STATE OF CONNECTICUT
*CONNECTICUT SITING COUNCIL*
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

June 29, 2012

Stephanie Wenderoth
Nexlink Global Services, Suite A, Bdlg. 2
800 Marshall Phelps Road
Windsor, CT 06095

RE: **EM-AT&T-164-120613B** – AT&T Mobility notice of intent to modify an existing telecommunications facility located at 1170 Matianuck Avenue, Windsor, Connecticut.

Dear Ms. Wenderoth:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated June 4, 2012. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of

uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

L Roberts

Linda Roberts
Executive Director

LR/CDM/cm

c: The Honorable Donald Trinks, Mayor, Town of Windsor
Peter Souza, Town Manager, Town of Windsor
Eric Barz, Town Planner, Town of Windsor

**CONNECTICUT SITING COUNCIL**
**NOTICE OF INTENT TO MODIFY AN EXISTING TOWER FACILITY**
**EXEMPT MODIFICATION FILING FORM**

Public Utility Environmental Standards Act, Connecticut General Statutes §§ 16-50g - 16-50aa
Regulations of Connecticut State Agencies §§ 16-50j-72(b)(2) and 16-50j-73

**EM-AT&T-164-120613B**

**TO BE COMPLETED BY FILER**

Date: 6/4/12

Filer Name and Contact Information
Name: Stephanie Wenderoth
Address: Nexlink Global Services; Suite A Building 2
800 Marshall Phelps Road, Windsor, CT 06095
Phone Number: 401.477.2938



Wireless Carrier: AT&T

Tower Owner: AT&T

Tower Site Address: 1170 Matianuck Ave, Windsor, CT

Municipality and Name of Chief Elected Official Provided A Copy Of This Notice:
Windsor, CT – Peter Souza; Town Manager

Description of Exempt Modification (including antenna and equipment changes):
Add 3 LTE Antennas, new conduit, new concrete pad, ice bridge and surge arrestor.

Attachments
____Plans
____Power density calculations if applicable
____Tower structural report if applicable
____$625.00 Filing Fee

If required:
Municipality w/i 2,500' & Name of Chief Elected Official Provided A Copy Of This Notice:

Underlying Property Owner Provided A Copy Of This Notice:

**FOR STAFF USE ONLY**

---

____ Modification will not result in an increase in tower height
____ Modification is within existing site boundaries
____ Modification will not increase noise levels at the site boundary by 6 dbA or more, or to levels that exceed State & local criteria
____ Modification will meet FCC and DEEP MPE limits
____ Modification will not result in significant adverse change in physical or environmental

characteristics of the site

____ Modification will not impair the structural integrity of the facility as determined by PE

____ If yes to all of the above, approval of acknowledgement letter

June 4, 2012

VIA Hand Delivery

Ms. Linda Roberts, Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: AT&T Mobility - Notice of Exempt Modification
1170 Matianuck Avenue, Windsor CT

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of AT&T Mobility ("AT&T"). AT&T is enhancing the capabilities of its wireless system in Connecticut by implementing LTE technology. In order to do so, AT&T will modify antenna and equipment configurations at a number of existing sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section I6-50j-73, a copy of this letter and attachments is being sent to the Town Manager of Windsor.

AT&T plans to modify the existing facility at 1170 Matianuck Avenue, owned by Genesis Health Ventures of Bloomfield & AT&T Wireless Pcs LLC (coordinates 41-50-25.96 N, 72-39-59.15 W). Attached are drawings depicting the planned changes, and documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration. Also included is a power density calculation reflecting the modification to AT&T's operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C. S.A. Section | 6-50j-l 2(b)(2).

1. The height of the overall structure will be unaffected. The existing antennas will remain and AT&T will add three (3) new antennas, six (6) RRU's and one (1) surge arrestor. Additionally, AT&T rniill install one (1) fiber cable and two (2) DC control cables within the existing monopole.

2. The proposed changes will not extend the site boundaries. AT&T will install additional equipment in the existing equipment shelter. Thus, there will no effect on the site compound.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed change will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environment as calculated for a mixed frequency site. As indicated in the attached

power density calculations, AT&T's operations at the site will result in a power density of 3.992%; the combined site operations will result in a total power density of 6.45%.

Please feel free to call me with any questions or concerns regarding this matter.
Thank you for your consideration.

Respectfully submitted,

AT&T Mobility
Stephanie Wenderoth, Consultant
wenderoths@nexlinkgs.com
401.477.2938

Cc: Peter Souza; Town Manager, 275 Broad Street, Windsor, CT. 06095

C Squared Systems, LLC
65 Dartmouth Drive, Unit A3
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

# Calculated Radio Frequency Emissions

at&t

## CT5137 – Windsor South

## 1170 Matianuck Avenue, Windsor, CT 06095

May 25, 2012

# Table of Contents



# List of Tables



# List of Figures

## 1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the stealth monopole tower located at 1170 Matianuck Avenue in Windsor, CT. The coordinates of the tower are 41-50-25.96 N, 72-39-59.15 W.

AT&T is proposing the following modifications:

1) Install three 700 MHz LTE antennas (one per sector).

## 2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter ($mW/cm^2$). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

## 3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left( \frac{1.6^2 \times EIRP}{4\pi \times R^2} \right) \text{x Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.

## 4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical pattern of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

| Carrier | Antenna Height (Feet) | Operating Frequency (MHz) | Number of Trans. | ERP Per Transmitter (Watts) | Power Density ($mw/cm^2$) | Limit | %MPE |
|---|---|---|---|---|---|---|---|
| *Cingular GSM* | *97* | *1900* | *3* | *570* | *0.0653* | *1.0000* | *6.53%* |
| *Cingular UMTS* | *97* | *880* | *1* | *500* | *0.0191* | *0.5867* | *3.26%* |
| Clearwire | 87 | 2496 | 2 | 153 | 0.0145 | 1.0000 | 1.45% |
| Clearwire | 87 | 18000 | 1 | 211 | 0.0100 | 1.0000 | 1.00% |
| AT&T UMTS | 97 | 880 | 2 | 565 | 0.0043 | 0.5867 | 0.74% |
| AT&T UMTS | 97 | 1900 | 2 | 1077 | 0.0082 | 1.0000 | 0.82% |
| AT&T LTE | 97 | 734 | 1 | 1615 | 0.0062 | 0.4893 | 1.26% |
| AT&T GSM | 97 | 880 | 1 | 283 | 0.0011 | 0.5867 | 0.18% |
| AT&T GSM | 97 | 1900 | 4 | 646 | 0.0099 | 1.0000 | 0.99% |
| | | | | | | **Total** | **6.45%** |

**Table 1: Carrier Information**[1] [2] [3]

[1] The existing CSC filing for Cingular should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for carriers other than AT&T was taken directly from the CSC database dated 3/29/2012. Please note that %MPE values listed are rounded to two decimal points. The total %MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

[2] In the case where antenna models are not uniform across all 3 sectors for the same frequency band, the antenna model with the highest gain was used for the calculations to present a worse-case scenario.

[3] Antenna height listed for AT&T is in reference to the B&T Engineering Structural Analysis Report dated 4/17/2012.

## 5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **6.45% of the FCC limit.**

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

## 6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.

Daniel L. Goulet
C Squared Systems, LLC

May 25, 2012
Date

## Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

## Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

### (A) Limits for Occupational/Controlled Exposure[4]

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

### (B) Limits for General Population/Uncontrolled Exposure[5]

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

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

**Table 2: FCC Limits for Maximum Permissible Exposure (MPE)**

[4] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

[5] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

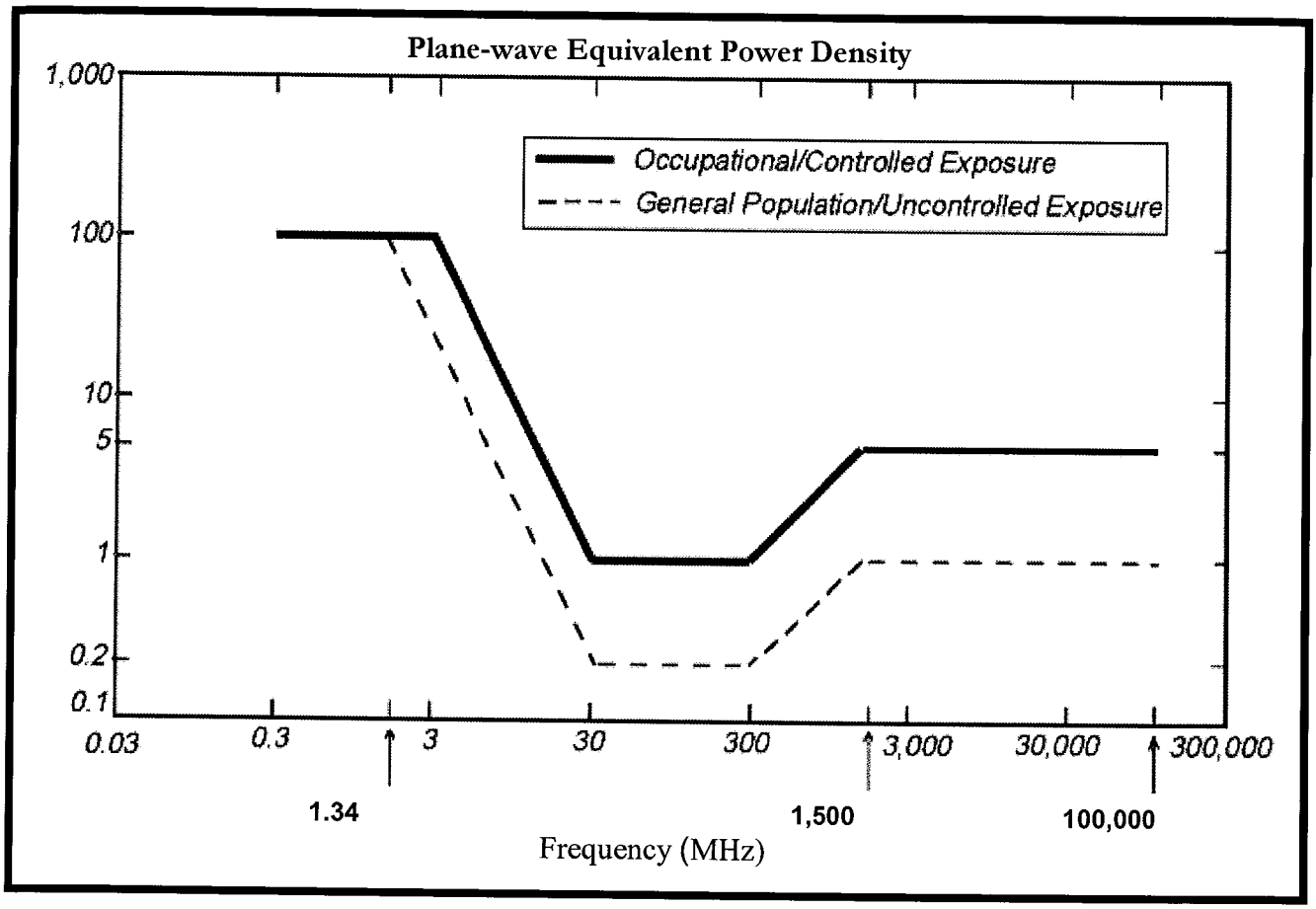
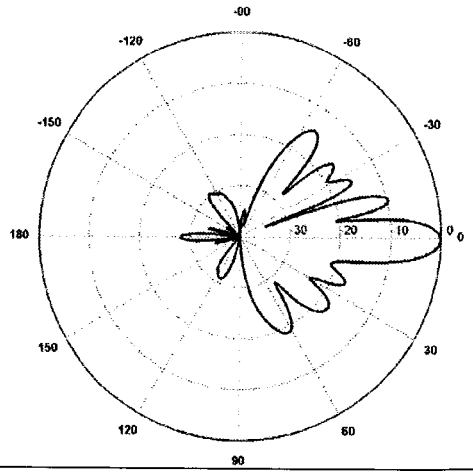



**Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)**

## Attachment C: AT&T Antenna Data Sheets and Electrical Patterns

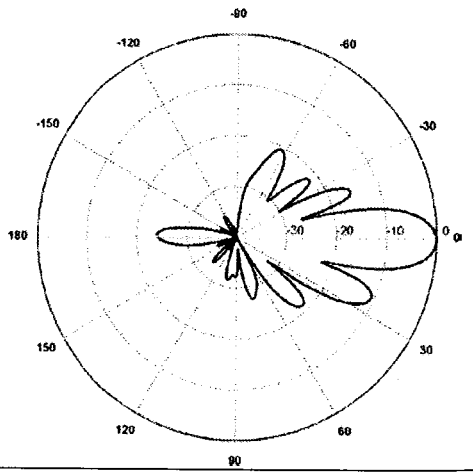
### 700 MHz

| | |
|---|---|
| Manufacturer: | Powerwave |
| Model #: | P65-17-XLH-RR |
| Frequency Band: | 698-806 MHz |
| Gain: | 14.3 dBd |
| Vertical Beamwidth: | 8.4 ° |
| Horizontal Beamwidth: | 70° |
| Polarization: | Dual Linear ±45° |
| Size L x W x D: | 96.0" x 12.0" x 6.0" |



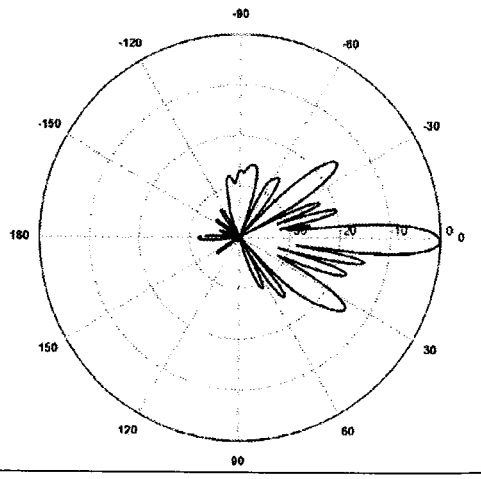

### 850 MHz

| | |
|---|---|
| Manufacturer: | Kathrein Scala |
| Model #: | 800 10121 |
| Frequency Band: | 824-896 MHz |
| Gain: | 11.5 dBd |
| Vertical Beamwidth: | 14.5° |
| Horizontal Beamwidth: | 86° |
| Polarization: | ±45° |
| Size L x W x D: | 54.5" x 10.3" x 5.9" |




### 1900 MHz

| | |
|---|---|
| Manufacturer: | Kathrein Scala |
| Model #: | 800 10121 |
| Frequency Band: | 1850-1990 MHz |
| Gain: | 14.3 dBd |
| Vertical Beamwidth: | 6.6° |
| Horizontal Beamwidth: | 85° |
| Polarization: | ±45° |
| Size L x W x D: | 54.5" x 10.3" x 5.9" |



**Nexlink Global Services**
800 Marshall Phelps Road
Windsor, CT 06095

April 17, 2012

**B&T Engineering, Inc.**
1717 S. Boulder, Suite 300
Tulsa, OK 74119

B&T No.: 84426.001

## STRUCTURAL ANALYSIS
## 100' Monopine Tower

| | | |
|---|---|---|
| AT&T DESIGNATION: | Site ID: | 25880 |
| | Site FA: | 10071337 |
| | Site Name: | Windsor South |
| | AT&T Project: | LTE |
| ANALYSIS CRITERIA: | Codes: | TIA/EIA-222-F (80 mph fastest mile)<br>IBC 2003<br>2003 IRC (State Bldg. Code, 2005 CT Supplement) |
| SITE DATA: | | 1170 Matianuck Avenue, Windsor, CT, Hartford County<br>Latitude 41.840492°, Longitude -72.666499°<br>Market MA/RI/VT/NH/ME/CT |

Ms. Stephanie Wenderoth,

B&T Engineering, Inc. is pleased to submit this Structural Analysis Report to determine the structural integrity of the aformentioned tower. The purpose of the analysis is to determine the suitability of the tower with the existing and proposed loading configuration detailed in the analysis report.

**Analysis Results**

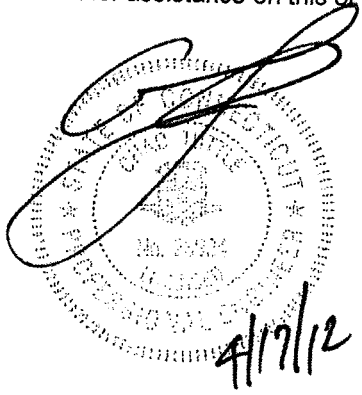
| | | |
|---|---|---|
| Tower Stress Level with Proposed Equipment: | **77.5%** | **Pass** |
| Foundation Ratio with Proposed Equipment: | **64.3%** | **Pass** |

We at B&T Engineering, Inc. appreciate the opportunity of providing our continuing professioinal services to you and Nexlink Global Services. If you have any questions or need further assistance on this or any other project please give us a call.

Respectfully Submitted by: B&T Engineering, Inc.

Analysis Prepared by: Chad Tuttle, P.E.

Analysis Reviewed by: Chad E. Tuttle, P.E.



## ANALYSIS RESULTS:

**Table 1 - Section Capacity (Summary)**

| Component (Tower Section) | % Capacity | Pass / Fail |
|---|---|---|
| TP21.11x15x0.188 | 53 | Pass |
| TP32.417x19.755x0.313 | 77.5 | Pass |
| TP45x30.382x0.375 | 74.8 | Pass |

**Table 2 - Tower Component Stresses vs. Capacity**

| Notes | Component | Elevation (ft) | % Capacity | Pass / Fail |
|---|---|---|---|---|
| 1 | Anchor Rods | Base | 69.9 | **Pass** |
| 1 | Base Plate | Base | 77.3 | **Pass** |
| 1 | Base Foundation | Base | 64.3 | **Pass** |

Notes:

1.) See additional documentation in "Appendix B - Calculations" for calculation supporting the % capacity consumed.

