EMPIRE telecom

EM-AT&T-164-140709

July 8, 2014

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

Regarding:	Notice of Exempt Modification – Addition of 3 radio heads previously approved
Property Address:	99 Day Hill Road, Windsor, CT (the "Property")
Applicant:	New Cingular Wireless PCS, LLC ("AT&T")

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 169 foot Monopole ("tower") location on the Property. AT&T's facility consists of nine (9) wireless telecommunications antenna at 169 feet. The tower was previously owned by AT&T and is now controlled by Crown Castle, LLC. The Council approved the previous application on June 29th 2012 reference number EM-AT&T-164-120613A. This application (attached) granted AT&T the use of 6 radio heads at this location. The approval expired one year from the issue date. During that time AT&T made the changes to the site per the approval but only installed three (3) of the six (6) radio heads that they received approval. AT&T would now like to install the additional three(3) radio heads that were originally approved under EM-AT&T-164-120613A.

Please accept this application as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72 (b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Mayor, Town Manager and Town Planner for the Town of Windsor. A copy of this letter is also being sent to Crown Castle, LLC, the owner of the structure that AT&T is located.

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

1. The planned modifications will not result in an increase in the height of the existing structure. AT&T's additional, previously approved 3 radio heads will be installed at 169 foot level of the 169 foot monopole.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.

16 Esquire Road, Billerica, MA 01862 Mobile 617-639-4908 Email: Dcooper@empiretelecomm.com

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4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. An RF emissions calculation (attached) for AT&T's modified facility was provided in the application which led to the June 29th 2012 Decision.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (Please see attached Structural analysis completed by B and T Engineering dated April 30th 2012).

For the foregoing reasons AT&T respectfully requests that the proposed addition of 3 radio heads previously approved be allowed within the exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

David P. Cooper

David P. Cooper
Director of Site Acquisition
Empire Telecom

CC: Mayor, Town Planner, Town Manager, Windsor, CT
Crown Castle, LLC

16 Esquire Road, Billerica, MA 01862 Mobile 617-639-4908 Email: Dcooper@empiretelecomm.com

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-164-120613A** – AT&T Mobility notice of intent to modify an existing telecommunications facility located at 90 Day Hill Road, 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,

LRoberts

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

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
99 Day Hill Road, 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 99 Day Hill Road, owned by Town of Windsor & Public Works Garage (coordinates 41-52-16.14 N, 72-40-15.90 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 1.58%; the combined site operations will result in a total power density of 15.20%.

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

CT5139 – Windsor Day Hill

99 Day Hill Road, Windsor, CT 06095

May 25, 2012

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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 monopole tower located at 99 Day Hill Road in Windsor, CT. The coordinates of the tower are 41-52-16.14 N, 72-40-15.90 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	*170*	*1900*	*3*	*427*	*0.0159*	*1.0000*	*1.59%*
Cingular UMTS	*170*	*880*	*1*	*500*	*0.0062*	*0.5867*	*1.06%*
Nextel	160	851	9	100	0.0126	0.5673	2.23%
Sprint	135	N/A	N/A	N/A	0.0295	1.0000	2.95%
Clearwire	160	2496	2	153	0.0043	1.0000	0.43%
Clearwire	164	18000	1	211	0.0028	1.0000	0.28%
Pocket	120	2130	3	631	0.0473	1.0000	4.73%
Bloomfield PD	142	4900	1	31.623	0.0006	1.0000	0.06%
Municipal Ant. 1	150	450	3	100	0.0048	0.3000	1.60%
Municipal Ant. 2	150	450	3	100	0.0048	0.3000	1.60%
Municipal MW 1	145	23000	1	0.1	0.0000	1.0000	0.00%
Municipal MW 2	150	23000	1	0.1	0.0000	1.0000	0.00%
AT&T UMTS	168	880	2	565	0.0014	0.5867	0.25%
AT&T UMTS	168	1900	2	1077	0.0027	1.0000	0.27%
AT&T LTE	169	734	1	1615	0.0020	0.4893	0.42%
AT&T GSM	168	880	1	283	0.0004	0.5867	0.06%
AT&T GSM	168	1900	4	646	0.0033	1.0000	0.33%
						Total	**15.20%**

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 4/30/2012.

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 **15.20% 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.

May 25, 2012

Daniel L. Goulet
C Squared Systems, LLC

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.

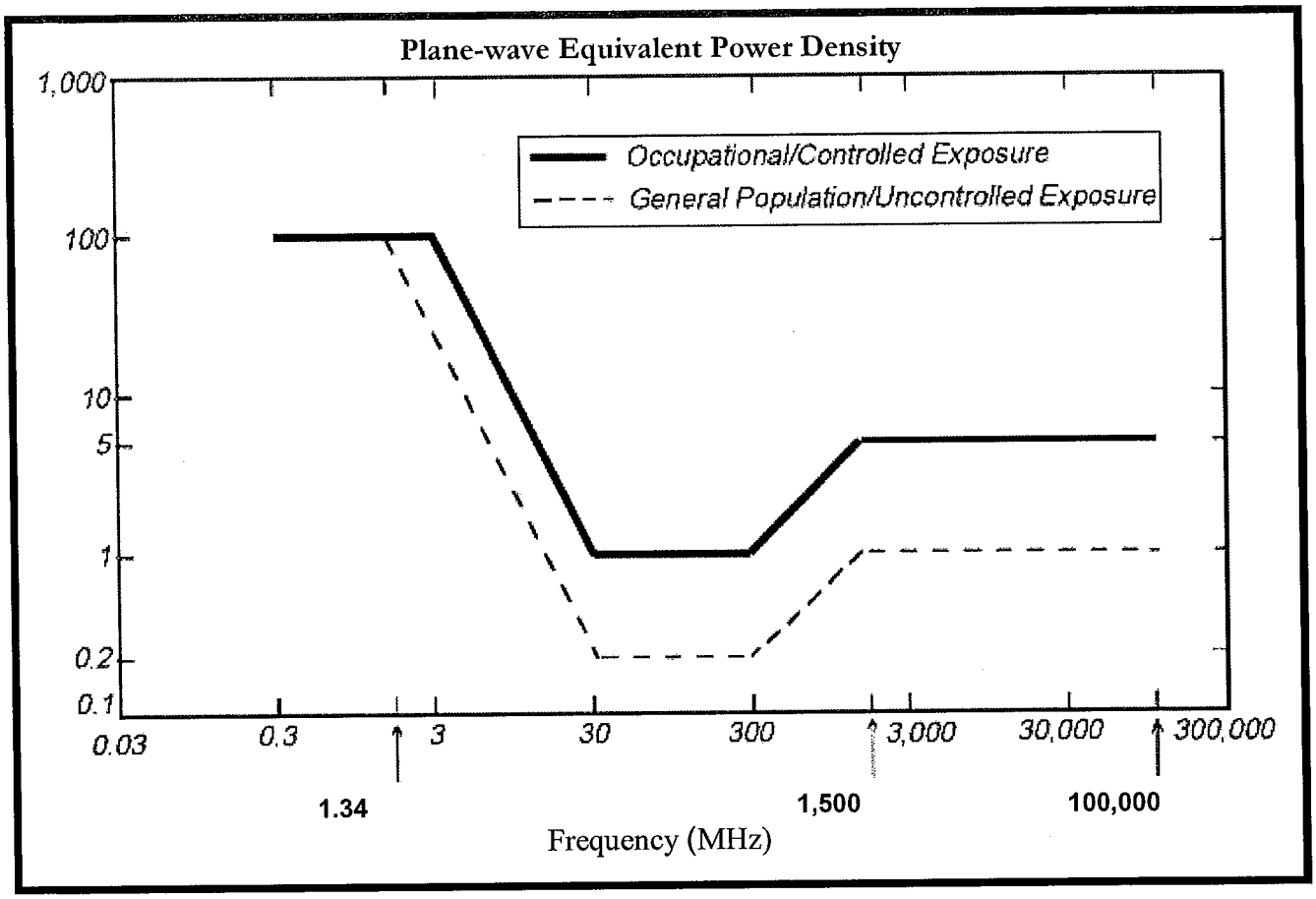
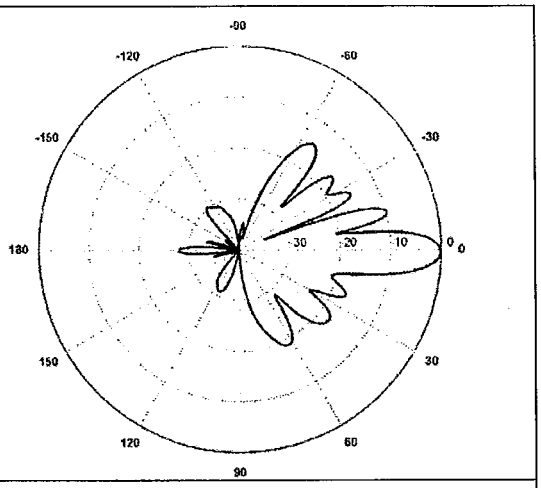


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

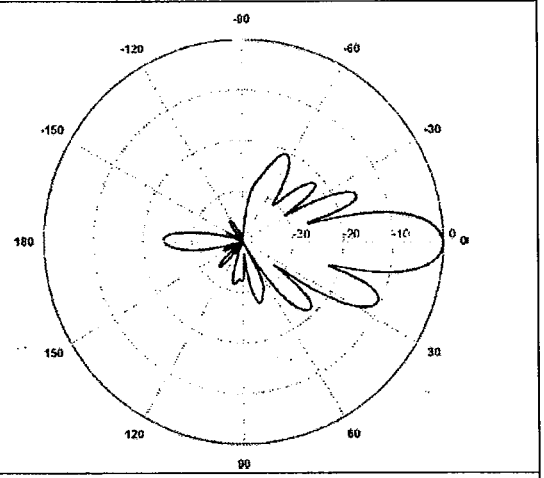
700 MHz

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"



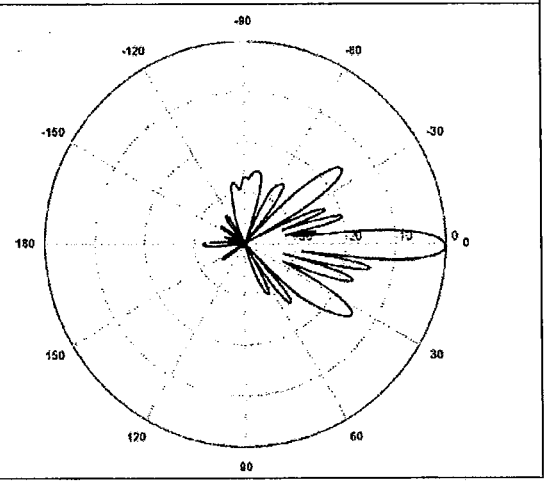
850 MHz

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, Inc.
800 Marshall Phelps Road
Windsor, CT 06095

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

April 30, 2012

B&T No.: 84437.001

STRUCTURAL ANALYSIS
168' Monopole Tower

AT&T DESIGNATION:	Site ID:	14489-A
	Site FA:	10071331
	Site Name:	Windsorday Hill
	AT&T Project:	MOD LTE W3 020912
ANALYSIS CRITERIA:	Codes:	TIA/EIA-222-F (80 mph fastest mile) IBC 2003 2005 CT State Building Code
SITE DATA:		99 DAY HILL ROAD , Windsor, CT, Hartford County Latitude 41.871092°, Longitude -72.670599° 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

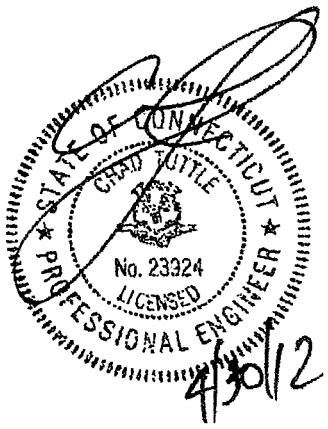
Tower Stress Level with Proposed Equipment:	**81.2%**	**Pass**
Foundation Ratio with Proposed Equipment:	**72.7%**	**Pass**

We at B&T Engineering, Inc. appreciate the opportunity of providing our continuing professioinal services to you and Nexlink Global Services, Inc.. 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: Nyckey Heath, E.I.

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



ANALYSIS RESULTS:

Table 1 - Section Capacity (Summary)

Component (Tower Section)	% Capacity	Pass / Fail
168 - 119.25	57.1	Pass
119.25 - 78.5	81.1	Pass
78.5 - 38.75	73	Pass
38.75 - 0	81.2	Pass

Table 2 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	77.5	**Pass**
1	Base Plate	Base	60.1	**Pass**
1	Base Foundation	Base	72.7	**Pass**

Structure Rating (max from all components) =	**81.2%**

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	Design Drawings by Summit Manufacturing, Inc.	11/8/2000	Siterra
Foundation Information	Design Drawings by Summit Manufacturing, Inc.	11/8/2000	Siterra
Geotech Report	Northeast Electrical Testing, Inc.	6/22/2001	Siterra
Loading	SA by GPD	7/19/2010	Siterra
	Equipment Mod Form	2/9/2012	Siterra
Previous Structural Analysis	SA by GPD	7/19/2010	Siterra
	SA by GPD	8/13/2008	Siterra
	SA by GPD	5/9/2008	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.

