



David Ford, Site Acquisition  
c/o New Cingular Wireless, PCS LLC (AT&T)  
Centerline Communications, LLC  
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Raynham, MA 02767  
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September 30, 2016

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

**RE: Notice of Exempt Modification // Site Number: CT1144  
482 Pigeon Hill Road, Windsor, CT 06095 (Site Name: Windsor)  
N 41.866631 // W 72.674777**

Dear Ms. Bachman:

New Cingular Wireless, PCS, LLC (AT&T) currently maintains six (6) antennas at the 169-foot level of the existing 160-foot self-support tower at 482 Pigeon Hill Road, Windsor, CT 06095. The tower is owned by Cellco Partnership d/b/a Verizon Wireless. The property is owned by Cellco Partnership c/o Verizon Wireless. AT&T now intends to add three (3) new LTE antennas for its LTE upgrade. These antennas would be installed at the 169-foot level of the tower. AT&T also intends to install six (6) remote radio units, one (1) surge arrestor, two (2) DC power lines and one (1) fiber line.

The current proposal involves an antenna add (6 existing antennas); three (3) antennas will be added.

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.C.S.A. § 16-50j-73, a copy of this letter is being sent to Donald Trinks, Mayor, Town of Windsor, as well as the tower owner, Cellco Partnership d/b/a Verizon Wireless and the ground owner, Cellco Partnership c/o Verizon Wireless.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

Attached to accommodate this filing are construction drawings dated September 27, 2016 by Centek Engineering, a structural analysis dated August 30, 2016 by Centek Engineering and an Emissions Analysis Report dated September 4, 2016 by EBI Consulting.

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modifications 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 Communications Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading as shown in the attached structural analysis by Centek Engineering, dated August 30, 2016.

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,



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David Ford, Site Acquisition  
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Raynham, MA 02767  
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[dford@centerlincommunications.com](mailto:dford@centerlincommunications.com)

Attachments

cc: Donald Trinks, Mayor, Town of Windsor - as elected official  
Cellco Partnership d/b/a Verizon Wireless - as tower owner  
Cellco Partnership c/o Verizon Wireless - as property owner



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

AT&T Existing Facility

Site ID: CT1144

Windsor  
482 Pigeon Hill Rd.  
Windsor, CT 06095

**September 4, 2016**

**EBI Project Number: 6216003862**

| Site Compliance Summary                                      |                  |
|--|------------------|
| Compliance Status:   | <b>COMPLIANT</b> |
| Site total MPE% of<br>FCC general public<br>allowable limit: | <b>4.88 %</b>    |



September 4, 2016

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

## Emissions Analysis for Site: **CT1144 – Windsor**

EBI Consulting was directed to analyze the proposed AT&T facility located at **482 Pigeon Hill Rd., Windsor, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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

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

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

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



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

Additional details can be found in FCC OET 65.

## CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at **482 Pigeon Hill Rd., Windsor, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

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



- 6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 7) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antennas used in this modeling are the **KMW AM-X-CD-14-65-00T-RET** and the **Quintel QS66512-3** for transmission in the 700 MHz, 850 MHz and 1900 MHz (PCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antenna mounting height centerlines of the proposed antennas are **169 feet** above ground level (AGL) for **Sector A**, **169 feet** above ground level (AGL) for **Sector B** and **169 feet** above ground level (AGL) for Sector C.
- 10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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



## AT&T Site Inventory and Power Data by Antenna

| Sector:            | A                         | Sector:            | B  | Sector:            | C  |
|--------------------|---------------------------|--------------------|--|--------------------|--|
| Antenna #:         | <b>1</b>                  | Antenna #:         | <b>1</b>   | Antenna #:         | <b>1</b>   |
| Make / Model:      | KMW AM-X-CD-14-65-00T-RET | Make / Model:      | KMW AM-X-CD-14-65-00T-RET                                  | Make / Model:      | KMW AM-X-CD-14-65-00T-RET                                  |
| Gain:              | 12.65 / 14.15 dBd         | Gain:              | 12.65 / 14.15 dBd  | Gain:              | 12.65 / 14.15 dBd  |
| Height (AGL):      | <b>169 feet</b>           | Height (AGL):      | <b>169 feet</b>  | Height (AGL):      | <b>169 feet</b>  |
| Frequency Bands    | 850 MHz / 1900 MHz (PCS)  | Frequency Bands    | 850 MHz / 1900 MHz (PCS) / Frequency Band / Frequency Band | Frequency Bands    | 850 MHz / 1900 MHz (PCS) / Frequency Band / Frequency Band |
| Channel Count      | 4                         | Channel Count      | 4  | Channel Count      | 4  |
| Total TX Power(W): | 120 Watts                 | Total TX Power(W): | 120 Watts  | Total TX Power(W): | 120 Watts  |
| ERP (W):           | 2,664.56                  | ERP (W):           | 2,664.56   | ERP (W):           | 2,664.56   |
| Antenna A1 MPE%    | <b>0.47 %</b>             | Antenna B1 MPE%    | <b>0.47 %</b>  | Antenna C1 MPE%    | <b>0.47 %</b>  |
| Antenna #:         | <b>2</b>                  | Antenna #:         | <b>2</b>   | Antenna #:         | <b>2</b>   |
| Make / Model:      | Quintel QS66512-3         | Make / Model:      | Quintel QS66512-3  | Make / Model:      | Quintel QS66512-3  |
| Gain:              | 12.78 dBd                 | Gain:              | 12.78 dBd  | Gain:              | 12.78 dBd  |
| Height (AGL):      | <b>169 feet</b>           | Height (AGL):      | <b>169 feet</b>  | Height (AGL):      | <b>169 feet</b>  |
| Frequency Bands    | 1900 MHz (PCS)            | Frequency Bands    | 1900 MHz (PCS)   | Frequency Bands    | 1900 MHz (PCS)   |
| Channel Count      | 2                         | Channel Count      | 2  | Channel Count      | 2  |
| Total TX Power(W): | 120 Watts                 | Total TX Power(W): | 120 Watts  | Total TX Power(W): | 120 Watts  |
| ERP (W):           | 2,276.05                  | ERP (W):           | 2,276.05   | ERP (W):           | 2,276.05   |
| Antenna A2 MPE%    | <b>0.31 %</b>             | Antenna B2 MPE%    | <b>0.31 %</b>  | Antenna C2 MPE%    | <b>0.31 %</b>  |
| Antenna #:         | <b>3</b>                  | Antenna #:         | <b>3</b>   | Antenna #:         | <b>3</b>   |
| Make / Model:      | KMW AM-X-CD-14-65-00T-RET | Make / Model:      | KMW AM-X-CD-14-65-00T-RET                                  | Make / Model:      | KMW AM-X-CD-14-65-00T-RET                                  |
| Gain:              | 12.65 / 14.15 dBd         | Gain:              | 12.65 / 14.15 dBd  | Gain:              | 12.65 / 14.15 dBd  |
| Height (AGL):      | <b>169 feet</b>           | Height (AGL):      | <b>169 feet</b>  | Height (AGL):      | <b>169 feet</b>  |
| Frequency Bands    | 850 MHz / 1900 MHz (PCS)  | Frequency Bands    | 850 MHz / 1900 MHz (PCS)                                   | Frequency Bands    | 850 MHz / 1900 MHz (PCS)                                   |
| Channel Count      | 4                         | Channel Count      | 4  | Channel Count      | 4  |
| Total TX Power(W): | 120 Watts                 | Total TX Power(W): | 120 Watts  | Total TX Power(W): | 120 Watts  |
| ERP (W):           | 2,664.56                  | ERP (W):           | 2,664.56   | ERP (W):           | 2,664.56   |
| Antenna A3 MPE%    | <b>0.47 %</b>             | Antenna B3 MPE%    | <b>0.47 %</b>  | Antenna C3 MPE%    | <b>0.47 %</b>  |

| Site Composite MPE%      |               |
|--------------------------|---------------|
| Carrier                  | MPE%          |
| AT&T – Max per sector    | <b>1.26 %</b> |
| T-Mobile                 | 0.51 %        |
| Verizon Wireless         | 2.93 %        |
| Town of Windsor          | 0.18 %        |
| <b>Site Total MPE %:</b> | <b>4.88 %</b> |

|                      |               |
|----------------------|---------------|
| AT&T Sector A Total: | 1.26 %        |
| AT&T Sector B Total: | 1.26 %        |
| AT&T Sector C Total: | 1.26 %        |
| <b>Site Total:</b>   | <b>4.88 %</b> |

| AT&T _ Max Values Per Sector | # Channels | Watts ERP (Per Channel) | Height (feet) | Total Power Density ( $\mu\text{W}/\text{cm}^2$ ) | Frequency (MHz) | Allowable MPE ( $\mu\text{W}/\text{cm}^2$ ) | Calculated % MPE |
|------------------------------|------------|-------------------------|---------------|---|-----------------|---|------------------|
| AT&T 850 MHz UMTS            | 2          | 552.23                  | 169           | 1.49  | 850 MHz         | 567   | 0.26%            |
| AT&T 1900 MHz (PCS) UMTS     | 2          | 780.05                  | 169           | 2.11  | 1900 MHz (PCS)  | 1000  | 0.21%            |
| AT&T 1900 MHz (PCS) LTE      | 2          | 1,138.02                | 169           | 3.08  | 1900 MHz (PCS)  | 1000  | 0.31%            |
| AT&T 850 MHz GSM             | 2          | 552.23                  | 169           | 1.49  | 850 MHz         | 567   | 0.26%            |
| AT&T 1900 MHz (PCS) GSM      | 2          | 780.05                  | 169           | 2.11  | 1900 MHz (PCS)  | 1000  | 0.21%            |
|                              |            |                         |               |   |                 | Total:                                      | 1.26%            |



## Summary

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

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

| AT&T Sector                         | Power Density Value (%) |
|-------------------------------------|-------------------------|
| Sector A:                           | 1.26 %                  |
| Sector B:                           | 1.26 %                  |
| Sector C:                           | 1.26 %                  |
| AT&T Maximum Total<br>(per sector): | 1.26 %                  |
|                                     |                         |
| Site Total:                         | 4.88 %                  |
|                                     |                         |
| Site Compliance Status:             | <b>COMPLIANT</b>        |

The anticipated composite MPE value for this site assuming all carriers present is **4.88 %** 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.





# WIRELESS COMMUNICATIONS FACILITY

## CT1144 - LTE 1900

### WINDSOR

#### 482 PIGEON HILL RD.

#### WINDSOR, CT 06095

### GENERAL NOTES

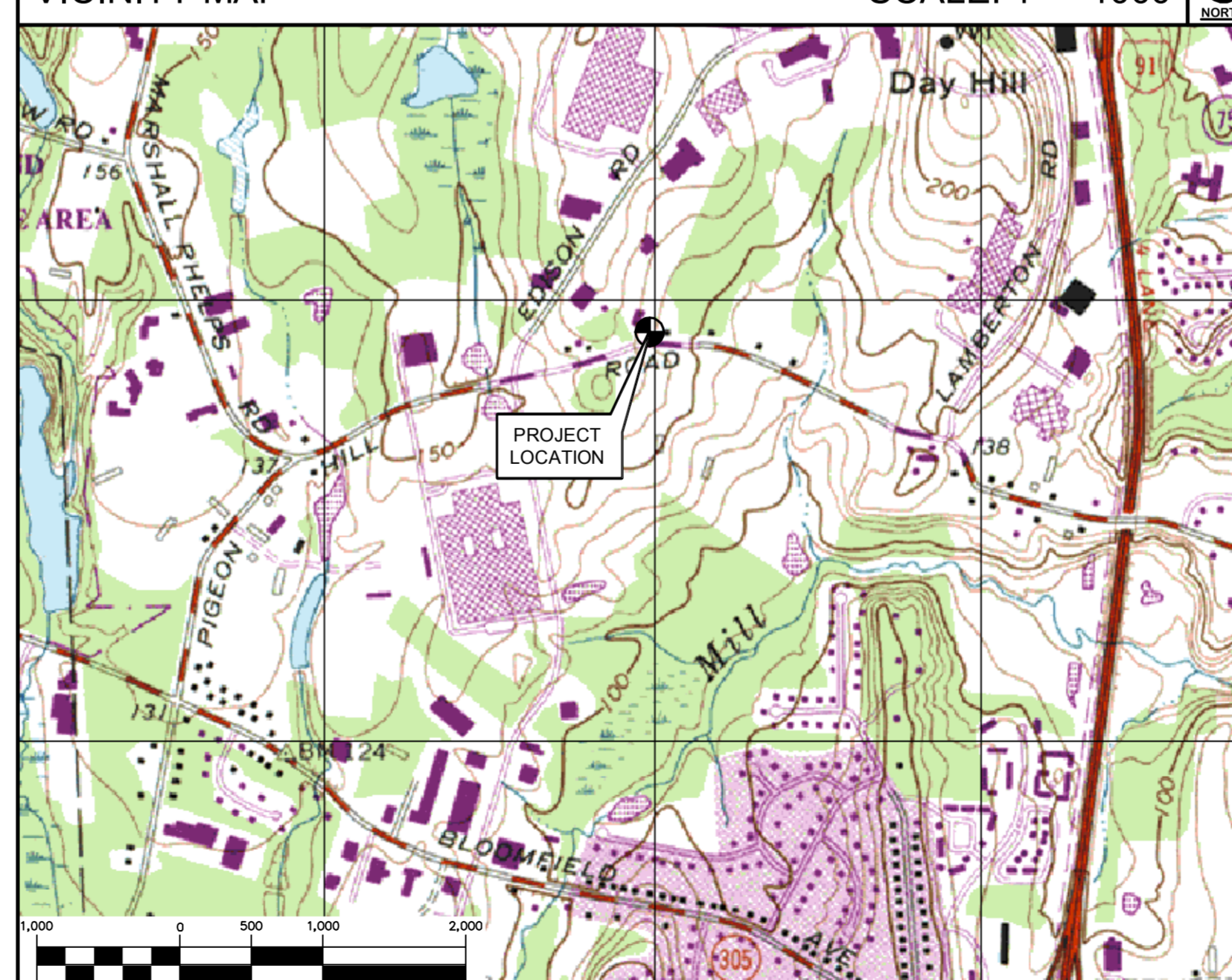
1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2005 CONNECTICUT SUPPLEMENT AND 2009 AMENDMENTS, INCLUDING THE TIA/EIA-222 REVISION "F" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES," 2005 CONNECTICUT FIRE SAFETY CODE AND 2009 AMENDMENTS, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDINGS/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

### SITE DIRECTIONS

| FROM:  | TO:   |
|--|---|
| 500 ENTERPRISE DRIVE<br>ROCKY HILL, CONNECTICUT        | 482 PIGEON HILL RD.<br>WINDSOR, CONNECTICUT |
| 1. HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD | 0.31 MI                                     |
| 2. TURN LEFT ONTO CAPITAL BLVD                         | 0.27 MI                                     |
| 3. TURN LEFT ONTO WEST ST                              | 0.16 MI                                     |
| 4. TURN LEFT TO MERGE ONTO I-91 S TOWARD HARTFORD      | 15.26 MI                                    |
| 5. TAKE EXIT 37 TOWARD WINDSOR CENTER                  | 0.24 MI                                     |
| 6. TURN LEFT ONTO CT-305/BLOOMFIELD AVE                | 0.87 MI                                     |
| 7. TURN RIGHT ONTO ADDISON RD.                         | 0.67 MI                                     |
| 8. TAKE THE 1ST RIGHT ONTO PIGEON HILL RD.             | 0.16 MI                                     |
| 9. ARRIVE AT 482 PIGEON HILL RD.                       |   |

### VICINITY MAP

SCALE: 1" = 1000'



### PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
  - A. INSTALL (3) NEW LTE ANTENNAS AT POSITION 2, (1) PER SECTOR.
  - B. INSTALL (3) NEW RRU-12+A2 BEHIND POSITION 2 ANTENNA.
  - C. INSTALL (1) AT&T SURGE ARRESTOR.
  - D. INSTALL (1) FIBER TRUNK LINE AND (2)-DC CONDUCTOR LINES ROUTED INSIDE EXISTING LATTICE TOWER

### PROJECT INFORMATION

|                      |   |
|----------------------|---|
| AT&T SITE NUMBER:    | CT1144  |
| AT&T SITE NAME:      | WINDSOR   |
| SITE ADDRESS:        | 482 PIGEON HILL RD.<br>WINDSOR, CT 06095  |
| LESSEE/APPLICANT:    | NEW CINGULAR WIRELESS PCS, LLC<br>500 ENTERPRISE DRIVE, SUITE 3A<br>ROCKY HILL, CT 06067  |
| ENGINEER:            | CEN TEK ENGINEERING, INC.<br>63-2 NORTH BRANFORD RD.<br>BRANFORD, CT. 06405   |
| PROJECT COORDINATES: | LATITUDE: 41°-51'-59.871" N<br>LONGITUDE: 72°-40'-29.196" W<br>GROUND ELEVATION: ±175' AMSL<br>GROUND ELEVATION REFERENCED FROM<br>GOOGLE EARTH. COORDINATES REFERENCED<br>FROM RFDS DOCUMENTS. |

### SHEET INDEX

| SHT. NO. | DESCRIPTION                     | REV. |
|----------|---------------------------------|------|
| T-1      | TITLE SHEET                     | 0    |
| N-1      | NOTES AND SPECIFICATIONS        | 0    |
| C-1      | PLANS, ELEVATION AND DETAILS    | 0    |
| C-2      | LTE 1900 EQUIPMENT DETAILS      | 0    |
| E-1      | LTE SCHEMATIC DIAGRAM AND NOTES | 0    |
| E-2      | LTE WIRING DIAGRAM              | 0    |
| E-3      | TYPICAL ELECTRICAL DETAILS      | 0    |

PROFESSIONAL ENGINEER SEAL



**CEN TEK engineering**  
 Center of Solutions  
 (203) 498-0380  
 (203) 498-3587 Fax  
 632 North Branford Road  
 Branford, CT 06405  
 www.CenTekEng.com

**AT&T MOBILITY**  
 WIRELESS COMMUNICATIONS FACILITY  
**WINDSOR**  
**CT1144 - LTE 1900**  
**482 PIGEON HILL RD.**  
**WINDSOR, CT 06095**

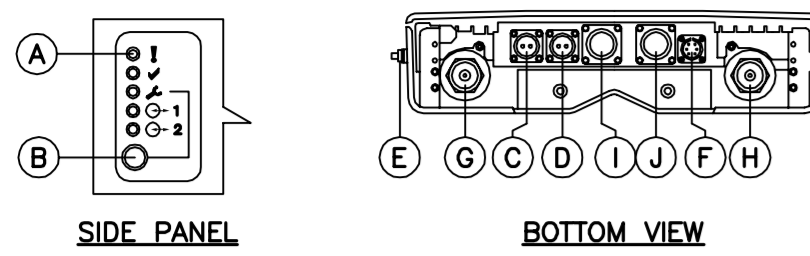
DATE: 06/13/16  
SCALE: AS NOTED  
JOB NO. 16071.20

TITLE SHEET

T-1

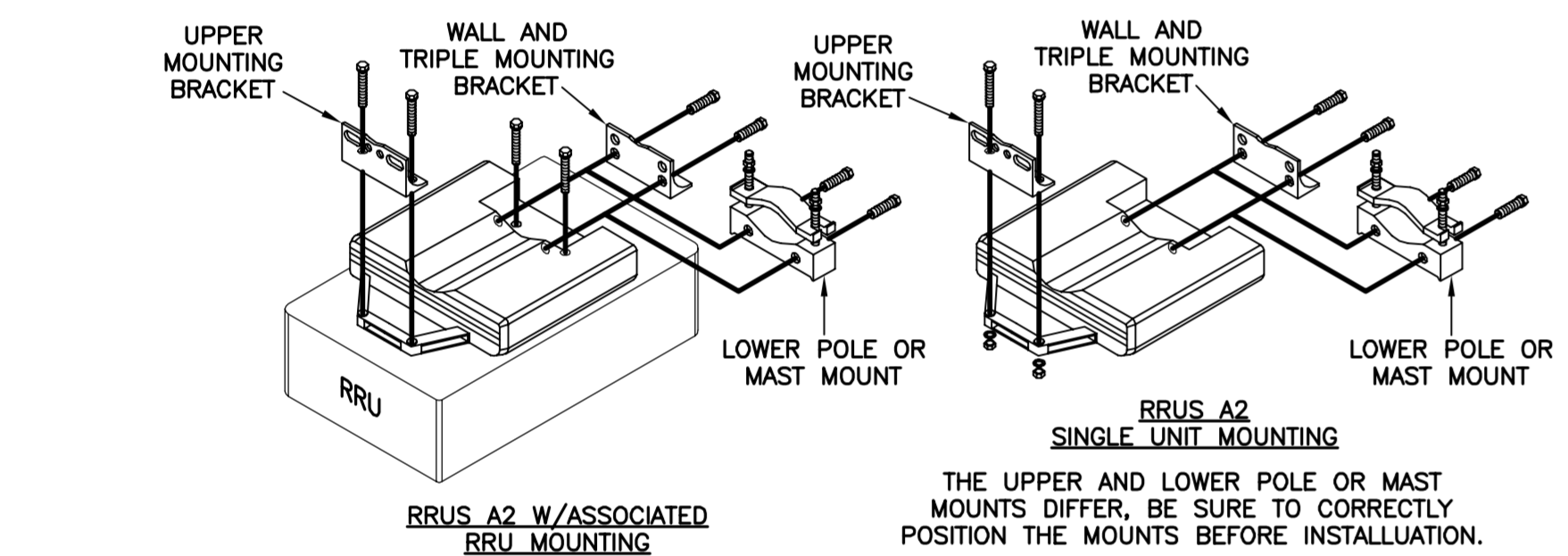
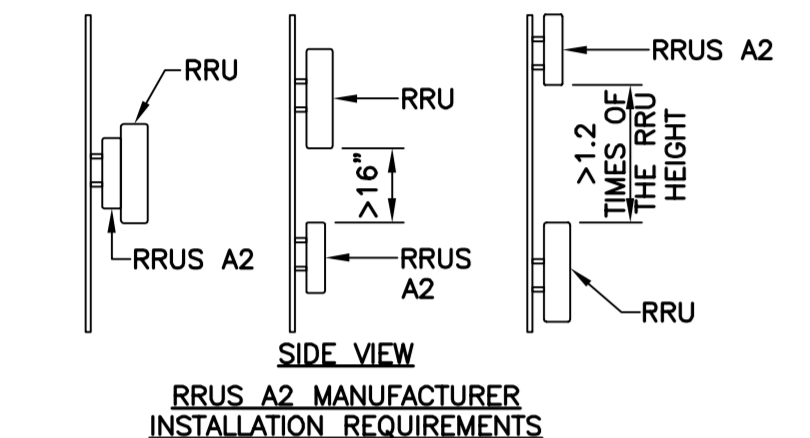
Sheet No. 1 of 7

| REV. | DATE     | BY    | CHK'D | DESCRIPTION                                       |
|------|----------|-------|-------|---|
| 1    | 09/27/16 | JTD   |       | CONSTRUCTION DOCUMENTS - ISSUED FOR CLIENT REVIEW |
| 0    | 09/16/16 | KAMUR |       | CONSTRUCTION DOCUMENTS - ISSUED FOR CLIENT REVIEW |

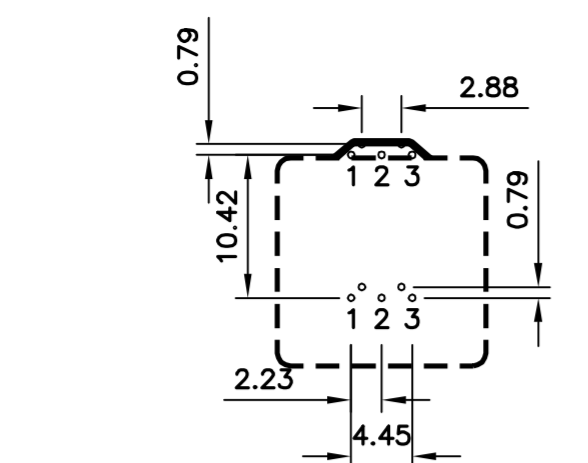


| POSITION (ID) | DESCRIPTION                 | MARKING             |
|---------------|-----------------------------|---------------------|
| A             | OPTICAL INDICATORS          | 1, 2, 3<br>O-1, O-2 |
| B             | MAINTENANCE                 | ▲                   |
| C             | -48V DC POWER SUPPLY        | POW IN              |
| D             | -48V DC POWER SUPPLY TO RRU | POW OUT             |
| E             | GROUNDING                   | ⊥                   |
| F             | RET                         | RET                 |
| G             | ANTENNA B                   | ▲ - B               |
| H             | ANTENNA A                   | ▲ - A               |
| I             | OPTICAL CABLE 1             | ○-1                 |
| J             | OPTICAL CABLE 2             | ○-2                 |

- NOTES:**
1. STACKING OF RRU'S IS NOT PERMITTED.
  2. NO PAINTING OF RRU OR THE SOLAR SHIELD IS ALLOWED.
  3. A SINGLE RRU A2 CAN BE INSTALLED AS A STAND ALONE UNIT OR MOUNTED TO THE BACK OF ITS ASSOCIATED RRU.

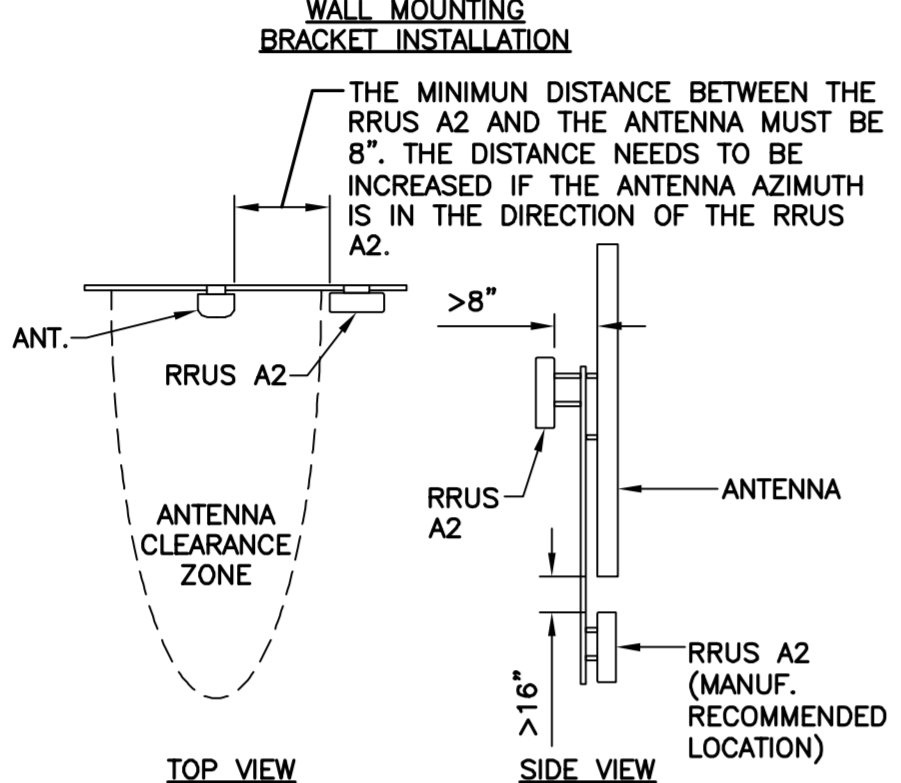


**1** ERICSSON RRU A2 DETAILS  
N-1 NOT TO SCALE



THE NUMBER OF BOLT HOLES DEPENDS ON THE WALL MATERIAL AS SPECIFIED BY THE SITE ENGINEER. A MINIMUM OF TWO BOLT HOLES ARE RECOMMENDED FOR EACH BRACKET.

- ONE OF THE FOLLOWING SOLUTIONS FOR HOLE POSITIONS MUST BE USED:
- 1, 3
  - 1, 2, 3



**NOTES AND SPECIFICATIONS**

**DESIGN BASIS:**

- GOVERNING CODE: 2003 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2005 CT STATE BUILDING CODE AND 2009 AMENDMENTS.
1. DESIGN CRITERIA:
    - WIND LOAD: PER EIA/TIA 222 F-96 (ANTENNA MOUNTS): 80 MPH (FASTEST MILE), EQUIVALENT TO 100 MPH (3 SECOND GUST)
    - BUILDING CLASSIFICATION: II (BASED ON IBC TABLE 1604.5)
    - BASIC WIND SPEED (OTHER STRUCTURE): 95 MPH (3 SECOND GUST) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-02) PER 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT SUPPLEMENT AND 2009 AMMENDMENT.
    - SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-02 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

**GENERAL NOTES:**

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON CL&P OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

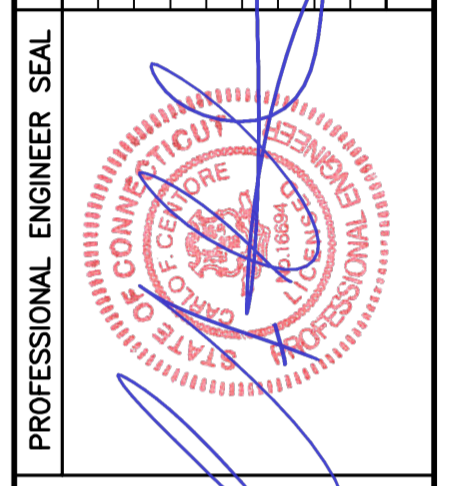
**STRUCTURAL STEEL**

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)
  - A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
  - B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
  - C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
  - D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
  - E. PIPE---ASTM A53 (FY = 35 KSI)
  - F. CONNECTION BOLTS---ASTM A325-N
  - G. U-BOLTS---ASTM A36
  - H. ANCHOR RODS---ASTM F 1554
  - I. WELDING ELECTRODE---ASTM E 70XX
2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

**PAINT NOTES**

- PAINTING SCHEDULE:**
1. **ANTENNA PANELS:**
    - A. SHERWIN WILLIAMS POLANE-B
    - B. COLOR TO BE MATCHED WITH EXISTING TOWER STRUCTURE.
  2. **COAXIAL CABLES:**
    - A. ONE COAT OF DTM BONDING PRIMER (2-5 MILS. DRY FINISH)
    - B. TWO COATS OF DTM ACRYLIC PRIMER/FINISH (2.5-5 MILS. DRY FINISH)
    - C. COLOR TO BE FIELD MATCHED WITH EXISTING STRUCTURE.
- EXAMINATION AND PREPARATION:**
1. DO NOT APPLY PAINT IN SNOW, RAIN, FOG OR MIST OR WHEN RELATIVE HUMIDITY EXCEEDS 85%. DO NOT APPLY PAINT TO DAMP OR WET SURFACES.
  2. VERIFY THAT SUBSTRATE CONDITIONS ARE READY TO RECEIVE WORK. EXAMINE SURFACE SCHEDULED TO BE FINISHED PRIOR TO COMMENCEMENT OF WORK. REPORT ANY CONDITION THAT MAY POTENTIALLY AFFECT PROPER APPLICATION.
  3. TEST SHOP APPLIED PRIMER FOR COMPATIBILITY WITH SUBSEQUENT COVER MATERIALS.
  4. PERFORM PREPARATION AND CLEANING PROCEDURE IN STRICT ACCORDANCE WITH COATING MANUFACTURER'S INSTRUCTIONS FOR EACH SUBSTRATE CONDITION.
  5. CORRECT DEFECTS AND CLEAN SURFACES WHICH AFFECT WORK OF THIS SECTION. REMOVE EXISTING COATINGS THAT EXHIBIT LOOSE SURFACE DEFECTS.
  6. IMPERVIOUS SURFACE: REMOVE MILDEW BY SCRUBBING WITH SOLUTION OF TRI-SODIUM PHOSPHATE AND BLEACH. RINSE WITH CLEAN WATER AND ALLOW SURFACE TO DRY.
  7. ALUMINUM SURFACE SCHEDULED FOR PAINT FINISH: REMOVE SURFACE CONTAMINATION BY STEAM OR HIGH-PRESSURE WATER. REMOVE OXIDATION WITH ACID ETCH AND SOLVENT WASHING. APPLY ETCHING PRIMER IMMEDIATELY FOLLOWING CLEANING.
  8. FERROUS METALS: CLEAN UNGALVANIZED FERROUS METAL SURFACES THAT HAVE NOT BEEN SHOP COATED; REMOVE OIL, GREASE, DIRT, LOOSE MILL SCALE, AND OTHER FOREIGN SUBSTANCES. USE SOLVENT OR MECHANICAL CLEANING METHODS THAT COMPLY WITH THE STEEL STRUCTURES PAINTING COUNCIL'S (SSPC) RECOMMENDATIONS. TOUCH UP BARE AREAS AND SHOP APPLIED PRIME COATS THAT HAVE BEEN DAMAGED. WIRE BRUSH, CLEAN WITH SOLVENTS RECOMMENDED BY PAINT MANUFACTURER, AND TOUCH UP WITH THE SAME PRIMER AS THE SHOP COAT.
  9. GALVANIZED SURFACES: CLEAN GALVANIZED SURFACES WITH NON-PETROLEUM-BASED SOLVENTS SO SURFACE IS FREE OF OIL AND SURFACE CONTAMINANTS. REMOVE PRETREATMENT FROM GALVANIZED SHEET METAL FABRICATED FROM COIL STOCK BY MECHANICAL METHODS.
  10. ANTENNA PANELS: REMOVE ALL OIL, DUST, GREASE, DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION. PANELS MUST BE WIPED WITH METHYL ETHYL KETONE (MEK).
  11. COAXIAL CABLES: REMOVE ALL OIL, DUST, GREASE, DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION.
- CLEANING:**
1. COLLECT WASTE MATERIAL, WHICH MAY CONSTITUTE A FIRE HAZARD, PLACE IN CLOSED METAL CONTAINERS AND REMOVE DAILY FROM SITE.
- APPLICATION:**
1. APPLY PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
  2. DO NOT APPLY FINISHES TO SURFACES THAT ARE NOT DRY.
  3. APPLY EACH COAT TO UNIFORM FINISH.
  4. APPLY EACH COAT OF PAINT SLIGHTLY DARKER THAN PRECEDING COAT UNLESS OTHERWISE APPROVED.
  5. SAND METAL LIGHTLY BETWEEN COATS TO ACHIEVE REQUIRED FINISH.
  6. VACUUM CLEAN SURFACES FREE OF LOOSE PARTICLES. USE TACK CLOTH JUST PRIOR TO APPLYING NEXT COAT.
  7. ALLOW APPLIED COAT TO DRY BEFORE NEXT COAT IS APPLIED.
- COMPLETED WORK:**
1. SAMPLES: PREPARE 24" x 24" SAMPLE AREA FOR REVIEW.
  2. MATCH APPROVED SAMPLES FOR COLOR, TEXTURE AND COVERAGE. REMOVE REFINISH OR REPAINT WORK NOT IN COMPLIANCE WITH SPECIFIED REQUIREMENTS.

| REV. | DATE     | BY   | CHKD | DESCRIPTION |
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 WINDSOR, CT 06095

DATE: 06/13/16  
 SCALE: AS NOTED  
 JOB NO. 16071.20

NOTES AND SPECIFICATIONS

AT&T ANTENNAS  
EL. ±169' AGL

TOP OF EXISTING LATTICE TOWER  
EL. ±160' AGL

AT&T FIBER TRUNK LINE AND (2)-DC  
CONDUCTOR LINES ROUTED INSIDE  
EXISTING LATTICE TOWER.

EXISTING ±160' TALL LATTICE TOWER

**TOWER STRUCTURAL NOTES:**

- TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
- ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS BY ENGINEER OF RECORD AND FINAL AT&T RF DATA SHEET.

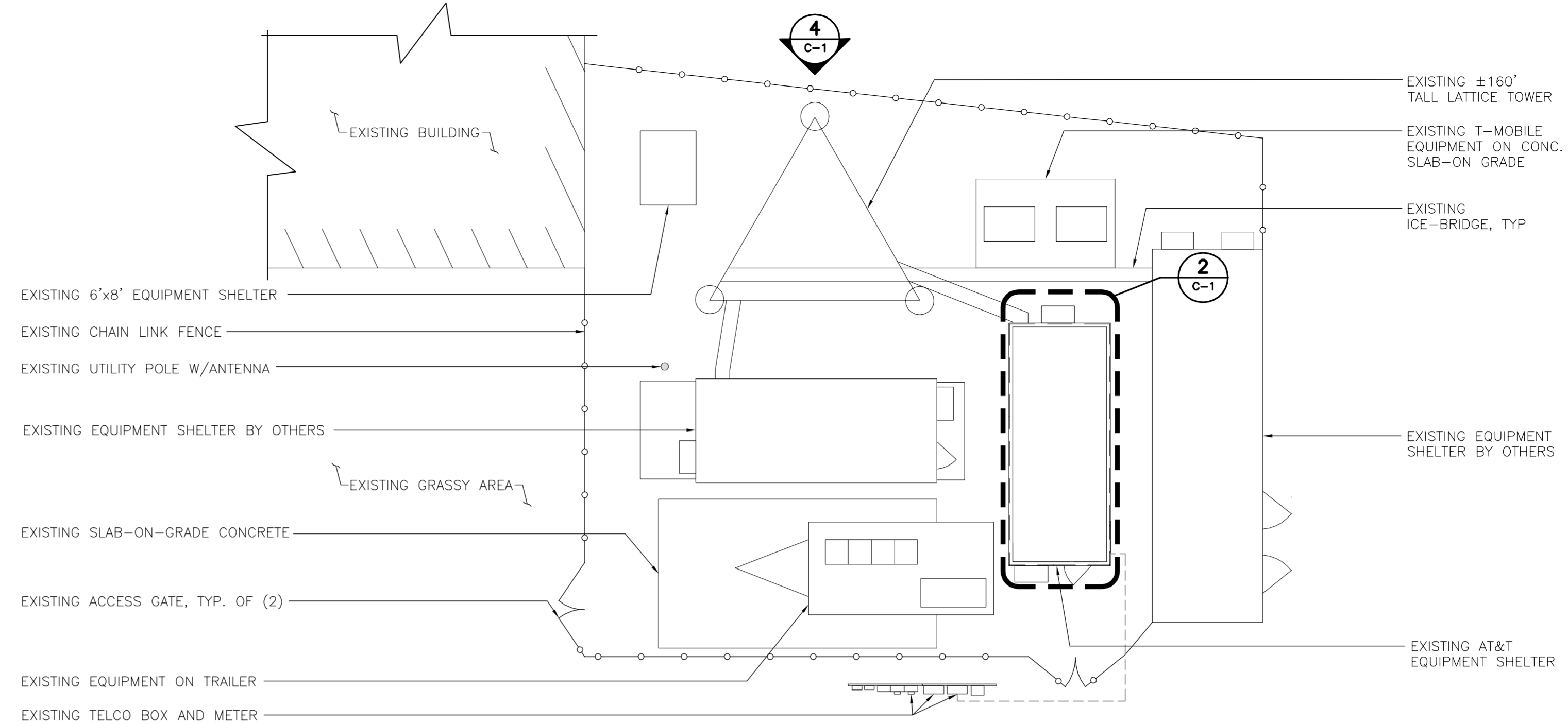
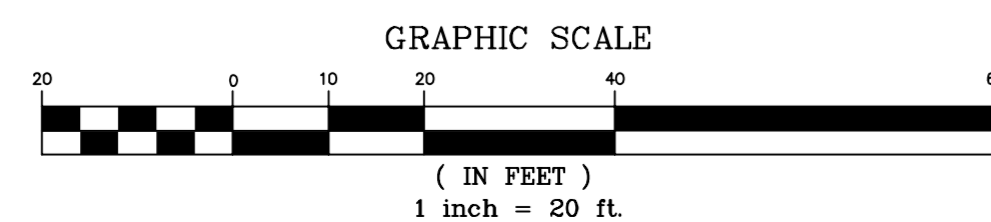
**NOTES:**

- OTHER CARRIER EQUIPMENT NOT SHOWN FOR CLARITY
- A.G.L. = ABOVE GRADE LEVEL

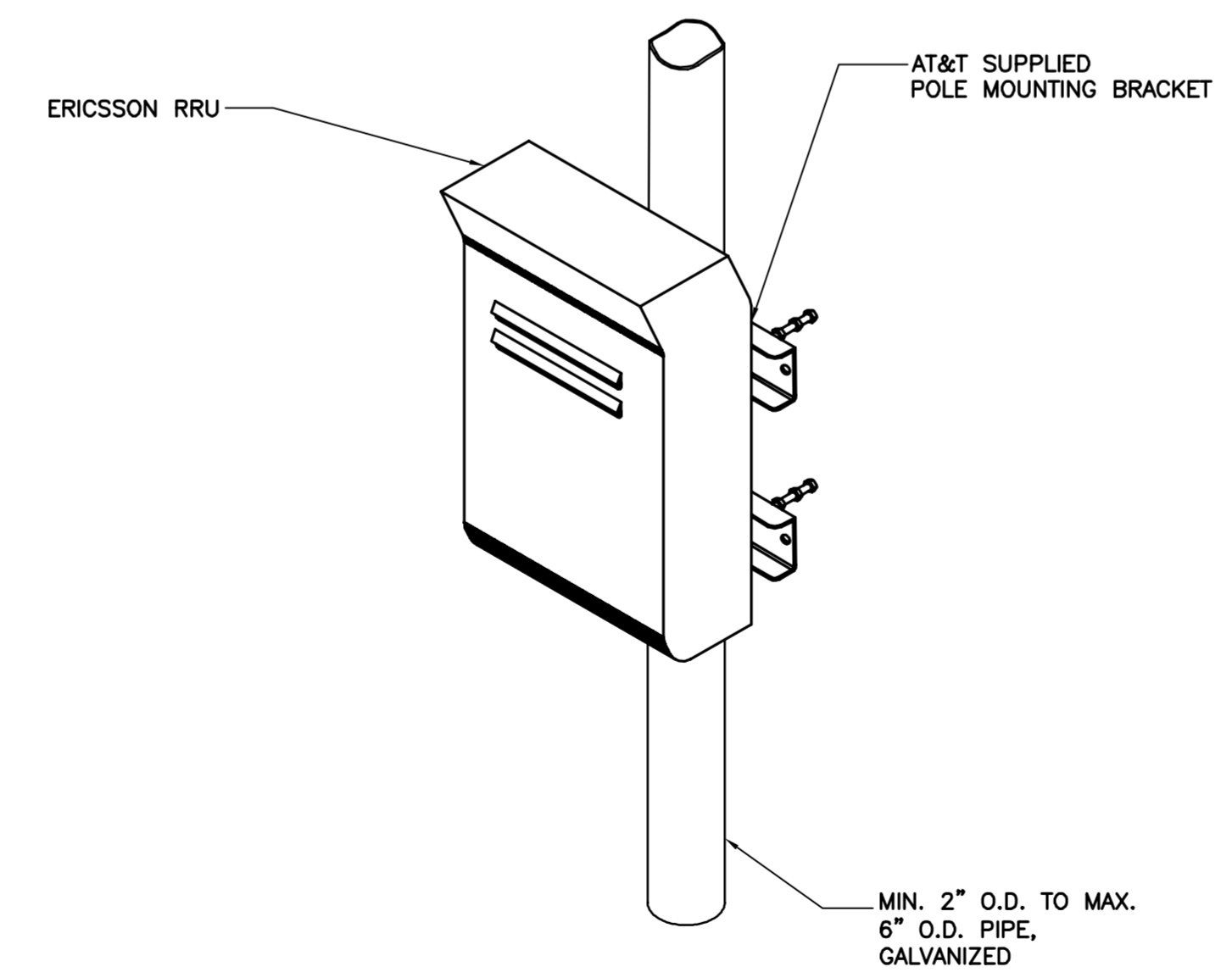
**NOTE:**  
GROUND EQUIPMENT NOT SHOWN FOR CLARITY.