2.) Capacities up to 105% are considered acceptable based on analysis methods used.

## Recommendations:

N/A

## ANALYSIS PROCEDURE:

**Table 4 - Documents Provided**

| Document | Description | Date | Source |
|---|---|---|---|
| Tower Data | EEI Project No. 10728 | 4/26/2002 | Siterra |
| Foundation Information | EEI Project No. 10728 | 4/26/2002 | Siterra |
| Geotech Report | Tectonic Engineering Consultants | 11/2/2001 | Siterra |
| Loading | Equipment Mod Form | 1/23/2012 | Siterra |
| | Previous SA by GPD Associates | 12/16/2009 | Siterra |
| Previous Structural Analysis | GPD Associates Job No. 2009287.01 | 12/16/2009 | Siterra |
| | Malouf Engineering Job #CT00802M-07V0 | 7/10/2007 | Siterra |

## ANALYSIS METHOD:

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

## ASSUMPTIONS:

1. Tower and structures were built in accordance with the manufacturer's specifications.
2. The tower and structures have been maintained in accordance with the manufacturer's specifications.
3. The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Appendix A of this report.
4. Mount areas and weights are assumed based on photographs provided.
5. Refer to the base level drawing for transmission line distribution.
6. Siterra stated that the Clearwire antennas at 87' have been removed. This was confirmed by the photos therefore we did not consider Clearwire antenans in this analysis.

If any of these assumptions have been made in error, B&T Engineering should be notified to determine the effect on the structural integrity of the tower.

# APPENDIX A

# TOWER ANALYSIS LOADING

## TOWER ANALYSIS LOADING:

### Existing / Reserved Loading

| Antenna | | | | | | Mount | | Transmission Line | |
|---|---|---|---|---|---|---|---|---|---|
| Antenna Owner | Mount Height (ft) | Antenna CL (ft) | Quantity | Manufacturer | Model | Quantity | Type | Quantity | Size (in) |
| **AT&T** | **97** | **97** | **3** | **Kathrein** | **800 1021** | **3** | **T-Arm Mounts** | **6** | **7/8"** |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

*Equipment to be Removed

### Proposed Loading

| Antenna | | | | | | Mount | | Transmission Line | |
|---|---|---|---|---|---|---|---|---|---|
| Antenna Owner | Mount Height (ft) | Antenna CL (ft) | Quantity | Manufacturer | Model | Quantity | Type | Quantity | Size (in) |
| **AT&T** | **97** | **97** | **1** | **Powerwave** | **P65-17-XLH-RR** | | | | |
| **AT&T** | **97** | **97** | **1** | **KMW** | **AM-X-CD-16-65-00T-RET** | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

### Future Loading

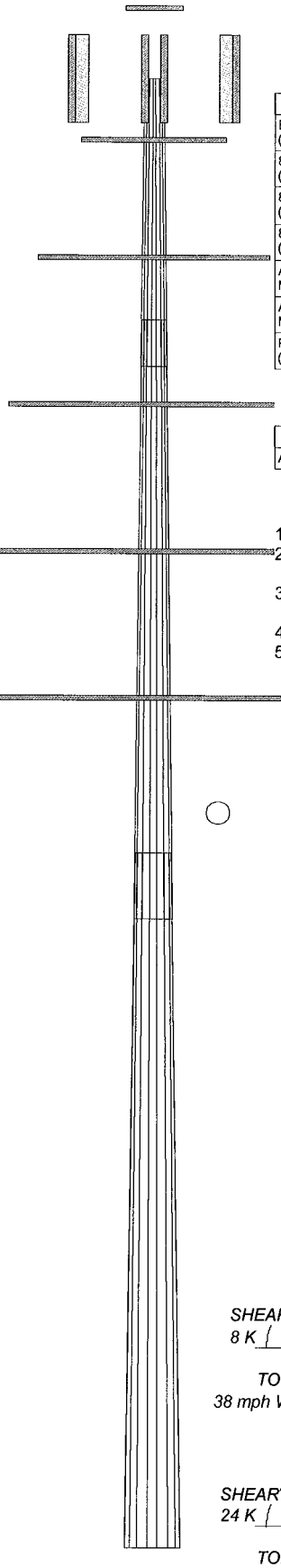
| Antenna | | | | | | Mount | | Transmission Line | |
|---|---|---|---|---|---|---|---|---|---|
| Antenna Owner | Mount Height (ft) | Antenna CL (ft) | Quantity | Manufacturer | Model | Quantity | Type | Quantity | Size (in) |
| | | | | | | | | | |
| | | | | | | | | | |

# APPENDIX B

# CALCULATIONS

| Section | 1 | 2 | 3 |
|---|---|---|---|
| Length (ft) | 19.570 | 40.850 | 47.270 |
| Number of Sides | 18 | 18 | 18 |
| Thickness (in) | 0.188 | 0.313 | 0.375 |
| Socket Length (ft) | 3.140 | 4.550 | |
| Top Dia (in) | 15.000 | 19.755 | 30.382 |
| Bot Dia (in) | 21.110 | 32.417 | 45.000 |
| Grade | A572-65 | | |
| Weight (K) | 0.7 | 3.7 | 7.5 |

100.0 ft
80.4 ft
42.7 ft
0.0 ft



## DESIGNED APPURTENANCE LOADING

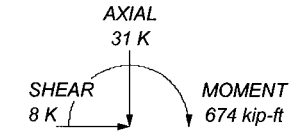
| TYPE | ELEVATION | TYPE | ELEVATION |
|---|---|---|---|
| EEI Pine Branches (CaAa 45,60) (E) | 105 | LGP21401 (ATI_E) | 97 |
| 800 10121 w/ Mount Pipe (ATI_E) | 97 | LGP21401 (ATI_E) | 97 |
| 800 10121 w/ Mount Pipe (ATI_E) | 97 | LGP21401 (ATI_E) | 97 |
| 800 10121 w/ Mount Pipe (ATI_E) | 97 | T-Arm Mount [TA 702-3] (ATI_E) | 97 |
| AM-X-CD-16-65-00T-RET w/ Mount Pipe (ATI_P) | 97 | EEI Pine Branches (CaAa 90,120) (E) | 96 |
| AM-X-CD-16-65-00T-RET w/ Mount Pipe (ATI_P) | 97 | EEI Pine Branches (CaAa 90,120) (E) | 88 |
| P65-17-XLH-RR w/ Mount Pipe (ATI_P) | 97 | EEI Pine Branches (CaAa 90,120) (E) | 78 |
| | | EEI Pine Branches (CaAa 90,120) (E) | 68 |
| | | EEI Pine Branches (CaAa 90,120) (E) | 58 |

## MATERIAL STRENGTH

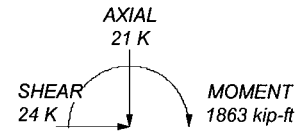
| GRADE | Fy | Fu | GRADE | Fy | Fu |
|---|---|---|---|---|---|
| A572-65 | 65 ksi | 80 ksi | | | |

## TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 77.5%



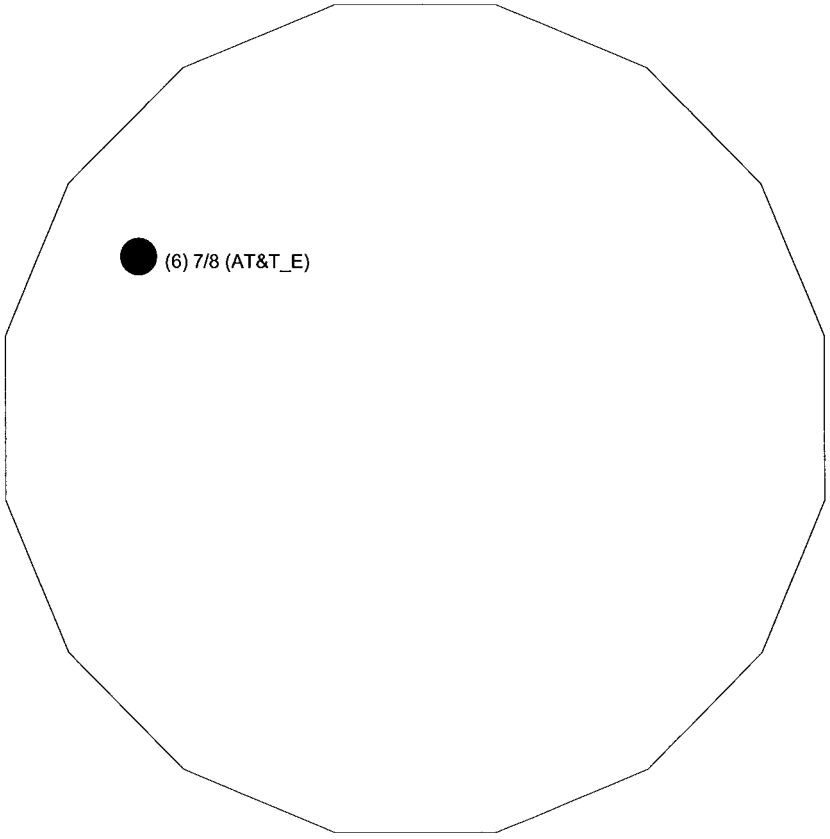

*TORQUE 0 kip-ft*
*38 mph WIND - 1.000 in ICE*




*TORQUE 0 kip-ft*
*REACTIONS - 80 mph WIND*


**B&T Engineering**
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265


| | | |
|---|---|---|
| Job: **84426.001 - Windsor South, CT** | | |
| Project: ***100' EEI Monopine / AT&T Co-Locate*** | | |
| Client: Nexlink Global Services | Drawn by: ctuttle | App'd: |
| Code: TIA/EIA-222-F | Date: 04/18/12 | Scale: N |
| Path: S:\B&T Engineering\Projects\BTE Management\84426.001 Windsor South\Engineering\tnx\Tower\84426.001 Windsor South(CT).en | | Dwg No. |

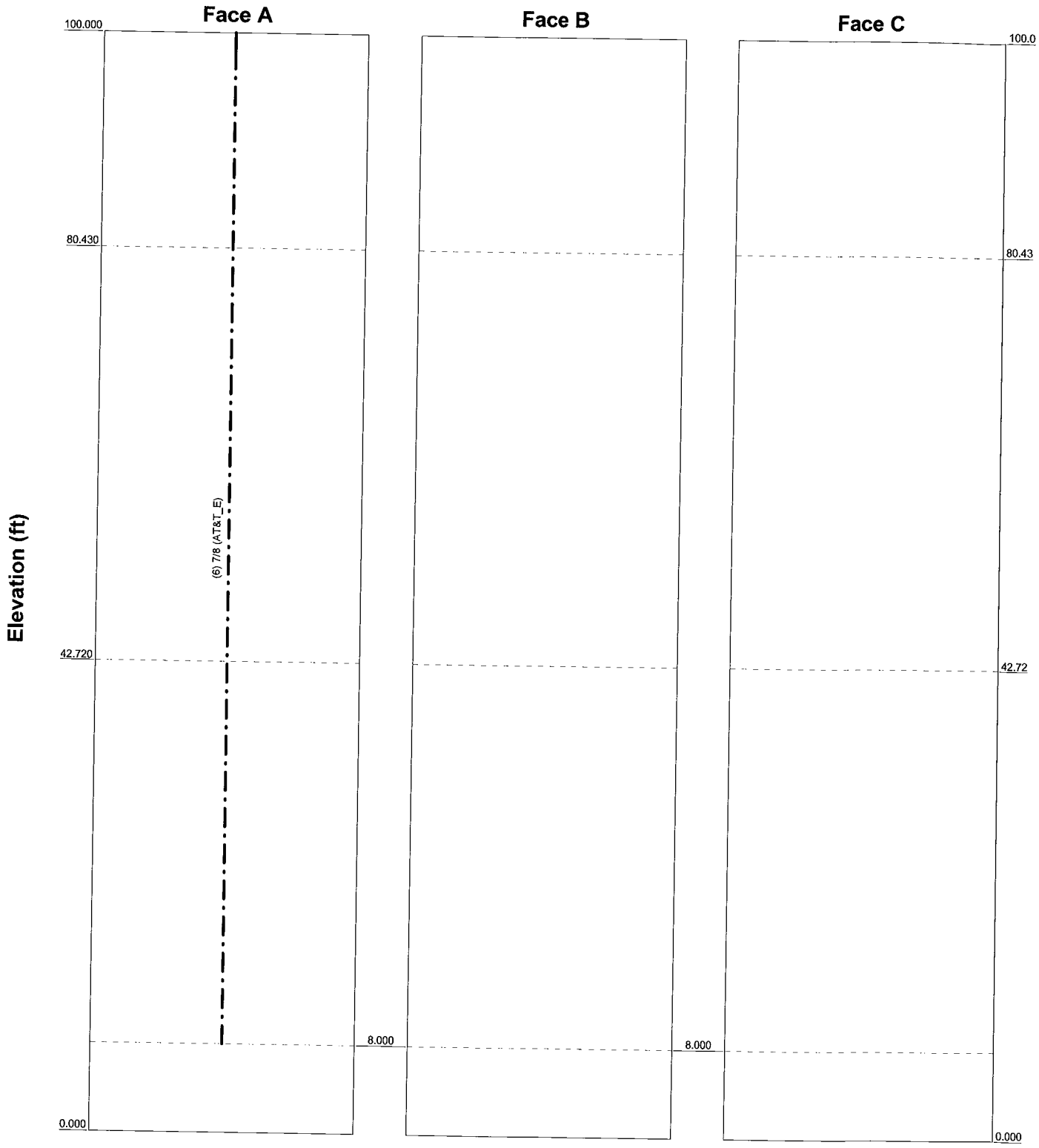



B&T Engineering
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

| | | | |
|---|---|---|---|
| Job: 84426.001 - Windsor South, CT | | | |
| Project: 100' EEI Monopine / AT&T Co-Locate | | | |
| Client: Nexlink Global Services | Drawn by: ctuttle | App'd: | |
| Code: TIA/EIA-222-F | Date: 04/18/12 | Scale: N | |
| Path: S:\B&T Engineering Projects\BTE Management\84426 Windsor South\Engineering\tnx Tower\84426.001 Windsor South.dwg | | Dwg No. | |

0' - 100'

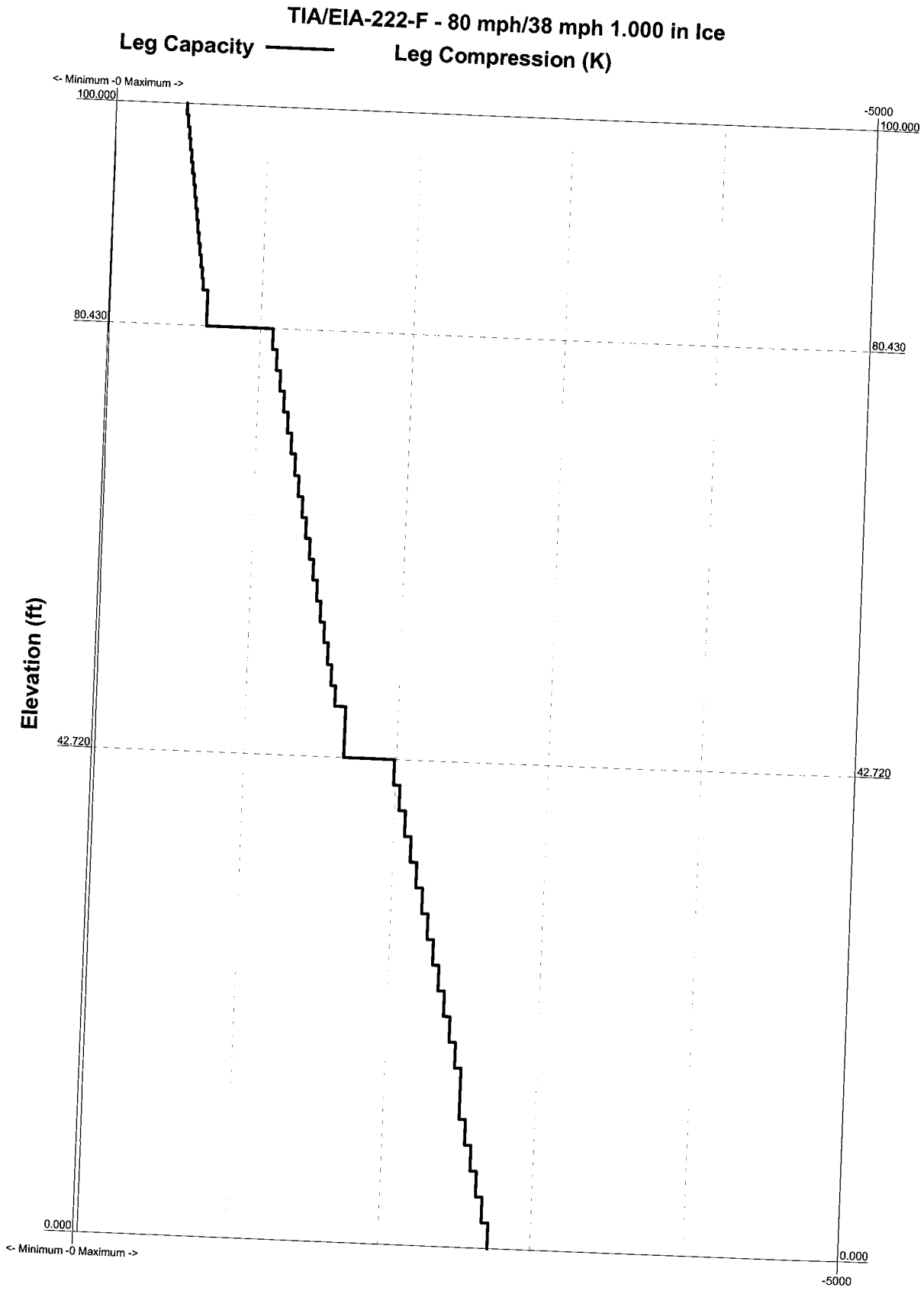
Round | Flat | App In Face | App Out Face | Truss Leg





