<b>87.7</b>	<b>Pass</b>

**APPENDIX B**  
**BASE LEVEL DRAWING**





BUSINESS UNIT: 806359 TOWER ID: C\_BASELEVEL

**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

## Asymmetric Anchor Rod

	Reactions
Moment (k-ft)	<b>1,859.0</b>
Axial (k)	<b>20.0</b>
Shear (k)	<b>26.0</b>
Code	<b>F</b>
Total Anchor Rods	<b>12</b>

	Original	Additional
Anchor Rods	<b>8</b>	<b>4</b>
Anchor Rod Grade	<b>A615-J</b>	<b>Dywidag</b>
Fy (ksi)	<b>75</b>	<b>127.7</b>
Fu (ksi)	<b>100</b>	<b>150</b>
Anchor Rod Diameter (in)	<b>2.25</b>	<b>1.75</b>
Anchor Rod Circle (in)	<b>47.58</b>	<b>52.8</b>
Base Plate	<b>Round</b>	
ETA Factor, $\eta$	<b>0.5</b>	

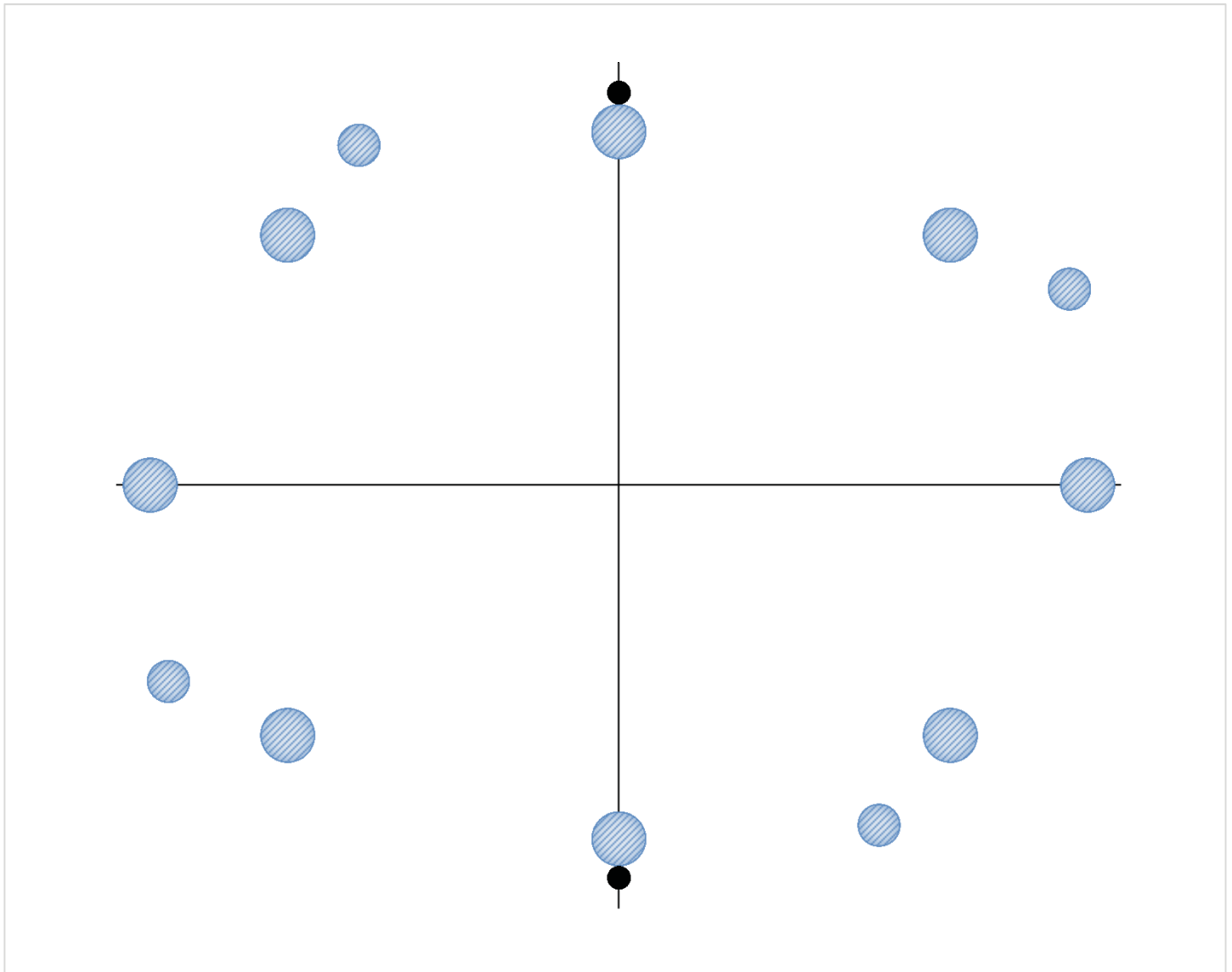
### Additional Anchor Rods

Anchor Rod	Anchor Rod Diameter, in	Anchor Rod Circle, in	Location, degrees	Anchor Rod Gross Area, in <sup>2</sup>	Force, kips	Anchor Rod Stress Ratio	
1	A615-J	2.25	47.58	0.0	3.98	163.2	<b>83.7%</b>
2	A615-J	2.25	47.58	45.0	3.98	114.9	58.9%
3	A615-J	2.25	47.58	90.0	3.98	-1.9	1.0%
4	A615-J	2.25	47.58	135.0	3.98	-114.9	58.9%
5	A615-J	2.25	47.58	180.0	3.98	-163.2	<b>83.7%</b>
6	A615-J	2.25	47.58	225.0	3.98	-114.9	58.9%
7	A615-J	2.25	47.58	270.0	3.98	1.9	1.0%
8	A615-J	2.25	47.58	315.0	3.98	114.9	58.9%
9	Dywidag	1.75	52.8	30.0	2.71	106.9	<b>59.7%</b>
10	Dywidag	1.75	52.8	120.0	2.71	-61.2	34.2%
11	Dywidag	1.75	52.8	210.0	2.71	-106.9	<b>59.7%</b>
12	Dywidag	1.75	52.8	300.0	2.71	61.2	34.2%

## Adjusted Loads for Base Plate Check

Welded Anchor Brackets?	<b>No</b>	
Adjusted Moment	<b>1859.0</b>	k-ft
Adjusted Axial	<b>20.0</b>	kips