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

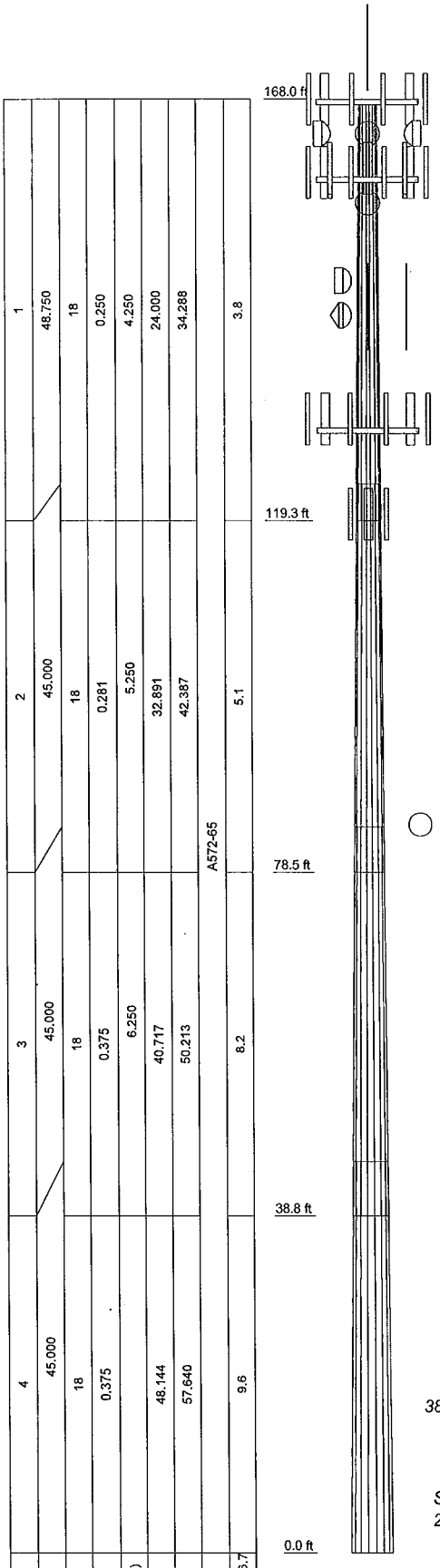
TOWER ANALYSIS LOADING

168	174	1	Unknown	12' Omni			1	7/8"
168	168	6	Katherine	800 10121	1	13' LP Platform	12	1-5/8"
168	168	6	Powerwave	LGP21401				
159	159.5	9	Decibel	DB844H90E-XY	1	13' LP Platform	15	1-1/4"
159	164	3	Andrew	VHLP 2.5			4	1/2"
159	164	3	Dragonwave	Horizon Compact ODU			6	5/16"
159	160	3	Kathrein	840 10054				
159	160	3	Samsung	U-RAS				
159	156	1	Andrew	VHLP 2.5				
159	156	1	Dragonwave	Horizon Compact ODU				
147	147	1	Unknown	3' HP Dish	1	Pipe Mount	1	3/8"
143	143	1	Unknown	3' HP Dish	1	Pipe Mount	1	3/8"
140	140	1	Motorola	WB2623CC (PTP 400)	1	18" Standoff	1	CAT5
135	144	2	Unknown	18' Omni	2	6' Standoff	2	7/8"
130	131	6	Decibel	980H90T2EM	1	13' LP Platform	6	1-1/4"
120	120	3	Kathrein	742 213	3	Pipe Mounts	6	1-5/8"
79	79	2	Unknown	GPS Unit	2	2' Standoff	2	1/2"
52	52	1	Unknown	GPS Unit	1	3' Standoff	1	1/2"

Antenna					Mount		Transmission Line	
Mount Height (ft)	Antenna CL (ft)	Quantity	Manufacturer	Model	Quantity	Type	Quantity	Size (in)
168	169	2	KMW	AM-X-CD-16-65-00T			3	1/2"
168	169	1	Powerwave	P65-17-XLH-RR				
168	169	6	Ericsson	RBS 6601				
168	169	1	Raycap	DC6-48-60-18-8F				

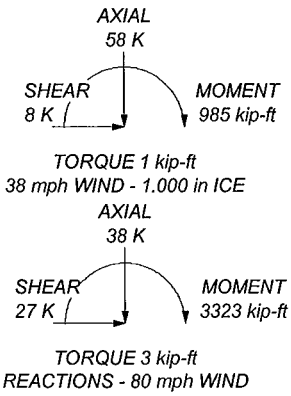
APPENDIX B

CALCULATIONS



Section	1	2	3	4
Length (ft)	48.750	45.000	45.000	45.000
Number of Sides	18	18	18	18
Thickness (in)	0.250	0.281	0.375	0.375
Socket Length (ft)	4.250	5.250	6.250	
Top Dia (in)	24.000	32.891	40.717	48.144
Bot Dia (in)	34.288	42.387	50.213	57.640
Grade	A572-65			
Weight (K)	3.8	5.1	8.2	9.6

26.7



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
12' Omni (E)	174	(3) DB844H90E-XY w/ Mount Pipe (E)	159.5
P65-17-XLH-RR w/ Mount Pipe (P)	169	(3) DB844H90E-XY w/ Mount Pipe (E)	159.5
AM-X-CD-16-65-00T-RET w/ Mount Pipe (P)	169	Platform Mount [LP 601-1] (E)	159
AM-X-CD-16-65-00T-RET w/ Mount Pipe (P)	169	Horizon Compact (E)	156
(2) RBS 6601 (P)	169	VHLP2.5 (E)	156
(2) RBS 6601 (P)	169	3' Dish (E)	147
(2) RBS 6601 (P)	169	Pipe Mount [PM 601-1] (E)	147
(2) 800 10121 w/ Mount Pipe (E)	168	18' Omni (E)	144
(2) 800 10121 w/ Mount Pipe (E)	168	18' Omni (E)	144
(2) 800 10121 w/ Mount Pipe (E)	168	3' Dish (E)	143
(2) LGP21401 (E)	168	Pipe Mount [PM 601-1] (E)	143
(2) LGP21401 (E)	168	PTP 400 (E)	140
(2) LGP21401 (E)	168	18" Standoff (E)	140
4' x 2" Pipe Mount (E)	168	6' Standoff (E)	135
4' x 2" Pipe Mount (E)	168	6' Standoff (E)	135
4' x 2" Pipe Mount (E)	168	(2) DB980H90T2E-M w/ Mount Pipe (E)	131
Platform Mount [LP 601-1] (E)	168	(2) DB980H90T2E-M w/ Mount Pipe (E)	131
DC6-48-60-18-8F (P)	167	(2) DB980H90T2E-M w/ Mount Pipe (E)	131
Horizon Compact (E)	164	Platform Mount [LP 601-1] (E)	130
Horizon Compact (E)	164	742 213 (E)	120
Horizon Compact (E)	164	742 213 (E)	120
VHLP2.5 (E)	164	Pipe Mount [PM 501-3] (E)	120
VHLP2.5 (E)	164	742 213 (E)	120
VHLP2.5 (E)	164	GPS (E)	79
URAS-FLEXIBLE (E)	160	GPS (E)	79
URAS-FLEXIBLE (E)	160	2' Standoff (E)	78
URAS-FLEXIBLE (E)	160	2' Standoff (E)	78
840 10054 w/ Mount Pipe (E)	160	GPS (E)	52
840 10054 w/ Mount Pipe (E)	160	3' Standoff (E)	50
840 10054 w/ Mount Pipe (E)	160		
(3) DB844H90E-XY w/ Mount Pipe (E)	159.5		

MATERIAL STRENGTH

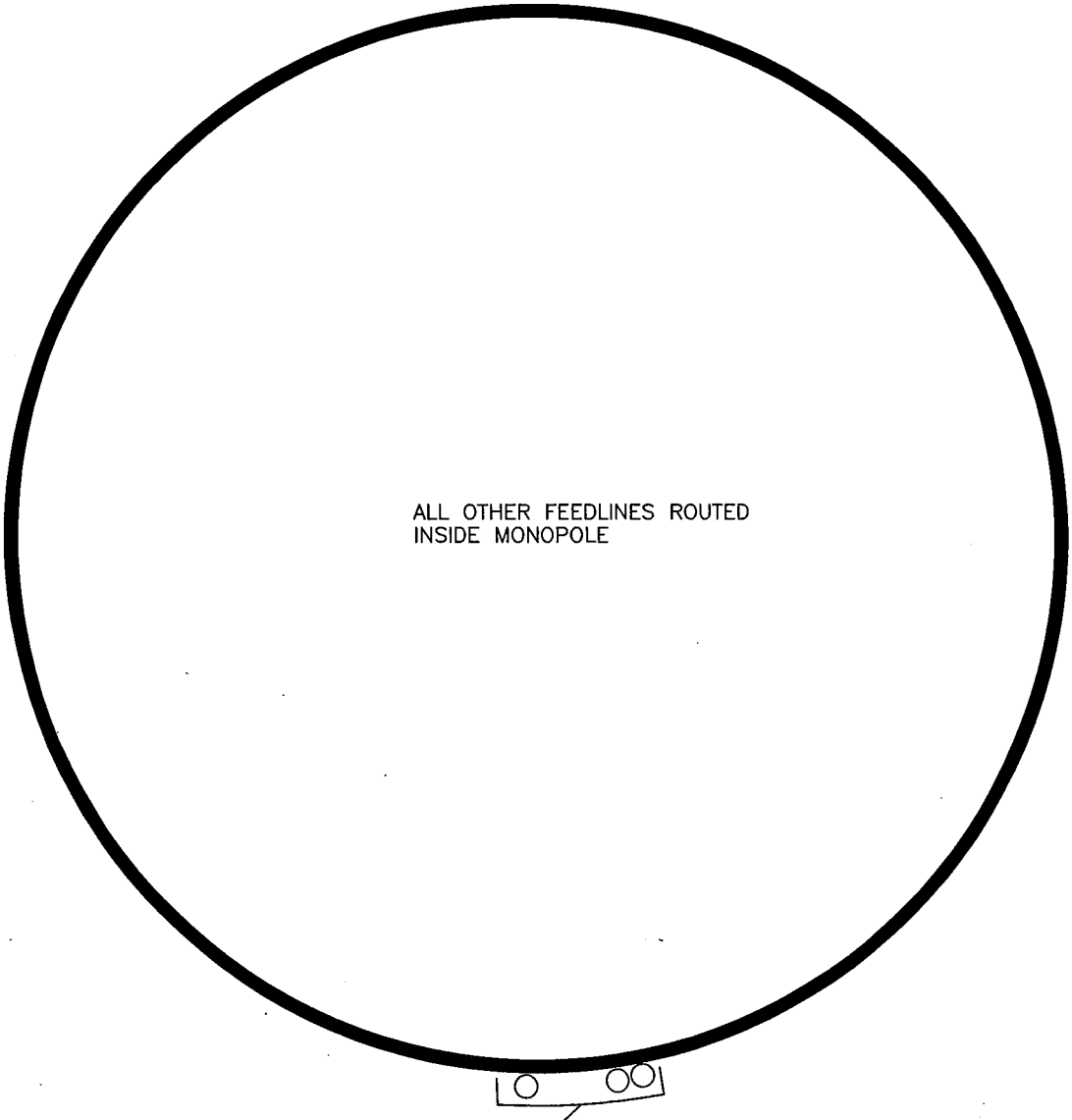
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

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: 81.2%

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

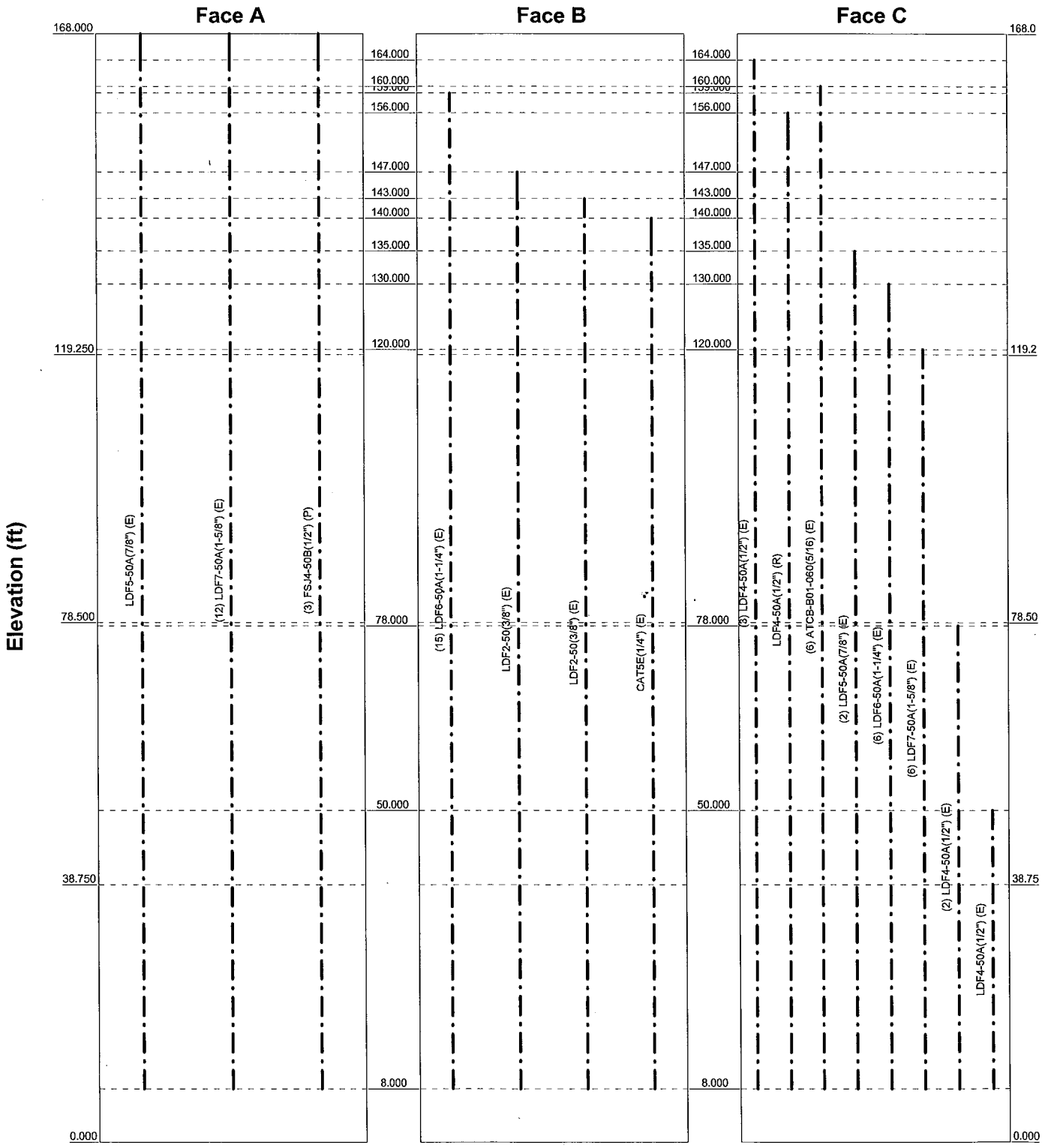
Job:	84437.001 - WindsorDay Hill, CT (Site# 14		
Project:	168' Summit Monopole / AT&T Co-Location		
Client: Nexlinkgs	Drawn by: NHeath	App'd:	
Code: TIA/EIA-222-F	Date: 04/27/12	Scale: N	
Path: S:\B&T Engineering\Projects\BTE Management\84437 WindsorDay Hill\Engineering\tnxTower\84437.001 WindsorDay Hill.eri		Dwg No.	