B&T Engineering
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265


| | | | |
|---|---|---|---|
| Job: 84426.001 - Windsor South, CT | | | |
| Project: 100' EEI Monopine / AT&T Co-Locate | | | |
| Client: Nexlink Global Services | Drawn by: ctuttle | App'd: | |
| Code: TIA/EIA-222-F | Date: 04/18/12 | Scale: N | |
| Path: S:\B&T Engineering\Projects\BTE Management\84426_Windsor South\Engineering\tnt\Tower\84426_001_Windsor South.CTwr | | Dwg No. | |

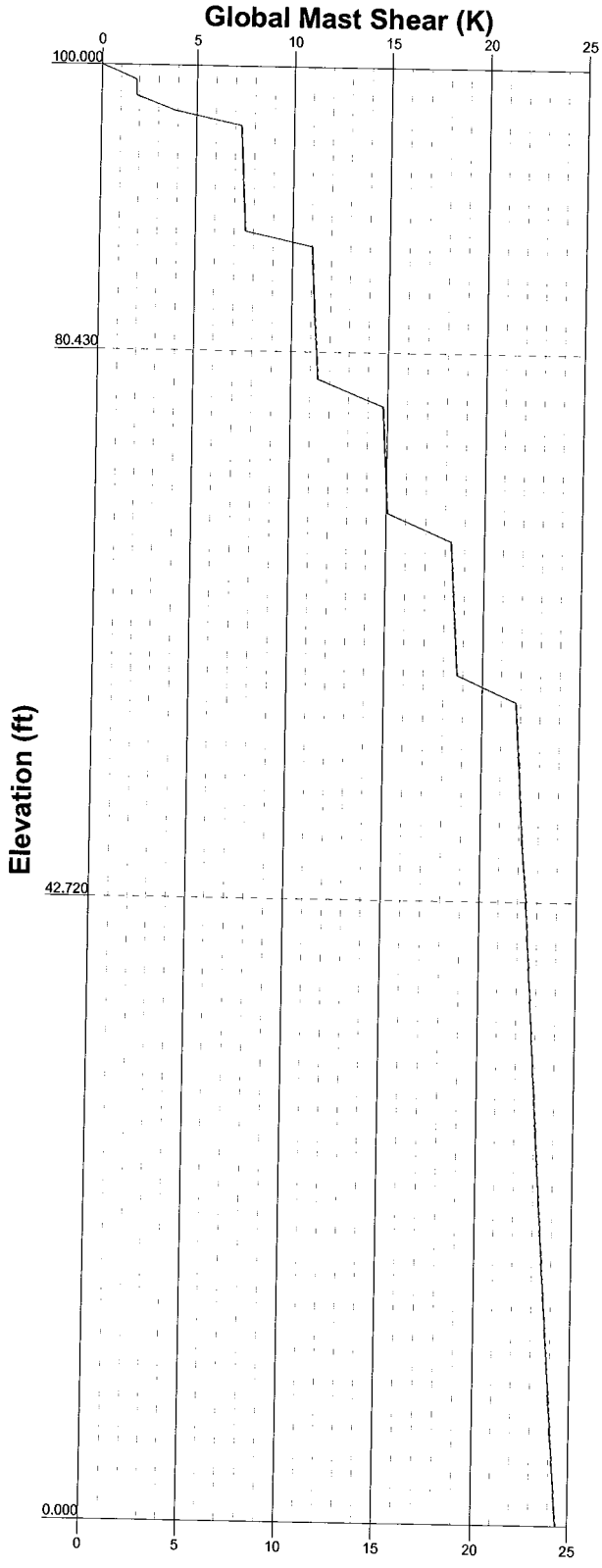


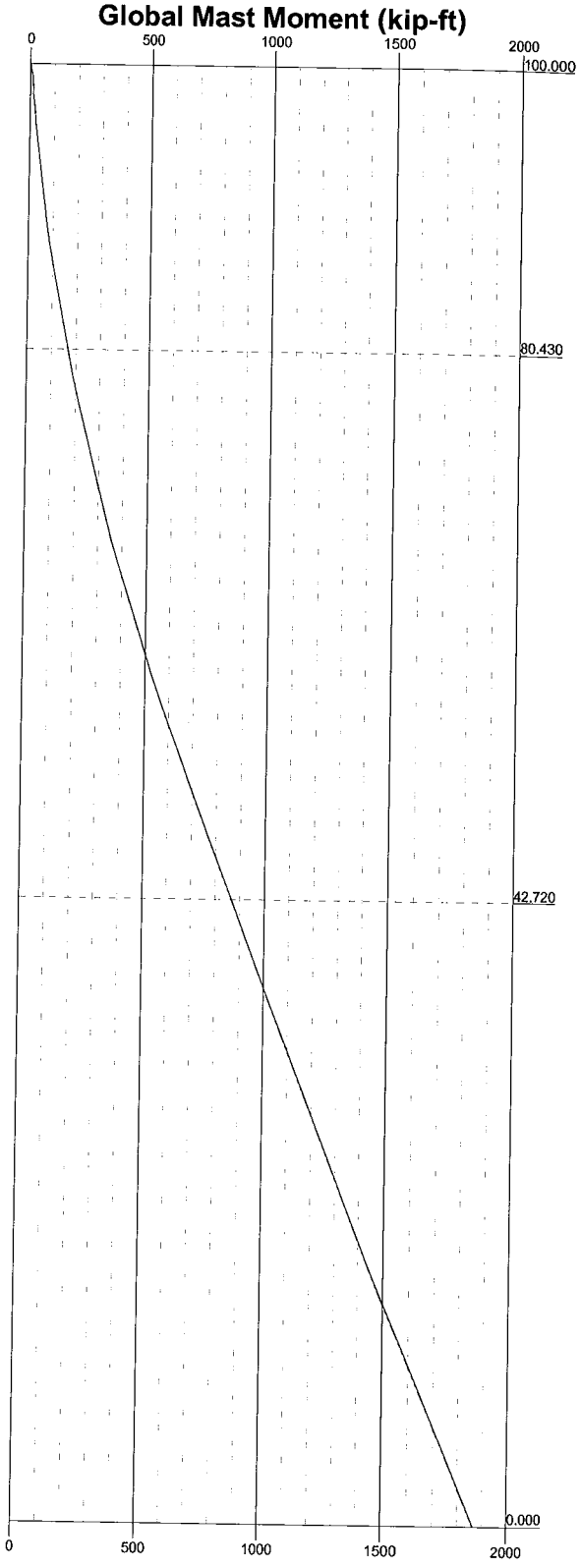

B&T Engineering
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

| | | | |
|---|---|---|---|
| Job: 84426.001 - Windsor South, CT | | | |
| Project: 100' EEI Monopine / AT&T Co-Locate | | | |
| Client: Nexlink Global Services | Drawn by: ctuttle | App'd: | |
| Code: TIA/EIA-222-F | Date: 04/18/12 | Scale: N | |
| Path: S:\B&T Engineering\Projects\RTE Management\84426 Windsor South\Engineering\Tnx Tower\84426.001 Windsor South.eri | | Dwg No. | |

Vx Vz

Mx Mz



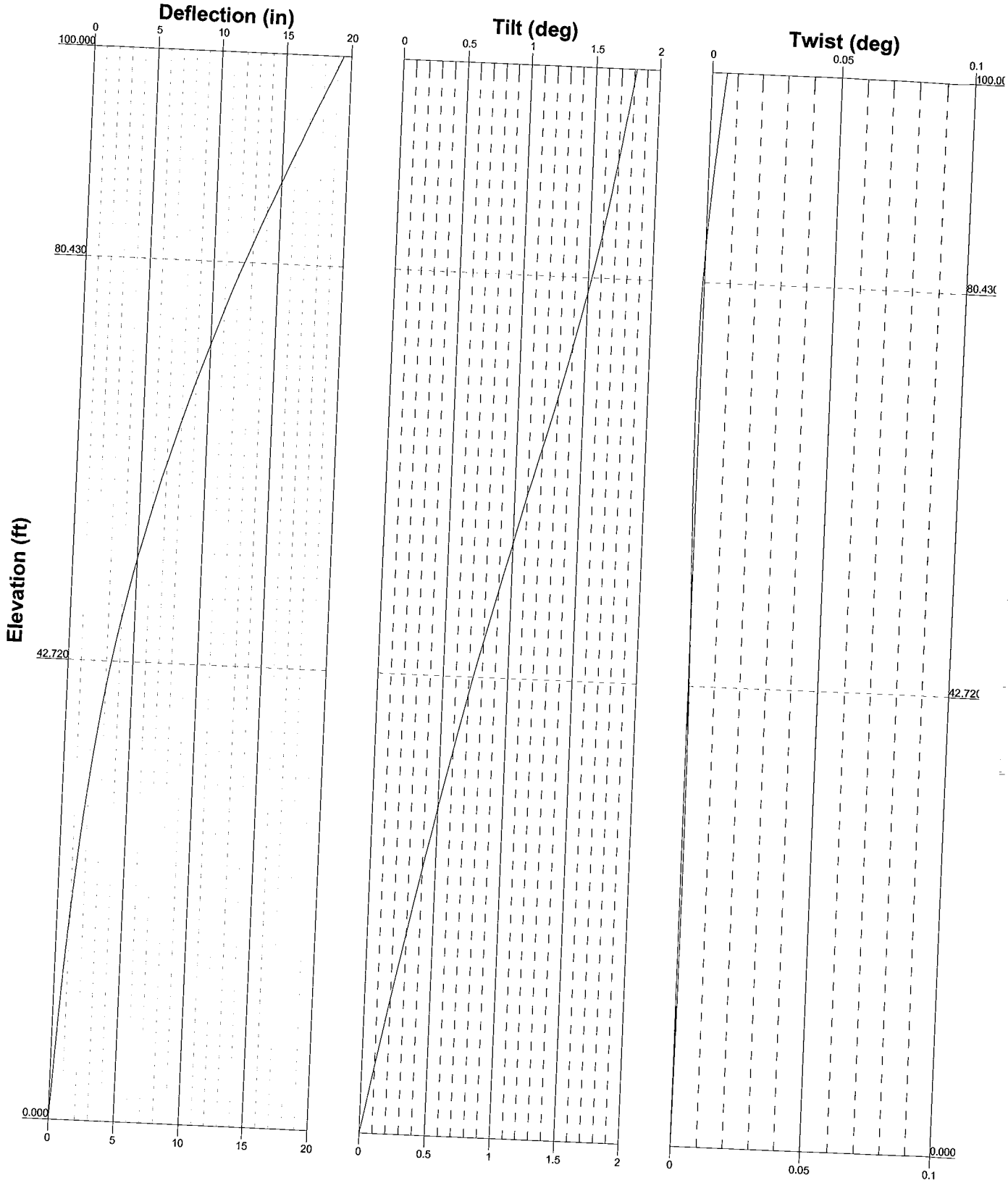


B&T Engineering
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265


| | | | |
|---|---|---|---|
| Job: 84426.001 - Windsor South, CT | | | |
| Project: 100' EEI Monopine / AT&T Co-Locate | | | |
| Client: Nexlink Global Services | Drawn by: ctuttle | App'd: | |
| Code: TIA/EIA-222-F | Date: 04/18/12 | Scale: N | |
| Path: S:\B&T Engineering Projects\BTE Management\84426 Windsor South\Engineering\tnxTower\84426 001 Windsor South.eri | | Dwg No. | |

TIA/EIA-222-F - Service - 50 mph

Maximum Values





B&T Engineering
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265


| | | | |
|---|---|---|---|
| Job: 84426.001 - Windsor South, CT | | | |
| Project: 100' EEI Monopine / AT&T Co-Locate | | | |
| Client: Nexlink Global Services | Drawn by: ctuttle | App'd: | |
| Code: TIA/EIA-222-F | Date: 04/18/12 | Scale: N | |
| Path: S:\B&T Engineering\Projects\B&T Management\84426 Windsor South\Engineering\tnxTower\84426.001 Windsor South.eri | | Dwg No. | |

## Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

## Options

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

## Tapered Pole Section Geometry

| Section | Elevation<br>ft | Section Length<br>ft | Splice Length<br>ft | Number of Sides | Top Diameter<br>in | Bottom Diameter<br>in | Wall Thickness<br>in | Bend Radius<br>in | Pole Grade |
|---|---|---|---|---|---|---|---|---|---|
| L1 | 100.000-80.430 | 19.570 | 3.140 | 18 | 15.000 | 21.110 | 0.188 | 0.750 | A572-65 (65 ksi) |
| L2 | 80.430-42.720 | 40.850 | 4.550 | 18 | 19.755 | 32.417 | 0.313 | 1.250 | A572-65 (65 ksi) |
| L3 | 42.720-0.000 | 47.270 | | 18 | 30.382 | 45.000 | 0.375 | 1.500 | A572-65 (65 ksi) |

## Tapered Pole Properties

| Section | Tip Dia. in | Area $in^2$ | I $in^4$ | r in | C in | I/C $in^3$ | J $in^4$ | It/Q $in^2$ | w in | w/t |
|---|---|---|---|---|---|---|---|---|---|---|
| L1 | 15.231 | 8.815 | 244.360 | 5.258 | 7.620 | 32.068 | 489.042 | 4.408 | 2.310 | 12.32 |
| | 21.436 | 12.451 | 688.621 | 7.427 | 10.724 | 64.214 | 1378.148 | 6.227 | 3.385 | 18.055 |
| L2 | 21.048 | 19.284 | 920.920 | 6.902 | 10.035 | 91.768 | 1843.051 | 9.644 | 2.927 | 9.366 |
| | 32.917 | 31.844 | 4146.716 | 11.397 | 16.468 | 251.805 | 8298.889 | 15.925 | 5.155 | 16.497 |
| L3 | 32.279 | 35.716 | 4062.921 | 10.652 | 15.434 | 263.245 | 8131.189 | 17.861 | 4.687 | 12.499 |
| | 45.694 | 53.115 | 13363.196 | 15.842 | 22.860 | 584.567 | 26743.975 | 26.563 | 7.260 | 19.36 |

| Tower Elevation ft | Gusset Area (per face) $ft^2$ | Gusset Thickness in | Gusset Grade | Adjust. Factor $A_f$ | Adjust. Factor $A_r$ | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals in | Double Angle Stitch Bolt Spacing Horizontals in |
|---|---|---|---|---|---|---|---|---|
| L1<br>100.000-80.430 | | | | 1 | 1 | 1.05 | | |
| L2<br>80.430-42.720 | | | | 1 | 1 | 1.05 | | |
| L3<br>42.720-0.000 | | | | 1 | 1 | 1.05 | | |

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

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Total Number | Number Per Row | Clear Spacing in | Width or Diameter in | Perimeter in | Weight klf |
|---|---|---|---|---|---|---|---|---|---|---|
| ***** | | | | | | | | | | |

## Feed Line/Linear Appurtenances - Entered As Area

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Total Number | | $C_AA_A$ $ft^2/ft$ | Weight klf |
|---|---|---|---|---|---|---|---|---|
| 7/8<br>(AT&T_E) | A | No | Inside Pole | 100.000 - 8.000 | 6 | No Ice | 0.000 | 0.001 |
| | | | | | | 1/2" Ice | 0.000 | 0.001 |
| | | | | | | 1" Ice | 0.000 | 0.001 |
| | | | | | | 2" Ice | 0.000 | 0.001 |
| ***** | | | | | | 4" Ice | 0.000 | 0.001 |
| ***** | | | | | | | | |

## Feed Line/Linear Appurtenances Section Areas

| Tower Section | Tower Elevation ft | Face | $A_R$ $ft^2$ | $A_F$ $ft^2$ | $C_AA_A$ In Face $ft^2$ | $C_AA_A$ Out Face $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|
| L1 | 100.000-80.430 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.063 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

| Tower Section | Tower Elevation ft | Face | $A_R$ $ft^2$ | $A_F$ $ft^2$ | $C_AA_A$ In Face $ft^2$ | $C_AA_A$ Out Face $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| L2 | 80.430-42.720 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.122 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| L3 | 42.720-0.000 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.112 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

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

| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | $A_R$ $ft^2$ | $A_F$ $ft^2$ | $C_AA_A$ In Face $ft^2$ | $C_AA_A$ Out Face $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|
| L1 | 100.000-80.430 | A | 1.127 | 0.000 | 0.000 | 0.000 | 0.000 | 0.063 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| L2 | 80.430-42.720 | A | 1.076 | 0.000 | 0.000 | 0.000 | 0.000 | 0.122 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| L3 | 42.720-0.000 | A | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.112 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

## Feed Line Center of Pressure

| Section | Elevation ft | $CP_X$ in | $CP_Z$ in | $CP_X$ Ice in | $CP_Z$ Ice in |
|---|---|---|---|---|---|
| L1 | 100.000-80.430 | 0.000 | 0.000 | 0.000 | 0.000 |
| L2 | 80.430-42.720 | 0.000 | 0.000 | 0.000 | 0.000 |
| L3 | 42.720-0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