Shear	<b>26.0</b>	kips

$I_x, \text{in}^4$	$I_y, \text{in}^4$	$I_{xy}, \text{in}^4$	$\bar{x}, \text{in}$	$\bar{y}, \text{in}$	$\Phi$	$c, \text{in}$
12781.58	12781.58	0.00	0.000	0.000	90.00	23.79



# Stiffened or Unstiffened, UngROUTed, Circular Base Plate - Any Rod Material

## TIA Rev F

### Site Data

BU#: 806359
Site Name: NHV 104 943122
App #: 310127 Rev. 7
Pole Manufacturer: <i>Other</i>

### Reactions

Moment:	1859	ft-kips
Axial:	20	kips
Shear:	26	kips

### Anchor Rod Data

Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	47.58	in

If No stiffeners, Criteria:

AISC ASD

<-Only Applicable to Unstiffened Cases

### Plate Data

Diam:	53.58	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	14.81	in

### Base Plate Results

Base Plate Stress:  
Allowable Plate Stress:  
Base Plate Stress Ratio:

### Flexural Check

30.2 ksi  
60.0 ksi  
50.4% **Pass**

### Rigid

Service ASD
0.75*Fy*ASIF
Y.L. Length:
23.63

### Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:		
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

### Stiffener Results

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

### Pole Results

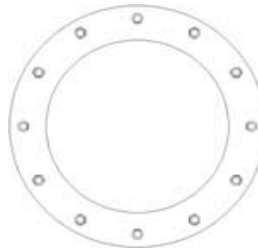
Pole Punching Shear Check: n/a

### Pole Data

Diam:	41.3	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

### Stress Increase Factor

ASIF:	1.333
-------	-------



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

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

BU:	806359
Site Name:	NHV 104 943122
App Number:	310127 Rev. 7
Work Order:	1161267