PROJECT NUMBER: 84437.001

0' - 168'

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



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Code: TIA/EIA-222-F	Date: 04/27/12	Scale: N	
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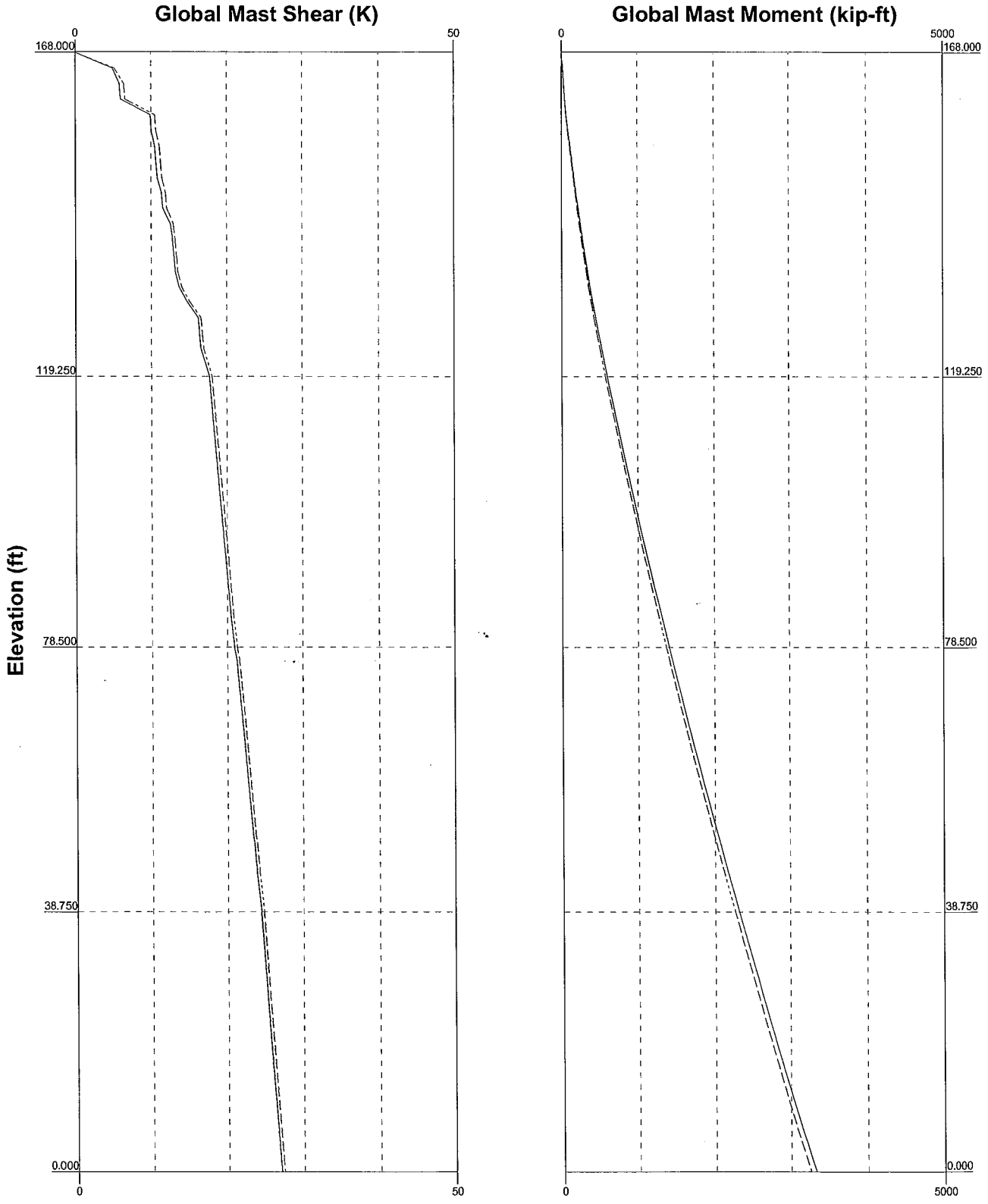
Vx Vz

Mx Mz



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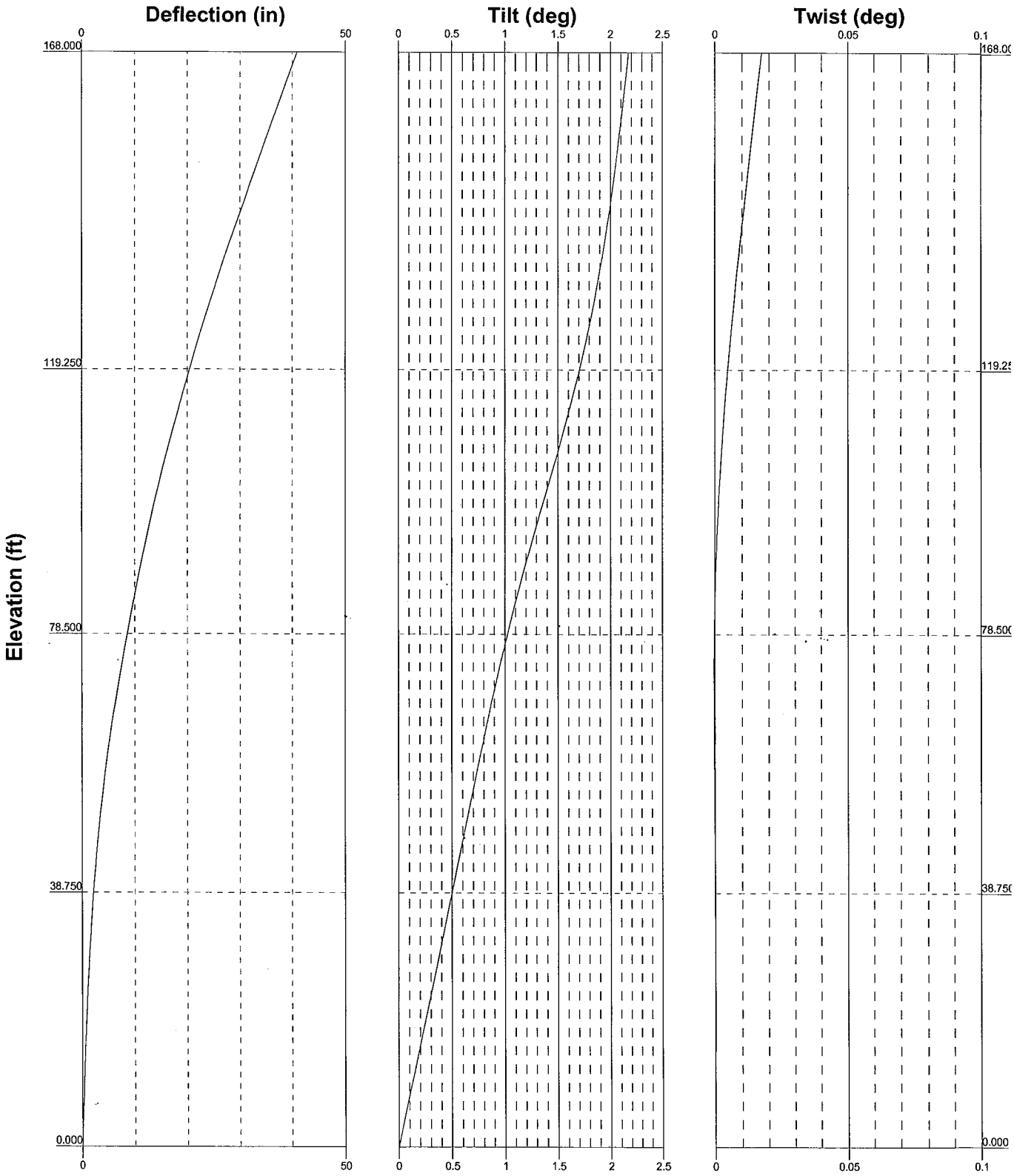
Job: 84437.001 - WindsorDay Hill, CT (Site# 14		
Project: 168' Summit Monopole / AT&T Co-Location		
Client: Nexlinkgs	Drawn by: NHeath	App'd:
Code: TIA/EIA-222-F	Date: 04/27/12	Scale: N
Path:		Dwg No.

TIA/EIA-222-F - Service - 50 mph **Maximum Values**



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Job: ***84437.001 - WindsorDay Hill, CT (Site# 14***		
Project: ***168' Summit Monopole / AT&T Co-Location***		
Client: Nexlinkgs	Drawn by: NHeath	App'd:
Code: TIA/EIA-222-F	Date: 04/27/12	Scale: N
Path: S:\B&T Engineering\Projects\SITE Management\84437 WindsorDay Hill\Engineering\cTower\84437-001 WindsorDay Hill.CTwr		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*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	168.000-119.250	48.750	4.250	18	24.000	34.288	0.250	1.000	A572-65 (65 ksi)
L2	119.250-78.500	45.000	5.250	18	32.891	42.387	0.281	1.125	A572-65 (65 ksi)
L3	78.500-38.750	45.000	6.250	18	40.717	50.213	0.375	1.500	A572-65 (65 ksi)
L4	38.750-0.000	45.000		18	48.144	57.640	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	24.370	18.846	1342.998	8.431	12.192	110.154	2687.762	9.425	3.784	15.136
	34.817	27.009	3953.452	12.083	17.418	226.971	7912.106	13.507	5.595	22.379
L2	34.309	29.116	3911.636	11.576	16.709	234.108	7828.418	14.561	5.294	18.819
	43.041	37.594	8420.479	14.948	21.533	391.057	16852.037	18.801	6.965	24.76
L3	42.470	48.017	9872.638	14.321	20.684	477.308	19758.267	24.013	6.506	17.35
	50.988	59.320	18614.761	17.692	25.508	729.756	37254.015	29.665	8.177	21.807
L4	50.226	56.857	16391.375	16.958	24.457	670.207	32804.319	28.434	7.813	20.836
	58.529	68.160	28238.618	20.329	29.281	964.397	56514.393	34.086	9.485	25.292

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 168.000-119.250				1	1	1		
L2 119.250-78.500				1	1	1		
L3 78.500-38.750				1	1	1		
L4 38.750-0.000				1	1	1		

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
LDF5-50A(7/8") (E)	A	No	Inside Pole	168.000 - 8.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
LDF7-50A(1-5/8") (E)	A	No	Inside Pole	168.000 - 8.000	12	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

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
FSJ4-50B(1/2")	A	No	Inside Pole	168.000 - 8.000	3	No Ice	0.000	0.000
(P)						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
-								
LDF6-50A(1-1/4")	B	No	Inside Pole	159.000 - 8.000	15	No Ice	0.000	0.001
(E)						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
LDF4-50A(1/2")	C	No	Inside Pole	164.000 - 8.000	3	No Ice	0.000	0.000
(E)						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
LDF4-50A(1/2")	C	No	Inside Pole	156.000 - 8.000	1	No Ice	0.000	0.000
(R)						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
ATCB-B01-060(5/16)	C	No	Inside Pole	160.000 - 8.000	6	No Ice	0.000	0.000
(E)						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
-								
LDF2-50(3/8")	B	No	Inside Pole	147.000 - 8.000	1	No Ice	0.000	0.000
(E)						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
-								
LDF2-50(3/8")	B	No	Inside Pole	143.000 - 8.000	1	No Ice	0.000	0.000
(E)						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
-								
CAT5E(1/4")	B	No	Inside Pole	140.000 - 8.000	1	No Ice	0.000	0.000
(E)						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
-								
LDF5-50A(7/8")	C	No	Inside Pole	135.000 - 8.000	2	No Ice	0.000	0.000
(E)						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
-								
LDF6-50A(1-1/4")	C	No	Inside Pole	130.000 - 8.000	6	No Ice	0.000	0.001
(E)						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
-								
LDF7-50A(1-5/8")	C	No	Inside Pole	120.000 - 8.000	6	No Ice	0.000	0.001
(E)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						4" Ice	0.000	0.001
-								
LDF4-50A(1/2") (E)	C	No	CaAa (Out Of Face)	78.000 - 8.000	2	No Ice	0.063	0.000
						1/2" Ice	0.163	0.001
						1" Ice	0.263	0.002
						2" Ice	0.463	0.007
						4" Ice	0.863	0.023
-								
LDF4-50A(1/2") (E)	C	No	CaAa (Out Of Face)	50.000 - 8.000	1	No Ice	0.063	0.000
						1/2" Ice	0.163	0.001
						1" Ice	0.263	0.002
						2" Ice	0.463	0.007
						4" Ice	0.863	0.023
-								