## Discrete Tower Loads

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral ft | Vert ft | Azimuth Adjustment ° | Placement ft | | $C_AA_A$ Front $ft^2$ | $C_AA_A$ Side $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|---|---|
| EEI Pine Branches (CaAa 45,60) (E) | C | None | | | 0.000 | 105.000 | No Ice | 45.000 | 45.000 | 0.750 |
| | | | | | | | 1/2" Ice | 60.000 | 60.000 | 0.850 |
| | | | | | | | 1" Ice | 75.000 | 75.000 | 0.950 |
| | | | | | | | 2" Ice | 105.000 | 105.000 | 1.150 |
| | | | | | | | 4" Ice | 165.000 | 165.000 | 1.550 |
| EEI Pine Branches (CaAa 90,120) (E) | C | None | | | 0.000 | 96.000 | No Ice | 90.000 | 90.000 | 1.500 |
| | | | | | | | 1/2" Ice | 120.000 | 120.000 | 1.900 |
| | | | | | | | 1" Ice | 150.000 | 150.000 | 2.300 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral ft | Vert ft | Azimuth Adjustment ° | Placement ft | | $C_AA_A$ Front $ft^2$ | $C_AA_A$ Side $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|---|---|
| EEI Pine Branches (CaAa 90,120) (E) | C | None | | | 0.000 | 88.000 | 2" Ice | 210.000 | 210.000 | 3.100 |
| | | | | | | | 4" Ice | 330.000 | 330.000 | 4.700 |
| | | | | | | | No Ice | 90.000 | 90.000 | 1.500 |
| | | | | | | | 1/2" Ice | 120.000 | 120.000 | 1.900 |
| | | | | | | | 1" Ice | 150.000 | 150.000 | 2.300 |
| EEI Pine Branches (CaAa 90,120) (E) | C | None | | | 0.000 | 78.000 | 2" Ice | 210.000 | 210.000 | 3.100 |
| | | | | | | | 4" Ice | 330.000 | 330.000 | 4.700 |
| | | | | | | | No Ice | 90.000 | 90.000 | 1.500 |
| | | | | | | | 1/2" Ice | 120.000 | 120.000 | 1.900 |
| | | | | | | | 1" Ice | 150.000 | 150.000 | 2.300 |
| EEI Pine Branches (CaAa 90,120) (E) | C | None | | | 0.000 | 68.000 | 2" Ice | 210.000 | 210.000 | 3.100 |
| | | | | | | | 4" Ice | 330.000 | 330.000 | 4.700 |
| | | | | | | | No Ice | 90.000 | 90.000 | 1.500 |
| | | | | | | | 1/2" Ice | 120.000 | 120.000 | 1.900 |
| | | | | | | | 1" Ice | 150.000 | 150.000 | 2.300 |
| EEI Pine Branches (CaAa 90,120) (E) | C | None | | | 0.000 | 58.000 | 2" Ice | 210.000 | 210.000 | 3.100 |
| | | | | | | | 4" Ice | 330.000 | 330.000 | 4.700 |
| | | | | | | | No Ice | 90.000 | 90.000 | 1.500 |
| | | | | | | | 1/2" Ice | 120.000 | 120.000 | 1.900 |
| | | | | | | | 1" Ice | 150.000 | 150.000 | 2.300 |
| | | | | | | | 2" Ice | 210.000 | 210.000 | 3.100 |
| | | | | | | | 4" Ice | 330.000 | 330.000 | 4.700 |
| ***** | | | | | | | | | | |
| 800 10121 w/ Mount Pipe (AT&T_E) | C | From Leg | 3.000 | 0.000 | 0.000 | 97.000 | No Ice | 5.685 | 4.600 | 0.066 |
| | | | | 3.000 | | | 1/2" Ice | 6.182 | 5.351 | 0.112 |
| | | | | | | | 1" Ice | 6.676 | 6.046 | 0.167 |
| | | | | | | | 2" Ice | 7.695 | 7.526 | 0.298 |
| | | | | | | | 4" Ice | 9.858 | 10.832 | 0.675 |
| 800 10121 w/ Mount Pipe (AT&T_E) | B | From Leg | 3.000 | 0.000 | 0.000 | 97.000 | No Ice | 5.685 | 4.600 | 0.066 |
| | | | | 3.000 | | | 1/2" Ice | 6.182 | 5.351 | 0.112 |
| | | | | | | | 1" Ice | 6.676 | 6.046 | 0.167 |
| | | | | | | | 2" Ice | 7.695 | 7.526 | 0.298 |
| | | | | | | | 4" Ice | 9.858 | 10.832 | 0.675 |
| 800 10121 w/ Mount Pipe (AT&T_E) | A | From Leg | 3.000 | 0.000 | 0.000 | 97.000 | No Ice | 5.685 | 4.600 | 0.066 |
| | | | | 3.000 | | | 1/2" Ice | 6.182 | 5.351 | 0.112 |
| | | | | | | | 1" Ice | 6.676 | 6.046 | 0.167 |
| | | | | | | | 2" Ice | 7.695 | 7.526 | 0.298 |
| | | | | | | | 4" Ice | 9.858 | 10.832 | 0.675 |
| AM-X-CD-16-65-00T-RET w/ Mount Pipe (AT&T_P) | C | From Leg | 3.000 | 0.000 | 0.000 | 97.000 | No Ice | 8.498 | 6.304 | 0.074 |
| | | | | 3.000 | | | 1/2" Ice | 9.149 | 7.479 | 0.136 |
| | | | | | | | 1" Ice | 9.767 | 8.368 | 0.210 |
| | | | | | | | 2" Ice | 11.031 | 10.179 | 0.385 |
| | | | | | | | 4" Ice | 13.679 | 14.024 | 0.874 |
| AM-X-CD-16-65-00T-RET w/ Mount Pipe (AT&T_P) | B | From Leg | 3.000 | 0.000 | 0.000 | 97.000 | No Ice | 8.498 | 6.304 | 0.074 |
| | | | | 3.000 | | | 1/2" Ice | 9.149 | 7.479 | 0.136 |
| | | | | | | | 1" Ice | 9.767 | 8.368 | 0.210 |
| | | | | | | | 2" Ice | 11.031 | 10.179 | 0.385 |
| | | | | | | | 4" Ice | 13.679 | 14.024 | 0.874 |
| P65-17-XLH-RR w/ Mount Pipe (AT&T_P) | A | From Leg | 3.000 | 0.000 | 0.000 | 97.000 | No Ice | 11.704 | 8.938 | 0.092 |
| | | | | 3.000 | | | 1/2" Ice | 12.424 | 10.450 | 0.174 |
| | | | | | | | 1" Ice | 13.153 | 11.986 | 0.271 |
| | | | | | | | 2" Ice | 14.639 | 14.313 | 0.498 |
| | | | | | | | 4" Ice | 17.906 | 19.144 | 1.125 |
| LGP21401 (AT&T_E) | C | From Leg | 3.000 | 0.000 | 0.000 | 97.000 | No Ice | 1.288 | 0.233 | 0.014 |
| | | | | 3.000 | | | 1/2" Ice | 1.445 | 0.313 | 0.021 |
| | | | | | | | 1" Ice | 1.611 | 0.403 | 0.030 |
| | | | | | | | 2" Ice | 1.969 | 0.608 | 0.055 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral ft | Offsets: Vert ft | Offsets: ft | Azimuth Adjustment ° | Placement ft | | $C_AA_A$ Front $ft^2$ | $C_AA_A$ Side $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LGP21401 (AT&T_E) | B | From Leg | 3.000 | 0.000 | 3.000 | 0.000 | 97.000 | 4" Ice | 2.788 | 1.121 | 0.135 |
| | | | | | | | | No Ice | 1.288 | 0.233 | 0.014 |
| | | | | | | | | 1/2" Ice | 1.445 | 0.313 | 0.021 |
| | | | | | | | | 1" Ice | 1.611 | 0.403 | 0.030 |
| | | | | | | | | 2" Ice | 1.969 | 0.608 | 0.055 |
| LGP21401 (AT&T_E) | A | From Leg | 3.000 | 0.000 | 3.000 | 0.000 | 97.000 | 4" Ice | 2.788 | 1.121 | 0.135 |
| | | | | | | | | No Ice | 1.288 | 0.233 | 0.014 |
| | | | | | | | | 1/2" Ice | 1.445 | 0.313 | 0.021 |
| | | | | | | | | 1" Ice | 1.611 | 0.403 | 0.030 |
| | | | | | | | | 2" Ice | 1.969 | 0.608 | 0.055 |
| T-Arm Mount [TA 702-3] (AT&T_E) | C | None | | | | 0.000 | 97.000 | 4" Ice | 2.788 | 1.121 | 0.135 |
| | | | | | | | | No Ice | 5.640 | 5.640 | 0.339 |
| | | | | | | | | 1/2" Ice | 6.550 | 6.550 | 0.429 |
| | | | | | | | | 1" Ice | 7.460 | 7.460 | 0.519 |
| | | | | | | | | 2" Ice | 9.280 | 9.280 | 0.699 |
| ***** | | | | | | | | 4" Ice | 12.920 | 12.920 | 1.059 |
| ***** | | | | | | | | | | | |

## Dishes

| Description | Face or Leg | Dish Type | Offset Type | Offsets: Horz Lateral ft | Offsets: Vert ft | Azimuth Adjustment ° | 3 dB Beam Width ° | Elevation ft | Outside Diameter ft | Aperture Area $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***** | | | | | | | | | | | |

## 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 |

| Comb. No. | Description |
|---|---|
| 17 | Dead+Wind 60 deg+Ice+Temp |
| 18 | Dead+Wind 90 deg+Ice+Temp |
| 19 | Dead+Wind 120 deg+Ice+Temp |
| 20 | Dead+Wind 150 deg+Ice+Temp |
| 21 | Dead+Wind 180 deg+Ice+Temp |
| 22 | Dead+Wind 210 deg+Ice+Temp |
| 23 | Dead+Wind 240 deg+Ice+Temp |
| 24 | Dead+Wind 270 deg+Ice+Temp |
| 25 | Dead+Wind 300 deg+Ice+Temp |
| 26 | Dead+Wind 330 deg+Ice+Temp |
| 27 | Dead+Wind 0 deg - Service |
| 28 | Dead+Wind 30 deg - Service |
| 29 | Dead+Wind 60 deg - Service |
| 30 | Dead+Wind 90 deg - Service |
| 31 | Dead+Wind 120 deg - Service |
| 32 | Dead+Wind 150 deg - Service |
| 33 | Dead+Wind 180 deg - Service |
| 34 | Dead+Wind 210 deg - Service |
| 35 | Dead+Wind 240 deg - Service |
| 36 | Dead+Wind 270 deg - Service |
| 37 | Dead+Wind 300 deg - Service |
| 38 | Dead+Wind 330 deg - Service |

## Maximum Member Forces

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|---|---|---|---|---|---|---|---|
| L1 | 100 - 80.43 | Pole | Max Tension | 1 | 0.000 | 0.000 | 0.000 |
| | | | Max. Compression | 14 | -8.858 | 0.000 | 0.250 |
| | | | Max. Mx | 5 | -4.450 | -131.459 | 0.048 |
| | | | Max. My | 2 | -4.447 | 0.000 | 131.889 |
| | | | Max. Vy | 5 | 11.162 | -131.459 | 0.048 |
| | | | Max. Vx | 2 | -11.184 | 0.000 | 131.889 |
| | | | Max. Torque | 5 | | | 0.368 |
| L2 | 80.43 - 42.72 | Pole | Max Tension | 1 | 0.000 | 0.000 | 0.000 |
| | | | Max. Compression | 14 | -20.869 | 0.000 | 0.250 |
| | | | Max. Mx | 5 | -12.380 | -762.930 | 0.064 |
| | | | Max. My | 2 | -12.378 | 0.000 | 764.174 |
| | | | Max. Vy | 5 | 22.146 | -762.930 | 0.064 |
| | | | Max. Vx | 2 | -22.168 | 0.000 | 764.174 |
| | | | Max. Torque | 5 | | | 0.368 |
| L3 | 42.72 - 0 | Pole | Max Tension | 1 | 0.000 | 0.000 | 0.000 |
| | | | Max. Compression | 14 | -31.470 | 0.000 | 0.250 |
| | | | Max. Mx | 5 | -21.324 | -1860.947 | 0.067 |
| | | | Max. My | 2 | -21.324 | 0.000 | 1863.239 |
| | | | Max. Vy | 5 | 24.383 | -1860.947 | 0.067 |
| | | | Max. Vx | 2 | -24.405 | 0.000 | 1863.239 |
| | | | Max. Torque | 5 | | | 0.367 |

## Maximum Reactions

| Location | Condition | Gov. Load Comb. | Vertical K | Horizontal, X K | Horizontal, Z K |
|---|---|---|---|---|---|

| Location | Condition | Gov. Load Comb. | Vertical K | Horizontal, X K | Horizontal, Z K |
|---|---|---|---|---|---|
| Pole | Max. Vert | 15 | 31.470 | 0.000 | 8.459 |
| | Max. $H_x$ | 11 | 21.343 | 24.366 | 0.000 |
| | Max. $H_z$ | 2 | 21.343 | 0.000 | 24.388 |
| | Max. $M_x$ | 2 | 1863.239 | 0.000 | 24.388 |
| | Max. $M_z$ | 5 | 1860.947 | -24.366 | 0.000 |
| | Max. Torsion | 5 | 0.367 | -24.366 | 0.000 |
| | Min. Vert | 1 | 21.343 | 0.000 | 0.000 |
| | Min. $H_x$ | 5 | 21.343 | -24.366 | 0.000 |
| | Min. $H_z$ | 8 | 21.343 | 0.000 | -24.388 |
| | Min. $M_x$ | 8 | -1863.102 | 0.000 | -24.388 |
| | Min. $M_z$ | 11 | -1860.947 | 24.366 | 0.000 |
| | Min. Torsion | 11 | -0.367 | 24.366 | 0.000 |

## Tower Mast Reaction Summary

| Load Combination | Vertical K | $Shear_x$ K | $Shear_z$ K | Overturning Moment, $M_x$ kip-ft | Overturning Moment, $M_z$ kip-ft | Torque kip-ft |
|---|---|---|---|---|---|---|
| Dead Only | 21.343 | 0.000 | 0.000 | -0.066 | 0.000 | 0.000 |
| Dead+Wind 0 deg - No Ice | 21.343 | 0.000 | -24.388 | -1863.239 | 0.000 | 0.000 |
| Dead+Wind 30 deg - No Ice | 21.343 | 12.183 | -21.120 | -1613.623 | -930.473 | -0.184 |
| Dead+Wind 60 deg - No Ice | 21.343 | 21.102 | -12.194 | -931.655 | -1611.628 | -0.318 |
| Dead+Wind 90 deg - No Ice | 21.343 | 24.366 | 0.000 | -0.067 | -1860.947 | -0.367 |
| Dead+Wind 120 deg - No Ice | 21.343 | 21.102 | 12.194 | 931.520 | -1611.627 | -0.317 |
| Dead+Wind 150 deg - No Ice | 21.343 | 12.183 | 21.120 | 1613.486 | -930.472 | -0.183 |
| Dead+Wind 180 deg - No Ice | 21.343 | 0.000 | 24.388 | 1863.102 | 0.000 | 0.000 |
| Dead+Wind 210 deg - No Ice | 21.343 | -12.183 | 21.120 | 1613.486 | 930.472 | 0.183 |
| Dead+Wind 240 deg - No Ice | 21.343 | -21.102 | 12.194 | 931.520 | 1611.627 | 0.317 |
| Dead+Wind 270 deg - No Ice | 21.343 | -24.366 | 0.000 | -0.067 | 1860.947 | 0.367 |
| Dead+Wind 300 deg - No Ice | 21.343 | -21.102 | -12.194 | -931.655 | 1611.628 | 0.318 |
| Dead+Wind 330 deg - No Ice | 21.343 | -12.183 | -21.120 | -1613.623 | 930.473 | 0.184 |
| Dead+Ice+Temp | 31.470 | 0.000 | 0.000 | -0.250 | 0.000 | 0.000 |
| Dead+Wind 0 deg+Ice+Temp | 31.470 | 0.000 | -8.459 | -674.453 | 0.000 | 0.000 |
| Dead+Wind 30 deg+Ice+Temp | 31.470 | 4.230 | -7.325 | -584.130 | -337.213 | -0.059 |
| Dead+Wind 60 deg+Ice+Temp | 31.470 | 7.327 | -4.229 | -337.361 | -584.070 | -0.102 |
| Dead+Wind 90 deg+Ice+Temp | 31.470 | 8.461 | -0.000 | -0.267 | -674.424 | -0.117 |
| Dead+Wind 120 deg+Ice+Temp | 31.470 | 7.327 | 4.229 | 336.827 | -584.070 | -0.102 |
| Dead+Wind 150 deg+Ice+Temp | 31.470 | 4.230 | 7.325 | 583.596 | -337.213 | -0.059 |
| Dead+Wind 180 deg+Ice+Temp | 31.470 | 0.000 | 8.459 | 673.919 | 0.000 | 0.000 |
| Dead+Wind 210 deg+Ice+Temp | 31.470 | -4.230 | 7.325 | 583.596 | 337.213 | 0.059 |
| Dead+Wind 240 deg+Ice+Temp | 31.470 | -7.327 | 4.229 | 336.827 | 584.070 | 0.102 |
| Dead+Wind 270 deg+Ice+Temp | 31.470 | -8.461 | -0.000 | -0.267 | 674.424 | 0.117 |
| Dead+Wind 300 deg+Ice+Temp | 31.470 | -7.327 | -4.229 | -337.361 | 584.070 | 0.102 |
| Dead+Wind 330 deg+Ice+Temp | 31.470 | -4.230 | -7.325 | -584.130 | 337.213 | 0.059 |
| Dead+Wind 0 deg - Service | 21.343 | 0.000 | -9.526 | -728.377 | 0.000 | 0.000 |
| Dead+Wind 30 deg - Service | 21.343 | 4.759 | -8.250 | -630.802 | -363.719 | -0.072 |
| Dead+Wind 60 deg - Service | 21.343 | 8.243 | -4.763 | -364.223 | -629.979 | -0.125 |
| Dead+Wind 90 deg - Service | 21.343 | 9.518 | 0.000 | -0.069 | -727.437 | -0.144 |
| Dead+Wind 120 deg - Service | 21.343 | 8.243 | 4.763 | 364.085 | -629.979 | -0.125 |
| Dead+Wind 150 deg - Service | 21.343 | 4.759 | 8.250 | 630.665 | -363.718 | -0.072 |
| Dead+Wind 180 deg - Service | 21.343 | 0.000 | 9.526 | 728.239 | 0.000 | 0.000 |
| Dead+Wind 210 deg - Service | 21.343 | -4.759 | 8.250 | 630.665 | 363.718 | 0.072 |
| Dead+Wind 240 deg - Service | 21.343 | -8.243 | 4.763 | 364.085 | 629.979 | 0.125 |
| Dead+Wind 270 deg - Service | 21.343 | -9.518 | 0.000 | -0.069 | 727.437 | 0.144 |
| Dead+Wind 300 deg - Service | 21.343 | -8.243 | -4.763 | -364.223 | 629.979 | 0.125 |
| Dead+Wind 330 deg - Service | 21.343 | -4.759 | -8.250 | -630.802 | 363.719 | 0.072 |