GRADE

**4 TOWER ELEVATION**  
C-1 SCALE: 1" = 20'



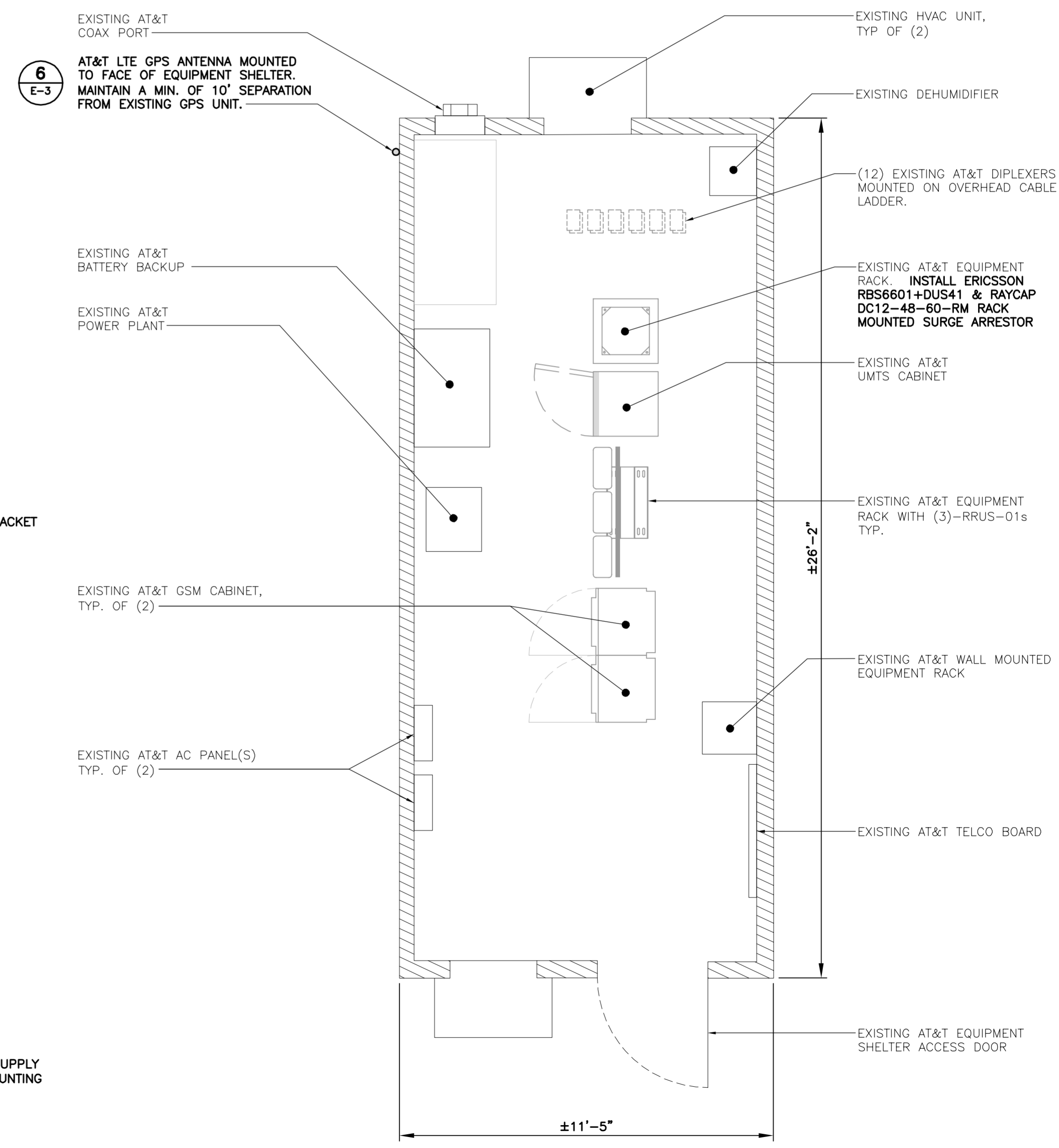
**1 SITE PLAN**  
C-1 SCALE: 3/32" = 1'-0" TRUE NORTH



**ISOMETRIC VIEW**

- NOTES:**
- AT&T SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
  - NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

**3 TYPICAL RRU'S MOUNTING DETAILS**  
C-1 SCALE: 1 1/2" = 1'-0"



**2 SHELTER PLAN**  
C-1 SCALE: 3/8" = 1'-0"

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PROFESSIONAL ENGINEER SEAL



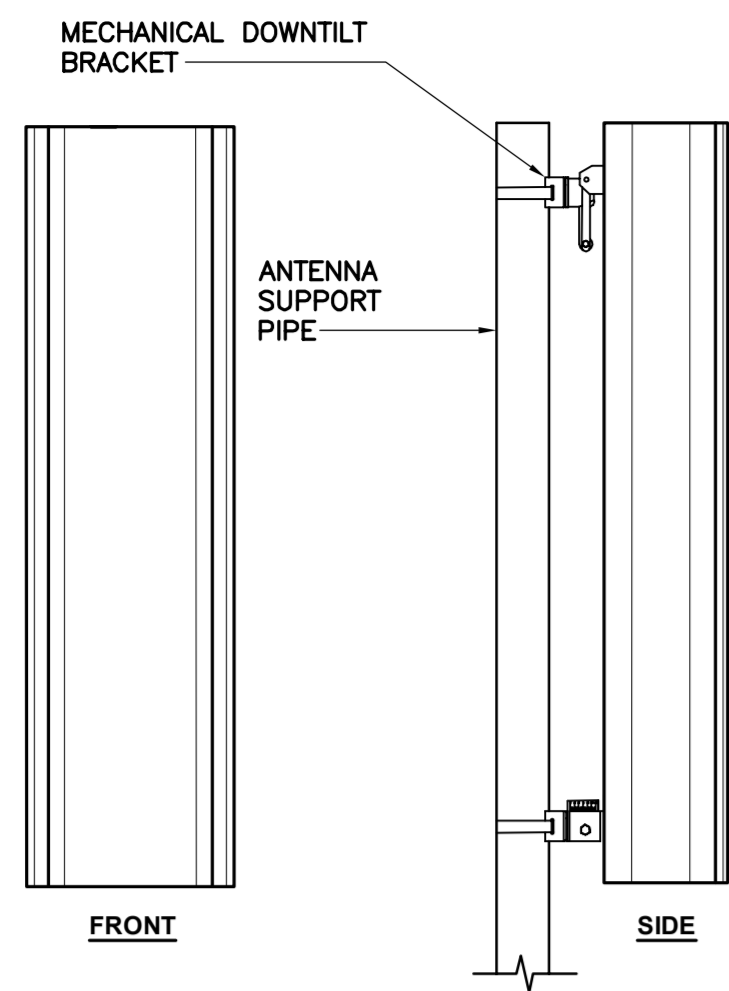
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PLANS, ELEVATION AND DETAILS

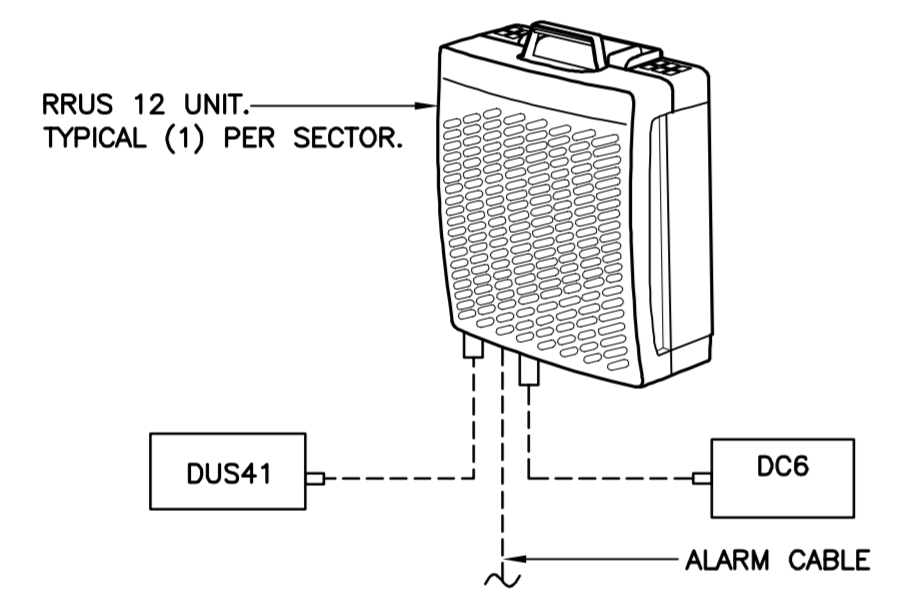
**C-1**  
Sheet No. 3 of 7



| ALPHA/BETA/GAMMA ANTENNA          |                         |           |
|-----------------------------------|-------------------------|-----------|
| EQUIPMENT                         | DIMENSIONS              | WEIGHT    |
| MAKE: QUINTEL<br>MODEL: QS66512-2 | 72.0"H x 12.0"W x 9.6"D | 112.0-LBS |

**6 PROPOSED ANTENNA DETAIL**

- SCALE: NTS
- NOTES:
- INSTALL ANTENNA TO EXISTING PIPE MAST USING MANUFACTURERS SUPPLIED BRACKETS AND MOUNTING HARDWARE
  - SET MECHANICAL DOWNTILT TO VALUE SPECIFIED IN LATEST RFDS

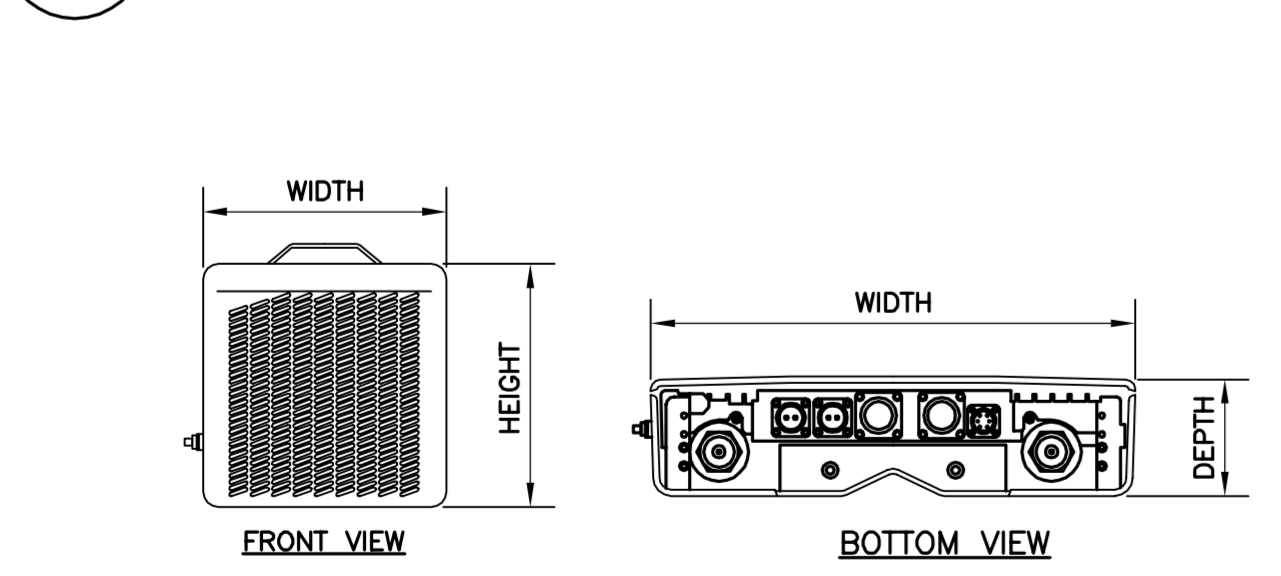


| RRU (REMOTE RADIO UNIT)          |                         |         |   |
|----------------------------------|-------------------------|---------|---|
| EQUIPMENT                        | DIMENSIONS              | WEIGHT  | CLEARANCES  |
| MAKE: ERICSSON<br>MODEL: RRUS 12 | 20.4"L x 18.5"W x 7.5"D | 50 LBS. | ABOVE: 16" MIN.<br>BELOW: 12" MIN.<br>FRONT: 36" MIN. |

NOTES:

- CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

**7 ERICSSON RRUS 12 DETAIL**

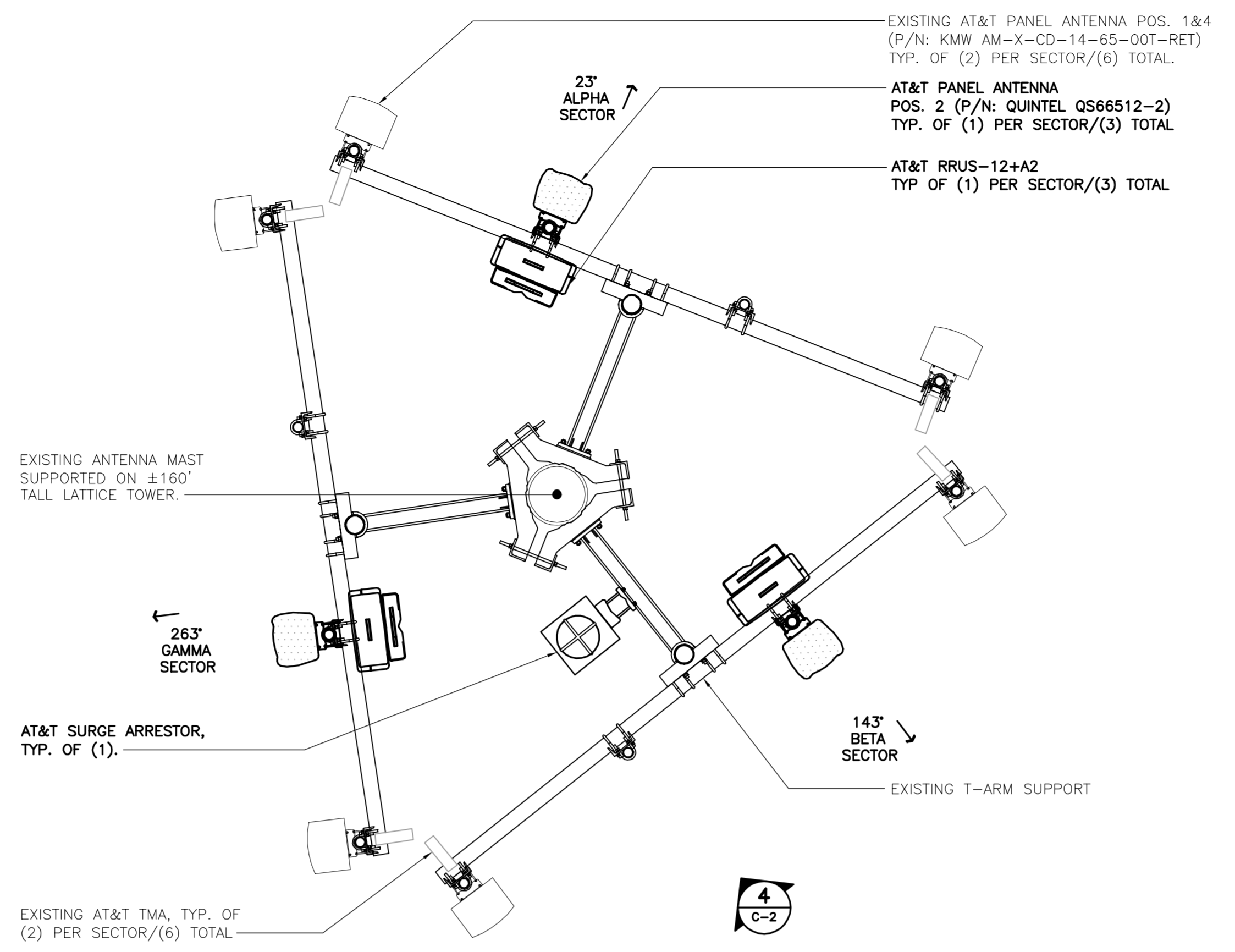


| RRU (REMOTE RADIO UNIT)          |                            |            |   |
|----------------------------------|----------------------------|------------|---|
| EQUIPMENT                        | DIMENSIONS                 | WEIGHT     | CLEARANCES  |
| MAKE: ERICSSON<br>MODEL: RRUS A2 | 16.42"L x 15.19"W x 3.35"D | 22.05 LBS. | ABOVE: 16" MIN.<br>BELOW: 12" MIN.<br>FRONT: 36" MIN. |

NOTES:

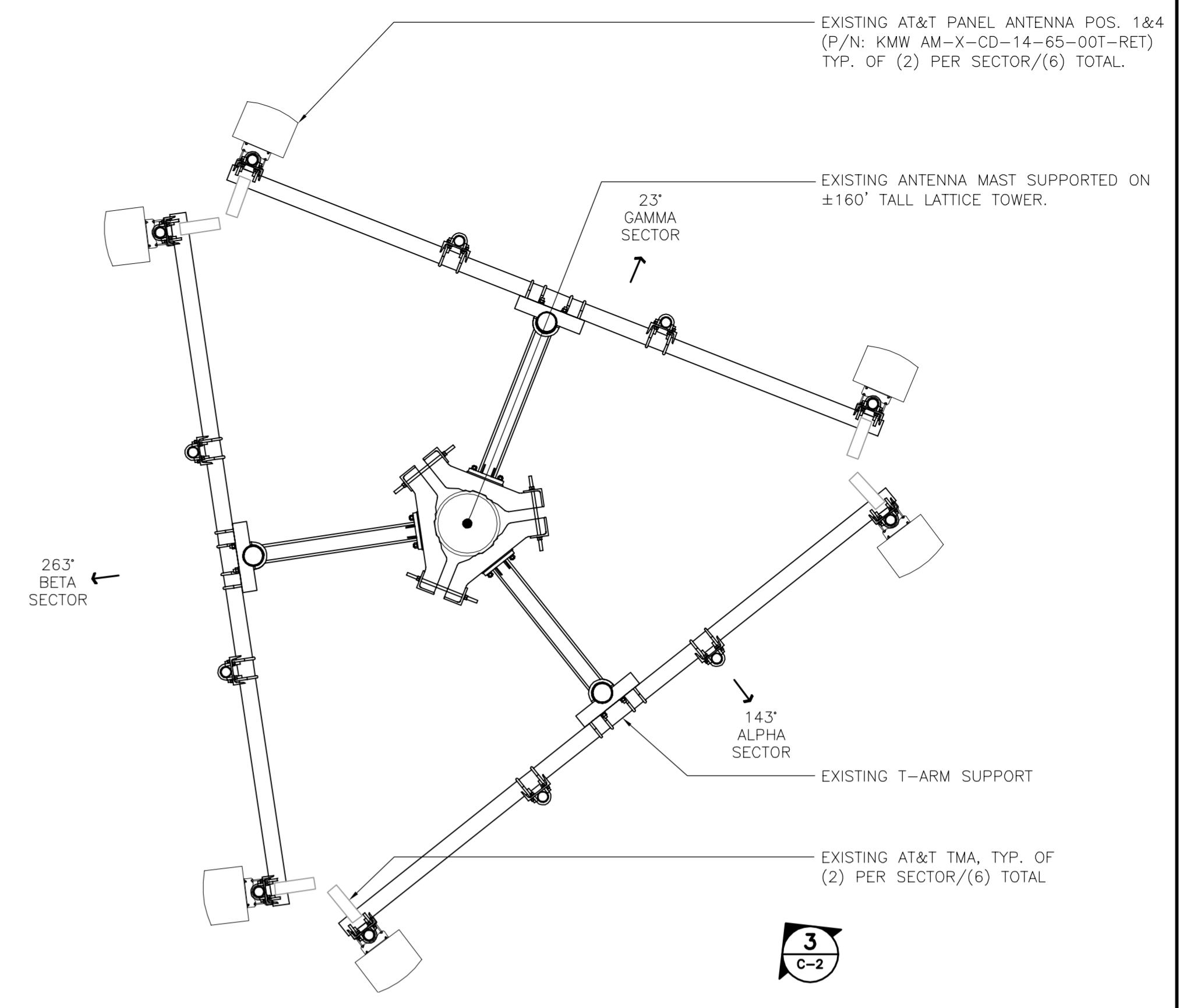
- CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

**8 ERICSSON RRUS A2 DETAIL**



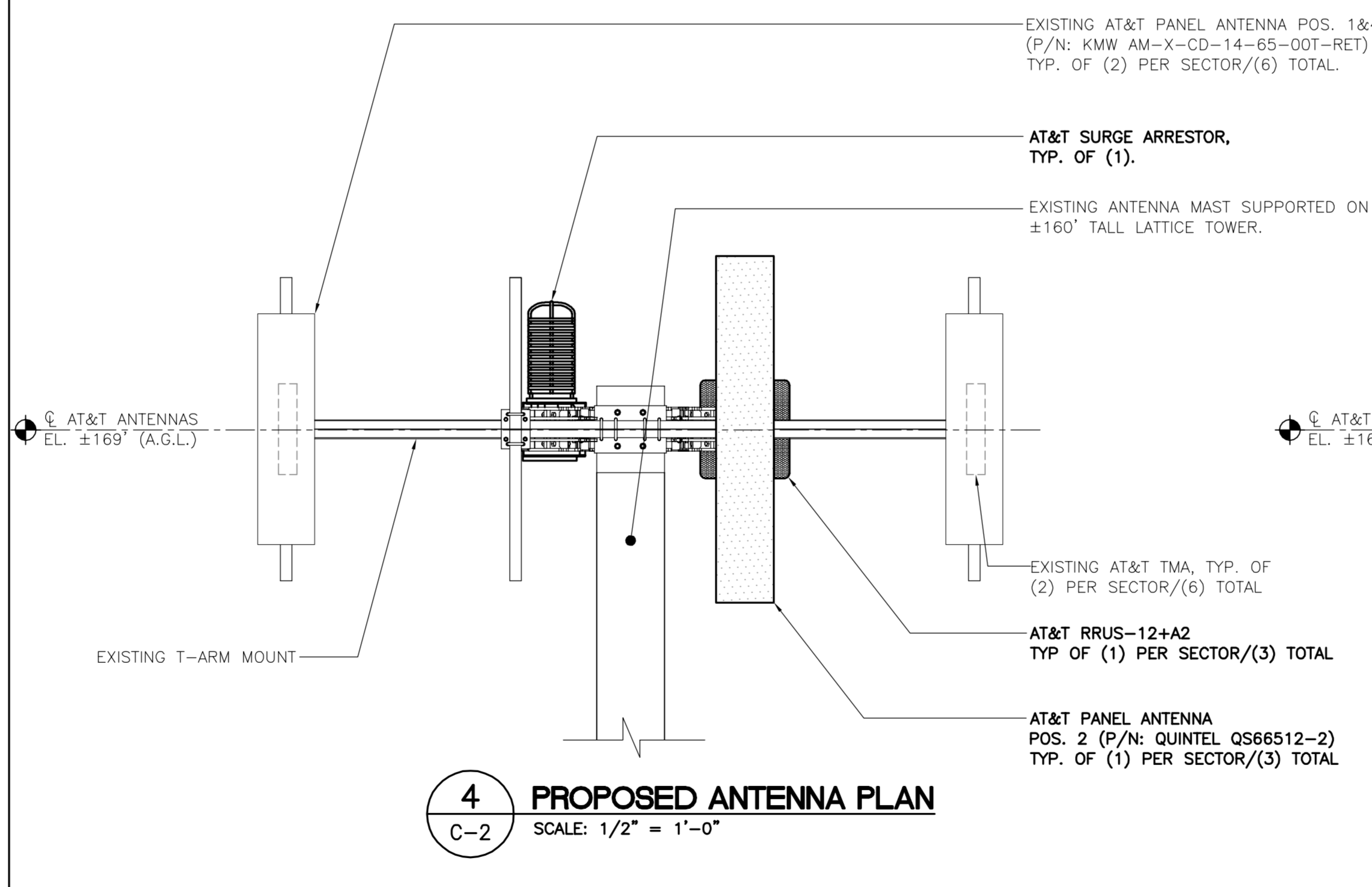
**2 PROPOSED ANTENNA PLAN**

SCALE: 1/2" = 1'-0" NORTH



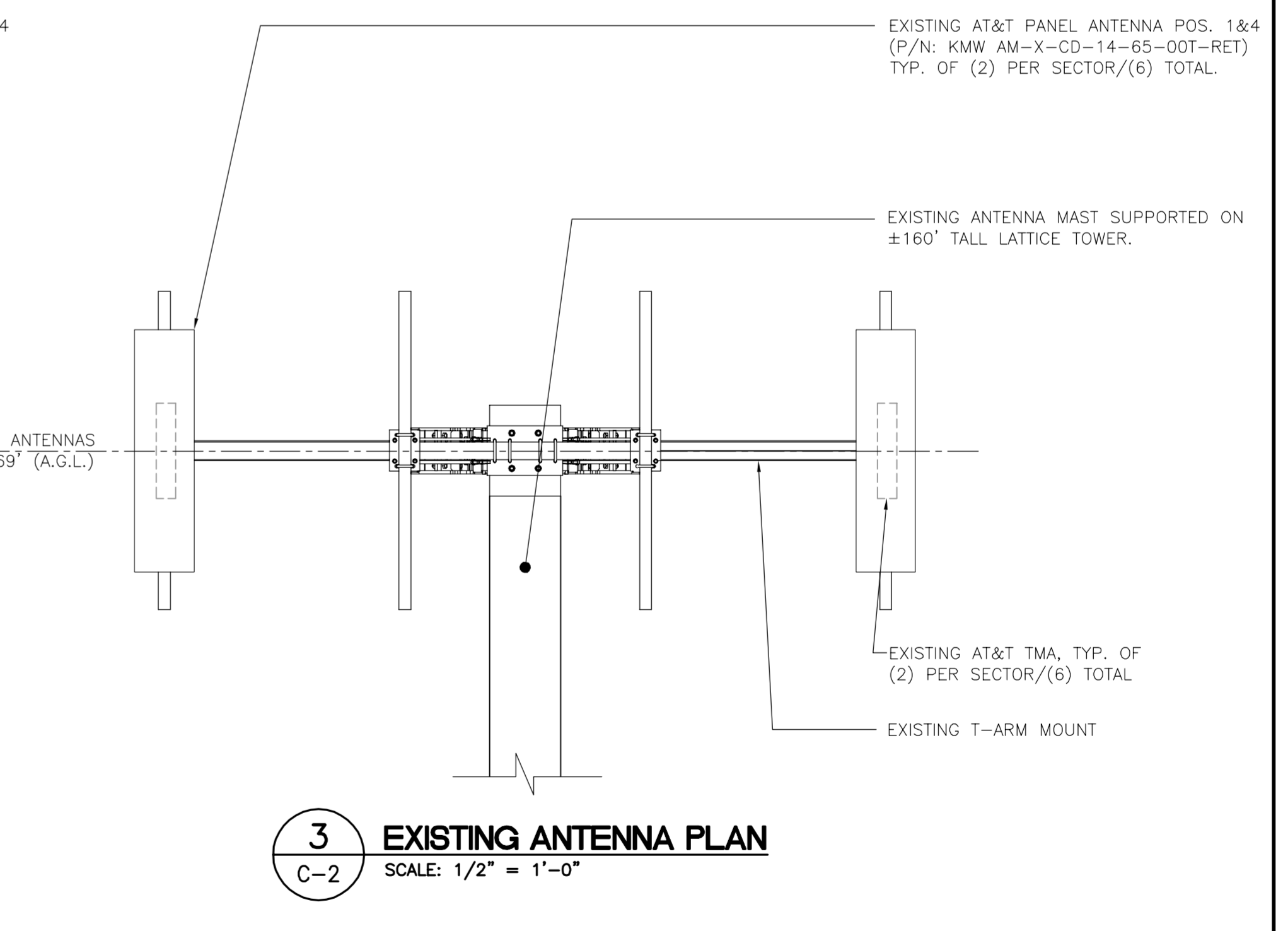
**1 EXISTING ANTENNA PLAN**

SCALE: 1/2" = 1'-0" NORTH



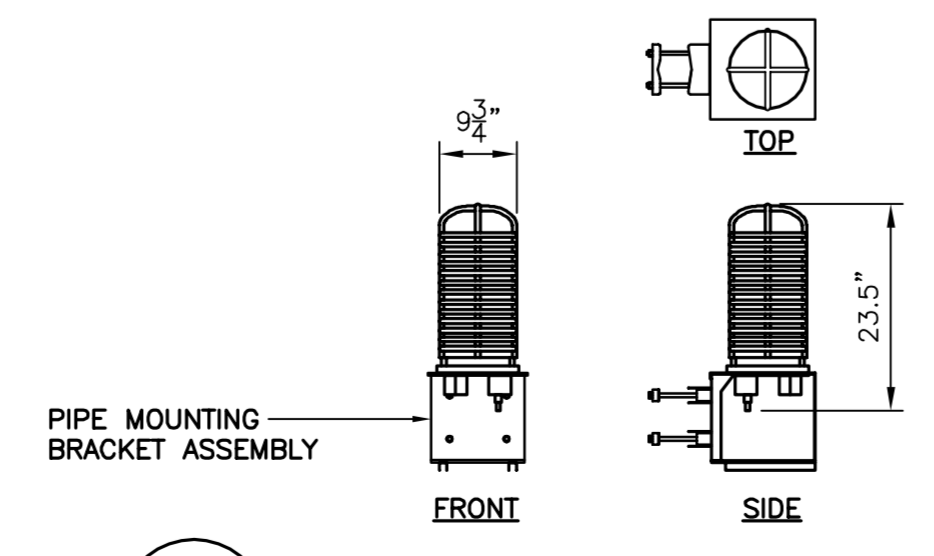
**4 PROPOSED ANTENNA PLAN**

SCALE: 1/2" = 1'-0" NORTH



**3 EXISTING ANTENNA PLAN**

SCALE: 1/2" = 1'-0" NORTH



**5 SURGE ARRESTOR DETAIL**

SCALE: NTS

| SITE TYPE | ARRESTOR MAKE/MODEL                            | QTY REQUIRED | ARRESTOR LOCATION                          | WEIGHT                  |
|-----------|--|--------------|--|-------------------------|
|           | MAKE: RAYCAP (SQUID)<br>MODEL: DC6-48-60-18-8F | (1) PER SITE | TOWER, ADJACENT TO AT&T ANTENNAS AND RRUS. | 20 LBS. (WITHOUT MOUNT) |

NOTES:

- CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
- CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.

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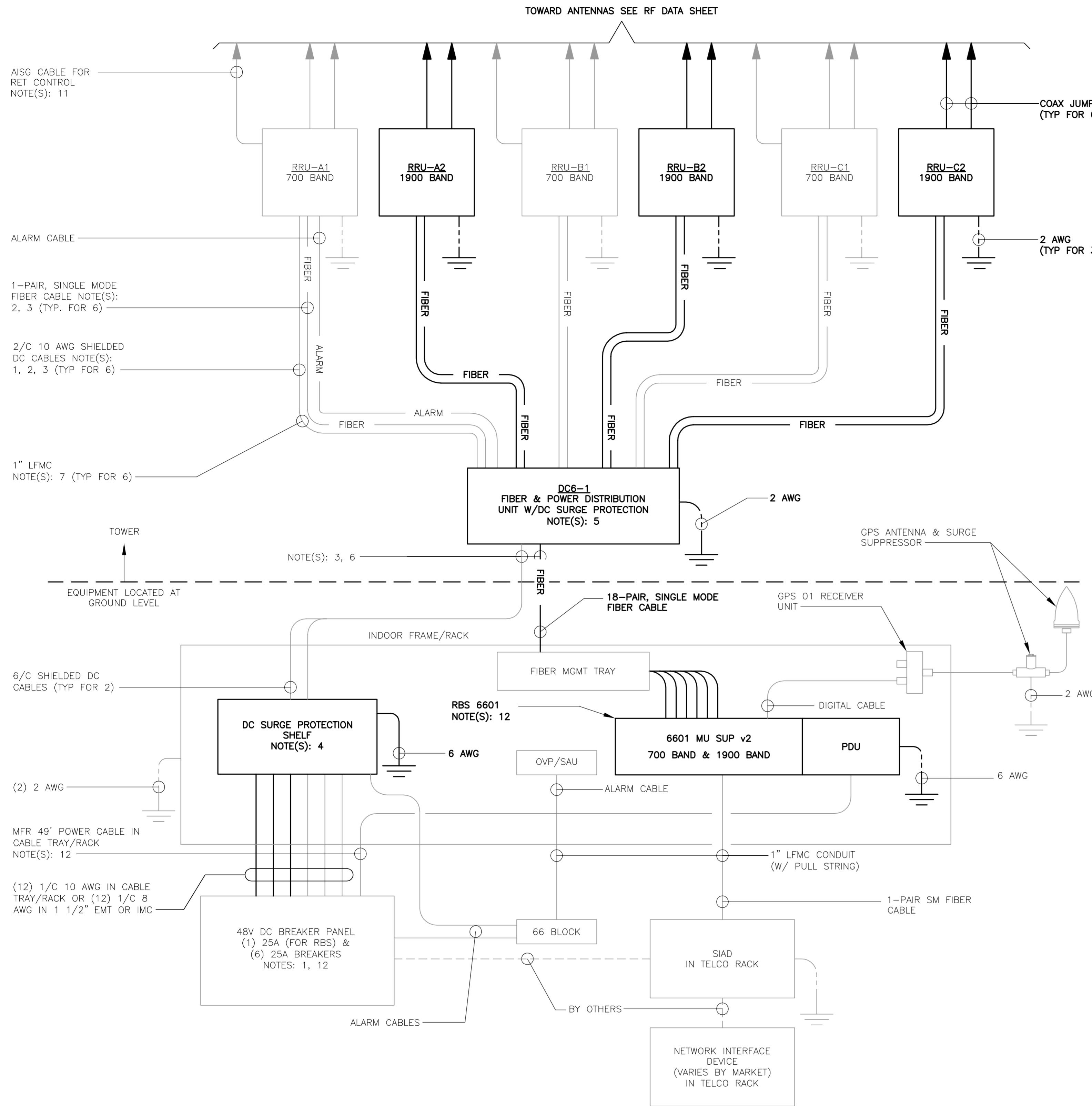
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 WINDSOR, CT 06095

DATE: 06/13/16  
 SCALE: AS NOTED  
 JOB NO. 16071.20

LTE 1900  
 EQUIPMENT  
 DETAILS

**C-2**  
 Sheet No. 4 of 7



**1** LTE SCHEMATIC DIAGRAM  
E-1 NOT TO SCALE

**LTE SCHEMATIC DIAGRAM NOTES:**

- BREAKERS TO BE TAGGED AND LOCKED OUT. A 20A (MIN.) OR 30A (MAX.) BREAKER FOR RRUs MAY BE SUBSTITUTED FOR THE RECOMMENDED 25A BREAKER. SIZE 12 CONDUCTORS MAY BE USED ONLY WITH 20A BREAKERS.
- LEAVE COILED AND PROTECTED UNTIL TERMINATED.
- DC AND FIBER CABLE SHALL BE ROUTED WITH THE EXISTING COAX CABLE.
- DC SURGE PROTECTION SHELF SHALL BE RAYCAP DCx-48-60-RM.
- FIBER & DC DISTRIBUTION BOX W/DC SURGE PROTECTION SHALL BE RAYCAP DC6-48-60-18-8F.
- SUPPORT FIBER & DC POWER CABLES WITH SNAP-IN HANGERS SPACED NO GREATER THAN 3 FEET APART ON TOWER. SUPPORT FIBER AND DC POWER CABLES INSIDE MONOPOLE WITH CABLE HOISTING GRIPS AT 250 FT MAXIMUM INTERVALS. DRESS CABLES TO PREVENT CONTACT WITH ENTRANCE AND EXIT OPENINGS.
- CONDUIT TO BE USED ON A TOWER IF THE RRU IS MORE THAN 10' FROM THE DISTRIBUTION UNITS. MAX CABLE LENGTH IS 16 FEET.
- SINGLE-CONDUCTOR DC POWER CABLES SHALL BE TELCOFLEX® OR KS24194", COPPER, UL LISTED RHH NON-HALOGEN, LOW SMOKE WITH BRAIDED COVER, TYPE TC (1/0 AND LARGER). UNLESS OTHERWISE NOTED, STRANDING SHALL BE CLASS B (TYPE III) FOR CABLES SIZES 14, 12 & 10 AWG AND CLASS I (TYPE IV) FOR SIZES 8 AWG AND LARGER. CABLES SHALL BE COLOR CODED RED FOR +24V, BLUE FOR -48V AND GRAY FOR 24V AND 48V RETURN CONDUCTORS. MULTI-CONDUCTOR DC POWER CABLES SHALL BE COPPER, CLASS B STRANDING WITH FLAME RETARDANT PVC JACKET, TYPE TC, UL LISTED FOR 90°C DRY/75°C WET INSTALLATION.
- GROUNDING WIRES SHALL BE COPPER, GREEN THHN/THWN UL LISTED FOR 90°C DRY/75°C WET INSTALLATION. MINIMUM SIZE IS 6 AWG UNLESS NOTED OTHERWISE.
- FIBER OPTIC CABLES SHALL BE INSTALLED IN FLEXIBLE CONDUIT AS SCOPED BY MARKET.
- RET CONTROL FROM THE RRU IS AN OPTIONAL METHOD OF CONNECTION. REFER TO RF DATA SHEET FOR APPLICABILITY.
- RBS 6601 VARIANT 2 REQUIRES A 25A BREAKER AND 10 AWG (MIN.) CONDUCTORS. REPLACE EXISTING 15A OR 20A BREAKERS AND 12 AWG CONDUCTORS WHEN UPGRADING AN EXISTING RBS 6601 VARIANT 1.

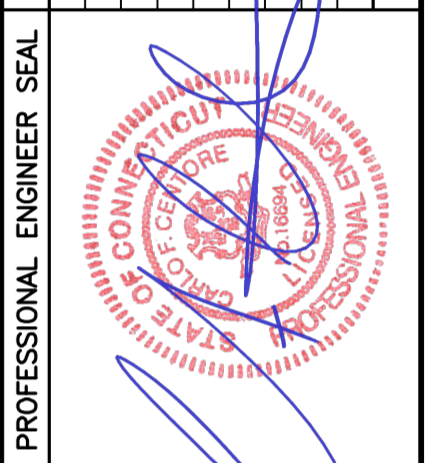
**ELECTRICAL NOTES**

- PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND ALL MANUFACTURER DOCUMENTATION FOR ALL EQUIPMENT TO BE INSTALLED.
- INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
- CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
- MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
- PRIOR TO INSTALLATION CONTRACTOR SHALL MEASURE EXISTING ELECTRICAL LOAD AND VERIFY EXISTING AVAILABLE CAPACITY FOR PROPOSED INSTALLATION. IF INADEQUATE CAPACITY IS AVAILABLE, CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRIC UTILITY COMPANY TO UPGRADE EXISTING ELECTRIC SERVICE.
- CONTRACTOR SHALL INSPECT EXISTING GROUNDING AND LIGHTNING PROTECTION SYSTEM AND ENSURE THAT IT IS IN COMPLIANCE WITH NEC, AND SITE OWNER'S SPECIFICATIONS. THE RESULTS OF THIS INSPECTION SHALL BE PRESENTED TO OWNERS REPRESENTATIVE, AND ANY DEFICIENCIES SHALL BE CORRECTED.
- ALL TRANSMISSION TOWER SITES CONTAIN AN EXTENSIVE BURIED GROUNDING SYSTEM. ALL GROUNDING WORK MUST BE COORDINATED WITH, AND APPROVED BY, THE TOWER OWNER'S SITE REPRESENTATIVE. ALL OF THE TOWER OWNER'S SPECIFICATIONS MUST BE STRICTLY FOLLOWED.
- PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
- ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION.
- MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
- THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.
- THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNER'S REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS MAY BE REQUIRED BY THE LOCAL AUTHORITY.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
- THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.
- DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.
- ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.
- GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
- EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122. (MIN. #12 AWG).
- CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16900).

**TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM**

- A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:
- TEST 1: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.
- THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:
- TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
  - CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
  - GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.
- B. TESTING SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNERS CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.
- C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.
- D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

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| 1   | 09/27/16 | JTD   | CAG         |
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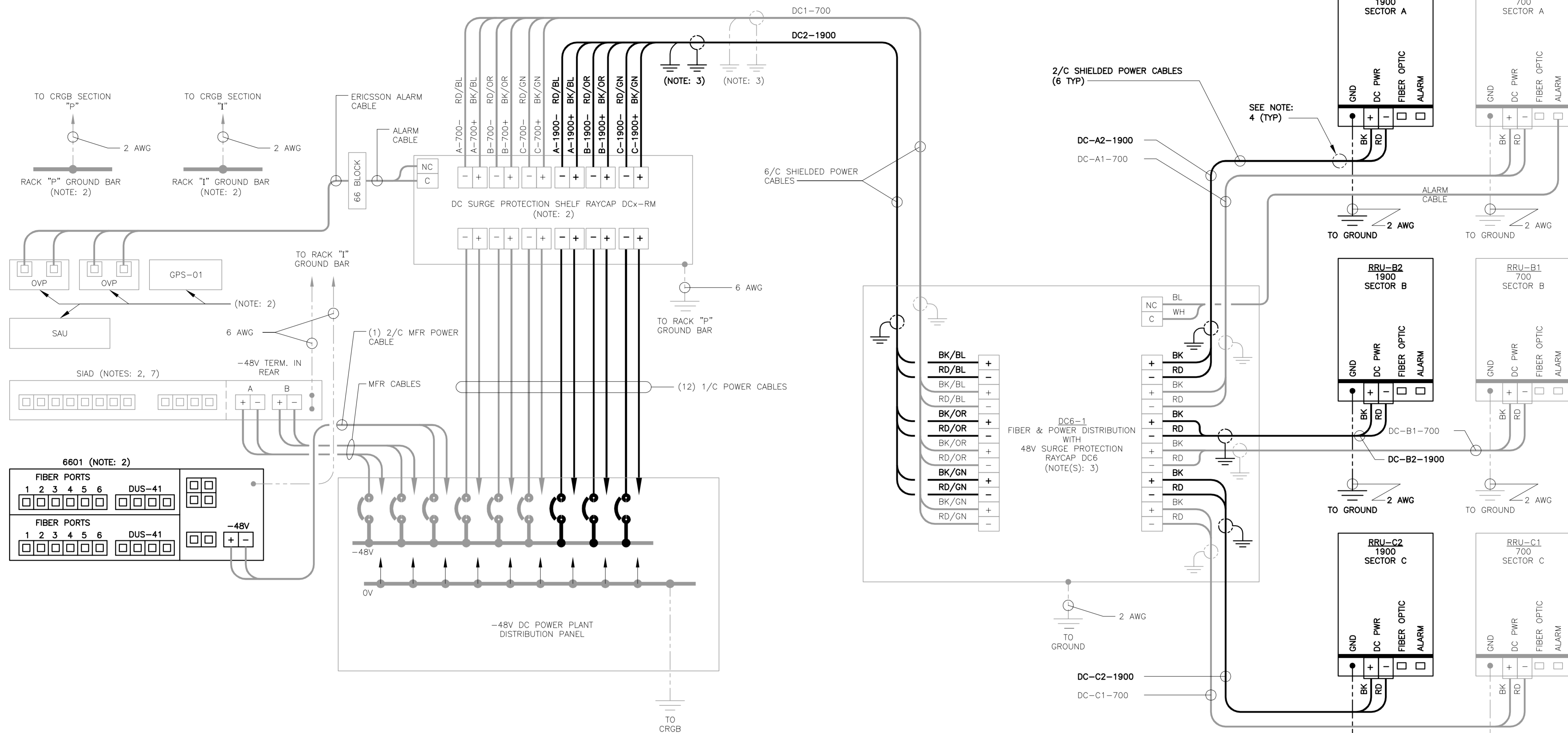


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482 PIGEON HILL RD.  
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DATE: 06/13/16  
SCALE: AS NOTED  
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LTE SCHEMATIC DIAGRAM AND NOTES

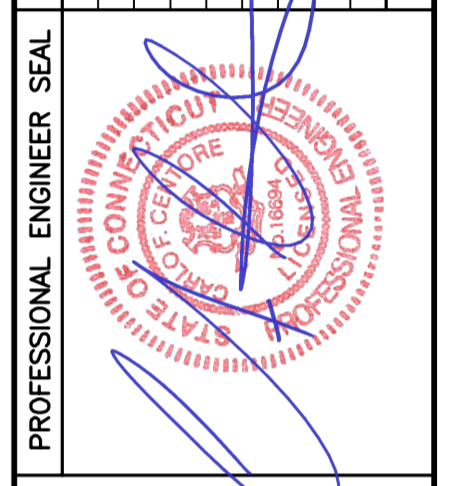


**1 LTE WIRING DIAGRAM**  
E-2 NOT TO SCALE

**LTE WIRING DIAGRAM NOTES:**

1. LABEL THE DC POWER CABLES AT BOTH ENDS OF EVERY WIRE AND IN ANY PULL BOX IF USED. LABEL SHALL BE DURABLE, SELF ADHESIVE, WRAPPED LONGITUDINALLY ALONG THE CABLE AND STATE THE SECTOR, FREQUENCY BAND AND POLARITY; I.E. "A-1900+". CABLE AND WIRE LABELS SHOWN ARE REPRESENTATIVE AND MAY BE MODIFIED AS DIRECTED BY AT&T.
2. INSTALL ON BASEBAND EQUIPMENT RACK.
3. THE BARE GROUND WIRE OF EACH MULTI-CONDUCTOR CABLE SHALL BE CONNECTED TO THE "P" GROUND BAR ON THE RACK. WHEN A SHIELDED CABLE IS USED, THE DRAIN WIRE ALSO SHALL BE CONNECTED TO THE "P" GROUND BAR.
4. CABLE GROUND WIRE AND SHIELD DRAIN WIRE TO BE LEFT UN-TERMINATED AT RRU AND DC POWER PLANT.
5. SEE LTE SCHEMATIC DIAGRAM DETAIL 1/E-1 FOR BREAKER RATING.

| REV. | DATE     | BY/CHKD | DESCRIPTION                  |
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| 0    | 09/27/16 | KAMUR   | DRAWN BY/CHKD BY/DESCRIPTION |
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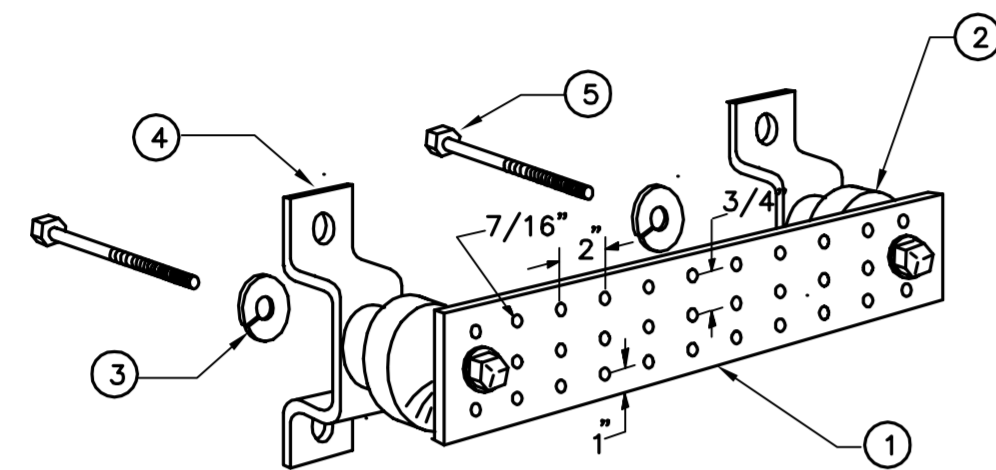


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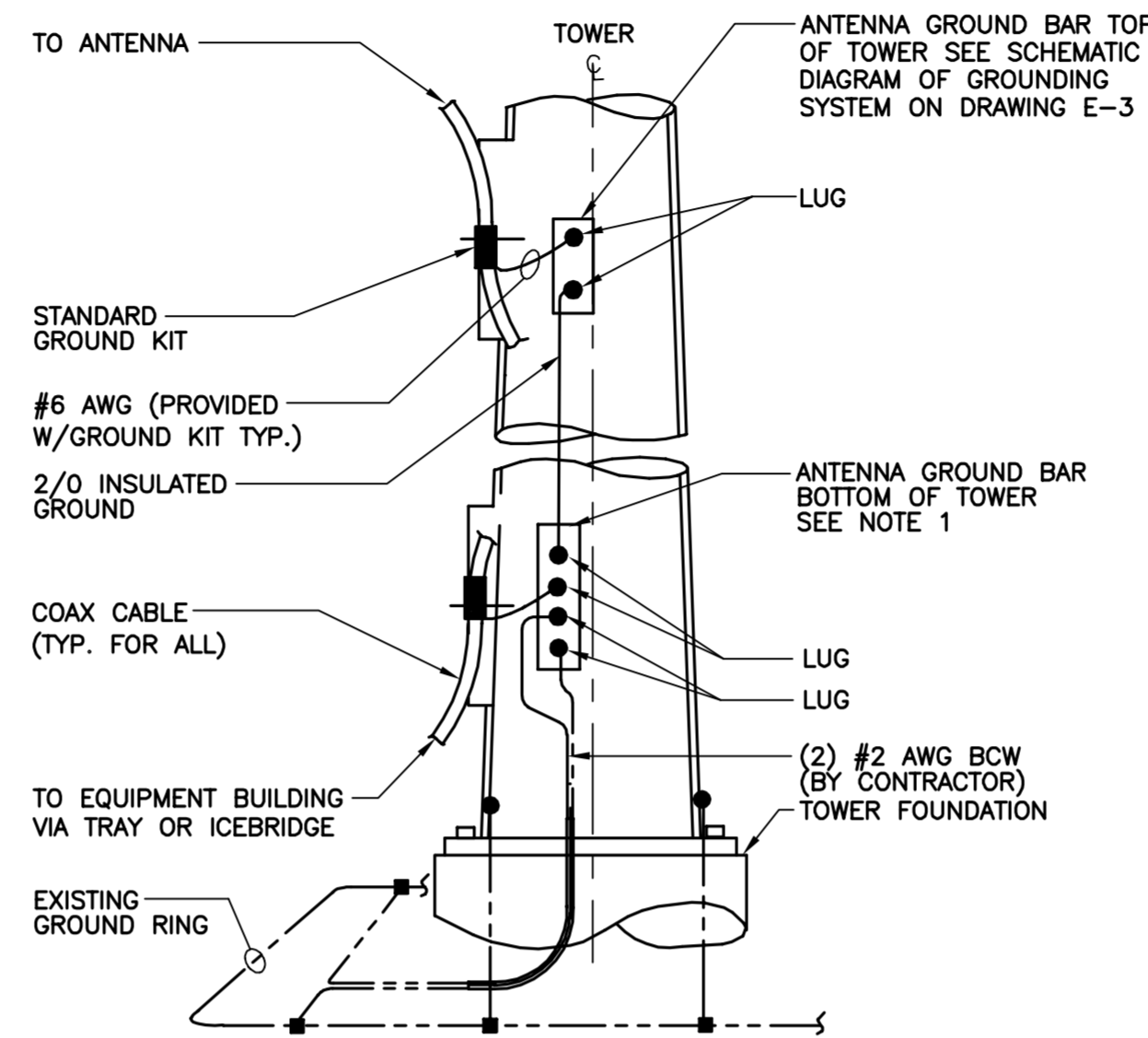
LTE WIRING DIAGRAM



**LEGEND**

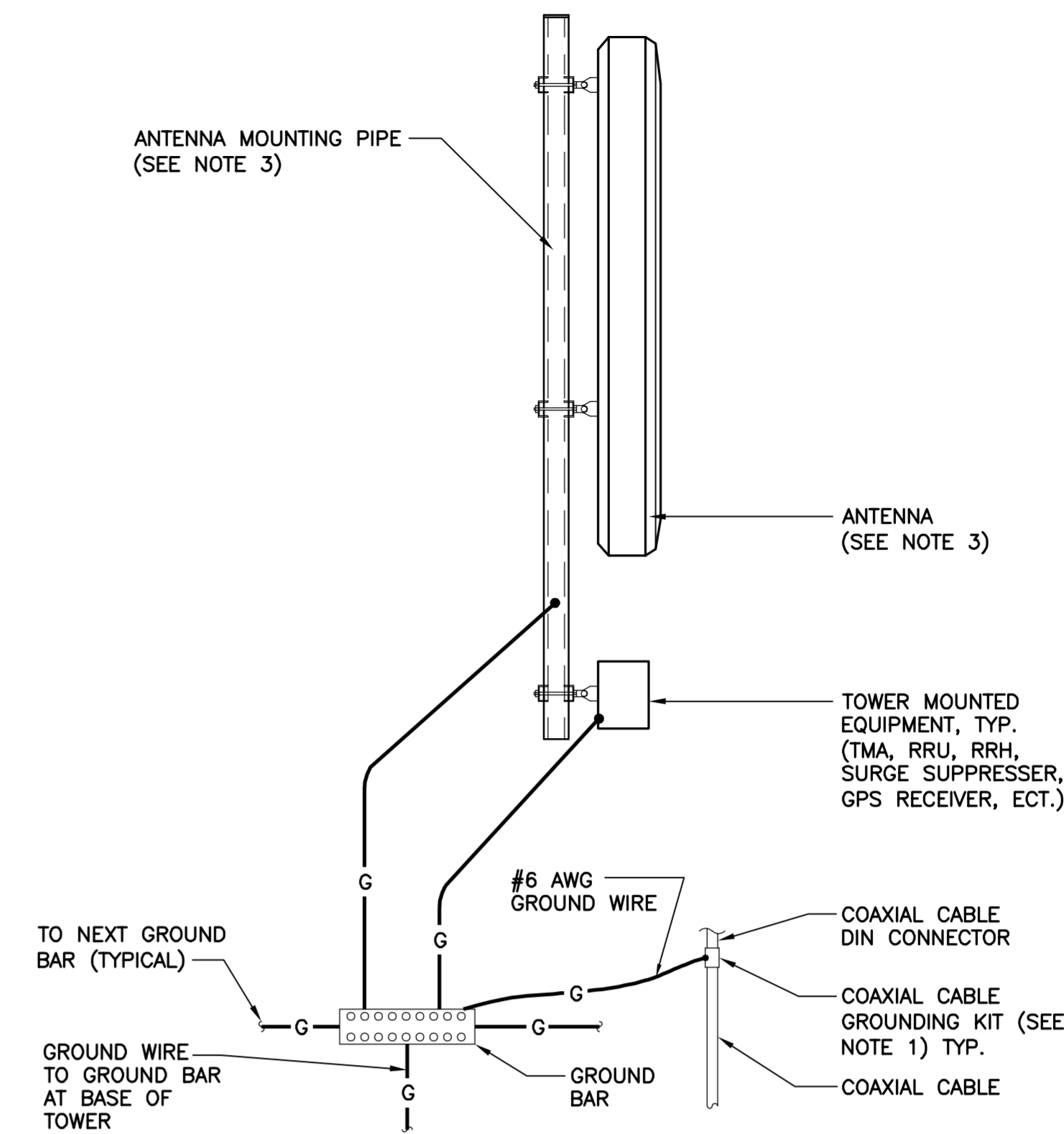
1. TINNED COPPER GROUND BAR, 1/4"x 4"x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG .
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 2. 3061-4.
3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT. NO. A-6056.
5. STAINLESS STEEL SECURITY SCREWS.