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	168.000-119.250	A	0.000	0.000	0.000	0.000	0.516
		B	0.000	0.000	0.000	0.000	0.400
		C	0.000	0.000	0.000	0.000	0.101
L2	119.250-78.500	A	0.000	0.000	0.000	0.000	0.432
		B	0.000	0.000	0.000	0.000	0.414
		C	0.000	0.000	0.000	0.000	0.432
L3	78.500-38.750	A	0.000	0.000	0.000	0.000	0.421
		B	0.000	0.000	0.000	0.000	0.404
		C	0.000	0.000	0.000	5.654	0.434
L4	38.750-0.000	A	0.000	0.000	0.000	0.000	0.326
		B	0.000	0.000	0.000	0.000	0.312
		C	0.000	0.000	0.000	5.812	0.339

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	168.000-119.250	A	1.192	0.000	0.000	0.000	0.000	0.516
		B		0.000	0.000	0.000	0.000	0.400
		C		0.000	0.000	0.000	0.000	0.101
L2	119.250-78.500	A	1.140	0.000	0.000	0.000	0.000	0.432
		B		0.000	0.000	0.000	0.000	0.414
		C		0.000	0.000	0.000	0.000	0.432
L3	78.500-38.750	A	1.071	0.000	0.000	0.000	0.000	0.421
		B		0.000	0.000	0.000	0.000	0.404
		C		0.000	0.000	0.000	26.119	0.669
L4	38.750-0.000	A	1.000	0.000	0.000	0.000	0.000	0.326
		B		0.000	0.000	0.000	0.000	0.312
		C		0.000	0.000	0.000	25.574	0.552

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	168.000-119.250	0.000	0.000	0.000	0.000
L2	119.250-78.500	0.000	0.000	0.000	0.000
L3	78.500-38.750	-0.180	0.104	-0.706	0.407
L4	38.750-0.000	-0.186	0.107	-0.710	0.410

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
12' Omni	C	None			0.000	174.000	No Ice	3.000	3.000	0.020
(E)							1/2" Ice	4.230	4.230	0.040
							1" Ice	5.460	5.460	0.060
							2" Ice	7.920	7.920	0.100
							4" Ice	12.840	12.840	0.180
*										
(2) 800 10121 w/ Mount Pipe	C	From Leg	4.000		60.000	168.000	No Ice	5.685	4.600	0.066
(E)			0.000				1/2" Ice	6.182	5.351	0.112
			0.000				1" Ice	6.676	6.046	0.167
							2" Ice	7.695	7.526	0.298
							4" Ice	9.858	10.832	0.675
(2) 800 10121 w/ Mount Pipe	B	From Leg	4.000		30.000	168.000	No Ice	5.685	4.600	0.066
(E)			0.000				1/2" Ice	6.182	5.351	0.112
			0.000				1" Ice	6.676	6.046	0.167
							2" Ice	7.695	7.526	0.298
							4" Ice	9.858	10.832	0.675
(2) 800 10121 w/ Mount Pipe	A	From Leg	4.000		30.000	168.000	No Ice	5.685	4.600	0.066
(E)			0.000				1/2" Ice	6.182	5.351	0.112
			0.000				1" Ice	6.676	6.046	0.167
							2" Ice	7.695	7.526	0.298
							4" Ice	9.858	10.832	0.675
(2) LGP21401	C	From Leg	4.000		60.000	168.000	No Ice	1.288	0.233	0.014
(E)			0.000				1/2" Ice	1.445	0.313	0.021
			0.000				1" Ice	1.611	0.403	0.030
							2" Ice	1.969	0.608	0.055
							4" Ice	2.788	1.121	0.135
(2) LGP21401	B	From Leg	4.000		30.000	168.000	No Ice	1.288	0.233	0.014
(E)			0.000				1/2" Ice	1.445	0.313	0.021
			0.000				1" Ice	1.611	0.403	0.030
							2" Ice	1.969	0.608	0.055
							4" Ice	2.788	1.121	0.135
(2) LGP21401	A	From Leg	4.000		30.000	168.000	No Ice	1.288	0.233	0.014
(E)			0.000				1/2" Ice	1.445	0.313	0.021
			0.000				1" Ice	1.611	0.403	0.030
							2" Ice	1.969	0.608	0.055
							4" Ice	2.788	1.121	0.135
P65-17-XLH-RR w/ Mount Pipe	C	From Leg	4.000		60.000	169.000	No Ice	11.704	8.938	0.092
(P)			0.000				1/2" Ice	12.424	10.450	0.174
			0.000				1" Ice	13.153	11.986	0.271

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	14.639	14.313	0.498
						4" Ice	17.906	19.144	1.125
AM-X-CD-16-65-00T-RET w/ Mount Pipe (P)	B	From Leg	4.000 0.000 0.000	30.000	169.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.074 0.136 0.210 0.385 0.874
AM-X-CD-16-65-00T-RET w/ Mount Pipe (P)	A	From Leg	4.000 0.000 0.000	30.000	169.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.074 0.136 0.210 0.385 0.874
(2) RBS 6601 (P)	C	From Leg	4.000 0.000 0.000	60.000	169.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.549 2.766 2.992 3.469 4.526	0.484 0.625 0.778 1.109 1.877	0.020 0.032 0.047 0.085 0.200
(2) RBS 6601 (P)	B	From Leg	4.000 0.000 0.000	30.000	169.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.549 2.766 2.992 3.469 4.526	0.484 0.625 0.778 1.109 1.877	0.020 0.032 0.047 0.085 0.200
(2) RBS 6601 (P)	A	From Leg	4.000 0.000 0.000	30.000	169.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.549 2.766 2.992 3.469 4.526	0.484 0.625 0.778 1.109 1.877	0.020 0.032 0.047 0.085 0.200
DC6-48-60-18-8F (P)	C	From Leg	4.000 0.000 0.000	0.000	167.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.798 3.038 3.543 4.658	4.317 4.596 4.885 5.488 6.797	0.019 0.050 0.085 0.167 0.383
4' x 2" Pipe Mount (E)	C	From Leg	4.000 0.000 0.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.866 1.111 1.365 1.901 3.228	0.866 1.111 1.365 1.901 3.228	0.015 0.022 0.032 0.062 0.161
4' x 2" Pipe Mount (E)	B	From Leg	4.000 0.000 0.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.866 1.111 1.365 1.901 3.228	0.866 1.111 1.365 1.901 3.228	0.015 0.022 0.032 0.062 0.161
4' x 2" Pipe Mount (E)	A	From Leg	4.000 0.000 0.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.866 1.111 1.365 1.901 3.228	0.866 1.111 1.365 1.901 3.228	0.015 0.022 0.032 0.062 0.161
Platform Mount [LP 601-1] (E)	C	None		0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.470 33.590 38.710 48.950 69.430	28.470 33.590 38.710 48.950 69.430	1.122 1.514 1.905 2.689 4.255
-									
(3) DB844H90E-XY w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	159.500	No Ice 1/2" Ice 1" Ice 2" Ice	3.536 4.033 4.522 5.535	5.158 6.026 6.770 8.314	0.036 0.076 0.125 0.243

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
						4" Ice	7.703	11.616	0.593
(3) DB844H90E-XY w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	159.500	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.536 4.033 4.522 5.535 7.703	5.158 6.026 6.770 8.314 11.616	0.036 0.076 0.125 0.243 0.593
(3) DB844H90E-XY w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	159.500	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.536 4.033 4.522 5.535 7.703	5.158 6.026 6.770 8.314 11.616	0.036 0.076 0.125 0.243 0.593
840 10054 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	30.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.413 5.833 6.263 7.156 9.093	2.385 2.917 3.466 4.614 7.316	0.051 0.086 0.128 0.230 0.533
840 10054 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	30.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.413 5.833 6.263 7.156 9.093	2.385 2.917 3.466 4.614 7.316	0.051 0.086 0.128 0.230 0.533
840 10054 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	30.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.413 5.833 6.263 7.156 9.093	2.385 2.917 3.466 4.614 7.316	0.051 0.086 0.128 0.230 0.533
URAS-FLEXIBLE (E)	C	From Leg	4.000 0.000 0.000	30.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.201
URAS-FLEXIBLE (E)	B	From Leg	4.000 0.000 0.000	30.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.201
URAS-FLEXIBLE (E)	A	From Leg	4.000 0.000 0.000	30.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.201
Horizon Compact (E)	C	From Leg	4.000 0.000 0.000	-40.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.841 0.966 1.099 1.392 2.082	0.429 0.525 0.629 0.863 1.435	0.012 0.018 0.026 0.048 0.122
Horizon Compact (E)	B	From Leg	4.000 0.000 0.000	24.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.841 0.966 1.099 1.392 2.082	0.429 0.525 0.629 0.863 1.435	0.012 0.018 0.026 0.048 0.122
Horizon Compact (E)	A	From Leg	4.000 0.000 0.000	17.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.841 0.966 1.099 1.392 2.082	0.429 0.525 0.629 0.863 1.435	0.012 0.018 0.026 0.048 0.122
Horizon Compact	A	From Leg	4.000	38.000	156.000	No Ice	0.841	0.429	0.012

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(E)			0.000			1/2" Ice	0.966	0.525	0.018
			0.000			1" Ice	1.099	0.629	0.026
						2" Ice	1.392	0.863	0.048
						4" Ice	2.082	1.435	0.122
Platform Mount [LP 601-1]	C	None		0.000	159.000	No Ice	28.470	28.470	1.122
(E)						1/2" Ice	33.590	33.590	1.514
						1" Ice	38.710	38.710	1.905
						2" Ice	48.950	48.950	2.689
						4" Ice	69.430	69.430	4.255
-									
Pipe Mount [PM 601-1]	C	From Leg	0.500	0.000	147.000	No Ice	3.000	0.900	0.065
(E)			0.000			1/2" Ice	3.740	1.120	0.079
			0.000			1" Ice	4.480	1.340	0.093
						2" Ice	5.960	1.780	0.122
						4" Ice	8.920	2.660	0.178
-									
Pipe Mount [PM 601-1]	C	From Leg	0.500	0.000	143.000	No Ice	3.000	0.900	0.065
(E)			0.000			1/2" Ice	3.740	1.120	0.079
			0.000			1" Ice	4.480	1.340	0.093
						2" Ice	5.960	1.780	0.122
						4" Ice	8.920	2.660	0.178
-									
PTP 400	B	From Leg	1.500	0.000	140.000	No Ice	2.040	0.530	0.010
(E)			0.000			1/2" Ice	2.240	0.650	0.020
			0.000			1" Ice	2.440	0.770	0.030
						2" Ice	2.840	1.010	0.050
						4" Ice	3.640	1.490	0.090
18" Standoff	B	From Leg	1.000	0.000	140.000	No Ice	0.380	0.950	0.010
(E)			0.000			1/2" Ice	0.480	1.210	0.020
			0.000			1" Ice	0.580	1.470	0.030
						2" Ice	0.780	1.990	0.050
						4" Ice	1.180	3.030	0.090
-									
18' Omni	A	From Leg	4.000	0.000	144.000	No Ice	5.400	5.400	0.020
(E)			0.000			1/2" Ice	7.233	7.233	0.059
			0.000			1" Ice	9.083	9.083	0.109
						2" Ice	12.833	12.833	0.245
						4" Ice	18.770	18.770	0.660
18' Omni	B	From Leg	4.000	0.000	144.000	No Ice	5.400	5.400	0.020
(E)			0.000			1/2" Ice	7.233	7.233	0.059
			0.000			1" Ice	9.083	9.083	0.109
						2" Ice	12.833	12.833	0.245
						4" Ice	18.770	18.770	0.660
6' Standoff	A	From Leg	1.000	0.000	135.000	No Ice	4.000	4.000	0.200
(E)			0.000			1/2" Ice	6.000	6.000	0.350
			0.000			1" Ice	8.000	8.000	0.500
						2" Ice	12.000	12.000	0.800
						4" Ice	20.000	20.000	1.400
6' Standoff	B	From Leg	1.000	0.000	135.000	No Ice	4.000	4.000	0.200
(E)			0.000			1/2" Ice	6.000	6.000	0.350
			0.000			1" Ice	8.000	8.000	0.500
						2" Ice	12.000	12.000	0.800
						4" Ice	20.000	20.000	1.400
-									
Platform Mount [LP 601-1]	C	None		0.000	130.000	No Ice	28.470	28.470	1.122
(E)						1/2" Ice	33.590	33.590	1.514
						1" Ice	38.710	38.710	1.905

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	48.950	48.950	2.689
						4" Ice	69.430	69.430	4.255
(2) DB980H90T2E-M w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	131.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.036 4.499 4.947 5.870 8.046	3.619 4.481 5.219 6.744 9.995	0.030 0.064 0.107 0.216 0.549
(2) DB980H90T2E-M w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	131.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.036 4.499 4.947 5.870 8.046	3.619 4.481 5.219 6.744 9.995	0.030 0.064 0.107 0.216 0.549
(2) DB980H90T2E-M w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	131.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.036 4.499 4.947 5.870 8.046	3.619 4.481 5.219 6.744 9.995	0.030 0.064 0.107 0.216 0.549
-									
742 213 (E)	C	From Leg	1.000 0.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.135 5.609 6.090 7.074 9.130	2.869 3.483 3.946 4.893 6.876	0.022 0.047 0.078 0.158 0.394
742 213 (E)	B	From Leg	1.000 0.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.135 5.609 6.090 7.074 9.130	2.869 3.483 3.946 4.893 6.876	0.022 0.047 0.078 0.158 0.394
742 213 (E)	A	From Leg	1.000 0.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.135 5.609 6.090 7.074 9.130	2.869 3.483 3.946 4.893 6.876	0.022 0.047 0.078 0.158 0.394
Pipe Mount [PM 501-3] (E)	A	From Leg	1.000 0.000 0.000	0.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.780 7.370 8.960 12.140 18.500	5.780 7.370 8.960 12.140 18.500	0.156 0.177 0.198 0.240 0.324
-									
GPS (E)	B	From Leg	2.000 0.000 0.000	0.000	79.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.175 0.238 0.309 0.477 0.918	0.175 0.238 0.309 0.477 0.918	0.000 0.002 0.005 0.014 0.053
GPS (E)	A	From Leg	2.000 0.000 0.000	0.000	79.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.175 0.238 0.309 0.477 0.918	0.175 0.238 0.309 0.477 0.918	0.000 0.002 0.005 0.014 0.053
2' Standoff (E)	B	From Leg	1.000 0.000 0.000	0.000	78.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.000 4.000 6.000 10.000 18.000	2.000 4.000 6.000 10.000 18.000	0.100 0.180 0.260 0.420 0.740
2' Standoff (E)	A	From Leg	1.000 0.000 0.000	0.000	78.000	No Ice 1/2" Ice 1" Ice	2.000 4.000 6.000	2.000 4.000 6.000	0.100 0.180 0.260