## Solution Summary

| Load Comb. | Sum of Applied Forces PX K | PY K | PZ K | Sum of Reactions PX K | PY K | PZ K | % Error |
|---|---|---|---|---|---|---|---|
| 1 | 0.000 | -21.343 | 0.000 | 0.000 | 21.343 | 0.000 | 0.000% |
| 2 | 0.000 | -21.343 | -24.388 | 0.000 | 21.343 | 24.388 | 0.000% |
| 3 | 12.183 | -21.343 | -21.120 | -12.183 | 21.343 | 21.120 | 0.000% |
| 4 | 21.102 | -21.343 | -12.194 | -21.102 | 21.343 | 12.194 | 0.000% |
| 5 | 24.366 | -21.343 | 0.000 | -24.366 | 21.343 | 0.000 | 0.000% |
| 6 | 21.102 | -21.343 | 12.194 | -21.102 | 21.343 | -12.194 | 0.000% |
| 7 | 12.183 | -21.343 | 21.120 | -12.183 | 21.343 | -21.120 | 0.000% |
| 8 | 0.000 | -21.343 | 24.388 | 0.000 | 21.343 | -24.388 | 0.000% |
| 9 | -12.183 | -21.343 | 21.120 | 12.183 | 21.343 | -21.120 | 0.000% |
| 10 | -21.102 | -21.343 | 12.194 | 21.102 | 21.343 | -12.194 | 0.000% |
| 11 | -24.366 | -21.343 | 0.000 | 24.366 | 21.343 | 0.000 | 0.000% |
| 12 | -21.102 | -21.343 | -12.194 | 21.102 | 21.343 | 12.194 | 0.000% |
| 13 | -12.183 | -21.343 | -21.120 | 12.183 | 21.343 | 21.120 | 0.000% |
| 14 | 0.000 | -31.470 | 0.000 | 0.000 | 31.470 | 0.000 | 0.000% |
| 15 | 0.000 | -31.470 | -8.459 | 0.000 | 31.470 | 8.459 | 0.000% |
| 16 | 4.230 | -31.470 | -7.325 | -4.230 | 31.470 | 7.325 | 0.000% |
| 17 | 7.327 | -31.470 | -4.229 | -7.327 | 31.470 | 4.229 | 0.000% |
| 18 | 8.461 | -31.470 | 0.000 | -8.461 | 31.470 | 0.000 | 0.000% |
| 19 | 7.327 | -31.470 | 4.229 | -7.327 | 31.470 | -4.229 | 0.000% |
| 20 | 4.230 | -31.470 | 7.325 | -4.230 | 31.470 | -7.325 | 0.000% |
| 21 | 0.000 | -31.470 | 8.459 | 0.000 | 31.470 | -8.459 | 0.000% |
| 22 | -4.230 | -31.470 | 7.325 | 4.230 | 31.470 | -7.325 | 0.000% |
| 23 | -7.327 | -31.470 | 4.229 | 7.327 | 31.470 | -4.229 | 0.000% |
| 24 | -8.461 | -31.470 | 0.000 | 8.461 | 31.470 | 0.000 | 0.000% |
| 25 | -7.327 | -31.470 | -4.229 | 7.327 | 31.470 | 4.229 | 0.000% |
| 26 | -4.230 | -31.470 | -7.325 | 4.230 | 31.470 | 7.325 | 0.000% |
| 27 | 0.000 | -21.343 | -9.526 | 0.000 | 21.343 | 9.526 | 0.000% |
| 28 | 4.759 | -21.343 | -8.250 | -4.759 | 21.343 | 8.250 | 0.000% |
| 29 | 8.243 | -21.343 | -4.763 | -8.243 | 21.343 | 4.763 | 0.000% |
| 30 | 9.518 | -21.343 | 0.000 | -9.518 | 21.343 | 0.000 | 0.000% |
| 31 | 8.243 | -21.343 | 4.763 | -8.243 | 21.343 | -4.763 | 0.000% |
| 32 | 4.759 | -21.343 | 8.250 | -4.759 | 21.343 | -8.250 | 0.000% |
| 33 | 0.000 | -21.343 | 9.526 | 0.000 | 21.343 | -9.526 | 0.000% |
| 34 | -4.759 | -21.343 | 8.250 | 4.759 | 21.343 | -8.250 | 0.000% |
| 35 | -8.243 | -21.343 | 4.763 | 8.243 | 21.343 | -4.763 | 0.000% |
| 36 | -9.518 | -21.343 | 0.000 | 9.518 | 21.343 | 0.000 | 0.000% |
| 37 | -8.243 | -21.343 | -4.763 | 8.243 | 21.343 | 4.763 | 0.000% |
| 38 | -4.759 | -21.343 | -8.250 | 4.759 | 21.343 | 8.250 | 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 | 0.00001539 |
| 3 | Yes | 5 | 0.00000001 | 0.00006338 |
| 4 | Yes | 5 | 0.00000001 | 0.00006538 |
| 5 | Yes | 4 | 0.00000001 | 0.00011218 |
| 6 | Yes | 5 | 0.00000001 | 0.00006281 |
| 7 | Yes | 5 | 0.00000001 | 0.00006482 |
| 8 | Yes | 4 | 0.00000001 | 0.00001539 |

| | | | | |
|---|---|---|---|---|
| 9 | Yes | 5 | 0.00000001 | 0.00006482 |
| 10 | Yes | 5 | 0.00000001 | 0.00006281 |
| 11 | Yes | 4 | 0.00000001 | 0.00011218 |
| 12 | Yes | 5 | 0.00000001 | 0.00006538 |
| 13 | Yes | 5 | 0.00000001 | 0.00006338 |
| 14 | Yes | 4 | 0.00000001 | 0.00000001 |
| 15 | Yes | 4 | 0.00000001 | 0.00070271 |
| 16 | Yes | 5 | 0.00000001 | 0.00004686 |
| 17 | Yes | 5 | 0.00000001 | 0.00004740 |
| 18 | Yes | 4 | 0.00000001 | 0.00070353 |
| 19 | Yes | 5 | 0.00000001 | 0.00004660 |
| 20 | Yes | 5 | 0.00000001 | 0.00004709 |
| 21 | Yes | 4 | 0.00000001 | 0.00070131 |
| 22 | Yes | 5 | 0.00000001 | 0.00004709 |
| 23 | Yes | 5 | 0.00000001 | 0.00004660 |
| 24 | Yes | 4 | 0.00000001 | 0.00070353 |
| 25 | Yes | 5 | 0.00000001 | 0.00004740 |
| 26 | Yes | 5 | 0.00000001 | 0.00004686 |
| 27 | Yes | 4 | 0.00000001 | 0.00000987 |
| 28 | Yes | 4 | 0.00000001 | 0.00032114 |
| 29 | Yes | 4 | 0.00000001 | 0.00034053 |
| 30 | Yes | 4 | 0.00000001 | 0.00003085 |
| 31 | Yes | 4 | 0.00000001 | 0.00031587 |
| 32 | Yes | 4 | 0.00000001 | 0.00033473 |
| 33 | Yes | 4 | 0.00000001 | 0.00000987 |
| 34 | Yes | 4 | 0.00000001 | 0.00033473 |
| 35 | Yes | 4 | 0.00000001 | 0.00031587 |
| 36 | Yes | 4 | 0.00000001 | 0.00003085 |
| 37 | Yes | 4 | 0.00000001 | 0.00034053 |
| 38 | Yes | 4 | 0.00000001 | 0.00032114 |

## Maximum Tower Deflections - Service Wind

| Section No. | Elevation<br>ft | Horz. Deflection<br>in | Gov. Load Comb. | Tilt<br>° | Twist<br>° |
|---|---|---|---|---|---|
| L1 | 100 - 80.43 | 19.401 | 27 | 1.816 | 0.003 |
| L2 | 83.57 - 42.72 | 13.455 | 27 | 1.579 | 0.001 |
| L3 | 47.27 - 0 | 4.072 | 27 | 0.827 | 0.000 |

## 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 |
|---|---|---|---|---|---|---|
| 105.000 | EEI Pine Branches (CaAa 45,60) | 27 | 19.401 | 1.816 | 0.003 | 9740 |
| 97.000 | 800 10121 w/ Mount Pipe | 27 | 18.283 | 1.776 | 0.003 | 9740 |
| 96.000 | EEI Pine Branches (CaAa 90,120) | 27 | 17.912 | 1.763 | 0.003 | 9740 |
| 88.000 | EEI Pine Branches (CaAa 90,120) | 27 | 14.996 | 1.650 | 0.002 | 4058 |
| 78.000 | EEI Pine Branches (CaAa 90,120) | 27 | 11.627 | 1.479 | 0.001 | 2829 |
| 68.000 | EEI Pine Branches (CaAa 90,120) | 27 | 8.680 | 1.277 | 0.001 | 2616 |
| 58.000 | EEI Pine Branches (CaAa 90,120) | 27 | 6.192 | 1.058 | 0.000 | 2432 |

## Maximum Tower Deflections - Design Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|---|---|---|---|---|---|
| L1 | 100 - 80.43 | 49.571 | 2 | 4.641 | 0.008 |
| L2 | 83.57 - 42.72 | 34.390 | 2 | 4.036 | 0.003 |
| L3 | 47.27 - 0 | 10.413 | 2 | 2.115 | 0.001 |

## Critical Deflections and Radius of Curvature - Design Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|---|---|---|---|---|---|---|
| 105.000 | EEI Pine Branches (CaAa 45,60) | 2 | 49.571 | 4.641 | 0.008 | 3856 |
| 97.000 | 800 10121 w/ Mount Pipe | 2 | 46.718 | 4.539 | 0.007 | 3856 |
| 96.000 | EEI Pine Branches (CaAa 90,120) | 2 | 45.769 | 4.505 | 0.007 | 3856 |
| 88.000 | EEI Pine Branches (CaAa 90,120) | 2 | 38.325 | 4.216 | 0.004 | 1606 |
| 78.000 | EEI Pine Branches (CaAa 90,120) | 2 | 29.721 | 3.782 | 0.002 | 1117 |
| 68.000 | EEI Pine Branches (CaAa 90,120) | 2 | 22.191 | 3.264 | 0.001 | 1030 |
| 58.000 | EEI Pine Branches (CaAa 90,120) | 2 | 15.832 | 2.706 | 0.001 | 955 |

## *Compression Checks*

## Pole Design Data

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| L1 | 100 - 80.43 (1) | TP21.11x15x0.188 | 19.570 | 0.000 | 0.0 | 39.000 | 11.868 | -4.447 | 462.853 | 0.010 |
| L2 | 80.43 - 42.72 (2) | TP32.417x19.755x0.313 | 40.850 | 0.000 | 0.0 | 39.000 | 30.445 | -12.378 | 1187.350 | 0.010 |
| L3 | 42.72 - 0 (3) | TP45x30.382x0.375 | 47.270 | 0.000 | 0.0 | 39.000 | 48.149 | -18.852 | 1877.820 | 0.010 |

## Pole Bending Design Data

| Section No. | Elevation ft | Size | Actual $M_x$ kip-ft | Actual $f_{bx}$ ksi | Allow. $F_{bx}$ ksi | Ratio $\frac{f_{bx}}{F_{bx}}$ | Actual $M_y$ kip-ft | Actual $f_{by}$ ksi | Allow. $F_{by}$ ksi | Ratio $\frac{f_{by}}{F_{by}}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| L1 | 100 - 80.43 (1) | TP21.11x15x0.188 | 131.889 | 27.141 | 39.000 | 0.696 | 0.000 | 0.000 | 39.000 | 0.000 |
| L2 | 80.43 - 42.72 (2) | TP32.417x19.755x0.313 | 764.174 | 39.859 | 39.000 | 1.022 | 0.000 | 0.000 | 39.000 | 0.000 |
| L3 | 42.72 - 0 (3) | TP45x30.382x0.375 | 1538.908 | 38.476 | 39.000 | 0.987 | 0.000 | 0.000 | 39.000 | 0.000 |

## Pole Shear Design Data

| Section No. | Elevation ft | Size | Actual V K | Actual $f_v$ ksi | Allow. $F_v$ ksi | Ratio $\frac{f_v}{F_v}$ | Actual T kip-ft | Actual $f_{vt}$ ksi | Allow. $F_{vt}$ ksi | Ratio $\frac{f_{vt}}{F_{vt}}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| L1 | 100 - 80.43 (1) | TP21.11x15x0.188 | 11.184 | 0.942 | 26.000 | 0.072 | 0.000 | 0.000 | 26.000 | 0.000 |
| L2 | 80.43 - 42.72 (2) | TP32.417x19.755x0.313 | 22.169 | 0.728 | 26.000 | 0.056 | 0.000 | 0.000 | 26.000 | 0.000 |
| L3 | 42.72 - 0 (3) | TP45x30.382x0.375 | 23.831 | 0.495 | 26.000 | 0.037 | 0.000 | 0.000 | 26.000 | 0.000 |

## Pole Interaction Design Data

| Section No. | Elevation ft | Ratio $\frac{P}{P_a}$ | Ratio $\frac{f_{bx}}{F_{bx}}$ | Ratio $\frac{f_{by}}{F_{by}}$ | Ratio $\frac{f_v}{F_v}$ | Ratio $\frac{f_{vt}}{F_{vt}}$ | Comb. Stress Ratio | Allow. Stress Ratio | Criteria |
|---|---|---|---|---|---|---|---|---|---|
| L1 | 100 - 80.43 (1) | 0.010 | 0.696 | 0.000 | 0.072 | 0.000 | 0.707 ✔ | 1.333 | H1-3+VT ✔ |
| L2 | 80.43 - 42.72 (2) | 0.010 | 1.022 | 0.000 | 0.056 | 0.000 | 1.033 ✔ | 1.333 | H1-3+VT ✔ |
| L3 | 42.72 - 0 (3) | 0.010 | 0.987 | 0.000 | 0.037 | 0.000 | 0.997 ✔ | 1.333 | H1-3+VT ✔ |

## Section Capacity Table

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | $SF*P_{allow}$ K | % Capacity | Pass Fail |
|---|---|---|---|---|---|---|---|---|
| L1 | 100 - 80.43 | Pole | TP21.11x15x0.188 | 1 | -4.447 | 616.983 | 53.0 | Pass |
| L2 | 80.43 - 42.72 | Pole | TP32.417x19.755x0.313 | 2 | -12.378 | 1582.737 | 77.5 | Pass |
| L3 | 42.72 - 0 | Pole | TP45x30.382x0.375 | 3 | -18.852 | 2503.134 | 74.8 | Pass |
| | | | | | | | Summary | |
| | | | | | | Pole (L2) | 77.5 | Pass |
| | | | | | | **RATING =** | **77.5** | **Pass** |

| | | | | |
|---|---|---|---|---|
| PROJECT | **84426.001 - Windsor South, CT** | | | |
| SUBJECT | **Base Plate and AB analysis** | | | |
| DATE | **04/17/12** | PAGE | 1 | OF 1 |

**B&T Engineering, Inc.**
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

## Circular Base Plate & Anchor Rods - TIA-222-F

Base Reactions:

| | | |
|---|---|---|
| Moment: | 1863 | (k-ft) |
| Axial: | 21 | (k) |
| Shear: | 24 | (k) |

Anchor Rod Data:

| | | |
|---|---|---|
| Qty: | 12 | |
| Diam: | 2.25 | (in) |
| Rod Material: | A615-J | |
| Strength (Fu): | 100 | (ksi) |
| Yield (Fy): | 75 | (ksi) |
| Bolt Circle: | 54.0 | (in) |

| | | |
|---|---|---|
| Anchor Rod Tension: | 136.3 | (k) |
| Allowable Tension: | 195.0 | (k) |
| Anchor Rod Capacity: | 69.9% | Pass |

Base Plate Data:

| | | |
|---|---|---|
| Diam: | 60 | (in) |
| Thick: | 1.75 | (in) |
| Grade: | 60 | (ksi) |

| | | |
|---|---|---|
| Base Plate Stress: | | (ksi) |
| Allowable Stress: | 60.0 | (ksi) |
| Base Plate Capacity: | | |

Pole Data:

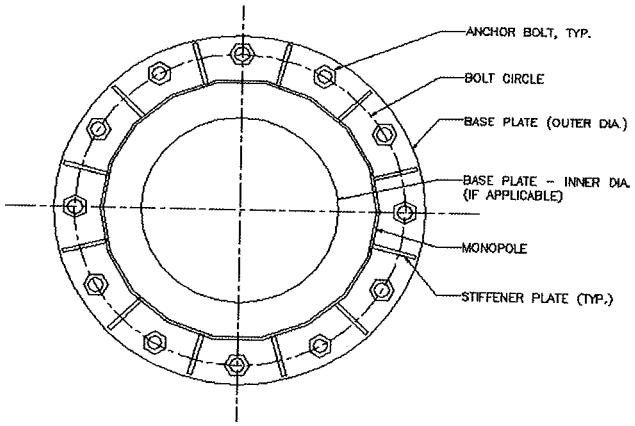
| | | |
|---|---|---|
| Diam: | 45 | (in) |
| Thick: | 0.38 | (in) |
| Grade: | 65 | (ksi) |
| # of Sides: | 18 | |
| Fu: | 80 | (ksi) |

| | | |
|---|---|---|
| Punching Shear Capacity: | 8.3% | Pass |

Stiffener Data:

| | | |
|---|---|---|
| Qty: | Every Bolt | |
| Wld Type: | Fillet | |
| Groove Depth: | | (in) |
| Groove Angle: | | (degrees) |
| Fillet H. Weld: | 0.50 | (in) |
| Fillet V. Weld: | 0.50 | (in) |
| Width: | 7.50 | (in) |
| Height: | 24.00 | (in) |
| Thick: | 1.25 | (in) |
| Notch: | 0.50 | (in) |
| Grade: | 50.00 | (ksi) |
| Weld Str.: | 70.00 | (ksi) |

| | | |
|---|---|---|
| Horizontal Weld: | 77.3% | Pass |
| Vertical Weld: | 24.9% | Pass |
| Plate Flex + Shear: | 6.1% | Pass |
| Plate Tension + Shear: | 30.9% | Pass |
| Plate Compression: | 33.8% | Pass |



```
**************************************************************************
*                                                                        *
*  PIER FOUNDATIONS ANALYSIS AND DESIGN - (C) 1995,2002 POWER LINE SYSTEMS, INC.*
*                                                                        *
**************************************************************************
```

*** ANALYSIS IDENTIFICATION : 25880 Windsor South (B&T #84426.001)
NOTES : Foundation Analysis

*** PIER PROPERTIES  CONCRETE STRENGTH (ksi) = 4.00  STEEL STRENGTH (ksi) = 60.00

DIAMETER (ft) = 6.500  DISTANCE FROM TOP OF PIER TO GROUND LEVEL (ft) = 1.00

*** SOIL PROPERTIES

| LAYER | TYPE | THICKNESS (ft) | DEPTH AT TOP OF LAYER (ft) | DENSITY (pcf) | CU (psf) | KP | PHI (degrees) |
|---|---|---|---|---|---|---|---|
| 1 | C | 3.50 | 0.00 | 0.0 | 0.0 | | |
| 2 | S | 6.50 | 3.50 | 117.4 | | 3.690 | 35.00 |
| 3 | S | 2.00 | 10.00 | 55.0 | | 3.690 | 35.00 |
| 4 | S | 11.00 | 12.00 | 45.0 | | 2.882 | 29.00 |
| 5 | C | 5.00 | 23.00 | 40.0 | 400.0 | | |
| 6 | C | 6.00 | 28.00 | 40.0 | 100.0 | | |
| 7 | C | 7.00 | 34.00 | 40.0 | 400.0 | | |

*** DESIGN (FACTORED) LOADS AT TOP OF PIER  MOMENT (ft-k) = 1863.0  VERTICAL (k) = 21.0  SHEAR (k) = 24.0
ADDITIONAL SAFETY FACTOR AGAINST SOIL FAILURE = 3.22

*** CALCULATED PIER LENGTH (ft) = 40.000

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

| TYPE | TOP OF LAYER BELOW TOP OF PIER (ft) | THICKNESS (ft) | DENSITY (pcf) | CU (psf) | KP | FORCE (k) | ARM (ft) |
|---|---|---|---|---|---|---|---|
| C | 1.00 | 3.50 | 0.0 | 0.0 | | 0.00 | 2.75 |
| S | 4.50 | 6.50 | 117.4 | | 3.690 | 178.45 | 8.83 |
| S | 11.00 | 2.00 | 55.0 | | 3.690 | 117.73 | 12.02 |
| S | 13.00 | 6.26 | 45.0 | | 2.882 | 356.57 | 16.27 |
| S | 19.26 | 4.74 | 45.0 | | 2.882 | -336.17 | 21.70 |
| C | 24.00 | 5.00 | 40.0 | 400.0 | | -104.00 | 26.50 |
| C | 29.00 | 6.00 | 40.0 | 100.0 | | -31.20 | 32.00 |
| C | 35.00 | 5.00 | 40.0 | 400.0 | | -104.00 | 37.50 |

*** SHEAR AND MOMENTS ALONG PIER

| DISTANCE BELOW TOP OF PIER (ft) | WITH THE ADDITIONAL SAFETY FACTOR SHEAR (k) | WITH THE ADDITIONAL SAFETY FACTOR MOMENT (ft-k) | WITHOUT ADDITIONAL SAFETY FACTOR SHEAR (k) | WITHOUT ADDITIONAL SAFETY FACTOR MOMENT (ft-k) |
|---|---|---|---|---|
| 0.00 | 77.4 | 6153.4 | 24.0 | 1911.0 |
| 4.00 | 77.4 | 6462.9 | 24.0 | 2007.1 |

| | | | | |
|---|---|---|---|---|
| 8.00 | 25.6 | 6712.1 | 8.0 | 2084.5 |
| 12.00 | -158.0 | 6488.8 | -49.1 | 2015.1 |
| 16.00 | -377.4 | 5412.2 | -117.2 | 1680.8 |
| 20.00 | -526.5 | 3458.5 | -163.5 | 1074.1 |
| 24.00 | -239.2 | 1913.6 | -74.3 | 594.3 |
| 28.00 | -156.0 | 1123.2 | -48.4 | 348.8 |
| 32.00 | -119.6 | 595.4 | -37.1 | 184.9 |
| 36.00 | -83.2 | 166.4 | -25.8 | 51.7 |
| 40.00 | -0.0 | 0.0 | -0.0 | 0.0 |

*** TOTAL REINFORCEMENT PCT = 0.42 REINFORCEMENT AREA (in^2) = 20.07
*** USABLE AXIAL CAP. (k) = 21.0 USABLE MOMENT CAP. (ft-k) = 2917.0

*** US Standard Re-Bars (Select one of the following):

| | | | | | |
|---|---|---|---|---|---|
| 101 | BARS #4 | (AREA = 0.20 in^2 | DIA = 0.500 in) | AT SPACING (in) = | 2.12 |
| 65 | BARS #5 | (AREA = 0.31 in^2 | DIA = 0.625 in) | AT SPACING (in) = | 3.29 |
| 46 | BARS #6 | (AREA = 0.44 in^2 | DIA = 0.750 in) | AT SPACING (in) = | 4.64 |
| 34 | BARS #7 | (AREA = 0.60 in^2 | DIA = 0.875 in) | AT SPACING (in) = | 6.28 |
| 26 | BARS #8 | (AREA = 0.79 in^2 | DIA = 1.000 in) | AT SPACING (in) = | 8.22 |
| 21 | BARS #9 | (AREA = 1.00 in^2 | DIA = 1.128 in) | AT SPACING (in) = | 10.17 |
| 16 | BARS #10 | (AREA = 1.27 in^2 | DIA = 1.270 in) | AT SPACING (in) = | 13.35 |
| 13 | BARS #11 | (AREA = 1.56 in^2 | DIA = 1.410 in) | AT SPACING (in) = | 16.43 |
| 9 | BARS #14 | (AREA = 2.25 in^2 | DIA = 1.693 in) | AT SPACING (in) = | 23.74 |

*** WEIGHT OF CAISSON (kips) = 199.098
*** PRESSURE UNDER CAISSON DUE TO INPUT DESIGN AXIAL LOAD (psf) = 632.9

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

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

**Site Data**

BU#:
Site Name: *Windsor South, CT*
App #: *####*

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

**Pier Properties**

***Concrete:***

| | | |
|---|---|---|
| Pier Diameter = | 6.5 | ft |
| Concrete Area = | 4778.4 | $in^2$ |

***Reinforcement:***

| | | |
|---|---|---|
| Clear Cover to **Tie**= | 3.00 | in |
| Horiz. **Tie** Bar Size= | 5 | |
| Vert. Cage Diameter = | 5.78 | ft |
| Vert. Cage Diameter = | 69.34 | in |
| **Vertical** Bar Size = | 11 | |
| Bar Diameter = | 1.41 | in |
| Bar Area = | 1.56 | $in^2$ |
| Number of Bars = | 18 | |
| As Total= | 28.08 | $in^2$ |
| A s/ Aconc, Rho: | 0.0059 | 0.59% |

ACI 10.5 , ACI 21.10.4, and IBC 1810.

Min As for Flexural, Tension Controlled, Shafts:

| | | |
|---|---|---|
| (3)*(Sqrt(f'c)/Fy: | 0.0032 | |
| 200 / Fy: | 0.0033 | |
| IBC 1810.1.2: | 0.0050 | SDC D, E, or F |
| Governing: | 0.0050 | **0.50%** |

ACI 10.8 and 10.9

Min As for Columns, Comp. Controlled, Shafts:

| | | |
|---|---|---|
| Min As: | 0.0100 | **1.00%** |

Minimum Rho Check:

| | | |
|---|---|---|
| Actual Req'd Min. Rho: | 0.50% | Flexural |
| Provided Rho: | 0.59% | OK |

| Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn): | | |
|---|---|---|
| Max Pu = (φ=0.65) Pn. | | |
| Pn per ACI 318 (10-2) | 9274.60 | kips |
| at Mu=(ϕ=0.65)Mn= | 5258.45 | ft-kips |
| | | |
| Max Tu, (φ=0.9) Tn = | 1516.32 | kips |
| at Mu=ϕ=(0.90)Mn= | 0.00 | ft-kips |

**Maximum Shaft Superimposed Forces**

| | | |
|---|---|---|
| TIA Revision: | F | |
| Max. Service Shaft M: | 2084.5 | ft-kips (* **Note**) |
| Max. Service Shaft P: | 21 | kips |
| Max Axial Force Type: | Comp. | |

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

| Load Factor | **Shaft Factored Loads** | | |
|---|---|---|---|
| 1.30 | Mu: | 2709.85 | ft-kips |
| 1.30 | Pu: | 27.3 | kips |

**Material Properties**

| | | |
|---|---|---|
| Concrete Comp. strength, f'c = | 4000 | psi |
| Reinforcement yield strength, Fy = | 60 | ksi |
| Reinforcing Modulus of Elasticity, E = | 29000 | ksi |
| Reinforcement yield strain = | 0.00207 | |
| Limiting compressive strain = | 0.003 | |

**ACI 318 Code**

| | |
|---|---|
| Select Analysis ACI Code= | 2008 |

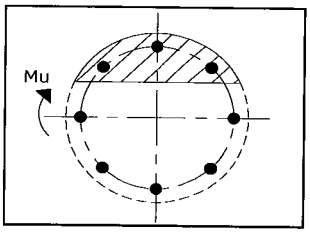
**Seismic Properties**

| | |
|---|---|
| Seismic Design Category = | D |
| Seismic Risk = | **High** |

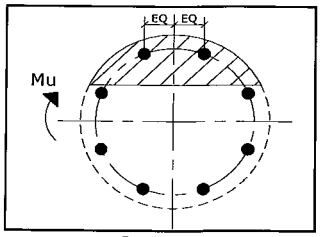
Solve (Run) <-- Press Upon Completing All Input

## Results:

Governing Orientation Case: **2**




Case 1




Case 2

| | | |
|---|---|---|
| Dist. From Edge to Neutral Axis: | **11.05** | in |
| Extreme Steel Strain, εt: | **0.0169** | |
| | **εt > 0.0050, Tension Controlled** | |
| Reduction Factor,φ: | **0.900** | |

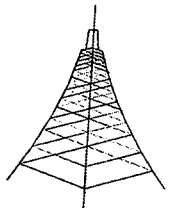
<-- Comment Box

Output Note: Negative Pu=Tension

| | | |
|---|---|---|
| For Axial Compression, φ Pn = Pu: | 27.30 | kips |
| Drilled Shaft Moment Capacity, φMn: | **4217.28** | ft-kips |
| Drilled Shaft Superimposed Mu: | **2709.85** | ft-kips |

| **(Mu/φMn, Drilled Shaft Flexure CSR:** | **64.26%** |
|---|---|

at&t




*Letter of Explanation (LOE)*
*MUST be attached to any Structural Analysis*

| | |
|---|---|
| *Site Name* | Windsor South |
| *Site Number* | 25880 |
| *PE of Record* | Chad E. Tuttle, P.E. |

| ALL STRUCTURES | Statement in COL A is Correct | VARIANCE from Col A | N/A | Alternate Value / Concept Used | Explanation | Yes | No | N/A | Comments / Reference |
|---|---|---|---|---|---|---|---|---|---|
| Structure Analyzed to F Code | X | | | | | | | | |
| *Note: ALL G analyses MUST be justified. A simple notation of jurisdiction requirement will suffice. F BUILT TOWERS in G Code jurisdictions MUST Have the new "5% Grace" Test Applied.G to be applied ONLY where this is exceeded. This 5% test applies to "like for like" only* | | | | | | | | | |
| Guy Tensions Adjusted Within Code to Find Optimum tension / Minimum Reinforcement (Applies to Guyed Tower Failures Only). Note : AT&T requires a pulse chart for altered Tensions | | | X | | | | | | |
| Antenna Azimuths Inputted Per AT&T Information. NOTE that new antennas should be calculated at 0 degrees to allow flexibility. | X | | | | | | | | |
| All Yield Stresses > = 50 ksi (legs) | | | X | | Monopole; Shaft = 65 ksi | | | | |
| All Yield Stresses > = 36 ksi (Diagonals and Horizontals)) | X | | X | | Monopole | | | | |
| Structures Designated Class II (G Only) | | | X | | | | | | |
| Exposure B Rating Used (Topography) | | | X | | | | | | |
| K value for Slenderness ratio < 1.0 | | | X | | Monopole | | | | |
| Shielding of All Appurtenances Used when Appropriate PER 2.6.9.4 (G Code Only) | | | X | | | | | | |
| 0.75 Reduction "Shape" Factor (Figure 2.6) for platform mounts, 0.8 for T-Boom Mounts Used (G Only) | | | X | | | | | | |
| Pipes and round Members have 1.0 Drag Factors. Note if Pipe is attached to flat antenna, these must be considered separately if differing Drag factors are Used | | X | | | In compliance with the TIA-222-F Table 3 | | | | |
| Are Tower Diagonals Designed as "Tension Only" | | | X | | | | | | |

| MODIFICATION SECTION | Statement in COL A is Correct | Deviation from Col A | N/A | Alternate Value / Concept Used | Explanation | Yes | No | N/A | Comments / Reference |
|---|---|---|---|---|---|---|---|---|---|
| **Guyed** | | | | | | | | | |
| **Guyed Only: Reinforcement Recommendation accompanies Optimum Guy Tensioning Scenario.** | | | | | | | | | |
| **Compression Failing Legs / Diagonals / Horizontals: Effective Length Reduced by U-Bolted Member** | | | | | | | | | |
| ***NOTE: Welded Solution Must be Explained and will only be considered in cases where other reinforcing methods will not work.*** | | | | | | | | | |
| **Self Supporting** | | | | | | | | | |
| **Compression Failing Legs / Diagonals / Horizontals: Effective Length Reduced by U-Bolted Member** | | | | | | | | | |
| ***NOTE: Welded Solution Must be Explained and will only be considered in cases where other reinforcing methods will not work.*** | | | | | | | | | |
| **Monopole** | | | | | | | | | |
| **Compression Collars** | | | | | | | | | |
| ***NOTE: Welded Solution Must be Explained and will only be considered in cases where other reinforcing methods will not work.*** | | | | | | | | | |
| **Foundation** | | | | | | | | | |
| **Guyed Anchor Failure: Berm Solution** | | | | | | | | | |
| **SS Foundation Pad and Pier Failure Berm** | | | | | | | | | |
| **SS Foundation Caisson / Concrete Cap** | | | | | | | | | |
| **Monopole: Cap** | | | | | | | | | |

## PROJECT INFORMATION

| | |
|---|---|
| SCOPE OF WORK: | UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS |
| SITE ADDRESS: | 1170 MATIANUCK AVENUE<br>WINDSOR, CT 06095 |
| LATITUDE: | 41.8405 N 41° 50' 25.8" N |
| LONGITUDE: | 72.6665 W 72° 39' 59.4" W |
| JURISDICTION: | NATIONAL, STATE & LOCAL CODES OR ORDINANCES |
| CURRENT USE: | TELECOMMUNICATIONS FACILITY |
| PROPOSED USE: | TELECOMMUNICATIONS FACILITY |

at&t

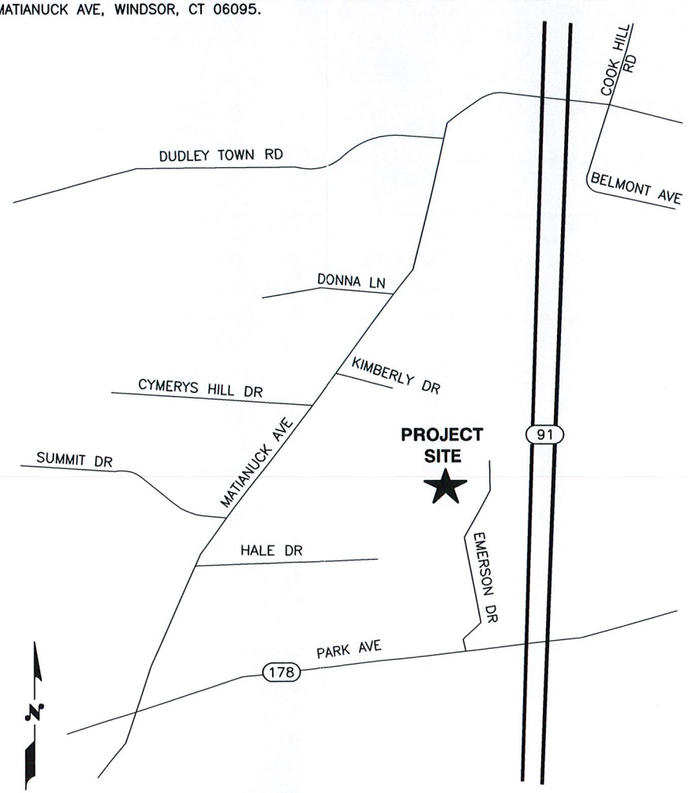
# SITE NUMBER: CT5137
# SITE NAME: WINDSOR SOUTH

## DRAWING INDEX



## VICINITY MAP

DIRECTIONS TO SITE:
FROM ROCKY HILL, CT: MERGE ONTO I-91 N TOWARD HARTFORD. 11.7 MILES. TAKE THE PARK AVE / CT-178 EXIT (EXIT 36) TOWARD BLOOMFIELD. 0.2 MILES. TURN LEFT ONTO CT-178 / PARK AVE. 0.4 MILES. TURN RIGHT ONTO MATIANUCK AVE. 0.4 MILES. END AT 1170 MATIANUCK AVE, WINDSOR, CT 06095.