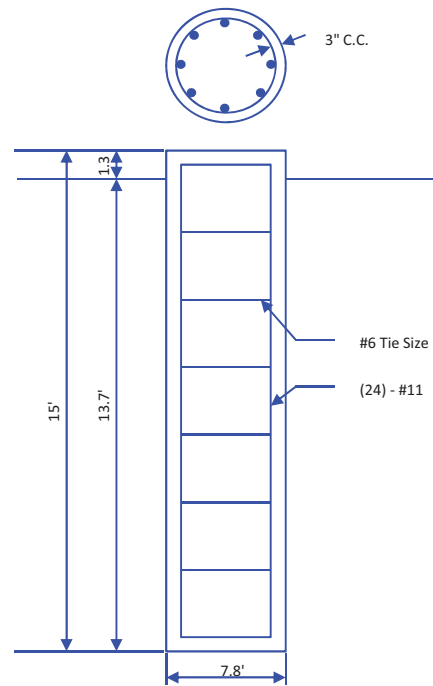


Monopole Drilled Pier

Input

<b>Criteria</b>	
TIA Revision:	F
ACI 318 Revision:	2002
Seismic Category:	B
<b>Forces</b>	
Compression	20 kips
Shear	26 kips
Moment	1859 k-ft
Swelling Force	0 kips
<b>Foundation Dimensions</b>	
Pier Diameter:	7.8 ft
Ext. above grade:	1.3 ft
Depth below grade:	13.7 ft
<b>Material Properties</b>	
Number of Rebar:	24
Rebar Size:	11
Tie Size	6
Rebar tensile strength:	60 ksi
Concrete Strength:	3000 psi
Ultimate Concrete Strain	0.003 in/in
Clear Cover to Ties:	3 in

Soil Profile: 123



Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	4	0	4	105	0				0	
2	2	4	6	105		29	0.62	0.62	0	
3	2.3	6	8.3	135		40	2.58	2.58	0	
4	5.4	8.3	13.7	150	20000		6	6	40	

Analysis Results

<b>Soil Lateral Capacity</b>	
Depth to Zero Shear:	6.64 ft
Max Moment, Mu:	2137.38 k-ft
Soil Safety Factor:	4.50
Safety Factor Req'd:	2
<b>RATING:</b>	<b>44.5%</b>

<b>Soil Axial Capacity</b>	
Skin Friction (k):	484.87 kips
End Bearing (k):	955.67 kips
Comp. Capacity (k), φCn:	1440.54 kips
Comp. (k), Cu:	26.00 kips
<b>RATING:</b>	<b>1.8%</b>

<b>Concrete/Steel Check</b>	
Mu (from soil analysis)	2778.60 k-ft
φMn	6651.55 k-ft
<b>RATING:</b>	<b>41.8%</b>

rho provided	0.54
rho required	0.33 OK

Rebar Spacing	9.68
Spacing required	22.56 OK

Dev. Length required	6.81
Dev. Length provided	61.78 OK

**Overall Foundation Rating: 44.5%**

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

T-Mobile Existing Facility

Site ID: CTNH009B

NH009/CrownOronoque\_ET  
423 Oronoque Rd  
Milford, CT 06460

**December 14, 2015**

**EBI Project Number: 6215006343**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general public allowable limit:	<b>15.35 %</b>

December 14, 2015

T-Mobile USA  
Attn: Jason Overbey, RF Manager  
35 Griffin Road South  
Bloomfield, CT 06002

Emissions Analysis for Site: **CTNH009B – NH009/CrownOronoque\_ET**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **423 Oronoque Rd, Milford, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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



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

Additional details can be found in FCC OET 65.