**3 GROUND BAR DETAIL**  
E-3 NOT TO SCALE



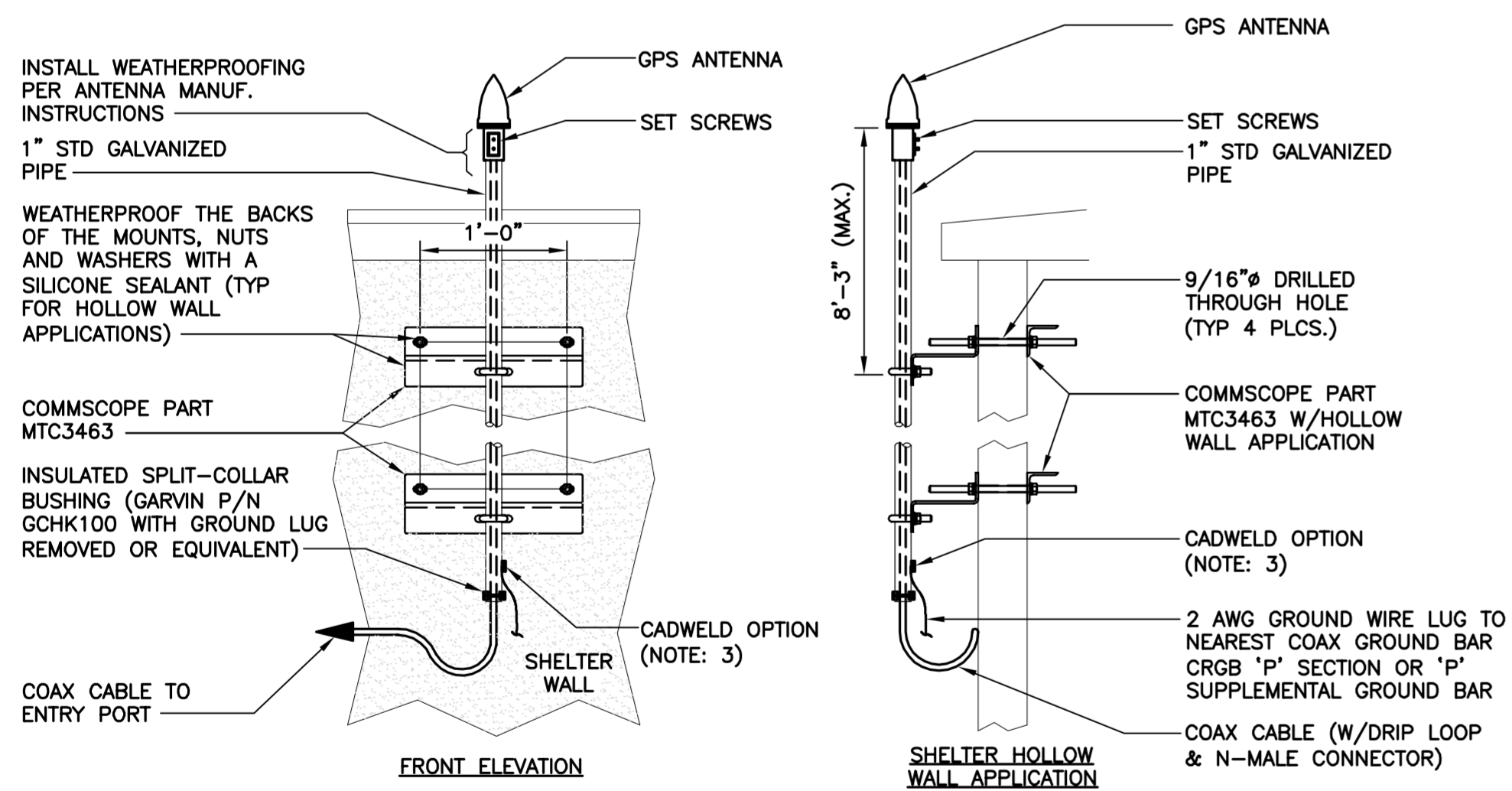
- NOTES:**
1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
  2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

**2 ANTENNA CABLE GROUNDING - TOWER**  
E-3 NOT TO SCALE



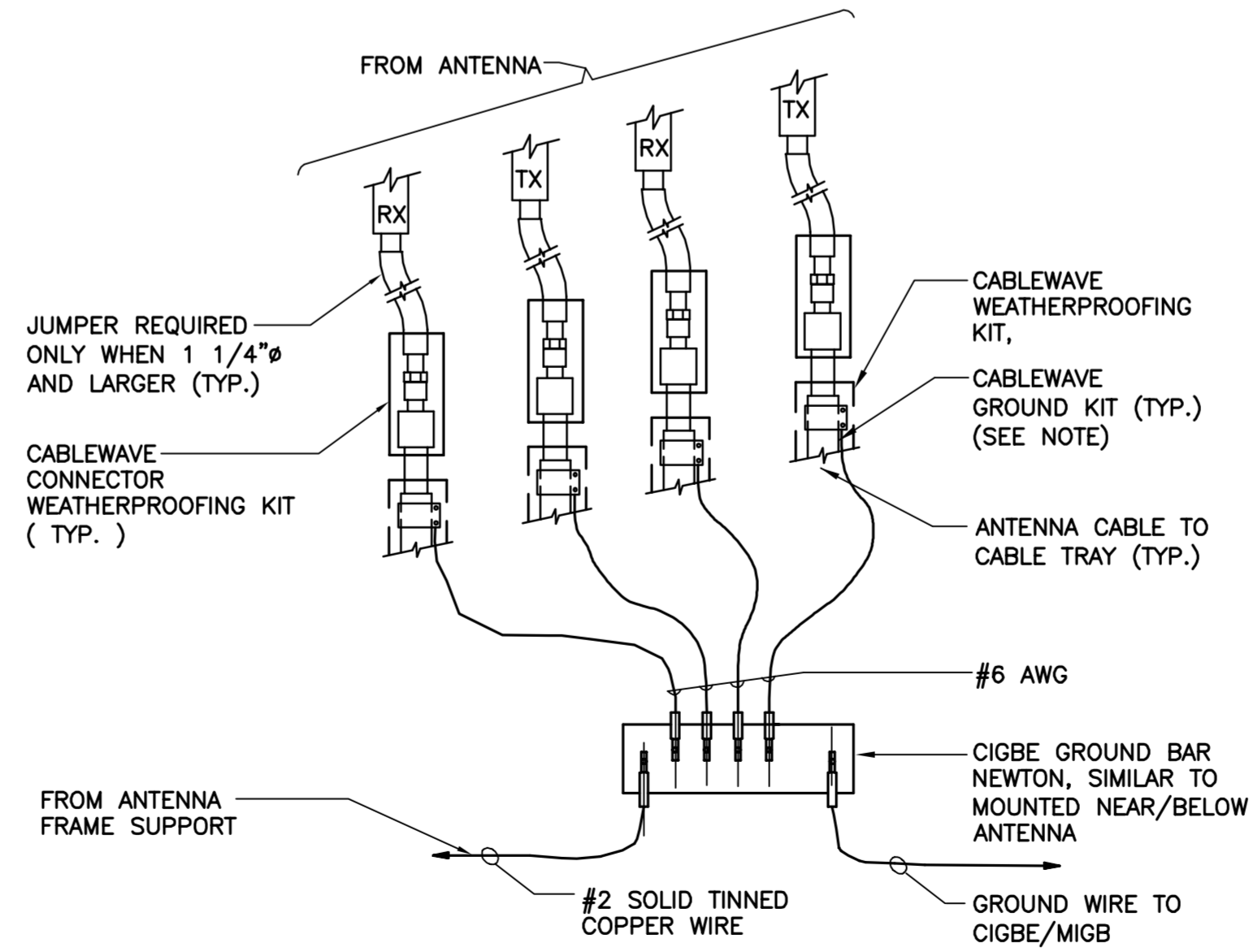
- NOTES:**
1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
  2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
  3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

**1 TYPICAL ANTENNA GROUNDING DETAIL**  
E-3 NOT TO SCALE



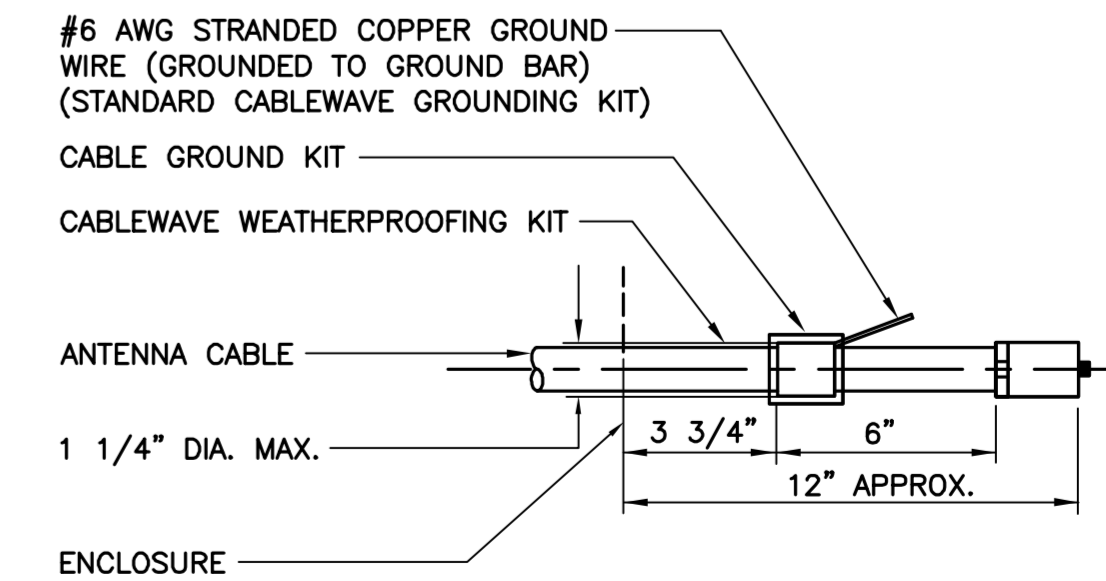
- NOTES:**
1. LOCATION OF ANTENNA MUST HAVE CLEAR VIEW OF SOUTHERN SKY AND CANNOT HAVE ANY BLOCKAGES EXCEEDING 25% OF THE SURFACE AREA OF A HEMISPHERE AROUND THE GPS ANTENNA.
  2. ALL GPS ANTENNA LOCATIONS MUST BE ABLE TO RECEIVE CLEAR SIGNALS FROM A MINIMUM OF FOUR (4) SATELLITES. VERIFY WITH HANDHELD GPS BEFORE FINAL LOCATION OF GPS ANTENNA.
  3. USE OF CADWELD CONNECTION INSTEAD OF PIPE CONNECTOR SHALL BE APPROVED BY AT&T LOCAL MARKET. CADWELDING SHALL NOT BE PERFORMED ON ROOFTOPS.
  4. LTE-GPS ANTENNA SHALL BE LOCATED A MINIMUM OF 10' OR MORE HORIZONTALLY AND VERTICALLY FROM ALL ANTENNAS.
  5. CLEAN PIPE SURFACE BENEATH SADDLE UNTIL SHINY AND APPLY A CONDUCTIVE ANTI-OXIDANT COMPOUND. TOUCH UP GALVANIZED SURFACE AS NECESSARY AFTER CONNECTOR IS INSTALLED.
  6. GPS ANTENNA SHALL NOT BE LOCATED WITHIN THE 1/2 POWER BEAM WIDTH IN FRONT OF A TRANSMITTING RF ANTENNA.

**6 GPS ANTENNA MOUNTING DETAIL**  
E-3 NOT TO SCALE



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

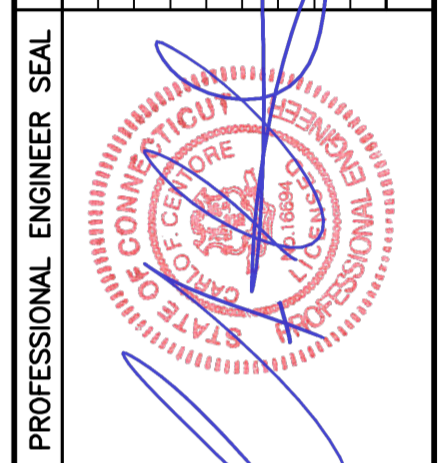
**5 CONNECTION OF GROUND WIRES TO GROUND BAR**  
E-3 NOT TO SCALE



- NOTE:**
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

**4 ANTENNA CABLE GROUNDING DETAIL**  
E-3 NOT TO SCALE

| REV. | DATE     | BY    | CHKD | DESCRIPTION |
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| 0    | 09/27/16 | JTD   |      |             |
| 1    | 09/16/16 | KAMUR |      |             |



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TYPICAL ELECTRICAL DETAILS

**E-3**

**Structural Analysis Report**

*160-ft Existing ROHN Lattice Tower*

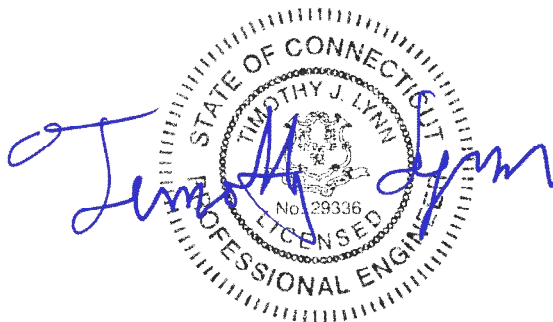
*Proposed AT&T Mobility  
Antenna Upgrade*

*AT&T Site Ref: CT1144*

*482 Pigeon Hill Road  
Windsor, CT*

*Centek Project No. 16071.20*

*Date: August 30, 2016*



**Prepared for:**  
AT&T Mobility  
500 Enterprise Drive, Suite 3A  
Rocky Hill, CT 06067



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## *I n t r o d u c t i o n*

The purpose of this report is to summarize the results of the non-linear, P- $\Delta$  structural analysis of the antenna upgrade proposed by AT&T on the existing self-supporting lattice tower located in Windsor, Connecticut.

The host tower is a 160-ft, three legged, tapered steel lattice tower originally designed and manufactured by UNR-ROHN. The manufacturer's drawings and calculations were unavailable for use in this report. The existing tower geometry, structure member sizes and foundation information were obtained from a previous structural report prepared by Centek job no. 15001.40 dated September 1, 2015.

Antenna and appurtenance information were obtained from the aforementioned Centek structural report and a AT&T RF data sheet.

The tower consists of eight (8) tapered vertical sections consisting of structural steel pipe legs conforming to ASTM A572 Gr. 50. Diagonal lateral support bracing consists of structural steel angle shapes conforming to ASTM A36. The vertical tower sections are connected by bolted flange plates while the pipe legs and bracing are connected by welded and bolted gusset connections. The width of the tower face is 8.56-ft at the top and 22.85-ft at the base.

AT&T proposes the installation of three (3) panel antennas, three (3) remote radio heads and one (1) main distribution box mounted on the existing T-Arms. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna configuration.

## *A n t e n n a   a n d   A p p u r t e n a n c e   S u m m a r y*

The existing, proposed and future loads considered in this analysis consist of the following:

- T-MOBILE (Existing):  
Antenna: Six (6) Ericsson AIR 21 panel antennas, three (3) RFS APX16DWV-16DWVS-C-A20 panel antennas and three (3) Ericsson KRY 112 TMA's mounted on three (3) 15-ft Wireless Frames with a RAD center elevation of  $\pm 147$ -ft above the existing tower base.  
Coax Cable: Eighteen (18) 1-5/8"  $\varnothing$  coax cables and one (1) 1-5/8"  $\varnothing$  fiber cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (EXISTING):  
Antenna: One (1) 15-ft  $\varnothing$  Omni-directional (whip) antenna mounted with an elevation of  $\pm 167.5$ -ft above the tower base.  
Coax Cable: One (1) 7/8"  $\varnothing$  coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (EXISTING):  
Antenna: One (1) 8-ft  $\varnothing$  dish antenna on a 5-ft x 4.5-in  $\varnothing$  pipe mount with an elevation of  $\pm 111.33$ -ft above the tower base.  
Coax Cable: One (1) EW63 cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- UNKNOWN (Existing):  
Antenna: One (1) 16-ft  $\varnothing$  Omni-directional (whip) antenna on a 4-ft side mount standoff with an elevation of  $\pm 108$ -ft above the tower base.  
Coax Cable: One (1) 7/8"  $\varnothing$  coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):  
Antenna: One (1) 6-ft  $\varnothing$  dish antenna on a 5-ft x 4.5-in  $\varnothing$  pipe mount with an elevation of  $\pm 102$ -ft above the tower base.  
Coax Cable: One (1) EW90  $\varnothing$  coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):  
Antenna: One (1) 6-ft  $\varnothing$  dish antenna on a 5-ft x 4.5-in  $\varnothing$  pipe mount with an elevation of  $\pm 94$ -ft above the tower base.  
Coax Cable: One (1) EW63 cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):  
Antenna: One (1) 10-ft  $\varnothing$  dish antenna on a 6-ft 8-in x 4-in  $\varnothing$  pipe mount with an elevation of  $\pm 72$ -ft above the tower base.  
Coax Cable: One (1) EW63 cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):  
Antenna: One (1) empty 4-ft side mount standoff with an elevation of  $\pm 47$ -ft above the tower base.
- UNKNOWN (Existing):  
Antenna: One (1) 12-ft  $\varnothing$  Omni-directional (whip) antenna on a 4-ft side mount standoff with an elevation of  $\pm 45.41$ -ft above the tower base.  
Coax Cable: One (1) 1/2-in  $\varnothing$  coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- VERIZON (Existing to Remain):  
Antennas: Six (6) Antel LPA-80063-4CF panel antennas, two (2) Antel BXA-70040/6CF panel antennas, one (1) Antel BXA-70063/6CF panel antennas, six (6) Andrew SBNHH-1D65B panel antennas, three (3) Alcatel-Lucent RRH4x30-B13 remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads and three (3) Alcatel-Lucent RRH4x45/2x90-AWS remote radio heads mounted on three (3) Valmont 15-ft T-Frames with a RAD center elevation of  $\pm 156.5$ -ft above the existing tower base.  
Misc Equipment: Two (2) RFS DB-T1-6Z-8AB-0Z main distribution boxes mounted to the leg of the existing tower with a RAD center elevation of 156.5-ft above the existing tower base.  
Coax Cables: Twelve (12) 1-5/8"  $\varnothing$  coax cables and two (2) 1-5/8"  $\varnothing$  fiber cable running on the face of the existing tower as specified in Section 3 of this report.

- **AT&T (Existing to Remain):**  
Antennas: Six (6) KMW AM-X-CD-14-65-00T-RET panel antennas and six (6) Powerwave TT19-08DB111 TMA's mounted on three (3) 10-ft-6in T-Arms connected to one (1) 8" SCH.40 x 18-ft long mast with a RAD center elevation of  $\pm 169$ -ft above the existing tower base.  
Coax Cables: Twelve (12) 1-1/4"  $\varnothing$  coax cables running on the leg/face of the existing tower as specified within Section 3 of this report.
- **AT&T (Proposed):**  
Antennas: Three (3) Quintel QS66512-2 panel antennas, three (3) Ericsson RRUS-12 remote radio heads, three (3) Ericsson A2s and one (1) Raycap DC-6-48-60-18-8F surge arrestor mounted on three (3) 10-ft-6in T-Arms connected to one (1) 8" SCH.40 x 18-ft long mast with a RAD center elevation of  $\pm 169$ -ft above the existing tower base.  
Coax Cables: One (1) fiber trunk and two (2) DC trunks running on the leg/face of the existing tower as specified within Section 3 of this report.

### Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.

## A n a l y s i s

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (fastest mile) with no ice and a 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled “Structural Standards for Steel Antenna Towers and Antenna Supporting Structures”, the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC<sup>1</sup> and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation of the tower analysis.

## T o w e r L o a d i n g

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½” radial ice on the tower structure and its components.

|                   |   |   |
|-------------------|---|---|
| Basic Wind Speed: | Hartford; v = 80 mph (fastest mile)   | [Section 16 of TIA/EIA-222-F-96]  |
|                   | Windsor; v = 95 mph (3 second gust) equivalent to v = 77.5 mph (fastest mile)   | [Appendix K of the 2005 CT Building Code Supplement]  |
|                   | <i>TIA/EIA-222 wind speed controls.</i>   |   |
| Load Cases:       | <u>Load Case 1</u> ; 80 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses.   | [Section 2.3.16 of TIA/EIA-222-F-96]  |
|                   | <u>Load Case 2</u> ; 69 mph wind speed w/ ½” radial ice plus gravity load – used in calculation of tower stresses. The 69 mph wind speed velocity represents 75% of the wind pressure generated by the 80 mph wind speed. | [Section 2.3.16 of TIA/EIA-222-F-96]  |
|                   | <u>Load Case 3</u> ; Seismic – not checked  | [Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type |

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<sup>1</sup> The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

## Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

- Calculated stresses were found to be within allowable limits. In Load Case 2, per tnxTower "Section Capacity Table", this tower was found to be at **98.1%** of its total capacity.

| Tower Section | Elevation       | Stress Ratio (percentage of capacity) | Result      |
|---------------|-----------------|---------------------------------------|-------------|
| Leg (T7)      | 20'-0" - 40'-0" | 98.1%                                 | <b>PASS</b> |
| Diagonal (T5) | 60'-0" - 80'-0" | 97.3%                                 | <b>PASS</b> |

## Foundation and Anchors

The existing foundation consists of three (3) 3-ft  $\varnothing$  reinforced concrete piers on three (3) 8-ft square reinforced concrete pads subsequently reinforced with four (4) rock anchors per pad. The existing foundation locations and dimensions were taken from the aforementioned Centek structural analysis and reinforcement design documents. The sub-grade conditions used in the analysis of the existing foundation were obtained from a geo-technical soils study report prepared by Clarence Welti & Associates, Inc., dated September 20, 2010. The tower legs are connected to the three (3) reinforced concrete piers by means of six (6) 7/8"  $\varnothing$ , ASTM A354 Grade BC anchor bolts per leg, embedded into the concrete foundation structure.

- The tower reactions developed from the governing Load Case 1 of the proposed reinforced tower condition were used in the verification of the foundation and anchor bolts:

| Leg Reactions | Vector      | Proposed Tower Reactions |
|---------------|-------------|--------------------------|
| Leg           | Shear       | <b>24 kips</b>           |
|               | Compression | <b>204 kips</b>          |
|               | Uplift      | <b>178 kips</b>          |
| Base          | Shear       | <b>39 kips</b>           |
|               | Compression | <b>31 kips</b>           |
|               | Moment      | <b>3832 kip-ft</b>       |

- The anchor bolts were found to be within allowable limits.

| Tower Section | Component | Stress Ratio<br>(percentage of capacity) | Result      |
|---------------|-----------|--|-------------|
| Anchor Bolts  | Tension   | 87.3%                                    | <b>PASS</b> |

- The foundation was found to be within allowable limits.

| Foundation Type                 | Design Limit                                  | Allowable Limit/FS  | Proposed Loading    | Result      |
|---------------------------------|---|---------------------|---------------------|-------------|
| Rock Anchored Pad and Pier (x3) | Bearing Pressure                              | 12.00ksf            | 8.9ksf              | <b>PASS</b> |
|                                 | Rock Mass Uplift Resistance                   | 2.00 <sup>(2)</sup> | 5.07 <sup>(2)</sup> | <b>PASS</b> |
|                                 | Rock Anchor Rock/Grout Bond Uplift Resistance | 2.00 <sup>(2)</sup> | 3.42 <sup>(2)</sup> | <b>PASS</b> |

Note 2: Minimum required Factor of Safety (FS) of 2.0 required per IBC 2003/2005 CSBC Section 3108.4.2.

## Conclusion and Recommendations

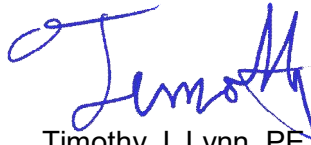
This analysis shows that the subject tower **is adequate** to support the proposed antenna configuration with the below recommendations.

- **All coax cables routed as specified in Section 3 of this report**

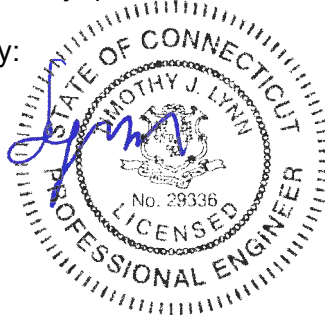
The analysis is based, in part, on the information provided to this office by AT&T. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE  
 Structural Engineer



*Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures*

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

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.



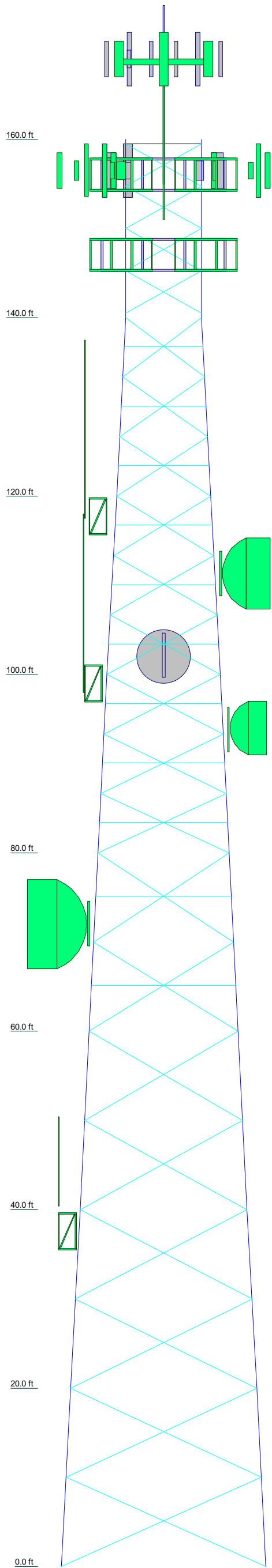
## GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISA Tower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

### tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

|                  |                  |          |                   |           |           |                  |           |            |
|------------------|------------------|----------|-------------------|-----------|-----------|------------------|-----------|------------|
| Section          | T1               | T2       | T3                | T4        | T5        | T6               | T7        | T8         |
| Legs             | ROHN 2.5 STD     |          | ROHN 2.5 EH       | ROHN 3 EH | ROHN 4 EH | ROHN 5 EH        | ROHN 5 EH | ROHN 6 EHS |
| Leg Grade        |                  |          |                   | A572-50   |           |                  |           |            |
| Diagonals        | L1 3/4x1 3/4x1/4 | L2x1/4   | L2 1/2x2 1/2x3/16 | L3x3x3/16 | L3x3x1/4  | L3 1/2x3 1/2x1/4 | L4x4x1/4  |            |
| Diagonal Grade   |                  |          |                   | A36       |           |                  |           |            |
| Top Gifts        | L2 1/2x2 1/2x3/8 |          |                   |           |           |                  |           |            |
| Sec. Horizontals | N.A.             | L2x2x1/4 | L2 1/2x2 1/2x3/16 | L3x3x3/16 | L3x3x1/4  |                  |           |            |
| Face Width (ft)  | 8.56             |          | 10.56             | 12.8      | 14.86     | 16.69            | 18.69     | 20.85      |
| # Panels @ (ft)  | 4 @ 4.75         |          | 9 @ 6.66667       |           |           | 8 @ 10           |           |            |
| Weight (K)       | 1.1              | 1.3      | 1.5               | 2.1       | 2.5       | 2.7              | 2.8       | 3.3        |



### DESIGNED APPURTENANCE LOADING

| TYPE  | ELEVATION | TYPE                                      | ELEVATION |
|---|-----------|---|-----------|
| (2) AM-X-CD-14-65-00T-RET (ATI)                     | 169       | RRH2x60-PCS (Verizon)                     | 156.5     |
| (2) AM-X-CD-14-65-00T-RET (ATI)                     | 169       | RRH2x60-PCS (Verizon)                     | 156.5     |
| (2) AM-X-CD-14-65-00T-RET (ATI)                     | 169       | RRH4x30-B13 (Verizon)                     | 156.5     |
| (2) TT19-08BP111-001 TMA (ATI)                      | 169       | RRH4x30-B13 (Verizon)                     | 156.5     |
| (2) TT19-08BP111-001 TMA (ATI)                      | 169       | RRH4x30-B13 (Verizon)                     | 156.5     |
| (2) TT19-08BP111-001 TMA (ATI)                      | 169       | DB-T1-6Z-8AB-0Z (Verizon)                 | 156.5     |
| QS66512-2 (ATI - Proposed)                          | 169       | DB-T1-6Z-8AB-0Z (Verizon)                 | 156.5     |
| QS66512-2 (ATI - Proposed)                          | 169       | LPA-80063-4CF (Verizon)                   | 156.5     |
| QS66512-2 (ATI - Proposed)                          | 169       | 15' Frame (Verizon)                       | 156       |
| RRUS-12 (ATI - Proposed)                            | 169       | 15' Frame (Verizon)                       | 156       |
| RRUS-12 (ATI - Proposed)                            | 169       | 15' Frame (Verizon)                       | 156       |
| RRUS-12 (ATI - Proposed)                            | 169       | APX16DWV-16DWVS-C-A20 (T-Mobile)          | 147       |
| A2 (ATI - Proposed)                                 | 169       | APX16DWV-16DWVS-C-A20 (T-Mobile)          | 147       |
| A2 (ATI - Proposed)                                 | 169       | (2) AIR21 (T-Mobile)                      | 147       |
| A2 (ATI - Proposed)                                 | 169       | (2) AIR21 (T-Mobile)                      | 147       |
| DC6-48-60-18-8F Surge Arrestor (ATI - Proposed)     | 169       | (2) AIR21 (T-Mobile)                      | 147       |
| Valmont 10'-6" T-Armx 3 (Colo Kit P/N 802738) (ATI) | 169       | KRY 112 TMA (T-Mobile)                    | 147       |
| 15' x 2" Dia Omni (Unknown)                         | 165       | KRY 112 TMA (T-Mobile)                    | 147       |
| P8 x18-ft Pipe Mast (ATI)                           | 161       | KRY 112 TMA (T-Mobile)                    | 147       |
| SBNHH-1D65B (Verizon)                               | 156.5     | 15' Frame (T-Mobile)                      | 147       |
| BXA-70040/6CF (Verizon)                             | 156.5     | 15' Frame (T-Mobile)                      | 147       |
| SBNHH-1D65B (Verizon)                               | 156.5     | 15' Frame (T-Mobile)                      | 147       |
| LPA-80063-4CF (Verizon)                             | 156.5     | APX16DWV-16DWVS-C-A20 (T-Mobile)          | 147       |
| LPA-80063-4CF (Verizon)                             | 156.5     | 15' x 2" Dia Omni (Unknown)               | 127.5     |
| SBNHH-1D65B (Verizon)                               | 156.5     | 4' Side Mount Standoff (Unknown)          | 117.75    |
| BXA-70040/6CF (Verizon)                             | 156.5     | 5'0"x4.5" Pipe Mount (Unknown)            | 111.33    |
| SBNHH-1D65B (Verizon)                               | 156.5     | 8 FT DISH (Unknown)                       | 111.33    |
| LPA-80063-4CF (Verizon)                             | 156.5     | 16' x 2" Dia Omni (Unknown)               | 108       |
| LPA-80063-4CF (Verizon)                             | 156.5     | 5'0"x4.5" Pipe Mount (Unknown)            | 102.2     |
| SBNHH-1D65B (Verizon)                               | 156.5     | 6 FT DISH (Unknown)                       | 102       |
| BXA-70063/6CF (Verizon)                             | 156.5     | 4' Side Mount Standoff (Unknown)          | 99        |
| SBNHH-1D65B (Verizon)                               | 156.5     | 6 FT DISH (Unknown)                       | 94        |
| LPA-80063-4CF (Verizon)                             | 156.5     | 5'0"x4.5" Pipe Mount (Unknown)            | 93.83     |
| RRH4x45/2x90-AWS (Verizon)                          | 156.5     | 5'0"x4.5" Pipe Mount (Unknown)            | 72.1      |
| RRH4x45/2x90-AWS (Verizon)                          | 156.5     | 10 FT DISH (Unknown)                      | 72        |
| RRH4x45/2x90-AWS (Verizon)                          | 156.5     | 4' Side Mount Standoff (Vacant) (Unknown) | 47        |
| RRH2x60-PCS (Verizon)                               | 156.5     | 12' x 1-1/2" Dia Omni (Unknown)           | 45.41     |
|   |           | 4' Side Mount Standoff (Unknown)          | 37.58     |

### MATERIAL STRENGTH

| GRADE   | Fy     | Fu     | GRADE | Fy     | Fu     |
|---------|--------|--------|-------|--------|--------|
| A572-50 | 50 ksi | 65 ksi | A36   | 36 ksi | 58 ksi |

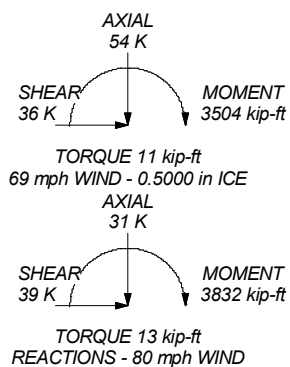
### TOWER DESIGN NOTES

1. Tower designed for a 80 mph basic wind in accordance with the EIA-222-D Standard.
2. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. Weld together tower sections have flange connections.
5. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
6. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
7. Welds are fabricated with ER-70S-6 electrodes.
8. TOWER RATING: 98.1%

### MAX. CORNER REACTIONS AT BASE:

DOWN: 204 K  
SHEAR: 24 K

UPLIFT: -178 K  
SHEAR: 21 K



Centek Engineering Inc.

63-2 North Branford Rd.  
Branford, CT 06405  
Phone: (203) 488-0580  
FAX: (203) 488-8587

Job: 16071.20 - CT1144

Project: 160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT

Client: AT&T Mobility

Drawn by: T.JL

App'd:

Code: EIA-222-D

Date: 08/30/16

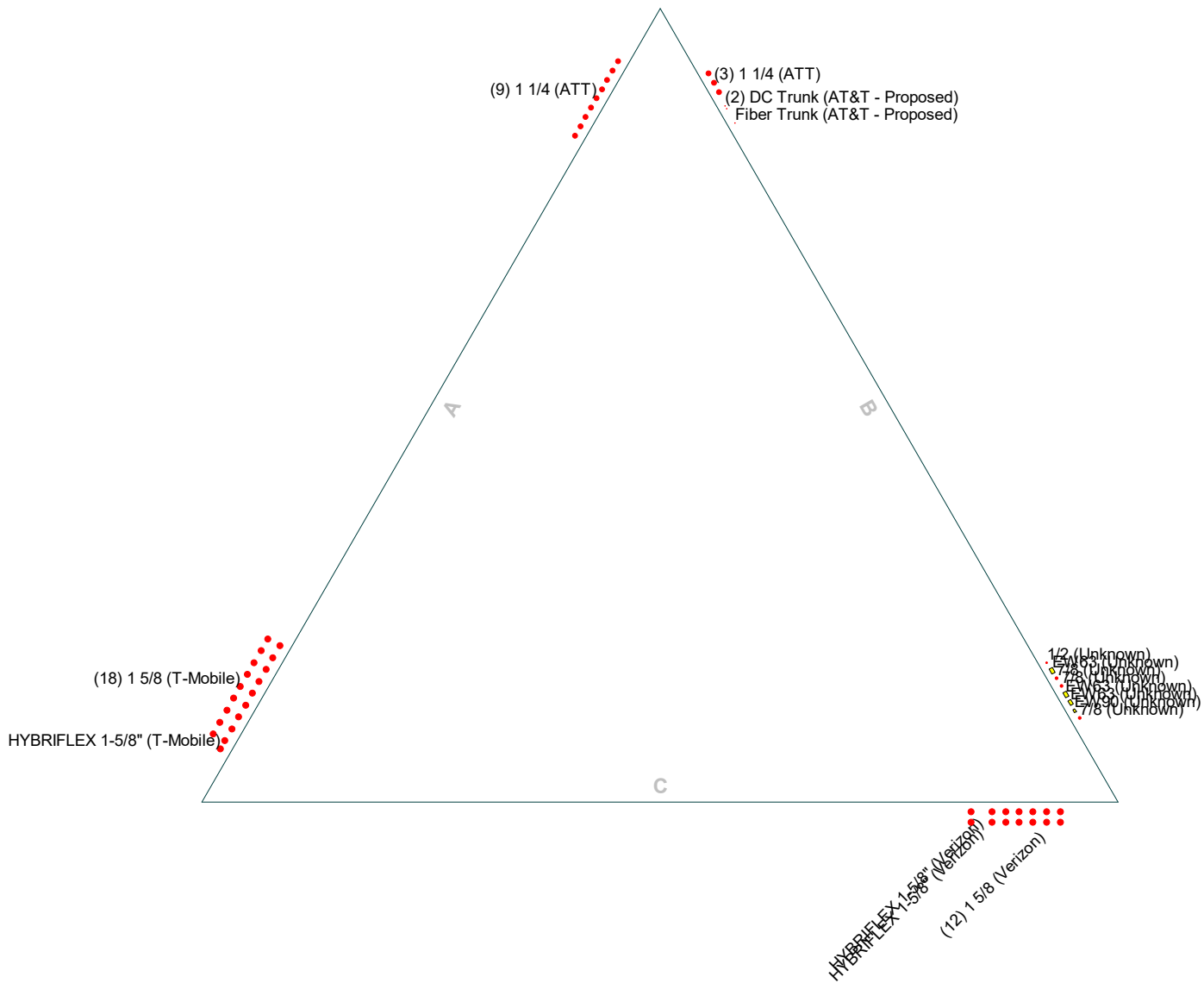
Scale: NTS

Path:

Dwg No. E-1

# Feed Line Plan

— Round   
 — Flat   
 — App In Face   
 — App Out Face

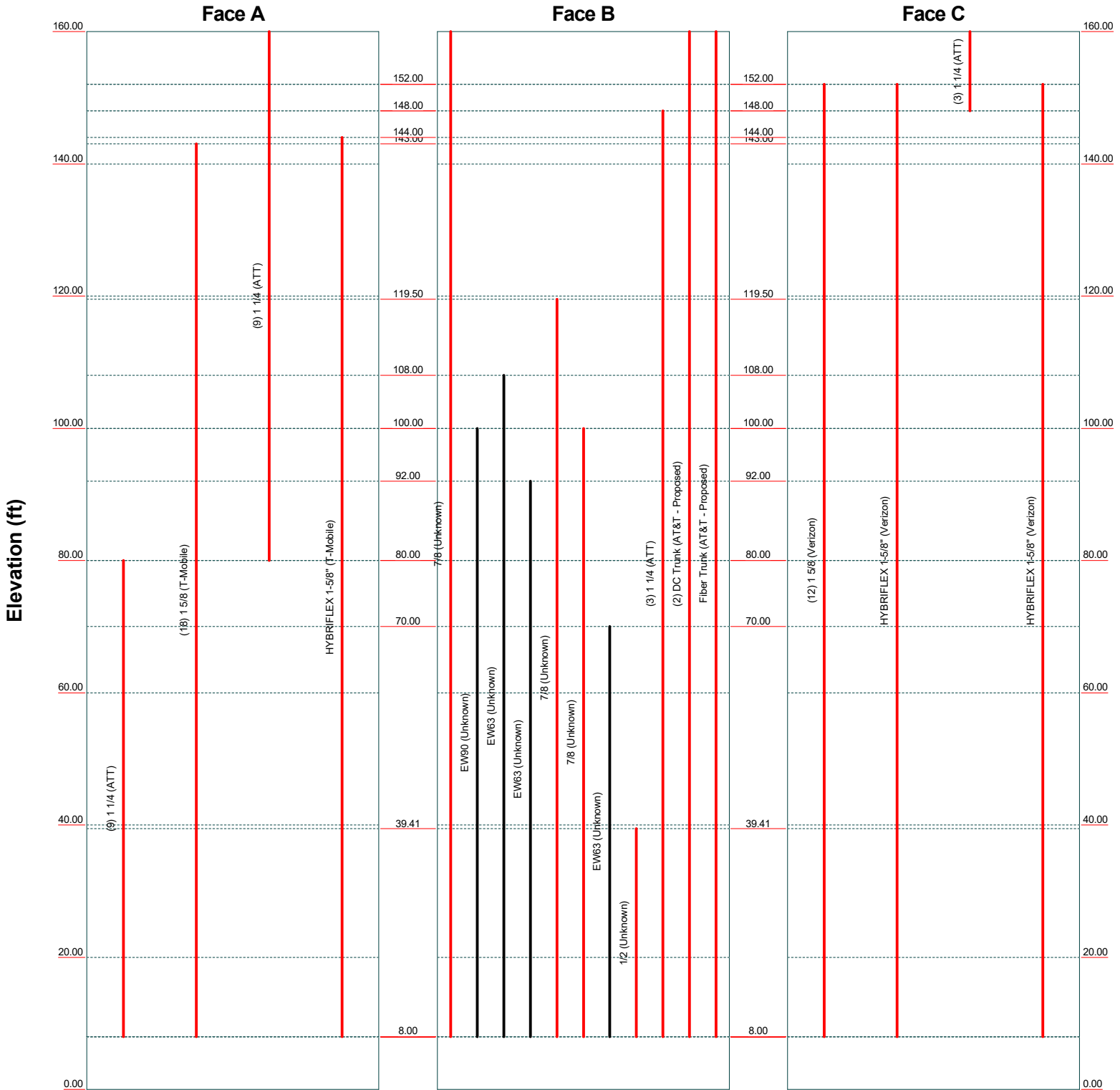


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|  |                |            |
|--|----------------|------------|
| Job: <b>16071.20 - CT1144</b>  |                |            |
| Project: <b>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT</b> |                |            |
| Client: AT&T Mobility  | Drawn by: T.JL | App'd:     |
| Code: EIA-222-D  | Date: 08/30/16 | Scale: NTS |
| Path:  | Dwg No. E-7    |            |

# Feed Line Distribution Chart 0' - 160'

— Round   
 — Flat   
 — App In Face   
 — App Out Face   
 — Truss Leg



|   |  |                                  |
|---|--|----------------------------------|
| <b>Centek Engineering Inc.</b>  |  |                                  |
| 63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 |  |                                  |
| Job: <b>16071.20 - CT1144</b>   | Project: <b>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT</b> | Client: <b>AT&amp;T Mobility</b> |
| Code: <b>EIA-222-D</b>  | Drawn by: <b>TJL</b>   | App'd:                           |
| Path:   | Date: <b>08/30/16</b>  | Scale: <b>NTS</b>                |
| Dwg No. <b>E-7</b>  |  |                                  |

|  |  |                                  |
|--|--|----------------------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>1 of 33           |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

## Tower Input Data

The main tower is a 3x free standing tower with an overall height of 160.00 ft above the ground line.

The base of the tower is set at an elevation of 0.00 ft above the ground line.

The face width of the tower is 8.56 ft at the top and 22.85 ft at the base.

This tower is designed using the EIA-222-D standard.

The following design criteria apply:

Basic wind speed of 80 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 69 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

Weld together tower sections have flange connections..

Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..

Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..

Welds are fabricated with ER-70S-6 electrodes..

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

Pressures are calculated at each section.

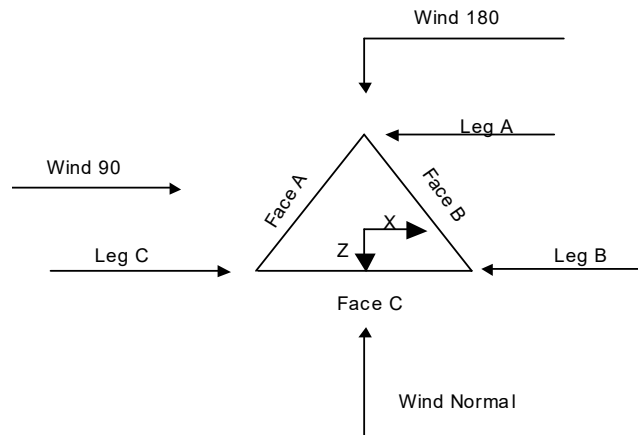
Stress ratio used in tower member design is 1.333.