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	10.000	10.000	0.420
						4" Ice	18.000	18.000	0.740
_									
GPS	C	From Leg	2.000	0.000	52.000	No Ice	0.175	0.175	0.000
(E)			0.000			1/2" Ice	0.238	0.238	0.002
			0.000			1" Ice	0.309	0.309	0.005
						2" Ice	0.477	0.477	0.014
						4" Ice	0.918	0.918	0.053
3' Standoff	C	From Leg	1.000	0.000	50.000	No Ice	2.000	2.000	0.100
(E)			0.000			1/2" Ice	4.000	4.000	0.180
			0.000			1" Ice	6.000	6.000	0.260
						2" Ice	10.000	10.000	0.420
						4" Ice	18.000	18.000	0.740
_									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
3' Dish	C	Paraboloid	From	1.000	0.000		147.000	3.000	No Ice	7.070	0.050
(E)		w/Shroud (HP)	Leg	0.000					1/2" Ice	7.470	0.070
				0.000					1" Ice	7.860	0.090
									2" Ice	8.660	0.130
									4" Ice	10.250	0.210
_											
3' Dish	C	Paraboloid	From	1.000	10.000		143.000	3.000	No Ice	7.070	0.050
(E)		w/Radome	Leg	0.000					1/2" Ice	7.470	0.070
				0.000					1" Ice	7.860	0.090
									2" Ice	8.660	0.130
									4" Ice	10.250	0.210
_											
VHLP2.5	C	Paraboloid	From	4.000	-40.000		164.000	2.917	No Ice	6.681	0.048
(E)		w/Shroud (HP)	Leg	0.000					1/2" Ice	7.069	0.077
				0.000					1" Ice	7.456	0.106
									2" Ice	8.230	0.164
									4" Ice	9.779	0.280
VHLP2.5	B	Paraboloid	From	4.000	24.000		164.000	2.917	No Ice	6.681	0.048
(E)		w/Shroud (HP)	Leg	0.000					1/2" Ice	7.069	0.077
				0.000					1" Ice	7.456	0.106
									2" Ice	8.230	0.164
									4" Ice	9.779	0.280
VHLP2.5	A	Paraboloid	From	4.000	17.000		164.000	2.917	No Ice	6.681	0.048
(E)		w/Shroud (HP)	Leg	0.000					1/2" Ice	7.069	0.077
				0.000					1" Ice	7.456	0.106
									2" Ice	8.230	0.164
									4" Ice	9.779	0.280
VHLP2.5	A	Paraboloid	From	4.000	38.000		156.000	2.917	No Ice	6.681	0.048
(E)		w/Shroud (HP)	Leg	0.000					1/2" Ice	7.069	0.077
				0.000					1" Ice	7.456	0.106
									2" Ice	8.230	0.164
									4" Ice	9.779	0.280
_											

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	168 - 119.25	Pole	Max Tension	14	0.000	0.000	0.000
			Max. Compression	14	-20.529	-0.436	0.847
			Max. Mx	5	-9.069	-502.838	1.968
			Max. My	2	-9.004	0.812	525.228
			Max. Vy	5	16.609	-502.838	1.968
			Max. Vx	2	-16.989	0.812	525.228
			Max. Torque	8			-4.272
L2	119.25 - 78.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-29.424	-0.436	1.343
			Max. Mx	5	-15.598	-1250.968	9.384
			Max. My	2	-15.555	-5.405	1288.840

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	5	20.418	-1250.968	9.384
			Max. Vx	2	-20.796	-5.405	1288.840
			Max. Torque	8			-3.197
L3	78.5 - 38.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-42.025	-0.051	1.121
			Max. Mx	5	-25.130	-2109.926	16.219
			Max. My	2	-25.107	-11.474	2162.450
			Max. Vy	5	23.800	-2109.926	16.219
			Max. Vx	2	-24.175	-11.474	2162.450
			Max. Torque	8			-3.217
L4	38.75 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-57.686	0.445	0.834
			Max. Mx	5	-37.713	-3253.776	24.018
			Max. My	2	-37.713	-18.490	3322.912
			Max. Vy	5	26.980	-3253.776	24.018
			Max. Vx	2	-27.341	-18.490	3322.912
			Max. Torque	8			-3.273

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	57.686	-0.064	7.755
	Max. H_x	11	37.729	26.878	-0.123
	Max. H_z	2	37.729	-0.154	27.318
	Max. M_x	2	3322.912	-0.154	27.318
	Max. M_z	5	3253.776	-26.958	0.171
	Max. Torsion	2	2.786	-0.154	27.318
	Min. Vert	1	37.729	0.000	0.000
	Min. H_x	5	37.729	-26.958	0.171
	Min. H_z	8	37.729	0.077	-27.247
	Min. M_x	8	-3310.472	0.077	-27.247
	Min. M_z	11	-3242.941	26.878	-0.123
	Min. Torsion	8	-3.273	0.077	-27.247

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	37.729	0.000	0.000	-0.586	0.083	0.000
Dead+Wind 0 deg - No Ice	37.729	0.154	-27.318	-3322.912	-18.491	-2.786
Dead+Wind 30 deg - No Ice	37.729	13.414	-23.718	-2884.514	-1611.219	-2.703
Dead+Wind 60 deg - No Ice	37.729	23.292	-13.776	-1676.787	-2806.833	-2.384
Dead+Wind 90 deg - No Ice	37.729	26.958	-0.171	-24.017	-3253.776	-1.862
Dead+Wind 120 deg - No Ice	37.729	23.332	13.601	1656.205	-2816.930	0.359
Dead+Wind 150 deg - No Ice	37.729	13.201	23.717	2888.929	-1585.214	2.716
Dead+Wind 180 deg - No Ice	37.729	-0.077	27.247	3310.472	7.916	3.273
Dead+Wind 210 deg - No Ice	37.729	-13.394	23.618	2868.492	1609.761	2.797
Dead+Wind 240 deg - No Ice	37.729	-23.195	13.807	1681.459	2792.355	2.432
Dead+Wind 270 deg - No Ice	37.729	-26.878	0.123	14.614	3242.941	1.778
Dead+Wind 300 deg - No Ice	37.729	-23.232	-13.682	-1670.784	2803.352	-0.219

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 330 deg - No Ice	37.729	-13.258	-23.731	-2893.123	1595.254	-2.222
Dead+Ice+Temp	57.686	0.000	0.000	-0.834	0.445	-0.000
Dead+Wind 0 deg+Ice+Temp	57.686	0.064	-7.755	-984.477	-8.663	-0.498
Dead+Wind 30 deg+Ice+Temp	57.686	3.845	-6.743	-856.568	-483.365	-0.607
Dead+Wind 60 deg+Ice+Temp	57.686	6.650	-3.929	-500.323	-837.430	-0.679
Dead+Wind 90 deg+Ice+Temp	57.686	7.680	-0.068	-11.361	-967.871	-0.680
Dead+Wind 120 deg+Ice+Temp	57.686	6.635	3.841	485.936	-835.763	-0.191
Dead+Wind 150 deg+Ice+Temp	57.686	3.748	6.718	851.829	-469.184	0.410
Dead+Wind 180 deg+Ice+Temp	57.686	-0.045	7.737	979.606	6.745	0.627
Dead+Wind 210 deg+Ice+Temp	57.686	-3.840	6.718	850.785	483.811	0.635
Dead+Wind 240 deg+Ice+Temp	57.686	-6.626	3.936	499.921	834.475	0.690
Dead+Wind 270 deg+Ice+Temp	57.686	-7.660	0.056	7.276	965.876	0.653
Dead+Wind 300 deg+Ice+Temp	57.686	-6.610	-3.861	-491.365	833.064	0.223
Dead+Wind 330 deg+Ice+Temp	57.686	-3.762	-6.722	-854.568	472.611	-0.283
Dead+Wind 0 deg - Service	37.729	0.060	-10.671	-1299.908	-7.171	-1.096
Dead+Wind 30 deg - Service	37.729	5.240	-9.265	-1128.434	-630.035	-1.064
Dead+Wind 60 deg - Service	37.729	9.098	-5.381	-656.107	-1097.572	-0.940
Dead+Wind 90 deg - Service	37.729	10.531	-0.067	-9.774	-1272.342	-0.737
Dead+Wind 120 deg - Service	37.729	9.114	5.313	647.303	-1101.533	0.139
Dead+Wind 150 deg - Service	37.729	5.157	9.264	1129.404	-619.870	1.073
Dead+Wind 180 deg - Service	37.729	-0.030	10.643	1294.265	3.149	1.295
Dead+Wind 210 deg - Service	37.729	-5.232	9.226	1121.391	629.570	1.105
Dead+Wind 240 deg - Service	37.729	-9.060	5.393	657.162	1092.009	0.958
Dead+Wind 270 deg - Service	37.729	-10.499	0.048	5.329	1268.199	0.697
Dead+Wind 300 deg - Service	37.729	-9.075	-5.344	-653.766	1096.325	-0.089
Dead+Wind 330 deg - Service	37.729	-5.179	-9.270	-1131.814	623.913	-0.876

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-37.729	0.000	0.000	37.729	0.000	0.000%
2	0.154	-37.729	-27.318	-0.154	37.729	27.318	0.000%
3	13.414	-37.729	-23.718	-13.414	37.729	23.718	0.000%
4	23.292	-37.729	-13.776	-23.292	37.729	13.776	0.000%
5	26.958	-37.729	-0.171	-26.958	37.729	0.171	0.000%
6	23.332	-37.729	13.601	-23.332	37.729	-13.601	0.000%
7	13.201	-37.729	23.717	-13.201	37.729	-23.717	0.000%
8	-0.077	-37.729	27.247	0.077	37.729	-27.247	0.000%
9	-13.394	-37.729	23.618	13.394	37.729	-23.618	0.000%
10	-23.195	-37.729	13.807	23.195	37.729	-13.807	0.000%
11	-26.878	-37.729	0.123	26.878	37.729	-0.123	0.000%
12	-23.232	-37.729	-13.682	23.232	37.729	13.682	0.000%
13	-13.258	-37.729	-23.731	13.258	37.729	23.731	0.000%
14	0.000	-57.686	0.000	0.000	57.686	0.000	0.000%
15	0.064	-57.686	-7.754	-0.064	57.686	7.755	0.000%
16	3.845	-57.686	-6.743	-3.845	57.686	6.743	0.000%
17	6.650	-57.686	-3.928	-6.650	57.686	3.929	0.000%
18	7.680	-57.686	-0.068	-7.680	57.686	0.068	0.000%
19	6.635	-57.686	3.841	-6.635	57.686	-3.841	0.000%
20	3.748	-57.686	6.718	-3.748	57.686	-6.718	0.000%
21	-0.045	-57.686	7.737	0.045	57.686	-7.737	0.000%
22	-3.840	-57.686	6.718	3.840	57.686	-6.718	0.000%
23	-6.626	-57.686	3.936	6.626	57.686	-3.936	0.000%
24	-7.660	-57.686	0.056	7.660	57.686	-0.056	0.000%
25	-6.610	-57.686	-3.861	6.610	57.686	3.861	0.000%
26	-3.762	-57.686	-6.722	3.762	57.686	6.722	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
27	0.060	-37.729	-10.671	-0.060	37.729	10.671	0.000%
28	5.240	-37.729	-9.265	-5.240	37.729	9.265	0.000%
29	9.098	-37.729	-5.381	-9.098	37.729	5.381	0.000%
30	10.531	-37.729	-0.067	-10.531	37.729	0.067	0.000%
31	9.114	-37.729	5.313	-9.114	37.729	-5.313	0.000%
32	5.157	-37.729	9.264	-5.157	37.729	-9.264	0.000%
33	-0.030	-37.729	10.643	0.030	37.729	-10.643	0.000%
34	-5.232	-37.729	9.226	5.232	37.729	-9.226	0.000%
35	-9.060	-37.729	5.393	9.060	37.729	-5.393	0.000%
36	-10.499	-37.729	0.048	10.499	37.729	-0.048	0.000%
37	-9.075	-37.729	-5.344	9.075	37.729	5.344	0.000%
38	-5.179	-37.729	-9.270	5.179	37.729	9.270	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	0.00097430
3	Yes	5	0.00000001	0.00040460
4	Yes	5	0.00000001	0.00044615
5	Yes	4	0.00000001	0.00094052
6	Yes	5	0.00000001	0.00042899
7	Yes	5	0.00000001	0.00040036
8	Yes	5	0.00000001	0.00004991
9	Yes	5	0.00000001	0.00044816
10	Yes	5	0.00000001	0.00040947
11	Yes	4	0.00000001	0.00058602
12	Yes	5	0.00000001	0.00042612
13	Yes	5	0.00000001	0.00044684
14	Yes	4	0.00000001	0.00000001
15	Yes	5	0.00000001	0.00024791
16	Yes	5	0.00000001	0.00031014
17	Yes	5	0.00000001	0.00031472
18	Yes	5	0.00000001	0.00024332
19	Yes	5	0.00000001	0.00030452
20	Yes	5	0.00000001	0.00030381
21	Yes	5	0.00000001	0.00024609
22	Yes	5	0.00000001	0.00031154
23	Yes	5	0.00000001	0.00030668
24	Yes	5	0.00000001	0.00024192
25	Yes	5	0.00000001	0.00030833
26	Yes	5	0.00000001	0.00030900
27	Yes	4	0.00000001	0.00024320
28	Yes	5	0.00000001	0.00004113
29	Yes	5	0.00000001	0.00004956
30	Yes	4	0.00000001	0.00018820
31	Yes	5	0.00000001	0.00004570
32	Yes	4	0.00000001	0.00099986
33	Yes	4	0.00000001	0.00030099
34	Yes	5	0.00000001	0.00005045
35	Yes	5	0.00000001	0.00004185
36	Yes	4	0.00000001	0.00015417
37	Yes	5	0.00000001	0.00004505
38	Yes	5	0.00000001	0.00005011