## GENERAL NOTES

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

72 HOURS
BEFORE YOU DIG
CALL TOLL FREE 800-922-4455

UNDERGROUND SERVICE ALERT


Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

NEXLINK GLOBAL SERVICES
a UniTek GLOBAL SERVICES company
800 MARSHALL PHELPS ROAD UNIT#: 2A
WINDSOR, CT 06095


SITE NUMBER: CT5137
SITE NAME: WINDSOR SOUTH
1170 MATIANUCK AVENUE
WINDSOR, CT 06095
HARTFORD COUNTY


at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067


| NO. | DATE | REVISIONS | BY | CHK | APP'D |
|---|---|---|---|---|---|
| 2 | 05/31/12 | CONSTRUCTION REVISED | NB | DC | DPH |
| 1 | 04/18/12 | ISSUED FOR CONSTRUCTION | DB | DC | DPH |
| 0 | 04/13/12 | ISSUED FOR REVIEW | DB | DC | DPH |

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: DB

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 21178
LICENSED PROFESSIONAL ENGINEER

AT&T

TITLE SHEET (LTE)

| JOB NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| 9137.01 | T-1 | 2 |

## GROUNDING NOTES

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

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

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

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

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

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

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

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

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

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

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

12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

## GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR – NEXLINK
SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
OWNER – AT&T MOBILITY

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

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

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

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

6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.

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

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

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

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

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

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

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

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

16. CONSTRUCTION SHALL COMPLY WITH UMTS SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

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

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

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

20. APPLICABLE BUILDING CODES:
SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
BUILDING CODE: 2003 IBC WITH 2005 CT SUPPLEMENT & 2009 CT AMENDMENTS
ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS
LIGHTENING CODE: REFER TO ELECTRICAL DRAWINGS

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

AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL

ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

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

## ABBREVIATIONS

| | | | | | |
|---|---|---|---|---|---|
| AGL | ABOVE GRADE LEVEL | G.C. | GENERAL CONTRACTOR | RF | RADIO FREQUENCY |
| AWG | AMERICAN WIRE GAUGE | MGB | MASTER GROUND BUS | | |
| BCW | BARE COPPER WIRE | MIN | MINIMUM | TBD | TO BE DETERMINED |
| BTS | BASE TRANSCEIVER STATION | PROPOSED | NEW | TBR | TO BE REMOVED |
| EXISTING | EXISTING | N.T.S. | NOT TO SCALE | TBRR | TO BE REMOVED AND REPLACED |
| EG | EQUIPMENT GROUND | REF | REFERENCE | TYP | TYPICAL |
| EGR | EQUIPMENT GROUND RING | REQ | REQUIRED | | |


Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586


NEXLINK GLOBAL SERVICES
a UniTek GLOBAL SERVICES company
800 MARSHALL PHELPS ROAD UNIT#: 2A
WINDSOR, CT 06095

**SITE NUMBER: CT5137**
**SITE NAME: WINDSOR SOUTH**
1170 MATIANUCK AVENUE
WINDSOR, CT 06095
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

| NO. | DATE | REVISIONS | BY | CHK | APP |
|---|---|---|---|---|---|
| 2 | 05/31/12 | CONSTRUCTION REVISED | NB | DC | DPH |
| 1 | 04/18/12 | ISSUED FOR CONSTRUCTION | DB | DC | DPH |
| 0 | 04/13/12 | ISSUED FOR REVIEW | DB | DC | DPH |

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: DB

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 21170
LICENSED PROFESSIONAL ENGINEER

AT&T

GENERAL NOTES (LTE)

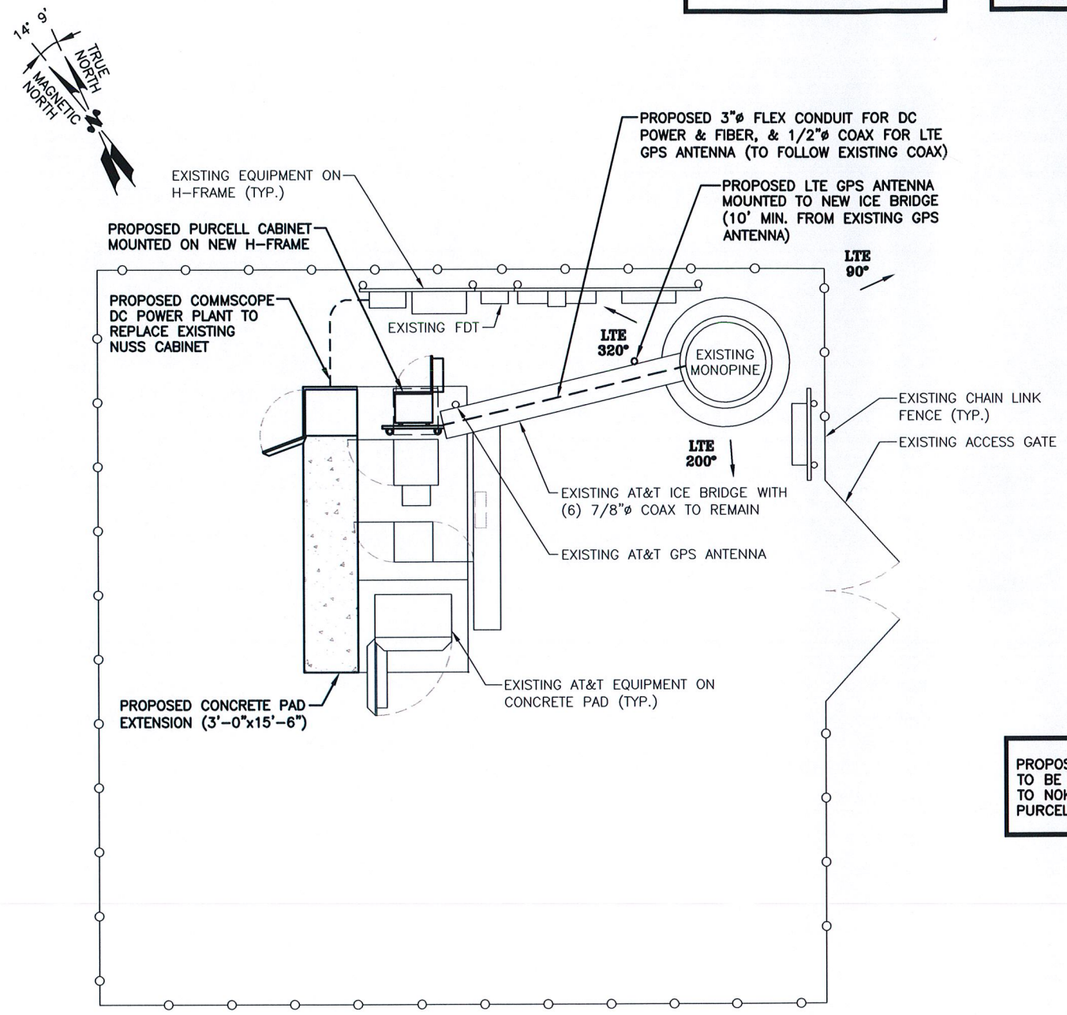
| DOC NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| 13037.01 | GN-1 | 2 |

NOTE:

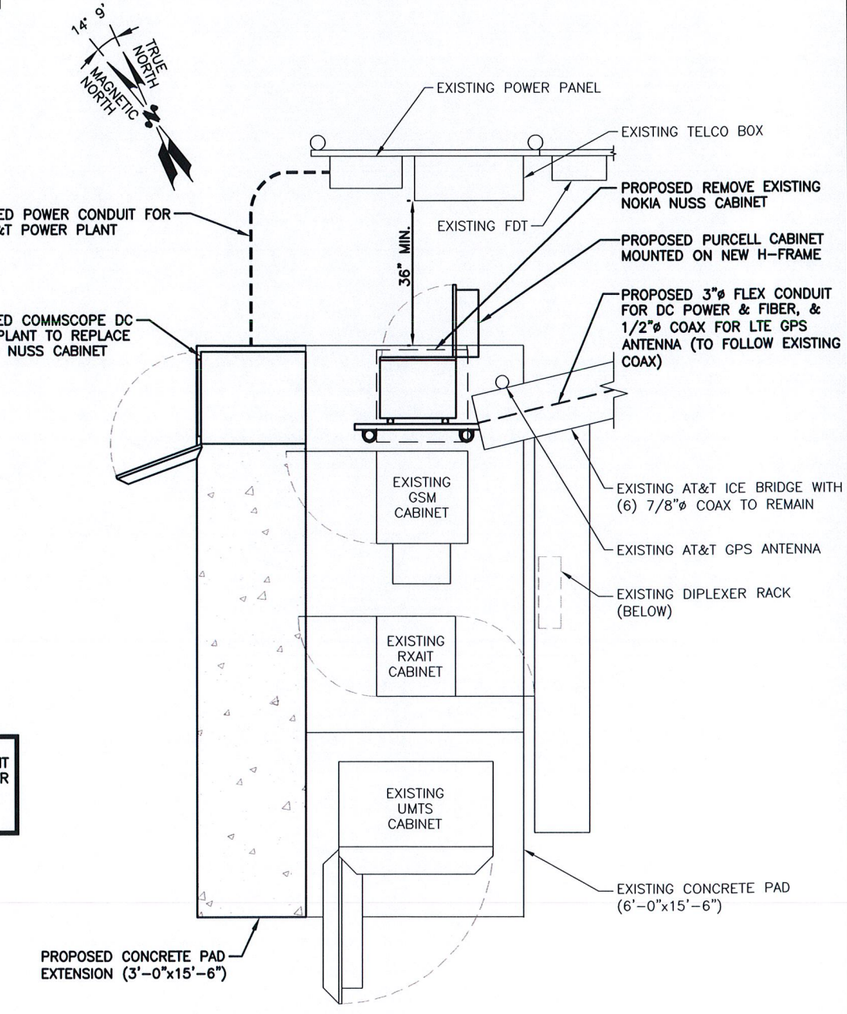
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.




PROPOSED COMMSCOPE DC PLANT TO BE INSTALLED AND LIVE PRIOR TO NOKIA NUSS REMOVAL AND PURCELL INSTALLATION.




## COMPOUND PLAN

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

0 2'-0" 4'-0" 8'-0" 12'-0"

## EQUIPMENT PLAN

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

0 1'-0" 2'-0" 4'-0" 6'-0"


Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

NEXLINK GLOBAL SERVICES
a UniTek GLOBAL SERVICES company
800 MARSHALL PHELPS ROAD UNIT#: 2A
WINDSOR, CT 06095


**SITE NUMBER: CT5137**
**SITE NAME: WINDSOR SOUTH**
1170 MATIANUCK AVENUE
WINDSOR, CT 06095
HARTFORD COUNTY


at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067


| NO. | DATE | REVISIONS | BY | CHK'D | APP'D |
|---|---|---|---|---|---|
| 2 | 05/31/12 | CONSTRUCTION REVISED | NB | DPH | DPH |
| 1 | 04/18/12 | ISSUED FOR CONSTRUCTION | DB | DPH | DPH |
| 0 | 04/13/12 | ISSUED FOR REVIEW | DB | DPH | DPH |

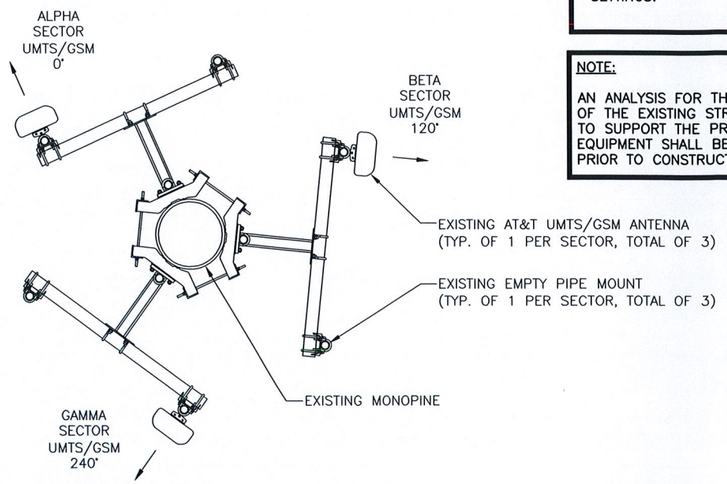
SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: DB

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

COMPOUND & EQUIPMENT PLAN (LTE)

| JOB NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| 5137.01 | A-1 | 2 |


**NOTE:**

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

**NOTE:**

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

## EXISTING UMTS/GSM ANTENNA PLAN

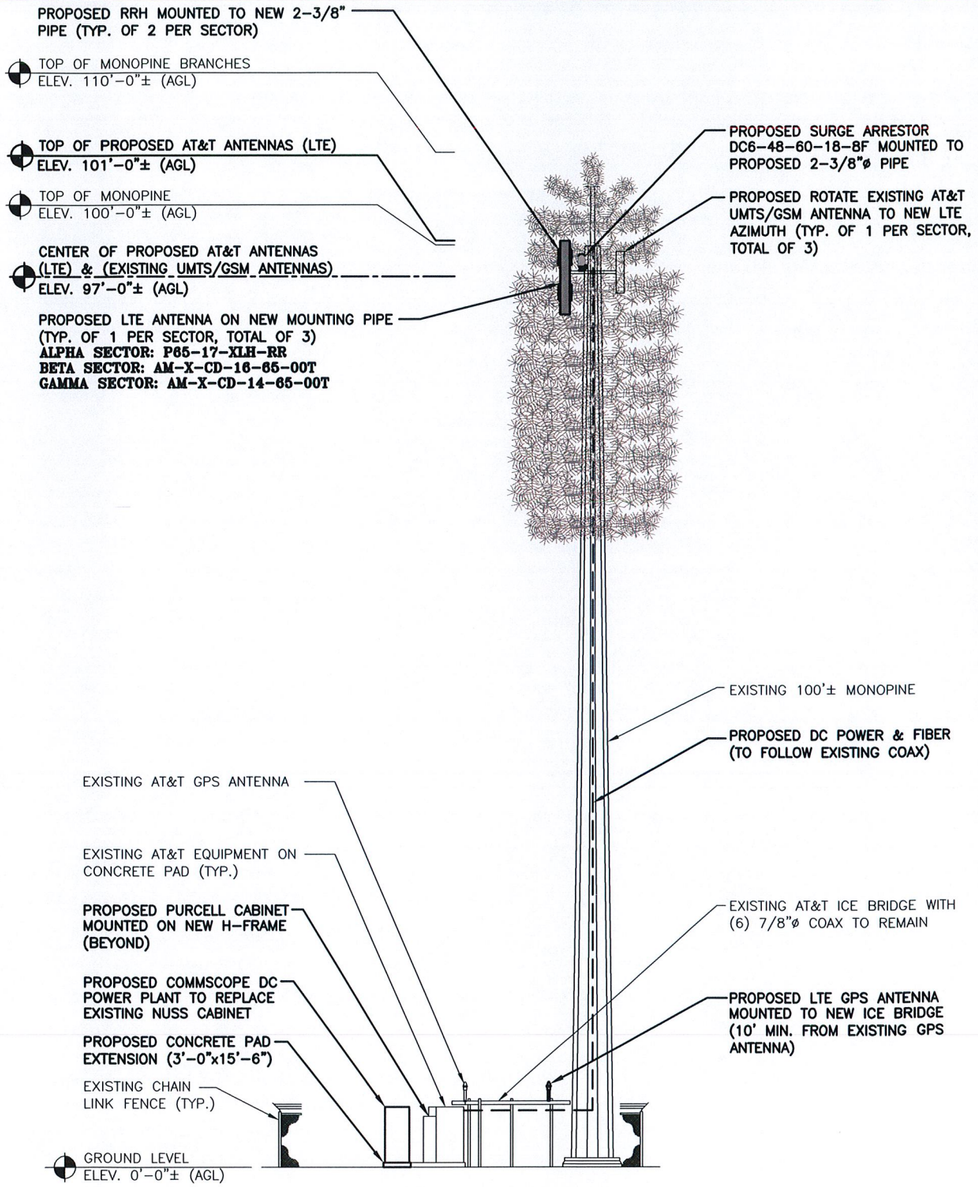
SCALE: N.T.S.