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

## Options

|  |  |  |
|--|--|--|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>√ Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>√ Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>SR Members Have Cut Ends</li> <li>SR Members Are Concentric</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>√ Use Clear Spans For KL/r</li> <li>Retension Guys To Initial Tension</li> <li>Bypass Mast Stability Checks</li> <li>√ Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>Add IBC .6D+W Combination</li> <li>√ Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> <li>Treat Feed Line Bundles As Cylinder</li> </ul> | <ul style="list-style-type: none"> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>√ Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>√ SR Leg Bolts Resist Compression</li> <li>√ All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feed Line Torque</li> <li>Include Angle Block Shear Check</li> <li>Use TIA-222-G Bracing Resist. Exemption</li> <li>Use TIA-222-G Tension Splice Exemption</li> <li style="background-color: #e0e0e0;">Poles</li> <li>Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> </ul> |
|--|--|--|

|  |  |                                  |
|--|--|----------------------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>2 of 33           |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJJ        |



**Triangular Tower**

**Tower Section Geometry**

| Tower Section | Tower Elevation | Assembly Database | Description | Section Width | Number of Sections | Section Length |
|---------------|-----------------|-------------------|-------------|---------------|--------------------|----------------|
|               | <i>ft</i>       |                   |             | <i>ft</i>     |                    | <i>ft</i>      |
| T1            | 160.00-140.00   |                   |             | 8.56          | 1                  | 20.00          |
| T2            | 140.00-120.00   |                   |             | 8.56          | 1                  | 20.00          |
| T3            | 120.00-100.00   |                   |             | 10.56         | 1                  | 20.00          |
| T4            | 100.00-80.00    |                   |             | 12.60         | 1                  | 20.00          |
| T5            | 80.00-60.00     |                   |             | 14.66         | 1                  | 20.00          |
| T6            | 60.00-40.00     |                   |             | 16.69         | 1                  | 20.00          |
| T7            | 40.00-20.00     |                   |             | 18.69         | 1                  | 20.00          |
| T8            | 20.00-0.00      |                   |             | 20.85         | 1                  | 20.00          |

**Tower Section Geometry (cont'd)**

| Tower Section | Tower Elevation | Diagonal Spacing | Bracing Type | Has K Brace End Panels | Has Horizontals | Top Girt Offset | Bottom Girt Offset |
|---------------|-----------------|------------------|--------------|------------------------|-----------------|-----------------|--------------------|
|               | <i>ft</i>       | <i>ft</i>        |              |                        |                 | <i>in</i>       | <i>in</i>          |
| T1            | 160.00-140.00   | 4.75             | X Brace      | No                     | No              | 6.0000          | 6.0000             |
| T2            | 140.00-120.00   | 6.67             | X Brace      | No                     | Yes             | 0.0000          | 0.0000             |
| T3            | 120.00-100.00   | 6.67             | X Brace      | No                     | Yes             | 0.0000          | 0.0000             |
| T4            | 100.00-80.00    | 6.67             | X Brace      | No                     | Yes             | 0.0000          | 0.0000             |
| T5            | 80.00-60.00     | 10.00            | X Brace      | No                     | Yes             | 0.0000          | 0.0000             |
| T6            | 60.00-40.00     | 10.00            | X Brace      | No                     | No              | 0.0000          | 0.0000             |
| T7            | 40.00-20.00     | 10.00            | X Brace      | No                     | No              | 0.0000          | 0.0000             |

|  |  |                                  |
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| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>3 of 33           |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Tower Section | Tower Elevation<br>ft | Diagonal Spacing<br>ft | Bracing Type | Has K Brace End Panels | Has Horizontals | Top Girt Offset<br>in | Bottom Girt Offset<br>in |
|---------------|-----------------------|------------------------|--------------|------------------------|-----------------|-----------------------|--------------------------|
| T8            | 20.00-0.00            | 10.00                  | X Brace      | No                     | No              | 0.0000                | 0.0000                   |

### Tower Section Geometry (cont'd)

| Tower Elevation<br>ft | Leg Type | Leg Size     | Leg Grade           | Diagonal Type | Diagonal Size     | Diagonal Grade  |
|-----------------------|----------|--------------|---------------------|---------------|-------------------|-----------------|
| T1 160.00-140.00      | Pipe     | ROHN 2.5 STD | A572-50<br>(50 ksi) | Equal Angle   | L1 3/4x1 3/4x1/4  | A36<br>(36 ksi) |
| T2 140.00-120.00      | Pipe     | ROHN 2.5 STD | A572-50<br>(50 ksi) | Equal Angle   | L2x2x1/4          | A36<br>(36 ksi) |
| T3 120.00-100.00      | Pipe     | ROHN 2.5 EH  | A572-50<br>(50 ksi) | Equal Angle   | L2 1/2x2 1/2x3/16 | A36<br>(36 ksi) |
| T4 100.00-80.00       | Pipe     | ROHN 3 EH    | A572-50<br>(50 ksi) | Equal Angle   | L3x3x3/16         | A36<br>(36 ksi) |
| T5 80.00-60.00        | Pipe     | ROHN 4 EH    | A572-50<br>(50 ksi) | Equal Angle   | L3x3x1/4          | A36<br>(36 ksi) |
| T6 60.00-40.00        | Pipe     | ROHN 5 EH    | A572-50<br>(50 ksi) | Equal Angle   | L3 1/2x3 1/2x1/4  | A36<br>(36 ksi) |
| T7 40.00-20.00        | Pipe     | ROHN 5 EH    | A572-50<br>(50 ksi) | Equal Angle   | L3 1/2x3 1/2x1/4  | A36<br>(36 ksi) |
| T8 20.00-0.00         | Pipe     | ROHN 6 EHS   | A572-50<br>(50 ksi) | Equal Angle   | L4x4x1/4          | A36<br>(36 ksi) |

### Tower Section Geometry (cont'd)

| Tower Elevation<br>ft | Top Girt Type | Top Girt Size    | Top Girt Grade  | Bottom Girt Type | Bottom Girt Size | Bottom Girt Grade |
|-----------------------|---------------|------------------|-----------------|------------------|------------------|-------------------|
| T1 160.00-140.00      | Equal Angle   | L2 1/2x2 1/2x3/8 | A36<br>(36 ksi) | Equal Angle      |                  | A36<br>(36 ksi)   |

### Tower Section Geometry (cont'd)

| Tower Elevation<br>ft | Secondary Horizontal Type | Secondary Horizontal Size | Secondary Horizontal Grade | Inner Bracing Type | Inner Bracing Size | Inner Bracing Grade |
|-----------------------|---------------------------|---------------------------|----------------------------|--------------------|--------------------|---------------------|
| T2 140.00-120.00      | Equal Angle               | L2x2x1/4                  | A36<br>(36 ksi)            | Equal Angle        |                    | A36<br>(36 ksi)     |
| T3 120.00-100.00      | Equal Angle               | L2 1/2x2 1/2x3/16         | A36<br>(36 ksi)            | Equal Angle        |                    | A36<br>(36 ksi)     |
| T4 100.00-80.00       | Equal Angle               | L3x3x3/16                 | A36<br>(36 ksi)            | Equal Angle        |                    | A36<br>(36 ksi)     |
| T5 80.00-60.00        | Equal Angle               | L3x3x1/4                  | A36<br>(36 ksi)            | Equal Angle        |                    | A36<br>(36 ksi)     |

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| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>4 of 33           |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

**Tower Section Geometry (cont'd)**

| Tower Elevation     | Gusset Area<br>(per face) | Gusset Thickness | Gusset Grade    | Adjust. Factor<br>$A_f$ | Adjust. Factor<br>$A_r$ | Weight Mult. | Double Angle<br>Stitch Bolt<br>Spacing<br>Diagonals<br>in | Double Angle<br>Stitch Bolt<br>Spacing<br>Horizontals<br>in | Double Angle<br>Stitch Bolt<br>Spacing<br>Redundants<br>in |
|---------------------|---------------------------|------------------|-----------------|-------------------------|-------------------------|--------------|---|---|--|
| ft                  | ft <sup>2</sup>           | in               |                 |                         |                         |              |   |   |  |
| T1<br>160.00-140.00 | 0.00                      | 0.0000           | A36<br>(36 ksi) | 1                       | 1                       | 1            | 36.0000   | 36.0000   | 36.0000  |
| T2<br>140.00-120.00 | 0.00                      | 0.0000           | A36<br>(36 ksi) | 1                       | 1                       | 1            | 36.0000   | 36.0000   | 36.0000  |
| T3<br>120.00-100.00 | 0.00                      | 0.0000           | A36<br>(36 ksi) | 1                       | 1                       | 1            | 36.0000   | 36.0000   | 36.0000  |
| T4<br>100.00-80.00  | 0.00                      | 0.0000           | A36<br>(36 ksi) | 1                       | 1                       | 1            | 36.0000   | 36.0000   | 36.0000  |
| T5<br>80.00-60.00   | 0.00                      | 0.0000           | A36<br>(36 ksi) | 1                       | 1                       | 1            | 36.0000   | 36.0000   | 36.0000  |
| T6<br>60.00-40.00   | 0.00                      | 0.0000           | A36<br>(36 ksi) | 1                       | 1                       | 1            | 36.0000   | 36.0000   | 36.0000  |
| T7<br>40.00-20.00   | 0.00                      | 0.0000           | A36<br>(36 ksi) | 1                       | 1                       | 1            | 36.0000   | 36.0000   | 36.0000  |
| T8<br>20.00-0.00    | 0.00                      | 0.0000           | A36<br>(36 ksi) | 1                       | 1                       | 1            | 36.0000   | 36.0000   | 36.0000  |

**Tower Section Geometry (cont'd)**

| Tower Elevation     | Calc K<br>Single Angles | Calc K<br>Solid Rounds | K Factors <sup>1</sup> |                     |                     |                 |       |        |                |                |        |
|---------------------|-------------------------|------------------------|------------------------|---------------------|---------------------|-----------------|-------|--------|----------------|----------------|--------|
|                     |                         |                        | Legs                   | X<br>Brace<br>Diags | K<br>Brace<br>Diags | Single<br>Diags | Girts | Horiz. | Sec.<br>Horiz. | Inner<br>Brace |        |
|                     |                         |                        |                        |                     |                     |                 |       |        |                |                | X<br>Y |
| ft                  |                         |                        |                        |                     |                     |                 |       |        |                |                |        |
| T1<br>160.00-140.00 | Yes                     | Yes                    | 1                      | 1                   | 1                   | 1               | 1     | 1      | 1              | 1              | 1      |
| T2<br>140.00-120.00 | Yes                     | Yes                    | 1                      | 1                   | 1                   | 1               | 1     | 1      | 1              | 1              | 1      |
| T3<br>120.00-100.00 | Yes                     | Yes                    | 1                      | 1                   | 1                   | 1               | 1     | 1      | 1              | 1              | 1      |
| T4<br>100.00-80.00  | Yes                     | Yes                    | 1                      | 1                   | 1                   | 1               | 1     | 1      | 1              | 1              | 1      |
| T5<br>80.00-60.00   | Yes                     | Yes                    | 1                      | 1                   | 1                   | 1               | 1     | 1      | 1              | 1              | 1      |
| T6<br>60.00-40.00   | Yes                     | Yes                    | 1                      | 1                   | 1                   | 1               | 1     | 1      | 1              | 1              | 1      |
| T7<br>40.00-20.00   | Yes                     | Yes                    | 1                      | 1                   | 1                   | 1               | 1     | 1      | 1              | 1              | 1      |
| T8<br>20.00-0.00    | Yes                     | Yes                    | 1                      | 1                   | 1                   | 1               | 1     | 1      | 1              | 1              | 1      |

<sup>1</sup>Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

**Tower Section Geometry (cont'd)**



|  |  |                                  |
|--|--|----------------------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>5 of 33           |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Tower Elevation<br>ft | Leg                       |   | Diagonal                  |   | Top Girt                  |   | Bottom Girt               |   | Mid Girt                  |   | Long Horizontal           |   | Short Horizontal          |   |
|-----------------------|---------------------------|---|---------------------------|---|---------------------------|---|---------------------------|---|---------------------------|---|---------------------------|---|---------------------------|---|
|                       | Net Width<br>Deduct<br>in | U | Net Width<br>Deduct<br>in | U | Net Width<br>Deduct<br>in | U | Net Width<br>Deduct<br>in | U | Net Width<br>Deduct<br>in | U | Net Width<br>Deduct<br>in | U | Net Width<br>Deduct<br>in | U |
| T1<br>160.00-140.00   | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 |
| T2<br>140.00-120.00   | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 |
| T3<br>120.00-100.00   | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 |
| T4<br>100.00-80.00    | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 |
| T5 80.00-60.00        | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 |
| T6 60.00-40.00        | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 |
| T7 40.00-20.00        | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 |
| T8 20.00-0.00         | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 | 0.0000                    | 1 |

**Tower Section Geometry (cont'd)**

| Tower Elevation<br>ft | Leg Connection<br>Type | Leg             |     | Diagonal        |     | Top Girt        |     | Bottom Girt     |     | Mid Girt        |     | Long Horizontal |     | Short Horizontal |     |
|-----------------------|------------------------|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|------------------|-----|
|                       |                        | Bolt Size<br>in | No. | Bolt Size<br>in | No. | Bolt Size<br>in | No. | Bolt Size<br>in | No. | Bolt Size<br>in | No. | Bolt Size<br>in | No. | Bolt Size<br>in  | No. |
| T1<br>160.00-140.00   | Flange                 | 0.6250          | 4   | 0.5000          | 1   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.6250           | 0   |
| T2<br>140.00-120.00   | Flange                 | 0.6250          | 4   | 0.5000          | 1   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.7500           | 0   |
| T3<br>120.00-100.00   | Flange                 | 0.7500          | 4   | 0.5000          | 1   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.7500           | 2   |
| T4<br>100.00-80.00    | Flange                 | 0.8750          | 4   | 0.5000          | 1   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.6250           | 2   |
| T5 80.00-60.00        | Flange                 | 1.0000          | 4   | 0.6250          | 1   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.6250           | 2   |
| T6 60.00-40.00        | Flange                 | 1.0000          | 4   | 0.6250          | 1   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.6250           | 0   |
| T7 40.00-20.00        | Flange                 | 1.0000          | 6   | 0.6250          | 1   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.6250           | 0   |
| T8 20.00-0.00         | Flange                 | 0.8750          | 6   | 0.6250          | 1   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.6250          | 0   | 0.6250           | 0   |
|                       |                        | A325N           |     | A325N           |     | A325N           |     | A325N           |     | A325N           |     | A325N           |     | A325N            |     |
|                       |                        | A325N           |     | A325N           |     | A325N           |     | A325N           |     | A325N           |     | A325N           |     | A325N            |     |
|                       |                        | A325N           |     | A325N           |     | A325X           |     | A325N           |     | A325N           |     | A325N           |     | A325X            |     |
|                       |                        | A325N           |     | A325N           |     | A325N           |     | A325N           |     | A325N           |     | A325N           |     | A325X            |     |
|                       |                        | A325N           |     | A325N           |     | A325X           |     | A325X           |     | A325X           |     | A325X           |     | A325N            |     |
|                       |                        | A325N           |     | A325N           |     | A325X           |     | A325X           |     | A325X           |     | A325X           |     | A325N            |     |
|                       |                        | A354-BC         |     | A325X           |     | A325X           |     | A325X           |     | A325X           |     | A325X           |     | A325N            |     |

**Feed Line/Linear Appurtenances - Entered As Round Or Flat**

| Description        | Face<br>or<br>Leg | Allow<br>Shield | Component<br>Type | Placement<br>ft | Face<br>Offset<br>in | Lateral<br>Offset<br>(Frac FW) | #  | #<br>Per<br>Row | Clear<br>Spacing<br>in | Width or<br>Diameter<br>in | Perimeter<br>in | Weight<br>plf |
|--------------------|-------------------|-----------------|-------------------|-----------------|----------------------|--------------------------------|----|-----------------|------------------------|----------------------------|-----------------|---------------|
| 1 5/8<br>(Verizon) | C                 | Yes             | Ar (CfAe)         | 152.00 - 8.00   | 2.0000               | -0.4                           | 12 | 6               | 1.9800                 | 1.9800                     |                 | 1.04          |
| 1 1/4<br>(ATT)     | A                 | Yes             | Ar (CfAe)         | 80.00 - 8.00    | 2.0000               | 0.38                           | 9  | 9               | 1.5500                 | 1.5500                     |                 | 0.66          |
| 7/8<br>(Unknown)   | B                 | Yes             | Ar (CfAe)         | 160.00 - 8.00   | 2.0000               | 0.4                            | 1  | 1               | 1.1100                 | 1.1100                     |                 | 0.54          |

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|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Description                       | Face or Leg | Allow Shield | Component Type | Placement<br>ft | Face Offset<br>in | Lateral Offset<br>(Frac FW) | #  | # Per Row | Clear Spacing<br>in | Width or Diameter<br>in | Perimeter<br>in | Weight<br>plf |
|-----------------------------------|-------------|--------------|----------------|-----------------|-------------------|-----------------------------|----|-----------|---------------------|-------------------------|-----------------|---------------|
| EW90<br>(Unknown)                 | B           | Yes          | Af (CfAe)      | 100.00 - 8.00   | 2.0000            | 0.39                        | 1  | 1         | 0.9869              | 0.9869                  | 3.2550          | 0.32          |
| EW63<br>(Unknown)                 | B           | Yes          | Af (CfAe)      | 108.00 - 8.00   | 2.0000            | 0.38                        | 1  | 1         | 1.5742              | 1.5742                  | 5.0668          | 0.51          |
| EW63<br>(Unknown)                 | B           | Yes          | Af (CfAe)      | 92.00 - 8.00    | 2.0000            | 0.37                        | 1  | 1         | 1.5742              | 1.5742                  | 5.0668          | 0.51          |
| 7/8<br>(Unknown)                  | B           | Yes          | Ar (CfAe)      | 119.50 - 8.00   | 2.0000            | 0.36                        | 1  | 1         | 1.1100              | 1.1100                  |                 | 0.54          |
| 7/8<br>(Unknown)                  | B           | Yes          | Ar (CfAe)      | 100.00 - 8.00   | 2.0000            | 0.35                        | 1  | 1         | 1.1100              | 1.1100                  |                 | 0.54          |
| EW63<br>(Unknown)                 | B           | Yes          | Af (CfAe)      | 70.00 - 8.00    | 2.0000            | 0.34                        | 1  | 1         | 1.5742              | 1.5742                  | 5.0668          | 0.51          |
| 1/2<br>(Unknown)                  | B           | Yes          | Ar (CfAe)      | 39.41 - 8.00    | 2.0000            | 0.33                        | 1  | 1         | 0.5800              | 0.5800                  |                 | 0.25          |
| 1 5/8<br>(T-Mobile)               | A           | Yes          | Ar (CfAe)      | 143.00 - 8.00   | 2.0000            | -0.37                       | 18 | 9         | 1.9800              | 1.9800                  |                 | 1.04          |
| 1 1/4<br>(ATT)                    | B           | Yes          | Ar (CfAe)      | 148.00 - 8.00   | 2.0000            | -0.4                        | 3  | 3         | 1.5500              | 1.5500                  |                 | 0.66          |
| HYBRIFLEX<br>1-5/8"<br>(Verizon)  | C           | Yes          | Ar (CfAe)      | 152.00 - 8.00   | 2.0000            | -0.34                       | 1  | 1         | 1.0000              | 1.9800                  |                 | 1.90          |
| 1 1/4<br>(ATT)                    | A           | Yes          | Ar (CfAe)      | 160.00 - 80.00  | 2.0000            | 0.3                         | 9  | 9         | 1.5500              | 1.5500                  |                 | 0.66          |
| 1 1/4<br>(ATT)                    | C           | Yes          | Ar (CfAe)      | 160.00 - 148.00 | -6.0000           | 0                           | 3  | 3         | 1.5500              | 1.5500                  |                 | 0.66          |
| HYBRIFLEX<br>1-5/8"<br>(T-Mobile) | A           | Yes          | Ar (CfAe)      | 144.00 - 8.00   | 2.0000            | -0.44                       | 1  | 1         | 1.0000              | 1.9800                  |                 | 1.90          |
| HYBRIFLEX<br>1-5/8"<br>(Verizon)  | C           | Yes          | Ar (CfAe)      | 152.00 - 8.00   | 5.0000            | -0.34                       | 1  | 1         | 1.0000              | 1.9800                  |                 | 1.90          |
| DC Trunk<br>(AT&T - Proposed)     | B           | Yes          | Ar (CfAe)      | 160.00 - 8.00   | 2.0000            | -0.37                       | 2  | 2         | 0.4000              | 0.4000                  |                 | 0.11          |
| Fiber Trunk<br>(AT&T - Proposed)  | B           | Yes          | Ar (CfAe)      | 160.00 - 8.00   | 2.0000            | -0.35                       | 1  | 1         | 0.4000              | 0.4000                  |                 | 1.00          |

### Feed Line/Linear Appurtenances Section Areas

| Tower Section | Tower Elevation<br>ft | Face | A <sub>R</sub><br>ft <sup>2</sup> | A <sub>F</sub><br>ft <sup>2</sup> | C <sub>A</sub> A <sub>A</sub><br>In Face<br>ft <sup>2</sup> | C <sub>A</sub> A <sub>A</sub><br>Out Face<br>ft <sup>2</sup> | Weight<br>K |
|---------------|-----------------------|------|-----------------------------------|-----------------------------------|---|--|-------------|
| T1            | 160.00-140.00         | A    | 28.365                            | 0.000                             | 0.000   | 0.000  | 0.18        |
|               |                       | B    | 6.950                             | 0.000                             | 0.000   | 0.000  | 0.05        |
|               |                       | C    | 20.490                            | 0.000                             | 0.000   | 0.000  | 0.22        |
| T2            | 140.00-120.00         | A    | 56.250                            | 0.000                             | 0.000   | 0.000  | 0.53        |
|               |                       | B    | 11.600                            | 0.000                             | 0.000   | 0.000  | 0.07        |
|               |                       | C    | 26.400                            | 0.000                             | 0.000   | 0.000  | 0.33        |
| T3            | 120.00-100.00         | A    | 56.250                            | 0.000                             | 0.000   | 0.000  | 0.53        |
|               |                       | B    | 13.404                            | 1.049                             | 0.000   | 0.000  | 0.09        |
|               |                       | C    | 26.400                            | 0.000                             | 0.000   | 0.000  | 0.33        |
| T4            | 100.00-80.00          | A    | 56.250                            | 0.000                             | 0.000   | 0.000  | 0.53        |
|               |                       | B    | 15.300                            | 5.843                             | 0.000   | 0.000  | 0.12        |
|               |                       | C    | 26.400                            | 0.000                             | 0.000   | 0.000  | 0.33        |
| T5            | 80.00-60.00           | A    | 56.250                            | 0.000                             | 0.000   | 0.000  | 0.53        |
|               |                       | B    | 15.300                            | 8.204                             | 0.000   | 0.000  | 0.13        |

|  |  |                                  |
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| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>7 of 33           |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Tower Section | Tower Elevation<br>ft | Face | $A_R$<br>ft <sup>2</sup> | $A_F$<br>ft <sup>2</sup> | $C_{AA}$<br>In Face<br>ft <sup>2</sup> | $C_{AA}$<br>Out Face<br>ft <sup>2</sup> | Weight<br>K |
|---------------|-----------------------|------|--------------------------|--------------------------|--|---|-------------|
| T6            | 60.00-40.00           | C    | 26.400                   | 0.000                    | 0.000                                  | 0.000                                   | 0.33        |
|               |                       | A    | 56.250                   | 0.000                    | 0.000                                  | 0.000                                   | 0.53        |
|               |                       | B    | 15.300                   | 9.516                    | 0.000                                  | 0.000                                   | 0.13        |
| T7            | 40.00-20.00           | C    | 26.400                   | 0.000                    | 0.000                                  | 0.000                                   | 0.33        |
|               |                       | A    | 56.250                   | 0.000                    | 0.000                                  | 0.000                                   | 0.53        |
|               |                       | B    | 16.238                   | 9.516                    | 0.000                                  | 0.000                                   | 0.14        |
| T8            | 20.00-0.00            | C    | 26.400                   | 0.000                    | 0.000                                  | 0.000                                   | 0.33        |
|               |                       | A    | 33.750                   | 0.000                    | 0.000                                  | 0.000                                   | 0.32        |
|               |                       | B    | 9.760                    | 5.710                    | 0.000                                  | 0.000                                   | 0.08        |
|               |                       | C    | 15.840                   | 0.000                    | 0.000                                  | 0.000                                   | 0.20        |

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

| Tower Section | Tower Elevation<br>ft | Face or Leg | Ice Thickness<br>in | $A_R$<br>ft <sup>2</sup> | $A_F$<br>ft <sup>2</sup> | $C_{AA}$<br>In Face<br>ft <sup>2</sup> | $C_{AA}$<br>Out Face<br>ft <sup>2</sup> | Weight<br>K |
|---------------|-----------------------|-------------|---------------------|--------------------------|--------------------------|--|---|-------------|
| T1            | 160.00-140.00         | A           | 0.500               | 45.948                   | 0.000                    | 0.000                                  | 0.000                                   | 0.50        |
|               |                       | B           |                     | 13.283                   | 1.333                    | 0.000                                  | 0.000                                   | 0.13        |
|               |                       | C           |                     | 31.490                   | 0.000                    | 0.000                                  | 0.000                                   | 0.52        |
| T2            | 140.00-120.00         | A           | 0.500               | 87.917                   | 0.000                    | 0.000                                  | 0.000                                   | 1.33        |
|               |                       | B           |                     | 20.933                   | 1.333                    | 0.000                                  | 0.000                                   | 0.20        |
|               |                       | C           |                     | 39.733                   | 0.000                    | 0.000                                  | 0.000                                   | 0.75        |
| T3            | 120.00-100.00         | A           | 0.500               | 87.917                   | 0.000                    | 0.000                                  | 0.000                                   | 1.33        |
|               |                       | B           |                     | 24.362                   | 2.827                    | 0.000                                  | 0.000                                   | 0.24        |
|               |                       | C           |                     | 39.733                   | 0.000                    | 0.000                                  | 0.000                                   | 0.75        |
| T4            | 100.00-80.00          | A           | 0.500               | 87.917                   | 0.000                    | 0.000                                  | 0.000                                   | 1.33        |
|               |                       | B           |                     | 27.967                   | 10.065                   | 0.000                                  | 0.000                                   | 0.35        |
|               |                       | C           |                     | 39.733                   | 0.000                    | 0.000                                  | 0.000                                   | 0.75        |
| T5            | 80.00-60.00           | A           | 0.500               | 87.917                   | 0.000                    | 0.000                                  | 0.000                                   | 1.33        |
|               |                       | B           |                     | 27.967                   | 13.426                   | 0.000                                  | 0.000                                   | 0.38        |
|               |                       | C           |                     | 39.733                   | 0.000                    | 0.000                                  | 0.000                                   | 0.75        |
| T6            | 60.00-40.00           | A           | 0.500               | 87.917                   | 0.000                    | 0.000                                  | 0.000                                   | 1.33        |
|               |                       | B           |                     | 27.967                   | 15.294                   | 0.000                                  | 0.000                                   | 0.40        |
|               |                       | C           |                     | 39.733                   | 0.000                    | 0.000                                  | 0.000                                   | 0.75        |
| T7            | 40.00-20.00           | A           | 0.500               | 87.917                   | 0.000                    | 0.000                                  | 0.000                                   | 1.33        |
|               |                       | B           |                     | 30.522                   | 15.294                   | 0.000                                  | 0.000                                   | 0.42        |
|               |                       | C           |                     | 39.733                   | 0.000                    | 0.000                                  | 0.000                                   | 0.75        |
| T8            | 20.00-0.00            | A           | 0.500               | 52.750                   | 0.000                    | 0.000                                  | 0.000                                   | 0.80        |
|               |                       | B           |                     | 18.360                   | 9.176                    | 0.000                                  | 0.000                                   | 0.25        |
|               |                       | C           |                     | 23.840                   | 0.000                    | 0.000                                  | 0.000                                   | 0.45        |

### Feed Line Shielding

| Section | Elevation<br>ft | Face | $A_R$<br>ft <sup>2</sup> | $A_R$<br>Ice<br>ft <sup>2</sup> | $A_F$<br>ft <sup>2</sup> | $A_F$<br>Ice<br>ft <sup>2</sup> |
|---------|-----------------|------|--------------------------|---------------------------------|--------------------------|---------------------------------|
| T1      | 160.00-140.00   | A    | 0.000                    | 0.000                           | 2.188                    | 4.839                           |
|         |                 | B    | 0.000                    | 0.000                           | 0.536                    | 1.539                           |
|         |                 | C    | 0.000                    | 0.000                           | 1.580                    | 3.317                           |
| T2      | 140.00-120.00   | A    | 0.000                    | 0.000                           | 4.840                    | 10.086                          |
|         |                 | B    | 0.000                    | 0.000                           | 0.998                    | 2.554                           |
|         |                 | C    | 0.000                    | 0.000                           | 2.271                    | 4.558                           |
| T3      | 120.00-100.00   | A    | 0.000                    | 0.000                           | 5.817                    | 11.517                          |
|         |                 | B    | 0.000                    | 0.000                           | 1.495                    | 3.591                           |

|  |  |                                  |
|--|--|----------------------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>8 of 33           |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Section | Elevation    | Face | $A_R$           | $A_R$                  | $A_F$           | $A_F$                  |
|---------|--------------|------|-----------------|------------------------|-----------------|------------------------|
|         | ft           |      | ft <sup>2</sup> | Ice<br>ft <sup>2</sup> | ft <sup>2</sup> | Ice<br>ft <sup>2</sup> |
| T4      | 100.00-80.00 | C    | 0.000           | 0.000                  | 2.730           | 5.205                  |
|         |              | A    | 0.000           | 0.000                  | 6.808           | 13.005                 |
|         |              | B    | 0.000           | 0.000                  | 2.559           | 5.839                  |
|         |              | C    | 0.000           | 0.000                  | 3.195           | 5.877                  |
| T5      | 80.00-60.00  | A    | 0.000           | 0.000                  | 4.744           | 9.062                  |
|         |              | B    | 0.000           | 0.000                  | 1.982           | 4.467                  |
|         |              | C    | 0.000           | 0.000                  | 2.226           | 4.095                  |
| T6      | 60.00-40.00  | A    | 0.000           | 0.000                  | 3.770           | 7.015                  |
|         |              | B    | 0.000           | 0.000                  | 1.663           | 3.629                  |
|         |              | C    | 0.000           | 0.000                  | 1.769           | 3.170                  |
| T7      | 40.00-20.00  | A    | 0.000           | 0.000                  | 3.678           | 6.843                  |
|         |              | B    | 0.000           | 0.000                  | 1.684           | 3.739                  |
|         |              | C    | 0.000           | 0.000                  | 1.726           | 3.093                  |
| T8      | 20.00-0.00   | A    | 0.000           | 0.000                  | 2.475           | 4.513                  |
|         |              | B    | 0.000           | 0.000                  | 1.134           | 2.470                  |
|         |              | C    | 0.000           | 0.000                  | 1.161           | 2.039                  |

### Feed Line Center of Pressure

| Section | Elevation     | $CP_X$  | $CP_Z$  | $CP_X$    | $CP_Z$    |
|---------|---------------|---------|---------|-----------|-----------|
|         | ft            | in      | in      | Ice<br>in | Ice<br>in |
| T1      | 160.00-140.00 | 1.6377  | -3.7832 | 1.6446    | -4.5436   |
| T2      | 140.00-120.00 | -4.3221 | -0.1166 | -4.3293   | -0.9396   |
| T3      | 120.00-100.00 | -3.4521 | 0.2086  | -3.4203   | -0.6038   |
| T4      | 100.00-80.00  | -1.2814 | 0.9400  | -1.1085   | 0.2430    |
| T5      | 80.00-60.00   | 0.0693  | 0.1789  | 0.4344    | -0.9120   |
| T6      | 60.00-40.00   | 0.6325  | 0.3734  | 1.0879    | -0.8740   |
| T7      | 40.00-20.00   | 1.1292  | 0.5385  | 2.0027    | -0.6902   |
| T8      | 20.00-0.00    | 0.8061  | 0.3749  | 1.4969    | -0.4844   |

### Discrete Tower Loads

| Description                            | Face<br>or<br>Leg | Offset<br>Type | Offsets:<br>Horz<br>Lateral<br>Vert | Azimuth<br>Adjustment | Placement | $C_{AA}$<br>Front  | $C_{AA}$<br>Side | Weight       |              |
|--|-------------------|----------------|-------------------------------------|-----------------------|-----------|--------------------|------------------|--------------|--------------|
|  |                   |                | ft<br>ft<br>ft                      | °                     | ft        | ft <sup>2</sup>    | ft <sup>2</sup>  | K            |              |
| (2)<br>AM-X-CD-14-65-00T-RET<br>(AT&T) | A                 | From Face      | 2.00<br>0.00<br>0.00                | 0.0000                | 169.00    | No Ice<br>1/2" Ice | 5.51<br>5.90     | 2.83<br>3.14 | 0.04<br>0.07 |
| (2)<br>AM-X-CD-14-65-00T-RET<br>(AT&T) | B                 | From Face      | 2.00<br>0.00<br>0.00                | 0.0000                | 169.00    | No Ice<br>1/2" Ice | 5.51<br>5.90     | 2.83<br>3.14 | 0.04<br>0.07 |
| (2)<br>AM-X-CD-14-65-00T-RET<br>(AT&T) | C                 | From Face      | 2.00<br>0.00<br>0.00                | 0.0000                | 169.00    | No Ice<br>1/2" Ice | 5.51<br>5.90     | 2.83<br>3.14 | 0.04<br>0.07 |
| (2) TT19-08BP111-001 TMA<br>(AT&T)     | A                 | From Face      | 2.00<br>0.00<br>0.00                | 0.0000                | 169.00    | No Ice<br>1/2" Ice | 0.00<br>0.00     | 0.52<br>0.62 | 0.02<br>0.02 |

|  |                |  |  |  |                    |  |                   |  |
|--|----------------|--|--|--|--------------------|--|-------------------|--|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b>     |  | 16071.20 - CT1144                                      |  | <b>Page</b>        |  | 9 of 33           |  |
|  | <b>Project</b> |  | 160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT |  | <b>Date</b>        |  | 09:35:08 08/30/16 |  |
|  | <b>Client</b>  |  | AT&T Mobility  |  | <b>Designed by</b> |  | TJL               |  |

| Description  | Face or Leg | Offset Type        | Offsets:              |      | Azimuth Adjustment | Placement | C <sub>AA</sub>    |                 | Weight         |              |
|--|-------------|--------------------|-----------------------|------|--------------------|-----------|--------------------|-----------------|----------------|--------------|
|  |             |                    | Horz Lateral          | Vert |                    |           | Front              | Side            |                |              |
|  |             |                    | ft                    | ft   | °                  | ft        | ft <sup>2</sup>    | ft <sup>2</sup> | K              |              |
| (2) TT19-08BP111-001 TMA (AT&T)                      | B           | From Face          | 2.00<br>0.00<br>0.00  |      | 0.0000             | 169.00    | No Ice<br>1/2" Ice | 0.00<br>0.00    | 0.52<br>0.62   | 0.02<br>0.02 |
| (2) TT19-08BP111-001 TMA (AT&T)                      | C           | From Face          | 2.00<br>0.00<br>0.00  |      | 0.0000             | 169.00    | No Ice<br>1/2" Ice | 0.00<br>0.00    | 0.52<br>0.62   | 0.02<br>0.02 |
| QS66512-2 (AT&T - Proposed)                          | A           | From Face          | 2.00<br>0.00<br>0.00  |      | 0.0000             | 169.00    | No Ice<br>1/2" Ice | 8.40<br>8.95    | 6.80<br>7.27   | 0.11<br>0.17 |
| QS66512-2 (AT&T - Proposed)                          | B           | From Face          | 2.00<br>0.00<br>0.00  |      | 0.0000             | 169.00    | No Ice<br>1/2" Ice | 8.40<br>8.95    | 6.80<br>7.27   | 0.11<br>0.17 |
| QS66512-2 (AT&T - Proposed)                          | C           | From Face          | 2.00<br>0.00<br>0.00  |      | 0.0000             | 169.00    | No Ice<br>1/2" Ice | 8.40<br>8.95    | 6.80<br>7.27   | 0.11<br>0.17 |
| RRUS-12 (AT&T - Proposed)                            | A           | From Face          | 2.00<br>0.00<br>0.00  |      | 0.0000             | 169.00    | No Ice<br>1/2" Ice | 0.00<br>0.00    | 1.49<br>1.67   | 0.06<br>0.08 |
| RRUS-12 (AT&T - Proposed)                            | B           | From Face          | 2.00<br>0.00<br>0.00  |      | 0.0000             | 169.00    | No Ice<br>1/2" Ice | 0.00<br>0.00    | 1.49<br>1.67   | 0.06<br>0.08 |
| RRUS-12 (AT&T - Proposed)                            | C           | From Face          | 2.00<br>0.00<br>0.00  |      | 0.0000             | 169.00    | No Ice<br>1/2" Ice | 0.00<br>0.00    | 1.49<br>1.67   | 0.06<br>0.08 |
| A2 (AT&T - Proposed)                                 | A           | From Face          | 2.00<br>0.00<br>0.00  |      | 0.0000             | 169.00    | No Ice<br>1/2" Ice | 0.00<br>0.00    | 0.54<br>0.67   | 0.02<br>0.03 |
| A2 (AT&T - Proposed)                                 | B           | From Face          | 2.00<br>0.00<br>0.00  |      | 0.0000             | 169.00    | No Ice<br>1/2" Ice | 0.00<br>0.00    | 0.54<br>0.67   | 0.02<br>0.03 |
| A2 (AT&T - Proposed)                                 | C           | From Face          | 2.00<br>0.00<br>0.00  |      | 0.0000             | 169.00    | No Ice<br>1/2" Ice | 0.00<br>0.00    | 0.54<br>0.67   | 0.02<br>0.03 |
| DC6-48-60-18-8F Surge Arrestor (AT&T - Proposed)     | A           | From Face          | 2.00<br>0.00<br>0.00  |      | 0.0000             | 169.00    | No Ice<br>1/2" Ice | 2.23<br>2.45    | 2.23<br>2.45   | 0.02<br>0.04 |
| P8 x18-ft Pipe Mast (AT&T)                           | C           | From Centroid-Face | 0.00<br>0.00<br>0.00  |      | 0.0000             | 161.00    | No Ice<br>1/2" Ice | 15.53<br>16.61  | 15.53<br>16.61 | 0.51<br>0.62 |
| Valmont 10'-6" T-Armx 3 (Colo Kit P/N 802738) (AT&T) | C           | From Centroid-Face | 0.00<br>0.00<br>0.00  |      | 0.0000             | 169.00    | No Ice<br>1/2" Ice | 15.97<br>20.77  | 15.97<br>20.77 | 0.47<br>0.59 |
| LPA-80063-4CF (Verizon)                              | A           | From Leg           | 5.00<br>-6.00<br>0.00 |      | 0.0000             | 156.50    | No Ice<br>1/2" Ice | 7.00<br>7.41    | 6.04<br>6.43   | 0.02<br>0.07 |
| SBNHH-1D65B (Verizon)                                | A           | From Leg           | 5.00<br>-4.00<br>0.00 |      | 0.0000             | 156.50    | No Ice<br>1/2" Ice | 8.33<br>8.88    | 5.34<br>5.79   | 0.04<br>0.09 |
| BXA-70040/6CF (Verizon)                              | A           | From Leg           | 5.00<br>0.00<br>0.00  |      | 0.0000             | 156.50    | No Ice<br>1/2" Ice | 16.31<br>16.93  | 5.72<br>6.17   | 0.04<br>0.12 |
| SBNHH-1D65B (Verizon)                                | A           | From Leg           | 5.00<br>-4.00<br>0.00 |      | 0.0000             | 156.50    | No Ice<br>1/2" Ice | 8.33<br>8.88    | 5.34<br>5.79   | 0.04<br>0.09 |
| LPA-80063-4CF (Verizon)                              | A           | From Leg           | 5.00<br>6.00<br>0.00  |      | 0.0000             | 156.50    | No Ice<br>1/2" Ice | 7.00<br>7.41    | 6.04<br>6.43   | 0.02<br>0.07 |

|  |                |  |                    |                   |
|--|----------------|--|--------------------|-------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b>     | 16071.20 - CT1144                                      | <b>Page</b>        | 10 of 33          |
|  | <b>Project</b> | 160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b>        | 09:35:08 08/30/16 |
|  | <b>Client</b>  | AT&T Mobility  | <b>Designed by</b> | TJL               |

| Description                   | Face or Leg | Offset Type | Offsets:              |        | Azimuth Adjustment | Placement | C <sub>AA</sub>    |                 | Weight       |              |
|-------------------------------|-------------|-------------|-----------------------|--------|--------------------|-----------|--------------------|-----------------|--------------|--------------|
|                               |             |             | Horz                  | Vert   |                    |           | Front              | Side            |              |              |
|                               |             |             | ft                    | ft     | °                  | ft        | ft <sup>2</sup>    | ft <sup>2</sup> | K            |              |
| LPA-80063-4CF<br>(Verizon)    | B           | From Leg    | 5.00<br>-6.00<br>0.00 | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 7.00<br>7.41    | 6.04<br>6.43 | 0.02<br>0.07 |
| SBNHH-1D65B<br>(Verizon)      | B           | From Leg    | 5.00<br>-4.00<br>0.00 | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 8.33<br>8.88    | 5.34<br>5.79 | 0.04<br>0.09 |
| BXA-70040/6CF<br>(Verizon)    | B           | From Leg    | 5.00<br>0.00<br>0.00  | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 16.31<br>16.93  | 5.72<br>6.17 | 0.04<br>0.12 |
| SBNHH-1D65B<br>(Verizon)      | B           | From Leg    | 5.00<br>-4.00<br>0.00 | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 8.33<br>8.88    | 5.34<br>5.79 | 0.04<br>0.09 |
| LPA-80063-4CF<br>(Verizon)    | B           | From Leg    | 5.00<br>6.00<br>0.00  | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 7.00<br>7.41    | 6.04<br>6.43 | 0.02<br>0.07 |
| LPA-80063-4CF<br>(Verizon)    | C           | From Leg    | 5.00<br>-6.00<br>0.00 | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 7.00<br>7.41    | 6.04<br>6.43 | 0.02<br>0.07 |
| SBNHH-1D65B<br>(Verizon)      | C           | From Leg    | 5.00<br>-4.00<br>0.00 | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 8.33<br>8.88    | 5.34<br>5.79 | 0.04<br>0.09 |
| BXA-70063/6CF<br>(Verizon)    | C           | From Leg    | 5.00<br>0.00<br>0.00  | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 7.73<br>8.27    | 4.16<br>4.60 | 0.01<br>0.05 |
| SBNHH-1D65B<br>(Verizon)      | C           | From Leg    | 5.00<br>-4.00<br>0.00 | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 8.33<br>8.88    | 5.34<br>5.79 | 0.04<br>0.09 |
| LPA-80063-4CF<br>(Verizon)    | C           | From Leg    | 5.00<br>6.00<br>0.00  | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 7.00<br>7.41    | 6.04<br>6.43 | 0.02<br>0.07 |
| RRH4x45/2x90-AWS<br>(Verizon) | A           | From Leg    | 4.00<br>4.00<br>0.00  | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 3.01<br>3.26    | 1.91<br>2.13 | 0.08<br>0.10 |
| RRH4x45/2x90-AWS<br>(Verizon) | B           | From Leg    | 4.00<br>4.00<br>0.00  | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 3.01<br>3.26    | 1.91<br>2.13 | 0.08<br>0.10 |
| RRH4x45/2x90-AWS<br>(Verizon) | C           | From Leg    | 4.00<br>4.00<br>0.00  | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 3.01<br>3.26    | 1.91<br>2.13 | 0.08<br>0.10 |
| RRH2x60-PCS<br>(Verizon)      | A           | From Leg    | 4.00<br>-4.00<br>0.00 | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 2.51<br>2.73    | 1.55<br>1.74 | 0.06<br>0.07 |
| RRH2x60-PCS<br>(Verizon)      | B           | From Leg    | 4.00<br>-4.00<br>0.00 | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 2.51<br>2.73    | 1.55<br>1.74 | 0.06<br>0.07 |
| RRH2x60-PCS<br>(Verizon)      | C           | From Leg    | 4.00<br>-4.00<br>0.00 | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 2.51<br>2.73    | 1.55<br>1.74 | 0.06<br>0.07 |
| RRH4x30-B13<br>(Verizon)      | A           | From Leg    | 4.00<br>0.00<br>0.00  | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 0.00<br>0.00    | 1.89<br>2.09 | 0.06<br>0.08 |
| RRH4x30-B13<br>(Verizon)      | B           | From Leg    | 4.00<br>0.00<br>0.00  | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 0.00<br>0.00    | 1.89<br>2.09 | 0.06<br>0.08 |
| RRH4x30-B13<br>(Verizon)      | C           | From Leg    | 4.00<br>0.00<br>0.00  | 0.0000 |                    | 156.50    | No Ice<br>1/2" Ice | 0.00<br>0.00    | 1.89<br>2.09 | 0.06<br>0.08 |

|  |                |  |             |                    |                   |
|--|----------------|--|-------------|--------------------|-------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b>     | 16071.20 - CT1144                                      | <b>Page</b> | 11 of 33           |                   |
|  | <b>Project</b> | 160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT |             | <b>Date</b>        | 09:35:08 08/30/16 |
|  | <b>Client</b>  | AT&T Mobility  |             | <b>Designed by</b> | TJL               |

| Description                             | Face or Leg | Offset Type | Offsets:             |      | Azimuth Adjustment | Placement | C <sub>AA</sub> Front | C <sub>AA</sub> Side | Weight       |              |
|---|-------------|-------------|----------------------|------|--------------------|-----------|-----------------------|----------------------|--------------|--------------|
|   |             |             | Horz                 | Vert |                    |           |                       |                      |              |              |
|   |             |             | ft                   | ft   | °                  | ft        | ft <sup>2</sup>       | ft <sup>2</sup>      | K            |              |
| DB-T1-6Z-8AB-0Z<br>(Verizon)            | C           | From Leg    | 0.50<br>0.00<br>0.00 |      | 0.0000             | 156.50    | No Ice<br>1/2" Ice    | 5.60<br>5.92         | 2.33<br>2.56 | 0.04<br>0.08 |
| DB-T1-6Z-8AB-0Z<br>(Verizon)            | B           | From Leg    | 0.50<br>0.00<br>0.00 |      | 0.0000             | 156.50    | No Ice<br>1/2" Ice    | 0.00<br>0.00         | 2.33<br>2.56 | 0.04<br>0.08 |
| 15' Frame<br>(Verizon)                  | A           | From Leg    | 0.50<br>0.00<br>0.00 |      | 0.0000             | 156.00    | No Ice<br>1/2" Ice    | 12.00<br>14.00       | 5.70<br>8.10 | 0.35<br>0.49 |
| 15' Frame<br>(Verizon)                  | B           | From Leg    | 0.50<br>0.00<br>0.00 |      | 0.0000             | 156.00    | No Ice<br>1/2" Ice    | 12.00<br>14.00       | 5.70<br>8.10 | 0.35<br>0.49 |
| 15' Frame<br>(Verizon)                  | C           | From Leg    | 0.50<br>0.00<br>0.00 |      | 0.0000             | 156.00    | No Ice<br>1/2" Ice    | 12.00<br>14.00       | 5.70<br>8.10 | 0.35<br>0.49 |
| APX16DWV-16DWVS-C-A<br>20<br>(T-Mobile) | A           | From Leg    | 4.00<br>0.00<br>0.00 |      | 0.0000             | 147.00    | No Ice<br>1/2" Ice    | 7.07<br>7.52         | 2.15<br>2.49 | 0.04<br>0.07 |
| APX16DWV-16DWVS-C-A<br>20<br>(T-Mobile) | B           | From Leg    | 4.00<br>0.00<br>0.00 |      | 0.0000             | 147.00    | No Ice<br>1/2" Ice    | 7.07<br>7.52         | 2.15<br>2.49 | 0.04<br>0.07 |
| APX16DWV-16DWVS-C-A<br>20<br>(T-Mobile) | C           | From Leg    | 4.00<br>0.00<br>0.00 |      | 0.0000             | 147.00    | No Ice<br>1/2" Ice    | 7.07<br>7.52         | 2.15<br>2.49 | 0.04<br>0.07 |
| (2) AIR21<br>(T-Mobile)                 | A           | From Leg    | 4.00<br>0.00<br>0.00 |      | 0.0000             | 147.00    | No Ice<br>1/2" Ice    | 6.53<br>6.98         | 4.36<br>4.77 | 0.08<br>0.12 |
| (2) AIR21<br>(T-Mobile)                 | A           | From Leg    | 4.00<br>0.00<br>0.00 |      | 0.0000             | 147.00    | No Ice<br>1/2" Ice    | 6.53<br>6.98         | 4.36<br>4.77 | 0.08<br>0.12 |
| (2) AIR21<br>(T-Mobile)                 | A           | From Leg    | 4.00<br>0.00<br>0.00 |      | 0.0000             | 147.00    | No Ice<br>1/2" Ice    | 6.53<br>6.98         | 4.36<br>4.77 | 0.08<br>0.12 |
| KRY 112 TMA<br>(T-Mobile)               | A           | From Leg    | 4.00<br>0.00<br>0.00 |      | 0.0000             | 147.00    | No Ice<br>1/2" Ice    | 0.00<br>0.00         | 0.49<br>0.59 | 0.03<br>0.03 |
| KRY 112 TMA<br>(T-Mobile)               | A           | From Leg    | 4.00<br>0.00<br>0.00 |      | 0.0000             | 147.00    | No Ice<br>1/2" Ice    | 0.00<br>0.00         | 0.49<br>0.59 | 0.03<br>0.03 |
| KRY 112 TMA<br>(T-Mobile)               | A           | From Leg    | 4.00<br>0.00<br>0.00 |      | 0.0000             | 147.00    | No Ice<br>1/2" Ice    | 0.00<br>0.00         | 0.49<br>0.59 | 0.03<br>0.03 |
| 15' Frame<br>(T-Mobile)                 | A           | From Leg    | 0.50<br>0.00<br>0.00 |      | 0.0000             | 147.00    | No Ice<br>1/2" Ice    | 7.13<br>9.71         | 5.70<br>8.10 | 0.35<br>0.49 |
| 15' Frame<br>(T-Mobile)                 | B           | From Leg    | 0.50<br>0.00<br>0.00 |      | 0.0000             | 147.00    | No Ice<br>1/2" Ice    | 7.13<br>9.71         | 5.70<br>8.10 | 0.35<br>0.49 |
| 15' Frame<br>(T-Mobile)                 | C           | From Leg    | 0.50<br>0.00<br>0.00 |      | 0.0000             | 147.00    | No Ice<br>1/2" Ice    | 7.13<br>9.71         | 5.70<br>8.10 | 0.35<br>0.49 |
| 4' Side Mount Standoff<br>(Unknown)     | C           | From Leg    | 1.75<br>0.00<br>0.00 |      | 0.0000             | 99.00     | No Ice<br>1/2" Ice    | 2.72<br>4.91         | 2.72<br>4.91 | 0.05<br>0.09 |
| 16' x 2" Dia Omni<br>(Unknown)          | C           | From Leg    | 3.50<br>0.00<br>0.00 |      | 0.0000             | 108.00    | No Ice<br>1/2" Ice    | 3.20<br>4.83         | 3.20<br>4.83 | 0.04<br>0.06 |





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| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>13 of 33          |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