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	168 - 119.25	40.823	27	2.169	0.015
L2	123.5 - 78.5	21.940	27	1.762	0.005
L3	83.75 - 38.75	9.800	27	1.104	0.002
L4	45 - 0	2.865	27	0.580	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
174.000	12' Omni	27	40.823	2.169	0.015	30554
169.000	P65-17-XLH-RR w/ Mount Pipe	27	40.823	2.169	0.015	30554
168.000	(2) 800 10121 w/ Mount Pipe	27	40.823	2.169	0.015	30554
167.000	DC6-48-60-18-8F	27	40.373	2.162	0.015	30554
164.000	VHLP2.5	27	39.023	2.142	0.014	30554
160.000	840 10054 w/ Mount Pipe	27	37.227	2.114	0.013	19096
159.500	(3) DB844H90E-XY w/ Mount Pipe	27	37.003	2.110	0.013	17972
159.000	Platform Mount [LP 601-1]	27	36.780	2.107	0.013	16974
156.000	VHLP2.5	27	35.442	2.085	0.012	12730
147.000	3' Dish	27	31.488	2.015	0.010	7274
144.000	18' Omni	27	30.197	1.989	0.009	6364
143.000	3' Dish	27	29.770	1.980	0.009	6109
140.000	PTP 400	27	28.502	1.952	0.008	5455
135.000	6' Standoff	27	26.434	1.902	0.007	4628
131.000	(2) DB980H90T2E-M w/ Mount Pipe	27	24.826	1.857	0.007	4127
130.000	Platform Mount [LP 601-1]	27	24.431	1.846	0.006	4018
120.000	742 213	27	20.658	1.712	0.005	3467
79.000	GPS	27	8.690	1.030	0.002	3823
78.000	2' Standoff	27	8.466	1.015	0.002	3813
52.000	GPS	27	3.752	0.667	0.001	3576
50.000	3' Standoff	27	3.482	0.642	0.001	3559

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	168 - 119.25	104.150	2	5.535	0.039
L2	123.5 - 78.5	56.014	2	4.499	0.014
L3	83.75 - 38.75	25.036	2	2.819	0.005
L4	45 - 0	7.322	2	1.481	0.002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
174.000	12' Omni	2	104.150	5.535	0.039	12161
169.000	P65-17-XLH-RR w/ Mount Pipe	2	104.150	5.535	0.039	12161
168.000	(2) 800 10121 w/ Mount Pipe	2	104.150	5.535	0.039	12161
167.000	DC6-48-60-18-8F	2	103.002	5.518	0.039	12161
164.000	VHLP2.5	2	99.561	5.465	0.037	12161
160.000	840 10054 w/ Mount Pipe	2	94.985	5.394	0.034	7600
159.500	(3) DB844H90E-XY w/ Mount Pipe	2	94.415	5.385	0.034	7153
159.000	Platform Mount [LP 601-1]	2	93.845	5.376	0.033	6755
156.000	VHLP2.5	2	90.435	5.321	0.031	5066
147.000	3' Dish	2	80.357	5.142	0.026	2893
144.000	18' Omni	2	77.065	5.077	0.024	2530
143.000	3' Dish	2	75.978	5.054	0.023	2429
140.000	PTP 400	2	72.746	4.983	0.021	2168
135.000	6' Standoff	2	67.473	4.854	0.019	1838
131.000	(2) DB980H90T2E-M w/ Mount Pipe	2	63.373	4.741	0.017	1639
130.000	Platform Mount [LP 601-1]	2	62.366	4.711	0.016	1595
120.000	742 213	2	52.745	4.371	0.012	1374
79.000	GPS	2	22.202	2.631	0.005	1504
78.000	2' Standoff	2	21.628	2.593	0.005	1500
52.000	GPS	2	9.588	1.705	0.003	1402
50.000	3' Standoff	2	8.898	1.641	0.003	1395

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	168 - 119.25 (1)	TP34.288x24x0.25	48.750	0.000	0.0	39.0000	26.298	-9.004	1025.600	0.009
L2	119.25 - 78.5 (2)	TP42.387x32.891x0.281	45.000	0.000	0.0	39.0000	36.605	-15.555	1427.590	0.011
L3	78.5 - 38.75 (3)	TP50.213x40.717x0.375	45.000	0.000	0.0	39.0000	57.750	-25.107	2252.240	0.011
L4	38.75 - 0 (4)	TP57.64x48.144x0.375	45.000	0.000	0.0	38.7052	68.160	-37.712	2638.140	0.014

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	168 - 119.25 (1)	TP34.288x24x0.25	525.229	29.2981	39.0000	0.751	0.000	0.0000	39.0000	0.000
L2	119.25 - 78.5 (2)	TP42.387x32.891x0.281	1288.850	41.7235	39.0000	1.070	0.000	0.0000	39.0000	0.000
L3	78.5 - 38.75 (3)	TP50.213x40.717x0.375	2162.483	37.5267	39.0000	0.962	0.000	0.0000	39.0000	0.000
L4	38.75 - 0 (4)	TP57.64x48.144x0.375	3322.967	41.3477	38.7052	1.068	0.000	0.0000	38.7052	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	168 - 119.25 (1)	TP34.288x24x0.25	16.989	0.6460	26.0000	0.050	2.708	0.0737	26.0000	0.003
L2	119.25 - 78.5 (2)	TP42.387x32.891x0.281	20.797	0.5681	26.0000	0.044	2.700	0.0427	26.0000	0.002
L3	78.5 - 38.75 (3)	TP50.213x40.717x0.375	24.176	0.4186	26.0000	0.032	2.730	0.0231	26.0000	0.001
L4	38.75 - 0 (4)	TP57.64x48.144x0.375	27.341	0.4011	26.0000	0.031	2.786	0.0169	26.0000	0.001

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	168 - 119.25 (1)	0.009	0.751	0.000	0.050	0.003	0.761 ✔	1.333	H1-3+VT ✔
L2	119.25 - 78.5 (2)	0.011	1.070	0.000	0.044	0.002	1.081 ✔	1.333	H1-3+VT ✔
L3	78.5 - 38.75 (3)	0.011	0.962	0.000	0.032	0.001	0.974 ✔	1.333	H1-3+VT ✔
L4	38.75 - 0 (4)	0.014	1.068	0.000	0.031	0.001	1.083 ✔	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	168 - 119.25	Pole	TP34.288x24x0.25	1	-9.004	1367.125	57.1	Pass
L2	119.25 - 78.5	Pole	TP42.387x32.891x0.281	2	-15.555	1902.977	81.1	Pass
L3	78.5 - 38.75	Pole	TP50.213x40.717x0.375	3	-25.107	3002.236	73.0	Pass
L4	38.75 - 0	Pole	TP57.64x48.144x0.375	4	-37.712	3516.640	81.2	Pass
						Summary		
						Pole (L4)	81.2	Pass
						RATING =	**81.2**	**Pass**

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

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

Site Data

Site#: *14489*
Site Name: *WindsorDay Hill, CT*
County #: *Hartford*

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	65	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	63	in
Thick:	3.25	in
Grade:	55	ksi
Clip Distance:	16	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:		**
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	57.64	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	3323	ft-kips
Unfactored Axial, P:	38	kips
Unfactored Shear, V:	27	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	151.0 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	77.5% Pass

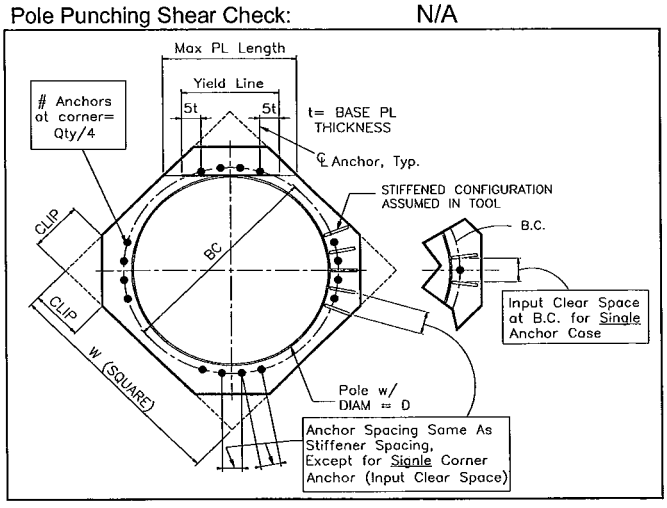
Base Plate Results	Flexural Check
Base Plate Stress:	33.0 ksi
Allowable PL Bending Stress:	55.0 ksi
Base Plate Stress Ratio:	60.1% Pass

N/A - Unstiffened
Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

Analysis date: 4/30/2012

CAISSON Version 10.35 8:57:42 AM Monday, April 30, 2012
B&T Engineering

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Project Title: 84437.001 - WindsorDay Hill, CT (Site# 14489)
Project Notes: 168' Summit Monopole- 8' Dia, 24.5' Depth (24' Bearing)

Calculation Method: Full 8CD

******* I N P U T D A T A

Pier Properties

Diameter (ft)	Distance of Top of Pier above Ground (ft)	Concrete Strength (ksi)	Steel Yield Strength (ksi)
8.00	0.50		

Soil Properties

Layer	Type	Thickness (ft)	Depth at Top of Layer (ft)	Density (lbs/ft^3)	CU (psf)	KP	PHI (deg)
1	Sand	5.00	0.00	110.0		1.000	
2	Sand	5.00	5.00	60.0		3.690	35.00
3	Sand	5.00	10.00	55.0		3.390	32.98
4	Sand	2.00	15.00	80.0		4.600	40.01
5	Clay	15.00	17.00	95.0	20000.0		

Design (Factored) Loads at Top of Pier

Moment (ft-k)	Axial Load (kips)	Shear Load (kips)	Additional Safety Factor Against Soil Failure
3323.0	38.0	27.00	2.00

******* R E S U L T S

Calculated Pier Properties

Length (ft)	Weight (kips)	End Bearing Pressure (psf)
20.000	150.796	756.0

20.0 FT < 24.5 FT => DESIGN OK

Ultimate Resisting Forces Along Pier

Type	Distance of Top of Layer to Top of Pier (ft)	Thickness (ft)	Density (lbs/ft^3)	CU (psf)	KP	Force (kips)	Arm (ft)
Sand	0.50	5.00	110.0		1.000	33.00	3.83
Sand	5.50	5.00	60.0		3.690	309.96	8.18
Sand	10.50	5.00	55.0		3.390	401.72	13.12
Sand	15.50	2.00	80.0		4.600	266.06	16.52
Clay	17.50	0.88	95.0	20000.0		1121.87	17.94
Clay	18.38	1.62	95.0	20000.0		-2078.12	19.19

Shear and Moments Along Pier

Distance below Top of Pier (ft)	Shear (with Safety Factor) (kips)	Moment (with Safety Factor) (ft-k)	Shear (without Safety Factor) (kips)	Moment (without Safety Factor) (ft-k)
0.00	54.5	7424.7	27.2	3712.3
2.00	51.5	7532.2	25.8	3766.1
4.00	38.3	7623.8	19.2	3811.9
6.00	-3.5	7673.9	-1.8	3837.0
8.00	-116.9	7557.1	-58.4	3778.5
10.00	-251.5	7192.2	-125.7	3596.1
12.00	-397.2	6544.3	-198.6	3272.1
14.00	-557.9	5592.1	-279.0	2796.0
16.00	-753.4	4296.5	-376.7	2148.2
18.00	-1596.2	2378.6	-798.1	1189.3
20.00	0.0	0.0	0.0	0.0

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#: *14489*
Site Name: *WindsorDay Hill, CT*
App #: *****

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	3837	ft-kips (* Note)
Max. Service Shaft P:	38	kips
Max Axial Force Type:	Comp.	