## **CALCULATIONS**

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **423 Oronoque Rd, Milford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

- 1) 2 GSM / UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel
- 2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.
- 5) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

- 6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 7) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P & B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P & B2A/B4P** have a maximum gain of **15.9 dBd** at their main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antenna mounting height centerline of the proposed antennas is **83 feet** above ground level (AGL).
- 9) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

### T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	83	Height (AGL):	83	Height (AGL):	83
Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)
Channel Count	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	2.83	Antenna B1 MPE%	2.83	Antenna C1 MPE%	2.83
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	83	Height (AGL):	83	Height (AGL):	83
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	2.83	Antenna B2 MPE%	2.83	Antenna C2 MPE%	2.83
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	83	Height (AGL):	83	Height (AGL):	83
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	1.12	Antenna B3 MPE%	1.12	Antenna C3 MPE%	1.12

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	6.78 %
MetroPCS	1.28 %
Verizon Wireless	4.03 %
Sirius XM Radio	3.26 %
<b>Site Total MPE %:</b>	<b>15.35 %</b>

T-Mobile Sector 1 Total:	6.78 %
T-Mobile Sector 2 Total:	6.78 %
T-Mobile Sector 3 Total:	6.78 %
<b>Site Total:</b>	<b>15.35 %</b>

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	2	2334.27	83	28.31	2100	1000	2.38 %
T-Mobile 1900 MHz (PCS) GSM/UMTS	2	1167.14	83	14.15	1900	1000	1.42 %
T-Mobile 2100 MHz (AWS) UMTS	2	1167.14	83	14.15	2100	1000	1.42 %
T-Mobile 700 MHz LTE	1	865.21	83	5.25	700	467	1.12 %
						<b>Total:</b>	<b>6.78%</b>

## Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector 1:	6.78 %
Sector 2:	6.78 %
Sector 3 :	6.78 %
T-Mobile Per Sector Maximum:	6.78 %
Site Total:	15.35 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **15.35%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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



Scott Heffernan  
RF Engineering Director

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



DATE FILED 2-2 Nov 06

RECEIPT # [scribble]  
FEE \$ [scribble]  
(INCLUDES CZC & STATE SURCHARGE \$30.00 AS OF 7/1/04)

# City of Milford, Connecticut

## APPLICATION FOR ZONING PERMIT

**INSTRUCTIONS:** Fill out this application in ball point pen. A scaled plot plan in duplicate, based on a certified surveyor's map may be required to be submitted with this application showing the proposed or existing lot and building dimensions and the location of all buildings in relation to the street lines, side lot lines and rear lot lines.

State Law now allows the applicant to advertise the issuance of this permit before proceeding with the described work. (See staff for details)

ADDRESS OF PROPERTY 423 Cromogue Rd ZONE R-30  
MAP 74 BLOCK 925 PARCEL 3-A LOT NO. ADDRESS MAP NO. LOT SIZE

WIDTH OF STREET RIGHT OF WAY LESS THAN 50 FT.? YES  NO  CORNER LOT? YES  NO   
IS ANY PORTION OF THE LOT BELOW REGULATORY FLOOD ELEVATION? YES  ZONE  NO   
CAM YES  NO

CITY WATER  PRIVATE WELL\*  SEWER\*\*  SEPTIC\*\*\*  ENGINEERING OFF STREET PERMIT #   
OWNER David Guensley PHONE [scribble]  
ADDRESS OF OWNER 423 Cromogue Rd CITY Milford STATE CT ZIP CODE

PRESENT USE OF PROPERTY \_\_\_\_\_  
PROPOSED CONSTRUCTION NEW  ADDITION  ALTERATION  REPAIR   
SIZE/USE OF PROPOSED CONSTRUCTION CO/locate 3 pairs of cell towers on pines of 8' + tallest structure on pines is at 95' +  
approved by zoning council

NO. OF STORIES \_\_\_\_\_ HEIGHT \_\_\_\_\_ LOT COVERAGE \_\_\_\_\_ % REQ. PARKING SPACES  PROVIDED \_\_\_\_\_  
WETLANDS APPROVAL REQUIRED YES  NO  DATE OF HISTORIC DIST. CERT. OF APPROP. \_\_\_\_\_  
APPROVAL DATES: CASPR \_\_\_\_\_ SITE PLAN REV. \_\_\_\_\_ SP. PERMIT \_\_\_\_\_ SP. EXC. \_\_\_\_\_  
ZBA \_\_\_\_\_ CAM EXEMPTION ISSUED \_\_\_\_\_ SUBDIV. NAME \_\_\_\_\_

**CERTIFICATION:** (WARNING) I hereby certify that I am making this application on behalf of and with full authority of the owner of the property and that I am aware of the Zoning Regulations pertinent in this case and that the statements made herein are true and correct. APPROVAL SHALL BE VALID FOR PLANS AS SUBMITTED.