**Tower Pressures - No Ice**

$G_H = 1.129$

| Section Elevation<br>ft | z<br>ft | $K_z$ | $q_z$<br>psf | $A_G$<br>ft <sup>2</sup> | F a c e | $A_F$<br>ft <sup>2</sup> | $A_R$<br>ft <sup>2</sup> | $A_{leg}$<br>ft <sup>2</sup> | Leg % | $C_{AA}$<br>In Face<br>ft <sup>2</sup> | $C_{AA}$<br>Out Face<br>ft <sup>2</sup> |
|-------------------------|---------|-------|--------------|--------------------------|---------|--------------------------|--------------------------|------------------------------|-------|--|---|
| T1<br>160.00-140.00     | 150.00  | 1.541 | 25           | 175.992                  | A       | 10.647                   | 37.948                   | 9.583                        | 19.72 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | B       | 12.299                   | 16.533                   |                              | 33.24 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | C       | 11.255                   | 30.073                   |                              | 23.19 | 0.000                                  | 0.000                                   |
| T2<br>140.00-120.00     | 130.00  | 1.48  | 24           | 195.998                  | A       | 11.183                   | 65.849                   | 9.599                        | 12.46 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | B       | 15.025                   | 21.199                   |                              | 26.50 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | C       | 13.751                   | 35.999                   |                              | 19.29 | 0.000                                  | 0.000                                   |
| T3<br>120.00-100.00     | 110.00  | 1.411 | 23           | 236.398                  | A       | 17.626                   | 65.850                   | 9.600                        | 11.50 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | B       | 22.998                   | 23.004                   |                              | 20.87 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | C       | 20.713                   | 36.000                   |                              | 16.93 | 0.000                                  | 0.000                                   |
| T4<br>100.00-80.00      | 90.00   | 1.332 | 22           | 278.441                  | A       | 25.481                   | 67.937                   | 11.687                       | 12.51 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | B       | 35.573                   | 26.987                   |                              | 18.68 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | C       | 29.094                   | 38.087                   |                              | 17.40 | 0.000                                  | 0.000                                   |
| T5<br>80.00-60.00       | 70.00   | 1.24  | 20           | 321.010                  | A       | 21.076                   | 71.276                   | 15.026                       | 16.27 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | B       | 32.041                   | 30.326                   |                              | 24.09 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | C       | 23.593                   | 41.426                   |                              | 23.11 | 0.000                                  | 0.000                                   |
| T6<br>60.00-40.00       | 50.00   | 1.126 | 18           | 363.083                  | A       | 19.350                   | 74.824                   | 18.574                       | 19.72 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | B       | 30.973                   | 33.874                   |                              | 28.64 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | C       | 21.351                   | 44.974                   |                              | 28.00 | 0.000                                  | 0.000                                   |
| T7<br>40.00-20.00       | 30.00   | 1     | 16           | 404.685                  | A       | 21.568                   | 74.829                   | 18.579                       | 19.27 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | B       | 33.078                   | 34.817                   |                              | 27.36 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | C       | 23.520                   | 44.979                   |                              | 27.12 | 0.000                                  | 0.000                                   |
| T8<br>20.00-0.00        | 10.00   | 1     | 16           | 448.055                  | A       | 28.791                   | 55.870                   | 22.120                       | 26.13 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | B       | 35.841                   | 31.880                   |                              | 32.66 | 0.000                                  | 0.000                                   |
|                         |         |       |              |                          | C       | 30.104                   | 37.960                   |                              | 32.50 | 0.000                                  | 0.000                                   |

**Tower Pressure - With Ice**

$G_H = 1.129$

| Section Elevation<br>ft | z<br>ft | $K_z$ | $q_z$<br>psf | $t_z$<br>in | $A_G$<br>ft <sup>2</sup> | F a c e | $A_F$<br>ft <sup>2</sup> | $A_R$<br>ft <sup>2</sup> | $A_{leg}$<br>ft <sup>2</sup> | Leg % | $C_{AA}$<br>In Face<br>ft <sup>2</sup> | $C_{AA}$<br>Out Face<br>ft <sup>2</sup> |
|-------------------------|---------|-------|--------------|-------------|--------------------------|---------|--------------------------|--------------------------|------------------------------|-------|--|---|
| T1<br>160.00-140.00     | 150.00  | 1.541 | 19           | 0.5000      | 177.658                  | A       | 12.687                   | 58.865                   | 12.917                       | 18.05 | 0.000                                  | 0.000                                   |
|                         |         |       |              |             |                          | B       | 17.320                   | 26.200                   |                              | 29.68 | 0.000                                  | 0.000                                   |
|                         |         |       |              |             |                          | C       | 14.210                   | 44.407                   |                              | 22.04 | 0.000                                  | 0.000                                   |
| T2<br>140.00-120.00     | 130.00  | 1.48  | 18           | 0.5000      | 197.666                  | A       | 11.278                   | 100.855                  | 12.938                       | 11.54 | 0.000                                  | 0.000                                   |
|                         |         |       |              |             |                          | B       | 20.142                   | 33.872                   |                              | 23.95 | 0.000                                  | 0.000                                   |
|                         |         |       |              |             |                          | C       | 16.805                   | 52.672                   |                              | 18.62 | 0.000                                  | 0.000                                   |
| T3<br>120.00-100.00     | 110.00  | 1.411 | 17           | 0.5000      | 238.067                  | A       | 18.178                   | 100.856                  | 12.939                       | 10.87 | 0.000                                  | 0.000                                   |
|                         |         |       |              |             |                          | B       | 28.931                   | 37.301                   |                              | 19.54 | 0.000                                  | 0.000                                   |
|                         |         |       |              |             |                          | C       | 24.490                   | 52.672                   |                              | 16.77 | 0.000                                  | 0.000                                   |
| T4<br>100.00-80.00      | 90.00   | 1.332 | 16           | 0.5000      | 280.110                  | A       | 26.460                   | 102.943                  | 15.026                       | 11.61 | 0.000                                  | 0.000                                   |
|                         |         |       |              |             |                          | B       | 43.690                   | 42.993                   |                              | 17.33 | 0.000                                  | 0.000                                   |
|                         |         |       |              |             |                          | C       | 33.587                   | 54.760                   |                              | 17.01 | 0.000                                  | 0.000                                   |
| T5<br>80.00-60.00       | 70.00   | 1.24  | 15           | 0.5000      | 322.678                  | A       | 22.495                   | 106.281                  | 18.365                       | 14.26 | 0.000                                  | 0.000                                   |
|                         |         |       |              |             |                          | B       | 40.516                   | 46.331                   |                              | 21.15 | 0.000                                  | 0.000                                   |
|                         |         |       |              |             |                          | C       | 27.462                   | 58.098                   |                              | 21.46 | 0.000                                  | 0.000                                   |

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| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>14 of 33          |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>T.J.L.     |

| Section Elevation<br>ft | z<br>ft | K <sub>Z</sub> | q <sub>z</sub><br>psf | t <sub>z</sub><br>in | A <sub>G</sub><br>ft <sup>2</sup> | F a c e<br>ft <sup>2</sup> | A <sub>F</sub><br>ft <sup>2</sup> | A <sub>R</sub><br>ft <sup>2</sup> | A <sub>leg</sub><br>ft <sup>2</sup> | Leg %                   | C <sub>AA</sub><br>In Face<br>ft <sup>2</sup> | C <sub>AA</sub><br>Out Face<br>ft <sup>2</sup> |
|-------------------------|---------|----------------|-----------------------|----------------------|-----------------------------------|----------------------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------|---|--|
| T6 60.00-40.00          | 50.00   | 1.126          | 14                    | 0.5000               | 364.752                           | A<br>B<br>C                | 20.509<br>39.189<br>24.354        | 109.830<br>49.880<br>61.646       | 21.913                              | 16.81<br>24.60<br>25.48 | 0.000<br>0.000<br>0.000                       | 0.000<br>0.000<br>0.000                        |
| T7 40.00-20.00          | 30.00   | 1              | 12                    | 0.5000               | 406.354                           | A<br>B<br>C                | 23.211<br>41.609<br>26.962        | 109.836<br>52.441<br>61.652       | 21.919                              | 16.47<br>23.31<br>24.74 | 0.000<br>0.000<br>0.000                       | 0.000<br>0.000<br>0.000                        |
| T8 20.00-0.00           | 10.00   | 1              | 12                    | 0.5000               | 449.724                           | A<br>B<br>C                | 31.964<br>43.184<br>34.438        | 78.209<br>43.819<br>49.299        | 25.459                              | 23.11<br>29.26<br>30.40 | 0.000<br>0.000<br>0.000                       | 0.000<br>0.000<br>0.000                        |

### Tower Pressure - Service

$$G_H = 1.129$$

| Section Elevation<br>ft | z<br>ft | K <sub>Z</sub> | q <sub>z</sub><br>psf | A <sub>G</sub><br>ft <sup>2</sup> | F a c e<br>ft <sup>2</sup> | A <sub>F</sub><br>ft <sup>2</sup> | A <sub>R</sub><br>ft <sup>2</sup> | A <sub>leg</sub><br>ft <sup>2</sup> | Leg %                   | C <sub>AA</sub><br>In Face<br>ft <sup>2</sup> | C <sub>AA</sub><br>Out Face<br>ft <sup>2</sup> |
|-------------------------|---------|----------------|-----------------------|-----------------------------------|----------------------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------|---|--|
| T1<br>160.00-140.00     | 150.00  | 1.541          | 10                    | 175.992                           | A<br>B<br>C                | 10.647<br>12.299<br>11.255        | 37.948<br>16.533<br>30.073        | 9.583                               | 19.72<br>33.24<br>23.19 | 0.000<br>0.000<br>0.000                       | 0.000<br>0.000<br>0.000                        |
| T2<br>140.00-120.00     | 130.00  | 1.48           | 9                     | 195.998                           | A<br>B<br>C                | 11.183<br>15.025<br>13.751        | 65.849<br>21.199<br>35.999        | 9.599                               | 12.46<br>26.50<br>19.29 | 0.000<br>0.000<br>0.000                       | 0.000<br>0.000<br>0.000                        |
| T3<br>120.00-100.00     | 110.00  | 1.411          | 9                     | 236.398                           | A<br>B<br>C                | 17.626<br>22.998<br>20.713        | 65.850<br>23.004<br>36.000        | 9.600                               | 11.50<br>20.87<br>16.93 | 0.000<br>0.000<br>0.000                       | 0.000<br>0.000<br>0.000                        |
| T4<br>100.00-80.00      | 90.00   | 1.332          | 9                     | 278.441                           | A<br>B<br>C                | 25.481<br>35.573<br>29.094        | 67.937<br>26.987<br>38.087        | 11.687                              | 12.51<br>18.68<br>17.40 | 0.000<br>0.000<br>0.000                       | 0.000<br>0.000<br>0.000                        |
| T5 80.00-60.00          | 70.00   | 1.24           | 8                     | 321.010                           | A<br>B<br>C                | 21.076<br>32.041<br>23.593        | 71.276<br>30.326<br>41.426        | 15.026                              | 16.27<br>24.09<br>23.11 | 0.000<br>0.000<br>0.000                       | 0.000<br>0.000<br>0.000                        |
| T6 60.00-40.00          | 50.00   | 1.126          | 7                     | 363.083                           | A<br>B<br>C                | 19.350<br>30.973<br>21.351        | 74.824<br>33.874<br>44.974        | 18.574                              | 19.72<br>28.64<br>28.00 | 0.000<br>0.000<br>0.000                       | 0.000<br>0.000<br>0.000                        |
| T7 40.00-20.00          | 30.00   | 1              | 6                     | 404.685                           | A<br>B<br>C                | 21.568<br>33.078<br>23.520        | 74.829<br>34.817<br>44.979        | 18.579                              | 19.27<br>27.36<br>27.12 | 0.000<br>0.000<br>0.000                       | 0.000<br>0.000<br>0.000                        |
| T8 20.00-0.00           | 10.00   | 1              | 6                     | 448.055                           | A<br>B<br>C                | 28.791<br>35.841<br>30.104        | 55.870<br>31.880<br>37.960        | 22.120                              | 26.13<br>32.66<br>32.50 | 0.000<br>0.000<br>0.000                       | 0.000<br>0.000<br>0.000                        |

### Tower Forces - No Ice - Wind Normal To Face

| Section Elevation<br>ft | Add Weight<br>K | Self Weight<br>K | F a c e<br>e | C <sub>F</sub>          | R <sub>R</sub>          | D <sub>F</sub>          | D <sub>R</sub> | A <sub>E</sub><br>ft <sup>2</sup> | F<br>K | w<br>plf | Ctrl.<br>Face |
|-------------------------|-----------------|------------------|--------------|-------------------------|-------------------------|-------------------------|----------------|-----------------------------------|--------|----------|---------------|
| T1<br>160.00-140.00     | 0.45            | 1.15             | A<br>B<br>C  | 0.276<br>0.164<br>0.235 | 2.361<br>2.721<br>2.484 | 0.609<br>0.584<br>0.598 | 1<br>1<br>1    | 33.753<br>21.949<br>29.242        | 2.27   | 113.61   | A             |

|  |  |                                  |
|--|--|----------------------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>15 of 33          |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Section Elevation<br>ft | Add Weight<br>K | Self Weight<br>K | F a c e | e     | C <sub>F</sub> | R <sub>R</sub> | D <sub>F</sub> | D <sub>R</sub> | A <sub>E</sub><br>ft <sup>2</sup> | F<br>K | w<br>plf | Ctrl. Face |
|-------------------------|-----------------|------------------|---------|-------|----------------|----------------|----------------|----------------|-----------------------------------|--------|----------|------------|
| T2<br>140.00-120.00     | 0.93            | 1.29             | A       | 0.393 | 2.078          | 0.649          | 1              | 1              | 53.905                            | 3.07   | 153.26   | A          |
|                         |                 |                  | B       | 0.185 | 2.647          | 0.587          | 1              | 1              | 27.477                            |        |          |            |
|                         |                 |                  | C       | 0.254 | 2.426          | 0.603          | 1              | 1              | 35.454                            |        |          |            |
| T3<br>120.00-100.00     | 0.95            | 1.52             | A       | 0.353 | 2.164          | 0.634          | 1              | 1              | 59.348                            | 3.35   | 167.55   | A          |
|                         |                 |                  | B       | 0.195 | 2.614          | 0.589          | 1              | 1              | 36.555                            |        |          |            |
|                         |                 |                  | C       | 0.24  | 2.468          | 0.599          | 1              | 1              | 42.290                            |        |          |            |
| T4<br>100.00-80.00      | 0.98            | 2.08             | A       | 0.336 | 2.206          | 0.627          | 1              | 1              | 68.106                            | 3.70   | 185.05   | A          |
|                         |                 |                  | B       | 0.225 | 2.516          | 0.596          | 1              | 1              | 51.651                            |        |          |            |
|                         |                 |                  | C       | 0.241 | 2.464          | 0.6            | 1              | 1              | 51.935                            |        |          |            |
| T5<br>80.00-60.00       | 0.99            | 2.46             | A       | 0.288 | 2.329          | 0.612          | 1              | 1              | 64.711                            | 3.46   | 172.80   | A          |
|                         |                 |                  | B       | 0.194 | 2.615          | 0.589          | 1              | 1              | 49.911                            |        |          |            |
|                         |                 |                  | C       | 0.203 | 2.588          | 0.591          | 1              | 1              | 48.072                            |        |          |            |
| T6<br>60.00-40.00       | 0.99            | 2.65             | A       | 0.259 | 2.41           | 0.604          | 1              | 1              | 64.567                            | 3.24   | 162.02   | A          |
|                         |                 |                  | B       | 0.179 | 2.669          | 0.586          | 1              | 1              | 50.832                            |        |          |            |
|                         |                 |                  | C       | 0.183 | 2.655          | 0.587          | 1              | 1              | 47.751                            |        |          |            |
| T7<br>40.00-20.00       | 1.00            | 2.78             | A       | 0.238 | 2.473          | 0.599          | 1              | 1              | 66.386                            | 3.04   | 151.84   | A          |
|                         |                 |                  | B       | 0.168 | 2.707          | 0.584          | 1              | 1              | 53.424                            |        |          |            |
|                         |                 |                  | C       | 0.169 | 2.702          | 0.585          | 1              | 1              | 49.815                            |        |          |            |
| T8 20.00-0.00           | 0.60            | 3.28             | A       | 0.189 | 2.633          | 0.588          | 1              | 1              | 61.654                            | 3.00   | 150.14   | A          |
|                         |                 |                  | B       | 0.151 | 2.767          | 0.582          | 1              | 1              | 54.384                            |        |          |            |
|                         |                 |                  | C       | 0.152 | 2.764          | 0.582          | 1              | 1              | 52.188                            |        |          |            |
| Sum Weight:             | 6.87            | 17.21            |         |       |                |                |                | OTM            | 1966.05<br>kip-ft                 | 25.13  |          |            |

### Tower Forces - No Ice - Wind 60 To Face

| Section Elevation<br>ft | Add Weight<br>K | Self Weight<br>K | F a c e | e     | C <sub>F</sub> | R <sub>R</sub> | D <sub>F</sub> | D <sub>R</sub> | A <sub>E</sub><br>ft <sup>2</sup> | F<br>K | w<br>plf | Ctrl. Face |
|-------------------------|-----------------|------------------|---------|-------|----------------|----------------|----------------|----------------|-----------------------------------|--------|----------|------------|
| T1<br>160.00-140.00     | 0.45            | 1.15             | A       | 0.276 | 2.361          | 0.609          | 0.8            | 1              | 31.624                            | 2.13   | 106.44   | A          |
|                         |                 |                  | B       | 0.164 | 2.721          | 0.584          | 0.8            | 1              | 19.489                            |        |          |            |
|                         |                 |                  | C       | 0.235 | 2.484          | 0.598          | 0.8            | 1              | 26.991                            |        |          |            |
| T2<br>140.00-120.00     | 0.93            | 1.29             | A       | 0.393 | 2.078          | 0.649          | 0.8            | 1              | 51.668                            | 2.94   | 146.90   | A          |
|                         |                 |                  | B       | 0.185 | 2.647          | 0.587          | 0.8            | 1              | 24.473                            |        |          |            |
|                         |                 |                  | C       | 0.254 | 2.426          | 0.603          | 0.8            | 1              | 32.703                            |        |          |            |
| T3<br>120.00-100.00     | 0.95            | 1.52             | A       | 0.353 | 2.164          | 0.634          | 0.8            | 1              | 55.823                            | 3.15   | 157.60   | A          |
|                         |                 |                  | B       | 0.195 | 2.614          | 0.589          | 0.8            | 1              | 31.955                            |        |          |            |
|                         |                 |                  | C       | 0.24  | 2.468          | 0.599          | 0.8            | 1              | 38.147                            |        |          |            |
| T4<br>100.00-80.00      | 0.98            | 2.08             | A       | 0.336 | 2.206          | 0.627          | 0.8            | 1              | 63.009                            | 3.42   | 171.20   | A          |
|                         |                 |                  | B       | 0.225 | 2.516          | 0.596          | 0.8            | 1              | 44.536                            |        |          |            |
|                         |                 |                  | C       | 0.241 | 2.464          | 0.6            | 0.8            | 1              | 46.116                            |        |          |            |
| T5<br>80.00-60.00       | 0.99            | 2.46             | A       | 0.288 | 2.329          | 0.612          | 0.8            | 1              | 60.496                            | 3.23   | 161.54   | A          |
|                         |                 |                  | B       | 0.194 | 2.615          | 0.589          | 0.8            | 1              | 43.502                            |        |          |            |
|                         |                 |                  | C       | 0.203 | 2.588          | 0.591          | 0.8            | 1              | 43.354                            |        |          |            |
| T6<br>60.00-40.00       | 0.99            | 2.65             | A       | 0.259 | 2.41           | 0.604          | 0.8            | 1              | 60.697                            | 3.05   | 152.31   | A          |
|                         |                 |                  | B       | 0.179 | 2.669          | 0.586          | 0.8            | 1              | 44.638                            |        |          |            |
|                         |                 |                  | C       | 0.183 | 2.655          | 0.587          | 0.8            | 1              | 43.481                            |        |          |            |
| T7<br>40.00-20.00       | 1.00            | 2.78             | A       | 0.238 | 2.473          | 0.599          | 0.8            | 1              | 62.072                            | 2.84   | 141.98   | A          |
|                         |                 |                  | B       | 0.168 | 2.707          | 0.584          | 0.8            | 1              | 46.808                            |        |          |            |
|                         |                 |                  | C       | 0.169 | 2.702          | 0.585          | 0.8            | 1              | 45.111                            |        |          |            |
| T8 20.00-0.00           | 0.60            | 3.28             | A       | 0.189 | 2.633          | 0.588          | 0.8            | 1              | 55.896                            | 2.72   | 136.12   | A          |
|                         |                 |                  | B       | 0.151 | 2.767          | 0.582          | 0.8            | 1              | 47.216                            |        |          |            |
|                         |                 |                  | C       | 0.152 | 2.764          | 0.582          | 0.8            | 1              | 46.168                            |        |          |            |
| Sum Weight:             | 6.87            | 17.21            |         |       |                |                |                | OTM            | 1847.00                           | 23.48  |          |            |

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| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>16 of 33          |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Section Elevation | Add Weight | Self Weight | F a c e | e | C <sub>F</sub> | R <sub>R</sub> | D <sub>F</sub> | D <sub>R</sub> | A <sub>E</sub>  | F | w   | Ctrl. Face |
|-------------------|------------|-------------|---------|---|----------------|----------------|----------------|----------------|-----------------|---|-----|------------|
| ft                | K          | K           |         |   |                |                |                |                | ft <sup>2</sup> | K | plf |            |
|                   |            |             |         |   |                |                |                |                | kip-ft          |   |     |            |

**Tower Forces - No Ice - Wind 90 To Face**

| Section Elevation | Add Weight | Self Weight | F a c e | e     | C <sub>F</sub> | R <sub>R</sub> | D <sub>F</sub> | D <sub>R</sub> | A <sub>E</sub>  | F     | w      | Ctrl. Face |
|-------------------|------------|-------------|---------|-------|----------------|----------------|----------------|----------------|-----------------|-------|--------|------------|
| ft                | K          | K           |         |       |                |                |                |                | ft <sup>2</sup> | K     | plf    |            |
| T1                | 0.45       | 1.15        | A       | 0.276 | 2.361          | 0.609          | 0.85           | 1              | 32.156          | 2.16  | 108.23 | A          |
| 160.00-140.00     |            |             | B       | 0.164 | 2.721          | 0.584          | 0.85           | 1              | 20.104          |       |        |            |
|                   |            |             | C       | 0.235 | 2.484          | 0.598          | 0.85           | 1              | 27.554          |       |        |            |
| T2                | 0.93       | 1.29        | A       | 0.393 | 2.078          | 0.649          | 0.85           | 1              | 52.227          | 2.97  | 148.49 | A          |
| 140.00-120.00     |            |             | B       | 0.185 | 2.647          | 0.587          | 0.85           | 1              | 25.224          |       |        |            |
|                   |            |             | C       | 0.254 | 2.426          | 0.603          | 0.85           | 1              | 33.391          |       |        |            |
| T3                | 0.95       | 1.52        | A       | 0.353 | 2.164          | 0.634          | 0.85           | 1              | 56.704          | 3.20  | 160.09 | A          |
| 120.00-100.00     |            |             | B       | 0.195 | 2.614          | 0.589          | 0.85           | 1              | 33.105          |       |        |            |
|                   |            |             | C       | 0.24  | 2.468          | 0.599          | 0.85           | 1              | 39.183          |       |        |            |
| T4                | 0.98       | 2.08        | A       | 0.336 | 2.206          | 0.627          | 0.85           | 1              | 64.284          | 3.49  | 174.66 | A          |
| 100.00-80.00      |            |             | B       | 0.225 | 2.516          | 0.596          | 0.85           | 1              | 46.315          |       |        |            |
|                   |            |             | C       | 0.241 | 2.464          | 0.6            | 0.85           | 1              | 47.570          |       |        |            |
| T5                | 0.99       | 2.46        | A       | 0.288 | 2.329          | 0.612          | 0.85           | 1              | 61.550          | 3.29  | 164.36 | A          |
| 80.00-60.00       |            |             | B       | 0.194 | 2.615          | 0.589          | 0.85           | 1              | 45.105          |       |        |            |
|                   |            |             | C       | 0.203 | 2.588          | 0.591          | 0.85           | 1              | 44.533          |       |        |            |
| T6                | 0.99       | 2.65        | A       | 0.259 | 2.41           | 0.604          | 0.85           | 1              | 61.665          | 3.09  | 154.73 | A          |
| 60.00-40.00       |            |             | B       | 0.179 | 2.669          | 0.586          | 0.85           | 1              | 46.186          |       |        |            |
|                   |            |             | C       | 0.183 | 2.655          | 0.587          | 0.85           | 1              | 44.549          |       |        |            |
| T7                | 1.00       | 2.78        | A       | 0.238 | 2.473          | 0.599          | 0.85           | 1              | 63.151          | 2.89  | 144.44 | A          |
| 40.00-20.00       |            |             | B       | 0.168 | 2.707          | 0.584          | 0.85           | 1              | 48.462          |       |        |            |
|                   |            |             | C       | 0.169 | 2.702          | 0.585          | 0.85           | 1              | 46.287          |       |        |            |
| T8                | 0.60       | 3.28        | A       | 0.189 | 2.633          | 0.588          | 0.85           | 1              | 57.336          | 2.79  | 139.62 | A          |
| 20.00-0.00        |            |             | B       | 0.151 | 2.767          | 0.582          | 0.85           | 1              | 49.008          |       |        |            |
|                   |            |             | C       | 0.152 | 2.764          | 0.582          | 0.85           | 1              | 47.673          |       |        |            |
| Sum Weight:       | 6.87       | 17.21       |         |       |                |                |                | OTM            | 1876.76         | 23.89 |        |            |
|                   |            |             |         |       |                |                |                |                | kip-ft          |       |        |            |

**Tower Forces - With Ice - Wind Normal To Face**

| Section Elevation | Add Weight | Self Weight | F a c e | e     | C <sub>F</sub> | R <sub>R</sub> | D <sub>F</sub> | D <sub>R</sub> | A <sub>E</sub>  | F    | w      | Ctrl. Face |
|-------------------|------------|-------------|---------|-------|----------------|----------------|----------------|----------------|-----------------|------|--------|------------|
| ft                | K          | K           |         |       |                |                |                |                | ft <sup>2</sup> | K    | plf    |            |
| T1                | 1.15       | 1.74        | A       | 0.403 | 2.059          | 0.653          | 1              | 1              | 51.110          | 2.25 | 112.47 | A          |
| 160.00-140.00     |            |             | B       | 0.245 | 2.453          | 0.601          | 1              | 1              | 33.056          |      |        |            |
|                   |            |             | C       | 0.33  | 2.219          | 0.626          | 1              | 1              | 41.987          |      |        |            |
| T2                | 2.28       | 1.99        | A       | 0.567 | 1.828          | 0.734          | 1              | 1              | 85.318          | 3.20 | 160.03 | A          |
| 140.00-120.00     |            |             | B       | 0.273 | 2.37           | 0.608          | 1              | 1              | 40.739          |      |        |            |
|                   |            |             | C       | 0.351 | 2.168          | 0.633          | 1              | 1              | 50.147          |      |        |            |
| T3                | 2.33       | 2.44        | A       | 0.5   | 1.9            | 0.698          | 1              | 1              | 88.525          | 3.29 | 164.55 | A          |
| 120.00-100.00     |            |             | B       | 0.278 | 2.356          | 0.609          | 1              | 1              | 51.665          |      |        |            |
|                   |            |             | C       | 0.324 | 2.234          | 0.624          | 1              | 1              | 57.335          |      |        |            |
| T4                | 2.43       | 3.31        | A       | 0.462 | 1.954          | 0.679          | 1              | 1              | 96.342          | 3.48 | 173.94 | A          |

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|--|--|----------------------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>17 of 33          |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Section Elevation<br>ft | Add Weight<br>K | Self Weight<br>K | F a c e | e     | C <sub>F</sub> | R <sub>R</sub> | D <sub>F</sub> | D <sub>R</sub> | A <sub>E</sub><br>ft <sup>2</sup> | F<br>K | w<br>plf | Ctrl. Face |
|-------------------------|-----------------|------------------|---------|-------|----------------|----------------|----------------|----------------|-----------------------------------|--------|----------|------------|
| 100.00-80.00            |                 |                  | B       | 0.309 | 2.271          | 0.619          | 1              | 1              | 70.296                            |        |          |            |
|                         |                 |                  | C       | 0.315 | 2.256          | 0.621          | 1              | 1              | 67.578                            |        |          |            |
| T5                      | 2.46            | 3.50             | A       | 0.399 | 2.066          | 0.651          | 1              | 1              | 91.709                            | 3.26   | 162.89   | A          |
| 80.00-60.00             |                 |                  | B       | 0.269 | 2.381          | 0.607          | 1              | 1              | 68.637                            |        |          |            |
|                         |                 |                  | C       | 0.265 | 2.393          | 0.606          | 1              | 1              | 62.661                            |        |          |            |
| T6                      | 2.48            | 3.63             | A       | 0.357 | 2.155          | 0.635          | 1              | 1              | 90.264                            | 3.04   | 151.90   | A          |
| 60.00-40.00             |                 |                  | B       | 0.244 | 2.455          | 0.6            | 1              | 1              | 69.137                            |        |          |            |
|                         |                 |                  | C       | 0.236 | 2.481          | 0.598          | 1              | 1              | 61.240                            |        |          |            |
| T7                      | 2.50            | 3.83             | A       | 0.327 | 2.226          | 0.625          | 1              | 1              | 91.823                            | 2.83   | 141.74   | A          |
| 40.00-20.00             |                 |                  | B       | 0.231 | 2.494          | 0.597          | 1              | 1              | 72.933                            |        |          |            |
|                         |                 |                  | C       | 0.218 | 2.537          | 0.594          | 1              | 1              | 63.599                            |        |          |            |
| T8                      | 1.50            | 4.55             | A       | 0.245 | 2.453          | 0.601          | 1              | 1              | 78.937                            | 2.69   | 134.28   | A          |
|                         |                 |                  | B       | 0.193 | 2.618          | 0.589          | 1              | 1              | 68.997                            |        |          |            |
|                         |                 |                  | C       | 0.186 | 2.643          | 0.588          | 1              | 1              | 63.410                            |        |          |            |
| Sum Weight:             | 17.12           | 24.99            |         |       |                |                |                | OTM            | 1920.45<br>kip-ft                 | 24.04  |          |            |

### Tower Forces - With Ice - Wind 60 To Face

| Section Elevation<br>ft | Add Weight<br>K | Self Weight<br>K | F a c e | e     | C <sub>F</sub> | R <sub>R</sub> | D <sub>F</sub> | D <sub>R</sub> | A <sub>E</sub><br>ft <sup>2</sup> | F<br>K | w<br>plf | Ctrl. Face |
|-------------------------|-----------------|------------------|---------|-------|----------------|----------------|----------------|----------------|-----------------------------------|--------|----------|------------|
| T1                      | 1.15            | 1.74             | A       | 0.403 | 2.059          | 0.653          | 0.8            | 1              | 48.572                            | 2.14   | 106.89   | A          |
| 160.00-140.00           |                 |                  | B       | 0.245 | 2.453          | 0.601          | 0.8            | 1              | 29.592                            |        |          |            |
|                         |                 |                  | C       | 0.33  | 2.219          | 0.626          | 0.8            | 1              | 39.145                            |        |          |            |
| T2                      | 2.28            | 1.99             | A       | 0.567 | 1.828          | 0.734          | 0.8            | 1              | 83.062                            | 3.12   | 155.80   | A          |
| 140.00-120.00           |                 |                  | B       | 0.273 | 2.37           | 0.608          | 0.8            | 1              | 36.711                            |        |          |            |
|                         |                 |                  | C       | 0.351 | 2.168          | 0.633          | 0.8            | 1              | 46.786                            |        |          |            |
| T3                      | 2.33            | 2.44             | A       | 0.5   | 1.9            | 0.698          | 0.8            | 1              | 84.889                            | 3.16   | 157.79   | A          |
| 120.00-100.00           |                 |                  | B       | 0.278 | 2.356          | 0.609          | 0.8            | 1              | 45.879                            |        |          |            |
|                         |                 |                  | C       | 0.324 | 2.234          | 0.624          | 0.8            | 1              | 52.437                            |        |          |            |
| T4                      | 2.43            | 3.31             | A       | 0.462 | 1.954          | 0.679          | 0.8            | 1              | 91.050                            | 3.29   | 164.39   | A          |
| 100.00-80.00            |                 |                  | B       | 0.309 | 2.271          | 0.619          | 0.8            | 1              | 61.558                            |        |          |            |
|                         |                 |                  | C       | 0.315 | 2.256          | 0.621          | 0.8            | 1              | 60.861                            |        |          |            |
| T5                      | 2.46            | 3.50             | A       | 0.399 | 2.066          | 0.651          | 0.8            | 1              | 87.210                            | 3.10   | 154.90   | A          |
| 80.00-60.00             |                 |                  | B       | 0.269 | 2.381          | 0.607          | 0.8            | 1              | 60.534                            |        |          |            |
|                         |                 |                  | C       | 0.265 | 2.393          | 0.606          | 0.8            | 1              | 57.168                            |        |          |            |
| T6                      | 2.48            | 3.63             | A       | 0.357 | 2.155          | 0.635          | 0.8            | 1              | 86.163                            | 2.90   | 144.99   | A          |
| 60.00-40.00             |                 |                  | B       | 0.244 | 2.455          | 0.6            | 0.8            | 1              | 61.299                            |        |          |            |
|                         |                 |                  | C       | 0.236 | 2.481          | 0.598          | 0.8            | 1              | 56.369                            |        |          |            |
| T7                      | 2.50            | 3.83             | A       | 0.327 | 2.226          | 0.625          | 0.8            | 1              | 87.180                            | 2.69   | 134.57   | A          |
| 40.00-20.00             |                 |                  | B       | 0.231 | 2.494          | 0.597          | 0.8            | 1              | 64.611                            |        |          |            |
|                         |                 |                  | C       | 0.218 | 2.537          | 0.594          | 0.8            | 1              | 58.206                            |        |          |            |
| T8                      | 1.50            | 4.55             | A       | 0.245 | 2.453          | 0.601          | 0.8            | 1              | 72.544                            | 2.47   | 123.40   | A          |
|                         |                 |                  | B       | 0.193 | 2.618          | 0.589          | 0.8            | 1              | 60.360                            |        |          |            |
|                         |                 |                  | C       | 0.186 | 2.643          | 0.588          | 0.8            | 1              | 56.522                            |        |          |            |
| Sum Weight:             | 17.12           | 24.99            |         |       |                |                |                | OTM            | 1836.07<br>kip-ft                 | 22.85  |          |            |

### Tower Forces - With Ice - Wind 90 To Face

|  |                |  |             |                    |                   |
|--|----------------|--|-------------|--------------------|-------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b>     | 16071.20 - CT1144                                      | <b>Page</b> | 18 of 33           |                   |
|  | <b>Project</b> | 160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT |             | <b>Date</b>        | 09:35:08 08/30/16 |
|  | <b>Client</b>  | AT&T Mobility  |             | <b>Designed by</b> | TJL               |

| Section Elevation   | Add Weight | Self Weight | F a c e | e     | C <sub>F</sub> | R <sub>R</sub> | D <sub>F</sub> | D <sub>R</sub> | A <sub>E</sub>    | F     | w      | Ctrl. Face |
|---------------------|------------|-------------|---------|-------|----------------|----------------|----------------|----------------|-------------------|-------|--------|------------|
| ft                  | K          | K           |         |       |                |                |                |                | ft <sup>2</sup>   | K     | plf    |            |
| T1<br>160.00-140.00 | 1.15       | 1.74        | A       | 0.403 | 2.059          | 0.653          | 0.85           | 1              | 49.207            | 2.17  | 108.28 | A          |
|                     |            |             | B       | 0.245 | 2.453          | 0.601          | 0.85           | 1              | 30.458            |       |        |            |
|                     |            |             | C       | 0.33  | 2.219          | 0.626          | 0.85           | 1              | 39.856            |       |        |            |
| T2<br>140.00-120.00 | 2.28       | 1.99        | A       | 0.567 | 1.828          | 0.734          | 0.85           | 1              | 83.626            | 3.14  | 156.86 | A          |
|                     |            |             | B       | 0.273 | 2.37           | 0.608          | 0.85           | 1              | 37.718            |       |        |            |
|                     |            |             | C       | 0.351 | 2.168          | 0.633          | 0.85           | 1              | 47.626            |       |        |            |
| T3<br>120.00-100.00 | 2.33       | 2.44        | A       | 0.5   | 1.9            | 0.698          | 0.85           | 1              | 85.798            | 3.19  | 159.48 | A          |
|                     |            |             | B       | 0.278 | 2.356          | 0.609          | 0.85           | 1              | 47.326            |       |        |            |
|                     |            |             | C       | 0.324 | 2.234          | 0.624          | 0.85           | 1              | 53.662            |       |        |            |
| T4<br>100.00-80.00  | 2.43       | 3.31        | A       | 0.462 | 1.954          | 0.679          | 0.85           | 1              | 92.373            | 3.34  | 166.78 | A          |
|                     |            |             | B       | 0.309 | 2.271          | 0.619          | 0.85           | 1              | 63.743            |       |        |            |
|                     |            |             | C       | 0.315 | 2.256          | 0.621          | 0.85           | 1              | 62.540            |       |        |            |
| T5<br>80.00-60.00   | 2.46       | 3.50        | A       | 0.399 | 2.066          | 0.651          | 0.85           | 1              | 88.334            | 3.14  | 156.90 | A          |
|                     |            |             | B       | 0.269 | 2.381          | 0.607          | 0.85           | 1              | 62.560            |       |        |            |
|                     |            |             | C       | 0.265 | 2.393          | 0.606          | 0.85           | 1              | 58.541            |       |        |            |
| T6<br>60.00-40.00   | 2.48       | 3.63        | A       | 0.357 | 2.155          | 0.635          | 0.85           | 1              | 87.188            | 2.93  | 146.72 | A          |
|                     |            |             | B       | 0.244 | 2.455          | 0.6            | 0.85           | 1              | 63.259            |       |        |            |
|                     |            |             | C       | 0.236 | 2.481          | 0.598          | 0.85           | 1              | 57.587            |       |        |            |
| T7<br>40.00-20.00   | 2.50       | 3.83        | A       | 0.327 | 2.226          | 0.625          | 0.85           | 1              | 88.341            | 2.73  | 136.37 | A          |
|                     |            |             | B       | 0.231 | 2.494          | 0.597          | 0.85           | 1              | 66.692            |       |        |            |
|                     |            |             | C       | 0.218 | 2.537          | 0.594          | 0.85           | 1              | 59.555            |       |        |            |
| T8 20.00-0.00       | 1.50       | 4.55        | A       | 0.245 | 2.453          | 0.601          | 0.85           | 1              | 74.143            | 2.52  | 126.12 | A          |
|                     |            |             | B       | 0.193 | 2.618          | 0.589          | 0.85           | 1              | 62.519            |       |        |            |
|                     |            |             | C       | 0.186 | 2.643          | 0.588          | 0.85           | 1              | 58.244            |       |        |            |
| Sum Weight:         | 17.12      | 24.99       |         |       |                |                |                | OTM            | 1857.17<br>kip-ft | 23.15 |        |            |

### Tower Forces - Service - Wind Normal To Face

| Section Elevation   | Add Weight | Self Weight | F a c e | e     | C <sub>F</sub> | R <sub>R</sub> | D <sub>F</sub> | D <sub>R</sub> | A <sub>E</sub>  | F    | w     | Ctrl. Face |
|---------------------|------------|-------------|---------|-------|----------------|----------------|----------------|----------------|-----------------|------|-------|------------|
| ft                  | K          | K           |         |       |                |                |                |                | ft <sup>2</sup> | K    | plf   |            |
| T1<br>160.00-140.00 | 0.45       | 1.15        | A       | 0.276 | 2.361          | 0.609          | 1              | 1              | 33.753          | 0.89 | 44.38 | A          |
|                     |            |             | B       | 0.164 | 2.721          | 0.584          | 1              | 1              | 21.949          |      |       |            |
|                     |            |             | C       | 0.235 | 2.484          | 0.598          | 1              | 1              | 29.242          |      |       |            |
| T2<br>140.00-120.00 | 0.93       | 1.29        | A       | 0.393 | 2.078          | 0.649          | 1              | 1              | 53.905          | 1.20 | 59.87 | A          |
|                     |            |             | B       | 0.185 | 2.647          | 0.587          | 1              | 1              | 27.477          |      |       |            |
|                     |            |             | C       | 0.254 | 2.426          | 0.603          | 1              | 1              | 35.454          |      |       |            |
| T3<br>120.00-100.00 | 0.95       | 1.52        | A       | 0.353 | 2.164          | 0.634          | 1              | 1              | 59.348          | 1.31 | 65.45 | A          |
|                     |            |             | B       | 0.195 | 2.614          | 0.589          | 1              | 1              | 36.555          |      |       |            |
|                     |            |             | C       | 0.24  | 2.468          | 0.599          | 1              | 1              | 42.290          |      |       |            |
| T4<br>100.00-80.00  | 0.98       | 2.08        | A       | 0.336 | 2.206          | 0.627          | 1              | 1              | 68.106          | 1.45 | 72.28 | A          |
|                     |            |             | B       | 0.225 | 2.516          | 0.596          | 1              | 1              | 51.651          |      |       |            |
|                     |            |             | C       | 0.241 | 2.464          | 0.6            | 1              | 1              | 51.935          |      |       |            |
| T5<br>80.00-60.00   | 0.99       | 2.46        | A       | 0.288 | 2.329          | 0.612          | 1              | 1              | 64.711          | 1.35 | 67.50 | A          |
|                     |            |             | B       | 0.194 | 2.615          | 0.589          | 1              | 1              | 49.911          |      |       |            |
|                     |            |             | C       | 0.203 | 2.588          | 0.591          | 1              | 1              | 48.072          |      |       |            |
| T6<br>60.00-40.00   | 0.99       | 2.65        | A       | 0.259 | 2.41           | 0.604          | 1              | 1              | 64.567          | 1.27 | 63.29 | A          |
|                     |            |             | B       | 0.179 | 2.669          | 0.586          | 1              | 1              | 50.832          |      |       |            |
|                     |            |             | C       | 0.183 | 2.655          | 0.587          | 1              | 1              | 47.751          |      |       |            |
| T7<br>40.00-20.00   | 1.00       | 2.78        | A       | 0.238 | 2.473          | 0.599          | 1              | 1              | 66.386          | 1.19 | 59.31 | A          |
|                     |            |             | B       | 0.168 | 2.707          | 0.584          | 1              | 1              | 53.424          |      |       |            |
|                     |            |             | C       | 0.169 | 2.702          | 0.585          | 1              | 1              | 49.815          |      |       |            |
| T8 20.00-0.00       | 0.60       | 3.28        | A       | 0.189 | 2.633          | 0.588          | 1              | 1              | 61.654          | 1.17 | 58.65 | A          |
|                     |            |             | B       | 0.151 | 2.767          | 0.582          | 1              | 1              | 54.384          |      |       |            |

|  |                |  |             |                    |                   |
|--|----------------|--|-------------|--------------------|-------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b>     | 16071.20 - CT1144                                      | <b>Page</b> | 19 of 33           |                   |
|  | <b>Project</b> | 160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT |             | <b>Date</b>        | 09:35:08 08/30/16 |
|  | <b>Client</b>  | AT&T Mobility  |             | <b>Designed by</b> | TJL               |

| Section Elevation | Add Weight | Self Weight | F a c e | e     | C <sub>F</sub> | R <sub>R</sub> | D <sub>F</sub> | D <sub>R</sub> | A <sub>E</sub>             | F    | w   | Ctrl. Face |
|-------------------|------------|-------------|---------|-------|----------------|----------------|----------------|----------------|----------------------------|------|-----|------------|
| ft                | K          | K           |         |       |                |                |                |                | ft <sup>2</sup>            | K    | plf |            |
| Sum Weight:       | 6.87       | 17.21       | C       | 0.152 | 2.764          | 0.582          | 1              | 1<br>OTM       | 52.188<br>767.99<br>kip-ft | 9.81 |     |            |

### Tower Forces - Service - Wind 60 To Face

| Section Elevation   | Add Weight | Self Weight | F a c e | e     | C <sub>F</sub> | R <sub>R</sub> | D <sub>F</sub> | D <sub>R</sub> | A <sub>E</sub>   | F    | w     | Ctrl. Face |
|---------------------|------------|-------------|---------|-------|----------------|----------------|----------------|----------------|------------------|------|-------|------------|
| ft                  | K          | K           |         |       |                |                |                |                | ft <sup>2</sup>  | K    | plf   |            |
| T1<br>160.00-140.00 | 0.45       | 1.15        | A       | 0.276 | 2.361          | 0.609          | 0.8            | 1              | 31.624           | 0.83 | 41.58 | A          |
|                     |            |             | B       | 0.164 | 2.721          | 0.584          | 0.8            | 1              | 19.489           |      |       |            |
|                     |            |             | C       | 0.235 | 2.484          | 0.598          | 0.8            | 1              | 26.991           |      |       |            |
| T2<br>140.00-120.00 | 0.93       | 1.29        | A       | 0.393 | 2.078          | 0.649          | 0.8            | 1              | 51.668           | 1.15 | 57.38 | A          |
|                     |            |             | B       | 0.185 | 2.647          | 0.587          | 0.8            | 1              | 24.473           |      |       |            |
|                     |            |             | C       | 0.254 | 2.426          | 0.603          | 0.8            | 1              | 32.703           |      |       |            |
| T3<br>120.00-100.00 | 0.95       | 1.52        | A       | 0.353 | 2.164          | 0.634          | 0.8            | 1              | 55.823           | 1.23 | 61.56 | A          |
|                     |            |             | B       | 0.195 | 2.614          | 0.589          | 0.8            | 1              | 31.955           |      |       |            |
|                     |            |             | C       | 0.24  | 2.468          | 0.599          | 0.8            | 1              | 38.147           |      |       |            |
| T4<br>100.00-80.00  | 0.98       | 2.08        | A       | 0.336 | 2.206          | 0.627          | 0.8            | 1              | 63.009           | 1.34 | 66.87 | A          |
|                     |            |             | B       | 0.225 | 2.516          | 0.596          | 0.8            | 1              | 44.536           |      |       |            |
|                     |            |             | C       | 0.241 | 2.464          | 0.6            | 0.8            | 1              | 46.116           |      |       |            |
| T5<br>80.00-60.00   | 0.99       | 2.46        | A       | 0.288 | 2.329          | 0.612          | 0.8            | 1              | 60.496           | 1.26 | 63.10 | A          |
|                     |            |             | B       | 0.194 | 2.615          | 0.589          | 0.8            | 1              | 43.502           |      |       |            |
|                     |            |             | C       | 0.203 | 2.588          | 0.591          | 0.8            | 1              | 43.354           |      |       |            |
| T6<br>60.00-40.00   | 0.99       | 2.65        | A       | 0.259 | 2.41           | 0.604          | 0.8            | 1              | 60.697           | 1.19 | 59.49 | A          |
|                     |            |             | B       | 0.179 | 2.669          | 0.586          | 0.8            | 1              | 44.638           |      |       |            |
|                     |            |             | C       | 0.183 | 2.655          | 0.587          | 0.8            | 1              | 43.481           |      |       |            |
| T7<br>40.00-20.00   | 1.00       | 2.78        | A       | 0.238 | 2.473          | 0.599          | 0.8            | 1              | 62.072           | 1.11 | 55.46 | A          |
|                     |            |             | B       | 0.168 | 2.707          | 0.584          | 0.8            | 1              | 46.808           |      |       |            |
|                     |            |             | C       | 0.169 | 2.702          | 0.585          | 0.8            | 1              | 45.111           |      |       |            |
| T8<br>20.00-0.00    | 0.60       | 3.28        | A       | 0.189 | 2.633          | 0.588          | 0.8            | 1              | 55.896           | 1.06 | 53.17 | A          |
|                     |            |             | B       | 0.151 | 2.767          | 0.582          | 0.8            | 1              | 47.216           |      |       |            |
|                     |            |             | C       | 0.152 | 2.764          | 0.582          | 0.8            | 1              | 46.168           |      |       |            |
| Sum Weight:         | 6.87       | 17.21       |         |       |                |                |                | OTM            | 721.49<br>kip-ft | 9.17 |       |            |