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

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

Load Factor	Shaft Factored Loads		
1.30	Mu:	4988.1	ft-kips
1.30	Pu:	49.4	kips

Pier Properties

Concrete:

Pier Diameter =	8.0	ft
Concrete Area =	7238.2	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	7.11	ft
Vert. Cage Diameter =	85.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	24	
As Total=	37.44	in^2
A s/ Aconc, Rho:	0.0052	0.52%

Material Properties		
Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	
ACI 318 Code		
Select Analysis ACI Code=	2008	
Seismic Properties		
Seismic Design Category =	D	
Seismic Risk =	**High**	

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

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

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

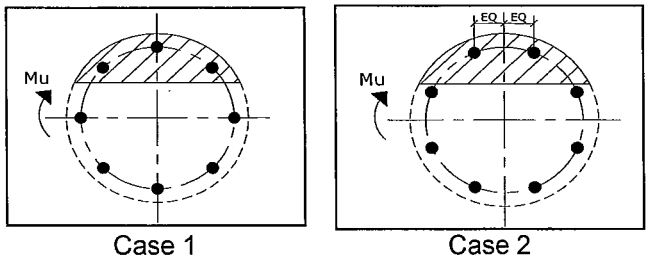
Min As:	0.0100	**1.00%**

Minimum Rho Check:

Actual Req'd Min. Rho:	0.50%	Flexural
Provided Rho:	0.52%	OK

Results:

Governing Orientation Case: **2**



Case 1 Case 2

Dist. From Edge to Neutral Axis:	**14.71**	in
Extreme Steel Strain, ϵt:	**0.0154**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor, φ:	**0.900**	

<-- Comment Box

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	10716.37	kips
at Mu=(ϕ=0.65)Mn=	7467.49	ft-kips
Max Tu, (φ=0.9) Tn =	2021.76	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	49.40	kips
Drilled Shaft Moment Capacity, φMn:	**6864.27**	ft-kips
Drilled Shaft Superimposed Mu:	**4988.10**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**72.67%**

Hill

le, P.E.

	Statement in COL A is Correct	from Col A	N/A	Alternate Value / Concept Used	Explanation	Yes	No	N/A	Comme
	X								
e notation of WERS in G e" Test eded. This 5%									
mum tension / er Failures red Tensions			X						
n. NOTE that to allow	X								
			X		Monopole; Shaft = 65 ksi				
ontals))			X		Monopole				
			X						
			X						
			X		Monopole				
opriate PER			X						
atform			X						

ill only be hods will not									
als: Effective									
ill only be hods will not									
ill only be hods will not									

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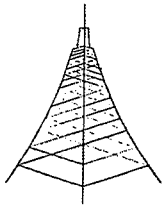
Letter of Explanation (LOE)
MUST be attached to any Structural Analysis



Site Name	Windsorday Hill
Site Number	14489-A
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		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		Monopole				

ill only be hods will not									
als: Effective									
ill only be hods will not									
ill only be hods will not									

PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS
SITE ADDRESS:	99 DAY HILL ROAD WINDSOR, CT 06095
LATITUDE:	41.87109 N 41° 52' 15.93" N
LONGITUDE:	72.67059 W 72° 40' 14.16" W
JURISDICTION:	NATIONAL, STATE & LOCAL CODES OR ORDINANCES
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

at&t

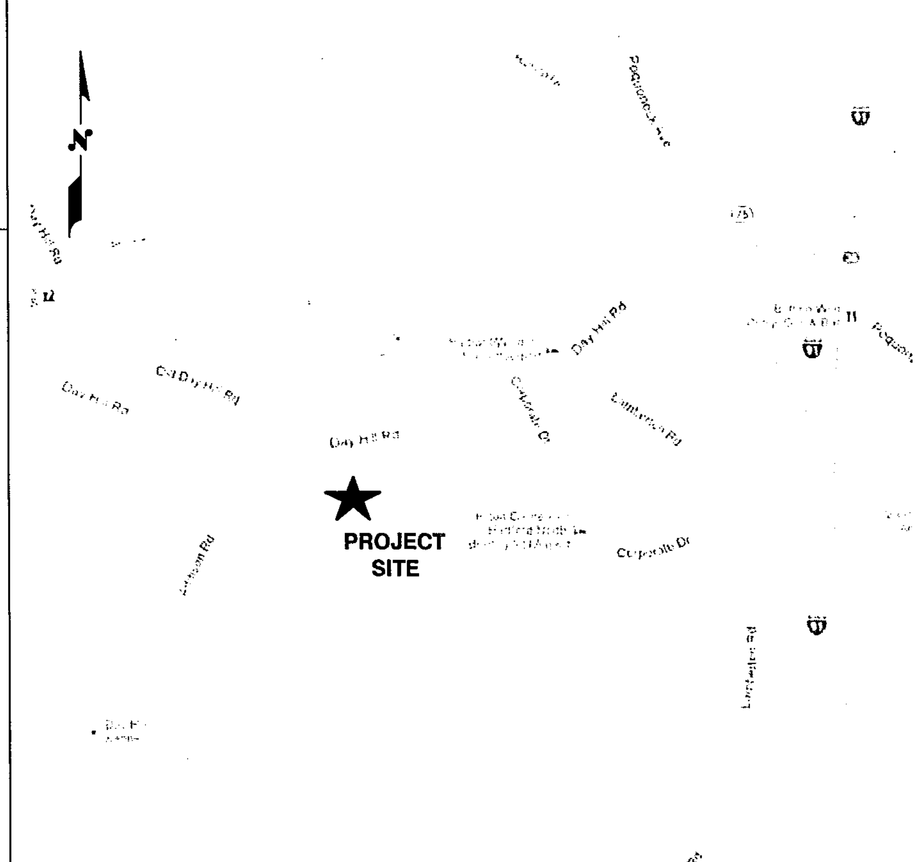
SITE NUMBER: CT5139
SITE NAME: WINDSOR - DAY HILL

DRAWING INDEX

		REV
T-1	TITLE SHEET	2
GN-1	GENERAL NOTES	2
A-1	COMPOUND & EQUIPMENT PLAN	2
A-2	ANTENNA PLAN AND ELEVATION	2
A-3	DETAILS	2
G-1	PLUMBING DIAGRAM & GROUNDING DETAILS	2

VICINITY MAP

DIRECTIONS TO SITE:
HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD. 0.3 MILES. TURN LEFT ONTO CAPITAL BLVD. 0.3 MILES. TURN LEFT ONTO WEST ST. 0.2 MILES. TURN LEFT TO MERGE ONTO I-91 N TOWARD HARTFORD. 17.1 MILES. TAKE EXIT 38 FOR CT-75 TOWARD POQUONOCK. 0.4 MILES. TURN RIGHT ONTO CT-75 N/POQUONOCK AVE. 0.3 MILES. EXIT ONTO DAY HILL RD TOWARD SUNMERWIND. 0.6 MILES. MAKE A U-TURN. DESTINATION WILL BE ON THE RIGHT.



GENERAL NOTES

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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

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1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
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SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JG

STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24176 · LICENSED PROFESSIONAL ENGINEER

AT&T
TITLE SHEET
(LTE)

JOB NUMBER	DRAWING NUMBER	REV
[illegible].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		
EGR	EQUIPMENT GROUND RING	REQ'D	REQUIRED	TYP	TYPICAL

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

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500 ENTERPRISE DRIVE, SUITE 3A
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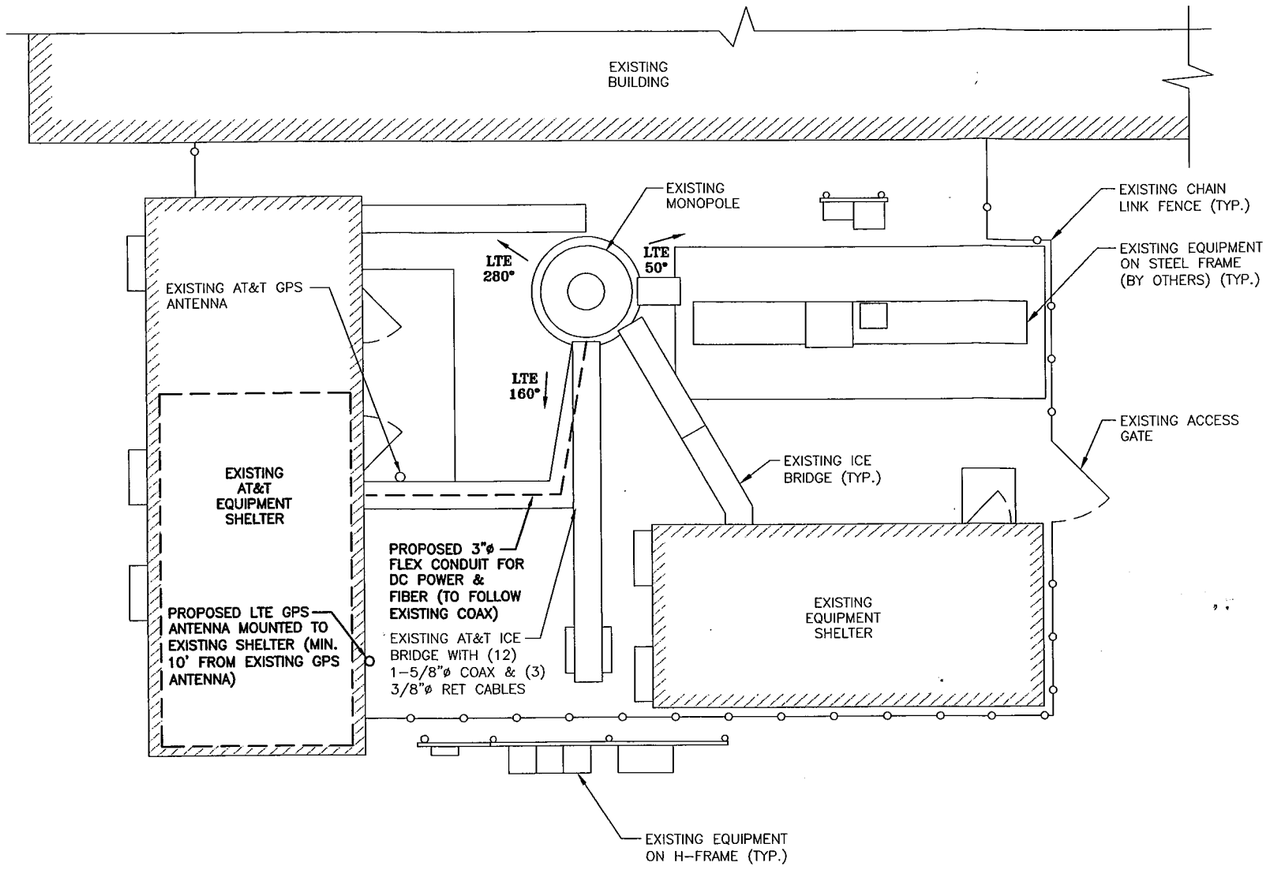
SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JG

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

AT&T

GENERAL NOTES (LTE)

JOB NUMBER	DRAWING NUMBER	REV
39.01	GN-1	2



COMPOUND PLAN

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

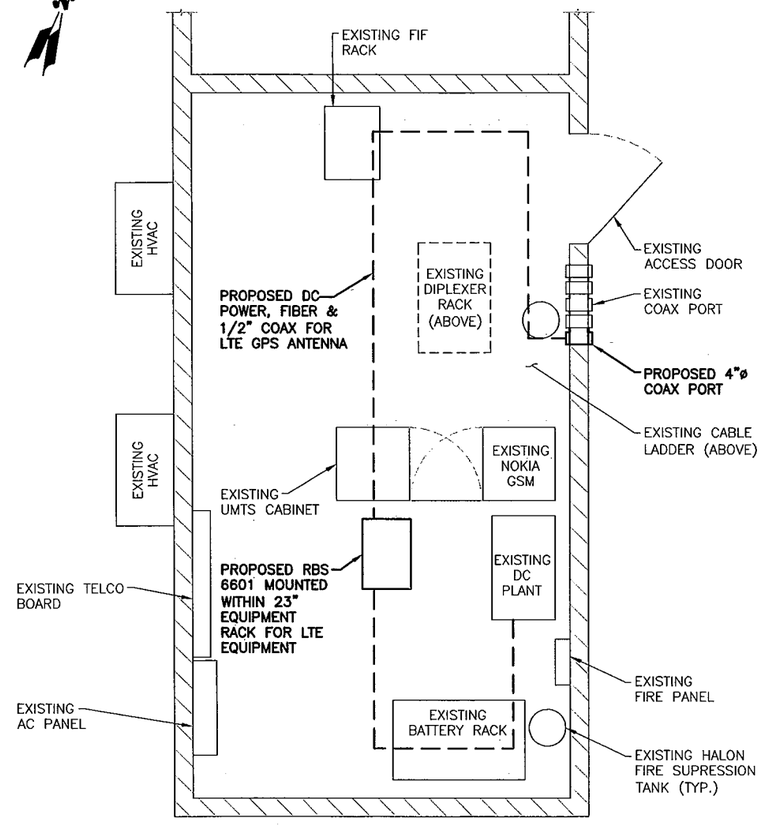
0 2'-0" 4'-0" 8'-0" 12'-0"

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.