## PROPOSED LTE ANTENNA PLAN

SCALE: N.T.S.




## SOUTHWEST ELEVATION

SCALE: 1/8"=1'-0"

0 4'-0" 8'-0" 16'-0" 24'-0"

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

NEXLINK GLOBAL SERVICES
a UniTek GLOBAL SERVICES company
800 MARSHALL PHELPS ROAD UNIT#: 2A
WINDSOR, CT 06095

**SITE NUMBER: CT5137**
**SITE NAME: WINDSOR SOUTH**
1170 MATIANUCK AVENUE
WINDSOR, CT 06095
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

| NO. | DATE | REVISIONS | BY | CHK | APP |
|---|---|---|---|---|---|
| 2 | 05/31/12 | CONSTRUCTION REVISED | NB | DC | DPH |
| 1 | 04/18/12 | ISSUED FOR CONSTRUCTION | DB | DC | DPH |
| 0 | 04/13/12 | ISSUED FOR REVIEW | DB | DC | DPH |

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: DB

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 21010
LICENSED PROFESSIONAL ENGINEER

AT&T

ANTENNA LAYOUT AND ELEVATION (LTE)

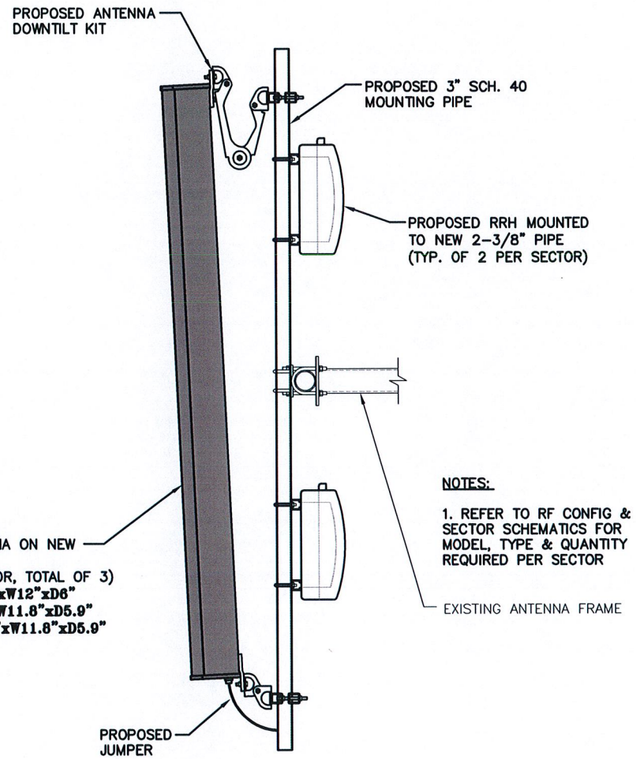
| JOB NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| 37.01 | A-2 | 2 |

NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

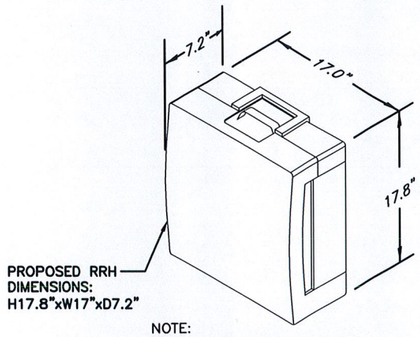



NOTES:

1. REFER TO RF CONFIG & SECTOR SCHEMATICS FOR MODEL, TYPE & QUANTITY REQUIRED PER SECTOR

## PROPOSED LTE ANTENNA MOUNTING DETAIL

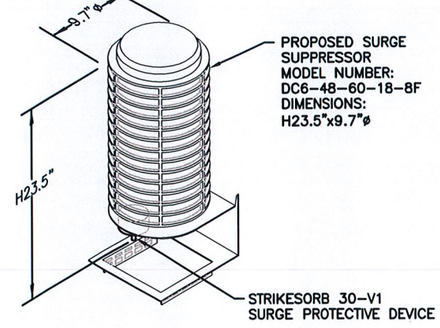
SCALE: N.T.S.




NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

## RRH DETAIL

SCALE: N.T.S.



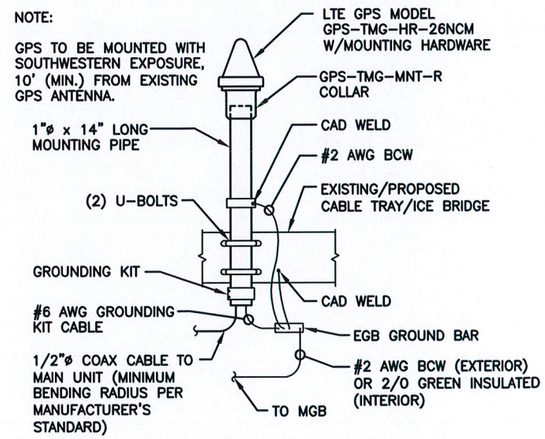

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

## DC SURGE SUPPRESSOR DETAIL

SCALE: N.T.S.

NOTE:

GPS TO BE MOUNTED WITH SOUTHWESTERN EXPOSURE, 10' (MIN.) FROM EXISTING GPS ANTENNA.




## GPS MOUNTING DETAIL

SCALE: N.T.S.


Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

NEXLINK GLOBAL SERVICES
a UniTek GLOBAL SERVICES company
800 MARSHALL PHELPS ROAD UNIT#: 2A
WINDSOR, CT 06095


**SITE NUMBER: CT5137**
**SITE NAME: WINDSOR SOUTH**
1170 MATIANUCK AVENUE
WINDSOR, CT 06095
HARTFORD COUNTY


at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067


| NO. | DATE | REVISIONS | BY | CHK | APP'D |
|---|---|---|---|---|---|
| 2 | 05/31/12 | CONSTRUCTION REVISED | NB | DC | DPH |
| 1 | 04/18/12 | ISSUED FOR CONSTRUCTION | DB | DC | DPH |
| 0 | 04/13/12 | ISSUED FOR REVIEW | DB | DC | DPH |

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: DB

STATE OF CONNECTICUT
DANIEL P. HARIM
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

DETAILS (LTE)

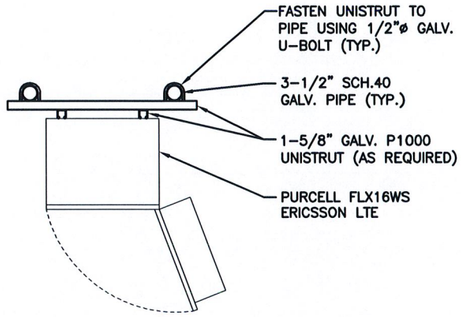
| JOB NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| 15117.01 | A-3 | 2 |

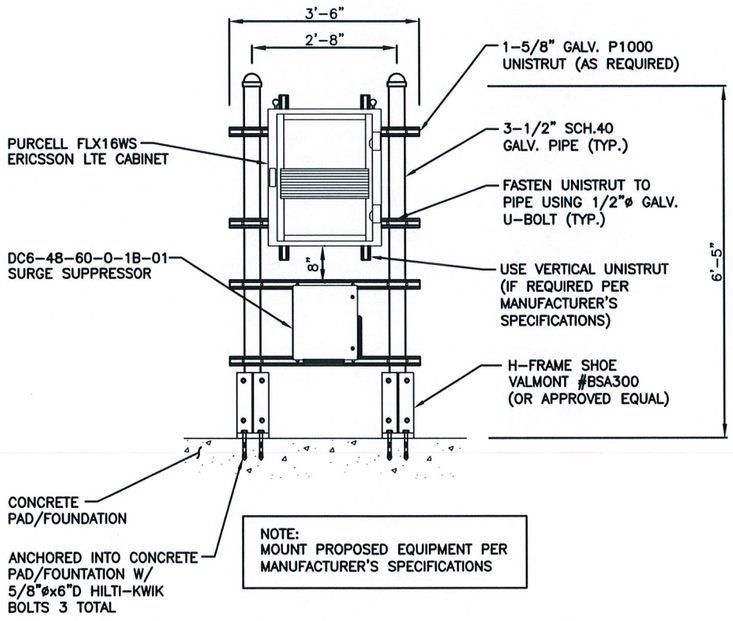
NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

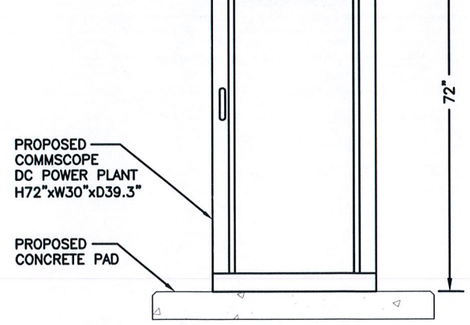



NOTE:
MOUNT PROPOSED EQUIPMENT PER MANUFACTURER'S SPECIFICATIONS

## PROPOSED EQUIPMENT MOUNTING DETAIL

SCALE: N.T.S.

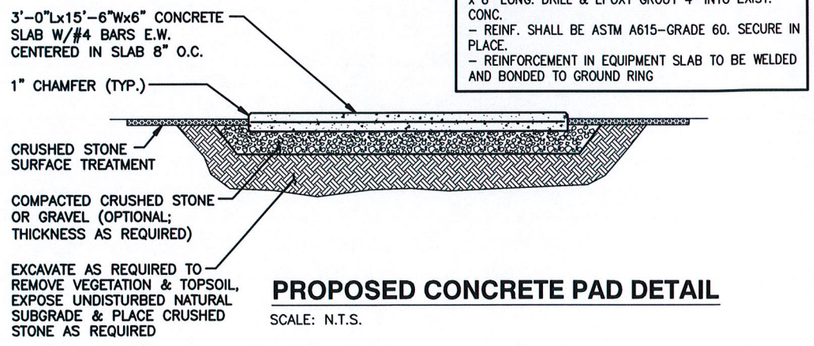



## PROPOSED DC POWER PLANT DETAIL

SCALE: N.T.S.

NOTE:
- ATTACH EQUIPMENT TO CONCRETE PER MANUFACTURER'S SPECIFICATIONS.

NEW CONC. PAD NOTES:
- REINF. W/ #4's @ 8" O.C. EA. WAY (MID-DEPTH).
- DOWEL NEW CONC. TO EXIST. W/ #4's @ 8" O.C. x 8" LONG. DRILL & EPOXY GROUT 4" INTO EXIST. CONC.
- REINF. SHALL BE ASTM A615-GRADE 60. SECURE IN PLACE.
- REINFORCEMENT IN EQUIPMENT SLAB TO BE WELDED AND BONDED TO GROUND RING




## PROPOSED CONCRETE PAD DETAIL

SCALE: N.T.S.


Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

NEXLINK GLOBAL SERVICES
a UniTek GLOBAL SERVICES company
800 MARSHALL PHELPS ROAD UNIT#: 2A
WINDSOR, CT 06095


**SITE NUMBER: CT5137**
**SITE NAME: WINDSOR SOUTH**
1170 MATIANUCK AVENUE
WINDSOR, CT 06095
HARTFORD COUNTY


at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067


| NO. | DATE | REVISIONS | BY | CHK | APP'D |
|---|---|---|---|---|---|
| 2 | 05/31/12 | CONSTRUCTION REVISED | NB | RC | DPH |
| 1 | 04/18/12 | ISSUED FOR CONSTRUCTION | DB | RC | DPH |
| 0 | 04/13/12 | ISSUED FOR REVIEW | DB | RC | DPH |

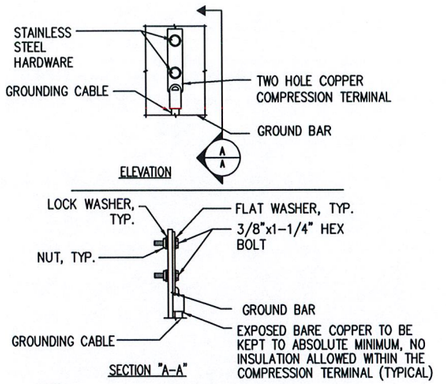
SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: DB

STATE OF CONNECTICUT
DANIEL P. HAMM
LICENSED PROFESSIONAL ENGINEER
No. 24172

AT&T

DETAILS (LTE)

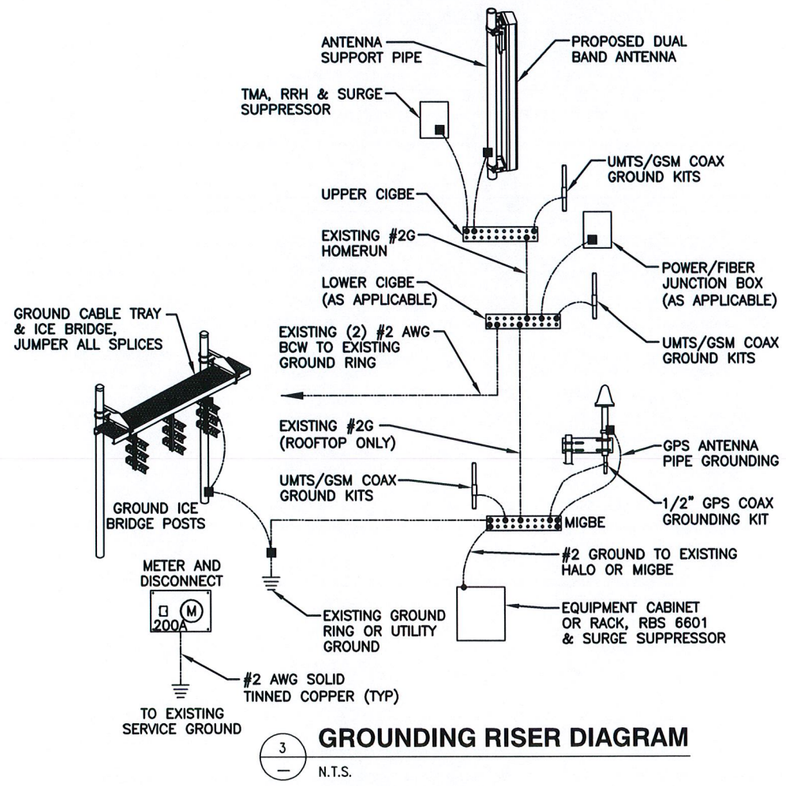
| JOB NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| 5137.01 | A-4 | 2 |




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

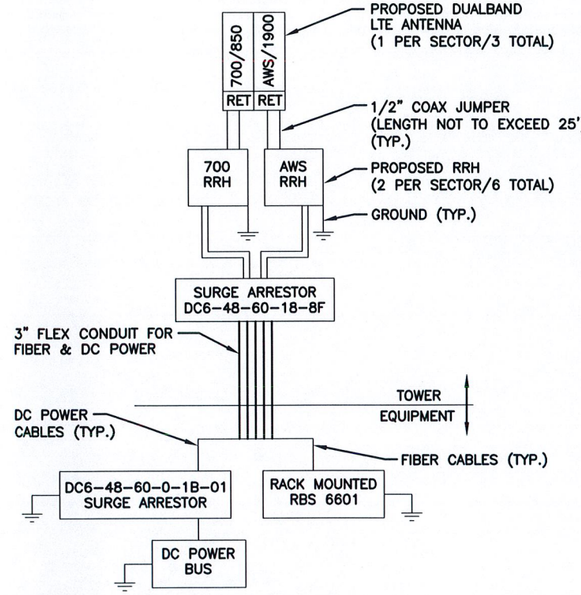
## TYPICAL GROUND BAR CONNECTION DETAIL

1 — N.T.S.




## GROUNDING RISER DIAGRAM

3 — N.T.S.




NOTES:

1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS.

## PLUMBING DIAGRAM

2 — N.T.S.

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

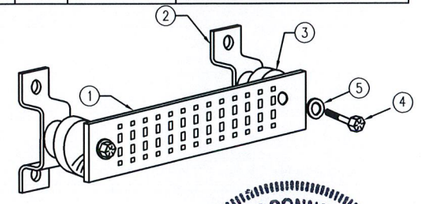
SECTION "P" – SURGE PRODUCERS

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

SECTION "A" – SURGE ABSORBERS

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

| WIRELESS SOLUTIONS INC. | | | |
|---|---|---|---|
| NO. | REQ. | PART NO. | DESCRIPTION |
| 1 | 1 | HLGB-0420-IS | SOLID GND. BAR (20"x4"x1/4") |
| 2 | 2 | ——— | WALL MTG. BRKT. |
| 3 | 2 | ——— | INSULATORS |
| 4 | 4 | ——— | 5/8"-11x1" H.H.C.S. |
| 5 | 4 | ——— | 5/8 LOCKWASHER |




## GROUND BAR - DETAIL

4 — N.T.S.

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

NEXLINK GLOBAL SERVICES
a UniTek GLOBAL SERVICES company
800 MARSHALL PHELPS ROAD UNIT#: 2A
WINDSOR, CT 06095

**SITE NUMBER: CT5137**
**SITE NAME: WINDSOR SOUTH**
1170 MATIANUCK AVENUE
WINDSOR, CT 06095
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

| NO. | DATE | REVISIONS | BY | CHK | APP'D |
|---|---|---|---|---|---|
| 2 | 05/31/12 | CONSTRUCTION REVISED | NB | DC | DPH |
| 1 | 04/18/12 | ISSUED FOR CONSTRUCTION | DB | DC | DPH |
| 0 | 04/13/12 | ISSUED FOR REVIEW | DB | DC | DPH |

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: DB

STATE OF CONNECTICUT DANIEL P. HAMM No. 21164 LICENSED PROFESSIONAL ENGINEER

AT&T

PLUMBING DIAGRAM & GROUNDING DETAILS (LTE)

| JOB NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| 5137.01 | G-1 | 2 |