### Tower Forces - Service - Wind 90 To Face

| Section Elevation   | Add Weight | Self Weight | F a c e | e     | C <sub>F</sub> | R <sub>R</sub> | D <sub>F</sub> | D <sub>R</sub> | A <sub>E</sub>  | F    | w     | Ctrl. Face |
|---------------------|------------|-------------|---------|-------|----------------|----------------|----------------|----------------|-----------------|------|-------|------------|
| ft                  | K          | K           |         |       |                |                |                |                | ft <sup>2</sup> | K    | plf   |            |
| T1<br>160.00-140.00 | 0.45       | 1.15        | A       | 0.276 | 2.361          | 0.609          | 0.85           | 1              | 32.156          | 0.85 | 42.28 | A          |
|                     |            |             | B       | 0.164 | 2.721          | 0.584          | 0.85           | 1              | 20.104          |      |       |            |
|                     |            |             | C       | 0.235 | 2.484          | 0.598          | 0.85           | 1              | 27.554          |      |       |            |
| T2<br>140.00-120.00 | 0.93       | 1.29        | A       | 0.393 | 2.078          | 0.649          | 0.85           | 1              | 52.227          | 1.16 | 58.00 | A          |
|                     |            |             | B       | 0.185 | 2.647          | 0.587          | 0.85           | 1              | 25.224          |      |       |            |
|                     |            |             | C       | 0.254 | 2.426          | 0.603          | 0.85           | 1              | 33.391          |      |       |            |
| T3<br>120.00-100.00 | 0.95       | 1.52        | A       | 0.353 | 2.164          | 0.634          | 0.85           | 1              | 56.704          | 1.25 | 62.53 | A          |
|                     |            |             | B       | 0.195 | 2.614          | 0.589          | 0.85           | 1              | 33.105          |      |       |            |

|  |  |                                  |
|--|--|----------------------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>20 of 33          |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Section Elevation<br>ft | Add Weight<br>K | Self Weight<br>K | F a c e | e     | C <sub>F</sub> | R <sub>R</sub> | D <sub>F</sub> | D <sub>R</sub> | A <sub>E</sub><br>ft <sup>2</sup> | F<br>K | w<br>plf | Ctrl. Face |
|-------------------------|-----------------|------------------|---------|-------|----------------|----------------|----------------|----------------|-----------------------------------|--------|----------|------------|
| T4<br>100.00-80.00      | 0.98            | 2.08             | C       | 0.24  | 2.468          | 0.599          | 0.85           | 1              | 39.183                            | 1.36   | 68.23    | A          |
|                         |                 |                  | A       | 0.336 | 2.206          | 0.627          | 0.85           | 1              | 64.284                            |        |          |            |
|                         |                 |                  | B       | 0.225 | 2.516          | 0.596          | 0.85           | 1              | 46.315                            |        |          |            |
| T5<br>80.00-60.00       | 0.99            | 2.46             | C       | 0.241 | 2.464          | 0.6            | 0.85           | 1              | 47.570                            | 1.28   | 64.20    | A          |
|                         |                 |                  | A       | 0.288 | 2.329          | 0.612          | 0.85           | 1              | 61.550                            |        |          |            |
|                         |                 |                  | B       | 0.194 | 2.615          | 0.589          | 0.85           | 1              | 45.105                            |        |          |            |
| T6<br>60.00-40.00       | 0.99            | 2.65             | C       | 0.203 | 2.588          | 0.591          | 0.85           | 1              | 44.533                            | 1.21   | 60.44    | A          |
|                         |                 |                  | A       | 0.259 | 2.41           | 0.604          | 0.85           | 1              | 61.665                            |        |          |            |
|                         |                 |                  | B       | 0.179 | 2.669          | 0.586          | 0.85           | 1              | 46.186                            |        |          |            |
| T7<br>40.00-20.00       | 1.00            | 2.78             | C       | 0.183 | 2.655          | 0.587          | 0.85           | 1              | 44.549                            | 1.13   | 56.42    | A          |
|                         |                 |                  | A       | 0.238 | 2.473          | 0.599          | 0.85           | 1              | 63.151                            |        |          |            |
|                         |                 |                  | B       | 0.168 | 2.707          | 0.584          | 0.85           | 1              | 48.462                            |        |          |            |
| T8 20.00-0.00           | 0.60            | 3.28             | C       | 0.169 | 2.702          | 0.585          | 0.85           | 1              | 46.287                            | 1.09   | 54.54    | A          |
|                         |                 |                  | A       | 0.189 | 2.633          | 0.588          | 0.85           | 1              | 57.336                            |        |          |            |
|                         |                 |                  | B       | 0.151 | 2.767          | 0.582          | 0.85           | 1              | 49.008                            |        |          |            |
| Sum Weight:             | 6.87            | 17.21            | C       | 0.152 | 2.764          | 0.582          | 0.85           | 1              | 47.673                            | 9.33   |          |            |
|                         |                 |                  |         |       |                |                |                | OTM            | 733.11<br>kip-ft                  |        |          |            |

### Force Totals

| Load Case                | Vertical Forces<br>K | Sum of Forces<br>X<br>K | Sum of Forces<br>Z<br>K | Sum of Overturning Moments, M <sub>x</sub><br>kip-ft | Sum of Overturning Moments, M <sub>z</sub><br>kip-ft | Sum of Torques<br>kip-ft |
|--------------------------|----------------------|-------------------------|-------------------------|--|--|--------------------------|
| Leg Weight               | 6.55                 |                         |                         |  |  |                          |
| Bracing Weight           | 10.66                |                         |                         |  |  |                          |
| Total Member Self-Weight | 17.21                |                         |                         | 7.48   | 6.07   |                          |
| Total Weight             | 31.33                |                         |                         | 7.48   | 6.07   |                          |
| Wind 0 deg - No Ice      |                      | 0.52                    | -37.89                  | -3732.32   | -24.95   | -2.65                    |
| Wind 30 deg - No Ice     |                      | 19.86                   | -31.53                  | -3126.66   | -1934.38   | 2.92                     |
| Wind 60 deg - No Ice     |                      | 32.82                   | -17.95                  | -1775.15   | -3230.99   | 2.00                     |
| Wind 90 deg - No Ice     |                      | 38.14                   | -0.19                   | 1.48   | -3749.42   | 2.18                     |
| Wind 120 deg - No Ice    |                      | 34.40                   | 18.25                   | 1828.13  | -3352.30   | 3.89                     |
| Wind 150 deg - No Ice    |                      | 19.28                   | 31.61                   | 3162.00  | -1903.43   | 7.69                     |
| Wind 180 deg - No Ice    |                      | -0.09                   | 36.45                   | 3649.20  | -2.30  | 4.68                     |
| Wind 210 deg - No Ice    |                      | -19.57                  | 31.43                   | 3137.22  | 1930.91  | -1.47                    |
| Wind 240 deg - No Ice    |                      | -34.06                  | 18.63                   | 1841.13  | 3343.81  | -0.85                    |
| Wind 270 deg - No Ice    |                      | -37.92                  | 0.03                    | 1.05   | 3755.84  | -4.65                    |
| Wind 300 deg - No Ice    |                      | -32.96                  | -17.65                  | -1771.86   | 3273.75  | -8.04                    |
| Wind 330 deg - No Ice    |                      | -19.76                  | -31.50                  | -3133.44   | 1963.05  | -13.44                   |
| Member Ice               | 7.78                 |                         |                         |  |  |                          |
| Total Weight Ice         | 53.62                |                         |                         | 17.56  | 12.90  |                          |
| Wind 0 deg - Ice         |                      | 0.39                    | -34.76                  | -3392.76   | -10.81   | -3.47                    |
| Wind 30 deg - Ice        |                      | 18.11                   | -29.16                  | -2860.24   | -1749.38   | 0.02                     |
| Wind 60 deg - Ice        |                      | 30.17                   | -16.66                  | -1624.31   | -2946.03   | -0.81                    |
| Wind 90 deg - Ice        |                      | 35.01                   | -0.15                   | 12.80  | -3415.48   | -0.21                    |
| Wind 120 deg - Ice       |                      | 31.31                   | 16.85                   | 1684.98  | -3032.75   | 2.01                     |
| Wind 150 deg - Ice       |                      | 17.66                   | 29.23                   | 2910.86  | -1725.40   | 6.21                     |
| Wind 180 deg - Ice       |                      | -0.07                   | 33.73                   | 3359.64  | 6.61   | 5.05                     |
| Wind 210 deg - Ice       |                      | -17.89                  | 29.09                   | 2892.16  | 1763.18  | 1.07                     |
| Wind 240 deg - Ice       |                      | -31.06                  | 17.13                   | 1695.11  | 3043.10  | 1.74                     |
| Wind 270 deg - Ice       |                      | -34.84                  | 0.02                    | 12.81  | 3436.97  | -1.69                    |
| Wind 300 deg - Ice       |                      | -30.29                  | -16.43                  | -1621.57   | 2995.06  | -5.29                    |
| Wind 330 deg - Ice       |                      | -18.04                  | -29.14                  | -2865.34   | 1787.52  | -10.61                   |
| Total Weight             | 31.33                |                         |                         | 7.48   | 6.07   |                          |



|  |  |                                  |
|--|--|----------------------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>21 of 33          |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Load Case              | Vertical Forces<br>K | Sum of Forces<br>X<br>K | Sum of Forces<br>Z<br>K | Sum of Overturning Moments, $M_x$<br>kip-ft | Sum of Overturning Moments, $M_z$<br>kip-ft | Sum of Torques<br>kip-ft |
|------------------------|----------------------|-------------------------|-------------------------|---|---|--------------------------|
| Wind 0 deg - Service   |                      | 0.20                    | -14.80                  | -1463.18                                    | -10.20                                      | -1.04                    |
| Wind 30 deg - Service  |                      | 7.76                    | -12.31                  | -1226.59                                    | -756.07                                     | 1.14                     |
| Wind 60 deg - Service  |                      | 12.82                   | -7.01                   | -698.66                                     | -1262.56                                    | 0.78                     |
| Wind 90 deg - Service  |                      | 14.90                   | -0.07                   | -4.66                                       | -1465.07                                    | 0.85                     |
| Wind 120 deg - Service |                      | 13.44                   | 7.13                    | 708.87                                      | -1309.94                                    | 1.52                     |
| Wind 150 deg - Service |                      | 7.53                    | 12.35                   | 1229.91                                     | -743.98                                     | 3.00                     |
| Wind 180 deg - Service |                      | -0.04                   | 14.24                   | 1420.22                                     | -1.35                                       | 1.83                     |
| Wind 210 deg - Service |                      | -7.64                   | 12.28                   | 1220.23                                     | 753.81                                      | -0.57                    |
| Wind 240 deg - Service |                      | -13.31                  | 7.28                    | 713.95                                      | 1305.72                                     | -0.33                    |
| Wind 270 deg - Service |                      | -14.81                  | 0.01                    | -4.83                                       | 1466.68                                     | -1.82                    |
| Wind 300 deg - Service |                      | -12.88                  | -6.90                   | -697.38                                     | 1278.36                                     | -3.14                    |
| Wind 330 deg - Service |                      | -7.72                   | -12.30                  | -1229.24                                    | 766.37                                      | -5.25                    |

## 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 |

|  |  |                                  |
|--|--|----------------------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>22 of 33          |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

### 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 |
|-------------|--------------|----------------------|------------------|-----------------|---------|--------------------------|--------------------------|
| T1          | 160 - 140    | Leg                  | Max Tension      | 4               | 21.97   | 1.00                     | -0.75                    |
|             |              |                      | Max. Compression | 2               | -27.67  | 0.02                     | 1.66                     |
|             |              |                      | Max. Mx          | 10              | -26.16  | 1.35                     | -0.90                    |
|             |              |                      | Max. My          | 2               | -27.67  | 0.02                     | 1.66                     |
|             |              |                      | Max. Vy          | 10              | -4.85   | 1.35                     | -0.90                    |
|             |              |                      | Max. Vx          | 2               | -6.06   | 0.02                     | 1.66                     |
|             |              | Diagonal             | Max Tension      | 13              | 4.98    | 0.00                     | 0.00                     |
|             |              |                      | Max. Compression | 7               | -5.00   | 0.00                     | 0.00                     |
|             |              |                      | Max. Mx          | 16              | 1.67    | 0.02                     | 0.00                     |
|             |              |                      | Max. My          | 12              | -4.51   | 0.01                     | -0.01                    |
|             |              |                      | Max. Vy          | 16              | 0.01    | 0.02                     | 0.00                     |
|             |              |                      | Max. Vx          | 12              | -0.00   | 0.00                     | 0.00                     |
|             |              | Top Girt             | Max Tension      | 10              | 0.13    | 0.00                     | 0.00                     |
|             |              |                      | Max. Compression | 17              | -0.24   | 0.00                     | 0.00                     |
|             |              |                      | Max. Mx          | 14              | -0.07   | -0.08                    | 0.00                     |
|             |              |                      | Max. My          | 18              | -0.03   | 0.00                     | 0.00                     |
|             |              |                      | Max. Vy          | 14              | 0.04    | 0.00                     | 0.00                     |
|             |              |                      | Max. Vx          | 18              | -0.00   | 0.00                     | 0.00                     |
| T2          | 140 - 120    | Leg                  | Max Tension      | 8               | 40.95   | -0.24                    | 0.00                     |
|             |              |                      | Max. Compression | 2               | -48.41  | -0.23                    | 0.01                     |
|             |              |                      | Max. Mx          | 2               | -31.99  | 1.66                     | -0.01                    |
|             |              |                      | Max. My          | 11              | -3.18   | 0.03                     | -0.62                    |
|             |              |                      | Max. Vy          | 2               | 0.59    | 1.66                     | -0.01                    |
|             |              |                      | Max. Vx          | 5               | 0.26    | 0.03                     | 0.62                     |
|             |              | Diagonal             | Max Tension      | 7               | 4.72    | 0.00                     | 0.00                     |
|             |              |                      | Max. Compression | 7               | -4.87   | -0.01                    | 0.01                     |
|             |              |                      | Max. Mx          | 15              | 3.21    | 0.04                     | 0.01                     |
|             |              |                      | Max. My          | 6               | -4.27   | -0.01                    | 0.01                     |
|             |              |                      | Max. Vy          | 15              | -0.02   | 0.04                     | 0.01                     |
|             |              |                      | Max. Vx          | 16              | 0.00    | 0.00                     | 0.00                     |
|             |              | Secondary Horizontal | Max Tension      | 2               | 0.84    | 0.00                     | 0.00                     |
|             |              |                      | Max. Compression | 2               | -0.84   | 0.00                     | -0.00                    |
|             |              |                      | Max. Mx          | 18              | -0.10   | 0.03                     | 0.00                     |
|             |              |                      | Max. My          | 17              | -0.14   | 0.02                     | 0.01                     |
|             |              |                      | Max. Vy          | 18              | -0.02   | 0.03                     | 0.00                     |
|             |              |                      | Max. Vx          | 17              | -0.00   | 0.00                     | 0.00                     |
| T3          | 120 - 100    | Leg                  | Max Tension      | 8               | 63.10   | 0.20                     | -0.03                    |
|             |              |                      | Max. Compression | 2               | -72.72  | -0.18                    | -0.01                    |
|             |              |                      | Max. Mx          | 10              | -62.54  | 0.45                     | 0.12                     |
|             |              |                      | Max. My          | 3               | -2.59   | 0.03                     | 0.45                     |
|             |              |                      | Max. Vy          | 10              | -0.49   | 0.45                     | 0.12                     |
|             |              |                      | Max. Vx          | 3               | 0.45    | 0.06                     | -0.10                    |
|             |              | Diagonal             | Max Tension      | 7               | 5.08    | 0.04                     | -0.00                    |
|             |              |                      | Max. Compression | 7               | -5.13   | 0.00                     | 0.00                     |
|             |              |                      | Max. Mx          | 15              | 3.79    | 0.06                     | 0.01                     |
|             |              |                      | Max. My          | 20              | -4.54   | 0.00                     | 0.01                     |
|             |              |                      | Max. Vy          | 15              | -0.03   | 0.06                     | 0.01                     |
|             |              |                      | Max. Vx          | 20              | 0.00    | 0.00                     | 0.00                     |
|             |              | Secondary Horizontal | Max Tension      | 2               | 1.26    | 0.00                     | 0.00                     |
|             |              |                      | Max. Compression | 2               | -1.26   | 0.02                     | -0.00                    |
|             |              |                      | Max. Mx          | 18              | -0.13   | 0.04                     | 0.00                     |
|             |              |                      | Max. My          | 17              | -0.56   | 0.02                     | 0.01                     |
|             |              |                      | Max. Vy          | 18              | -0.02   | 0.04                     | 0.00                     |

|  |                |  |                    |                   |
|--|----------------|--|--------------------|-------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b>     | 16071.20 - CT1144                                      | <b>Page</b>        | 23 of 33          |
|  | <b>Project</b> | 160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b>        | 09:35:08 08/30/16 |
|  | <b>Client</b>  | AT&T Mobility  | <b>Designed by</b> | TJL               |

| Section No. | Elevation ft | Component Type       | Condition        | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|-------------|--------------|----------------------|------------------|-----------------|---------|--------------------------|--------------------------|
| T4          | 100 - 80     | Leg                  | Max. Vx          | 21              | -0.00   | 0.00                     | 0.00                     |
|             |              |                      | Max Tension      | 12              | 86.22   | 0.26                     | -0.02                    |
|             |              |                      | Max. Compression | 2               | -97.71  | -0.46                    | 0.02                     |
|             |              |                      | Max. Mx          | 6               | -97.55  | 0.60                     | -0.00                    |
|             |              |                      | Max. My          | 5               | -4.85   | -0.07                    | 0.52                     |
|             |              |                      | Max. Vy          | 19              | 0.36    | 0.59                     | -0.00                    |
|             |              | Diagonal             | Max. Vx          | 3               | 0.44    | -0.06                    | -0.42                    |
|             |              |                      | Max Tension      | 7               | 5.74    | 0.05                     | 0.00                     |
|             |              |                      | Max. Compression | 7               | -5.92   | 0.00                     | 0.00                     |
|             |              |                      | Max. Mx          | 15              | 4.27    | 0.09                     | 0.01                     |
|             |              |                      | Max. My          | 20              | -5.33   | 0.01                     | 0.01                     |
|             |              |                      | Max. Vy          | 15              | -0.03   | 0.09                     | 0.01                     |
|             |              | Secondary Horizontal | Max. Vx          | 20              | 0.00    | 0.00                     | 0.00                     |
|             |              |                      | Max Tension      | 2               | 1.69    | 0.00                     | 0.00                     |
|             |              |                      | Max. Compression | 2               | -1.69   | 0.01                     | -0.00                    |
|             |              |                      | Max. Mx          | 18              | -0.15   | 0.06                     | 0.00                     |
|             |              |                      | Max. My          | 17              | -0.27   | 0.04                     | 0.01                     |
|             |              |                      | Max. Vy          | 18              | -0.03   | 0.06                     | 0.00                     |
| T5          | 80 - 60      | Leg                  | Max. Vx          | 18              | -0.00   | 0.00                     | 0.00                     |
|             |              |                      | Max Tension      | 12              | 107.85  | 0.29                     | 0.25                     |
|             |              |                      | Max. Compression | 10              | -121.90 | -0.12                    | 0.01                     |
|             |              |                      | Max. Mx          | 10              | -107.82 | 1.19                     | 0.02                     |
|             |              |                      | Max. My          | 13              | -7.87   | -0.03                    | 1.08                     |
|             |              |                      | Max. Vy          | 4               | -0.57   | -1.08                    | -0.05                    |
|             |              | Diagonal             | Max. Vx          | 13              | -0.80   | -0.03                    | 1.08                     |
|             |              |                      | Max Tension      | 5               | 7.46    | 0.00                     | 0.00                     |
|             |              |                      | Max. Compression | 11              | -7.56   | 0.00                     | 0.00                     |
|             |              |                      | Max. Mx          | 19              | 4.89    | 0.12                     | -0.01                    |
|             |              |                      | Max. My          | 19              | -5.96   | 0.04                     | 0.01                     |
|             |              |                      | Max. Vy          | 25              | 0.04    | 0.10                     | 0.00                     |
|             |              | Secondary Horizontal | Max. Vx          | 19              | 0.00    | 0.00                     | 0.00                     |
|             |              |                      | Max Tension      | 10              | 2.11    | 0.00                     | 0.00                     |
|             |              |                      | Max. Compression | 10              | -2.11   | 0.04                     | -0.00                    |
|             |              |                      | Max. Mx          | 25              | -0.62   | 0.07                     | 0.02                     |
|             |              |                      | Max. My          | 21              | -0.58   | 0.07                     | 0.02                     |
|             |              |                      | Max. Vy          | 25              | -0.04   | 0.07                     | 0.02                     |
| T6          | 60 - 40      | Leg                  | Max. Vx          | 26              | -0.00   | 0.00                     | 0.00                     |
|             |              |                      | Max Tension      | 12              | 131.64  | -0.49                    | -0.03                    |
|             |              |                      | Max. Compression | 10              | -149.09 | 0.48                     | -0.01                    |
|             |              |                      | Max. Mx          | 25              | 113.42  | -1.16                    | 0.03                     |
|             |              |                      | Max. My          | 5               | -6.39   | -0.03                    | 0.47                     |
|             |              |                      | Max. Vy          | 19              | 0.19    | 1.00                     | 0.05                     |
|             |              | Diagonal             | Max. Vx          | 11              | -0.10   | -0.02                    | -0.46                    |
|             |              |                      | Max Tension      | 5               | 7.57    | 0.00                     | 0.00                     |
|             |              |                      | Max. Compression | 11              | -7.74   | 0.00                     | 0.00                     |
|             |              |                      | Max. Mx          | 19              | 5.46    | 0.16                     | -0.01                    |
|             |              |                      | Max. My          | 26              | -4.27   | 0.11                     | 0.02                     |
|             |              |                      | Max. Vy          | 25              | 0.05    | 0.16                     | -0.01                    |
|             |              | Secondary Horizontal | Max. Vx          | 26              | -0.00   | 0.00                     | 0.00                     |
|             |              |                      | Max Tension      | 12              | 153.02  | -0.32                    | 0.00                     |
|             |              |                      | Max. Compression | 10              | -174.05 | 0.62                     | -0.00                    |
|             |              |                      | Max. Mx          | 25              | 131.93  | -1.88                    | 0.00                     |
|             |              |                      | Max. My          | 13              | -13.38  | -0.04                    | 0.65                     |
|             |              |                      | Max. Vy          | 17              | 0.30    | -1.87                    | -0.00                    |
| T7          | 40 - 20      | Leg                  | Max. Vx          | 9               | 0.11    | -0.06                    | 0.64                     |
|             |              |                      | Max Tension      | 18              | 7.59    | 0.00                     | 0.00                     |
|             |              |                      | Max. Compression | 5               | -7.53   | 0.00                     | 0.00                     |
|             |              |                      | Max. Mx          | 25              | 5.22    | 0.19                     | -0.02                    |
|             |              |                      | Max. My          | 25              | -6.61   | 0.13                     | 0.02                     |
|             |              |                      | Max. Vy          | 25              | -6.61   | 0.13                     | 0.02                     |
|             |              | Diagonal             | Max. Vx          | 25              | -6.61   | 0.13                     | 0.02                     |
|             |              |                      | Max Tension      | 18              | 7.59    | 0.00                     | 0.00                     |
|             |              |                      | Max. Compression | 5               | -7.53   | 0.00                     | 0.00                     |
|             |              |                      | Max. Mx          | 25              | 5.22    | 0.19                     | -0.02                    |
|             |              |                      | Max. My          | 25              | -6.61   | 0.13                     | 0.02                     |
|             |              |                      | Max. Vy          | 25              | -6.61   | 0.13                     | 0.02                     |

|  |                |  |             |                    |                   |
|--|----------------|--|-------------|--------------------|-------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b>     | 16071.20 - CT1144                                      | <b>Page</b> | 24 of 33           |                   |
|  | <b>Project</b> | 160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT |             | <b>Date</b>        | 09:35:08 08/30/16 |
|  | <b>Client</b>  | AT&T Mobility  |             | <b>Designed by</b> | TJL               |

| Section No. | Elevation ft | Component Type | Condition        | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|-------------|--------------|----------------|------------------|-----------------|---------|--------------------------|--------------------------|
| T8          | 20 - 0       | Leg            | Max. Vy          | 25              | 0.06    | 0.19                     | -0.02                    |
|             |              |                | Max. Vx          | 25              | -0.00   | 0.00                     | 0.00                     |
|             |              |                | Max Tension      | 12              | 173.28  | -0.61                    | 0.03                     |
|             |              |                | Max. Compression | 6               | -197.91 | 0.00                     | -0.00                    |
|             |              |                | Max. Mx          | 23              | -189.97 | 2.13                     | 0.02                     |
|             |              |                | Max. My          | 11              | -9.62   | -0.07                    | -1.29                    |
|             |              | Diagonal       | Max. Vy          | 17              | -0.35   | -1.87                    | -0.00                    |
|             |              |                | Max. Vx          | 11              | -0.19   | -0.07                    | -1.29                    |
|             |              |                | Max Tension      | 18              | 8.69    | 0.00                     | 0.00                     |
|             |              |                | Max. Compression | 18              | -8.54   | 0.00                     | 0.00                     |
|             |              |                | Max. Mx          | 25              | 4.24    | 0.30                     | 0.02                     |
|             |              |                | Max. My          | 25              | -7.83   | 0.21                     | 0.03                     |
|             |              |                | Max. Vy          | 25              | 0.08    | 0.30                     | 0.02                     |
|             |              |                | Max. Vx          | 25              | -0.00   | 0.00                     | 0.00                     |

### Maximum Reactions

| Location | Condition           | Gov. Load Comb. | Vertical K | Horizontal, X K | Horizontal, Z K |
|----------|---------------------|-----------------|------------|-----------------|-----------------|
| Leg C    | Max. Vert           | 10              | 204.00     | 20.62           | -11.79          |
|          | Max. H <sub>x</sub> | 10              | 204.00     | 20.62           | -11.79          |
|          | Max. H <sub>z</sub> | 17              | -153.10    | -18.51          | 10.66           |
|          | Min. Vert           | 4               | -176.49    | -18.46          | 10.52           |
|          | Min. H <sub>x</sub> | 17              | -153.10    | -18.51          | 10.66           |
|          | Min. H <sub>z</sub> | 10              | 204.00     | 20.62           | -11.79          |
| Leg B    | Max. Vert           | 6               | 204.05     | -20.73          | -11.70          |
|          | Max. H <sub>x</sub> | 25              | -155.19    | 18.62           | 10.52           |
|          | Max. H <sub>z</sub> | 25              | -155.19    | 18.62           | 10.52           |
|          | Min. Vert           | 12              | -178.29    | 18.56           | 10.36           |
|          | Min. H <sub>x</sub> | 6               | 204.05     | -20.73          | -11.70          |
|          | Min. H <sub>z</sub> | 6               | 204.05     | -20.73          | -11.70          |
| Leg A    | Max. Vert           | 2               | 199.75     | -0.12           | 23.21           |
|          | Max. H <sub>x</sub> | 11              | 10.39      | 2.76            | 0.81            |
|          | Max. H <sub>z</sub> | 2               | 199.75     | -0.12           | 23.21           |
|          | Min. Vert           | 8               | -174.65    | 0.13            | -20.73          |
|          | Min. H <sub>x</sub> | 5               | 10.37      | -2.85           | 0.93            |
|          | Min. H <sub>z</sub> | 21              | -152.91    | 0.13            | -20.99          |

### 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                  | 31.33      | 0.00                 | 0.00                 | 7.48                                      | 6.07                                      | -0.00         |
| Dead+Wind 0 deg - No Ice   | 31.33      | 0.52                 | -37.89               | -3746.10                                  | -24.98                                    | -2.68         |
| Dead+Wind 30 deg - No Ice  | 31.33      | 19.86                | -31.53               | -3138.26                                  | -1941.35                                  | 2.89          |
| Dead+Wind 60 deg - No Ice  | 31.33      | 32.82                | -17.95               | -1781.76                                  | -3242.77                                  | 1.99          |
| Dead+Wind 90 deg - No Ice  | 31.33      | 38.14                | -0.19                | 1.50                                      | -3763.07                                  | 2.18          |
| Dead+Wind 120 deg - No Ice | 31.33      | 34.40                | 18.25                | 1834.92                                   | -3364.44                                  | 3.90          |
| Dead+Wind 150 deg - No Ice | 31.33      | 19.28                | 31.61                | 3173.71                                   | -1910.36                                  | 7.70          |
| Dead+Wind 180 deg - No Ice | 31.33      | -0.09                | 36.45                | 3662.70                                   | -2.34                                     | 4.71          |
| Dead+Wind 210 deg - No Ice | 31.33      | -19.57               | 31.43                | 3148.84                                   | 1937.89                                   | -1.44         |

|  |                |  |             |                    |                   |
|--|----------------|--|-------------|--------------------|-------------------|
| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b>     | 16071.20 - CT1144                                      | <b>Page</b> | 25 of 33           |                   |
|  | <b>Project</b> | 160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT |             | <b>Date</b>        | 09:35:08 08/30/16 |
|  | <b>Client</b>  | AT&T Mobility  |             | <b>Designed by</b> | TJL               |

| 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 240 deg - No Ice  | 31.33    | -34.06             | 18.63              | 1847.91                            | 3355.95                            | -0.84  |
| Dead+Wind 270 deg - No Ice  | 31.33    | -37.92             | 0.03               | 1.02                               | 3769.56                            | -4.66  |
| Dead+Wind 300 deg - No Ice  | 31.33    | -32.96             | -17.65             | -1778.51                           | 3285.70                            | -8.06  |
| Dead+Wind 330 deg - No Ice  | 31.33    | -19.76             | -31.50             | -3145.08                           | 1970.19                            | -13.45 |
| Dead+Ice+Temp               | 53.62    | 0.00               | -0.00              | 17.60                              | 12.95                              | -0.00  |
| Dead+Wind 0 deg+Ice+Temp    | 53.62    | 0.39               | -34.76             | -3412.89                           | -10.76                             | -3.53  |
| Dead+Wind 30 deg+Ice+Temp   | 53.62    | 18.11              | -29.16             | -2877.24                           | -1759.51                           | -0.00  |
| Dead+Wind 60 deg+Ice+Temp   | 53.62    | 30.17              | -16.66             | -1634.00                           | -2963.24                           | -0.81  |
| Dead+Wind 90 deg+Ice+Temp   | 53.62    | 35.01              | -0.15              | 12.85                              | -3435.42                           | -0.18  |
| Dead+Wind 120 deg+Ice+Temp  | 53.62    | 31.31              | 16.85              | 1695.00                            | -3050.37                           | 2.06   |
| Dead+Wind 150 deg+Ice+Temp  | 53.62    | 17.66              | 29.23              | 2928.06                            | -1735.47                           | 6.27   |
| Dead+Wind 180 deg+Ice+Temp  | 53.62    | -0.07              | 33.73              | 3379.47                            | 6.60                               | 5.10   |
| Dead+Wind 210 deg+Ice+Temp  | 53.62    | -17.89             | 29.09              | 2909.24                            | 1773.41                            | 1.10   |
| Dead+Wind 240 deg+Ice+Temp  | 53.62    | -31.06             | 17.13              | 1705.08                            | 3060.84                            | 1.74   |
| Dead+Wind 270 deg+Ice+Temp  | 53.62    | -34.84             | 0.02               | 12.80                              | 3457.07                            | -1.71  |
| Dead+Wind 300 deg+Ice+Temp  | 53.62    | -30.29             | -16.43             | -1631.32                           | 3012.56                            | -5.34  |
| Dead+Wind 330 deg+Ice+Temp  | 53.62    | -18.04             | -29.14             | -2882.38                           | 1797.93                            | -10.67 |
| Dead+Wind 0 deg - Service   | 31.33    | 0.20               | -14.80             | -1458.79                           | -6.05                              | -1.05  |
| Dead+Wind 30 deg - Service  | 31.33    | 7.76               | -12.31             | -1221.35                           | -754.65                            | 1.13   |
| Dead+Wind 60 deg - Service  | 31.33    | 12.82              | -7.01              | -691.46                            | -1263.02                           | 0.78   |
| Dead+Wind 90 deg - Service  | 31.33    | 14.90              | -0.07              | 5.14                               | -1466.27                           | 0.85   |
| Dead+Wind 120 deg - Service | 31.33    | 13.44              | 7.13               | 721.34                             | -1310.55                           | 1.52   |
| Dead+Wind 150 deg - Service | 31.33    | 7.53               | 12.35              | 1244.31                            | -742.55                            | 3.01   |
| Dead+Wind 180 deg - Service | 31.33    | -0.04              | 14.24              | 1435.33                            | 2.79                               | 1.84   |
| Dead+Wind 210 deg - Service | 31.33    | -7.64              | 12.28              | 1234.60                            | 760.71                             | -0.56  |
| Dead+Wind 240 deg - Service | 31.33    | -13.31             | 7.28               | 726.42                             | 1314.65                            | -0.33  |
| Dead+Wind 270 deg - Service | 31.33    | -14.81             | 0.01               | 4.96                               | 1476.22                            | -1.81  |
| Dead+Wind 300 deg - Service | 31.33    | -12.88             | -6.90              | -690.19                            | 1287.21                            | -3.15  |
| Dead+Wind 330 deg - Service | 31.33    | -7.72              | -12.30             | -1224.01                           | 773.32                             | -5.26  |

## Solution Summary

| Load Comb. | Sum of Applied Forces |         |         | Sum of Reactions |         |         | % Error |
|------------|-----------------------|---------|---------|------------------|---------|---------|---------|
|            | PX<br>K               | PY<br>K | PZ<br>K | PX<br>K          | PY<br>K | PZ<br>K |         |
| 1          | 0.00                  | -31.33  | 0.00    | 0.00             | 31.33   | 0.00    | 0.000%  |
| 2          | 0.52                  | -31.33  | -37.89  | -0.52            | 31.33   | 37.89   | 0.000%  |
| 3          | 19.86                 | -31.33  | -31.53  | -19.86           | 31.33   | 31.53   | 0.002%  |
| 4          | 32.82                 | -31.33  | -17.95  | -32.82           | 31.33   | 17.95   | 0.000%  |
| 5          | 38.14                 | -31.33  | -0.19   | -38.14           | 31.33   | 0.19    | 0.001%  |
| 6          | 34.40                 | -31.33  | 18.25   | -34.40           | 31.33   | -18.25  | 0.000%  |
| 7          | 19.28                 | -31.33  | 31.61   | -19.28           | 31.33   | -31.61  | 0.000%  |
| 8          | -0.09                 | -31.33  | 36.45   | 0.09             | 31.33   | -36.45  | 0.000%  |
| 9          | -19.57                | -31.33  | 31.43   | 19.57            | 31.33   | -31.43  | 0.000%  |
| 10         | -34.06                | -31.33  | 18.63   | 34.06            | 31.33   | -18.63  | 0.000%  |
| 11         | -37.92                | -31.33  | 0.03    | 37.92            | 31.33   | -0.03   | 0.001%  |
| 12         | -32.96                | -31.33  | -17.65  | 32.96            | 31.33   | 17.65   | 0.000%  |
| 13         | -19.76                | -31.33  | -31.50  | 19.76            | 31.33   | 31.50   | 0.001%  |
| 14         | 0.00                  | -53.62  | 0.00    | 0.00             | 53.62   | 0.00    | 0.000%  |
| 15         | 0.39                  | -53.62  | -34.76  | -0.39            | 53.62   | 34.76   | 0.000%  |
| 16         | 18.11                 | -53.62  | -29.16  | -18.11           | 53.62   | 29.16   | 0.000%  |
| 17         | 30.17                 | -53.62  | -16.66  | -30.17           | 53.62   | 16.66   | 0.000%  |
| 18         | 35.01                 | -53.62  | -0.15   | -35.01           | 53.62   | 0.15    | 0.000%  |
| 19         | 31.31                 | -53.62  | 16.85   | -31.31           | 53.62   | -16.85  | 0.000%  |
| 20         | 17.66                 | -53.62  | 29.23   | -17.66           | 53.62   | -29.23  | 0.000%  |
| 21         | -0.07                 | -53.62  | 33.73   | 0.07             | 53.62   | -33.73  | 0.000%  |
| 22         | -17.89                | -53.62  | 29.09   | 17.89            | 53.62   | -29.09  | 0.000%  |
| 23         | -31.06                | -53.62  | 17.13   | 31.06            | 53.62   | -17.13  | 0.000%  |

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| <b>tnxTower</b><br><br><b>Centek Engineering Inc.</b><br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | <b>Job</b><br>16071.20 - CT1144  | <b>Page</b><br>26 of 33          |
|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Load Comb. | Sum of Applied Forces |        |        | Sum of Reactions |       |        | % Error |
|------------|-----------------------|--------|--------|------------------|-------|--------|---------|
|            | PX K                  | PY K   | PZ K   | PX K             | PY K  | PZ K   |         |
| 24         | -34.84                | -53.62 | 0.02   | 34.84            | 53.62 | -0.02  | 0.000%  |
| 25         | -30.29                | -53.62 | -16.43 | 30.29            | 53.62 | 16.43  | 0.000%  |
| 26         | -18.04                | -53.62 | -29.14 | 18.04            | 53.62 | 29.14  | 0.000%  |
| 27         | 0.20                  | -31.33 | -14.80 | -0.20            | 31.33 | 14.80  | 0.000%  |
| 28         | 7.76                  | -31.33 | -12.31 | -7.76            | 31.33 | 12.31  | 0.000%  |
| 29         | 12.82                 | -31.33 | -7.01  | -12.82           | 31.33 | 7.01   | 0.000%  |
| 30         | 14.90                 | -31.33 | -0.07  | -14.90           | 31.33 | 0.07   | 0.000%  |
| 31         | 13.44                 | -31.33 | 7.13   | -13.44           | 31.33 | -7.13  | 0.000%  |
| 32         | 7.53                  | -31.33 | 12.35  | -7.53            | 31.33 | -12.35 | 0.000%  |
| 33         | -0.04                 | -31.33 | 14.24  | 0.04             | 31.33 | -14.24 | 0.000%  |
| 34         | -7.64                 | -31.33 | 12.28  | 7.64             | 31.33 | -12.28 | 0.000%  |
| 35         | -13.31                | -31.33 | 7.28   | 13.31            | 31.33 | -7.28  | 0.000%  |
| 36         | -14.81                | -31.33 | 0.01   | 14.81            | 31.33 | -0.01  | 0.000%  |
| 37         | -12.88                | -31.33 | -6.90  | 12.88            | 31.33 | 6.90   | 0.000%  |
| 38         | -7.72                 | -31.33 | -12.30 | 7.72             | 31.33 | 12.30  | 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             | 0.00000238      |
| 3                | Yes        | 4                | 0.00000001             | 0.00000467      |
| 4                | Yes        | 4                | 0.00000001             | 0.00000563      |
| 5                | Yes        | 4                | 0.00000001             | 0.00000478      |
| 6                | Yes        | 4                | 0.00000001             | 0.00000251      |
| 7                | Yes        | 4                | 0.00000001             | 0.00000312      |
| 8                | Yes        | 4                | 0.00000001             | 0.00000465      |
| 9                | Yes        | 4                | 0.00000001             | 0.00000308      |
| 10               | Yes        | 4                | 0.00000001             | 0.00000205      |
| 11               | Yes        | 4                | 0.00000001             | 0.00000381      |
| 12               | Yes        | 4                | 0.00000001             | 0.00000490      |
| 13               | Yes        | 4                | 0.00000001             | 0.00000366      |
| 14               | Yes        | 4                | 0.00000001             | 0.00000001      |
| 15               | Yes        | 4                | 0.00000001             | 0.00000269      |
| 16               | Yes        | 4                | 0.00000001             | 0.00000710      |
| 17               | Yes        | 4                | 0.00000001             | 0.00000898      |
| 18               | Yes        | 4                | 0.00000001             | 0.00000703      |
| 19               | Yes        | 4                | 0.00000001             | 0.00000272      |
| 20               | Yes        | 4                | 0.00000001             | 0.00000553      |
| 21               | Yes        | 4                | 0.00000001             | 0.00000790      |
| 22               | Yes        | 4                | 0.00000001             | 0.00000514      |
| 23               | Yes        | 4                | 0.00000001             | 0.00000235      |
| 24               | Yes        | 4                | 0.00000001             | 0.00000585      |
| 25               | Yes        | 4                | 0.00000001             | 0.00000816      |
| 26               | Yes        | 4                | 0.00000001             | 0.00000618      |
| 27               | Yes        | 4                | 0.00000001             | 0.00000001      |
| 28               | Yes        | 4                | 0.00000001             | 0.00000001      |
| 29               | Yes        | 4                | 0.00000001             | 0.00000001      |
| 30               | Yes        | 4                | 0.00000001             | 0.00000001      |
| 31               | Yes        | 4                | 0.00000001             | 0.00000001      |
| 32               | Yes        | 4                | 0.00000001             | 0.00000001      |
| 33               | Yes        | 4                | 0.00000001             | 0.00000001      |
| 34               | Yes        | 4                | 0.00000001             | 0.00000001      |
| 35               | Yes        | 4                | 0.00000001             | 0.00000001      |
| 36               | Yes        | 4                | 0.00000001             | 0.00000001      |

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|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

|    |     |   |            |            |
|----|-----|---|------------|------------|
| 37 | Yes | 4 | 0.00000001 | 0.00000001 |
| 38 | Yes | 4 | 0.00000001 | 0.00000001 |

### Maximum Tower Deflections - Service Wind

| Section No. | Elevation<br>ft | Horz. Deflection<br>in | Gov. Load Comb. | Tilt<br>° | Twist<br>° |
|-------------|-----------------|------------------------|-----------------|-----------|------------|
| T1          | 160 - 140       | 5.608                  | 35              | 0.3380    | 0.0187     |
| T2          | 140 - 120       | 4.216                  | 35              | 0.3154    | 0.0129     |
| T3          | 120 - 100       | 2.994                  | 35              | 0.2536    | 0.0057     |
| T4          | 100 - 80        | 2.016                  | 35              | 0.1946    | 0.0063     |
| T5          | 80 - 60         | 1.268                  | 35              | 0.1415    | 0.0067     |
| T6          | 60 - 40         | 0.727                  | 35              | 0.1001    | 0.0051     |
| T7          | 40 - 20         | 0.344                  | 35              | 0.0674    | 0.0031     |
| T8          | 20 - 0          | 0.101                  | 35              | 0.0327    | 0.0013     |

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

| Elevation<br>ft | Appurtenance                    | Gov. Load Comb. | Deflection<br>in | Tilt<br>° | Twist<br>° | Radius of Curvature<br>ft |
|-----------------|---------------------------------|-----------------|------------------|-----------|------------|---------------------------|
| 169.00          | (2) AM-X-CD-14-65-00T-RET       | 35              | 5.608            | 0.3380    | 0.0187     | 89646                     |
| 165.00          | 15' x 2" Dia Omni               | 35              | 5.608            | 0.3380    | 0.0187     | 89646                     |
| 161.00          | P8 x18-ft Pipe Mast             | 35              | 5.608            | 0.3380    | 0.0187     | 89646                     |
| 156.50          | LPA-80063-4CF                   | 35              | 5.359            | 0.3358    | 0.0178     | 89646                     |
| 156.00          | 15' Frame                       | 35              | 5.323            | 0.3355    | 0.0177     | 89646                     |
| 147.00          | APX16DWV-16DWVS-C-A20           | 35              | 4.691            | 0.3272    | 0.0152     | 34479                     |
| 127.50          | 15' x 2" Dia Omni               | 35              | 3.425            | 0.2791    | 0.0078     | 18882                     |
| 117.75          | 4' Side Mount Standoff          | 35              | 2.871            | 0.2465    | 0.0059     | 17645                     |
| 111.33          | 8 FT DISH                       | 35              | 2.540            | 0.2272    | 0.0062     | 18654                     |
| 108.00          | 16' x 2" Dia Omni               | 35              | 2.378            | 0.2174    | 0.0063     | 19255                     |
| 102.20          | 50"x4.5" Pipe Mount             | 35              | 2.112            | 0.2008    | 0.0063     | 20376                     |
| 102.00          | 6 FT DISH                       | 35              | 2.103            | 0.2003    | 0.0063     | 20413                     |
| 99.00           | 4' Side Mount Standoff          | 35              | 1.973            | 0.1918    | 0.0063     | 20852                     |
| 94.00           | 6 FT DISH                       | 35              | 1.768            | 0.1779    | 0.0064     | 21192                     |
| 93.83           | 50"x4.5" Pipe Mount             | 35              | 1.762            | 0.1774    | 0.0064     | 21201                     |
| 72.10           | 50"x4.5" Pipe Mount             | 35              | 1.032            | 0.1236    | 0.0063     | 25099                     |
| 72.00           | 10 FT DISH                      | 35              | 1.029            | 0.1234    | 0.0063     | 25146                     |
| 47.00           | 4' Side Mount Standoff (Vacant) | 35              | 0.462            | 0.0787    | 0.0038     | 35498                     |
| 45.41           | 12' x 1-1/2" Dia Omni           | 35              | 0.434            | 0.0762    | 0.0036     | 35958                     |
| 37.58           | 4' Side Mount Standoff          | 35              | 0.307            | 0.0633    | 0.0029     | 35674                     |

### Maximum Tower Deflections - Design Wind

| Section No. | Elevation<br>ft | Horz. Deflection<br>in | Gov. Load Comb. | Tilt<br>° | Twist<br>° |
|-------------|-----------------|------------------------|-----------------|-----------|------------|
| T1          | 160 - 140       | 14.350                 | 6               | 0.8587    | 0.0480     |
| T2          | 140 - 120       | 10.773                 | 6               | 0.8027    | 0.0330     |
| T3          | 120 - 100       | 7.645                  | 6               | 0.6485    | 0.0145     |

|  |  |                                  |
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|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
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| Section No. | Elevation<br>ft | Horz.<br>Deflection<br>in | Gov.<br>Load<br>Comb. | Tilt<br>° | Twist<br>° |
|-------------|-----------------|---------------------------|-----------------------|-----------|------------|
| T4          | 100 - 80        | 5.147                     | 6                     | 0.4971    | 0.0160     |
| T5          | 80 - 60         | 3.236                     | 6                     | 0.3608    | 0.0172     |
| T6          | 60 - 40         | 1.857                     | 6                     | 0.2553    | 0.0131     |
| T7          | 40 - 20         | 0.879                     | 6                     | 0.1717    | 0.0079     |
| T8          | 20 - 0          | 0.258                     | 6                     | 0.0833    | 0.0034     |

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

| Elevation<br>ft | Appurtenance                    | Gov.<br>Load<br>Comb. | Deflection<br>in | Tilt<br>° | Twist<br>° | Radius of<br>Curvature<br>ft |
|-----------------|---------------------------------|-----------------------|------------------|-----------|------------|------------------------------|
| 169.00          | (2) AM-X-CD-14-65-00T-RET       | 6                     | 14.350           | 0.8587    | 0.0480     | 36382                        |
| 165.00          | 15' x 2" Dia Omni               | 6                     | 14.350           | 0.8587    | 0.0480     | 36382                        |
| 161.00          | P8 x18-ft Pipe Mast             | 6                     | 14.350           | 0.8587    | 0.0480     | 36382                        |
| 156.50          | LPA-80063-4CF                   | 6                     | 13.709           | 0.8533    | 0.0457     | 36382                        |
| 156.00          | 15' Frame                       | 6                     | 13.618           | 0.8525    | 0.0453     | 36382                        |
| 147.00          | APX16DWV-16DWVS-C-A20           | 6                     | 11.993           | 0.8321    | 0.0390     | 13993                        |
| 127.50          | 15' x 2" Dia Omni               | 6                     | 8.748            | 0.7125    | 0.0204     | 7544                         |
| 117.75          | 4' Side Mount Standoff          | 6                     | 7.332            | 0.6303    | 0.0151     | 6990                         |
| 111.33          | 8 FT DISH                       | 6                     | 6.485            | 0.5805    | 0.0159     | 7358                         |
| 108.00          | 16' x 2" Dia Omni               | 6                     | 6.072            | 0.5555    | 0.0160     | 7578                         |
| 102.20          | 5'0"x4.5" Pipe Mount            | 6                     | 5.392            | 0.5130    | 0.0160     | 7984                         |
| 102.00          | 6 FT DISH                       | 6                     | 5.369            | 0.5115    | 0.0160     | 7997                         |
| 99.00           | 4' Side Mount Standoff          | 6                     | 5.038            | 0.4899    | 0.0161     | 8158                         |
| 94.00           | 6 FT DISH                       | 6                     | 4.514            | 0.4542    | 0.0165     | 8289                         |
| 93.83           | 5'0"x4.5" Pipe Mount            | 6                     | 4.497            | 0.4530    | 0.0165     | 8293                         |
| 72.10           | 5'0"x4.5" Pipe Mount            | 6                     | 2.634            | 0.3152    | 0.0162     | 9806                         |
| 72.00           | 10 FT DISH                      | 6                     | 2.627            | 0.3146    | 0.0162     | 9824                         |
| 47.00           | 4' Side Mount Standoff (Vacant) | 6                     | 1.182            | 0.2006    | 0.0097     | 13933                        |
| 45.41           | 12' x 1-1/2" Dia Omni           | 6                     | 1.109            | 0.1941    | 0.0093     | 14113                        |
| 37.58           | 4' Side Mount Standoff          | 6                     | 0.784            | 0.1613    | 0.0073     | 13998                        |