EQUIPMENT PLAN

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

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

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

STATE OF CONNECTICUT
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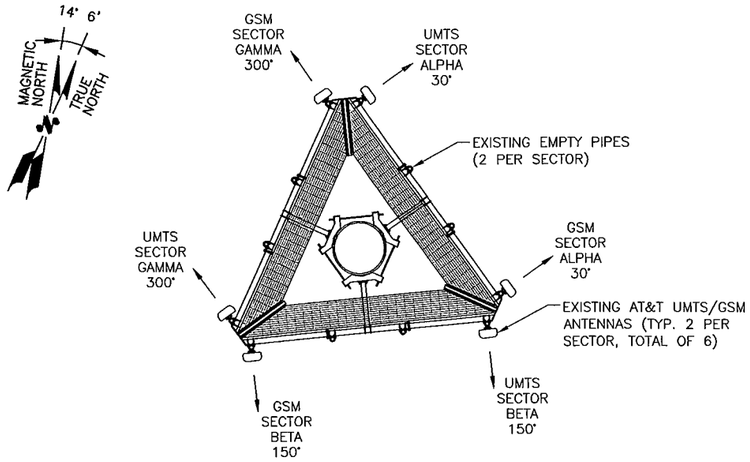
AT&T

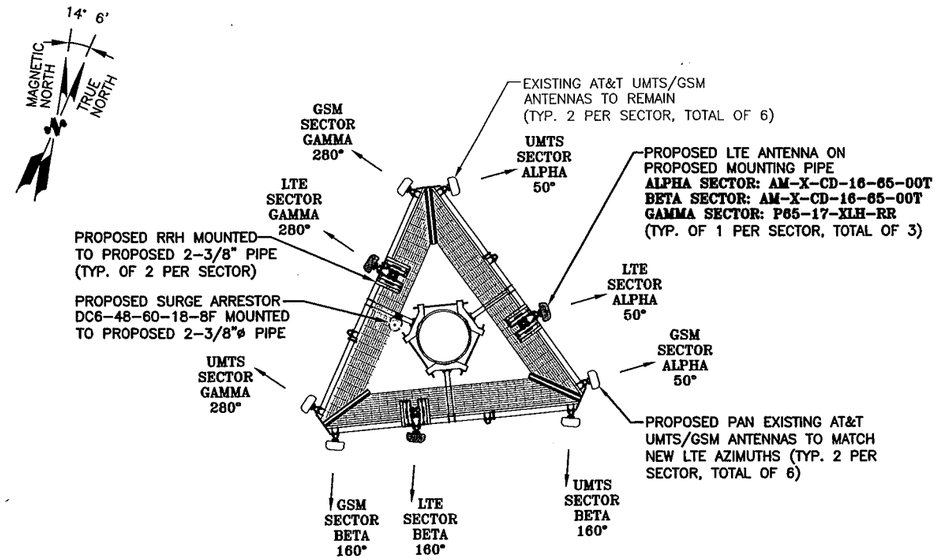
COMPOUND & EQUIPMENT PLAN (LTE)

JOB NUMBER	DRAWING NUMBER	REV
39.01	A-1	2



EXISTING GSM/UMTS ANTENNA PLAN

SCALE: N.T.S.



PROPOSED LTE ANTENNA PLAN

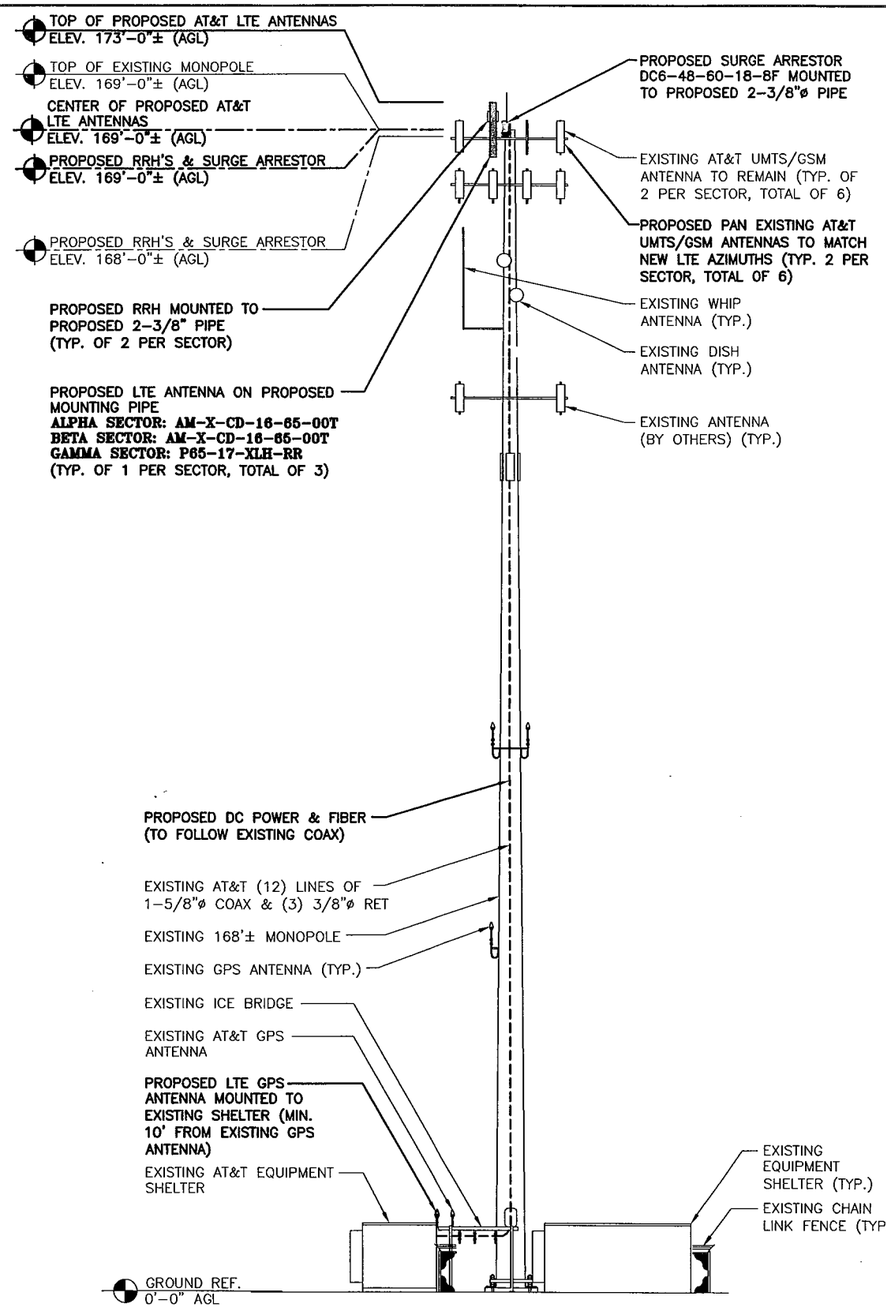
SCALE: N.T.S.

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.



SOUTH ELEVATION

SCALE: 3/32"=1'-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: CT5139
SITE NAME: WINDSOR - DAY HILL

99 DAY HILL ROAD
WINDSOR, CT 06095
HARTFORD COUNTY

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

NO.	DATE	REVISIONS	BY	CHK'D
2	05/31/12	CONSTRUCTION REVISED	NB	DC
1	04/19/12	ISSUED FOR CONSTRUCTION	DB	DC
0	04/13/12	ISSUED FOR REVIEW	JS	DC

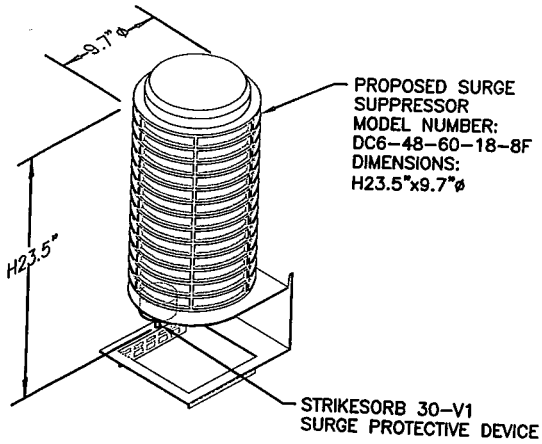
SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JS

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

AT&T

ANTENNA PLAN AND ELEVATION (LTE)

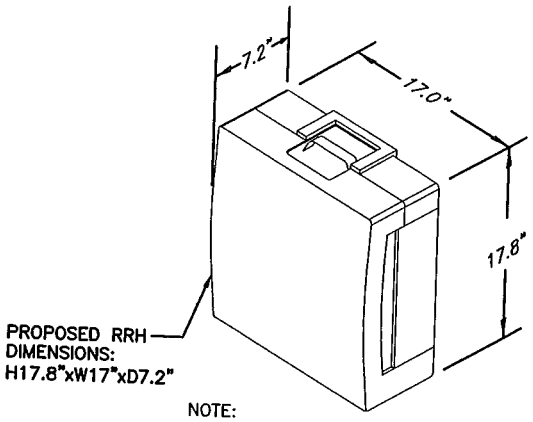
JOB NUMBER	DRAWING NUMBER	REV
3199.01	A-2	2



NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

DC SURGE SUPPRESSOR DETAIL

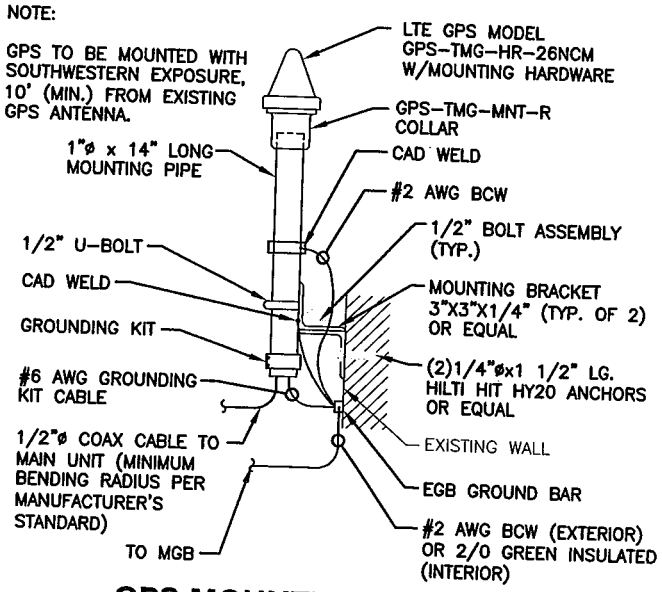
SCALE: N.T.S.



NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

RRH DETAIL

SCALE: N.T.S.



GPS MOUNTING DETAIL

SCALE: N.T.S.

at&t

DRIVE, SUITE 3A
-, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APPD
2	05/31/12	CONSTRUCTION REVISED	NB	DC	
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0	04/13/12	ISSUED FOR REVIEW	JG	DC	

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

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

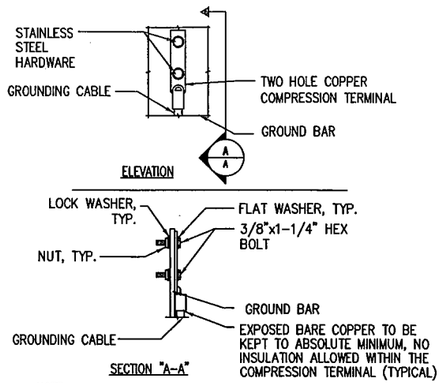
AT&T

DETAILS (LTE)

JOB NUMBER 11.01

DRAWING NUMBER A-3

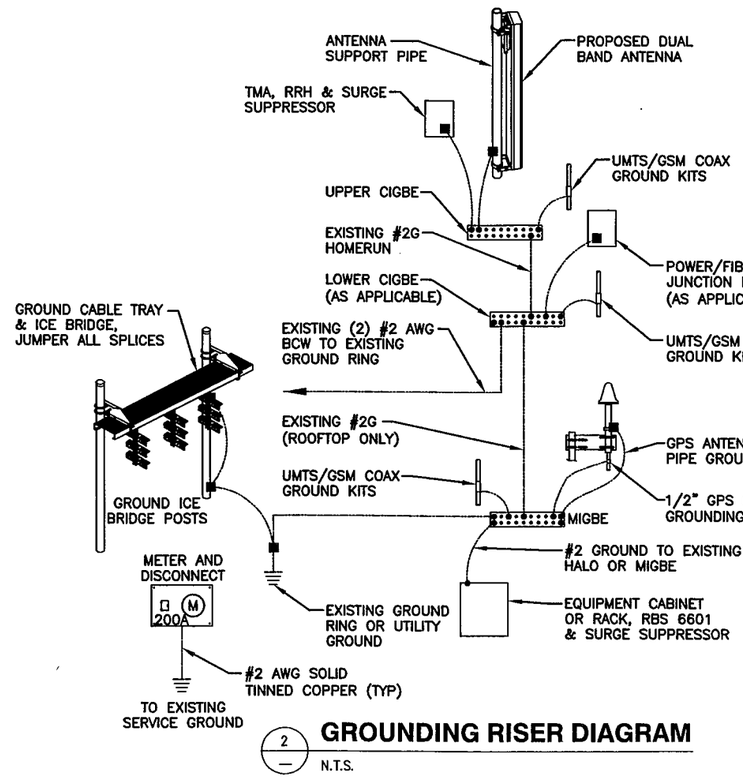
REV 2



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.

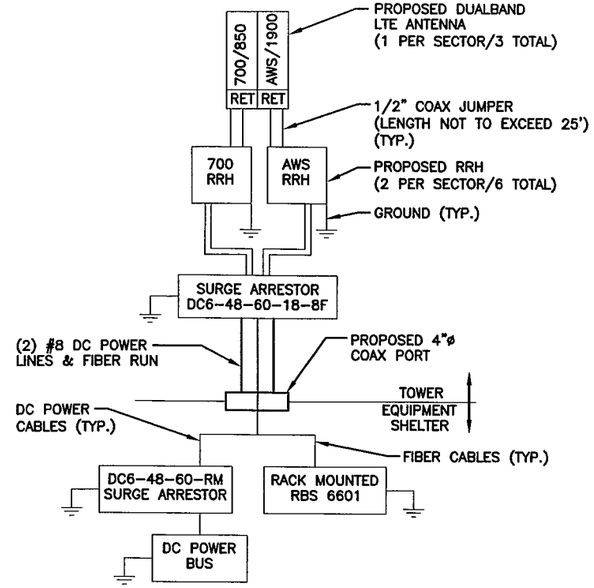
1 TYPICAL GROUND BAR CONNECTION DETAIL

N.T.S.



2 GROUNDING RISER DIAGRAM

N.T.S.



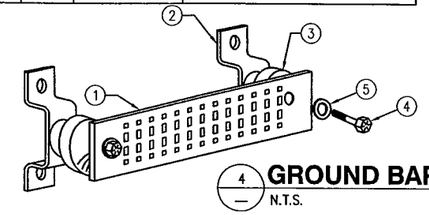
NOTES:

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

3 PLUMBING DIAGRAM

N.T.S.

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



4 GROUND BAR - DETAIL

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)

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

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

AT&T

PLUMBING DIAGRAM & GROUNDING DETAILS (LTE)

JOB NUMBER	DRAWING NUMBER	REV
5139.01	G-1	2