THE OCCUPANCY AND USE OF LAND AND BUILDINGS OR STRUCTURES PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY IS PROHIBITED

APPROVED BY: [Signature] ZONING OFFICIAL  
APPLICANT: NAME: David Guensley  
SIGNATURE: [Signature]  
ADDRESS: 30 Cold Spring Rd  
CITY: Rocky Hill STATE: CT ZIP: 06067  
TELEPHONE NO.: (860) 766-3788

DATE ISSUED 2-2 Nov 06

\*Permit required from State Health Dept. for apartments, subdivisions, trailer parks, shopping centers and public buildings.  
\*\*Permits for sewer connections are granted by Sewer Commission  
\*\*\*Septic system approvals are granted by Health Department

700 Cromogue Road



DATE FILED 11/10/08  
 RECEIPT # 8912  
 FEE \$ 42  
 (INCLUDES CZC & STATE SURCHARGE  
 \$30.00 AS OF 7/1/04)

## City of Milford, Connecticut APPLICATION FOR ZONING PERMIT

**INSTRUCTIONS:** Fill out this application in ball point pen. A scaled plot plan in duplicate, based on a certified surveyor's map may be required to be submitted with this application showing the proposed or existing lot and building dimensions and the location of all buildings in relation to the street lines, side lot lines and rear lot lines.

State Law now allows the applicant to advertise the issuance of this permit before proceeding with the described work. (See staff for details)

ADDRESS OF PROPERTY 423 Oronogue Road ZONE R-30  
 MAP 74 BLOCK 925 PARCEL 3-A LOT NO. ADDRESS MAP NO. LOT SIZE 1100 SF

WIDTH OF STREET RIGHT OF WAY LESS THAN 50 FT.? YES  NO  CORNER LOT? YES  NO   
 IS ANY PORTION OF THE LOT BELOW REGULATORY FLOOD ELEVATION? YES  ZONE  NO

CAM YES  NO   
 CITY WATER N/A PRIVATE WELL\* SEWER\*\* SEPTIC\*\*\* ENGINEERING OFF STREET PERMIT # N/A

X OWNER Crown Castle International PHONE 201-236-9059

X ADDRESS OF OWNER 500 W. Cummings St Pk, Woburn MA 01801  
 STREET CITY STATE ZIP CODE

PRESENT USE OF PROPERTY Cell Tower  
 PROPOSED CONSTRUCTION NEW  ADDITION  ALTERATION  REPAIR

SIZE/USE OF PROPOSED CONSTRUCTION Adding 3 antennas to existing cell tower  
POCKET COMMUNICATIONS

NO. OF STORIES  HEIGHT  LOT COVERAGE  % REQ. PARKING SPACES  PROVIDED

WETLANDS APPROVAL REQUIRED YES  NO  DATE OF HISTORIC DIST. CERT. OF APPROX. N/A

APPROVAL DATES: CASPR  SITE PLAN REV.  SP. PERMIT  SP. EXC.   
 ZBA  CAM EXEMPTION ISSUED  SUBDIV. NAME

**CERTIFICATION:** (WARNING) I hereby certify that I am making this application on behalf of and with full authority of the owner of the property and that I am aware of the Zoning Regulations pertinent in this case and that the statements made herein are true and correct. APPROVAL SHALL BE VALID FOR PLANS AS SUBMITTED.

THE OCCUPANCY AND USE OF LAND AND BUILDINGS OR STRUCTURES  
 PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY IS PROHIBITED

APPROVED BY: [Signature]  
 ZONING OFFICIAL  
 DATE ISSUED 10/17/08  
 APPLICANT: NAME: Ryan Bugdofe  
 SIGNATURE [Signature]  
 ADDRESS 50 Eastman St  
 CITY South Easton STATE MA ZIP 02375  
 TELEPHONE NO. (814) 388-9479

\*Permit required from State Health Dept. for apartments, subdivisions, trailer parks, shopping centers and public buildings.  
 \*\*Permits for sewer connections are granted by Sewer Commission  
 \*\*\*Septic system approvals are granted by Health Department