### Bolt Design Data

| Section No. | Elevation<br>ft | Component Type       | Bolt Grade | Bolt Size<br>in | Number Of Bolts | Maximum Load per Bolt<br>K | Allowable Load<br>K | Ratio Load/Allowable | Allowable Ratio | Criteria             |
|-------------|-----------------|----------------------|------------|-----------------|-----------------|----------------------------|---------------------|----------------------|-----------------|----------------------|
| T1          | 160             | Leg                  | A325N      | 0.6250          | 4               | 5.49                       | 13.19               | 0.416                | ✓               | 1.333 Bolt Tension   |
|             |                 | Diagonal             | A325N      | 0.5000          | 1               | 5.00                       | 4.12                | 1.213                | ✓               | 1.333 Bolt Shear     |
| T2          | 140             | Leg                  | A325N      | 0.6250          | 4               | 10.23                      | 13.50               | 0.758                | ✓               | 1.333 Bolt Tension   |
|             |                 | Diagonal             | A325N      | 0.5000          | 1               | 4.87                       | 4.12                | 1.180                | ✓               | 1.333 Bolt Shear     |
| T3          | 120             | Leg                  | A325N      | 0.7500          | 4               | 15.76                      | 19.44               | 0.811                | ✓               | 1.333 Bolt Tension   |
|             |                 | Diagonal             | A325N      | 0.5000          | 1               | 5.08                       | 4.08                | 1.246                | ✓               | 1.333 Member Bearing |
|             |                 | Secondary Horizontal | A325X      | 0.7500          | 2               | 0.63                       | 9.79                | 0.064                | ✓               | 1.333 Member Bearing |
| T4          | 100             | Leg                  | A325N      | 0.8750          | 4               | 21.53                      | 26.46               | 0.814                | ✓               | 1.333 Bolt Tension   |
|             |                 | Diagonal             | A325X      | 0.5000          | 1               | 5.74                       | 5.44                | 1.056                | ✓               | 1.333 Member Bearing |



|  |  |                                  |
|--|--|----------------------------------|
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|  | <b>Project</b><br>160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT | <b>Date</b><br>09:35:08 08/30/16 |
|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Section No. | Elevation ft | Component Type           | Bolt Grade | Bolt Size in | Number Of Bolts | Maximum Load per Bolt K | Allowable Load K | Ratio Load Allowable | Allowable Ratio | Criteria       |
|-------------|--------------|--------------------------|------------|--------------|-----------------|-------------------------|------------------|----------------------|-----------------|----------------|
| T5          | 80           | Secondary Horizontal Leg | A325X      | 0.6250       | 2               | 0.85                    | 8.16             | 0.104 ✓              | 1.333           | Member Bearing |
|             |              |                          | A325N      | 1.0000       | 4               | 26.93                   | 34.56            | 0.779 ✓              | 1.333           | Bolt Tension   |
| T6          | 60           | Secondary Horizontal Leg | A325N      | 0.6250       | 1               | 7.56                    | 6.44             | 1.174 ✓              | 1.333           | Bolt Shear     |
|             |              |                          | A325X      | 0.6250       | 2               | 1.06                    | 9.20             | 0.115 ✓              | 1.333           | Bolt Shear     |
| T7          | 40           | Leg                      | A325N      | 1.0000       | 4               | 32.91                   | 34.56            | 0.952 ✓              | 1.333           | Bolt Tension   |
|             |              |                          | A325N      | 0.6250       | 1               | 7.74                    | 6.44             | 1.201 ✓              | 1.333           | Bolt Shear     |
| T8          | 20           | Leg                      | A325N      | 1.0000       | 6               | 25.50                   | 34.56            | 0.738 ✓              | 1.333           | Bolt Tension   |
|             |              |                          | A325N      | 0.6250       | 1               | 7.59                    | 6.44             | 1.178 ✓              | 1.333           | Bolt Shear     |
| T8          | 20           | Diagonal                 | A354-BC    | 0.8750       | 6               | 28.88                   | 24.80            | 1.164 ✓              | 1.333           | Bolt Tension   |
|             |              |                          | A325X      | 0.6250       | 1               | 8.69                    | 6.80             | 1.278 ✓              | 1.333           | Member Bearing |

### Compression Checks

### Leg Design Data (Compression)

| 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> |
|-------------|--------------|--------------|-------|-------------------|----------------|--------------------|-------------------|------------|-------------------------|------------------------|
| T1          | 160 - 140    | ROHN 2.5 STD | 20.00 | 4.75              | 60.2<br>K=1.00 | 22.690             | 1.7040            | -27.67     | 38.66                   | 0.716 ✓                |
| T2          | 140 - 120    | ROHN 2.5 STD | 20.03 | 3.46              | 43.9<br>K=1.00 | 25.276             | 1.7040            | -48.41     | 43.07                   | 1.124 ✓                |
| T3          | 120 - 100    | ROHN 2.5 EH  | 20.03 | 3.44              | 44.7<br>K=1.00 | 25.153             | 2.2535            | -72.72     | 56.68                   | 1.283 ✓                |
| T4          | 100 - 80     | ROHN 3 EH    | 20.04 | 3.43              | 36.2<br>K=1.00 | 26.354             | 3.0159            | -97.71     | 79.48                   | 1.229 ✓                |
| T5          | 80 - 60      | ROHN 4 EH    | 20.03 | 5.18              | 42.1<br>K=1.00 | 25.539             | 4.4074            | -121.90    | 112.56                  | 1.083 ✓                |
| T6          | 60 - 40      | ROHN 5 EH    | 20.03 | 10.02             | 65.4<br>K=1.00 | 21.782             | 6.1120            | -149.09    | 133.13                  | 1.120 ✓                |
| T7          | 40 - 20      | ROHN 5 EH    | 20.04 | 10.02             | 65.4<br>K=1.00 | 21.778             | 6.1120            | -174.05    | 133.11                  | 1.308 ✓                |
| T8          | 20 - 0       | ROHN 6 EHS   | 20.03 | 10.02             | 54.0<br>K=1.00 | 23.713             | 6.7133            | -197.91    | 159.19                  | 1.243 ✓                |

### Diagonal Design Data (Compression)

|  |  |                                  |
|--|--|----------------------------------|
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|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Section No. | Elevation<br>ft | Size              | L<br>ft | L <sub>u</sub><br>ft | Kl/r            | F <sub>a</sub><br>ksi | A<br>in <sup>2</sup> | Actual P<br>K | Allow.<br>P <sub>a</sub><br>K | Ratio<br>P<br>P <sub>a</sub> |
|-------------|-----------------|-------------------|---------|----------------------|-----------------|-----------------------|----------------------|---------------|-------------------------------|------------------------------|
| T1          | 160 - 140       | L1 3/4x1 3/4x1/4  | 9.79    | 4.65                 | 163.6<br>K=1.00 | 5.580                 | 0.8125               | -5.00         | 4.53                          | 1.103                        |
| T2          | 140 - 120       | L2x2x1/4          | 12.21   | 6.06                 | 185.9<br>K=1.00 | 4.322                 | 0.9380               | -4.52         | 4.05                          | 1.115                        |
| T3          | 120 - 100       | L2 1/2x2 1/2x3/16 | 13.96   | 6.93                 | 168.0<br>K=1.00 | 5.289                 | 0.9020               | -5.13         | 4.77                          | 1.075                        |
| T4          | 100 - 80        | L3x3x3/16         | 15.79   | 7.80                 | 157.1<br>K=1.00 | 6.054                 | 1.0900               | -5.92         | 6.60                          | 0.897                        |
| T5          | 80 - 60         | L3x3x1/4          | 19.03   | 9.47                 | 192.0<br>K=1.00 | 4.052                 | 1.4400               | -7.56         | 5.83                          | 1.296                        |
| T6          | 60 - 40         | L3 1/2x3 1/2x1/4  | 20.76   | 10.28                | 177.8<br>K=1.00 | 4.726                 | 1.6900               | -7.74         | 7.99                          | 0.969                        |
| T7          | 40 - 20         | L3 1/2x3 1/2x1/4  | 22.64   | 11.24                | 194.4<br>K=1.00 | 3.951                 | 1.6900               | -7.53         | 6.68                          | 1.127                        |
| T8          | 20 - 0          | L4x4x1/4          | 24.49   | 12.10                | 182.6<br>K=1.00 | 4.480                 | 1.9400               | -8.29         | 8.69                          | 0.954                        |

### Secondary Horizontal Design Data (Compression)

| Section No. | Elevation<br>ft | Size              | L<br>ft | L <sub>u</sub><br>ft | Kl/r            | F <sub>a</sub><br>ksi | A<br>in <sup>2</sup> | Actual P<br>K | Allow.<br>P <sub>a</sub><br>K | Ratio<br>P<br>P <sub>a</sub> |
|-------------|-----------------|-------------------|---------|----------------------|-----------------|-----------------------|----------------------|---------------|-------------------------------|------------------------------|
| T2          | 140 - 120       | L2x2x1/4          | 10.22   | 9.98                 | 167.1<br>K=0.85 | 5.348                 | 0.9380               | -0.84         | 5.02                          | 0.167                        |
| T3          | 120 - 100       | L2 1/2x2 1/2x3/16 | 12.25   | 11.53                | 155.6<br>K=0.87 | 6.169                 | 0.9020               | -1.26         | 5.56                          | 0.227                        |
| T4          | 100 - 80        | L3x3x3/16         | 14.31   | 13.62                | 153.3<br>K=0.88 | 6.358                 | 1.0900               | -1.69         | 6.93                          | 0.245                        |
| T5          | 80 - 60         | L3x3x1/4          | 16.17   | 15.40                | 168.4<br>K=0.85 | 5.268                 | 1.4400               | -2.11         | 7.59                          | 0.279                        |

### Top Girt Design Data (Compression)

| Section No. | Elevation<br>ft | Size             | L<br>ft | L <sub>u</sub><br>ft | Kl/r            | F <sub>a</sub><br>ksi | A<br>in <sup>2</sup> | Actual P<br>K | Allow.<br>P <sub>a</sub><br>K | Ratio<br>P<br>P <sub>a</sub> |
|-------------|-----------------|------------------|---------|----------------------|-----------------|-----------------------|----------------------|---------------|-------------------------------|------------------------------|
| T1          | 160 - 140       | L2 1/2x2 1/2x3/8 | 8.56    | 8.32                 | 172.3<br>K=0.84 | 5.031                 | 1.7300               | -0.24         | 8.70                          | 0.028                        |

### Tension Checks

### Leg Design Data (Tension)

|  |  |                                  |
|--|--|----------------------------------|
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|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Section No. | Elevation<br>ft | Size         | L<br>ft | L <sub>u</sub><br>ft | Kl/r | F <sub>a</sub><br>ksi | A<br>in <sup>2</sup> | Actual<br>P<br>K | Allow.<br>P <sub>a</sub><br>K | Ratio<br>P<br>P <sub>a</sub> |
|-------------|-----------------|--------------|---------|----------------------|------|-----------------------|----------------------|------------------|-------------------------------|------------------------------|
| T1          | 160 - 140       | ROHN 2.5 STD | 20.00   | 4.75                 | 60.2 | 30.000                | 1.7040               | 21.97            | 51.12                         | 0.430                        |
| T2          | 140 - 120       | ROHN 2.5 STD | 20.03   | 3.46                 | 43.9 | 30.000                | 1.7040               | 40.95            | 51.12                         | 0.801                        |
| T3          | 120 - 100       | ROHN 2.5 EH  | 20.03   | 3.44                 | 44.7 | 30.000                | 2.2535               | 63.10            | 67.61                         | 0.933                        |
| T4          | 100 - 80        | ROHN 3 EH    | 20.04   | 3.43                 | 36.2 | 30.000                | 3.0159               | 86.22            | 90.48                         | 0.953                        |
| T5          | 80 - 60         | ROHN 4 EH    | 20.03   | 5.18                 | 42.1 | 30.000                | 4.4074               | 107.85           | 132.22                        | 0.816                        |
| T6          | 60 - 40         | ROHN 5 EH    | 20.03   | 10.02                | 65.4 | 30.000                | 6.1120               | 131.64           | 183.36                        | 0.718                        |
| T7          | 40 - 20         | ROHN 5 EH    | 20.04   | 10.02                | 65.4 | 30.000                | 6.1120               | 153.02           | 183.36                        | 0.835                        |
| T8          | 20 - 0          | ROHN 6 EHS   | 20.03   | 10.02                | 54.0 | 30.000                | 6.7133               | 173.29           | 201.40                        | 0.860                        |

### Diagonal Design Data (Tension)

| Section No. | Elevation<br>ft | Size              | L<br>ft | L <sub>u</sub><br>ft | Kl/r  | F <sub>a</sub><br>ksi | A<br>in <sup>2</sup> | Actual<br>P<br>K | Allow.<br>P <sub>a</sub><br>K | Ratio<br>P<br>P <sub>a</sub> |
|-------------|-----------------|-------------------|---------|----------------------|-------|-----------------------|----------------------|------------------|-------------------------------|------------------------------|
| T1          | 160 - 140       | L1 3/4x1 3/4x1/4  | 9.79    | 4.65                 | 108.0 | 21.600                | 0.8125               | 4.98             | 17.55                         | 0.284                        |
| T2          | 140 - 120       | L2x2x1/4          | 11.12   | 5.52                 | 110.8 | 21.600                | 0.9380               | 4.72             | 20.26                         | 0.233                        |
| T3          | 120 - 100       | L2 1/2x2 1/2x3/16 | 13.96   | 6.93                 | 108.5 | 21.600                | 0.9020               | 5.08             | 19.48                         | 0.261                        |
| T4          | 100 - 80        | L3x3x3/16         | 15.79   | 7.80                 | 101.3 | 21.600                | 1.0900               | 5.74             | 23.54                         | 0.244                        |
| T5          | 80 - 60         | L3x3x1/4          | 19.03   | 9.47                 | 123.7 | 21.600                | 1.4400               | 7.46             | 31.10                         | 0.240                        |
| T6          | 60 - 40         | L3 1/2x3 1/2x1/4  | 20.76   | 10.28                | 114.5 | 21.600                | 1.6900               | 7.57             | 36.50                         | 0.207                        |
| T7          | 40 - 20         | L3 1/2x3 1/2x1/4  | 22.64   | 11.24                | 125.1 | 21.600                | 1.6900               | 7.59             | 36.50                         | 0.208                        |
| T8          | 20 - 0          | L4x4x1/4          | 24.49   | 12.10                | 117.3 | 21.600                | 1.9400               | 8.69             | 41.90                         | 0.207                        |

### Secondary Horizontal Design Data (Tension)

| Section No. | Elevation<br>ft | Size              | L<br>ft | L <sub>u</sub><br>ft | Kl/r  | F <sub>a</sub><br>ksi | A<br>in <sup>2</sup> | Actual<br>P<br>K | Allow.<br>P <sub>a</sub><br>K | Ratio<br>P<br>P <sub>a</sub> |
|-------------|-----------------|-------------------|---------|----------------------|-------|-----------------------|----------------------|------------------|-------------------------------|------------------------------|
| T2          | 140 - 120       | L2x2x1/4          | 10.22   | 9.98                 | 196.6 | 21.600                | 0.9380               | 0.84             | 20.26                         | 0.041                        |
| T3          | 120 - 100       | L2 1/2x2 1/2x3/16 | 12.25   | 11.53                | 185.3 | 21.600                | 0.9020               | 1.26             | 19.48                         | 0.065                        |

|  |  |                                  |
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|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Section No. | Elevation<br>ft | Size      | L<br>ft | L <sub>u</sub><br>ft | Kl/r  | F <sub>a</sub><br>ksi | A<br>in <sup>2</sup> | Actual<br>P<br>K | Allow.<br>P <sub>a</sub><br>K | Ratio<br>P<br>P <sub>a</sub> |
|-------------|-----------------|-----------|---------|----------------------|-------|-----------------------|----------------------|------------------|-------------------------------|------------------------------|
| T4          | 100 - 80        | L3x3x3/16 | 14.31   | 13.62                | 179.1 | 21.600                | 1.0900               | 1.69             | 23.54                         | 0.072 ✓                      |
| T5          | 80 - 60         | L3x3x1/4  | 16.17   | 15.40                | 203.8 | 21.600                | 1.4400               | 2.11             | 31.10                         | 0.068 ✓                      |

### Top Girt Design Data (Tension)

| Section No. | Elevation<br>ft | Size             | L<br>ft | L <sub>u</sub><br>ft | Kl/r  | F <sub>a</sub><br>ksi | A<br>in <sup>2</sup> | Actual<br>P<br>K | Allow.<br>P <sub>a</sub><br>K | Ratio<br>P<br>P <sub>a</sub> |
|-------------|-----------------|------------------|---------|----------------------|-------|-----------------------|----------------------|------------------|-------------------------------|------------------------------|
| T1          | 160 - 140       | L2 1/2x2 1/2x3/8 | 8.56    | 8.32                 | 132.6 | 21.600                | 1.7300               | 0.13             | 37.37                         | 0.003 ✓                      |

### Section Capacity Table

| Section No. | Elevation<br>ft | Component<br>Type    | Size              | Critical<br>Element | P<br>K  | SF*P <sub>allow</sub><br>K | %<br>Capacity | Pass<br>Fail |      |
|-------------|-----------------|----------------------|-------------------|---------------------|---------|----------------------------|---------------|--------------|------|
| T1          | 160 - 140       | Leg                  | ROHN 2.5 STD      | 3                   | -27.67  | 51.54                      | 53.7          | Pass         |      |
| T2          | 140 - 120       | Leg                  | ROHN 2.5 STD      | 33                  | -48.41  | 57.42                      | 84.3          | Pass         |      |
| T3          | 120 - 100       | Leg                  | ROHN 2.5 EH       | 63                  | -72.72  | 75.56                      | 96.2          | Pass         |      |
| T4          | 100 - 80        | Leg                  | ROHN 3 EH         | 93                  | -97.71  | 105.95                     | 92.2          | Pass         |      |
| T5          | 80 - 60         | Leg                  | ROHN 4 EH         | 121                 | -121.90 | 150.05                     | 81.2          | Pass         |      |
| T6          | 60 - 40         | Leg                  | ROHN 5 EH         | 142                 | -149.09 | 177.46                     | 84.0          | Pass         |      |
| T7          | 40 - 20         | Leg                  | ROHN 5 EH         | 157                 | -174.05 | 177.43                     | 98.1          | Pass         |      |
| T8          | 20 - 0          | Leg                  | ROHN 6 EHS        | 173                 | -197.91 | 212.20                     | 93.3          | Pass         |      |
| T1          | 160 - 140       | Diagonal             | L1 3/4x1 3/4x1/4  | 9                   | -5.00   | 6.04                       | 82.8          | Pass         |      |
| T2          | 140 - 120       | Diagonal             | L2x2x1/4          | 38                  | -4.52   | 5.40                       | 83.6          | Pass         |      |
| T3          | 120 - 100       | Diagonal             | L2 1/2x2 1/2x3/16 | 66                  | -5.13   | 6.36                       | 88.5 (b)      | Pass         |      |
| T4          | 100 - 80        | Diagonal             | L3x3x3/16         | 96                  | -5.92   | 8.80                       | 80.6          | Pass         |      |
| T5          | 80 - 60         | Diagonal             | L3x3x1/4          | 124                 | -7.56   | 7.78                       | 93.5 (b)      | Pass         |      |
| T6          | 60 - 40         | Diagonal             | L3 1/2x3 1/2x1/4  | 145                 | -7.74   | 10.65                      | 67.3          | Pass         |      |
| T7          | 40 - 20         | Diagonal             | L3 1/2x3 1/2x1/4  | 161                 | -7.53   | 8.90                       | 79.2 (b)      | Pass         |      |
| T8          | 20 - 0          | Diagonal             | L4x4x1/4          | 176                 | -8.29   | 11.59                      | 97.3          | Pass         |      |
| T2          | 140 - 120       | Secondary Horizontal | L2x2x1/4          | 41                  | -0.84   | 6.69                       | 12.6          | Pass         |      |
| T3          | 120 - 100       | Secondary Horizontal | L2 1/2x2 1/2x3/16 | 71                  | -1.26   | 7.42                       | 17.0          | Pass         |      |
| T4          | 100 - 80        | Secondary Horizontal | L3x3x3/16         | 101                 | -1.69   | 9.24                       | 18.3          | Pass         |      |
| T5          | 80 - 60         | Secondary Horizontal | L3x3x1/4          | 130                 | -2.11   | 10.11                      | 20.9          | Pass         |      |
| T1          | 160 - 140       | Top Girt             | L2 1/2x2 1/2x3/8  | 5                   | -0.24   | 11.60                      | 2.1           | Pass         |      |
|             |                 |                      |                   |                     |         |                            | Summary       |              |      |
|             |                 |                      |                   |                     |         |                            | Leg (T7)      | 98.1         | Pass |
|             |                 |                      |                   |                     |         |                            | Diagonal (T5) | 97.3         | Pass |
|             |                 |                      |                   |                     |         |                            | Secondary     | 20.9         | Pass |

|  |  |                                  |
|--|--|----------------------------------|
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|  | <b>Client</b><br>AT&T Mobility   | <b>Designed by</b><br>TJL        |

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | SF*P <sub>allow</sub> K | % Capacity  | Pass Fail   |
|-------------|--------------|----------------|------|------------------|-----|-------------------------|-------------|-------------|
|             |              |                |      |                  |     | Horizontal (T5)         |             |             |
|             |              |                |      |                  |     | Top Girt (T1)           | 2.1         | Pass        |
|             |              |                |      |                  |     | Bolt Checks             | 95.9        | Pass        |
|             |              |                |      |                  |     | <b>RATING =</b>         | <b>98.1</b> | <b>Pass</b> |

**Rock Anchor Foundation Analysis:**

**Input Data:**

Max Pier Reactions:

Uplift = Uplift := 178-kips *user input*  
 Shear = Shear := 24-kips *user input*  
 Compression = Axial := 204-kips *user input*

Structure:

Footing Width =  $B_{ftg} := 8.0ft$  *user input*  
 Footing Length =  $L_{ftg} := 8.0ft$  *user input*  
 Footing Thickness =  $T_{ftg} := 3.50ft$  *user input*  
 Pier Length/Width =  $L_{pier} := 3.00ft$  *user input*  
 Pier Height =  $T_{pier} := 9.50ft$  *user input*  
 Pier Projection Above Grade =  $P_p := 2.00-ft$  *user input*

Depths:

Depth to Bottom of Footing =  $D_{ftg} := 11.00ft$  *user input* (from grade line)  
 Depth to Suitable Rock =  $D_{rock} := 12.00ft$  *user input* (from grade line)  
 Depth to Suitable Earth =  $D_{earth} := 1.0ft$  *user input* (from grade line)  
 Anchor Length =  $L_{anchor} := 30.00ft$  *user input* (from grade line)  
 Depth to Top of Submerged Anchor =  $D_{anchortop} := 2.50ft$  *user input* (from grade line)  
 Anchor Depth =  $D_{anchor} := D_{anchortop} + L_{anchor}$  (from grade line)  
 $D_{anchor} = 32.5ft$

Subgrade Properties:

Internal Friction Angle =  $\phi := 30deg$  *user input*  
 Unit Weight of Earth =  $\gamma_{earth} := 110 \frac{lb}{ft^3}$  *user input* (Existing sub-grade conditions utilized in the analysis of the existing foundation system were obtained from a geo-technical soils study prepared by Clarence Welti & Assoc., P.E., P.C, dated September 20 2010.)  
 Unit Weight of Rock =  $\gamma_{rock} := 165 \frac{lb}{ft^3}$  *user input*  
 Unit Weight of Conc =  $\gamma_{conc} := 150 \frac{lb}{ft^3}$  *user input*  
 Allowable Bearing = Bearing := 12000-psf *user input*

Rock Anchor Properties:

|  |   |                   |   |
|--|---|-------------------|---|
| Number of Anchors =                            | $N_{\text{anchor}} := 4$  | <i>user input</i> |   |
| Hole Diameter =                                | $\text{hole}_d := 4.00\text{in}$  | <i>user input</i> |   |
| Allowable Bond Stress Between Rock and Grout = | $\sigma_{\text{bond}} := 50\text{-psi}$   | <i>user input</i> | Working bond Strength based on Weathered Rock/Sandstone   |
| Grout Allowable Compressive Stress =           | $f_{c_g} := 5000\text{-psi}$  | <i>user input</i> |   |
| Anchor Spacing* (along length) =               | $S_{\text{anchor}} := 5.00\text{ft}$  | <i>user input</i> |   |
| Required Factor of Safety =                    | $F_S := 2.0$  | <i>user input</i> |   |
| Rock Anchor Ultimate Strength =                | $F_{u_{\text{anchor}}} := 150.0\text{ksi}$  | <i>user input</i> | Williams R71-11 1-3/8" dia 150ksi<br>Per Recommendation of PTI For Prestressed Rock Anchors and Soil Anchors Section 6.6 Design Load Should not be more than 60% of Specified Minimum Tensile Strength. |
| Rock Anchor Yield Strength =                   | $F_{y_{\text{anchor}}} := 127.7\text{ksi}$  | <i>user input</i> |   |
| Rock Anchor Diameter =                         | $d_{ra} := 1.250\text{in}$  | <i>user input</i> |   |
| Rock Anchor Area per Group =                   | $A_g := 1.250\text{in}^2$   | <i>user input</i> |   |
| Rock Anchor Ultimate Tensile Load =            | $T_u := 188\text{kips}$   |                   |   |
| Rock Anchor Allowable Tension =                | $T_{\text{all}} := 0.60 \cdot T_u = 112.8\text{-kips}$  |                   |   |
| Rock Anchor Maximum Working Load to Yield =    | $T_y := 0.80 \cdot T_u = 150.4\text{-kips}$   |                   |   |
| Rock Anchor Shear Capacity =                   | $Sh := 0.4 \cdot T_y = 60.16\text{-kips}$   |                   |   |
| Total Volume of Concrete =                     | $V_{\text{conc}} := B_{\text{ftg}} \cdot L_{\text{ftg}} \cdot T_{\text{ftg}} + \frac{\pi \cdot L_{\text{pier}}^2}{4} \cdot T_{\text{pier}} = 291.2\text{-ft}^3$ |                   |   |
| Weight of Pad =                                | $W_{\text{pad}} := (B_{\text{ftg}} \cdot L_{\text{ftg}} \cdot T_{\text{ftg}}) \cdot \gamma_{\text{conc}} = 33.6\text{-kips}$                                    |                   |   |
| Weight of Pier =                               | $W_{\text{pier}} := \left( L_{\text{pier}}^2 \cdot T_{\text{pier}} \right) \cdot \gamma_{\text{conc}} = 12.83\text{-kips}$                                      |                   |   |
| Total Weight of Concrete =                     | $W_{\text{conc}} := W_{\text{pad}} + W_{\text{pier}} = 46.4\text{-kips}$  |                   |   |

**Rock Anchor Tension/Shear Check:**

Actual Tension Force per Anchor =

$$T_a := \frac{\text{Uplift} - W_{\text{conc}}}{N_{\text{anchor}}} = 32.9\text{-kips}$$

Design Shear Force per Anchor =

$$S_a := \frac{\text{Shear}}{N_{\text{anchor}}} = 6\text{-kips}$$

Reduced Tension For Tension/Shear Combination =

$$T_{\text{allr}} := \left[ 1 - \left( \frac{S_a}{T_{\text{all}}} \right)^2 \right] \cdot T_{\text{all}} = 112.48\text{-kips}$$

Tension Check =

$$\text{TensionCheck} := \text{if}(T_{\text{allr}} \geq T_a, \text{"OK"}, \text{"IncreaseSize"}) = \text{"OK"}$$

Shear Check =

$$\text{ShearCheck} := \text{if}(S_h \geq S_a, \text{"OK"}, \text{"IncreaseSize"}) = \text{"OK"}$$

Provided Safety Factor =

$$\frac{T_{\text{allr}}}{T_a} = 3.42$$

$$\text{SafetyFactor} := \text{if}\left(\frac{T_{\text{allr}}}{T_a} \geq 1.0, \text{"OK"}, \text{"Overstressed"}\right)$$

**SafetyFactor = "OK"**

**Rock Anchor Req'd Development Length in Rock:**

Minimum Free Stress Length Required =

$$F_{\text{stressreqd}} := 10.0\text{ft}$$

(Original Centek design free stress length)

Minimum Free Stress Length Provided =

$$F_{\text{stressprov}} := 10.0\text{ft}$$

Controlling Free Stress Length:

$$L_f := \text{if}(F_{\text{stressprov}} > F_{\text{stressreqd}}, F_{\text{stressprov}}, F_{\text{stressreqd}}) \quad L_f = 10\text{ft}$$

Required Rock Anchor Proof Load (1.33x Design Load) =

$$T_p := T_a \cdot 1.33 = 43.7\text{-kips}$$

Provided Rock Anchor Proof Load (1.33x Design Load) =

$$T_{pp} := 40\text{kips} \cdot 1.33 \cdot F_S = 106.4\text{-kips}$$

$$T_{PL\text{max}} := 0.80 \cdot T_u = 150.4\text{-kips}$$

Required Release Lock Off Load (1.10x Design Load) =

$$T_L := T_a \cdot 1.10 = 36.2\text{-kips}$$

Actual Release Lock Off Load (1.00x Design Load) =

$$T_{LL} := 40\text{kips} \cdot 1.00 \cdot F_S = 80\text{-kips}$$

$$T_{LL\text{max}} := 0.70 \cdot T_u = 131.6\text{-kips}$$

Rock Anchor/Grout Bond Length:

$$L_d := \frac{\left(\frac{0.04}{\text{in}} \cdot T_{LL}\right)}{\sqrt{f_{c_g} \cdot \text{psi}}} \quad L_d = 3.77\text{-ft}$$

**Note:**  
 Max Allowable Tensile Load = 60% of Ultimate Strength.  
 Max Lock Off Load = 70% of Ultimate Strength.  
 Max Proof Load = 80% of Ultimate Strength.

Required Rock/Grout Bond Length:

$$L_b := \frac{T_{LL}}{\pi \cdot \text{hole}_d \cdot \sigma_{\text{bond}}} = 10.61\text{ft}$$

Controlling Length:

$$L_a := \text{if}(L_b < L_d, L_d, L_b) \quad L_a = 10.61\text{ft}$$

$$L_{b\text{prov}} := D_{\text{anchor}} - L_f - D_{\text{anchortop}} = 20\text{ft}$$

$$\text{Bond\_Length\_Check} := \text{if}\left(\frac{L_a}{L_{b\text{prov}}} \leq 1.00, \text{"OK"}, \text{"Increase Length"}\right)$$

**Bond\_Length\_Check = "OK"**



**Calculated Uplift Resistance:**

Intermediate Dimension:

Suitable Earth Height =  $H := D_{rock} - D_{earth} = 11 \text{ ft}$

Suitable Rock Height =  $Z := (D_{anchor} - D_{rock}) = 20.5 \text{ ft}$

Total Anchor Width =  $W := S_{anchor} = 5 \text{ ft}$

Volumes:

Base Area 1 of Resisting Pyramid =  $B_1 := W^2 = 25 \text{ ft}^2$

Note: Rock Cone Taken At Half Suitable Rock Height - See Rock Volume Calculations.

Base Area 2 of Resisting Pyramid =  $B_2 := [\tan(\phi) \cdot (Z \cdot 0.5) \cdot 2 + W]^2 = 283.4 \text{ ft}^2$

Base Area 3 of Resisting Pyramid =  $B_3 := [\tan(\phi) \cdot (Z \cdot 0.5 + H) \cdot 2 + W]^2 = 872.5 \text{ ft}^2$

Total Volume of Resisting Material =  $V_{tot} := \frac{[H + (Z \cdot 0.5)] \cdot (B_1 + B_3 + \sqrt{B_1 \cdot B_3})}{3} = 7403.1 \text{ ft}^3$

Volume of Rock =  $V_{rock} := \frac{(Z \cdot 0.5) \cdot (B_1 + B_2 + \sqrt{B_1 \cdot B_2})}{3} = 1341.4 \text{ ft}^3$

Volume of Earth =  $V_{earth} := V_{tot} - V_{rock} - V_{conc} = 5770.5 \text{ ft}^3$

Resisting Forces:

Resisting Rock Force =  $W_{rock} := V_{rock} \cdot \gamma_{rock} = 221.3 \text{ kips}$

Resisting Earth Force =  $W_{earth} := V_{earth} \cdot \gamma_{earth} = 634.8 \text{ kips}$

Total Resisting Force =  $W_{total} := W_{rock} + W_{earth} + W_{conc} = 902.5 \text{ kips}$

**Foundation Uplift Check:**

Factor of Safety =  $\frac{W_{total}}{\text{Uplift}} = 5.07$

$\text{Uplift\_Check} := \left( \text{if} \left( \frac{W_{total}}{\text{Uplift}} \geq F_S, \text{"OK"}, \text{"Overstressed"} \right) \right)$

**Uplift\_Check = "OK"**

**Rock Bearing Capacity Check:**

Bearing Force =  $\text{MaxBearing} := \left[ \frac{(\text{Axial} + W_{conc}) + (N_{anchor} T_{LL})}{B_{ftg} \cdot L_{ftg}} \right] = 8913 \text{ psf}$

$\frac{\text{MaxBearing}}{\text{Bearing}} = 0.74$

$\text{Rock\_Bearing\_Check} := \left( \text{if} \left( \frac{\text{MaxBearing}}{\text{Bearing}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right) \right)$

**Rock\_Bearing\_Check = "OK"**



Section 6 - RBS GENERAL INFORMATION - existing

|                    | GSM 1ST RBS         | GSM 2ND RBS         | UMTS 1ST RBS        | UMTS 2ND RBS        | LTE 1ST RBS |  |  |  |  |  |  |  |
|--------------------|---------------------|---------------------|---------------------|---------------------|-------------|--|--|--|--|--|--|--|
| RBS ID:            | 96516               | 96517               | 208892              | 300964              |             |  |  |  |  |  |  |  |
| CTS COMMON ID:     | 184D1144_2          | 184D1144            | CTV1144             | CTU1144             |             |  |  |  |  |  |  |  |
| BTA/TID:           | 184G                | 184P                | 184U                | 184W                |             |  |  |  |  |  |  |  |
| 4-DIGIT SITE ID:   | 1144                | 1144                | 1144                | 1144                |             |  |  |  |  |  |  |  |
| COW OR TOY?:       | No                  | No                  | No                  | No                  |             |  |  |  |  |  |  |  |
| CELL SITE TYPE:    | SECTORIZED          | SECTORIZED          | SECTORIZED          | SECTORIZED          |             |  |  |  |  |  |  |  |
| SITE TYPE:         | BTS-CONVENTIONAL    | BTS-CONVENTIONAL    | MACRO-CONVENTIONAL  | MACRO-CONVENTIONAL  |             |  |  |  |  |  |  |  |
| BTS LOCATION ID:   | GROUND              | GROUND              | INTERNAL            | INTERNAL            |             |  |  |  |  |  |  |  |
| ORIGINATING CO:    | CINGULAR            | CINGULAR            | CINGULAR            | CINGULAR            |             |  |  |  |  |  |  |  |
| CELLULAR NETWORK:  | GOLD                | GOLD                | GOLD                | GOLD                |             |  |  |  |  |  |  |  |
| OPS DISTRICT:      | NORTH               | CT-NORTH            | CT-NORTH            | CT-NORTH            |             |  |  |  |  |  |  |  |
| RF DISTRICT:       | NORTH               | NPO TRIAGE          | MIDDLETOWN          | NPO TRIAGE          |             |  |  |  |  |  |  |  |
| OPS ZONE:          | NE_CT_WINDSOR_CS    | NE_CT_N_TLDN_N_CS   | NE_CT_N_TLDN_N_CS   | NE_CT_WINDSOR_CS    |             |  |  |  |  |  |  |  |
| RF ZONE:           | BCT01 - HARTFORD    | HOTSEAT             | BCT05               | BCT05               |             |  |  |  |  |  |  |  |
| BASE STATION TYPE: | BASE                | BASE                | BASE                | OVERLAY             |             |  |  |  |  |  |  |  |
| EQUIPMENT NAME:    | WINDSOR-PIGEON HILL | WINDSOR-PIGEON HILL | WINDSOR-PIGEON HILL | WINDSOR-PIGEON HILL |             |  |  |  |  |  |  |  |
| DISASTER PRIORITY: | 0                   | 0                   | 0                   | 3                   |             |  |  |  |  |  |  |  |

Section 6 - RBS GENERAL INFORMATION - final

|                    | GSM 1ST RBS         | GSM 2ND RBS         | UMTS 1ST RBS        | UMTS 2ND RBS        | LTE 1ST RBS         |  |  |  |  |  |  |  |
|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--|--|--|--|--|--|--|
| RBS ID:            | 96516               | 96517               | 208892              | 300964              | RFDS_14171669       |  |  |  |  |  |  |  |
| CTS COMMON ID:     | 184D1144_2          | 184D1144            | CTV1144             | CTU1144             | CTL01144            |  |  |  |  |  |  |  |
| BTA/TID:           | 184G                | 184P                | 184U                | 184W                | 321L                |  |  |  |  |  |  |  |
| 4-DIGIT SITE ID:   | 1144                | 1144                | 1144                | 1144                | 1144                |  |  |  |  |  |  |  |
| COW OR TOY?:       | No                  | No                  | No                  | No                  | No                  |  |  |  |  |  |  |  |
| CELL SITE TYPE:    | SECTORIZED          | SECTORIZED          | SECTORIZED          | SECTORIZED          | SECTORIZED          |  |  |  |  |  |  |  |
| SITE TYPE:         | BTS-CONVENTIONAL    | BTS-CONVENTIONAL    | MACRO-CONVENTIONAL  | MACRO-CONVENTIONAL  | MACRO-CONVENTIONAL  |  |  |  |  |  |  |  |
| BTS LOCATION ID:   | GROUND              | GROUND              | INTERNAL            | INTERNAL            | INTERNAL            |  |  |  |  |  |  |  |
| ORIGINATING CO:    | CINGULAR            | CINGULAR            | CINGULAR            | CINGULAR            | CINGULAR            |  |  |  |  |  |  |  |
| CELLULAR NETWORK:  | GOLD                | GOLD                | GOLD                | GOLD                | GOLD                |  |  |  |  |  |  |  |
| OPS DISTRICT:      | CT-North            | CT-North            | CT-North            | CT-North            | CT-North            |  |  |  |  |  |  |  |
| RF DISTRICT:       | NPO Triage          | NPO Triage          | Middletown          | NPO Triage          | NPO Triage          |  |  |  |  |  |  |  |
| OPS ZONE:          | NE_CT_WINDSOR_CS    | NE_CT_WINDSOR_CS    | NE_CT_WINDSOR_CS    | NE_CT_WINDSOR_CS    | NE_CT_WINDSOR_CS    |  |  |  |  |  |  |  |
| RF ZONE:           | Hotseat             | Hotseat             | BCT05               | BCT05               | Hotseat             |  |  |  |  |  |  |  |
| BASE STATION TYPE: | BASE                | BASE                | BASE                | OVERLAY             | BASE                |  |  |  |  |  |  |  |
| EQUIPMENT NAME:    | WINDSOR-PIGEON HILL | WINDSOR-PIGEON HILL | WINDSOR-PIGEON HILL | WINDSOR-PIGEON HILL | WINDSOR-PIGEON HILL |  |  |  |  |  |  |  |
| DISASTER PRIORITY: | 0                   | 0                   | 0                   | 3                   | 3                   |  |  |  |  |  |  |  |















Section 15A - CURRENT SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

| ANTENNA COMMON FIELDS  |  | ANTENNA POSITION 1    |  |  | ANTENNA POSITION 2                                 |  |  | ANTENNA POSITION 3 |  |  | ANTENNA POSITION 4    |  |  | ANTENNA POSITION 5                                 |  |  | ANTENNA POSITION 6 |  |  | ANTENNA POSITION 7 |  |  |
|--|--|-----------------------|--|--|--|--|--|--------------------|--|--|-----------------------|--|--|--|--|--|--------------------|--|--|--------------------|--|--|
| ANTENNA MAKE - MODEL   |  | AM-X-CD-14-65-00T-RET |  |  |  |  |  |                    |  |  | AM-X-CD-14-65-00T-RET |  |  |  |  |  |                    |  |  |                    |  |  |
| ANTENNA VENDOR   |  | KMW                   |  |  |  |  |  |                    |  |  | KMW                   |  |  |  |  |  |                    |  |  |                    |  |  |
| ANTENNA SIZE (H x W x D)   |  | 48X11.8X5.9           |  |  |  |  |  |                    |  |  | 48X11.8X5.9           |  |  |  |  |  |                    |  |  |                    |  |  |
| ANTENNA WEIGHT   |  | 36.4                  |  |  |  |  |  |                    |  |  | 36.4                  |  |  |  |  |  |                    |  |  |                    |  |  |
| AZIMUTH  |  | 143                   |  |  |  |  |  |                    |  |  | 143                   |  |  |  |  |  |                    |  |  |                    |  |  |
| MAGNETIC DECLINATION   |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| RADIATION CENTER (feet)  |  | 169.04                |  |  |  |  |  |                    |  |  | 169.04                |  |  |  |  |  |                    |  |  |                    |  |  |
| ANTENNA TIP HEIGHT   |  | 171                   |  |  |  |  |  |                    |  |  | 171                   |  |  |  |  |  |                    |  |  |                    |  |  |
| MECHANICAL DOWNTILT  |  | 1                     |  |  |  |  |  |                    |  |  | 1                     |  |  |  |  |  |                    |  |  |                    |  |  |
| FEEDER AMOUNT  |  | 2                     |  |  |  |  |  |                    |  |  | 2                     |  |  |  |  |  |                    |  |  |                    |  |  |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| Antenna RET Motor (QTY/MODEL)  |  | Internal              |  |  |  |  |  |                    |  |  | Internal              |  |  |  |  |  |                    |  |  |                    |  |  |
| SURGE ARRESTOR (QTY/MODEL)   |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| DIPLEXER (QTY/MODEL)   |  | 2                     |  |  | KMW / KDXCV0012017                                 |  |  |                    |  |  | 2                     |  |  | KMW / KDXCV0012017                                 |  |  |                    |  |  |                    |  |  |
| DUPLER (QTY/MODEL)   |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |  |                       |  |  |  |  |  |                    |  |  | 1                     |  |  | KATHREIN 860-10006                                 |  |  |                    |  |  |                    |  |  |
| DC BLOCK (QTY/MODEL)   |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| TMA/LNA (QTY/MODEL)  |  | 1                     |  |  | Pwav TT19-08BP111-001<br>Twin 1900 w/ 850BP (1900) |  |  |                    |  |  | 1                     |  |  | Pwav TT19-08BP111-001<br>Twin 1900 w/ 850BP (1900) |  |  |                    |  |  |                    |  |  |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  |  | 2                     |  |  | Polyphaser 1000860                                 |  |  |                    |  |  |                       |  |  | AISG Diplexer                                      |  |  |                    |  |  |                    |  |  |
| PDU FOR TMA (QTY/MODEL)  |  | 1                     |  |  | LGP 12104 (1900 AND 850 Bypass TMA)                |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| FILTER (QTY/MODEL)   |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| SQUID (QTY/MODEL)  |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| FIBER TRUNK (QTY/MODEL)  |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| DC TRUNK (QTY/MODEL)   |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| RRH - 700 band (QTY/MODEL)   |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| RRH - 850 band (QTY/MODEL)   |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| RRH - 1900 band (QTY/MODEL)  |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| RRH - AWS band (QTY/MODEL)   |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| RRH - WCS band (QTY/MODEL)   |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| Additional RRH #1 - any band (QTY/MODEL)                                       |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| Additional RRH #2 - any band (QTY/MODEL)                                       |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| Additional Component1 (QTY/MODEL)  |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| Additional Component2 (QTY/MODEL)  |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| Additional Component3 (QTY/MODEL)  |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| Local Market Note1   |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| Local Market Note2   |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |
| Local Market Note3   |  |                       |  |  |  |  |  |                    |  |  |                       |  |  |  |  |  |                    |  |  |                    |  |  |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng)      | USEID (Atoll)      | ATOLL TXID | ATOLL CELL ID | TX/RX ? | TECHNOLOGY/FREQUENCY | ANTENNA ATOLL                      | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE      | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID (CSSNG) |  |
|----------------------|-------------|--------------------|--------------------|------------|---------------|---------|----------------------|------------------------------------|--------------|--------------------|-----------------|---|-------------------|----------------------|-------------------|------------------------|--------------------------|-------------------|--------------------------|-------------|------------------|--------------|------------------|--|
| ANTENNA POSITION 1   | PORT 1      | 59388.A.850.3G.1   | 59388.A.850.3G.1   | CTV11441   | CTV11441      |         | UMTS 850             | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | None                                      | RFS 1-1/4 (850)   | 200.05121            |                   |                        |                          |                   |                          |             |                  |              |                  |  |
|                      | PORT 2      | 59388.A.850.3G.1   | 59388.A.850.3G.1   | CTV11441   | CTV1144A      |         | UMTS 850             | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | Bottom                                    | RFS 1-1/4 (850)   | 200.05121            |                   |                        |                          |                   |                          |             |                  |              |                  |  |
|                      | PORT 3      | 59388.A.1900.3G.2  | 59388.A.1900.3G.2  | CTU11447   | CTU11447      |         | UMTS 1900            | AM-X-CD-14-65-00T-RET_1920MHz_02DT | 16.29        |                    | 2               | None                                      | RFS 1-1/4 (1900)  | 200.05121            |                   |                        |                          |                   |                          |             |                  |              |                  |  |
| ANTENNA POSITION 4   | PORT 1      | 59388.A.850.25G.1  | 59388.A.850.25G.1  | 184G11441  | 184G11441     |         | GSM 850              | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | None                                      | 1-1/4 at 850 MHz  | 200.05121            |                   |                        |                          |                   | 11.22                    | 169.82      |                  |              |                  |  |
|                      | PORT 3      | 59388.A.1900.25G.1 | 59388.A.1900.25G.1 | 184P11441  | 184P11441     |         | GSM 1900             | AM-X-CD-14-65-00T-RET_1920MHz_02DT | 16.29        |                    | 2               | None                                      | 1-1/4 at 1900 MHz | 200.05121            |                   |                        |                          |                   | 28.18                    | 454.98      |                  |              |                  |  |

Section 15B - CURRENT SECTOR/CELL INFORMATION - SECTOR B

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1    | ANTENNA POSITION 2                                 | ANTENNA POSITION 3 | ANTENNA POSITION 4    | ANTENNA POSITION 5                                 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|--|-----------------------|--|--------------------|-----------------------|--|--------------------|--------------------|
| ANTENNA MAKE - MODEL   | AM-X-CD-14-65-00T-RET |  |                    | AM-X-CD-14-65-00T-RET |  |                    |                    |
| ANTENNA VENDOR   | KMW                   |  |                    | KMW                   |  |                    |                    |
| ANTENNA SIZE (H x W x D)   | 48X11.8X5.9           |  |                    | 48X11.8X5.9           |  |                    |                    |
| ANTENNA WEIGHT   | 36.4                  |  |                    | 36.4                  |  |                    |                    |
| AZIMUTH  | 263                   |  |                    | 263                   |  |                    |                    |
| MAGNETIC DECLINATION   |                       |  |                    |                       |  |                    |                    |
| RADIATION CENTER (feet)  | 169.04                |  |                    | 169.04                |  |                    |                    |
| ANTENNA TIP HEIGHT   | 171                   |  |                    | 171                   |  |                    |                    |
| MECHANICAL DOWNTILT  | 0                     |  |                    | 0                     |  |                    |                    |
| FEEDER AMOUNT  | 2                     |  |                    | 2                     |  |                    |                    |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |                       |  |                    |                       |  |                    |                    |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |                       |  |                    |                       |  |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |                       |  |                    |                       |  |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |                       |  |                    |                       |  |                    |                    |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |                       |  |                    |                       |  |                    |                    |
| Antenna RET Motor (QTY/MODEL)  | Internal              |  |                    | Internal              |  |                    |                    |
| SURGE ARRESTOR (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| DIPLEXER (QTY/MODEL)   | 2                     | KMW / KDXCV0012017                                 |                    | 2                     | KMW / KDXCV0012017                                 |                    |                    |
| DUPLEXER (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| DC BLOCK (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| TMA/LNA (QTY/MODEL)  | 1                     | Pwav TT19-08BP111-001<br>Twin 1900 w/ 850BP (1900) |                    | 1                     | Pwav TT19-08BP111-001<br>Twin 1900 w/ 850BP (1900) |                    |                    |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  | 2                     | Polyphaser 1000860                                 |                    | AISG Diplexer         |  |                    |                    |
| PDU FOR TMA (QTY/MODEL)  |                       |  |                    |                       |  |                    |                    |
| FILTER (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| SQUID (QTY/MODEL)  |                       |  |                    |                       |  |                    |                    |
| FIBER TRUNK (QTY/MODEL)  |                       |  |                    |                       |  |                    |                    |
| DC TRUNK (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| RRH - 700 band (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| RRH - 850 band (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| RRH - 1900 band (QTY/MODEL)  |                       |  |                    |                       |  |                    |                    |
| RRH - AWS band (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| RRH - WCS band (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| Additional RRH #1 - any band (QTY/MODEL)                                       |                       |  |                    |                       |  |                    |                    |
| Additional RRH #2 - any band (QTY/MODEL)                                       |                       |  |                    |                       |  |                    |                    |
| Additional Component1 (QTY/MODEL)  |                       |  |                    |                       |  |                    |                    |
| Additional Component2 (QTY/MODEL)  |                       |  |                    |                       |  |                    |                    |
| Additional Component3 (QTY/MODEL)  |                       |  |                    |                       |  |                    |                    |
| Local Market Note1   |                       |  |                    |                       |  |                    |                    |
| Local Market Note2   |                       |  |                    |                       |  |                    |                    |
| Local Market Note3   |                       |  |                    |                       |  |                    |                    |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng)      | USEID (Atoll)      | ATOLL TXID | ATOLL CELL ID | TX/RX ? | TECHNOLOGY/FREQUENCY | ANTENNA ATOLL                      | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE      | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID (CSSNG) |  |
|----------------------|-------------|--------------------|--------------------|------------|---------------|---------|----------------------|------------------------------------|--------------|--------------------|-----------------|---|-------------------|----------------------|-------------------|------------------------|--------------------------|-------------------|--------------------------|-------------|------------------|--------------|------------------|--|
| ANTENNA POSITION 1   | PORT 1      | 59388.B.850.3G.1   | 59388.B.850.3G.1   | CTV11442   | CTV11442      |         | UMTS 850             | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | None                                      | RFS 1-1/4 (850)   | 200.05121            |                   |                        |                          |                   |                          |             |                  |              |                  |  |
|                      | PORT 2      | 59388.B.850.3G.1   | 59388.B.850.3G.1   | CTV1144    | CTV1144B      |         | UMTS 850             | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | Bottom                                    | RFS 1-1/4 (850)   | 200.05121            |                   |                        |                          |                   |                          |             |                  |              |                  |  |
|                      | PORT 3      | 59388.B.1900.3G.2  | 59388.B.1900.3G.2  | CTU11448   | CTU11448      |         | UMTS 1900            | AM-X-CD-14-65-00T-RET_1920MHz_02DT | 16.29        |                    | 2               | None                                      | RFS 1-1/4 (1900)  | 200.05121            |                   |                        |                          |                   |                          |             |                  |              |                  |  |
| ANTENNA POSITION 4   | PORT 1      | 59388.B.850.25G.1  | 59388.B.850.25G.1  | 184G11442  | 184G11442     |         | GSM 850              | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | None                                      | 1-1/4 at 850 MHz  | 200.05121            |                   |                        |                          |                   | 12.58                    | 190.54      |                  |              |                  |  |
|                      | PORT 3      | 59388.B.1900.25G.1 | 59388.B.1900.25G.1 | 184P11442  | 184P11442     |         | GSM 1900             | AM-X-CD-14-65-00T-RET_1920MHz_02DT | 16.29        |                    | 2               | None                                      | 1-1/4 at 1900 MHz | 200.05121            |                   |                        |                          |                   | 28.18                    | 454.98      |                  |              |                  |  |

Section 15C - CURRENT SECTOR/CELL INFORMATION - SECTOR C

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1    | ANTENNA POSITION 2                                 | ANTENNA POSITION 3 | ANTENNA POSITION 4    | ANTENNA POSITION 5                                 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|--|-----------------------|--|--------------------|-----------------------|--|--------------------|--------------------|
| ANTENNA MAKE - MODEL   | AM-X-CD-14-65-00T-RET |  |                    | AM-X-CD-14-65-00T-RET |  |                    |                    |
| ANTENNA VENDOR   | KMW                   |  |                    | KMW                   |  |                    |                    |
| ANTENNA SIZE (H x W x D)   | 48X11.8X5.9           |  |                    | 48X11.8X5.9           |  |                    |                    |
| ANTENNA WEIGHT   | 36.4                  |  |                    | 36.4                  |  |                    |                    |
| AZIMUTH  | 23                    |  |                    | 23                    |  |                    |                    |
| MAGNETIC DECLINATION   |                       |  |                    |                       |  |                    |                    |
| RADIATION CENTER (feet)  | 169.04                |  |                    | 169.04                |  |                    |                    |
| ANTENNA TIP HEIGHT   | 171                   |  |                    | 171                   |  |                    |                    |
| MECHANICAL DOWNTILT  | 0                     |  |                    | 0                     |  |                    |                    |
| FEEDER AMOUNT  | 2                     |  |                    | 2                     |  |                    |                    |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |                       |  |                    |                       |  |                    |                    |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |                       |  |                    |                       |  |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |                       |  |                    |                       |  |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |                       |  |                    |                       |  |                    |                    |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |                       |  |                    |                       |  |                    |                    |
| Antenna RET Motor (QTY/MODEL)  | Internal              |  |                    | Internal              |  |                    |                    |
| SURGE ARRESTOR (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| DIPLEXER (QTY/MODEL)   | 2                     | KMW / KDXCV0012017                                 |                    | 2                     | KMW / KDXCV0012017                                 |                    |                    |
| DUPLEXER (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| DC BLOCK (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| TMA/LNA (QTY/MODEL)  | 1                     | Pwav TT19-08BP111-001<br>Twin 1900 w/ 850BP (1900) |                    | 1                     | Pwav TT19-08BP111-001<br>Twin 1900 w/ 850BP (1900) |                    |                    |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  | 2                     | Polyphaser 1000860                                 |                    |                       | AISG Diplexer                                      |                    |                    |
| PDU FOR TMA (QTY/MODEL)  |                       |  |                    |                       |  |                    |                    |
| FILTER (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| SQUID (QTY/MODEL)  |                       |  |                    |                       |  |                    |                    |
| FIBER TRUNK (QTY/MODEL)  |                       |  |                    |                       |  |                    |                    |
| DC TRUNK (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| RRH - 700 band (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| RRH - 850 band (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| RRH - 1900 band (QTY/MODEL)  |                       |  |                    |                       |  |                    |                    |
| RRH - AWS band (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| RRH - WCS band (QTY/MODEL)   |                       |  |                    |                       |  |                    |                    |
| Additional RRH #1 - any band (QTY/MODEL)                                       |                       |  |                    |                       |  |                    |                    |
| Additional RRH #2 - any band (QTY/MODEL)                                       |                       |  |                    |                       |  |                    |                    |
| Additional Component1 (QTY/MODEL)  |                       |  |                    |                       |  |                    |                    |
| Additional Component2 (QTY/MODEL)  |                       |  |                    |                       |  |                    |                    |
| Additional Component3 (QTY/MODEL)  |                       |  |                    |                       |  |                    |                    |
| Local Market Note1   |                       |  |                    |                       |  |                    |                    |
| Local Market Note2   |                       |  |                    |                       |  |                    |                    |
| Local Market Note3   |                       |  |                    |                       |  |                    |                    |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng)      | USEID (Atoll)      | ATOLL TXID | ATOLL CELL ID | TX/RX ? | TECHNOLOGY/FREQUENCY | ANTENNA ATOLL                      | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE      | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID (CSSNG) |  |
|----------------------|-------------|--------------------|--------------------|------------|---------------|---------|----------------------|------------------------------------|--------------|--------------------|-----------------|---|-------------------|----------------------|-------------------|------------------------|--------------------------|-------------------|--------------------------|-------------|------------------|--------------|------------------|--|
| ANTENNA POSITION 1   | PORT 1      | 59388.C.850.3G.1   | 59388.C.850.3G.1   | CTV11443   | CTV11443      |         | UMTS 850             | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | None                                      | RFS 1-1/4 (850)   | 200.05121            |                   |                        |                          |                   |                          |             |                  |              |                  |  |
|                      | PORT 2      | 59388.C.850.3G.1   | 59388.C.850.3G.1   | CTV11443   | CTV1144C      |         | UMTS 850             | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | Bottom                                    | RFS 1-1/4 (850)   | 200.05121            |                   |                        |                          |                   |                          |             |                  |              |                  |  |
|                      | PORT 3      | 59388.C.1900.3G.2  | 59388.C.1900.3G.2  | CTU11449   | CTU11449      |         | UMTS 1900            | AM-X-CD-14-65-00T-RET_1920MHz_02DT | 16.29        |                    | 2               | None                                      | RFS 1-1/4 (1900)  | 200.05121            |                   |                        |                          |                   |                          |             |                  |              |                  |  |
| ANTENNA POSITION 4   | PORT 1      | 59388.C.850.25G.1  | 59388.C.850.25G.1  | 184G11443  | 184G11443     |         | GSM 850              | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | None                                      | 1-1/4 at 850 MHz  | 200.05121            |                   |                        |                          |                   | 22.38                    | 338.84      |                  |              |                  |  |
|                      | PORT 3      | 59388.C.1900.25G.1 | 59388.C.1900.25G.1 | 184P11443  | 184P11443     |         | GSM 1900             | AM-X-CD-14-65-00T-RET_1920MHz_02DT | 16.29        |                    | 2               | None                                      | 1-1/4 at 1900 MHz | 200.05121            |                   |                        |                          |                   | 28.18                    | 454.98      |                  |              |                  |  |

Section 16A - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1  | ANTENNA POSITION 2 | ANTENNA POSITION 3 | ANTENNA POSITION 4 | ANTENNA POSITION 5 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|--|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Existing Antenna?  |   |                    |                    |                    |                    |                    |                    |
| ANTENNA MAKE - MODEL   |   | QS66512-2          |                    |                    |                    |                    |                    |
| ANTENNA VENDOR   |   | Quintel            |                    |                    |                    |                    |                    |
| ANTENNA SIZE (H x W x D)   |   | 72.0X12.0X9.6      |                    |                    |                    |                    |                    |
| ANTENNA WEIGHT   |   | 111                |                    |                    |                    |                    |                    |
| AZIMUTH  |   | 23                 |                    |                    |                    |                    |                    |
| MAGNETIC DECLINATION   |   |                    |                    |                    |                    |                    |                    |
| RADIATION CENTER (feet)  |   | 169.04             |                    |                    |                    |                    |                    |
| ANTENNA TIP HEIGHT   |   | 172                |                    |                    |                    |                    |                    |
| MECHANICAL DOWNTILT  |   |                    |                    |                    |                    |                    |                    |
| FEEDER AMOUNT  |   |                    |                    |                    |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |   |                    |                    |                    |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |   |                    |                    |                    |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |   |                    |                    |                    |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |   |                    |                    |                    |                    |                    |                    |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |   |                    |                    |                    |                    |                    |                    |
| Antenna RET Motor (QTY/MODEL)  |   |                    | Internal           |                    |                    |                    |                    |
| SURGE ARRESTOR (QTY/MODEL)   |   | 1                  | DC/Fiber Squid     |                    |                    |                    |                    |
| DIPLEXER (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| DUPLEXER (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |   |                    | LTE RRH            |                    |                    |                    |                    |
| DC BLOCK (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| TMA/LNA (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| PDU FOR TMA (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| FILTER (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| SQUID (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| FIBER TRUNK (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| DC TRUNK (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| RRH - 700 band (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| RRH - 850 band (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| RRH - 1900 band (QTY/MODEL)  |   | 1                  | RRUS-12+RRUS-A2    |                    |                    |                    |                    |
| RRH - AWS band (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| RRH - WCS band (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| Additional RRH #1 - any band (QTY/MODEL)                                       |   |                    |                    |                    |                    |                    |                    |
| Additional RRH #2 - any band (QTY/MODEL)                                       |   |                    |                    |                    |                    |                    |                    |
| Additional Component1 (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| Additional Component2 (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| Additional Component3 (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| Local Market Note1   | Bronze Standard- LTE PCS eNode B with Bronze Standard Configuration- Add 12 port 6' ANT at POS 2 on all sectors- Add RRUS-12+A@- Add Fiber/DC Squid- Add Fiber and DC Trunks- Add DUS |                    |                    |                    |                    |                    |                    |
| Local Market Note2   |   |                    |                    |                    |                    |                    |                    |
| Local Market Note3   |   |                    |                    |                    |                    |                    |                    |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Atoll)     | ATOLL TXID    | ATOLL CELL ID | TX/RX ? | TECHNOLOGY/FREQUENCY | ANTENNA ATOLL          | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID (CSSNG) |
|----------------------|-------------|---------------|-------------------|---------------|---------------|---------|----------------------|------------------------|--------------|--------------------|-----------------|---|--------------|----------------------|-------------------|------------------------|--------------------------|-------------------|--------------------------|-------------|------------------|--------------|------------------|
| ANTENNA POSITION 2   | PORT 1      |               | 59388.A.1900.4G.1 | CTL01144_9A_1 | CTL01144_9A_1 |         | LTE 1900             | QS66512-2_1930MHz_10DT | 16           |                    | 10              | Top                                       | Fiber        | 0                    |                   |                        |                          |                   |                          | 3664.3757   |                  | 3            |                  |

Section 16B - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR B

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1  | ANTENNA POSITION 2 | ANTENNA POSITION 3 | ANTENNA POSITION 4 | ANTENNA POSITION 5 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|--|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Existing Antenna?  |   |                    |                    |                    |                    |                    |                    |
| ANTENNA MAKE - MODEL   |   | QS66512-2          |                    |                    |                    |                    |                    |
| ANTENNA VENDOR   |   | Quintel            |                    |                    |                    |                    |                    |
| ANTENNA SIZE (H x W x D)   |   | 72.0X12.0X9.6      |                    |                    |                    |                    |                    |
| ANTENNA WEIGHT   |   | 111                |                    |                    |                    |                    |                    |
| AZIMUTH  |   | 143                |                    |                    |                    |                    |                    |
| MAGNETIC DECLINATION   |   |                    |                    |                    |                    |                    |                    |
| RADIATION CENTER (feet)  |   | 169.04             |                    |                    |                    |                    |                    |
| ANTENNA TIP HEIGHT   |   | 172                |                    |                    |                    |                    |                    |
| MECHANICAL DOWNTILT  |   |                    |                    |                    |                    |                    |                    |
| FEEDER AMOUNT  |   |                    |                    |                    |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |   |                    |                    |                    |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |   |                    |                    |                    |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |   |                    |                    |                    |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |   |                    |                    |                    |                    |                    |                    |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |   |                    |                    |                    |                    |                    |                    |
| Antenna RET Motor (QTY/MODEL)  |   |                    | Internal           |                    |                    |                    |                    |
| SURGE ARRESTOR (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| DIPLEXER (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| DUPLEXER (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |   |                    | LTE RRH            |                    |                    |                    |                    |
| DC BLOCK (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| TMA/LNA (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| PDU FOR TMA (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| FILTER (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| SQUID (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| FIBER TRUNK (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| DC TRUNK (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| RRH - 700 band (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| RRH - 850 band (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| RRH - 1900 band (QTY/MODEL)  |   | 1                  | RRUS-12+RRUS-A2    |                    |                    |                    |                    |
| RRH - AWS band (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| RRH - WCS band (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| Additional RRH #1 - any band (QTY/MODEL)                                       |   |                    |                    |                    |                    |                    |                    |
| Additional RRH #2 - any band (QTY/MODEL)                                       |   |                    |                    |                    |                    |                    |                    |
| Additional Component1 (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| Additional Component2 (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| Additional Component3 (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| Local Market Note1   | Bronze Standard- LTE PCS eNode B with Bronze Standard Configuration- Add 12 port 6' ANT at POS 2 on all sectors- Add RRUS-12+A@- Add Fiber/DC Squid- Add Fiber and DC Trunks- Add DUS |                    |                    |                    |                    |                    |                    |
| Local Market Note2   |   |                    |                    |                    |                    |                    |                    |
| Local Market Note3   |   |                    |                    |                    |                    |                    |                    |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Atoll)     | ATOLL TXID    | ATOLL CELL ID | TX/RX ? | TECHNOLOGY/FREQUENCY | ANTENNA ATOLL          | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID (CSSNG) |
|----------------------|-------------|---------------|-------------------|---------------|---------------|---------|----------------------|------------------------|--------------|--------------------|-----------------|---|--------------|----------------------|-------------------|------------------------|--------------------------|-------------------|--------------------------|-------------|------------------|--------------|------------------|
| ANTENNA POSITION 2   | PORT 1      |               | 59388.B.1900.4G.1 | CTL01144_9B_1 | CTL01144_9B_1 |         | LTE 1900             | QS66512-2_1930MHz_07DT | 16           |                    | 7               | Top                                       | Fiber        | 0                    |                   |                        |                          |                   |                          | 3664.3757   |                  | 11           |                  |

Section 16C - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR C

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1  | ANTENNA POSITION 2 | ANTENNA POSITION 3 | ANTENNA POSITION 4 | ANTENNA POSITION 5 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|--|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Existing Antenna?  |   |                    |                    |                    |                    |                    |                    |
| ANTENNA MAKE - MODEL   |   | QS66512-2          |                    |                    |                    |                    |                    |
| ANTENNA VENDOR   |   | Quintel            |                    |                    |                    |                    |                    |
| ANTENNA SIZE (H x W x D)   |   | 72.0X12.0X9.6      |                    |                    |                    |                    |                    |
| ANTENNA WEIGHT   |   | 111                |                    |                    |                    |                    |                    |
| AZIMUTH  |   | 263                |                    |                    |                    |                    |                    |
| MAGNETIC DECLINATION   |   |                    |                    |                    |                    |                    |                    |
| RADIATION CENTER (feet)  |   | 169.04             |                    |                    |                    |                    |                    |
| ANTENNA TIP HEIGHT   |   | 172                |                    |                    |                    |                    |                    |
| MECHANICAL DOWNTILT  |   |                    |                    |                    |                    |                    |                    |
| FEEDER AMOUNT  |   |                    |                    |                    |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |   |                    |                    |                    |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |   |                    |                    |                    |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |   |                    |                    |                    |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |   |                    |                    |                    |                    |                    |                    |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |   |                    |                    |                    |                    |                    |                    |
| Antenna RET Motor (QTY/MODEL)  |   |                    | Internal           |                    |                    |                    |                    |
| SURGE ARRESTOR (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| DIPLEXER (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| DUPLEXER (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |   |                    | LTE RRH            |                    |                    |                    |                    |
| DC BLOCK (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| TMA/LNA (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| PDU FOR TMA (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| FILTER (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| SQUID (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| FIBER TRUNK (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| DC TRUNK (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| RRH - 700 band (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| RRH - 850 band (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| RRH - 1900 band (QTY/MODEL)  |   | 1                  | RRUS-12+RRUS-A2    |                    |                    |                    |                    |
| RRH - AWS band (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| RRH - WCS band (QTY/MODEL)   |   |                    |                    |                    |                    |                    |                    |
| Additional RRH #1 - any band (QTY/MODEL)                                       |   |                    |                    |                    |                    |                    |                    |
| Additional RRH #2 - any band (QTY/MODEL)                                       |   |                    |                    |                    |                    |                    |                    |
| Additional Component1 (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| Additional Component2 (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| Additional Component3 (QTY/MODEL)  |   |                    |                    |                    |                    |                    |                    |
| Local Market Note1   | Bronze Standard- LTE PCS eNode B with Bronze Standard Configuration- Add 12 port 6' ANT at POS 2 on all sectors- Add RRUS-12+A@- Add Fiber/DC Squid- Add Fiber and DC Trunks- Add DUS |                    |                    |                    |                    |                    |                    |
| Local Market Note2   |   |                    |                    |                    |                    |                    |                    |
| Local Market Note3   |   |                    |                    |                    |                    |                    |                    |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Atoll)     | ATOLL TXID    | ATOLL CELL ID | TX/RX ? | TECHNOLOGY/FREQUENCY | ANTENNA ATOLL          | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID (CSSNG) |
|----------------------|-------------|---------------|-------------------|---------------|---------------|---------|----------------------|------------------------|--------------|--------------------|-----------------|---|--------------|----------------------|-------------------|------------------------|--------------------------|-------------------|--------------------------|-------------|------------------|--------------|------------------|
| ANTENNA POSITION 2   | PORT 1      |               | 59388.C.1900.4G.1 | CTL01144_9C_1 | CTL01144_9C_1 |         | LTE 1900             | QS66512-2_1930MHz_06DT | 16           |                    | 6               | Top                                       | Fiber        | 0                    |                   |                        |                          |                   |                          | 3664.3757   |                  | 19           |                  |

Section 17A - FINAL SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1  | ANTENNA POSITION 2                              | ANTENNA POSITION 3 | ANTENNA POSITION 4    | ANTENNA POSITION 5                              | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|--|---|---|--------------------|-----------------------|---|--------------------|--------------------|
| ANTENNA MAKE - MODEL   | AM-X-CD-14-65-00T-RET   | QS66512-2                                       |                    | AM-X-CD-14-65-00T-RET |   |                    |                    |
| ANTENNA VENDOR   | KMW   | Quintel   |                    | KMW                   |   |                    |                    |
| ANTENNA SIZE (H x W x D)   | 48X11.8X5.9   | 72.0X12.0X9.6                                   |                    | 48X11.8X5.9           |   |                    |                    |
| ANTENNA WEIGHT   | 36.4  | 111   |                    | 36.4                  |   |                    |                    |
| AZIMUTH  | 143   | 23  |                    | 143                   |   |                    |                    |
| MAGNETIC DECLINATION   |   |   |                    |                       |   |                    |                    |
| RADIATION CENTER (feet)  | 169.04  | 169.04  |                    | 169.04                |   |                    |                    |
| ANTENNA TIP HEIGHT   | 171   | 172   |                    | 171                   |   |                    |                    |
| MECHANICAL DOWNTILT  | 1   |   |                    | 1                     |   |                    |                    |
| FEEDER AMOUNT  | 2   |   |                    | 2                     |   |                    |                    |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |   |   |                    |                       |   |                    |                    |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |   |   |                    |                       |   |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |   |   |                    |                       |   |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |   |   |                    |                       |   |                    |                    |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |   |   |                    |                       |   |                    |                    |
| Antenna RET Motor (QTY/MODEL)  | Internal  | Internal  |                    | Internal              |   |                    |                    |
| SURGE ARRESTOR (QTY/MODEL)   | 1   | DC/Fiber Squid                                  |                    |                       |   |                    |                    |
| DIPLEXER (QTY/MODEL)   | 2   | KMW / KDXCV0012017                              |                    | 2                     | KMW / KDXCV0012017                              |                    |                    |
| DIPLEXER (QTY/MODEL)   |   |   |                    |                       |   |                    |                    |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |   | LTE RRH   |                    | 1                     | KATHREIN 860-10006                              |                    |                    |
| DC BLOCK (QTY/MODEL)   |   |   |                    |                       |   |                    |                    |
| TMA/LNA (QTY/MODEL)  | 1   | Pwav TT19-08BP111-001 Twin 1900 w/ 850BP (1900) |                    | 1                     | Pwav TT19-08BP111-001 Twin 1900 w/ 850BP (1900) |                    |                    |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  | 2   | Polyphaser 1000860                              |                    |                       | AISG Diplexer                                   |                    |                    |
| PDU FOR TMA (QTY/MODEL)  | 1   | LGP 12104 (1900 AND 850 Bypass TMA)             |                    |                       |   |                    |                    |
| FILTER (QTY/MODEL)   |   |   |                    |                       |   |                    |                    |
| SQUID (QTY/MODEL)  |   |   |                    |                       |   |                    |                    |
| FIBER TRUNK (QTY/MODEL)  |   |   |                    |                       |   |                    |                    |
| DC TRUNK (QTY/MODEL)   |   |   |                    |                       |   |                    |                    |
| RRH - 700 band (QTY/MODEL)   |   |   |                    |                       |   |                    |                    |
| RRH - 850 band (QTY/MODEL)   |   |   |                    |                       |   |                    |                    |
| RRH - 1900 band (QTY/MODEL)  |   | 1   | RRUS-12+RRUS-A2    |                       |   |                    |                    |
| RRH - AWS band (QTY/MODEL)   |   |   |                    |                       |   |                    |                    |
| RRH - WCS band (QTY/MODEL)   |   |   |                    |                       |   |                    |                    |
| Additional RRH #1 - any band (QTY/MODEL)                                       |   |   |                    |                       |   |                    |                    |
| Additional RRH #2 - any band (QTY/MODEL)                                       |   |   |                    |                       |   |                    |                    |
| Additional Component1 (QTY/MODEL)  |   |   |                    |                       |   |                    |                    |
| Additional Component2 (QTY/MODEL)  |   |   |                    |                       |   |                    |                    |
| Additional Component3 (QTY/MODEL)  |   |   |                    |                       |   |                    |                    |
| Local Market Note1   | Bronze Standard- LTE PCS eNode B with Bronze Standard Configuration- Add 12 port 6' ANT at POS 2 on all sectors- Add RRUS-12+A@- Add Fiber/DC Squid- Add Fiber and DC Trunks- Add DUS |   |                    |                       |   |                    |                    |
| Local Market Note2   |   |   |                    |                       |   |                    |                    |
| Local Market Note3   |   |   |                    |                       |   |                    |                    |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng)                     | USEID (Atoll)     | ATOLL TXID    | ATOLL CELL ID | TX/RX ? | TECHNOLOGY/FREQUENCY | ANTENNA ATOLL                      | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE     | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID (CSSNG) |
|----------------------|-------------|-----------------------------------|-------------------|---------------|---------------|---------|----------------------|------------------------------------|--------------|--------------------|-----------------|---|------------------|----------------------|-------------------|------------------------|--------------------------|-------------------|--------------------------|-------------|------------------|--------------|------------------|
| ANTENNA POSITION 1   | PORT 1      | 59388.A.850.3G.1                  | 59388.A.850.3G.1  | CTV11441      | CTV11441      |         | UMTS 850             | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | None                                      | RFS 1-1/4 (850)  | 200.05121            |                   |                        |                          |                   |                          | 323.59      |                  | 1            |                  |
|                      | PORT 2      | 59388.A.850.3G.1,59388.A.850.3G.2 | 59388.A.850.3G.1  | CTV11441      | CTV1144A      |         | UMTS 850             | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | Bottom                                    | RFS 1-1/4 (850)  | 200.05121            |                   |                        |                          |                   |                          | 323.59      |                  | 1            |                  |
|                      | PORT 3      | 59388.A.1900.3G.2                 | 59388.A.1900.3G.2 | CTU11447      | CTU11447      |         | UMTS 1900            | AM-X-CD-14-65-00T-RET_1920MHz_02DT | 16.29        |                    | 2               | None                                      | RFS 1-1/4 (1900) | 200.05121            |                   |                        |                          |                   |                          | 378.44      |                  | 2            |                  |
| ANTENNA POSITION 2   | PORT 1      | 59388.A.1900.4G.tmp1              | 59388.A.1900.4G.1 | CTL01144_9A_1 | CTL01144_9A_1 |         | LTE 1900             | QS66512-2_1930MHz_10DT             | 16           |                    | 10              | Top                                       | Fiber            | 0                    |                   |                        |                          |                   |                          | 3664.3757   |                  | 3            |                  |
| ANTENNA POSITION 4   | PORT 1      | 59388.A.850.25G.1                 | 59388.A.850.25G.1 | 184G11441     | 184G11441     |         | GSM 850              | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | None                                      | 1-1/4 at 850 MHz | 200.05121            |                   |                        |                          |                   | 11.22                    | 169.82      |                  | 7            |                  |



|  |        |                    |                    |           |           |  |          |                                    |       |  |   |      |                  |           |  |  |  |  |       |        |  |   |  |
|--|--------|--------------------|--------------------|-----------|-----------|--|----------|------------------------------------|-------|--|---|------|------------------|-----------|--|--|--|--|-------|--------|--|---|--|
|  | PORT 3 | 59388.A.1900.25G.1 | 59388.A.1900.25G.1 | 184P11441 | 184P11441 |  | GSM 1900 | AM-X-CD-14-65-00T-RET_1920MHZ_0ZDT | 16.29 |  | 2 | None | 1-1/4 at 650 MHz | 200.05121 |  |  |  |  | 28.18 | 454.98 |  | 7 |  |
|--|--------|--------------------|--------------------|-----------|-----------|--|----------|------------------------------------|-------|--|---|------|------------------|-----------|--|--|--|--|-------|--------|--|---|--|

Section 17B - FINAL SECTOR/CELL INFORMATION - SECTOR B

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1   |  | ANTENNA POSITION 2                                 |  | ANTENNA POSITION 3 |  | ANTENNA POSITION 4    |  | ANTENNA POSITION 5                                 |  | ANTENNA POSITION 6 |  | ANTENNA POSITION 7 |  |
|--|--|--|--|--|--------------------|--|-----------------------|--|--|--|--------------------|--|--------------------|--|
| ANTENNA MAKE - MODEL   | AM-X-CD-14-65-00T-RET  |  | QS66512-2  |  |                    |  | AM-X-CD-14-65-00T-RET |  |  |  |                    |  |                    |  |
| ANTENNA VENDOR   | KMW  |  | Quintel  |  |                    |  | KMW                   |  |  |  |                    |  |                    |  |
| ANTENNA SIZE (H x W x D)   | 48X11.8X5.9  |  | 72.0X12.0X9.6                                      |  |                    |  | 48X11.8X5.9           |  |  |  |                    |  |                    |  |
| ANTENNA WEIGHT   | 36.4   |  | 111  |  |                    |  | 36.4                  |  |  |  |                    |  |                    |  |
| AZIMUTH  | 263  |  | 143  |  |                    |  | 263                   |  |  |  |                    |  |                    |  |
| MAGNETIC DECLINATION   |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| RADIATION CENTER (feet)  | 169.04   |  | 169.04   |  |                    |  | 169.04                |  |  |  |                    |  |                    |  |
| ANTENNA TIP HEIGHT   | 171  |  | 172  |  |                    |  | 171                   |  |  |  |                    |  |                    |  |
| MECHANICAL DOWNTILT  | 0  |  |  |  |                    |  | 0                     |  |  |  |                    |  |                    |  |
| FEEDER AMOUNT  | 2  |  |  |  |                    |  | 2                     |  |  |  |                    |  |                    |  |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Antenna RET Motor (QTY/MODEL)  | Internal   |  | Internal   |  |                    |  | Internal              |  |  |  |                    |  |                    |  |
| SURGE ARRESTOR (QTY/MODEL)   |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| DIPLEXER (QTY/MODEL)   | 2  |  | KMW / KDXCV0012017                                 |  |                    |  | 2                     |  | KMW / KDXCV0012017                                 |  |                    |  |                    |  |
| DUPLEXER (QTY/MODEL)   |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |  |  | LTE RRH  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| DC BLOCK (QTY/MODEL)   |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| TMA/LNA (QTY/MODEL)  | 1  |  | Pwav TT19-08BP111-001<br>Twin 1900 w/ 850BP (1900) |  |                    |  | 1                     |  | Pwav TT19-08BP111-001<br>Twin 1900 w/ 850BP (1900) |  |                    |  |                    |  |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  | 2  |  | Polyphaser 1000860                                 |  |                    |  |                       |  | AISG Diplexer                                      |  |                    |  |                    |  |
| PDU FOR TMA (QTY/MODEL)  |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| FILTER (QTY/MODEL)   |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| SQUID (QTY/MODEL)  |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| FIBER TRUNK (QTY/MODEL)  |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| DC TRUNK (QTY/MODEL)   |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| RRH - 700 band (QTY/MODEL)   |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| RRH - 850 band (QTY/MODEL)   |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| RRH - 1900 band (QTY/MODEL)  |  |  | 1  |  | RRUS-12+RRUS-A2    |  |                       |  |  |  |                    |  |                    |  |
| RRH - AWS band (QTY/MODEL)   |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| RRH - WCS band (QTY/MODEL)   |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Additional RRH #1 - any band (QTY/MODEL)                                       |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Additional RRH #2 - any band (QTY/MODEL)                                       |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Additional Component1 (QTY/MODEL)  |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Additional Component2 (QTY/MODEL)  |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Additional Component3 (QTY/MODEL)  |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Local Market Note1   | Bronze Standard- LTE PCS eNode B with Bronze Standard Configuration- Add 12 port 6' ANT at POS 2 on all sectors- Add RRUS-12+A@ - Add Fiber/DC Squid- Add Fiber and DC Trunks- Add DUS |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Local Market Note2   |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Local Market Note3   |  |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng)                     | USEID (Atoll)      | ATOLL TXID    | ATOLL CELL ID | TX/RX ? | TECHNOLOGY/FREQUENCY | ANTENNA ATOLL                      | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE     | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID (CSSNG) |
|----------------------|-------------|-----------------------------------|--------------------|---------------|---------------|---------|----------------------|------------------------------------|--------------|--------------------|-----------------|---|------------------|----------------------|-------------------|------------------------|--------------------------|-------------------|--------------------------|-------------|------------------|--------------|------------------|
| ANTENNA POSITION 1   | PORT 1      | 59388.B.850.3G.1                  | 59388.B.850.3G.1   | CTV11442      | CTV11442      |         | UMTS 850             | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | None                                      | RFS 1-1/4 (850)  | 200.05121            |                   |                        |                          |                   |                          | 323.59      |                  | 9            |                  |
|                      | PORT 2      | 59388.B.850.3G.1,59388.B.850.3G.2 | 59388.B.850.3G.1   | CTV1144       | CTV1144B      |         | UMTS 850             | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | Bottom                                    | RFS 1-1/4 (850)  | 200.05121            |                   |                        |                          |                   |                          | 323.59      |                  | 9            |                  |
|                      | PORT 3      | 59388.B.1900.3G.2                 | 59388.B.1900.3G.2  | CTU11448      | CTU11448      |         | UMTS 1900            | AM-X-CD-14-65-00T-RET_1920MHz_02DT | 16.29        |                    | 2               | None                                      | RFS 1-1/4 (1900) | 200.05121            |                   |                        |                          |                   |                          | 378.44      |                  | 10           |                  |
| ANTENNA POSITION 2   | PORT 1      | 59388.B.1900.4G.tmp1              | 59388.B.1900.4G.1  | CTL01144_9B_1 | CTL01144_9B_1 |         | LTE 1900             | QS66512-2_1930MHz_07DT             | 16           |                    | 7               | Top                                       | Fiber            | 0                    |                   |                        |                          |                   |                          | 3664.3757   |                  | 11           |                  |
| ANTENNA POSITION 4   | PORT 1      | 59388.B.850.25G.1                 | 59388.B.850.25G.1  | 184G11442     | 184G11442     |         | GSM 850              | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | None                                      | 1-1/4 at 850 MHz | 200.05121            |                   |                        |                          |                   | 12.58                    | 190.54      |                  | 15           |                  |
|                      | PORT 3      | 59388.B.1900.25G.1                | 59388.B.1900.25G.1 | 184P11442     | 184P11442     |         | GSM 1900             | AM-X-CD-14-65-00T-RET_1920MHz_02DT | 16.29        |                    | 2               | None                                      | 1-1/4 at 850 MHz | 200.05121            |                   |                        |                          | 28.18             | 454.98                   |             | 15               |              |                  |



Section 17C - FINAL SECTOR/CELL INFORMATION - SECTOR C

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1  |  | ANTENNA POSITION 2                                 |  | ANTENNA POSITION 3 |  | ANTENNA POSITION 4    |  | ANTENNA POSITION 5                                 |  | ANTENNA POSITION 6 |  | ANTENNA POSITION 7 |  |
|--|---|--|--|--|--------------------|--|-----------------------|--|--|--|--------------------|--|--------------------|--|
| ANTENNA MAKE - MODEL   | AM-X-CD-14-65-00T-RET   |  | QS66512-2  |  |                    |  | AM-X-CD-14-65-00T-RET |  |  |  |                    |  |                    |  |
| ANTENNA VENDOR   | KMW   |  | Quintel  |  |                    |  | KMW                   |  |  |  |                    |  |                    |  |
| ANTENNA SIZE (H x W x D)   | 48X11.8X5.9   |  | 72.0X12.0X9.6                                      |  |                    |  | 48X11.8X5.9           |  |  |  |                    |  |                    |  |
| ANTENNA WEIGHT   | 36.4  |  | 111  |  |                    |  | 36.4                  |  |  |  |                    |  |                    |  |
| AZIMUTH  | 23  |  | 263  |  |                    |  | 23                    |  |  |  |                    |  |                    |  |
| MAGNETIC DECLINATION   |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| RADIATION CENTER (feet)  | 169.04  |  | 169.04   |  |                    |  | 169.04                |  |  |  |                    |  |                    |  |
| ANTENNA TIP HEIGHT   | 171   |  | 172  |  |                    |  | 171                   |  |  |  |                    |  |                    |  |
| MECHANICAL DOWNTILT  | 0   |  |  |  |                    |  | 0                     |  |  |  |                    |  |                    |  |
| FEEDER AMOUNT  | 2   |  |  |  |                    |  | 2                     |  |  |  |                    |  |                    |  |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Antenna RET Motor (QTY/MODEL)  | Internal  |  | Internal   |  |                    |  | Internal              |  |  |  |                    |  |                    |  |
| SURGE ARRESTOR (QTY/MODEL)   |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| DIPLEXER (QTY/MODEL)   | 2   |  | KMW / KDXCV0012017                                 |  |                    |  | 2                     |  | KMW / KDXCV0012017                                 |  |                    |  |                    |  |
| DUPLEXER (QTY/MODEL)   |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |   |  | LTE RRH  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| DC BLOCK (QTY/MODEL)   |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| TMA/LNA (QTY/MODEL)  | 1   |  | Pwav TT19-08BP111-001<br>Twin 1900 w/ 850BP (1900) |  |                    |  | 1                     |  | Pwav TT19-08BP111-001<br>Twin 1900 w/ 850BP (1900) |  |                    |  |                    |  |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  | 2   |  | Polyphaser 1000860                                 |  |                    |  |                       |  | AISG Diplexer                                      |  |                    |  |                    |  |
| PDU FOR TMA (QTY/MODEL)  |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| FILTER (QTY/MODEL)   |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| SQUID (QTY/MODEL)  |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| FIBER TRUNK (QTY/MODEL)  |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| DC TRUNK (QTY/MODEL)   |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| RRH - 700 band (QTY/MODEL)   |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| RRH - 850 band (QTY/MODEL)   |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| RRH - 1900 band (QTY/MODEL)  |   |  | 1  |  | RRUS-12+RRUS-A2    |  |                       |  |  |  |                    |  |                    |  |
| RRH - AWS band (QTY/MODEL)   |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| RRH - WCS band (QTY/MODEL)   |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Additional RRH #1 - any band (QTY/MODEL)                                       |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Additional RRH #2 - any band (QTY/MODEL)                                       |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Additional Component1 (QTY/MODEL)  |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Additional Component2 (QTY/MODEL)  |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Additional Component3 (QTY/MODEL)  |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Local Market Note1   | Bronze Standard- LTE PCS eNode B with Bronze Standard Configuration- Add 12 port 6' ANT at POS 2 on all sectors- Add RRUS-12+A@- Add Fiber/DC Squid- Add Fiber and DC Trunks- Add DUS |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Local Market Note2   |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |
| Local Market Note3   |   |  |  |  |                    |  |                       |  |  |  |                    |  |                    |  |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng)                     | USEID (Atoll)      | ATOLL TXID    | ATOLL CELL ID | TX/RX ? | TECHNOLOGY/FREQUENCY | ANTENNA ATOLL                      | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE     | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID (CSSNG) |
|----------------------|-------------|-----------------------------------|--------------------|---------------|---------------|---------|----------------------|------------------------------------|--------------|--------------------|-----------------|---|------------------|----------------------|-------------------|------------------------|--------------------------|-------------------|--------------------------|-------------|------------------|--------------|------------------|
| ANTENNA POSITION 1   | PORT 1      | 59388.C.850.3G.1                  | 59388.C.850.3G.1   | CTV11443      | CTV11443      |         | UMTS 850             | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | None                                      | RFS 1-1/4 (850)  | 200.05121            |                   |                        |                          |                   |                          | 323.59      |                  | 17           |                  |
|                      | PORT 2      | 59388.C.850.3G.1,59388.C.850.3G.2 | 59388.C.850.3G.1   | CTV11443      | CTV1144C      |         | UMTS 850             | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | Bottom                                    | RFS 1-1/4 (850)  | 200.05121            |                   |                        |                          |                   |                          | 323.59      |                  | 17           |                  |
|                      | PORT 3      | 59388.C.1900.3G.2                 | 59388.C.1900.3G.2  | CTU11449      | CTU11449      |         | UMTS 1900            | AM-X-CD-14-65-00T-RET_1920MHz_02DT | 16.29        |                    | 2               | None                                      | RFS 1-1/4 (1900) | 200.05121            |                   |                        |                          |                   |                          | 378.44      |                  | 18           |                  |
| ANTENNA POSITION 2   | PORT 1      | 59388.C.1900.4G.tmp1              | 59388.C.1900.4G.1  | CTL01144_9C_1 | CTL01144_9C_1 |         | LTE 1900             | QS66512-2_1930MHz_06DT             | 16           |                    | 6               | Top                                       | Fiber            | 0                    |                   |                        |                          |                   |                          | 3664.3757   |                  | 19           |                  |
| ANTENNA POSITION 4   | PORT 1      | 59388.C.850.25G.1                 | 59388.C.850.25G.1  | 184G11443     | 184G11443     |         | GSM 850              | AM-X-CD-14-65-00T-RET_850MHz_02DT  | 14.8         |                    | 2               | None                                      | 1-1/4 at 850 MHz | 200.05121            |                   |                        |                          |                   | 22.38                    | 338.84      |                  | 23           |                  |
|                      | PORT 3      | 59388.C.1900.25G.1                | 59388.C.1900.25G.1 | 184P11443     | 184P11443     |         | GSM 1900             | AM-X-CD-14-65-00T-                 | 16.29        |                    | 2               | None                                      | 1-1/4 at 850 MHz | 200.05121            |                   |                        |                          |                   | 28.18                    | 454.98      |                  | 23           |                  |



WORKFLOW SUMMARY

| Date       | FROM<br>State / Status               | FROM<br>ATTUID | TO<br>State / Status                 | TO<br>ATTUID | Operation | Comments             |
|------------|--------------------------------------|----------------|--------------------------------------|--------------|-----------|----------------------|
| 02/01/2016 | Preliminary / In Progress            | om636a         | Preliminary / Submitted for Approval | KM8621       | Promote   | LTE Preliminary RFDS |
| 02/08/2016 | Preliminary / Submitted for Approval | KM8621         | Preliminary / Approved               | BG144B       | Promote   |                      |
| 05/16/2016 | Preliminary / Approved               | BG144B         | Final / RF Approval                  | OM636A       | Promote   | Needs Fianl          |



- Provides 12 antenna Ports in a slim-line form factor
- Optimized Azimuth patterns for Min Inter-Sector Interference
- Industry leading Minimal Wind-Load design

- 700, 850, PCS, AWS & WCS bands in one antenna
- AISG & 3GPP compliant internal remote electrical tilt (RET)
- AWS & PCS Cross band PIM >159dBc

The Quintel MultiServ™ Multiband 12 Port Antenna with patented QTilt™ technology uniquely delivers four independent services in a single slim-line antenna. This enables existing antenna network sites to be upgraded constraint free to add new services such as LTE for 700, 850, PCS, AWS and WCS bands with the replacement of one antenna. The QS66512-2 also provides 4x1695-1780+2110-2400MHz & 4x1850-1990MHz ports as two side-by-side (CLA-2X) arrays, each set of 4 ports having independent tilt for connection to 2T4R/4T4R services.

| Electrical Characteristics                  | 2x Ports<br>1&2 | 2x Ports<br>3&4 | 4x Ports<br>5-8                |           |            | 4 Ports<br>9-12  |
|---|-----------------|-----------------|--------------------------------|-----------|------------|------------------|
| Operating Frequency (MHz)                   | <b>698-806*</b> | <b>824-894</b>  | <b>1695-1780 and 2110-2400</b> |           |            | <b>1850-1990</b> |
|   | 698-806         | 824-894         | 1695-1780                      | 2110-2180 | 2300-2400  | 1850-1990        |
| Azimuth beamwidth <sup>1</sup>              | 67°             | 64°             | 68°                            | 63°       | 58°        | 69°              |
| Elevation beamwidth <sup>1</sup>            | 12°             | 10°             | 6.5°                           | 5.5°      | 4.5°       | 5.5°             |
| Gain <sup>1</sup> (dBi)                     | 13.2            | 13.5            | 16.2                           | 16.5      | 17.0       | 16.0             |
| Polarization                                | ±45°            | ±45°            | ±45°                           |           |            | ±45°             |
| Electrical down-tilt range                  | 2°-10°          | 2°-10°          | 2° - 7°                        |           |            | 2° - 7°          |
| Upper SLL (20° > mainbeam) <sup>1</sup>     | -17dB           | -19dB           | -18dB                          | -18B      | -18dB      | -16dB            |
| Front to Back Ratio(180°±10°) <sup>1</sup>  | ≥27dB           | ≥29dB           | ≥28dB                          | ≥28dB     | ≥28dB      | ≥27dB            |
| Port to Port isolation <sup>1</sup>         | ≥28dB           | ≥30dB           | ≥30dB                          | ≥30dB     | ≥30dB      | ≥30dB            |
| Return loss (VSWR)                          | 14dB(1.5)       | 14dB(1.5)       | 14dB(1.5)                      | 14dB(1.5) | 14dB (1.5) | 14dB(1.5)        |
| X Polar Discrimination (at 0°)              | >18dB           | >16dB           | >20dB                          | >20dB     | >18dB      | >20dB            |
| Max Power handling (per any port)           | 500 watts       | 500 watts       | 250 watts                      |           |            | 250 watts        |
| Total Composite Power (all ports)           | 1750 watts      |                 |                                |           |            |                  |
| PIM (3 <sup>rd</sup> Order) (2x43dBm)       | >153dBc         | >153dBc         | >153dBc                        |           |            | >153dBc          |
| XBand PIM (3 <sup>rd</sup> Order) (2x43dBm) | >159dBc         |                 |                                |           |            |                  |



<sup>1</sup>Typical Performance across frequency and Downtilt. \*Products Ordered after Jan 2016 will be 698-806MHz

| Mechanical Characteristics      |  |
|---------------------------------|--|
| Dimensions                      | L 72"(1828mm) x W 12"(304mm) x D 9.6"(245mm) |
| Weight (excl mounting brackets) | 111lbs (50.3kg)                              |
| No. of Connectors               | 12x 4.3-10.0 DIN Female Long Neck            |
| Max Wind Speed                  | 150mph (67m/s)                               |
| Equivalent Flat Plate Area      | 2.96ft <sup>2</sup> (0.275m <sup>2</sup> )   |
| Wind Load @ 160km/h (45m/s)     | Front: 587N (132 lbs), Side: 382N (86 lbs)   |
| Operating Temperature           | -40°C to +65°C                               |

| Fully Integrated RET Characteristics |                                  |
|--------------------------------------|----------------------------------|
| AISG Standards                       | V1.1, V 2.0 and 3GPP             |
| Factory Default                      | AISG 2.0                         |
| Surge immunity                       | IEC 61000-4-5:2005 4KV(AISG PIN) |
| Device Type                          | SRET Type 1                      |
| AISG Data rate                       | 9.6 kbps                         |
| No of connectors                     | 1in/1out.                        |
| Connector type                       | IEC 60130-9 (Ed 3.0)             |
| MTBF                                 | 36,000 Operational moves         |

**All specifications are subject to change without notice. Please contact your Quintel representative for complete information.**

# POWER

## DC6-48-60-18-8F

### DC Surge Suppression Solution

The DC6-48-60-18 is a dual chambered, DC surge suppression system for use in multi-circuit, Distributed Antenna Systems. The system will protect up to 6 Remote Radio Heads from voltage surges and lightning, and connect up to 18 fiber pairs. The system is enclosed in a NEMA 4 rated, waterproof enclosure.

#### FEATURES

- Protects up to 6 Remote Radio Heads, each with its own protection circuit.
- Flexible design allows for installation at the top of a tower for Remote Radio Head protection.
- Includes fiber connections for up to 18 pairs of fiber.
- LED indicators on individual circuits provide visual indication of suppressor status.
- Form 'C' relays allow for remote monitoring of the suppressor status.
- Patented Strikesorb technology provides over 60 kA of surge current capacity per circuit.
- Strikesorb suppression modules are fully recognized to UL 1449-3rd Edition Safety Standard, meeting all intermediate and high current fault requirements to facilitate use in OEM applications.
- Raycap recommends that DC protection system be installed within 2 meters or 6 feet of the radio.
- Dome design is lightweight and aerodynamic providing maximum flexibility for installation on top of towers.

